Rear Drive Axle - Vue

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Clutch Cover M8 Bolts	26 N.m	19 lb ft
Drain Plug	30 N.m	22 lb in
Fill Plug	35 N.m	26 lb ft
Input Flange 3/4 x 20 Nut	203 N.m	150 lb ft
Prop Guard	24 N.m	18 lb ft
Propeller Shaft-to-Drive Shaft Flange M10 Bolts	70 N.m	52 lb ft
Rear Bracket Bushing-to-Body M12 Bolts	105 N.m	77 lb ft
Rear Bracket M12 Bolts/Nuts	105 N.m	77 lb ft
Rear Cover M10 Bolts	46 N.m	34 lb ft
Rear Cover M8 Bolts	26 N.m	19 lb ft
Ring Gear M8 Bolts	54 N.m	40 lb ft
Side Bracket Bushing-to-Body M12 Bolts	105 N.m	77 lb ft
Vent Fitting	24 N.m	18 lb ft

REAR AXLE SPECIFICATIONS

Rear Axle Specifications

Application	Specification	
	Metric	English
Assembly Rolling Torque - without Clutch Lubed Bearings	1.9-3.5	17-31 lb in
Gear Ratio, L61 2.2L and L81 3.0L	2.53	2.53
Gear Ratio L66 3.5L	3.39	3.39
Pinion Shaft Preload	1.69 N.m	15 lb in
Pinion to Ring Gear Backlash	0.125-0.225 mm	0.005-0.009 in
Rear Differential Fill Quantity	750 ml	25.4 oz

SEALERS, ADHESIVES, AND LUBRICANTS

Sealers, Adhesives, and Lubricants

Application	Type of Material	Saturn P/N
		United States

Clutch Housing to Differential Housing Sealing Surfaces	Sealant	21019581
Drain Plug Threads	Sealant	21485278
Fill Plug Threads	Sealant	21485278
GM Versatrak Fluid	Synthetic Gear Oil	12378514
Propeller Shaft Mounting Bolts	Threadlocker	21005994
Rear Cover to Differential Housing Sealing Surfaces	Sealant	21019581
Ring Gear Pattern Inspection	Gear Marking Compound	1052351

COMPONENT LOCATOR

REAR AXLE DISASSEMBLED VIEWS

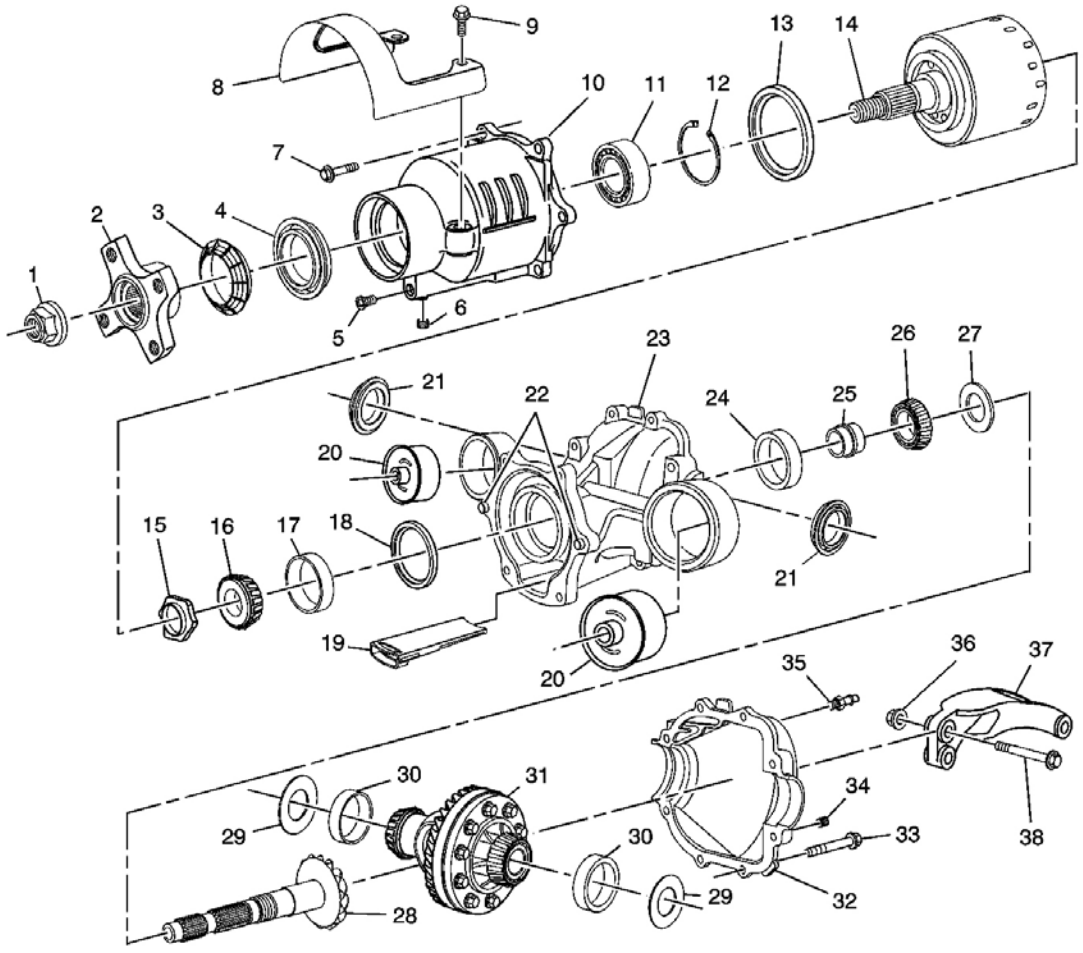


Fig. 1: Rear Axle Disassembled View
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1 Disassembled View

Callout	Component Name
1	Nut
2	Input Flange
3	Dust Shield
4	Oil Seal
5	Drain Plug
6	Plug
7	Bolt
8	Shield
9	Bolt
10	Clutch Cover
11	Bearing
12	Snap Ring
13	Seal
14	Clutch Drum
15	Pinion Nut
16	Bearing
17	Cup
18	Seal
19	Filter
20	Mount
21	Axle Seals
22	Hollow Dowel
23	Differential Carrier
24	Cup
25	Collapsible Spacer
26	Bearing
27	Shim
28	Pinion Gear
29	Shim
30	Cup
31	Differential Carrier Assembly
32	Cover
33	Bolt
34	Fill Plug
35	Vent
36	Nut
37	Bracket
38	Bolt

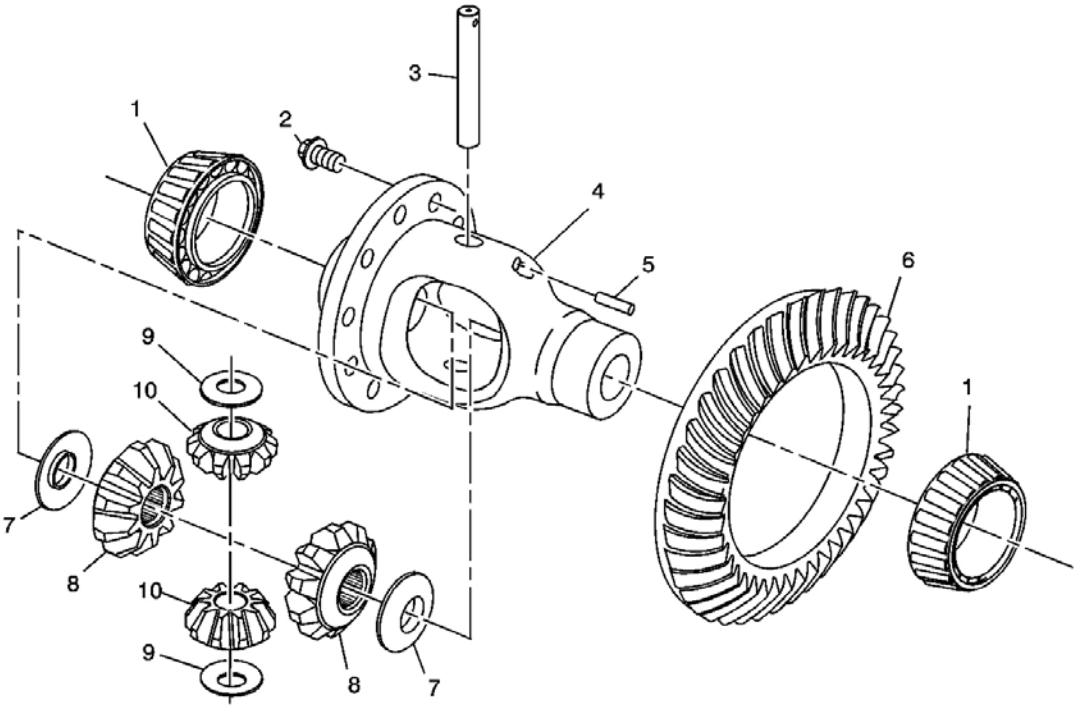


Fig. 2: Differential Carrier Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2 Disassembled View

Callout	Component Name
1	Bearing
1	Bearing
2	Bolt
3	Pinion Shaft Pin
4	Differential Case
5	Pinion Shaft Lock Pin
6	Ring Gear
7	Washer
7	Washer
8	Axle Side Gear
8	Axle Side Gear
9	Washer
9	Washer
10	Pinion Gears
10	Pinion Gears

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - REAR DRIVE AXLE

Begin the system diagnosis by reviewing the **Rear Axle Disassembled Views** or **Rear Drive Axle Description and Operation** , and **Transfer Case Description and Operation** in Transfer Case NVG900. Reviewing the description and operation information will help you determine the correct symptom diagnostic procedure when a malfunction exists. Reviewing the description and operation information will also help you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Rear Drive Axle** procedure for diagnosing the system.

SYMPTOMS - REAR DRIVE AXLE

Strategy Based Diagnostics

Review the system in order to familiarize yourself with the system functions. Refer to **Rear Axle Disassembled Views** or **Rear Drive Axle Description and Operation** , and **Transfer Case Description and Operation** in Transfer Case NVG900. All diagnosis on a vehicle should follow a logical process. Strategy based diagnostics is a uniform approach for repairing all systems. The diagnostics flow may always be used in order to resolve a system problem. The diagnostic flow is the place to start when repairs are necessary. For a detailed explanation, refer to **Strategy Based Diagnosis** .

Visual/Physical Inspection

- Inspect for aftermarket devices, which could affect the operation of the vehicle. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or a condition which could cause the symptom.
- Check for correct lubricant level and proper viscosity.
- Verify the exact operating conditions under which the concerns exist. Note factors such as speed, road conditions, ambient temperature, and other specifics.
- Compare the driving characteristics or sounds, if applicable, to a known good vehicle and make sure you are not trying to correct a normal condition.

NOTE: **Do not exceed more than 5 seconds of parking brake application. RDM damage may result.**

- Rear Axle activation and operation may be checked by position the four wheels off the ground, starting the vehicle, and selecting the drive position. A properly operating rear axle and transfer case will rotate all four wheels at equal RPM. Fully apply the parking brake, the rear will stop turning. Apply the throttle while watching the rear wheels. They will rotate slightly as the driveline winds-up. This indicates the AWD is functioning.
- Factors that may contribute to an inoperative rear axle include:
  - A low gear oil level
  - A mini spare or different size tires

- A fluid over-temperature condition
- A defective rear axle assembly
- An inoperative transfer case assembly
- The wrong fluid type

Intermittent

Test the vehicle under the same conditions that the customer reported in order to verify the system is operating properly.

Noise Acceptability

A gear driven unit will produce a certain amount of noise. Some noise is acceptable and audible at certain speeds, or under various driving conditions, such as a newly-paved blacktop road. Slight noise is not detrimental to the operation of the axle and is considered normal.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Noisy in Drive**
- **Noisy When Coasting**
- **Intermittent Noise**
- **Constant Noise**
- **Noisy on Turns**
- **Rear Axle Lubricant Leak Diagnosis**

NOISY IN DRIVE

Noisy in Drive

Cause	Correction
Inspect for proper gear oil levels prior to performing system diagnosis.	
Loose propeller shaft mounting bolts	Tighten the bolts as required. Refer to **Fastener Tightening Specifications** in Propeller Shaft.
Worn propeller shaft constant velocity joint	Replace the propeller shaft assembly. Refer to **Propeller Shaft Replacement** in Propeller Shaft. A worn propeller shaft constant velocity joint may create a clicking, grinding, or snapping type noise.
Worn or loose center bearing assembly	Replace the center bearing assembly as required. A worn center bearing may cause vehicle vibration or a grinding, squealing type of noise. Refer to **Center Bearing Removal** in Propeller Shaft.
Worn universal joints	Replace the universal joints as required. A worn universal joint may create a clicking or snapping type of noise. Refer to **Universal Joint Replacement - External Snap Ring**

	in Propeller Shaft.
Worn axle shaft constant velocity joints	Replace/repair the constant velocity joints as required. A worn axle shaft constant velocity joint may create a clicking, grinding, or snapping type of noise. Refer to **Symptoms - Rear Drive Axle** .
Transfer case noise	Refer to Diagnostic Starting Point-Transfer Case procedure in Power Take-Off Unit.
Worn or damaged axle mounting bushings (side)	Replace bushings as required. A worn bushing may create a clunk type of noise during acceleration or deceleration. Refer to **Differential Housing Support Bushing Replacement** .
Worn or damaged axle mounting bushing (rear)	Replace bushings as required. A worn bushing may create a clunk type of noise during acceleration or deceleration. Check bushing orientation; the tuning slots must be in proper position.
Loose rear mounting bracket	Tighten the bracket bolts as required. Refer to **Fastener Tightening Specifications** .
Loose or damaged prop guard	Repair or replace as required. A loose dust shield may contact the propeller shaft assembly and create a scraping or grinding type of noise.
Bearing noise within axle assembly	A grinding roar type of noise will increase or decrease relative to the vehicle speed. 1. Check for proper fluid level. Refer to **Lubricant Replacement - Rear Drive Axle** . 2. If the noise continues, repair or replace the unit as required.
Gear set whine noise within axle assembly	A whine type of noise will increase or decrease relative to the vehicle speed (approximately 80-90 km/h (50-56 mph)). 1. Check for the proper fluid level. Refer to **Lubricant Replacement - Rear Drive Axle** . 2. Repair or replace the unit as required.
Shutter or moan at slow speeds or slow turns	A shutter or moan type of noise in slow sharp turns. 1. RDM could be contaminated with the wrong fluid type/water. 2. Replace the fluid; fill as required and retest under conditions. Refer to **Lubricant Replacement - Rear Drive Axle** . 3. Replace the drum.

NOISY WHEN COASTING

Noisy When Coasting

Cause	Correction
Inspect for proper gear oil levels prior to performing system diagnosis.	

Loose propeller shaft mounting bolts	Tighten the bolts as required. Refer to **Fastener Tightening Specifications** in Propeller Shaft.
Worn propeller shaft constant velocity joint.	Replace the propeller shaft assembly. Refer to **Propeller Shaft Replacement** in Propeller Shaft. A worn propeller shaft constant velocity joint may create a clicking, grinding, or snapping type of noise.
Worn or loose center bearing assembly	Replace the center bearing assembly as required. A worn center bearing assembly may cause vehicle vibration or a grinding or squealing type of noise.
Worn universal joints	Replace the universal joints as required. A worn universal joint may create a clicking or a snapping type of noise. Refer to **Universal Joint Replacement - External Snap Ring** in Propeller Shaft.
Worn axle shaft constant velocity joints.	Replace or repair the constant velocity joints as required. A worn axle shaft constant velocity joint may create a clicking, grinding, or snapping type of noise. Refer to **Symptoms - Rear Drive Axle** .
Transfer case noise	Refer to **Symptoms - Transfer Case** .
Worn or damaged axle mounting bushings (Side)	Check the bushing position and replace the bushings as required. A worn bushing may create a clunk type of noise during acceleration or deceleration or wrong orientation. Refer to **Differential Housing Support Bushing Replacement** .
Worn or damaged axle mounting bushings (Rear)	Replace the bushings as required. A worn bushing may create a clunk type of noise during acceleration or deceleration. Refer to **Differential Housing Support Bushing Replacement** .
Loose rear mounting bracket	Tighten the bracket bolts as required. Refer to **Fastener Tightening Specifications** .
Loose or damaged prop guard	Repair or replace as required. A loose dust shield may contact the propeller shaft assembly and create a scraping or grinding type of noise.
Bearing noise within axle assembly	A grinding or roar type of noise will increase or decrease relative to vehicle speed. 1. Check for the proper fluid level. Refer to **Lubricant Replacement - Rear Drive Axle** . 2. If the noise continues, repair or replace the unit as required.
Gear set whine noise within axle assembly created by incorrect gear backlash	A whine type of noise will increase of decrease relative to vehicle speed. 1. Check for the proper fluid level. Refer to **Lubricant Replacement - Rear Drive Axle** . 2. Repair or replace the unit as required.

INTERMITTENT NOISE

Intermittent Noise

Cause	Correction
Inspect for proper gear oil levels prior to performing system diagnosis.	
Low gear oil levels	Fill axle to the recommended level. Refer to **Lubricant Replacement - Rear Drive Axle** . A low level may create intermittent or incomplete clutch park engagement.
Incorrect gear oil	Replace with gear oil Saturn P/N 12378514. Refer to **Lubricant Replacement - Rear Drive Axle** . Incorrect gear oil may create improper clutch pack engagement or a slippage condition.
Worn clutch pack oil pump	Replace the clutch pack assembly.
Worn clutch pack friction discs	Replace the clutch pack assembly.

CONSTANT NOISE

Constant Noise

Cause	Correction
Inspect for proper gear oil levels prior to performing system diagnosis.	
Low gear oil levels	Faulty oil seal or other types of leaks may contribute to lower than required fluid levels. Refer to **Rear Axle Lubricant Leak Diagnosis** . Fill to the proper level with gear oil Saturn P/N 12378514. Refer to **Lubricant Replacement - Rear Drive Axle** .
Worn or loose axle mounts	Repair or replace axle mounts as required. Refer to **Differential Housing Support Bushing Replacement** .
Worn propeller shaft constant velocity or universal joints	Replace the universal joints as required. Refer to **Universal Joint Replacement - External Snap Ring** in Propeller Shaft. If constant velocity joint is damaged, replace the propeller shaft. Refer to **Propeller Shaft Replacement** in Propeller Shaft.
Worn propeller shaft center bearing assembly	Replace the center bearing assembly. Refer to **Center Bearing Removal** in Propeller Shaft.
Bearing noise within axle assembly	This type of noise will decrease or increase relative to the vehicle speed. 1. Check for the proper fluid level. Refer to **Lubricant Replacement - Rear Drive Axle** . 2. Repair or replace the unit as required.
Gear set whine noise within the carrier assembly caused by incorrect backlash	A whine type of noise will increase or decrease relative to the vehicle speed. 1. Check for the proper fluid level. Refer to **Lubricant**

	Replacement - Rear Drive Axle . 2. Repair or replace the unit as required.

NOISY ON TURNS

Noisy on Turns

Cause	Correction
Inspect for proper gear oil levels prior to performing system diagnosis. Operate the vehicle turning in tight circles, in both left and right directions. Moan, groan, chatter, or a pulsing type concern may indicate a pump or clutch park problem within the axle assembly.	
Worn or loose rear axle mounts	Repair or replace as required.
Worn axle shaft constant velocity joints	Replace the constant velocity joints as required.
Worn wheel bearings	Replace the wheel bearings as required.
Incorrect gear oil	Replace with gear oil Saturn P/N 12378514. Refer to **Lubricant Replacement - Rear Drive Axle** .
Worn differential side and/or idler gears and worn cross-pin	Replace gears and pin as required.
Worn clutch plates	Replace clutch drum.

REAR AXLE LUBRICANT LEAK DIAGNOSIS

Rear Axle Lubricant Leak Diagnosis

Cause	Correction
Restricted or damaged ventilation tube assembly	Replace the ventilation tube as required.
Leaking fill or drain plug	Install sealant Saturn P/N 21485278 or equivalent onto threads of plugs and tighten. Refer to **Fastener Tightening Specifications** .
Leaking input flange seal	1. Inspect the input flange surface for excessive wear or damage. 2. Inspect the front bearing for wear or damage. A worn bearing may allow excessive movement of the clutch pack input shaft. 3. Replace the components as required.
Leaks at the housing sealing surfaces	Dissemble the axle and reseal the sealing surfaces as required. Refer to **Differential Housing Assembly Disassemble** .
Worn or damages axle shaft oil seals	Replace the axle shaft oil seals as required.
Axle housing porosity	Replace the housing(s) as required. Refer to **Rear Axle Shaft Seal Replacement - Left** and **Rear Axle Shaft Seal Replacement - Right** .

REPAIR INSTRUCTIONS

LUBRICANT LEVEL INSPECTION - REAR DRIVE AXLE

Inspection Procedure

IMPORTANT: In order to obtain an accurate indication of the fluid level, the rear drive module priming procedure must be performed prior to fluid level inspection.

1. Prime the rear drive module in the service stall:
    1. Raise and support the vehicle so that all wheels are off of the ground. Refer to **Lifting and Jacking the Vehicle** in General Information.
    2. Start the engine and place transmission in a forward gear.
    3. Slowly apply the park brake until the rear wheels stop rotating.
    4. Carefully accelerate the engine until the rear wheels begin to rotate.

    IMPORTANT: Do not exceed 5 seconds of park brake apply while vehicle is in gear and the engine is running to avoid overheating of the rear drive module.

    5. Continue allowing the rear wheels to rotate for 5 seconds.
    6. Release the accelerator and apply the brakes.
    7. Place transmission in park or neutral and turn off the engine.
    8. Release the park brake.
    9. Raise the vehicle fully.
2. Alternatively, prime the rear drive module by driving the vehicle on a flat, paved surface in a tight, 360 degree circle for 3 consecutive revolutions at 8 km/h (5 mph).
3. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

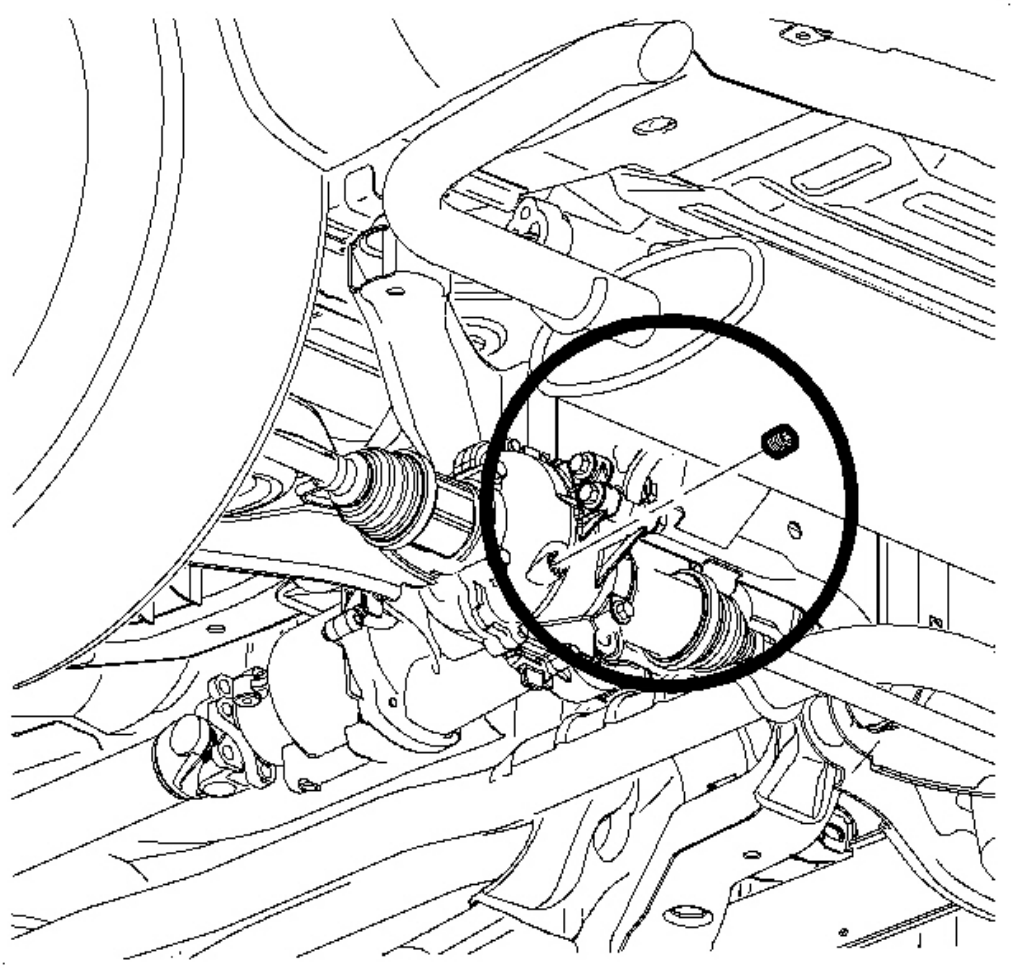


Fig. 3: Removing/Installing Fluid Fill Plug
Courtesy of GENERAL MOTORS CORP.

4. Clean the area around the fluid fill plug.
5. Remove the fluid fill plug.

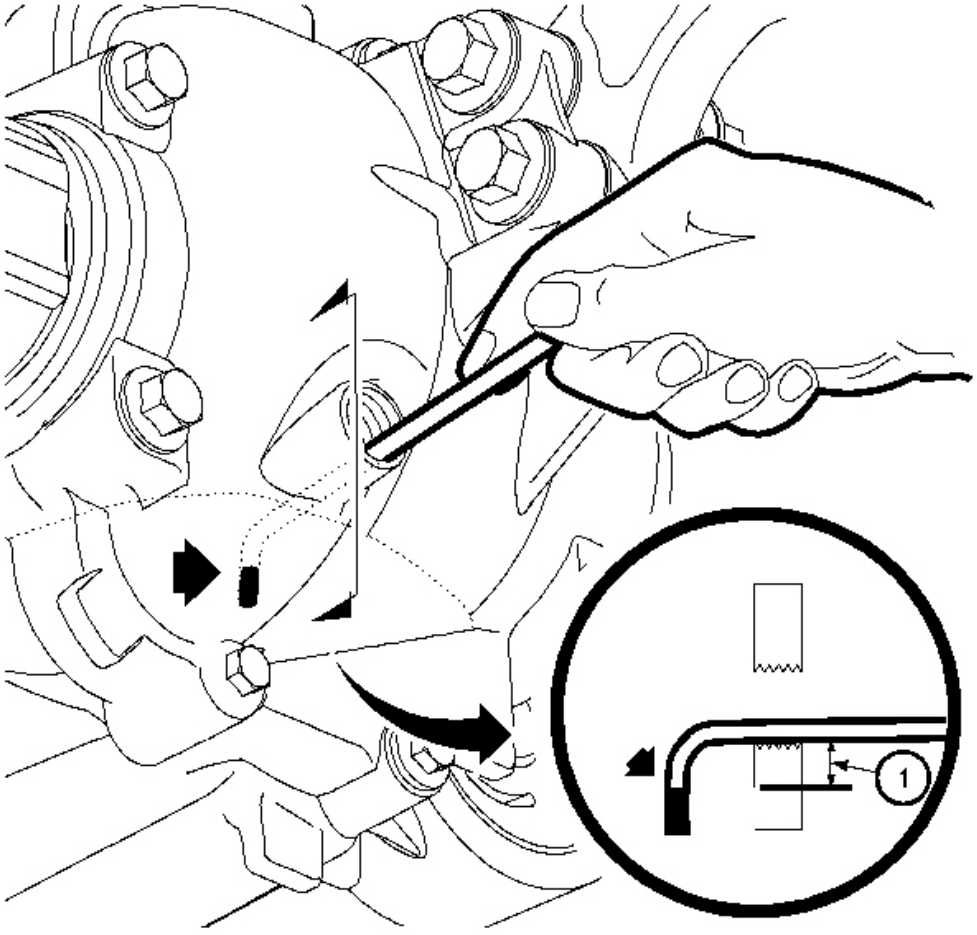


Fig. 4: Removing Wire & Measure The Distance Between The Bend & The Fluid Level
Courtesy of GENERAL MOTORS CORP.

6. Using a length of heavy mechanics wire or equivalent, position a 90 degree bend approximately 25 mm (1 in) from the end of the wire.
7. Place the angled end of the wire into the fluid fill plug hole.
8. Rest the wire squarely on the threads of the fill plug hole.
9. Remove the wire and measure the distance between the bend and the fluid level as indicated by the witness mark.

Specification: The distance from the bend to the witness mark should be 8-17 mm (0.32-0.68 in).

10. Adjust the fluid level as required by adding or removing fluid Saturn P/N 12378514.
11. Thoroughly clean the fill plug threads and apply sealer Saturn P/N 21485278 to the threads.
12. Install the rear drive module fill plug.

    Tighten: Tighten the fill plug to 35 N.m (26 lb ft).

13. Lower the vehicle.

LUBRICANT REPLACEMENT - REAR DRIVE AXLE

Draining Procedure

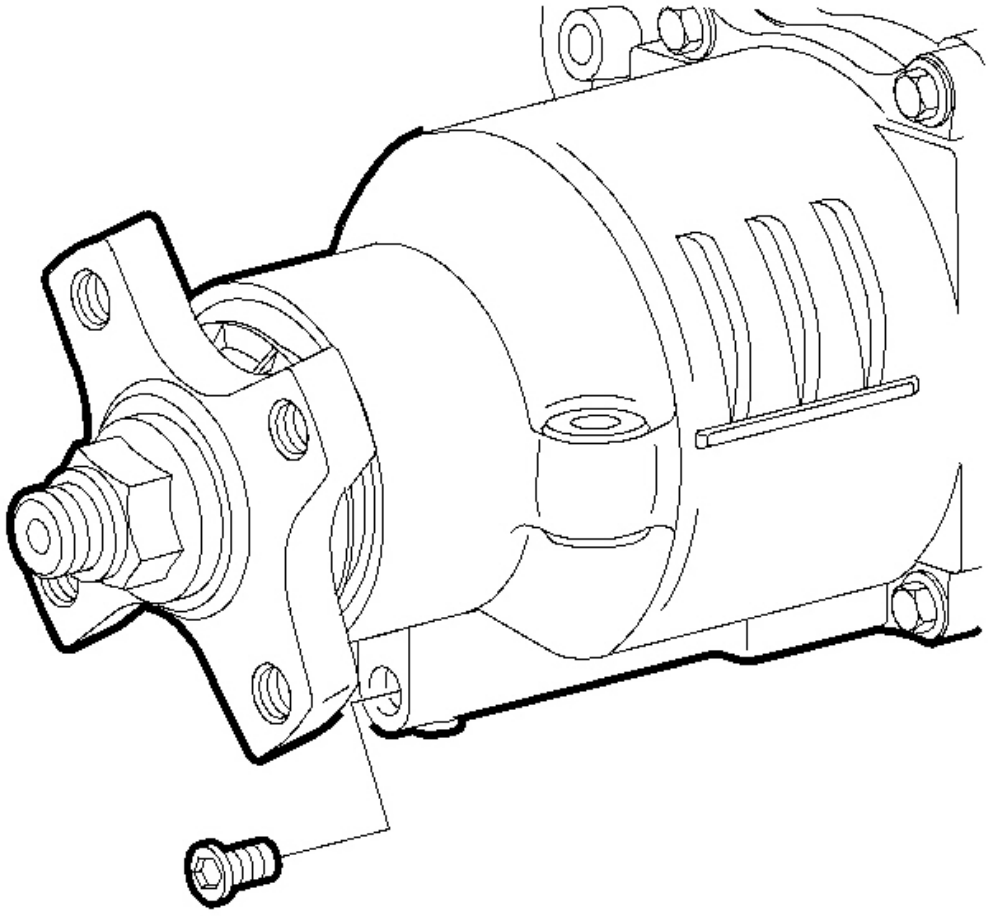


Fig. 5: View Of Rear Drive Axle
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Place a drain pan below the rear drive module.
3. Remove the drain plug from the front of the rear drive module, below the input flange.
4. Drain the fluid.

Filling Procedure

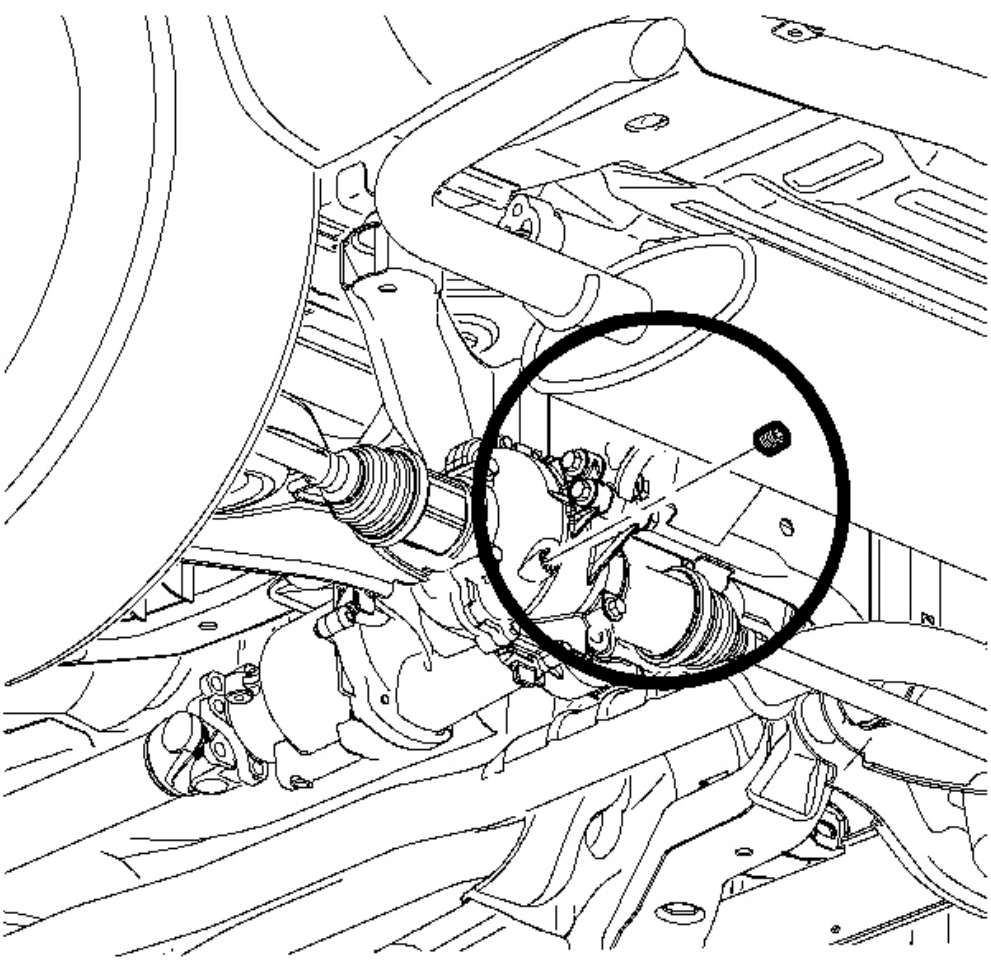


Fig. 6: Removing/Installing Fluid Fill Plug
Courtesy of GENERAL MOTORS CORP.

1. Thoroughly clean the threads of the drain plug.
2. Apply sealer GM P/N 12346004 (Canadian P/N 10953480) to the drain plug threads.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the drain plug to the rear drive module.

   Tighten: Tighten the drain plug to 30 N.m (22 lb ft).

4. Remove the rear drive module fill plug.
5. Fill the rear drive module with fluid GM P/N 12378514 (Canadian P/N 88901045).

   Specification: Fill initially with 750 ml (25.4 oz) of fluid.

6. Inspect the fluid level. Refer to **Lubricant Level Inspection - Rear Drive Axle** .
7. Thoroughly clean the threads of the fill plug.
8. Apply sealer GM P/N 12346004 (Canadian P/N 10953480) to the fill plug threads.
9. Install the fill plug to the rear drive module.

   Tighten: Tighten the fill plug to 35 N.m (26 lb ft).

10. Lower the vehicle.

DIFFERENTIAL CLUTCH DRUM ASSEMBLY REPLACEMENT

Tools Required

- **J 44873** Pinion Flange Holder and Remover. See **Special Tools and Equipment** .
- **J 46607** Alignment Tool. See **Special Tools and Equipment** .

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

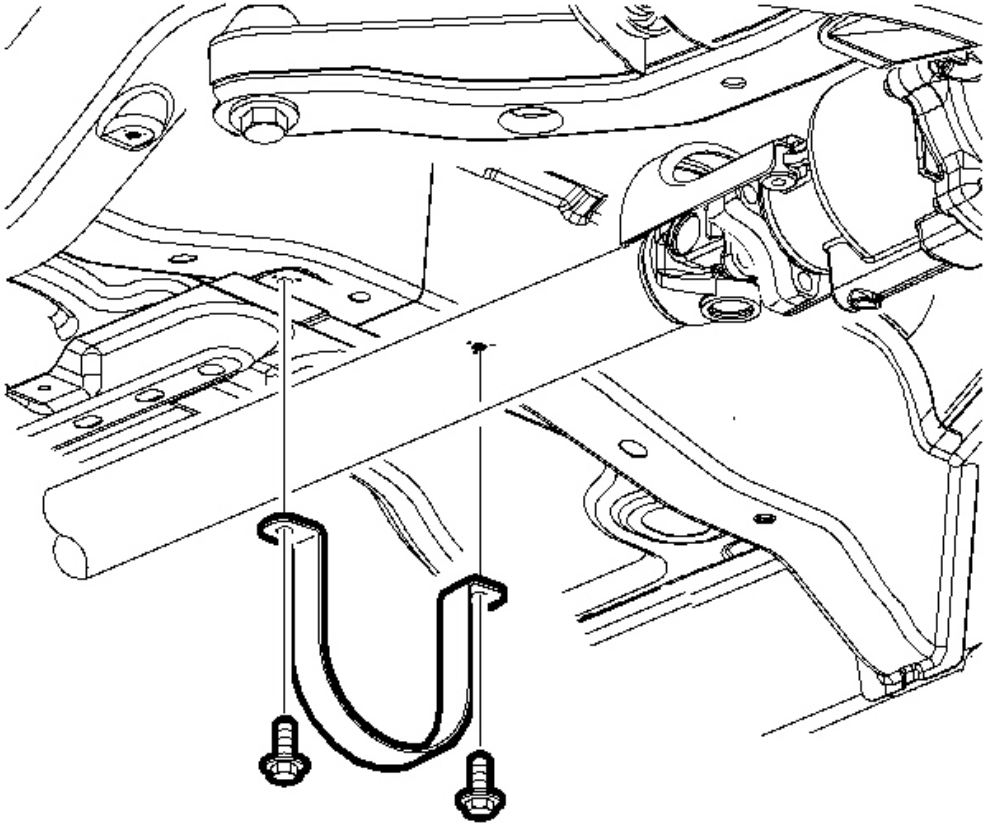


Fig. 7: Removing/Installing Propeller Shaft Underbody Guard Loop Bolts
Courtesy of GENERAL MOTORS CORP.

2. Remove the propeller shaft underbody guard loop bolts.
3. Remove the guard loop.

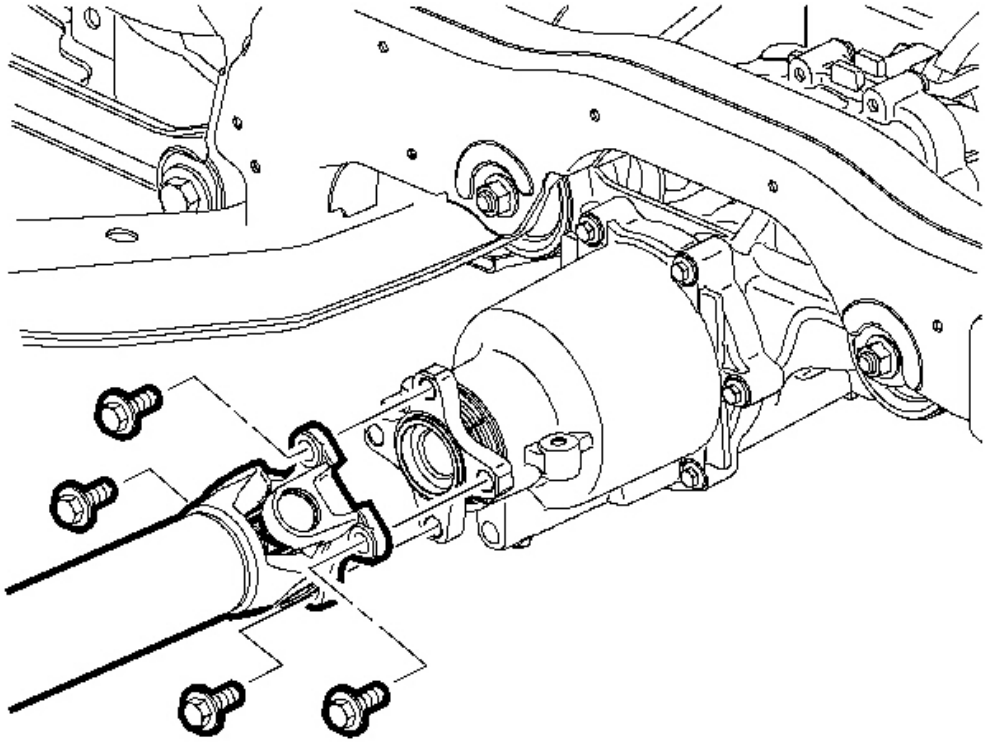


Fig. 8: Removing/Installing Propeller Shaft Flange Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

4. Reference mark the propeller shaft flange-to-pinion flange relationship at the rear drive module (RDM).
5. Remove the propeller shaft flange mounting bolts at the RDM pinion flange.
6. Position the end of the propeller shaft away from the RDM and secure with heavy mechanics wire, or equivalent.

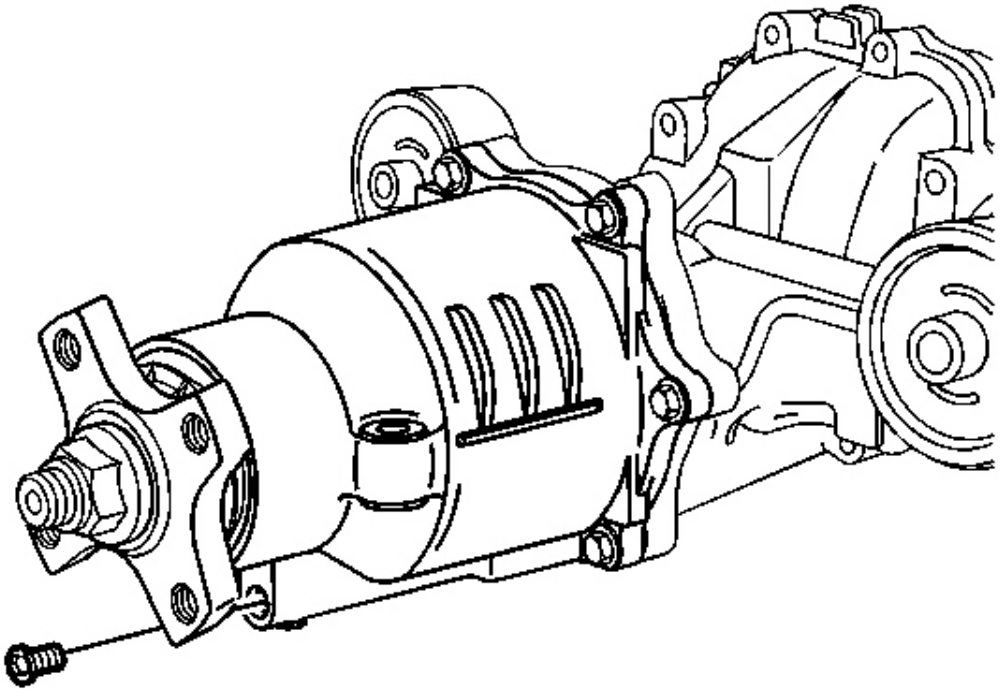


Fig. 9: Removing/Installing RDM Drain Plug
Courtesy of GENERAL MOTORS CORP.

7. Place a container under the RDM housing.
8. Remove the RDM drain plug.
9. Drain the RDM fluid.

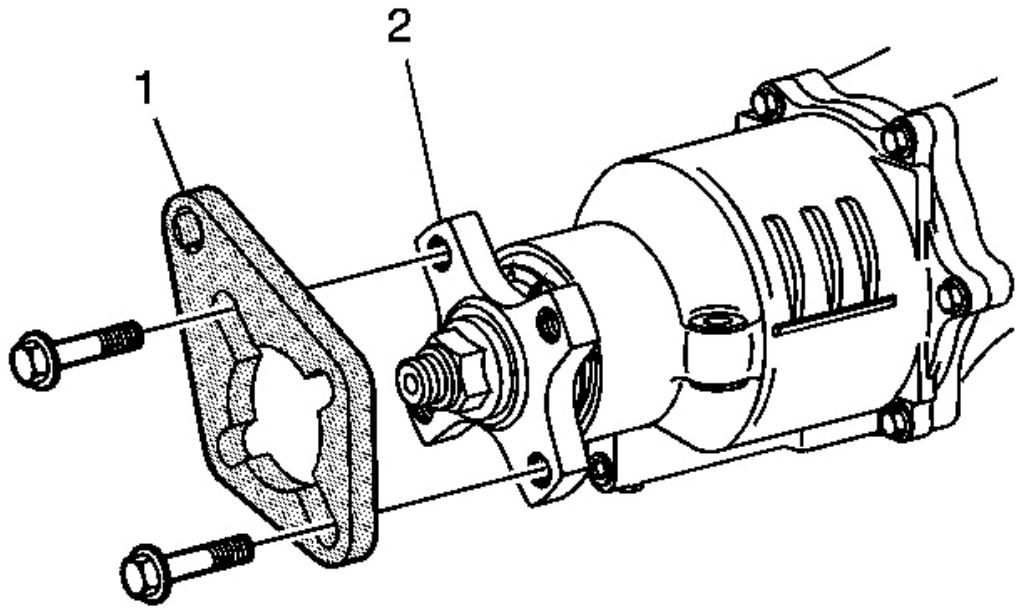


Fig. 10: Installing J44873 On The Pinion Flange
Courtesy of GENERAL MOTORS CORP.

10. Install the **J 44873** (1) to the pinion flange (2) using the J 44873-2 shoulder bolts. See **Special Tools and Equipment** .
11. Using a breaker bar to hold the **J 44873** stationary, loosen the pinion flange nut. See **Special Tools and Equipment** .

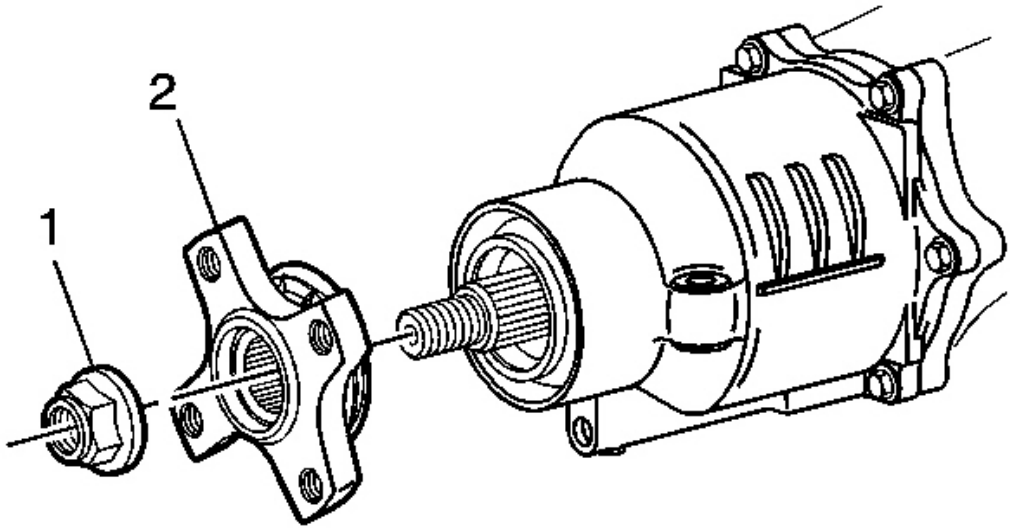


Fig. 11: Removing/Installing Input Flange On The Clutch Shaft
Courtesy of GENERAL MOTORS CORP.

12. Remove and discard the pinion flange nut (1).
13. Remove the pinion flange (2).

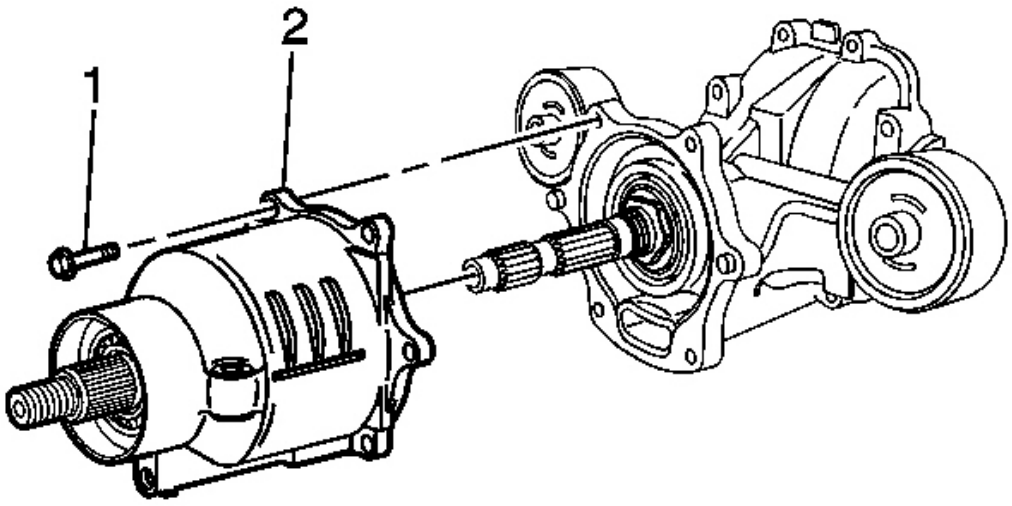


Fig. 12: Removing Bolts & The Clutch Cover From The Differential Housing
Courtesy of GENERAL MOTORS CORP.

14. Remove the RDM housing cover bolts (1).
15. Carefully remove the housing cover (2) from the RDM.

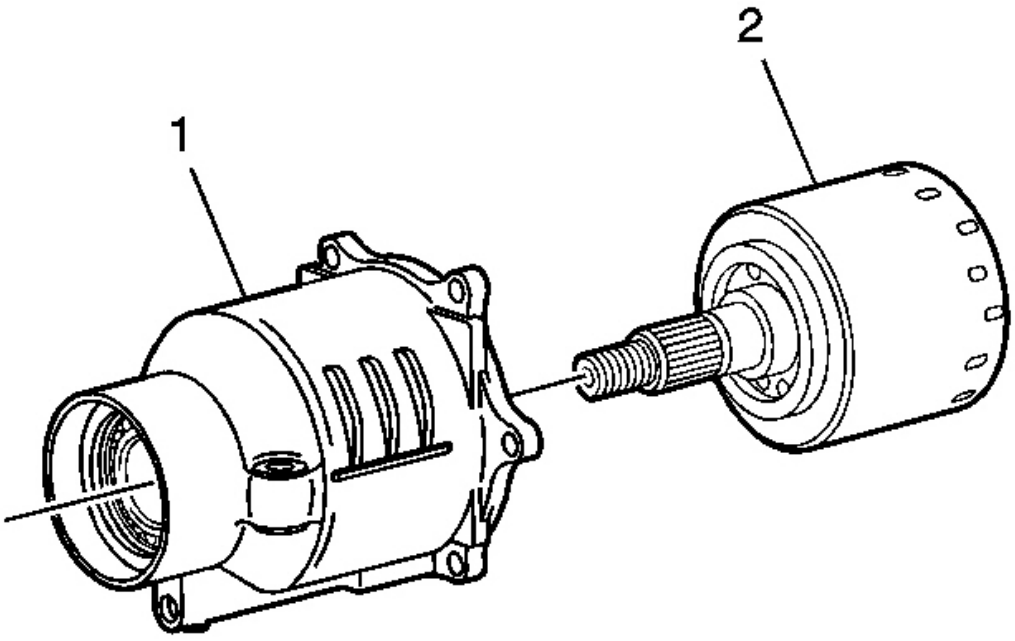


Fig. 13: Removing Clutch Drum From The Housing Cover
Courtesy of GENERAL MOTORS CORP.

16. Remove the clutch drum (2) from the housing cover (1).

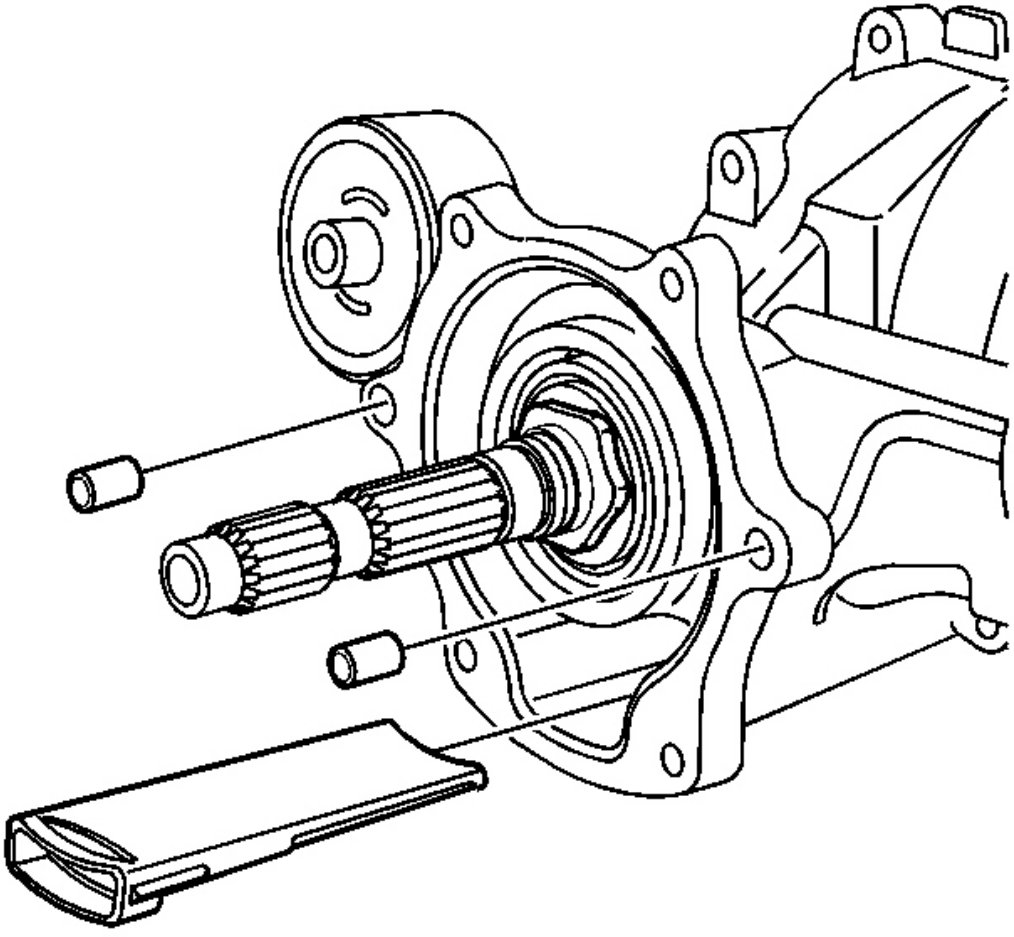


Fig. 14: Removing/Installing Filter Assembly
Courtesy of GENERAL MOTORS CORP.

17. Remove the filter assembly.
18. Remove the locating pins.

IMPORTANT: Do not gouge the housing cover and RDM sealing surfaces.

19. Remove all traces of sealer from the housing cover and RDM sealing surfaces.
20. Clean the housing cover and RDM sealing surfaces with denatured alcohol or equivalent, and dry with a clean, lint free cloth.

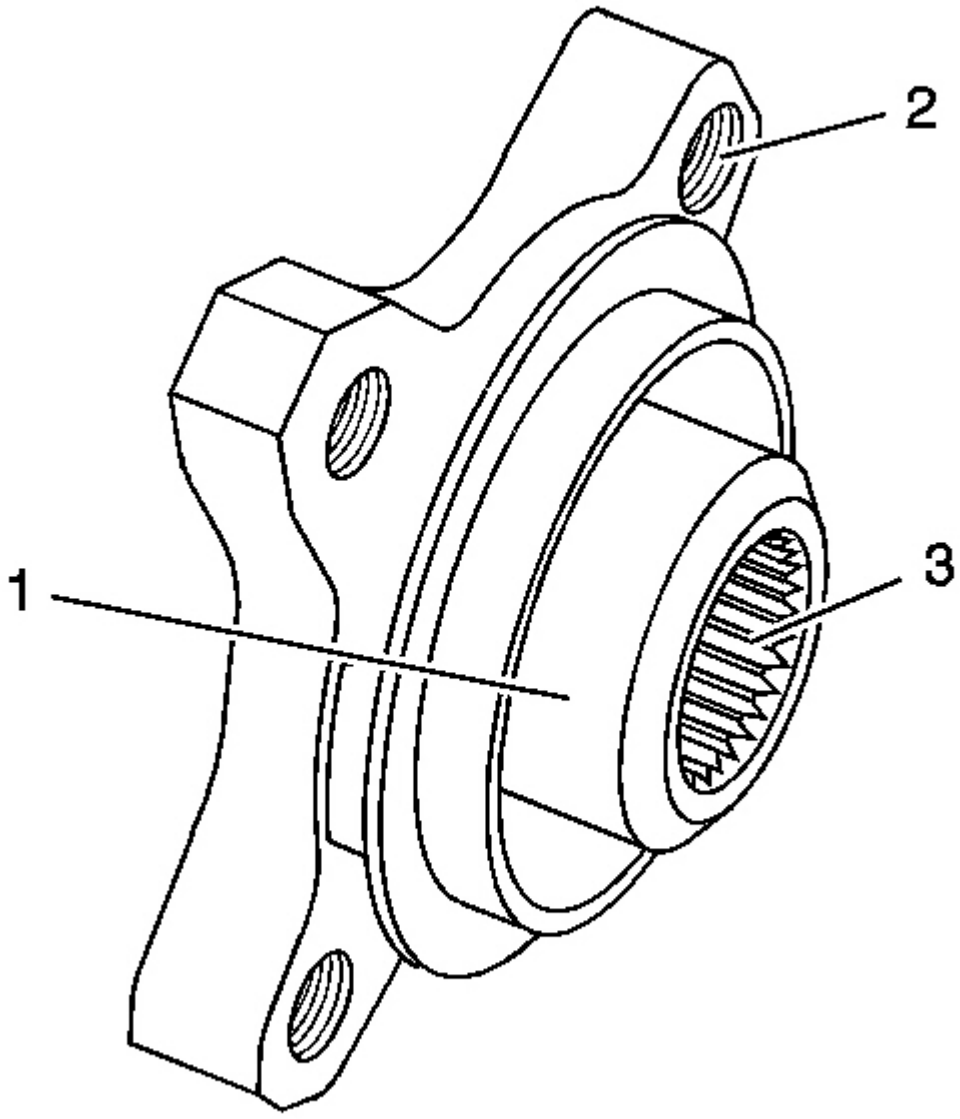


Fig. 15: Inspecting Pinion Flange Sealing Surface
Courtesy of GENERAL MOTORS CORP.

21. Check the pinion flange sealing surface (1) for wear or gouges, the bolt threads (2) for damage and the pinion splines (3) for worn or damaged splines.

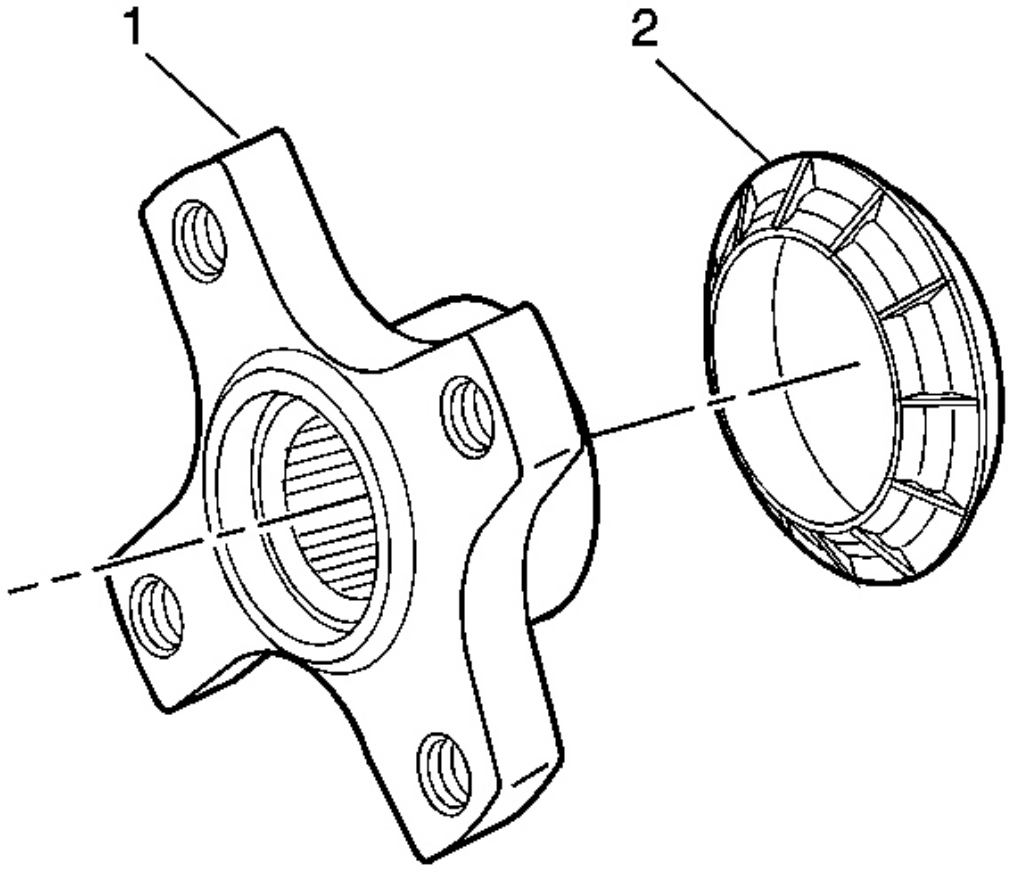


Fig. 16: Inspecting Dust Deflector For Cracks
Courtesy of GENERAL MOTORS CORP.

22. Inspect the dust deflector (2) for cracks.

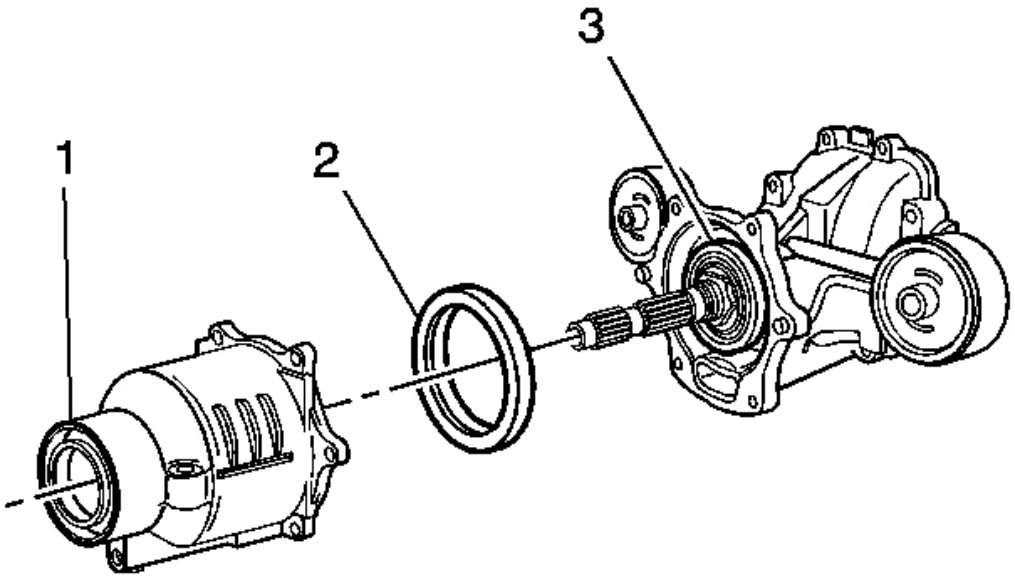


Fig. 17: Inspecting Pinion Flange Seal
Courtesy of GENERAL MOTORS CORP.

23. Inspect the pinion flange seal (1), the front seal (2) and the rear seal (3) for tears, cuts, and gouges on the seals and sealing surfaces.

Installation Procedure

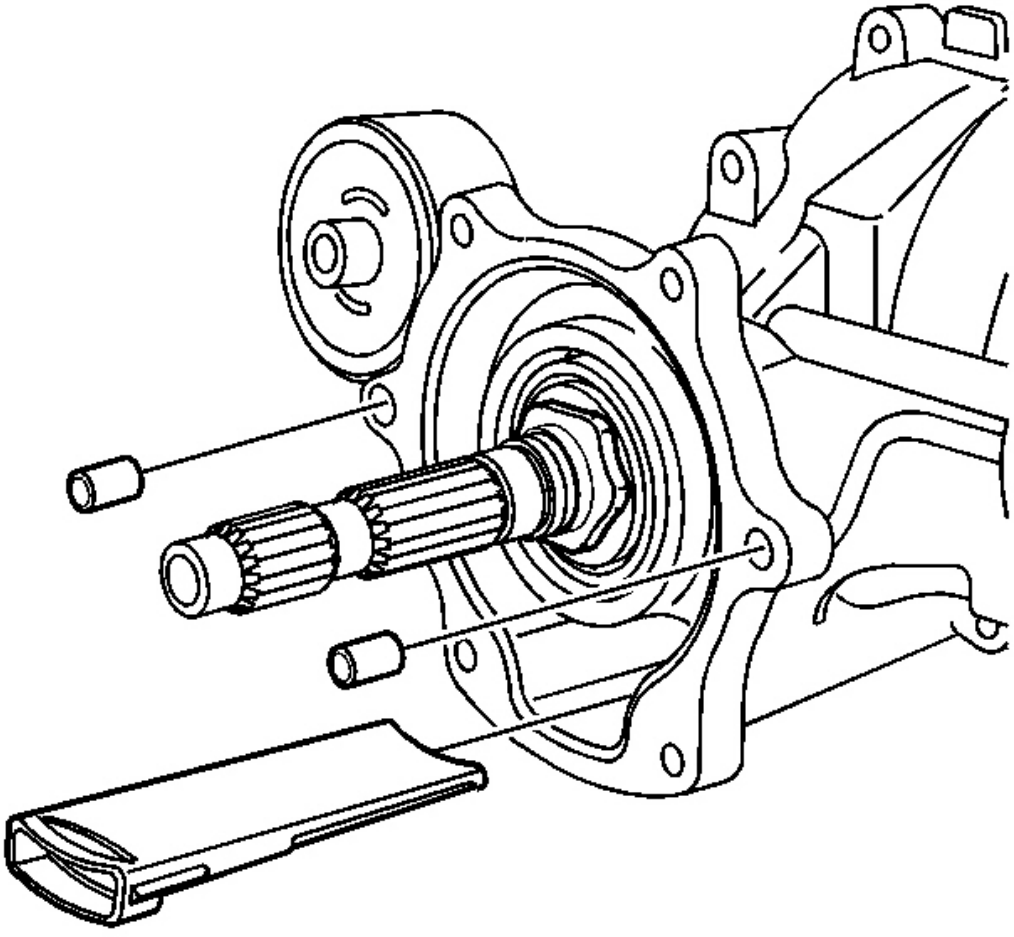


Fig. 18: Removing/Installing Filter Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install a new filter assembly.
2. Install the locating pins.

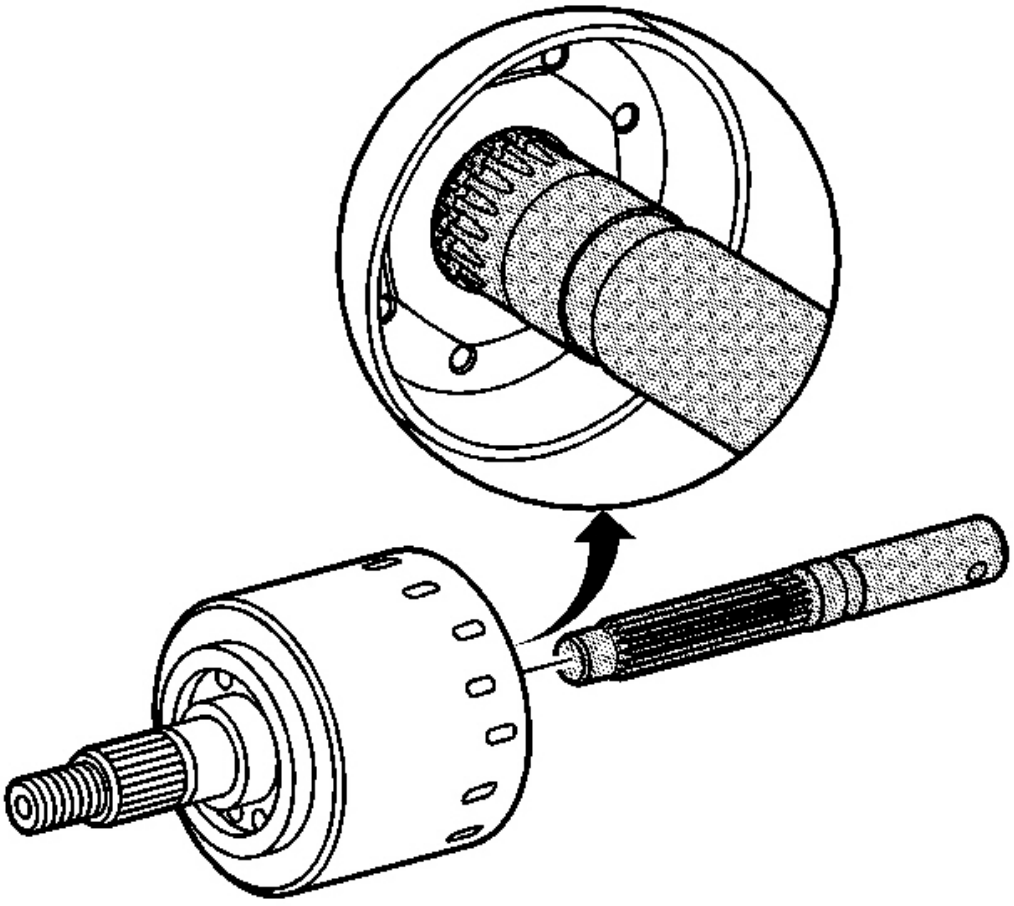


Fig. 19: Aligning Clutch With The Pump & Pump Bushing
Courtesy of GENERAL MOTORS CORP.

3. Align the clutch with the pump and pump bushing. Place the **J 46607** in the splines of the clutch. See **Special Tools and Equipment** . Twist alignment tool back and forth to align the pump and bushing. With a properly aligned clutch, the grove on the **J 46607** will be flush with the drum as shown. See **Special Tools and Equipment** . Remove the tool by pulling straight out.

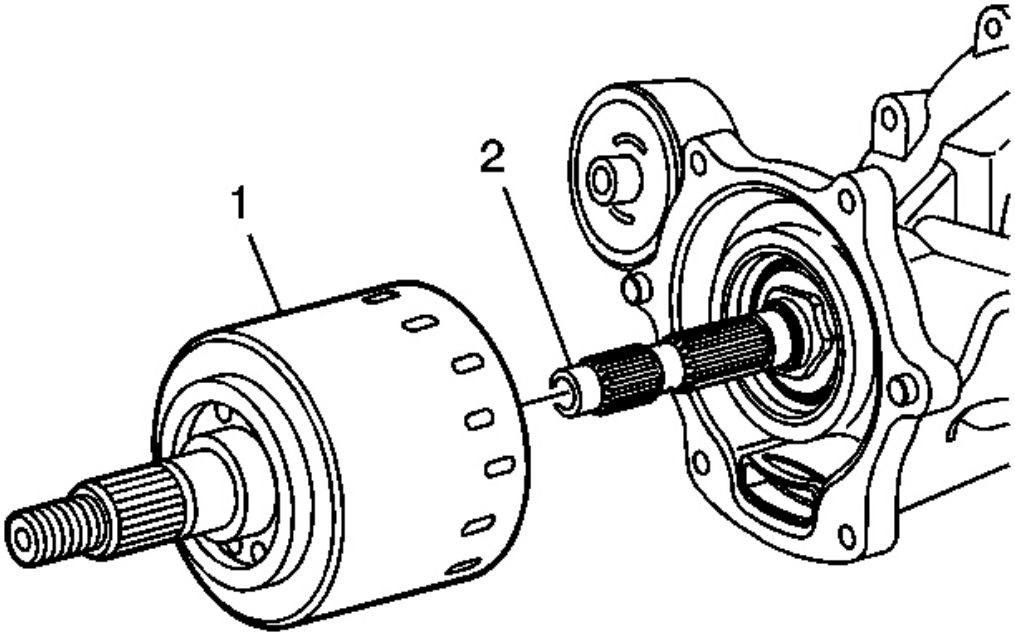


Fig. 20: Installing Clutch Drum On The Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not submerge the clutch drum in solvent. This will damage friction material and gerotor pump.

IMPORTANT: The clutch drum may require some slight rotational movement to install completely. If the clutch is not fully seated, the clutch housing may break when tightening the bolts.

4. Install the clutch drum (1) to the pinion shaft.

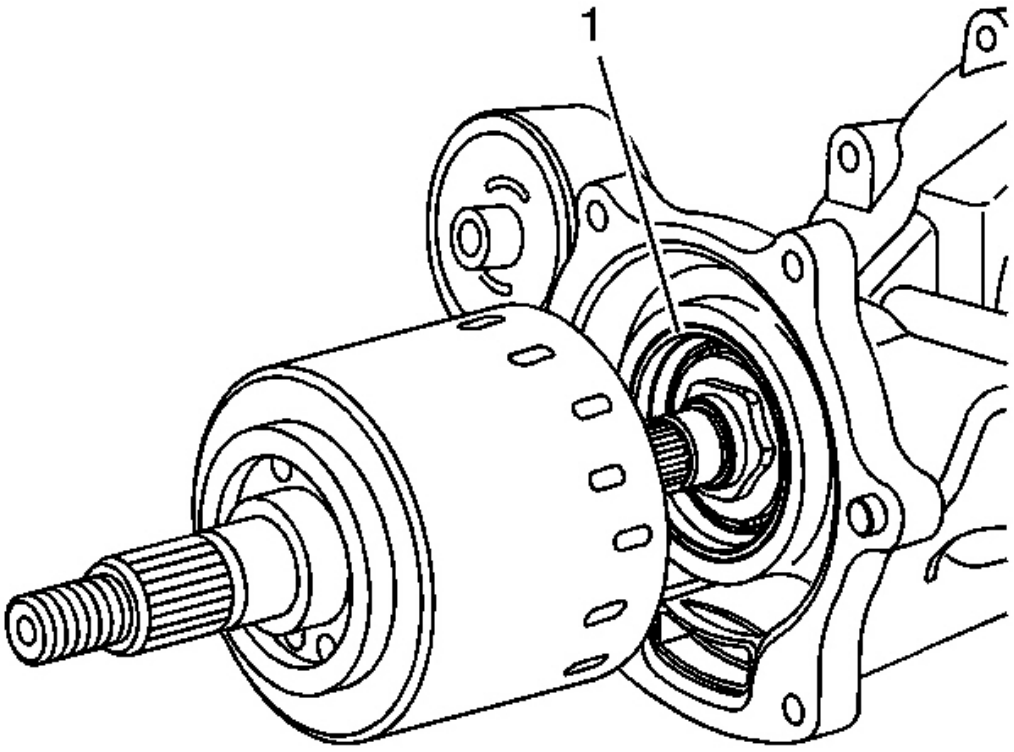


Fig. 21: Clutch Drum Oil Seal
Courtesy of GENERAL MOTORS CORP.

5. When properly engaged, the clutch drum will be fully seated against the clutch drum oil seal (1).

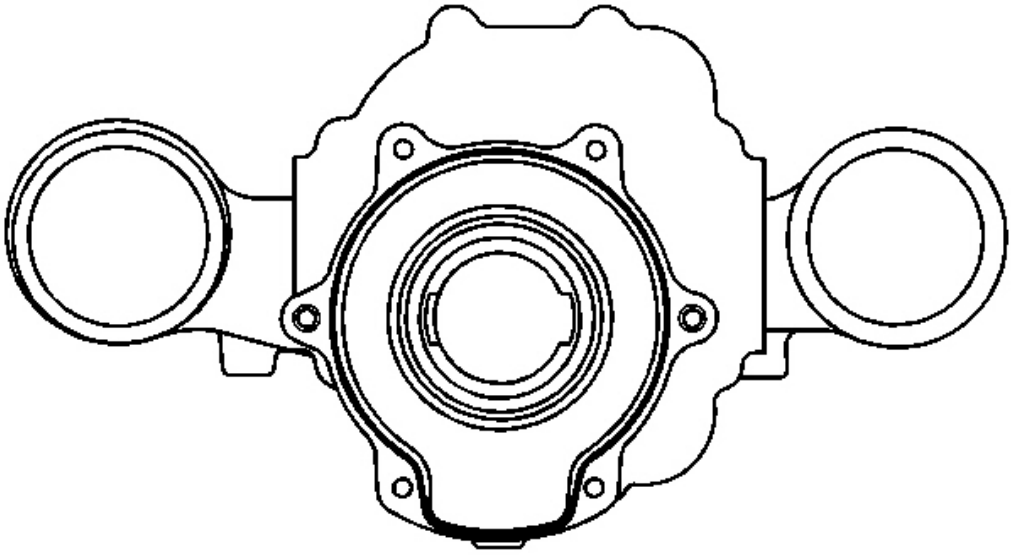


Fig. 22: RDM Housing Sealing Surface
Courtesy of GENERAL MOTORS CORP.

6. Apply a continuous bead of sealer Saturn P/N 21019581 of equal height and width to the RDM housing sealing surface.

   Specification: Apply sealer to a height and width of 2.5 mm (0.098 in).

   NOTE: The clutch cover housing must be fully seated to the rear drive module (RDM). Do Not use the mounting bolts to draw the cover to the RDM. If the cover does not fully seat to the RDM, the clutch drum assembly splines must be realigned to the pinion shaft splines before proceeding. Failure to follow these instructions will result in damage to the clutch assembly.

   IMPORTANT: Do not disturb the sealer bead applied to the RDM sealing surface.

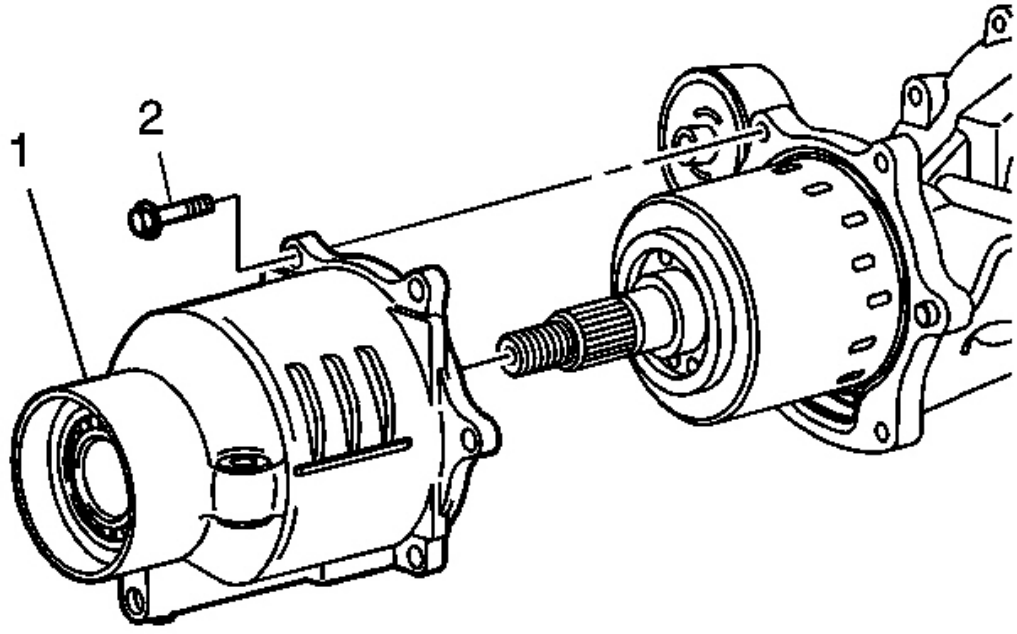


Fig. 23: Installing Clutch Housing Cover On The RDM
Courtesy of GENERAL MOTORS CORP.

7. Install the clutch housing cover (1) to the RDM.

NOTE: Refer to Fastener Notice in Cautions and Notices.

8. Hand install the clutch housing cover bolts (2).

Tighten: Tighten the bolts to 26 N.m (19 lb ft).

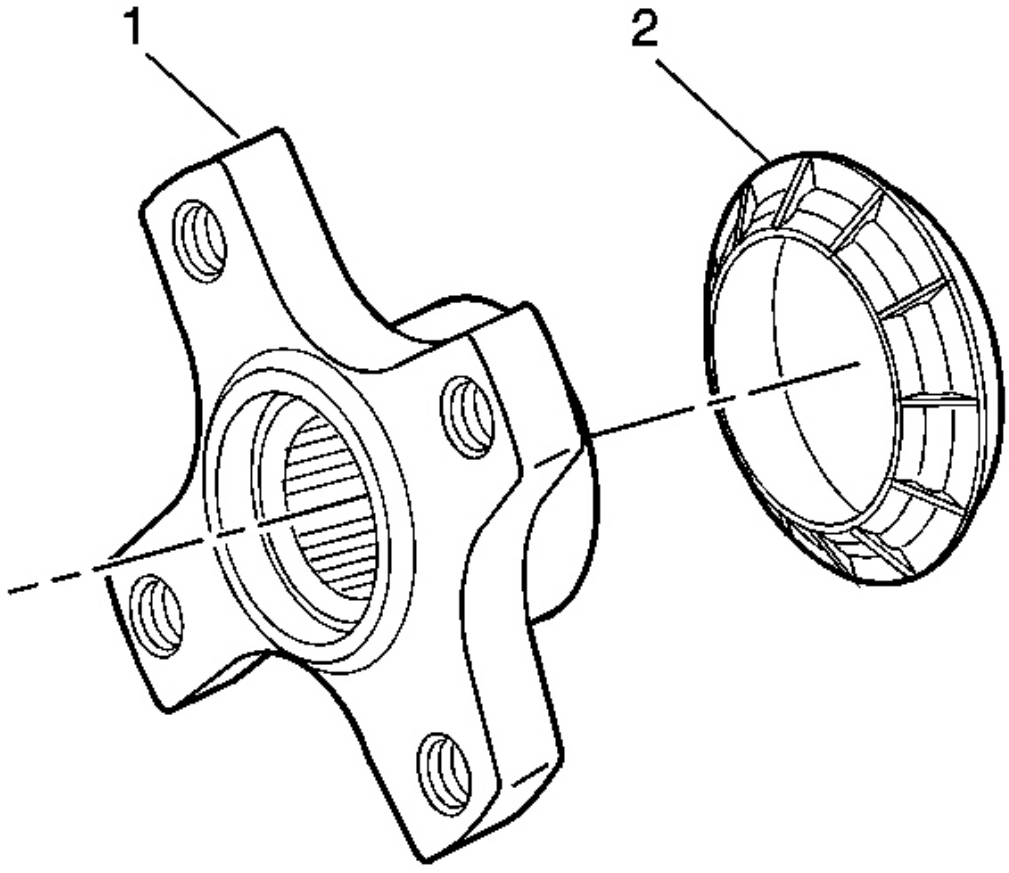


Fig. 24: Inspecting Dust Deflector For Cracks
Courtesy of GENERAL MOTORS CORP.

9. Install the dust deflector (2) to the input flange (1) if removed.

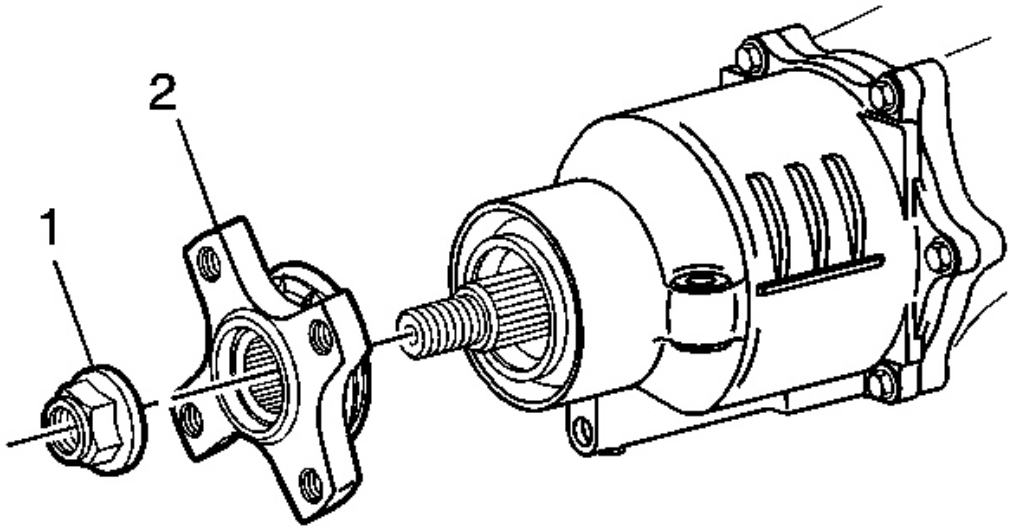


Fig. 25: Removing/Installing Input Flange On The Clutch Shaft
Courtesy of GENERAL MOTORS CORP.

10. Install the input flange (2) to the clutch shaft.
11. Hand install a new input flange nut (1) to the clutch shaft.

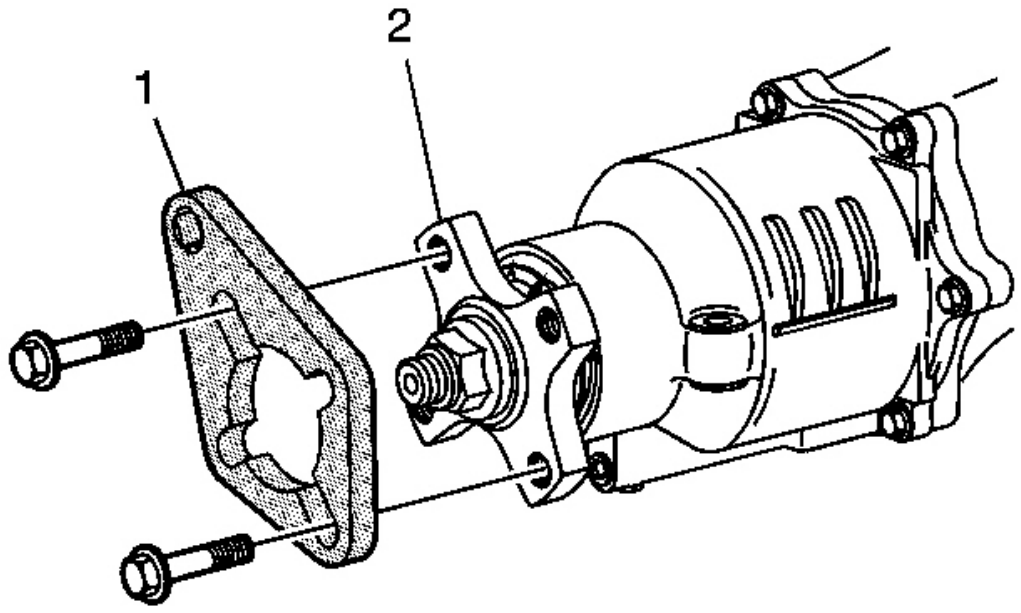


Fig. 26: Installing J44873 On The Pinion Flange
Courtesy of GENERAL MOTORS CORP.

12. Install the **J 44873** (1) to the pinion flange (2) using the J 44873-2 shoulder bolts. See **Special Tools and Equipment** .
13. Using a breaker bar to hold the **J 44873** stationary, tighten the pinion nut. See **Special Tools and Equipment** .

    Tighten: Tighten the nut to 203 N.m (150 lb ft).

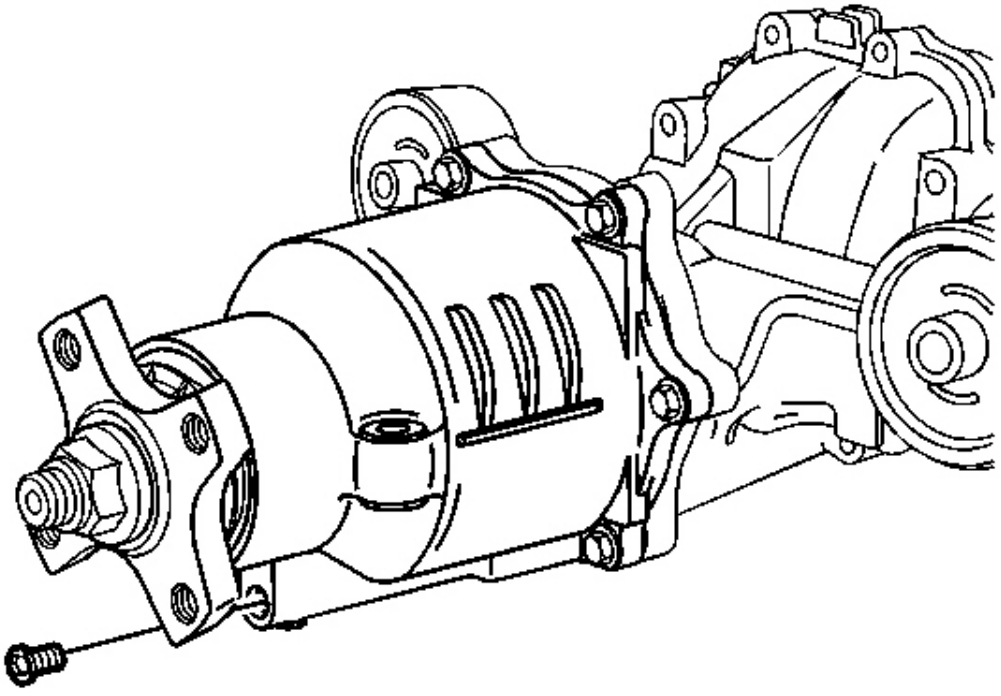


Fig. 27: Removing/Installing RDM Drain Plug
Courtesy of GENERAL MOTORS CORP.

14. Thoroughly clean the drain plug threads and apply thread sealer Saturn P/N 21485278 to the plug threads.
15. Install the RDM drain plug.

Tighten: Tighten the plug to 30 N.m (22 lb ft).

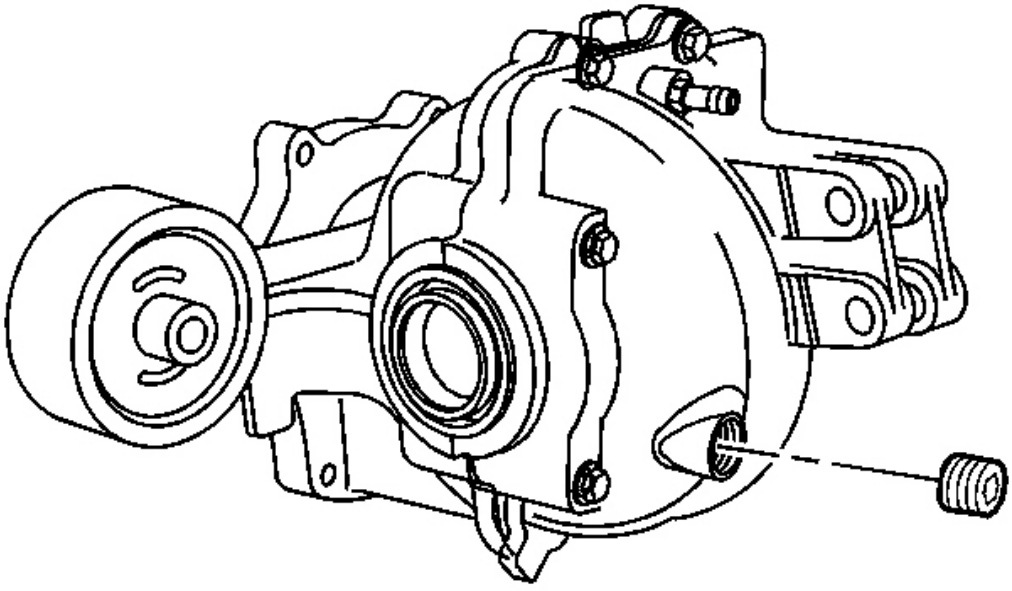


Fig. 28: Removing/Installing Fill Plug
Courtesy of GENERAL MOTORS CORP.

16. Remove the RDM fill plug.
17. Thoroughly clean the fill plug threads and apply thread sealer Saturn P/N 21485278 to the plug threads.
18. Fill the RDM with lubricant. Refer to **Lubricant Replacement - Rear Drive Axle** .
19. Install the fill plug.

    Tighten: Tighten the plug to 35 N.m (26 lb ft).

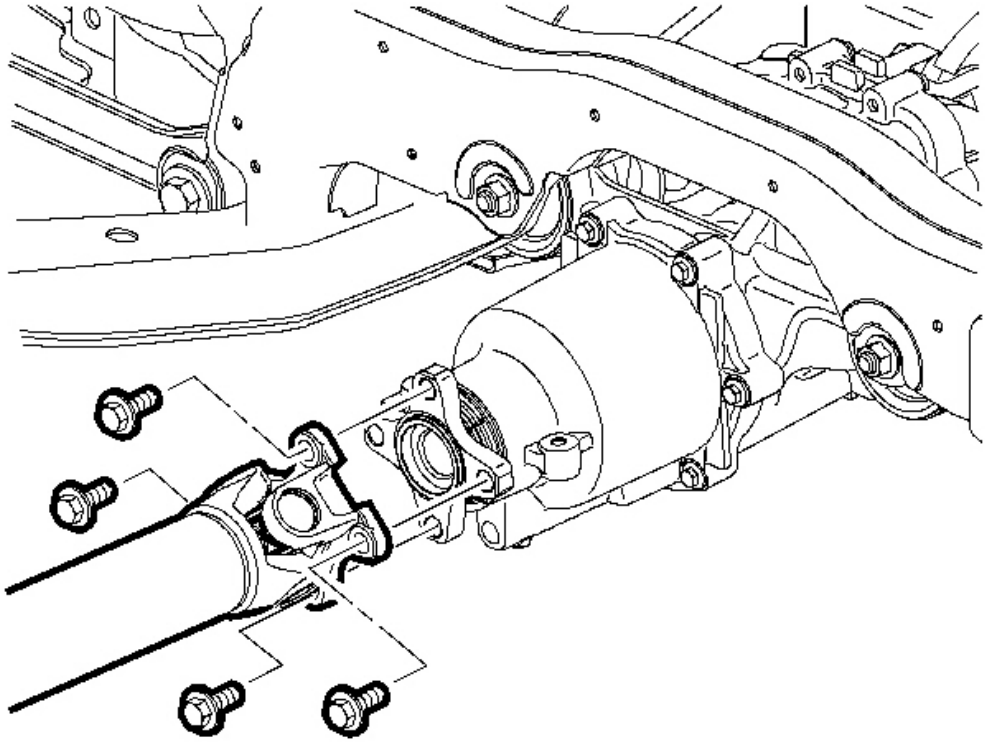


Fig. 29: Removing/Installing Propeller Shaft Flange Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

20. Thoroughly clean and apply threadlocker Saturn P/N 21005994 to the propeller shaft flange mounting bolt threads.
21. Align the reference marks on the propeller shaft flange and the RDM input flange.
22. Install the propeller shaft flange mounting bolts.

    Tighten: Tighten the bolts to 50 N.m (37 lb ft).

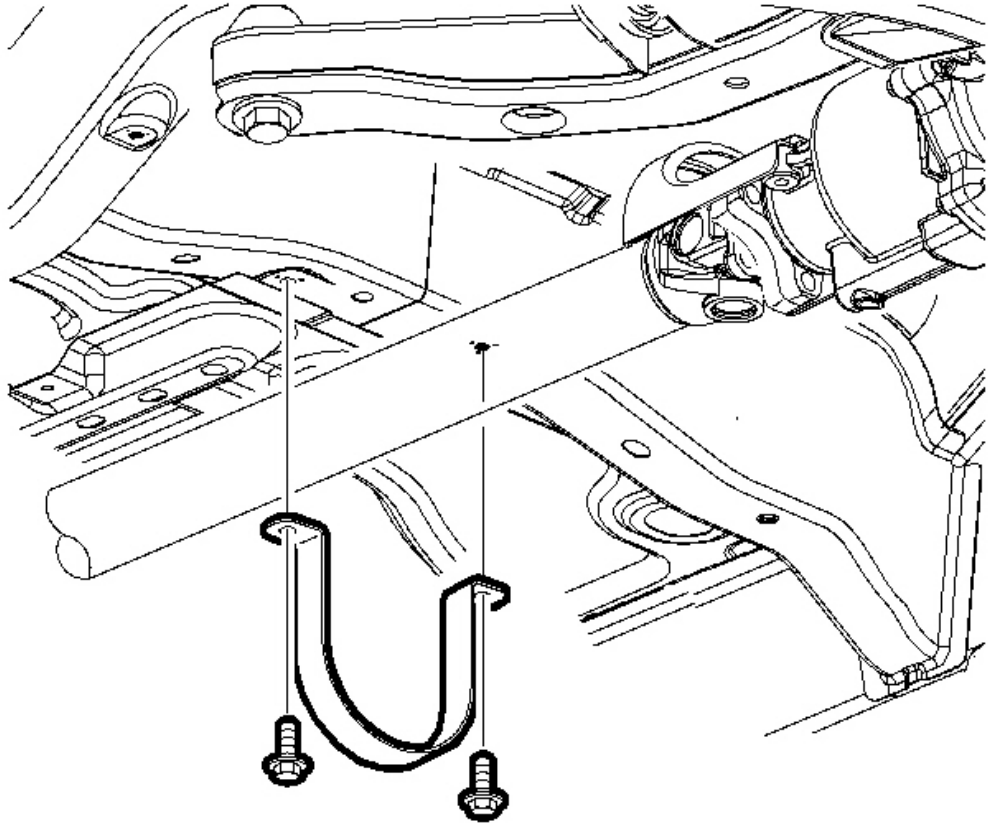


Fig. 30: Removing/Installing Propeller Shaft Underbody Guard Loop Bolts
Courtesy of GENERAL MOTORS CORP.

23. Install the propeller shaft underbody guard loop.
24. Install the propeller shaft underbody guard loop bolts.

    Tighten: Tighten the bolts to 24 N.m (18 lb ft).

25. Lower the vehicle.

DIFFERENTIAL CARRIER ASSEMBLY MOUNT REPLACEMENT

Tools Required

J 44866 Support Bushing Remover and Installer. See **Special Tools and Equipment** .

Removal Procedure

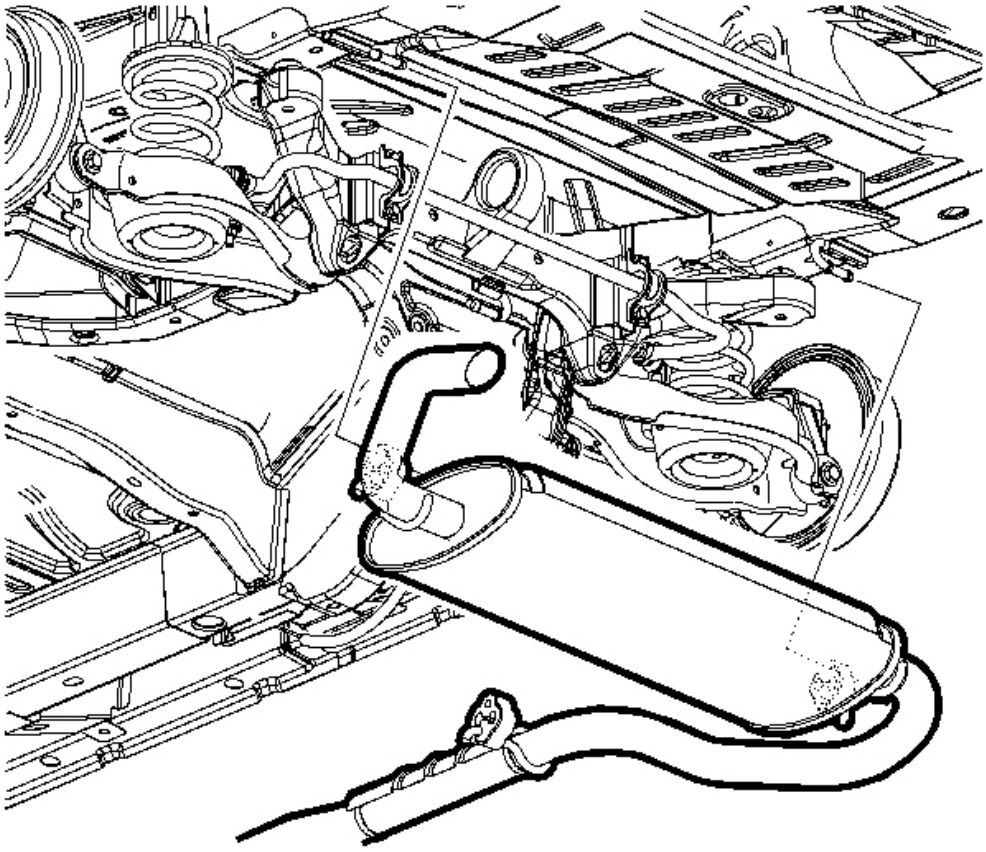


Fig. 31: Installing Intermediate Pipe & Muffler Assembly
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Disconnect the intermediate exhaust pipe from the front pipe and remove the intermediate pipe and muffler assembly. Refer to **Muffler Replacement (Production Assembly)** or **Muffler Replacement (Service Part)** in Engine Exhaust.
3. Place a support stand under the rear drive module (RDM) and support the RDM.

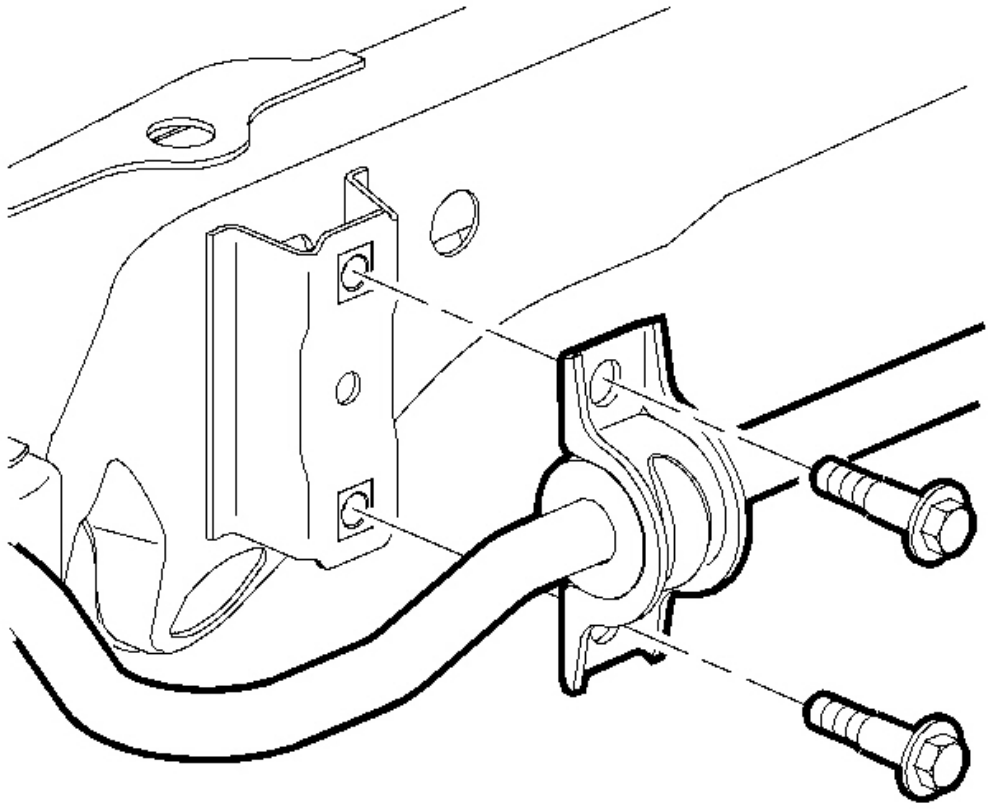


Fig. 32: Removing/Installing Rear Stabilizer Bar
Courtesy of GENERAL MOTORS CORP.

4. Remove the rear stabilizer bar. Refer to **Stabilizer Shaft Replacement** in Rear Suspension.

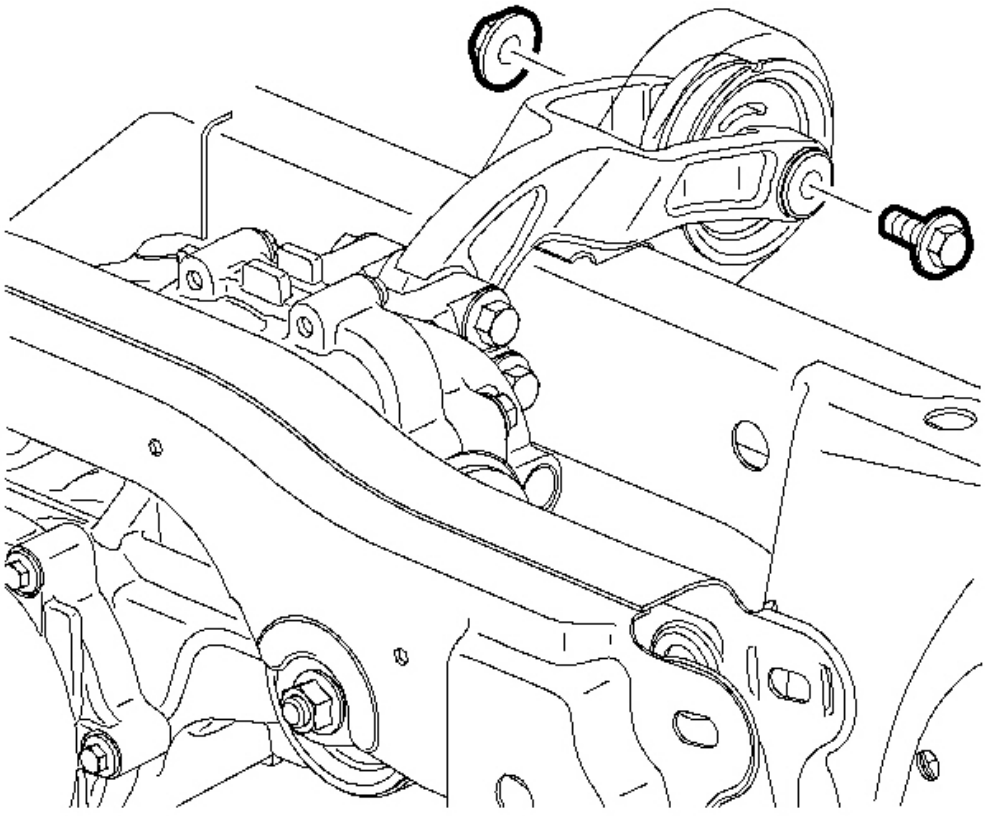


Fig. 33: Removing/Installing RDM Rear Mounting Bracket
Courtesy of GENERAL MOTORS CORP.

5. Remove the RDM bracket-to-bushing mounting nut and bolt.

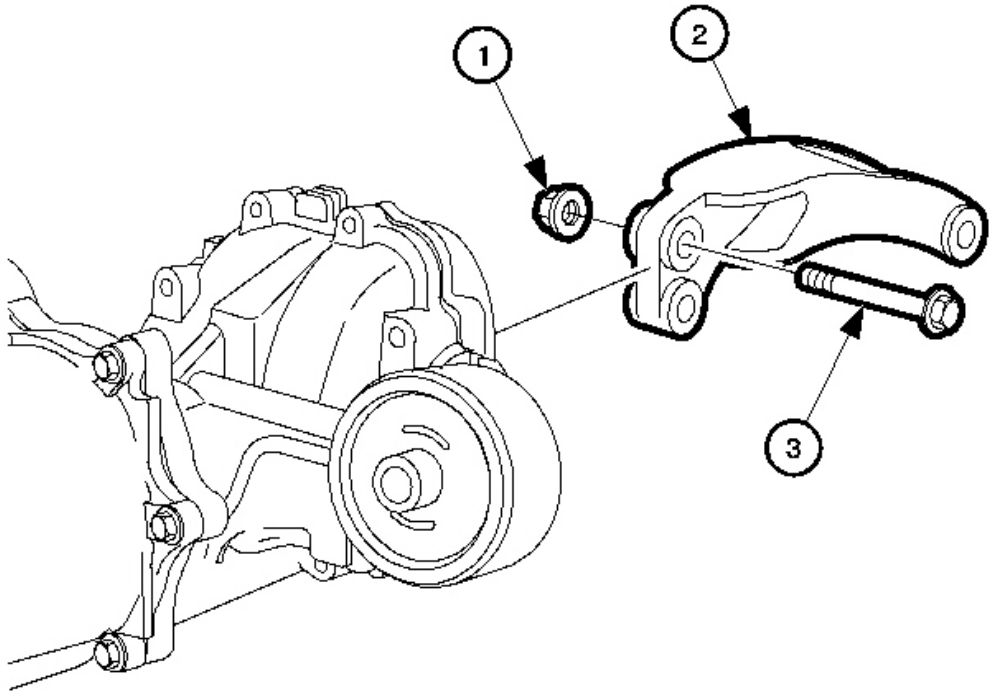


Fig. 34: Removing/Installing Nut & Bolt From The RDM Mounting Bracket
Courtesy of GENERAL MOTORS CORP.

6. Remove the nut (1) and bolt (3) from the mounting RDM mounting bracket (2) and remove the bracket.

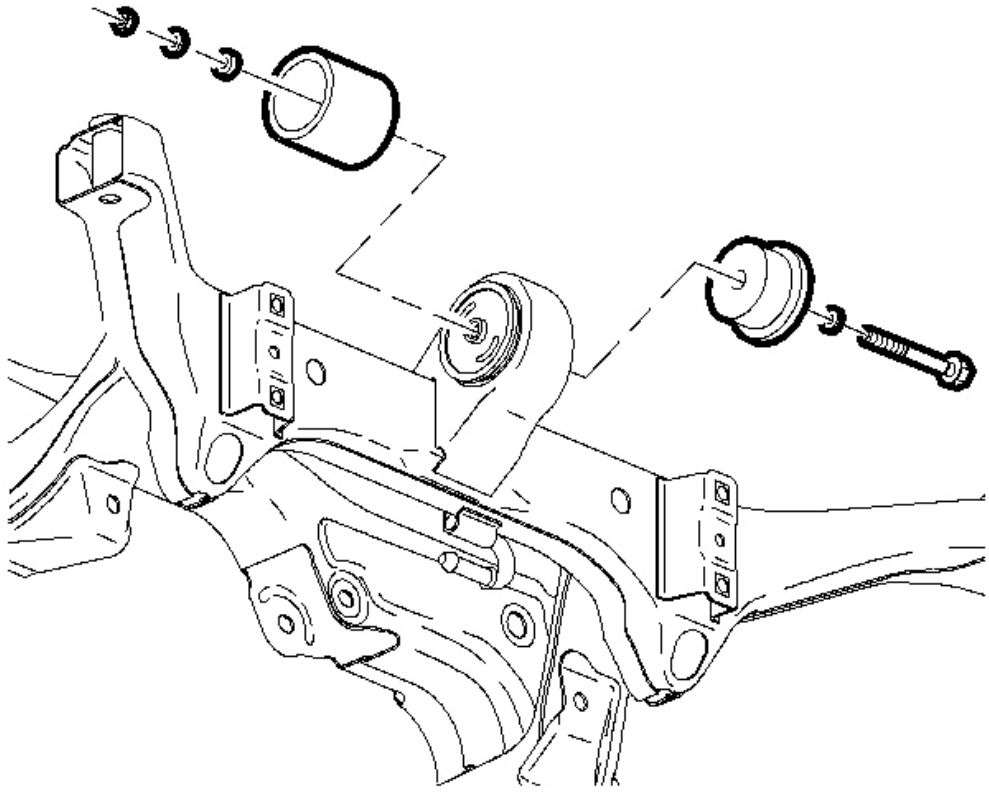


Fig. 35: Installing Bolt & Washer Through The Driver, Bushing, & Receiver
Courtesy of GENERAL MOTORS CORP.

7. Place the open receiver end of the **J 44866** over the flanged side of the bushing and against the vehicle frame. See **Special Tools and Equipment** .
8. Position the driver portion of the **J 44866** with the smaller diameter of the driver against the bushing. See **Special Tools and Equipment** .
9. Install the bolt and washer through the driver, bushing, and receiver
10. Install the nut to the bolt.
11. Slowly tighten the bolt and nut until the bushing is driven out of the vehicle frame and into the receiver.
12. Disassemble the **J 44866** and remove the bushing. See **Special Tools and Equipment** .

Installation Procedure

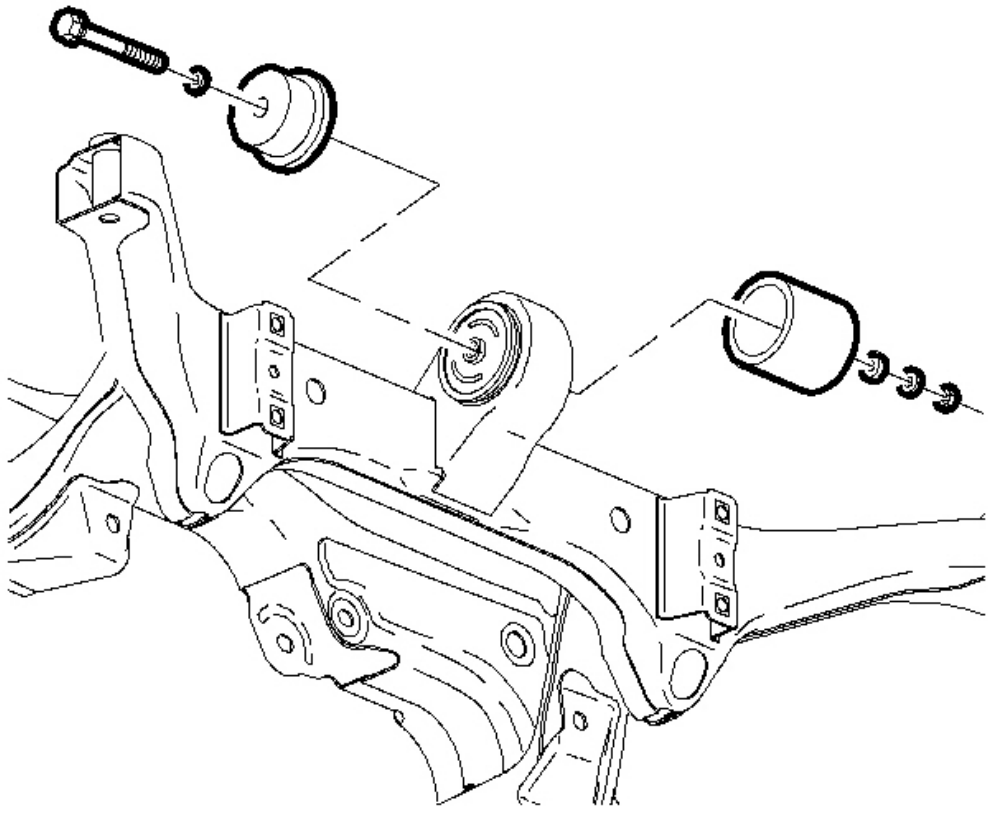


Fig. 36: Positioning RDM Support Bushing On The Vehicle Frame
Courtesy of GENERAL MOTORS CORP.

1. Position the RDM support bushing to the vehicle frame with the slotted portions of the bushing at the 6 o'clock and 12 o'clock positions.
2. Install the receiver end of the **J 44866** against the vehicle frame opposite the bushing. See **Special Tools and Equipment** .
3. Place the large diameter face of the **J 44866** driver against the flanged portion of the bushing. See **Special Tools and Equipment** .
4. Install the bolt and washer through the driver, bushing, and receiver.

5. Install the nut to the bolt.
6. Slowly tighten the bolt and nut until the bushing is drawn into the vehicle frame and the flange is seated squared against the vehicle frame.
7. Remove the **J 44866** . See **Special Tools and Equipment** .

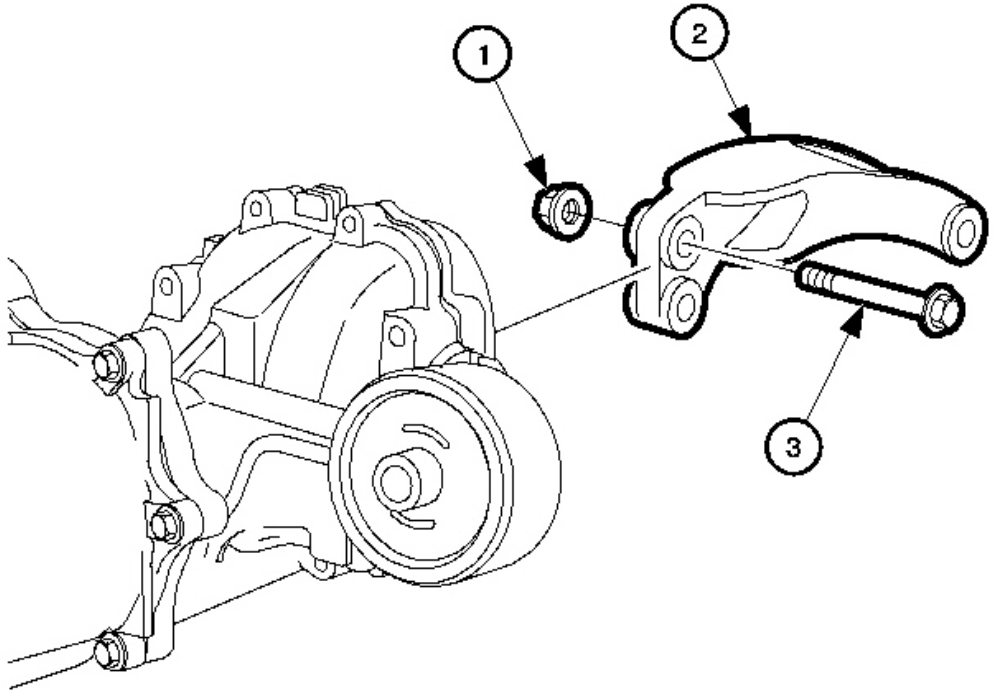


Fig. 37: Removing/Installing Nut & Bolt From The RDM Mounting Bracket
Courtesy of GENERAL MOTORS CORP.

8. Install the support bracket (2) to the RDM.
9. Install the bolt (3) and nut (1) to the bracket.

NOTE: Refer to Fastener Notice in Cautions and Notices.

10. Tighten the support bracket nut and bolt.

    Tighten: Tighten the bolt and nut to 105 N.m (77 lb ft).

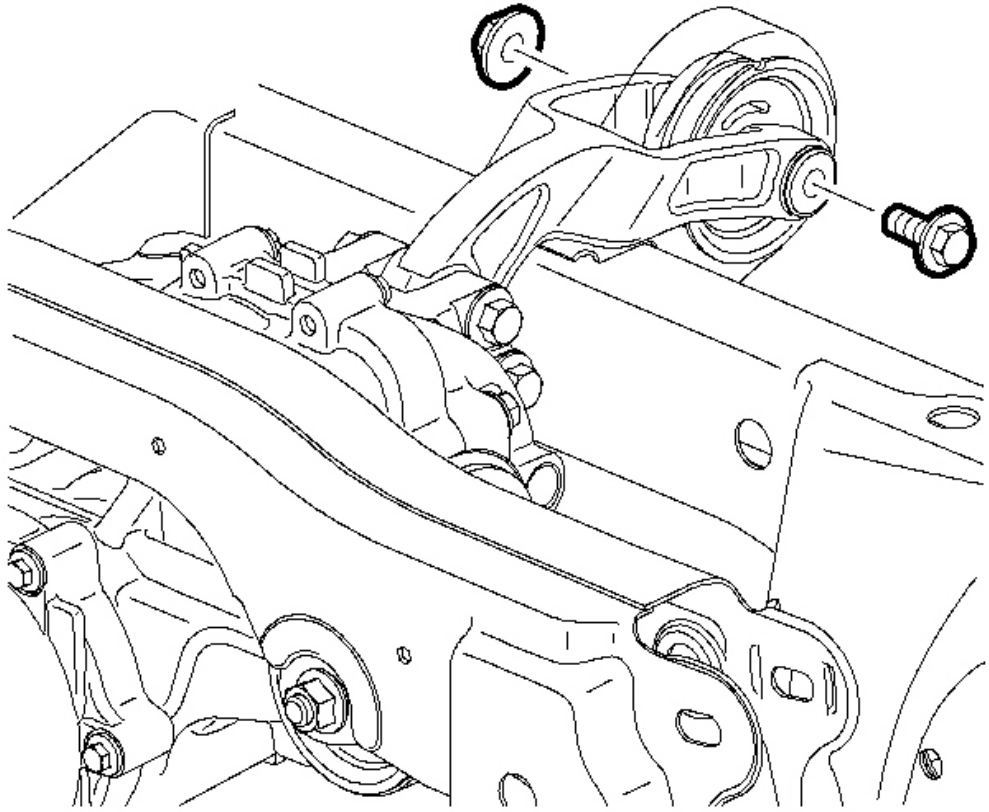


Fig. 38: Removing/Installing RDM Rear Mounting Bracket
Courtesy of GENERAL MOTORS CORP.

11. Install the bracket-to-bushing bolt and nut.

    Tighten: Tighten the bolt and nut to 105 N.m (77 lb ft).

12. Remove the support stand from under the RDM.

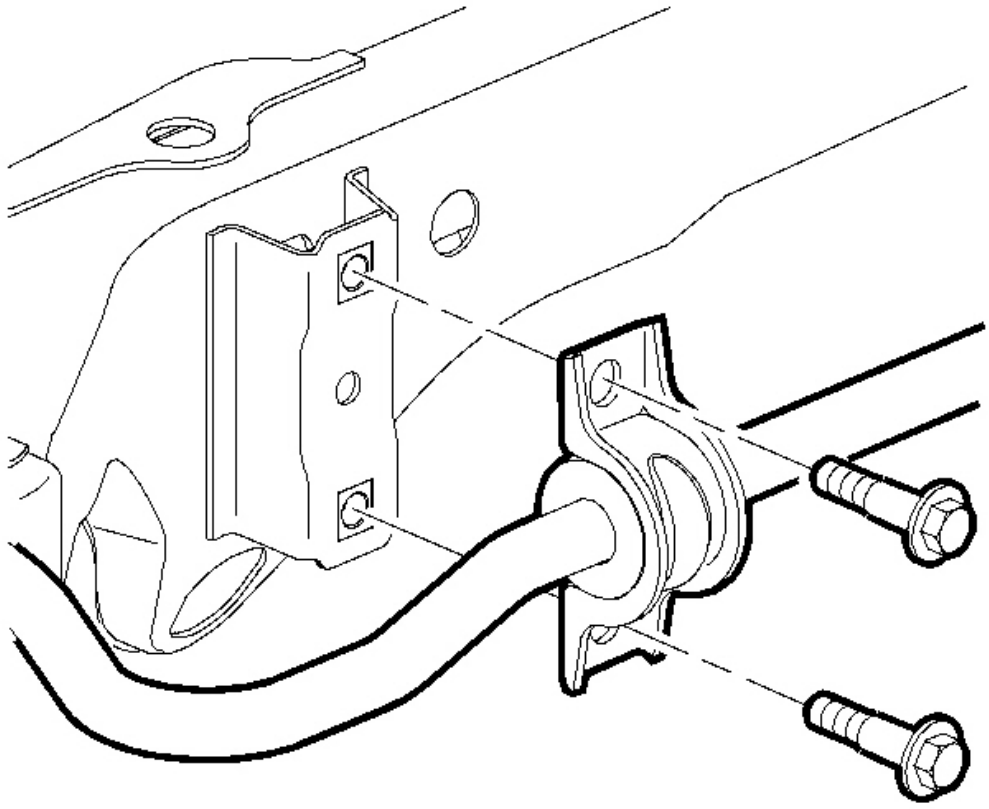


Fig. 39: Removing/Installing Rear Stabilizer Bar
Courtesy of GENERAL MOTORS CORP.

13. Install the rear stabilizer bar to the vehicle. Refer to **Stabilizer Shaft Replacement** in Rear Suspension.

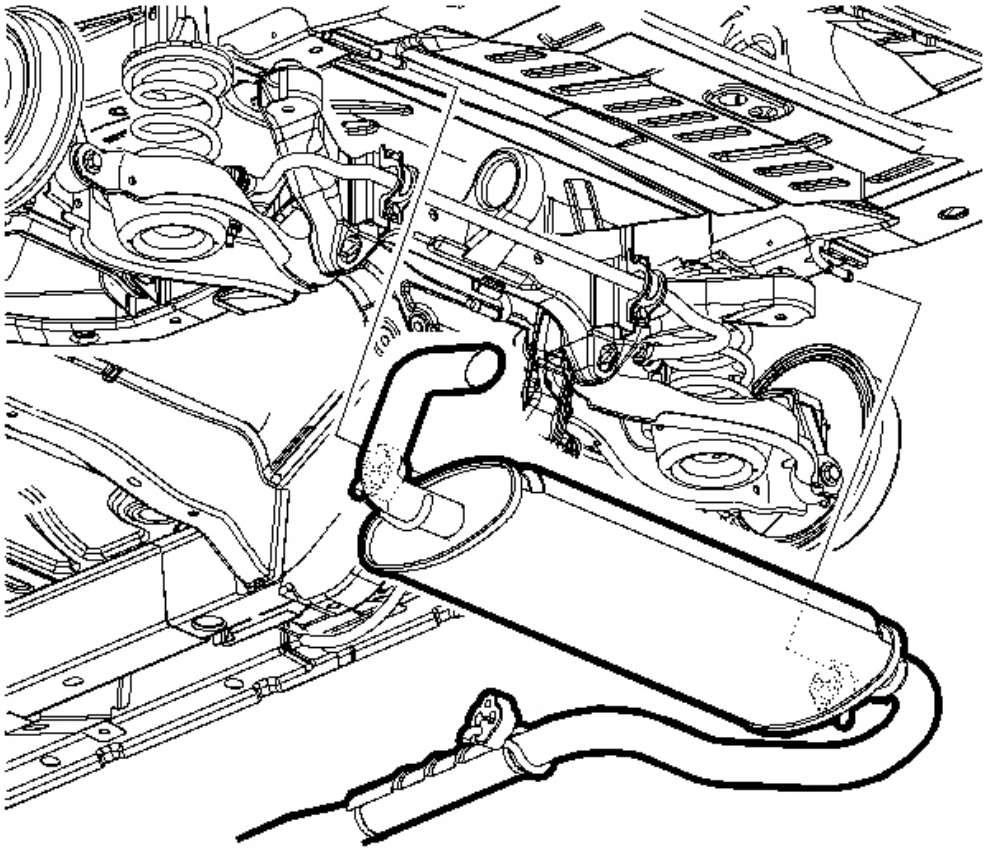


Fig. 40: Installing Intermediate Pipe & Muffler Assembly
Courtesy of GENERAL MOTORS CORP.

14. Install the intermediate pipe and muffler assembly. Refer to **Muffler Replacement (Production Assembly)** or **Muffler Replacement (Service Part)** in Engine Exhaust.
15. Lower the vehicle.

VENT HOSE REPLACEMENT

Removal Procedure

IMPORTANT: Make note of the routing in order to aid in reassembly.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the right rear tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.

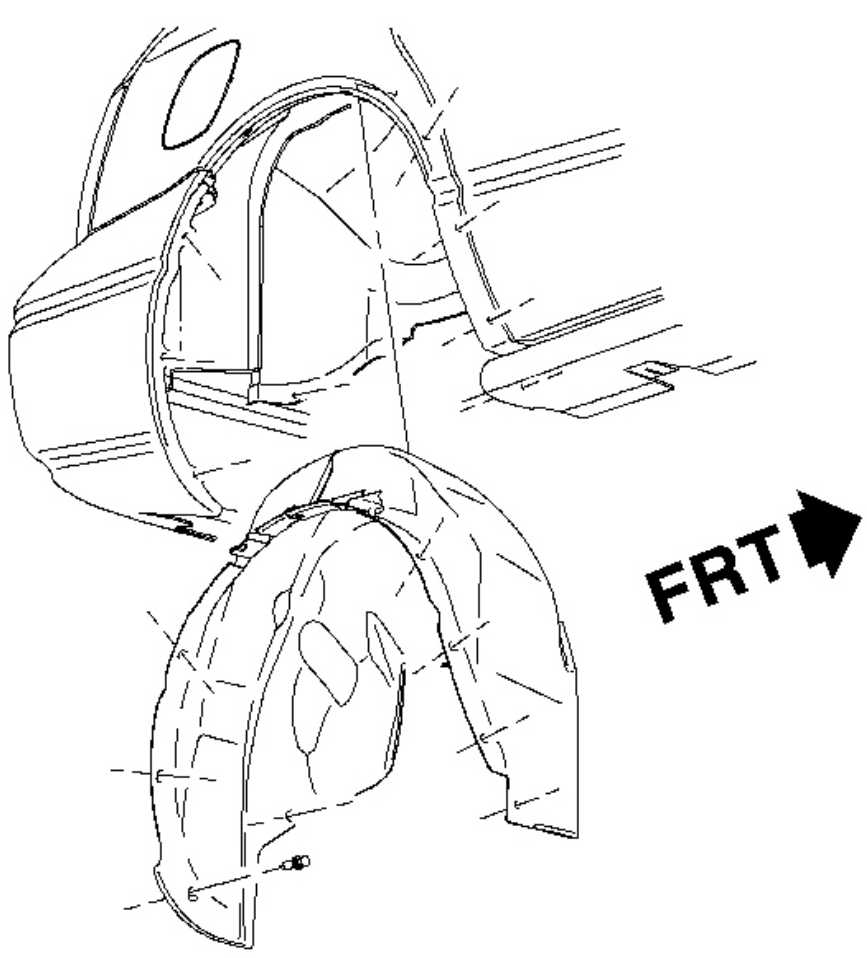


Fig. 41: Wheelhouse Liner & Pushpin Retainers
Courtesy of GENERAL MOTORS CORP.

3. Release the pushpin retainers from the right rear wheelhouse liner and remove the liner.

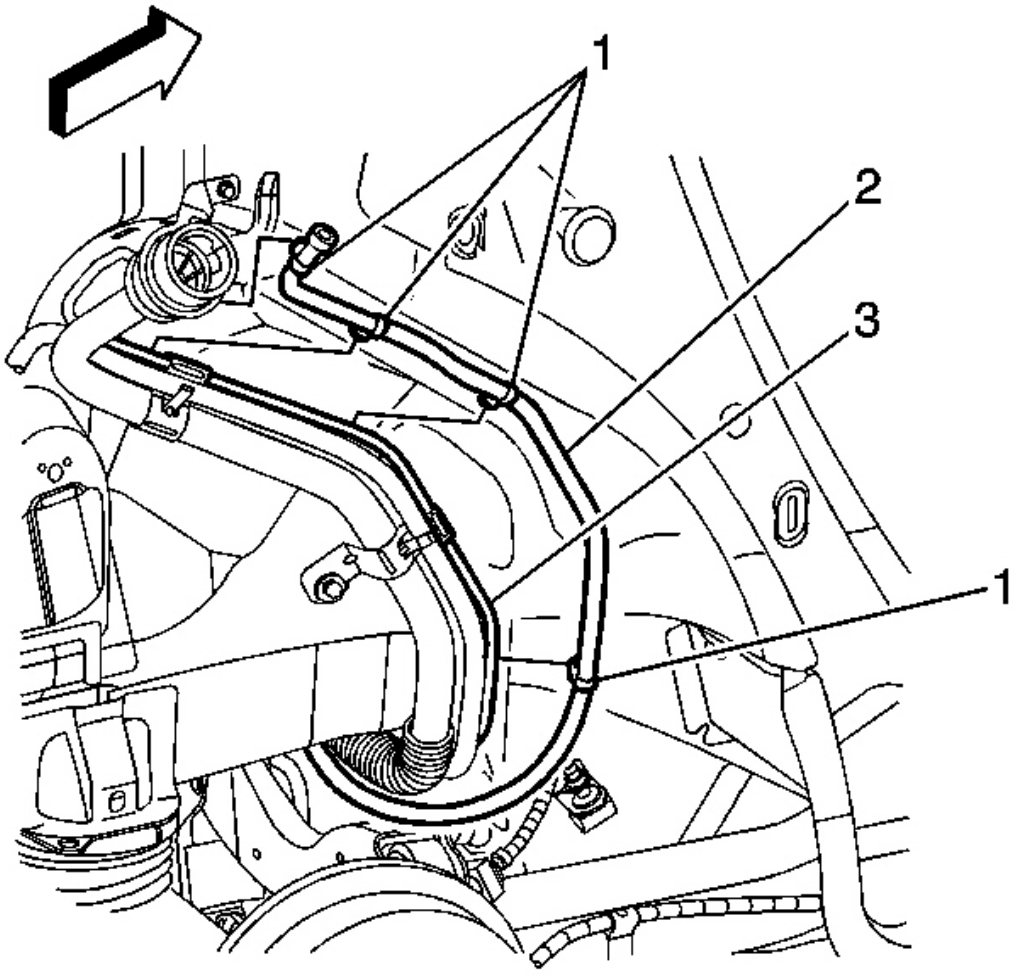


Fig. 42: Releasing Vent Hose Clips From The Fuel Vent Pipe
Courtesy of GENERAL MOTORS CORP.

4. Release the vent hose clips (2) from the fuel vent pipe (1).

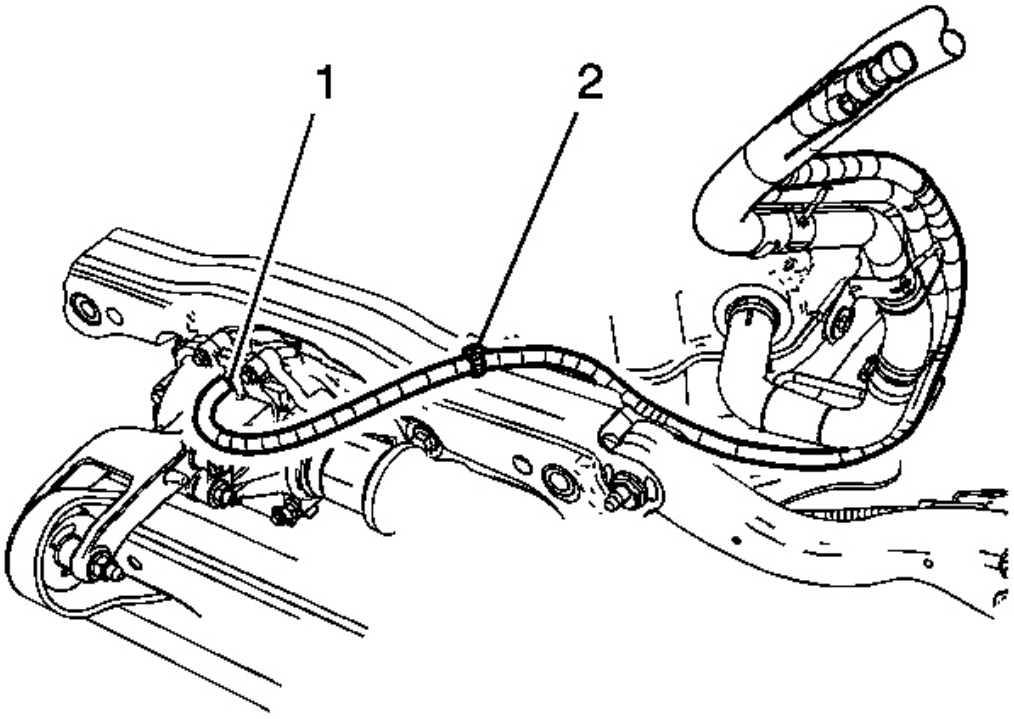


Fig. 43: Removing/Installing Vent Hose On The Differential Assembly
Courtesy of GENERAL MOTORS CORP.

5. Release the retaining clip (2) securing the vent hose along the top of the rear suspension crossmember.
6. Remove the vent hose (1) from the differential assembly by carefully twisting the hose off of the barbed fitting.

Installation Procedure

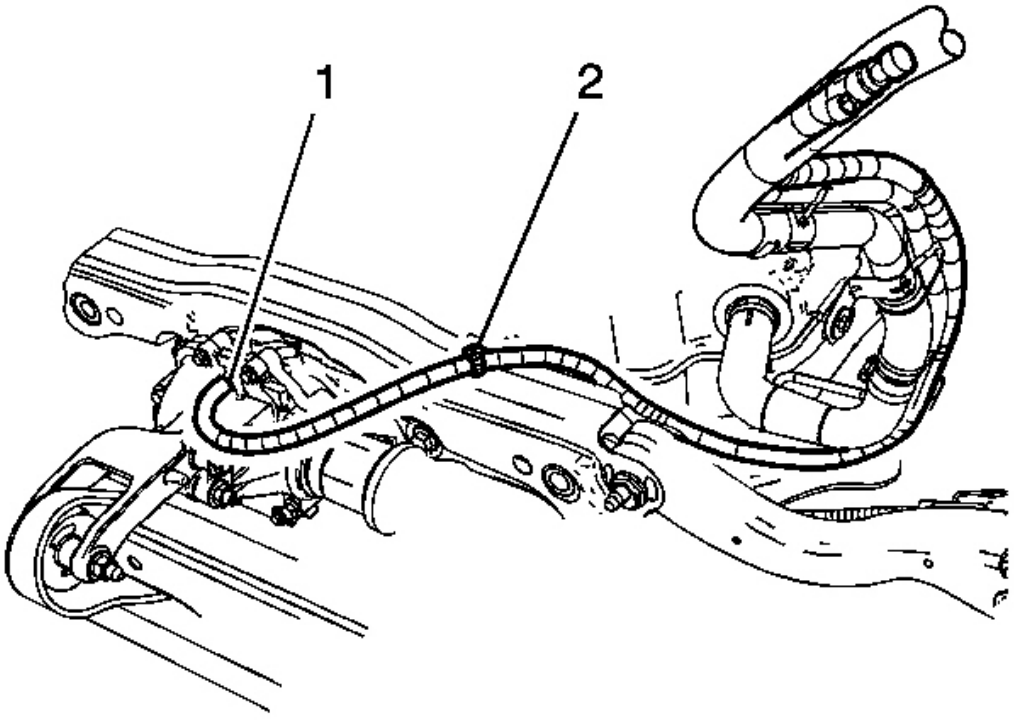


Fig. 44: Removing/Installing Vent Hose On The Differential Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the vent hose (1) to the differential assembly by pushing the vent hose over the barbed fitting. Ensure the vent hose is fully seated on the fitting.
2. Secure the vent hose retaining clip (2) along the top of the rear suspension crossmember.

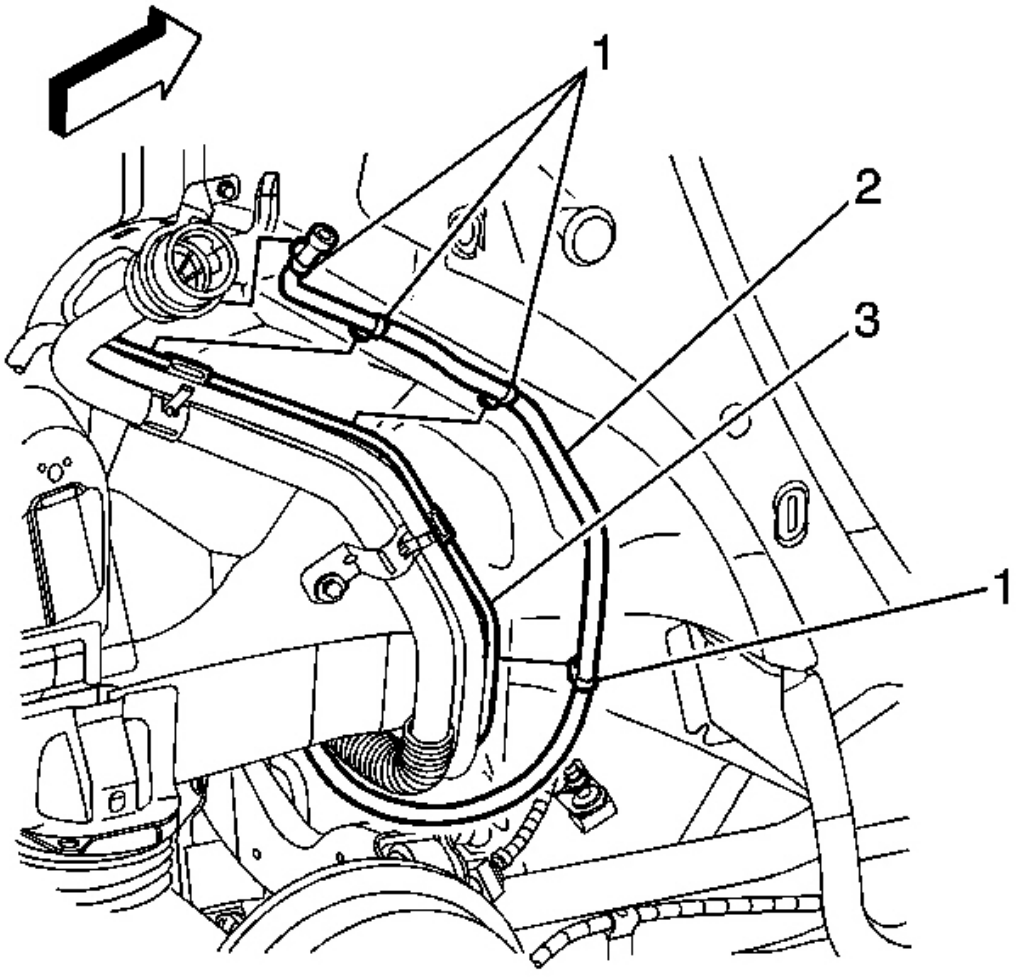


Fig. 45: Releasing Vent Hose Clips From The Fuel Vent Pipe
Courtesy of GENERAL MOTORS CORP.

3. Secure the vent hose clips (2) to the fuel vent pipe (3).

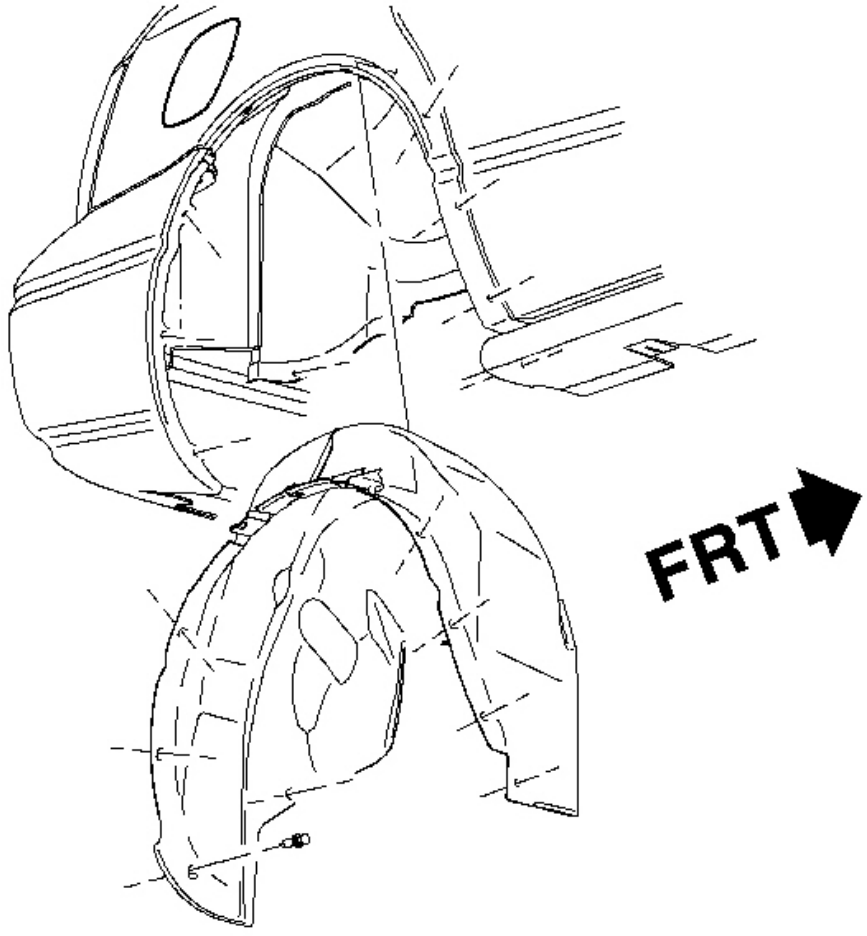


Fig. 46: Wheelhouse Liner & Pushpin Retainers
Courtesy of GENERAL MOTORS CORP.

4. Position the wheelhouse liner to the vehicle and install the pushpin retainers.
5. Install the wheel and tire assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
6. Lower the vehicle.

REAR AXLE SHAFT SEAL REPLACEMENT - LEFT

Tools Required

J 44809 Output Shaft Seal Installer. See **Special Tools and Equipment** .

Removal Procedure

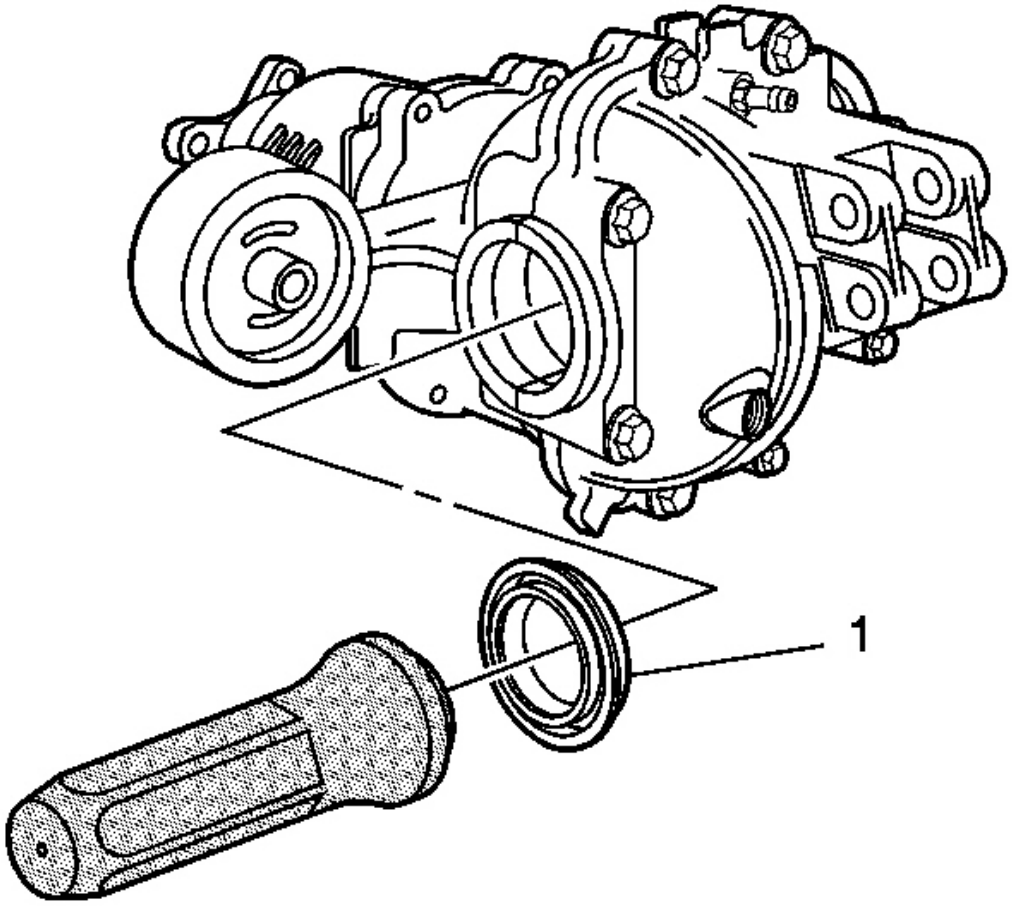


Fig. 47: Removing/Installing Left Rear Wheel & Tire Assembly
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the left rear wheel and tire assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the left rear wheel drive shaft. Refer to **Wheel Drive Shaft Replacement - Rear** in Wheel Drive Shafts.
4. Carefully pry out the output shaft seal and discard.

Installation Procedure

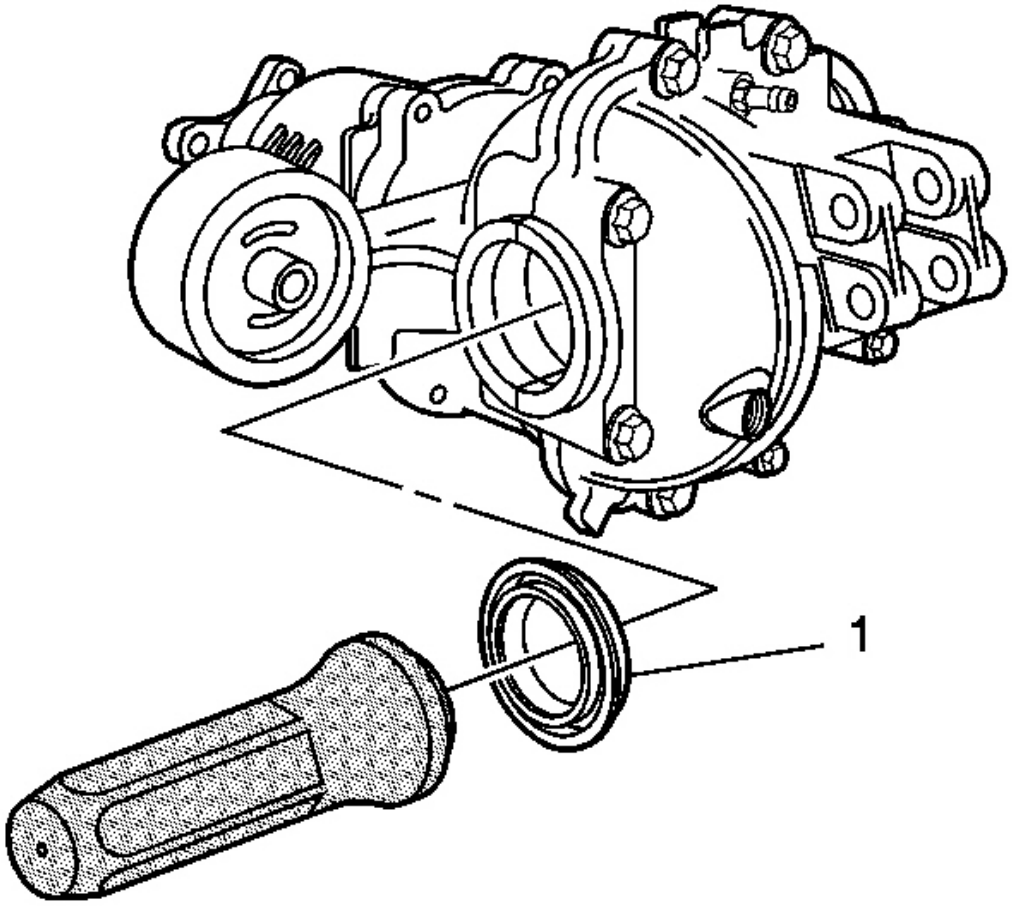


Fig. 48: Removing/Installing Left Rear Wheel & Tire Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the new output shaft seal using the **J 44809** . See **Special Tools and Equipment** .
2. Install the left rear wheel drive shaft. Refer to **Wheel Drive Shaft Replacement - Rear** in Wheel Drive Shafts.
3. Inspect the rear drive module fluid level. Refer to **Lubricant Level Inspection - Rear Drive Axle** .
4. Install the left rear wheel and tire assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
5. Lower the vehicle.

REAR AXLE SHAFT SEAL REPLACEMENT - RIGHT

Tools Required

J 44809 Output Shaft Seal Installer. See **Special Tools and Equipment** .

Removal Procedure

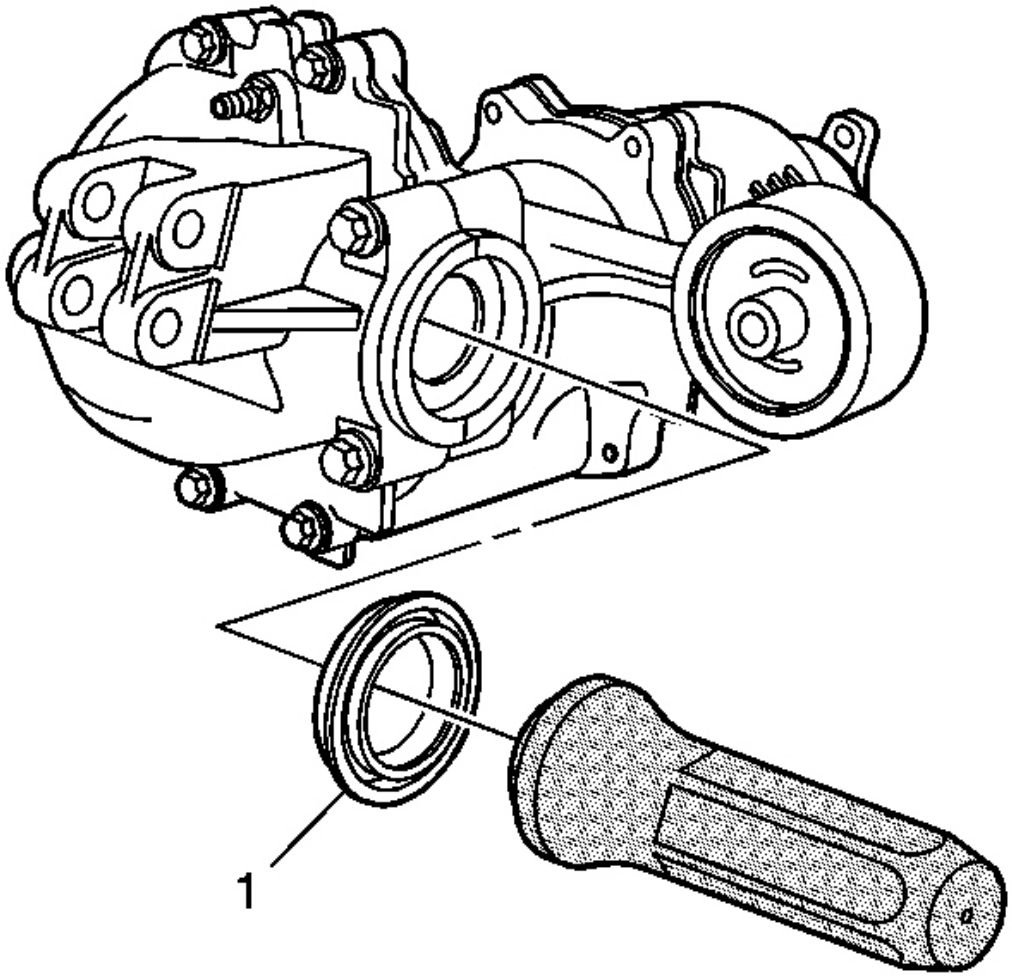


Fig. 49: Removing/Installing Right Rear Wheel & Tire Assembly
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the right rear wheel and tire assembly. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
3. Remove the right rear wheel drive shaft. Refer to **Wheel Drive Shaft Replacement - Rear** in Wheel Drive Shafts.

4. Carefully pry out the output shaft seal and discard.

Installation Procedure

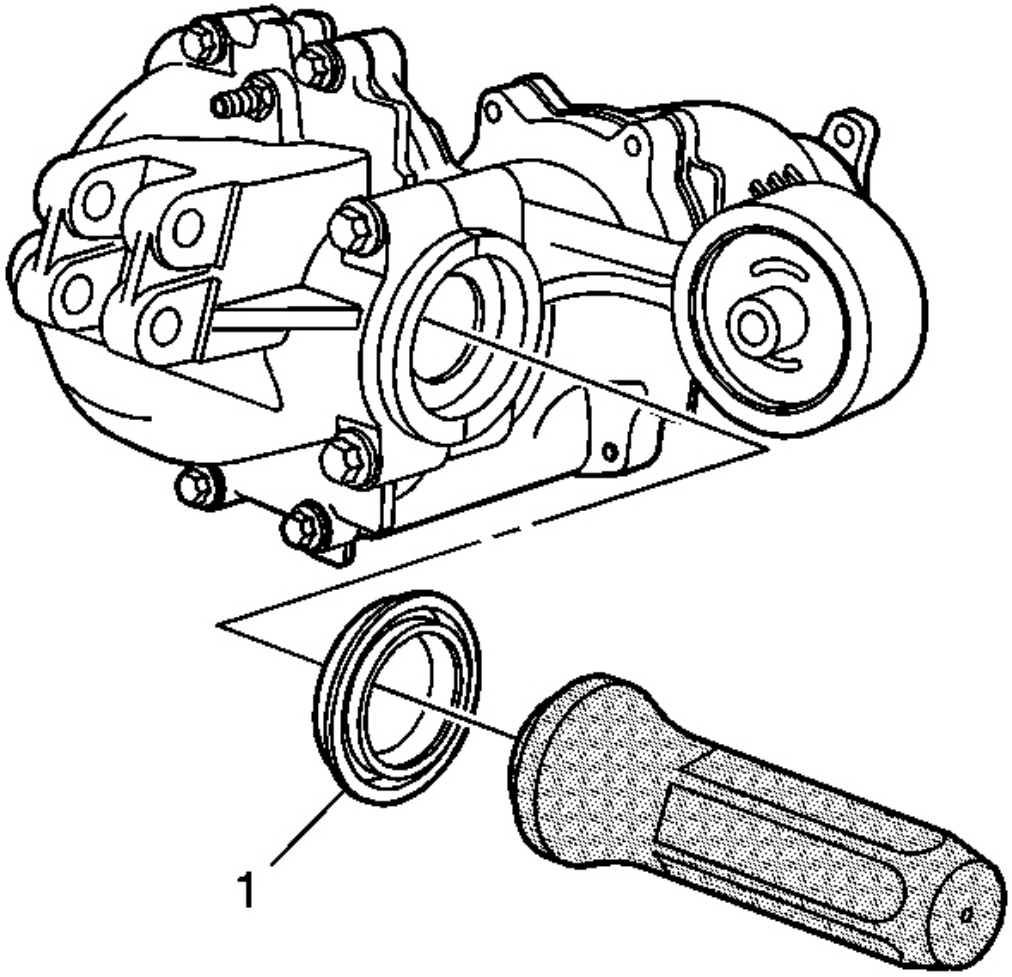


Fig. 50: Removing/Installing Right Rear Wheel & Tire Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the new output shaft seal using the **J 44809** . See **Special Tools and Equipment** .
2. Install the right rear wheel drive shaft. Refer to **Wheel Drive Shaft Replacement - Rear** in Wheel Drive Shafts.
3. Inspect the rear drive module fluid level. Refer to **Lubricant Level Inspection - Rear Drive Axle** .
4. Install the right rear wheel and tire assembly. Refer to **Tire and Wheel Removal and Installation** in

Tires and Wheels.

5. Lower the vehicle.

DRIVE PINION FLANGE/YOKE AND/OR OIL SEAL REPLACEMENT

Tools Required

- **J 44851** Pinion Seal Installer. See **Special Tools and Equipment** .
- **J 44873** Pinion Flange Holder and Remover. See **Special Tools and Equipment** .

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Index mark the propeller shaft at the power take-off unit (PTU) output flange and at the rear drive module input flange.
3. Place an adjustable support at the front and the rear of the propeller shaft.

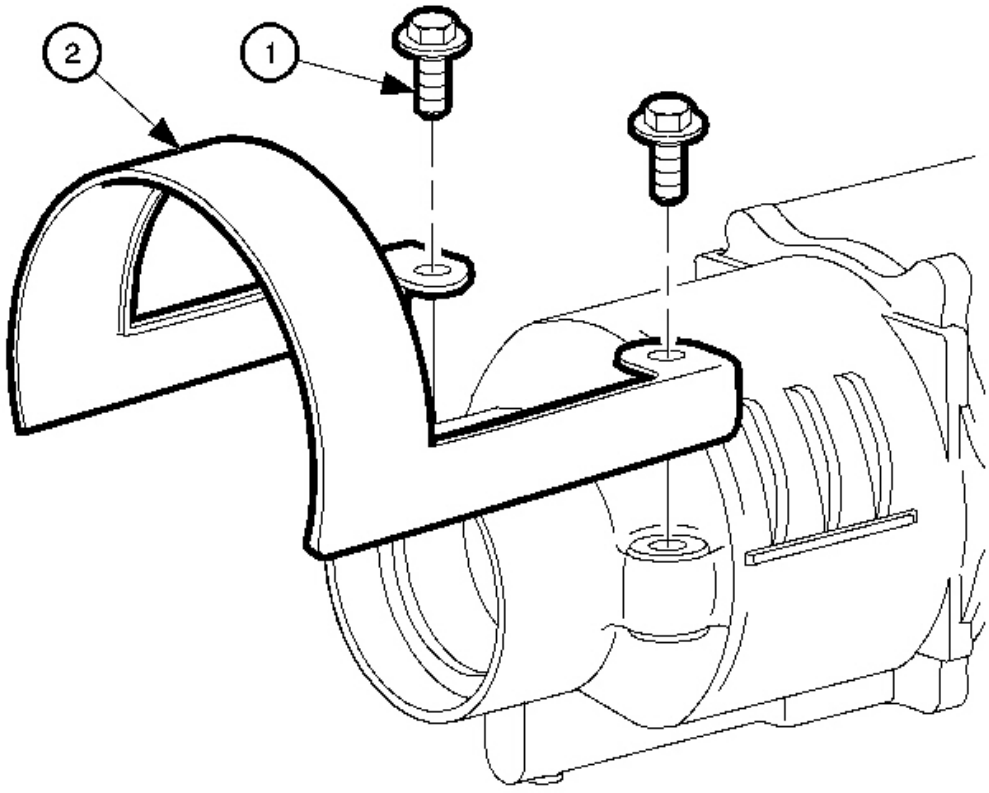


Fig. 51: Removing/Installing Rear Drive Module (RDM) Propeller Shaft Guard
Courtesy of GENERAL MOTORS CORP.

4. Remove the rear drive module (RDM) propeller shaft guard (2) mounting bolts (1)

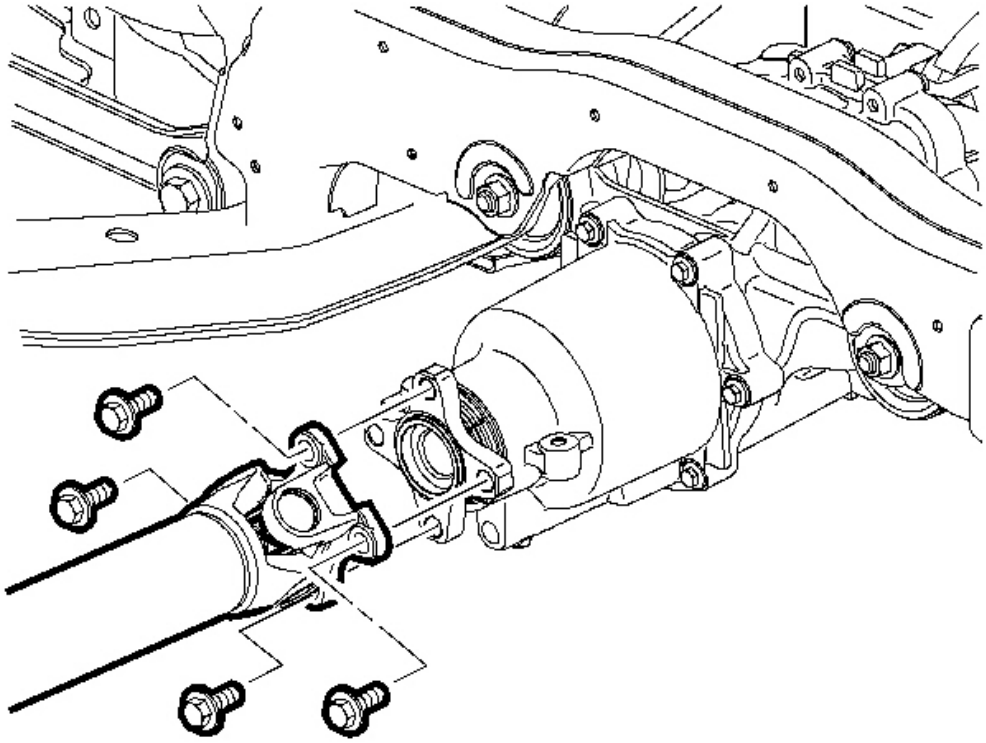


Fig. 52: Removing/Installing Propeller Shaft Flange Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

5. Remove the bolts securing the propeller shaft to the RDM flange.

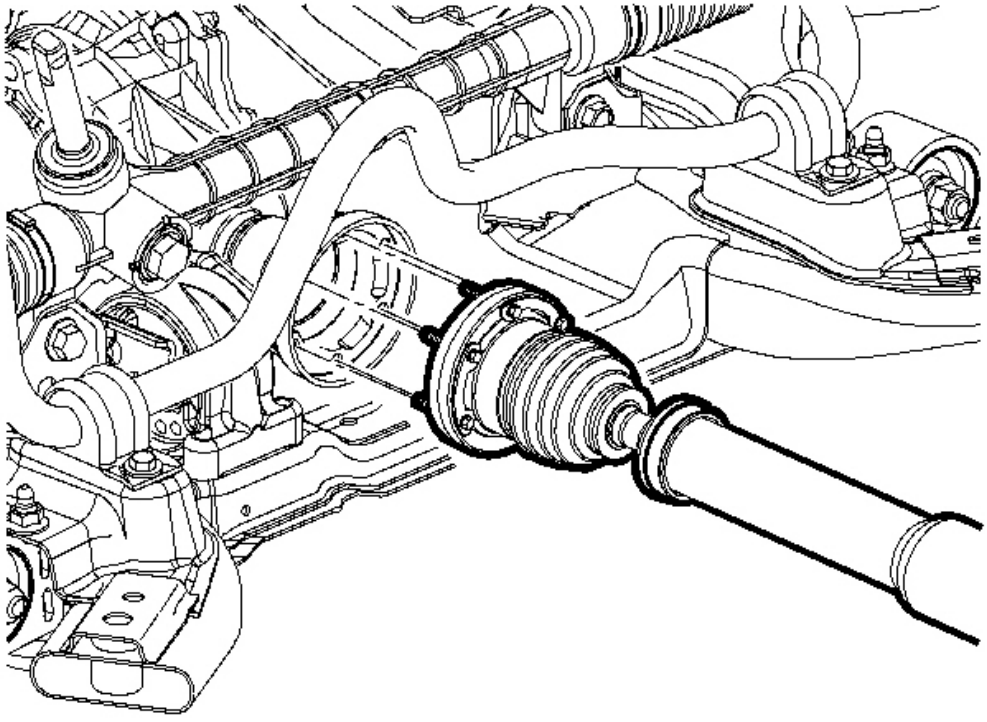


Fig. 53: Propeller Shaft & PTU
Courtesy of GENERAL MOTORS CORP.

6. Remove the bolts securing the propeller shaft to the PTU.

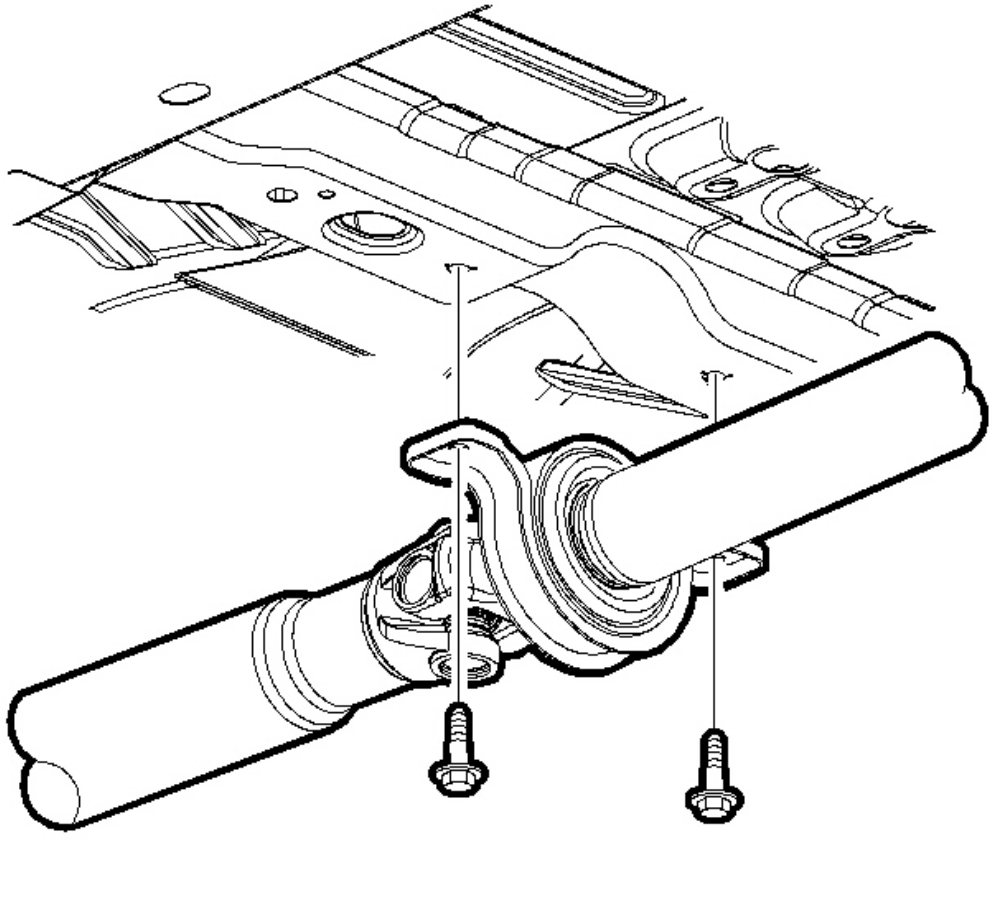


Fig. 54: Installing Support Bearing Retainer Bolts On The Vehicle Underbody
Courtesy of GENERAL MOTORS CORP.

7. Remove the bolts securing the support bearing to the vehicle underbody.
8. Remove the propeller shaft from the vehicle.

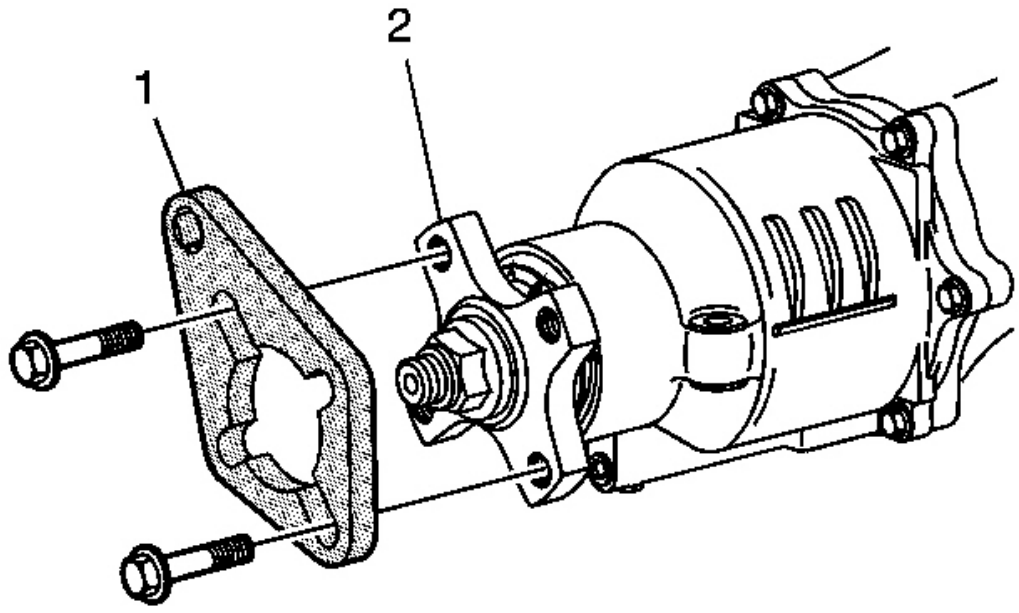


Fig. 55: Installing J44873 On The Pinion Flange
Courtesy of GENERAL MOTORS CORP.

9. Install the **J 44873** (1) to the pinion flange (2). See **Special Tools and Equipment** .
10. While holding the **J 44873** with a breaker bar, loosen the pinion flange nut. See **Special Tools and Equipment** .

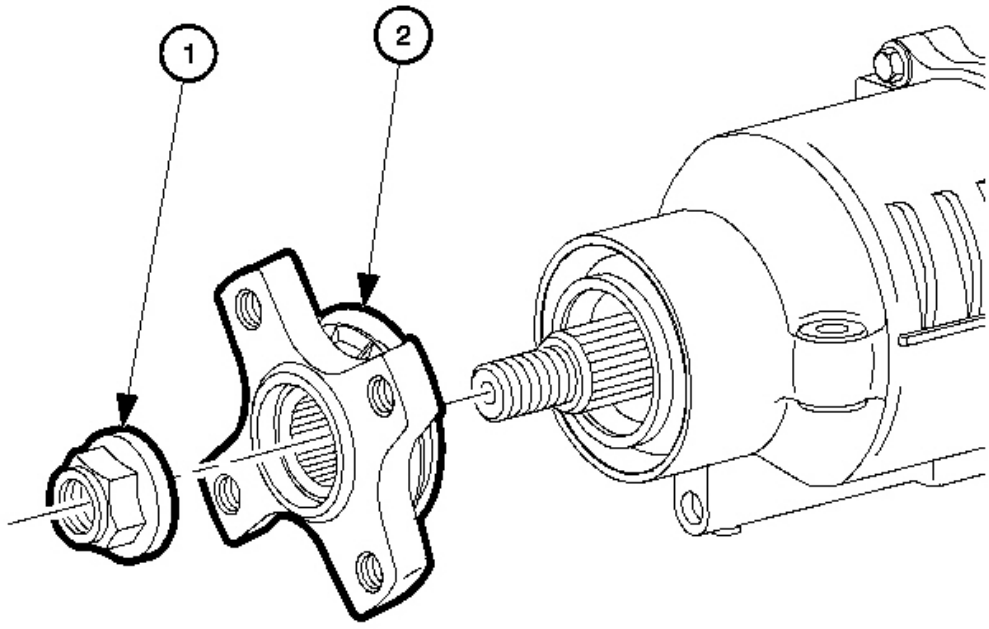


Fig. 56: Removing/Installing Pinion Flange Nut On The RDM
Courtesy of GENERAL MOTORS CORP.

11. Remove and discard the pinion flange nut (1).
12. Remove the flange (2).

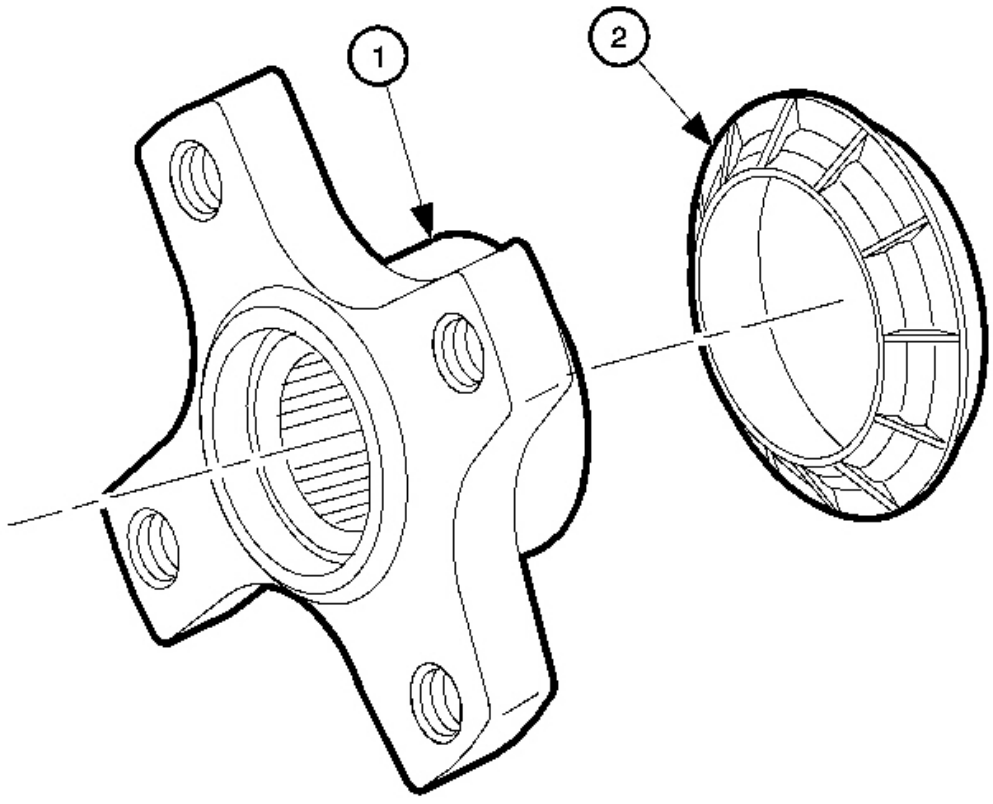


Fig. 57: Removing/Installing Dust Deflector On The Drive Pinion Flange
Courtesy of GENERAL MOTORS CORP.

13. Remove the dust deflector (2) from the pinion flange (1).

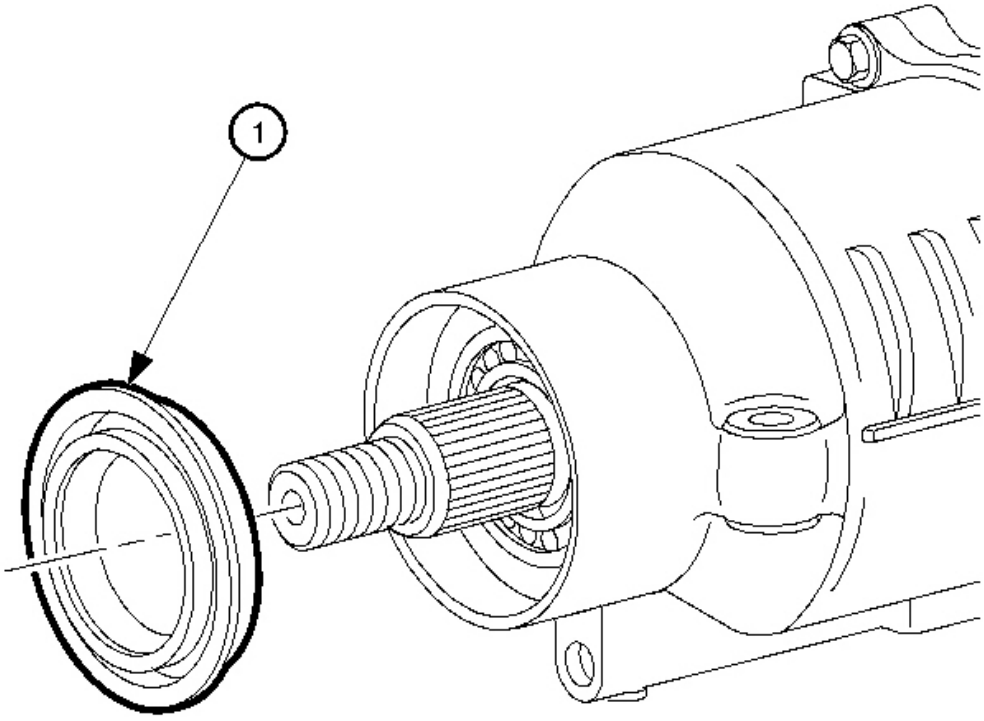


Fig. 58: Removing & Discard The Pinion Oil Seal
Courtesy of GENERAL MOTORS CORP.

14. Remove and discard the pinion oil seal (1).

Installation Procedure

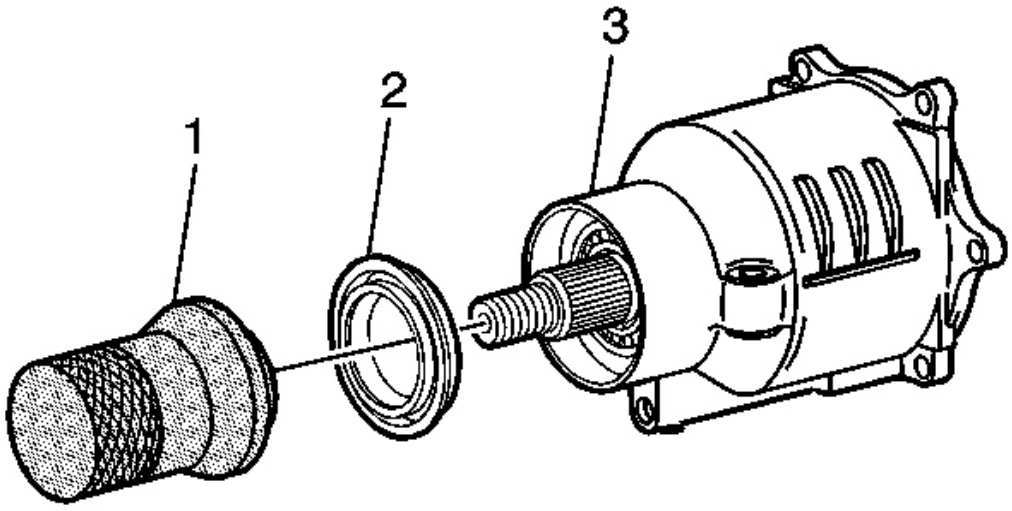


Fig. 59: Installing Pinion Oil Seal On RDM
Courtesy of GENERAL MOTORS CORP.

1. Thoroughly clean the pinion oil seal mounting surface of the RDM housing (1).
2. Using the **J 44851** , install a new pinion oil seal to the RDM. See **Special Tools and Equipment** .
3. Ensure that the seal flange seats squarely against the face of the RDM.

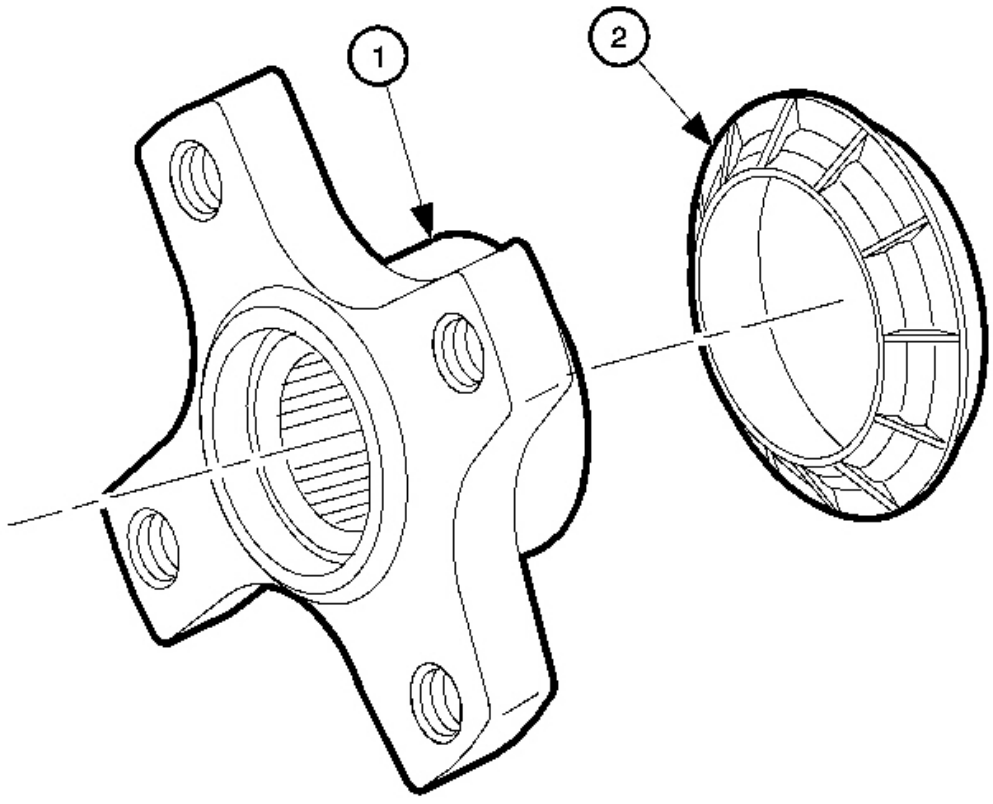


Fig. 60: Removing/Installing Dust Deflector On The Drive Pinion Flange
Courtesy of GENERAL MOTORS CORP.

4. Install the dust deflector (2) to the drive pinion flange (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

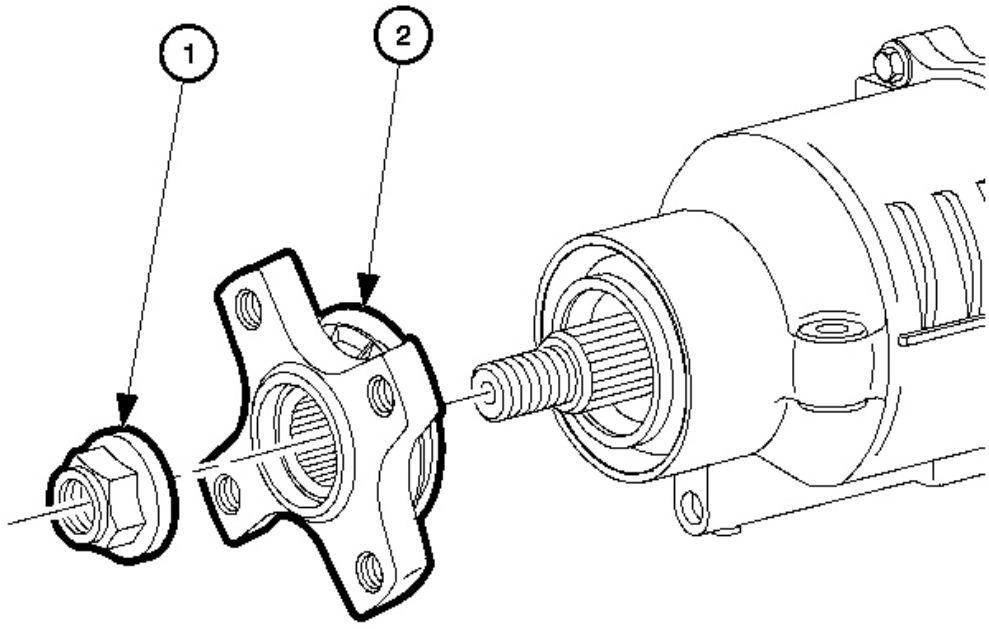


Fig. 61: Removing/Installing Pinion Flange Nut On The RDM
Courtesy of GENERAL MOTORS CORP.

5. Install the pinion flange (2) and nut (1) to the RDM.

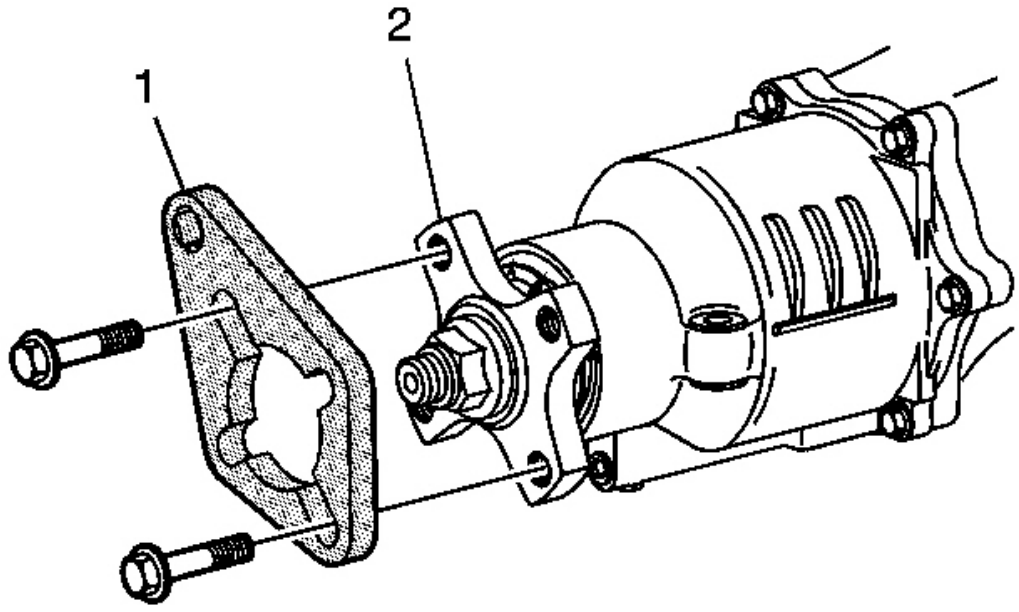


Fig. 62: Installing J44873 On The Pinion Flange
Courtesy of GENERAL MOTORS CORP.

6. Install the **J 44873** (1) to the pinion flange (2). See **Special Tools and Equipment** .
7. While holding the pinion flange stationary with a breaker bar on the **J 44873** , tighten the pinion flange nut. See **Special Tools and Equipment** .

   Tighten: Tighten the nut to 203 N.m (150 lb ft).

8. Remove the **J 44873** from pinion flange. See **Special Tools and Equipment** .

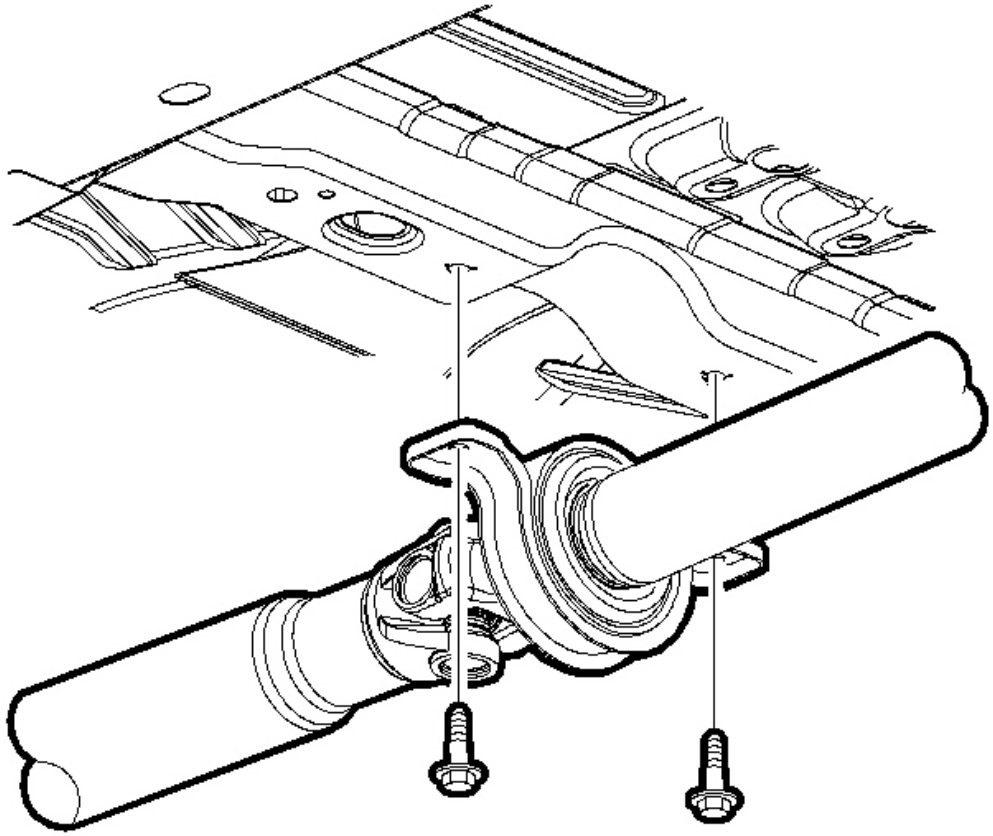


Fig. 63: Installing Support Bearing Retainer Bolts On The Vehicle Underbody
Courtesy of GENERAL MOTORS CORP.

9. Install the propeller shaft to the vehicle using support stands to assist in positioning the propeller shaft.
10. Hand install the support bearing retainer bolts to the vehicle underbody.

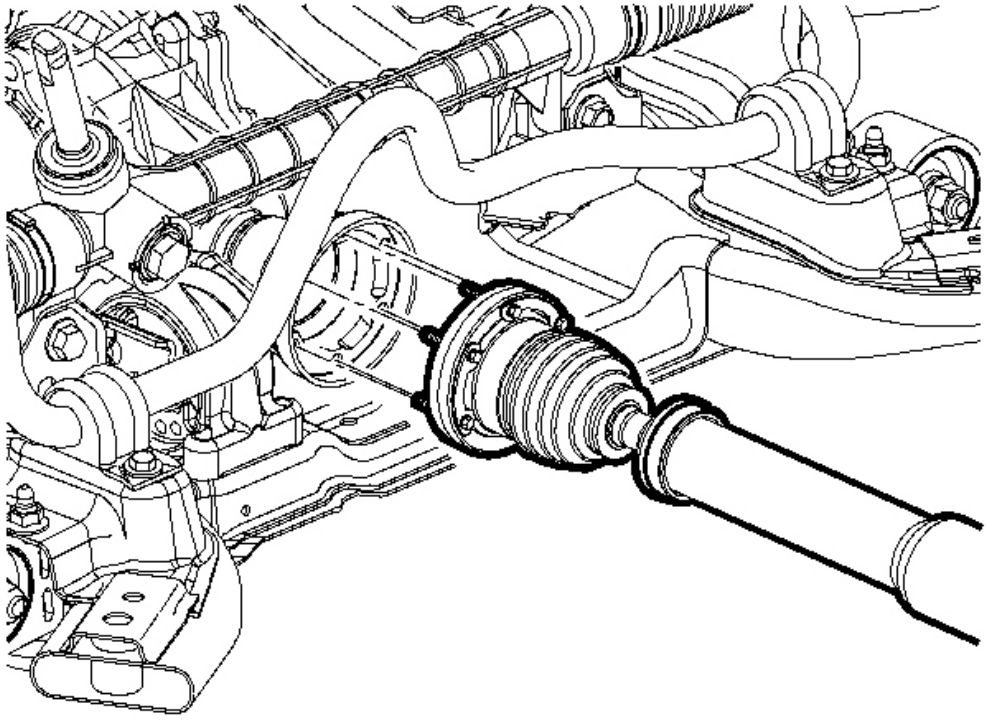


Fig. 64: Propeller Shaft & PTU
Courtesy of GENERAL MOTORS CORP.

11. Align the reference marks on the propeller shaft and the PTU output flange.
12. Install the bolts to the propeller shaft and the PTU flange.

Tighten: Tighten the bolts to 25 N.m (18 lb ft).

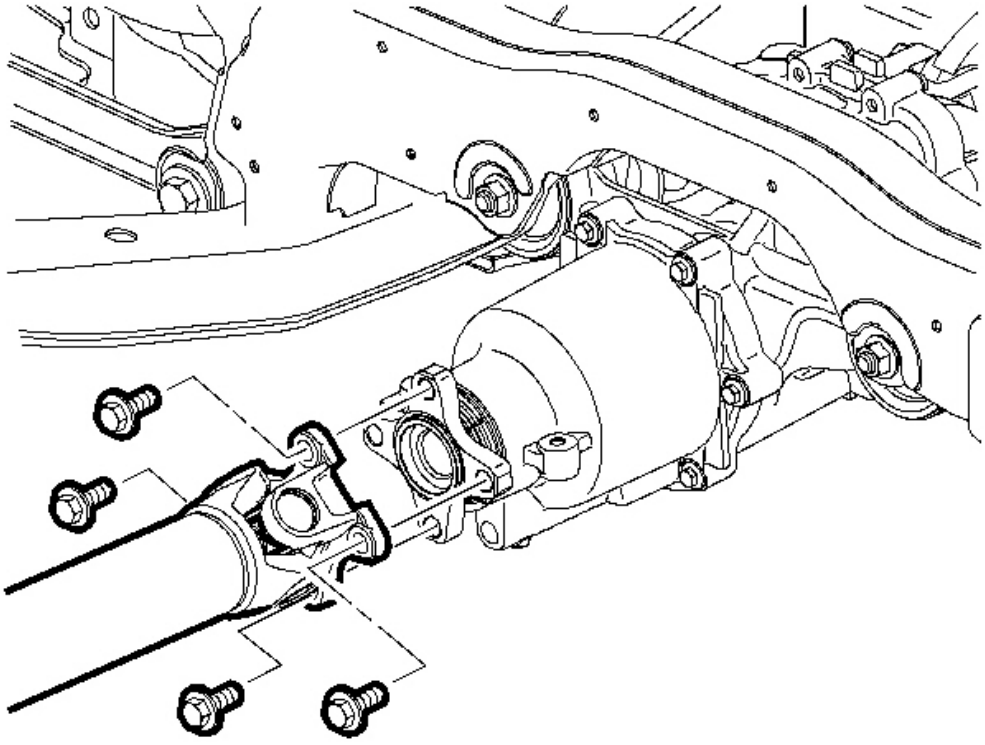


Fig. 65: Removing/Installing Propeller Shaft Flange Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

13. Align the reference marks on the propeller shaft and the RDM pinion flange.
14. Install the bolts to the propeller shaft and the pinion flange.

    Tighten: Tighten the bolts to 50 N.m (37 lb ft).

15. Remove the support stands.

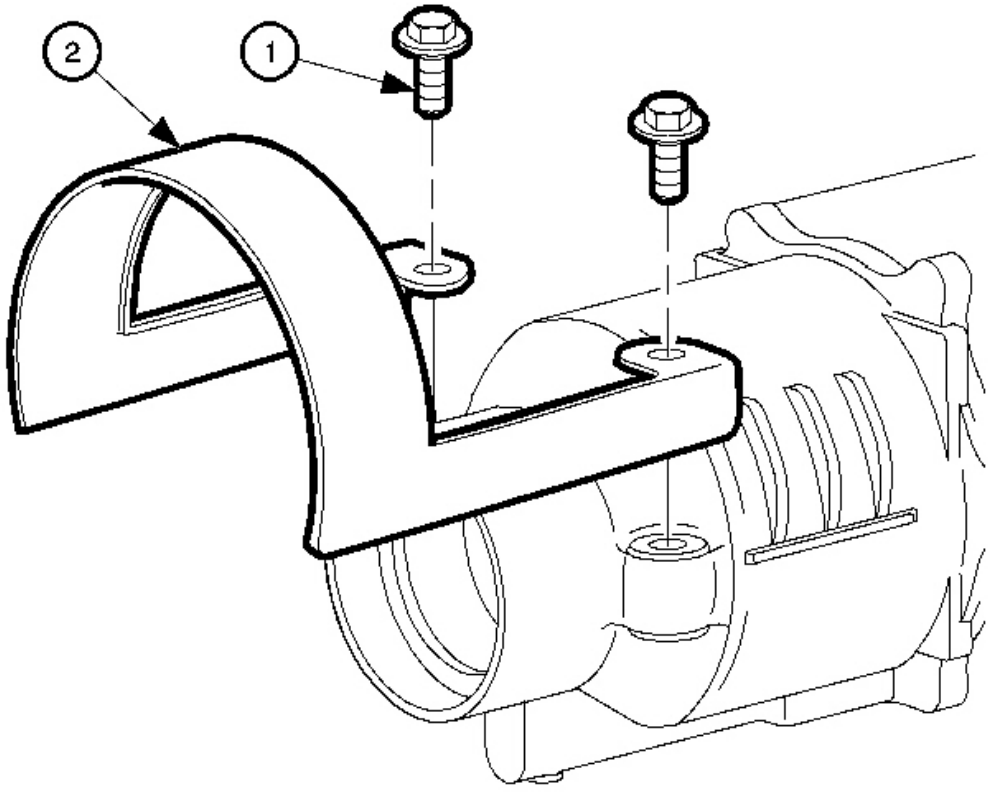


Fig. 66: Removing/Installing Rear Drive Module (RDM) Propeller Shaft Guard
Courtesy of GENERAL MOTORS CORP.

16. Install the propeller shaft guard to the RDM.
17. Install the bolts to the propeller shaft guard.

    Tighten: Tighten the bolts to 25 N.m (18 lb ft).

18. Inspect the RDM fluid level. Refer to **Lubricant Level Inspection - Rear Drive Axle** .
19. Lower the vehicle.

DRIVE PINION HOUSING AND/OR SEAL REPLACEMENT

Tools Required

- **J 44851** Pinion Seal Installer. See **Special Tools and Equipment** .
- **J 44873** Pinion Flange Holder and Remover. See **Special Tools and Equipment** .

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.

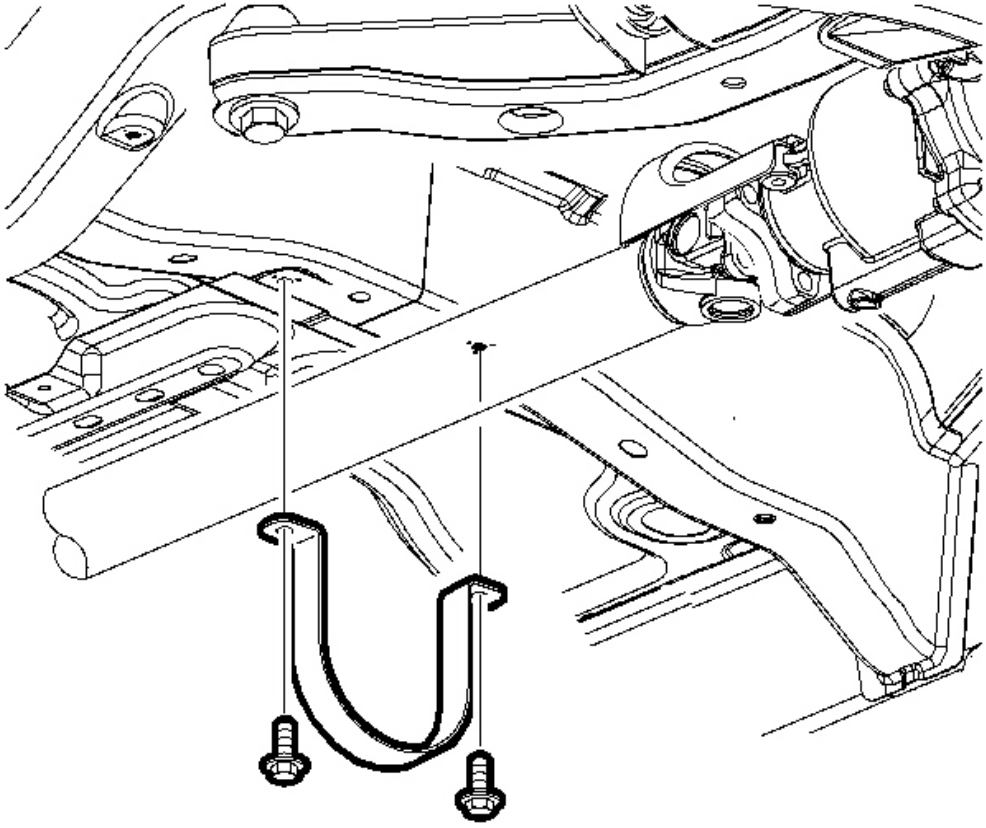


Fig. 67: Removing/Installing Propeller Shaft Underbody Guard Loop Bolts
Courtesy of GENERAL MOTORS CORP.

2. Remove the propeller shaft underbody guard loop bolts.

3. Remove the guard loop.

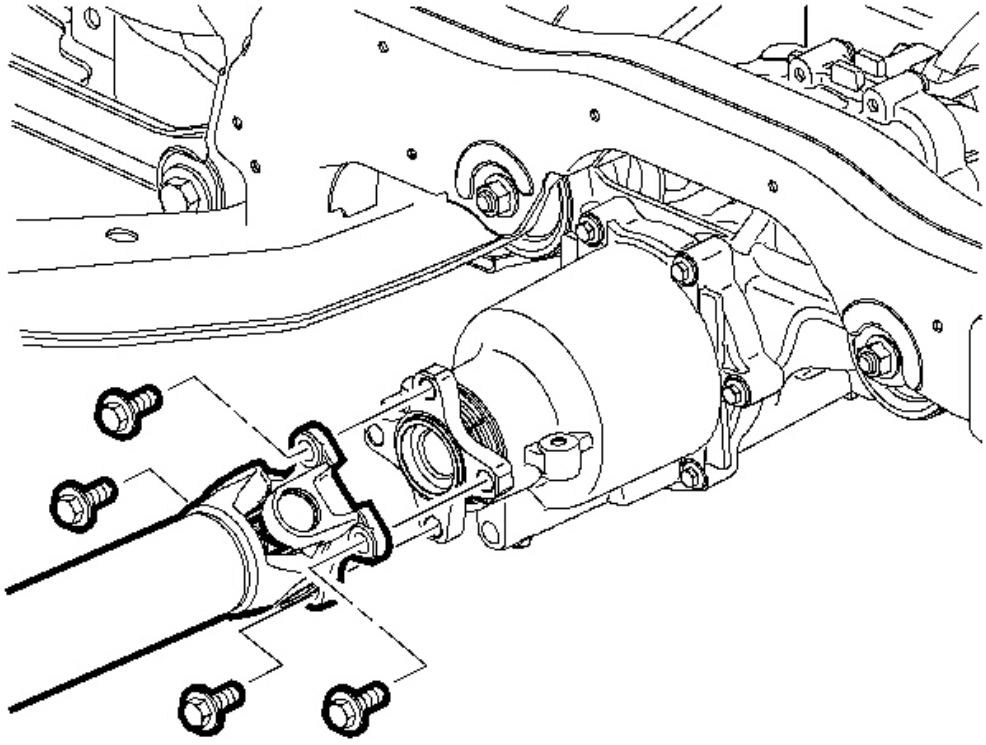


Fig. 68: Removing/Installing Propeller Shaft Flange Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

4. Reference mark the propeller shaft flange-to-input flange relationship at the rear drive module (RDM).
5. Remove the propeller shaft flange mounting bolts at the RDM input flange.
6. Position the end of the propeller shaft away from the RDM and secure with heavy mechanics wire, or equivalent.

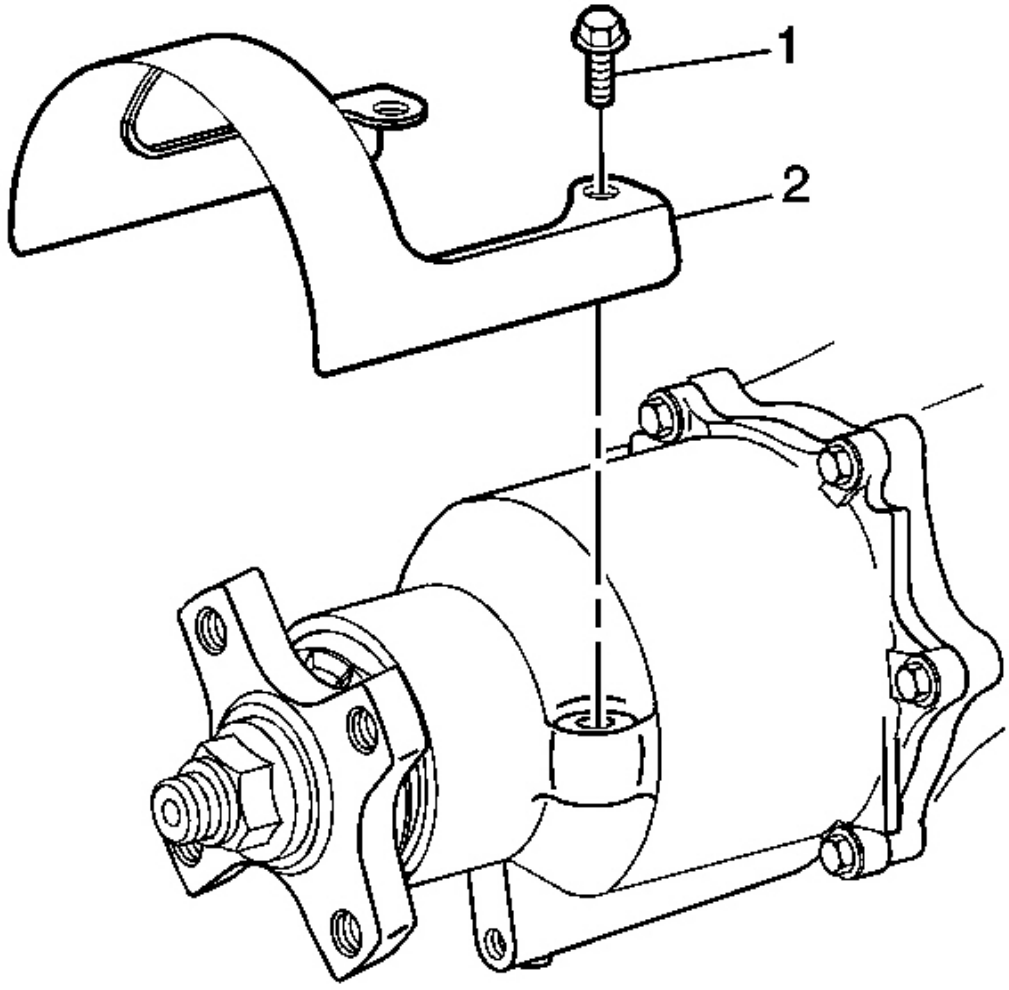


Fig. 69: Removing/Installing Propeller Shaft Shield On RDM
Courtesy of GENERAL MOTORS CORP.

7. Remove the propeller shaft shield mounting bolts (1) and the propeller shaft shield (2).

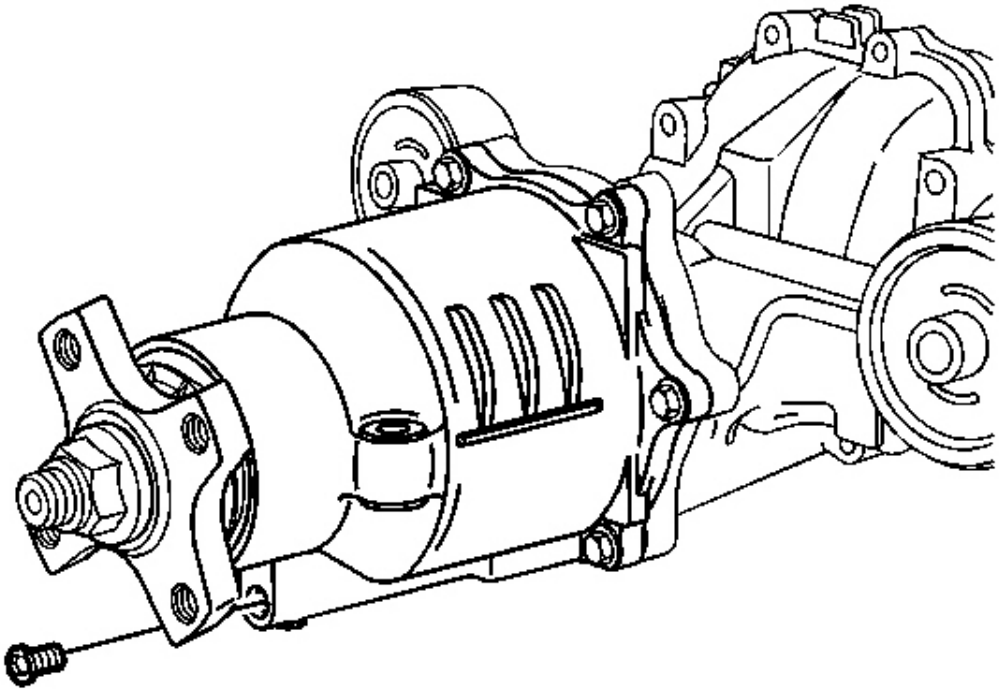


Fig. 70: Removing/Installing RDM Drain Plug
Courtesy of GENERAL MOTORS CORP.

8. Place a container under the RDM housing.
9. Remove the RDM drain plug.
10. Drain the RDM fluid.

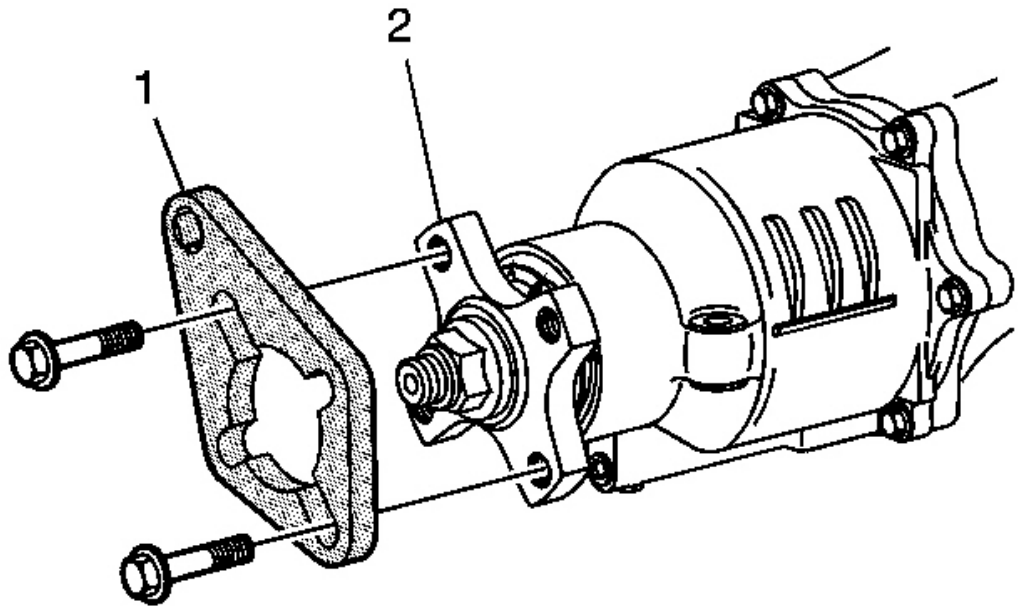


Fig. 71: Installing J44873 On The Pinion Flange
Courtesy of GENERAL MOTORS CORP.

11. Install the **J 44873** (1) to the pinion flange (2). See **Special Tools and Equipment** .
12. Using a breaker bar to hold the **J 44873** stationary, loosen the pinion flange nut. See **Special Tools and Equipment** .

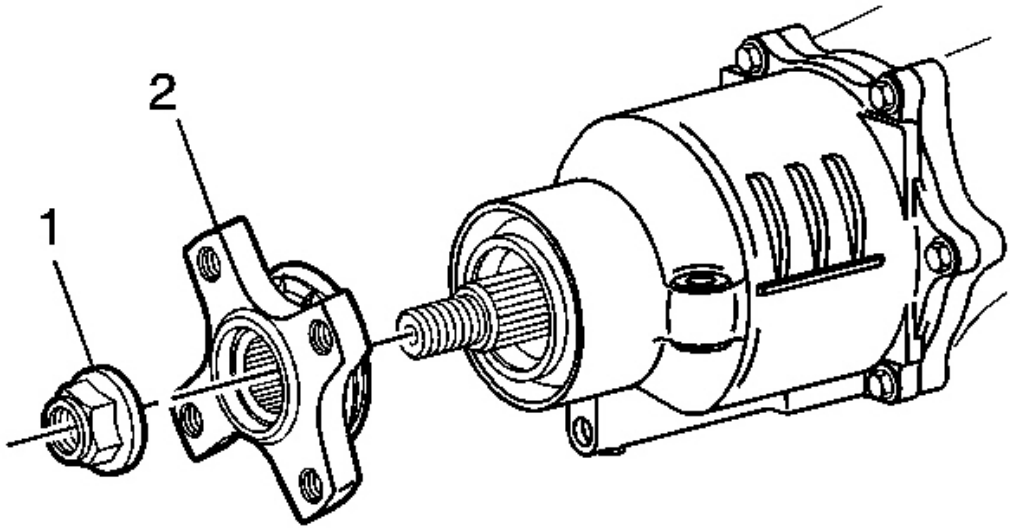


Fig. 72: Removing/Installing Input Flange On The Clutch Shaft
Courtesy of GENERAL MOTORS CORP.

13. Remove and discard the input flange nut (1).
14. Remove the input flange (2).

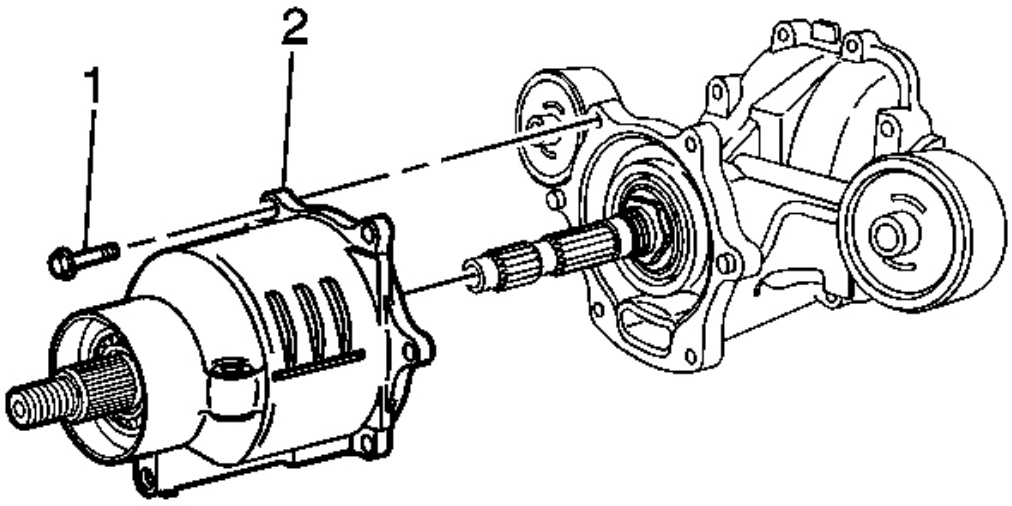


Fig. 73: Removing Bolts & The Clutch Cover From The Differential Housing
Courtesy of GENERAL MOTORS CORP.

15. Remove the RDM housing cover bolts (1).
16. Carefully remove the housing cover (2) from the RDM.

IMPORTANT: Do not gouge the housing cover and RDM sealing surfaces.

17. Remove all traces of sealer from the housing cover and RDM sealing surfaces.
18. Clean the housing cover and RDM sealing surfaces with denatured alcohol or equivalent, and dry with a clean, lint free cloth.

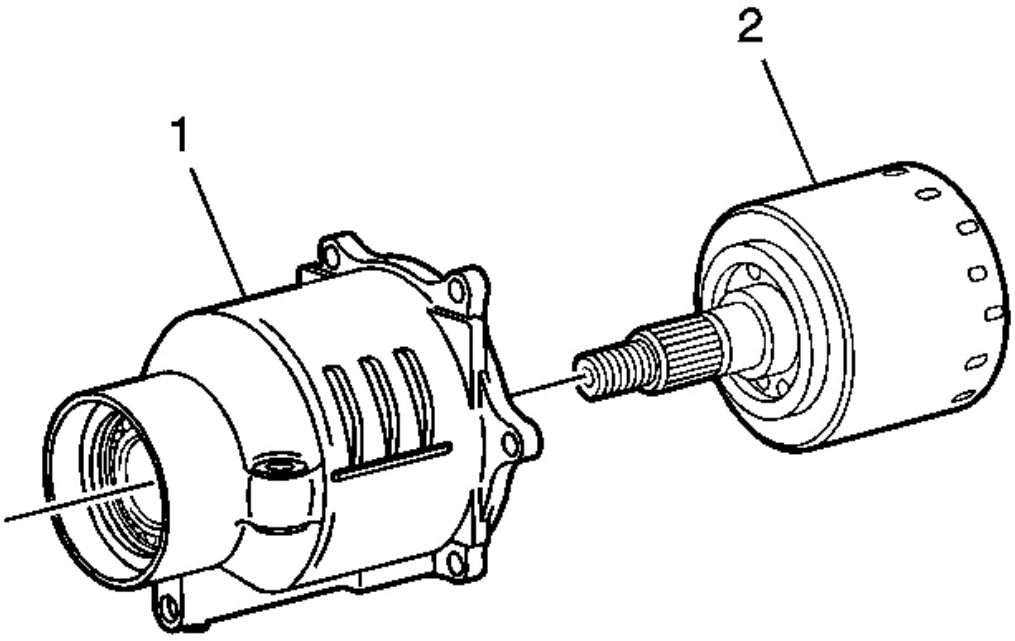


Fig. 74: Removing Clutch Drum From The Housing Cover
Courtesy of GENERAL MOTORS CORP.

19. Remove the clutch drum (2) from the housing cover (1).

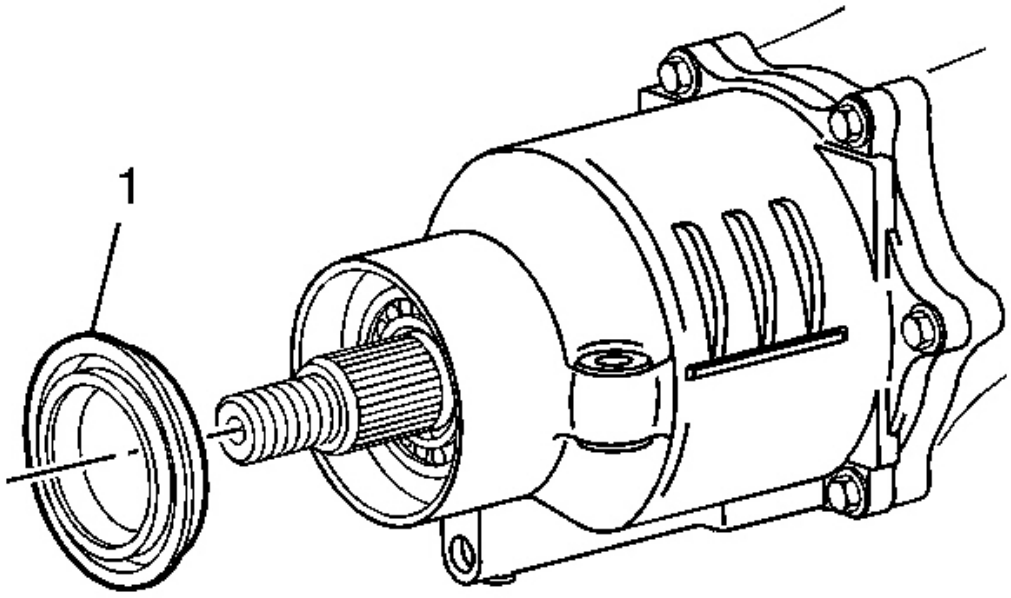


Fig. 75: Removing Input Flange Oil Seal From The Housing Cover
Courtesy of GENERAL MOTORS CORP.

20. Remove the input flange oil seal (1) from the housing cover.

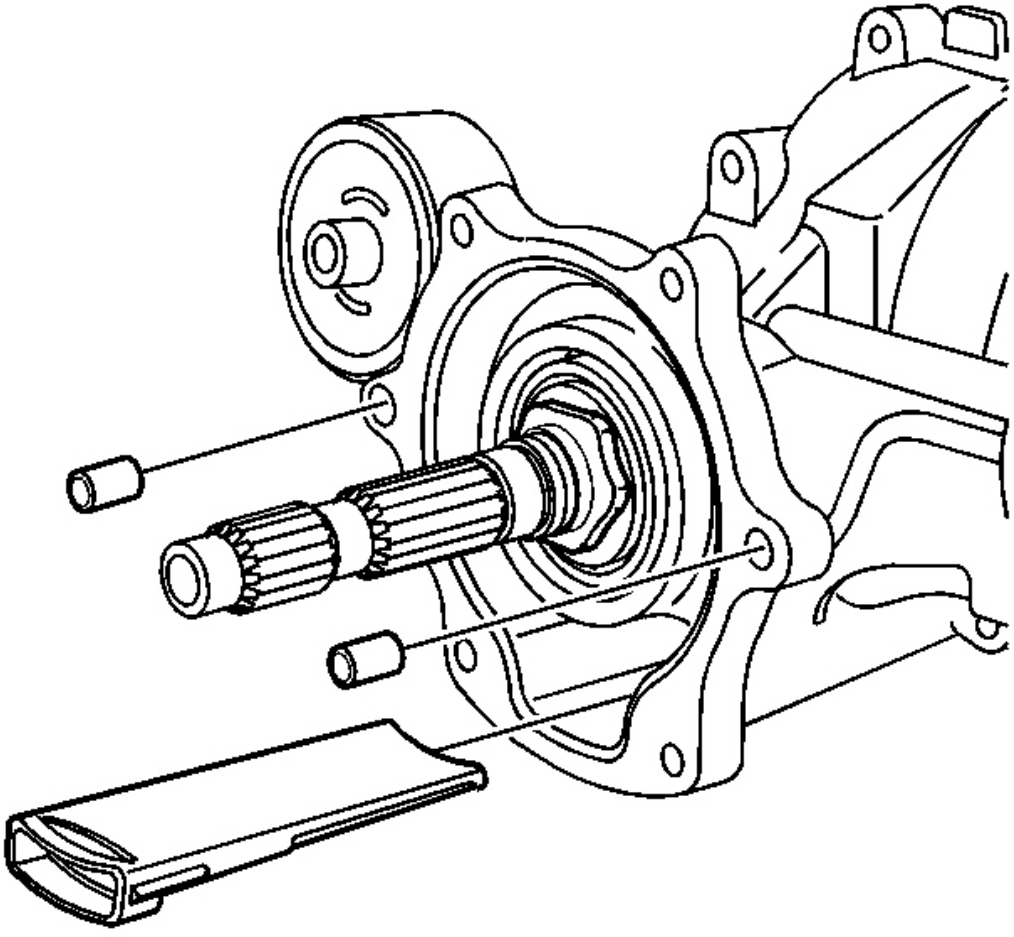


Fig. 76: Removing/Installing Filter Assembly
Courtesy of GENERAL MOTORS CORP.

21. Remove and discard the filter assembly.

Installation Procedure

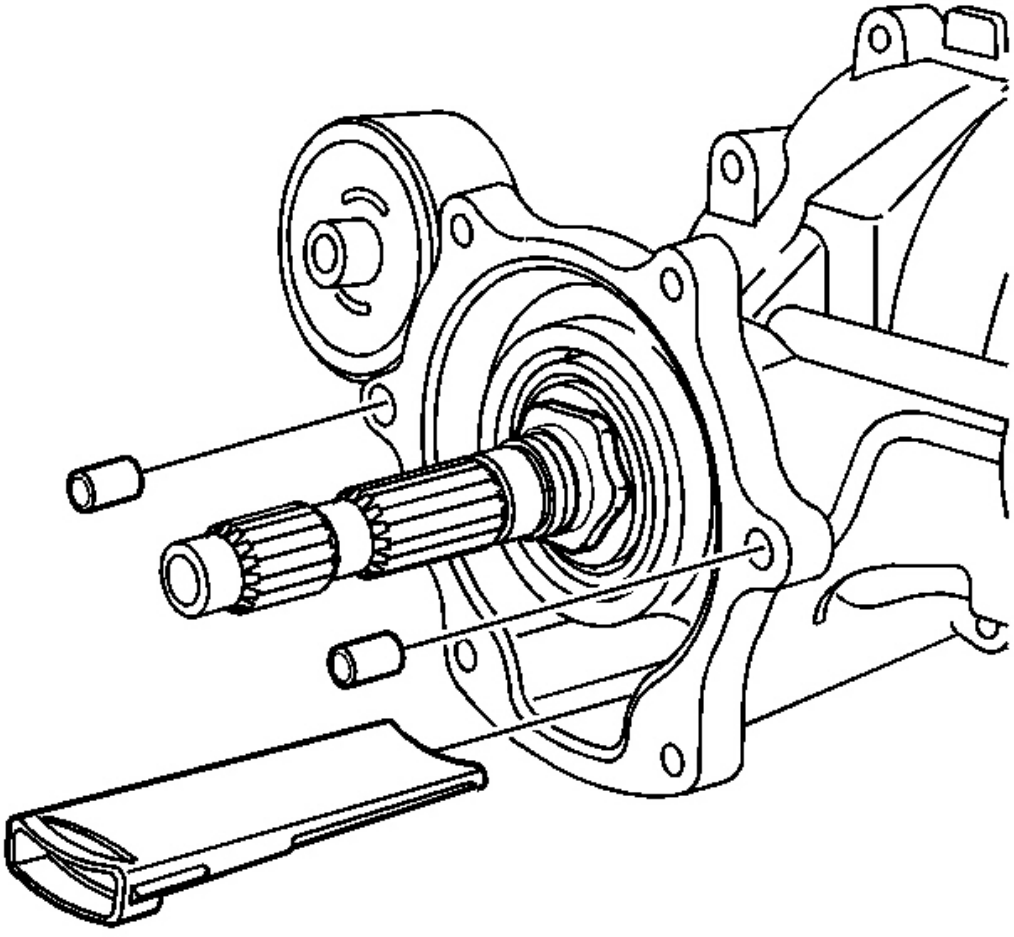


Fig. 77: Removing/Installing Filter Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install a new filter assembly.
2. Install the locating pins, if removed.

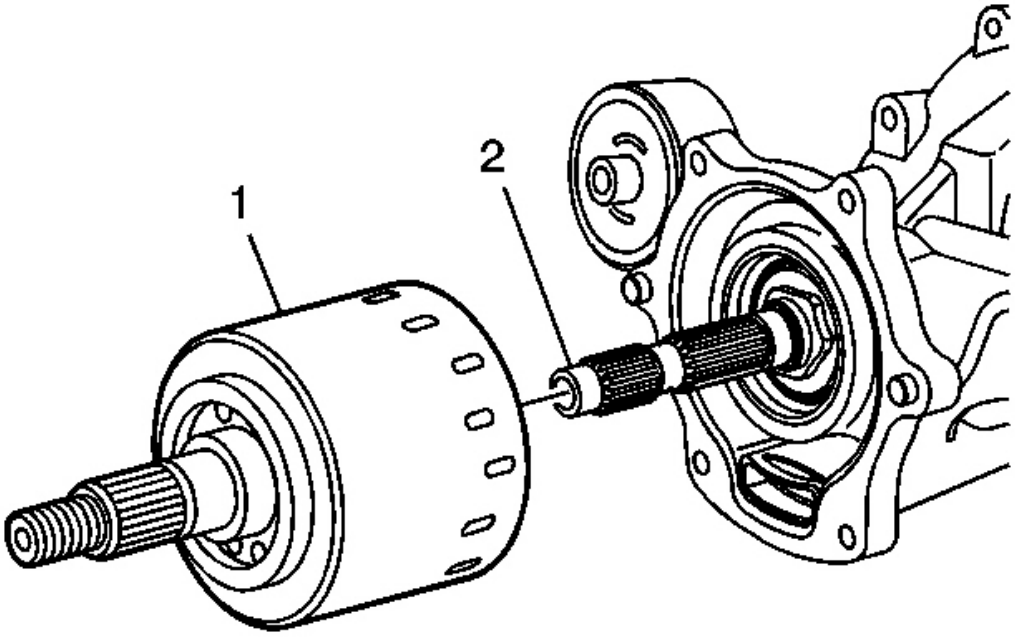


Fig. 78: Installing Clutch Drum On The Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

3. Install the clutch drum (1) to the pinion shaft (2) by shaking the drum while rotating the drum back and forth to engage the splines of the pump rotor and bushing.

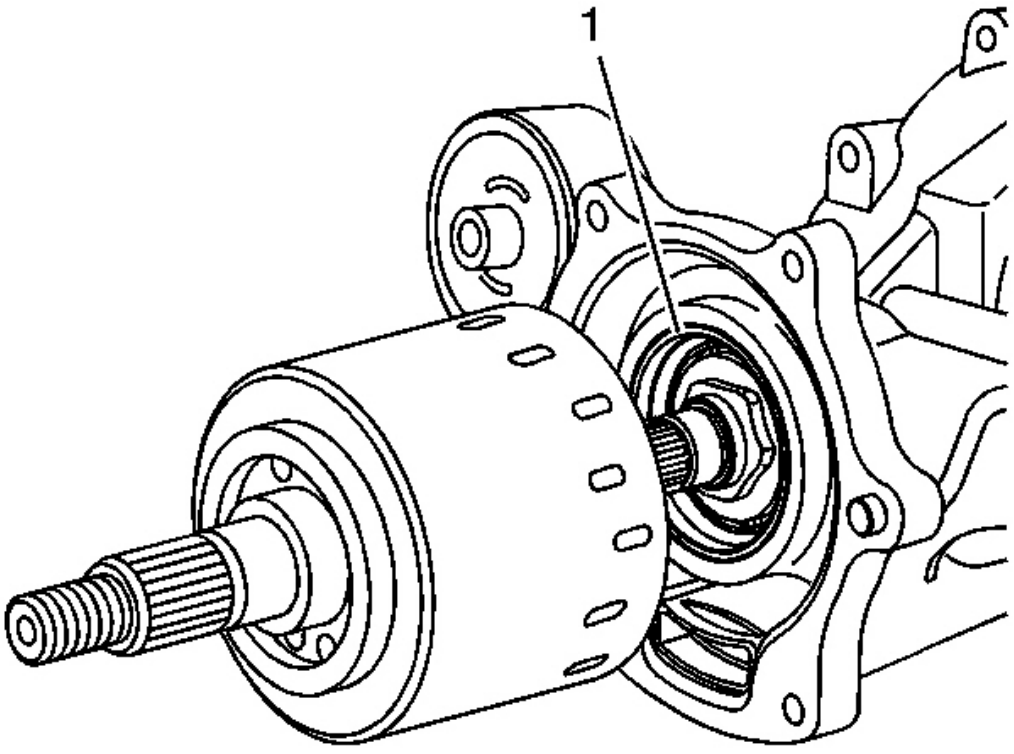


Fig. 79: Clutch Drum Oil Seal
Courtesy of GENERAL MOTORS CORP.

4. When properly engaged, the clutch drum will be fully seated against the clutch drum oil seal (1).

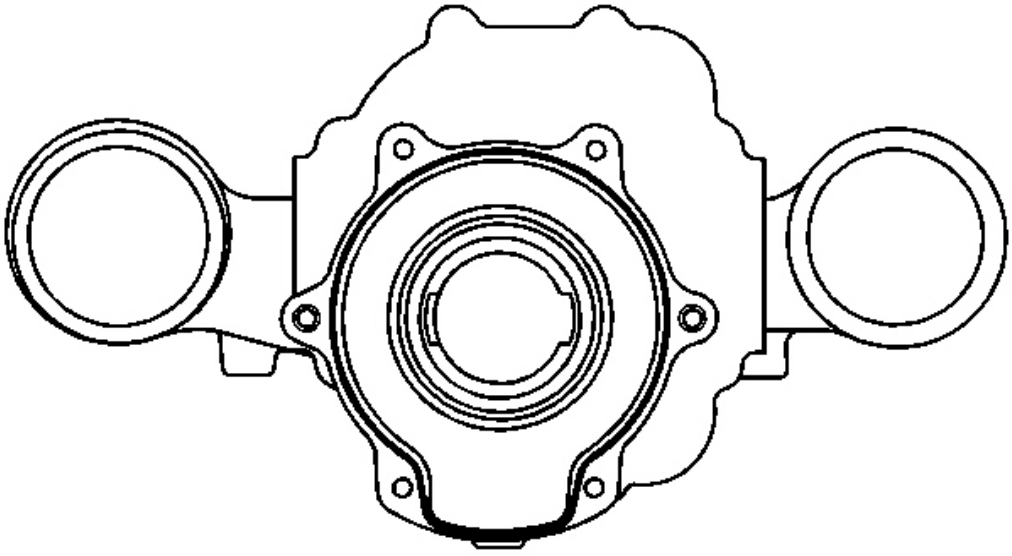


Fig. 80: RDM Housing Sealing Surface
Courtesy of GENERAL MOTORS CORP.

5. Apply a continuous bead of sealer Saturn P/N 12346240 of equal height and width to the RDM housing sealing surface.

   Specification: Apply sealer to a height and width of 2.5 mm (0.098 in).

   IMPORTANT: Do not disturb the sealer bead applied to the RDM sealing surface.

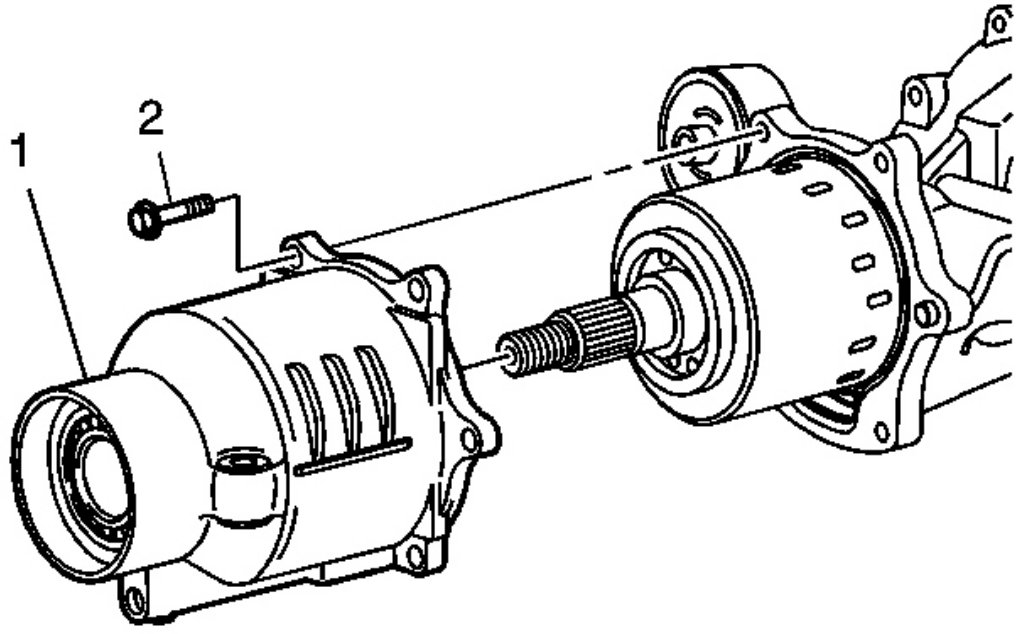


Fig. 81: Installing Clutch Housing Cover On The RDM
Courtesy of GENERAL MOTORS CORP.

6. Install the clutch housing cover (1) to the RDM.
7. Hand install the clutch housing cover bolts (2).

NOTE: Refer to Fastener Notice in Cautions and Notices.

8. Install the housing cover mounting bolts (1).

   Tighten: Tighten the bolts to 26 N.m (19 lb ft).

IMPORTANT: Strict adherence to the sealer cure time must be observed.

9. Allow the sealer to cure a minimum of 8 hours.

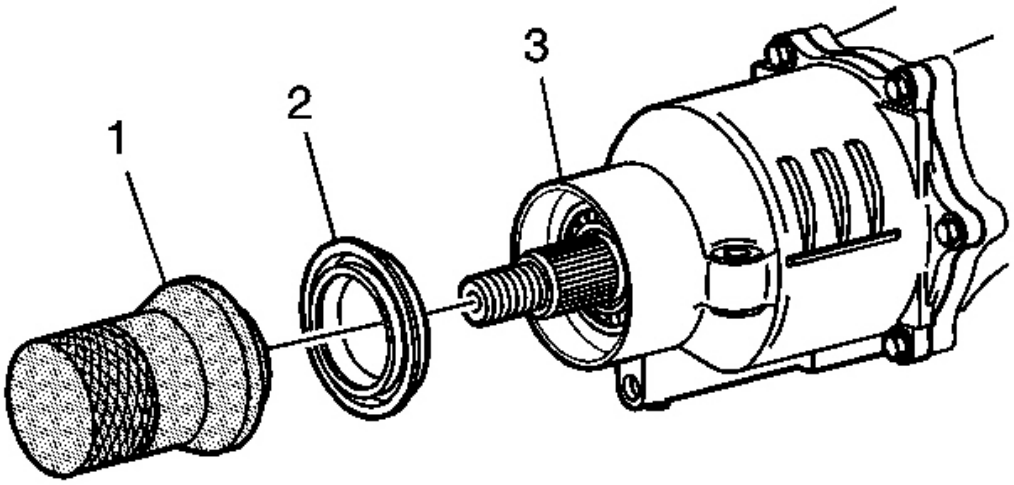


Fig. 82: Installing Input Shaft Seal On The Housing Cover
Courtesy of GENERAL MOTORS CORP.

10. Using the **J 44851** (1) install the input shaft seal (2) to the housing cover (3). See **Special Tools and Equipment** .

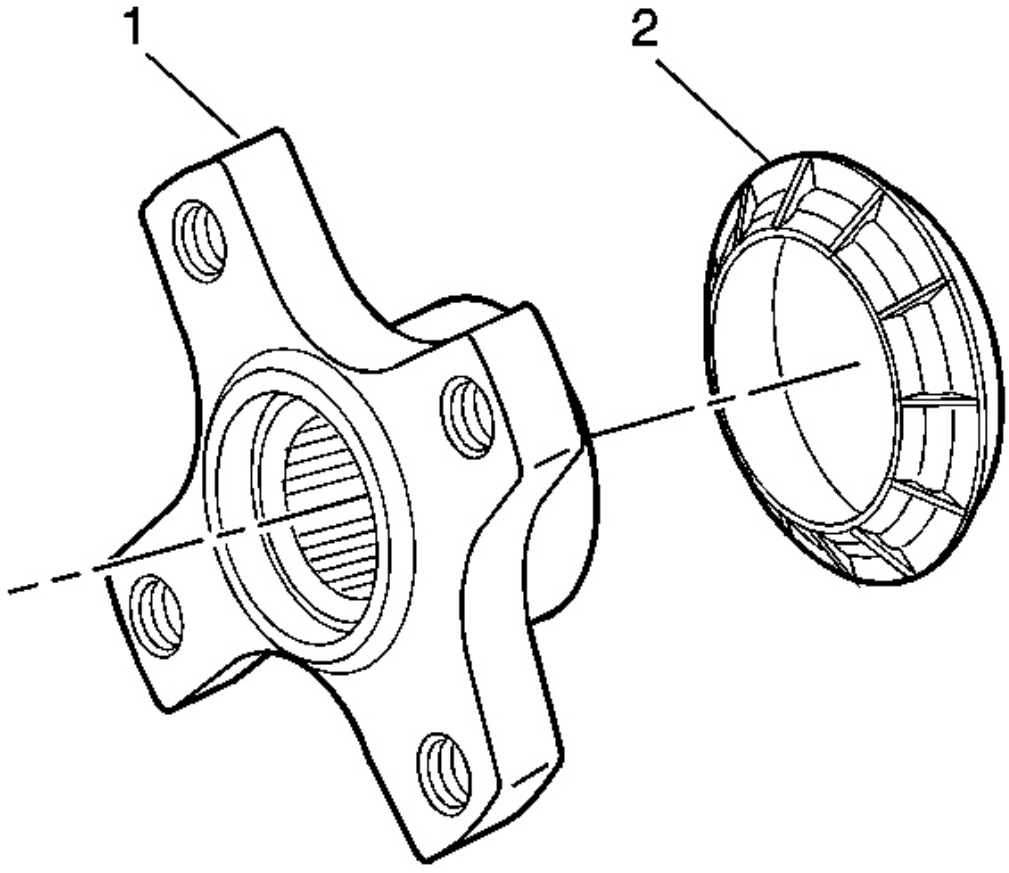


Fig. 83: Inspecting Dust Deflector For Cracks
Courtesy of GENERAL MOTORS CORP.

11. Install the dust deflector (2) to the input flange (1) if removed.

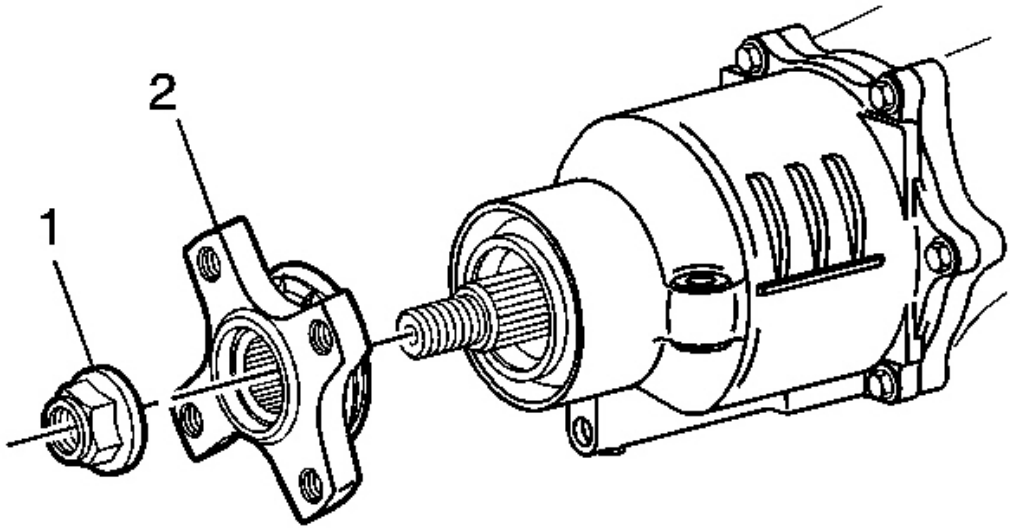


Fig. 84: Removing/Installing Input Flange On The Clutch Shaft
Courtesy of GENERAL MOTORS CORP.

12. Install the input flange (2) to the clutch shaft.
13. Hand install a new input flange nut (1) to the clutch shaft.

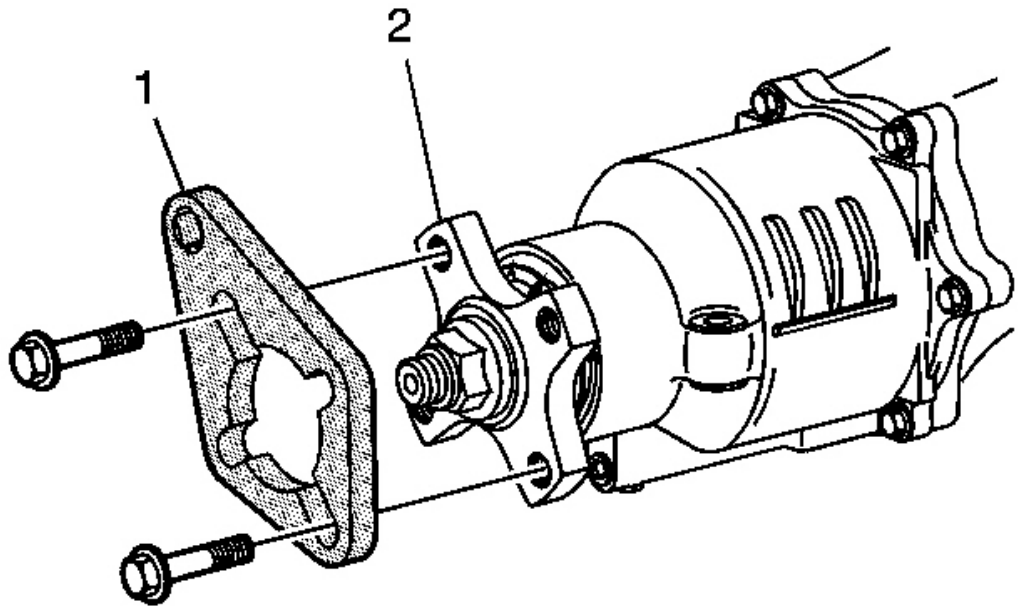


Fig. 85: Installing J44873 On The Pinion Flange
Courtesy of GENERAL MOTORS CORP.

14. Install the **J 44873** (1) to the pinion flange (2). See **Special Tools and Equipment** .
15. Using a breaker bar to hold the **J 44873** stationary, tighten the pinion nut. See **Special Tools and Equipment** .

    Tighten: Tighten the nut to 203 N.m (150 lb ft).

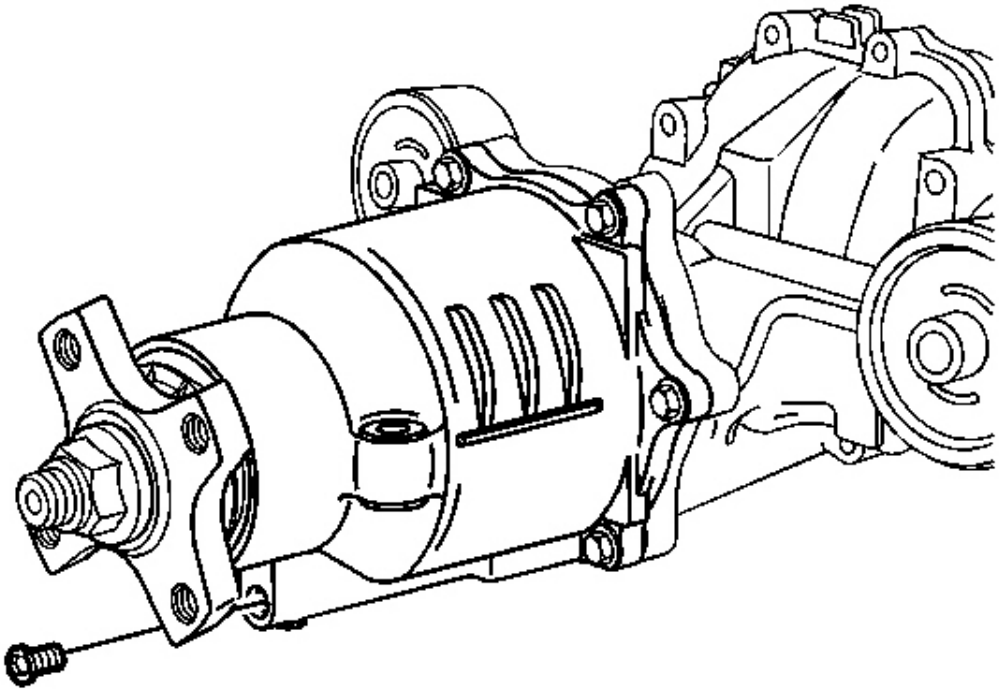


Fig. 86: Removing/Installing RDM Drain Plug
Courtesy of GENERAL MOTORS CORP.

16. Thoroughly clean the drain plug threads and apply thread sealer Saturn P/N 21485278 to the plug threads.
17. Install the RDM drain plug.

Tighten: Tighten the plug to 30 N.m (22 lb ft).

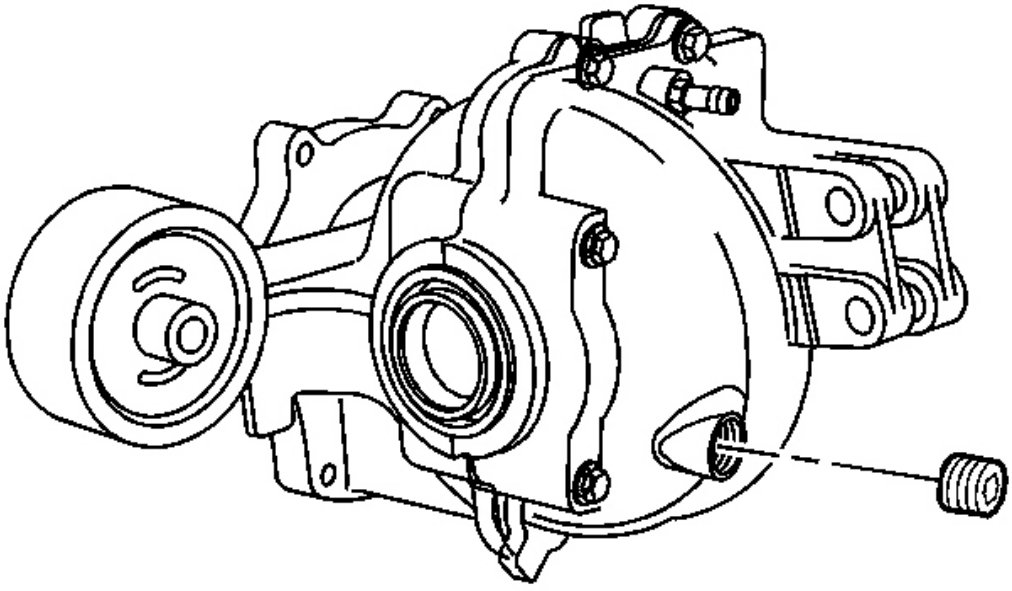


Fig. 87: Removing/Installing Fill Plug
Courtesy of GENERAL MOTORS CORP.

18. Remove the RDM fill plug.
19. Thoroughly clean the fill plug threads and apply thread sealer Saturn P/N 21485278 to the plug threads.
20. Fill the RDM with lubricant. Refer to **Lubricant Replacement - Rear Drive Axle** .
21. Install the fill plug.

    Tighten: Tighten the plug to 35 N.m (26 lb ft).

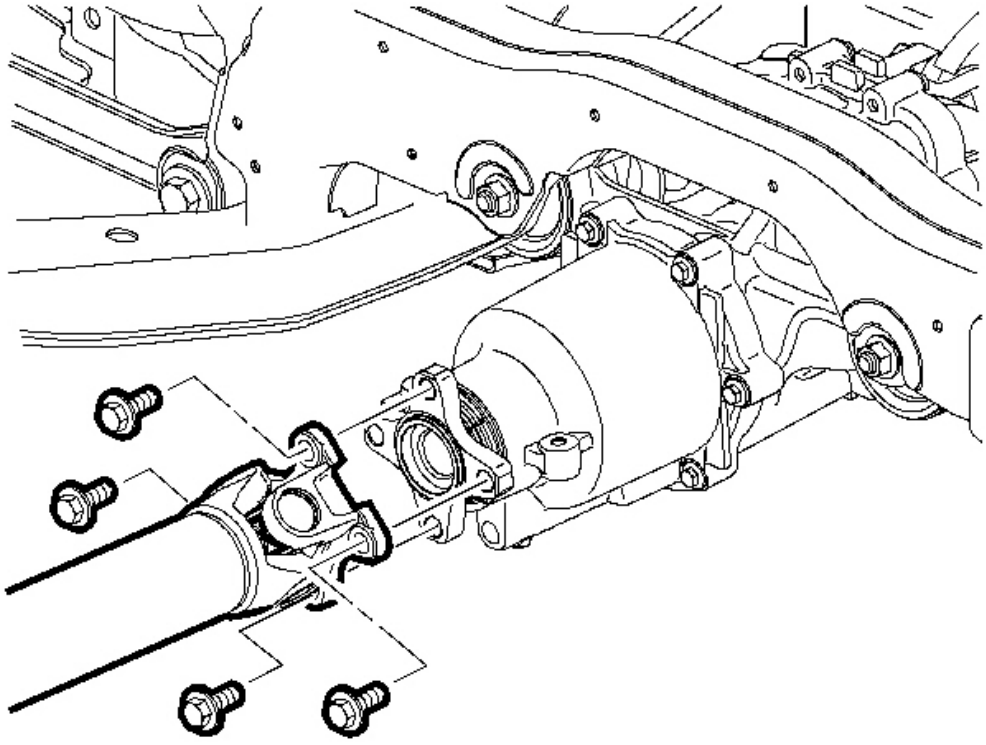


Fig. 88: Removing/Installing Propeller Shaft Flange Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

22. Thoroughly clean and apply threadlocker Saturn P/N 21005994 to the propeller shaft flange mounting bolt threads.
23. Align the reference marks on the propeller shaft flange and the RDM input flange.
24. Install the propeller shaft flange mounting bolts.

    Tighten: Tighten the bolts to 50 N.m (37 lb ft).

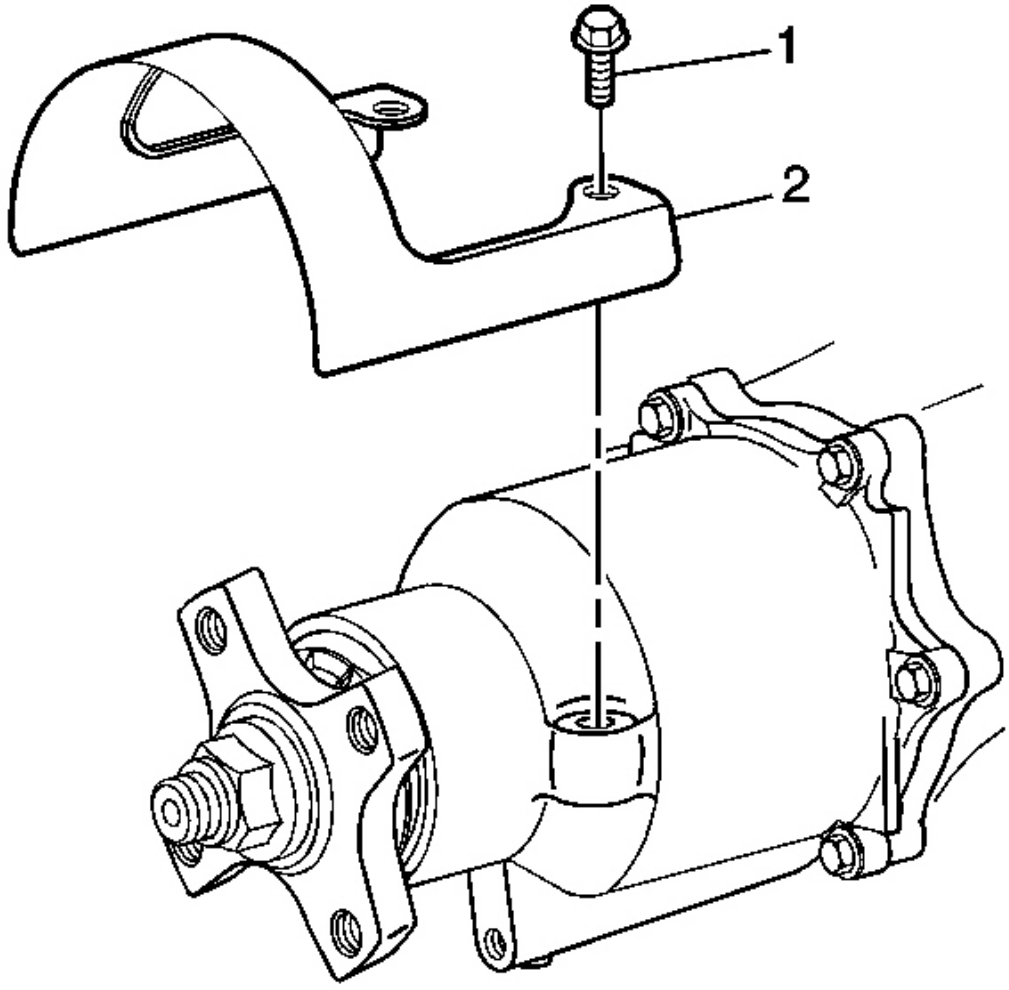


Fig. 89: Removing/Installing Propeller Shaft Shield On RDM
Courtesy of GENERAL MOTORS CORP.

25. Install the propeller shaft shield (2) to the RDM.
26. Install the propeller shaft shield mounting bolts (1).

Tighten: Tighten the bolts to 25 N.m (18 lb ft).

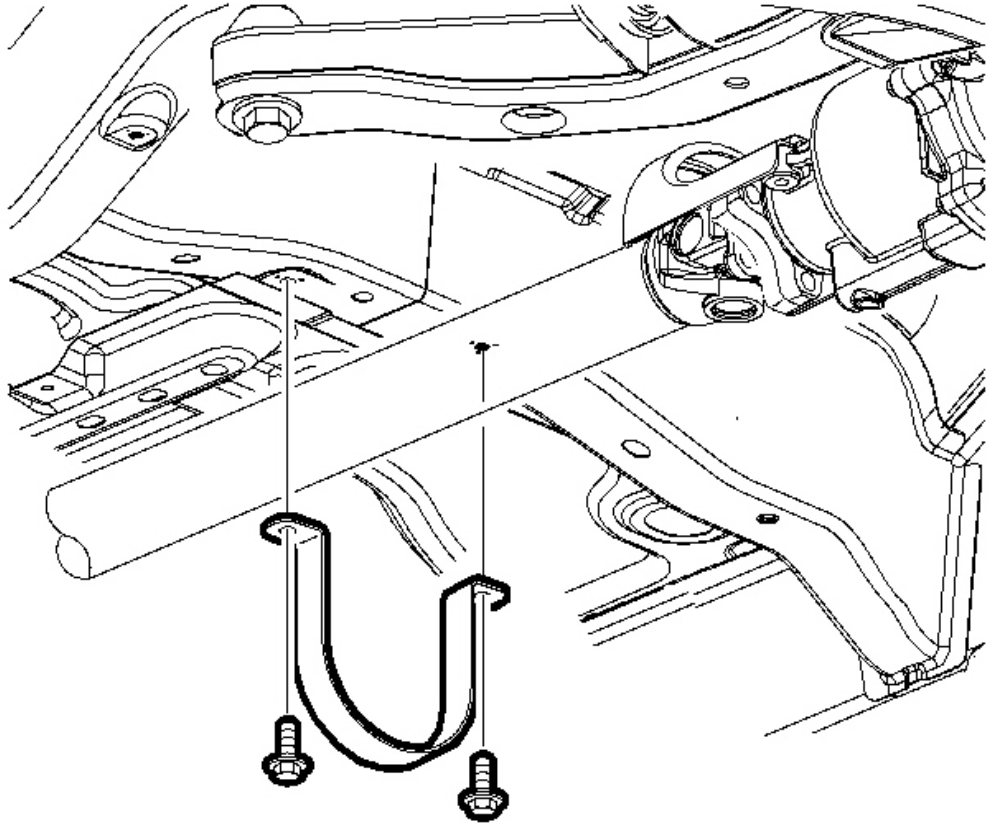


Fig. 90: Removing/Installing Propeller Shaft Underbody Guard Loop Bolts
Courtesy of GENERAL MOTORS CORP.

27. Install the propeller shaft underbody guard loop.
28. Install the propeller shaft underbody guard loop bolts.

    Tighten: Tighten the bolts to 24 N.m (18 lb ft).

29. Lower the vehicle.

DIFFERENTIAL REPLACEMENT

Removal Procedure

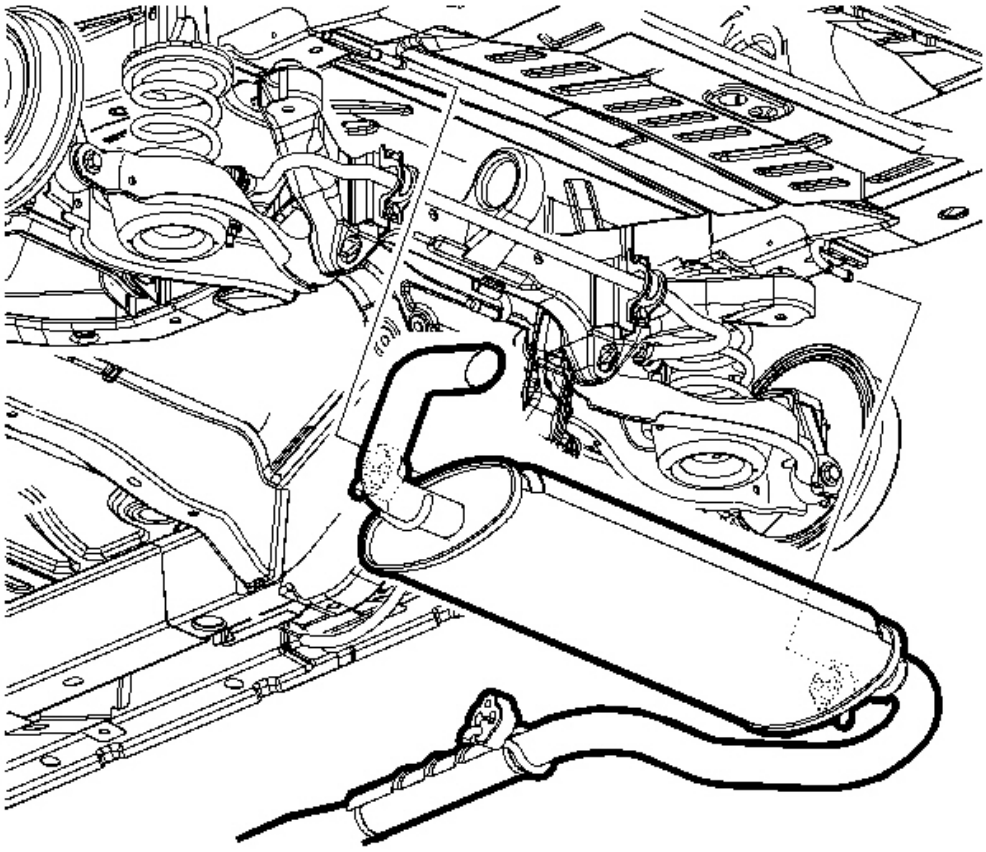


Fig. 91: Removing/Installing Intermediate Pipe & Muffler Assembly
Courtesy of GENERAL MOTORS CORP.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Disconnect and remove the intermediate exhaust pipe and muffler assembly from the front pipe. Refer to **Muffler Replacement (Production Assembly)** or **Muffler Replacement (Service Part)** in Engine Exhaust.
3. Remove the rear wheel drive shafts. Refer to **Wheel Drive Shaft Replacement - Rear** in Wheel Drive Shafts.

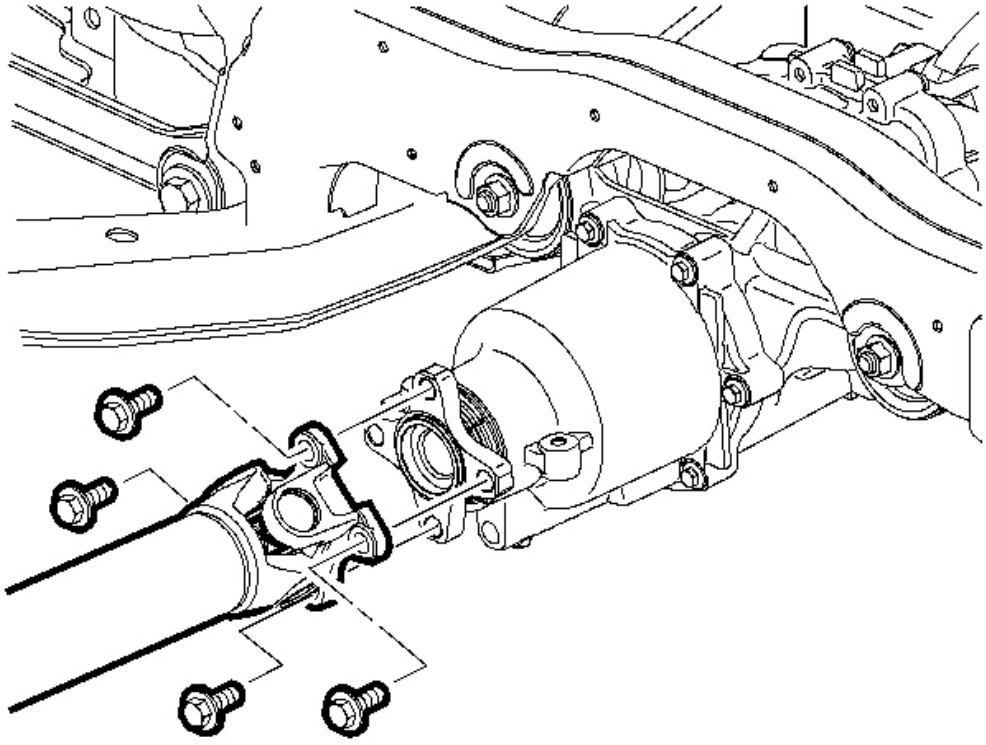


Fig. 92: Removing/Installing Propeller Shaft Flange Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

4. Reference mark the propeller shaft flange-to-rear drive module (RDM) input flange.
5. Place a support stand under the rear of the propeller shaft.
6. Remove the propeller shaft flange mounting bolts.

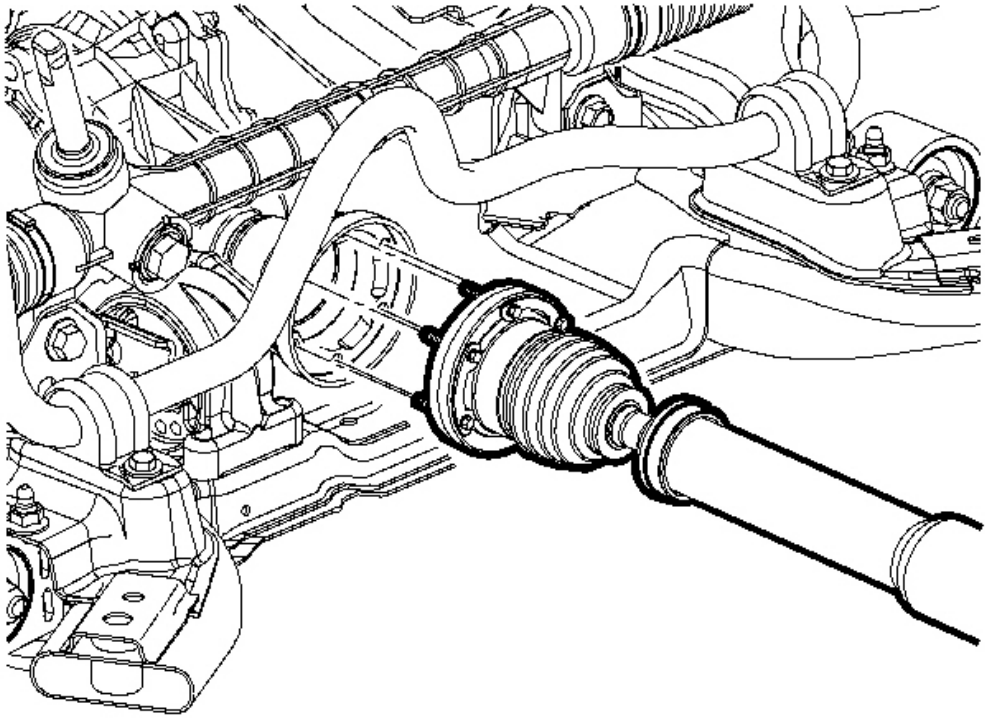


Fig. 93: Propeller Shaft & PTU
Courtesy of GENERAL MOTORS CORP.

7. Reference mark the power take-off unit (PTU) flange-to-propeller shaft constant velocity (CV) joint.
8. Place a support stand under the front of the propeller shaft.
9. Remove the propeller shaft CV joint mounting bolts.

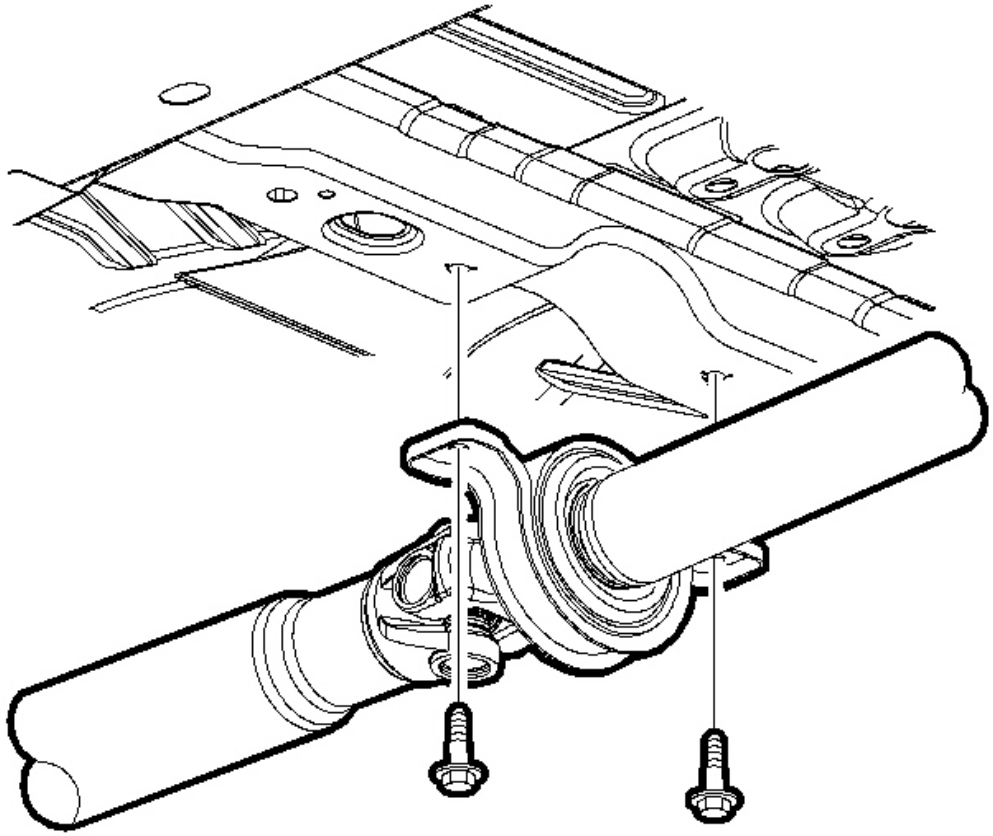


Fig. 94: Installing Support Bearing Retainer Bolts On The Vehicle Underbody
Courtesy of GENERAL MOTORS CORP.

10. While supporting the propeller shaft, remove the support bearing mounting bolts from the vehicle underbody.
11. Remove the propeller shaft from the vehicle.

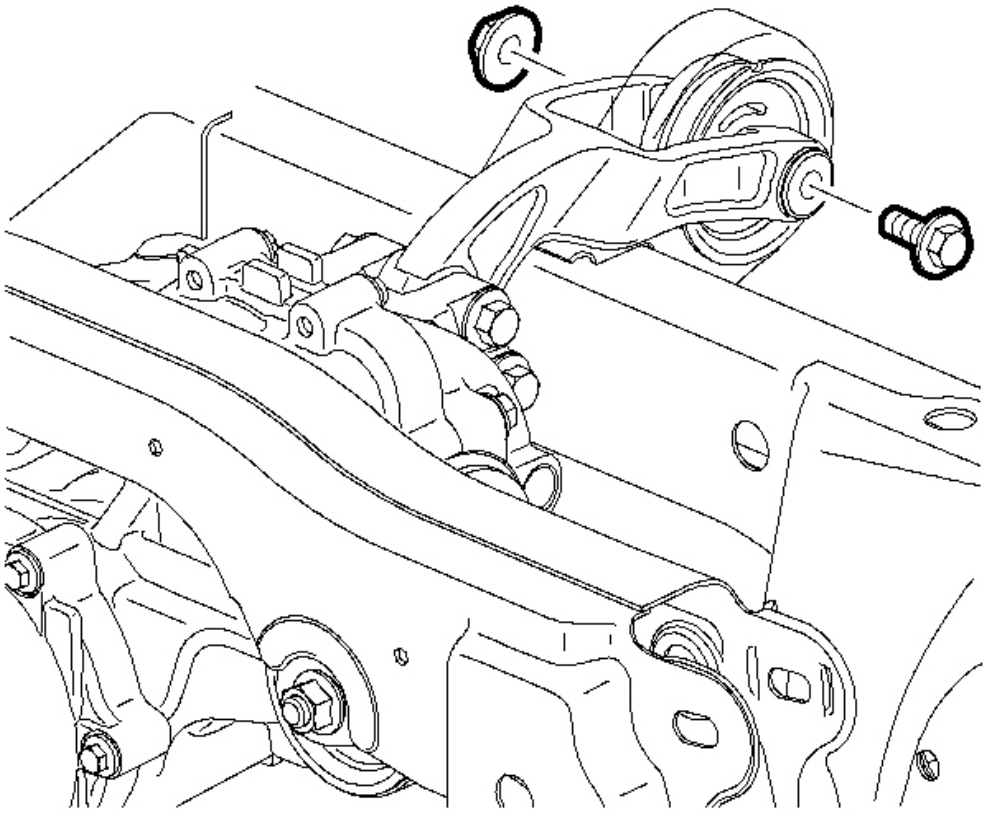


Fig. 95: Removing/Installing RDM Rear Mounting Bracket
Courtesy of GENERAL MOTORS CORP.

12. Place a support stand under the RDM and secure the RDM.
13. Remove the RDM support bracket. Refer to **Differential Carrier Assembly Mount Replacement** .
14. Remove the left and right RDM support mounting nuts and discard the nut.
15. Remove the left and right RDM mounting bolts.
16. Carefully remove the RDM from the vehicle.

Installation Procedure

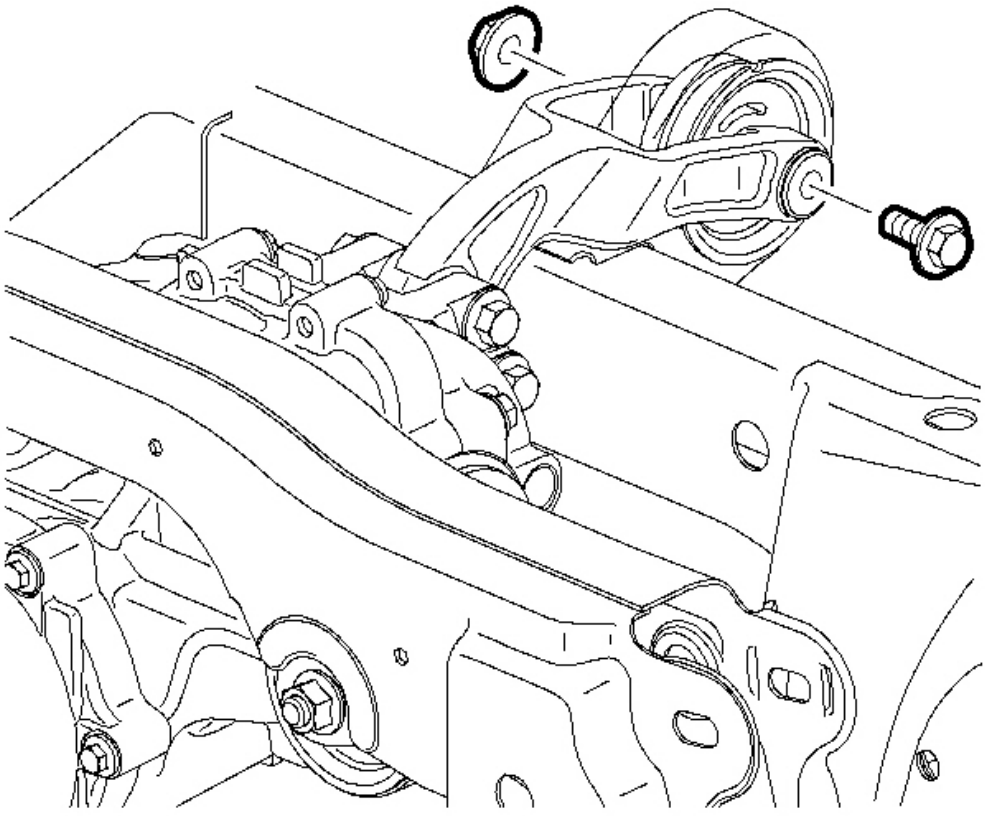


Fig. 96: Removing/Installing RDM Rear Mounting Bracket
Courtesy of GENERAL MOTORS CORP.

1. With the RDM secured to a support stand, position the RDM to the vehicle.
2. Install the left and right RDM mounting bolts to the mounts.
3. Hand install NEW bolts to the left and right mounting bolts.
4. Install the RDM rear mounting bracket. Refer to **Differential Carrier Assembly Mount Replacement** .

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Tighten the left and right RDM mounting nuts.

Tighten: Tighten the nuts to 105 N.m (77 lb ft).

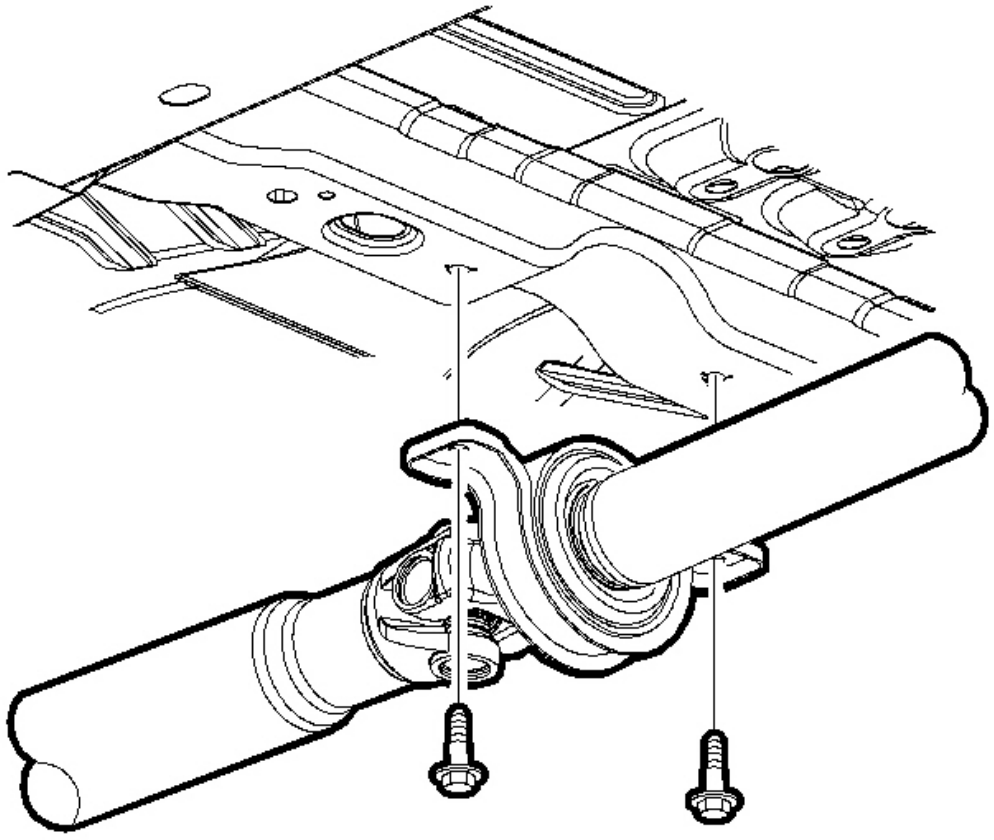


Fig. 97: Installing Support Bearing Retainer Bolts On The Vehicle Underbody
Courtesy of GENERAL MOTORS CORP.

6. Position the propeller shaft to the vehicle and support the propeller shaft at the front and rear.
7. Install the support bearing to the vehicle.
8. Hand install the support bearing bolts.

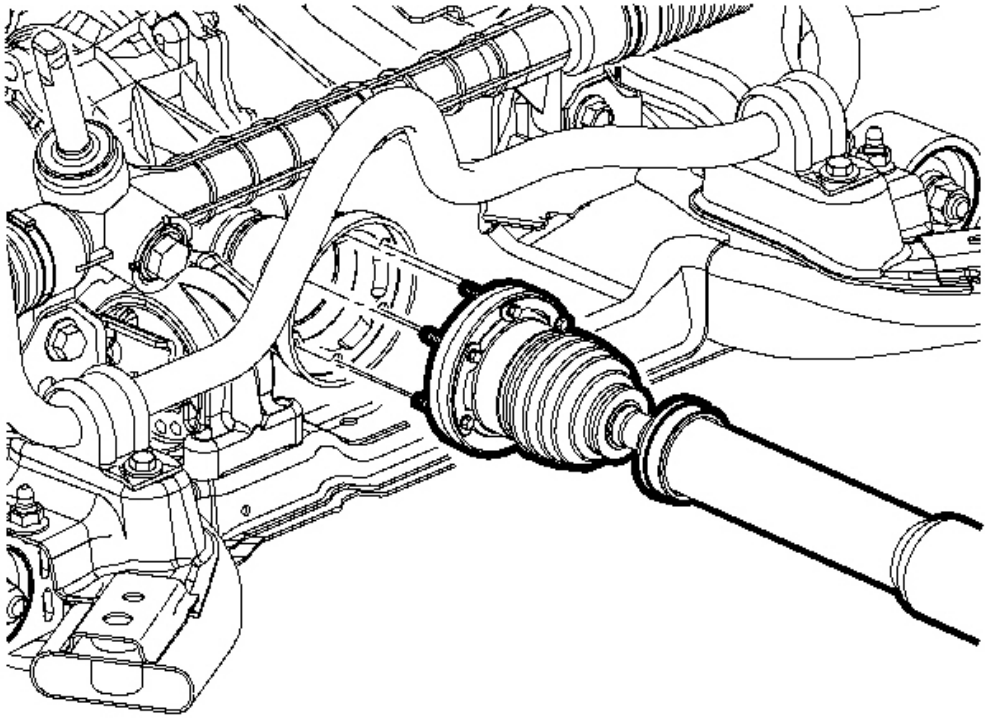


Fig. 98: Propeller Shaft & PTU
Courtesy of GENERAL MOTORS CORP.

9. Align the reference marks on the propeller shaft CV joint and the PTU output flange.

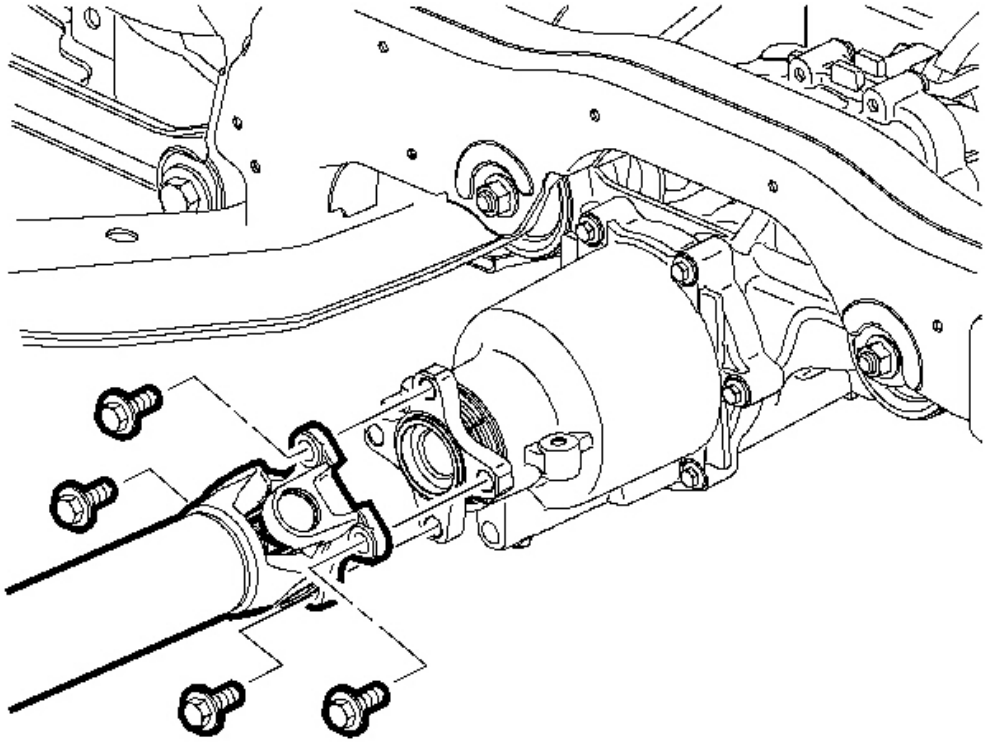


Fig. 99: Removing/Installing Propeller Shaft Flange Mounting Bolts
Courtesy of GENERAL MOTORS CORP.

10. Align the reference marks on the propeller shaft flange and the RDM input flange.
11. Install the propeller shaft. Refer to **Propeller Shaft Replacement** in Propeller Shaft.

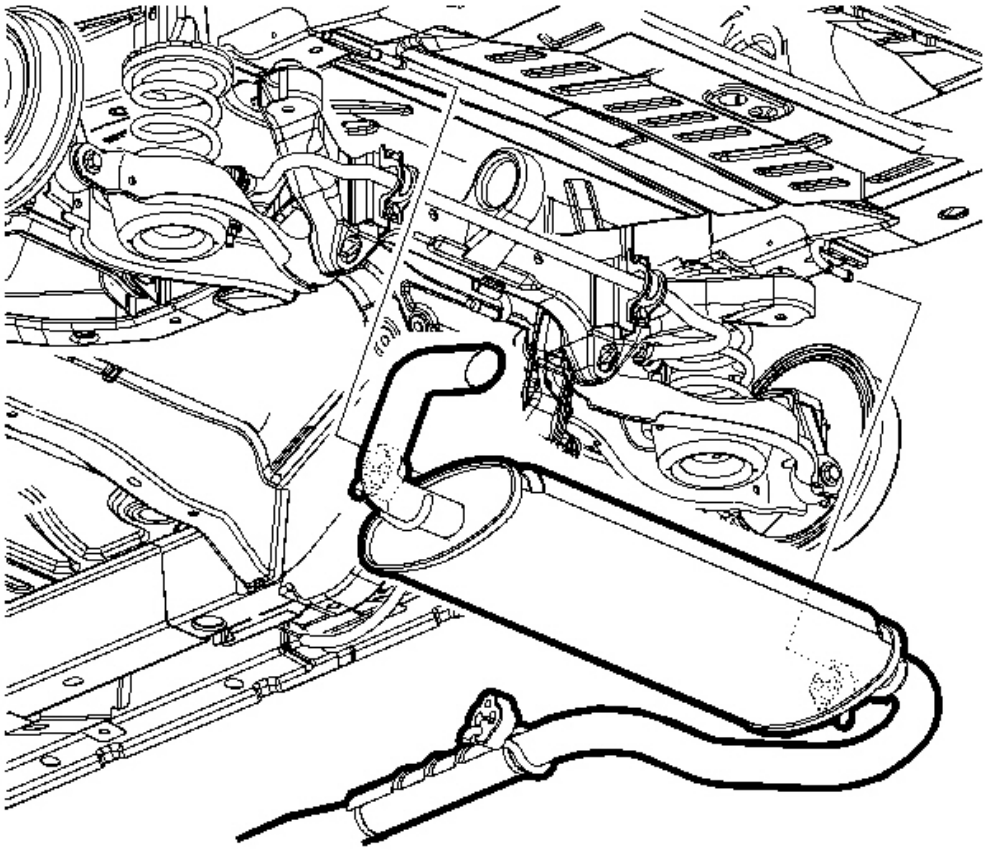


Fig. 100: Installing Intermediate Pipe & Muffler Assembly
Courtesy of GENERAL MOTORS CORP.

12. Install the rear wheel drive shafts. Refer to **Wheel Drive Shaft Replacement - Rear** in Wheel Drive Shafts.
13. Install the muffler and intermediate pipe assembly. Refer to **Muffler Replacement (Production Assembly)** or **Muffler Replacement (Service Part)** in Engine Exhaust.
14. Lower the vehicle.

DIFFERENTIAL HOUSING ASSEMBLY DISASSEMBLE

Tools Required

- **J 22912-01** Bearing Puller
- **J 3940** Bearing Race Remover. See **Special Tools and Equipment** .
- **J 43964** Engine Stand Fixture Adapter. See **Special Tools and Equipment** .
- **J 44854** Side Bearing Remover. See **Special Tools and Equipment** .
- **J 44855** Side Bearing Installer. See **Special Tools and Equipment** .
- **J 44858** Pinion Bearing Remover. See **Special Tools and Equipment** .
- **J 44864** Pinion Nut Wrench. See **Special Tools and Equipment** .
- **J 44865** Spline Socket. See **Special Tools and Equipment** .
- **J 44869** Assembly Holding Fixture. See **Special Tools and Equipment** .
- **J 44873** Pinion Flange Holder and Remover. See **Special Tools and Equipment** .

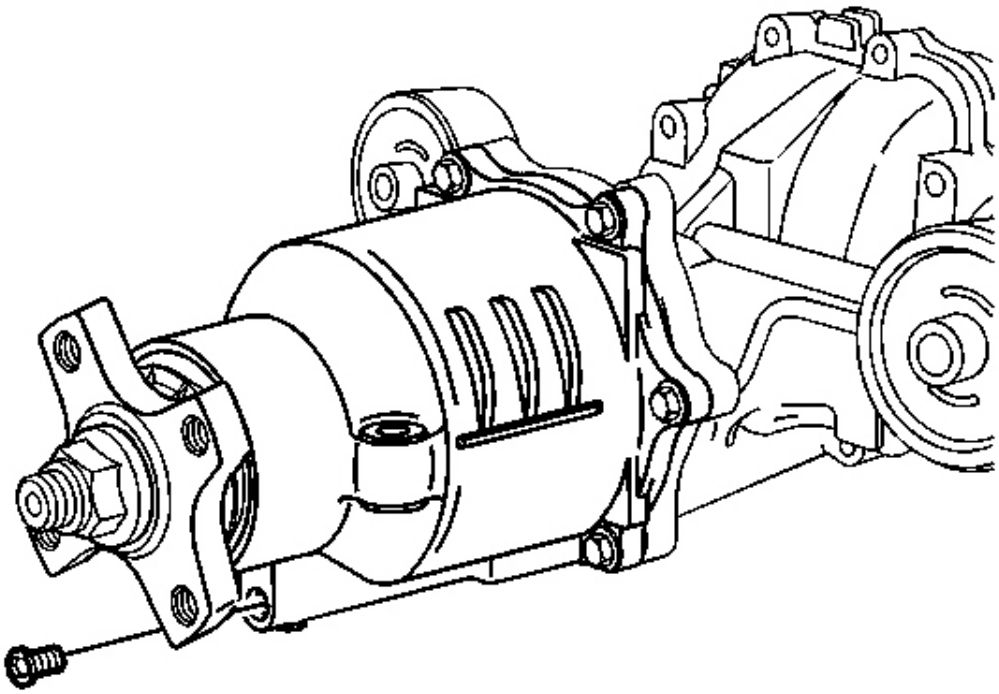


Fig. 101: Removing/Installing RDM Drain Plug
Courtesy of GENERAL MOTORS CORP.

1. Remove the drain plug and the drain the fluid.

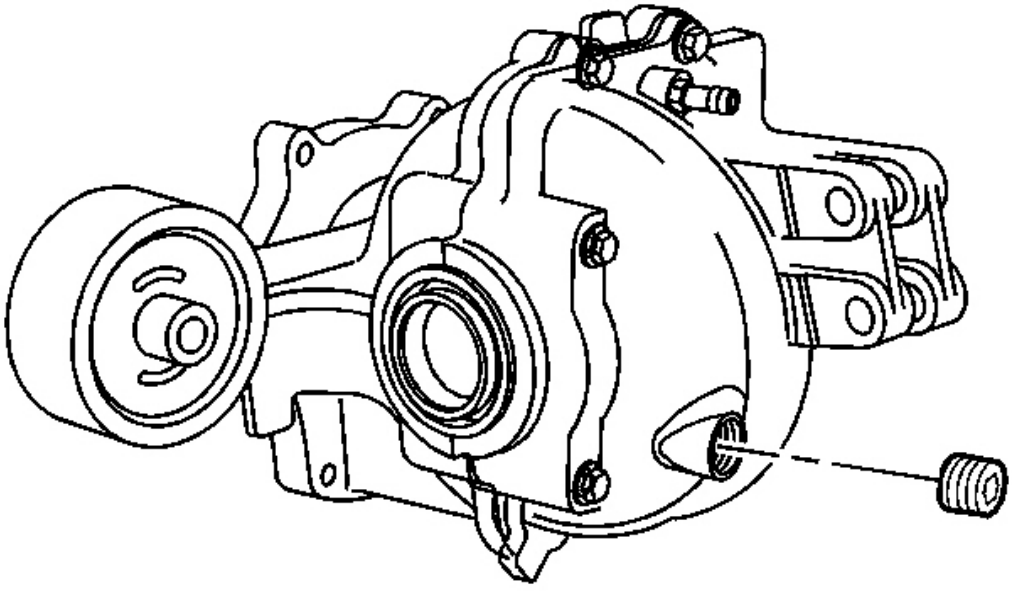


Fig. 102: Removing/Installing Fill Plug
Courtesy of GENERAL MOTORS CORP.

2. Remove the fill plug.

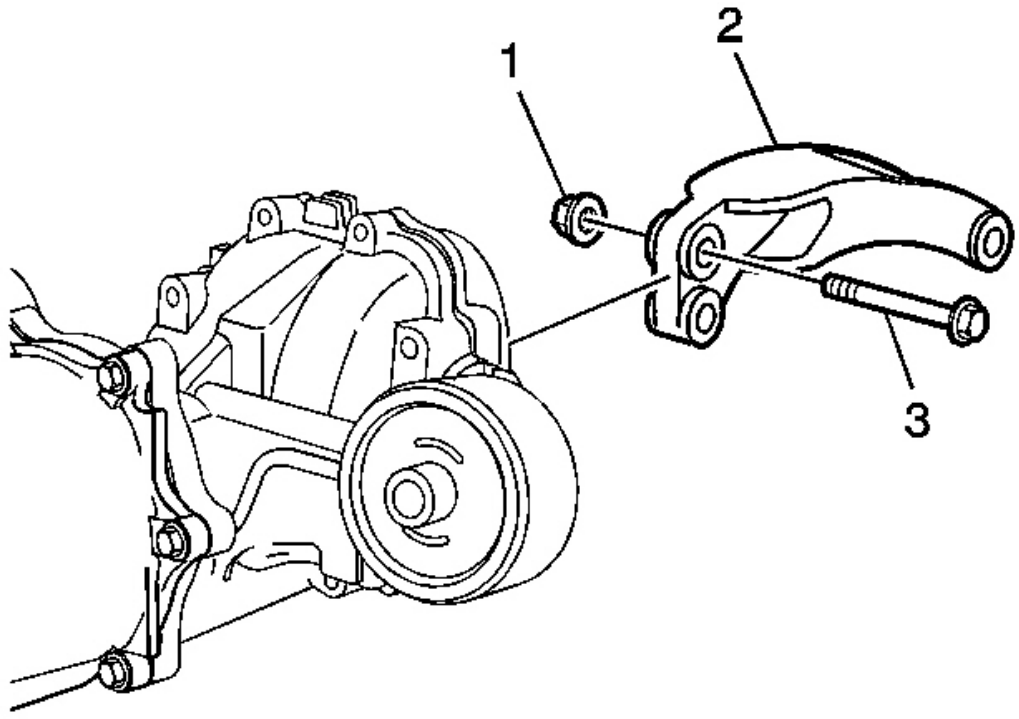


Fig. 103: Removing Rear Mounting Bracket & Bolts
Courtesy of GENERAL MOTORS CORP.

3. Remove the rear mounting bracket (2) and the bolts (3).

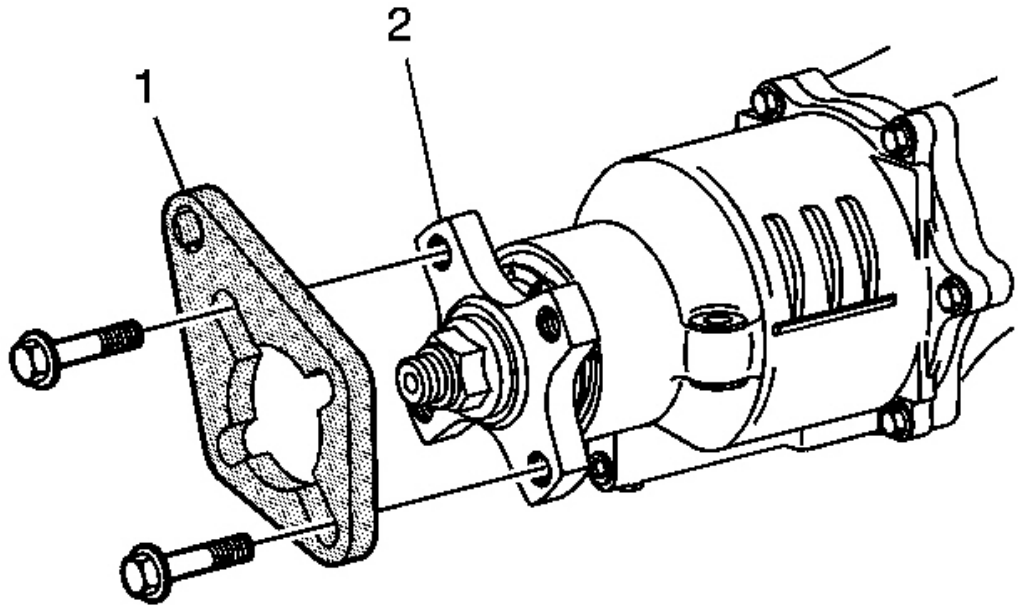


Fig. 104: Installing J44873 On The Pinion Flange
Courtesy of GENERAL MOTORS CORP.

4. Install **J 44873** to the pinion flange (2) using 2 prop shaft bolts. See **Special Tools and Equipment** . Attach half drive breaker bar in order to hold the pinion flange to remove nut.

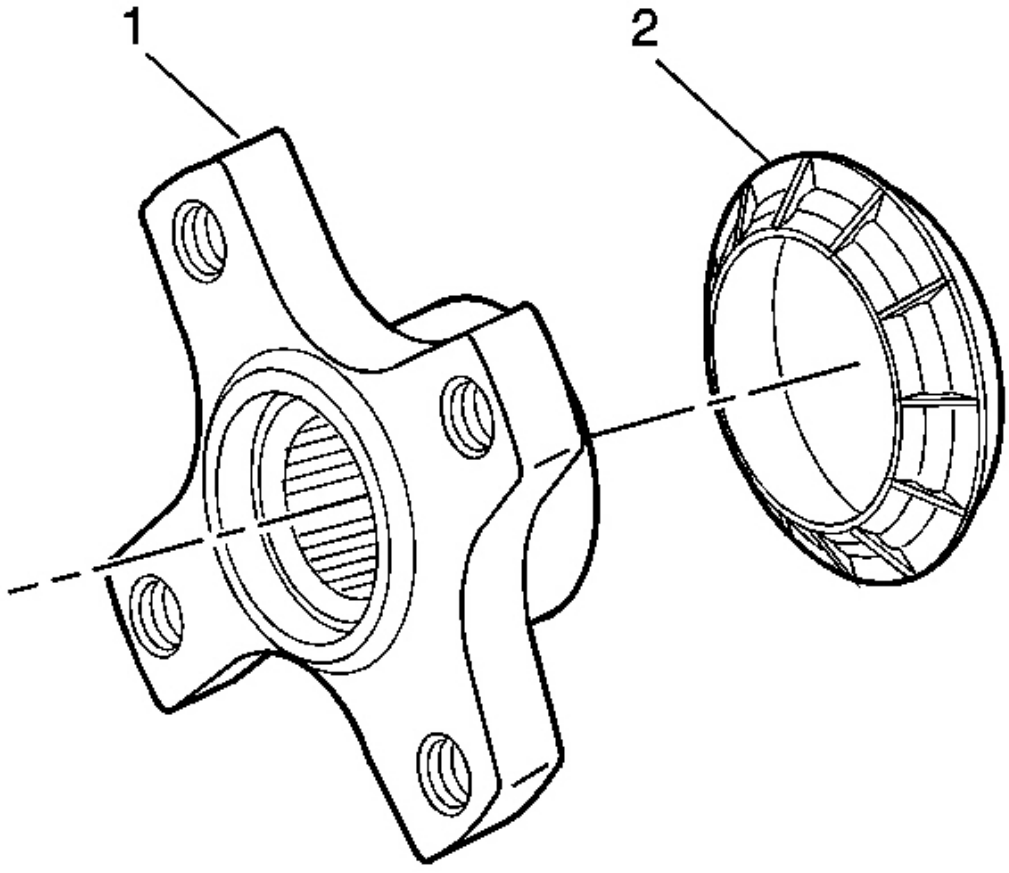


Fig. 105: Inspecting Dust Deflector For Cracks
Courtesy of GENERAL MOTORS CORP.

5. Remove the nut (1) and the flange (2). Discard the used nut.
6. Remove the dust deflector (2) from the flange (1), if required.

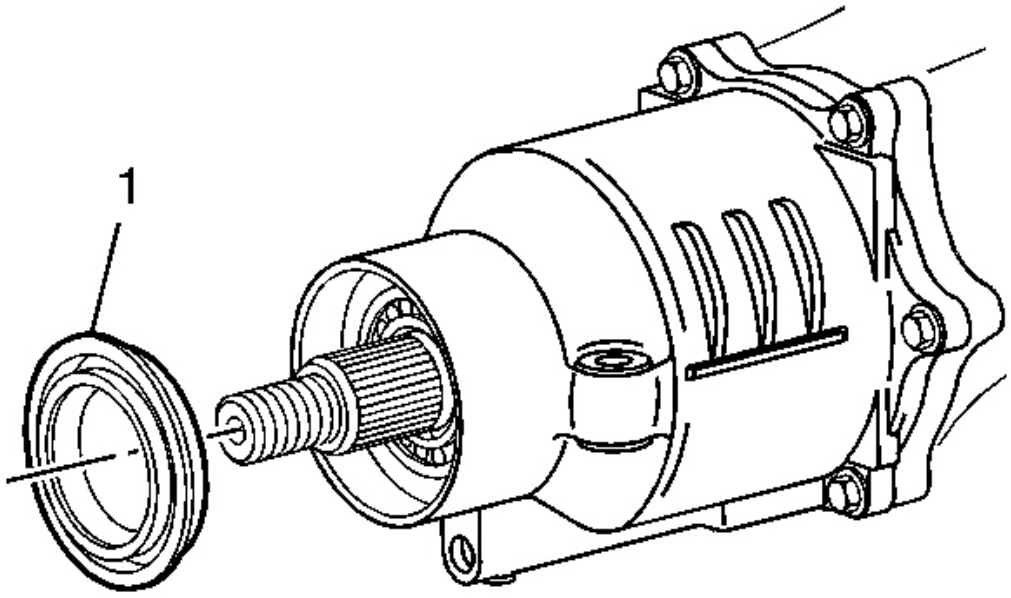


Fig. 106: Removing Input Flange Oil Seal From The Clutch Cover
Courtesy of GENERAL MOTORS CORP.

7. Remove the input flange oil seal (1) from the clutch cover.

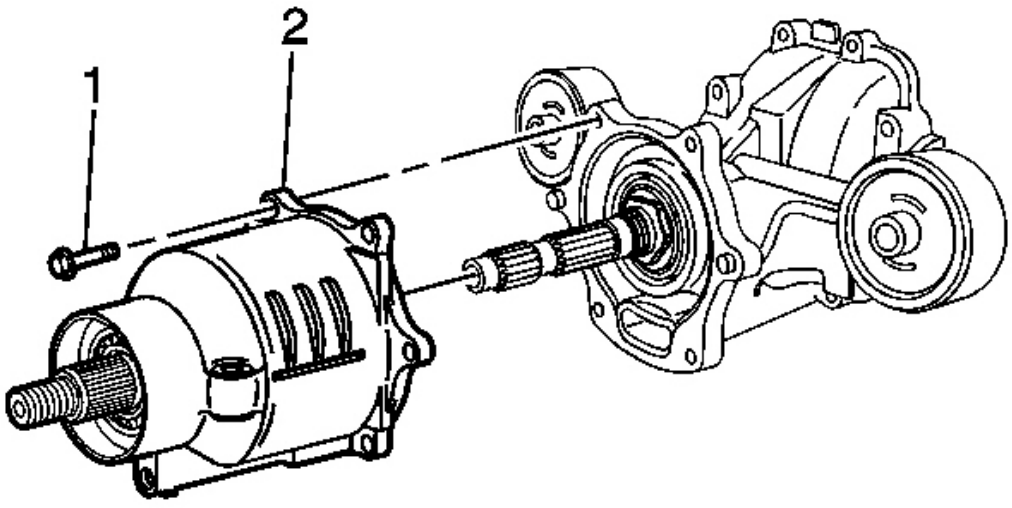


Fig. 107: Removing Bolts & The Clutch Cover From The Differential Housing
Courtesy of GENERAL MOTORS CORP.

8. Remove the bolts (1) and the clutch cover (2) from the differential housing.

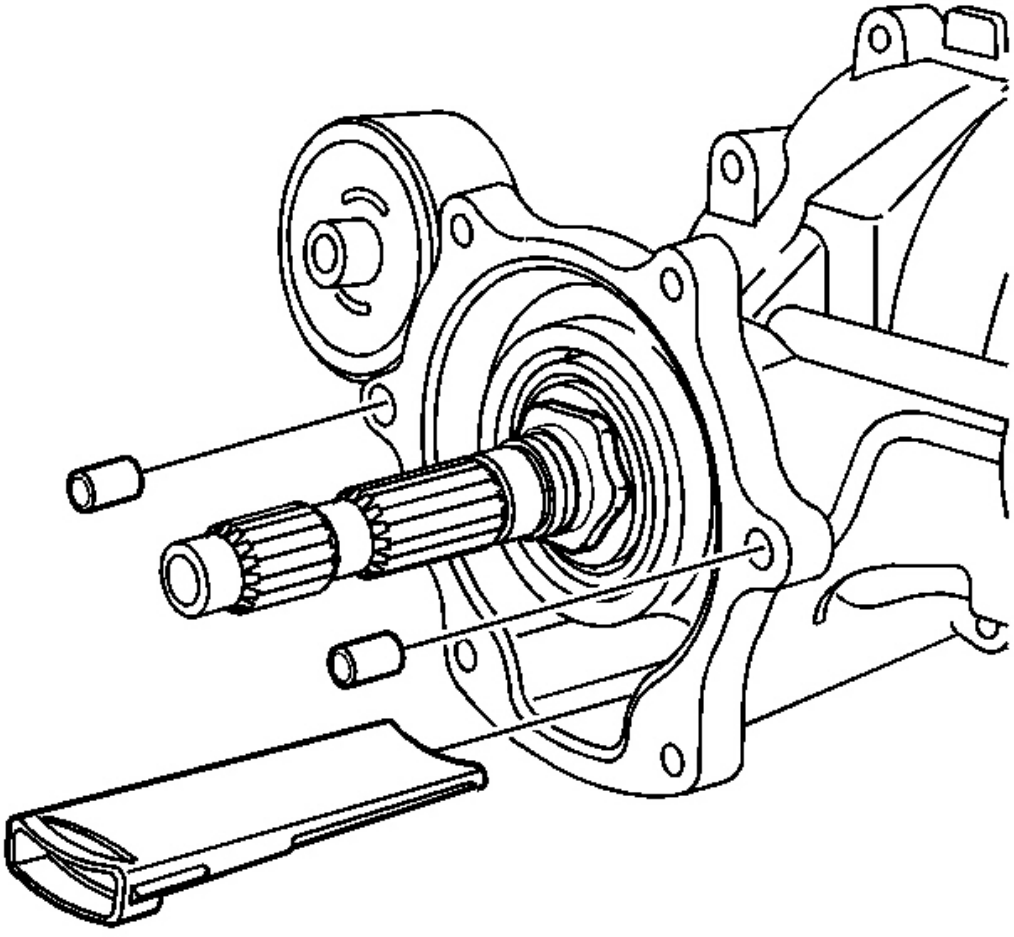


Fig. 108: Removing/Installing Filter Assembly
Courtesy of GENERAL MOTORS CORP.

9. Remove the filter assembly.
10. Remove the dowel pins.

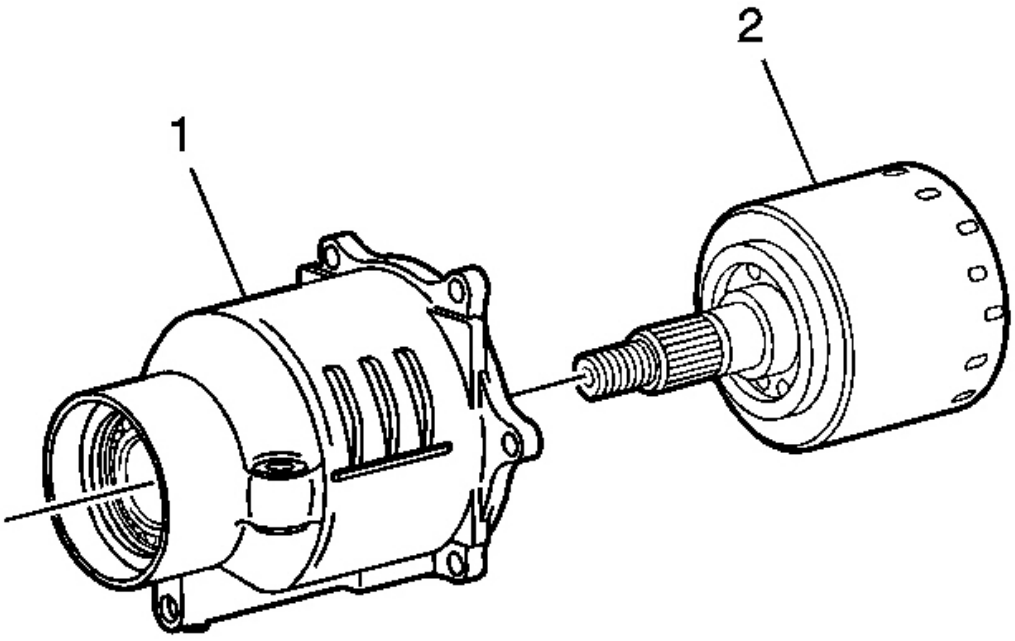


Fig. 109: Removing Clutch Drum From The Housing Cover
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not submerge the clutch drum in solvent. This will damage friction material and gerotor pump.

IMPORTANT: The clutch drum is not serviceable. If inoperative conditions are found, replace the unit.

11. Remove the clutch drum (2) from the clutch cover (1).

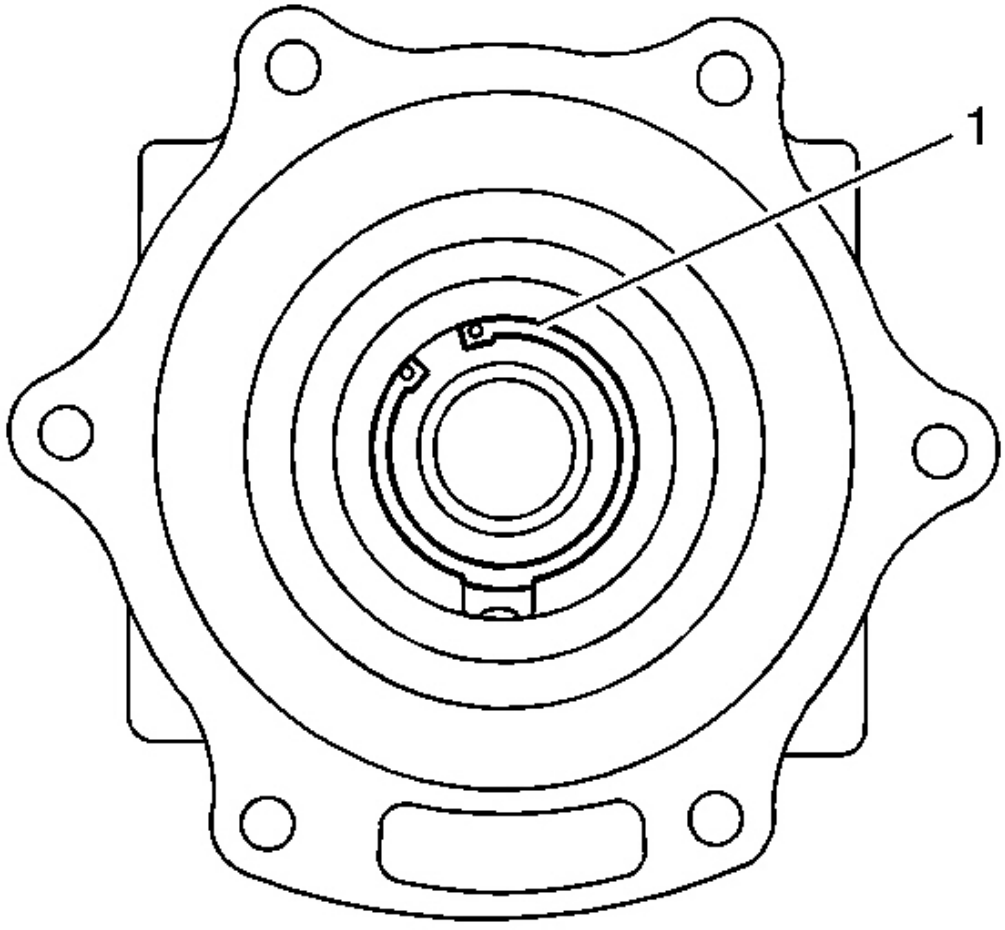


Fig. 110: Removing Snap Ring From The Clutch Cover
Courtesy of GENERAL MOTORS CORP.

12. Remove the snap ring (1) from the clutch cover.

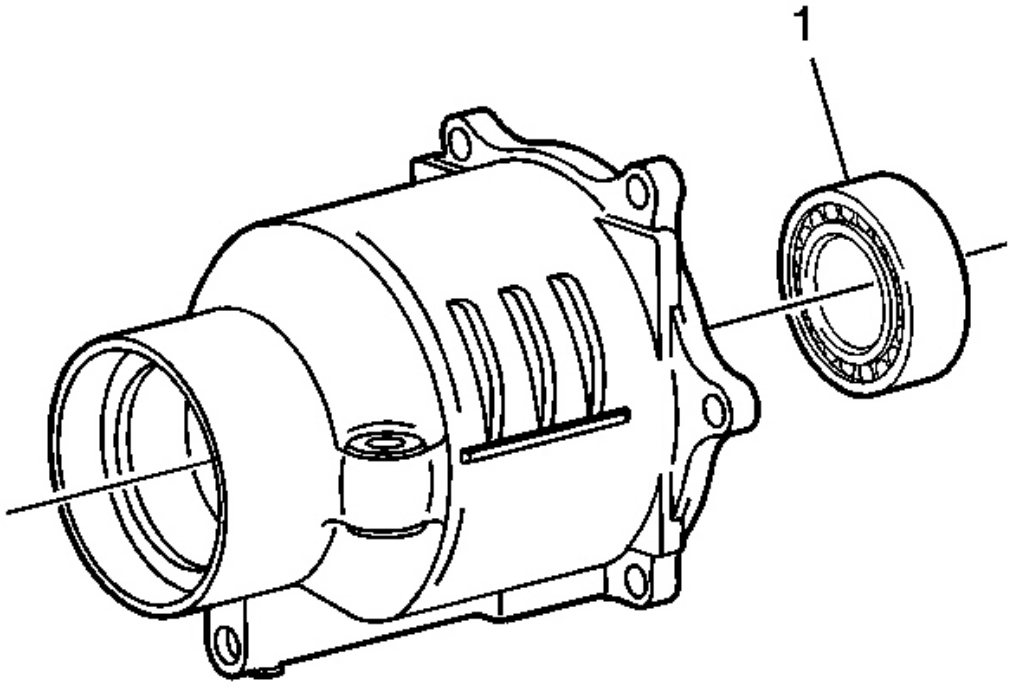


Fig. 111: Remove Bearing If It's Going To Be Replaced
Courtesy of GENERAL MOTORS CORP.

13. Remove the bearing (1). Only remove the bearing if it is going to be replaced. It must be pressed out by the inner race.

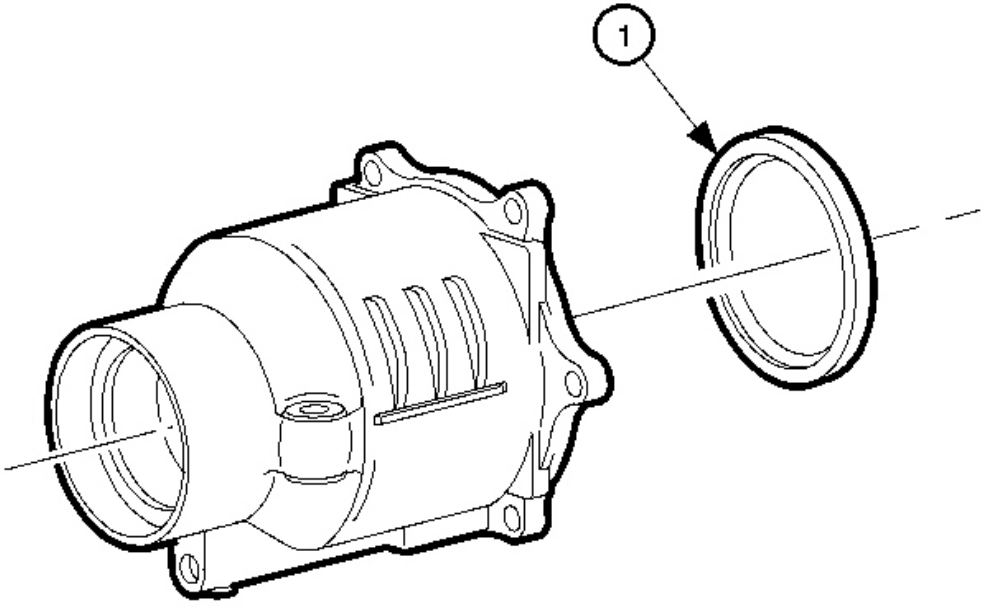


Fig. 112: Removing Clutch Drum Rear Oil Seal
Courtesy of GENERAL MOTORS CORP.

14. Remove the clutch drum rear oil seal (1) from the housing.

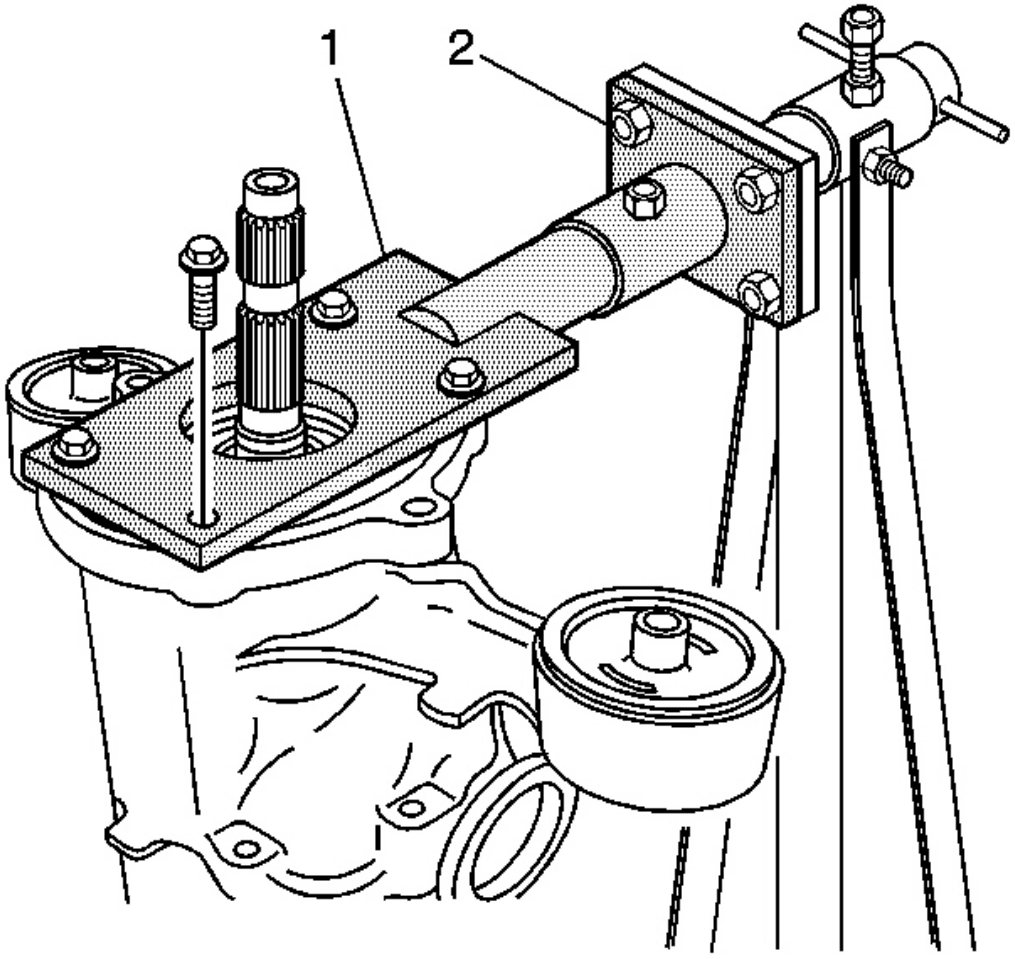


Fig. 113: Installing Differential Housing On J44869 Using 4 Clutch Cover Bolts
Courtesy of GENERAL MOTORS CORP.

15. Attach the assembly holding fixture **J 44869** to the housing, using 4 clutch cover bolts. See **Special Tools and Equipment** .
16. Install the housing (1) and the fixture into **J 43964** (2) adapter. See **Special Tools and Equipment** .

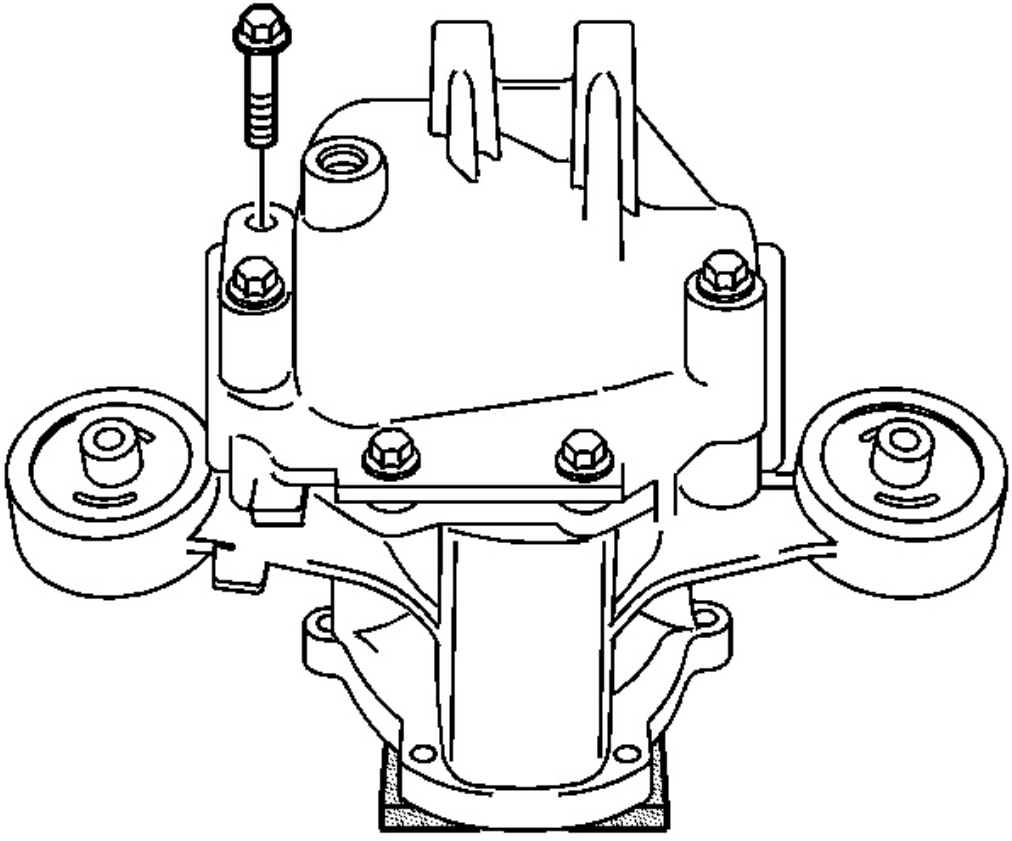


Fig. 114: Removing/Installing 4 (M10) Cover Bolts
Courtesy of GENERAL MOTORS CORP.

17. Remove the rear cover bolts, 4 M8 and 4 M10.

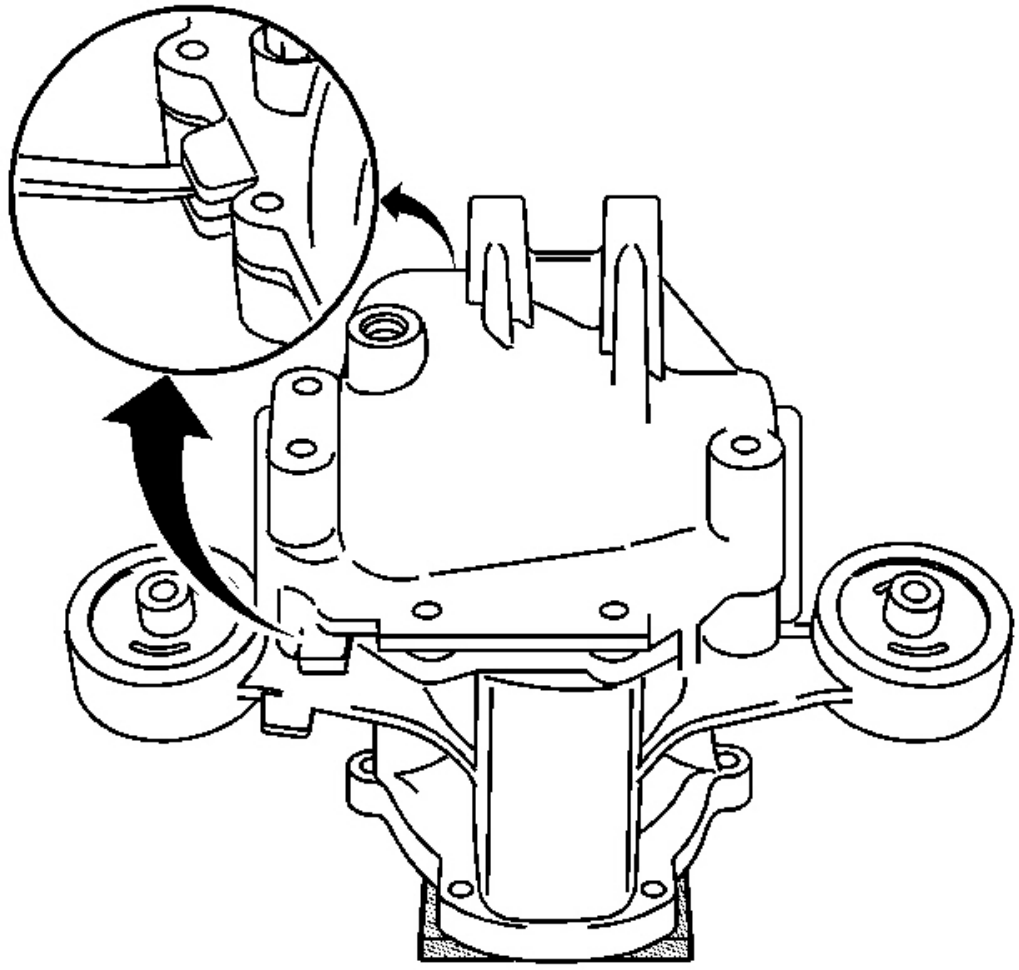


Fig. 115: Removing Rear Cover By Prying It Off At The Pry Point Locations
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Use the pry point only. Do not pry on the sealing surface.

IMPORTANT: The rear differential carrier may come out with the cover.

18. Remove the rear cover by prying it off at the pry point locations.

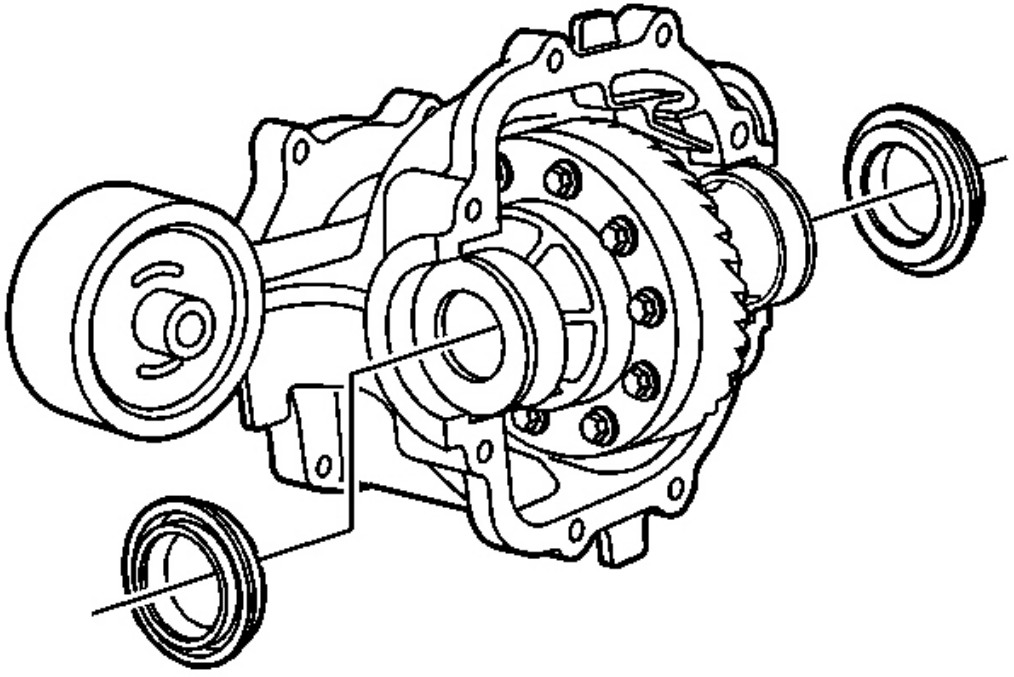


Fig. 116: Removing Right & Left Axle Shaft Oil Seals
Courtesy of GENERAL MOTORS CORP.

19. Remove the right and the left axle shaft oil seals.

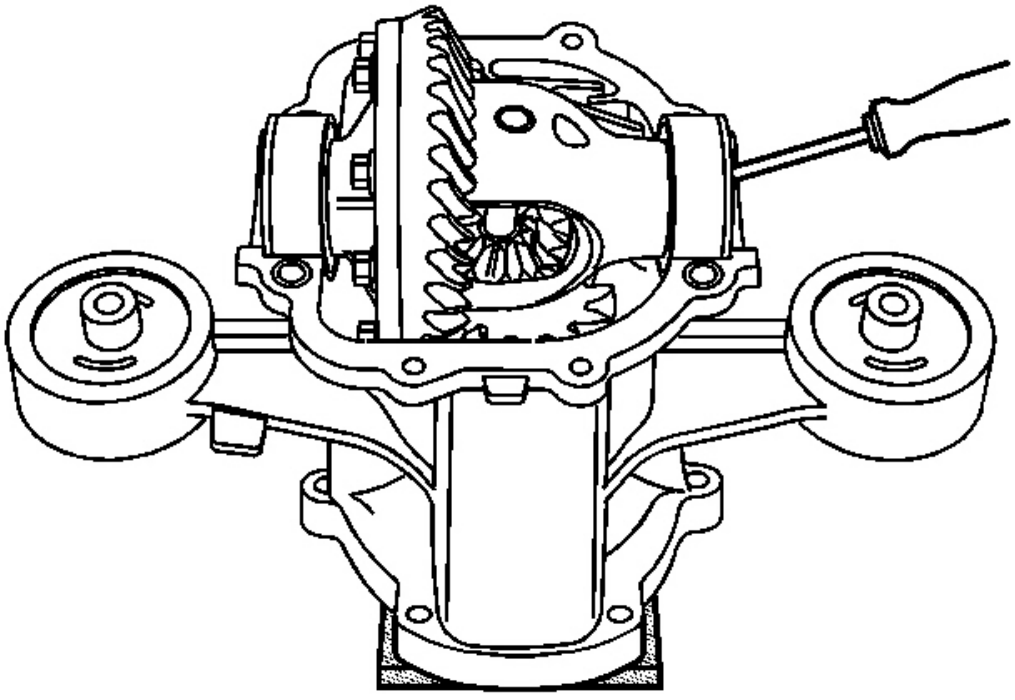


Fig. 117: Removing Differential Carrier
Courtesy of GENERAL MOTORS CORP.

20. Remove the differential carrier. Place a screw driver in the axle differential bore and pry up.

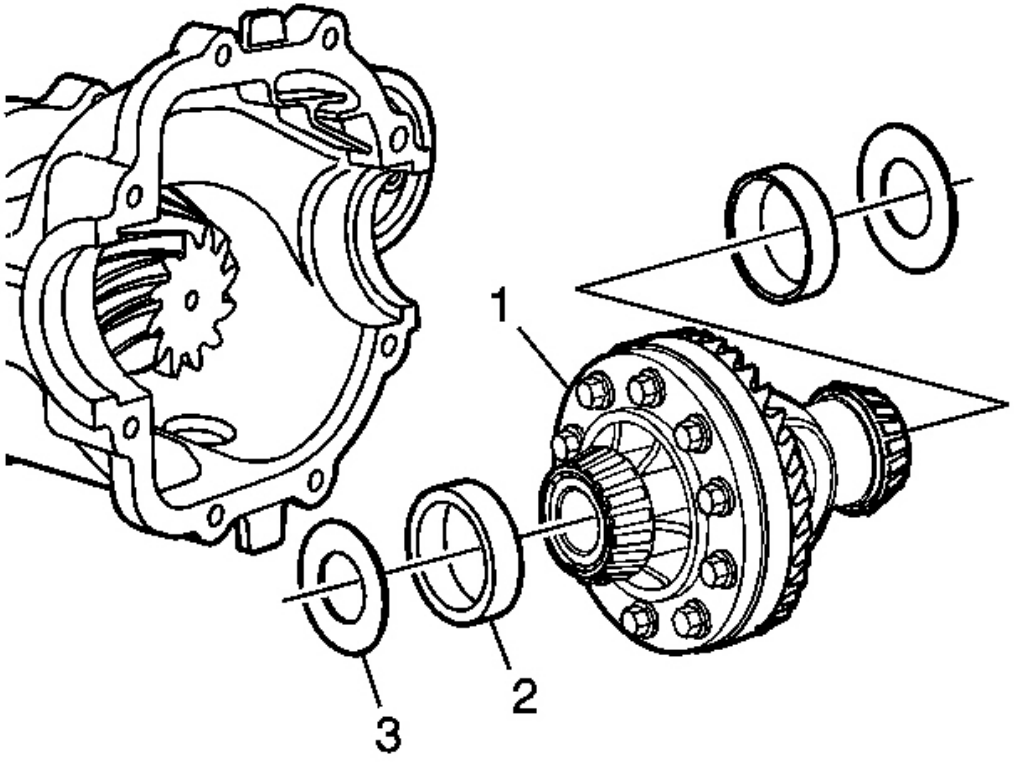


Fig. 118: Removing Carrier Assembly, Bearing Races & Shims
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Mark or tag the bearing races and the shims for assembly.

21. Remove the carrier assembly (1), bearing races (2), and shims (3).

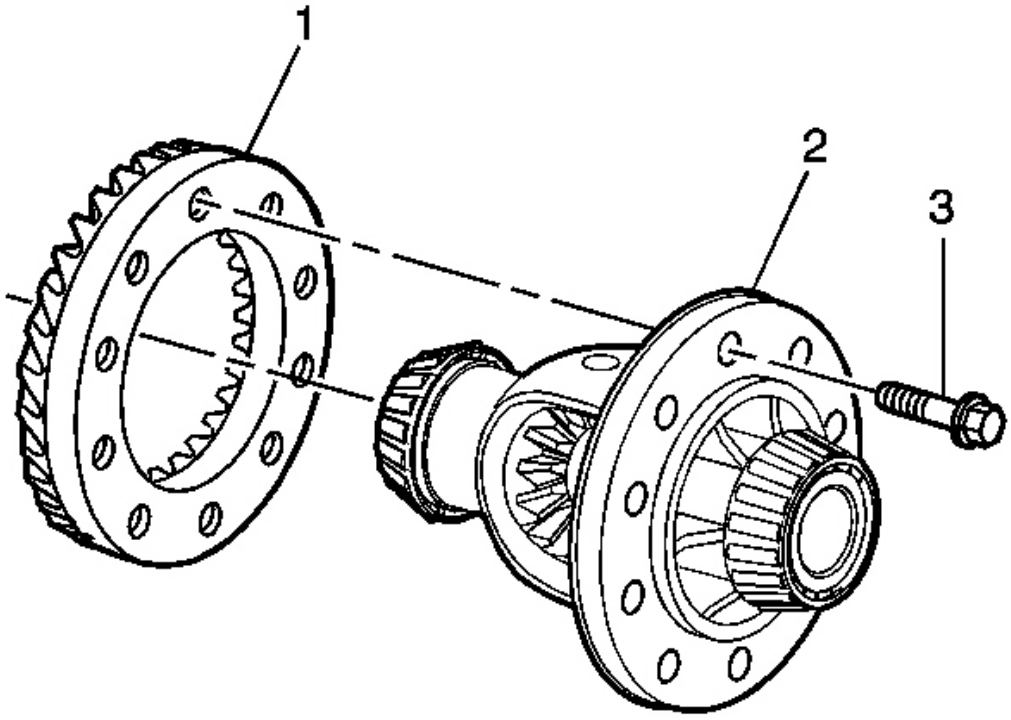


Fig. 119: Removing Bolts & Ring Gear From The Carrier
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The ring gear bolts are not to be reused. Use new bolts during assembly.

22. Remove the bolts (3) and the ring gear (1) from the carrier (2).

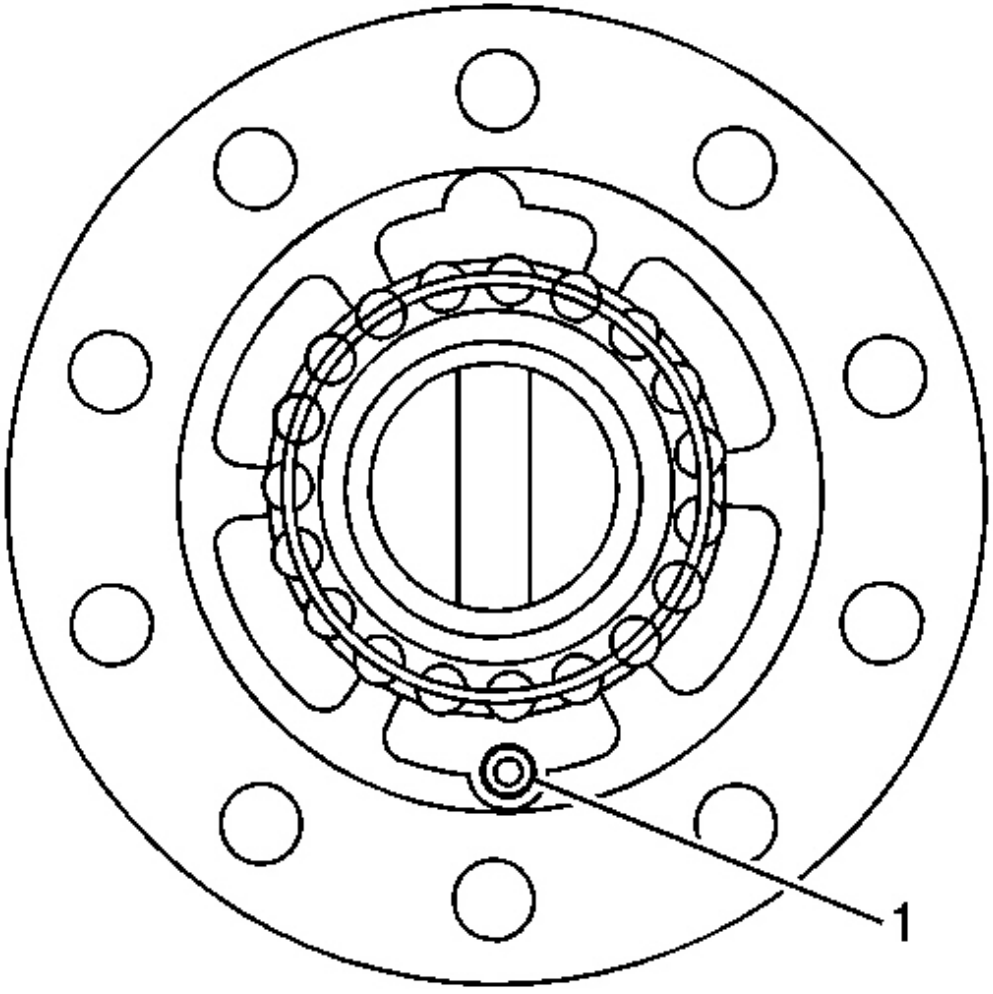


Fig. 120: Identifying Lock Pin Location
Courtesy of GENERAL MOTORS CORP.

23. Identify the lock pin location (1) within the differential case.

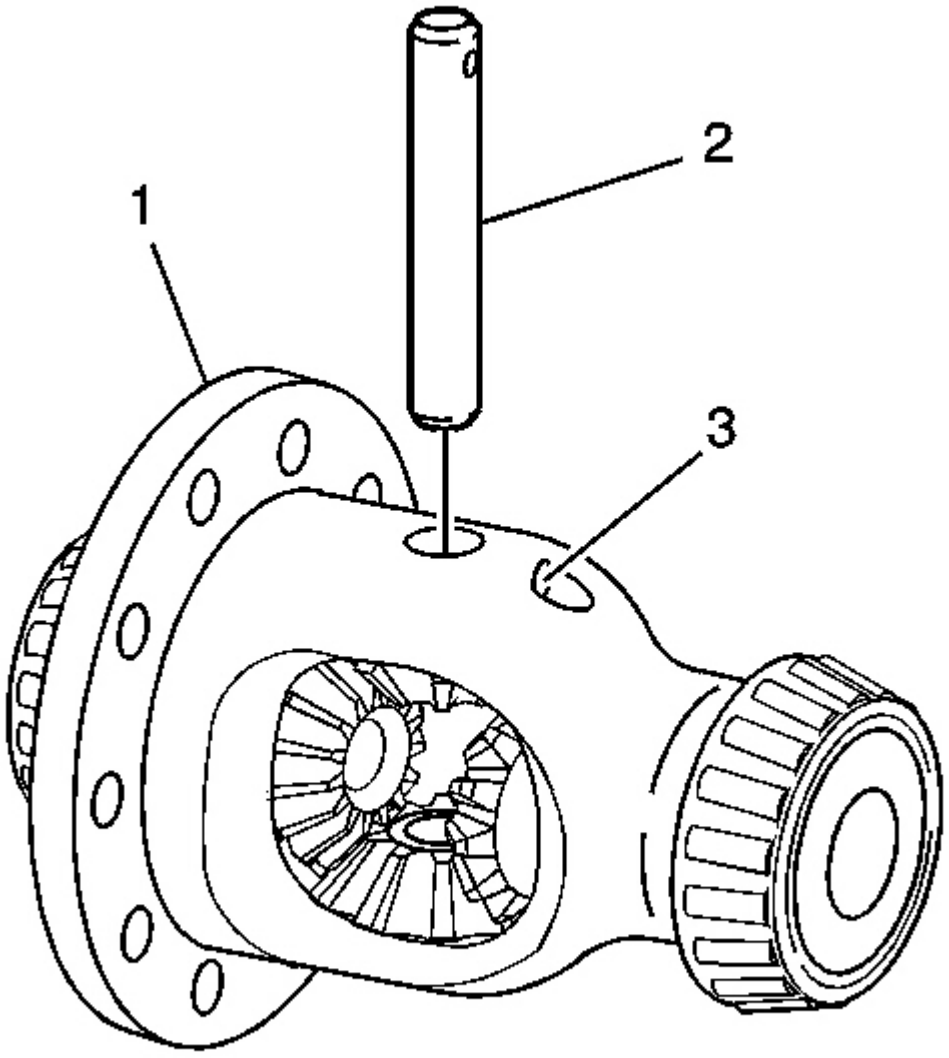


Fig. 121: Identifying Pinion Shaft Roll Pin
Courtesy of GENERAL MOTORS CORP.

24. Drive the pinion shaft roll pin from the access hole (3) until the pinion shaft (2) can be removed from the differential case (1).

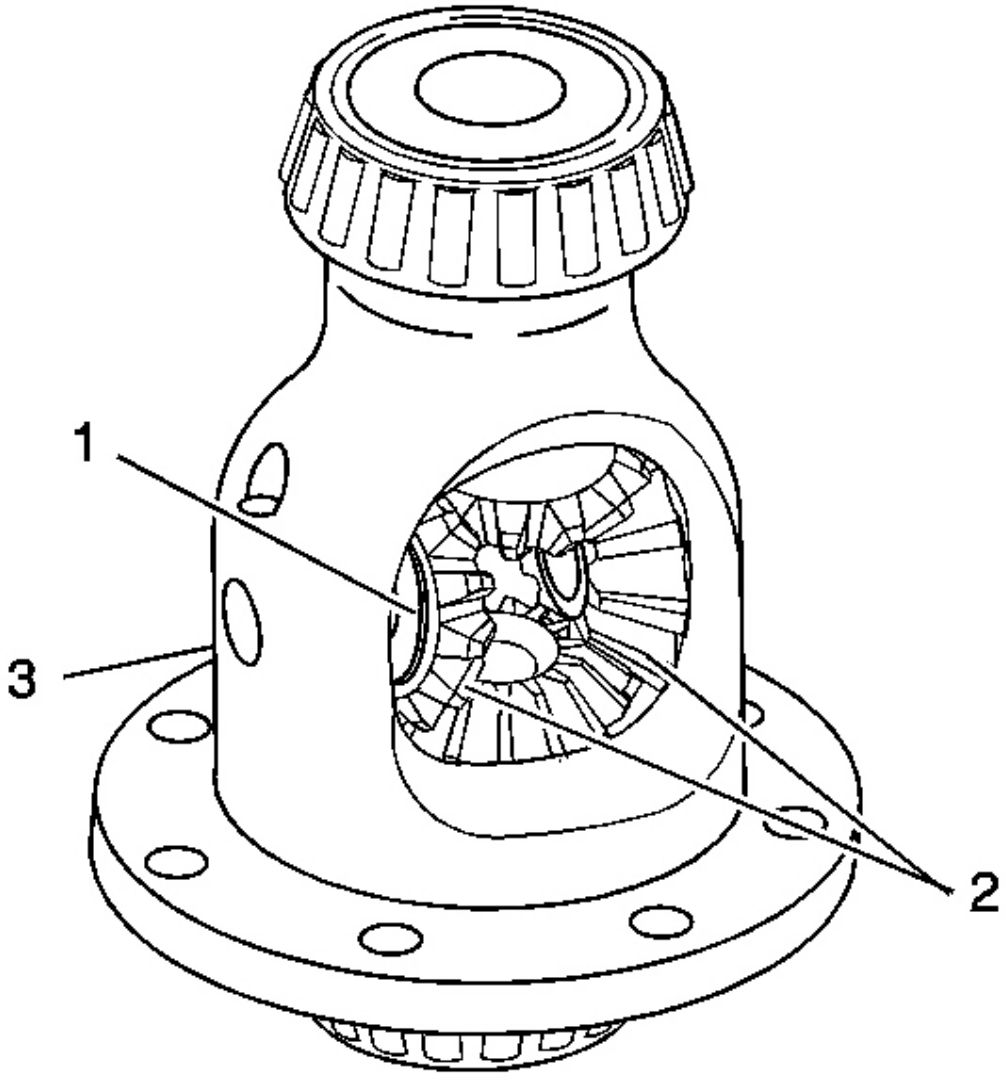


Fig. 122: Removing Washers, Pinion Gears & Side Gears
Courtesy of GENERAL MOTORS CORP.

25. Remove the washers (1), pinion gears (2) and side gears (3) from the differential case.

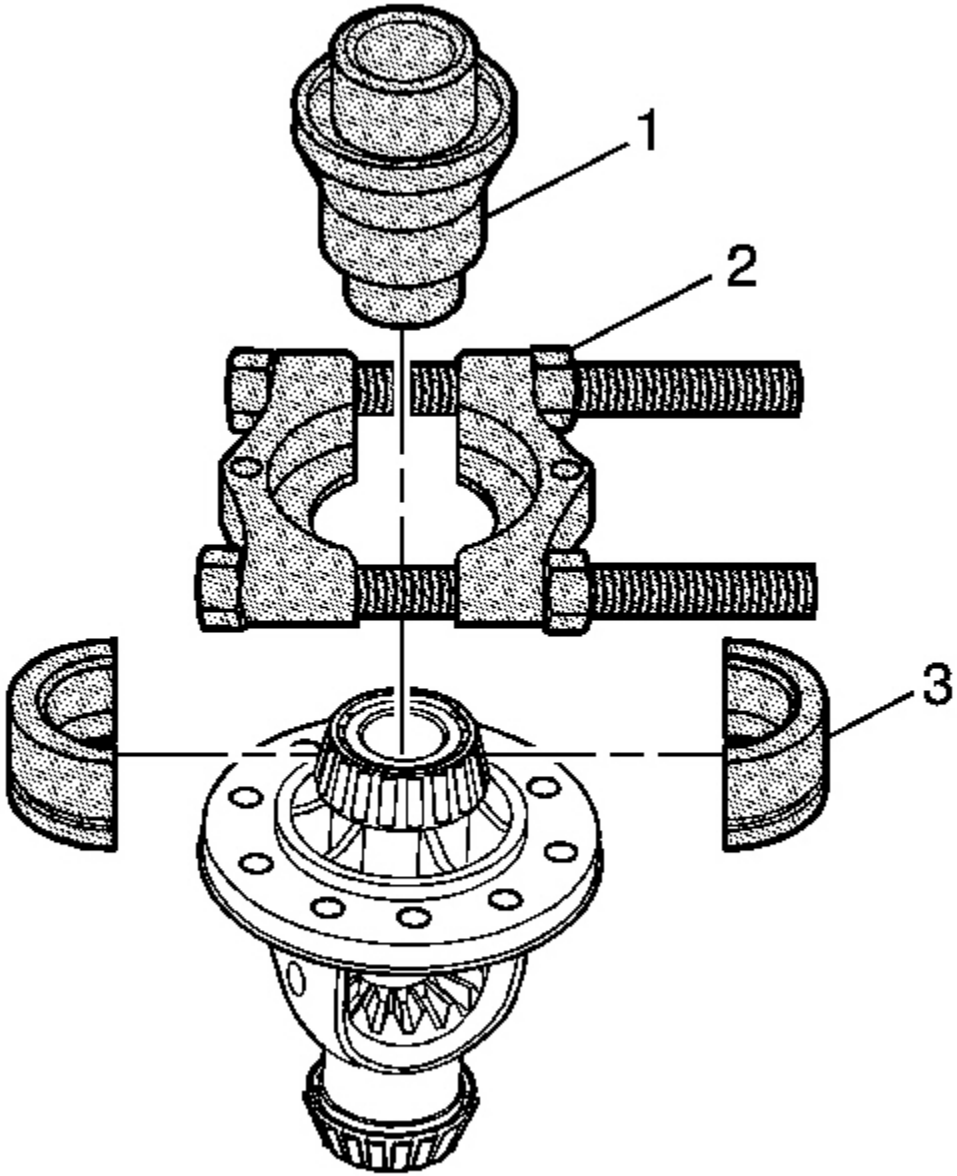


Fig. 123: Using J44854
Courtesy of GENERAL MOTORS CORP.

26. Using **J 44854** (3),. See **Special Tools and Equipment** .**J 22912-01** (2), and **J 44855** (1), place the carrier into a press and press off the bearing. See **Special Tools and Equipment** .
27. Turn the carrier over, using the same; remove the right side differential bearing.

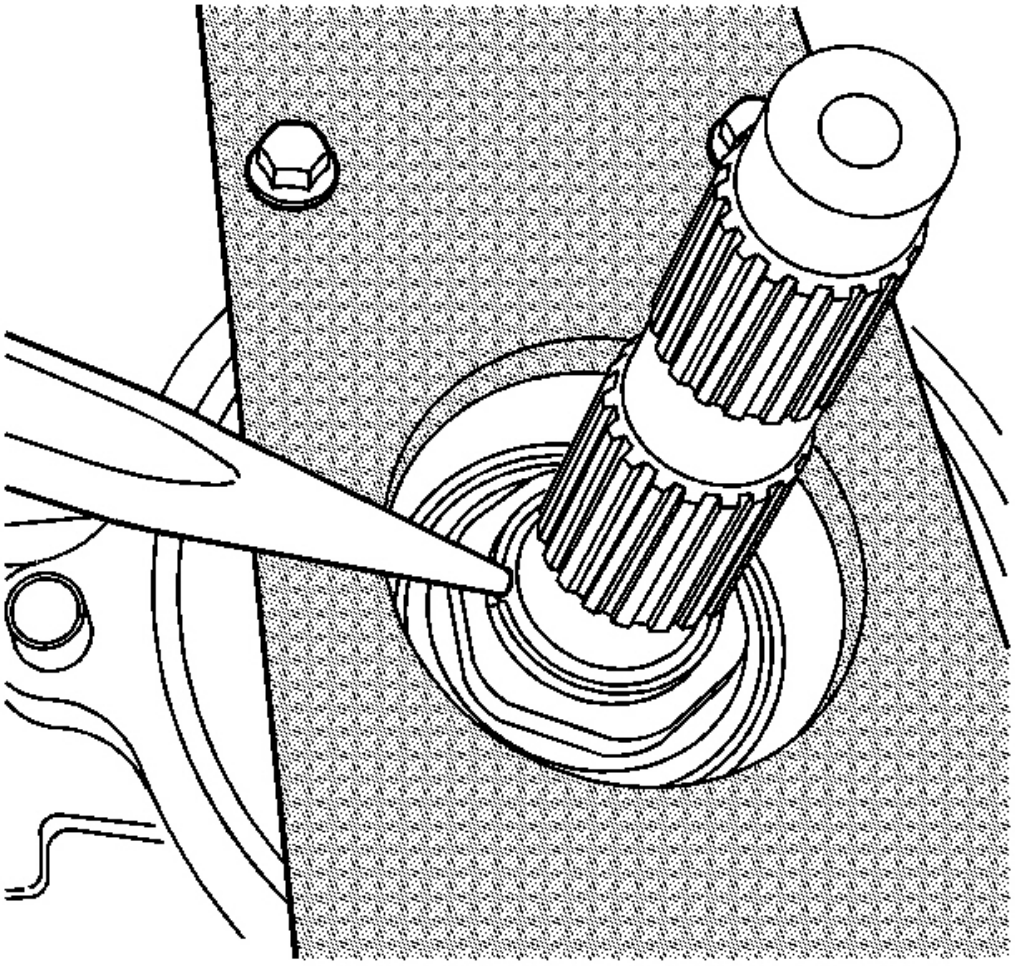


Fig. 124: Using Punch Bend Out The Flat On Both Sides Of The Pinion
Courtesy of GENERAL MOTORS CORP.

28. Using a punch, bend out the flat on both sides of the pinion nut.

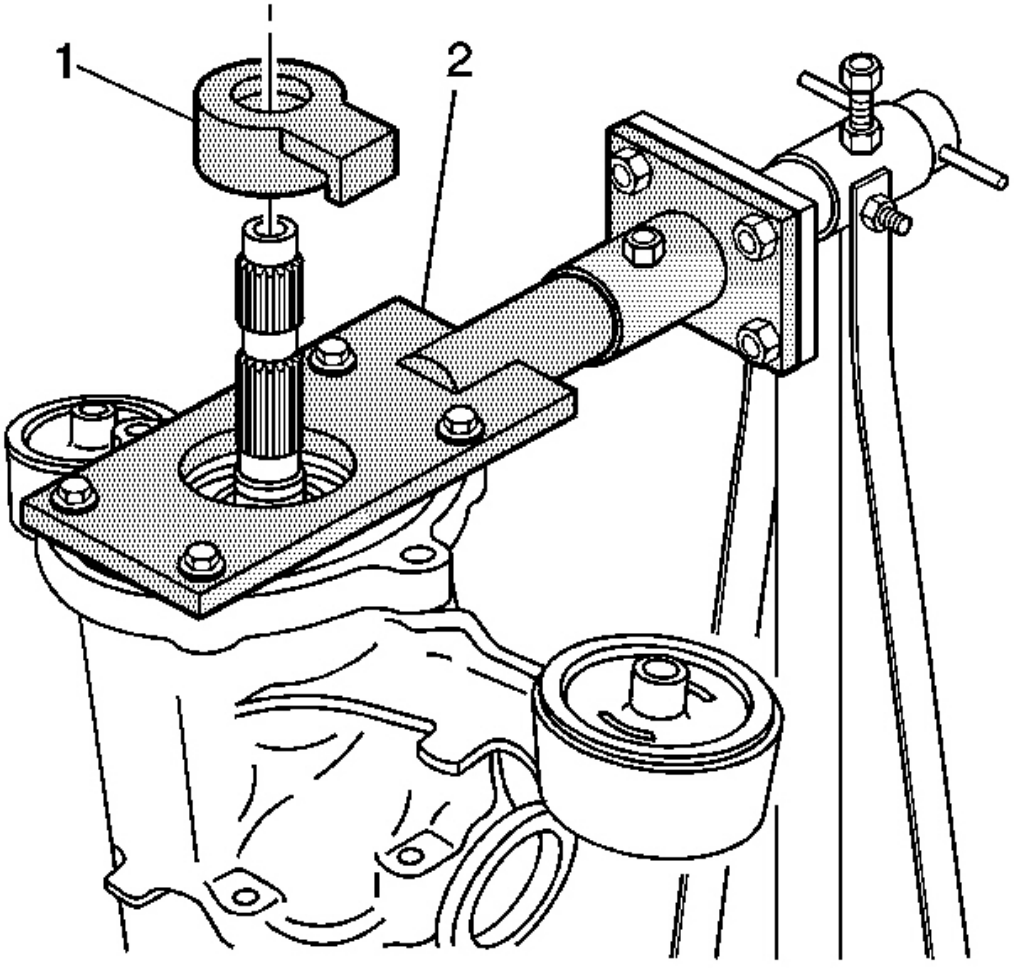


Fig. 125: Placing J44864 Over The Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

29. Place **J 44864** (1) over the pinion shaft. See **Special Tools and Equipment** . Turn the shaft to align the hex nut with the flat on the assembly holding fixture **J 44869** (2). See **Special Tools and Equipment** .

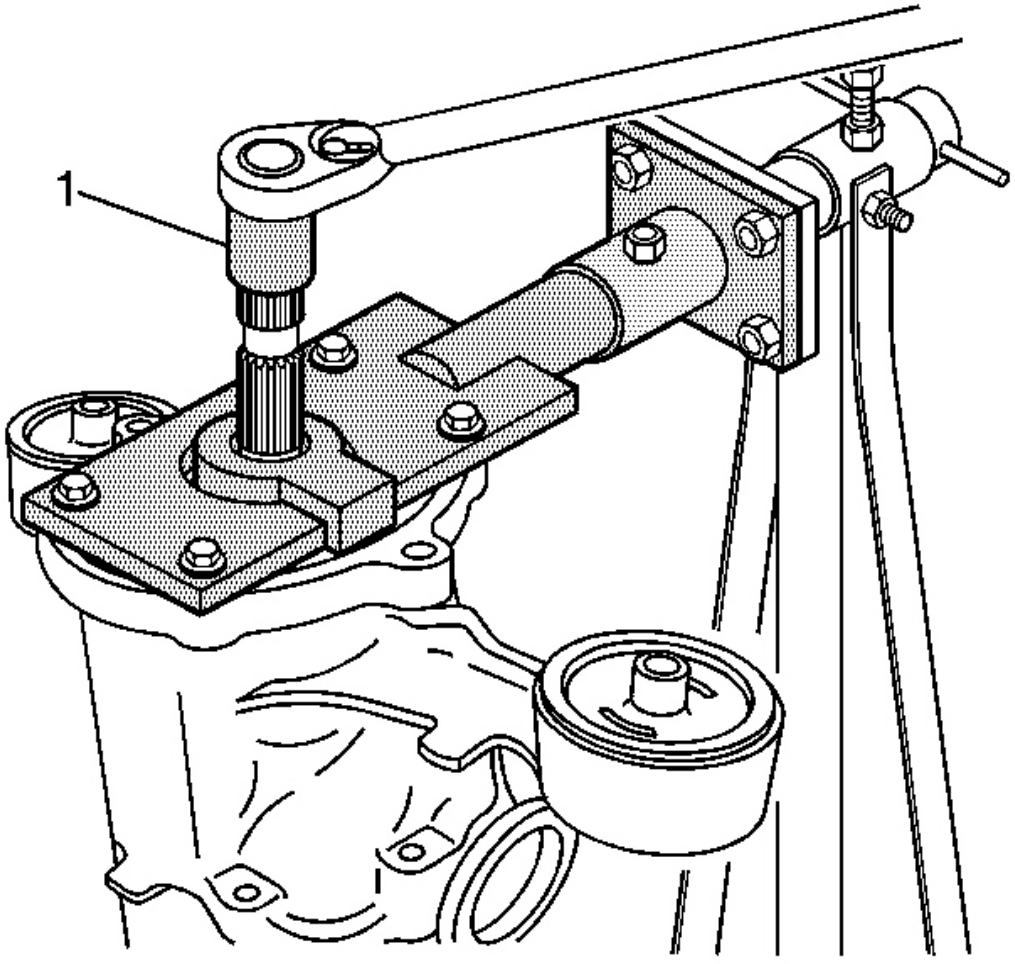


Fig. 126: Placing J44865 & Breaker Bar Over The Pinion Splines
Courtesy of GENERAL MOTORS CORP.

30. Place **J 44865** (1) and the breaker bar over the pinion splines. See **Special Tools and Equipment** . Remove the nut.

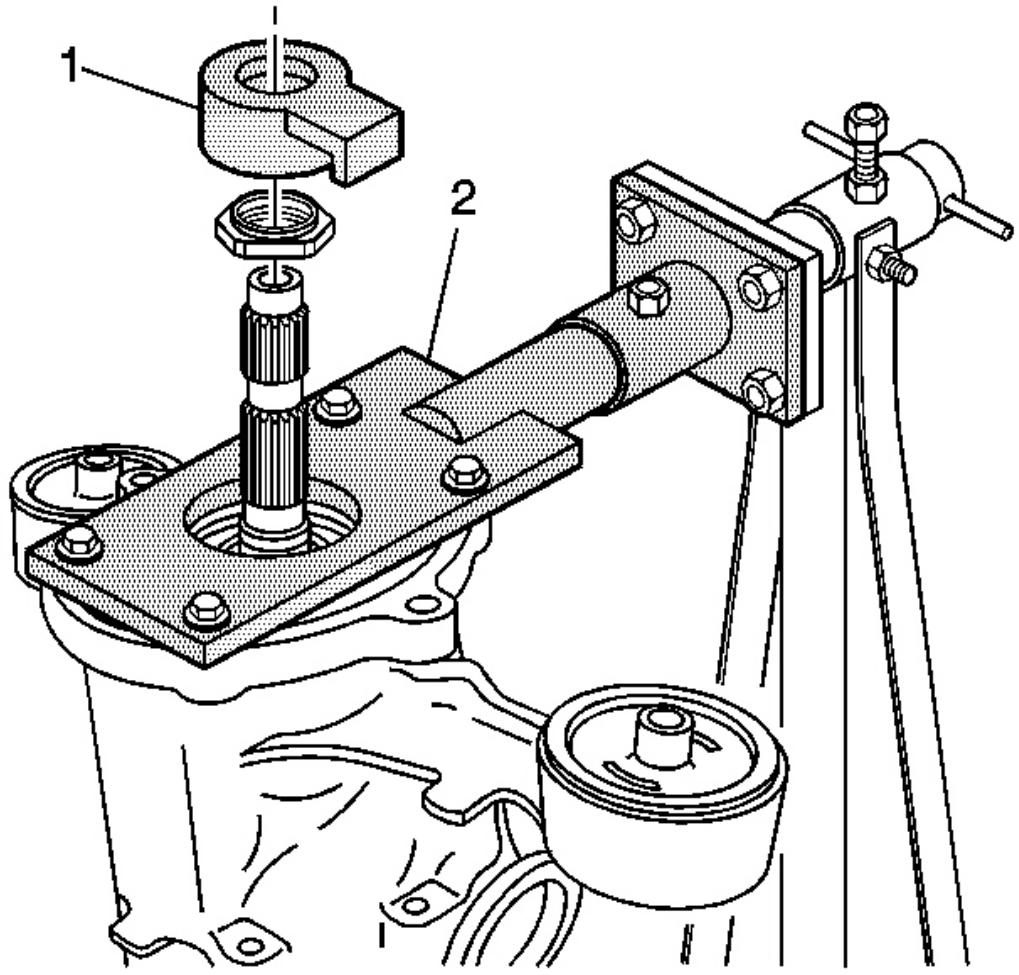


Fig. 127: Removing/Installing Pinion Nut On The Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The pinion nut is not reusable.

31. Remove **J 44864** (1) and the nut. See **Special Tools and Equipment** .
32. Remove the 4 bolts from **J 44869** , and remove from the housing. See **Special Tools and Equipment** .

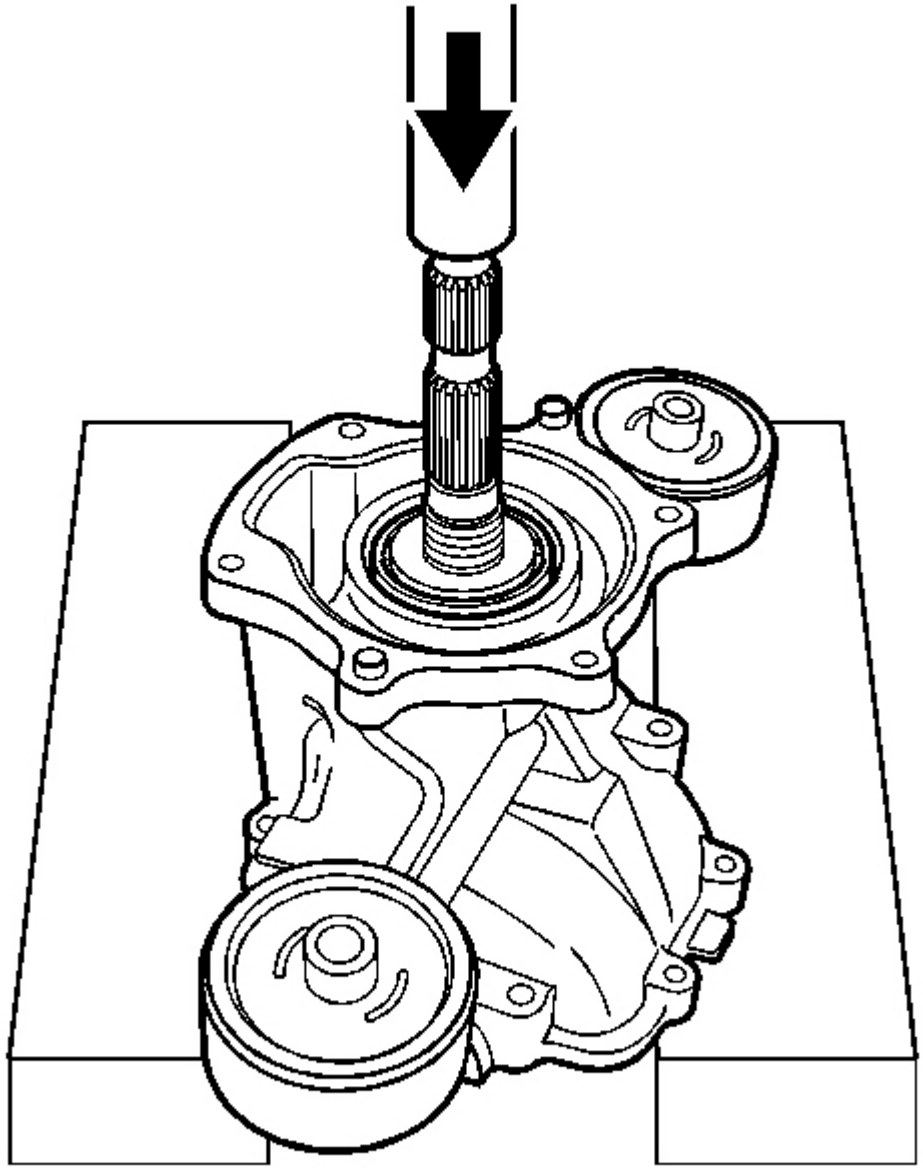


Fig. 128: Inspecting Press Bar Surface
Courtesy of GENERAL MOTORS CORP.

NOTE: **Inspect the press bar surface. Do not press the housing against a rough surface. Sealing surfaces could be damaged.**

33. Position the differential housing into a press in order to remove the pinion shaft.

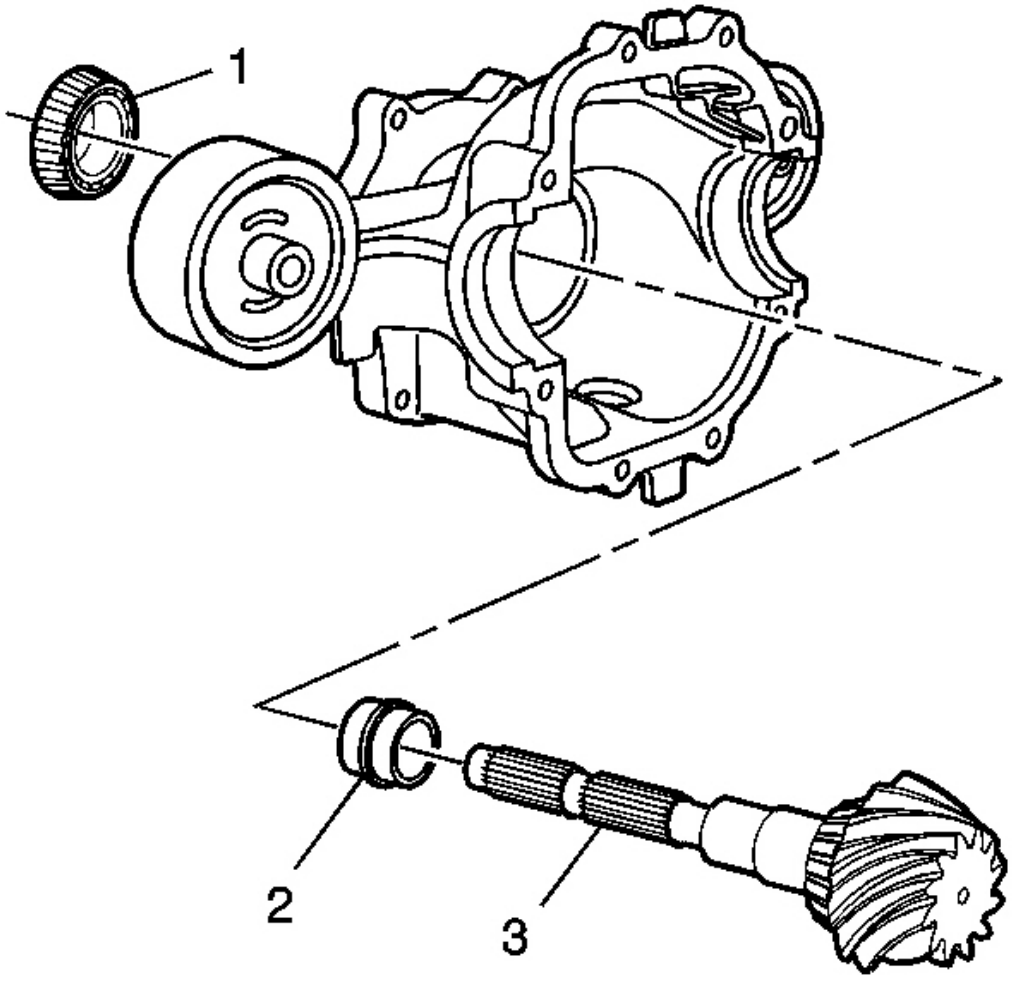


Fig. 129: Removing Front Bearing, Collapsible Spacer & Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The collapsible spacer is not reusable.

34. Remove the front bearing (1), the collapsible spacer (2) and the pinion shaft (3).

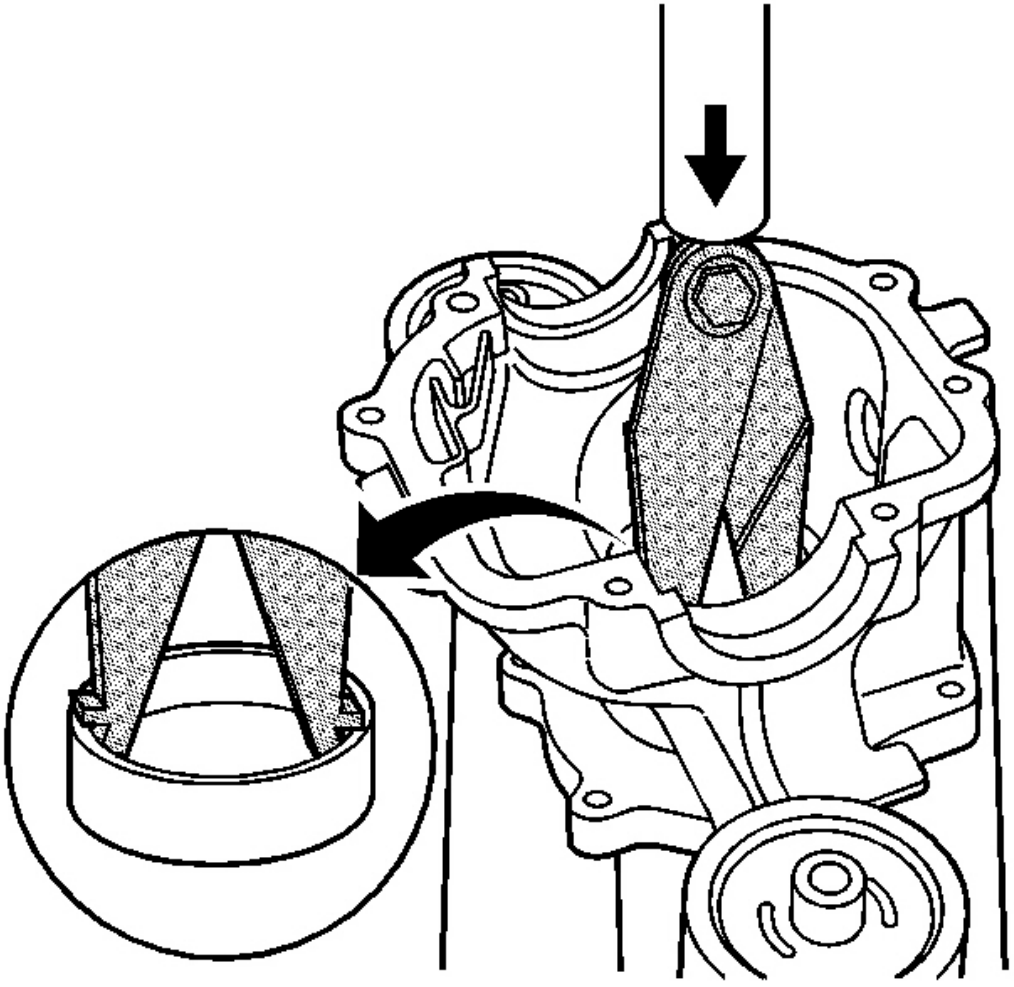


Fig. 130: Placing J3940 Behind The Bearing Race
Courtesy of GENERAL MOTORS CORP.

NOTE: If dowel pins are still in the housing, remove them before pressing. Pressing on dowels will damage the housing.

IMPORTANT: The bolt is left-hand threaded on J 3940.

35. Place **J 3940** behind the front bearing race in the grooves. See **Special Tools and Equipment** . Spread the arms and tighten the lock bolt.
36. Place the housing in a press and remove the race.

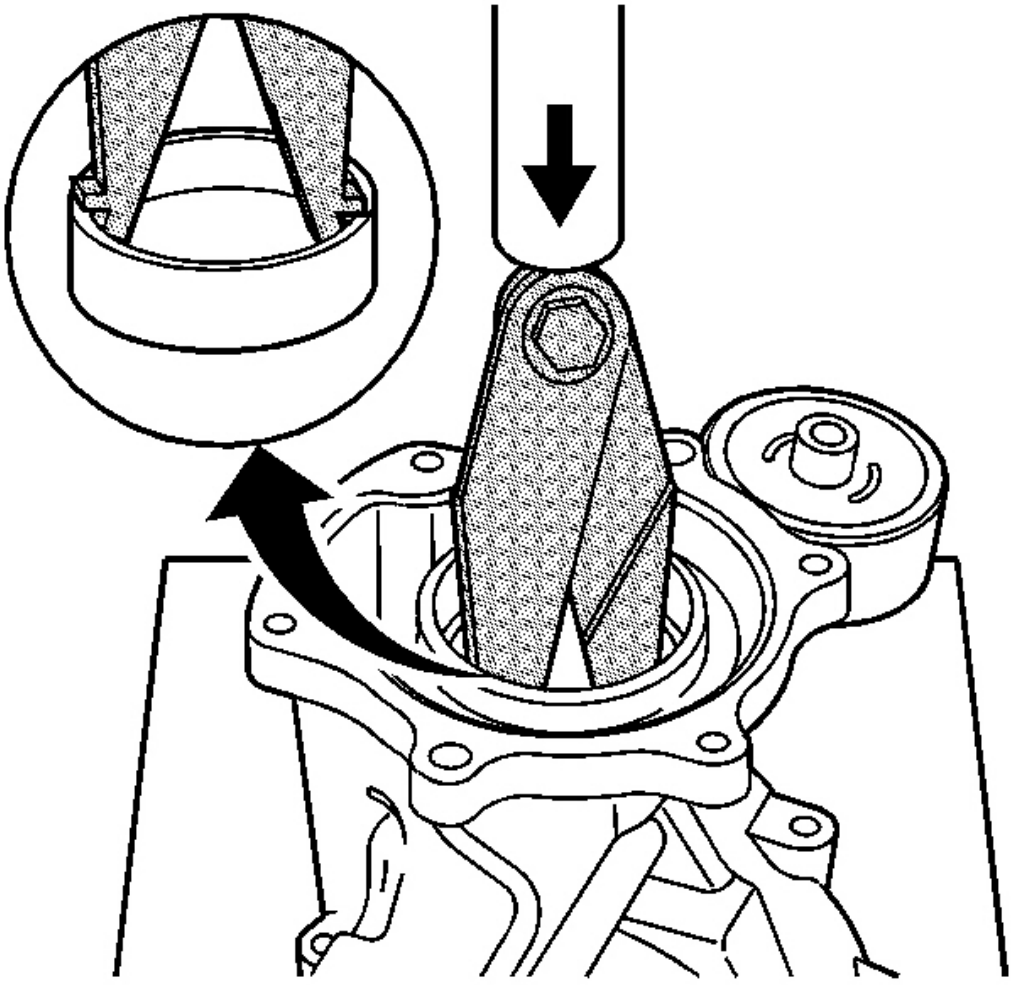


Fig. 131: Placing J3940 Behind The Rear Pinion Bearing Race
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The bolt is left-hand threaded on J 3940.

37. Place **J 3940** behind the rear pinion bearing race in the grooves. See **Special Tools and Equipment** . Spread the arms and tighten the lock bolt.
38. Place the housing in a press and remove the race.

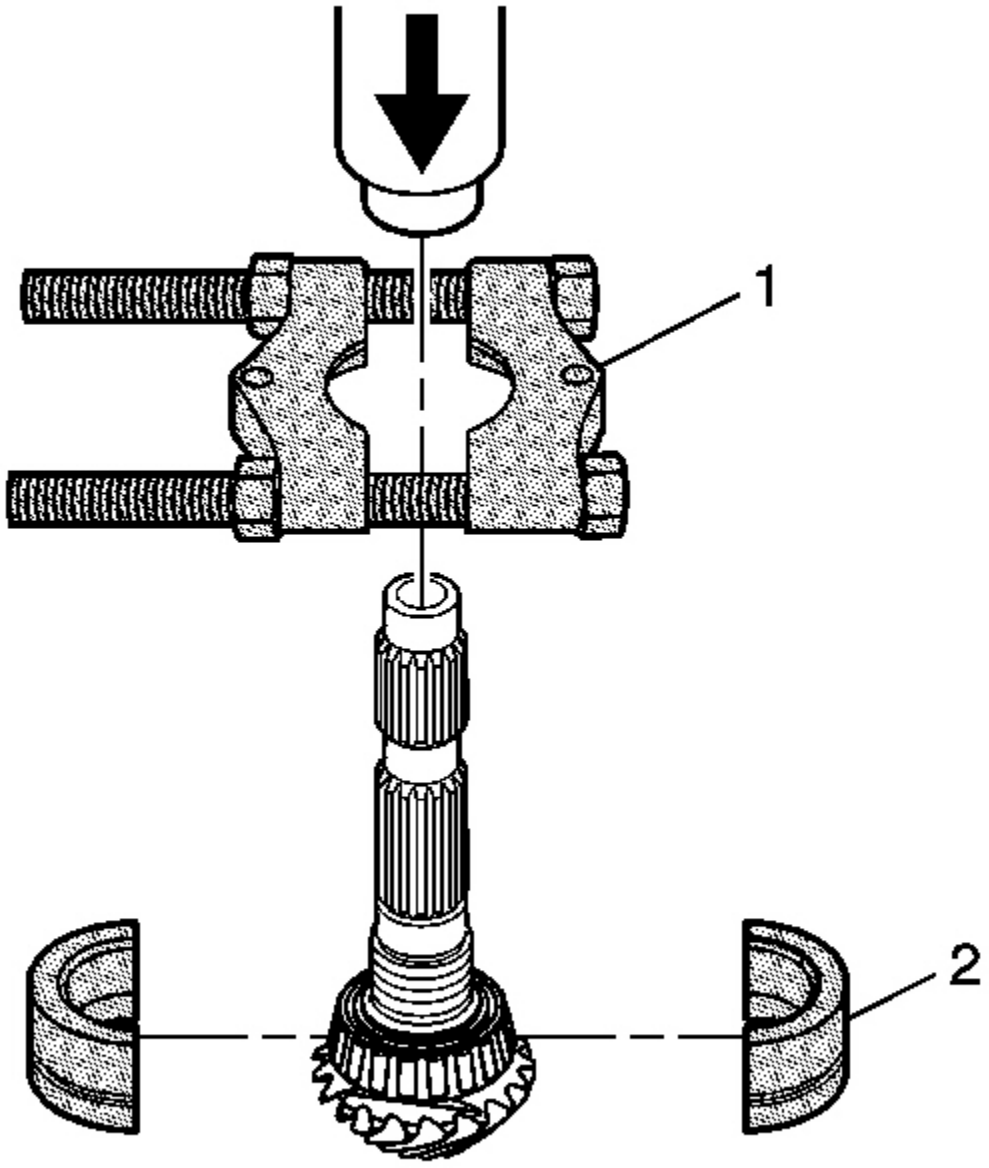


Fig. 132: Using J44858
Courtesy of GENERAL MOTORS CORP.

39. Using **J 44858** (2), and. See **Special Tools and Equipment** .**J 22912-01** (1), place the V of the split plate in the groove of **J 44858** (2). See **Special Tools and Equipment** . Tighten the nuts.

IMPORTANT: The pinion shim is located under the bearing. Measure and mark or tag when removed.

40. Place the pinion shaft and the tools in a press; then remove the bearing and the shim.

DIFFERENTIAL HOUSING CLEANING AND INSPECTION

Housings

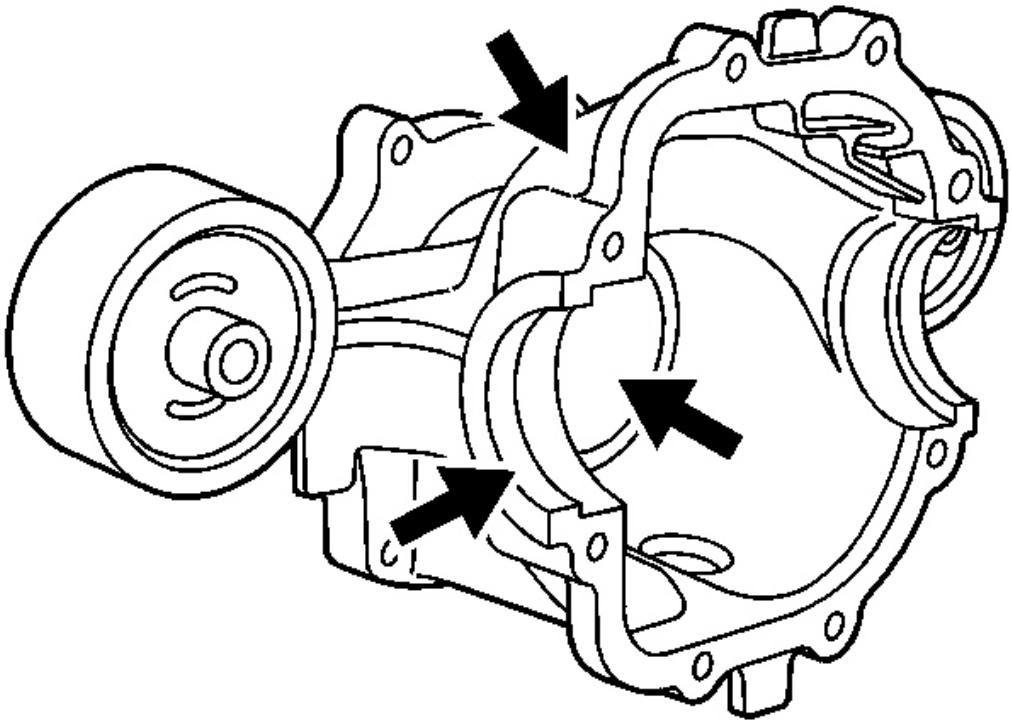


Fig. 133: Inspecting Clutch & Differential Housing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not use any type of motored cleaning device, air tools or drills.

1. Carefully and thoroughly inspect all drive unit components before assembly. Thorough inspection of the drive components for wear and stress with subsequent replacement of worn components eliminates costly drive component repair after assembly.
2. Clean the housings in solvent and remove all sealant material from the sealing surfaces.
3. Inspect the clutch and differential housings for the following:

- Damaged sealing surfaces
- Worn or scored bearing race bores
- Damaged bolt, drain plug, or fill plug hole threads
- Porosity
- Damage to the exterior of the housings
- Damaged, restricted or missing vent tube
- Worn mounting bracket bushings

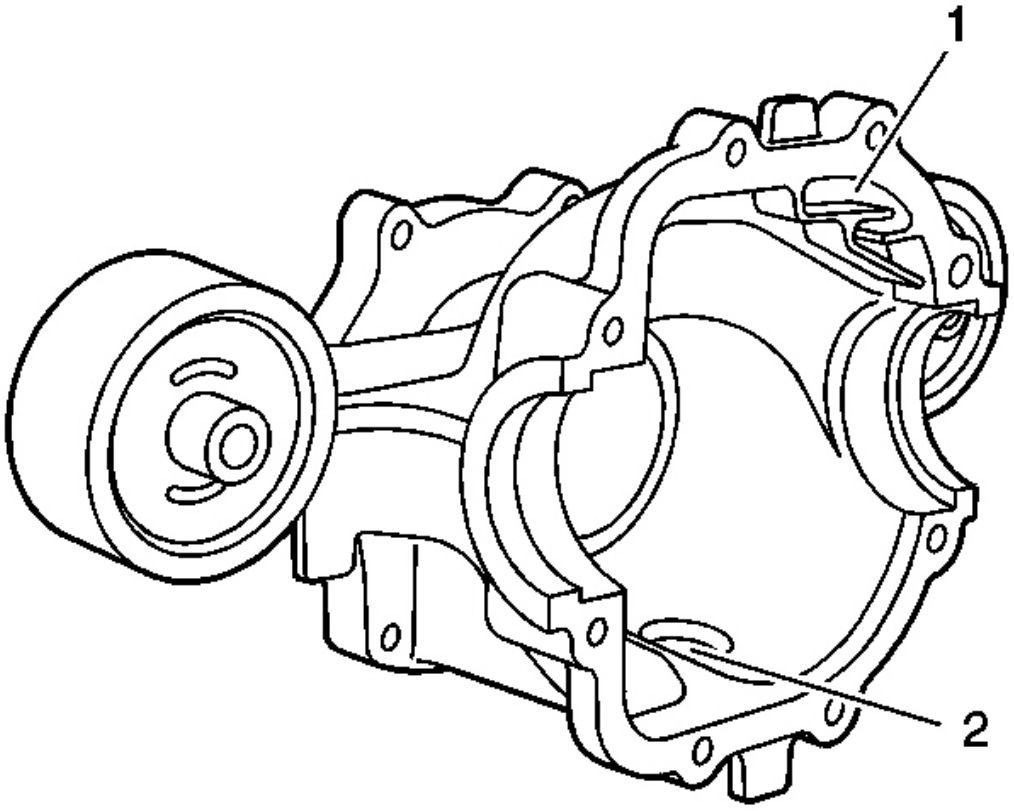


Fig. 134: Cleaning Vent Passage & Oil Return Passage
Courtesy of GENERAL MOTORS CORP.

4. Clean and inspect the vent passage (1) and the oil return passage (2).

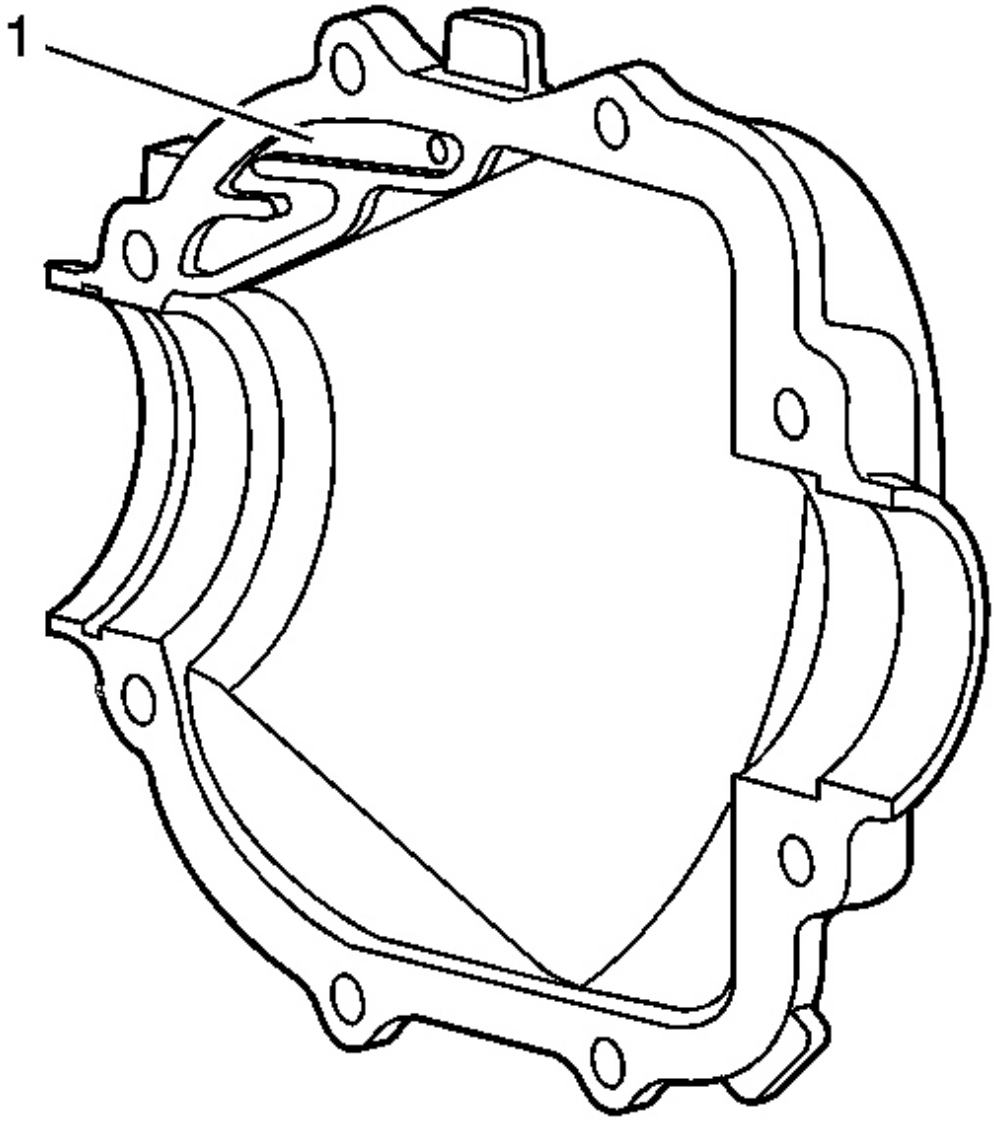


Fig. 135: Inspecting Vent Passage
Courtesy of GENERAL MOTORS CORP.

5. Clean and inspect the vent passage (1) in the rear cover.

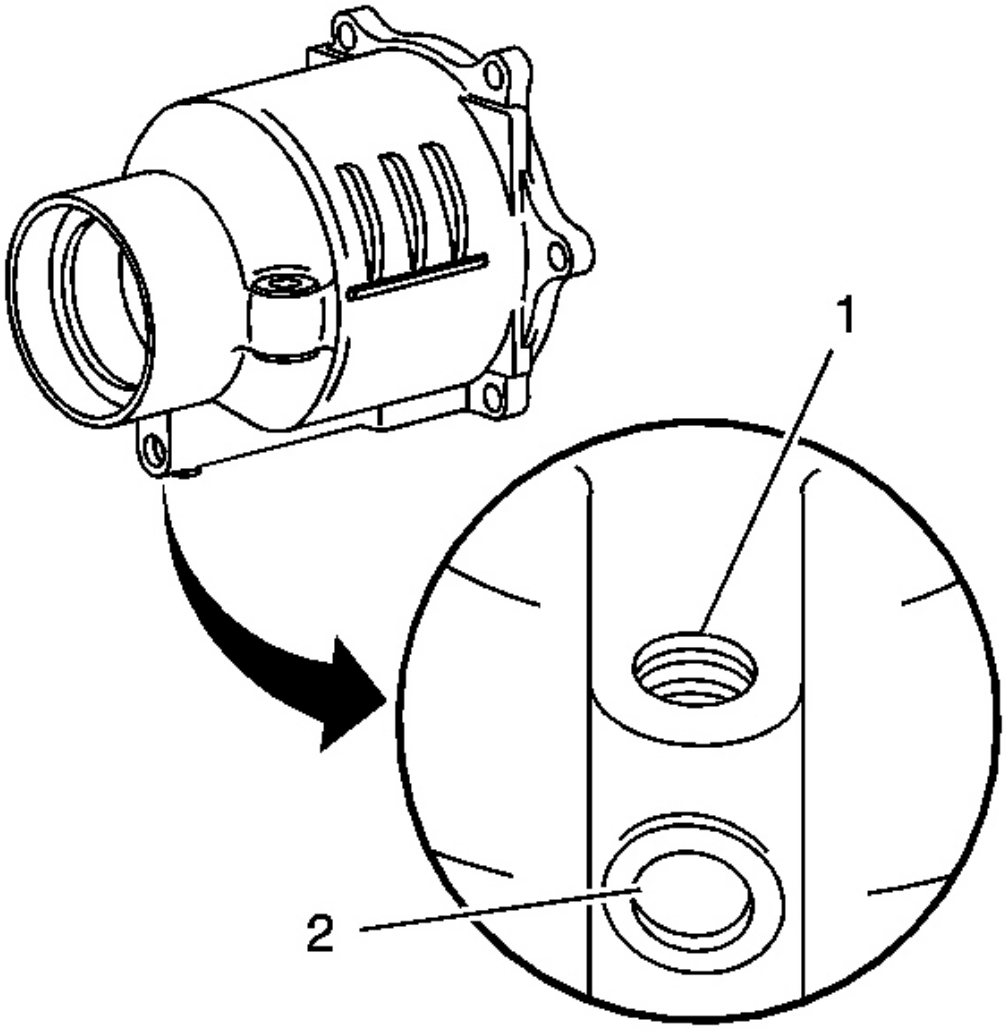


Fig. 136: Cleaning Drain Plug Threads & Check Welch Plug For Leakage, Rust Holes & Looseness
Courtesy of GENERAL MOTORS CORP.

6. Clean and inspect the drain plug threads (1), and check the welch plug (2) for leakage, rust holes and looseness.

Gears and Shafts

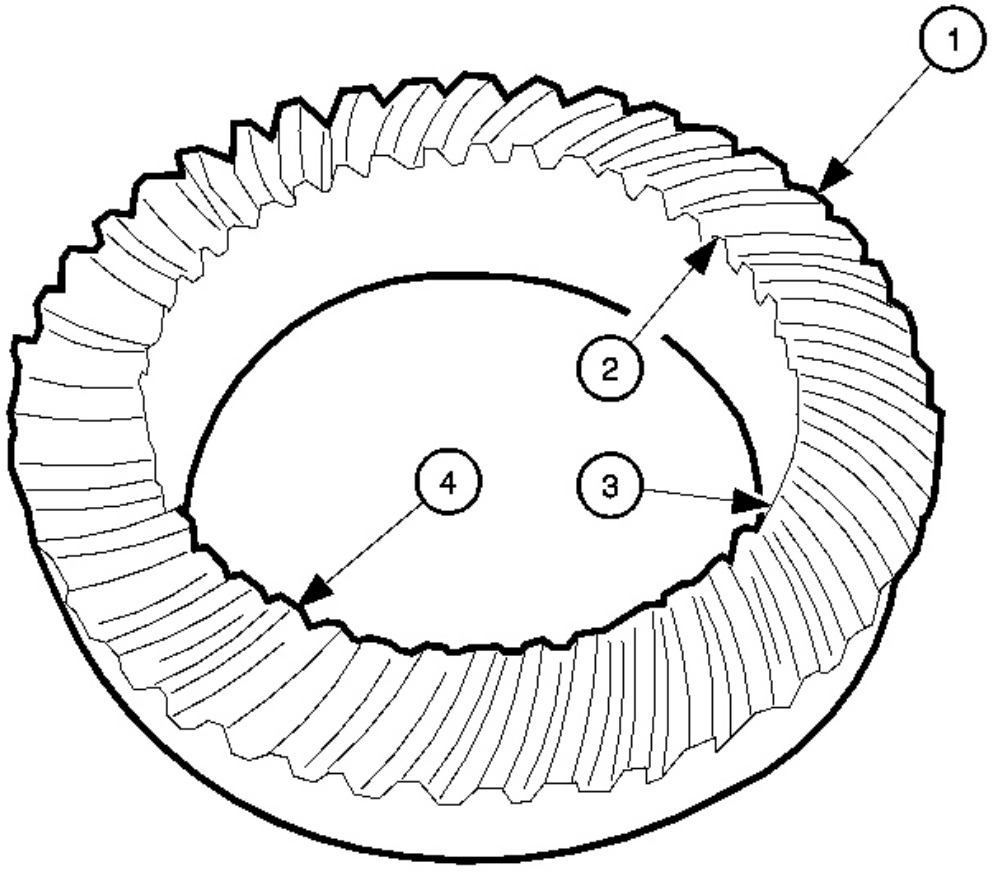


Fig. 137: Cleaning Gears & Shaft
Courtesy of GENERAL MOTORS CORP.

1. Clean the gears and shafts in solvent.
2. The ring gear and pinion must be inspected for proper wear pattern.
    - The end of the gear tooth farthest away from the center of the ring gear (1) is the heel end of the tooth.
    - The end of gear tooth nearest to the center of the ring gear (2) is the toe end of the tooth.
    - The side of the tooth that curves inward or is concave (3) is considered the coast side of the tooth.
    - The side of the tooth that curves outward or is convex (4) is considered the drive side of the tooth.

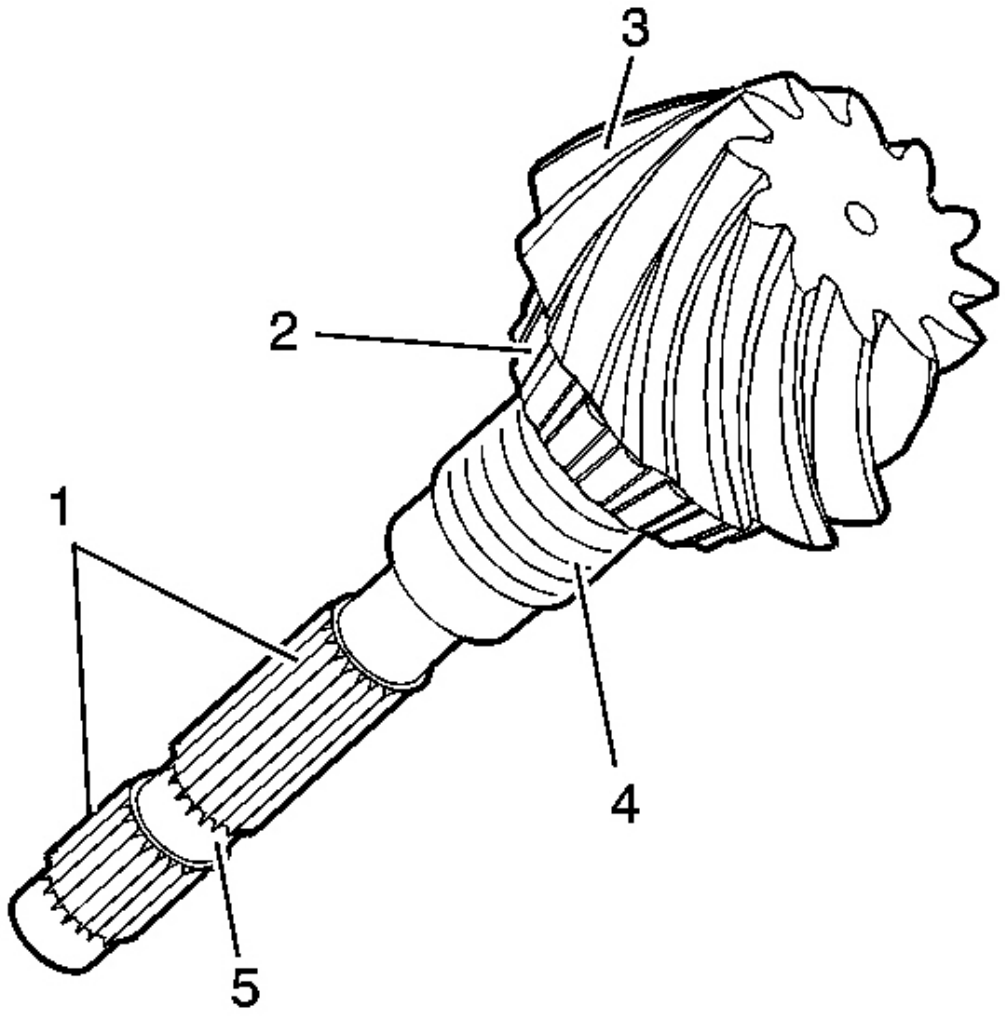


Fig. 138: Inspecting Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

3. Inspect the pinion shaft for the following:
    - Worn or damaged splines (1)
    - Worn bearings (2)
    - Wear, pitting, or discoloration by heat (3)
    - Damaged threads (4)
    - Worn or scored shaft (5)
4. Inspect the bearings for a bent bearing cage.

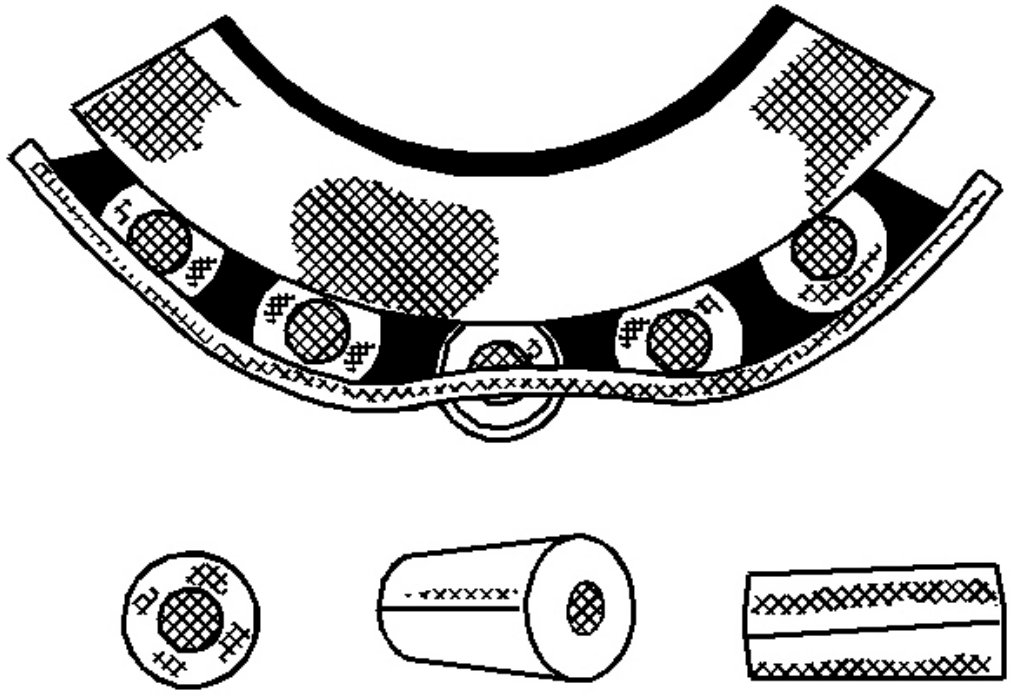


Fig. 139: Bent Cage
Courtesy of GENERAL MOTORS CORP.

1. Inspect the bearing rollers and races for the following:
    - Pitting
    - Scoring or grooves
    - Excessive wear or other damage

IMPORTANT: Bearing races with any sign of heat discoloration must be replaced.

2. Inspect the bearing rollers and races for heat discoloration. Heat discoloration ranges from a faint yellow to a dark blue color. This discoloration may result from an overload or improper lubrication. Excessive heat causes softening of the rollers and races.

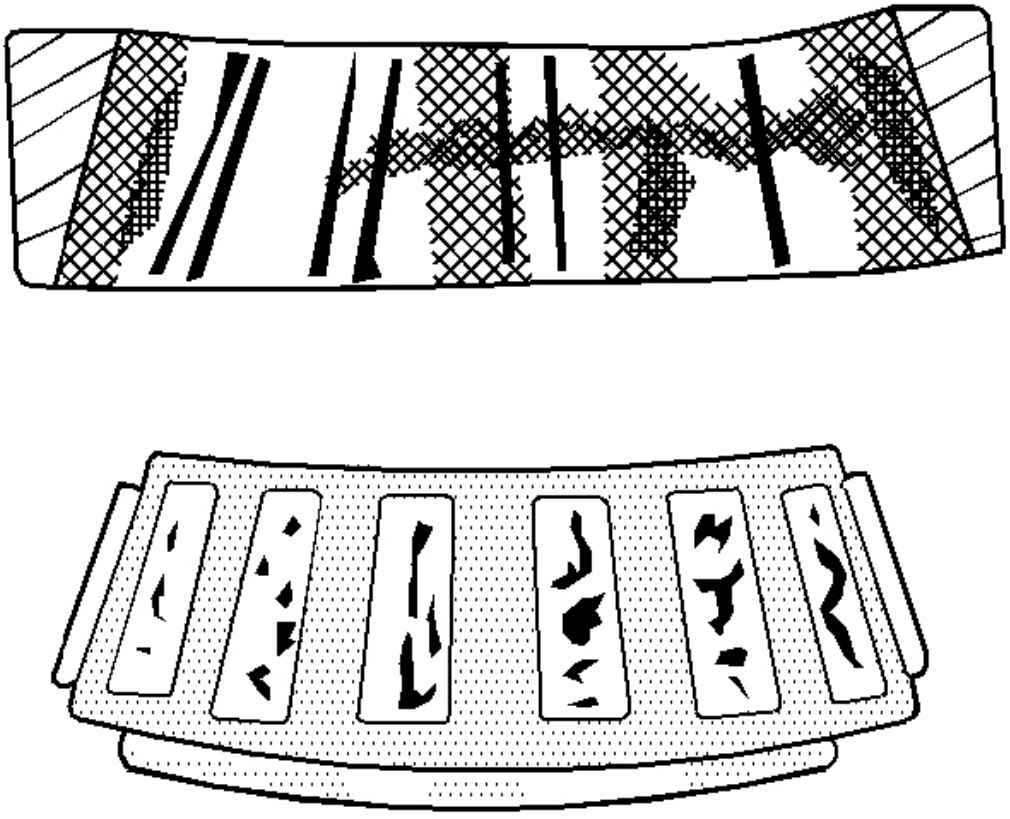


Fig. 140: Fatigue Spalling
Courtesy of GENERAL MOTORS CORP.

1. Inspect the bearing rollers and races for the following:
    - Pitting
    - Scoring or grooves
    - Excessive wear or other damage

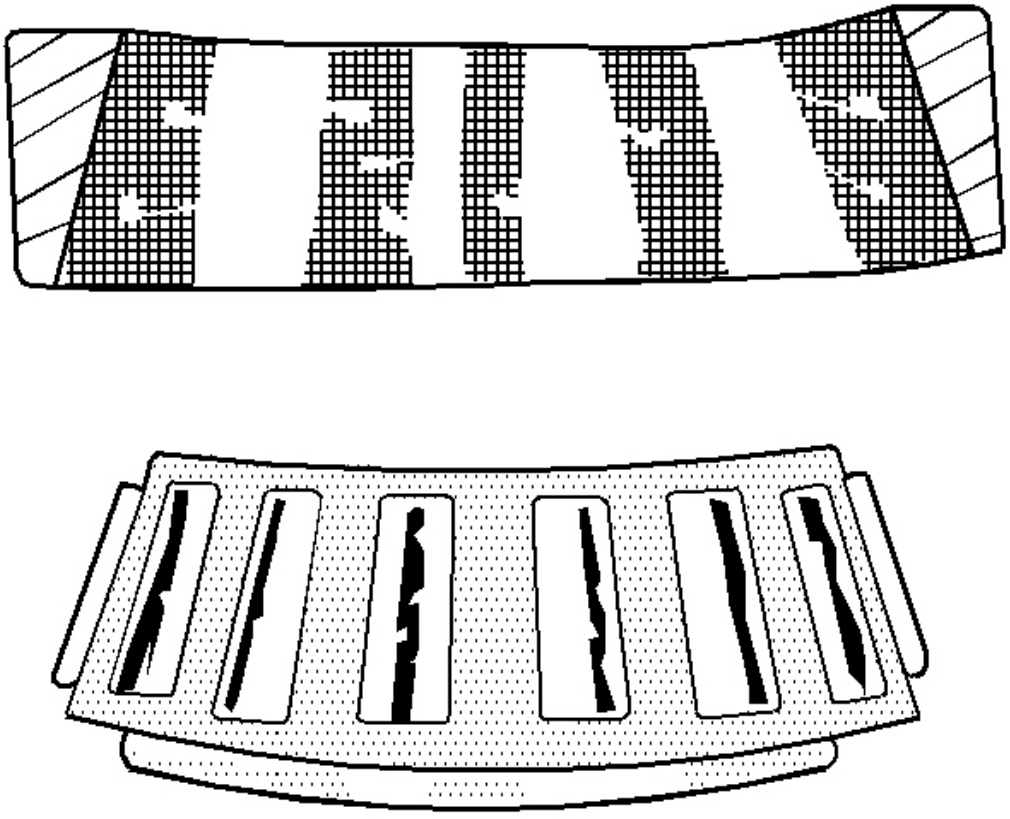


Fig. 141: Damaged Areas
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Bearing races with a sign of hear discoloration must be replaced.

2. Inspect the bearing rollers and races for heat discoloration. Heat discoloration ranges from a faint yellow to a dark blue color. This discoloration may result from an overload or improper lubrication. Excessive heat causes softening of the rollers and races.

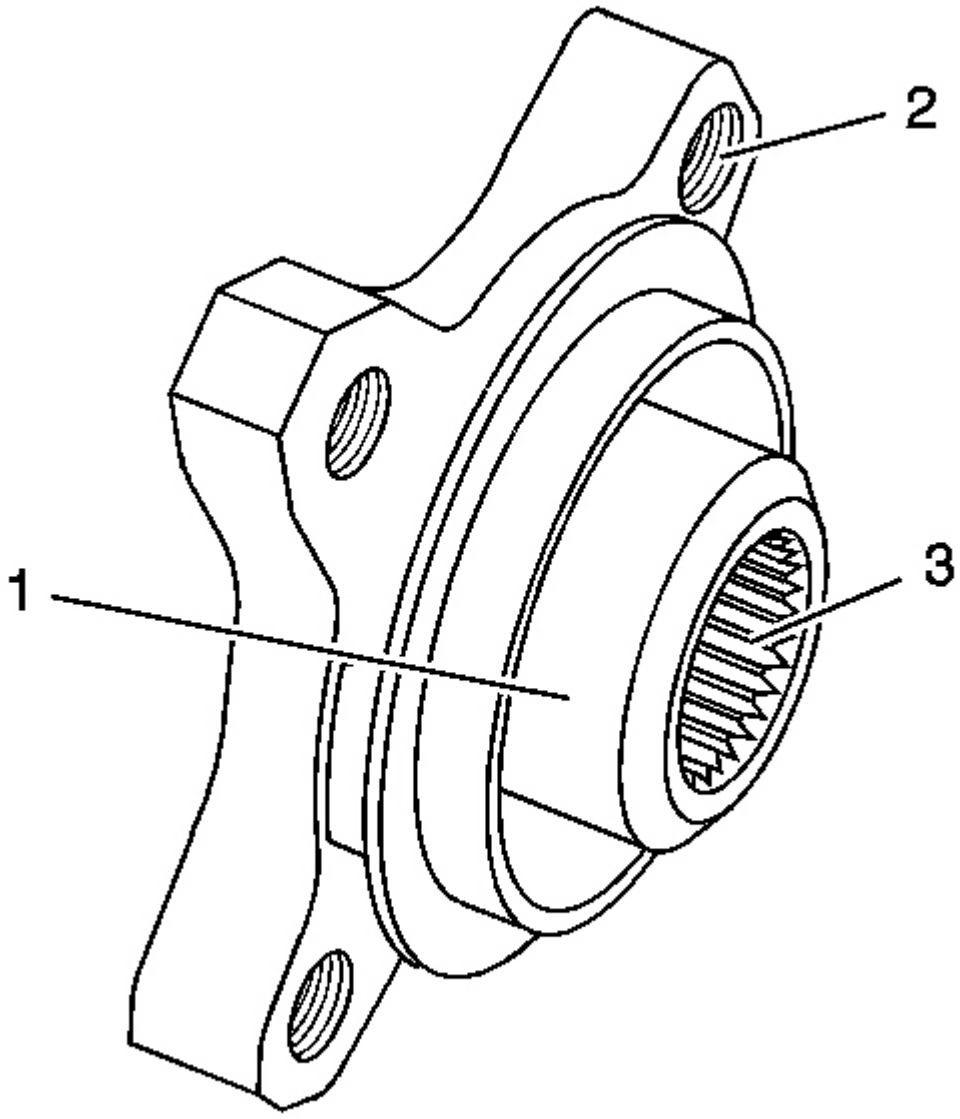


Fig. 142: Inspecting Pinion Flange Sealing Surface
Courtesy of GENERAL MOTORS CORP.

3. Inspect the pinion flange sealing surface (1) for wear, damaged bolt threads (2) and worn or damaged splines (3).

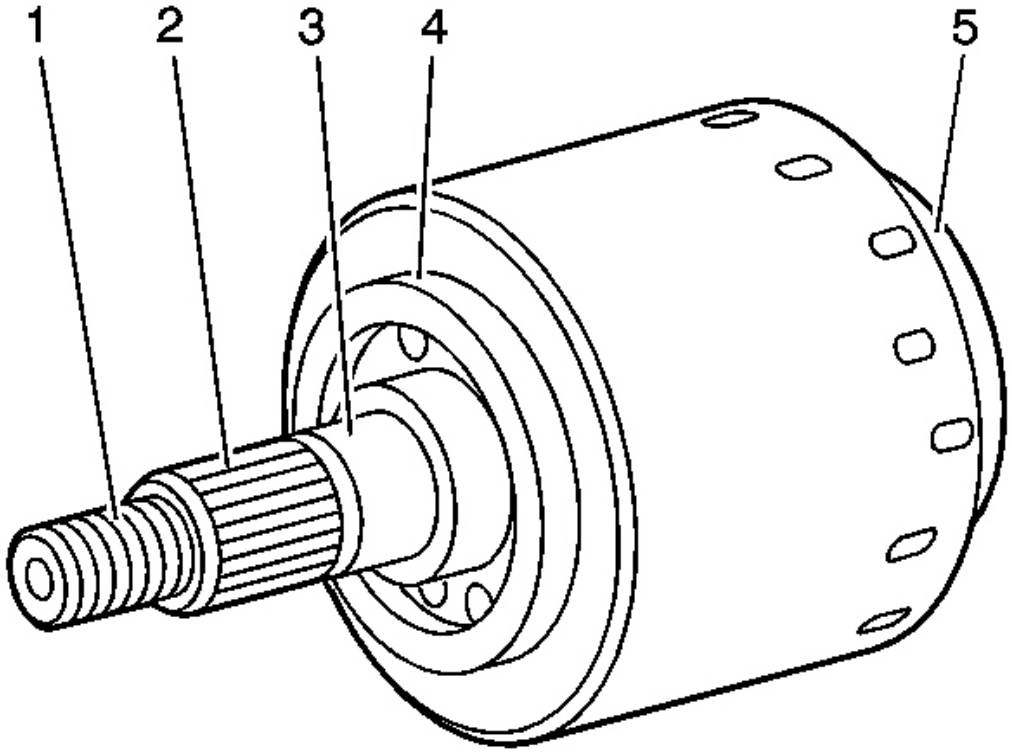


Fig. 143: View Of Clutch Drum
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not submerge the clutch drum in solvent. This will damage friction material and gerotor pump.

IMPORTANT: The clutch drum is not serviceable. If inoperative conditions are found, replace the unit.

4. Wipe with a clean lint free towel and inspect the following:
    - The pinion nut threads (1)
    - The pinion splines (2)
    - The bearing surface (3)
    - The front sealing surface (4)
    - The rear sealing surface (5)

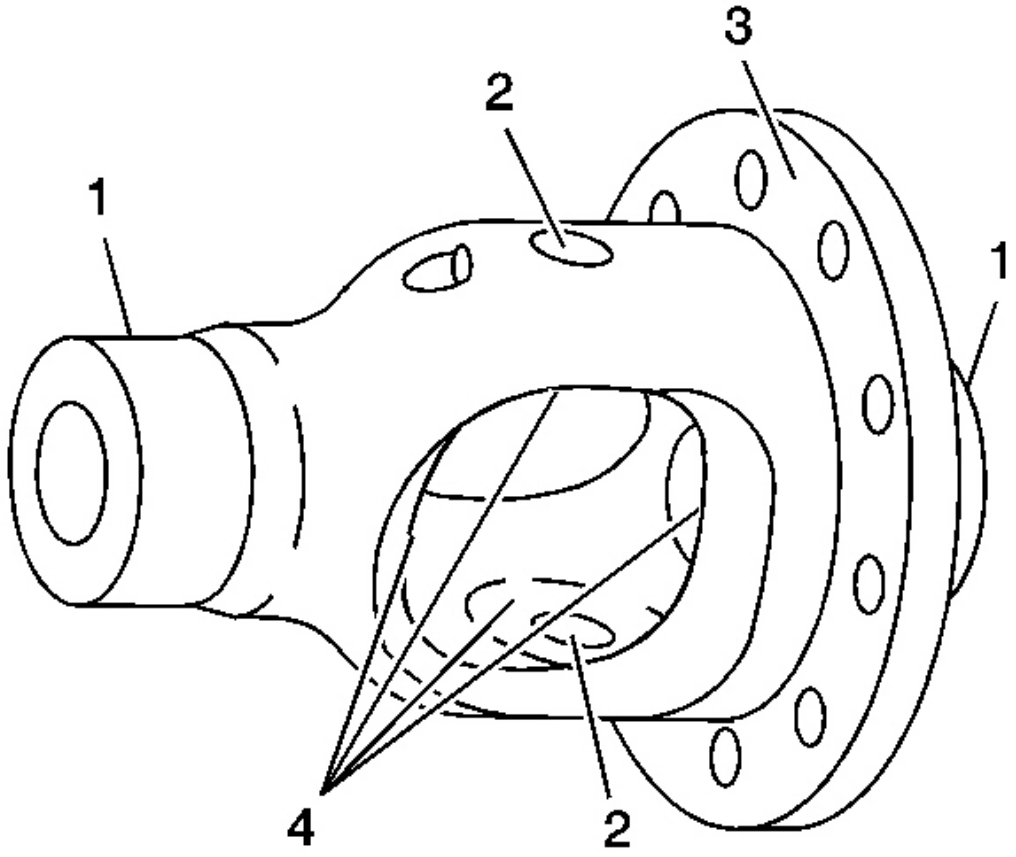


Fig. 144: Replacing Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

5. Clean the differential case in solvent.
6. Inspect the following for cracking or scoring.
    - The side bearing mounting surfaces (1)
    - The differential pin bores (2)
    - The ring gear mounting surfaces (3)
    - The side and pinion gear thrust washer 7/16 surfaces (4)
7. Replace the differential carrier assembly as necessary.

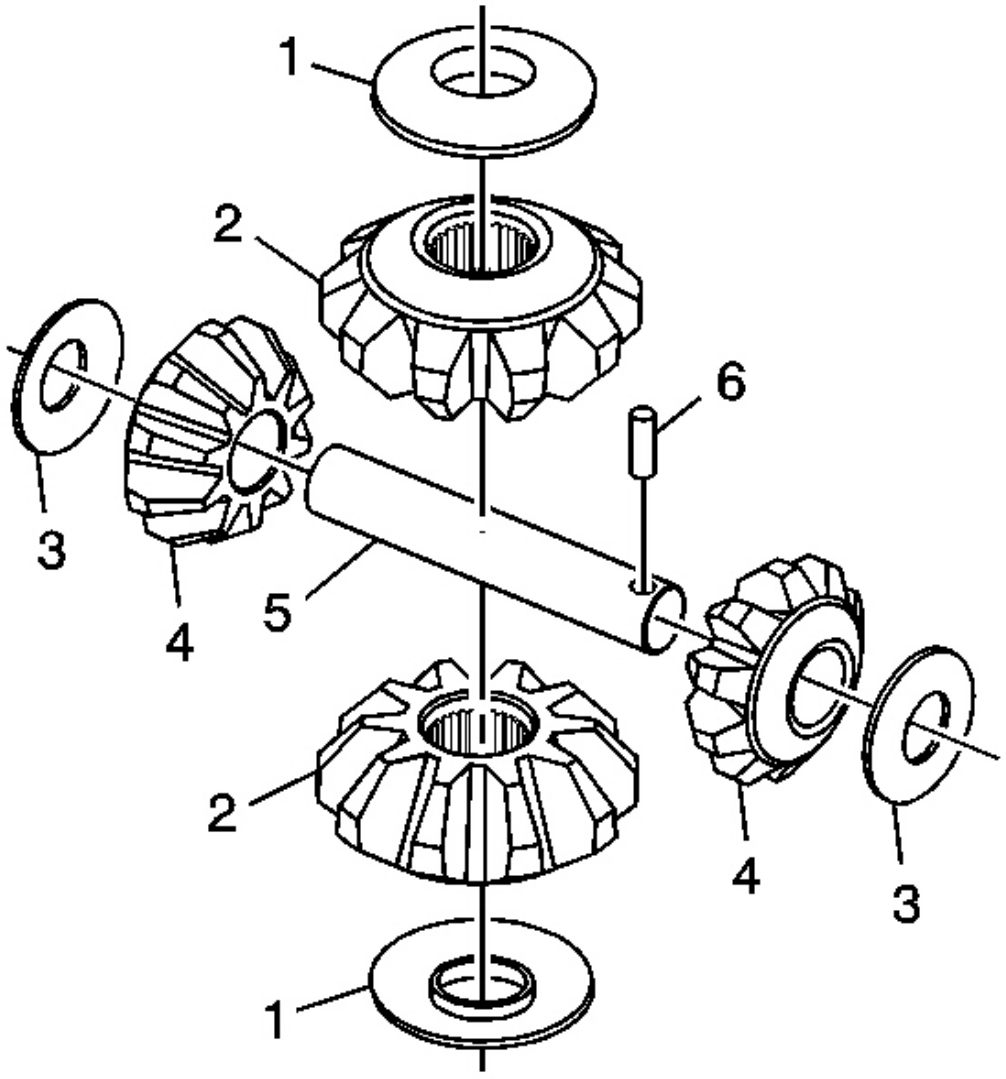


Fig. 145: Cleaning Parts In Solvent
Courtesy of GENERAL MOTORS CORP.

8. Clean the following parts in solvent.
9. Inspect the following for scoring, pitted teeth and cracks:
    - Side gear thrust washers (1)
    - Side gears (2)
    - Pinion gear thrust washers (3)

- Pinion gears (4)
- Pinion shaft pin (5)
- Lock pin (6)

DIFFERENTIAL HOUSING SUPPORT BUSHING REPLACEMENT

Tools Required

J 44866 Support Bushing Remover/Installer. See **Special Tools and Equipment** .

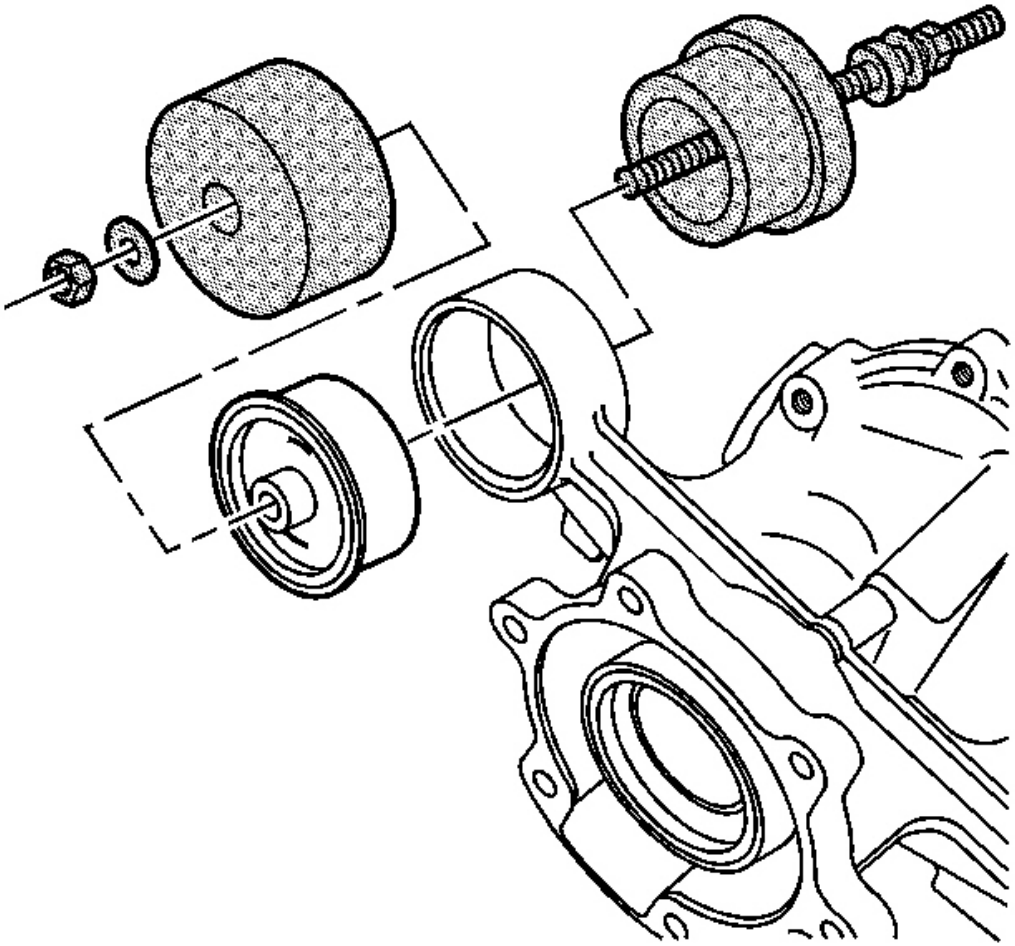


Fig. 146: Removing Bushing If Damaged or Worn Out
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Remove the bushing only if damaged or worn out.

IMPORTANT: Use the high pressure lube supplied with the tool.

1. Install **J 44866** . See **Special Tools and Equipment** . Tighten the nuts in order to force out the bushing.

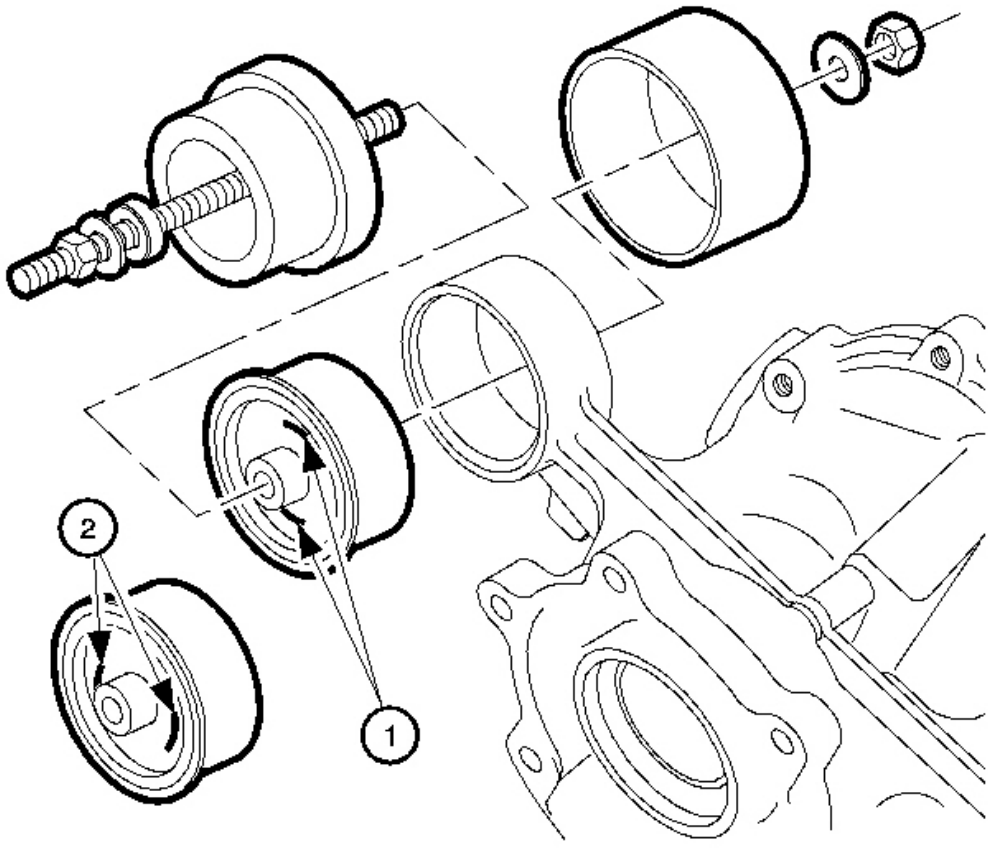


Fig. 147: Installing J44866
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The bushing has 2 slots molded into the rubber section. The slots are used to control vibration and must be installed in the following positions:

- **4-Cylinder Vehicles - Align the slots in the 3 o'clock and 9 o'clock position (2).**
- **6-Cylinder Vehicles - Align the slots in the 6 o'clock and 12 o'clock position (1).**

2. Install **J 44866** . See **Special Tools and Equipment** . Tighten the nuts in order to force the bushing in.

DRIVE PINION SHIM SELECTION

- **J 35664** Pinion Shaft Bearing Installer. See **Special Tools and Equipment** .
- **J 44856** Pinion Depth Shim Selector. See **Special Tools and Equipment** .
- **J 44861** Pinion Inner Bearing Race Installer. See **Special Tools and Equipment** .
- **J 44864** Pinion Nut Wrench. See **Special Tools and Equipment** .
- **J 44865** Spline Socket. See **Special Tools and Equipment** .
- **J 44869** Assembly Holding Fixture. See **Special Tools and Equipment** .

NOTE: Inspect the press bar surface. Do not press the housing against a rough surface. Sealing surfaces could be damaged.

1. Using the axle lube, lightly lubricate the bearing cup. Place **J 44861** inside the race. See **Special Tools and Equipment** . Using a press, install the race.

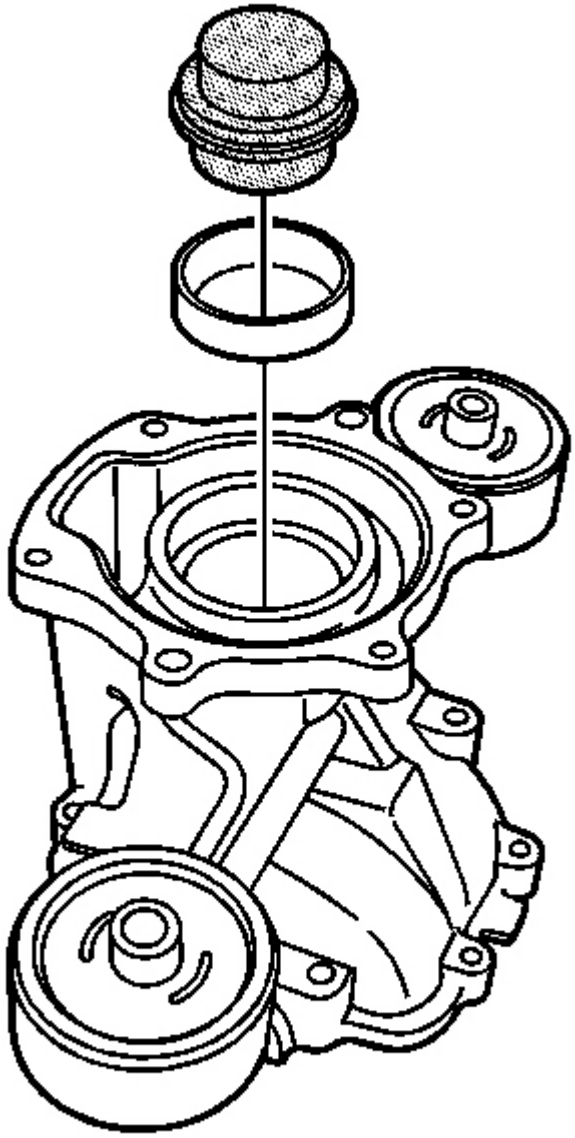


Fig. 148: View Of Drive Pinion Shim
Courtesy of GENERAL MOTORS CORP.

2. Inspect the race to ensure it is properly seated.

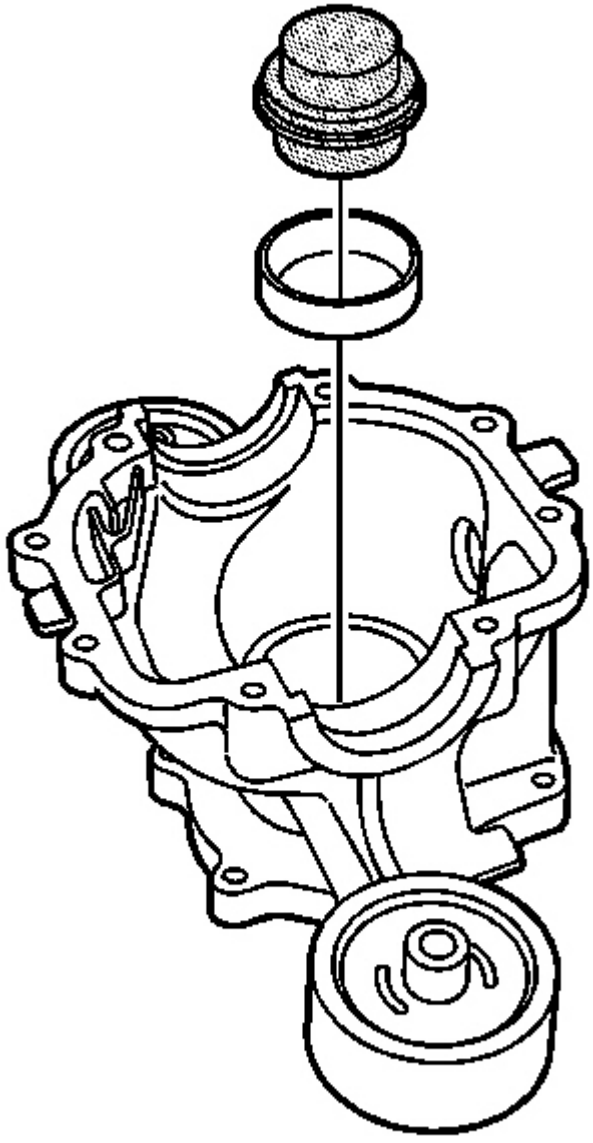


Fig. 149: Placing J44861 Inside The Race
Courtesy of GENERAL MOTORS CORP.

NOTE: If dowel pins are still in the housing, remove them before pressing. Pressing on dowels will damage the housing.

3. Using the axle lube, lightly lubricate the bearing race. Place **J 44861** inside the race. See **Special Tools**

and Equipment . Using a press, install the race.

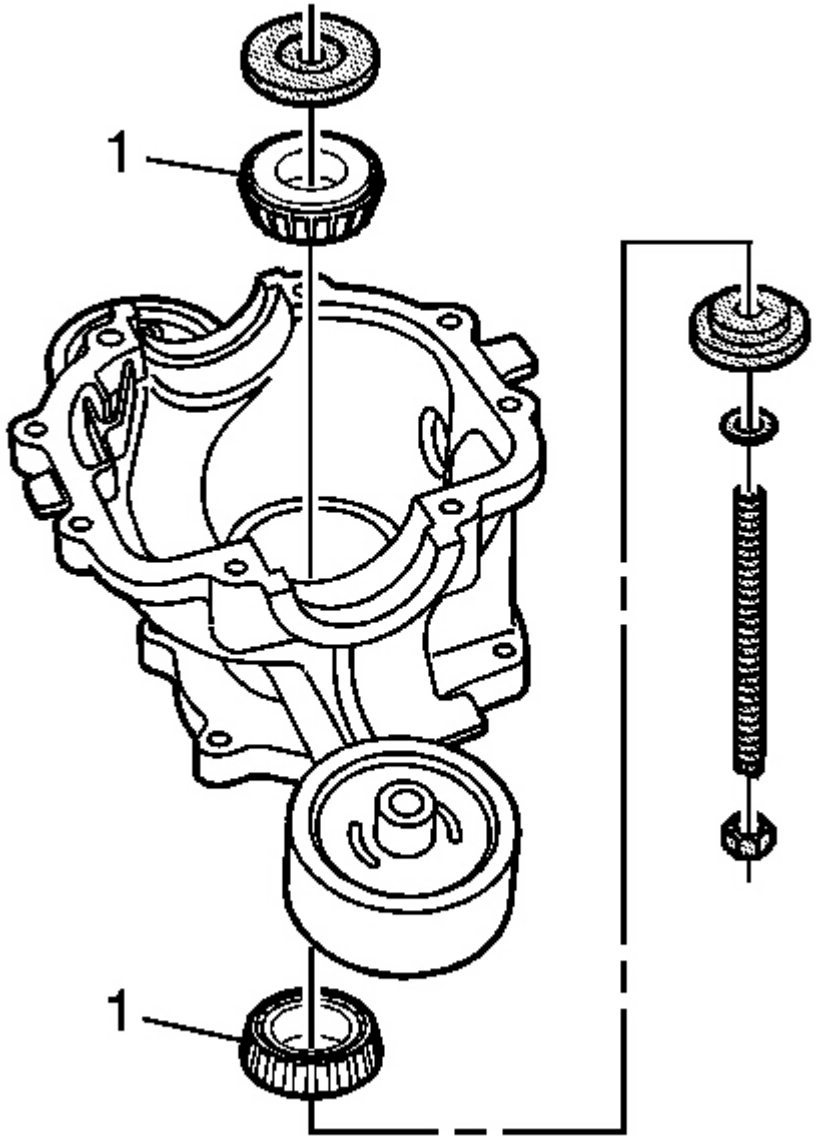


Fig. 150: Installing J44856-2
Courtesy of GENERAL MOTORS CORP.

4. Install **J 44856-2** ,. See **Special Tools and Equipment** .**J 44856-3** and. See **Special Tools and Equipment** .**J 44856-4** on the pinion bearings (1) as shown. See **Special Tools and Equipment** .

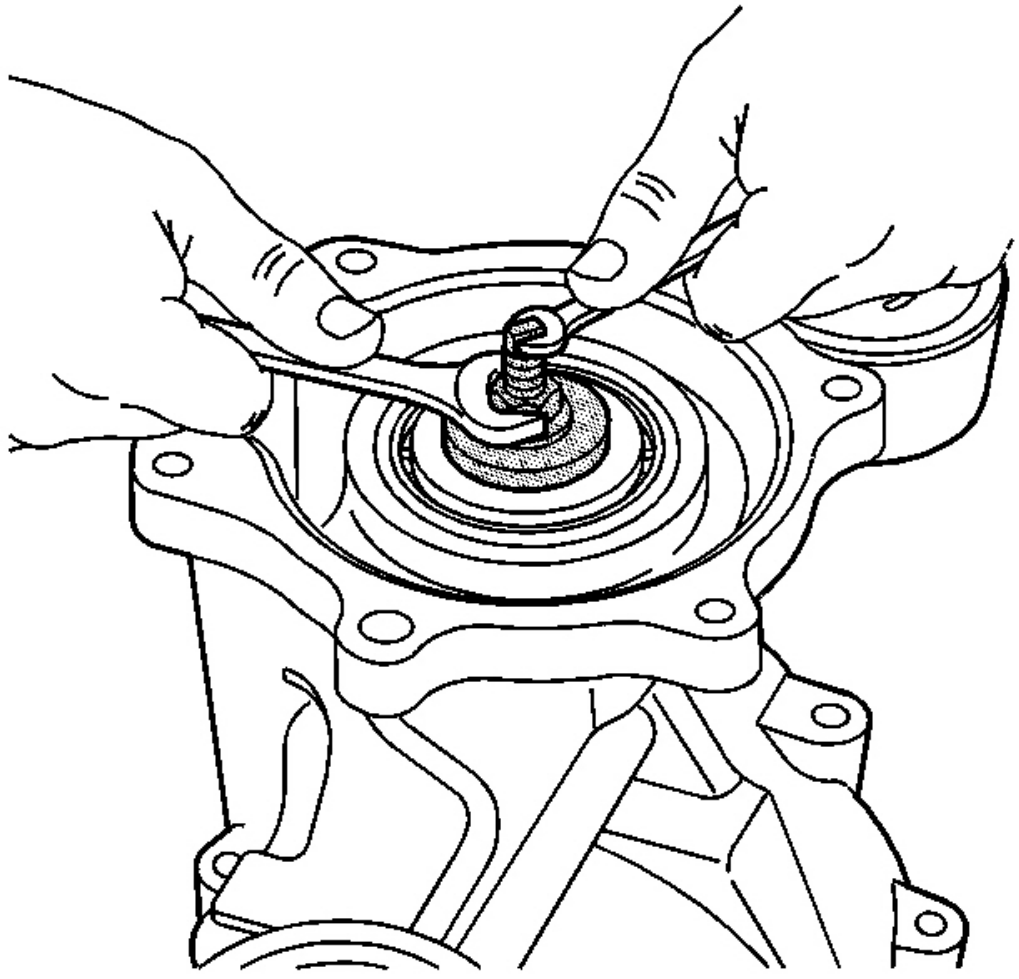


Fig. 151: Holding Shaft & Tighten
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: Lightly lubricate the bearing rollers with the axle lube.

5. Hold the shaft and tighten.

   Tighten: Tighten the shaft nut to 1.7 N.m (15 lb in) rolling torque.

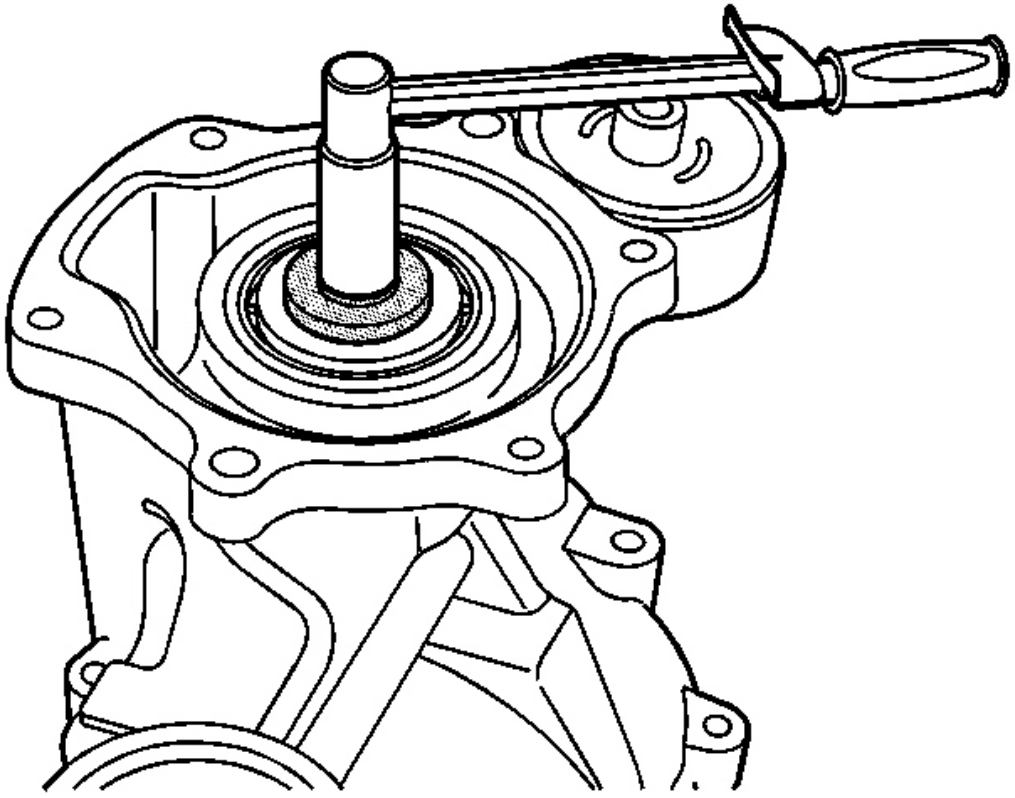


Fig. 152: Rotating Stud Assembly While Inspecting Rolling Torque
Courtesy of GENERAL MOTORS CORP.

6. Rotate the stud assembly while inspecting the rolling torque.

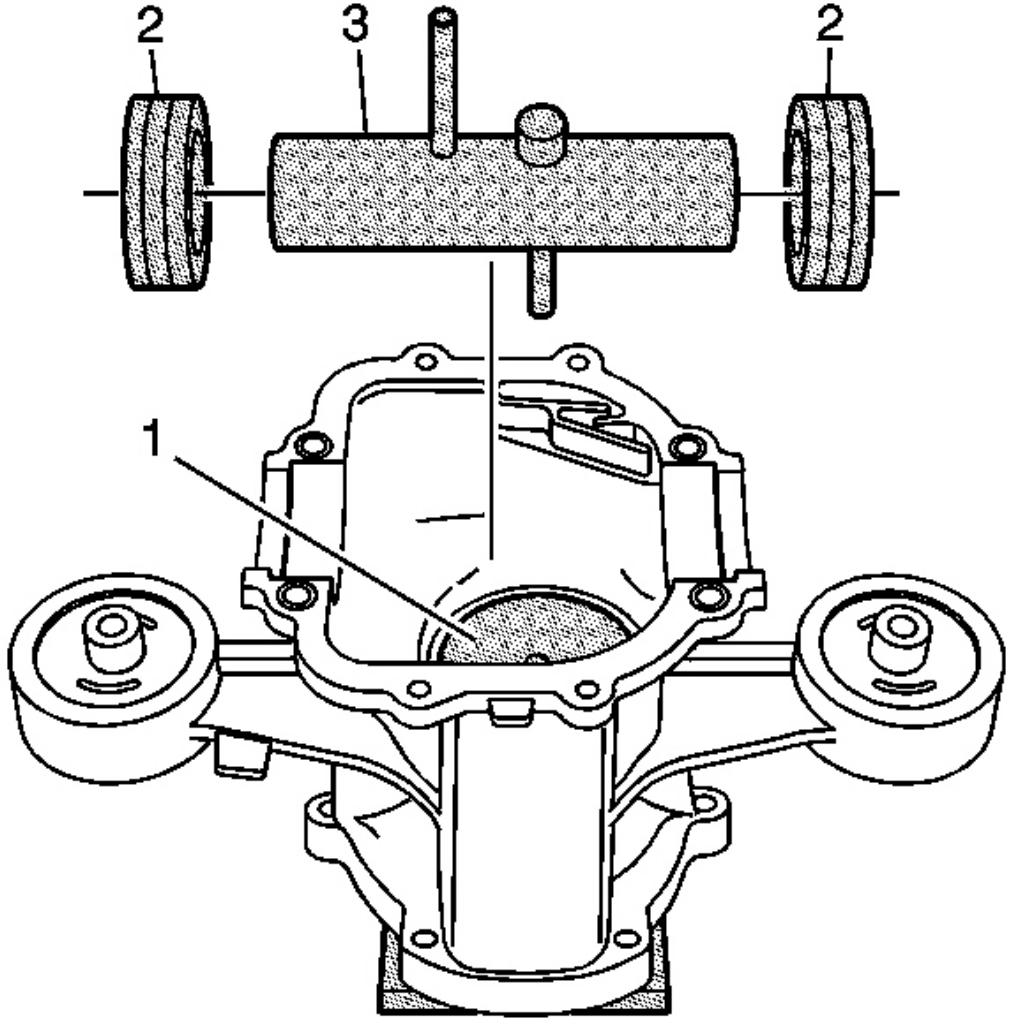


Fig. 153: Installing J44856-5
Courtesy of GENERAL MOTORS CORP.

7. Turn the housing over so that **J 44856-3** (1) is up. See **Special Tools and Equipment** .
8. Install **J 44856-5** (2) See **Special Tools and Equipment** .**J 44856-1** (3) and place it in the differential bearing bores. See **Special Tools and Equipment** .

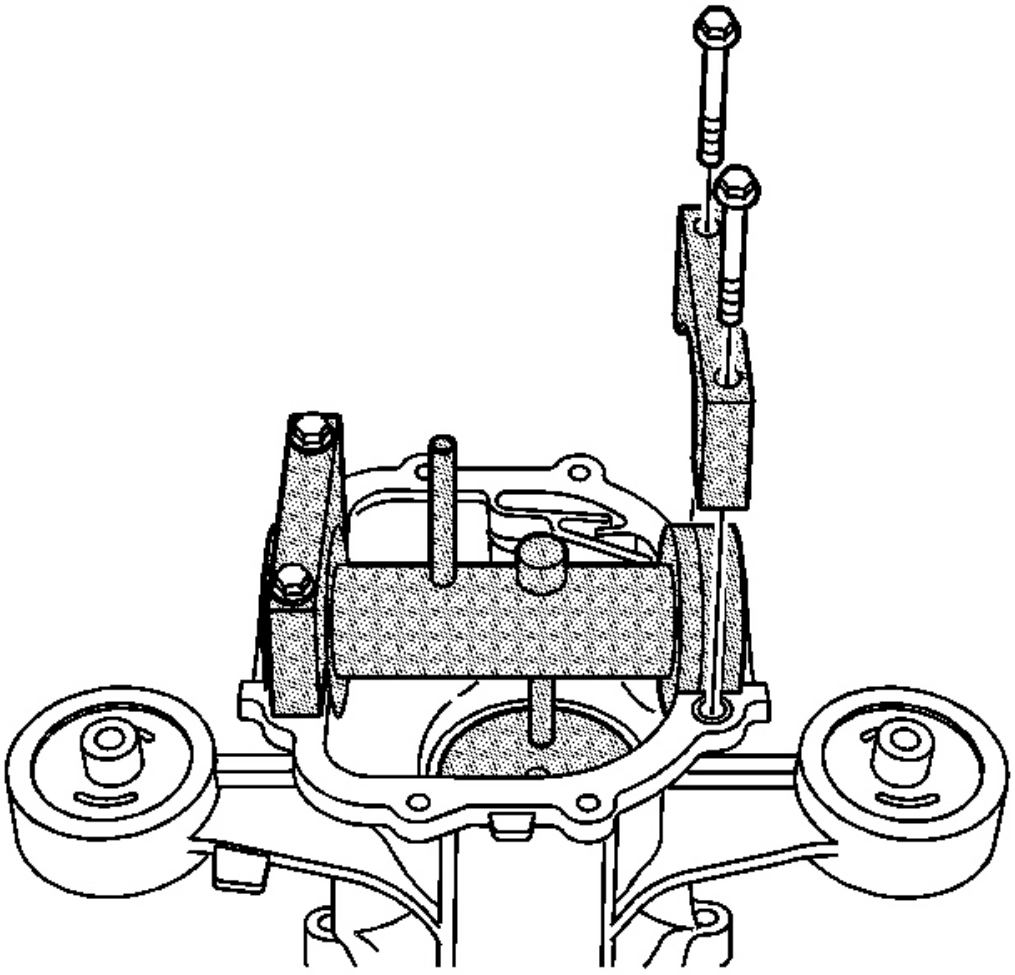


Fig. 154: Installing J44856-9 Over The Master Bearings
Courtesy of GENERAL MOTORS CORP.

9. Install the **J 44856-9** over the master bearings using 2 (M10) rear cover bolts and snug tighten the bolts. See **Special Tools and Equipment** .

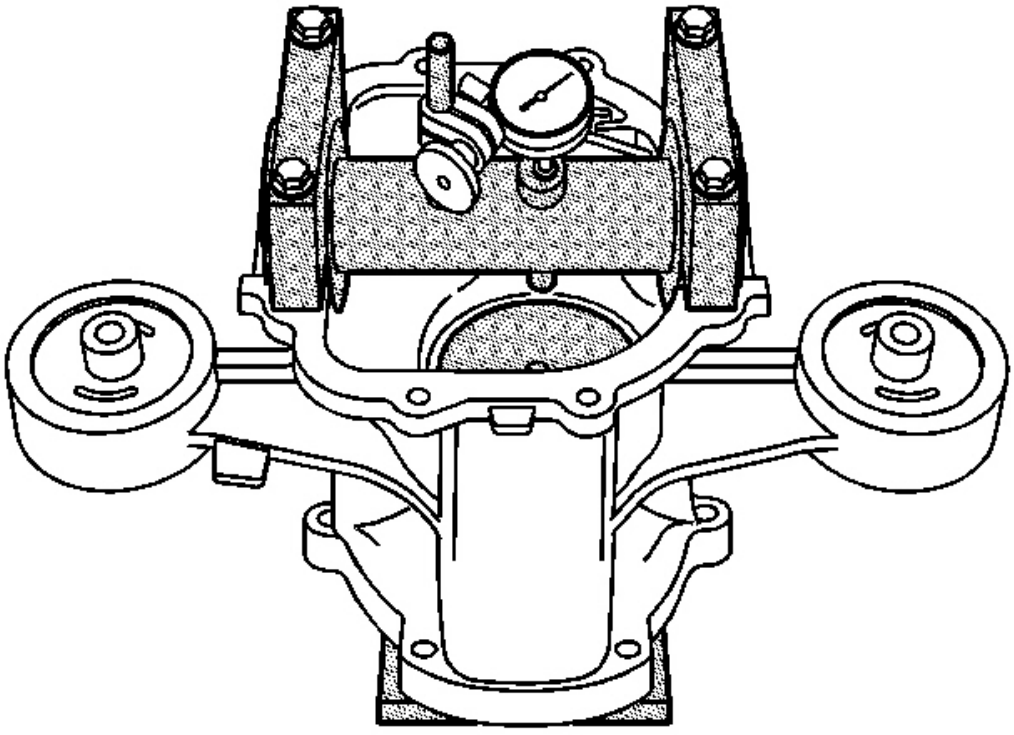


Fig. 155: Installing Dial Indicator On The Arbor Post
Courtesy of GENERAL MOTORS CORP.

10. Install the dial indicator on the arbor post.
11. Rotate **J 44856-1** so that the gage pin is not in contact with the. See **Special Tools and Equipment** .**J 44856-3** and zero the dial indicator. See **Special Tools and Equipment** .

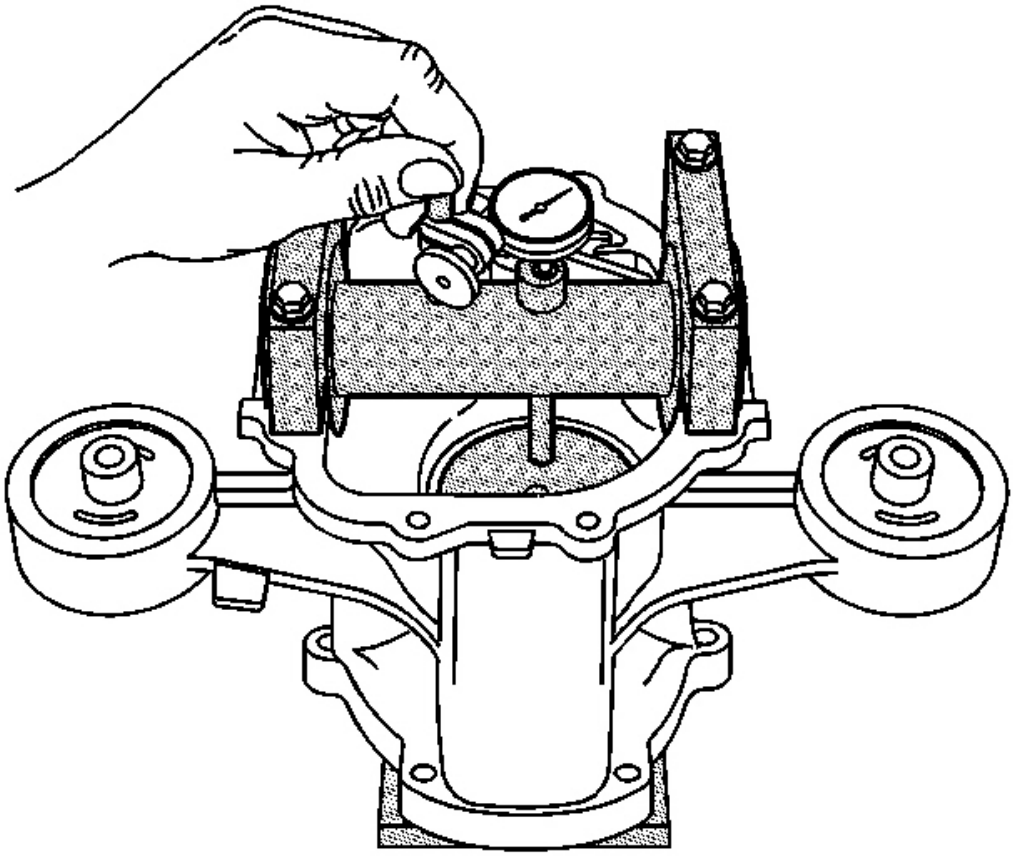


Fig. 156: Lifting Gage Pin & Rotate
Courtesy of GENERAL MOTORS CORP.

12. Lift the gage pin and rotate **J 44856-1** . See **Special Tools and Equipment** . Drop the gage pin onto **J 44856-3** . See **Special Tools and Equipment** .
13. Rock the arbor back and forth slightly and record the maximum reading from the dial indicator.

    Subtract this measurement from 2.54 mm (0.100 in). This equals the shim thickness.

14. Remove the pinion shimming tools.

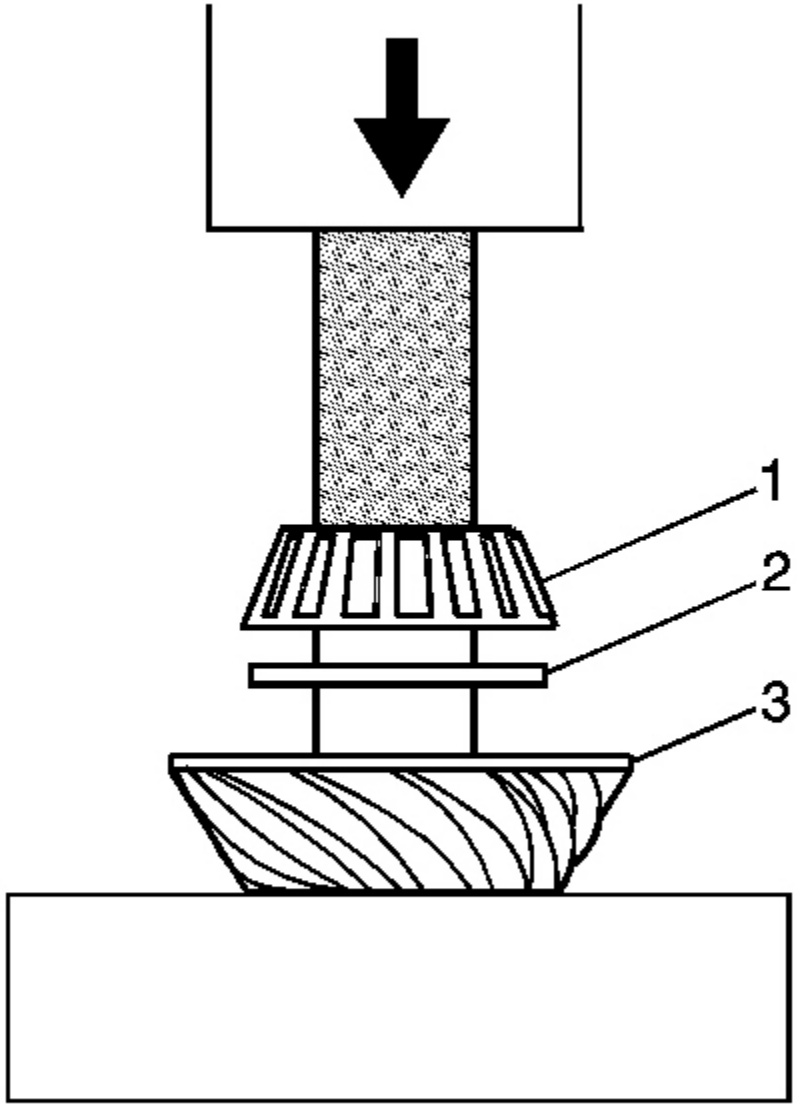


Fig. 157: Using J35664 Position Pinion Shaft Into A Press
Courtesy of GENERAL MOTORS CORP.

15. Using **J 35664** , position the pinion shaft (3) into a press. See **Special Tools and Equipment** . Install the determined shim (2) and bearing (1) on the shaft.

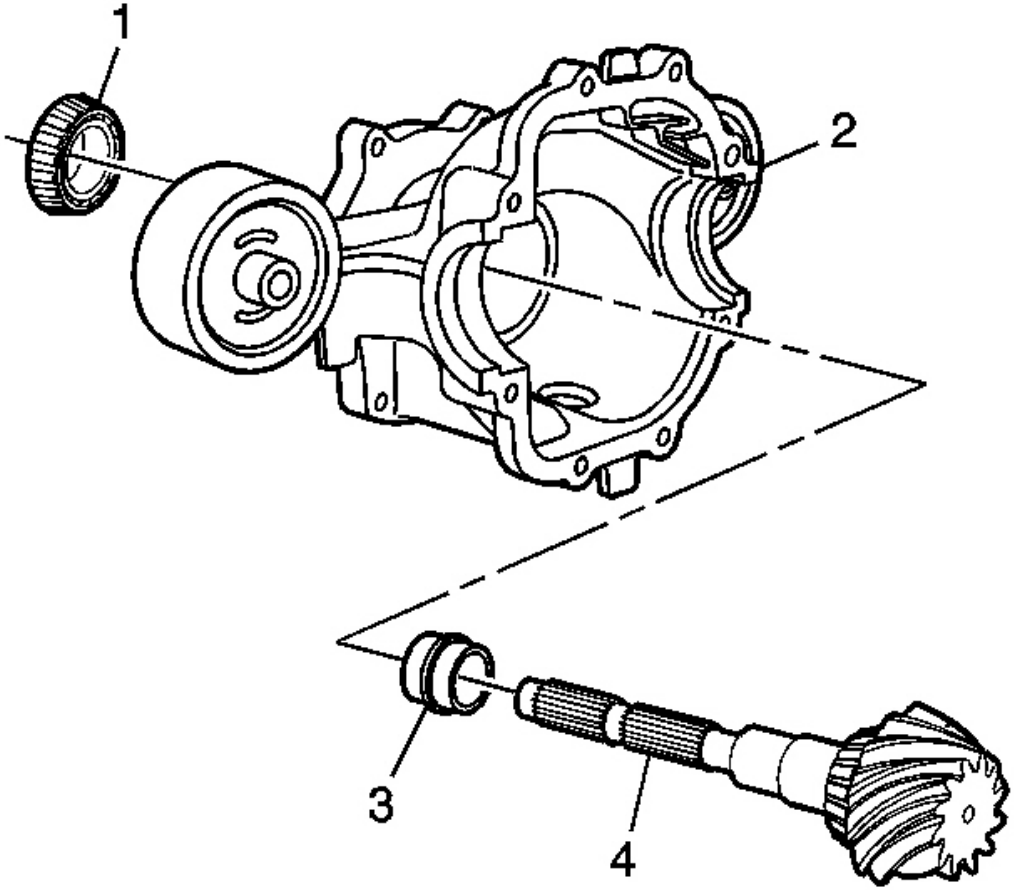


Fig. 158: Installing Pinion Shaft, Collapsible Spacer & Bearing
Courtesy of GENERAL MOTORS CORP.

16. Install the pinion shaft (4), the new collapsible spacer (3), and the bearing (1) into the differential housing (2).

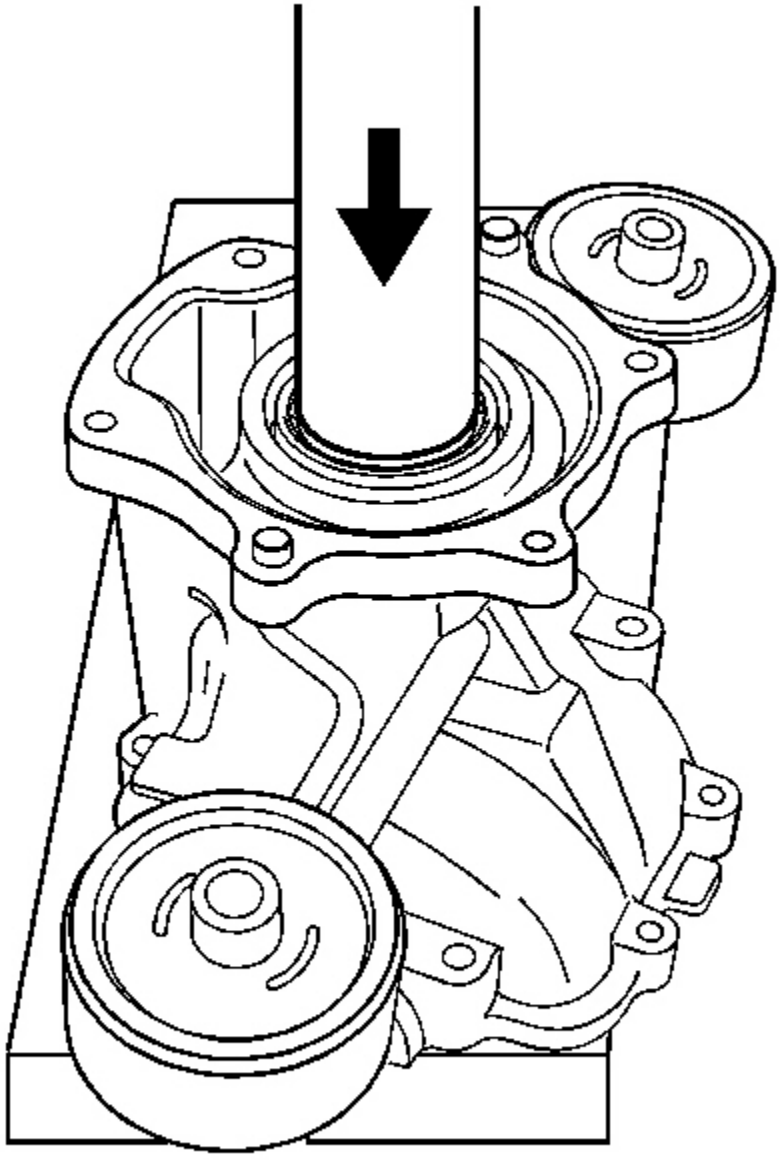


Fig. 159: Installing Differential Housing On J35664
Courtesy of GENERAL MOTORS CORP.

NOTE: **Do not over-press the bearing on the shaft. This could pre-crush the collapsible spacer.**

IMPORTANT: The rear face of the pinion shaft must be supported in order to install the pinion shaft and bearing.

17. Position the pinion shaft and the differential housing into a press in order to press the bearing on the shaft using **J 35664** . See **Special Tools and Equipment** .

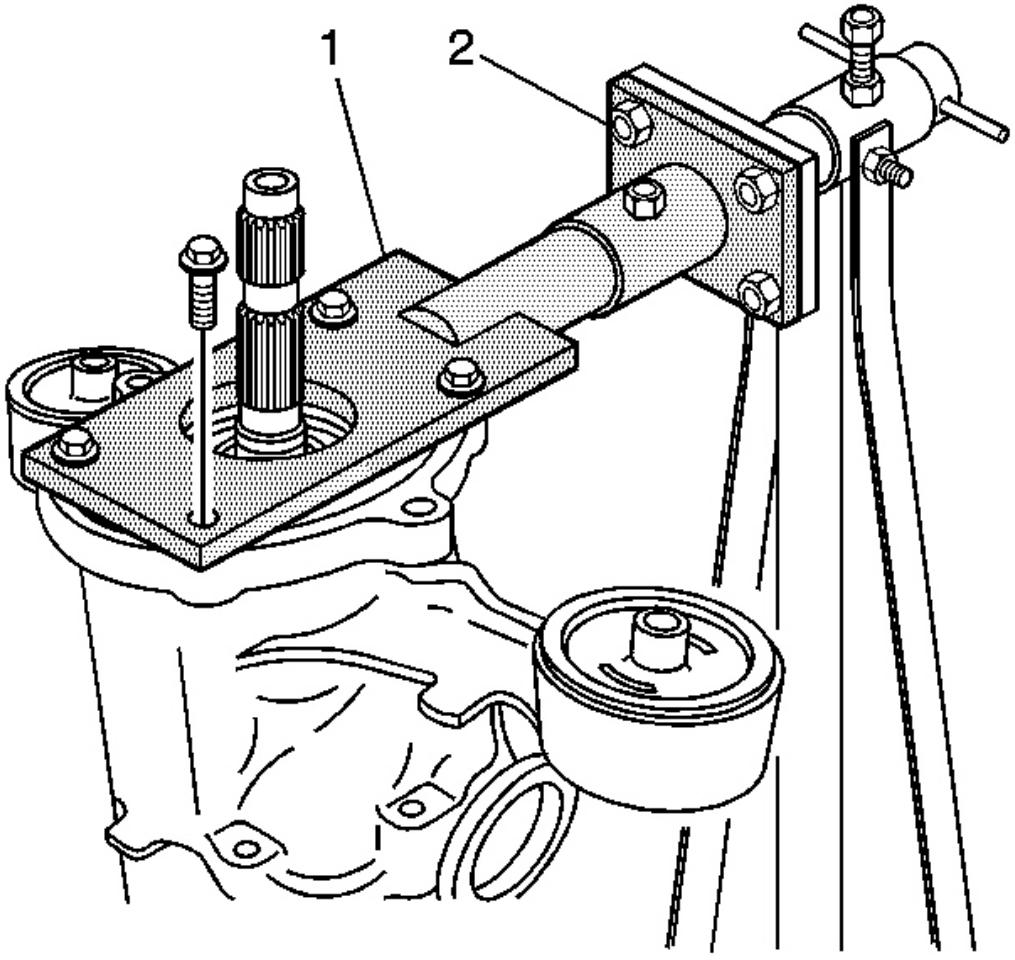


Fig. 160: Installing Differential Housing On J44869 Using 4 Clutch Cover Bolts
Courtesy of GENERAL MOTORS CORP.

18. Install the differential housing on the **J 44869** using 4 clutch cover bolts (1). See **Special Tools and Equipment** .

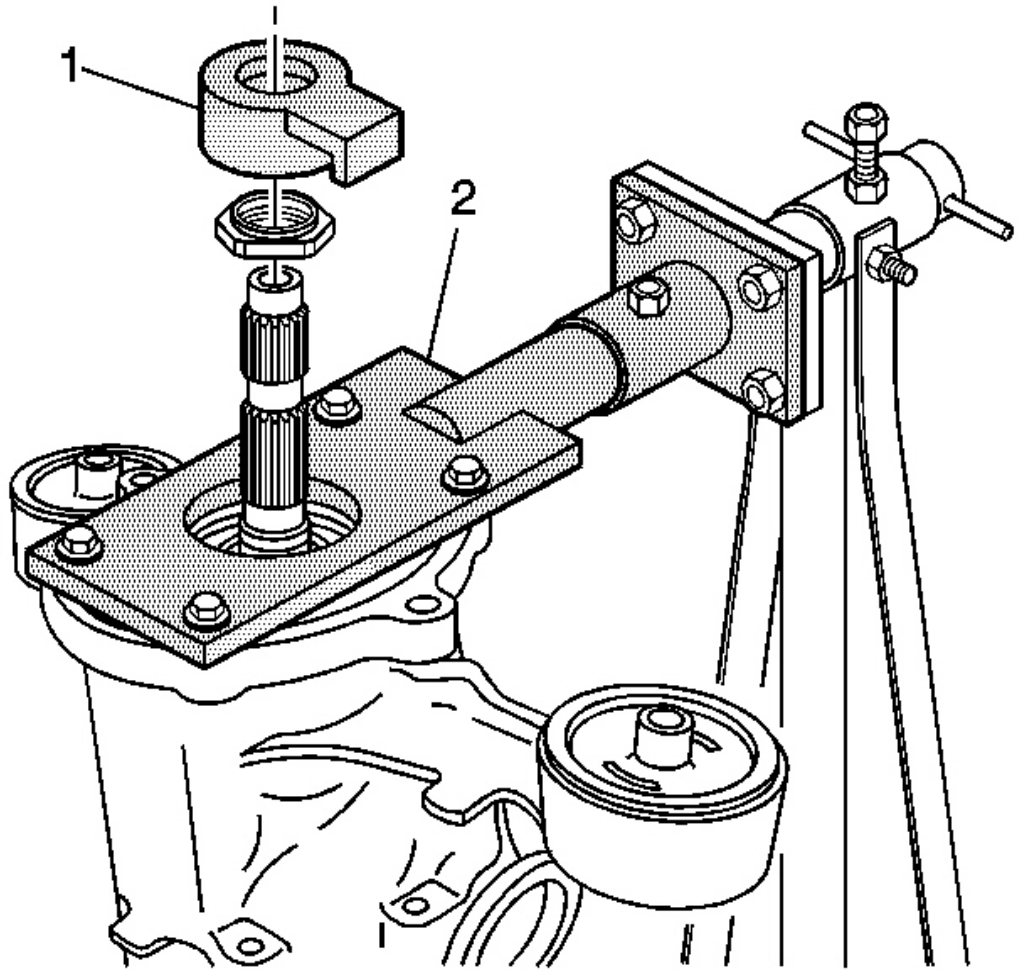


Fig. 161: Removing/Installing Pinion Nut On The Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The pinion nut is left-hand threaded.

19. Install a new pinion nut on the pinion shaft. Place the **J 44864** (1) over the pinion shaft (1). See **Special Tools and Equipment** . Turn the pinion shaft by hand to align the hex nut and the **J 44864** to the flats of the. See **Special Tools and Equipment** .**J 44869** (2). See **Special Tools and Equipment** .

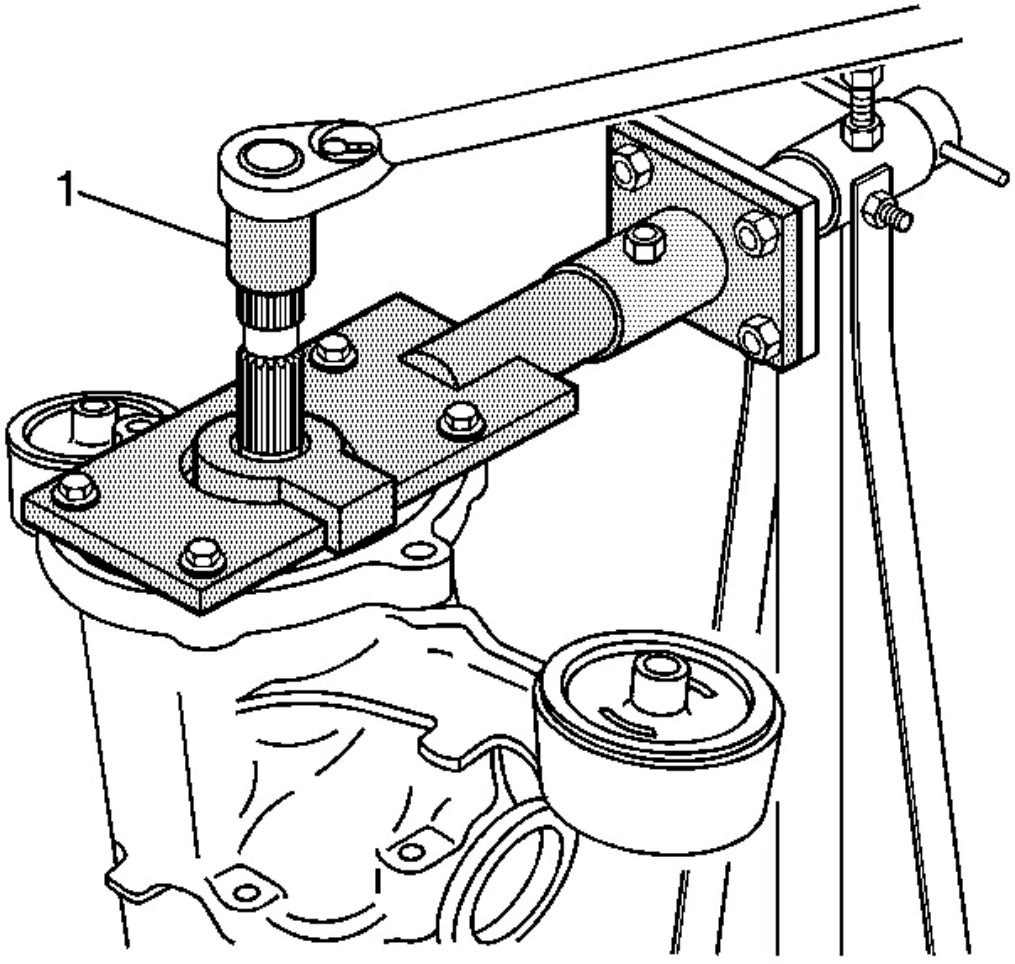


Fig. 162: Placing J44865 & Breaker Bar Over The Pinion Splines
Courtesy of GENERAL MOTORS CORP.

20. Place **J 44865** (1) and the breaker bar over the splines on the pinion shaft. See **Special Tools and Equipment** .
21. Tighten the nut in the left-handed direction in small increments, as needed, to apply bearing preload.

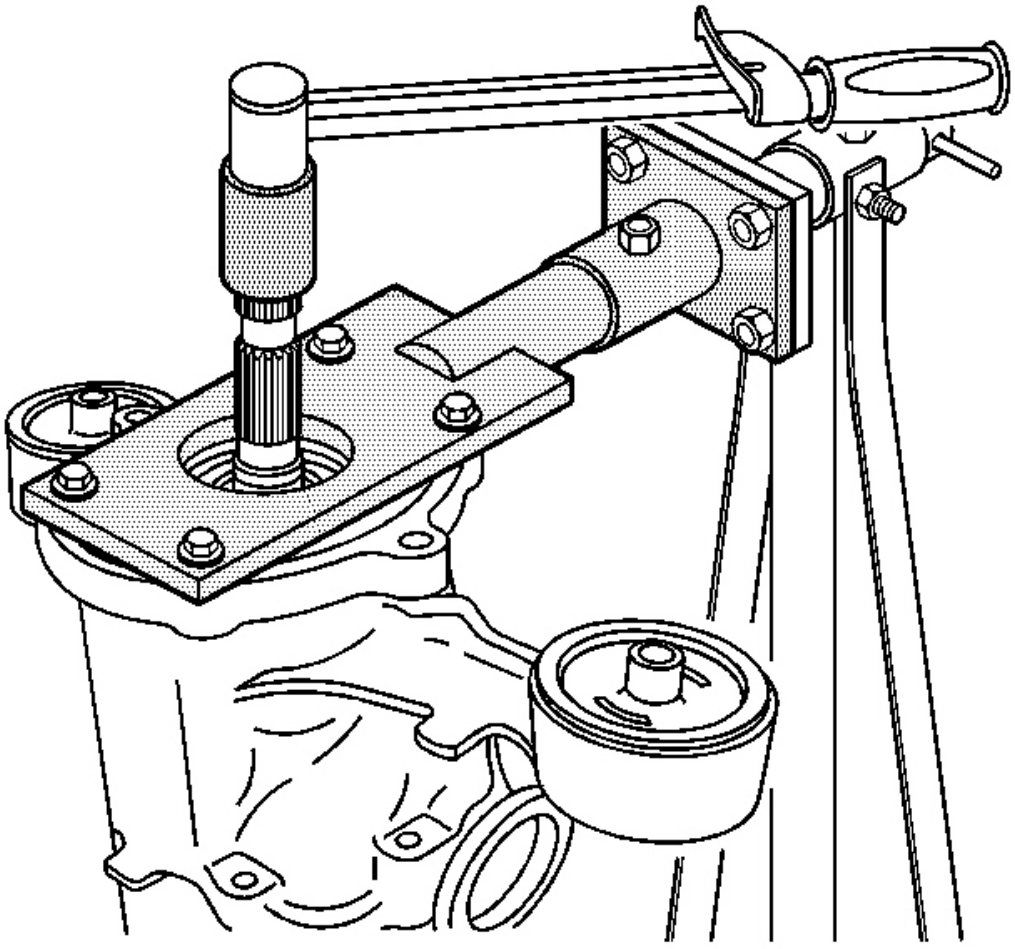


Fig. 163: Removing J44864
Courtesy of GENERAL MOTORS CORP.

22. Remove **J 44864** . See **Special Tools and Equipment** . Place the **J 44865** on a needle type torque wrench. See **Special Tools and Equipment** . Rotate the shaft, inspecting the rolling torque.

    Tighten: Tighten the shaft to 1.7 N.m (15 lb in).

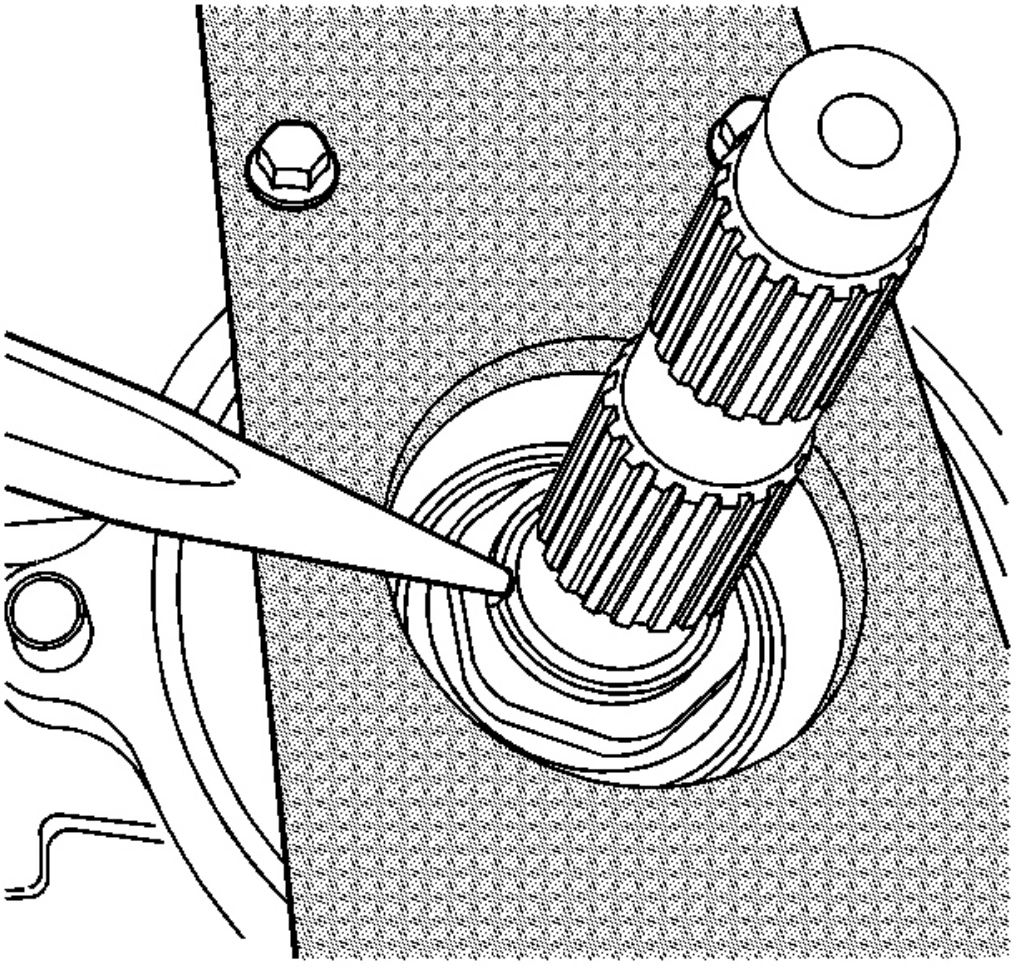


Fig. 164: Using Punch To Stake The Nut On The Pinion Shaft Flats
Courtesy of GENERAL MOTORS CORP.

23. When the rolling torque is reached, use a punch to stake the nut on the pinion shaft flats.

DIFFERENTIAL CARRIER ASSEMBLY - ASSEMBLE

Assemble Procedure

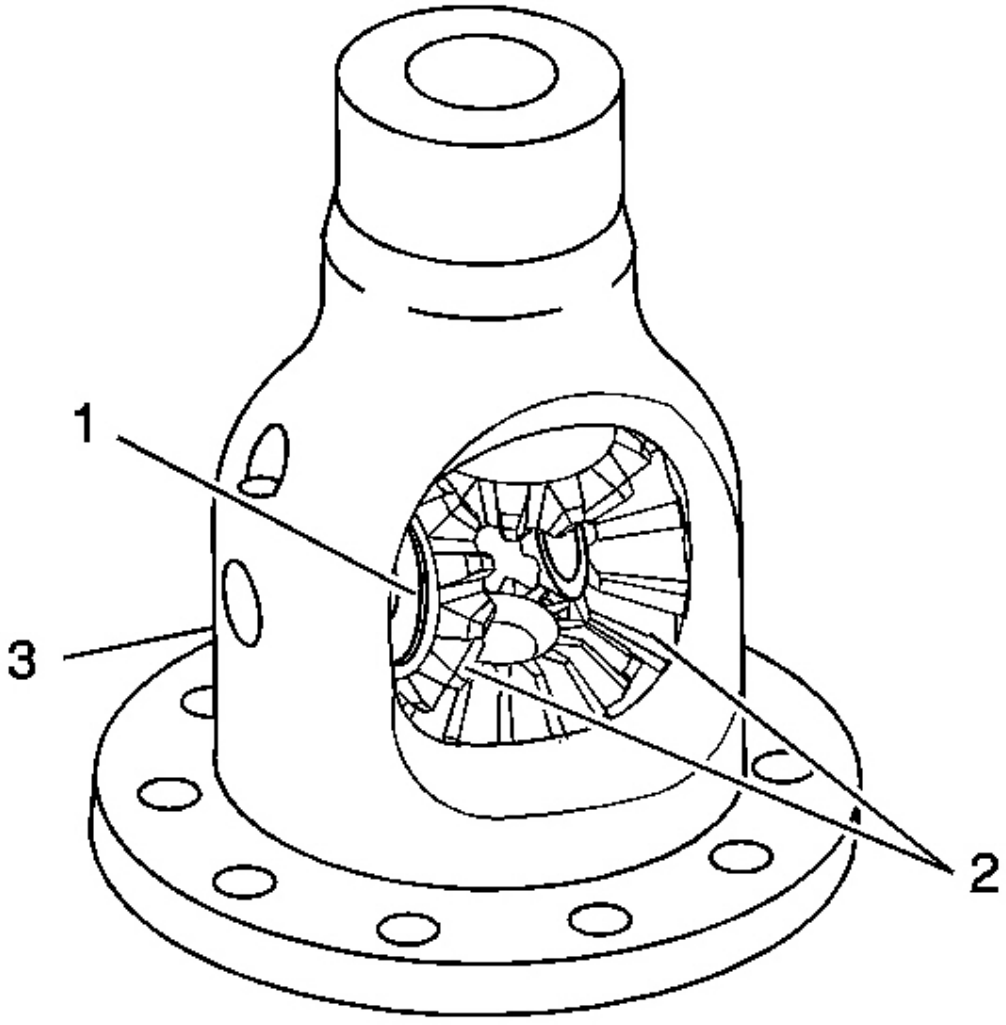


Fig. 165: View Of Assemble Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the side gears, pinion gears (2) and washers (1) into the differential case (3).

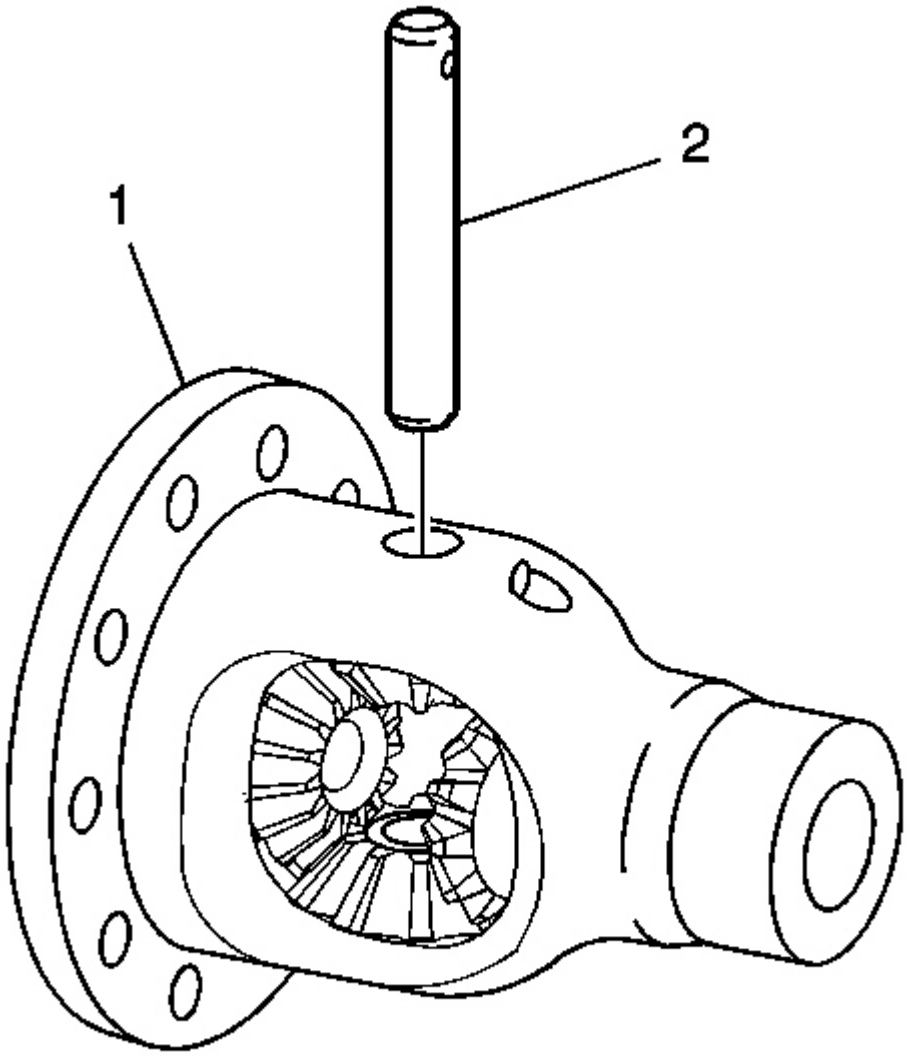


Fig. 166: Installing Pinion Shaft Pin & Aligned With The Hole In The Differential Case
Courtesy of GENERAL MOTORS CORP.

2. Install the pinion shaft pin (2) with the hole end aligned with the hole in the differential case (1).

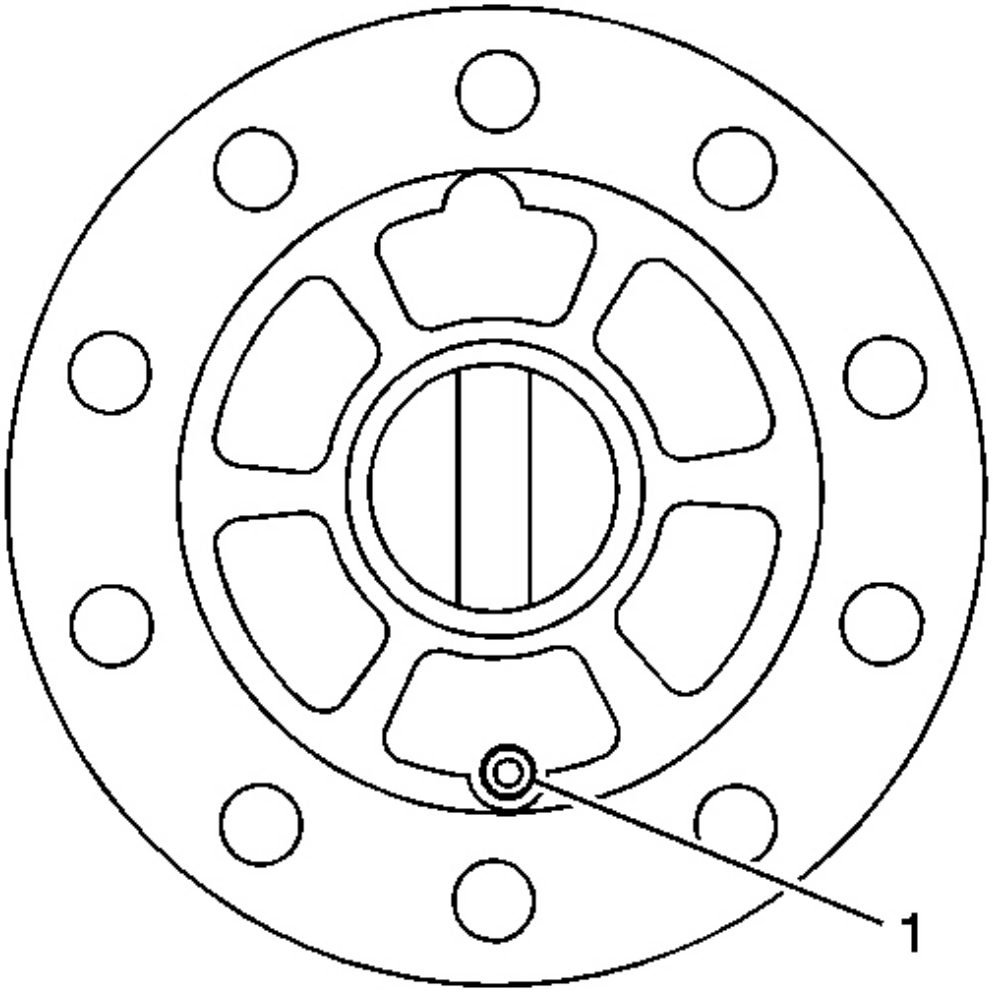


Fig. 167: Driving Roll Pin From Location
Courtesy of GENERAL MOTORS CORP.

3. Drive the roll pin from location (1) through the pinion shaft pin.

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTMENT

Tools Required

- **J 44855** Side Bearing Installer. See **Special Tools and Equipment** .
- **J 44856** Pinion Depth Shim Selector. See **Special Tools and Equipment**

- **J 44868** Housing Spreader. See **Special Tools and Equipment** .
- **J 45923** Alignment Pins. See **Special Tools and Equipment** .

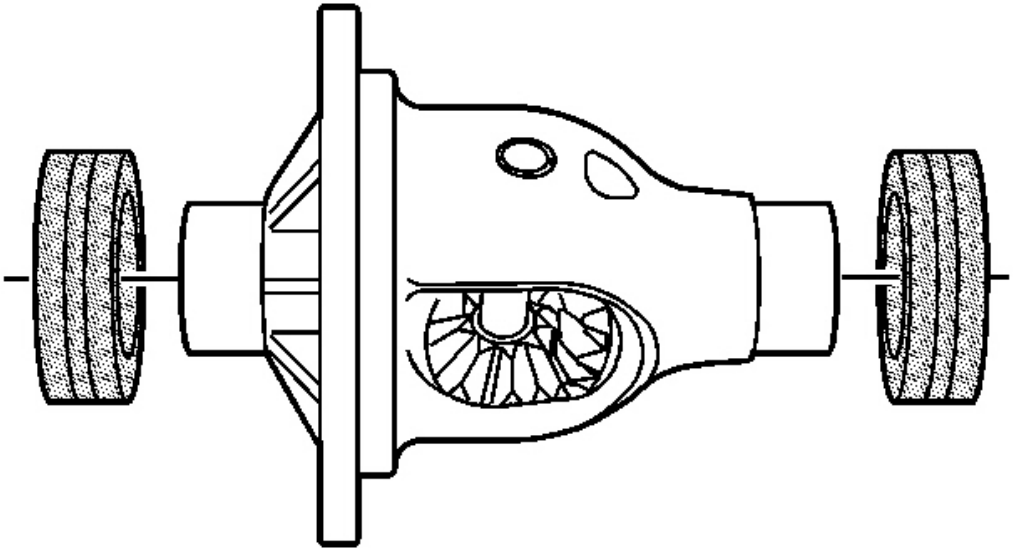


Fig. 168: View Of Side Bearing
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The ring gear must be removed to perform this measurement.

1. Install **J 44856-5** on the differential carrier. See **Special Tools and Equipment** .

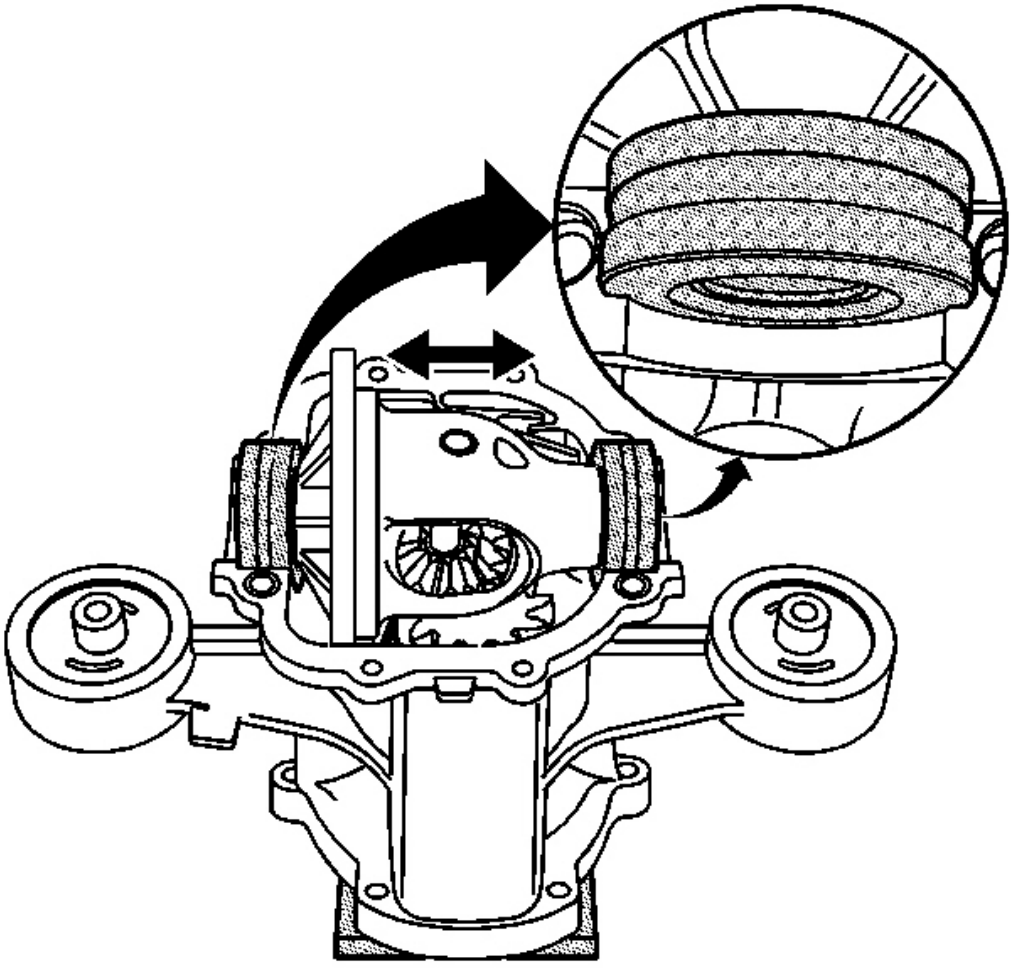


Fig. 169: Installing Differential Carrier & Master Bearings
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Master bearings must seat properly in the bearing bores. Improper seating could cause a wrong measurement.

2. Rotate the housing so the carrier side is up.
3. Install the differential carrier and the master bearings in the bores of the housing. Slide the carrier back and forth to seat the master bearings.

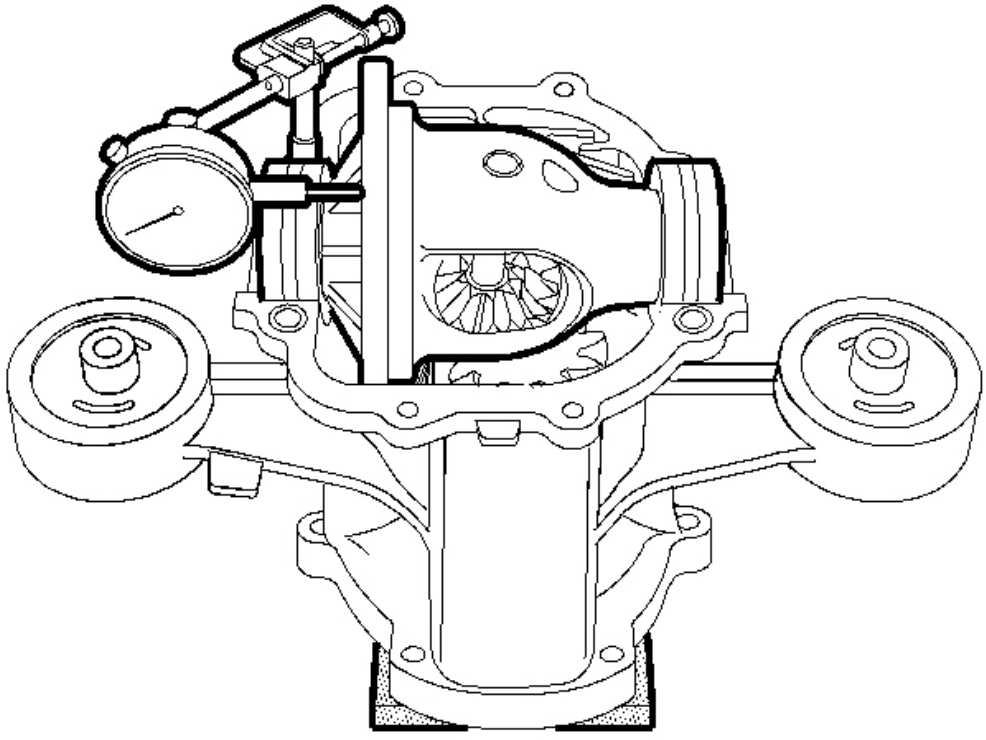


Fig. 170: Installing Dial Indicator On The 44856-6
Courtesy of GENERAL MOTORS CORP.

4. Install **J 44856-6** into the M10 bolt hole. See **Special Tools and Equipment** .
5. Install the dial indicator on the **J 44856-6** . See **Special Tools and Equipment** .
6. Slide the carrier away from the dial indicator until the carrier hits the master bearing and zero the indicator.
7. Slide the carrier toward the dial indicator and record this measurement as dimension (A) - total travel.

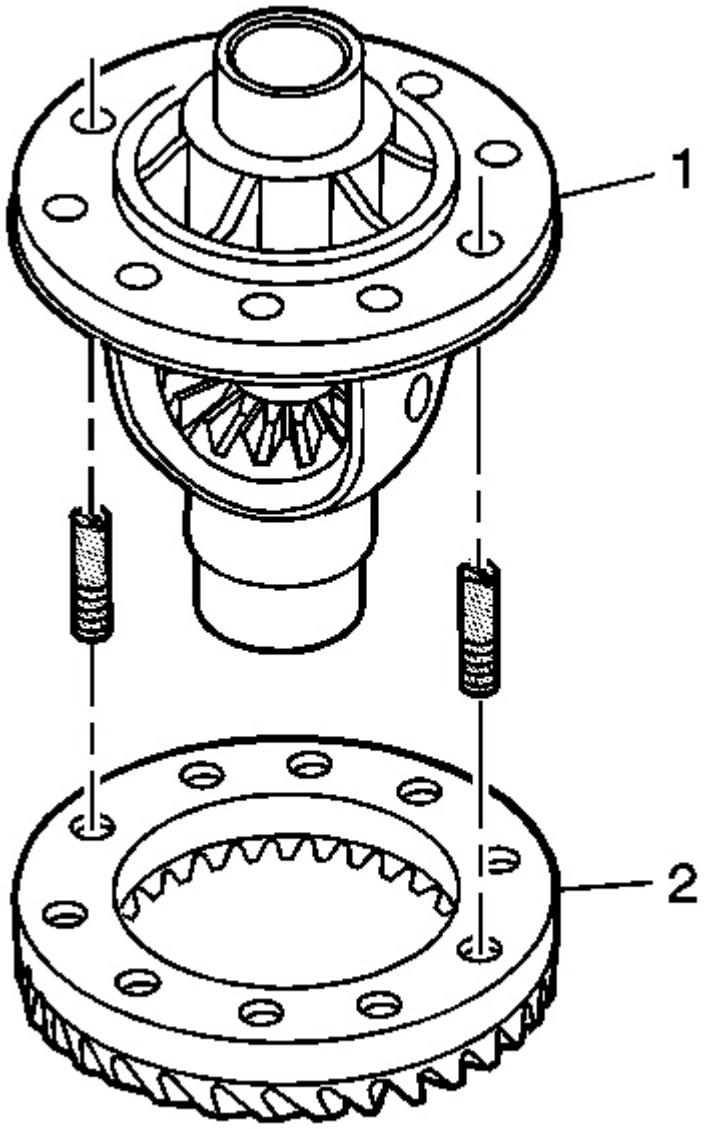


Fig. 171: Installing J45923 On The Ring Gear Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: Install the new bolts during the ring gear assembly. The bolts will have the new Permatex threadlocker on the threads.

8. Install **J 45923** into the ring gear (2). See **Special Tools and Equipment** . Place the differential case (1) over the alignment pins.

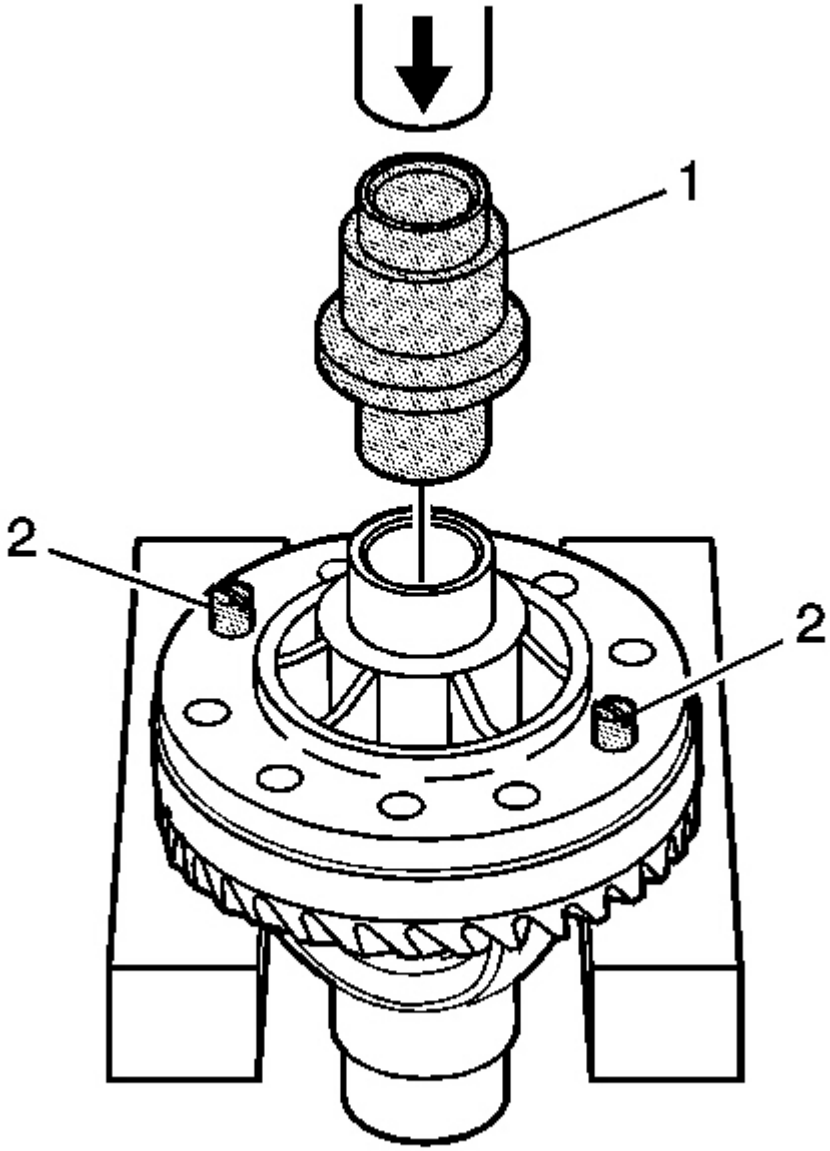


Fig. 172: Placing Differential Case Into A Press
Courtesy of GENERAL MOTORS CORP.

9. Place the differential case into a press. Use **J 44855** (1) to press the ring gear on and remove the alignment pins (2). See **Special Tools and Equipment** .

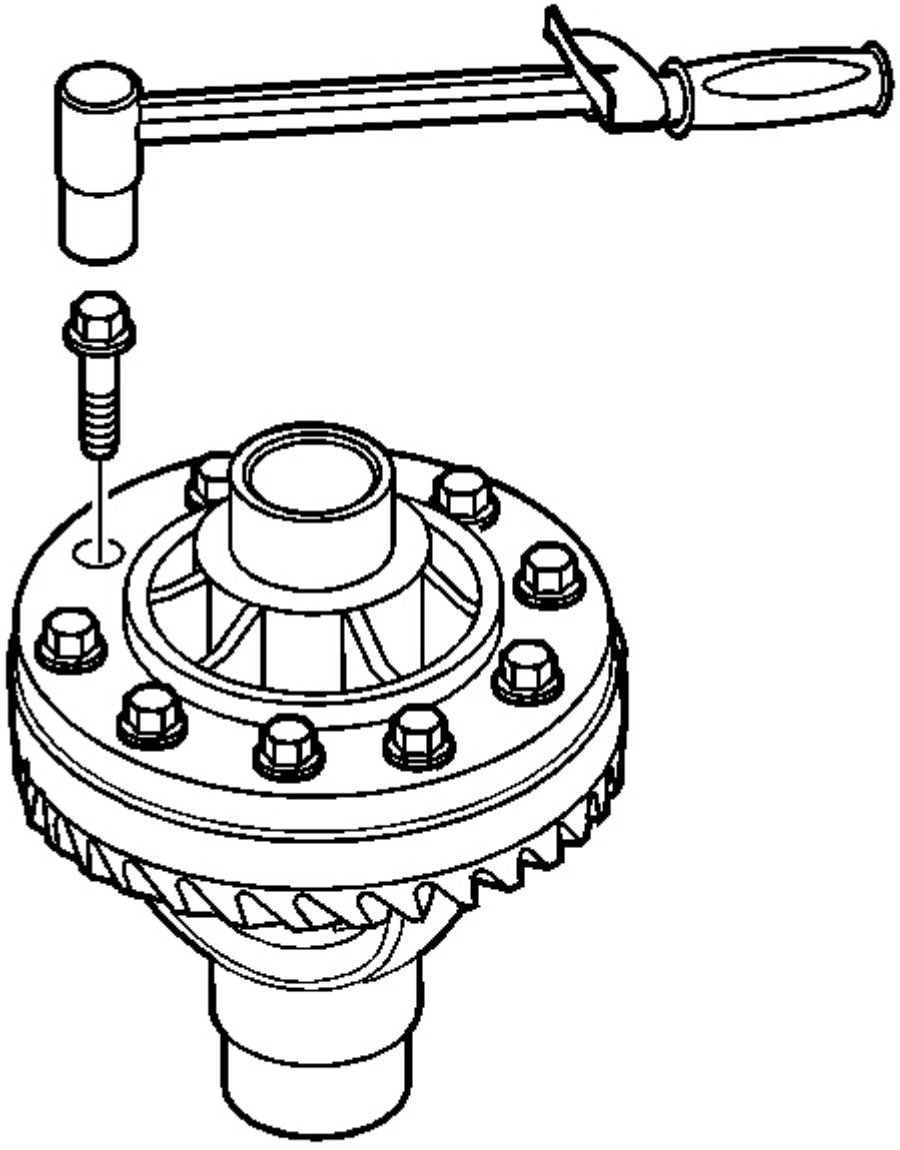


Fig. 173: Installing Ring Gear Bolts
Courtesy of GENERAL MOTORS CORP.

10. Install the ring gear bolts in a criss-cross pattern and tighten.

Tighten: Tighten the ring gear bolts to 52 N.m (38 lb ft).

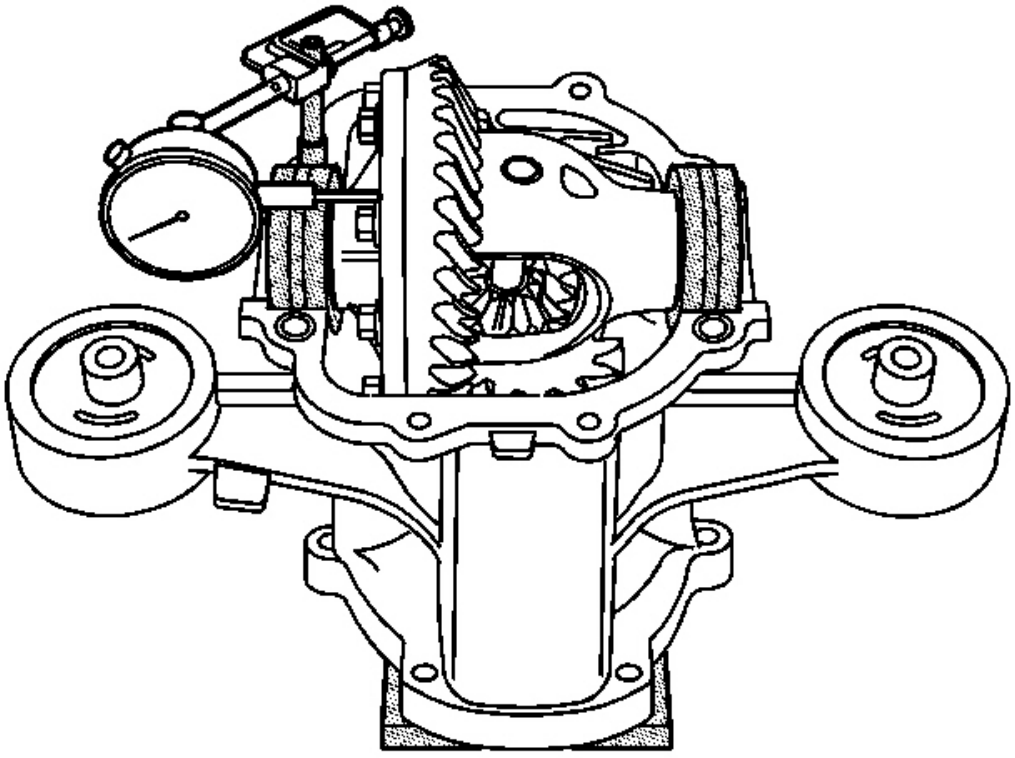


Fig. 174: Installing Dial Indicator On The J44856-6
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The ring gear must be installed to record this measurement.

IMPORTANT: Master bearings J 44856-5 must seat properly in the bearing bores. See Special Tools and Equipment . Improper seating could cause a wrong measurement.

11. Install the dial indicator on the **J 44856-6** . See **Special Tools and Equipment** .
12. Slide the carrier away from the dial indicator. Ensure the ring gear teeth contact to the pinion gear teeth is at zero lash. Zero out the indicator.
13. Slide the carrier away from the pinion gear. Record this measurement as dimension (B).
14. The (B) dimension is the nominal value of the gear side.
15. Subtract 0.006 in from the nominal value (B). This is the gear side shim size.

16. Subtract nominal value (B) from (A). This is the nominal value (C) for the right side.
17. Add 0.008 in to the right side nominal value (C). This is the right side shim size.

Example: Measurement (A) from step 7 is 0.500. Measurement (B) from step 13 with gear on was 0.250 - 0.006 = 0.244. This is the gear side shim thickness. Subtract (B) 0.250 from (A) 0.500 = 0.250 + 0.008 = 0.258. This is the right side shim thickness.

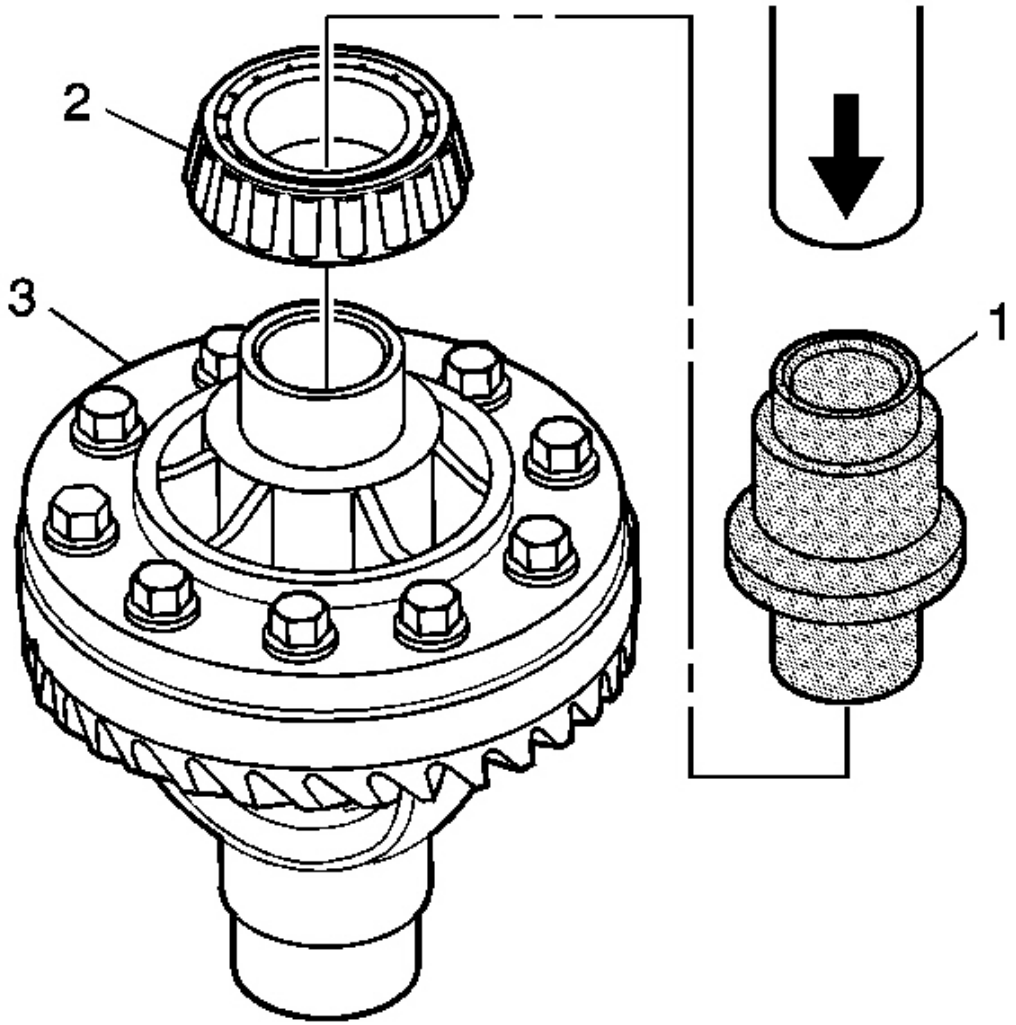


Fig. 175: Replacing Both Bearing & Races
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The differential bearings and the bearing races are matched sets. Replace both the bearing and the races when either part requires placement.

18. Use the **J 44855** (1). See **Special Tools and Equipment** . Into the bearing (2), place the differential carrier (3) in a press and install the bearing until it seats.
19. Turn the carrier over. Using the same process, install the right side bearing until it seats.

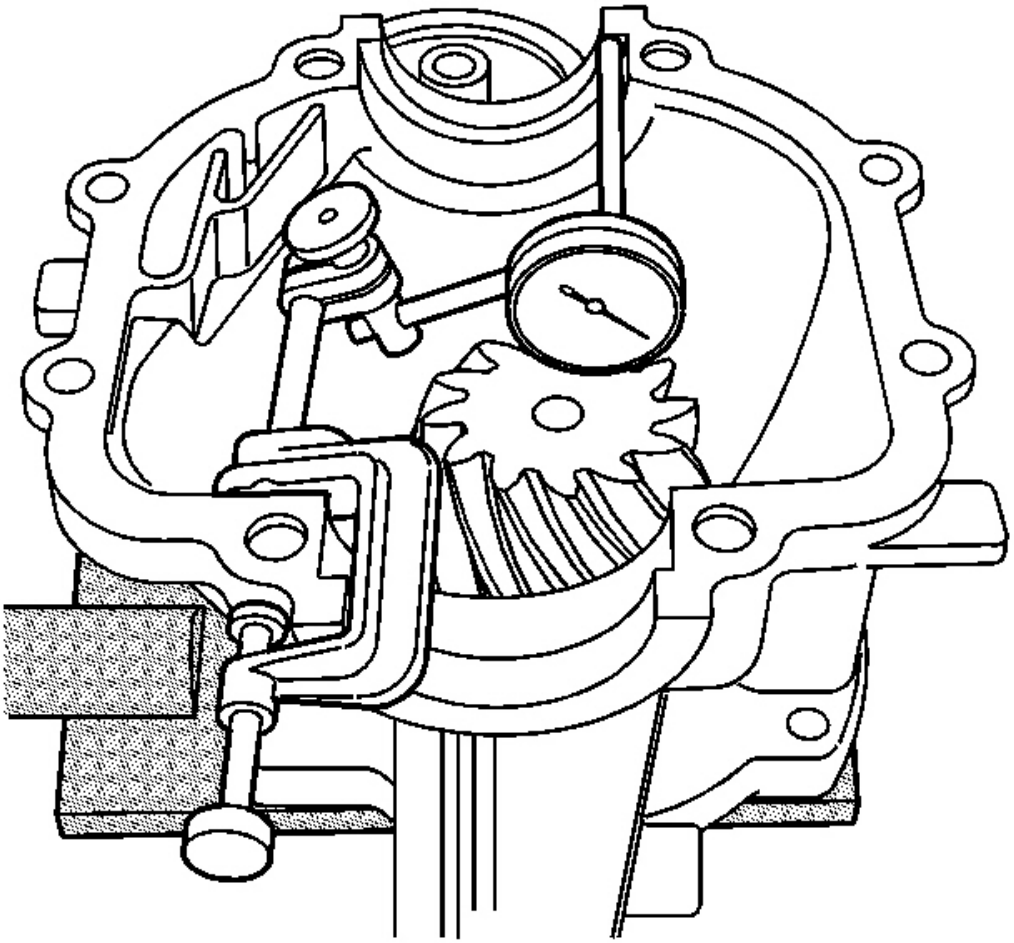


Fig. 176: Installing Dial Indicator On The Differential Bore
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not overspread the component. Spread the component only enough to allow the component to fit. Overspreading may damage the component.

20. Install a dial indicator in the differential bore. Measure at the top of the bearing bore. Preload the dial indicator and zero it out so that the maximum spread can be read.
21. The maximum housing spread is 0.30-0.40 mm (0.012-0.016 in).

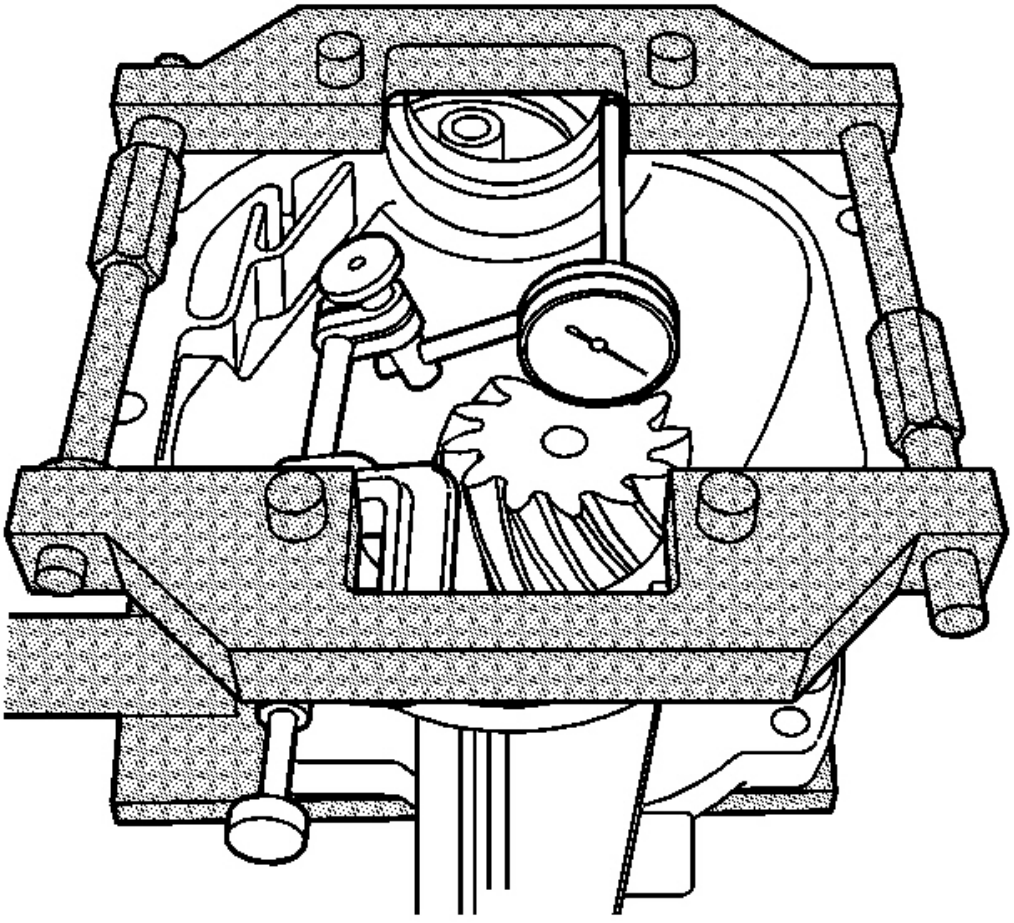


Fig. 177: Installing J44868
Courtesy of GENERAL MOTORS CORP.

22. Install **J 44868** with the short dowels in the M10 bolt holes. See **Special Tools and Equipment** .
23. Spread the housing by turning the forcing screws. Watch the dial indicator reading, do not over-spread the housing.
24. After the housing is spread, remove the dial indicator from under the **J 44868** . See **Special Tools and Equipment** .

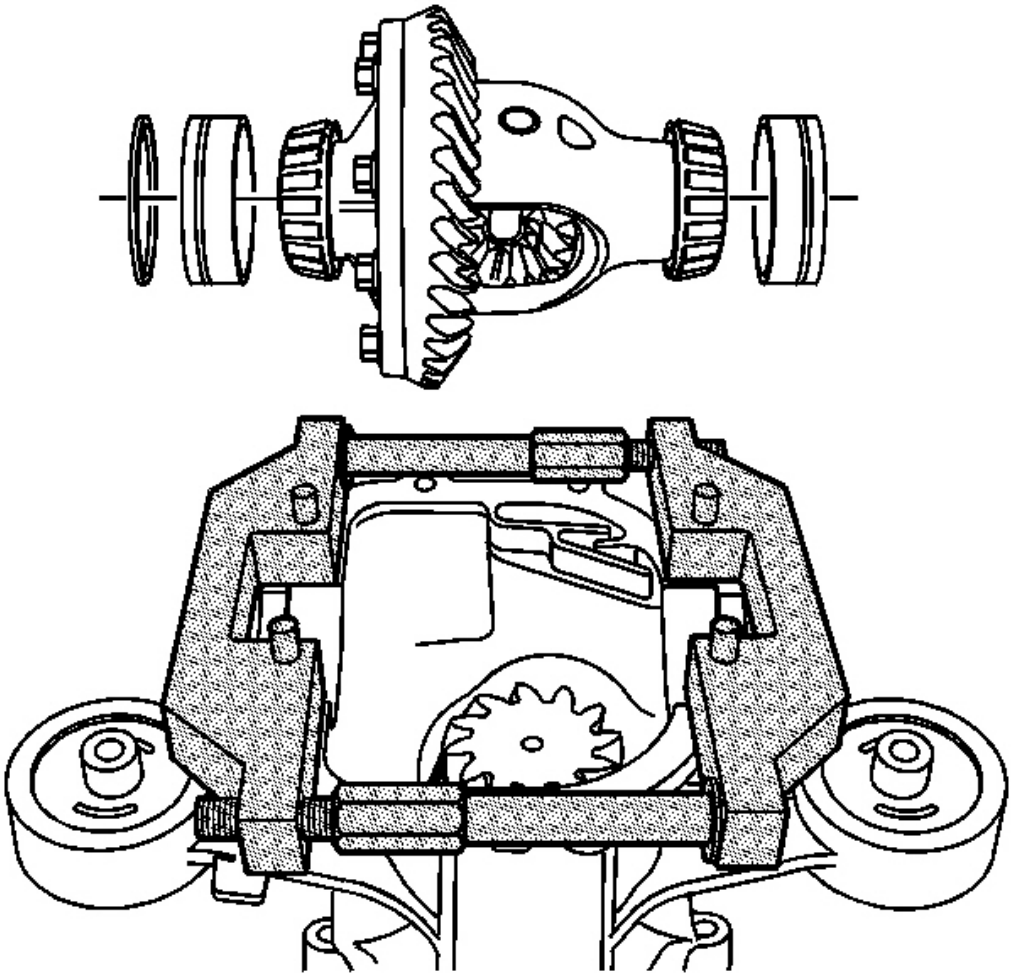


Fig. 178: Installing Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

25. Install the differential carrier assembly into the housing with 2 bearing cups and 1 of the side shims.

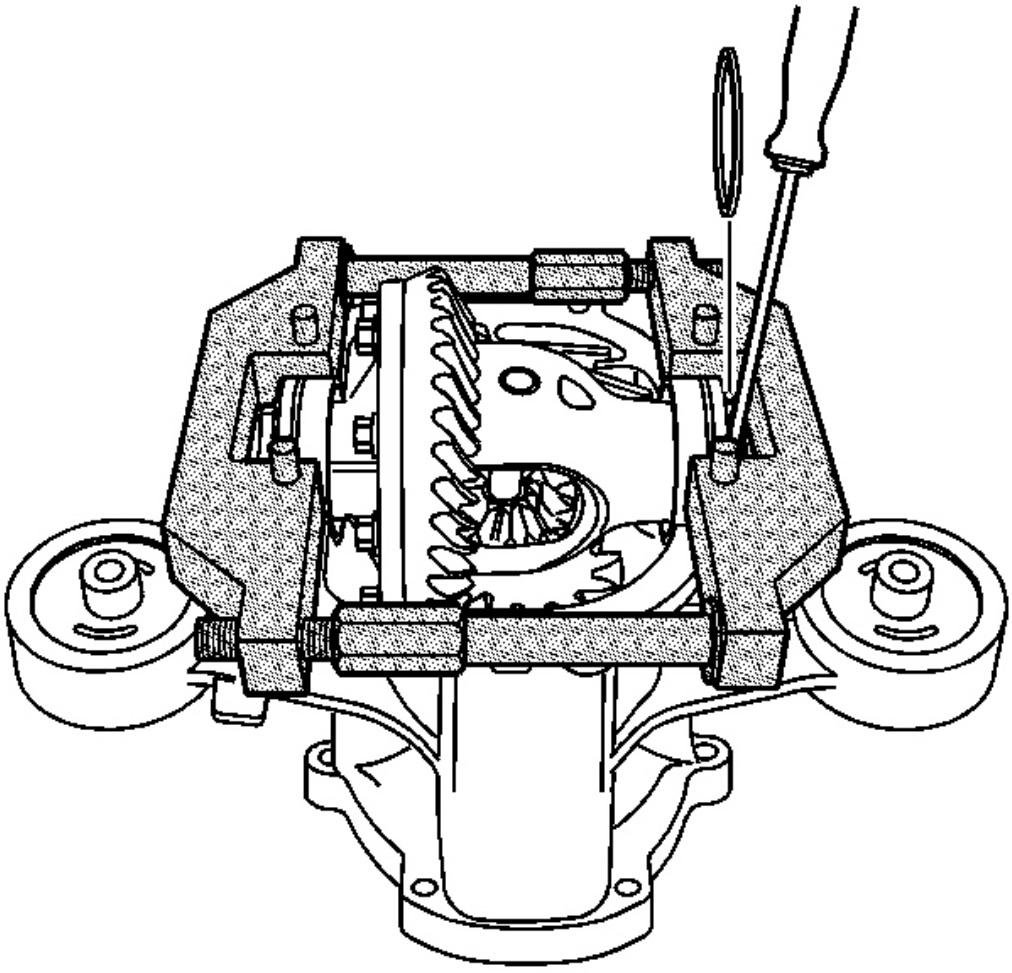


Fig. 179: Removing J44868
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not pry on the housing and do not force or drive the shims into place.

26. Use a screwdriver to slide the races into the bores and place the other side shim into place.
27. Remove the **J 44868** . See **Special Tools and Equipment** .

GEAR TOOTH CONTACT PATTERN INSPECTION

Tools Required

- **J 44856** Pinion Depth Shim Selector
- **J 44865** Spline Socket. See **Special Tools and Equipment** .
- **J 44868** Housing Spreader. See **Special Tools and Equipment** .

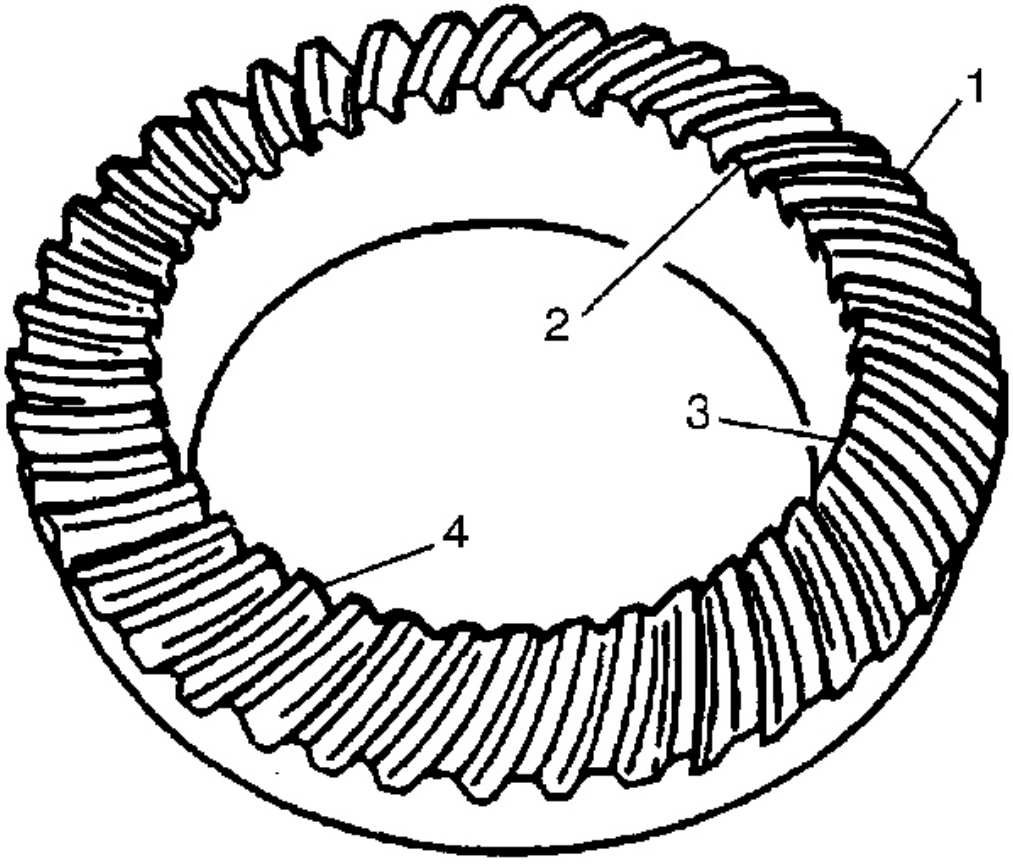


Fig. 180: Gear Tooth Nomenclature
Courtesy of GENERAL MOTORS CORP.

Before the final assembly of the differential, perform a gear tooth pattern inspection.

This contact pattern inspection is not a substitute for adjusting the pinion depth and backlash. Use this method in order to verify the correct running position of the ring gear and drive pinion. Gear sets which are not positioned properly may be noisy, have a short life or both. A pattern inspection ensures the best contact between the ring gear and the drive pinion for low noise and long life.

Gear Tooth Nomenclature

The side of the ring gear tooth which curves outward, or is convex, is the drive side (4). The concave side is the coast side (3). The end of the tooth nearest the center of the ring gear is the toe end (2). The end of the tooth farthest away from the center is the heel end (1).

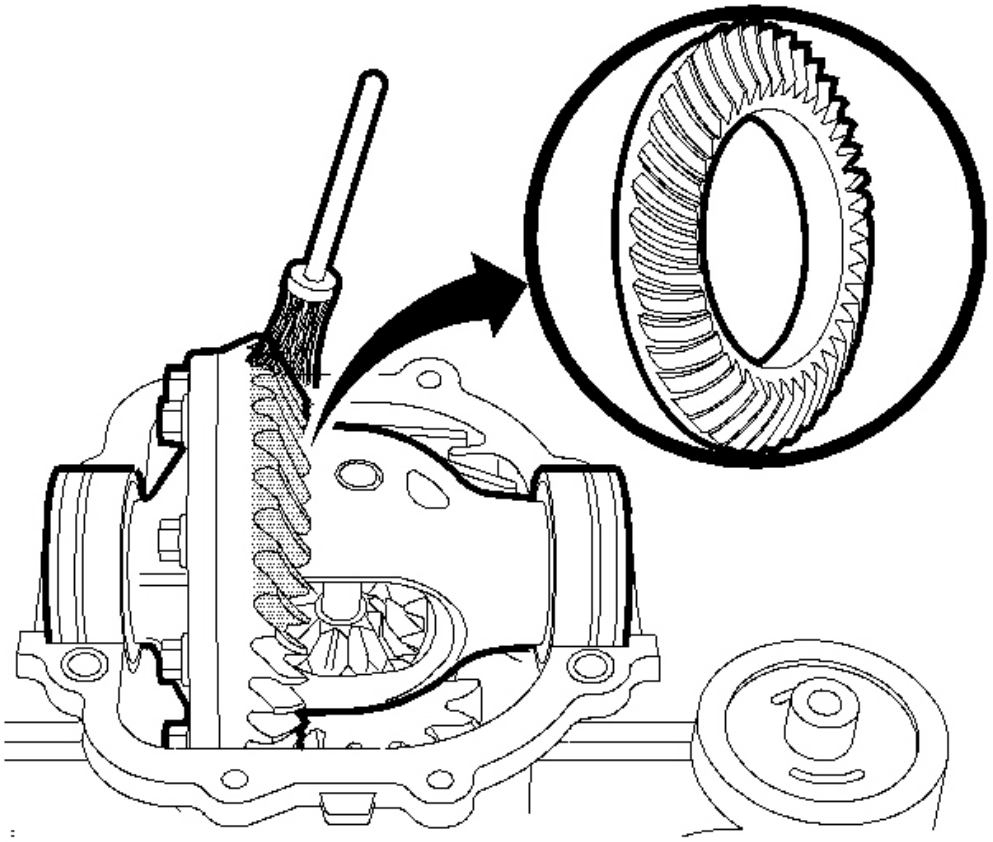


Fig. 181: Applying Pattern Chemical Inspection
Courtesy of GENERAL MOTORS CORP.

1. Apply the pattern inspection chemical Saturn P/N 1052351 to all of the teeth of the ring gear.

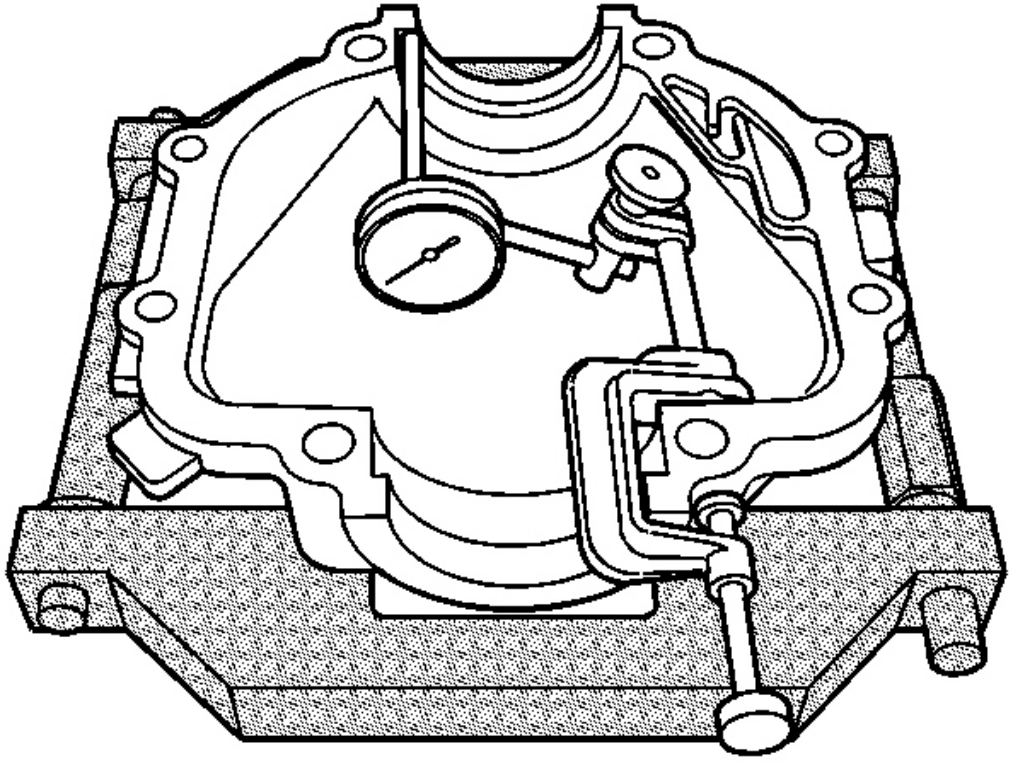


Fig. 182: Installing Dial Indicator On The Cover
Courtesy of GENERAL MOTORS CORP.

2. Install the dial indicator on the cover at the top of the bearing bore. Preload the indicator and zero it out.
3. Install the **J 44868** on the cover. See **Special Tools and Equipment** .
4. Spread the cover while measuring the movement. Do not spread the cover more than 0.30-0.40 mm (0.012-0.016 in).
5. After the spread is reached, remove the dial indicator.

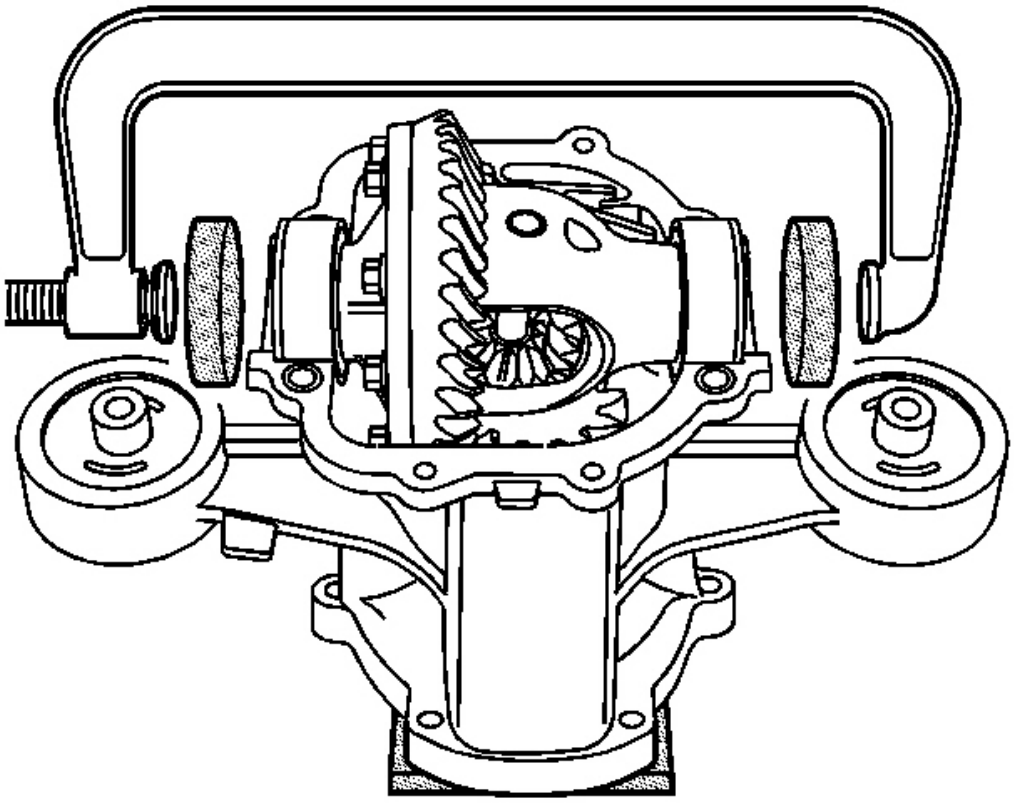


Fig. 183: Tightening C-clamp On The Disc
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Do not apply sealer to the housing or cover at this time.

6. Install the cover.
7. If a spread cover will not go over the shims and bearings, use a C-clamp and **J 44856-10** . See **Special Tools and Equipment** . Tighten the C-clamp on the disc. This will straighten out the shims and bearing races.

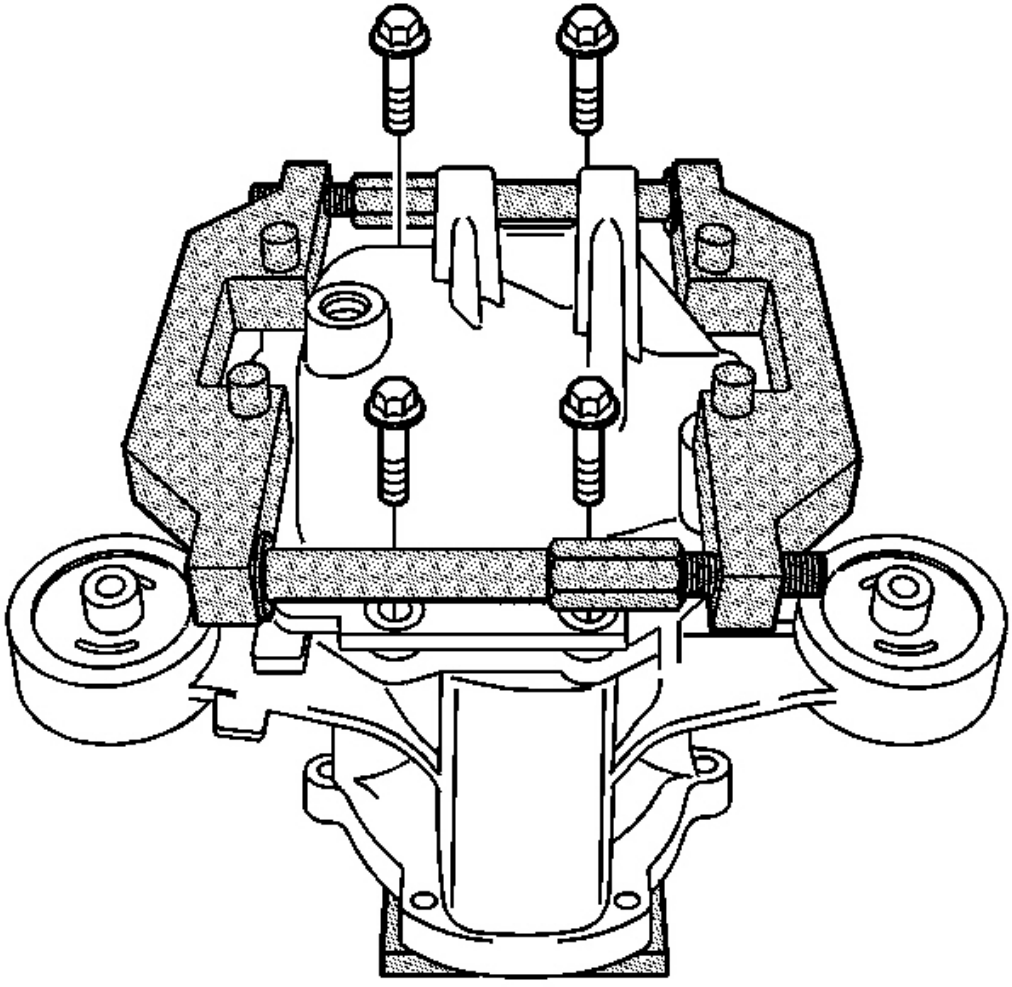


Fig. 184: Installing 4 (M8) Cover Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

8. Install the 4 (M8) cover bolts and tighten in a criss-cross pattern.

   Tighten: Tighten the cover bolts (M8) to 24 N.m (18 lb ft).

9. Remove the **J 44868** . See **Special Tools and Equipment** .

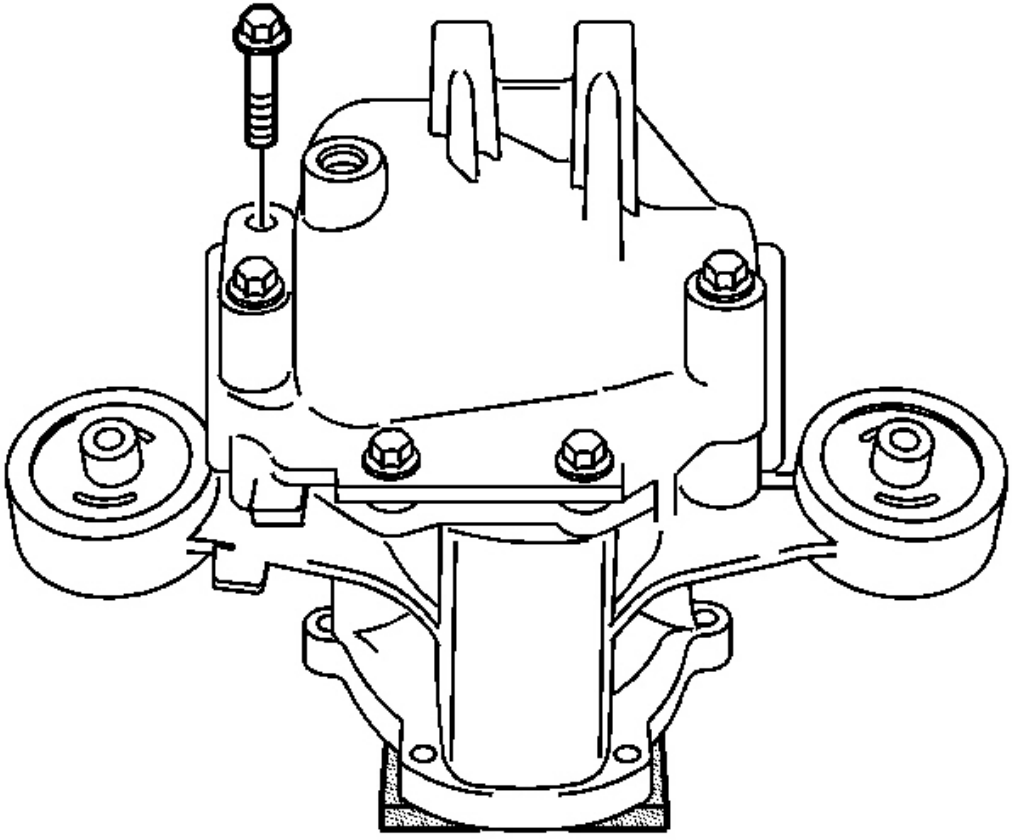


Fig. 185: Removing/Installing 4 (M10) Cover Bolts
Courtesy of GENERAL MOTORS CORP.

10. Install 4 (M10) cover bolts and tighten in a criss-cross pattern.

    Tighten: Tighten the cover bolts (M10) to 52 N.m (38 lb ft).

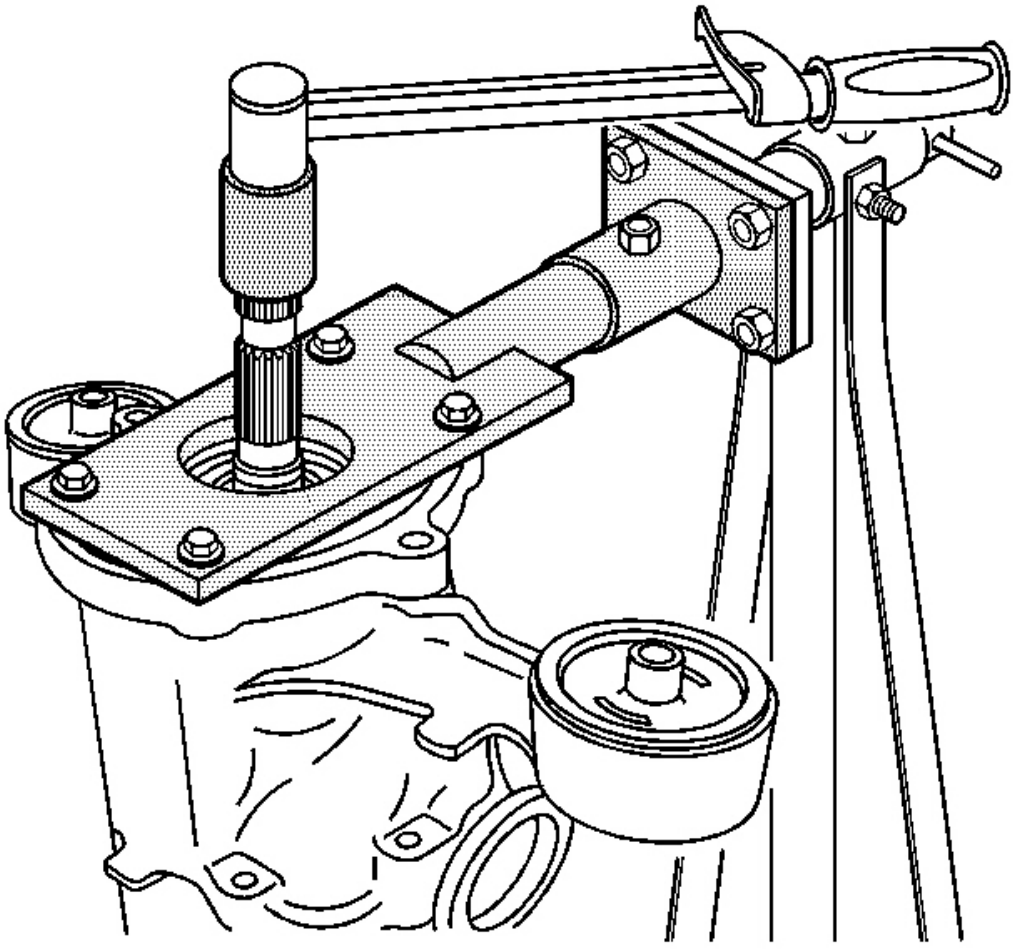


Fig. 186: Using J44865
Courtesy of GENERAL MOTORS CORP.

11. Use **J 44865** and an inch pound needle type torque wrench to check assembled rolling torque. See **Special Tools and Equipment** . Torque should be 2-4 N.m (21-32 lb in).

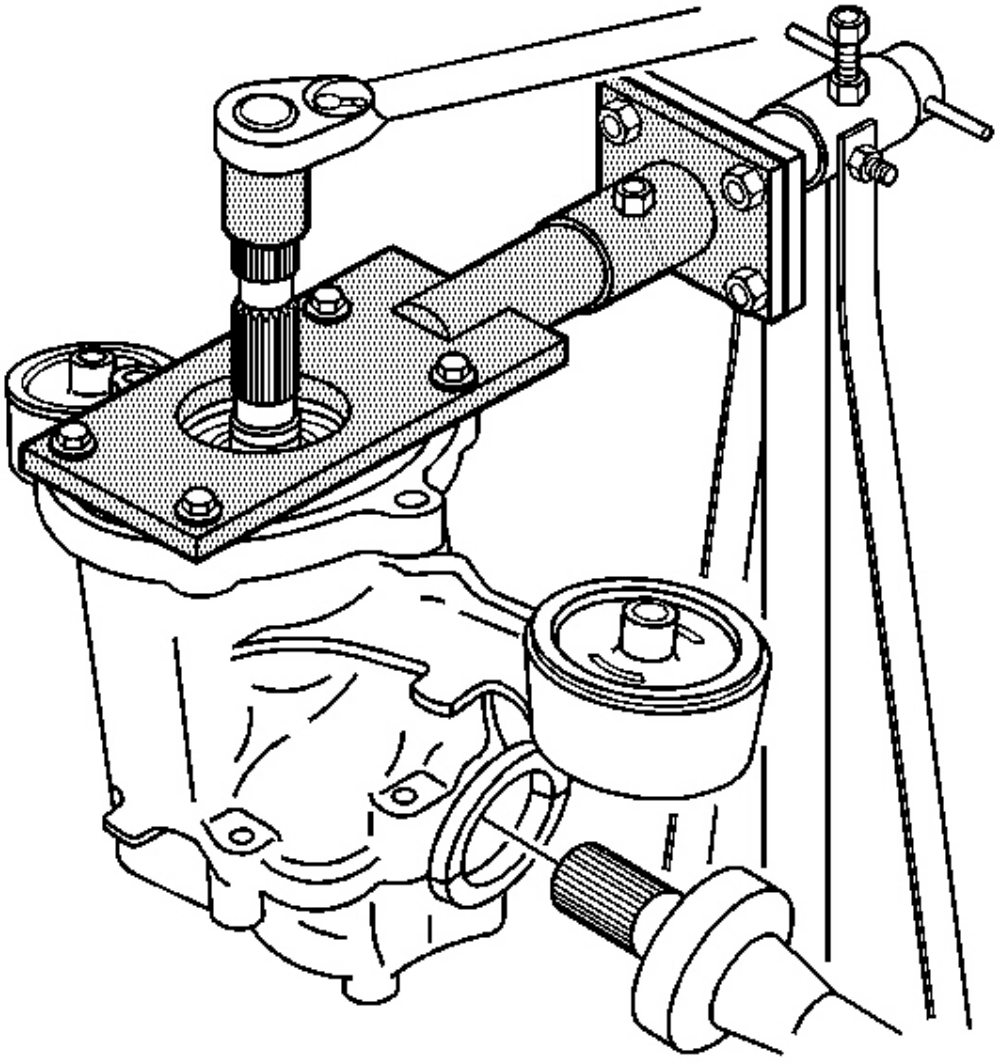


Fig. 187: Using J44865 & Breaker Bar
Courtesy of GENERAL MOTORS CORP.

12. Use **J 44865** and a breaker bar over the pinion shaft. See **Special Tools and Equipment** .

    The axle preload must be applied to the gear set to perform the proper pattern inspection.

13. Install an axle shaft into the differential bore.
14. Hold the axle shaft with a gloved hand applying pressure while turning the pinion shaft 10 times in the

clockwise direction and 10 times in the counterclockwise direction.

15. Remove the axle shaft.

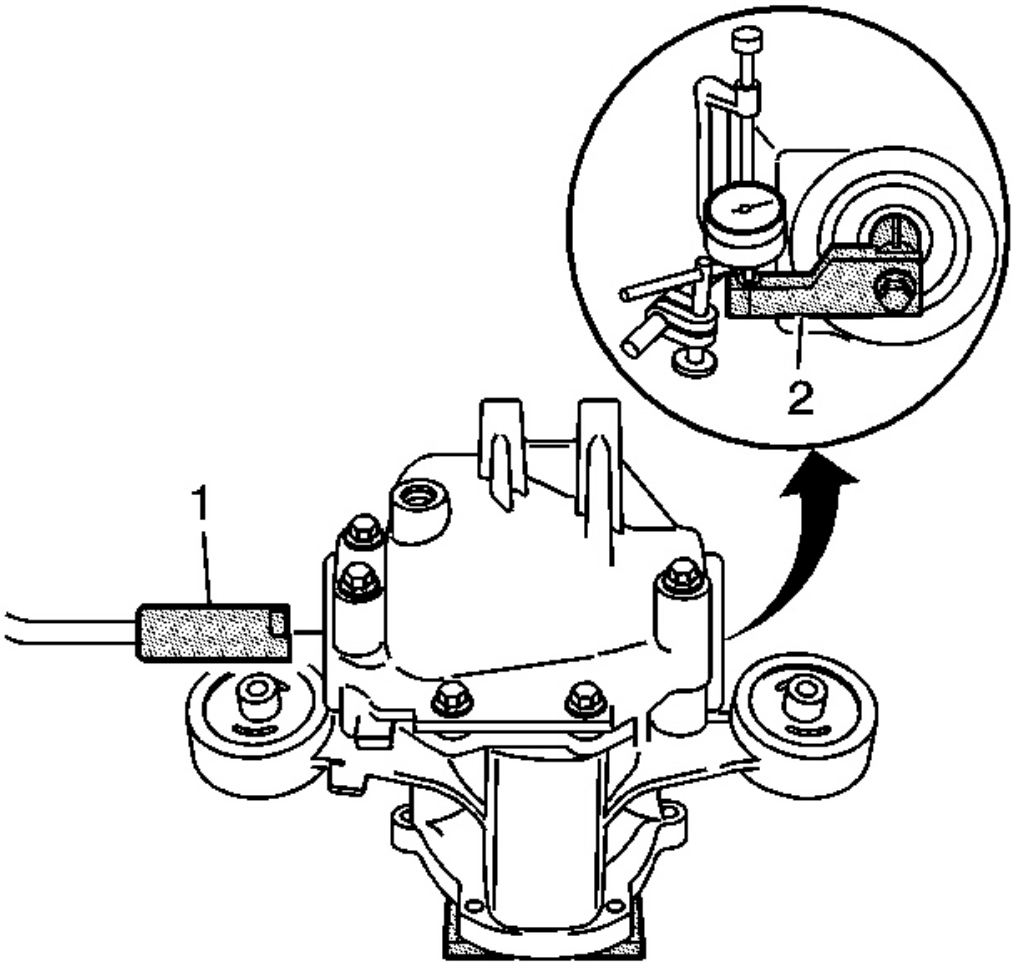


Fig. 188: Installing J44856-7 Into One Side Of Differential Axle Bore
Courtesy of GENERAL MOTORS CORP.

16. Install **J 44856-7** (2) into one side of the differential axle bore and tighten the nut to lock the tool in place. See **Special Tools and Equipment** .
17. Attach the dial indicator to the housing. Measure from the line marked on **J 44856-7** (2). See **Special Tools and Equipment** . Zero out the dial indicator.
18. Install the **J 44856-8** (1) in the opposite side axle bore. See **Special Tools and Equipment** .
19. Use a speed handle to rotate the differential back and forth to measure the backlash. The backlash should

be 0.125-0.225 mm (0.005-0.009 in).

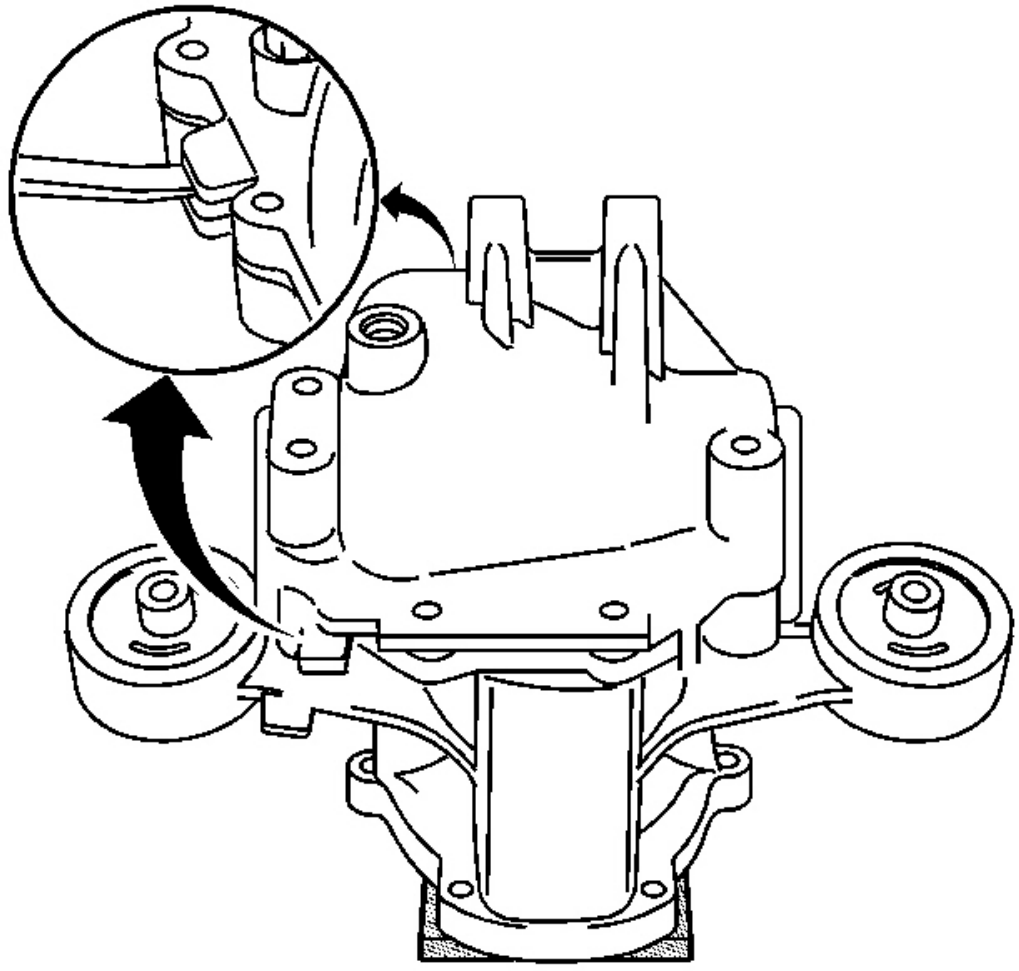


Fig. 189: Removing Rear Cover By Prying It Off At The Pry Point Locations
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Use the pry points only. Do not pry on the sealing surface.

IMPORTANT: The rear differential may come out with the cover.

20. Remove the rear cover bolts.
21. Remove the cover.

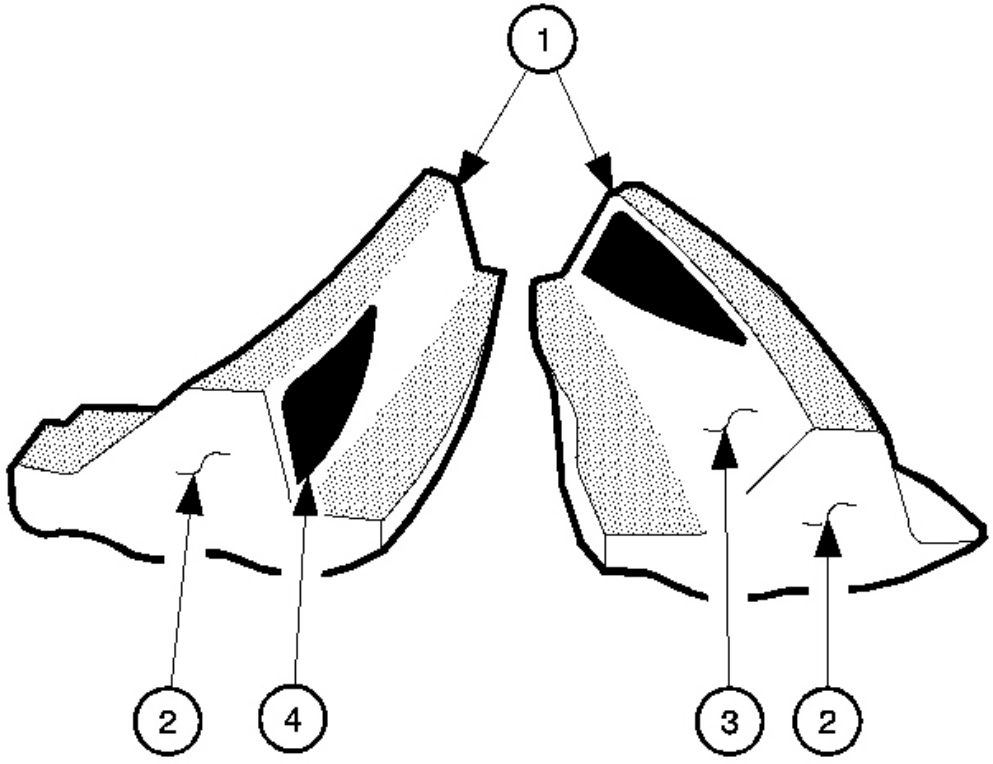


Fig. 190: Observing Pattern On The Ring Gear Teeth
Courtesy of GENERAL MOTORS CORP.

22. Observe the pattern on the ring gear teeth. Compare the pattern with the following illustrations. Use the legend below:
    - (1) Toe
    - (2) Heel
    - (3) Coast Side, Concave
    - (4) Drive Side, Convex

Condition

- The backlash is correct.
- The pinion depth is incorrect. The pinion gear is too far away from the gear.

Correction

Increase the thickness of the pinion shim.

Service Hints

How to inspect the pattern:

1. Brush gear marking compound on the ring gear teeth.
2. Rotate the pinion clockwise 10 times.
3. Rotate the pinion counterclockwise 10 times.
4. Observe the tooth contact pattern. Make any necessary corrections.

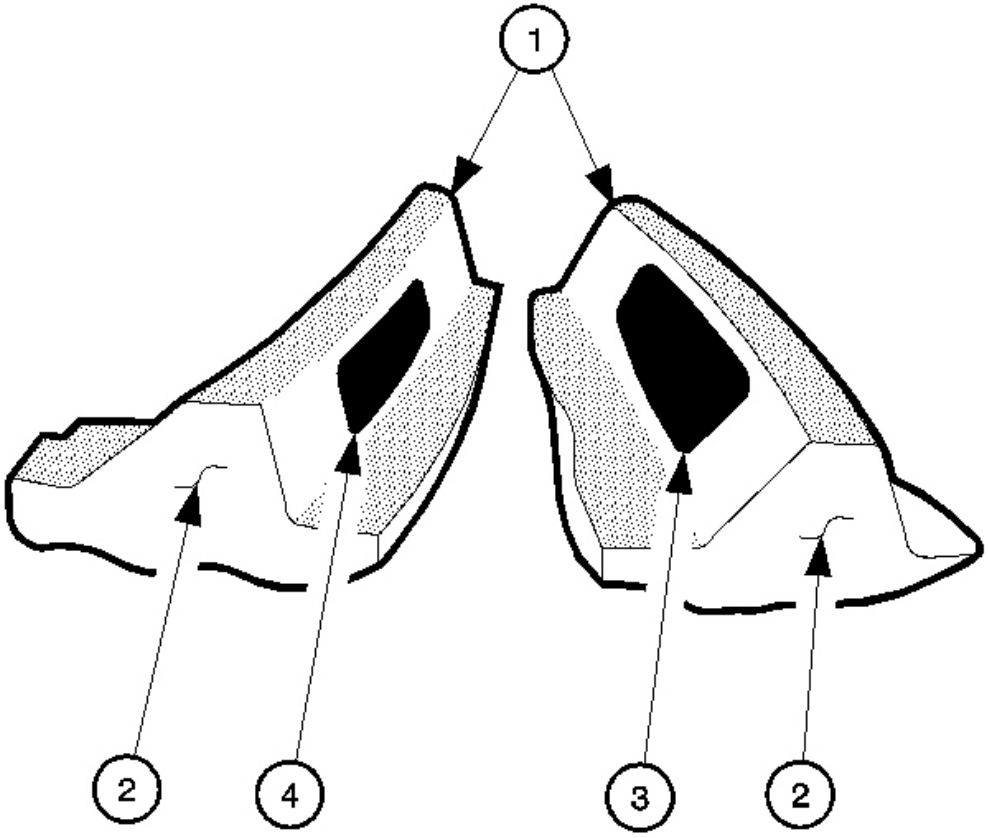


Fig. 191: Loosening Bearing On The Pinion
Courtesy of GENERAL MOTORS CORP.

Condition

- The backlash is correct.
- The pinion depth is correct (3) (4).

Correction

Correction may not be necessary.

Service Hints

Loose bearings on the pinion or in the differential case may cause patterns that vary. Inspect the following preload settings:

- Total assembly
- Differential case
- Pinion

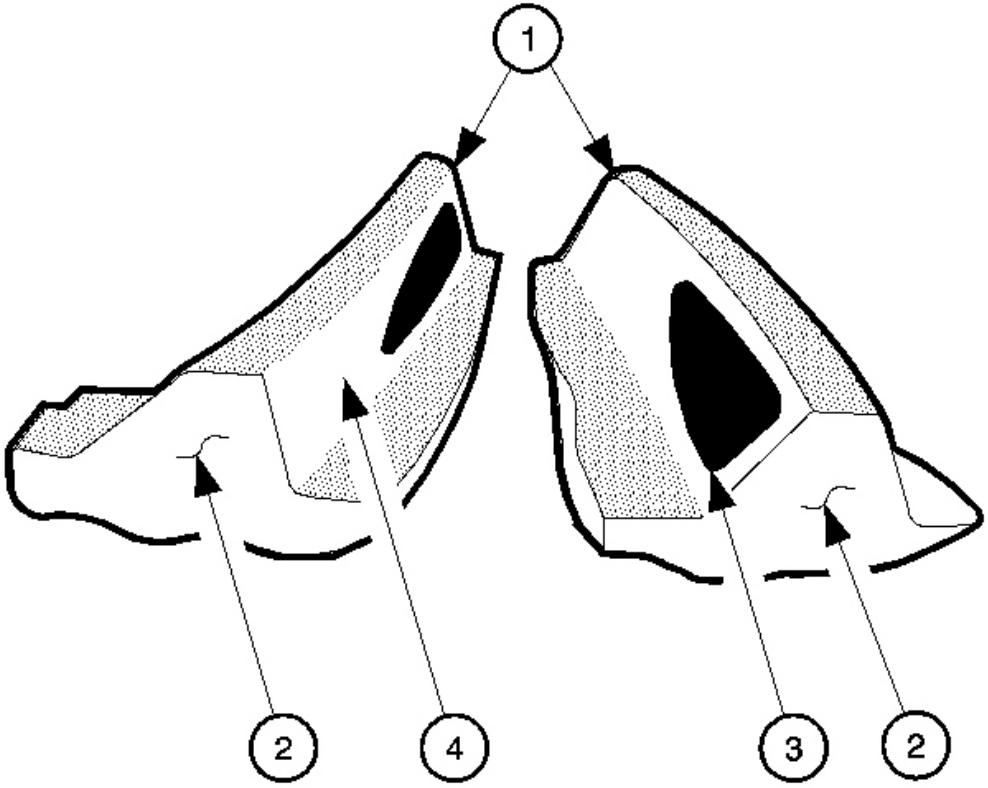


Fig. 192: Correcting & Looking For Damage or Incorrectly Assembled Parts
Courtesy of GENERAL MOTORS CORP.

If these settings are correct, look for damage or incorrectly assembled parts.

Condition

- The backlash is correct.
- The pinion depth is incorrect (3) (4).

Correction

Decrease the thickness of the pinion shim.

Service Hints

The shims which adjust the pinion depth are located between the inner pinion bearing and the head of the pinion gear.

Adjustments Affecting Tooth Contact

There are 2 adjustments that affect the tooth contact pattern; backlash and drive pinion depth. The effects of bearing preloads are not readily apparent on hand-loaded tooth contact pattern tests. However, bearing preloads should be within the specifications before proceeding with the backlash and drive pinion adjustments.

Adjust the position of the drive pinion by increasing or decreasing the distance between the pinion head and the centerline of the ring gear. Decreasing the distance moves the pinion closer to the centerline of the ring gear. Increasing the distance moves the pinion farther away from the centerline of the ring gear.

Adjust the backlash by means of the side-bearing adjusting shims which move the case and ring gear assembly closer to, or farther from, the drive pinion. Also use the adjusting shims to set the side bearing preload.

If the thickness of the right shim is increased, along with an equal decrease in thickness of the left shim, backlash will increase.

If the thickness of the left shim is increased, along with an equal decrease in the thickness of the right shim, the backlash will decrease.

DIFFERENTIAL HOUSING ASSEMBLY ASSEMBLE

Tools Required

- **J 44809** Output Shaft Seal Installer. See **Special Tools and Equipment** .
- **J 44851** Pinion Seal Installer. See **Special Tools and Equipment** .
- **J 44852** Front Clutch Drum Seal Installer. See **Special Tools and Equipment** .
- **J 44853** Rear Clutch Drum Seal Installer. See **Special Tools and Equipment** .
- **J 44868** Housing Spreader. See **Special Tools and Equipment** .
- **J 44873** Pinion Flange Holder and Remover. See **Special Tools and Equipment** .
- **J 46607** Alignment Tool. See **Special Tools and Equipment** .
- **SA9114T** Converter Bearing Installer. See **Special Tools and Equipment** .

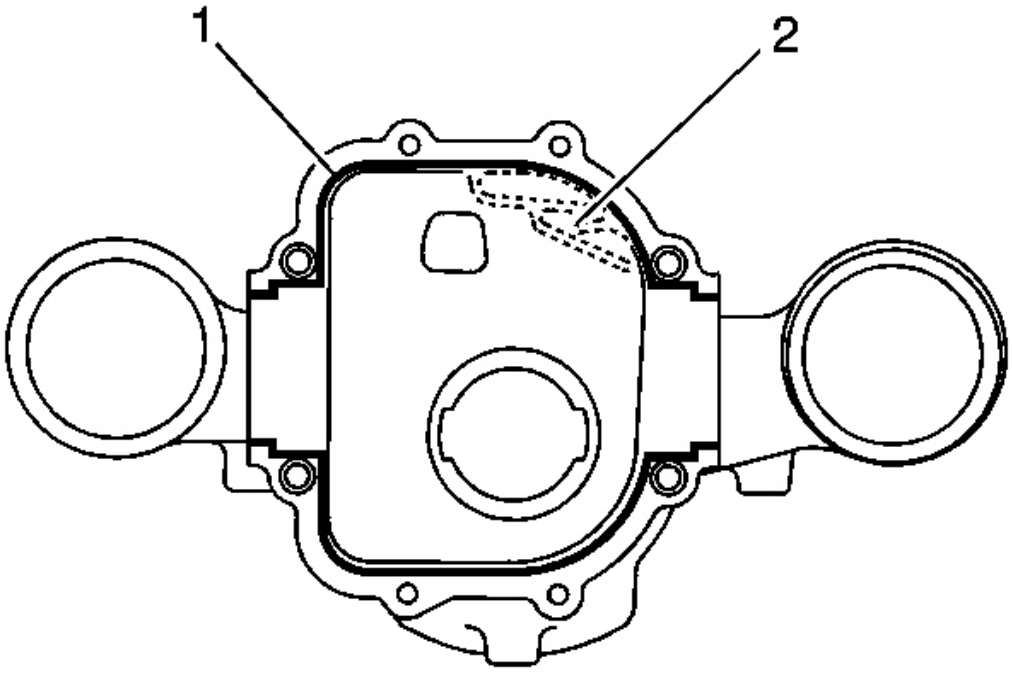


Fig. 193: View Of Differential Housing Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not use excessive amounts of sealer. Excess sealer could plug the vent passage, the oil pump, and/or the oil pump screen causing internal damage.

IMPORTANT: Ensure sealing surface is still clean and oil free.

1. Apply sealer Saturn P/N 21019581 to the rear housing sealing surface (1). Do not apply sealer to vent walls (2). Apply a constant bead of sealer 2.5 mm (0.098 in) wide and thick.

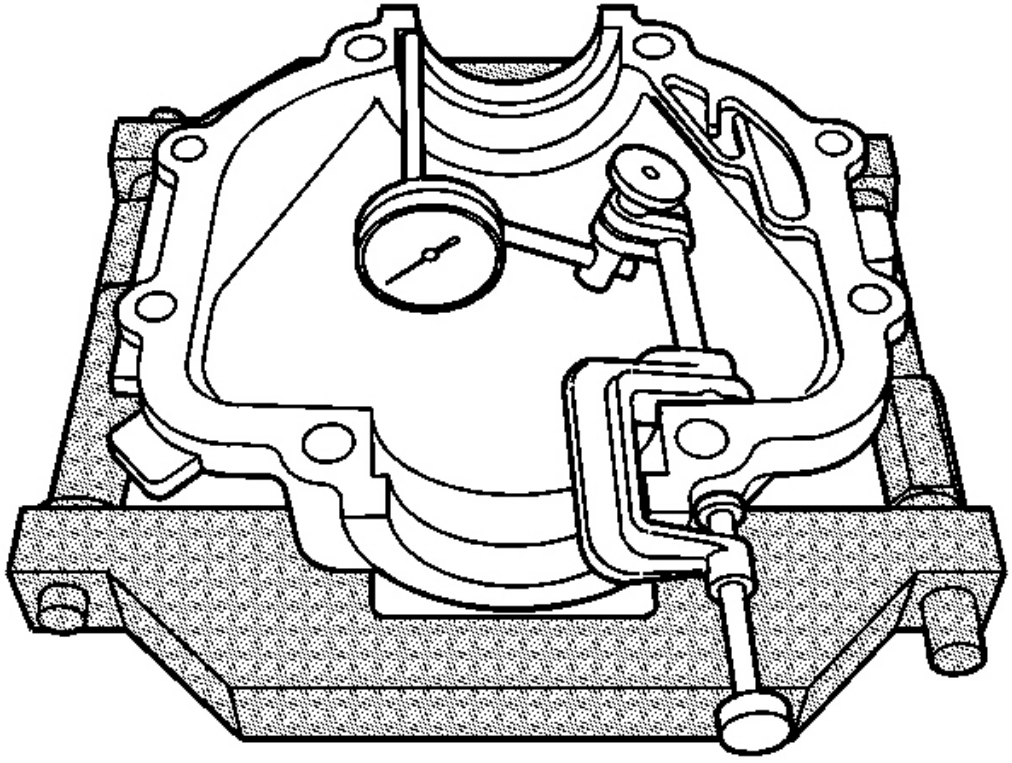


Fig. 194: Installing Dial Indicator On The Cover
Courtesy of GENERAL MOTORS CORP.

2. Install the dial indicator on the cover at the top of the bearing bore. Preload the indicator and zero it out.
3. Install **J 44868** on the cover. See **Special Tools and Equipment** .
4. Spread the cover while measuring the movement. Do not spread the cover more than 0.30-0.40 mm (0.012-0.016 in).
5. After the spread is reached, remove the dial indicator.

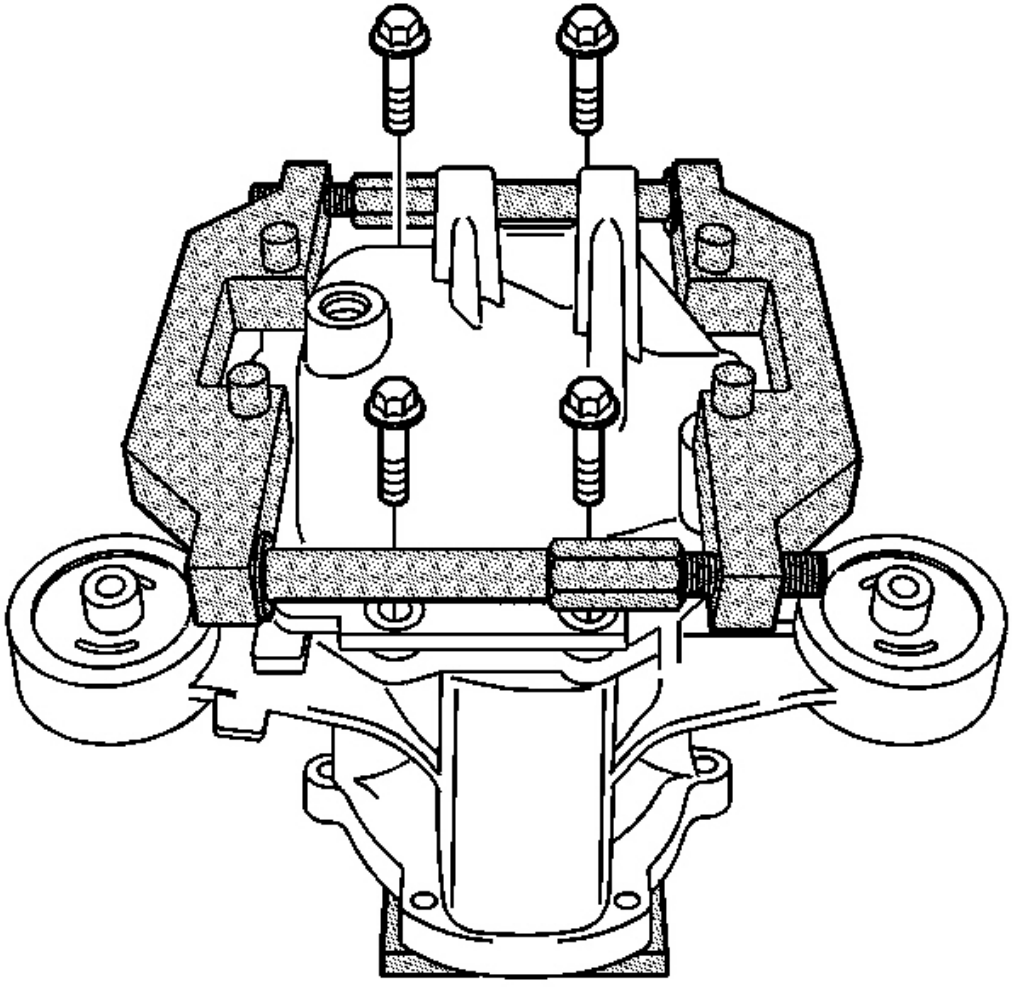


Fig. 195: Installing 4 (M8) Cover Bolts
Courtesy of GENERAL MOTORS CORP.

6. Install the cover.

NOTE: **Refer to Fastener Notice in Cautions and Notices.**

7. Install the 4 (M8) cover bolts and tighten in a criss-cross pattern.

   Tighten: Tighten the cover bolts (M8) to 24 N.m (18 lb ft).

8. Remove the housing spreader **J 44868** . See **Special Tools and Equipment** .

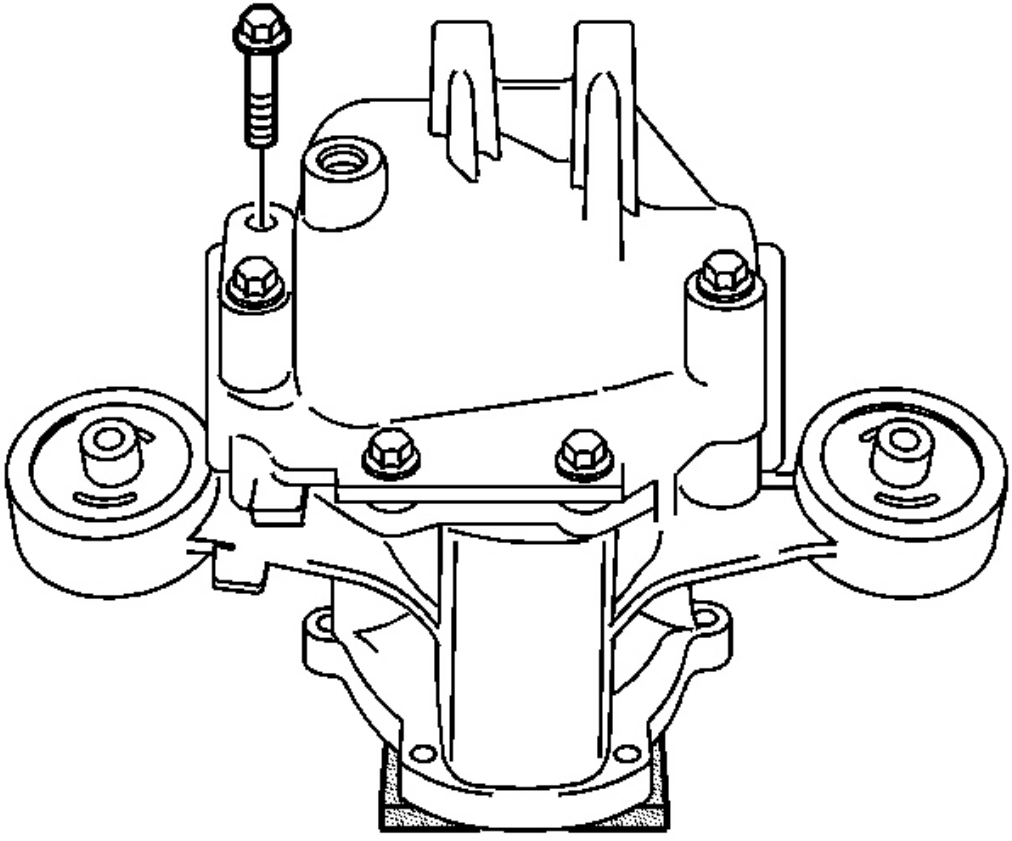


Fig. 196: Removing/Installing 4 (M10) Cover Bolts
Courtesy of GENERAL MOTORS CORP.

9. Install 4 (M10) cover bolts and tighten in a criss-cross pattern.

   Tighten: Tighten the cover bolts (M10) to 52 N.m (38 lb ft).

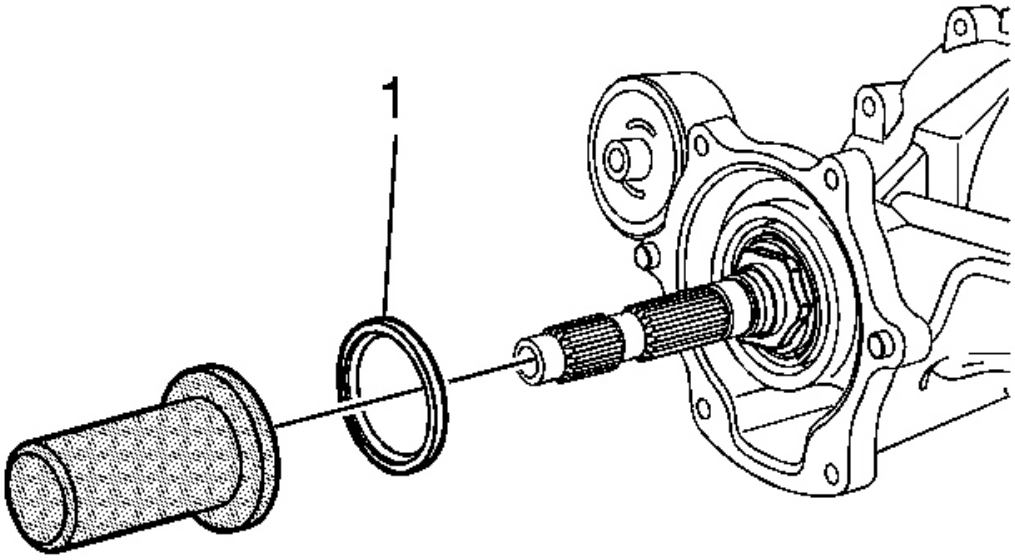


Fig. 197: Installing Clutch Drum Rear Oil Seal Using J44853
Courtesy of GENERAL MOTORS CORP.

10. Using **J 44853** install the clutch drum rear oil seal (1) to the differential housing. See **Special Tools and Equipment** .

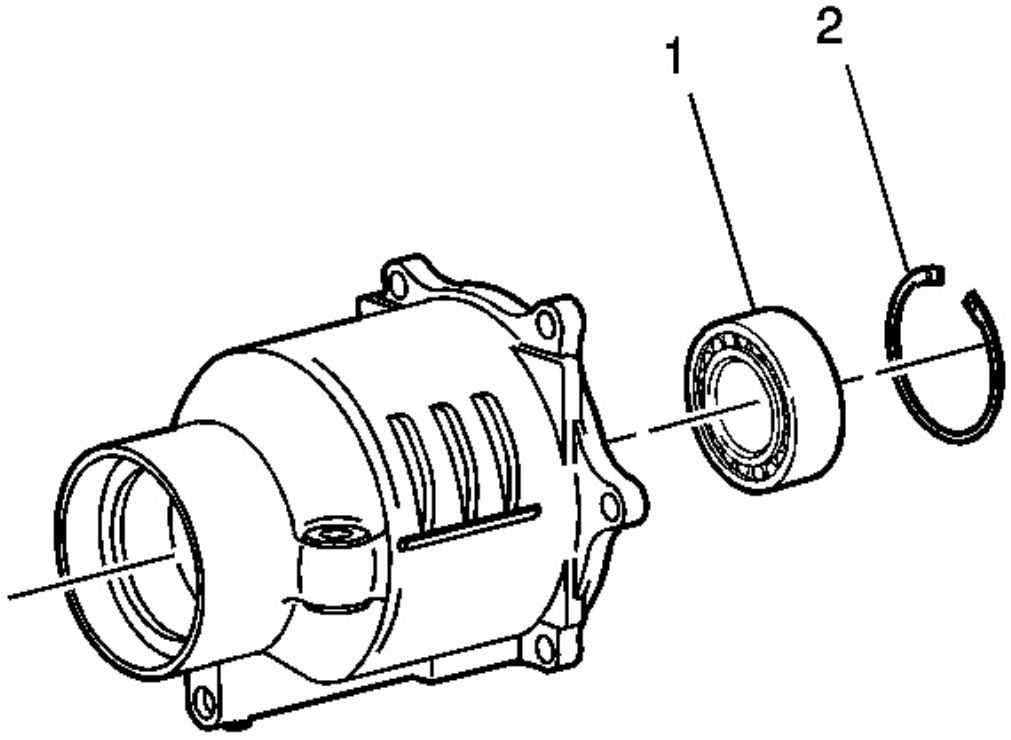


Fig. 198: Installing Bearing & Snap Ring On The Clutch Cover
Courtesy of GENERAL MOTORS CORP.

11. Install the bearing (1) and the snap ring (2) to the clutch cover. If removed, the bearing will have to be pressed in. Press the bearing from the outer race. Use **SA9114T** from SA1991T2 automatic transmission tool kit or equivalent. See **Special Tools and Equipment** .

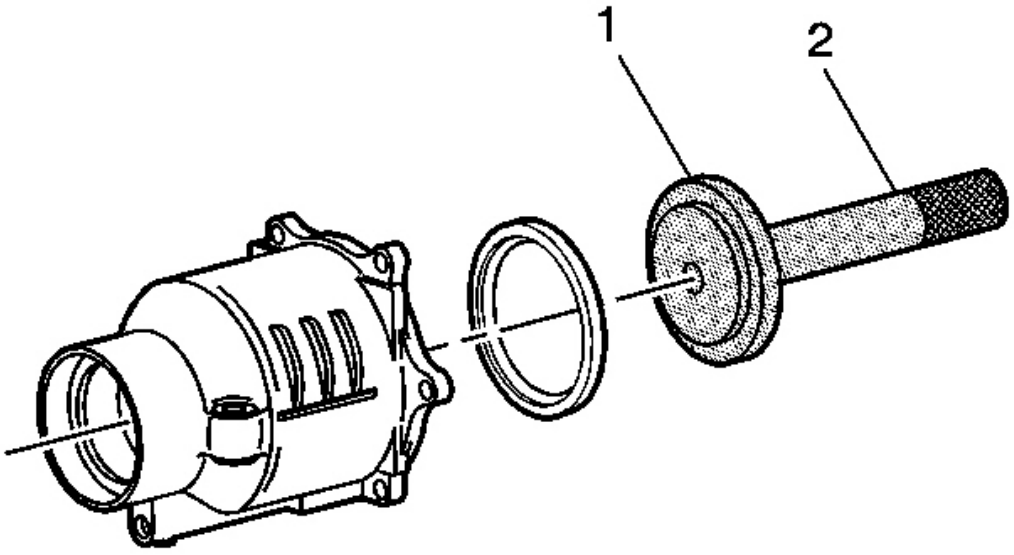


Fig. 199: Installing Front Clutch Drum Oil Seal
Courtesy of GENERAL MOTORS CORP.

12. Using **J 44852** install the front clutch drum oil seal. See **Special Tools and Equipment** .

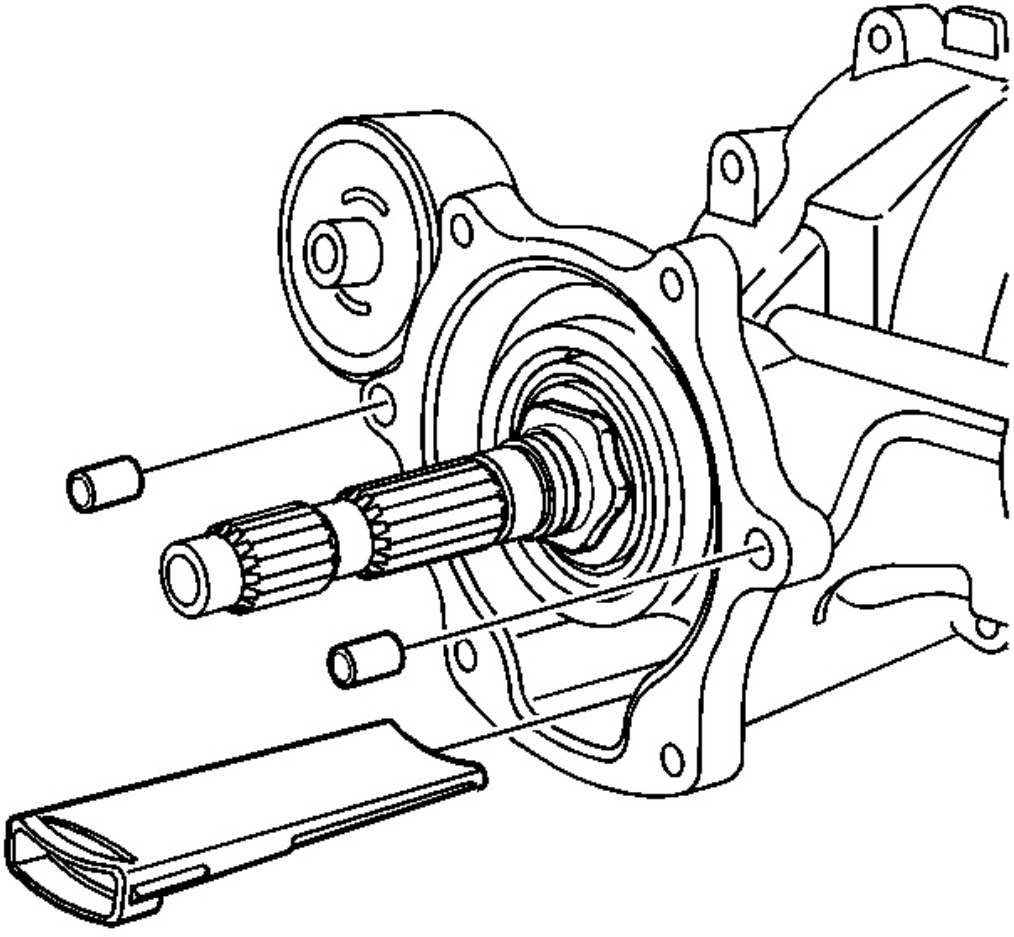


Fig. 200: Removing/Installing Filter Assembly
Courtesy of GENERAL MOTORS CORP.

13. Install the filter assembly.
14. Install the dowel pins.

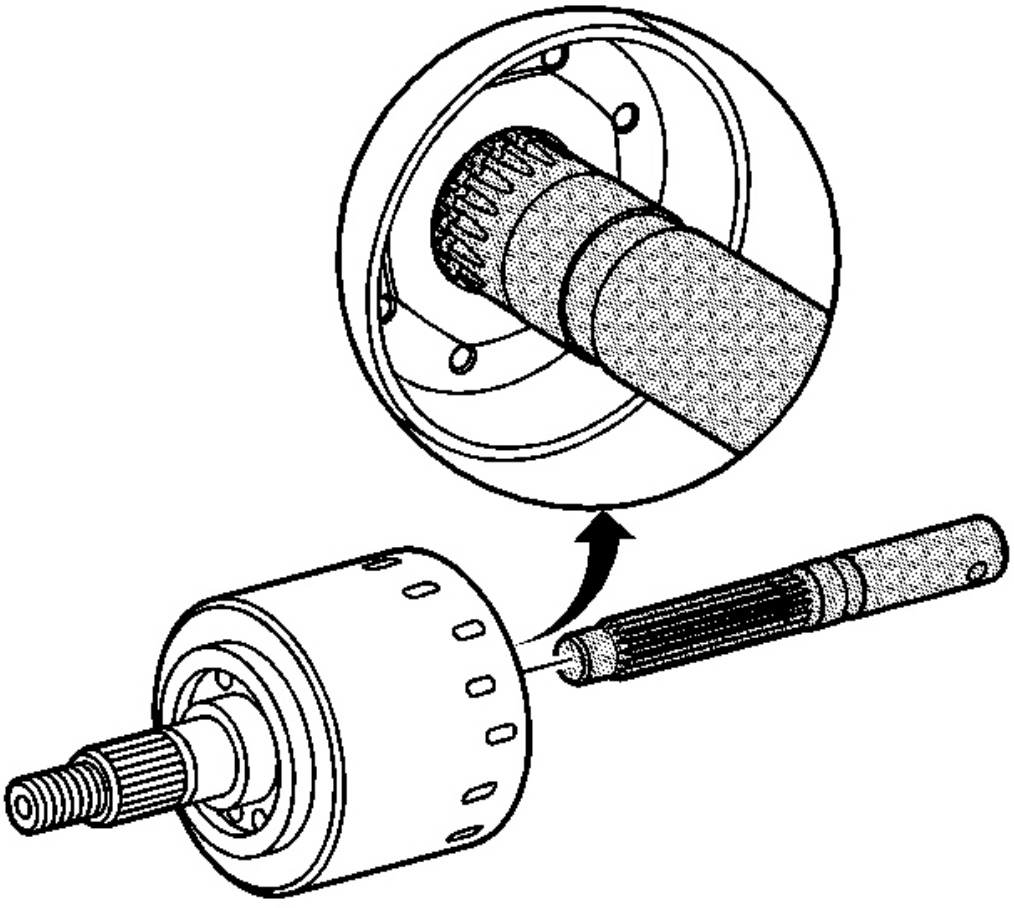


Fig. 201: Aligning Clutch With The Pump & Pump Bushing
Courtesy of GENERAL MOTORS CORP.

15. Align the clutch with the pump and the pump bushing. Place **J 46607** in the splines of the clutch. See **Special Tools and Equipment** . Twist **J 46607** back and forth to align the pump and the bushing. See **Special Tools and Equipment** . With a properly aligned clutch, the groove on **J 46607** will be flush with the drum as shown. See **Special Tools and Equipment** . Remove **J 46607** by pulling straight out. See **Special Tools and Equipment** .

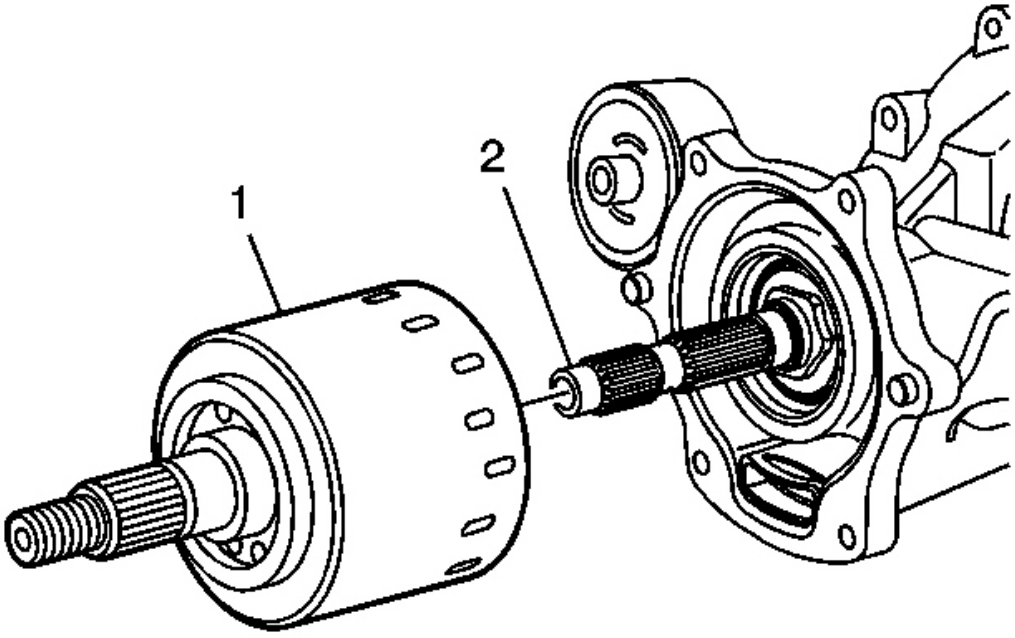


Fig. 202: Installing Clutch Drum On The Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

16. Install the clutch drum (1) on the pinion shaft (2) carefully.

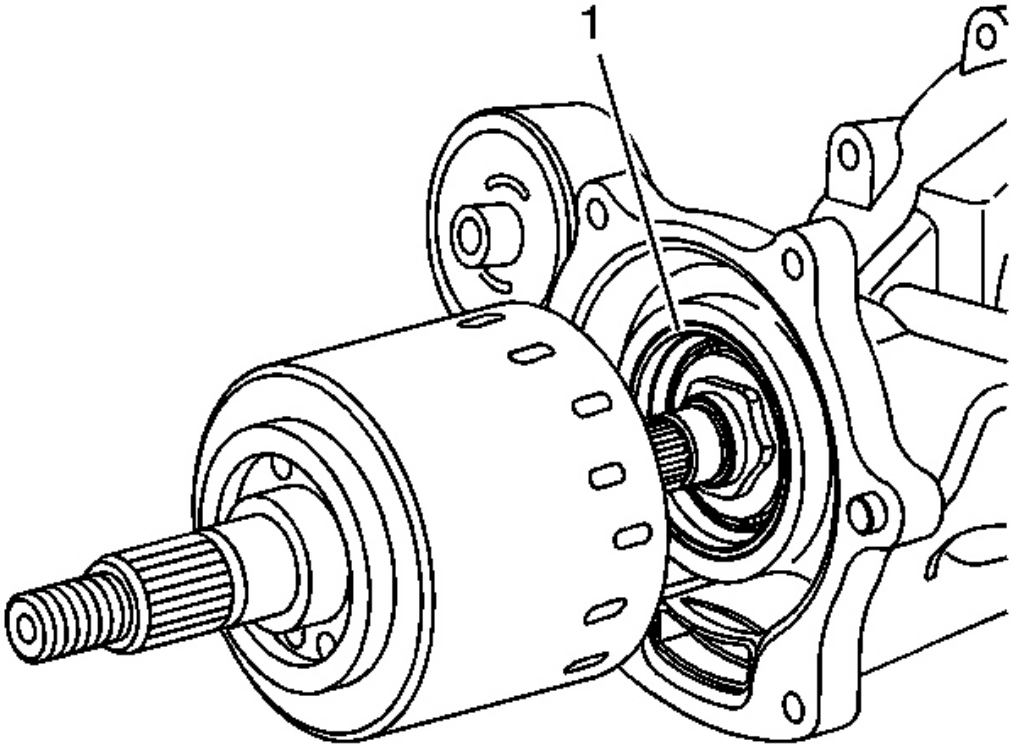


Fig. 203: Clutch Drum Oil Seal
Courtesy of GENERAL MOTORS CORP.

17. A properly installed clutch drum will be fully engaged into the seal (1).

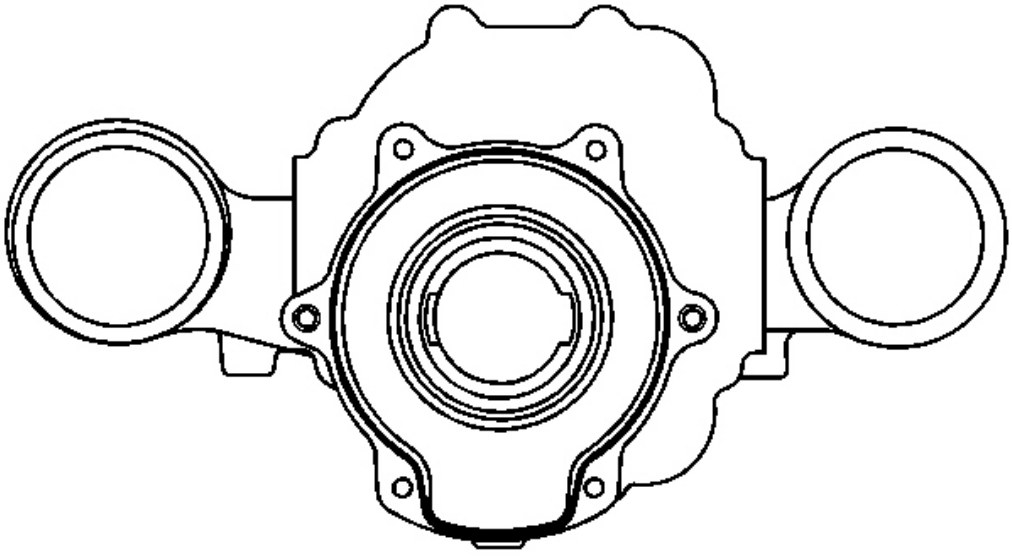


Fig. 204: RDM Housing Sealing Surface
Courtesy of GENERAL MOTORS CORP.

18. Apply sealant Saturn P/N 21019581 to the sealing surface of the differential housing. Apply a constant bead of sealer 2.5 mm (0.098 in) wide and thick.

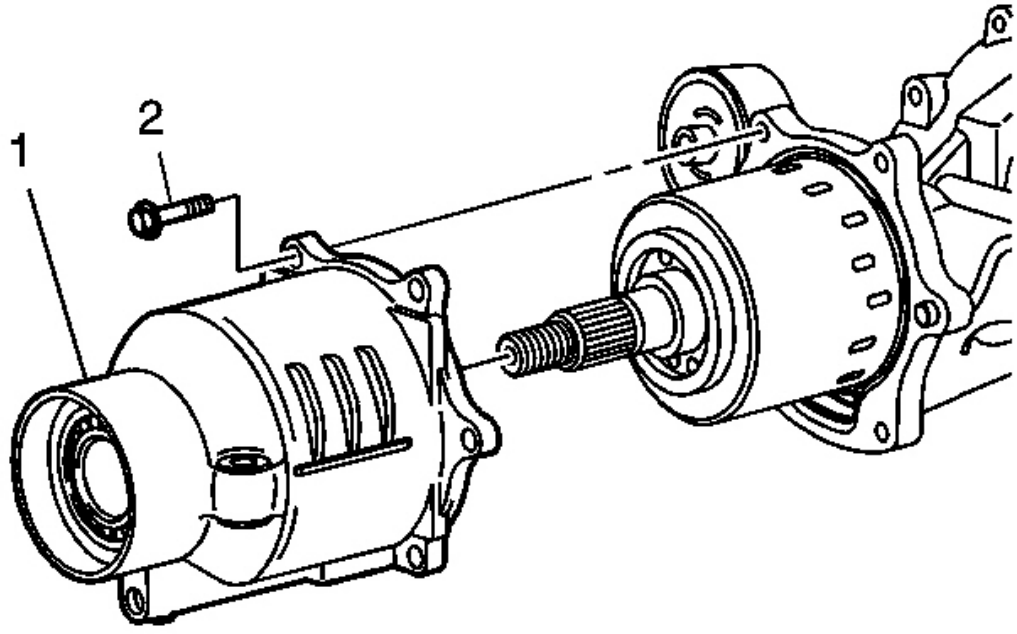


Fig. 205: Installing Clutch Housing Cover On The RDM
Courtesy of GENERAL MOTORS CORP.

19. Install the clutch cover (1) and bolts (2) to the differential housing and tighten the bolts.

    Tighten: Tighten the clutch cover bolts to 24 N.m (18 lb ft).

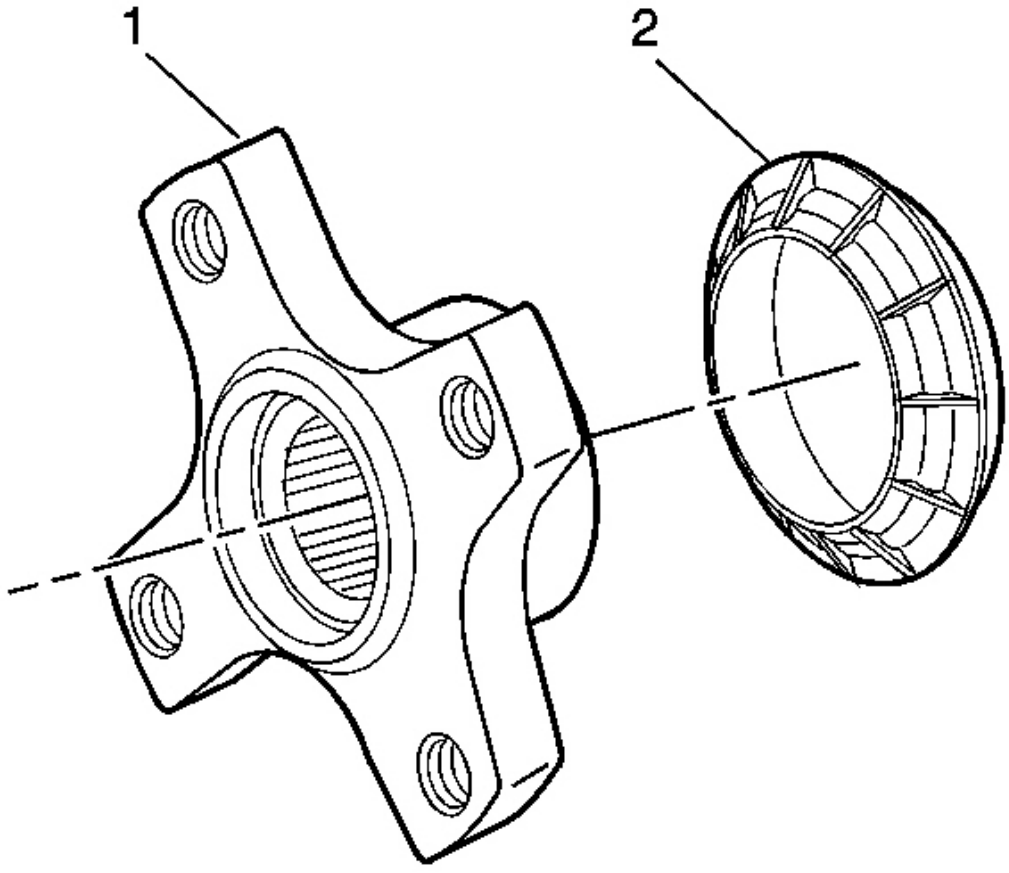


Fig. 206: Inspecting Dust Deflector For Cracks
Courtesy of GENERAL MOTORS CORP.

20. Install the dust deflector (2) to the flange (1) if required.

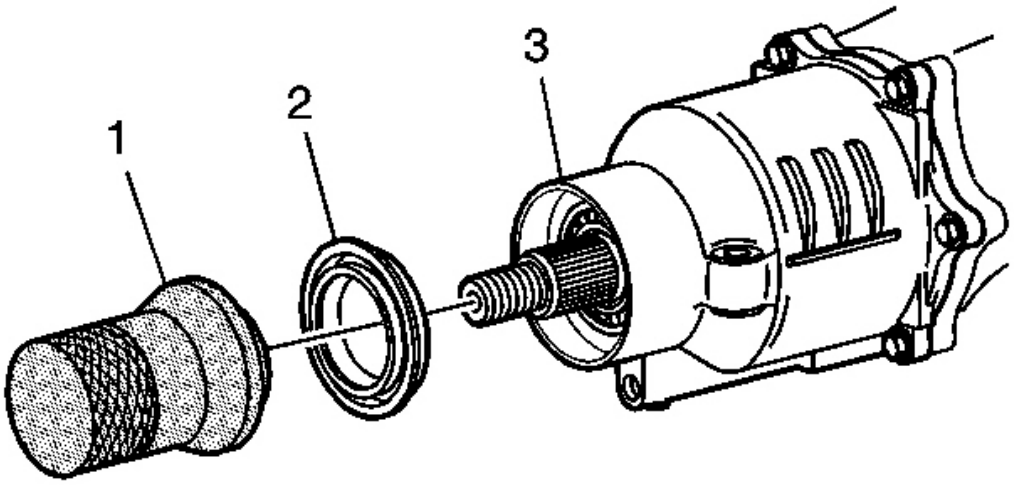


Fig. 207: Installing Input Shaft Seal On The Housing Cover
Courtesy of GENERAL MOTORS CORP.

21. Using **J 44851** (1), install the seal (2) into the housing (3). See **Special Tools and Equipment** .

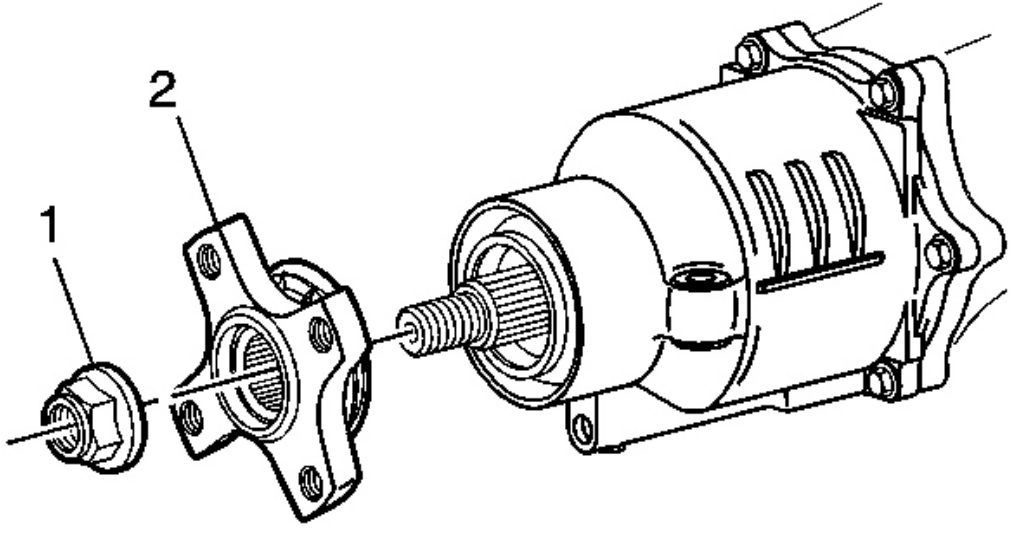


Fig. 208: Removing/Installing Input Flange On The Clutch Shaft
Courtesy of GENERAL MOTORS CORP.

22. Install the flange (2) and a new nut (1) to the pinion shaft.

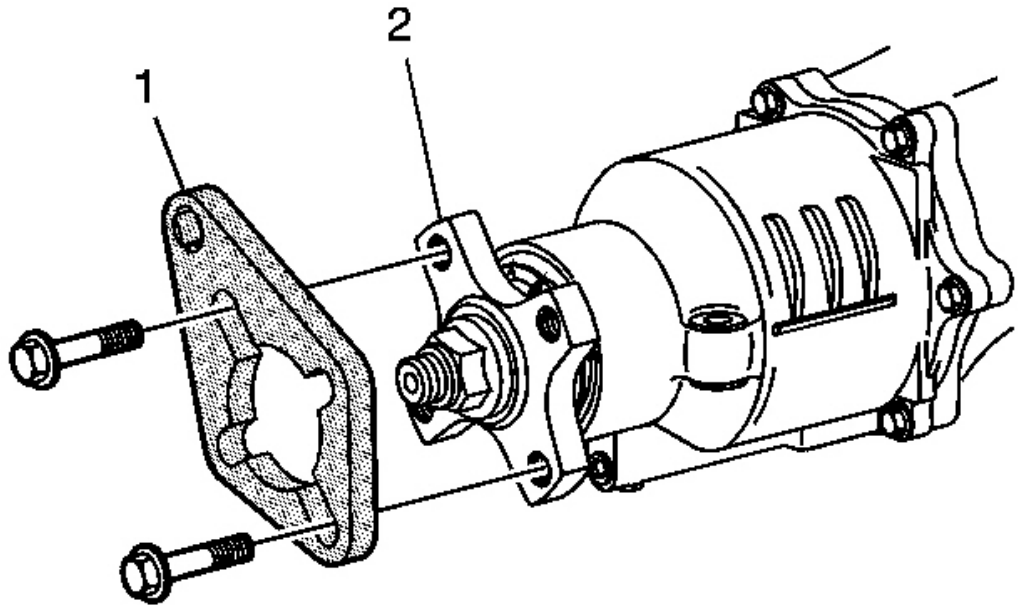


Fig. 209: Installing J44873 On The Pinion Flange
Courtesy of GENERAL MOTORS CORP.

23. Install **J 44873** (1) to the pinion flange (2) using J 44873-2 shoulder bolts. See **Special Tools and Equipment** . Attach half drive breaker bar in order to hold the pinion flange to tighten the nut.

    Tighten: Tighten the pinion shaft nut to 203 N.m (150 lb ft).

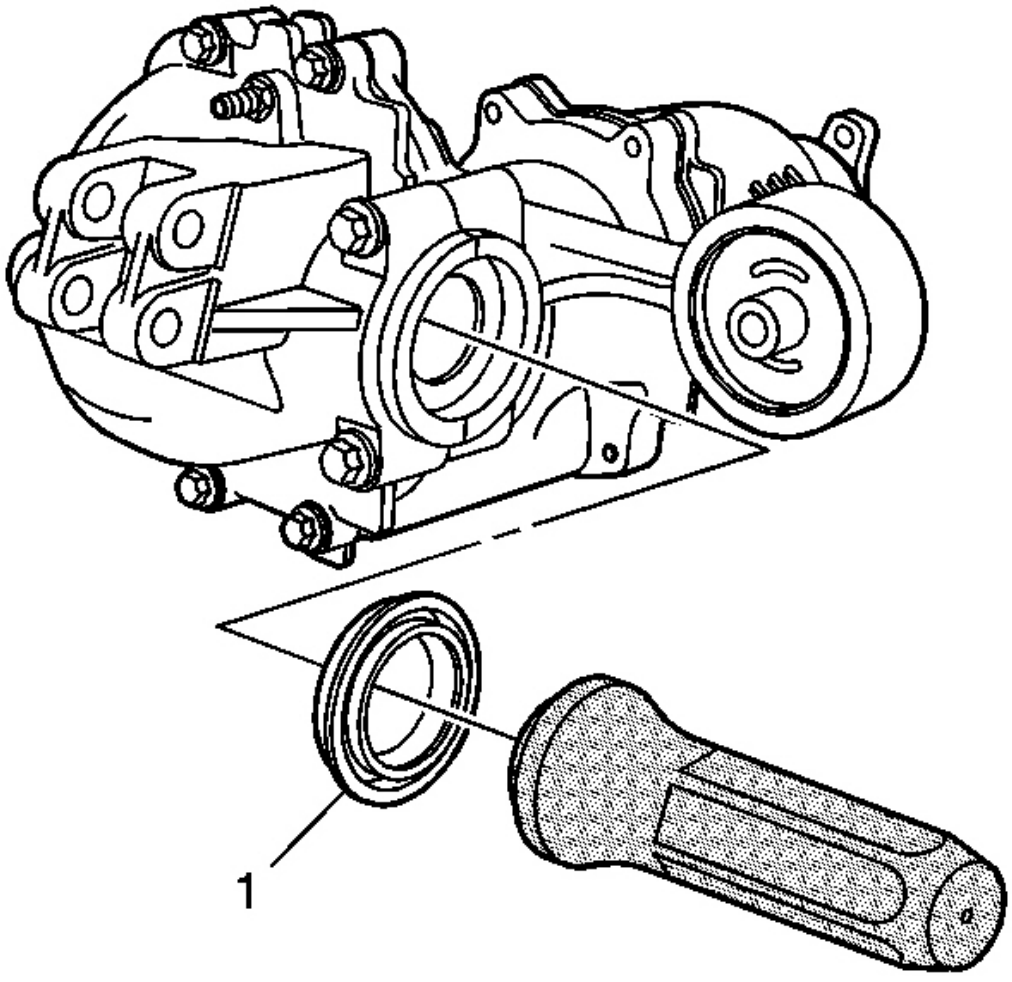


Fig. 210: Removing/Installing Right Rear Wheel & Tire Assembly
Courtesy of GENERAL MOTORS CORP.

24. Using **J 44809** , install the right axle shaft oil seal (1) into the differential housing. See **Special Tools and Equipment** .

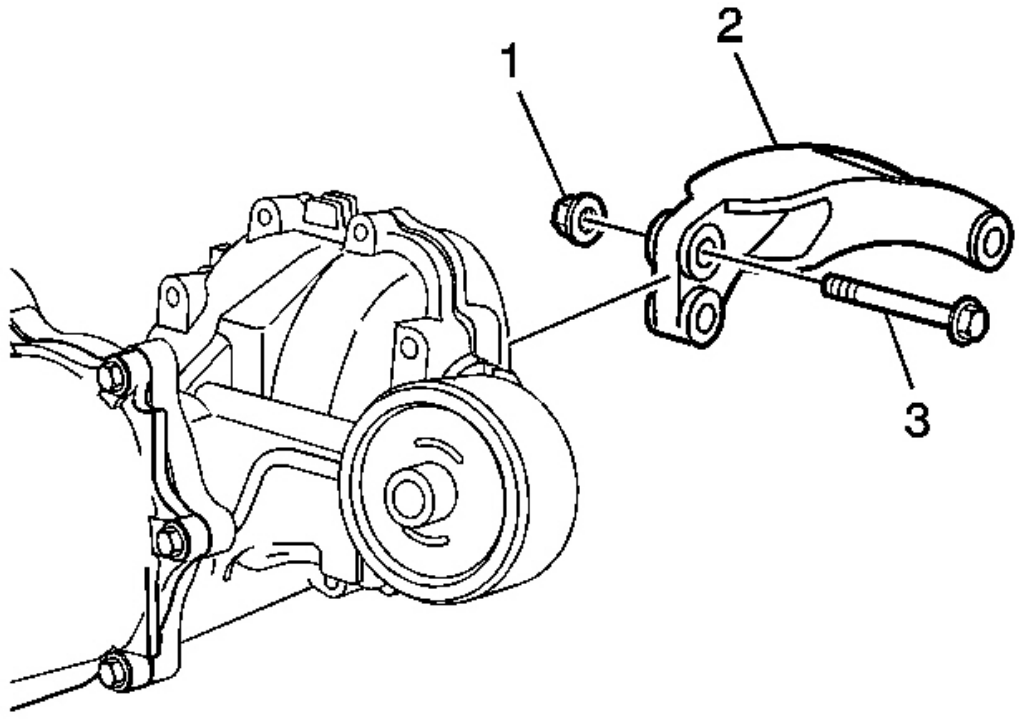


Fig. 211: Removing Rear Mounting Bracket & Bolts
Courtesy of GENERAL MOTORS CORP.

25. Install the rear mounting bracket (2), bolts (3) and the new nuts (1) to the differential housing and tighten the bolt.

    Tighten: Tighten the bracket-to-rear drive module bolts to 105 N.m (77 lb ft).

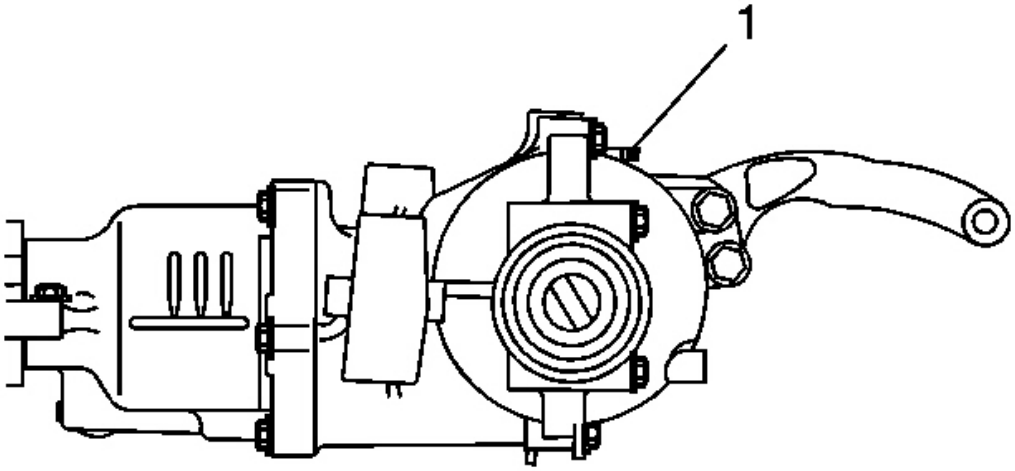


Fig. 212: Installing Vent On The Differential Housing
Courtesy of GENERAL MOTORS CORP.

26. Apply Saturn P/N 21485278 or equivalent on the threads and install the vent to the differential housing, if removed (1).

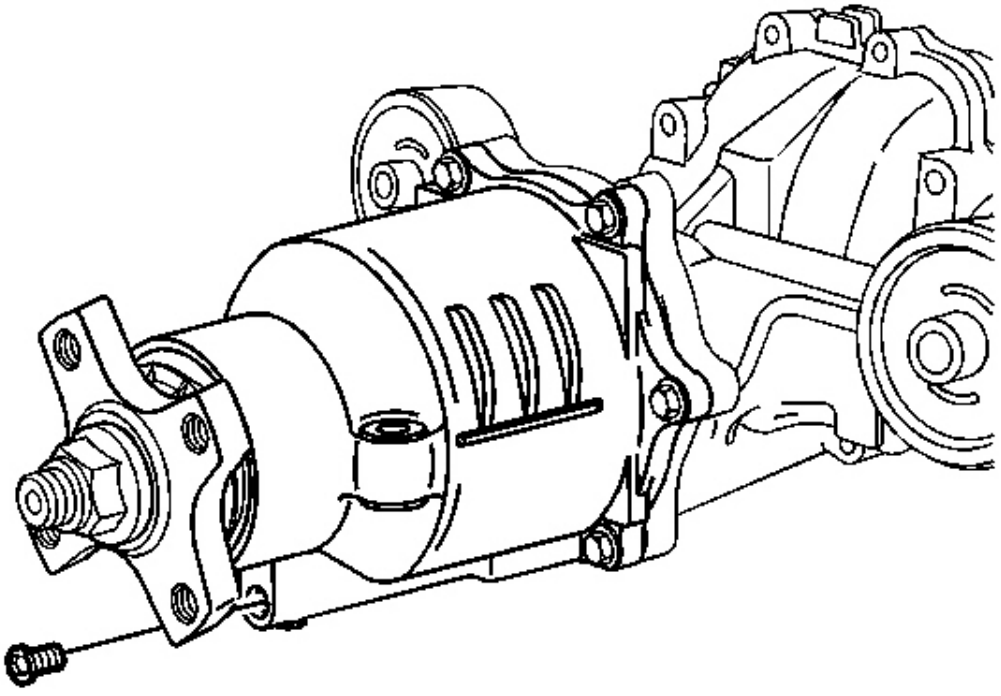


Fig. 213: Removing/Installing RDM Drain Plug
Courtesy of GENERAL MOTORS CORP.

27. Apply Saturn P/N 21485278 or equivalent to the drain plug threads.
28. Install the drain plug to the differential housing and tighten.

    Tighten: Tighten the drain plug to 30 N.m (22 lb ft).

29. Apply sealant Saturn P/N 21485278 or equivalent to the threads of the fill plug.
30. Install 750 mm (25.4 oz) GM VERSATRAK fluid Saturn P/N 12378514 after the axle is installed in the vehicle. Refer to **Lubricant Replacement - Rear Drive Axle** .

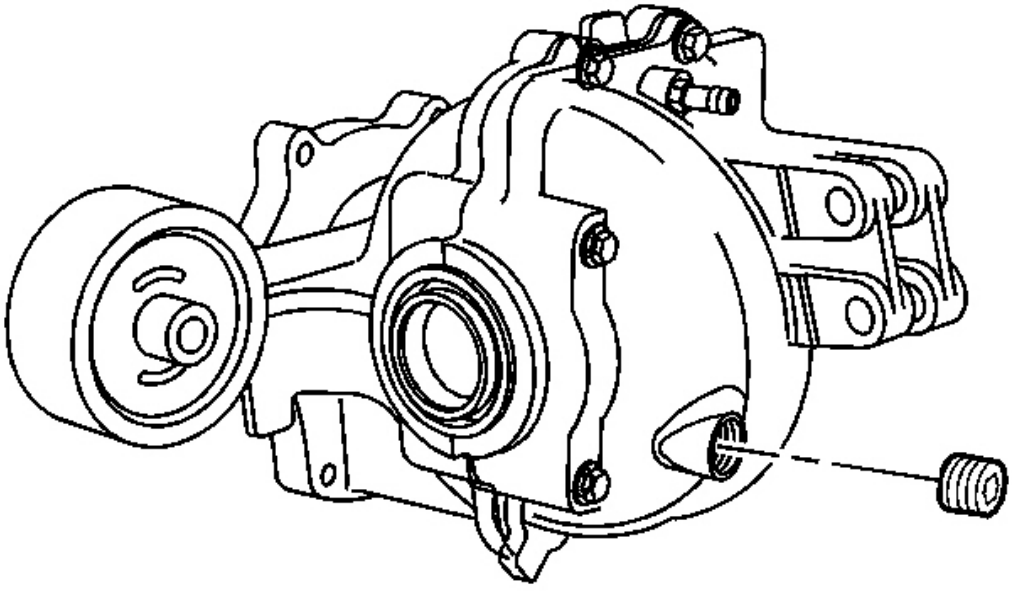


Fig. 214: Removing/Installing Fill Plug
Courtesy of GENERAL MOTORS CORP.

31. Install the fill plug and tighten.

    Tighten: Tighten the fluid fill plug to 35 N.m (26 lb ft).

DESCRIPTION AND OPERATION

REAR DRIVE AXLE DESCRIPTION AND OPERATION

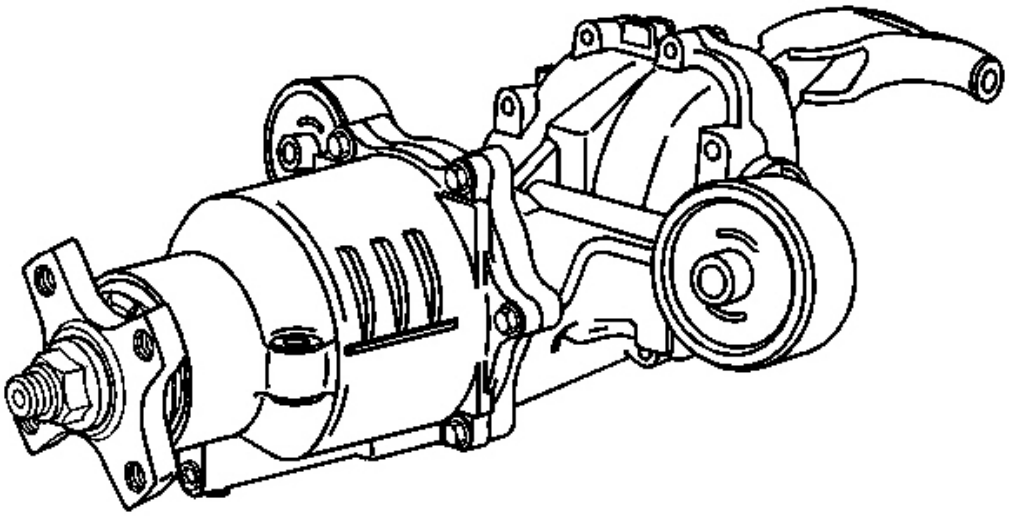


Fig. 215: View Of Rear Drive Axle
Courtesy of GENERAL MOTORS CORP.

The rear drive module (RDM) in this vehicle consists of an aluminum housing which contains a gerotor fluid pump, clutch pack and a differential. It has a common fluid reservoir.

The on-demand rear differential distributes variable torque/power to the rear wheels via individual axle shafts.

The on-demand system operates as follows: only when front wheel slippage is encountered torque/power is proportioned to the rear wheels. As long as there is no front-to-rear speed difference; there is no torque/power to the rear wheels.

When front-to-rear wheel slippage does occur, the rear differential (gerotor) pumps fluid stored in the sump to a piston which actuates a clutch pack, which then distributes torque/power to the rear wheels.

The system has an integral protection device that reduces rear wheel torque when excessive heat is generated, thus protecting the rear wheel drive module (RDM).

Rear Differential Assembly Fluid

The rear differential assembly uses a specifically developed synthetic hypoid fluid which is intended for a lifetime service interval. However, proper fluid level must be maintained to ensure proper rear differential assembly operation.

NOTE: Use only GM VERSATRAK fluid.

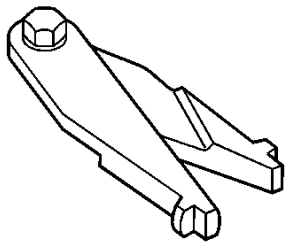
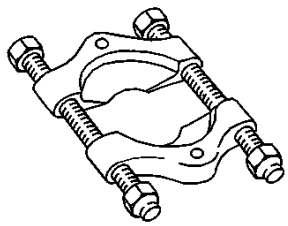
The fluid level range for proper rear differential assembly operation is 700-800 ml. New service replacement units will be shipped dry (without fluid). Fill new units with 750 ml of GM VERSATRAK fluid.

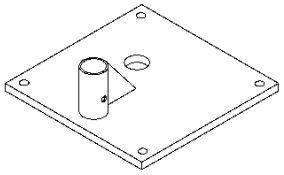
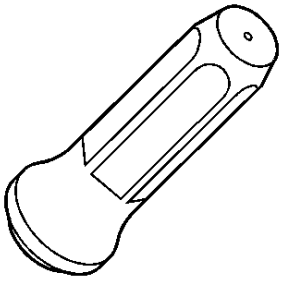
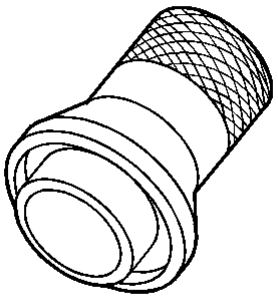
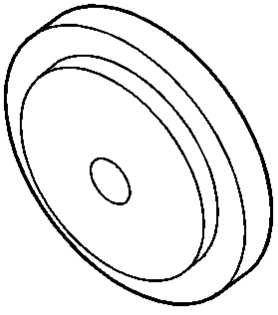
NOTE: **Do not use any leak detection dye additive. Additives may affect the operation of an All-Wheel Drive System. The GM VERSATRAK fluid Saturn P/N 12378514 contains a phosphorus agent, which when used with a black light will assist in leak detection.**

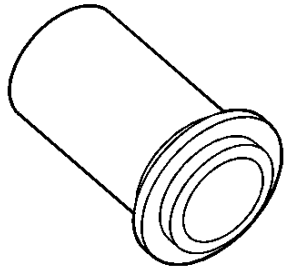
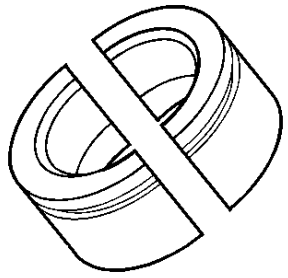
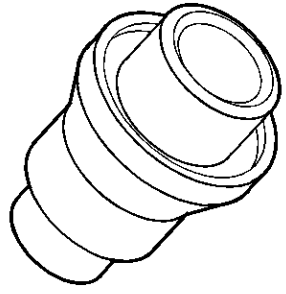
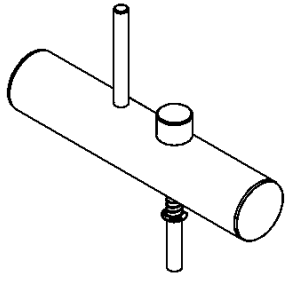
SPECIAL TOOLS AND EQUIPMENT

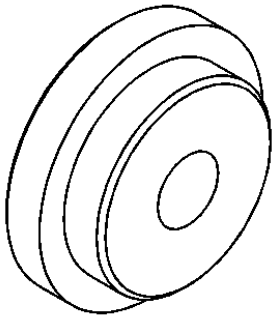
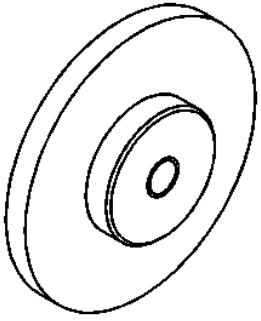
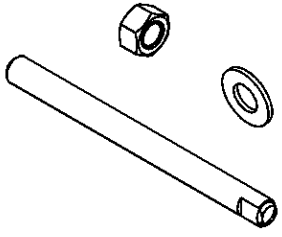
SPECIAL TOOLS

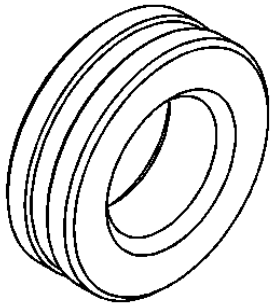
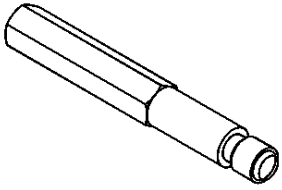
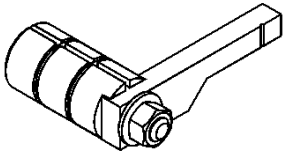
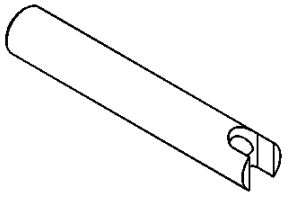
Special Tools

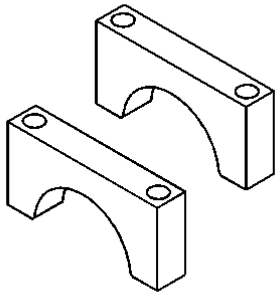
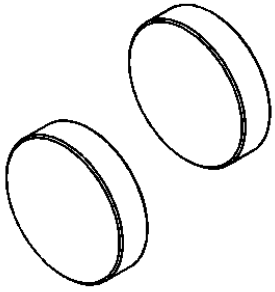
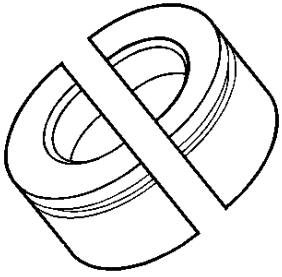
Illustration	Tool Number/Description
	J 3940 Bearing Race Remover
	J 22912-01 Bearing Puller
	J 35664 Pinion Shaft Bearing Installer
	J 43964

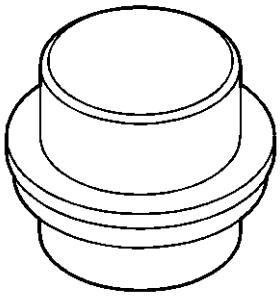
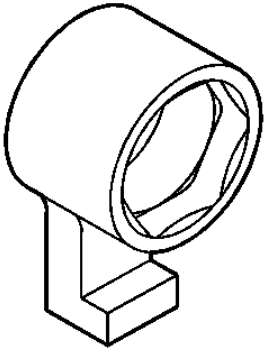
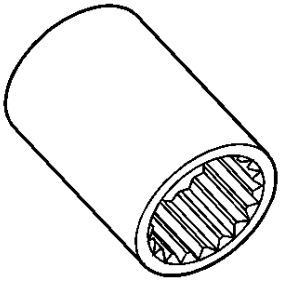
	Engine Stand Fixture Adapter
	J 44809 Output Shaft Seal Installer
	J 44851 Pinion Seal Installer
	J 44852 Front Clutch Drum Seal Installer

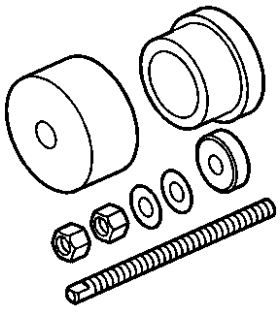
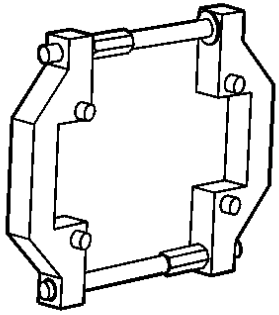
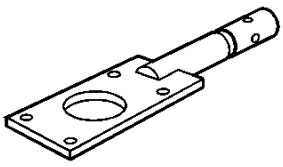
	J 44853 Rear Clutch Drum Seal Installer
	J 44854 Side Bearing Remover
	J 44855 Side Bearing Installer
	J 44856-01 Gage Arbor

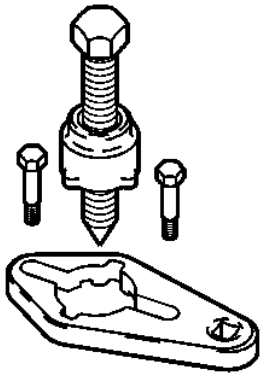
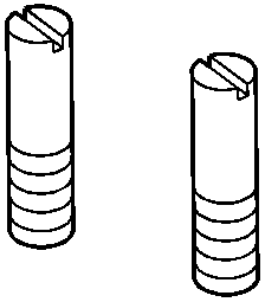
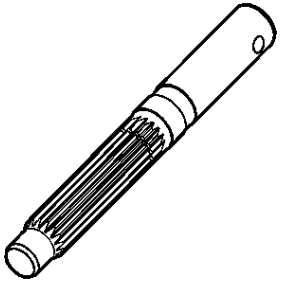
	J 44856-02 Front Pilot Washer
	J 44856-03 Gage Plate
	J 44856-04 Gage Stud
	J 44856-05 Master Bearings

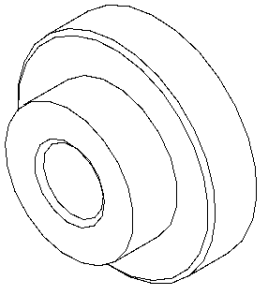
	
	J 44856-06 Gage Stud
	J 44856-07 Backlash Gage
	J 44856-08 Differential Pin Wrench
	J 44856-09 Master Bearing Caps

	
	J 44856-10 Alignment Disc
	J 44858 Pinion Bearing Remover
	J 44861 Pinion Inner Bearing Race Installer

	
	J 44864 Pinion Nut Wrench
	J 44865 Spline Socket
	J 44866 Support Bushing Remover and Installer

	
	J 44868 Housing Spreader
	J 44869 Assembly Holding Fixture
	J 44873 Pinion Flange Holder and Remover

	
	J 45923 Alignment Pins
	J 46607 Alignment Tool
	SA9114T

	Converter Bearing Installer