REAR AXLE - 198RII

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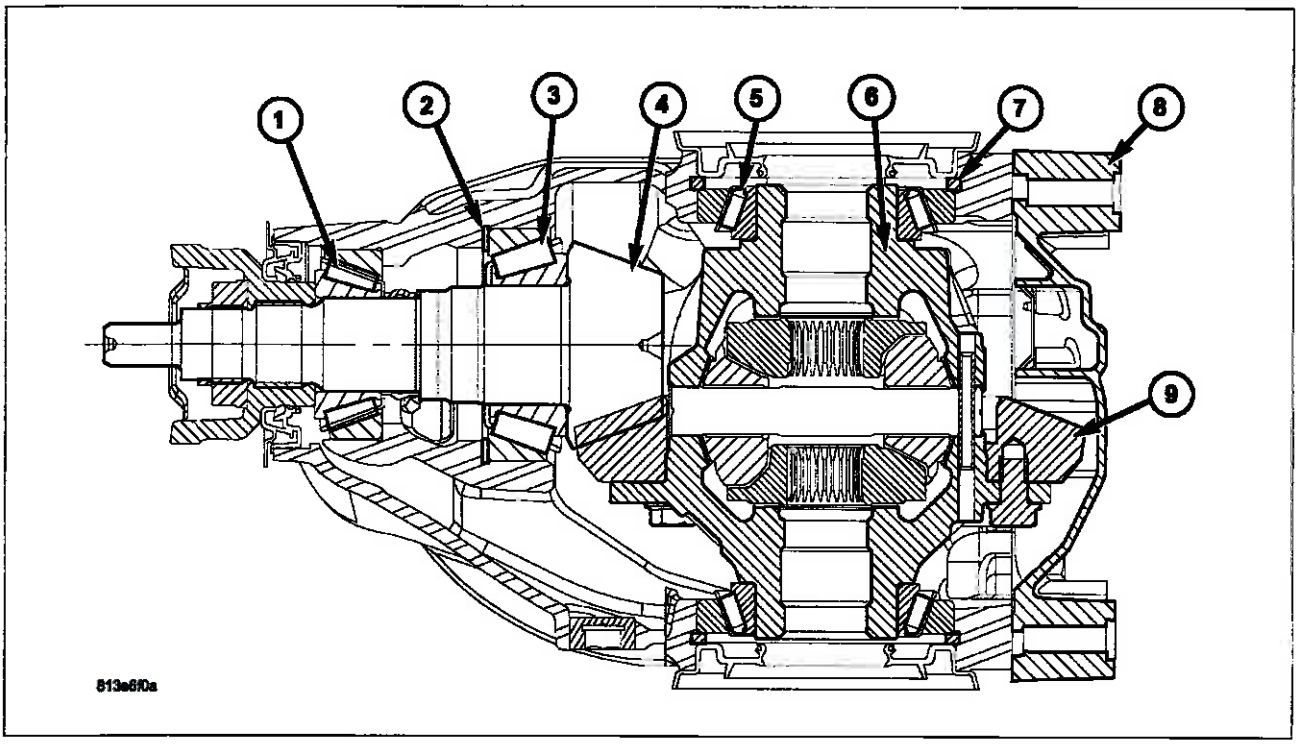
REAR AXLE - 198RII

DESCRIPTION

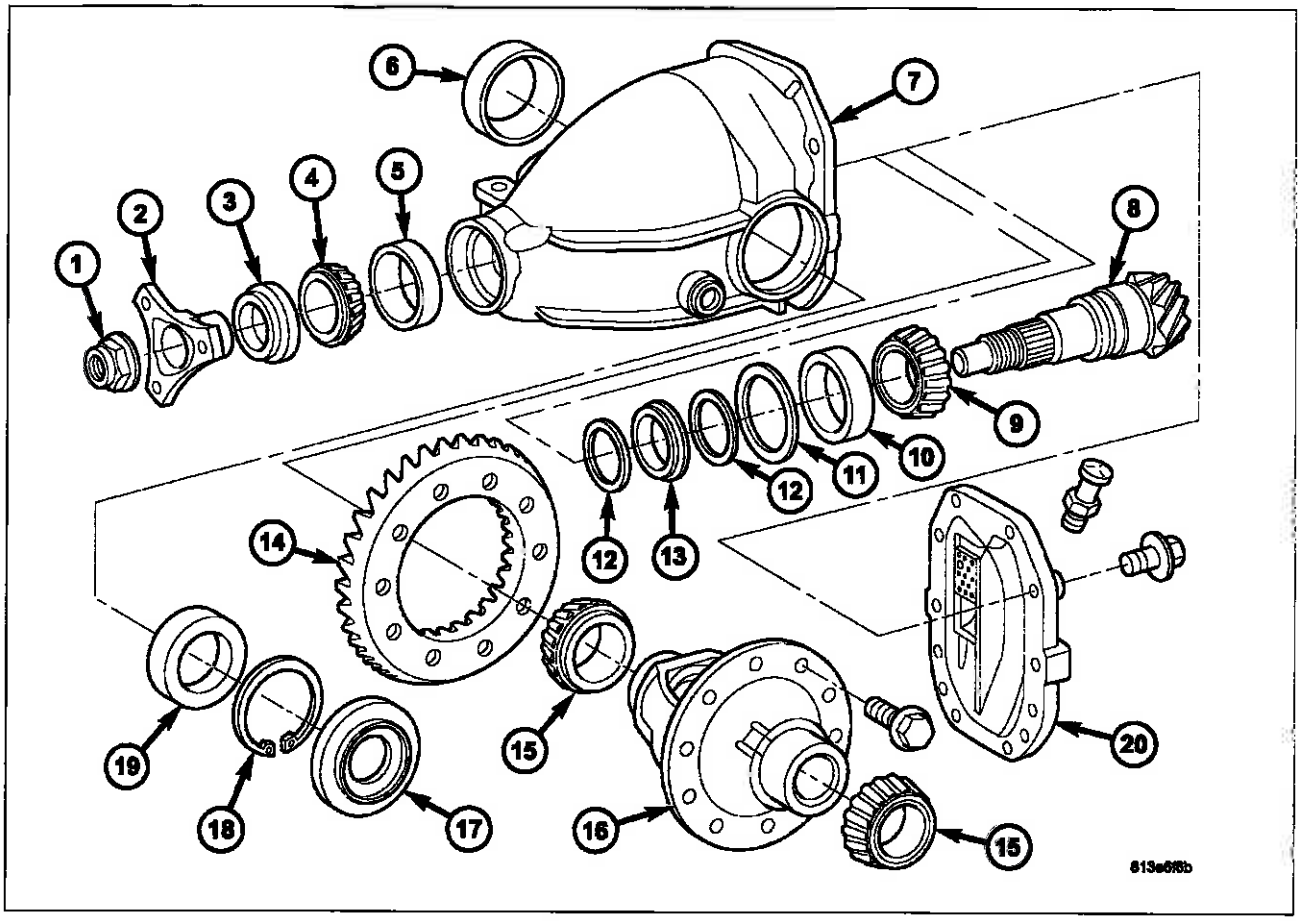


198/210 MM RII Axle Section View

1 - BEARING, PINION TAIL
2 - SHIM, PINION DEPTH
3 - BEARING, PINION HEAD
4 - GEAR/SHAFT, PINION
5 - BEARING, DIFFERENTIAL SIDE
6 - DIFFERENTIAL
7 - RING, SNAP
8 - COVER, AXLE
9 - GEAR, RING

The 198 MM RII (Rear-Independent-Iron) axle is an independent assembly with a cast iron housing and differential. The 198 MM RII uses an open differential which is supported by two tapered roller bearings located on either side of the case. Differential bearing preload and ring gear backlash are controlled with select snap-rings located on the outside of the differential bearing cups. Pinion height is set with a select shim located under the rear pinion bearing cup.

The 198 axle is available only in V6 engine-equipped models in three available gear ratios: 3.08, 3.64 & 3.90:1.



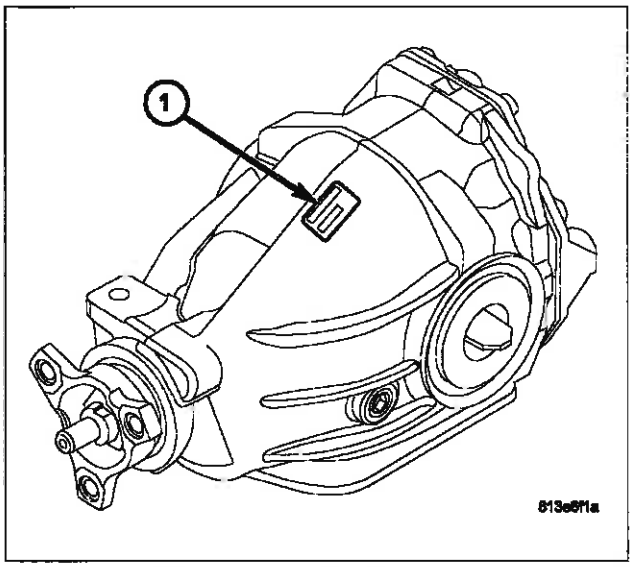
198/210 Axle Components

1 - NUT, PINION FLANGE
2 - FLANGE, PINION
3 - SEAL, PINION
4 - CONE, PINION TAIL BEARING
5 - CUP, PINION TAIL BEARING
6 - CUP, DIFFERENTIAL SIDE BEARING
7 - HOUSING, AXLE
8 - GEAR/SHAFT, PINION
9 - CONE, PINION HEAD BEARING
10 - CUP, PINION HEAD BEARING
11 - SHIM, PINION DEPTH
12 - WASHER (2)
13 - SPACER, COLLAPSIBLE
14 - GEAR, RING
15 - CONE, DIFFERENTIAL SIDE BEARING
16 - DIFFERENTIAL
17 - SEAL, AXLE
18 - RING, SNAP
19 - CUP, DIFFERENTIAL SIDE BEARING
20 - COVER, AXLE HOUSING

AXLE IDENTIFICATION

The 198 MM axle utilizes a barcoded label (1) which is adhered to the top of the axle housing as shown. The following information is found on the identification label:

- Traceability Code (Plant Use)
- Axle Part Number
- Axle Gear Ratio



198 Axle Identification Label

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

BEARING NOISE

The differential and pinion bearings can 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.

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

All driveline components should be examined before starting any repair.

DRIVELINE SNAP

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

- High engine idle speed.
- Transmission shift operation.
- Loose engine/transmission/transfer case mounts.
- Worn U-joints or CV joints.
- Worn or broken axle mount isolators.
- 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

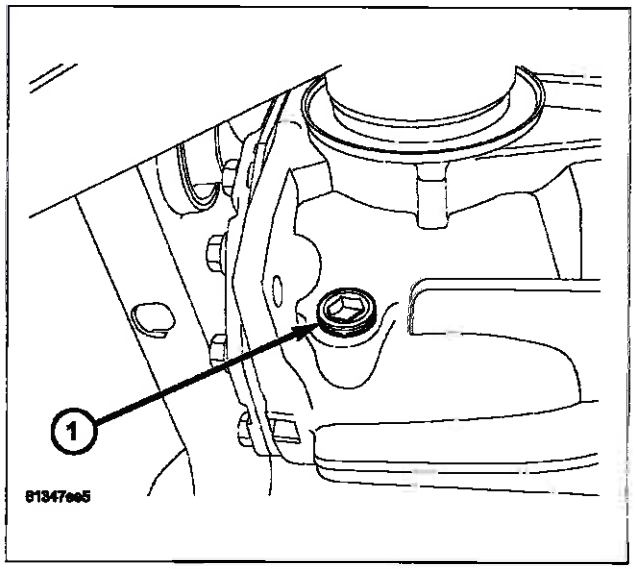
CONDITION	POSSIBLE CAUSE	CORRECTION
Wheel Noise	1. Wheel loose.	1. Tighten loose nuts.
	2. Faulty, brinelled wheel bearing.	2. Replace bearing.
Differential Cracked	1. Improper differential side bearing preload.	1. Replace case and inspect gears and bearings for further damage. Set differential bearing preload properly.
	2. Excessive ring gear backlash.	2. Replace case and inspect gears and bearings for further damage. Set ring gear backlash properly.
	3. Vehicle overloaded.	3. Replace case and inspect gears and bearings for further damage. Avoid excessive vehicle weight.
Differential Gears Scored	1. Insufficient lubrication.	1. Replace scored gears. Fill differential with the correct fluid type and quantity.
	2. Improper grade of lubricant.	2. Replace scored gears. Fill differential with the proper fluid type and quantity.
	3. Excessive spinning of one wheel/tire.	3. Replace scored gears. Inspect all gears, pinion bores, and shaft for damage. Service as necessary.
Loss Of Lubricant	1. Lubricant level too high.	1. Drain lubricant to the correct level.
	2. Worn axle shaft seals.	2. Replace seals.
	3. Cracked axle housing.	3. Repair as necessary.
	4. Worn pinion seal.	4. Replace seal.
	5. Worn/scored pinion flange journal.	5. Replace pinion flange and seal.
	6. Axle cover not properly sealed.	6. Remove, clean, and re-seal cover.
Axle Overheating	1. Lubricant level low.	1. Fill differential to correct level.
	2. Improper grade of lubricant.	2. Fill differential with the correct fluid type and quantity.
	3. Bearing preload too high.	3. Readjust bearing pre-load.
	4. Insufficient ring gear backlash.	4. Re-adjust ring gear backlash.
Gear Teeth Broke	1. Overloading.	1. Replace gears. Examine other gears and bearings for possible damage.
	2. Ice-spotted pavement.	2. Replace gears and examine remaining parts for damage.
	3. Improper adjustments.	3. Replace gears and examine remaining parts for damage. Ensure ring gear backlash is correct.

CONDITION	POSSIBLE CAUSE	CORRECTION
Axle Noise	1. Insufficient lubricant.	1. Fill axle with the correct fluid type and quantity.
	2. Improper ring gear and pinion adjustment.	2. Check ring gear and pinion contact pattern. Adjust backlash or pinion depth.
	3. Unmatched ring gear and pinion.	3. Replace gears with a matched ring gear and pinion.
	4. Worn teeth on ring gear and/or pinion.	4. Replace ring gear and pinion.
	5. Loose pinion bearings.	5. Adjust pinion bearing pre-load.
	6. Loose differential bearings.	6. Adjust differential bearing preload.
	7. Misaligned or sprung ring gear.	7. Measure ring gear run-out. Replace components as necessary.
	8. Housing not machined properly.	8. Replace housing.

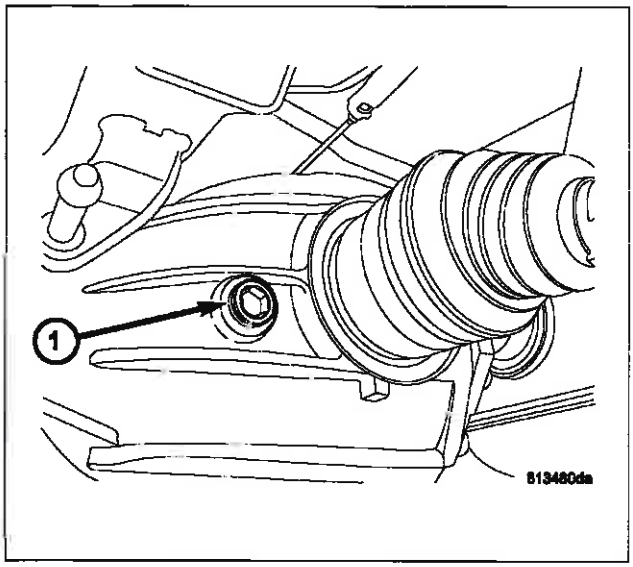
STANDARD PROCEDURE - FLUID DRAIN AND FILL

Note: Note: The fluid required for use in this axle is Mopar® Synthetic Gear and Axle Lubricant 75W-140.

1. Drive the vehicle until the differential lubricant is at the normal operating temperature.
2. With vehicle in neutral, position and raise vehicle on hoist.
3. Remove rear axle drain plug and drain lubricant completely from the axle.
4. Install drain plug and tighten to 60 N·m (44 ft lbs).



5. Remove fill plug (1) and fill rear axle with 1.4 L (1.5 qts.) Mopar® Synthetic Gear & Axle Lubricant 75W-140.
6. Install fill plug and tighten to 60 N·m (44 ft lbs).

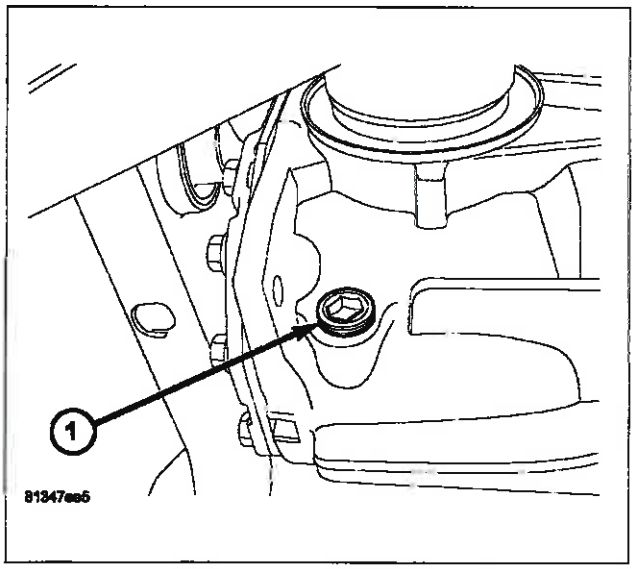


REMOVAL

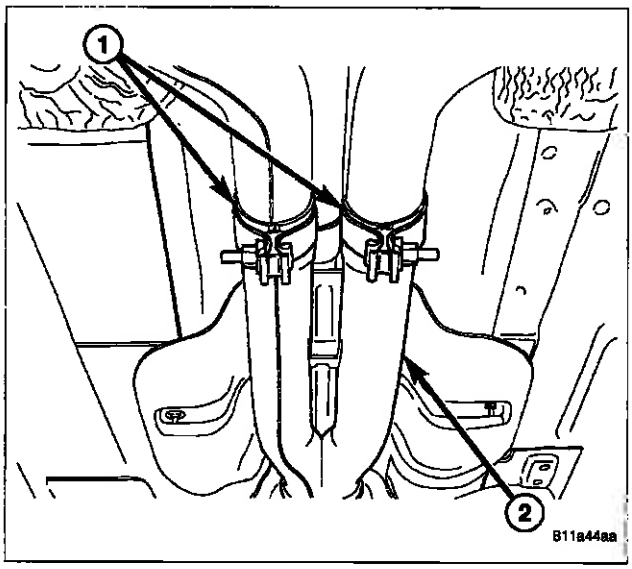
Note: This procedure requires the compression of the rear suspension to ride height. A drive-on hoist should be used. If a drive-on hoist is not used, screw-style under-hoist jack stands are required to compress the rear suspension, facilitating rear halfshaft removal.

CAUTION: Never grasp halfshaft assembly by the inner or outer boots. Doing so may cause the boot to pucker or crease, reducing the service life of the boot and joint. Avoid over angulating or stroking the C/V joints when handling the halfshaft.

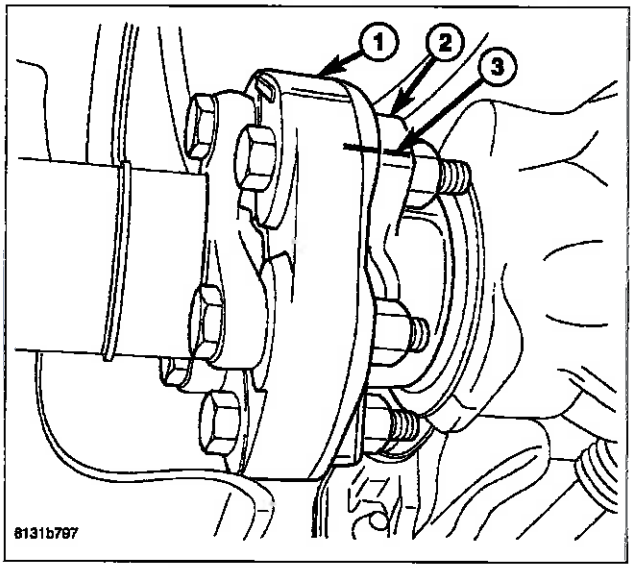
1. With vehicle in neutral, position and raise vehicle on hoist.
2. Using 14mm hex, remove axle drain plug (1) and drain rear axle fluid into container suitable for fluid reuse.
3. Install drain plug (1) and torque to 50 N·m (37 ft. lbs.) torque.



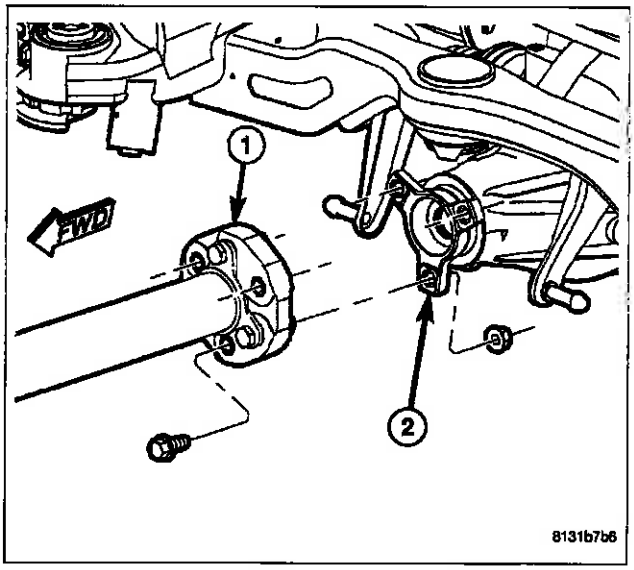
4. Remove rear exhaust system (2) on dual-outlet exhaust models.



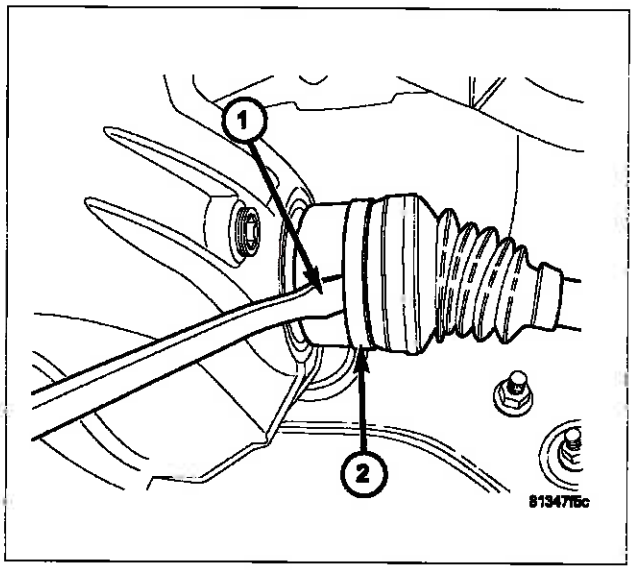
5. Apply alignment index marks (3) to the propeller shaft rubber coupler (1) and axle flange (2).



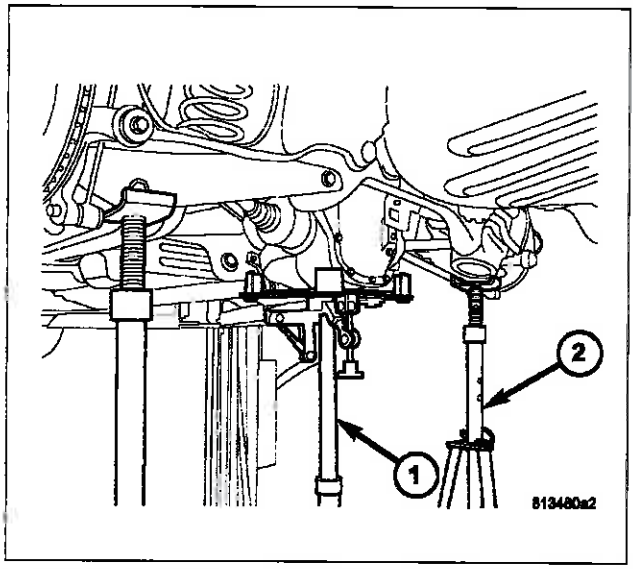
6. Remove three (3) propeller shaft coupler-to-axle flange bolt/nuts.



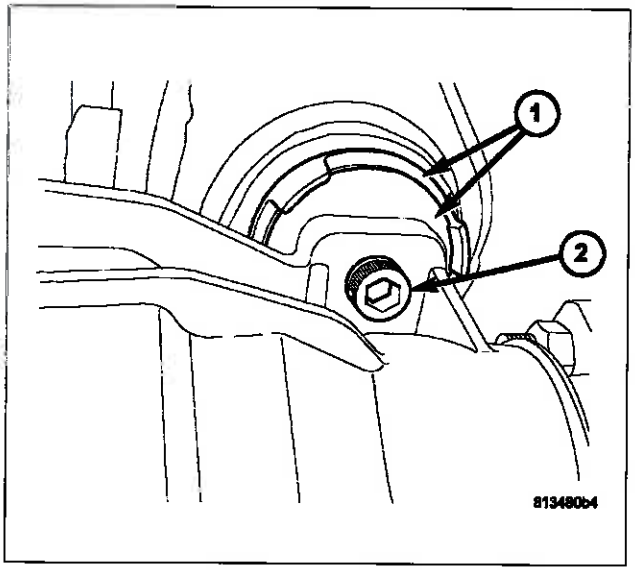
7. Using suitable screwdriver (1), partially disengage halfshaft(s) (2) from axle assembly.



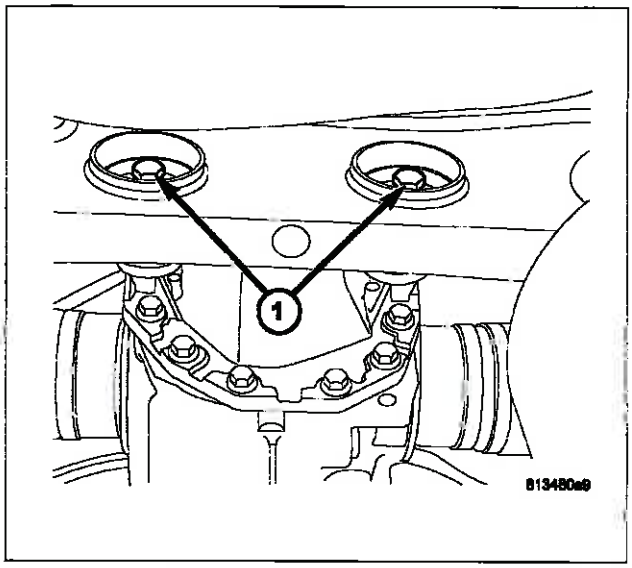
8. If a drive-on hoist is used, position transmission jack(1) to rear axle assembly. If a drive-on hoist is not used, compress rear suspension using screw-style under-hoist jack stands (2), then position transmission jack to rear axle assembly.



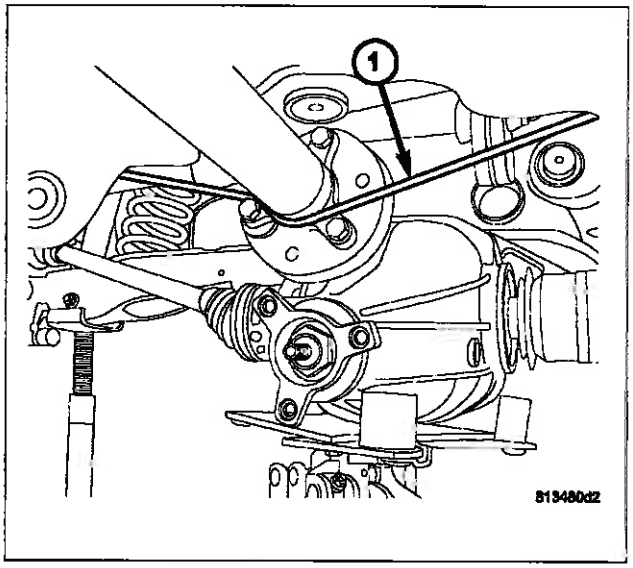
9. Remove rear axle forward mount isolator (1) bolt/ nut (2).



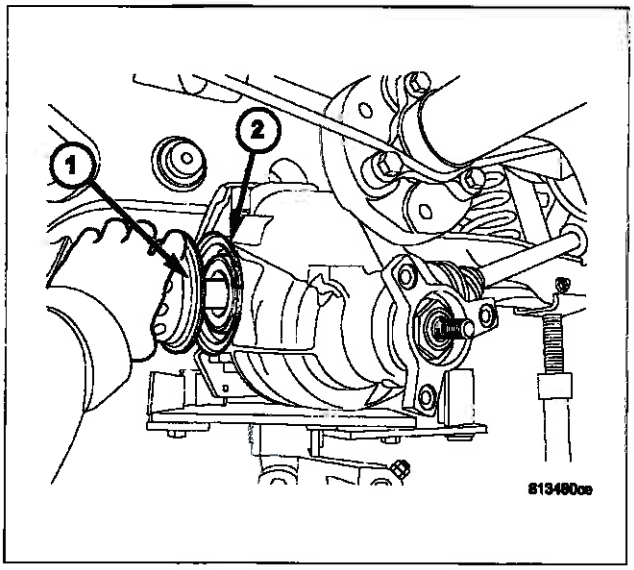
10. Remove two rear axle-to-crossmember bolts (1).



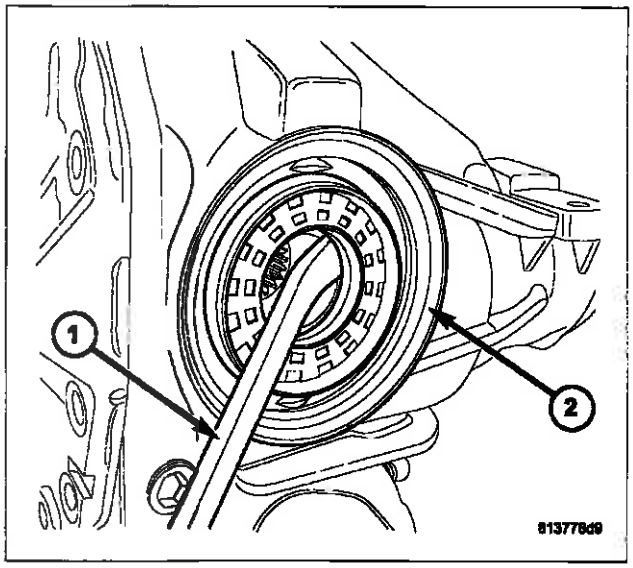
11. Carefully lower rear axle. While lowering axle, separate propeller shaft from axle and support with suitable rope or wire (1).



12. Lower axle just enough to remove both halfshafts one at a time. Shift axle assembly in one direction, compressing one halfshaft while removing the other (1). Use caution to protect axle seal and journal.

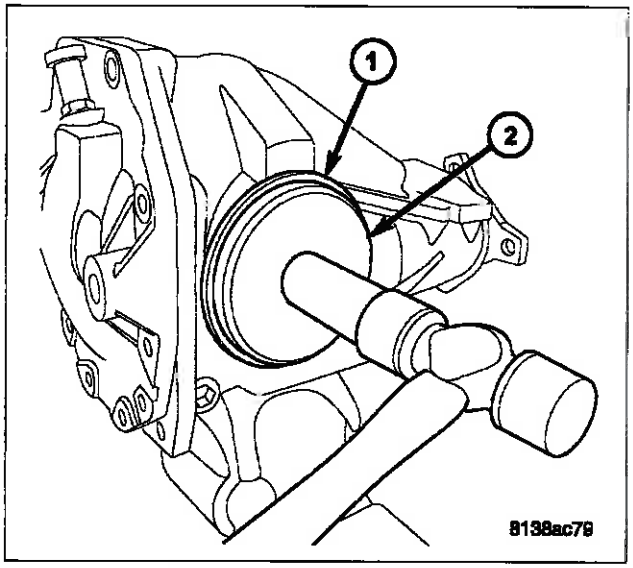


13. Remove axle assembly from vehicle and transfer to bench.
14. Using suitable screwdriver, remove axle seals and discard.

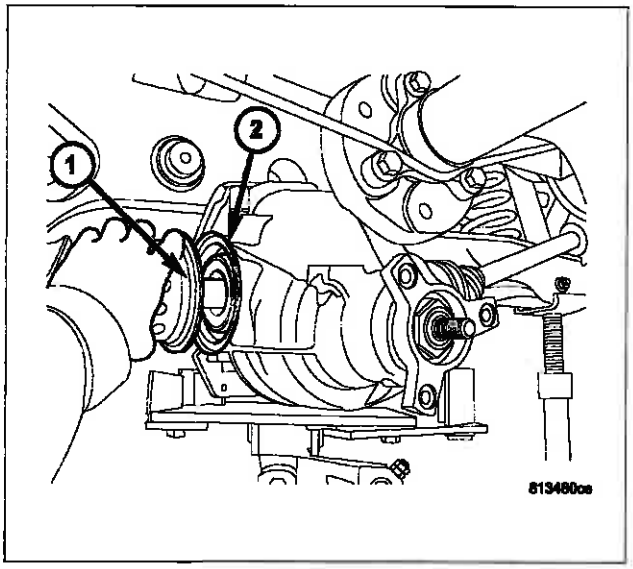


INSTALLATION

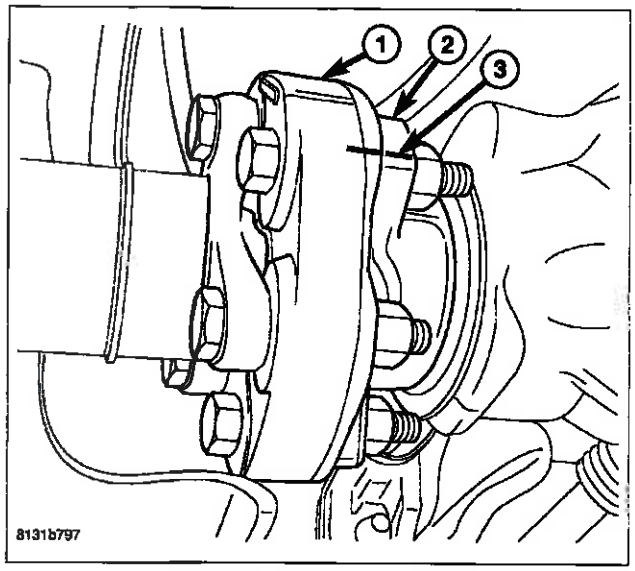
1. Install new axle seal(s) (1) using Tool 9223 (2).



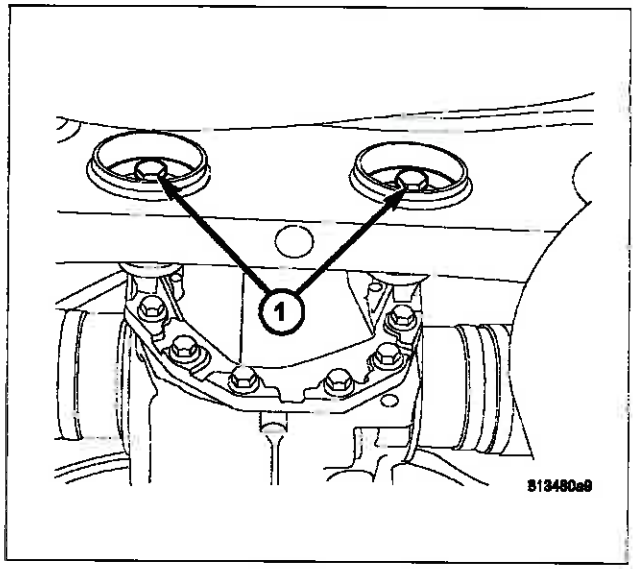
2. Using new circlip(s), install halfshaft (1) to rear axle assembly. Use care not to damage axle seals(2). Verify proper installation by pulling outward on joint by hand.



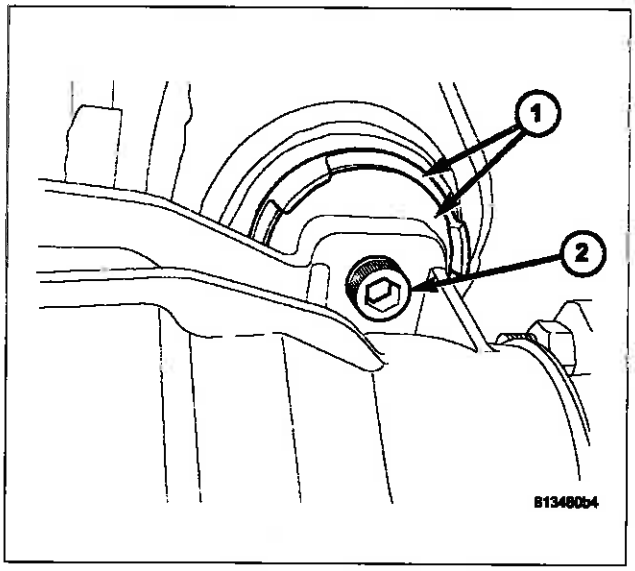
3. Raise rear axle assembly into position. Align propeller shaft index marks (3) and start propeller shaft coupler-to-axle bolt/nuts by hand.



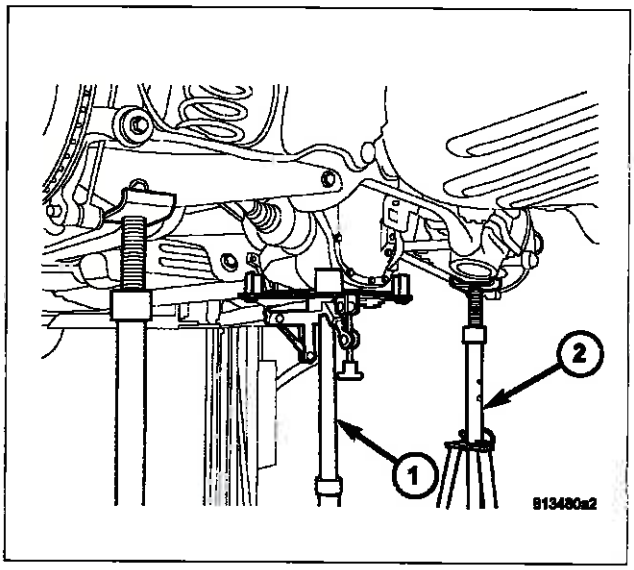
4. Install two rear axle-to-crossmember bolts (1) and torque to 220 N·m (162 ft. lbs.).



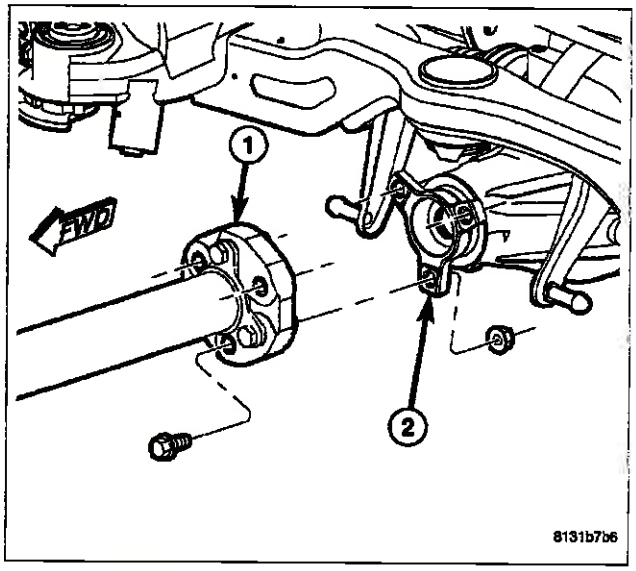
5. Install rear axle front mount isolator (1) as shown and torque bolt/nut to 65 N·m (48 ft. lbs.).



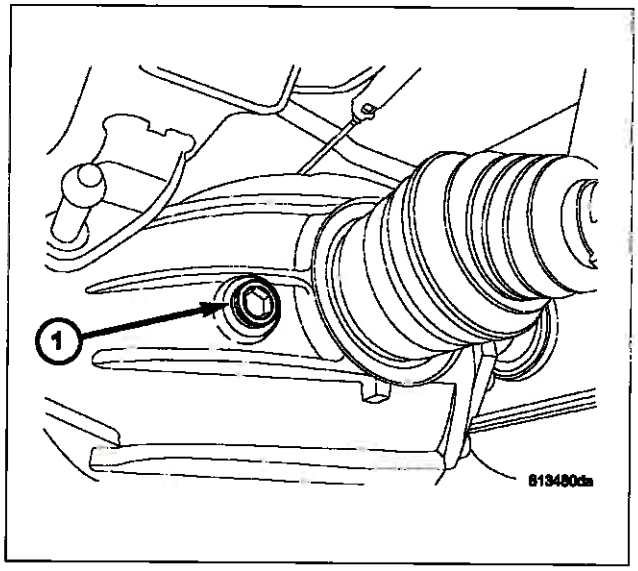
6. Again verify halfshaft inner joints are fully engaged to axle assembly.
7. Remove transmission jack (1).
8. If used, remove screw-type under-hoist jack stands (2).



9. Torque propeller shaft coupler-to-axle flange bolt/nuts to 58 N·m (43 ft. lbs.).



10. Using a 14mm hex, remove rear axle fill plug (1). Fill axle with 1.4L (1.5 qts.) of Mopar® 75W-140 Synthetic Gear & Axle Lubricant. Install fill plug and torque to 60 N·m (44 ft. lbs.).

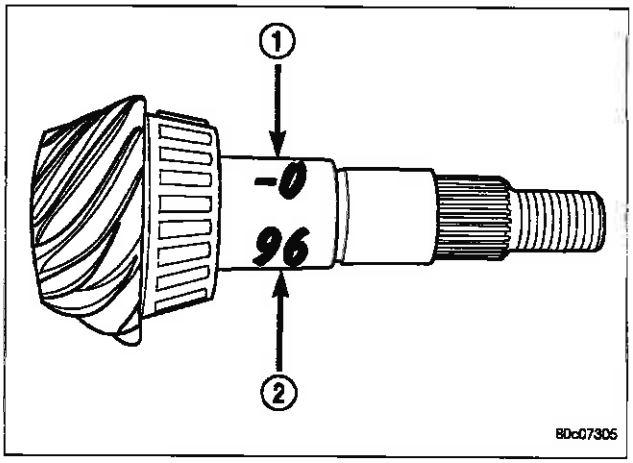


ADJUSTMENTS

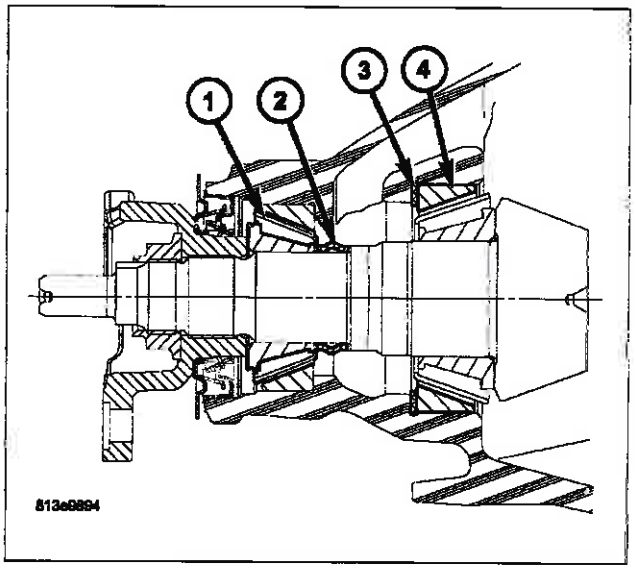
ADJUSTMENT - PINION DEPTH

PINION DEPTH VARIANCE

Ring gear and pinion are supplied as matched sets. Identifying numbers for the ring gear and pinion are painted onto the pinion gear shaft and the side of the ring gear. A plus (+) number, minus (–) number or zero (0) along with the gear set sequence number (01 to 99) is on each gear. The pinion depth variance (1) is the amount the depth varies from the standard depth setting of a pinion marked with a (0). The remaining numbers (2) are the sequence number of the gear set. The standard depth provides the best gear tooth contact pattern.



Compensation for pinion depth variance is achieved with select shims (3). The shims are sandwiched between the pinion head bearing cup (4) and axle housing.



If installing a new gear, note the depth variance number of the original and replacement pinion. Add or subtract this number from the original depth shim to compensate for the difference in the depth variances. The numbers represent deviation from the standard in microns. If the number is negative, subtract that value to the required thickness of the depth shims. If the number is positive, subtract that value from the thickness of the depth shim.

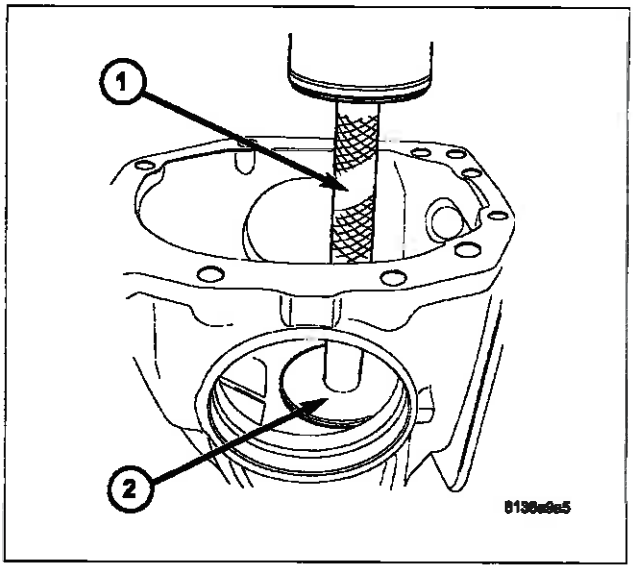
PINION GEAR DEPTH VARIANCE

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

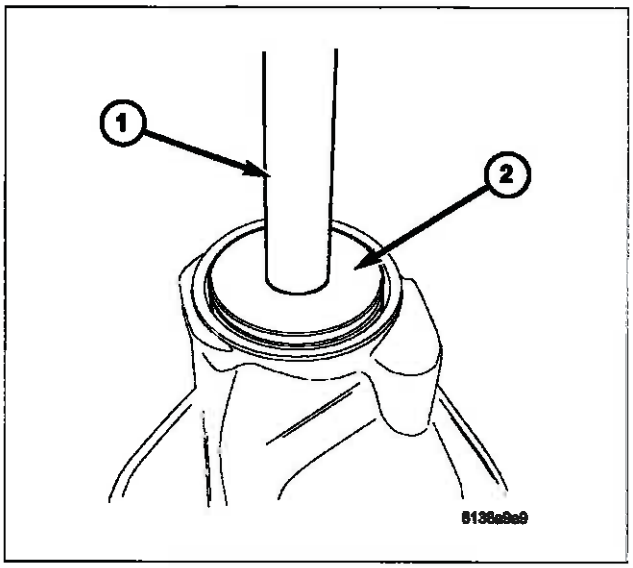
PINION DEPTH MEASUREMENT

Pinion depth measurement is taken with the pinion head and tail bearing cups pressed into the axle housing without the shim.

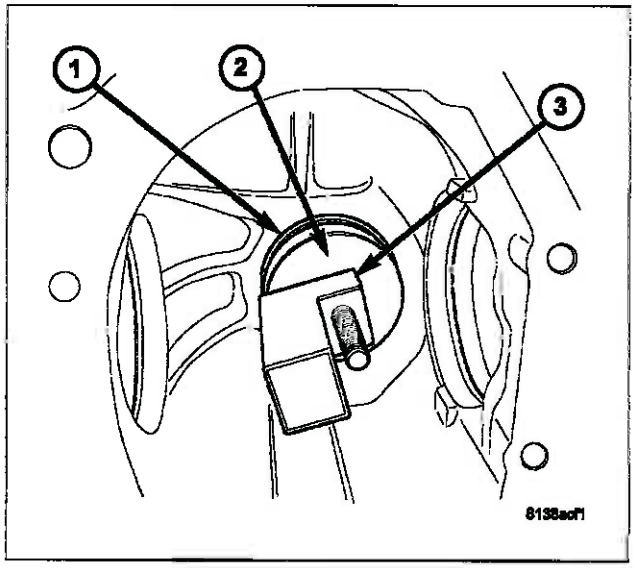
1. Press pinion head bearing cup into housing using Tools C-4171 (1) and C-4310 (2).



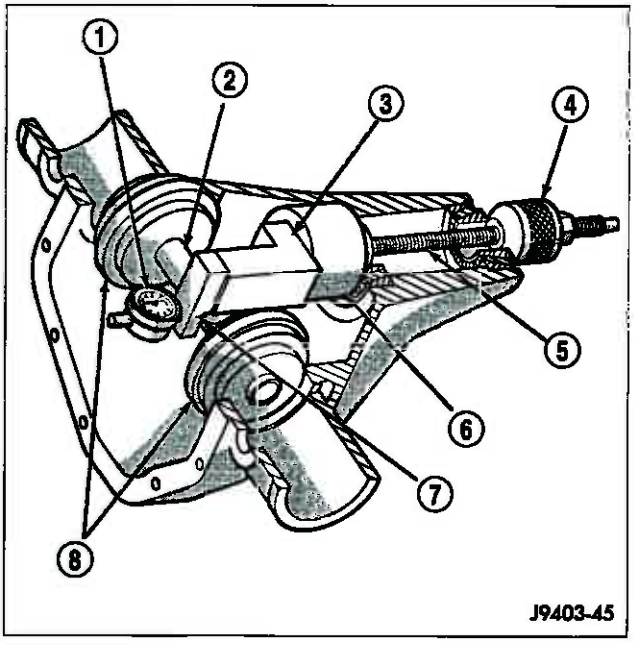
2. Press pinion tail bearing cup into housing using Tools C-4171 (1) and D-146 (2).



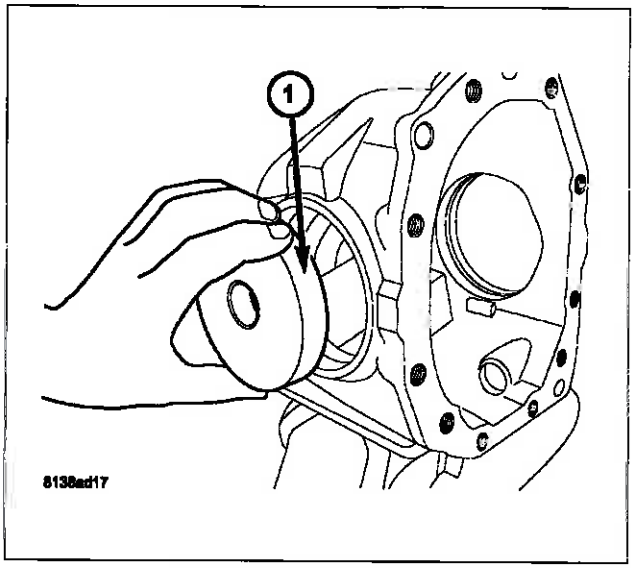
3. Install Pinion Height Block 6739 (3), Pinion Gage Block 9227 (2), and pinion head bearing cone (1) onto Screw 6741. Install assembly into axle housing and through bearing cups.



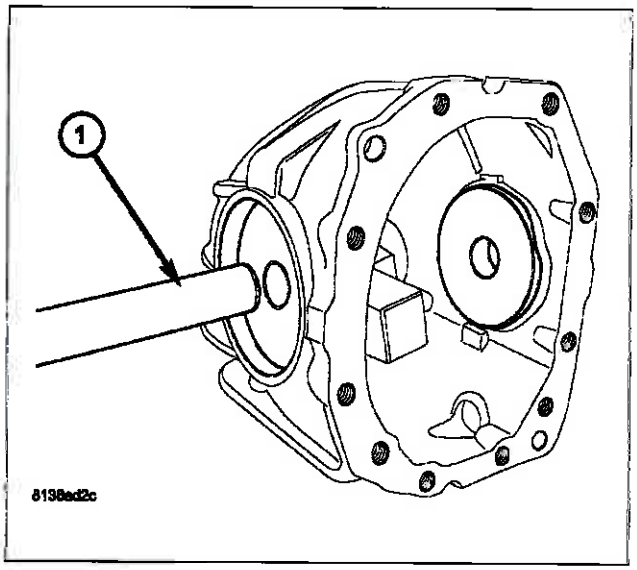
4. Install pinion tail bearing and Cone 6740 (4). Tighten Cone 6740 by hand until 3.4 N·m (30 in. lbs.) of rotating torque is measured at Screw 6741 (5).



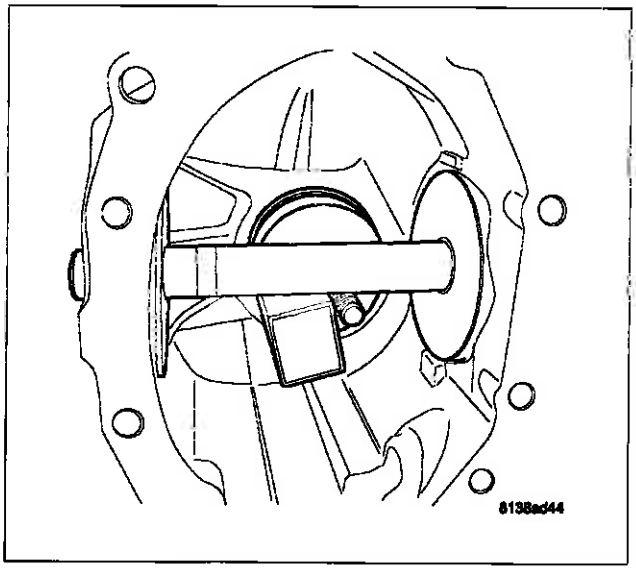
5. Install Arbor Discs 9228 (1).



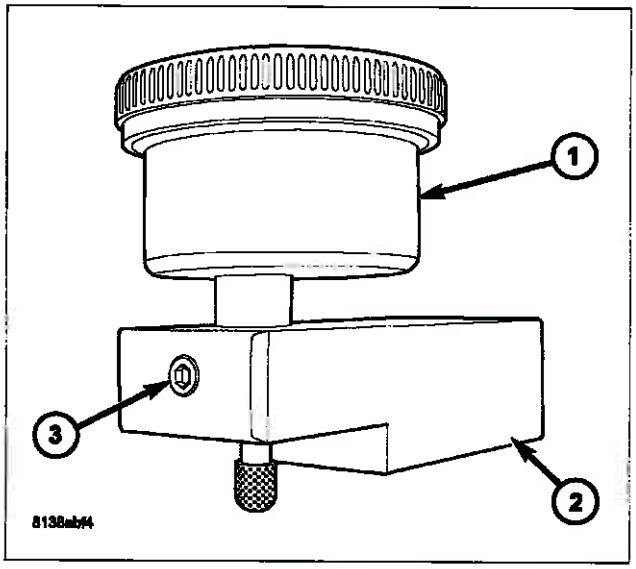
6. Install Arbor Bar D-115-3 (1).



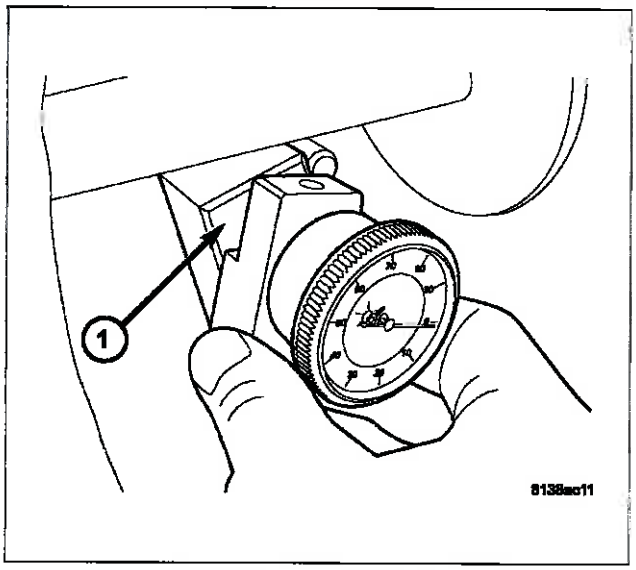
7. Verify pinion depth setup is a shown.



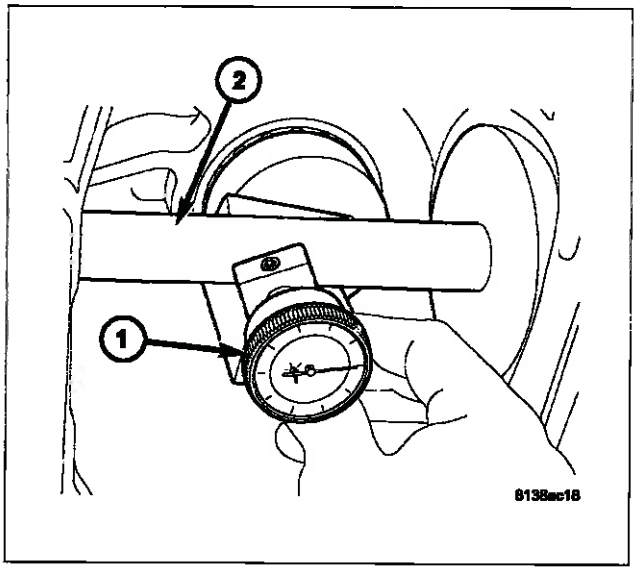
8. Install Dial Indicator 9524 (1) to Scooter Block D-115-2A (2). Secure with set-screw (3).



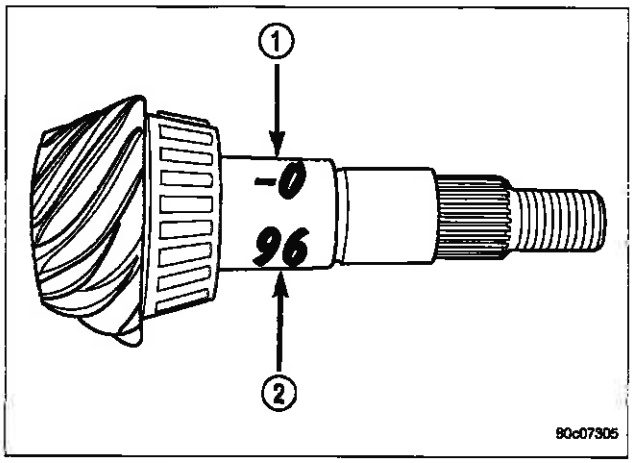
9. Install Indicator/Block assembly to top of Height Block 6739 (1). Zero indicator on top surface.



10. Slide indicator probe off of height block and onto Arbor Bar D-115-3 (2). As indicator contacts Arbor Bar (2), indicator needle will rotate clockwise. Continue moving indicator probe to the crest of the arbor bar and record the highest reading.



11. Select a shim equal to the dial indicator reading plus the drive pinion gear depth variance number (1) written on the side of the pinion shaft. For example, if the depth variance is –1, subtract 0.025mm (0.001 in.) from dial indicator reading.



ADJUSTMENT - SIDE BEARING PRELOAD AND RING GEAR BACKLASH

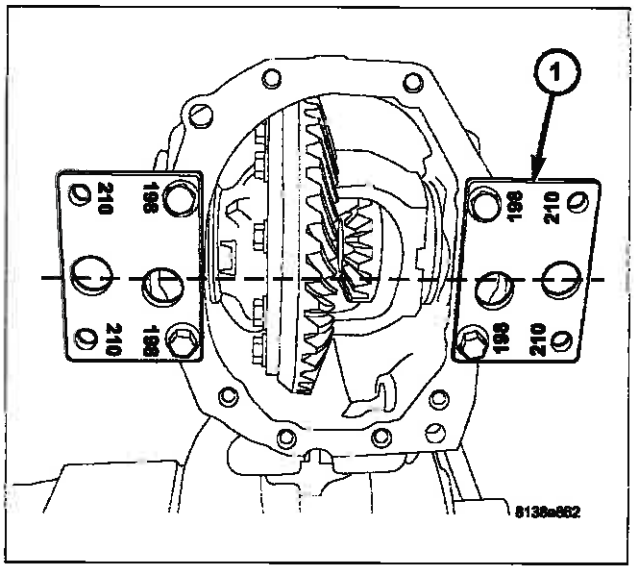
DIFFERENTIAL SIDE BEARING PRELOAD MEASUREMENT/CORRECTION

Differential side bearing preload should be measured and adjusted after the following scenarios:

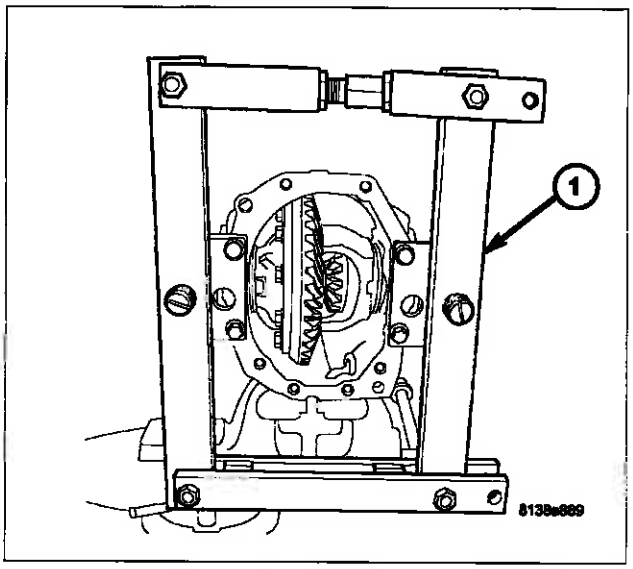
- Differential case replacement
- Differential side bearing replacement
- Axle housing replacement
- Loss or replacement of side bearing snap rings

If none of these situations apply, refer to Adjustment — Ring Gear Backlash

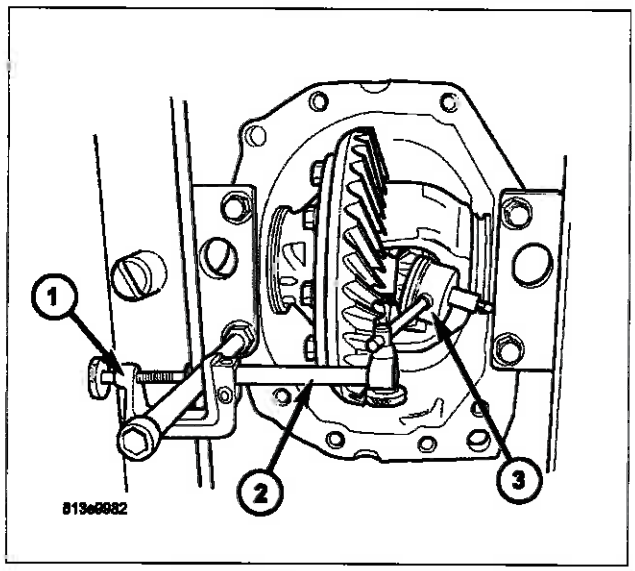
1. Install Spreader Adapter Plates 9226 (1) as shown



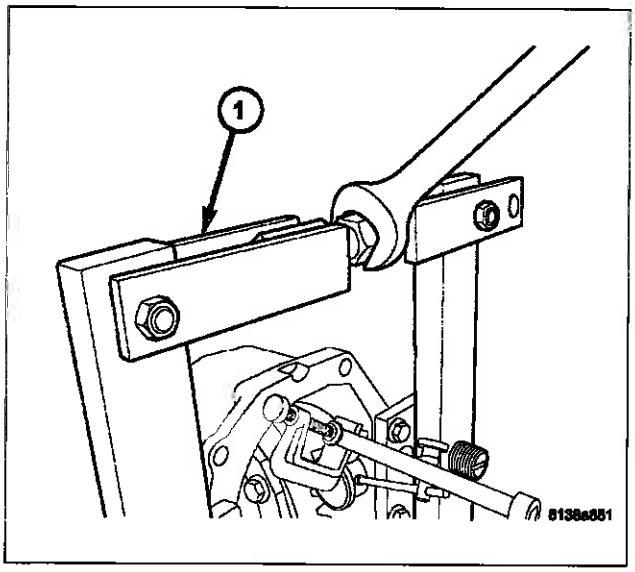
2. Mount axle housing to Spreader W-129-B (1).



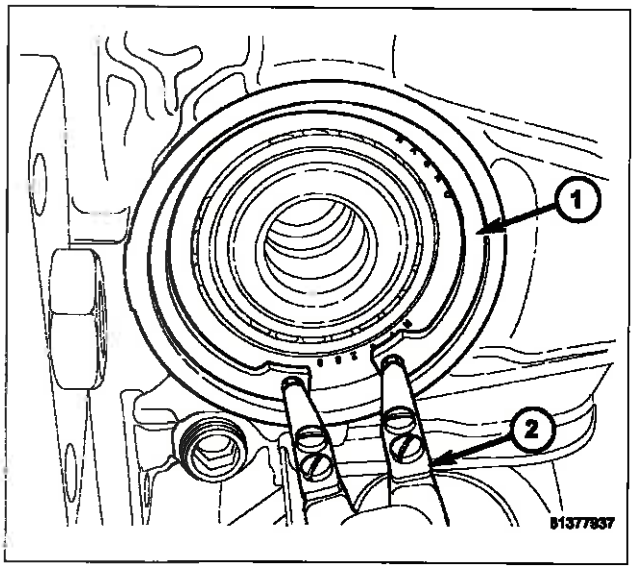
3. Set up Dial Indicator Set C-3339-A as shown to measure axle housing spread:
   a. Clamp SP-5426 (1)
   b. Post SP-5425-B (2)
   c. Metric Dial Indicator 9524 (3)



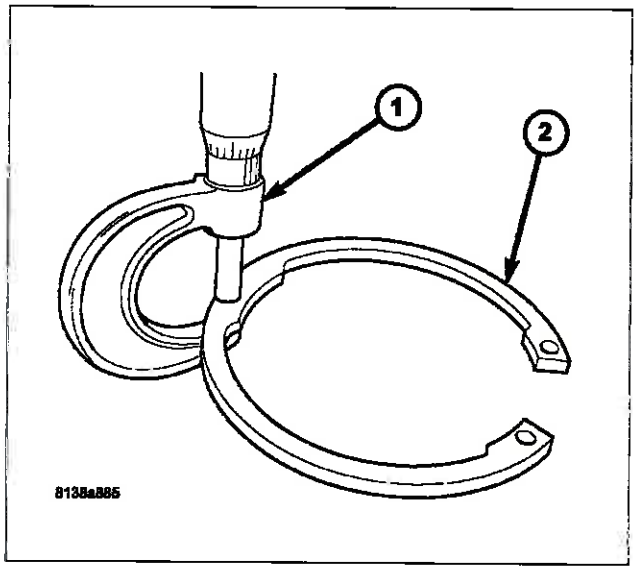
4. If differential side bearing cups and snap rings are removed at this point, skip to Step 8. Otherwise, expand spreader to spread axle housing no more than 0.30 mm (0.012 in.).



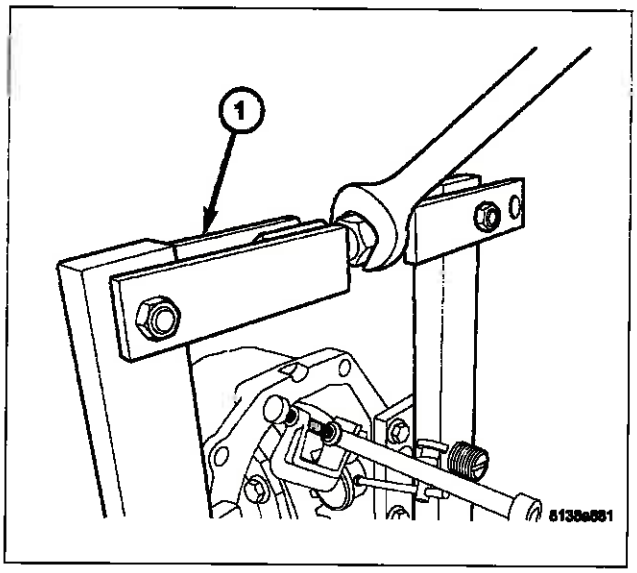
5. Remove both differential side bearing snap rings (1). Tag snap ring to ensure replacement to original position.



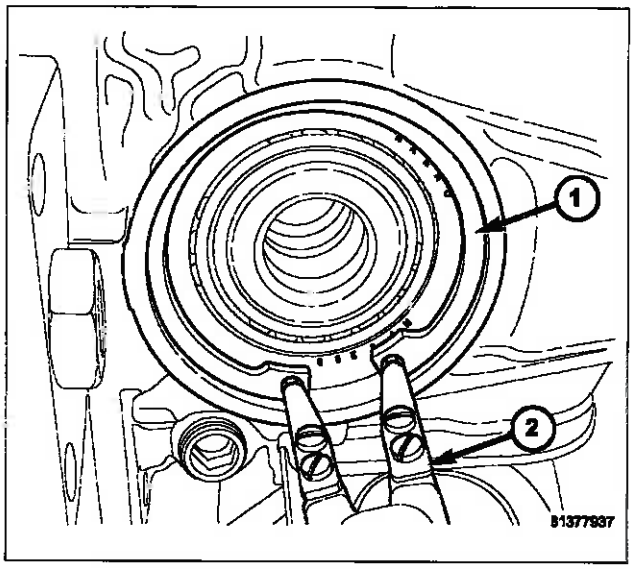
6. Measure and record snap ring (2) thickness for later use.



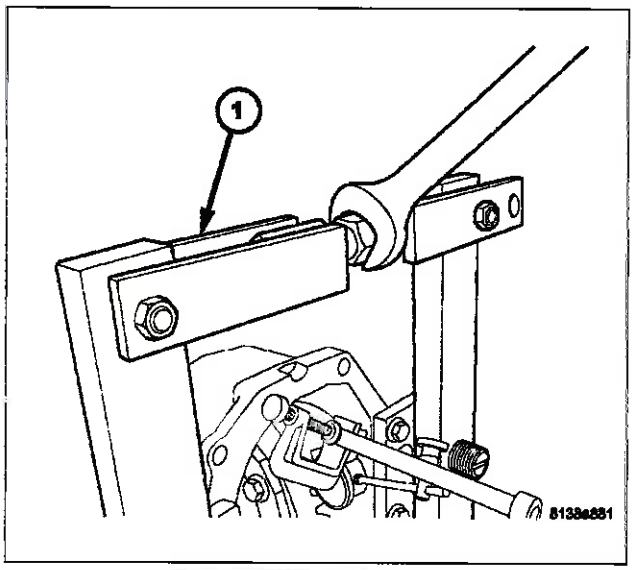
7. Relax spreader (1) to relieve tension on axle housing.



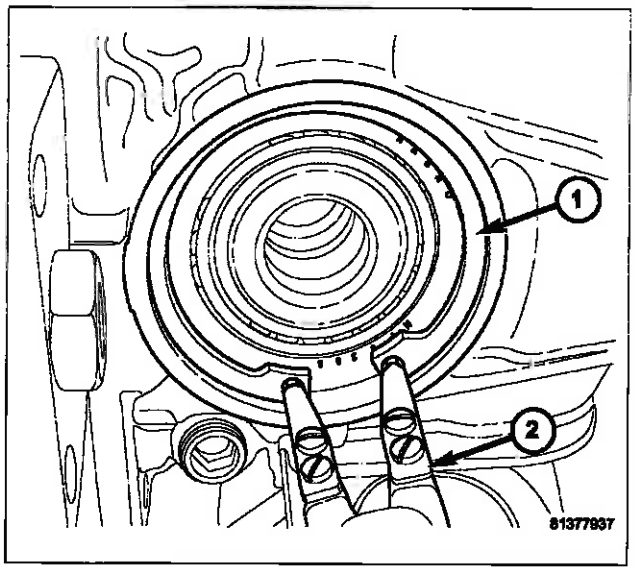
8. Install right (pinion) side bearing cup and snap ring (1).



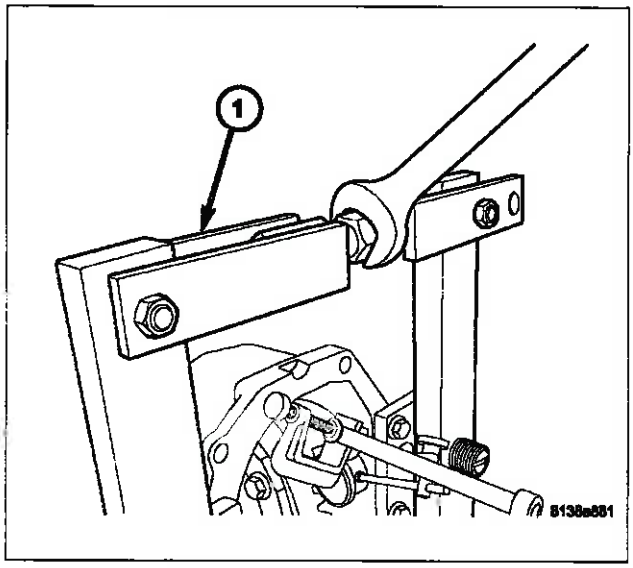
9. Zero dial indicator.
10. Expand spreader (1) to spread axle housing no more than 0.30 mm (0.012 in.).



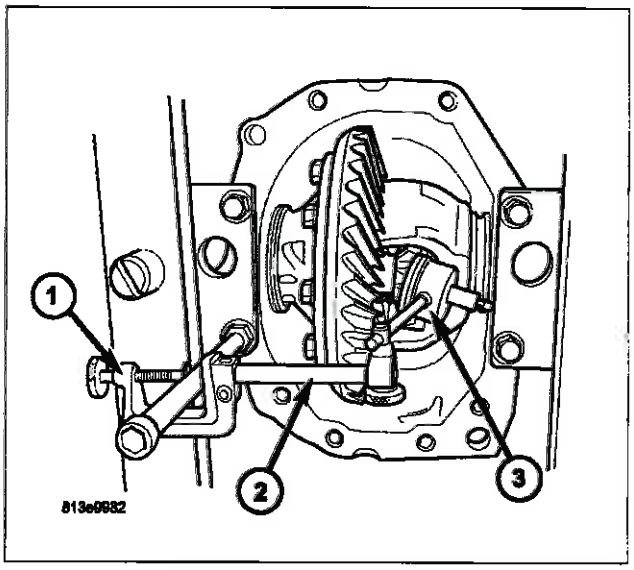
11. Install left (ring gear) side bearing cup and snap ring (1).



12. Relax spreader (1) to relieve tension on axle housing.



13. Measurement showing on indicator is the axle housing retained spread. Proper differential side bearing preload is achieved with an axle housing retained spread of 0.18-0.23 mm (0.007-0.009 in.).
14. If retained spread is less than 0.18 mm (0.007 in.), increase snap ring thickness at each side in equal increments.
15. If retained spread is greater than 0.23 mm (0.009 in.), decrease snap ring thickness at each side in equal increments.



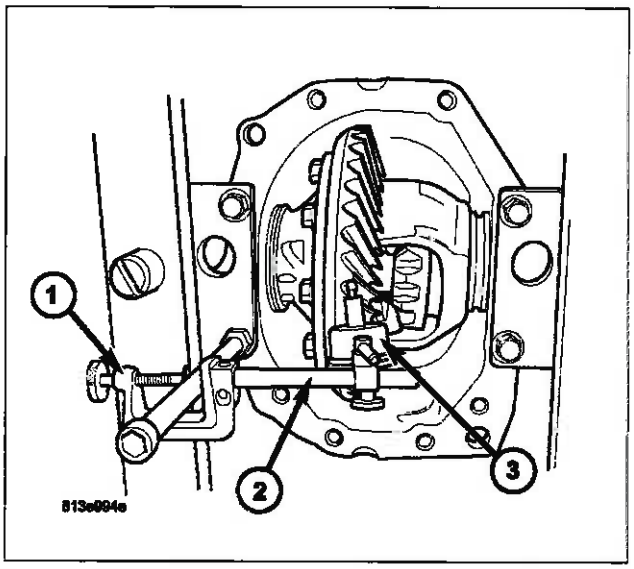
RING GEAR BACKLASH MEASUREMENT/CORRECTION

Differential Ring Gear Backlash should be measured and adjusted after the following scenarios:

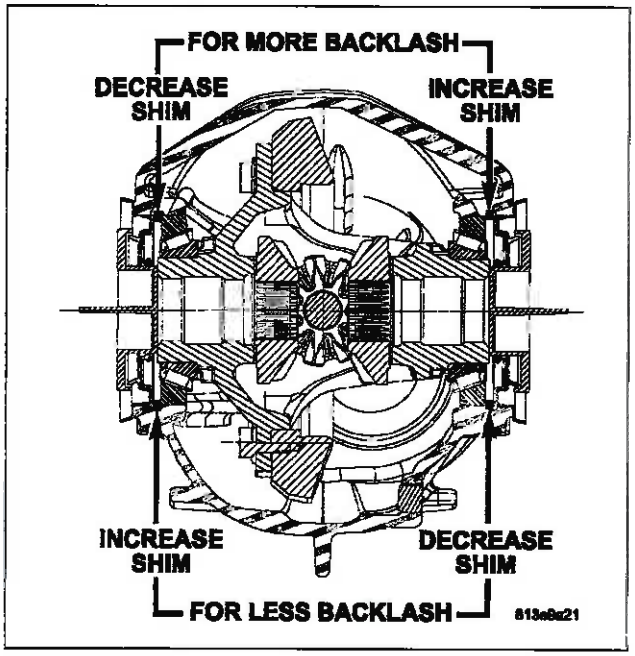
1. Ring and pinion gear replacement
2. Pinion head bearing replacement
3. Pinion depth (shim) adjustment
4. Differential case replacement
5. Differential side bearing replacement
6. Axle housing replacement

Note: If Spreader W-129-B is installed, make sure tension on axle housing is relieved.

7. Set up Dial Indicator Set C-3339-A as shown to measure ring gear backlash:
   a. Clamp SP-5426 (1)
   b. Post SP-5425-B (2)
   c. Metric Dial Indicator 9524 (3)
8. Rotate ring gear one direction to take up clearance to pinion. Verify indicator tip is in contact with ring gear and zero indicator. Rotate ring gear back and forth and record measurement. Ring gear backlash should be 0.13-0.18 mm (0.005-0.007 in.). Verify back lash measurement in four (4) positions.



9. If backlash measurement is less than 0.13 mm (0.005 in.), it is necessary to decrease the snap ring thickness on the ring gear (left) side, and increase the thickness on the pinion (right) side.
10. If backlash measurement is greater than 0.18 mm (0.007 in.), it is necessary to increase the snap ring thickness on the ring gear (right) side, and decrease the thickness on the pinion (left) side.

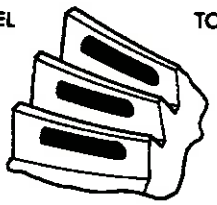
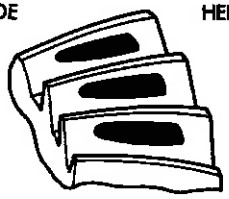
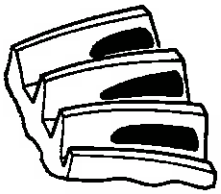
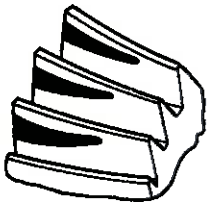
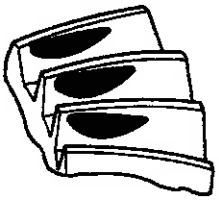
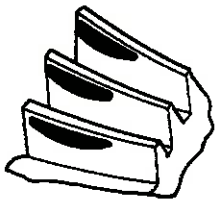
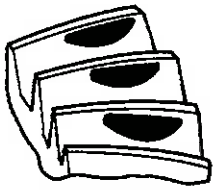
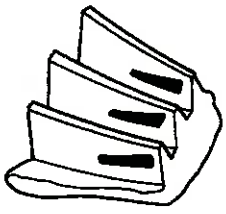
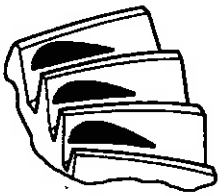


GEAR CONTACT PATTERN

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 squeegee 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 and adjust pinion depth and gear backlash as necessary.

DRIVE SIDE OF RING GEAR TEETH	COAST SIDE OF RING GEAR TEETH	
HEEL TOE 	TOE HEEL 	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.
		RING GEAR BACKLASH CORRECT. **THINNER** PINION GEAR DEPTH SHIM REQUIRED.
		RING GEAR BACKLASH CORRECT. **THICKER** PINION GEAR DEPTH SHIM REQUIRED.
		PINION GEAR DEPTH SHIM CORRECT. **DECREASE** RING GEAR BACKLASH.
		PINION GEAR DEPTH SHIM CORRECT. **INCREASE** RING GEAR BACKLASH.

J9003-24

Gear Tooth Contact Patterns

SPECIFICATIONS - 198 RII AXLE

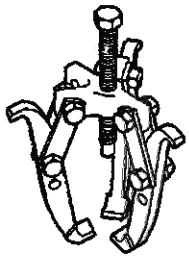
SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Axle Ratios	3.08, 3.64, 3.90
Ring Gear Diameter	198 mm (7.8 in.)
Ring Gear Backlash	0.13-0.18 mm (0.005-0.007 in.)
Side Bearing Preload	6-8000 N
Axle Housing Retained Spread	0.18 mm to 0.23 mm (0.007 in. to 0.009 in.)
Select Snap Ring Size	3.60-4.50mm (0.14-0.17 in.) In 0.02mm (0.0007 in.) increments
Select Pinion Shim Size	1.40-2.50mm (0.05-0.10 in.) In 0.01mm (0.0004 in.) increments
Pinion Torque To Rotate	2.25N·m (20 in. lbs.)
Total Torque To Rotate (Approx.)	3.38N·m (30 in. lbs.)

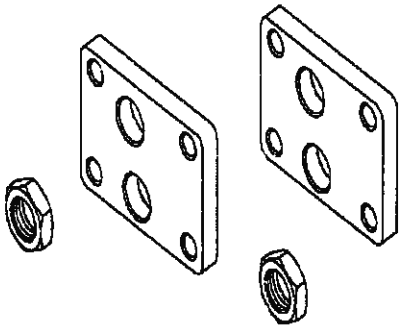
TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Plug, Rear Axle Drain/Fill	60	44	—
Bolt, Differential Cover	30 +45°	22 + 45°	—
Bolt, Ring Gear-to-Differential Case	85	63	—
Bolt, Axle Housing-to-Crossmember	220	162	—
Bolt/Nut, Axle Front Mount Isolator	65	48	—

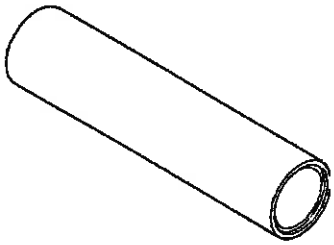
SPECIAL TOOLS - 198 RII AXLE



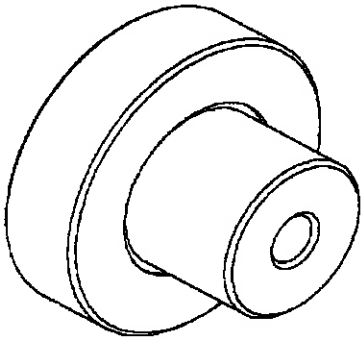
Puller, 1026



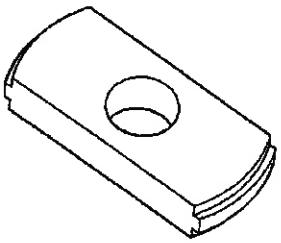
Spreader Adapters, 9226



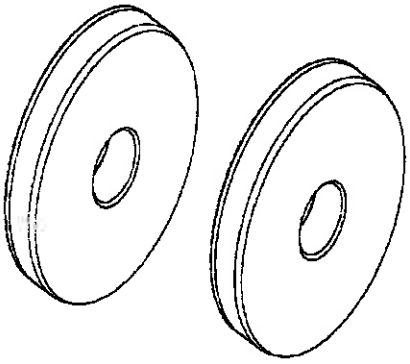
Installer, 6448A



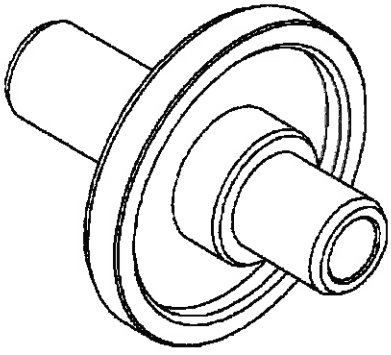
Pinion Height Gage, 9227



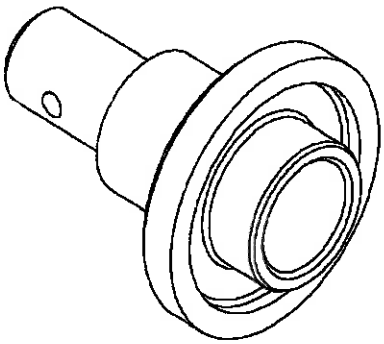
Remover, 9084



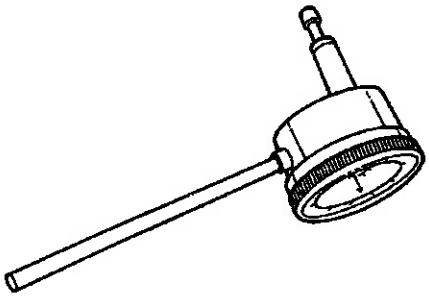
Arbor Discs, 9228



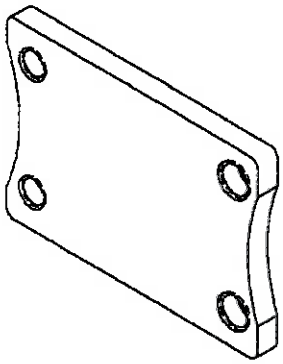
Installer, 9223



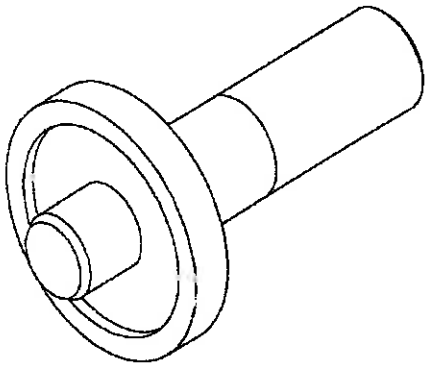
Installer, 9231A



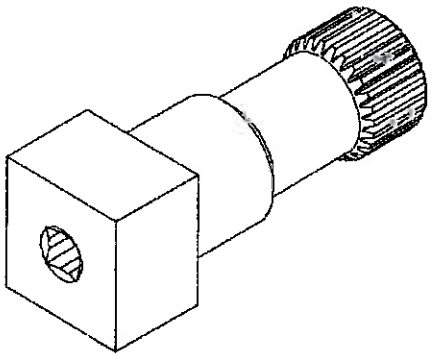
Dial Indicator, 9524



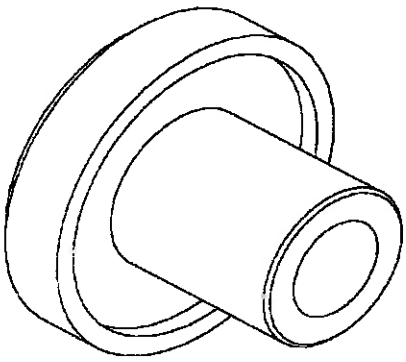
Mounting Plate, 9630



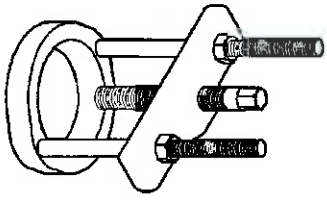
Removal/Installation Arbor, 9522



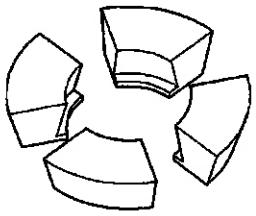
Fixture, 9631



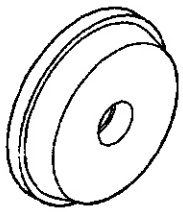
Installer, 9523



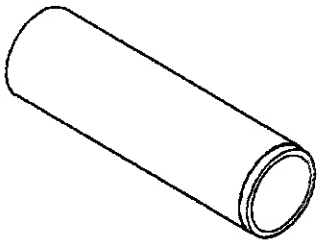
Puller Press, C-293-PA



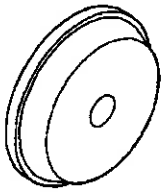
Adapters, C-293-37



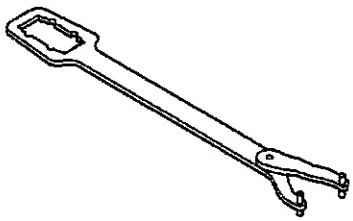
Installer, C-4310



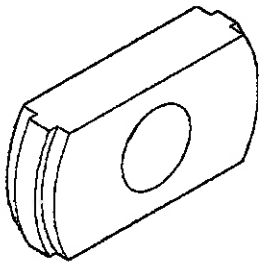
Installer, C-3095-A



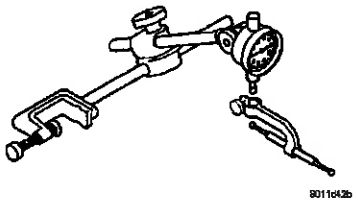
Installer, D-146



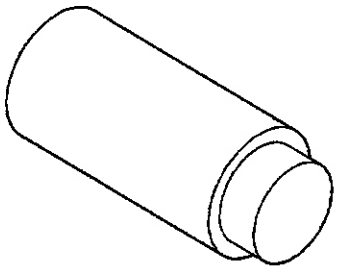
Flange Wrench, C-3281



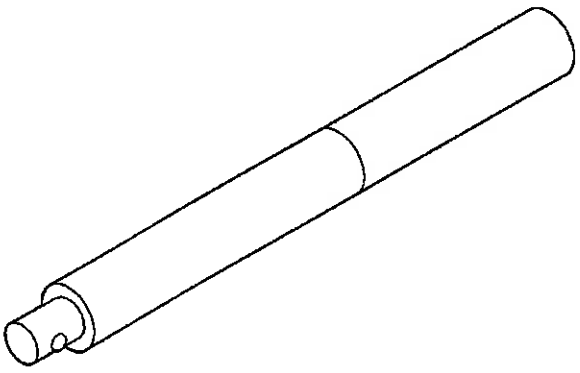
Remover, D-149



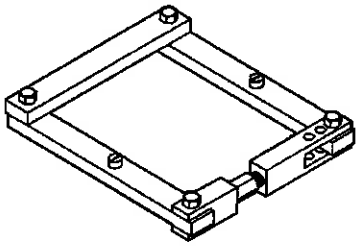
Dial Indicator Set, C-3339-A



Adapter, SP-3289



Handle, C-4171

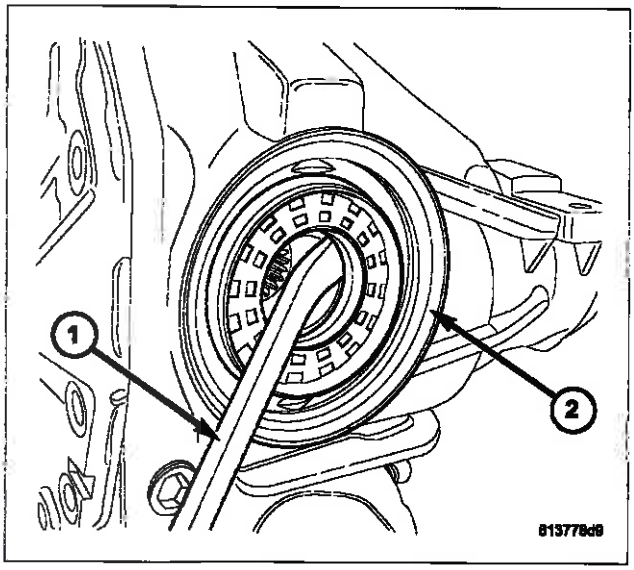


Spreader, W-129-B

AXLE SHAFT SEALS

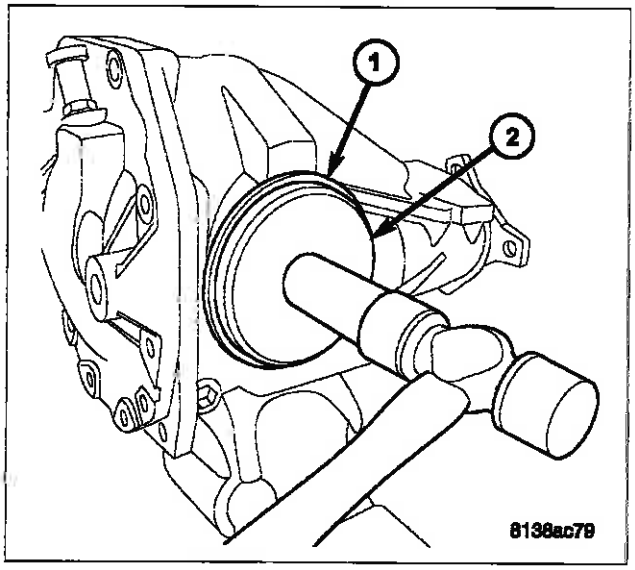
REMOVAL

1. Remove halfshaft(s).(Refer to 3 - DIFFERENTIAL & DRIVELINE/HALF SHAFT - REMOVAL)
2. Using suitable screwdriver (1), remove axle shaft seal (2).
3. Visually inspect halfshaft seal journal for damage (excessive seal groove, nicks, scratches, etc. Replace halfshaft if necessary.

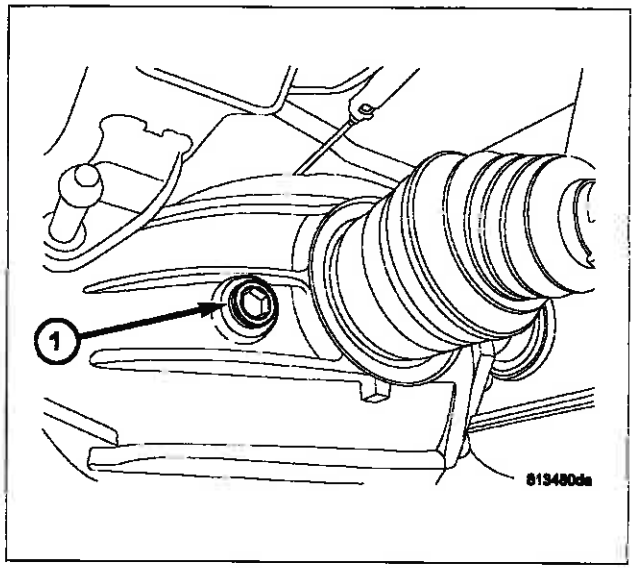


INSTALLATION

1. Using Tool 9223 (2), install **NEW** axle shaft seal (1). Lubricate the inside diameter with Mopar® Gear and Axle Lubricant 75W-140 to protect seal during halfshaft installation.
2. Install halfshaft(s). (Refer to 3 - DIFFERENTIAL & DRIVELINE/HALF SHAFT - INSTALLATION)



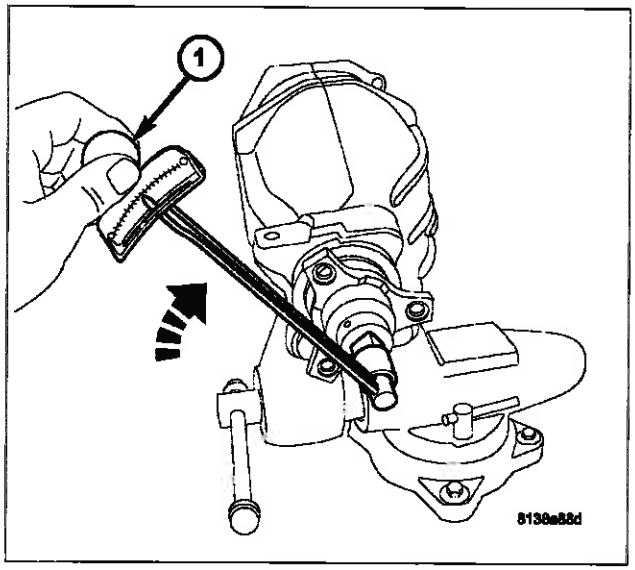
3. Remove fill plug (1) to check and adjust rear axle fluid level. Top off axle with Mopar® Gear and Axle Lubricant 75W-140. Reinstall fill plug torque to 60 N·m (44 ft. lbs.) torque.



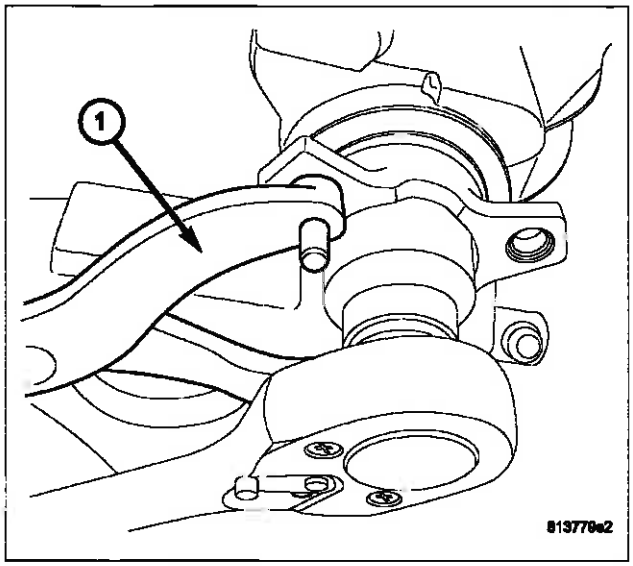
PINION SEAL

REMOVAL

1. Remove rear axle assembly from vehicle. Refer to Rear Axle Removal.
2. Measure axle assembly rotating torque and record measurement for reuse on assembly.

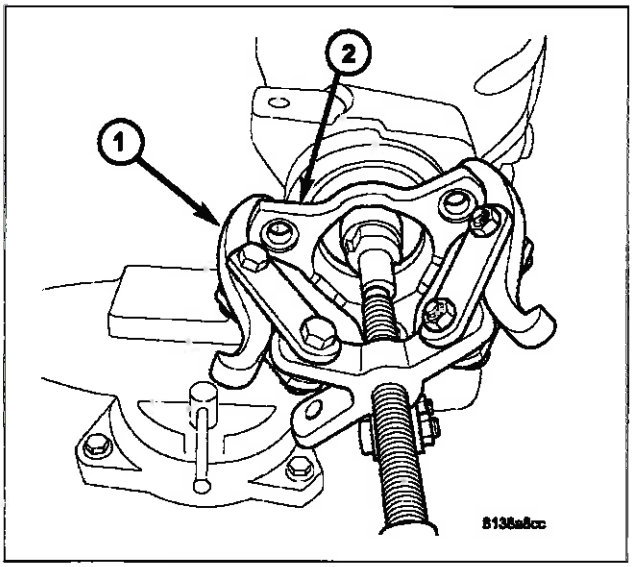


3. Using flange holder C-3281(1) and 41mm socket, remove pinion flange nut and discard.

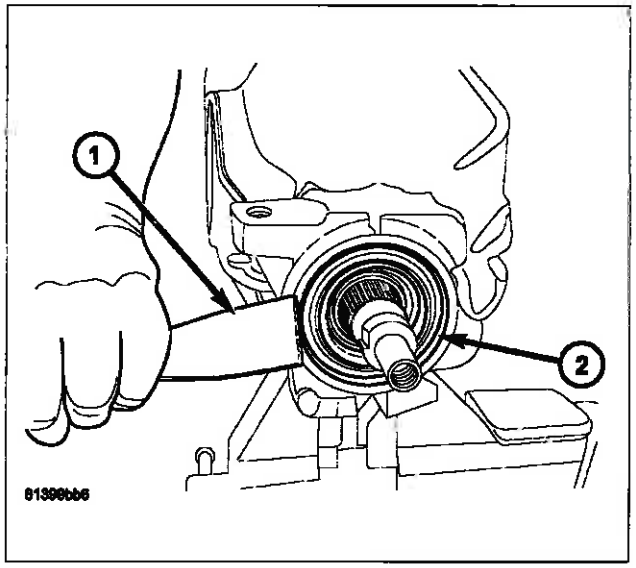


Note: Due to axle imbalance concerns, it is necessary to make sure pinion flange-to-shaft orientation is maintained. If alignment marks are not visible, apply appropriate marks before removing pinion flange.

4. Using puller 1026 (1), remove pinion flange (2) from pinion shaft.

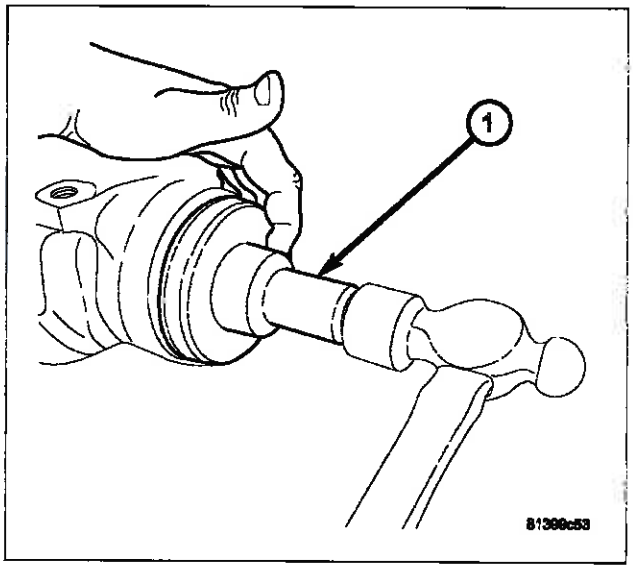


5. Using suitable tool (1), remove pinion seal (2) and discard.

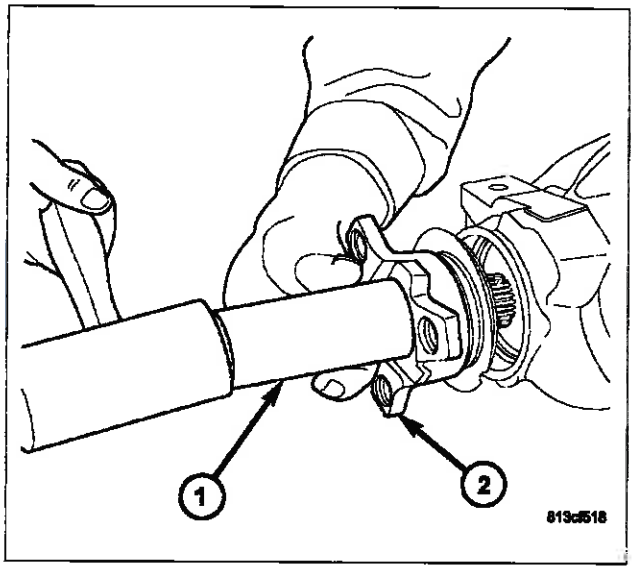


INSTALLATION

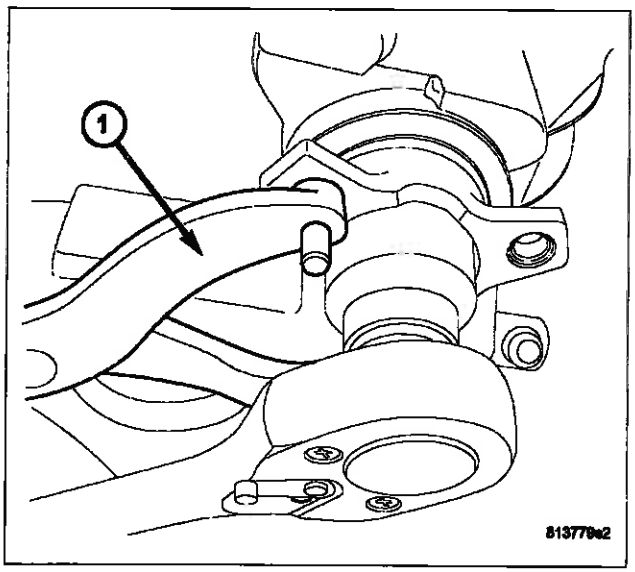
1. Apply light coating of gear lubricant to the lip of the pinion seal.
2. Using Tool 9231A (1), install pinion seal until tool bottoms on carrier.



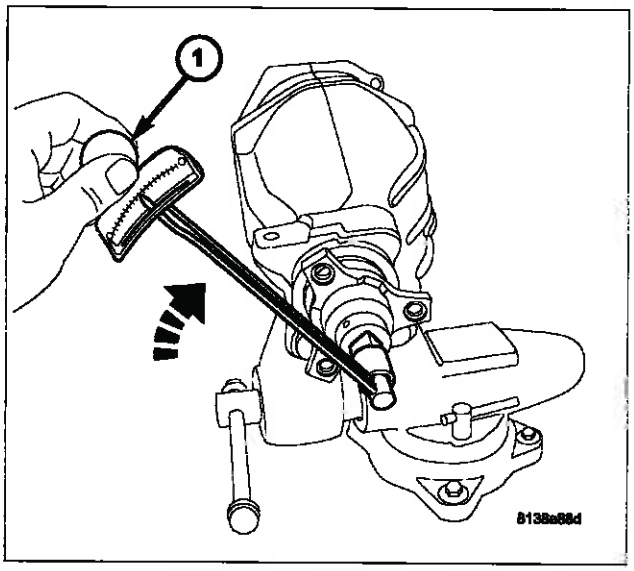
3. Install pinion flange into position. Align index marks to maintain assembly balance.
4. Using Installer 6448A (1), lightly tap on pinion flange (2) until adequate pinion shaft threads are exposed.



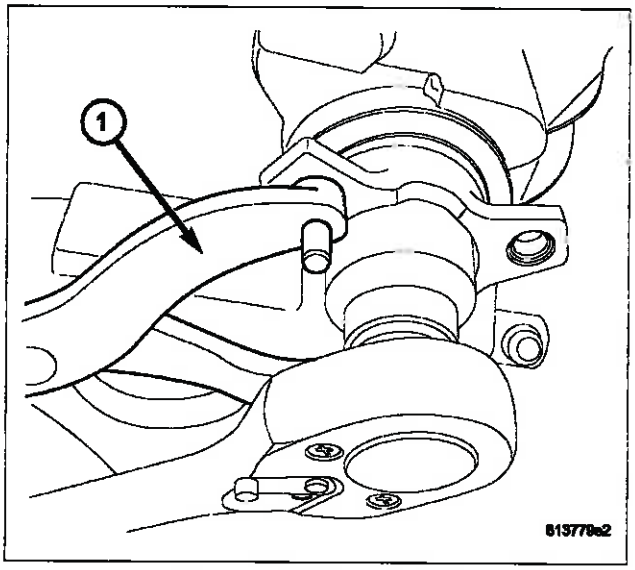
5. Install **new** pinion flange nut. Using flange holder tool C-3281(1) and 41mm socket, torque nut to 136 N·m (100 ft. lbs.).



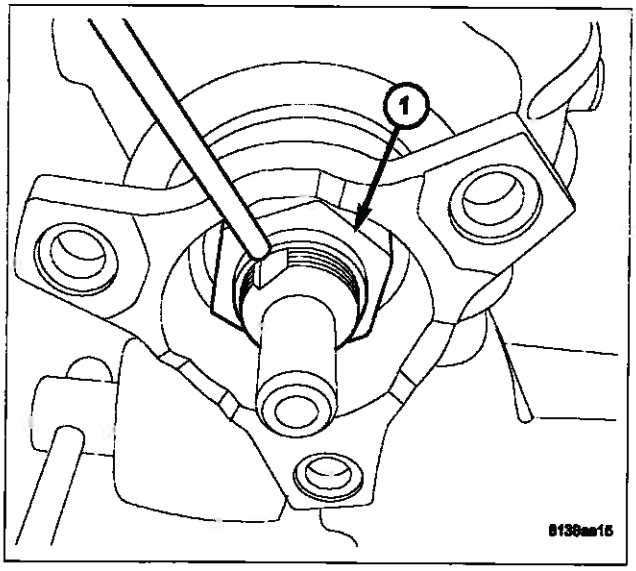
6. Measure assembly turning torque. Axle assembly rotating torque must be should be equal to the reading recorded upon seal/flange removal.



7. If rotating torque is low, increase pinion flange nut torque in 7 N·m (5 ft. lbs.) increments. Repeat until proper rotating torque is received.



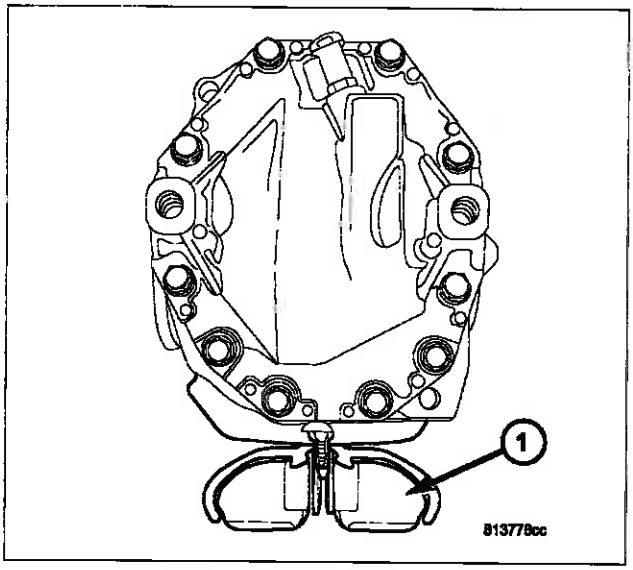
8. Stake pinion flange nut (1) as shown.
9. Install rear axle assembly. Refer to Rear Axle Installation.



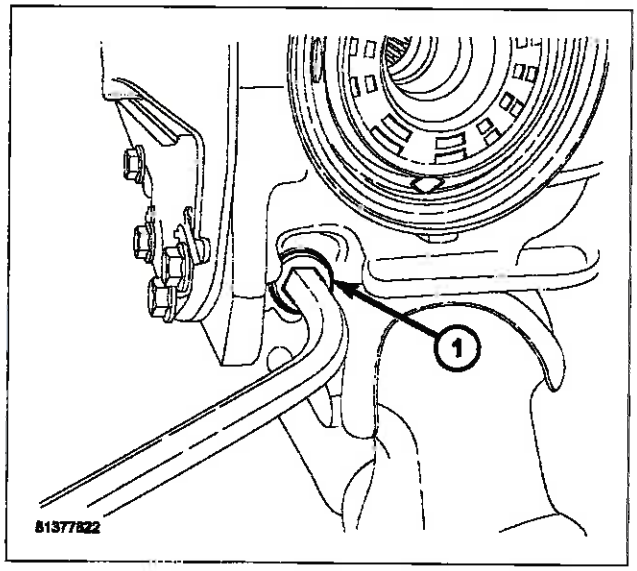
DIFFERENTIAL

REMOVAL

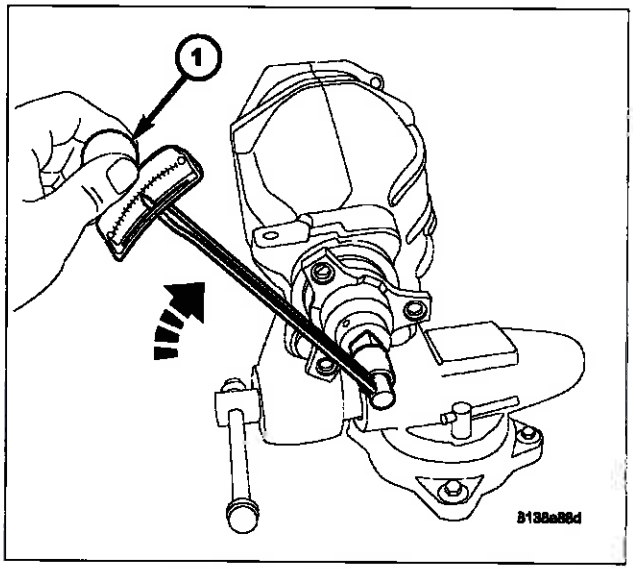
1. Clamp rear axle assembly into bench vise (1).



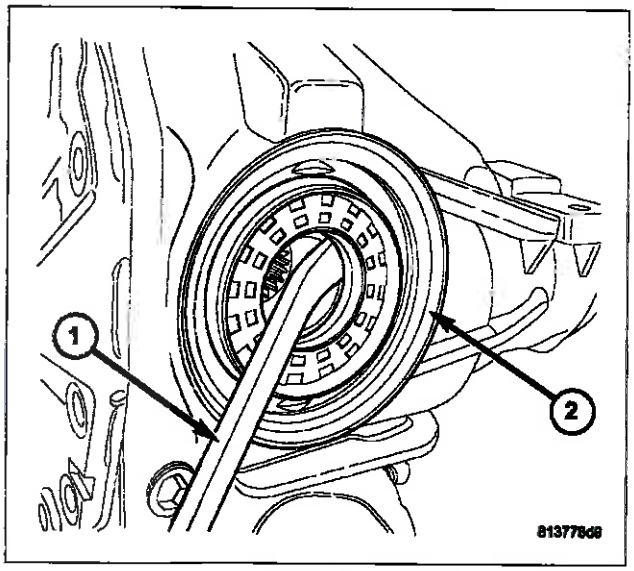
2. Remove drain plug (1) and drain fluid into container suitable for reuse.
3. Install drain plug and torque to 60 N·m (44 ft. lbs.).



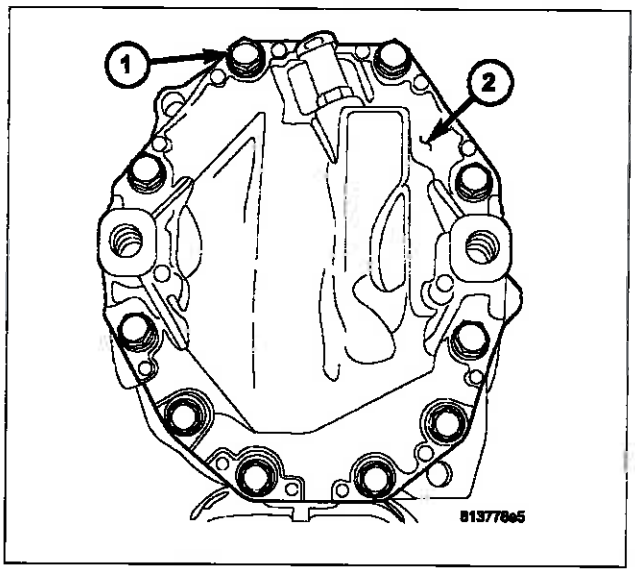
4. Using suitable torque wrench (1), measure and record rear axle assembly total turning torque.



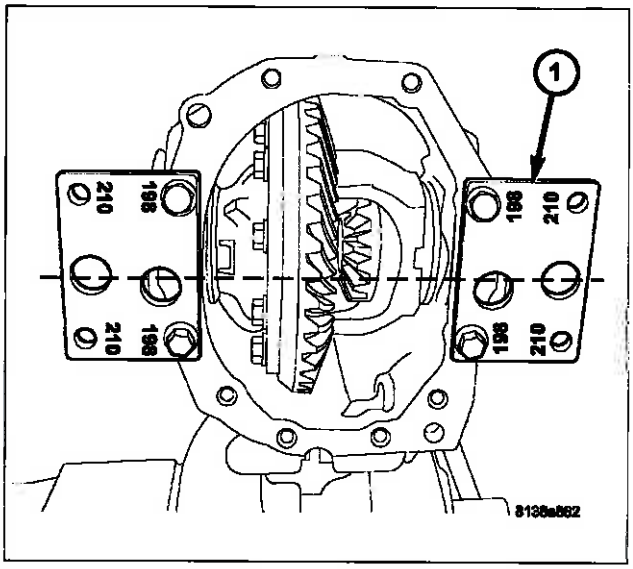
5. Using suitable screwdriver (1), remove both axle seals (2).



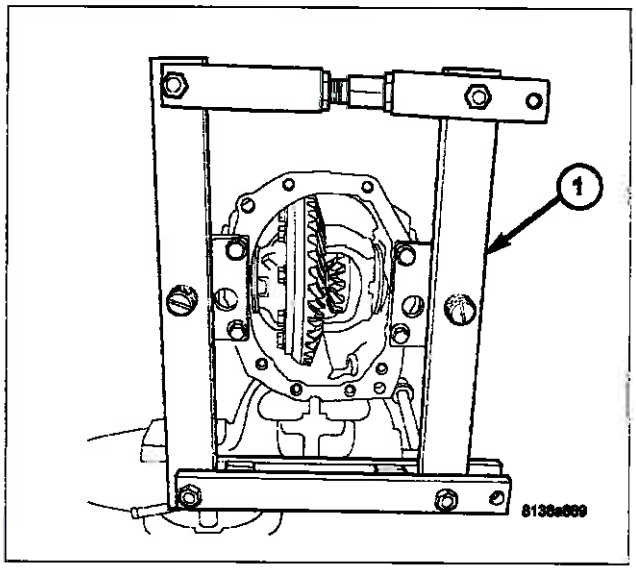
6. Remove twelve axle cover-to-housing bolts (1) and remove cover (2).



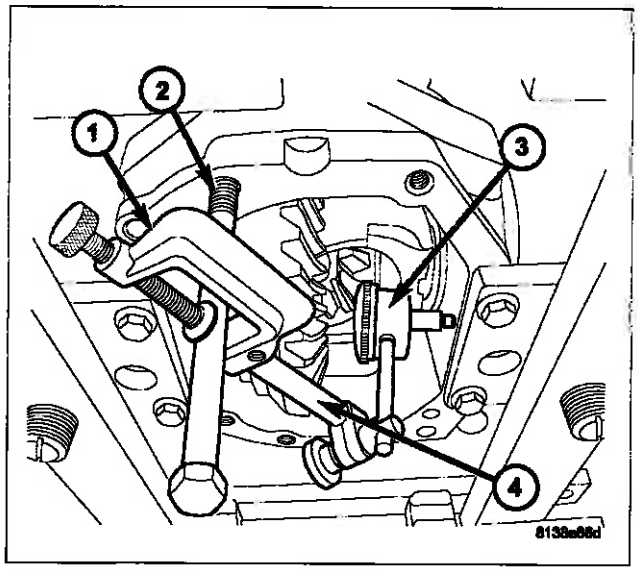
7. Install spreader adapters (1), Tool 9226, as shown. Adapters contain two hole patterns and are labeled accordingly.



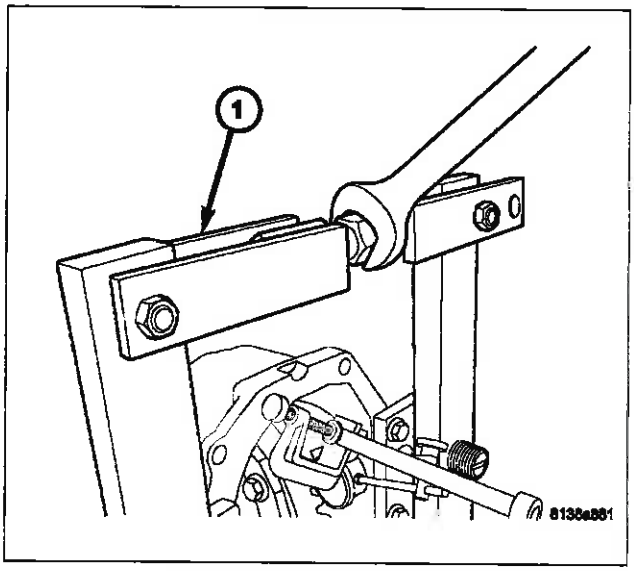
8. Install spreader, Tool W-129-B (1), as shown.



9. Set up Dial Indicator Set C-3339-A to measure housing spread as shown.
   a. Clamp SP-5426 (1)
   b. Post SP-5425-B (2)
   c. Metric Dial Indicator 9524 (3)

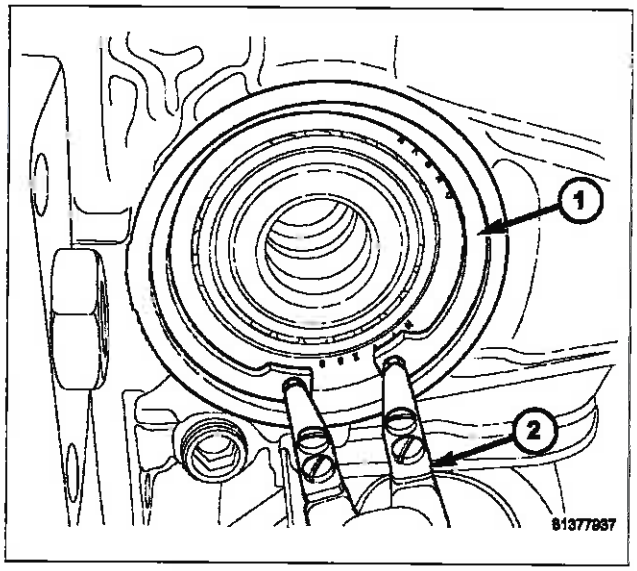


10. Spread axle housing no more than 0.30 mm (0.012 in.).

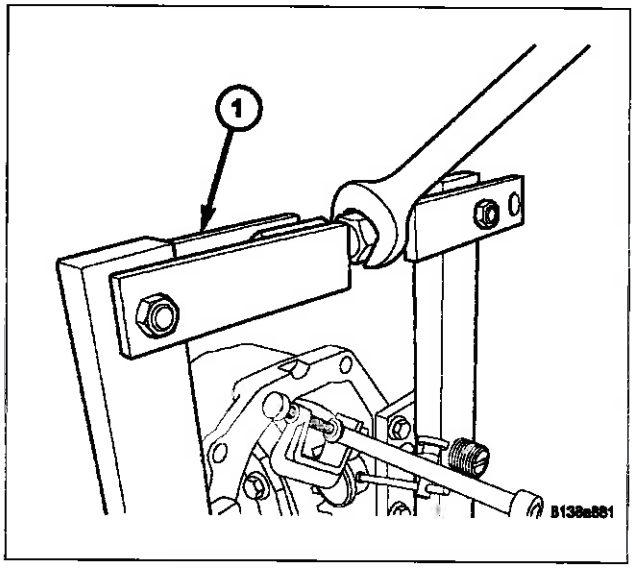


Note: The differential side bearing snap rings are select-fit, and control ring gear backlash and differential side bearing preload. It is important to return original snap rings to their original position.

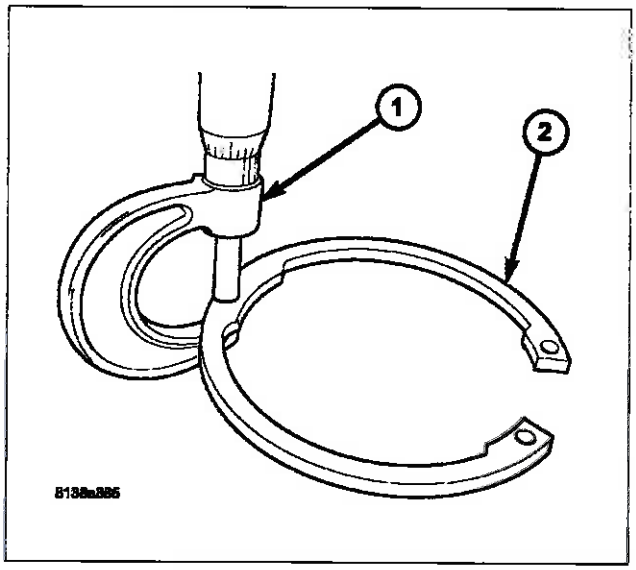
11. Using suitable snap ring pliers (2), compress and remove differential side bearing snap rings (1). Identify and tag for proper reuse.

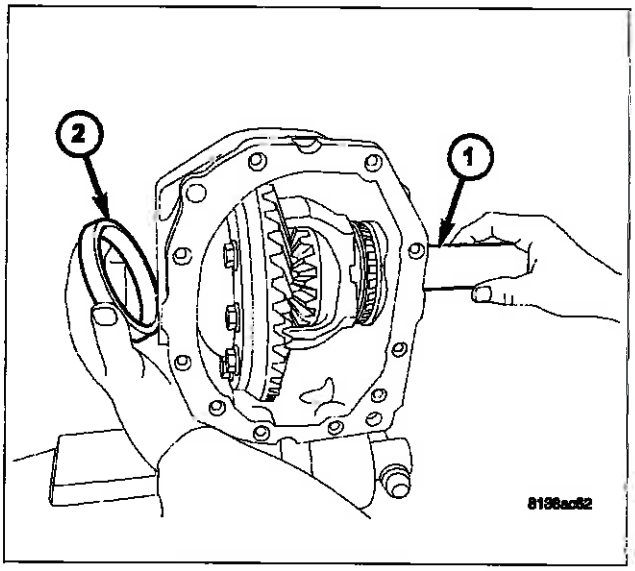


12. Back off W-129-B spreader (1) to relax tension on housing.
13. Measure snap ring thickness and record for future use.



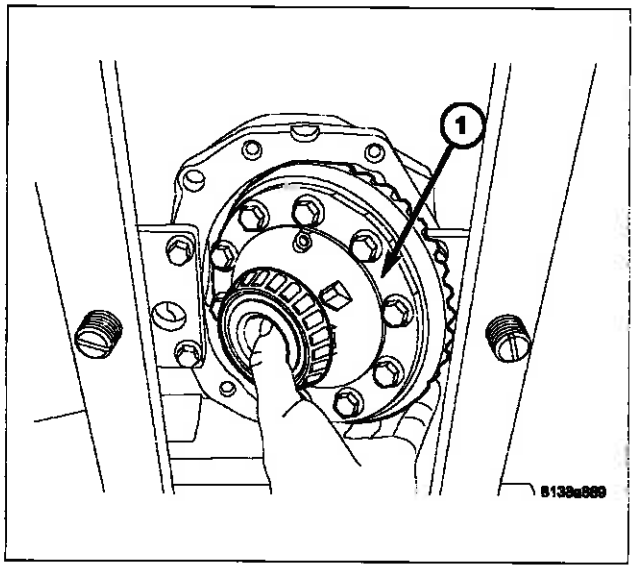
14. Install Tool 9522 (1) into one side of housing and push inward to release differential side bearing cup (2) from opposite side. Repeat for other bearing.





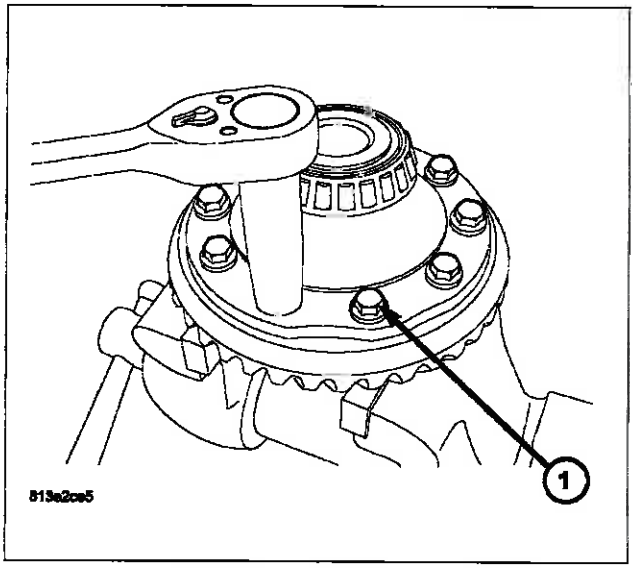
15. Remove differential assembly from axle housing.

Note: Note: If difficulty removing differential is encountered due to interference with W-129-B spreader and adapter plates, remove spreader and adapter plates to facilitate removal.

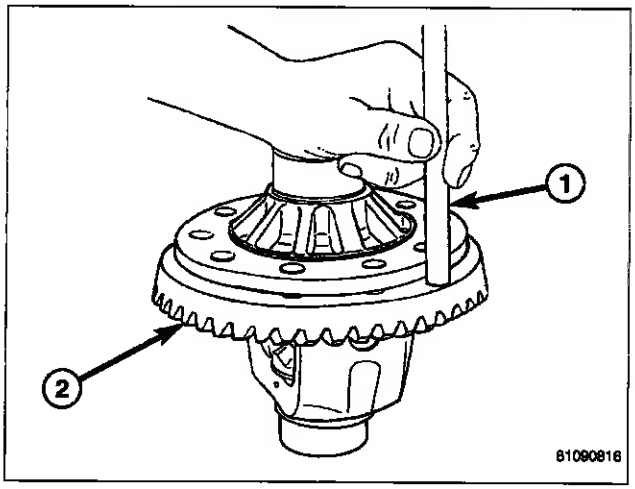


DISASSEMBLY

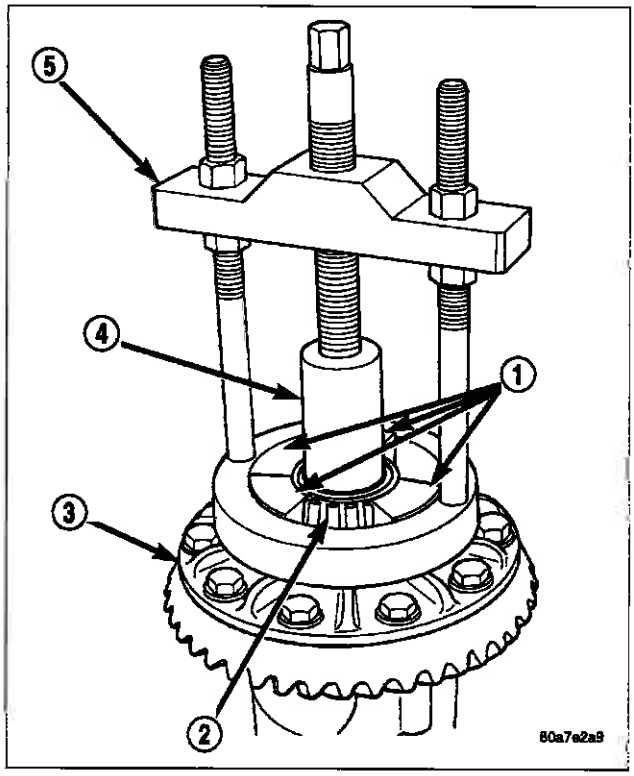
1. Remove differential ring gear-to-case bolts (1).



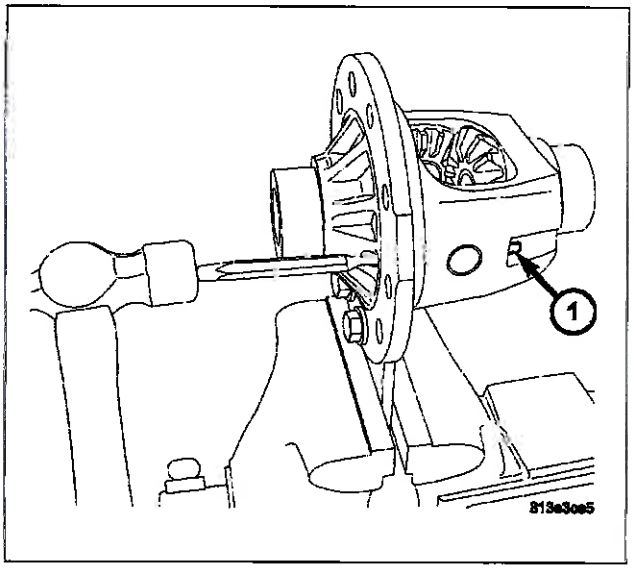
2. Using brass drift (1), remove ring gear (2).



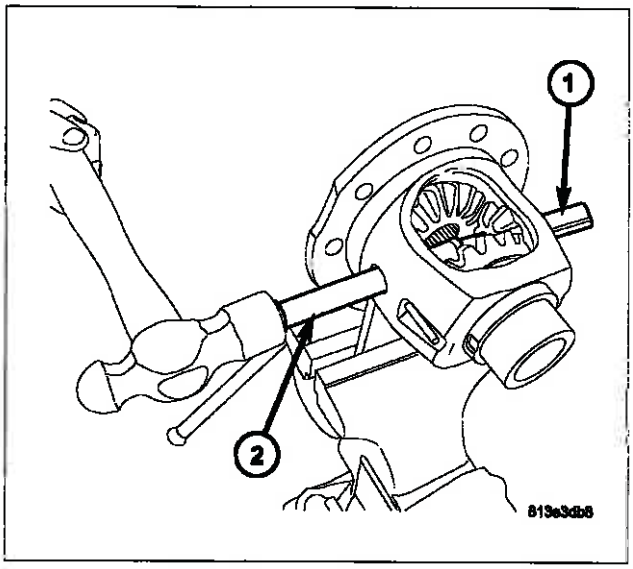
3. Remove bearings (2) from the differential case (3) with Puller/Press C-293-PA (5), Adapters C-293-37 (1) and Plug SP-3289 (4).



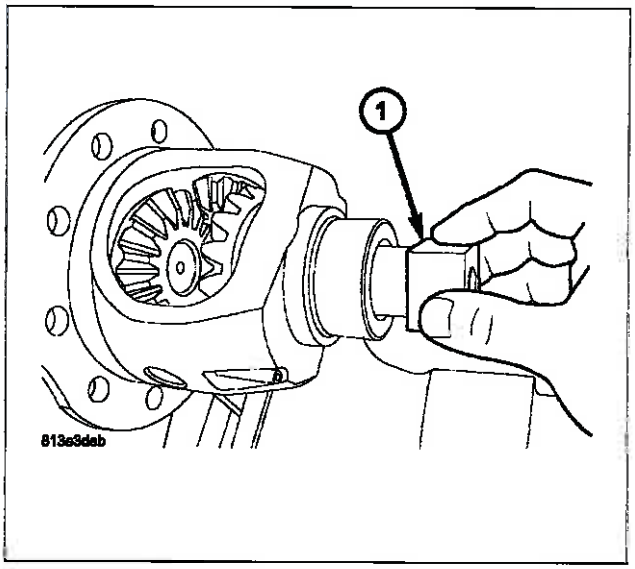
4. Drive out pinion shaft-to-case roll pin using hammer and suitable punch.



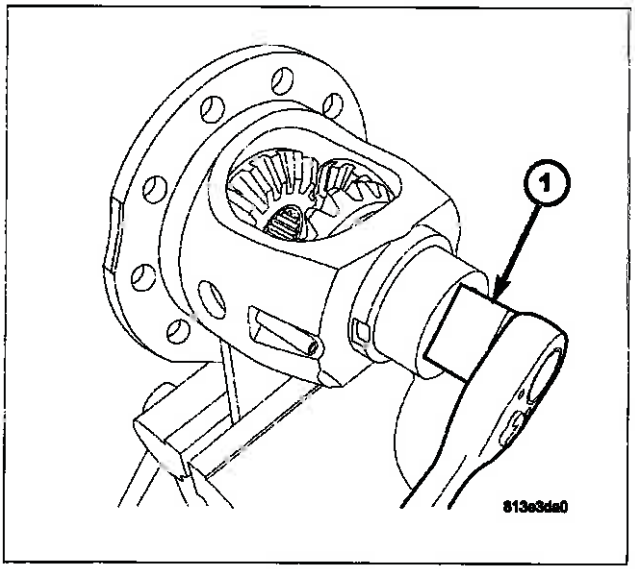
5. Using brass drift (2), drive out pinion shaft (1).



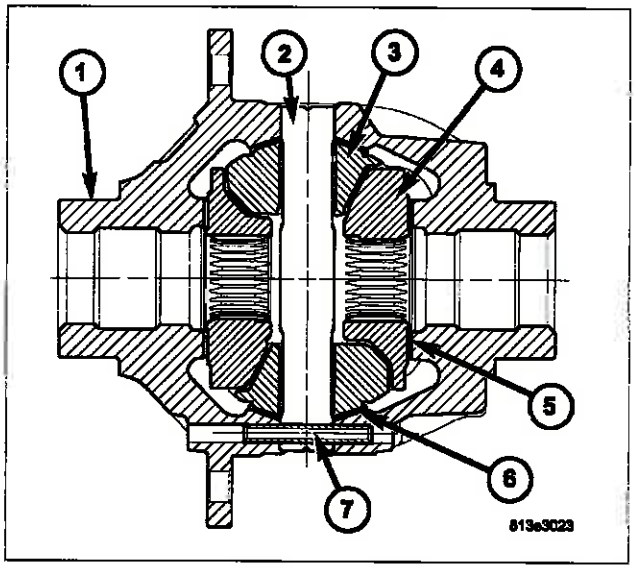
6. Install Tool 9631 (1) into differential side gear.



7. Rotate Tool 9631 (1) to gain access to and remove pinion gears and thrust washers.

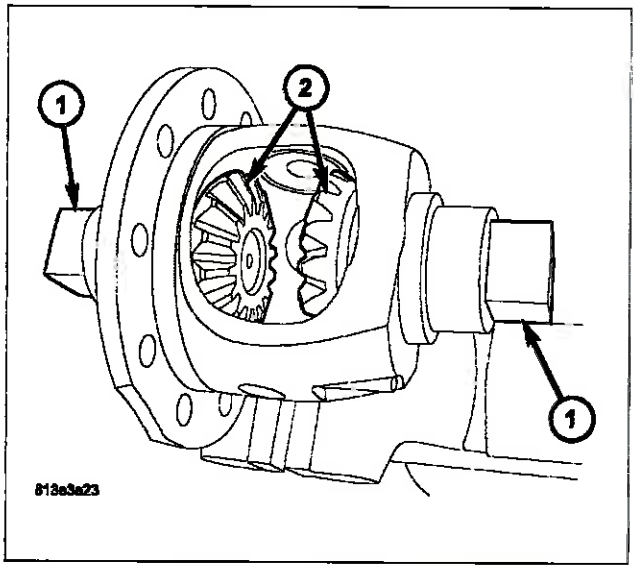


8. Remove differential side gears (4) and thrust washers (5).

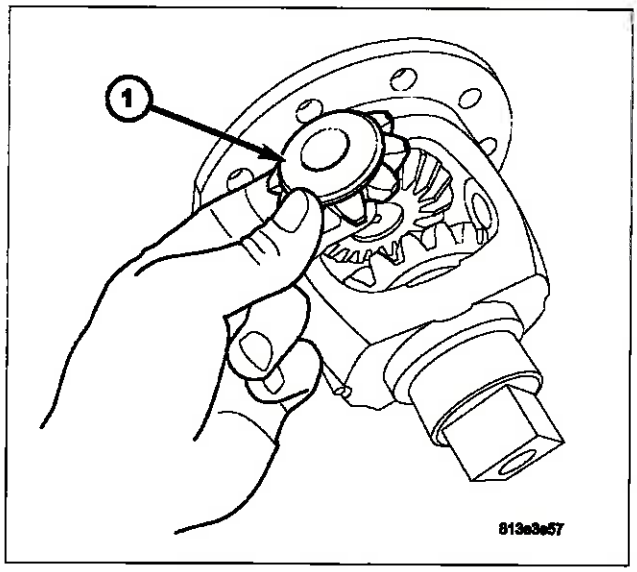


ASSEMBLY

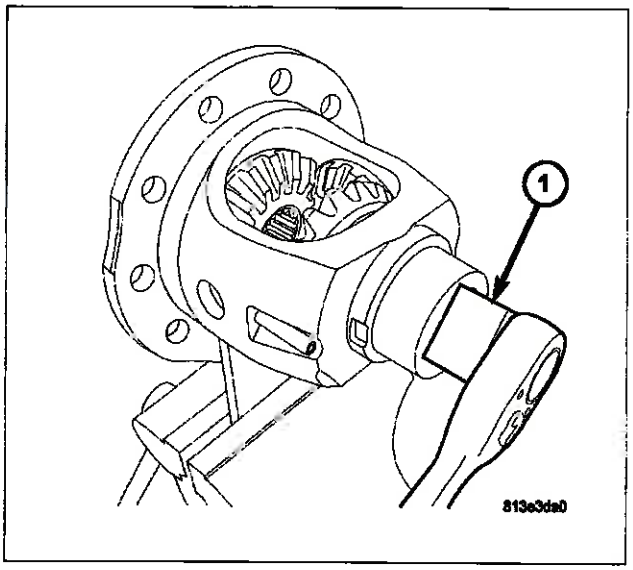
1. Lubricate all differential components with hypoid gear lubricant.
2. Install differential side gears (2) and thrust washers to Tools 9631 (1) as shown in illustration.



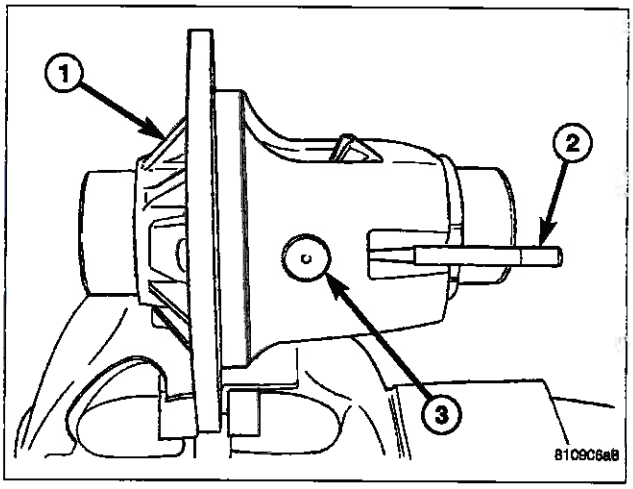
3. Install differential pinion gears (1) and thrust washers into position across from each other.



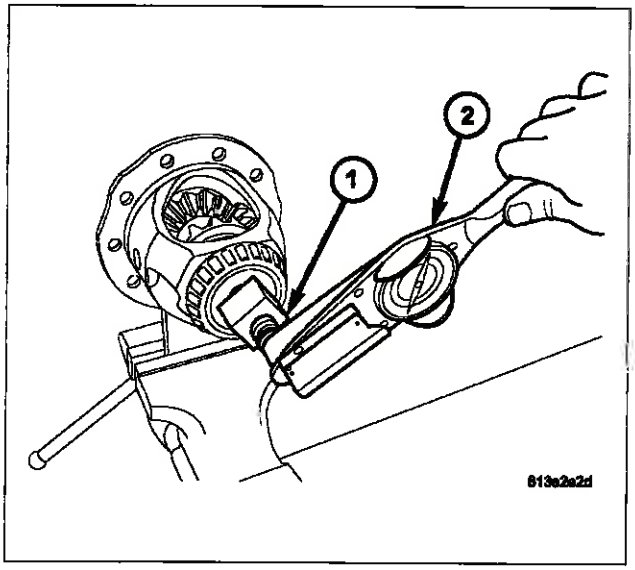
4. Rotate pinion gears into place using Tool 9631 and line up gear centers with pinion shaft bore.



5. Using a brass hammer, drive pinion shaft (3) into differential case (1), making sure to line up roll pin bores.
6. Using suitable punch (2), drive new roll pin into position.

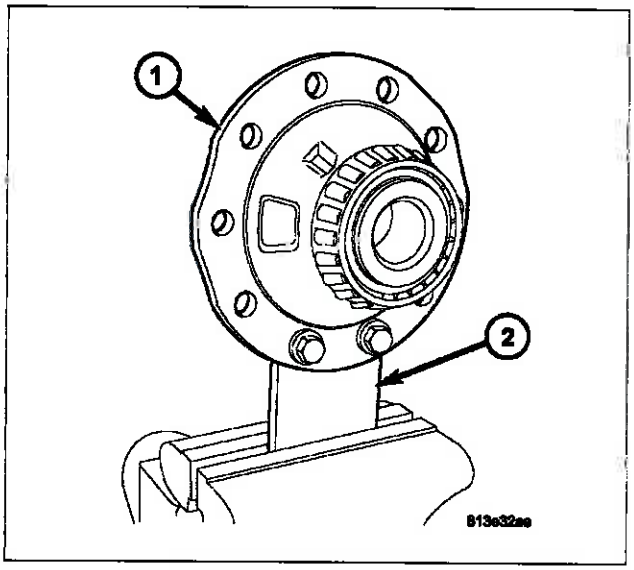


7. Measure differential gear rotating torque as shown. Differential gear rotating torque should be 5-30 N·m (44-266 in. lbs.) Rotating torque is adjusted using select side gear thrust washers. Refer to the following chart.

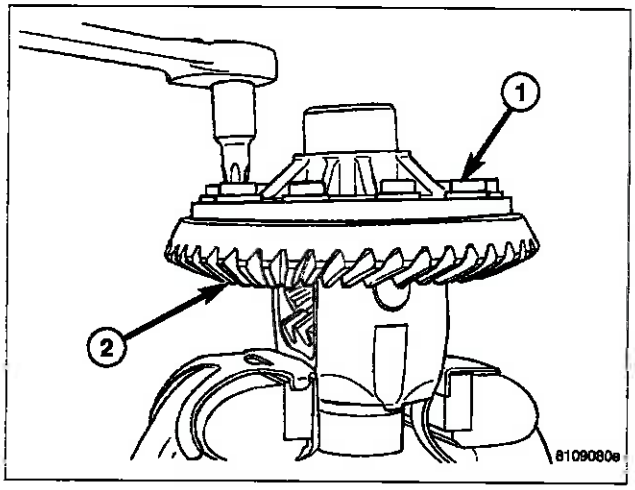


Available Side Gear Thrust Washer Thicknesses
1.25 mm (0.049 in.)
1.30 mm (0.051 in.)
1.35 mm (0.053 in.)
1.40 mm (0.055 in.)
1.45 mm (0.057 in.)
1.50 mm (0.059 in.)
1.55 mm (0.061 in.)
1.60 mm (0.063 in.)
1.65 mm (0.065 in.)

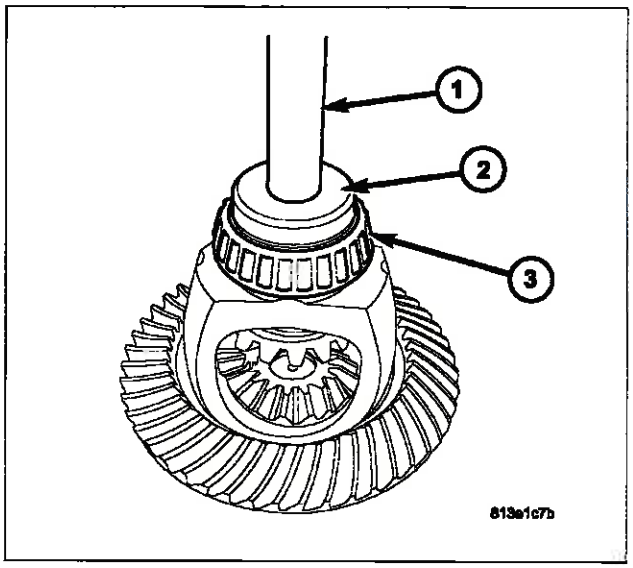
8. Remove differential case from Tool 9630 (2).



9. Install ring gear to case. Lightly tap ring gear into position to facilitate starting of bolts.
10. Install **new** ring gear-to-case bolts and torque to 85 N·m (63 ft. lbs.).



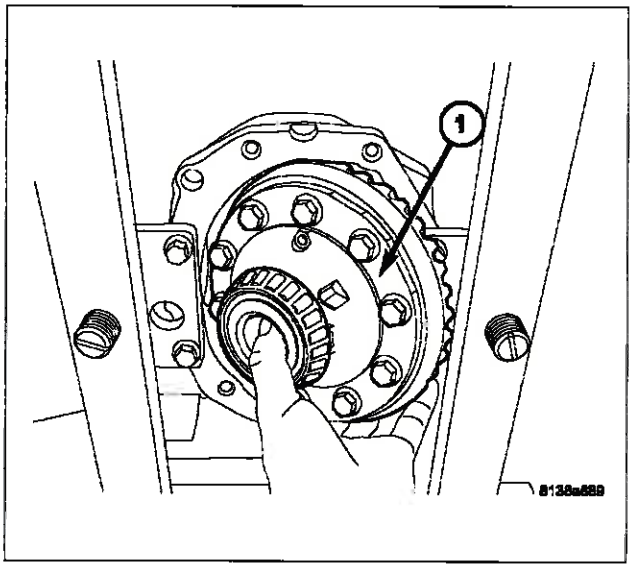
11. Using Tool 9523 (2) and Handle C-4171 (1), press **new** differential side bearings (3) onto differential case.



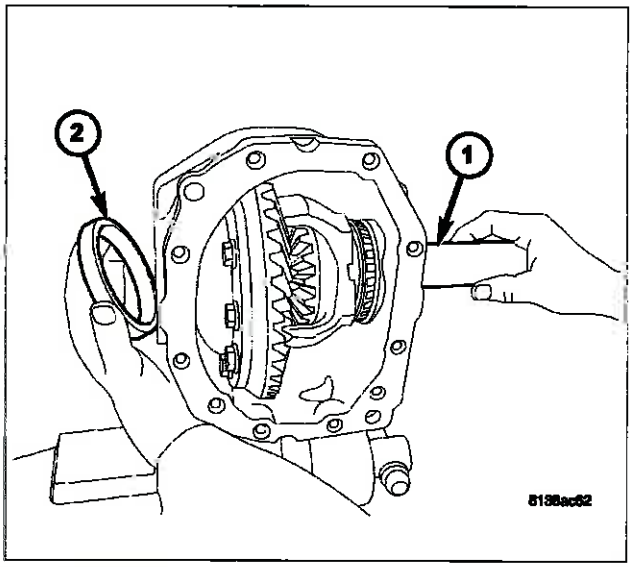
INSTALLATION

Note: If replacement differential side bearings or differential case are being installed, it is necessary to measure and adjust Differential Side Bearing Preload and Gear Backlash. Refer to Adjustments — Differential Side Bearing Preload and Gear Backlash to determine proper snap ring selection.

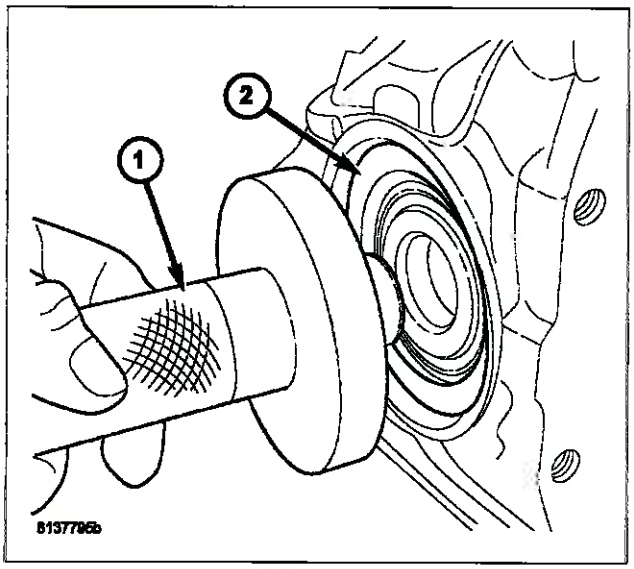
1. Install differential assembly (1) into axle housing.



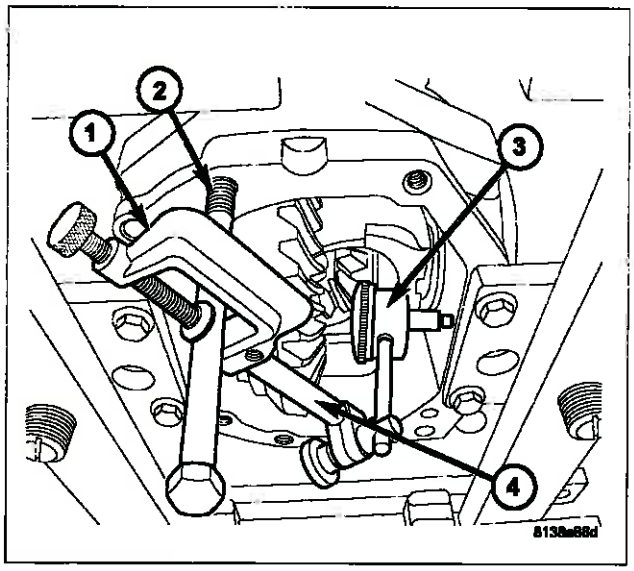
2. Install differential side bearing cups (2).



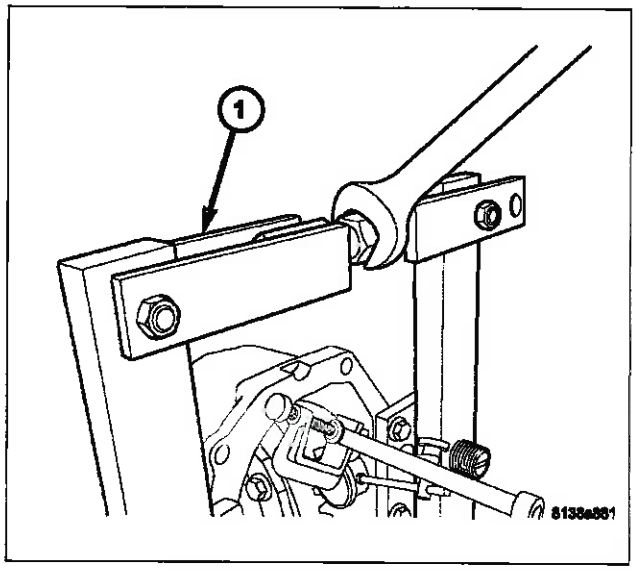
3. Use Tool 9522 (1) to aid in seating side bearing cups (2).



4. Set up Dial Indicator Set C-3339-A to measure housing spread as shown:
   a. Clamp SP-5426 (1)
   b. Post SP-5425-B (2)
   c. Metric Dial Indicator 9524 (3)

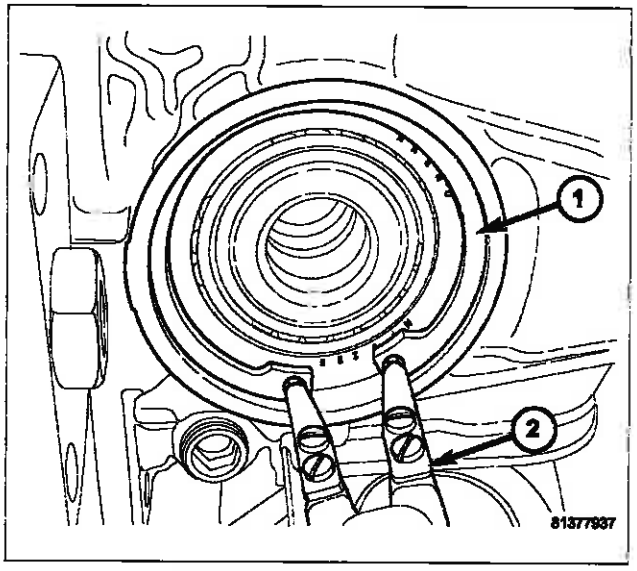


5. Expand spreader W-129-B (1) to spread axle housing no more than 0.30 mm (0.012 in.).

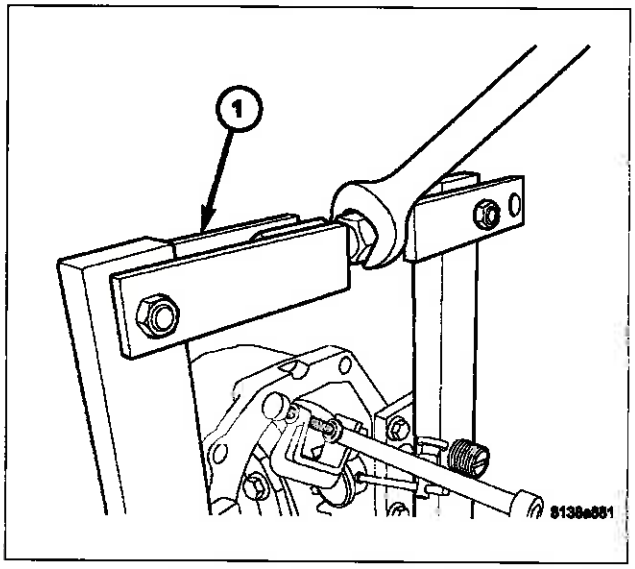


Note: The differential side bearing snap rings are select-fit, and control ring gear backlash and differential side bearing preload. It is necessary to return snap rings to their original position. If replacement differential side bearings or differential case are being installed, refer to Adjustments — Differential Side Bearing Preload and Gear Backlash to determine proper snap ring selection.

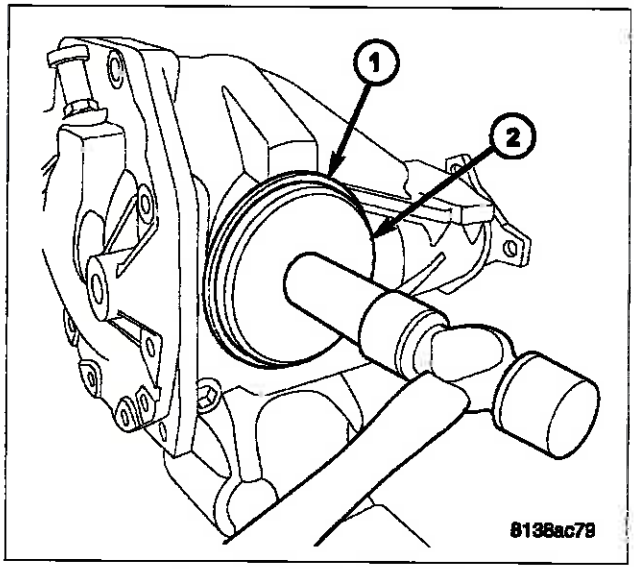
6. Using suitable snap ring pliers (2), install differential side bearing snap rings (1).



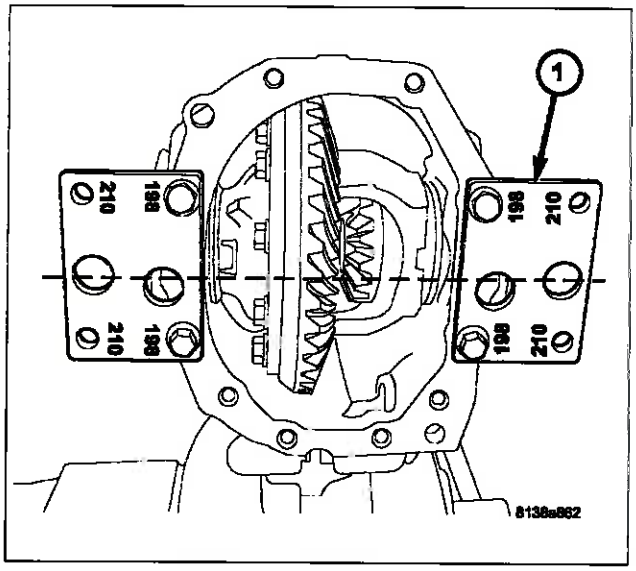
7. Back off W-129-B spreader (1) to relax tension on housing.



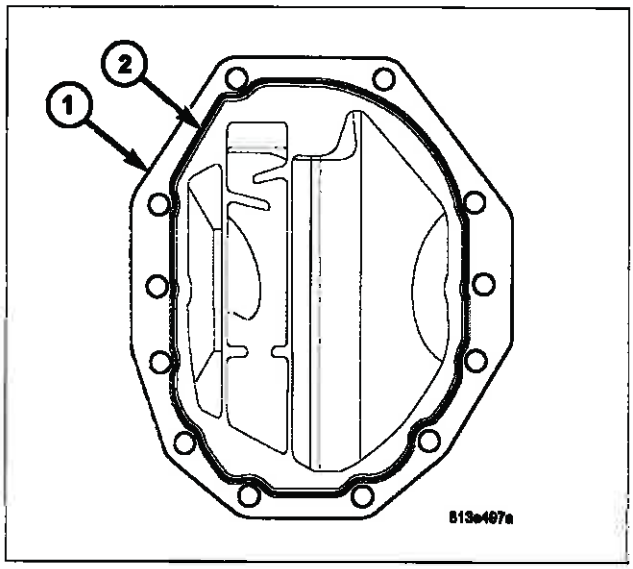
8. Install axle seals (1) using Tool 9223 (2).



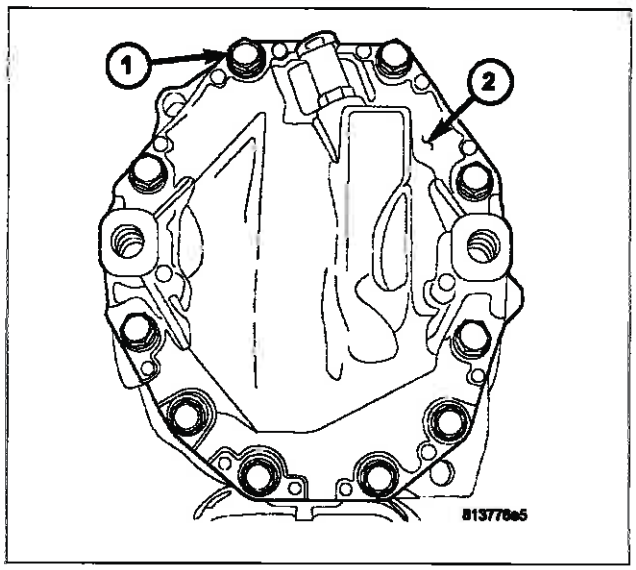
9. Remove spreader W-129-B and adapter plates 9226 (1).



10. Apply 4mm (0.157 in.) bead (2) of Mopar® Axle RTV to axle housing cover (1) as shown.



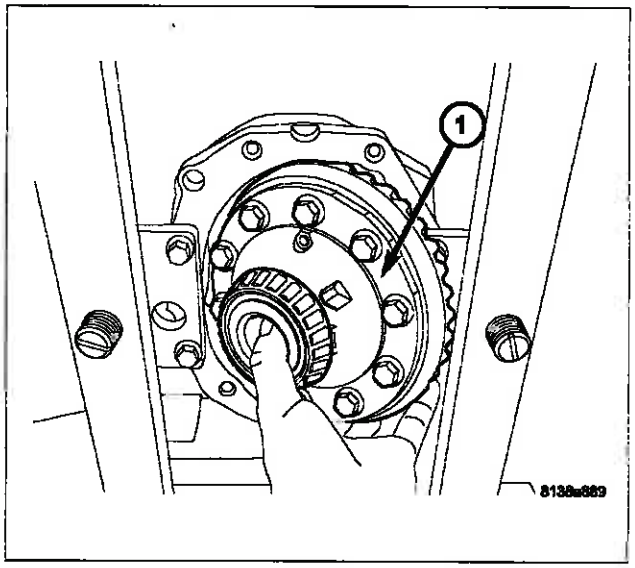
11. Install cover to axle housing. Install and torque cover-to-housing bolts to 30 N·m (22 ft. lbs.) + 90°.



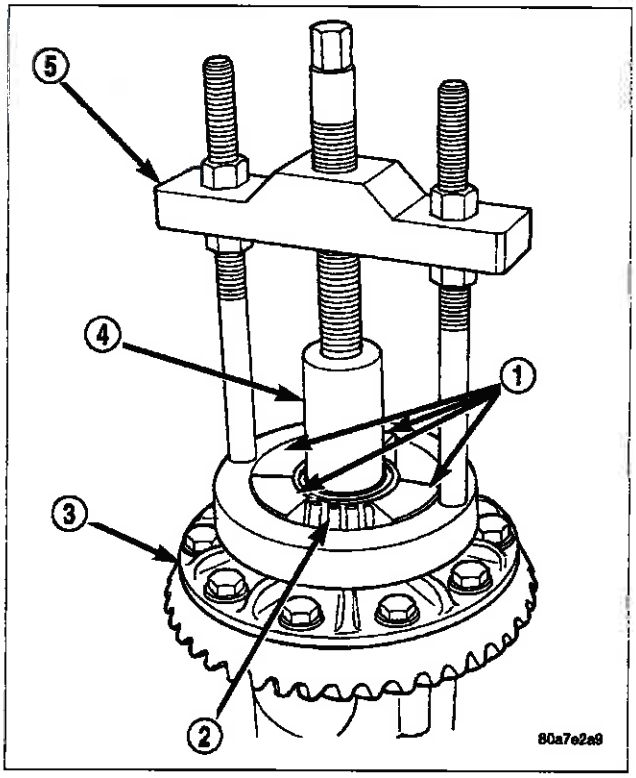
DIFFERENTIAL CASE BEARINGS

REMOVAL

1. Remove differential assembly from axle. Refer to Differential Removal.

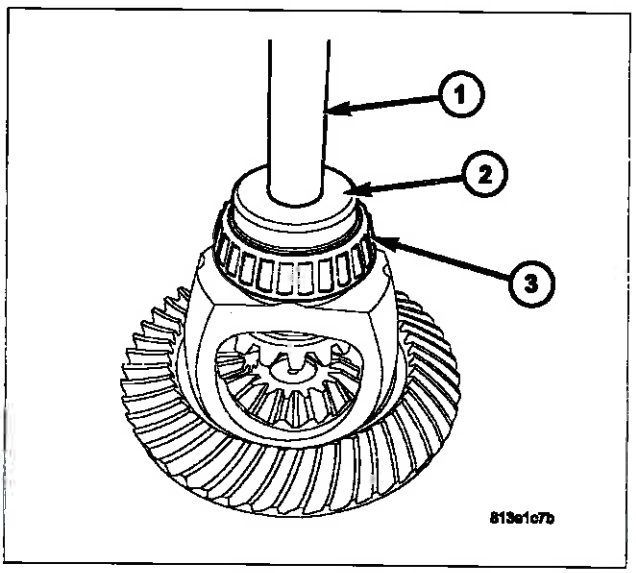


2. Remove bearings (2) from the differential case (3) with Puller/Press C-293-PA (5), Adapters C-293-37 (1) and Plug SP-3289 (4).

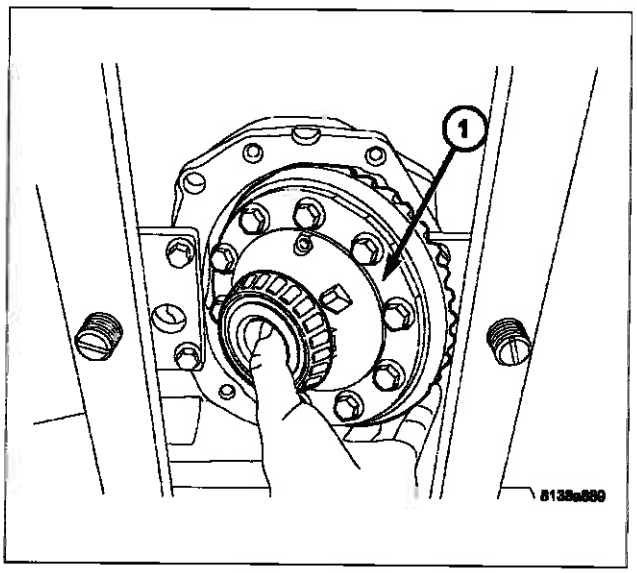


INSTALLATION

1. Using Tool 9523 and Handle C-4171, press differential side bearings onto differential case.



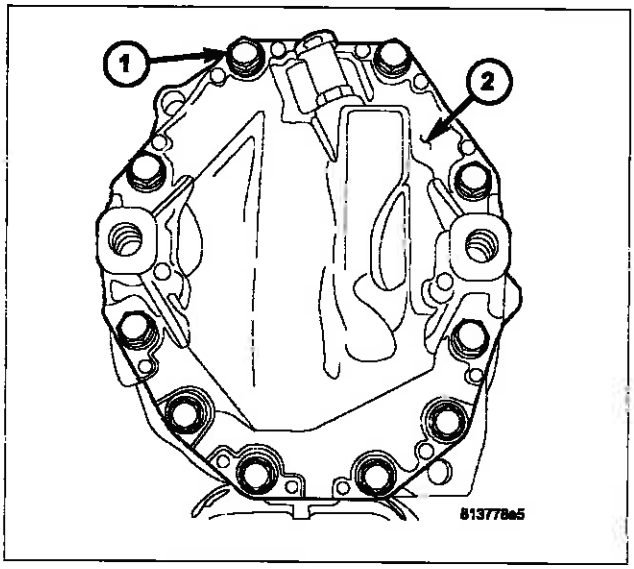
2. Install differential and reassemble axle assembly.



DIFFERENTIAL COVER

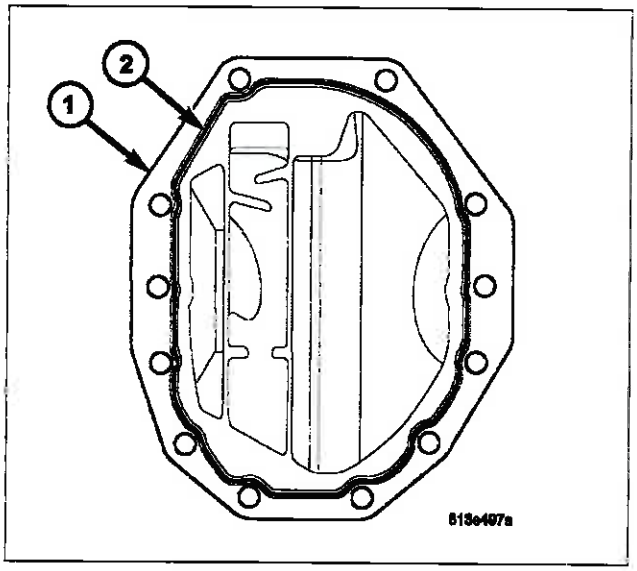
REMOVAL

1. Remove axle assembly from vehicle.(Refer to 3 - DIFFERENTIAL & DRIVELINE/REAR AXLE - 198MM - REMOVAL)
2. Remove axle housing cover bolts (1).
3. Using suitable screwdriver, remove axle housing cover (1).

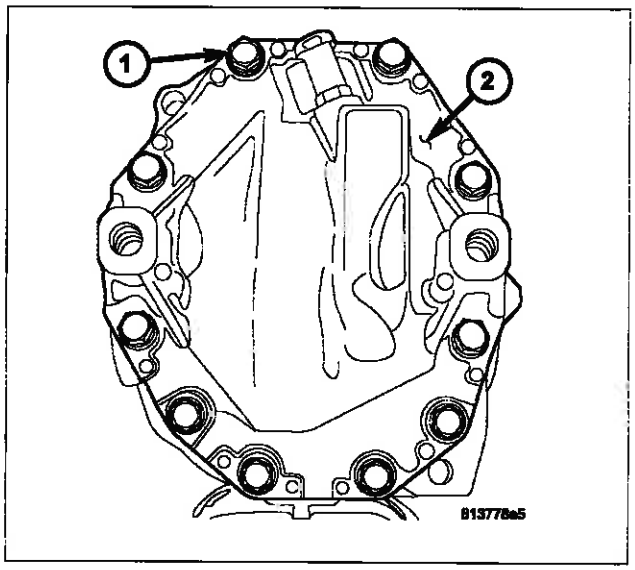


INSTALLATION

1. After thoroughly cleaning axle housing cover (1), apply a 4 mm (0.157 in.) bead (2) of Mopar® Axle RTV as shown.



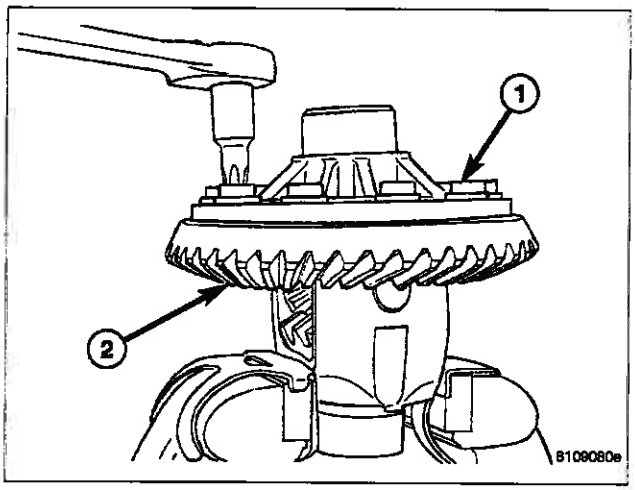
2. Immediately install cover (2) to axle housing. Install and torque axle housing cover bolts (1) to 30 N·m (22 ft. lbs.) + 45°.
3. Install axle assembly to vehicle.(Refer to 3 - DIFFERENTIAL & DRIVELINE/REAR AXLE - 198MM - INSTALLATION)



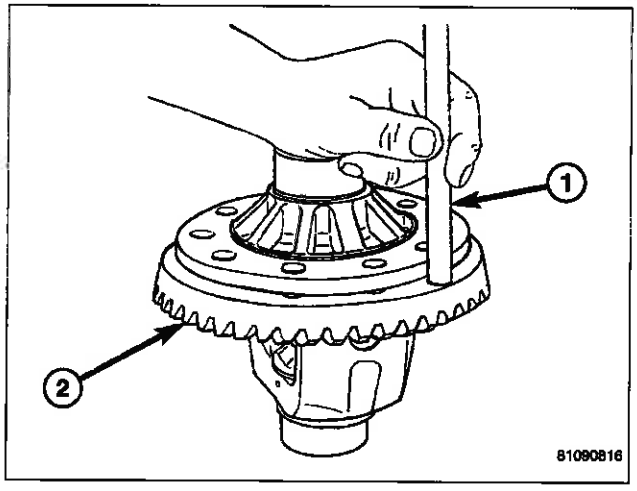
PINION GEAR/RING GEAR

REMOVAL

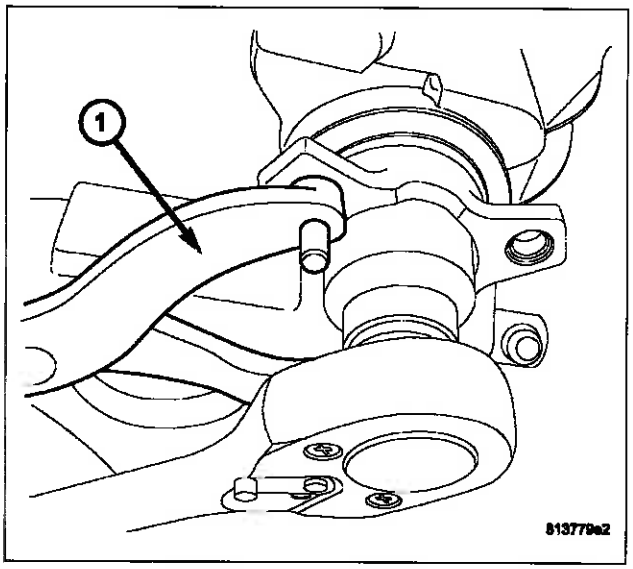
1. Remove differential assembly. (Refer to 3 - DIFFERENTIAL & DRIVELINE/REAR AXLE - 198MM/ DIFFERENTIAL - REMOVAL)
2. Place differential case in a soft-jawwed vise and remove ring gear-to-case bolts.



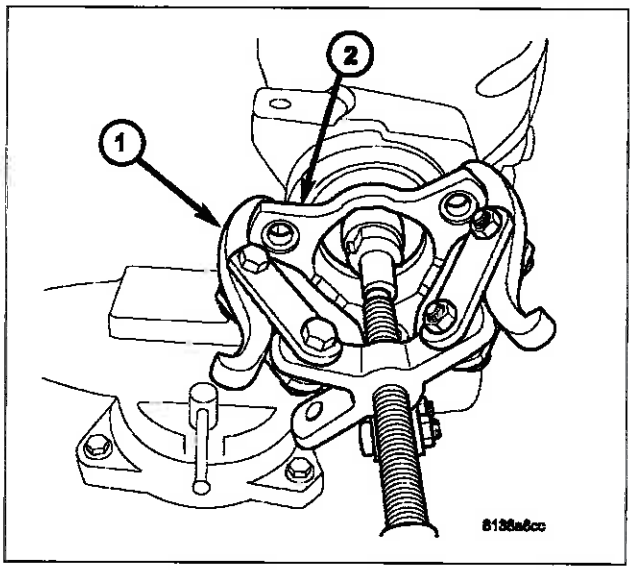
3. Remove ring gear from differential case with a brass drift and hammer.



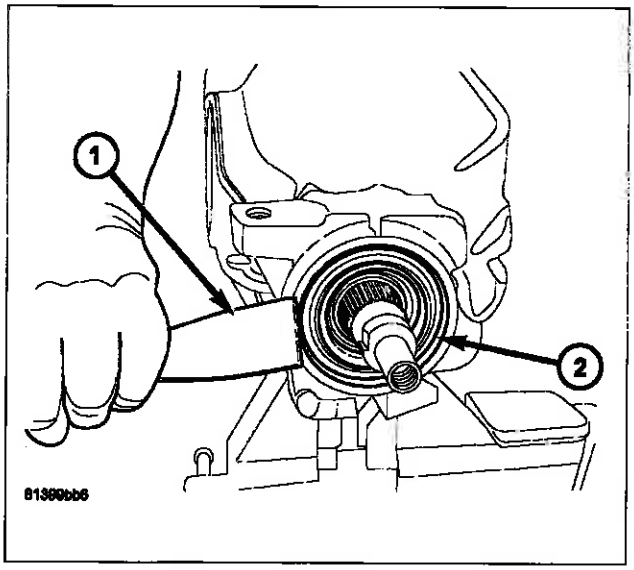
4. Using 41mm socket and flange wrench Tool C-3281 (1), remove pinion nut and discard.



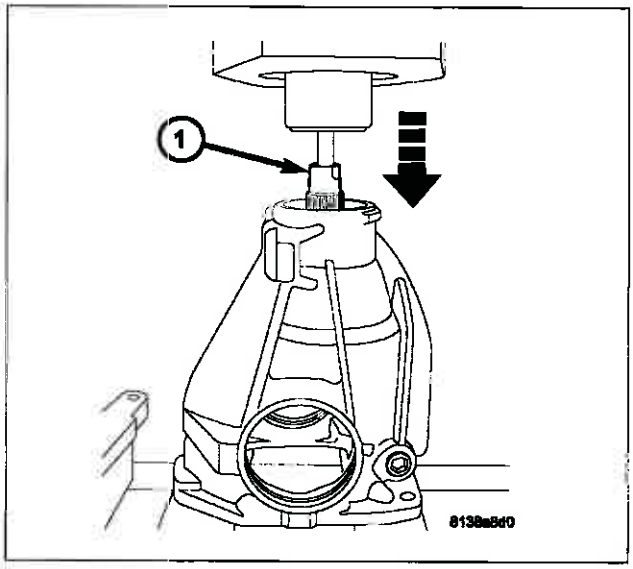
5. Using puller Tool 1026 (1), remove pinion flange (2).



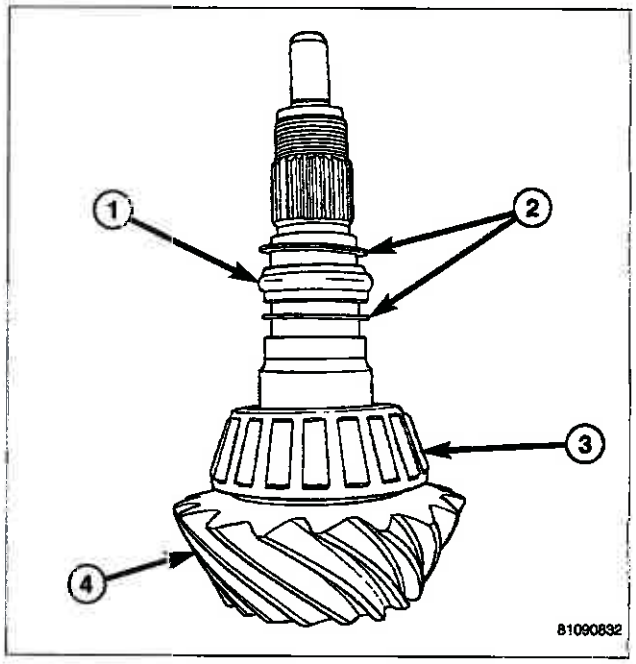
6. Using a suitable screwdriver, remove and discard the pinion seal.
7. Remove pinion tail bearing cone.



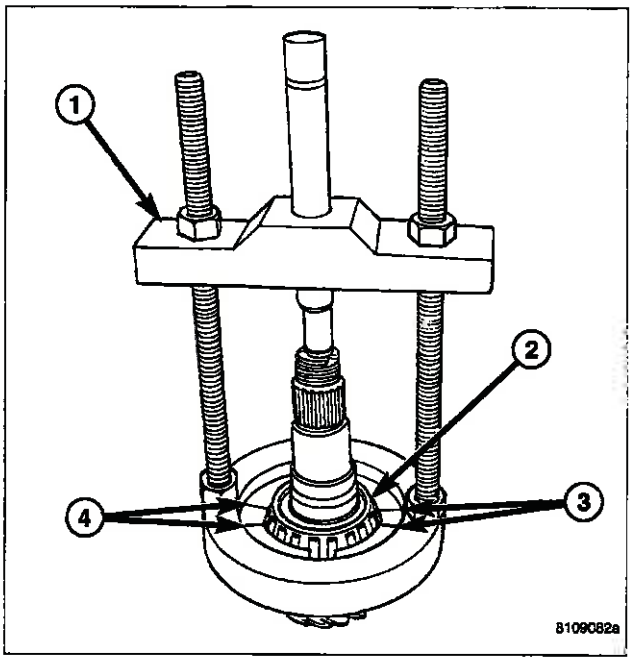
8. Move axle housing to press and press out pinion shaft (1) as shown.



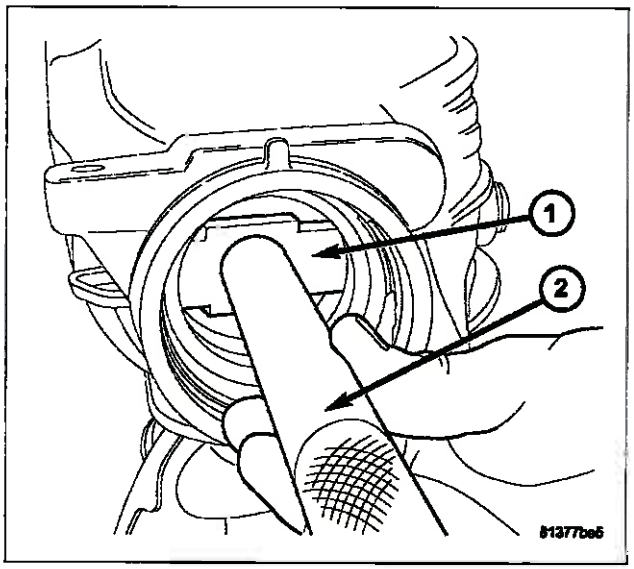
9. Remove collapsible spacer (1) and washers (2). Discard collapsible spacer.



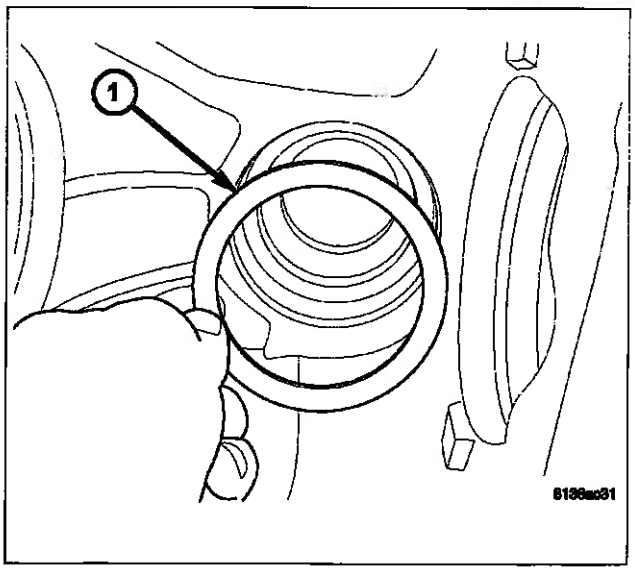
10. Remove pinion head bearing (2) with Puller C-293-PA (1) and Adapters C-293-37 (3,4).



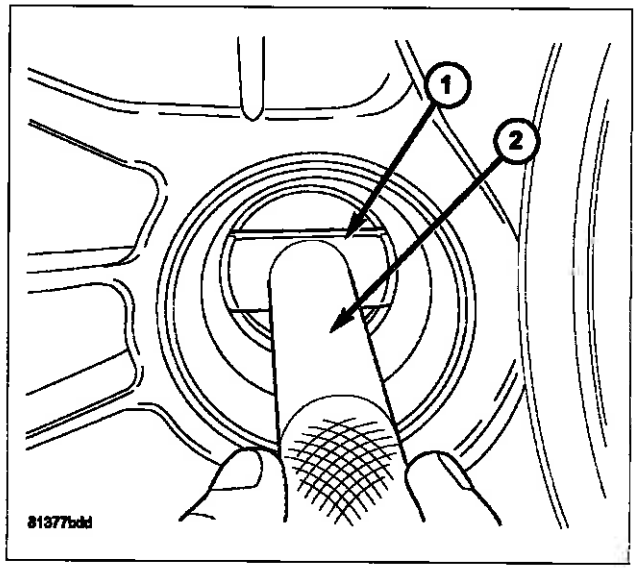
11. Using driver handle C-4171(2) and remover Tool 9084 (1), drive out pinion head bearing cup.



12. Remove pinion head shim. Measure and record shim thickness.

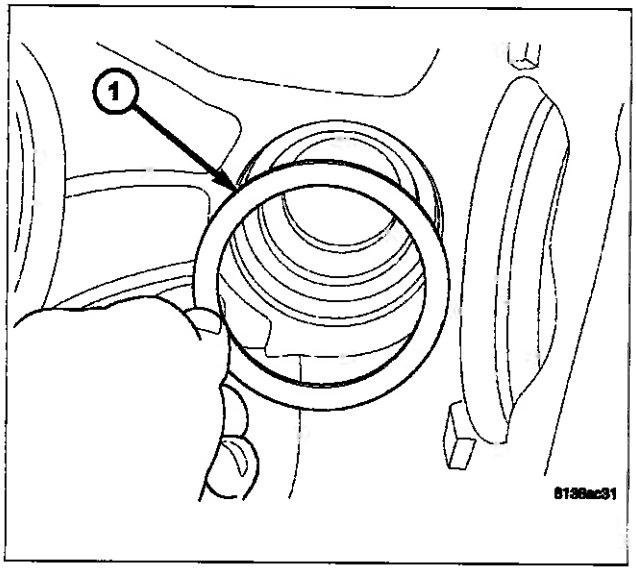


13. Using driver handle C-4171 (2) and remover Tool D-149 (1), drive out pinion tail bearing cup.

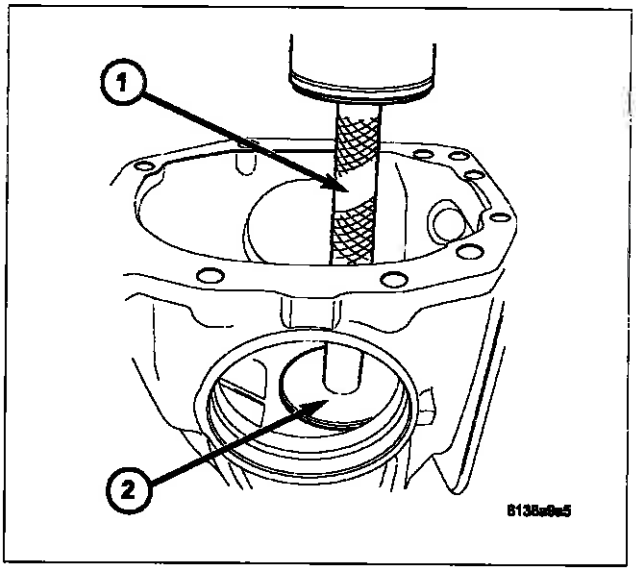


INSTALLATION

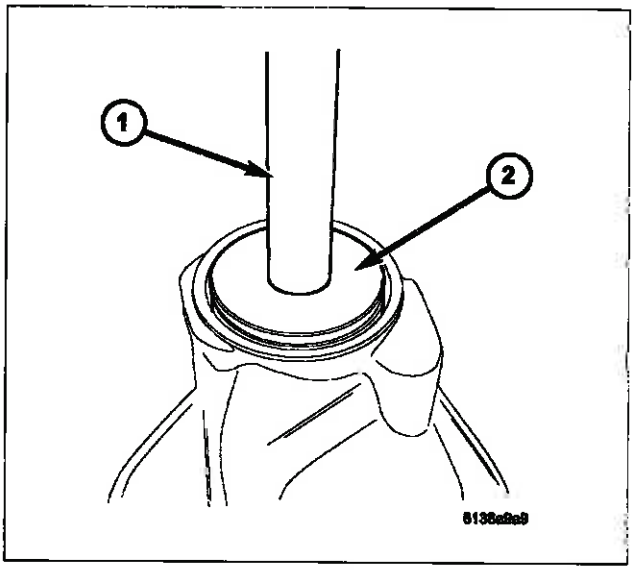
1. Install selected pinion depth shim (1) into housing.



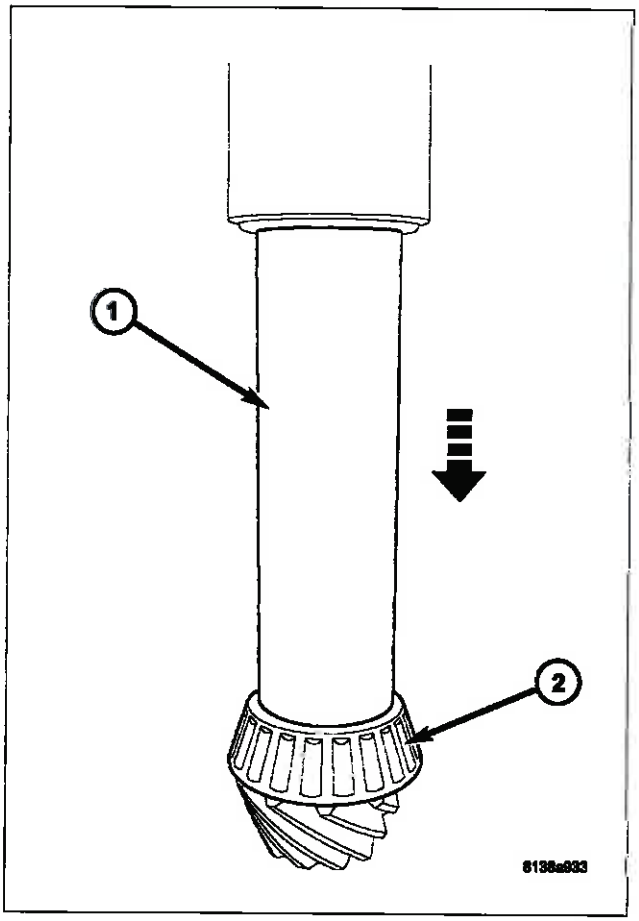
2. Press pinion head bearing cup into housing using Tools C-4171 (1) and C-4310 (2).



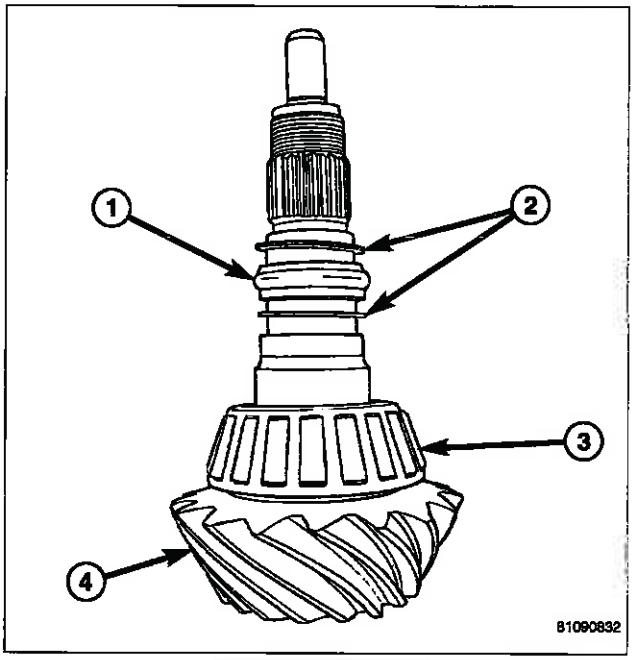
3. Press pinion tail bearing cup into housing using Tools C-4171 (1) and D-146 (2).



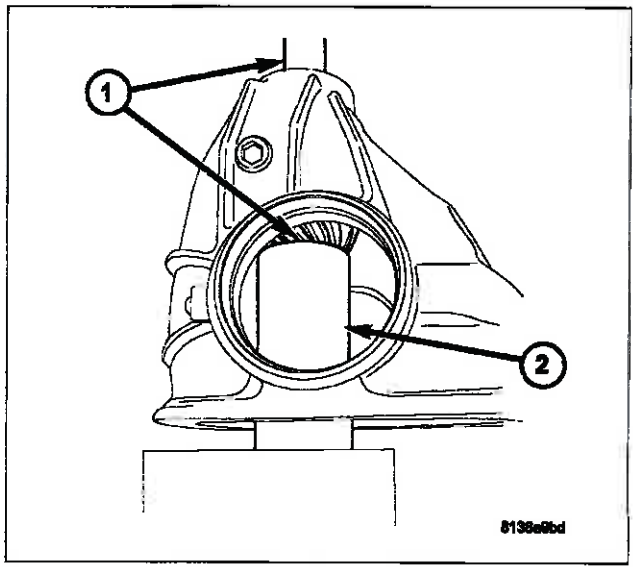
4. Press **new** pinion head bearing (2) onto pinion shaft using Tool C-3095-A (1).



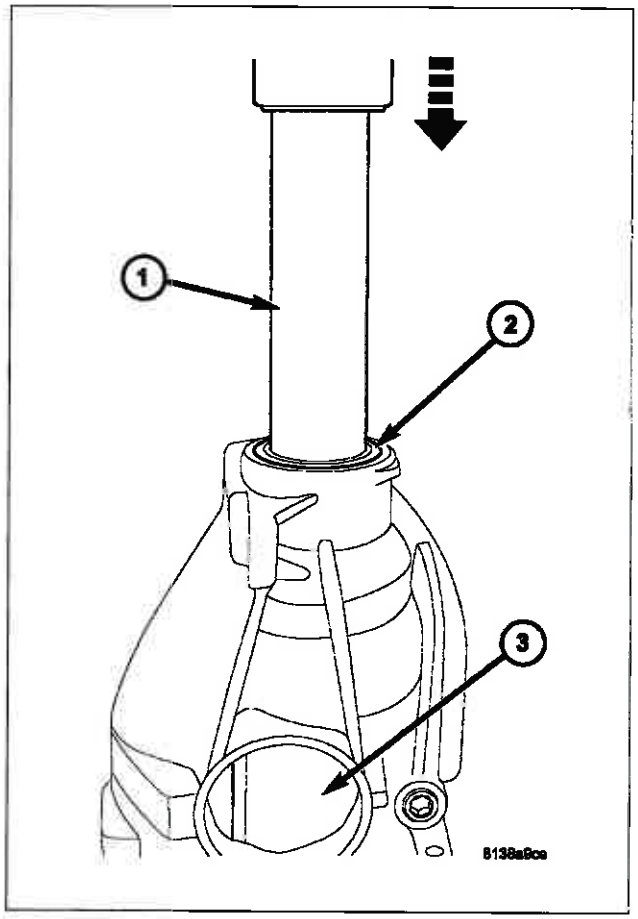
5. Install washers (2) and **new** collapsible spacer (1) to pinion shaft.



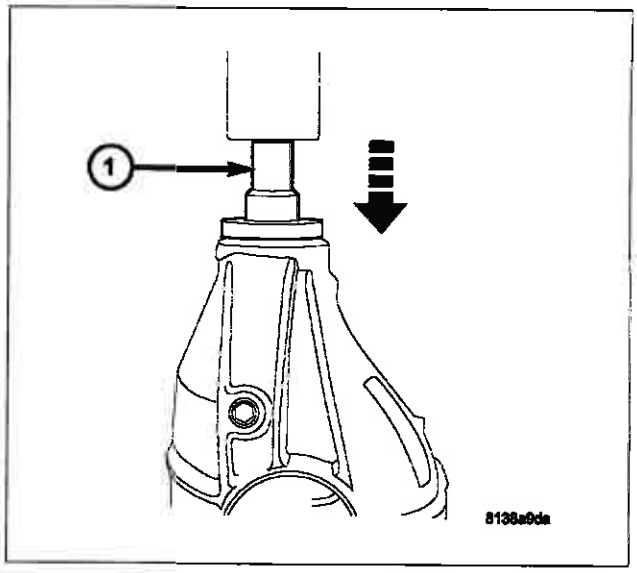
6. Install pinion shaft (1) into housing and support on press table atop Tool 8255 (2). **Ensure pinion gear face is centered atop Tool 8255.**



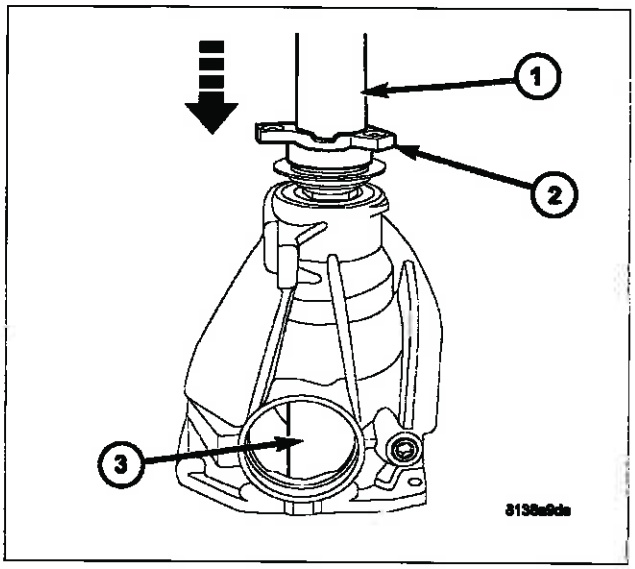
7. Using Tool C-3095-A (1), press on **new** pinion tail bearing (2).



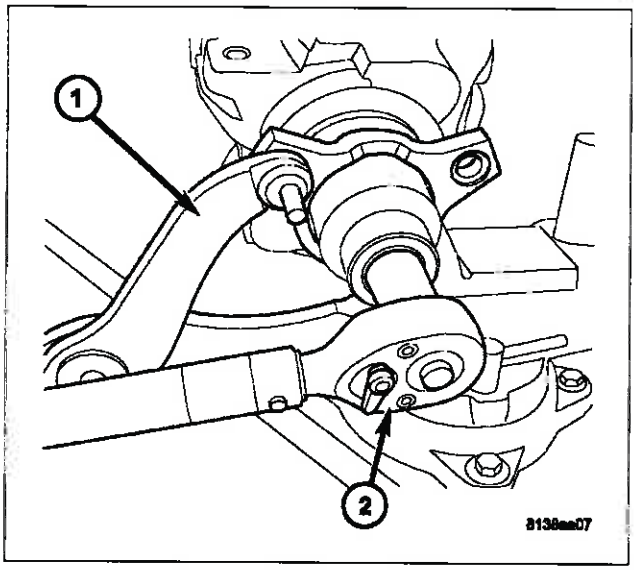
8. Install new pinion seal into position.
9. Press pinion seal into housing using Tool 9231A (1).



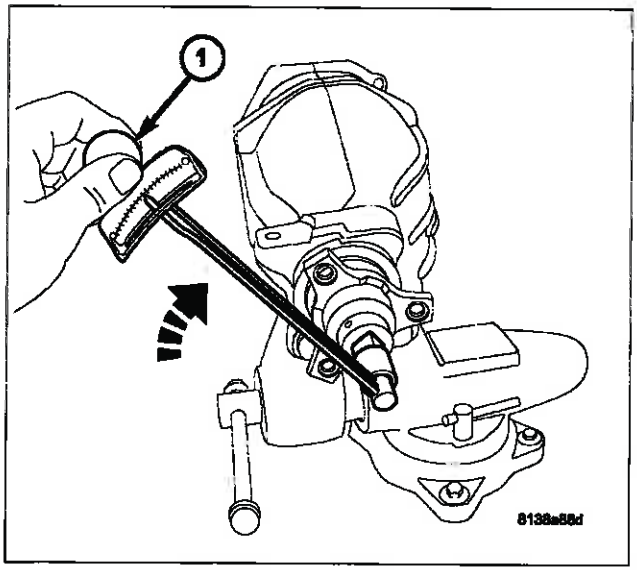
10. Lightly lubricate pinion flange seal with axle lubricant for flange installation.
11. Align index marks and press pinion flange (2) on using Tool C-3095-A (1).



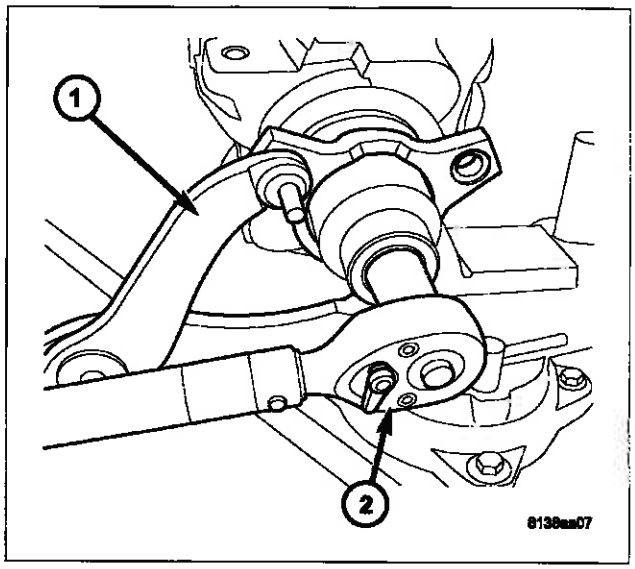
12. Install new pinion flange nut by hand.
13. Hold pinion flange with Tool C-3281 (1). Using a deep 41 mm socket, tighten pinion flange nut to an initial torque of 203 N·m (150 ft. lbs.).



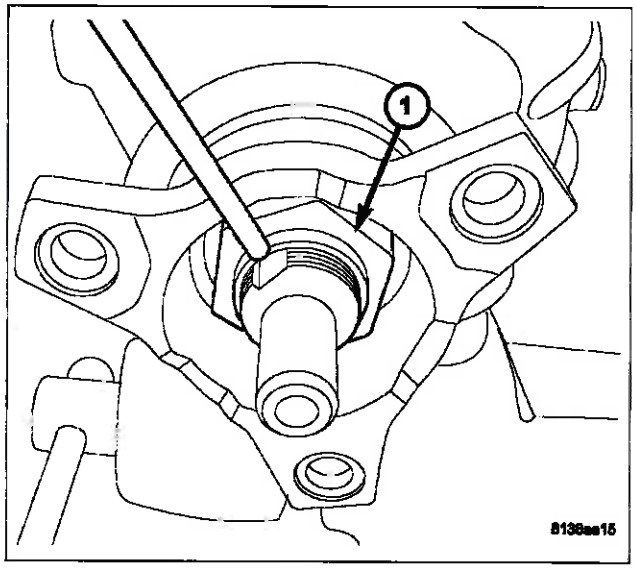
14. Rotate pinion flange to ensure bearing is properly seated.
15. Measure pinion rotating torque using suitable torque wrench (1). **Pinion rotating torque should be 215-245 N. cm (19-22 in. lbs.).**
16. If pinion rotating torque exceeds the specified range, the pinion shaft must be removed and the crush sleeve replaced.



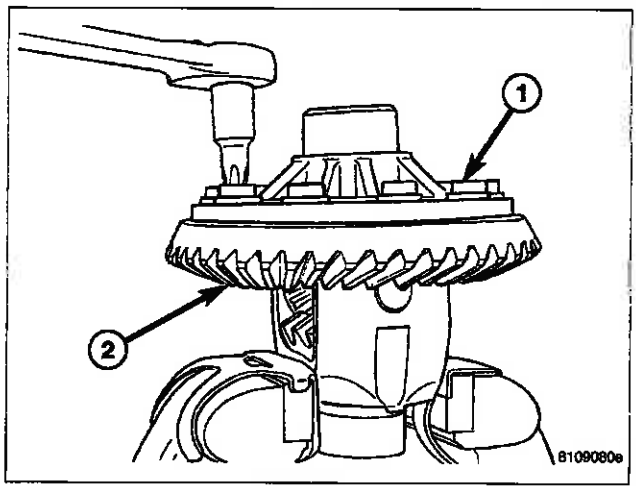
17. If pinion rotating torque is below the specified range, increase nut torque by 7 N·m (5 ft. lbs.) increments and recheck turning torque until rotating torque is within range.



18. Stake pinion flange nut (1) using hammer and suitable punch.



19. Install ring gear to differential case. Loosely install **new** ring-gear-to-differential case bolts.
20. Torque all ring gear-to-case bolts to 85 N·m (64 ft. lbs.)



21. Install differential and reassemble axle assembly. (Refer to 3 - DIFFERENTIAL & DRIVELINE/REAR AXLE - 198MM/DIFFERENTIAL - INSTALLATION)