2004 DRIVELINE/AXLE

Front Drive Axle - C/K SUV

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Differential Adjuster Lock Nut Bolt	20 N.m	15 lb ft
Differential Carrier Assembly Case Bolts	47 N.m	35 lb ft
Differential Carrier Bracket to Frame Nuts	90 N.m	67 lb ft
Differential Carrier Assembly Mounting Bolts and Nuts	100 N.m	75 lb ft
Front Differential Carrier Shield Bolts	20 N.m	15 lb ft
Front Drive Axle Actuator	20 N.m	15 lb ft
Inner Shaft Housing to Bracket Nuts	100 N.m	75 lb ft
Inner Shaft Housing to Differential Carrier Assembly Bolts	40 N.m	30 lb ft
Pinion Shaft Lock Bolt, 9.25" axle	53 N.m	39 lb ft
Plug, Drain and Fill	33 N.m	24 lb ft
Ring Gear Bolts, 8.25" Axle	120 N.m	89 lb ft
Ring Gear Bolts, 9.25" Axle	138 N.m	102 lb ft
Stabilizer Link Nut	18 N.m	13 lb ft
Vent Hose Connector	28 N.m	21 lb ft
Wheel Drive Shaft Inboard Flange Bolts	79 N.m	58 lb ft
Wheel Drive Shaft to Front Hub Nut	240 N.m	177 lb ft
Yoke Retainer Bolts	25 N.m	18 lb ft

AXLE PRELOAD AND BACKLASH SPECIFICATIONS

Axle Preload and Backlash Specifications

Application	Specification	
	Metric	English
Backlash	0.08-0.25 mm	0.003-0.010 in
Backlash (Preferred)	0.13-0.18 mm	0.005-0.007 in
Pinion Bearing Preload, New Bearings	1.7-3.4 N.m	15-30 lb in
Pinion Bearing Preload, Used Bearings	1.1-2.3 N.m	10-20 lb in
Pinion and Differential Case Bearing Preload, New Bearings	3.4-6.2 N.m	30-55 lb in
Pinion and Differential Case Bearing Preload, Used Bearings	2.8-5.1 N.m	25-45 lb in

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SEALERS, ADHESIVES, AND LUBRICANTS

Sealers, Adhesives, and Lubricants

Application	Type of Material	GM Part Number
Differential Carrier Assembly Case Mating Surfaces	Sealant	1052942 (Canadian P/N 10953466) or equivalent
Electric Motor Actuator	Sealant	12346004 (Canadian P/N 10953480) or equivalent
Front Drive Axle (8.25" S4WD Axle)	Lubricant	1052271 (Canadian P/N 10950849) or SAE 80W-90 GL5
Front Drive Axle (8.25" F4WD Axle, 9.25" S4WD Axle)	Lubricant	12378261 (Canadian P/N 10953455) or equivalent meeting GM Specification 9986115
Front Drive Axle Inner Shaft Housing to Differential Carrier Assembly	Sealant	1052942 (Canadian P/N 10953466) or equivalent
Pinion Yoke Splines	Sealant	12346004 (Canadian P/N 10953480) or equivalent

COMPONENT LOCATOR

FRONT DRIVE AXLE DISASSEMBLED VIEWS

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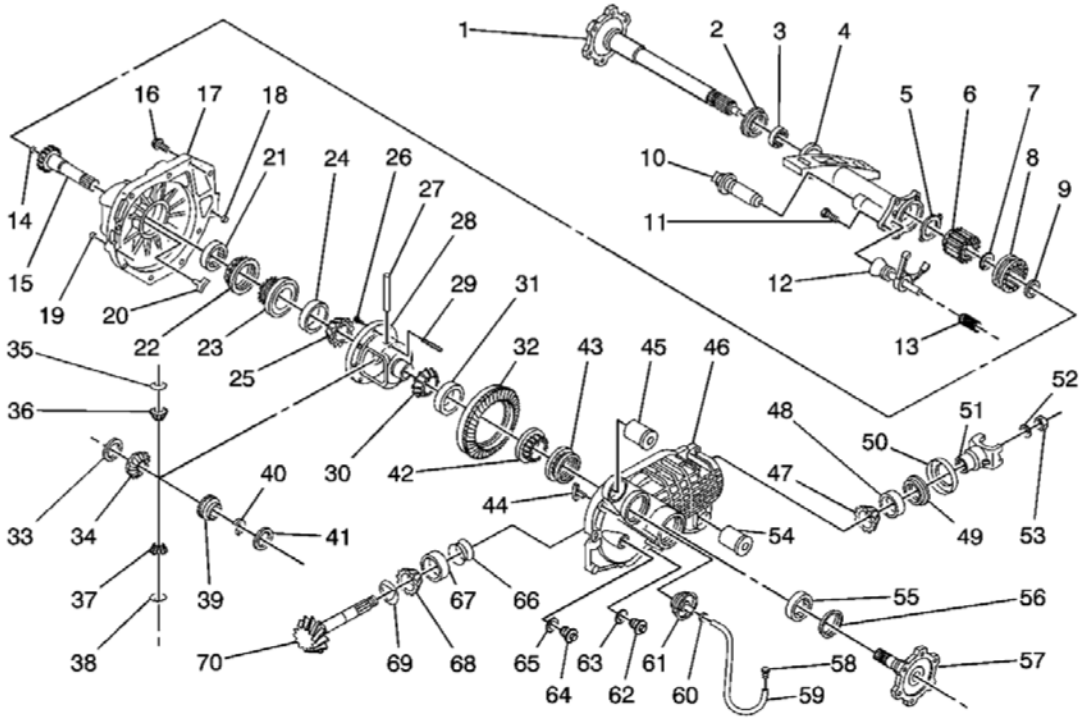


Fig. 1: Front Drive Axle Disassembled View (8.25 Inch) (S4WD)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Front Drive Axle Inner Shaft
2	Front Drive Axle Inner Shaft Seal
3	Front Drive Axle Inner Axle Shaft Bearing
4	Front Drive Axle Inner Shaft Housing
5	Front Drive Axle Clutch Gear Thrust Washer
6	Front Drive Axle Clutch Gear
7	Front Drive Axle Inner Shaft Retaining Ring
8	Front Drive Axle Clutch Sleeve
9	Front Drive Axle Clutch Gear Shim
10	Front Drive Axle Actuator
11	Front Drive Axle Inner Shaft Housing Bolt
12	Front Drive Axle Clutch Fork Assembly
13	Front Drive Axle Clutch Fork Inner Spring
14	Front Drive Axle Clutch Shaft Bearing
15	Front Drive Axle Clutch Shaft
16	Front Differential Carrier Case Half Bolt

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17	Front Differential Carrier Case Half
18	Front Differential Case Half Lock Pin
19	Front Differential Case Half Lock Pin
20	Front Differential Bearing Adjuster Nut Lock
21	Front Drive Axle Clutch Shaft Bearing
22	Front Differential Bearing Adjuster Nut
23	Front Differential Bearing Adjuster Nut Sleeve
24	Front Differential Side Bearing Cup
25	Front Differential Side Bearing
26	Front Differential Ring Gear Bolt
27	Front Differential Pinion Gear Shaft
28	Front Differential Case
29	Differential Pinion Gear Shaft Lock Bolt
30	Differential Side Bearing
31	Differential Side Bearing Cup
32	Front Differential Ring Gear
33	Differential Side Gear Thrust Washer
34	Differential Side Gear
35	Differential Pinion Gear Thrust Washer
36	Differential Pinion Gear
37	Differential Pinion Gear
38	Differential Pinion Gear Thrust Washer
39	Differential Side Gear
40	Differential Side Gear Retainer
41	Differential Side Gear Thrust Washer
42	Front Differential Bearing Adjuster Nut Sleeve
43	Front Differential Bearing Adjuster Nut
44	Front Differential Bearing Adjuster Nut Lock
45	Front Differential Carrier Bushing
46	Front Differential Carrier Case Half
47	Front Differential Drive Pinion Gear Outer Bearing
48	Front Differential Drive Pinion Gear Outer Bearing Cup
49	Front Differential Drive Pinion Gear Oil Seal
50	Front Differential Drive Pinion Gear Deflector
51	Front Differential Drive Pinion Gear Yoke
52	Front Differential Drive Pinion Gear Yoke Washer
53	Front Differential Drive Pinion Gear Yoke Nut
54	Front Differential Carrier Bushing
55	Front Differential Inner Shaft Bearing
56	Front Differential Inner Shaft Seal
57	Front Drive Axle Inner Shaft

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	Front Differential Carrier Vent
59	Front Axle Vent Hose
60	Clamp
61	Front Differential Carrier Vent Hose Connector
62	Front Differential Carrier Oil Drain Plug
63	Front Differential Carrier Oil Drain Plug Washer
64	Front Differential Carrier Oil Fill Plug
65	Front Differential Carrier Oil Fill Plug Washer
66	Front Differential Drive Pinion Gear Bearing Spacer
67	Front Differential Drive Pinion Gear Inner Bearing Cup
68	Front Differential Drive Pinion Gear Inner Bearing
69	Front Differential Drive Pinion Gear Bearing Shim
70	Front Differential Drive Pinion Gear

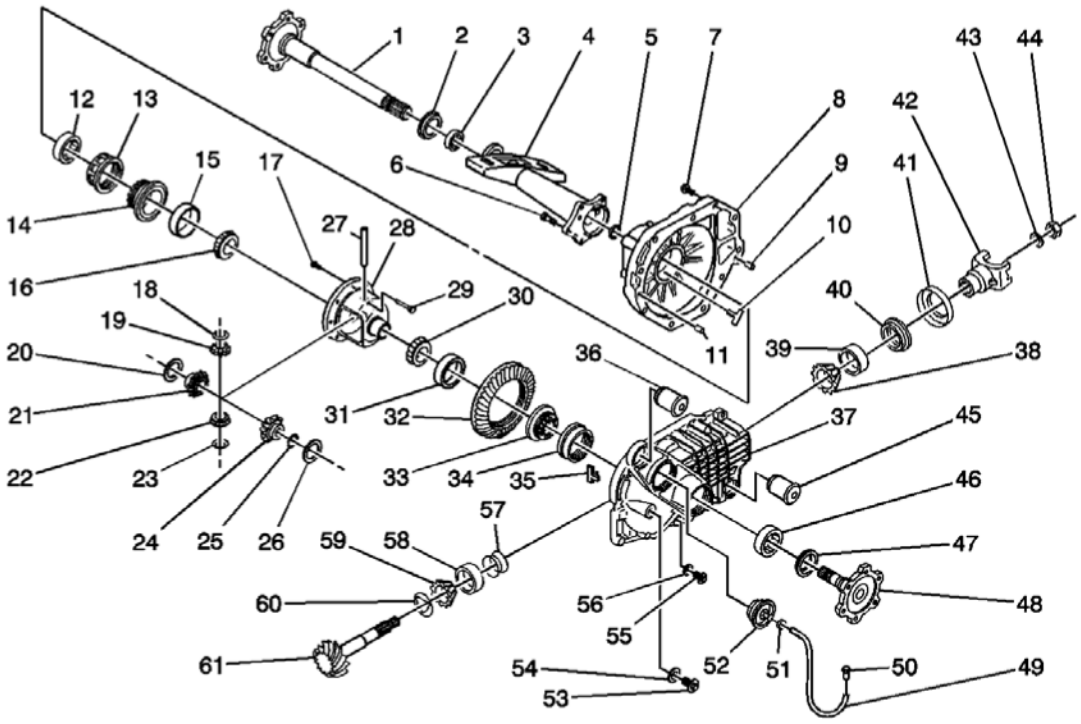


Fig. 2: Front Drive Axle Disassembled View (8.25 Inch) (F4WD)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

Callout	Component Name
1	Front Drive Axle Inner Shaft
2	Front Drive Axle Inner Shaft Seal

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3	Front Drive Axle Inner Shaft Bearing
4	Front Drive Axle Inner Shaft Housing
5	Front Drive Axle Inner Shaft Retaining Ring
6	Front Drive Axle Inner Shaft Bolt
7	Front Differential Carrier Case Bolt
8	Front Differential Carrier Case Half
9	Front Differential Carrier Half Lock Pin
10	Front Differential Bearing Adjuster Lock Pin
11	Front Differential Case Half Lock Pin
12	Front Drive Axle Clutch Shaft Bearing
13	Front Differential Bearing Adjuster Nut
14	Front Differential Bearing Adjuster Nut Sleeve
15	Front Differential Case Side Bearing Cup
16	Front Differential Case Side Bearing
17	Front Differential Ring Gear Bolt
18	Differential Pinion Gear Thrust Washer
19	Differential Pinion Gear
20	Differential Side Gear Thrust Washer
21	Differential Side Gear
22	Differential Pinion Gear
23	Differential Pinion Gear Thrust Washer
24	Front Differential Side Gear
25	Differential Side Gear Retainer
26	Front Differential Side Gear Thrust Washer
27	Front Differential Pinion Gear Shaft
28	Front Differential Case
29	Differential Pinion Gear Shaft Lock Bolt
30	Differential Case Side Bearing
31	Differential Case Side Bearing Cup
32	Front Differential Ring Gear
33	Front Differential Bearing Adjuster Nut
34	Front Differential Bearing Adjuster Nut Sleeve
35	Front Differential Bearing Adjuster Nut Lock
36	Front Differential Carrier Bushing
37	Front Differential Carrier Case Half
38	Front Differential Drive Pinion Gear Outer Bearing
39	Front Differential Drive Pinion Gear Outer Bearing Cup
40	Front Differential Drive Pinion Gear Oil Seal
41	Front Differential Drive Pinion Gear Deflector
42	Front Differential Drive Pinion Gear Yoke
43	Front Differential Drive Pinion Gear Yoke Washer

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	Front Differential Drive Pinion Gear Yoke Nut
45	Front Differential Carrier Bushing
46	Front Differential Inner Shaft Bearing
47	Front Drive Axle Inner Shaft
48	Front Drive Axle Inner Shaft
49	Front Axle Vent Hose
50	Front Axle Vent
51	Clamp
52	Front Differential Carrier Vent Hose Connector
53	Front Differential Carrier Oil Drain Plug
54	Front Differential Carrier Oil Drain Plug Washer
55	Front Differential Carrier Oil Fill Plug
56	Front Differential Carrier Oil Fill Plug Washer
57	Front Differential Drive Pinion Gear Bearing Spacer
58	Front Differential Drive Pinion Gear Inner Bearing Cup
59	Front Differential Drive Pinion Gear Inner Bearing
60	Front Differential Drive Pinion Gear Inner Bearing Shim
61	Front Differential Drive Pinion Gear

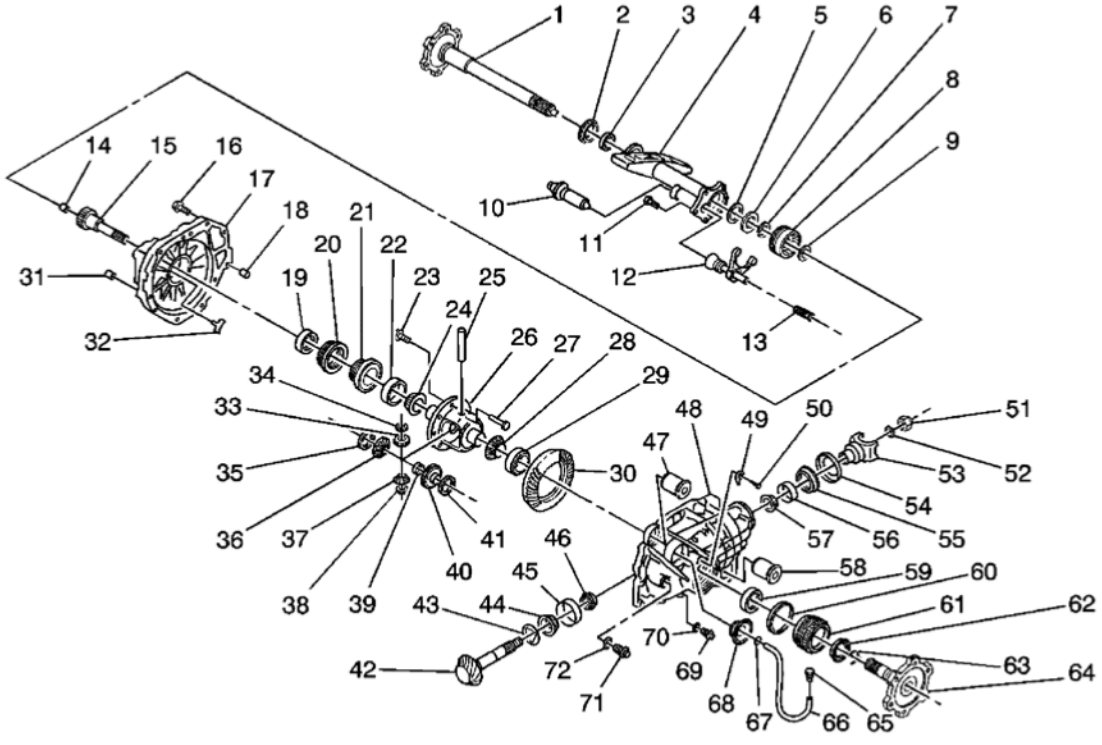


Fig. 3: Front Drive Axle Disassembled View (9.25 Inch)
Courtesy of GENERAL MOTORS CORP.

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Callouts For Fig. 3

Callout	Component Name
1	Front Drive Axle Inner Shaft
2	Front Drive Axle Inner Shaft Seal
3	Front Drive Axle Inner Axle Shaft Bearing
4	Front Drive Axle Inner Shaft Housing
5	Front Drive Axle Clutch Gear Thrust Washer
6	Front Drive Axle Clutch Gear
7	Front Drive Axle Inner Shaft Retaining Ring
8	Front Drive Axle Clutch Sleeve
9	Front Drive Axle Clutch Shim
10	Front Drive Axle Actuator
11	Front Drive Axle Inner Shaft Housing Bolt
12	Front Drive Axle Clutch Fork Assembly
13	Front Drive Axle Clutch Fork Inner Spring
14	Front Drive Axle Clutch Shaft Bearing
15	Front Drive Axle Clutch Shaft
16	Front Differential Carrier Bolt
17	Front Differential Carrier
18	Front Differential Carrier Half Location Pin
19	Front Differential Case Bearing
20	Front Differential Bearing Adjuster Nut
21	Front Differential Bearing Adjuster Nut Sleeve
22	Front Differential Side Bearing Cup
23	Differential Ring Gear Bolt
24	Front Differential Side Bearing
25	Front Differential Pinion Gear Shaft
26	Front Differential Case
27	Differential Pinion Gear Shaft Lock Bolt
28	Differential Side Bearing
29	Differential Side Bearing Cup
30	Front Differential Ring Gear
31	Front Differential Half Carrier Location Pin
32	Front Differential Bearing Adjuster Nut Lock
33	Differential Pinion Gear
34	Differential Pinion Gear Thrust Washer
35	Differential Side Gear Thrust Washer
36	Differential Side Gear
37	Differential Pinion Gear
38	Differential Pinion Gear Thrust Washer
39	Front Differential Side Gear Spacer

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40	Front Differential Side Gear
41	Front Differential Side Gear Thrust Washer
42	Front Differential Drive Pinion Gear
43	Differential Drive Pinion Gear Bearing Shim
44	Front Differential Drive Pinion Gear Inner Bearing
45	Front Differential Drive Pinion Gear Inner Bearing Cup
46	Front Differential Drive Pinion Gear Bearing Spacer
47	Front Differential Carrier Bushing
48	Front Differential Carrier
49	Front Differential Bearing Adjuster Nut Lock
50	Bolt
51	Front Differential Drive Pinion Gear Yoke Nut
52	Front Differential Drive Pinion Gear Thrust Washer
53	Front Differential Drive Pinion Gear Yoke
54	Front Differential Drive Pinion Gear Bearing Dirt Deflector
55	Front Differential Drive Pinion Gear Seal
56	Front Differential Drive Pinion Gear Outer Bearing Cup
57	Front Differential Drive Pinion Gear Outer Bearing
58	Front Differential Carrier Bushing
59	Differential Bearing
60	Front Differential Bearing Adjuster O-Ring Seal
61	Front Differential Bearing Adjuster
62	Front Drive Axle Inner Shaft Seal
63	Front Drive Axle Inner Shaft Retaining Ring
64	Front Drive Axle Inner Shaft
65	Front Differential Carrier Vent
66	Fuel and Oil Resistant Hose
67	Clamp
68	Front Differential Carrier Vent Hose Connector
69	Front Differential Carrier Oil Drain Plug
70	Front Differential Carrier Oil Drain Plug Washer
71	Front Differential Carrier Oil Fill Plug
72	Front Differential Carrier Oil Fill Plug Washer

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - FRONT DRIVE AXLE

Begin the system diagnosis by reviewing the system Description and Operation. Refer to **Front Drive Axle Description and Operation**. Reviewing the Description and Operation information will help you determine the correct symptom diagnostic procedure when a malfunction exist. Reviewing the Description and Operation information will also help you determine if the condition described by the customer is normal operation. Refer

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to **Symptoms - Front Drive Axle** in order to identify the correct procedure for diagnosing the system and where the procedure is located.

SYMPTOMS - FRONT DRIVE AXLE

Before beginning diagnosis, review the system description and operation in order to familiarize yourself with the system functions. Refer to **Front Drive Axle Description and Operation**.

Noise Diagnosis

Any gear-driven unit produces a certain amount of noise that is normal and that conventional repairs or adjustment cannot eliminate. Slight noise that is heard only at a certain speed or under unusual or remote conditions is acceptable. For example, this noise tends to reach a peak at speeds from 60-100 km/h (40-60 mph) depending upon road and load conditions, or upon gear ratio and tire size. Noise of this kind does not indicate trouble in the axle assembly.

When an axle is suspected of being noisy, make a thorough test in order to determine whether the noise originates in the tires, road surface, wheel bearings, engine, transmission, propeller shaft, or axle assembly.

Classifying the Symptom

Front Drive Axle symptoms can usually be classified into the following categories:

- Leaks
- Noises
- Vibrations

Leak and noise related symptoms are diagnosed within the Front Drive Axle section. For vibration related symptoms, refer to **Diagnostic Starting Point - Vibration Diagnosis and Correction** in Vibration Diagnosis and Correction.

Visual/Physical Inspection

- Inspect the system for loose or missing fasteners.
- Inspect the system for loose or leaking components.
- Inspect the system for obvious damage or conditions which may cause the symptom.

Symptoms List

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

- **Front Drive Axle Noises**
- **Noisy in Drive**
- **Noisy When Coasting**
- **Intermittent Noise**

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- **Constant Noise**
- **Noisy on Turns**
- **Front Axle Lubricant Leak Diagnosis**

FRONT DRIVE AXLE NOISES

Gear Noise

Gear noise or whine is audible from 32-89 km/h (20-55 mph) under 4 driving conditions:

- Drive - Acceleration or heavy pull
- Road Load - Vehicle driving load or constant speed
- Float - Using enough throttle to keep the vehicle from driving the engine, the vehicle slows down gradually but the engine still pulls slightly
- Coast - Throttle is closed and the vehicle is in gear

Gear noise most frequently has periods where the noise is more prominent, usually between 48-64 km/h (30-40 mph) and 80-85 km/h (50-53 mph). Gear whine is corrected by ring and pinion gear replacement or adjustment, depending on the mileage of the gear set.

Bearing Noise

Faulty bearings produce a rough growl or grating sound, rather than the whine typical of gear noise. Bearing noise (hum) will pulsate at a constant vehicle speed. This indicates a bad pinion or a bad front axle side bearing. This noise can be confused with front wheel bearing noise. Inspect and replace the bearings and the affected components as required.

Front Wheel Bearing Noise

A rough front wheel bearing produces a noise which continues with the car coasting at low speed and the transmission in neutral. The noise may diminish some when the brakes are gently applied. The noise may also change when performing side-to-side maneuvers with the vehicle.

A rough and/or noisy wheel bearing can be heard by spinning the wheels by hand and listening at the hubs for the noise. Inspect and replace the bearings and the affected components as needed.

Knock at Low Speeds

A low speed knock can be caused by a differential case side gear bore that has worn oversize. Inspect the side gears and the differential case assembly and replace the components as necessary.

Backlash Clunk

Excessive backlash clunk under acceleration or de-acceleration can be caused by any of the following:

- Worn differential pinion shaft

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- Worn differential pinion and/or side gear teeth
- Worn thrust washers
- Excessive clearance between the side gears and the axle shafts
- Excessive clearance between differential side gears and the bore in the case
- Excessive drive pinon and ring gear backlash

Inspect, adjust or replace the affected components as necessary.

NOISY IN DRIVE

Noisy in Drive

Checks	Action
Excessive pinion to ring gear backlash	Adjust the pinion to ring gear backlash. Refer to **Backlash Inspection and Adjustment**.
Worn pinion and ring gear	Replace the pinion and the ring gear. Perform the following procedures: 1. **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)** 2. **Differential Case Assembly Disassemble (8.25 Inch Axle)** or **Differential Case Assembly Disassemble (9.25 Inch Axle)** 3. **Differential Case Assembly Assemble (8.25 Inch Axle)** or **Differential Case Assembly Assemble (9.25 Inch Axle)** 4. **Pinion Bearing Cup Installation (8.25 Inch Axle w/J 45858)** or **Pinion Bearing Cup Installation (9.25 Inch Axle w/J 45754)** or **Pinion Bearing Cup Installation (8.25/9.25 Inch Axles w/J 36598)** 5. **Differential Carrier Assembly - Assemble**
Worn pinion bearings	Replace the pinion bearings. Perform the following procedures: 1. **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)** 2. **Pinion Bearing Cup Installation (8.25 Inch Axle w/J 45858)** or **Pinion Bearing Cup Installation (9.25 Inch Axle w/J 45754)** or **Pinion Bearing Cup Installation (8.25/9.25 Inch Axles w/J 36598)** 3. **Differential Carrier Assembly - Assemble**
Loose pinion bearings	Adjust the pinion bearings preload. Perform the following procedures: 1. **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)**

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	2. **Differential Carrier Assembly - Assemble** 3. **Backlash Inspection and Adjustment**
Excessive pinion end play	Adjust the pinion end play. Refer to **Differential Carrier Assembly - Assemble**.
Worn differential bearings	Replace the differential bearings. Perform the following procedures: 1. **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)** 2. **Differential Case Assembly Disassemble (8.25 Inch Axle)** or **Differential Case Assembly Disassemble (9.25 Inch Axle)** 3. **Differential Case Assembly Assemble (8.25 Inch Axle)** or **Differential Case Assembly Assemble (9.25 Inch Axle)** 4. **Differential Carrier Assembly - Assemble**
Loose differential bearings	Adjust the differential bearing preload. Perform the following procedures: 1. **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)** 2. **Differential Carrier Assembly - Assemble**
Excessive ring gear runout	Replace the ring gear. Perform the following procedures: 1. **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)** 2. **Differential Carrier Assembly - Assemble**
Low oil level	Fill the fluid level to specifications with the proper lubricant. Refer to **Lubricant Level Inspection - Front Drive Axle**.
Wrong or poor grade oil	Drain and refill the system with the proper lubricant. Refer to **Lubricant Replacement - Front Drive Axle**.

NOISY WHEN COASTING

Noisy When Coasting

Checks	Action
DEFINITION: Noise is audible when slowing down and disappears when driving.	
Worn pinion and ring gear	Adjust or replace the pinion and the ring gear. Refer to **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)**.
Pinion and ring gear too tight	Adjust the pinion and the ring gear backlash. Refer to **Backlash Inspection and Adjustment**.

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INTERMITTENT NOISE

Intermittent Noise

Checks	Action
Warped ring gear	Replace the ring gear. Refer to **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)**.
Loose differential case assembly	Set the differential case assembly to the proper preload and backlash. Refer to **Differential Carrier Assembly - Assemble** and **Backlash Inspection and Adjustment**.

CONSTANT NOISE

Constant Noise

Checks	Action
Flat spot on the pinion or the ring gear teeth	Replace the pinion and the ring gear. Refer to **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)**.
Flat spot on the pinion bearing	Replace the bearing. Refer to **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)**.
Worn pinion splines	Replace the pinion. Refer to **Differential Carrier Assembly - Disassemble (9.25 Inch Axle)** or **Differential Carrier Assembly - Disassemble (8.25 Inch Axles)**.

NOISY ON TURNS

Noisy on Turns

Checks	Action
Worn differential side gears and pinions	Replace the differential side gears and pinions. Refer to **Differential Case Assembly Disassemble (8.25 Inch Axle)** or **Differential Case Assembly Disassemble (9.25 Inch Axle)**.
Worn differential spider	Replace the spine gears. Refer to **Differential Case Assembly Disassemble (8.25 Inch Axle)** or **Differential Case Assembly Disassemble (9.25 Inch Axle)**.
Worn axle shaft splines	Replace the axle shaft. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle)**.

WHEEL BEARING WEAR - FRONT DRIVE AXLE (STRAIGHT)

Straight Roller Bearing Diagnosis

Consider the following factors when diagnosing a bearing condition:

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- Note the general condition of all parts during disassembly and inspection.
- Classify the failure with the aid of the illustrations.
- Determine the cause.
- Make all repairs following recommended procedures.

Wear (Minor)

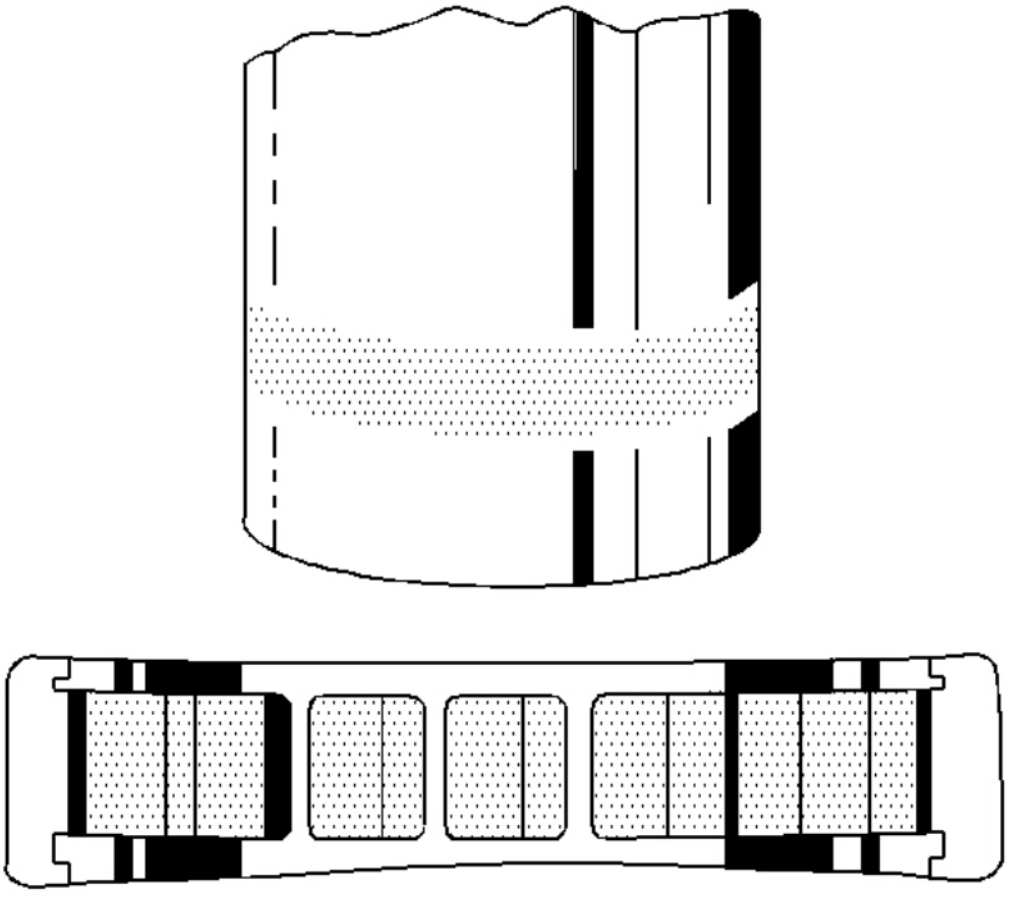


Fig. 4: Identifying Minor Wear
Courtesy of GENERAL MOTORS CORP.

Light pattern on races and rollers can be caused by fine abrasives. Clean all of the parts including the housings. Check the seals. Replace the bearings if rough or noisy. Replace the shaft if damaged.

Wear (Major)

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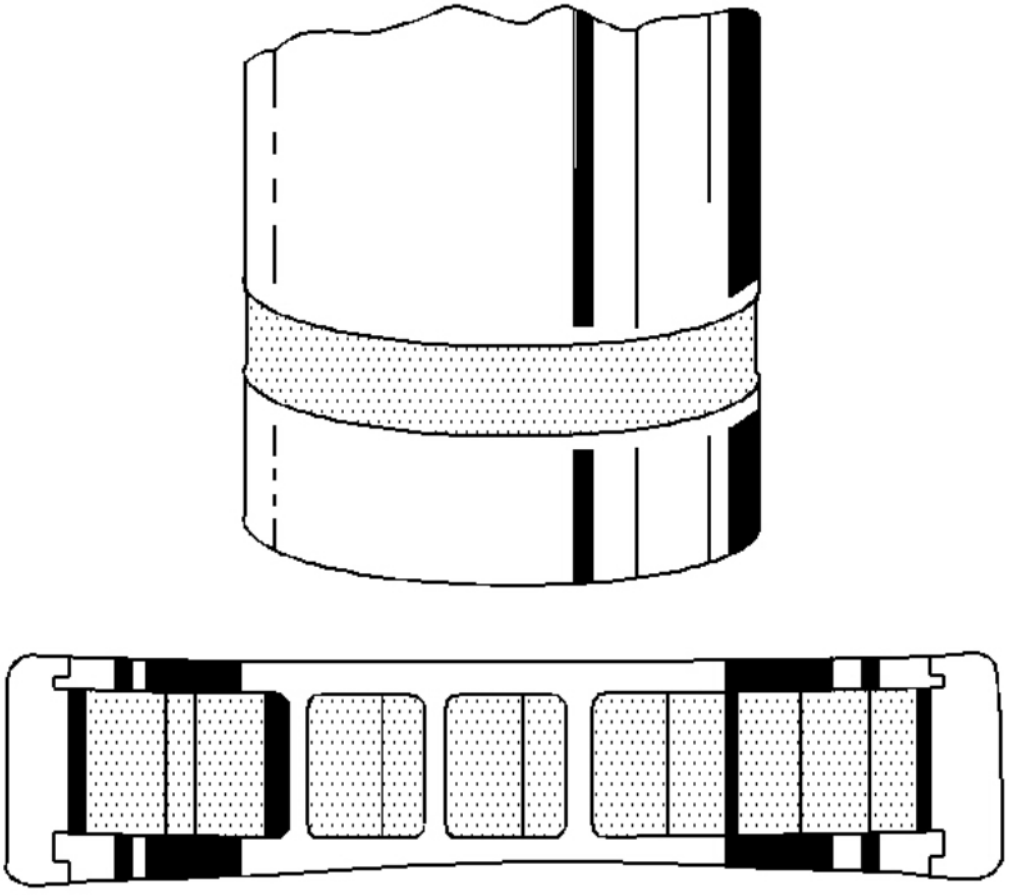


Fig. 5: Identifying Major Wear
Courtesy of GENERAL MOTORS CORP.

Heavy pattern on races and rollers can be caused by fine abrasives. Clean all of the parts including the housing. Check the seals. Replace the bearings if rough or noisy. Replace the shaft if damaged.

Brinelling

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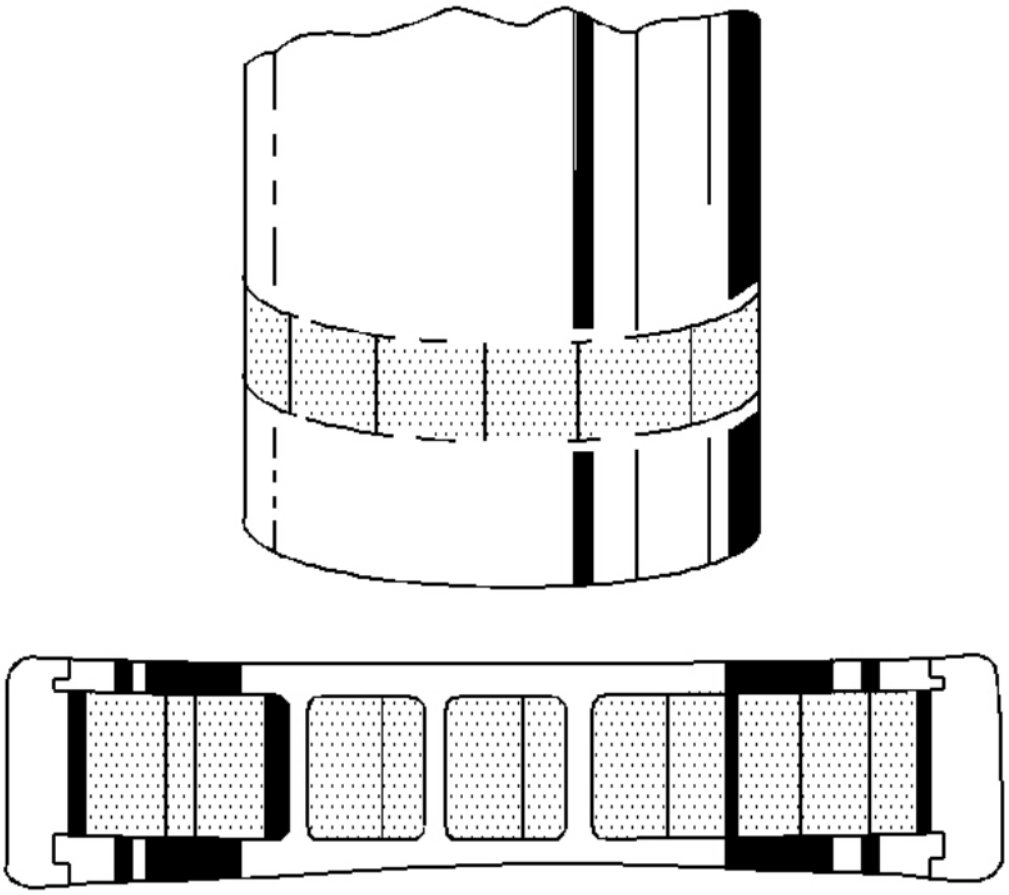


Fig. 6: Identifying Brinelling
Courtesy of GENERAL MOTORS CORP.

Surface indentations in the raceway can be caused by roll either under impact loading or vibration while the bearing is not rotating. Replace the bearing if rough or noisy. Replace the shaft if damaged.

Indentations

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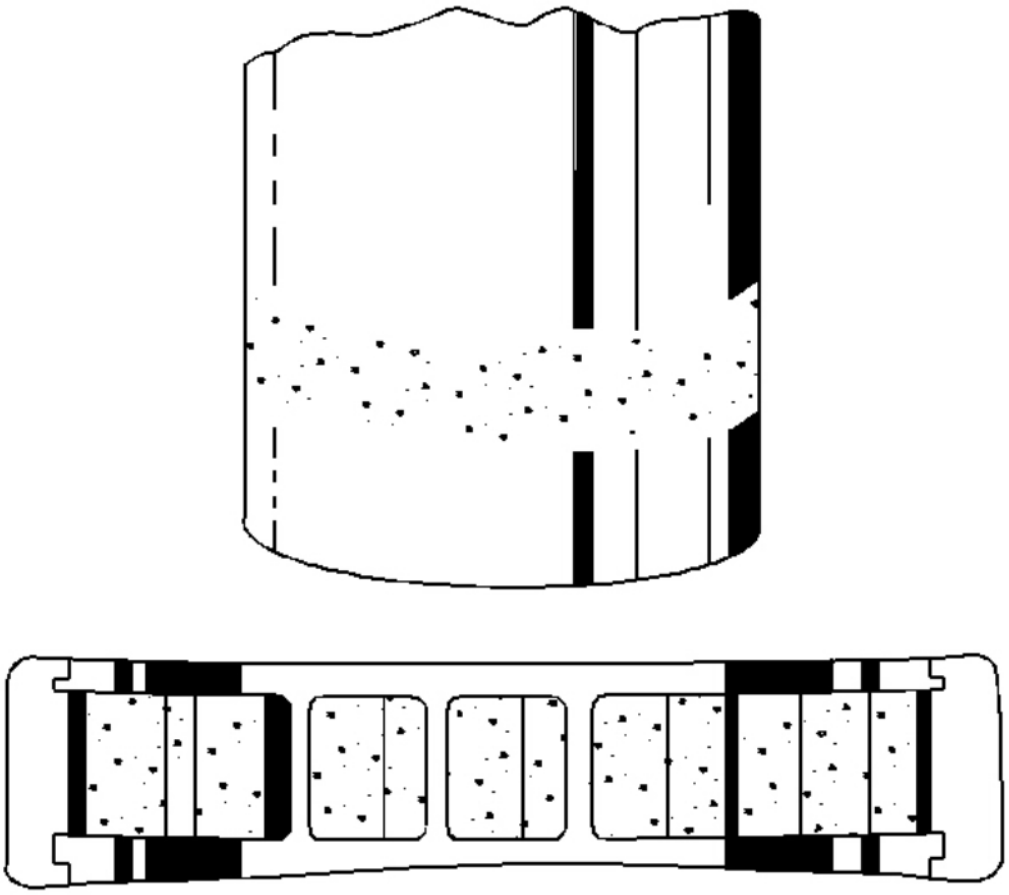


Fig. 7: Identifying Indentations
Courtesy of GENERAL MOTORS CORP.

Surface depressions on race and rollers can be caused by hard particles of foreign material. Clean all of the parts, including the housing. Check the seals. Replace the bearings if rough or noisy. Replace the shaft if damaged.

Single Edge Pitting

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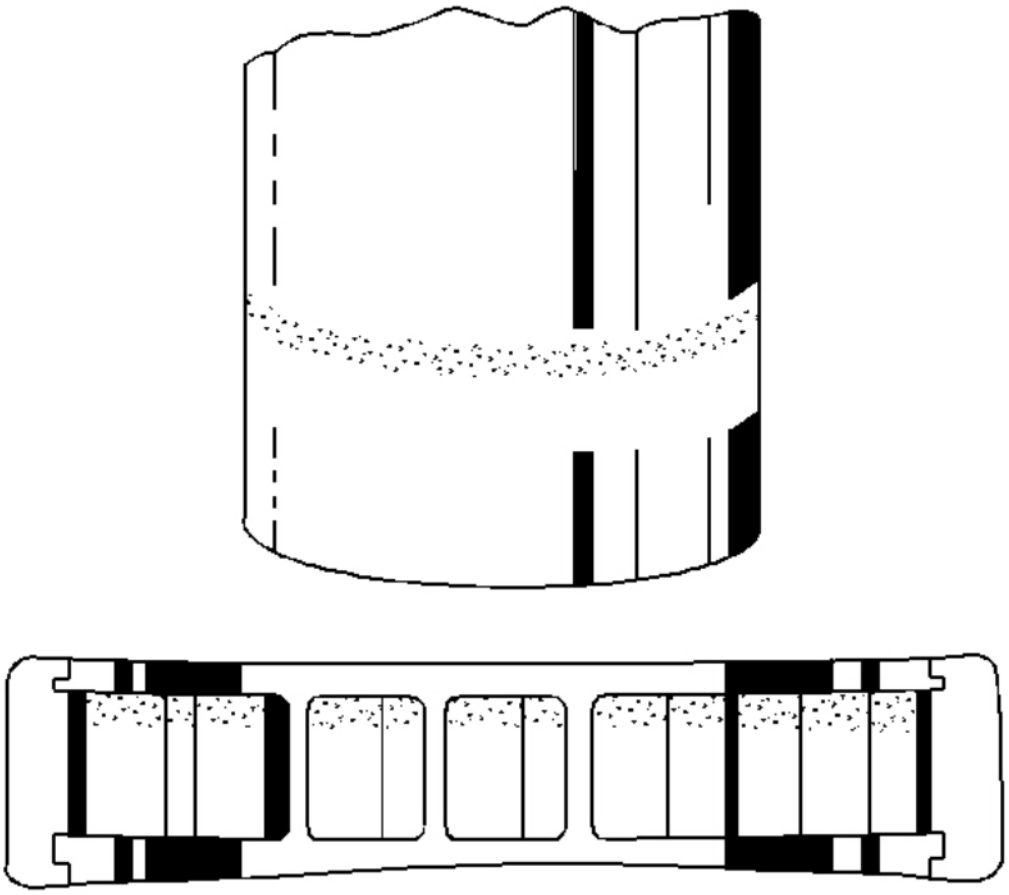


Fig. 8: Identifying Single Edge Pitting
Courtesy of GENERAL MOTORS CORP.

Flaking of surface metal results from fatigue, usually at one edge of race and rollers. Replace the bearing. Clean all related parts. Replace the shaft if damaged.

Double Edge Pitting

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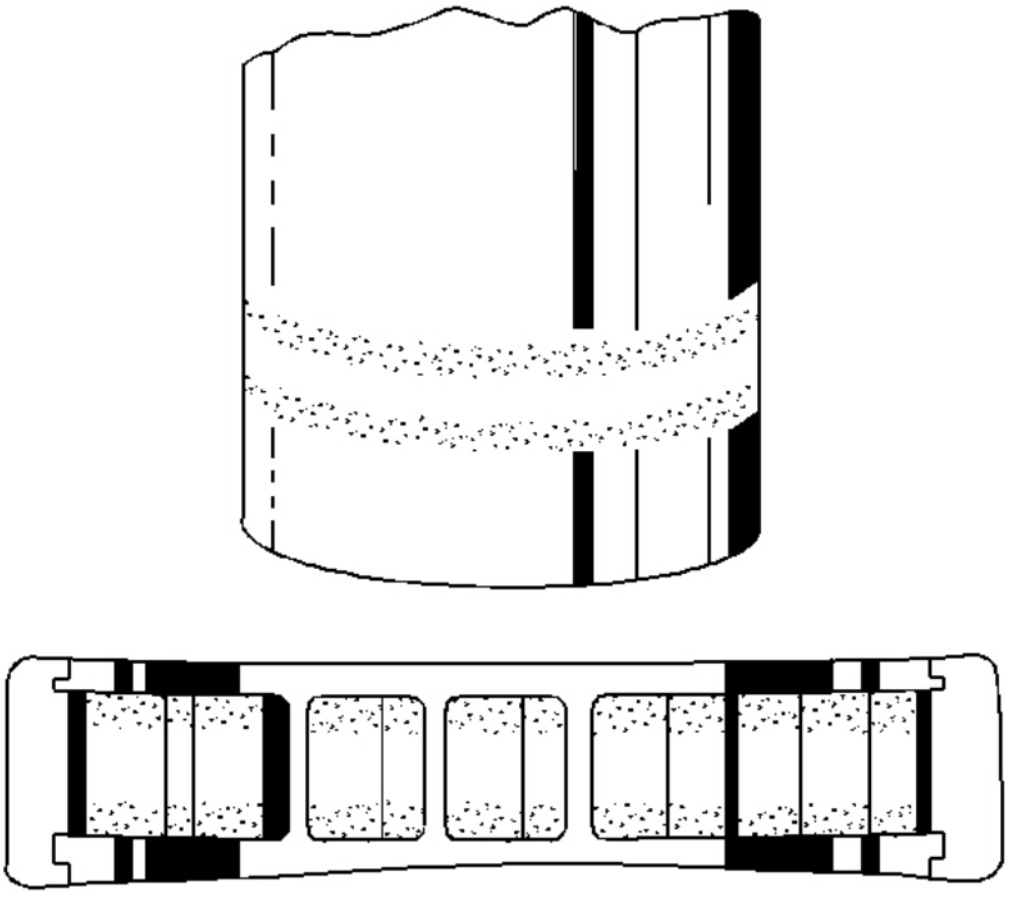


Fig. 9: Identifying Double Edge Pitting
Courtesy of GENERAL MOTORS CORP.

Flaking of surface metal results from fatigue, usually at both edges of the race and rollers. Replace the bearing. Clean all related parts. Replace the shaft if damaged.

Misalignment

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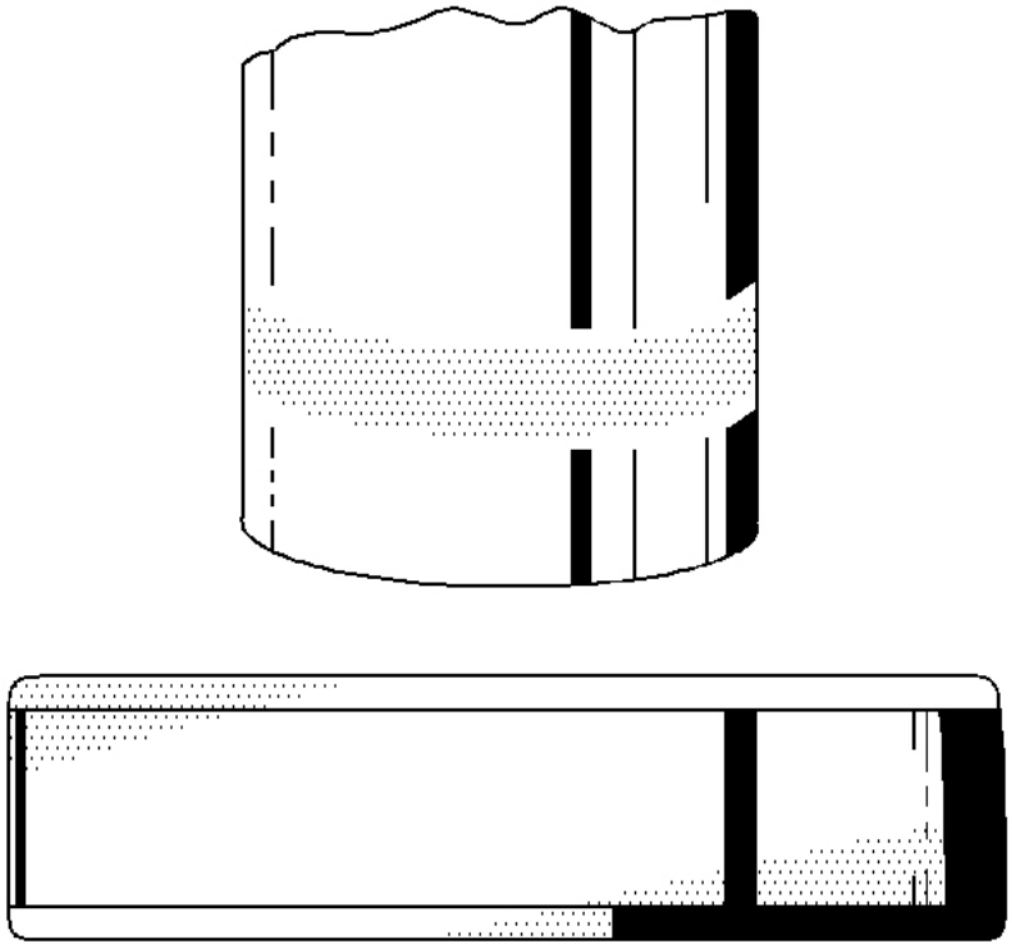


Fig. 10: Identifying Misalignment
Courtesy of GENERAL MOTORS CORP.

Outer misalignment due to a foreign object. Replace the bearing. Ensure races are properly seated. Replace the shaft if the bearing operating surface is damaged.

Frettage

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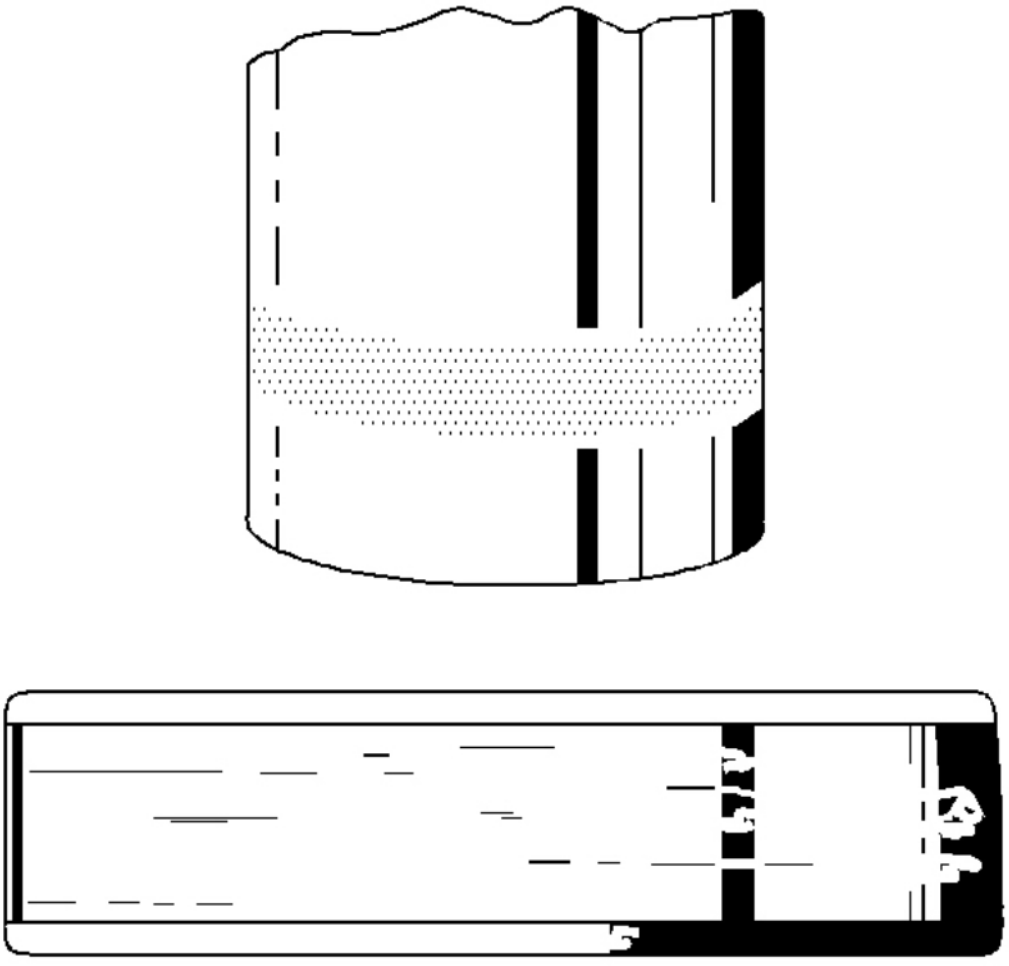


Fig. 11: Identifying Frettage
Courtesy of GENERAL MOTORS CORP.

Corrosion set up by a small relative movement of parts with no lubrication. Replace the bearing. Clean all the relative parts. Check the seals. Check for proper fit and lubrication. Replace the shaft if damaged.

Smears

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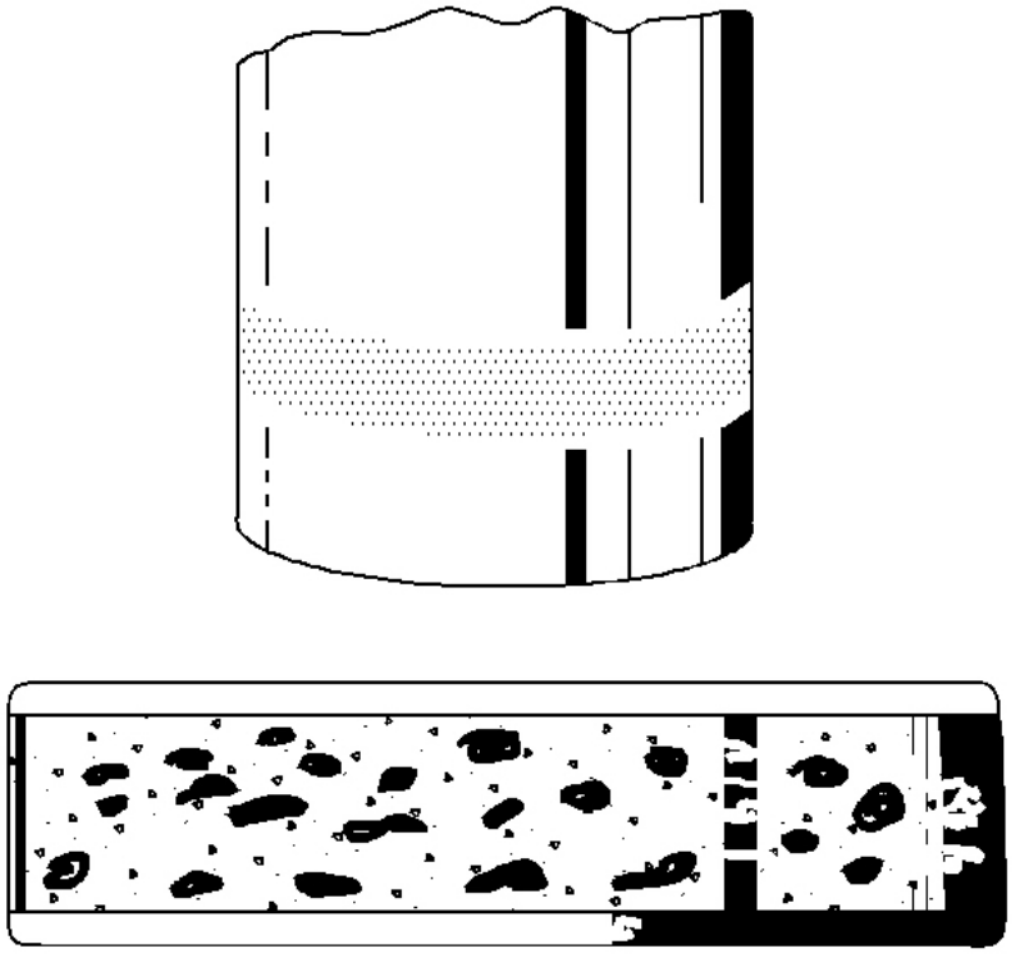


Fig. 12: Identifying Smears
Courtesy of GENERAL MOTORS CORP.

Smearing of metal due to slippage. Slippage can be caused by poor fits, lack of lubrication, overheating, overloads or handling damage. Replace the bearing. Clean all the related parts. Check for proper fit and lubrication.

WHEEL BEARING WEAR - FRONT DRIVE AXLE (TAPERED)

Tapered Roller Bearing Diagnosis

Consider the following factors when diagnosing bearing condition:

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- General condition of all parts during disassembly and inspection.
- Classify the failure with the aid of the illustrations.
- Determine the cause.
- Make all repairs following recommended procedures.

Abrasive Roller Wear

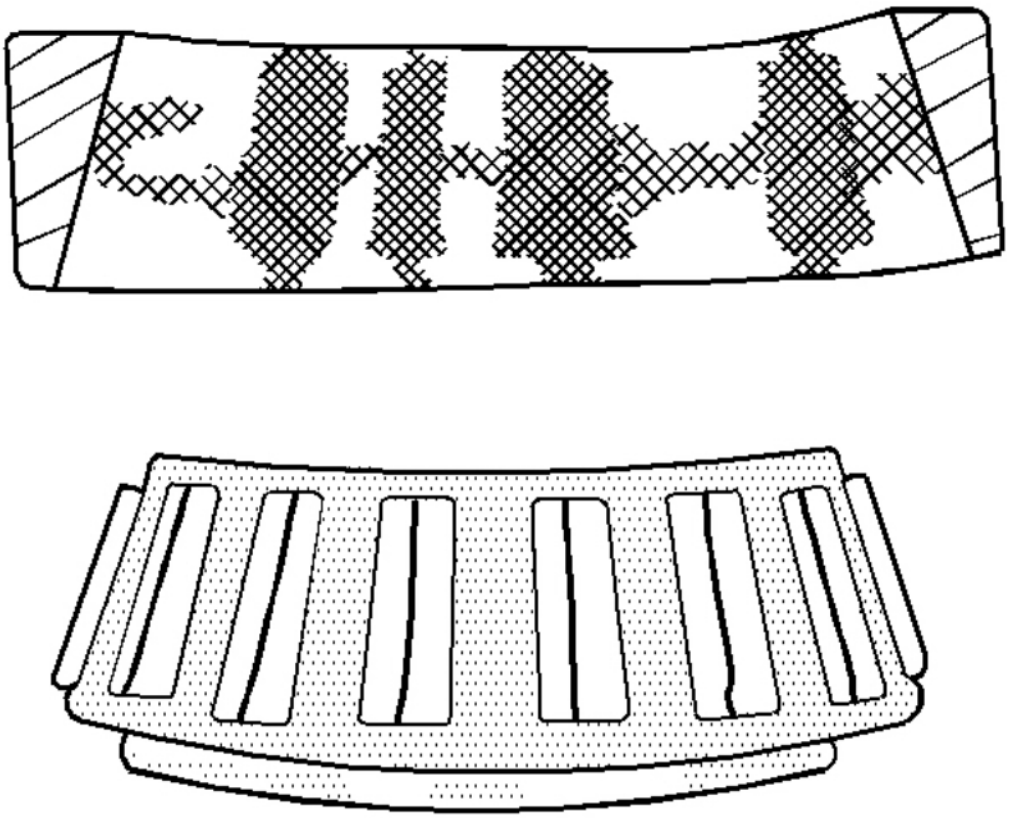


Fig. 13: Identifying Abrasive Roller Wear
Courtesy of GENERAL MOTORS CORP.

Pattern on the races and the rollers caused by fine abrasives. Clean all of the parts and the housings. Check the seals and the bearings. Replace any leaky, rough, or noisy bearings.

Abrasive Step Wear

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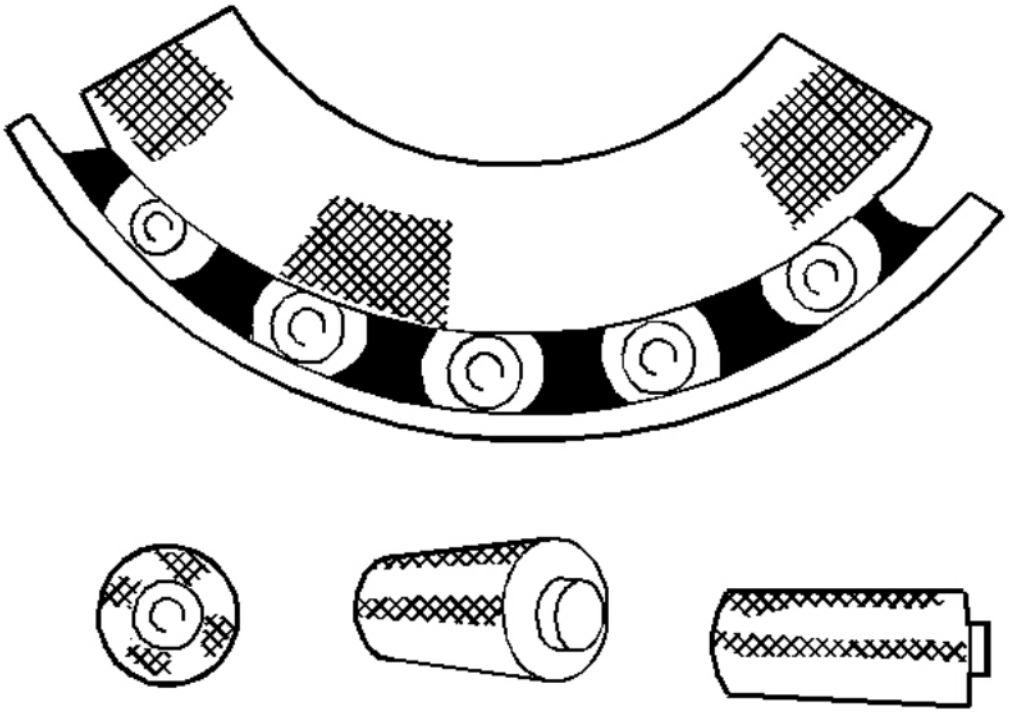


Fig. 14: Identifying Abrasive Step Wear
Courtesy of GENERAL MOTORS CORP.

Pattern on the roller ends caused by fine abrasives. Clean all of the parts and the housings. Check the seals and the bearings. Replace any leaky, rough, or noisy bearings.

Galling

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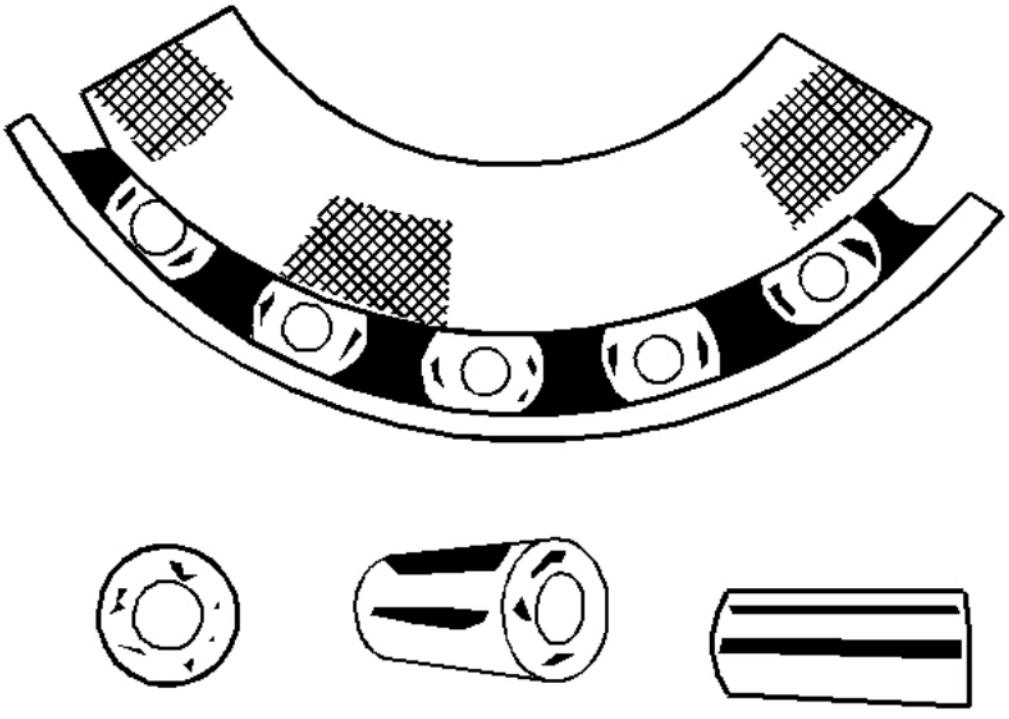


Fig. 15: Identifying Galling
Courtesy of GENERAL MOTORS CORP.

Metal smears on the roller ends due to overheating, lubricant failure, or lubricant overload. Replace the bearing. Check the seals. Check for proper lubrication.

Etching

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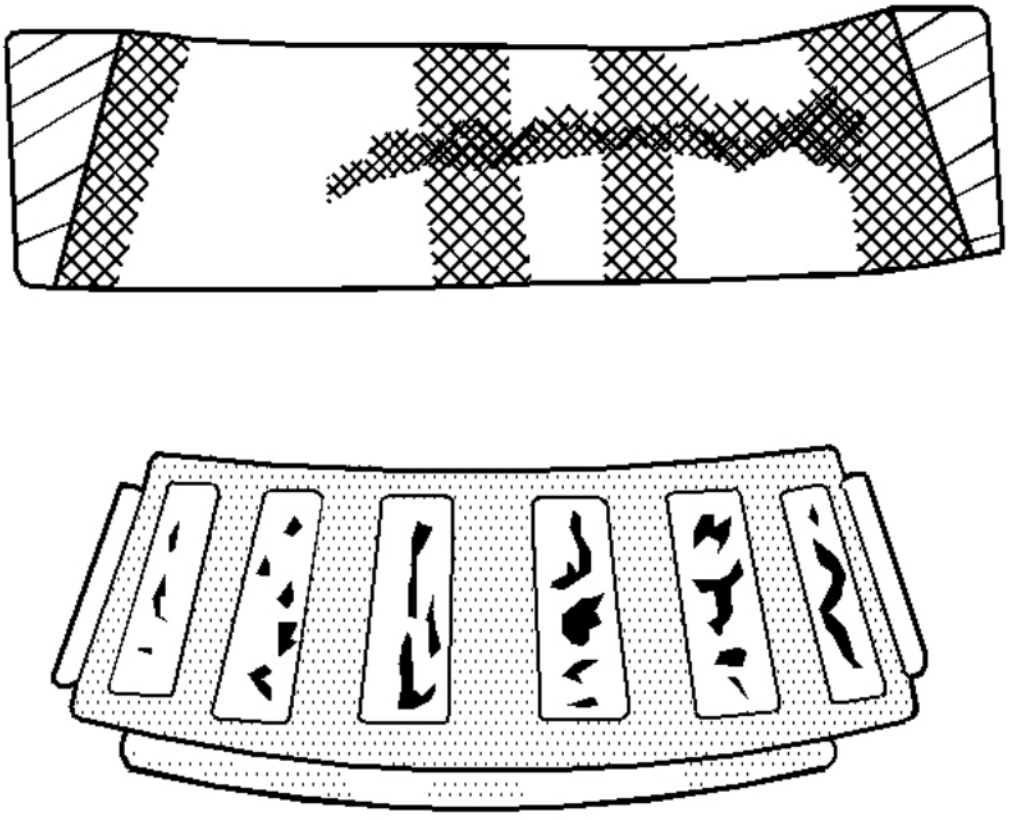


Fig. 16: Identifying Etching
Courtesy of GENERAL MOTORS CORP.

Bearing surfaces appear gray or grayish black in color, with related etching away of material usually at roller spacing. Replace the bearings. Check the seals. Check for proper lubrication.

Bent Cage

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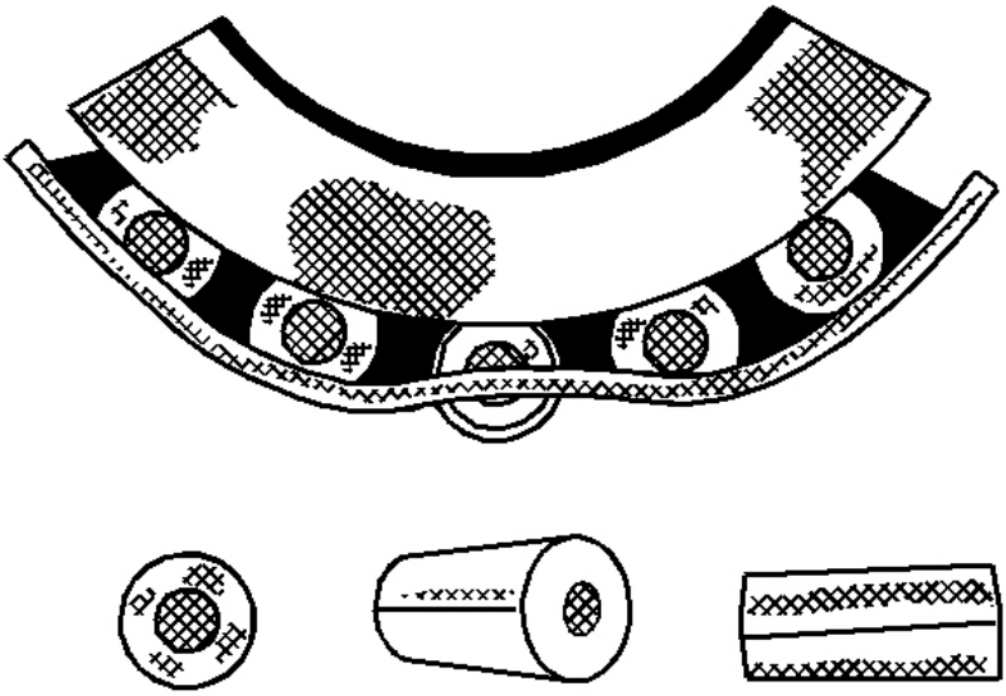


Fig. 17: Identifying Bent Roller Cage
Courtesy of GENERAL MOTORS CORP.

A damaged cage due to improper handling or improper tool usage. Replace the bearing.

Cage Wear

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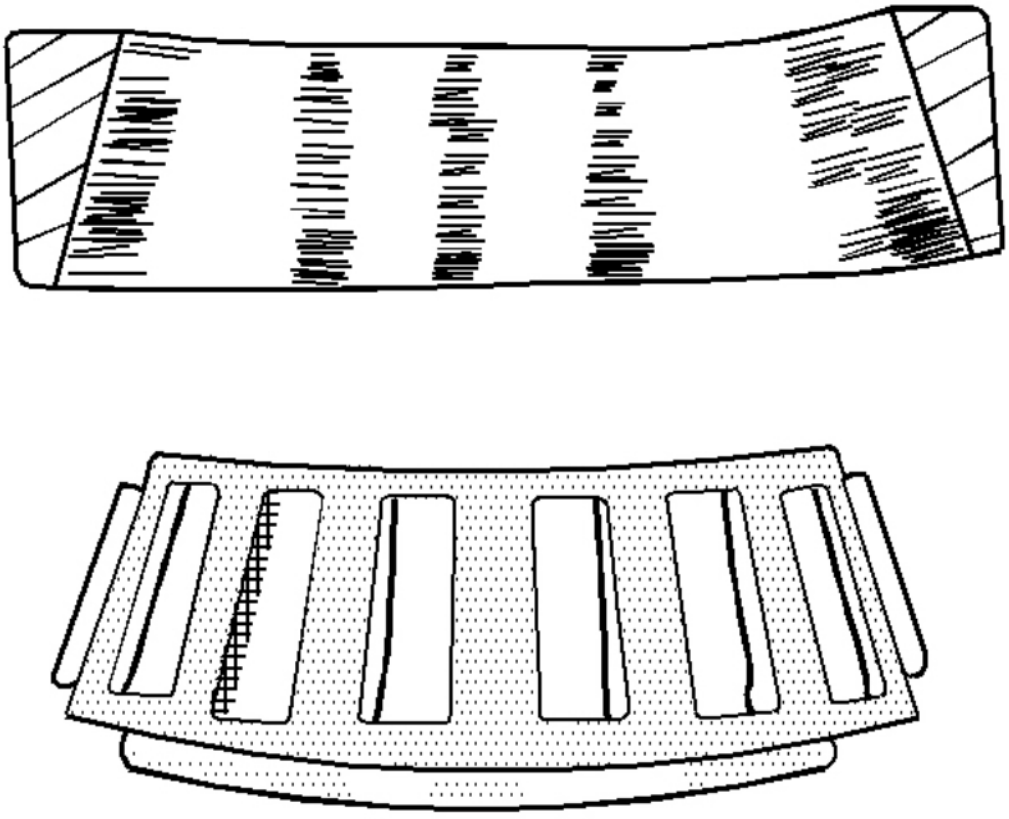


Fig. 18: Identifying Cage Wear
Courtesy of GENERAL MOTORS CORP.

Wear around the outside diameter of the cage and the roller pockets caused by abrasive material. Wear caused from inefficient lubrication. Clean the related parts and the housings. Check the seals. Replace the bearings.

Indentations

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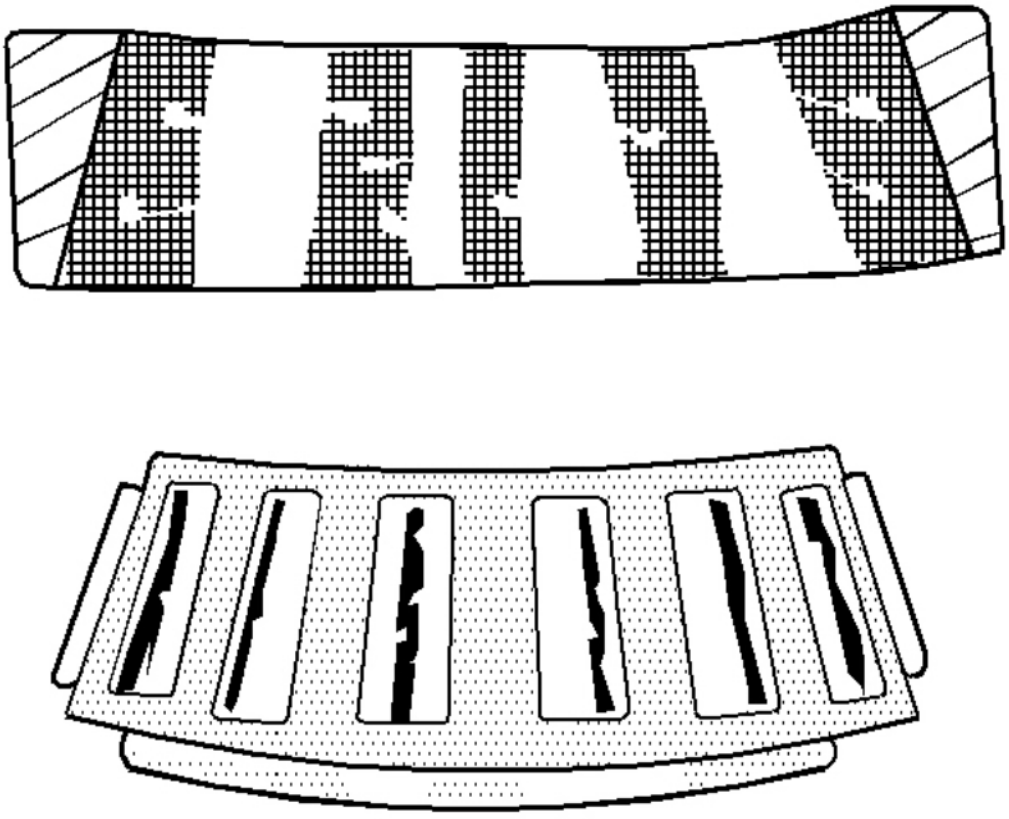


Fig. 19: Inspecting Bearing Rollers & Races For Heat Discoloration
Courtesy of GENERAL MOTORS CORP.

Surface depressions on the race and the rollers caused by hard particles of foreign matter. Clean all the parts and the housings. Check the seals. Replace rough or noisy bearings.

Frettage

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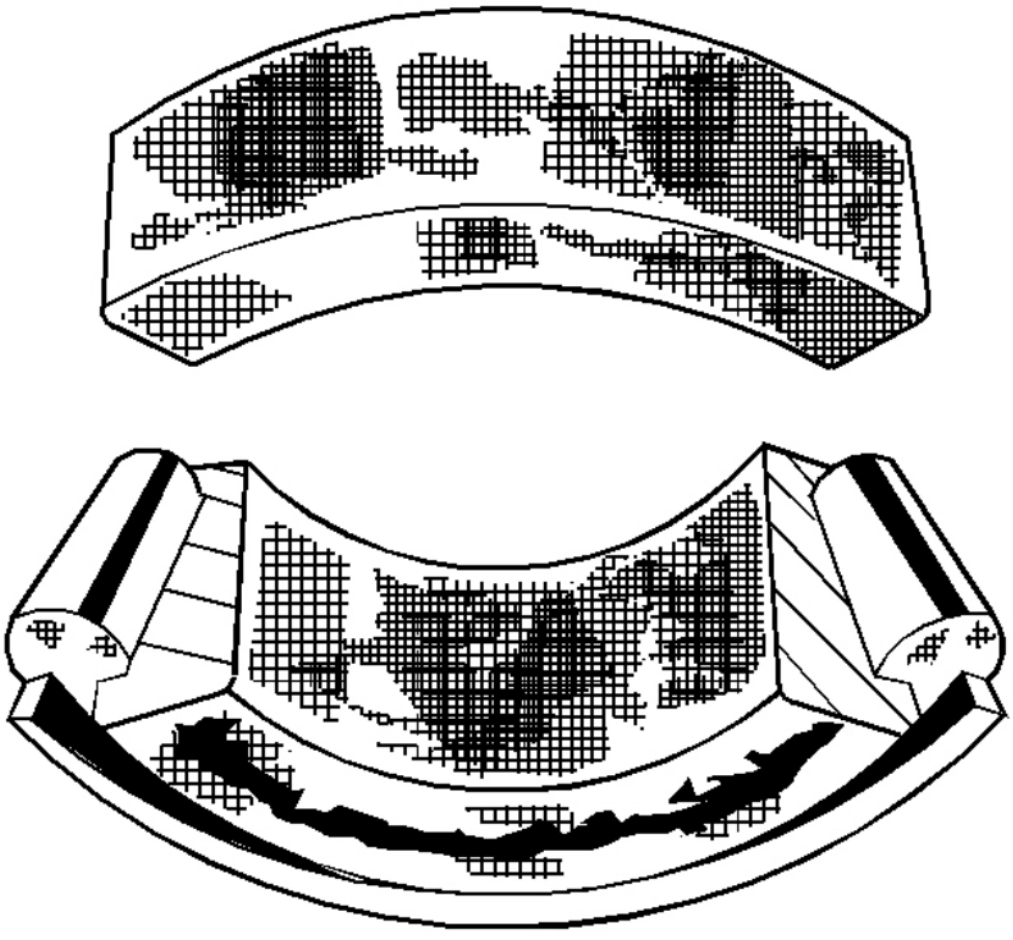


Fig. 20: Identifying Frettage
Courtesy of GENERAL MOTORS CORP.

Corrosion caused by small relative movement of parts with no lubrication. Replace the bearing. Clean the related parts. Check the seals. Check for proper lubrication.

Smears

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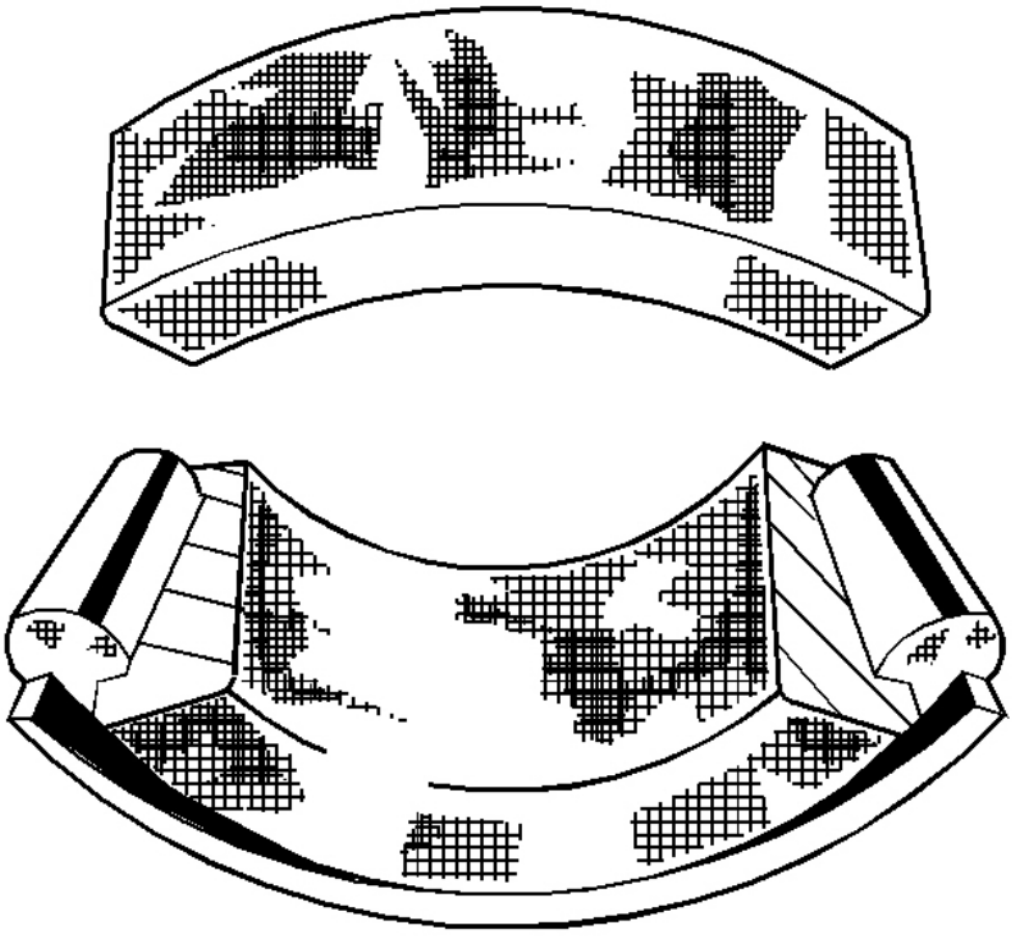


Fig. 21: Identifying Smears
Courtesy of GENERAL MOTORS CORP.

Smearing of the metal due to slippage. Slippage can be caused by the following factors:

- Poor fits
- Lubrication
- Overheating
- Overloads
- Handling damage

Replace the bearings. Clean the related parts. Check for proper fit and lubrication.

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Stain Discoloration

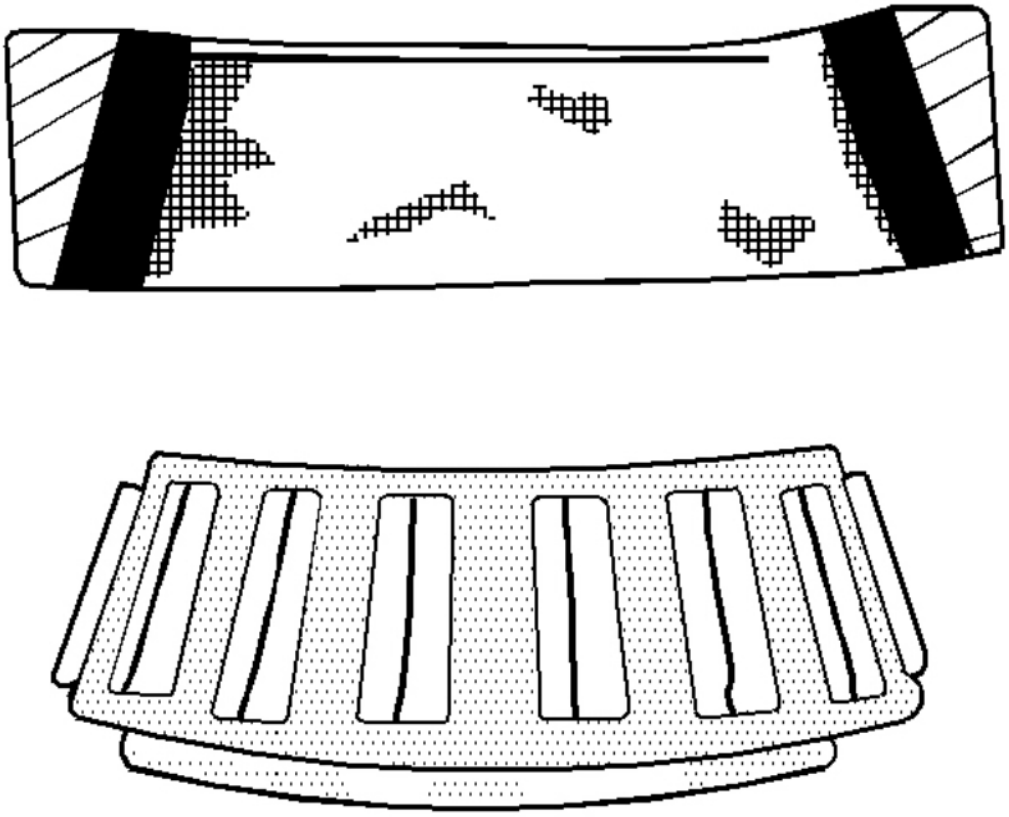


Fig. 22: Identifying Stain Discoloration
Courtesy of GENERAL MOTORS CORP.

Discoloration ranging from light brown to black. This discoloration is caused from incorrect lubrication or moisture. Reuse the bearing if you can remove the stains with light polishing. Reuse the bearing if there is no evidence of overheating. Check the seals and the related parts for damage.

Heat Discoloration

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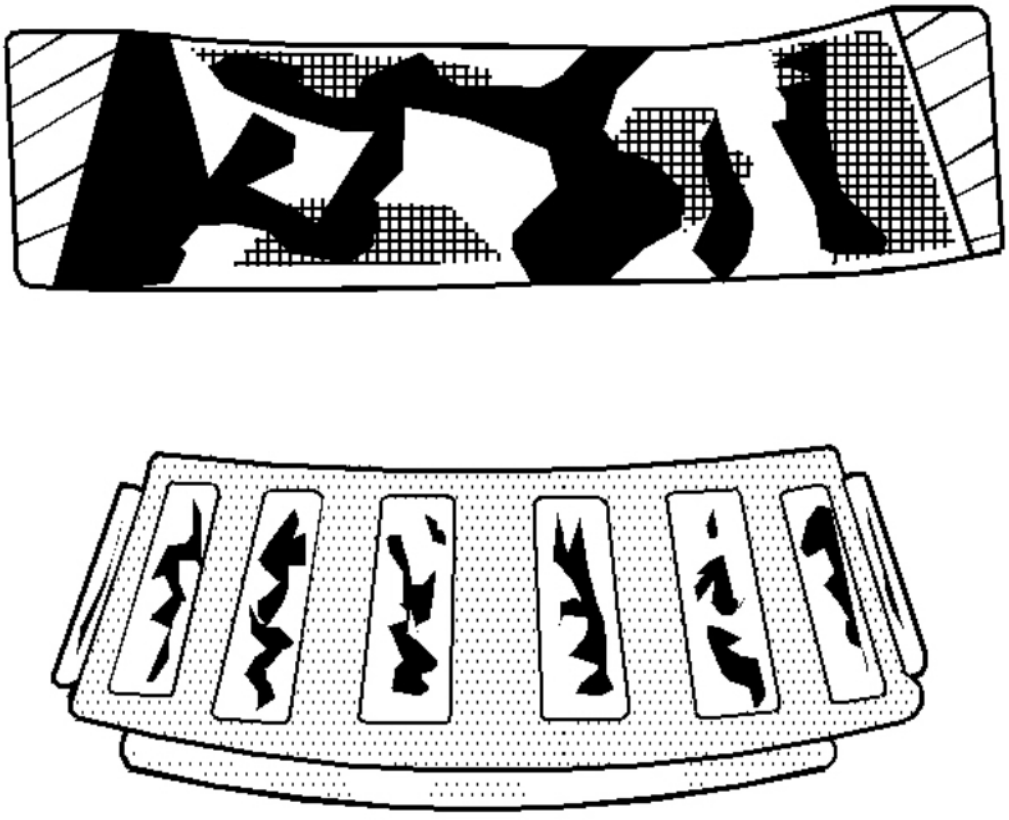


Fig. 23: Identifying Heat Discoloration
Courtesy of GENERAL MOTORS CORP.

Heat discoloration ranges from faint yellow to dark blue. This discoloration results from overload or an incorrect lubricant. Excessive heat causes softening of the races or the rollers. In order to check for loss of temper on the races and the rollers, perform a file test. A file drawn over a tempered part will grab and cut the metal. A file drawn over a hard part will glide readily with no metal cutting. Replace the bearings if overheating damage is indicated. The tempered part will fail the file test. Check the seals and the other related parts.

Misalignment

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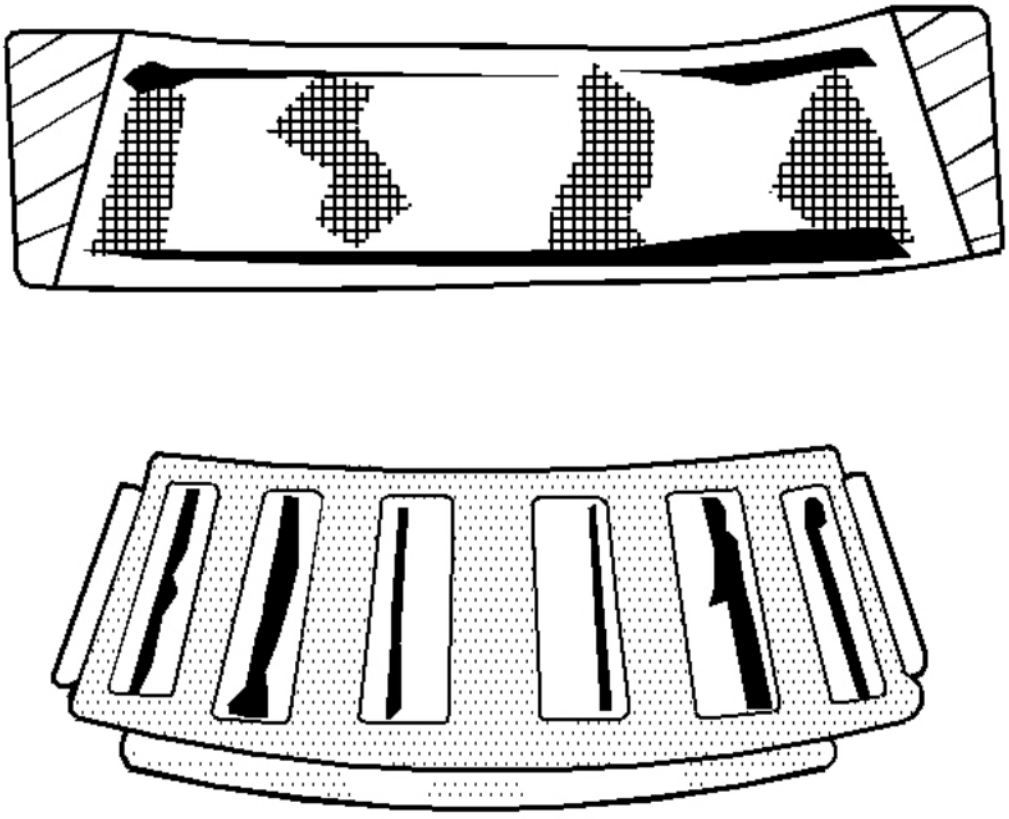


Fig. 24: Identifying Misalignment
Courtesy of GENERAL MOTORS CORP.

A misaligned outer race due to a foreign object. Clean the related parts. Replace the bearing. Ensure the races are properly sealed.

Cracked Inner Race

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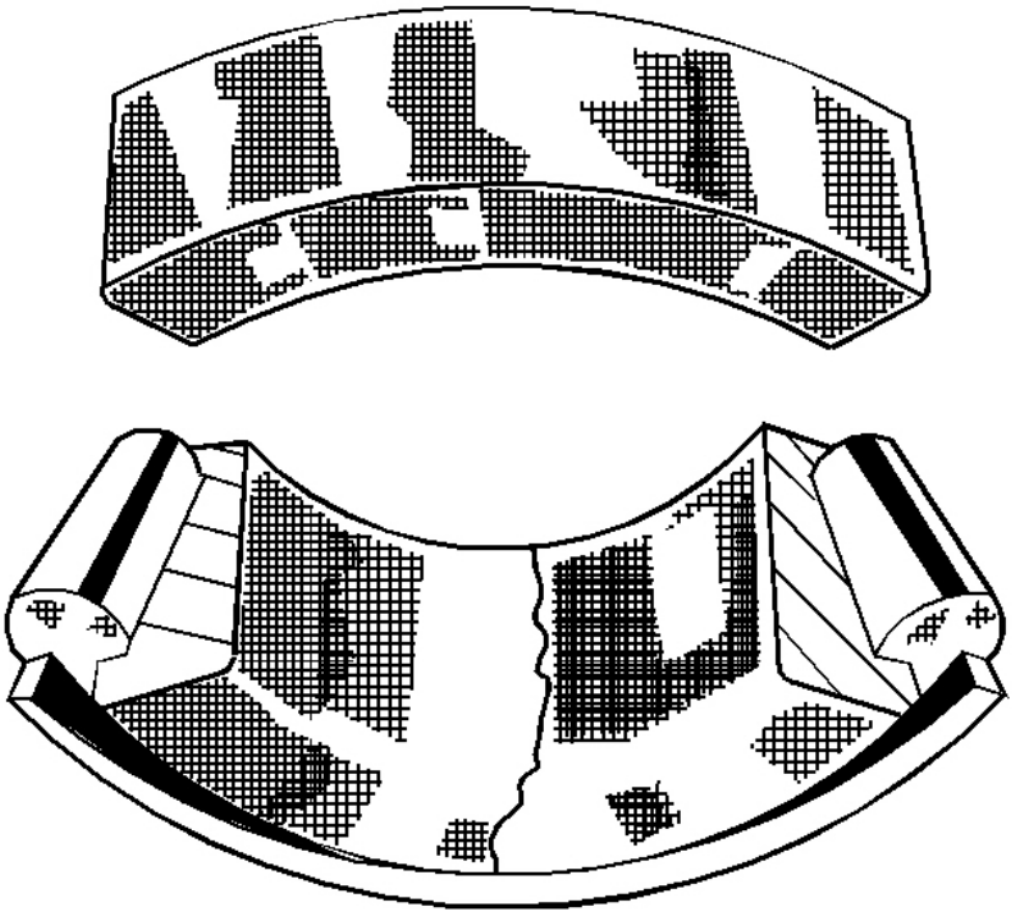


Fig. 25: Identifying Cracked Inner Race
Courtesy of GENERAL MOTORS CORP.

Cracked race due to improper fit, cocking, or poor bearing seats. Replace the bearing. Correct bearing seats.

Fatigue Spalling

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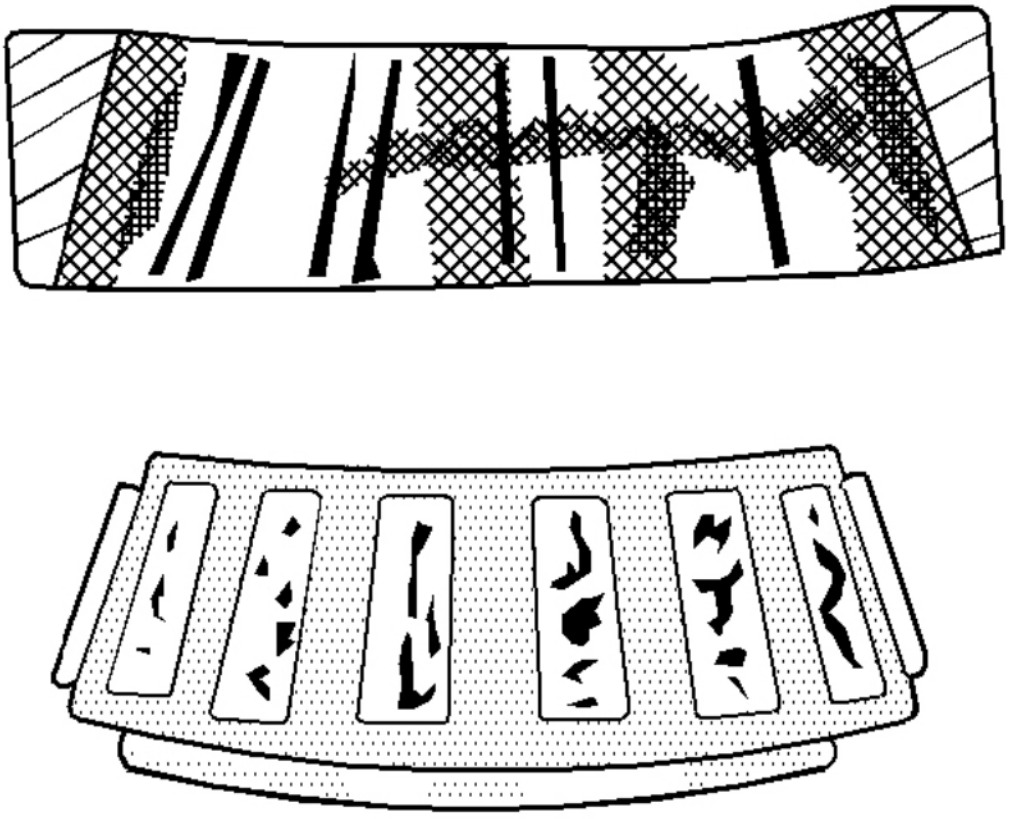


Fig. 26: Inspecting Bearing Rollers & Races For Pitting, Grooves, Spalling & Excessive Wear
Courtesy of GENERAL MOTORS CORP.

Flaked surface metal that results from fatigue. Replace the bearing. Clean all related parts.

Brinelling

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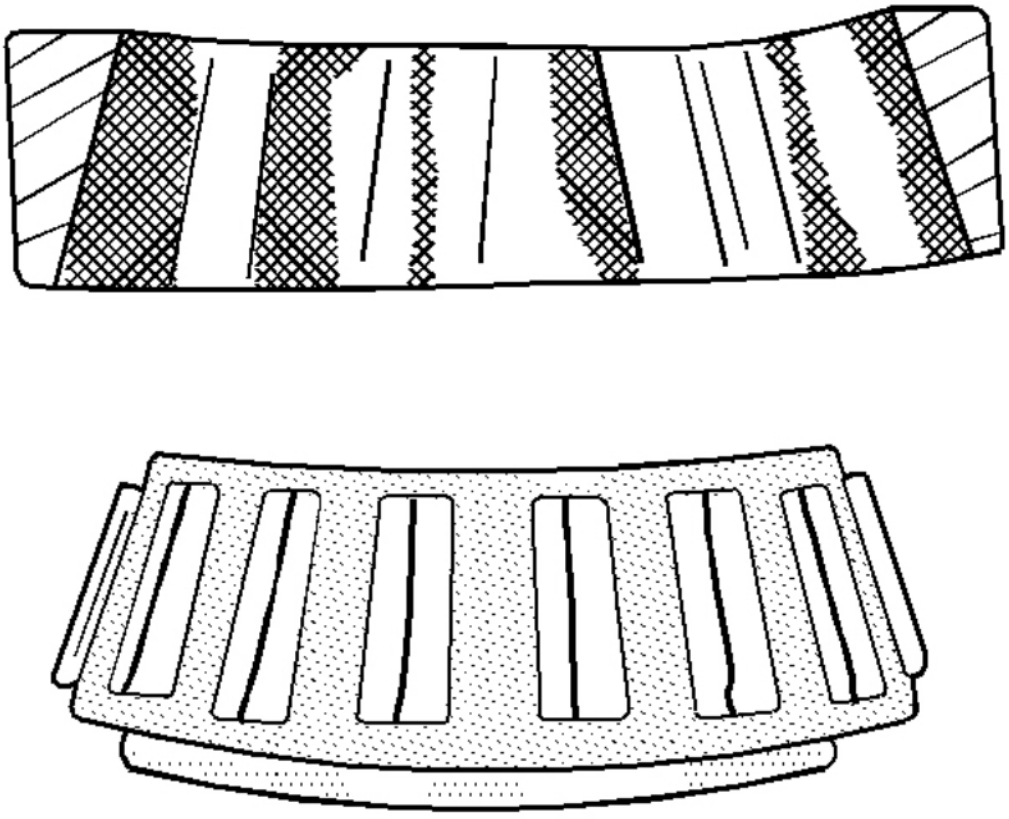


Fig. 27: Identifying Brinelling
Courtesy of GENERAL MOTORS CORP.

Surface indentations in the race way caused by the rollers under impact loading or caused from vibration while the bearing is not rotating. Replace a rough or noisy bearing.

FRONT AXLE LUBRICANT LEAK DIAGNOSIS

Front axle lubricant leaks can occur at the following locations:

- Axle shaft oil seals
- Differential carrier assembly mating surface
- Drain plug
- Fill plug
- Inner axle tube assembly to differential carrier assembly mating surface
- Pinion yoke oil seal

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- Vent tube

Determining the Cause

While most front axle leaks may be easy to find, determining the cause may not be. A thorough inspection of the area around the leak may assist in determining the cause of the leak.

Oil Seals

Lubricant leaks from a oil seal may be caused by any of the following:

- An improperly installed seal
- A distorted seal
- A worn seal
- A worn shaft
- A brittle seal lip
- A hardened seal lip

To determine the actual cause of the leak, clean the area around the leak. Observe the area of the leak and determine the if the seal or another component is causing the leak. A worn seal surface will cause a leak at the sealing lip while a misaligned seal or a seal installed into a housing with an excessive bore will cause the seal to leak at the outside surface of the seal. Hardened or cracked seal lips usually indicate the axle is operating beyond the normal temperature limits for the axle. A seal whose sealing surface has been nicked or cut may indicate that the shaft has a rough, burred, or gouged surface and will need to be inspected before the seal can be replaced.

Sealing Surfaces

Front axles components are assembled using specific sealers. A leak at a surface sealed with sealant is usually caused by a poor fit of the components but can also be caused by the use of the wrong sealant. When correcting a sealant leak, inspect each component for distortion and for nicks or gouges that may prohibit the sealant from sealing properly and when re-assembling the component, use the proper sealant.

Differential Carrier Assembly

Lubricant leaks at the differential carrier assembly can occur at the following locations:

- Drain Plug
- Fill Plug
- Vent tube

Drain and fill plug leaks are usually caused by a loose plug. A vent tube leak can be cause by a loose fitting vent hose or by a vent tube assembly whose interior shield is stuck in the upside down position. Inspect the vent plug's interior shield for unrestricted movement, repair or replace the plug as necessary. Drain or fill plug leaks can be repaired by either tightening the plug or by using an approved sealer on the threads on the plug.

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REPAIR INSTRUCTIONS

LUBRICANT LEVEL INSPECTION - FRONT DRIVE AXLE

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Make sure the vehicle is level.
3. Inspect the front axle for leaks. Repair as necessary.
4. Clean the area around the front axle fill plug.
5. Remove the front axle fill plug (1).

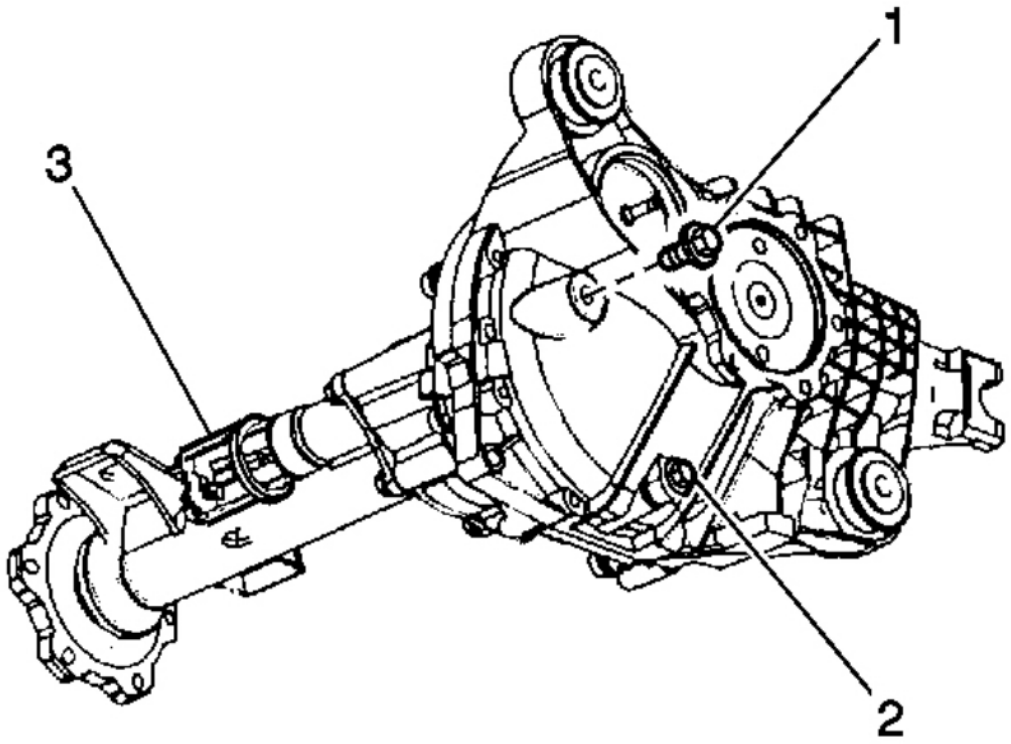


Fig. 28: View Of Front Axle Fill Plug & Electric Motor Actuator
Courtesy of GENERAL MOTORS CORP.

6. Inspect the oil level.

Specification:

- For the 8.25 inch axle, the oil level should be between 12-16 mm (0.50-0.625 in) below the fill plug opening.

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- For the 9.25 inch axle, the oil level should be between 0-6 mm (0-0.25 in) below the fill plug opening.

7. If the level is low, add oil until the level is between 12-16 mm (0.50-0.625 in) for the 8.25 inch axle or 0-6 mm (0-0.25 in) for the 9.25 inch axle. Use the correct fluid. Refer to **Sealers, Adhesives, and Lubricants**.

NOTE: Refer to Fastener Notice in Cautions and Notices.

8. Install the fill plug.

   Tighten: Tighten the plug to 33 N.m (24 lb ft).

9. Lower the vehicle.

LUBRICANT REPLACEMENT - FRONT DRIVE AXLE

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the front differential carrier shield, if equipped. Refer to **Shield Replacement**.
3. Clean the area around the front axle fill plug and the drain plug.
4. Remove the fill plug.
5. Remove the drain plug.

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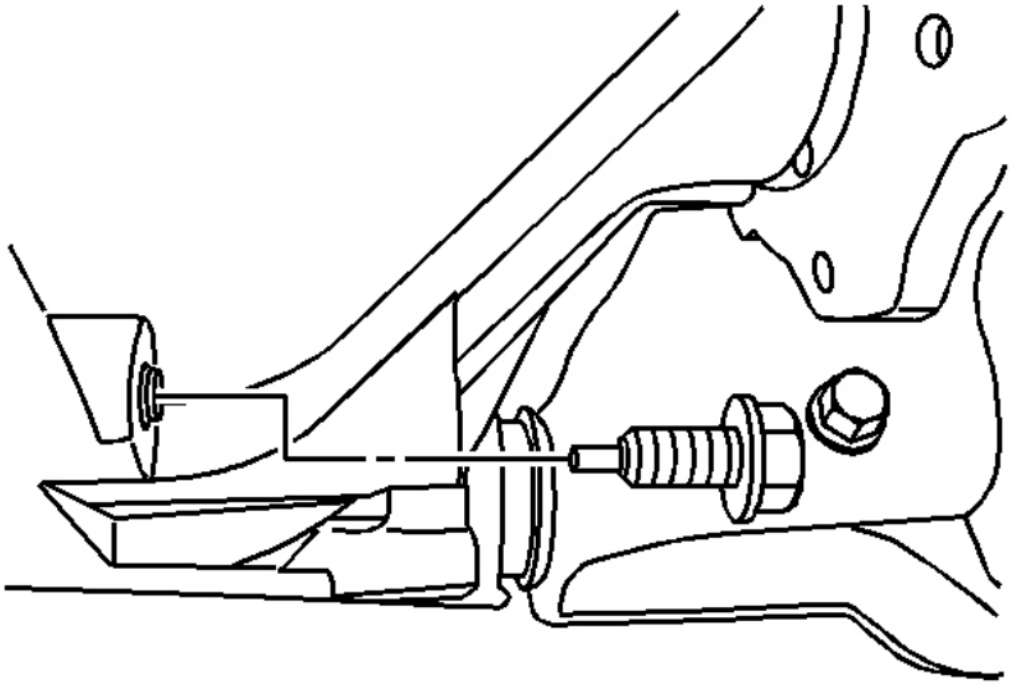


Fig. 29: View Of Front Axle Drain Plug
Courtesy of GENERAL MOTORS CORP.

6. Drain the fluid from the front differential carrier assembly.

Installation Procedure

NOTE: Refer to Fastener Notice in Cautions and Notices.

1. Install the drain plug.

   Tighten: Tighten the drain plug to 33 N.m (24 lb ft).

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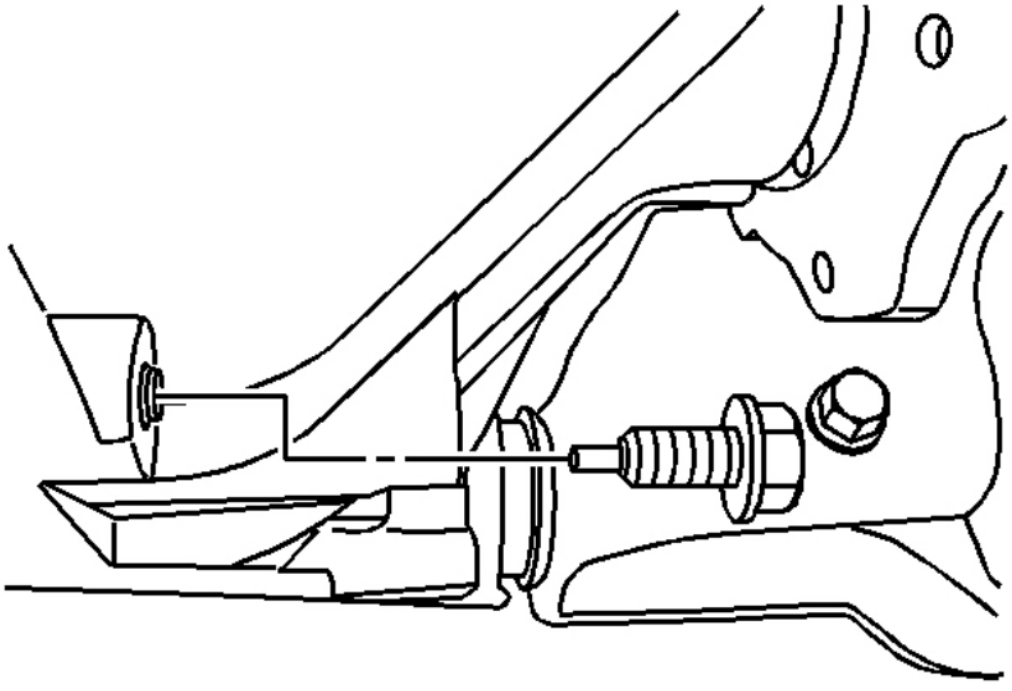


Fig. 30: View Of Front Axle Drain Plug
Courtesy of GENERAL MOTORS CORP.

2. Fill the differential carrier assembly with axle lubricant. Use the correct fluid. Refer to **Capacities - Approximate Fluid** in Maintenance and Lubrication and **Sealers, Adhesives, and Lubricants**.
3. Install the fill plug.

   Tighten: Tighten the fill plug to 33 N.m (24 lb ft).

4. Install the front differential carrier shield, if equipped. Refer to **Shield Replacement**.
5. Lower the vehicle.

SHIELD REPLACEMENT

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the front differential carrier shield bolts.
3. Remove the front differential carrier shield.

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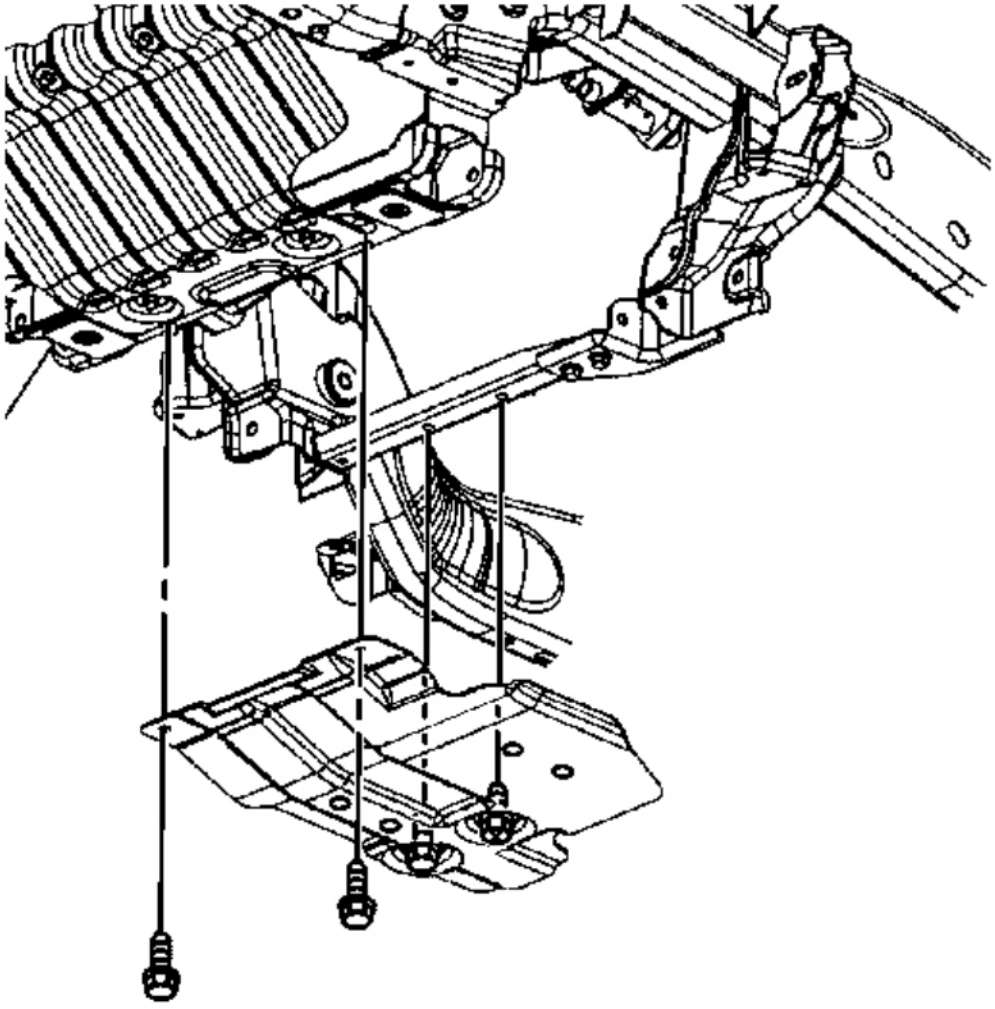


Fig. 31: View Of Front Differential Carrier Shield & Bolts
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the front differential carrier shield.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the front differential carrier shield bolts.

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Tighten: Tighten the front differential carrier shield bolts to 20 N.m (15 lb ft).

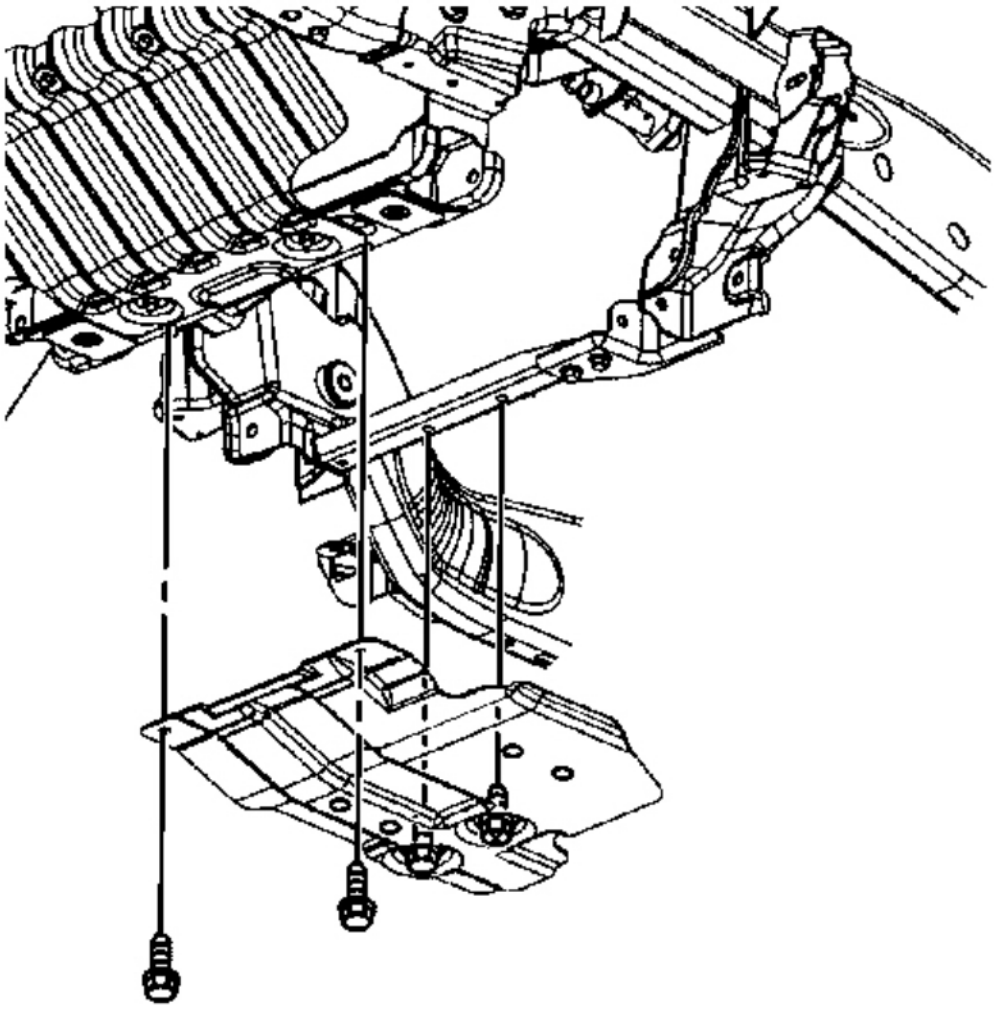


Fig. 32: View Of Front Differential Carrier Shield & Bolts
Courtesy of GENERAL MOTORS CORP.

3. Lower the vehicle.

ELECTRIC MOTOR ACTUATOR REPLACEMENT

Removal Procedure

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1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the front differential carrier shield, if equipped. Refer to **Shield Replacement**.
3. Disconnect the electrical connector from the actuator.
4. Remove the electric motor actuator (3) by turning the actuator counterclockwise.

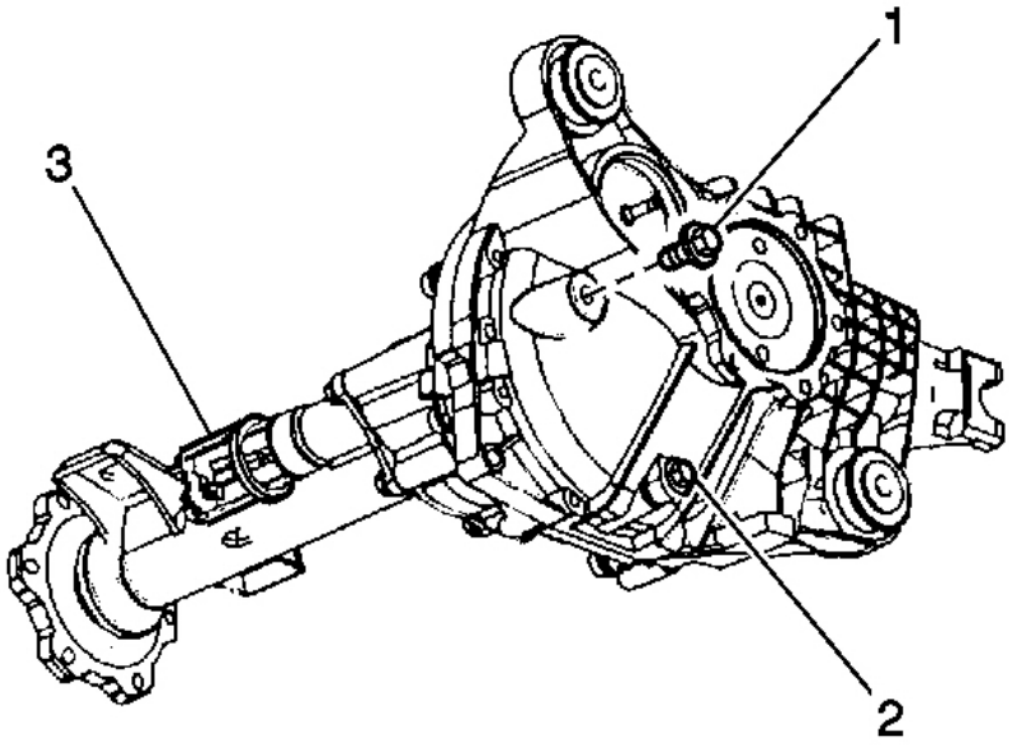


Fig. 33: View Of Front Axle Fill Plug & Electric Motor Actuator
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Apply sealant to the threads of the electric motor actuator. Use the correct sealant. Refer to **Sealers, Adhesives, and Lubricants**.

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

2. Install the electric motor actuator (3).

Tighten: Tighten the actuator to 20 N.m (15 lb ft).

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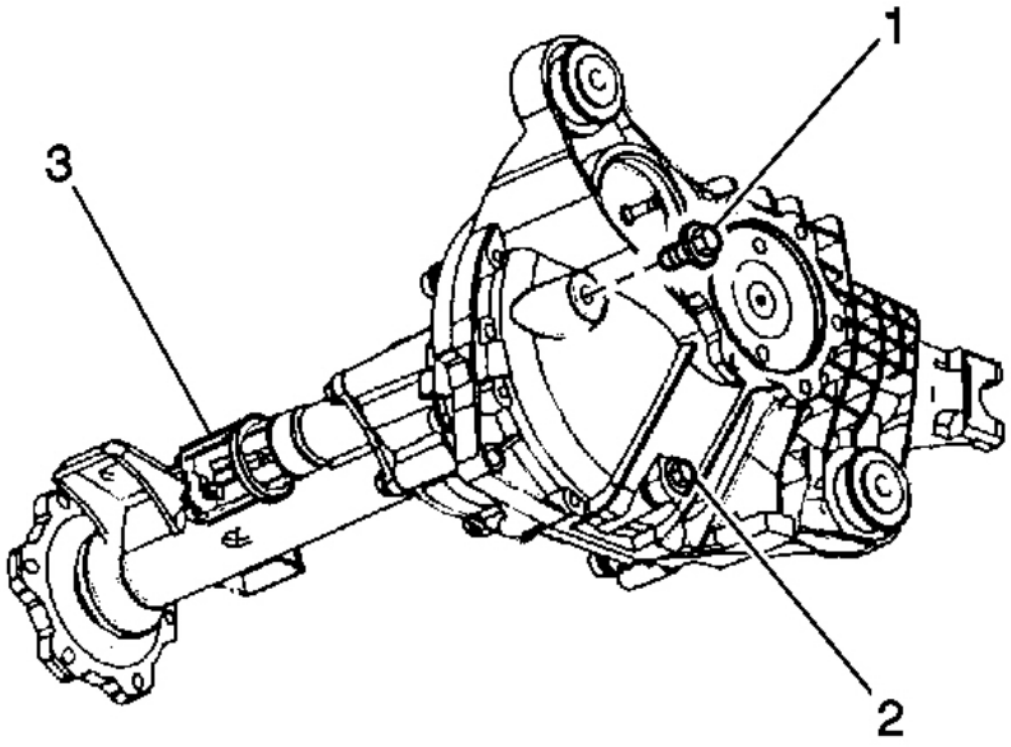


Fig. 34: View Of Front Axle Fill Plug & Electric Motor Actuator
Courtesy of GENERAL MOTORS CORP.

3. Connect the electrical connector to the actuator.
4. Install the front differential carrier shield, if equipped. Refer to **Shield Replacement**.
5. Lower the vehicle.

VENT HOSE REPLACEMENT

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the front differential carrier shield, if equipped. Refer to **Shield Replacement**.

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

3. Remove the vent hose (1) from the wiring bundle (2), S4WD axles only.

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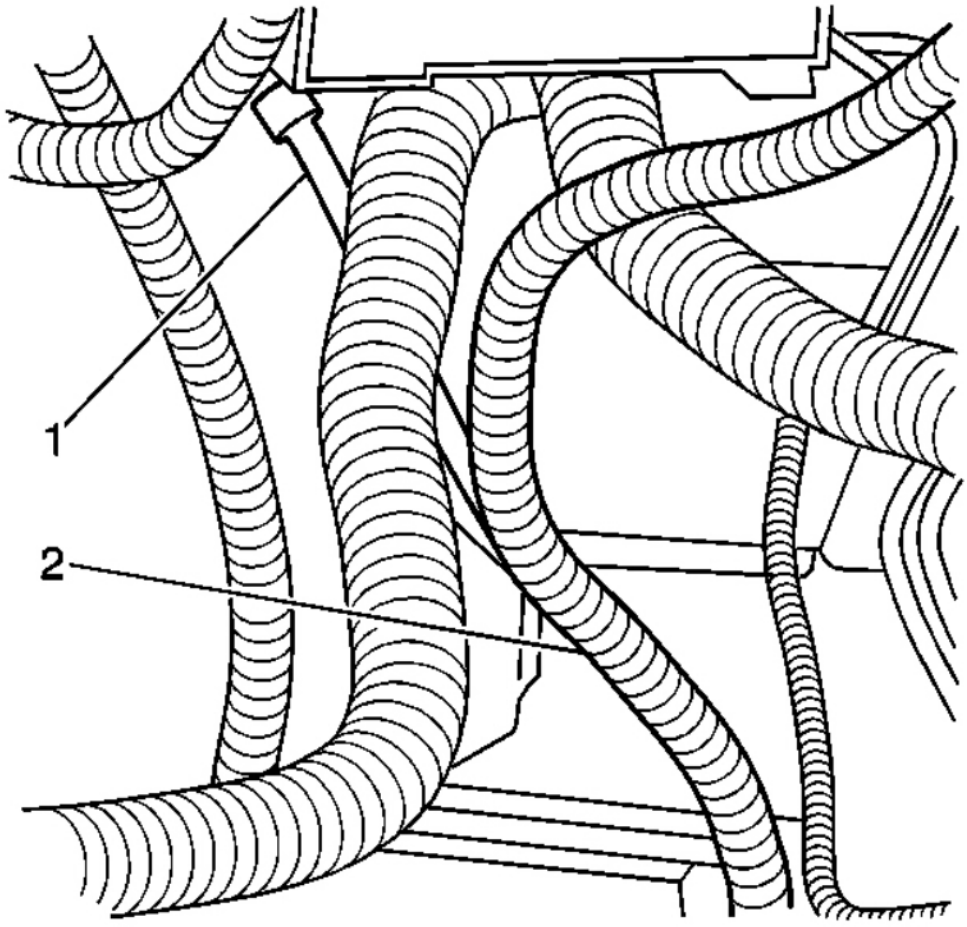


Fig. 35: View Of Vent Hose & Wiring Bundle
Courtesy of GENERAL MOTORS CORP.

4. Remove the vent hose from the retainer clips, all axles.
5. Remove the vent hose from the differential carrier assembly.

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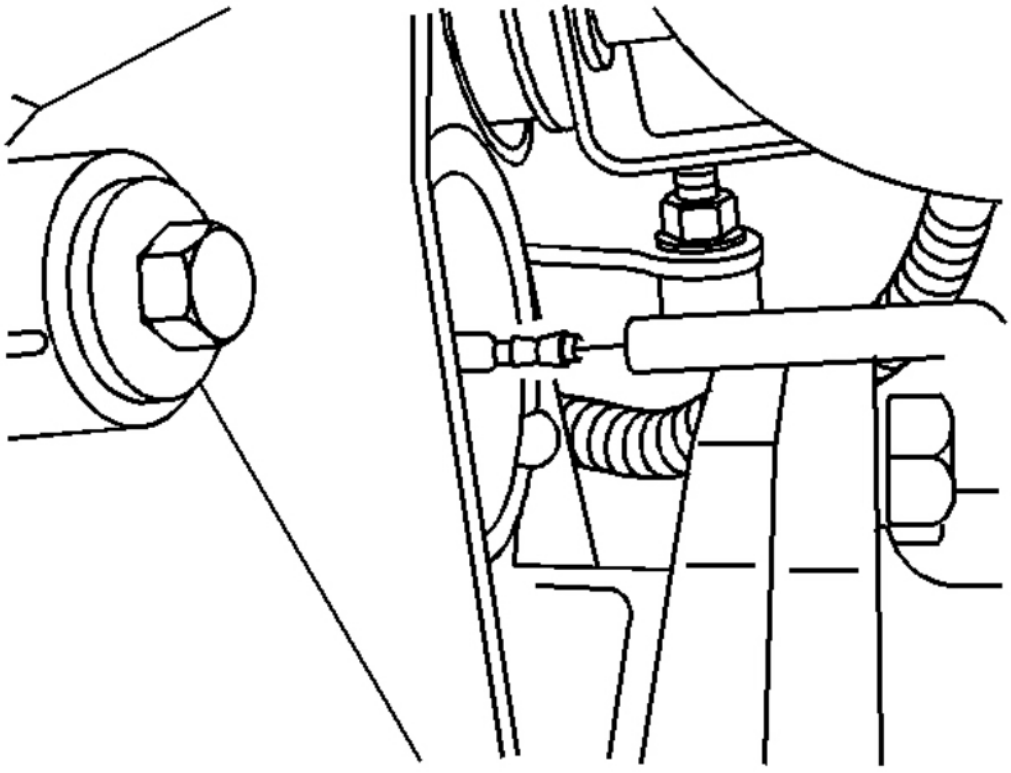


Fig. 36: View Of Vent Hose To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

6. Remove the vent hose from the vehicle.

Installation Procedure

1. Install the vent hose to the vehicle.
   - Route the vent hose the same way as when removed.
   - Ensure the hose is free of kinks and routes clear of sharp components.
   - Ensure the vent hose is not plugged.
2. Connect the vent hose to the differential carrier assembly.

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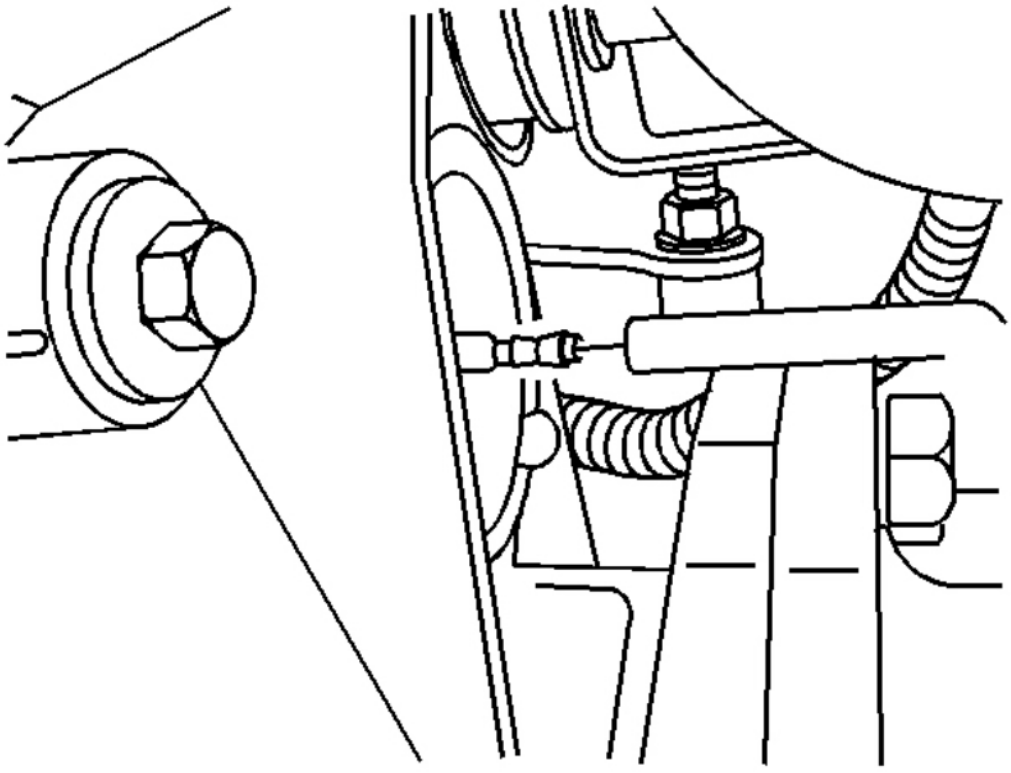


Fig. 37: View Of Vent Hose To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

3. Install the vent hose (1) to the wiring bundle (2), S4WD axles only.

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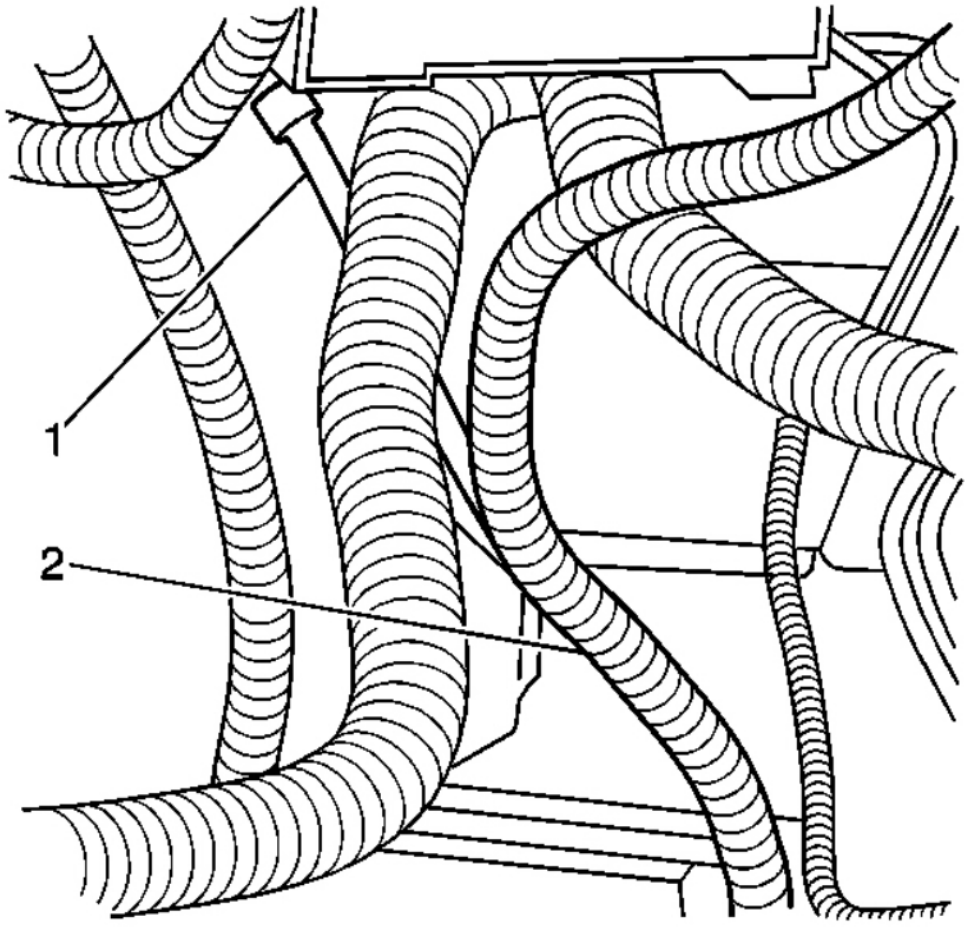


Fig. 38: View Of Vent Hose & Wiring Bundle
Courtesy of GENERAL MOTORS CORP.

4. Install the vent hose to the retainer clips, all axles.
5. Install the front differential carrier shield, if equipped. Refer to **Shield Replacement**.
6. Lower the vehicle.

VENT HOSE CONNECTOR REPLACEMENT - FRONT DRIVE AXLE

Removal Procedure

1. Raise the vehicle. Refer **Lifting and Jacking the Vehicle** in General Information.
2. Disconnect the vent hose from the vent hose connector.

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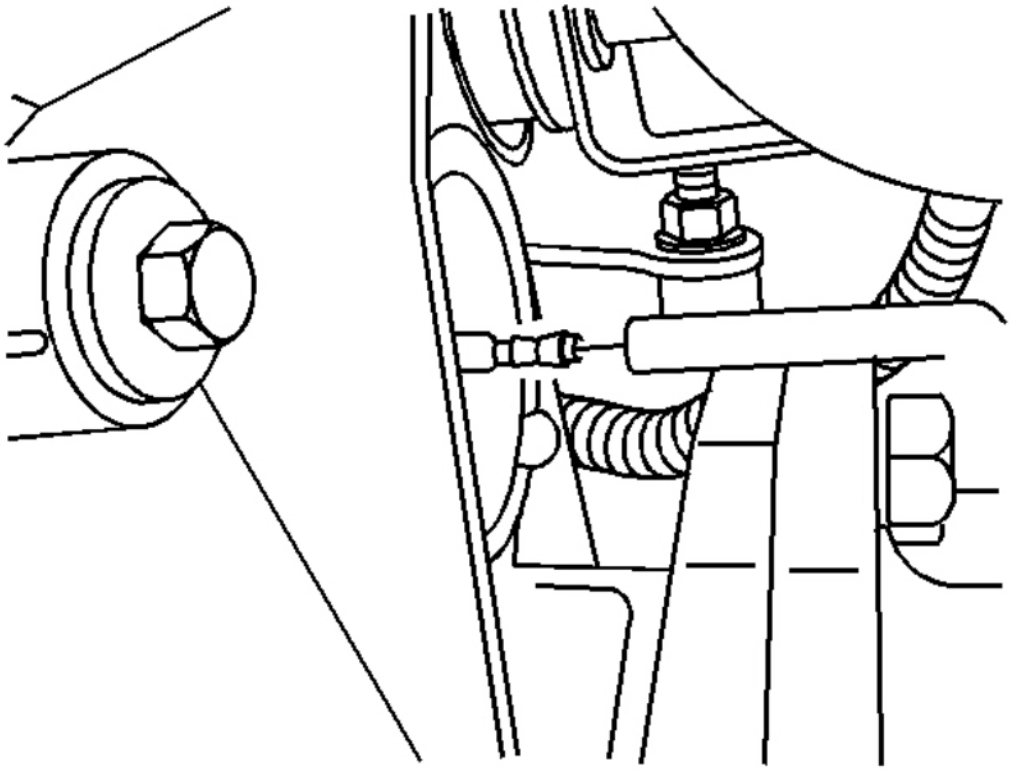


Fig. 39: View Of Vent Hose To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

3. Remove the vent hose connector from the differential carrier assembly.

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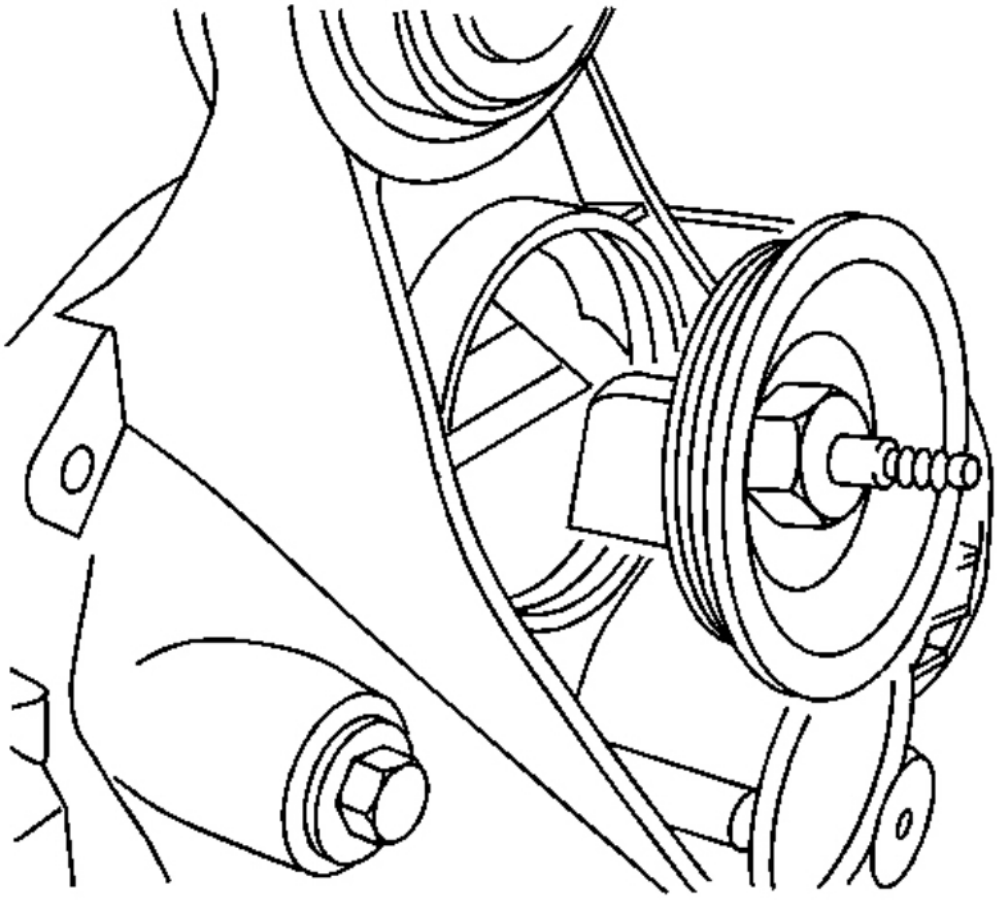


Fig. 40: View Of Vent Hose Connector
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the vent hose connector into the differential carrier assembly.

   Apply a small amount of sealer GM P/N 12346004 (Canadian P/N 10953480) or equivalent onto the threads.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Tighten the vent hose connector.

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Tighten: Tighten the vent hose connector to 28 N.m (21 lb ft).

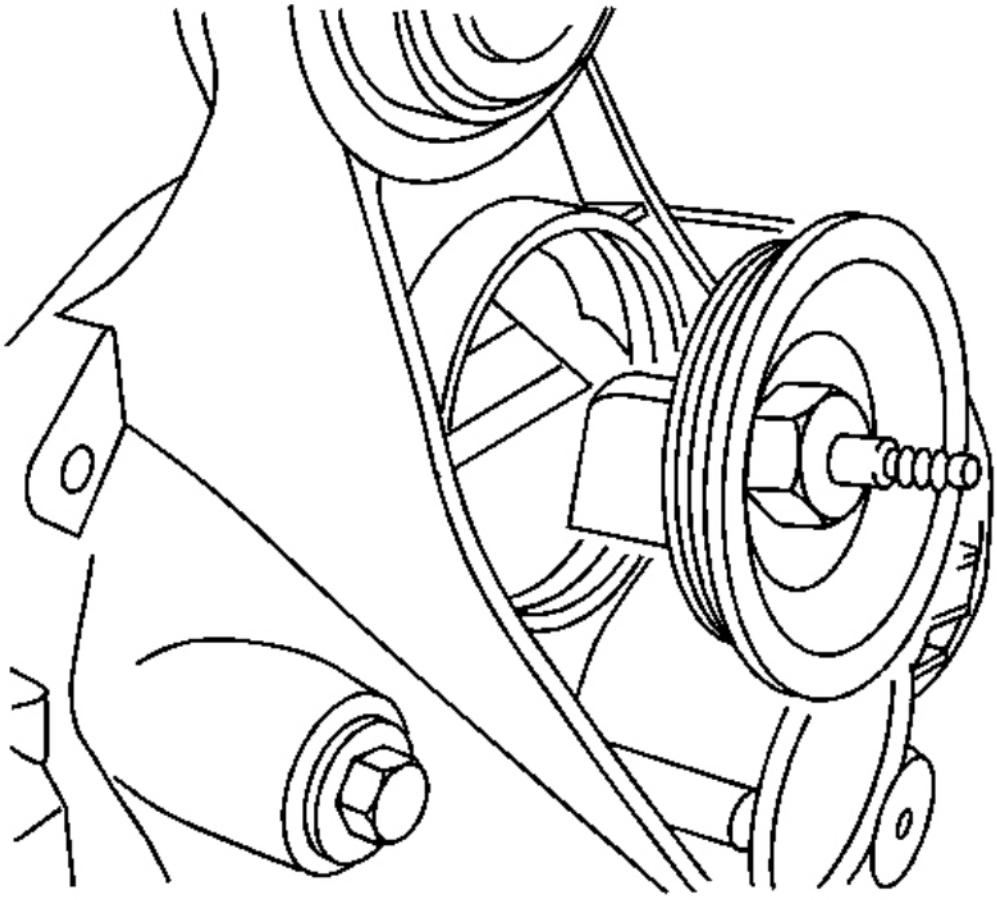


Fig. 41: View Of Vent Hose Connector
Courtesy of GENERAL MOTORS CORP.

3. Connect the vent hose to the vent hose connector.

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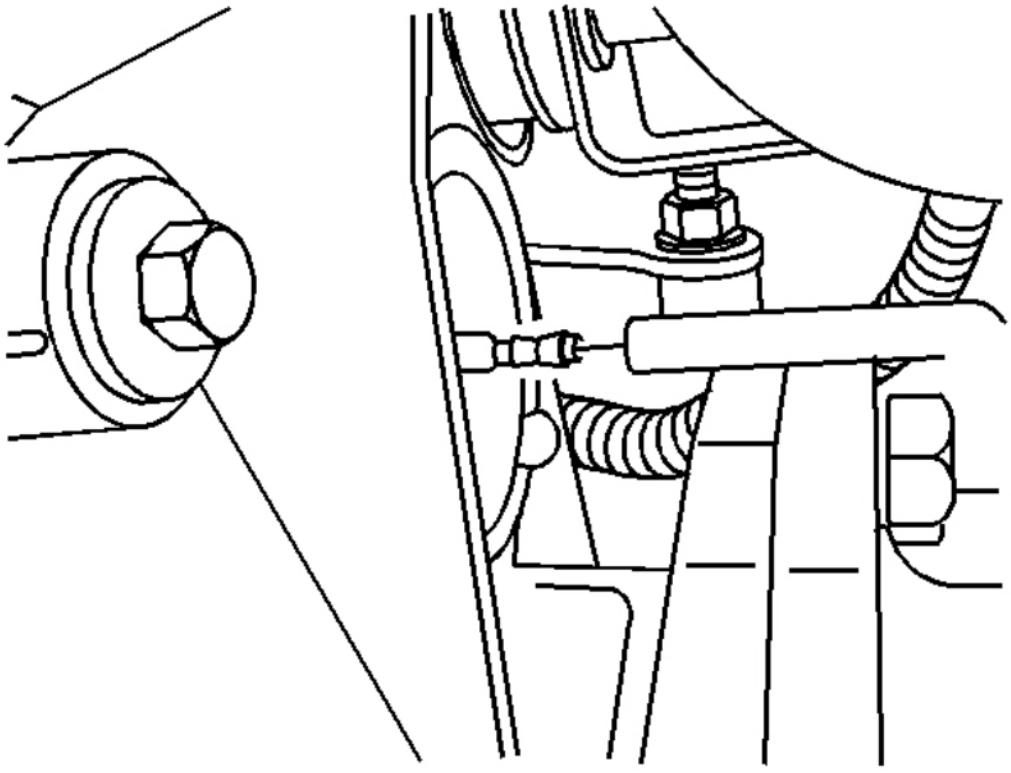


Fig. 42: View Of Vent Hose To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

4. Lower the vehicle.

INNER SHAFT AND/OR HOUSING REPLACEMENT - FRONT DRIVE AXLE (8.25 S4WD AND 9.25 AXLES)

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Drain the differential carrier assembly. Refer to **Lubricant Replacement - Front Drive Axle**.
3. Disconnect the electrical connector from the electric motor actuator.

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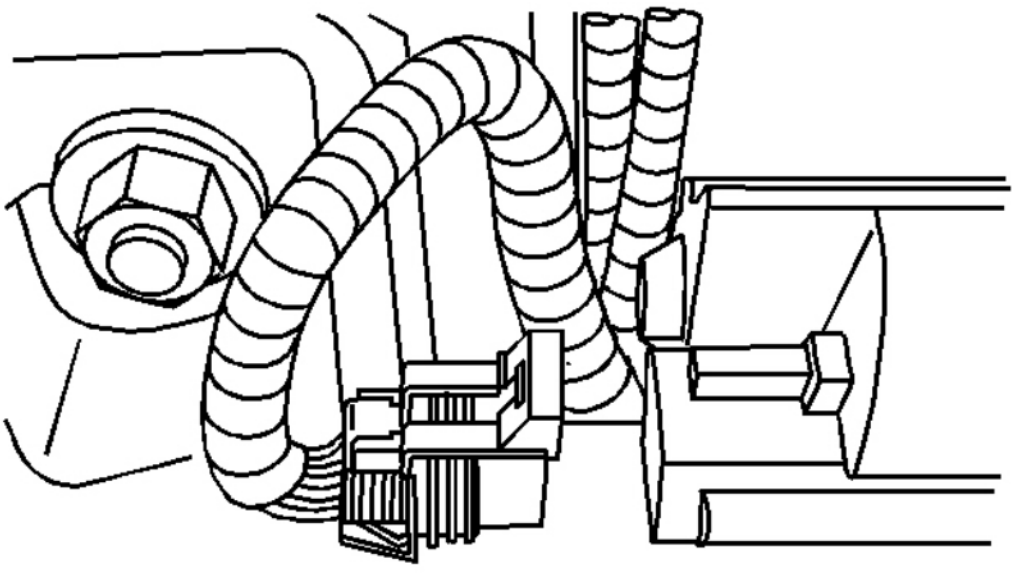


Fig. 43: View Of Front Axle Actuator Electrical Connector
Courtesy of GENERAL MOTORS CORP.

4. Disconnect the wire harness from the inner axle shaft housing.

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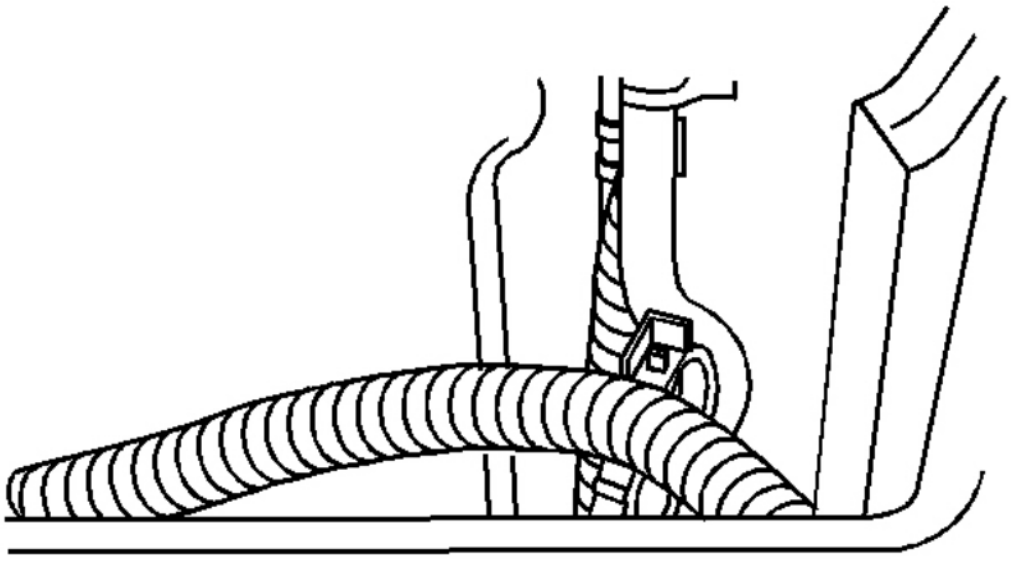


Fig. 44: View Of Inner Axle Shaft Housing Wire Harness
Courtesy of GENERAL MOTORS CORP.

5. Remove the stabilizer shaft link assembly. Refer to **Stabilizer Shaft Link Replacement** in Front Suspension.
6. Remove the wheel drive shaft inboard flange bolts from the inner axle shaft.

   Disconnect the wheel drive shaft from the inner axle shaft.

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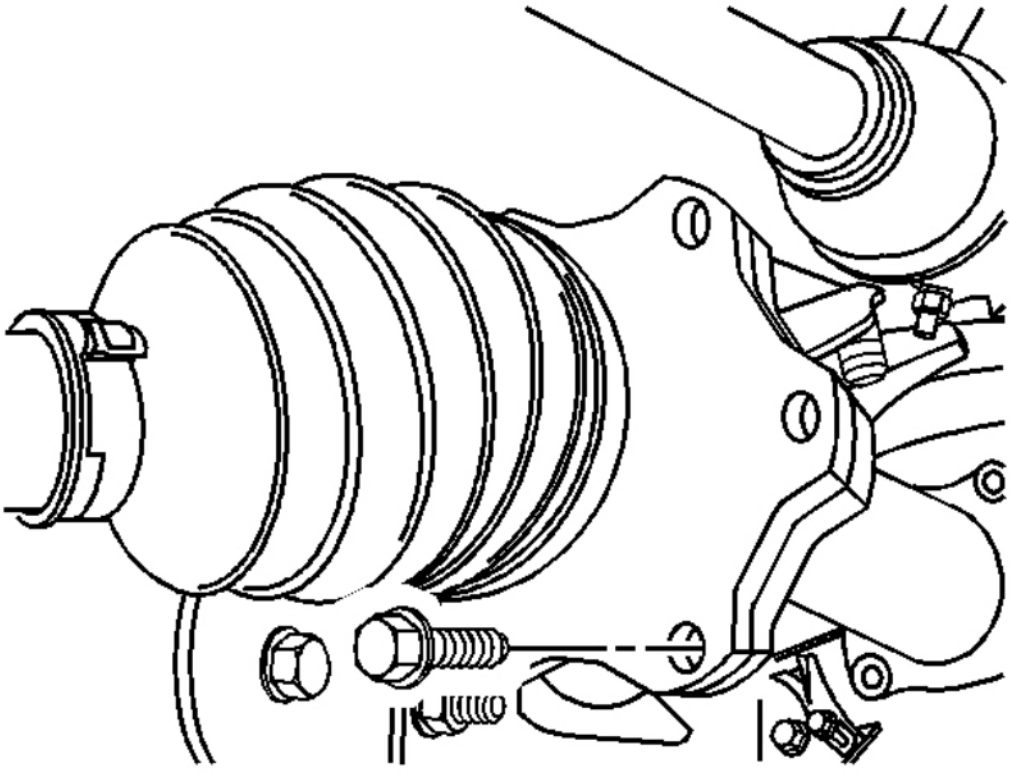


Fig. 45: View Of Wheel Drive Shaft Inboard Flange Bolt - Front Drive Axle
Courtesy of GENERAL MOTORS CORP.

7. Remove the inner axle shaft housing nuts from the bracket.

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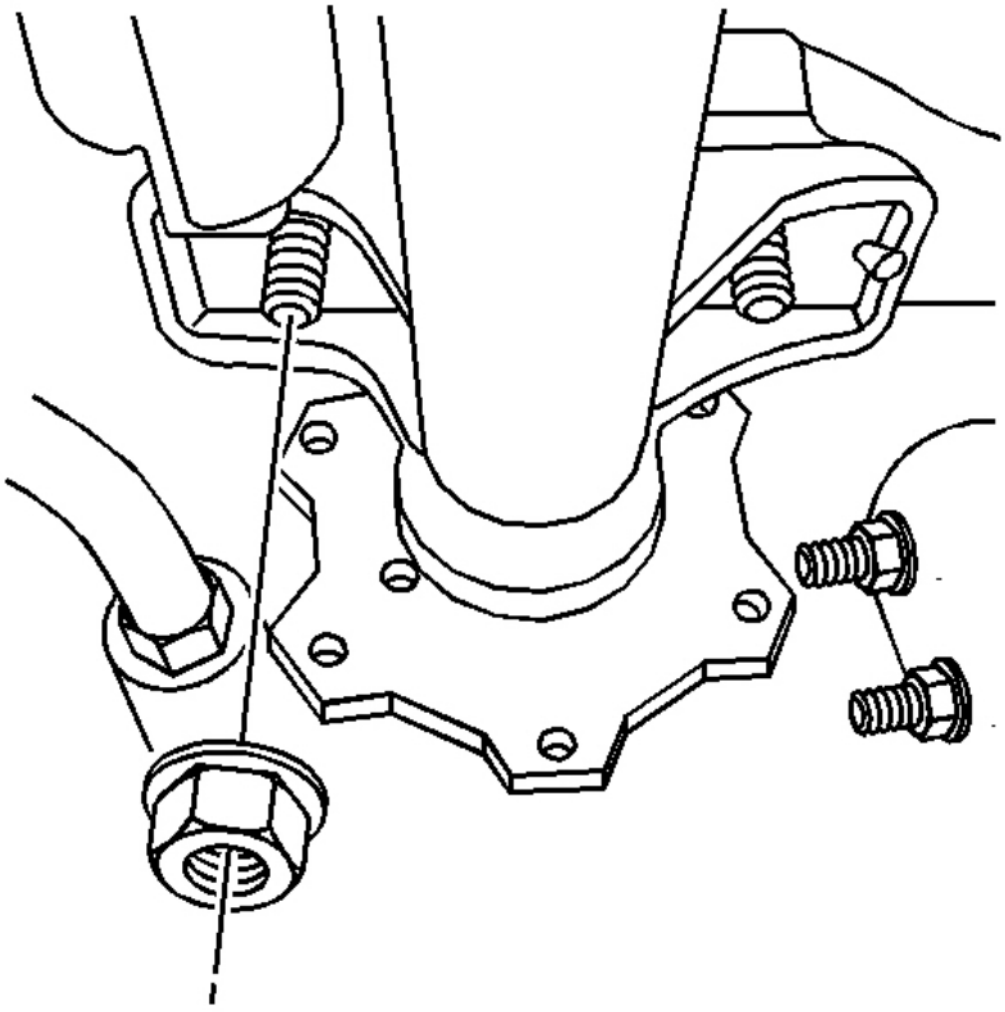


Fig. 46: View Of Inner Axle Housing Nuts
Courtesy of GENERAL MOTORS CORP.

8. For 25/35 series vehicles, perform the following steps in order to provide additional clearance so the inner axle housing can be removed from the vehicle:
    1. Remove the front axle mounting bracket to frame nuts.
    2. Slide the front axle mounting bracket towards the engine. It may be necessary to pull down on the inner axle housing and/or push up on the mounting bracket in order to gain clearance.

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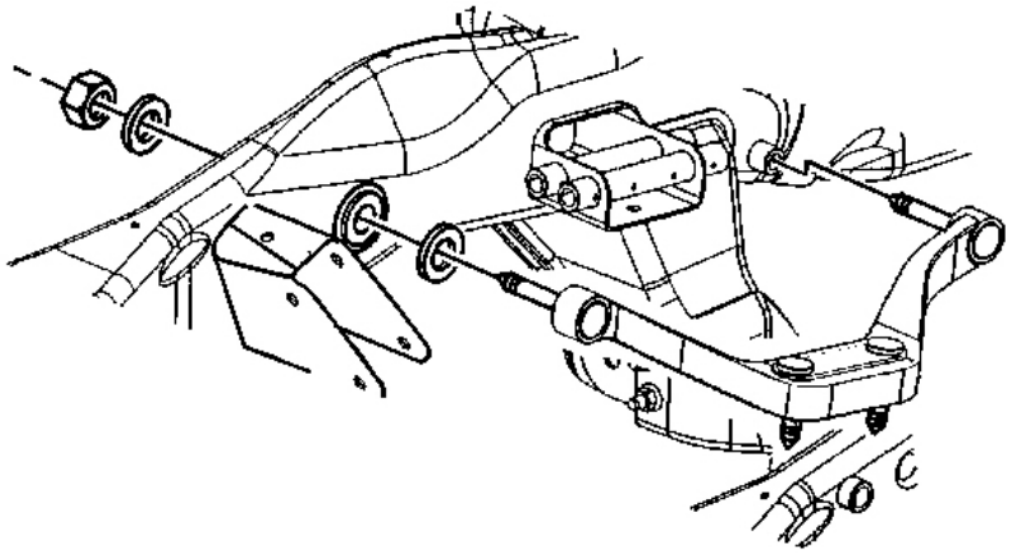


Fig. 47: View Of Front Axle Mounting Bracket (25/35 Series)
Courtesy of GENERAL MOTORS CORP.

9. Remove the inner axle shaft housing bolts from the differential carrier case.

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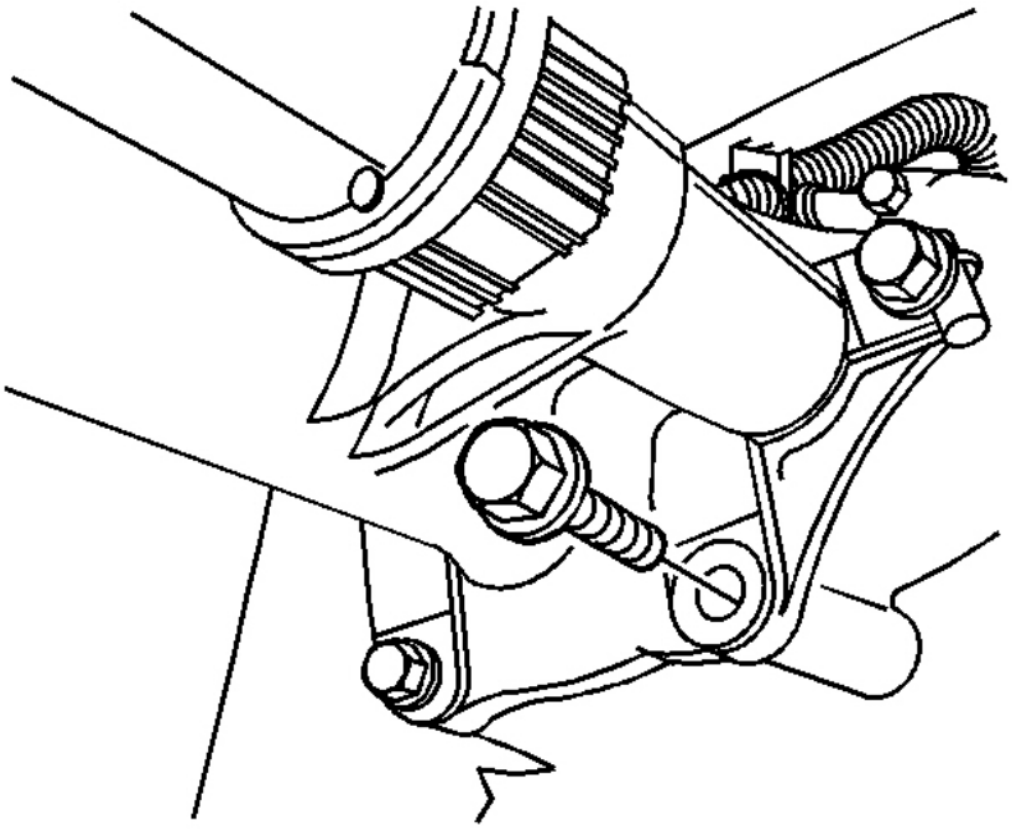


Fig. 48: View Of Inner Axle Shaft Housing Bolts
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Keep the open end of the inner axle shaft housing up.

10. Carefully remove the inner axle shaft housing assembly from the differential carrier assembly.

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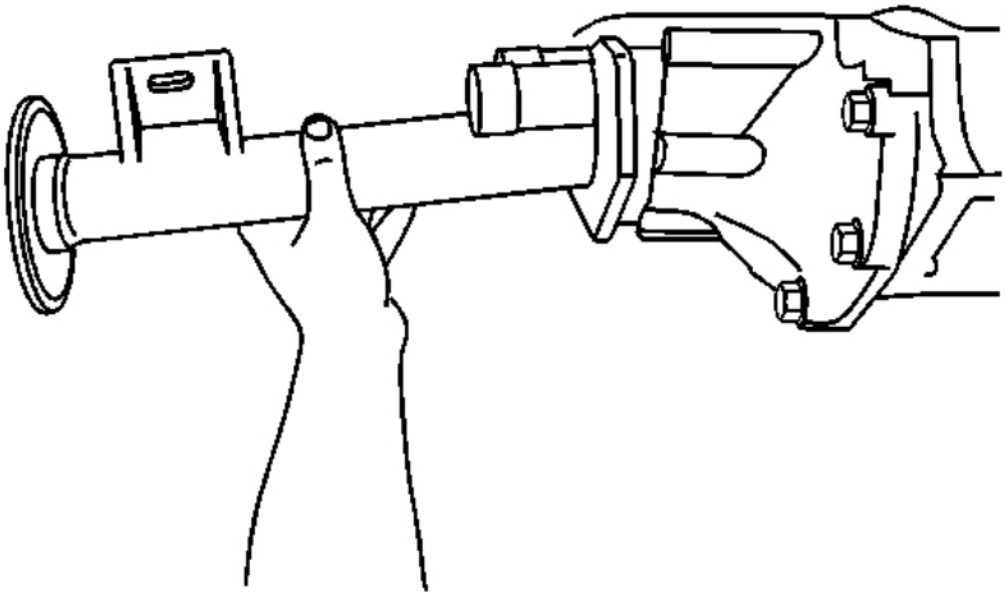


Fig. 49: Removing Inner Axle Shaft Housing Assembly From Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

11. For the 8.25 inch axle, remove the following components from the inner axle shaft housing:
    A. The clutch fork inner spring (10)
    B. The clutch fork assembly (11)
    C. The clutch shaft shim (9)
    D. The clutch sleeve (8)
    E. The clutch gear (6) by doing the following:
        1. Clamp the inner axle shaft housing (4) in a vise.

           Clamp only on the mounting flange.

        2. Strike the inside surface of the shaft (1) flange with a hammer and a brass drift in order to dislodge the front drive axle clutch gear (6) from the inner axle shaft (1).
    F. The thrust washer (5)

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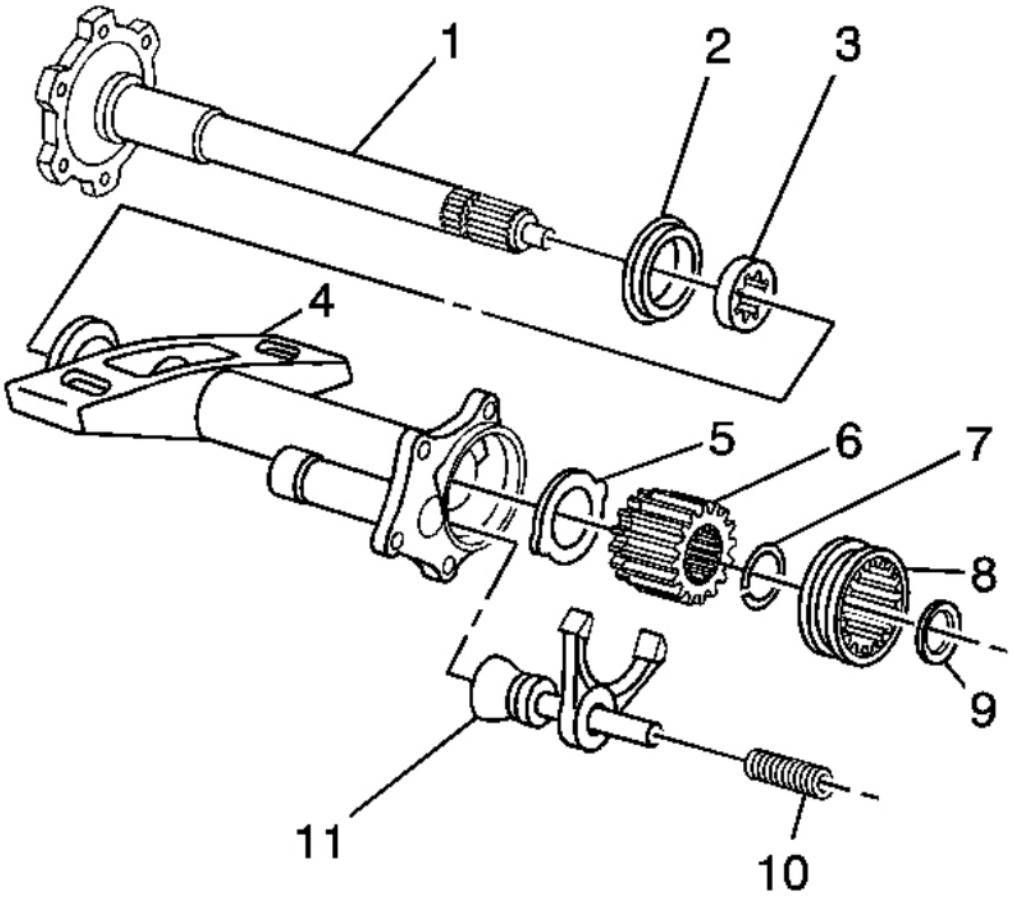


Fig. 50: Exploded View Of Inner Axle Shaft Housing (8.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

12. For the 9.25 inch axle, remove the following components from the inner axle shaft housing:
    A. The clutch fork inner spring (10)
    B. The clutch fork assembly (11)
    C. The clutch shaft shim (9)
    D. The clutch sleeve (8)
    E. The retainer ring (7)
    F. The thrust washers (5, 6)

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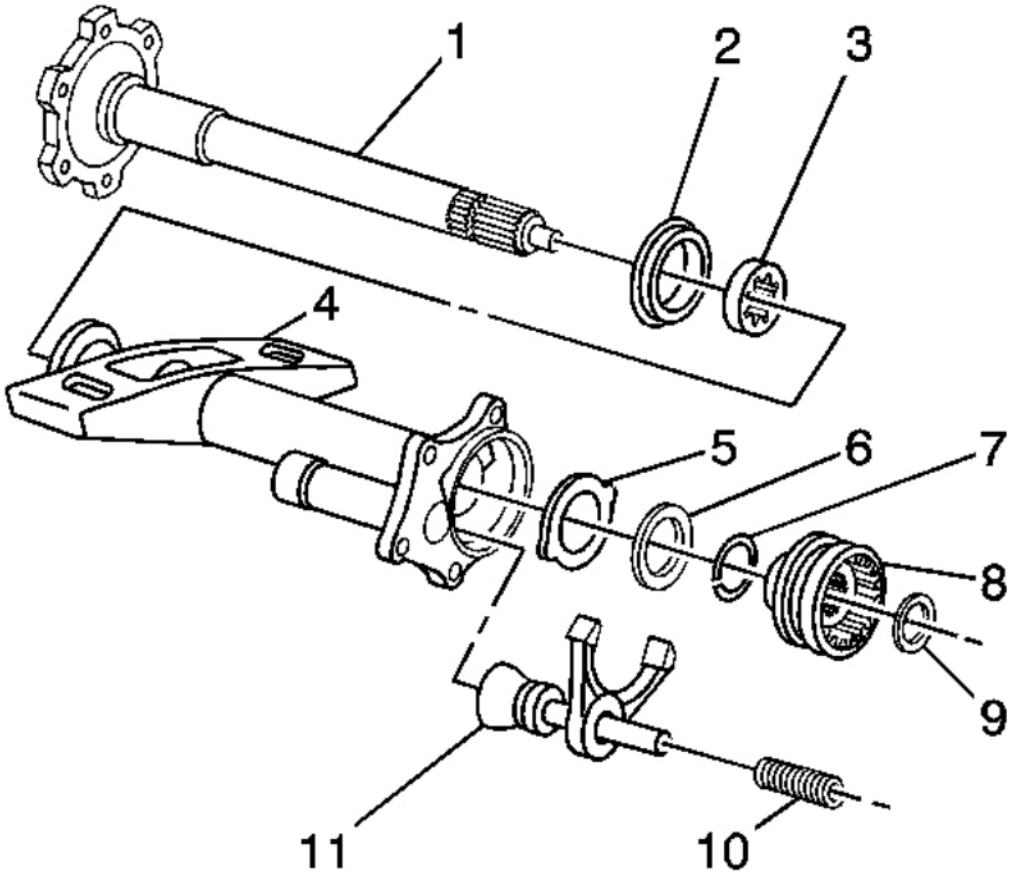


Fig. 51: Exploded View Of Inner Axle Shaft Housing (9.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

13. Remove the inner axle shaft (2). Tap out the inner axle shaft with a soft-faced mallet, if necessary.

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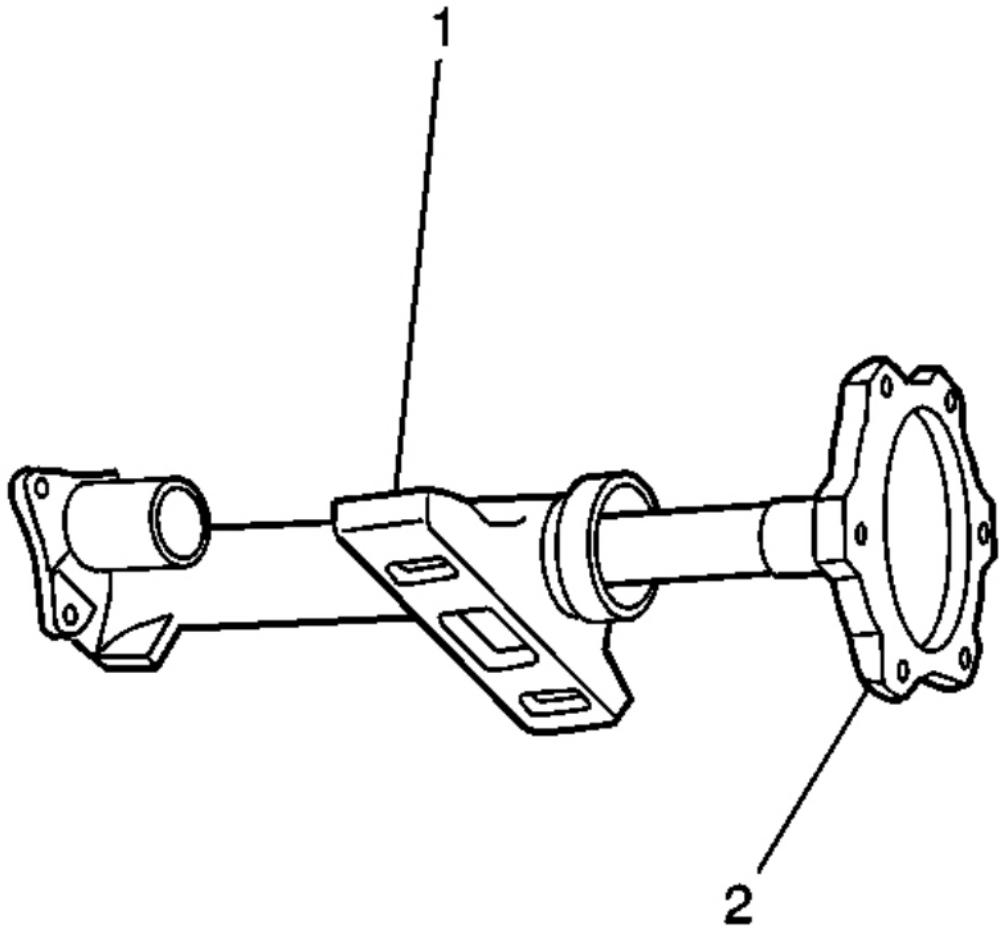


Fig. 52: View Of Inner Axle Shaft
Courtesy of GENERAL MOTORS CORP.

14. Remove the inner axle seal and the bearing from the axle housing. Refer to **Inner Axle Seal and/or Bearing Replacement - Front Drive Axle**.

Installation Procedure

1. Install the new inner axle shaft bearing and the seal to the axle housing. Refer to **Inner Axle Seal and/or Bearing Replacement - Front Drive Axle**.
2. Install the inner axle shaft (2) into the inner axle shaft housing (1).

   Carefully tap the inner axle shaft into place with a soft-faced mallet.

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3. Place the inner axle shaft housing on end so that the splines of the inner axle shaft is facing up.

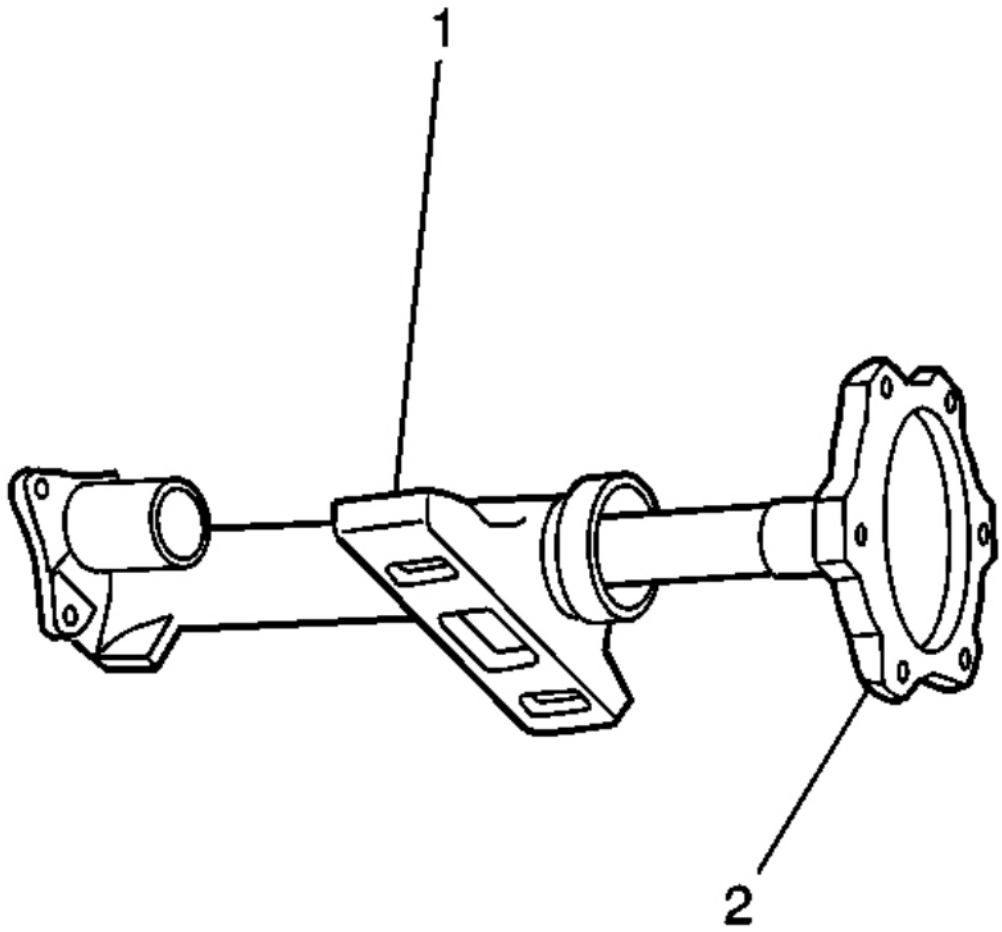


Fig. 53: View Of Inner Axle Shaft
Courtesy of GENERAL MOTORS CORP.

4. For the 8.25 inch axle, install the following components into the inner axle shaft housing:

IMPORTANT: Use chassis grease in order to hold the thrust washer in place.

A. The thrust washer (5)

Ensure the tabs on the thrust washer are aligned with the slots in the inner axle shaft housing (4).

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B. The retainer ring (7) into the clutch gear (6).
C. The clutch gear (6) onto the inner axle shaft (1).

Drive the clutch gear into place with a plastic hammer.

D. Determine the clutch gear shim thickness. Refer to **Inner Axle Shaft Shim Adjustment**.
E. The clutch gear shim (9)
F. The clutch sleeve (8)
G. The clutch fork assembly (11)
H. The clutch fork inner spring (10)

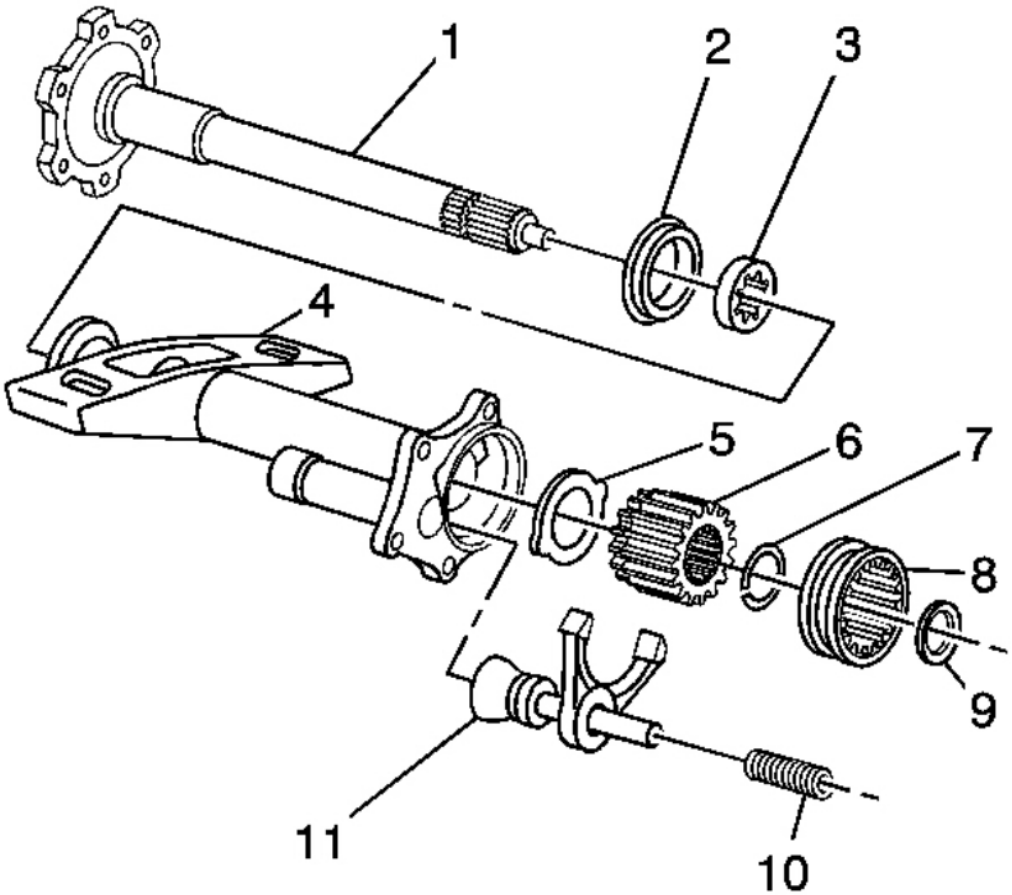


Fig. 54: Exploded View Of Inner Axle Shaft Housing (8.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

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5. For the 9.25 inch axle, install the following components into the inner axle shaft housing:

IMPORTANT: Use chassis grease in order to hold the thrust washer in place.

A. The thrust washer (5)

   Ensure the tabs on the thrust washer are aligned with the slots in the inner axle shaft housing (4).

B. The second thrust washer (6)
C. The retainer ring (7) onto the inner axle shaft (1).
D. Determine the clutch gear shim thickness. Refer to **Inner Axle Shaft Shim Adjustment**.
E. The clutch gear shim (9)
F. The clutch sleeve (8)
G. The clutch fork assembly (11)
H. The clutch fork inner spring (10)

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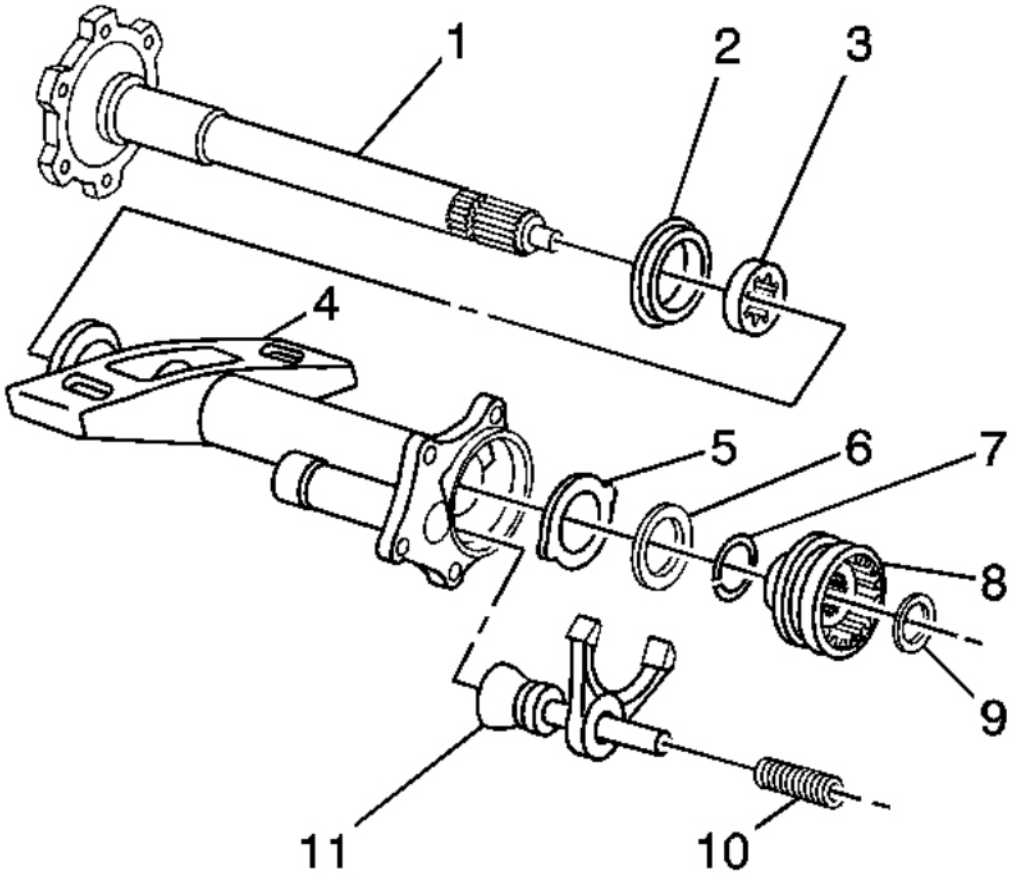


Fig. 55: Exploded View Of Inner Axle Shaft Housing (9.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

6. Apply sealant to the inner axle housing to differential carrier sealing surface. Use the correct sealant. Refer to **Sealers, Adhesives, and Lubricants**.
7. Install the inner axle shaft housing assembly to the differential carrier assembly.

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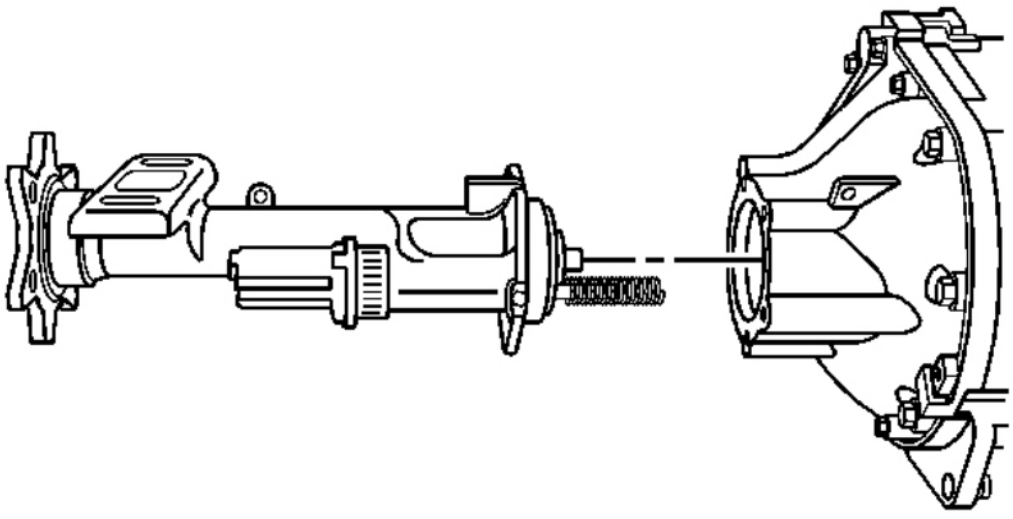


Fig. 56: View Of Inner Axle Shaft Housing Assembly To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

8. Install the inner axle shaft housing bolts.

   Tighten: Tighten the inner axle shaft housing bolts to 40 N.m (30 lb ft).

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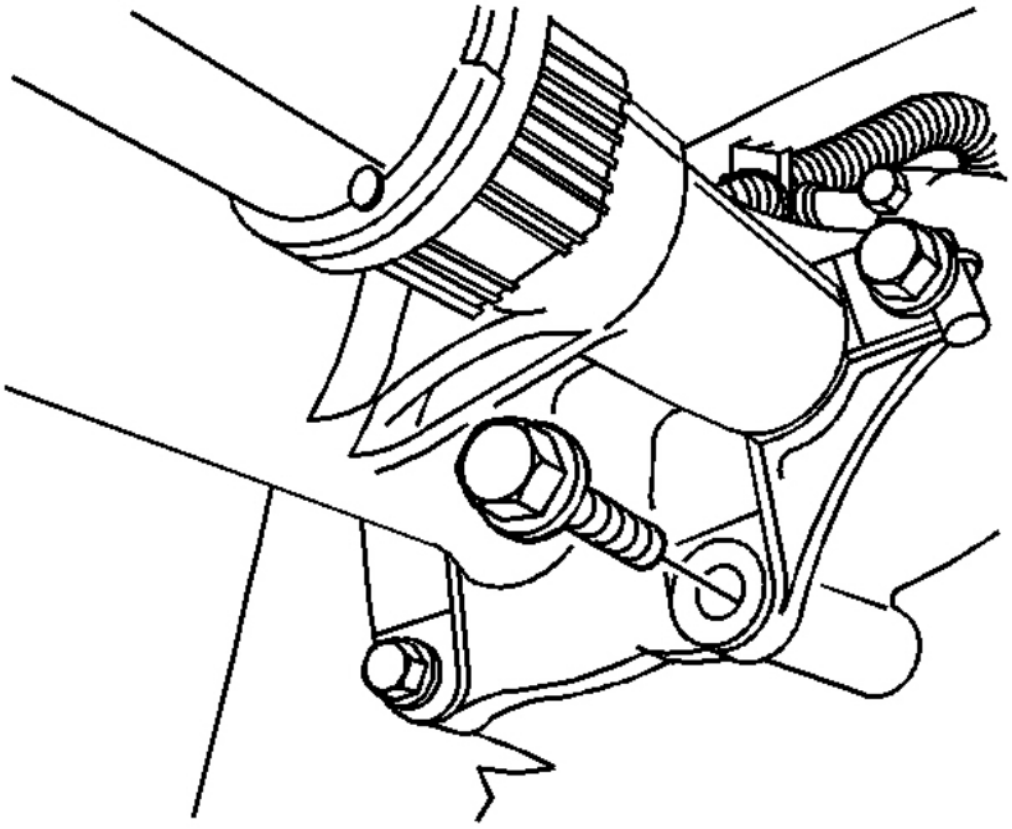


Fig. 57: View Of Inner Axle Shaft Housing Bolts
Courtesy of GENERAL MOTORS CORP.

9. For 25/35 series vehicles, perform the following steps in order to install the front axle mounting bracket to the inner axle shaft housing:
   A. Slide the front axle mounting bracket towards the frame.

      Install the front axle mounting bracket studs into the inner shaft housing mounting flange.

      It may be necessary to push up on the front axle mounting bracket and/or pull down on the inner axle housing in order to gain enough clearance to install the mounting bracket studs into the inner shaft housing.

   B. Install the front axle mounting bracket to frame nuts.

      Tighten: Tighten the inner axle shaft housing mounting bracket to frame nuts to 90 N.m (67 lb ft).

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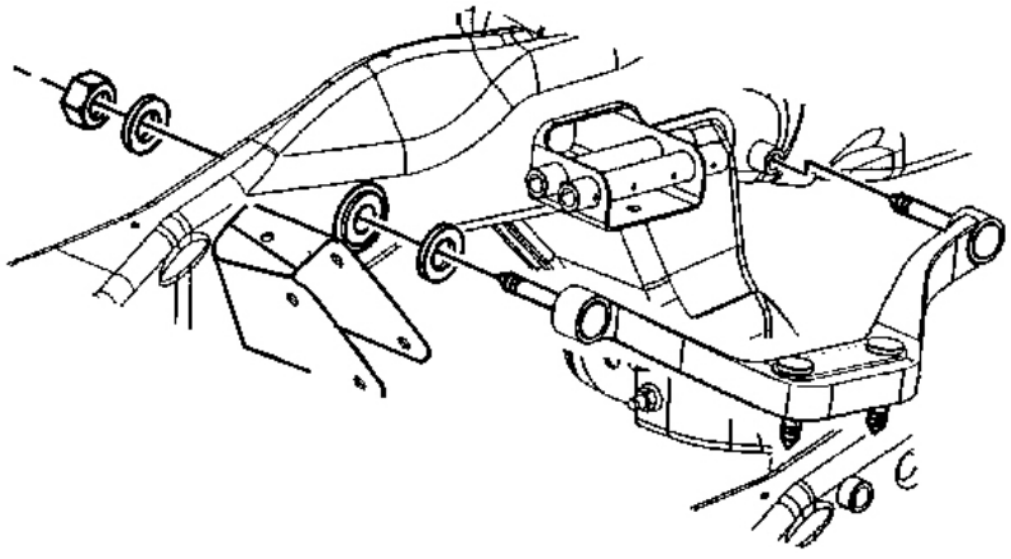


Fig. 58: View Of Front Axle Mounting Bracket (25/35 Series)
Courtesy of GENERAL MOTORS CORP.

10. Install the inner axle shaft housing washers and nuts to the bracket.

    Tighten: Tighten the inner axle shaft housing nuts to 100 N.m (75 lb ft).

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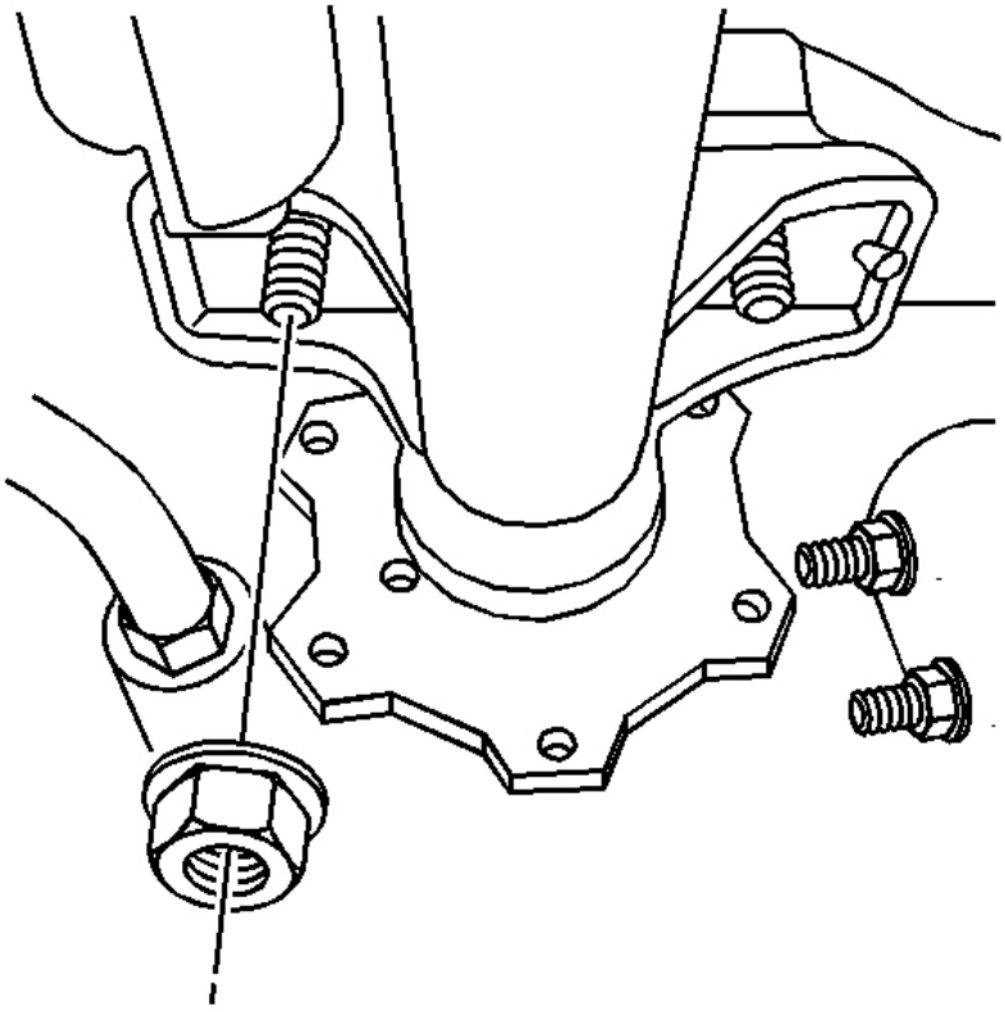


Fig. 59: View Of Inner Axle Housing Nuts
Courtesy of GENERAL MOTORS CORP.

11. Connect the wheel drive shaft inboard flange to the inner axle shaft.
12. Install the wheel drive shaft inboard flange to the inner axle shaft bolts.

Tighten: Tighten the wheel drive shaft inboard flange to inner axle shaft bolts to 79 N.m (58 lb ft).

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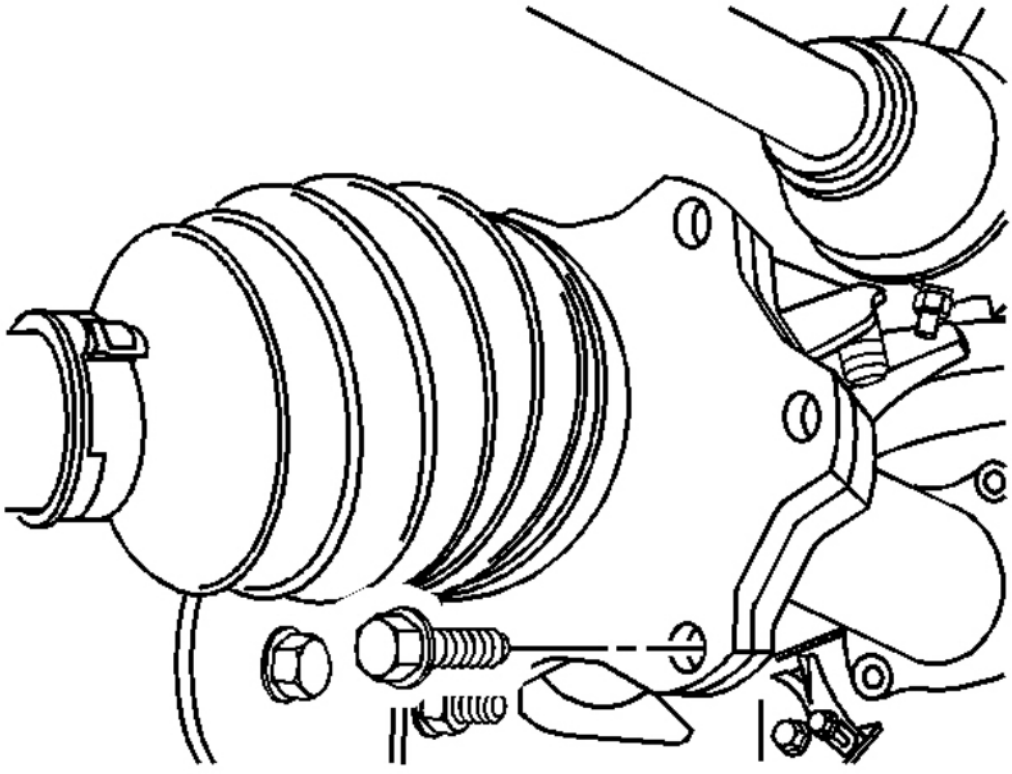


Fig. 60: View Of Wheel Drive Shaft Inboard Flange Bolt - Front Drive Axle
Courtesy of GENERAL MOTORS CORP.

13. Install the stabilizer shaft link assembly. Refer to **Stabilizer Shaft Link Replacement** in Front Suspension.
14. Connect the wire harness to the inner axle shaft housing.

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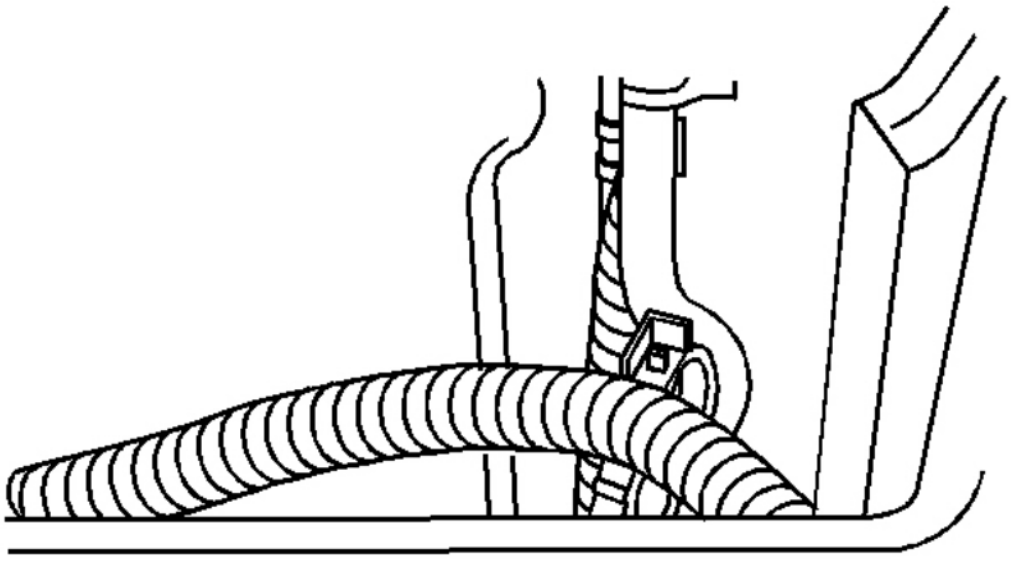


Fig. 61: View Of Inner Axle Shaft Housing Wire Harness
Courtesy of GENERAL MOTORS CORP.

15. Connect the electrical connector to the front axle actuator.

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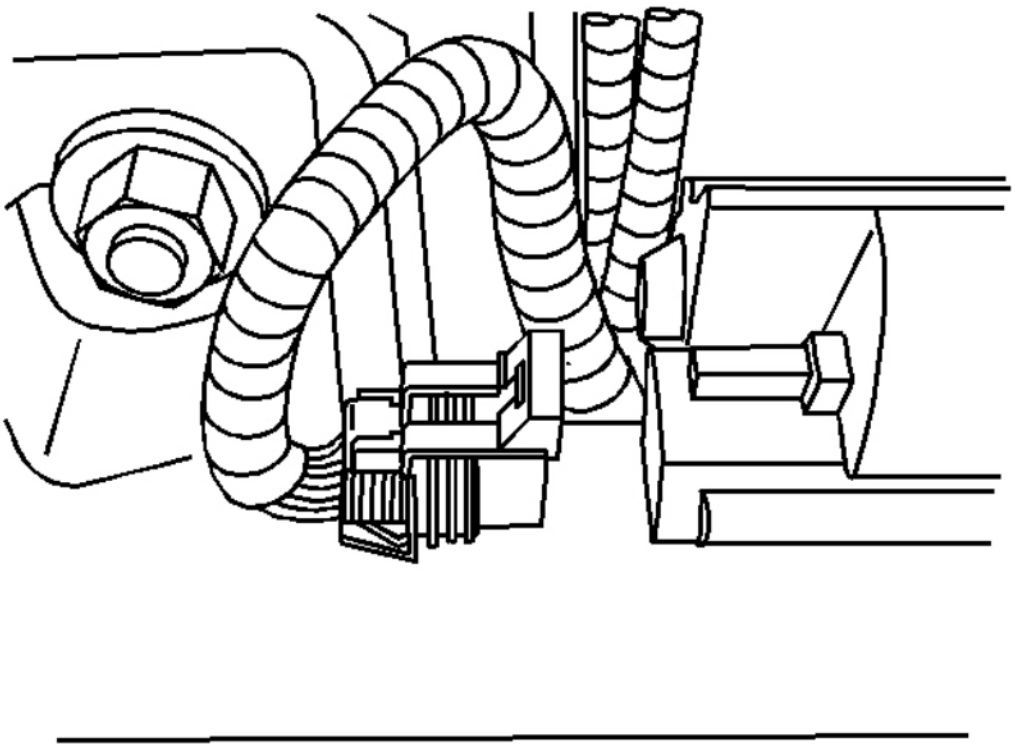


Fig. 62: View Of Front Axle Actuator Electrical Connector
Courtesy of GENERAL MOTORS CORP.

16. Fill the differential carrier assembly with axle lubricant. Use the correct fluid. Refer to **Lubricant Replacement - Front Drive Axle**.
17. Lower the vehicle.

INNER SHAFT AND/OR HOUSING REPLACEMENT - FRONT DRIVE AXLE (8.25 F4WD AXLE)

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Drain the differential carrier assembly. Refer to **Lubricant Replacement - Front Drive Axle**.
3. Remove the stabilizer shaft link assembly. Refer to **Stabilizer Shaft Link Replacement** in Front Suspension.
4. Remove the wheel drive shaft inboard flange bolts from the inner axle shaft.

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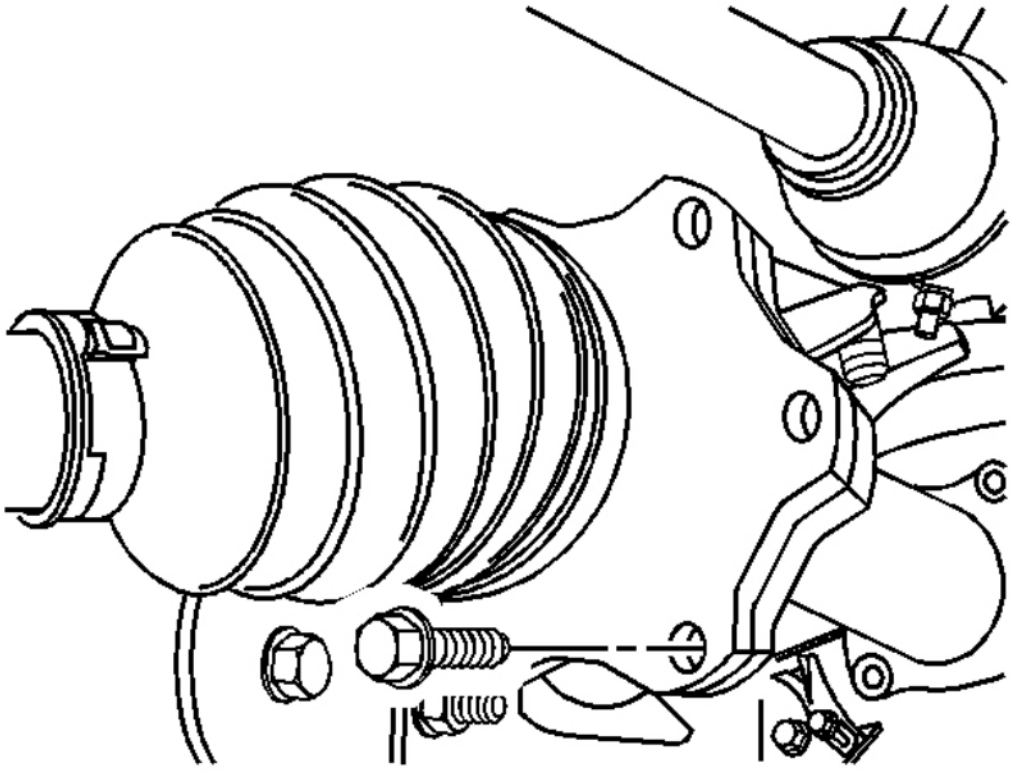


Fig. 63: View Of Wheel Drive Shaft Inboard Flange Bolt - Front Drive Axle
Courtesy of GENERAL MOTORS CORP.

5. Disconnect the wheel drive shaft from the inner axle shaft.
6. Disconnect the inner axle shaft from the differential case side gear using a hammer and brass drift.

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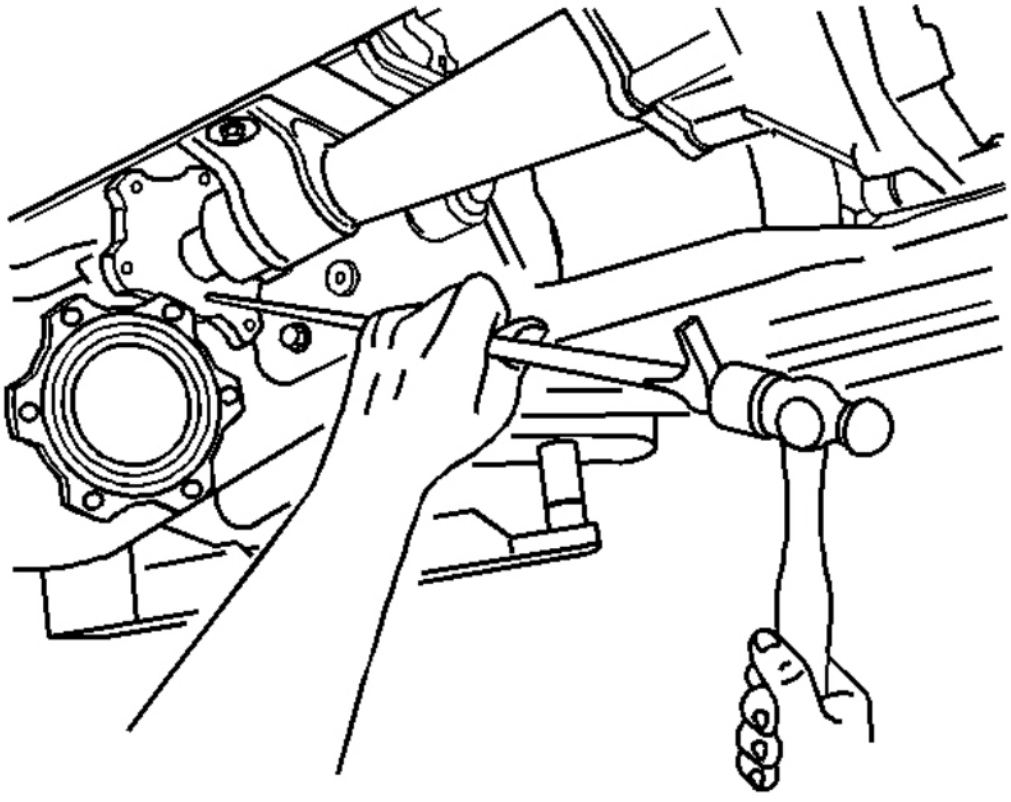


Fig. 64: Disconnecting Inner Axle Shaft From Differential Case Side Gear
Courtesy of GENERAL MOTORS CORP.

7. Remove the inner axle shaft housing nuts from the bracket.

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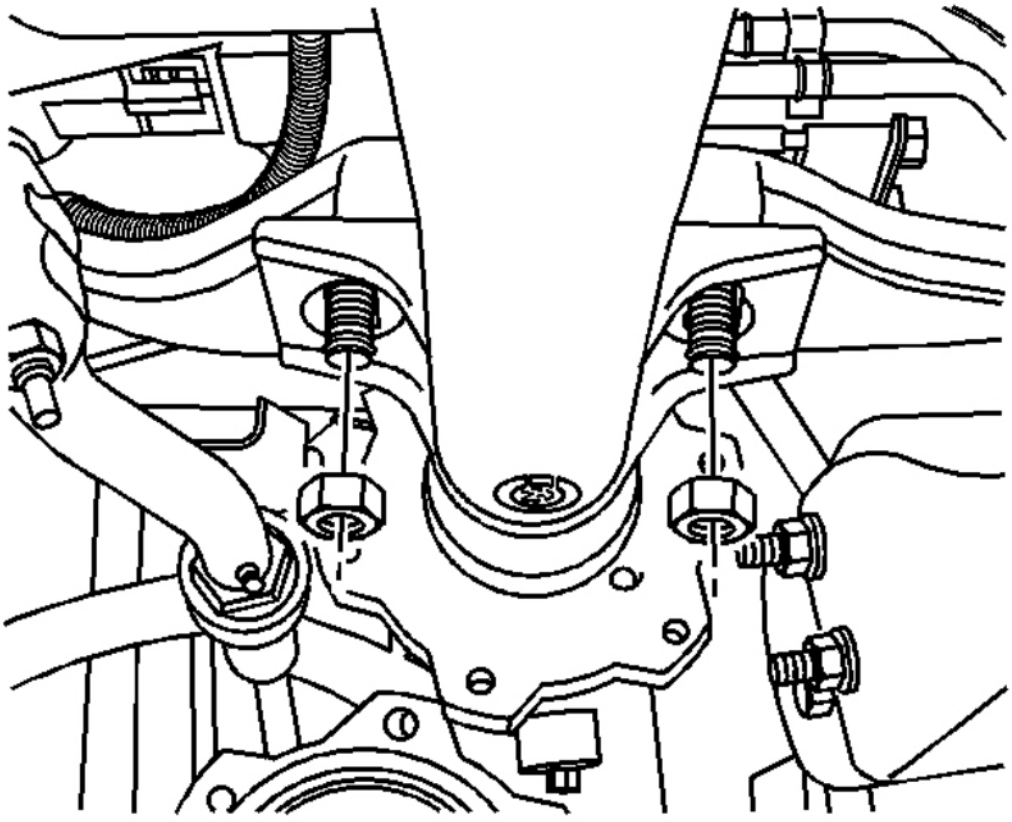


Fig. 65: View Of Inner Axle Shaft Housing Nuts To Bracket (8.25 F4WD Axle)
Courtesy of GENERAL MOTORS CORP.

8. Remove the inner axle shaft housing bolts from the differential carrier assembly.

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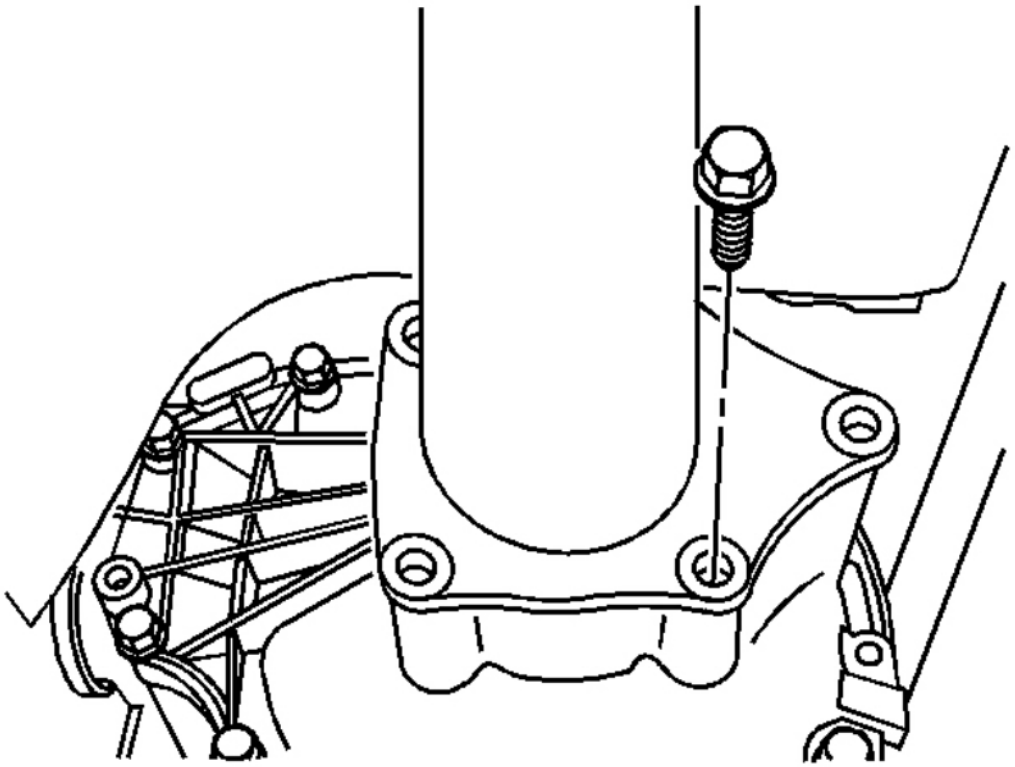


Fig. 66: View Of Inner Axle Shaft Housing Bolts To Differential Carrier Assembly (8.25 F4WD Axle)
Courtesy of GENERAL MOTORS CORP.

9. Remove the inner axle shaft and inner axle shaft housing from the vehicle.
10. Remove the inner axle shaft from the inner axle shaft housing.
11. Remove the inner axle shaft seal and the bearing from the inner axle shaft housing. Refer to **Inner Axle Seal and/or Bearing Replacement - Front Drive Axle**.

Installation Procedure

1. Install the new inner axle shaft bearing and the new seal to the inner axle shaft housing. Refer to **Inner Axle Seal and/or Bearing Replacement - Front Drive Axle**.
2. Install the inner axle shaft into the inner axle shaft housing.

   Do not install the inner axle shaft completely into the inner axle shaft housing at this time.

3. Apply sealant to the inner axle housing to differential carrier sealing surface. Use the correct sealant.

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Refer to **Sealers, Adhesives, and Lubricants**.

4. Install the inner axle shaft and the inner axle shaft housing to the differential carrier assembly.

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Install the inner axle shaft housing bolts.

Tighten: Tighten the inner axle shaft housing bolts to 40 N.m (30 lb ft).

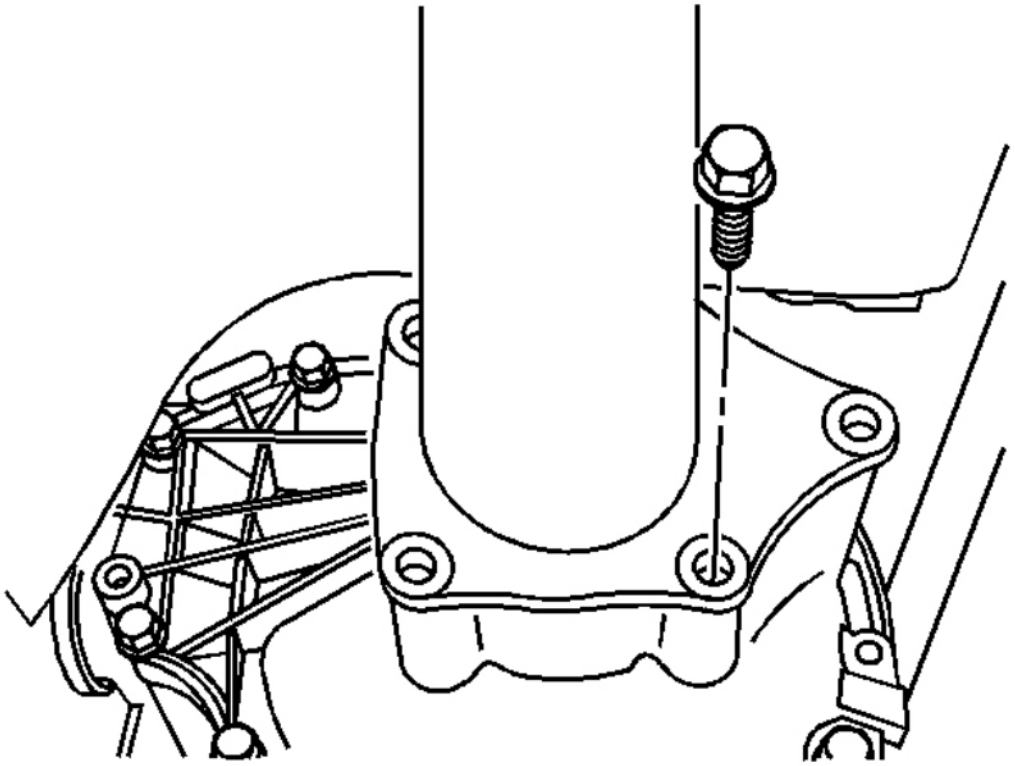


Fig. 67: View Of Inner Axle Shaft Housing Bolts To Differential Carrier Assembly (8.25 F4WD Axle)
Courtesy of GENERAL MOTORS CORP.

6. Install the inner axle shaft housing nuts to the bracket.

Tighten: Tighten the inner axle shaft housing nuts to 100 N.m (75 lb ft).

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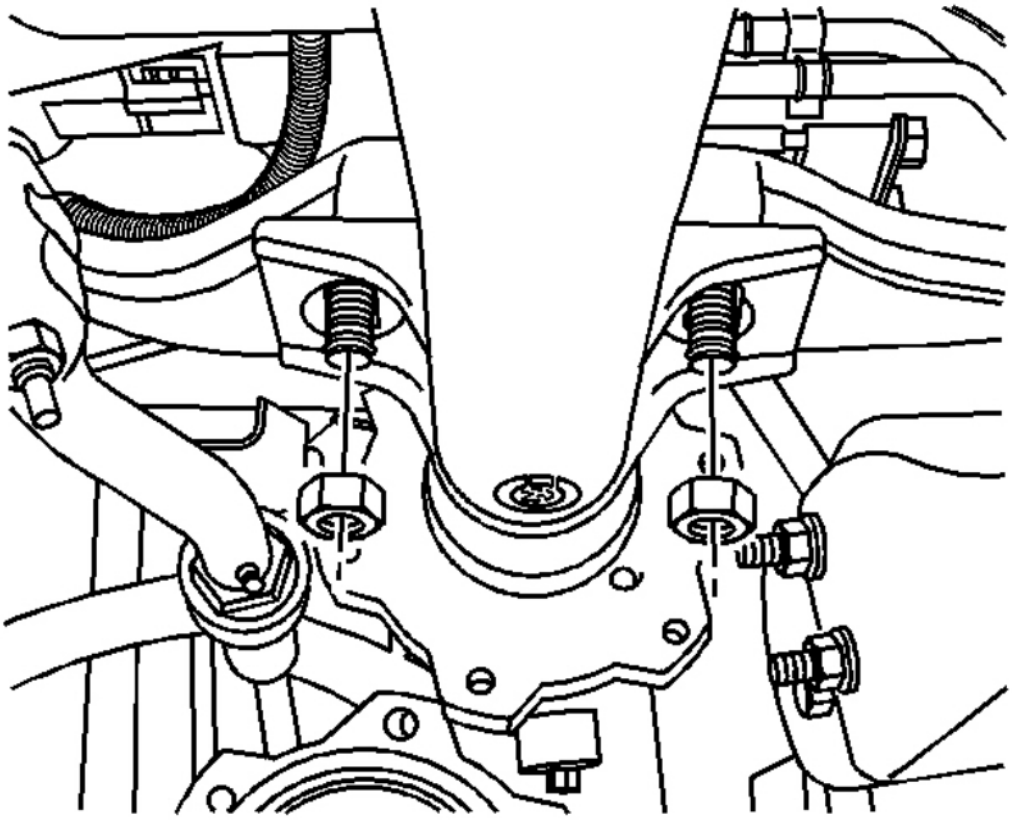


Fig. 68: View Of Inner Axle Shaft Housing Nuts To Bracket (8.25 F4WD Axle)
Courtesy of GENERAL MOTORS CORP.

7. Install the inner axle shaft into the differential case side gear by doing the following:
   A. Turn the inner axle shaft and align the splines of the inner axle shaft with the splines on the differential side gear.
   B. Install the inner axle shaft into the differential case side gear using a soft-faced mallet until the retaining ring on the inner axle shaft is fully seated within the groove in the differential case side gear.
   C. Pull back on the inner axle shaft to ensure that the inner axle shaft is properly retained in the differential case side gear.
8. Install the wheel drive shaft inboard flange to the inner axle shaft.
9. Install the wheel drive shaft inboard flange to inner axle shaft bolts.

Tighten: Tighten the wheel drive shaft inboard flange to inner axle shaft bolts to 79 N.m (58 lb ft).

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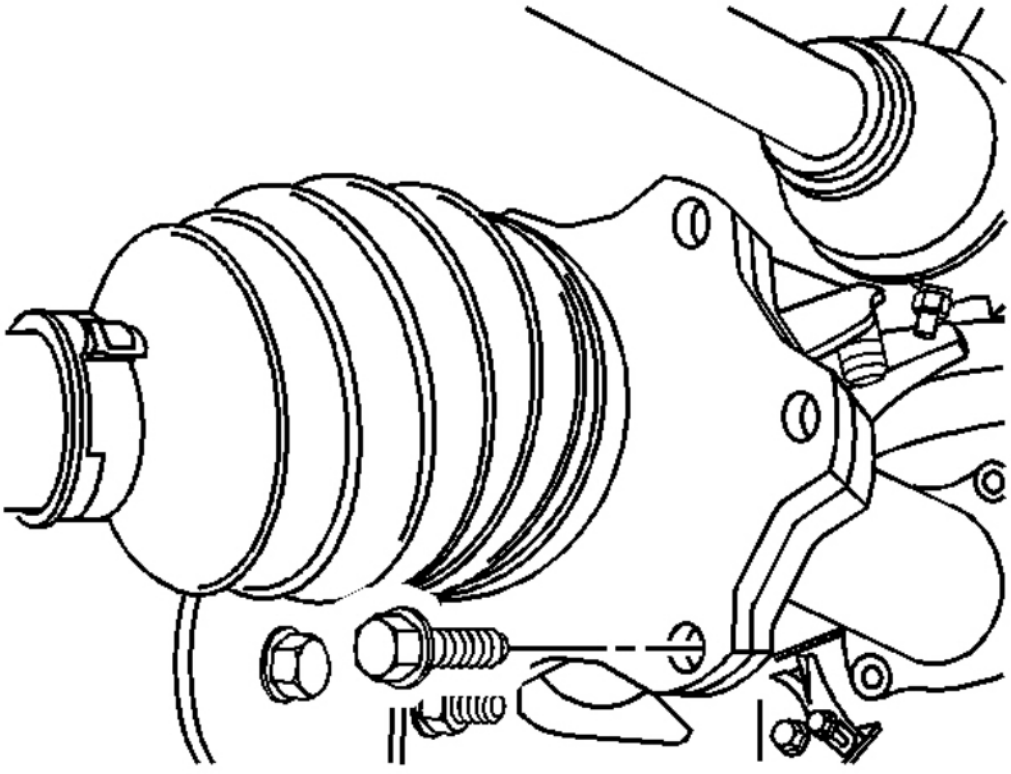


Fig. 69: View Of Wheel Drive Shaft Inboard Flange Bolt - Front Drive Axle
Courtesy of GENERAL MOTORS CORP.

10. Install the stabilizer shaft link assembly. Refer to **Stabilizer Shaft Link Replacement** in Front Suspension.
11. Fill the differential carrier assembly with axle lubricant. Use the correct fluid. Refer to **Lubricant Replacement - Front Drive Axle**.
12. Lower the vehicle.

CLUTCH FORK REPLACEMENT - FRONT DRIVE AXLE

Removal Procedure

1. Remove the inner axle shaft and housing assembly. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle)**.
2. Remove the clutch fork assembly (2) from the inner axle shaft housing (1).
3. Remove the clutch fork inner spring from the differential carrier case assembly, if necessary.

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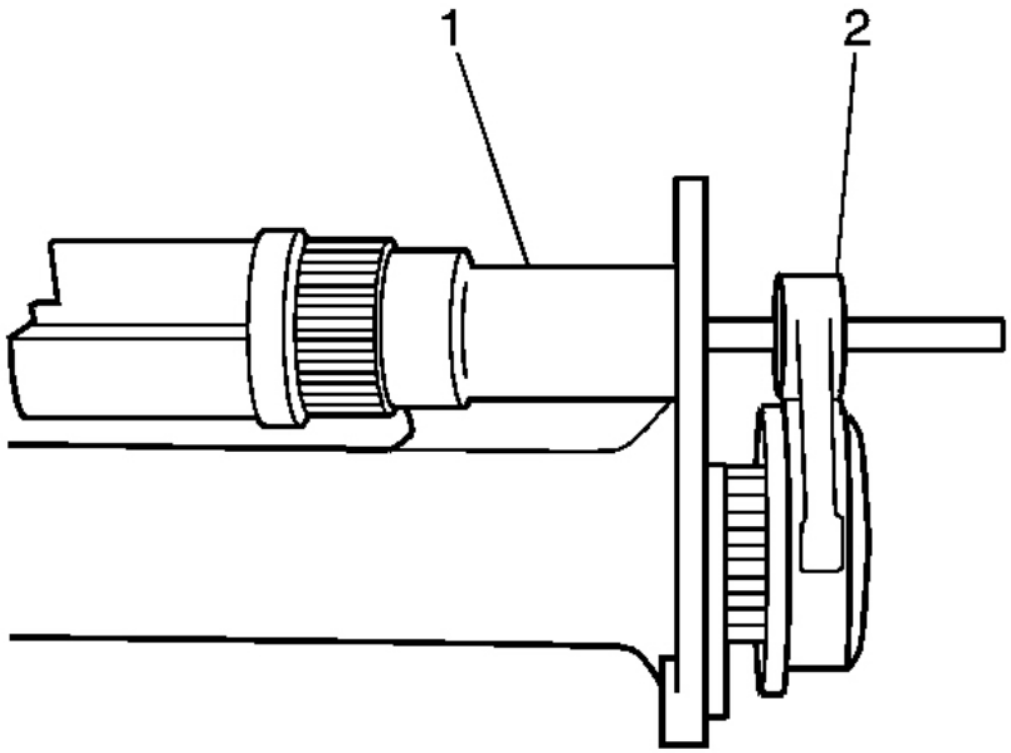


Fig. 70: View Of Clutch Fork Assembly & Inner Axle Shaft Housing
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the clutch fork inner spring into the differential carrier case assembly, if necessary.
2. Install the clutch fork assembly (2) into the inner axle shaft housing (1).

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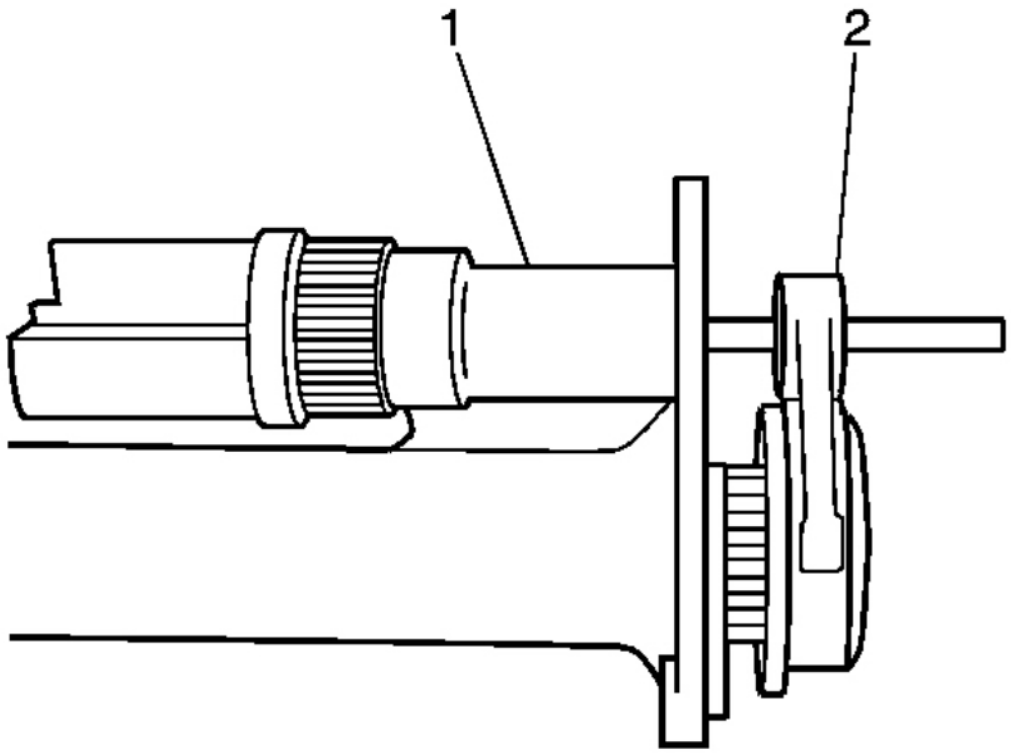


Fig. 71: View Of Clutch Fork Assembly & Inner Axle Shaft Housing
Courtesy of GENERAL MOTORS CORP.

3. Install the inner axle shaft and housing assembly. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle)**.

CLUTCH FORK INSPECTION - FRONT DRIVE AXLE

- Inspect the carrier connector for damaged splines and teeth. Replace as required.
- Inspect the shift fork for wear, scoring, and damage to the thrust surfaces. Replace as required.
- Inspect the differential sleeve and the inner output shaft for damaged splines and teeth. Replace as required.
- Inspect the damper spring for breakage. Replace or repair the damper spring as needed.
- Inspect the differential actuator and the engagement switch for damage and frayed wiring.

CLUTCH SHAFT BEARING REPLACEMENT - FRONT DRIVE AXLE

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Tools Required

- **J 34011** Pilot Bearing Remover. See **Special Tools and Equipment**.
- **J 33842** Pilot Bearing Installer.

Removal Procedure

1. Remove the inner axle shaft and housing assembly. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle)**.
2. Remove the clutch shaft from the differential carrier assembly.
3. Remove the clutch shaft pilot bearing using the **J 34011** .

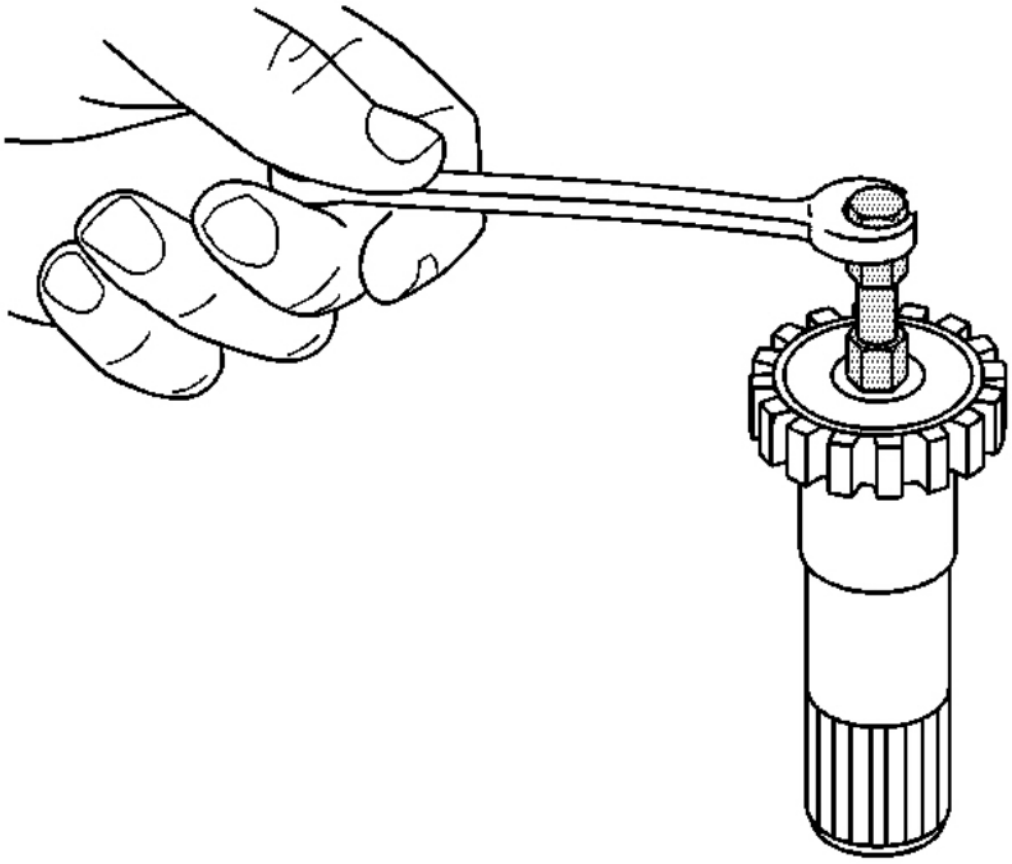
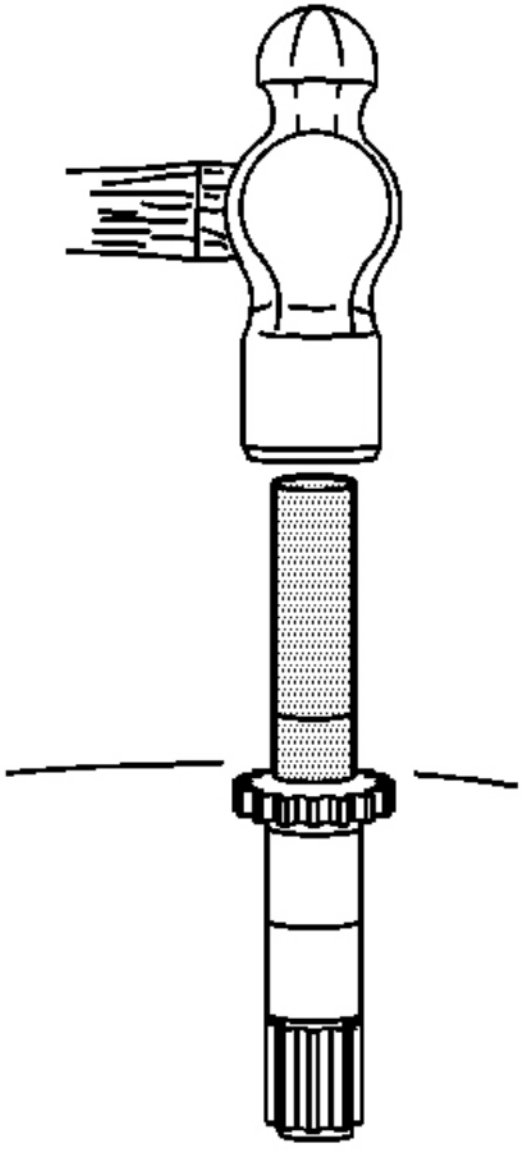


Fig. 72: Removing Clutch Shaft Pilot Bearing Using J 34011
Courtesy of GENERAL MOTORS CORP.

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Installation Procedure

1. Lubricate the bearing with axle lubricant. Use the proper fluid. Refer to **Fluid and Lubricant Recommendations** in Maintenance and Lubrication.
2. Install the clutch shaft pilot bearing using the **J 33842** .
3. Install the clutch shaft to the differential carrier assembly.



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Fig. 73: Installing Clutch Shaft Pilot Using J 33842
Courtesy of GENERAL MOTORS CORP.

4. Install the inner axle shaft and housing assembly. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle)**.

INNER AXLE SEAL AND/OR BEARING REPLACEMENT - FRONT DRIVE AXLE

Tools Required

- **J 8092** Universal Driver Handle - 3/4 in - 10. See **Special Tools and Equipment**.
- **J 2619-01** Slide Hammer
- **J 29369-1** Bushing and Bearing Remover
- **J 29369-2** Bushing and Bearing Remover (2-3 inch)
- **J 36609** Axle Tube Bearing Installer
- **J 45225** Axle Seal Installer

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Drain the differential carrier assembly. Refer to **Lubricant Replacement - Front Drive Axle**.
3. Remove the right side seal and/or bearing by performing the following steps:
   A. Remove the inner axle shaft and housing assembly from the differential carrier case assembly. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle)**.
   B. Remove the clutch fork assembly components and the inner axle shaft from the inner axle shaft housing. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle)**.
   C. Install the inner axle shaft housing into a vise.

      Clamp only on the mounting flange of the inner axle shaft housing.

   D. Install the **J 29369-1** , 8.25 inch axle, or the **J 29369-2** , 9.25 inch axle, behind the inner axle shaft seal or the inner axle shaft bearing as necessary.
   E. Install the **J 2619-01** (2) to the **J 29369-1** or the **J 29369-2** (1).
   F. Remove the inner axle shaft seal and/or the inner axle shaft bearing using the **J 2619-01** .

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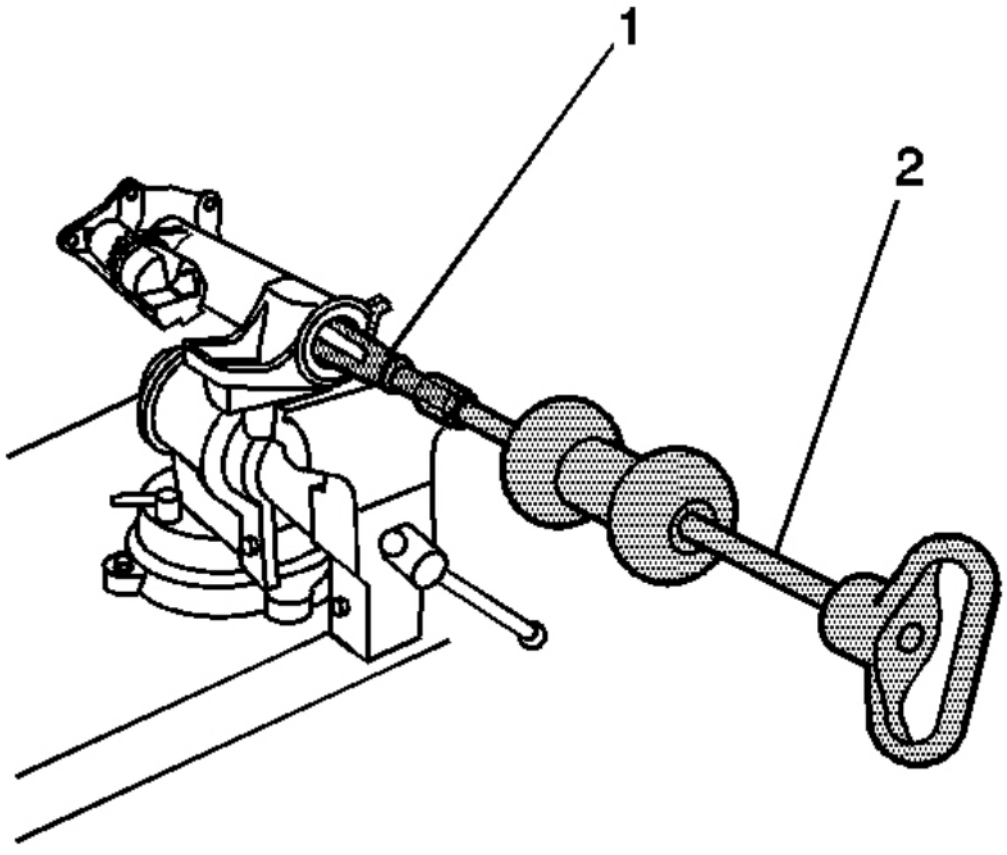


Fig. 74: Installing J 2619-01 To J 29369
Courtesy of GENERAL MOTORS CORP.

4. If only replacing the left side seal, perform the following steps:
   - Place an alignment mark between the inner axle shaft and the wheel drive shaft.
   - Disconnect the wheel drive shaft from the inner axle shaft.
   - Remove the inner axle shaft using a hammer and a brass drift.
   - Remove the inner axle shaft seal using a suitable seal remover tool.

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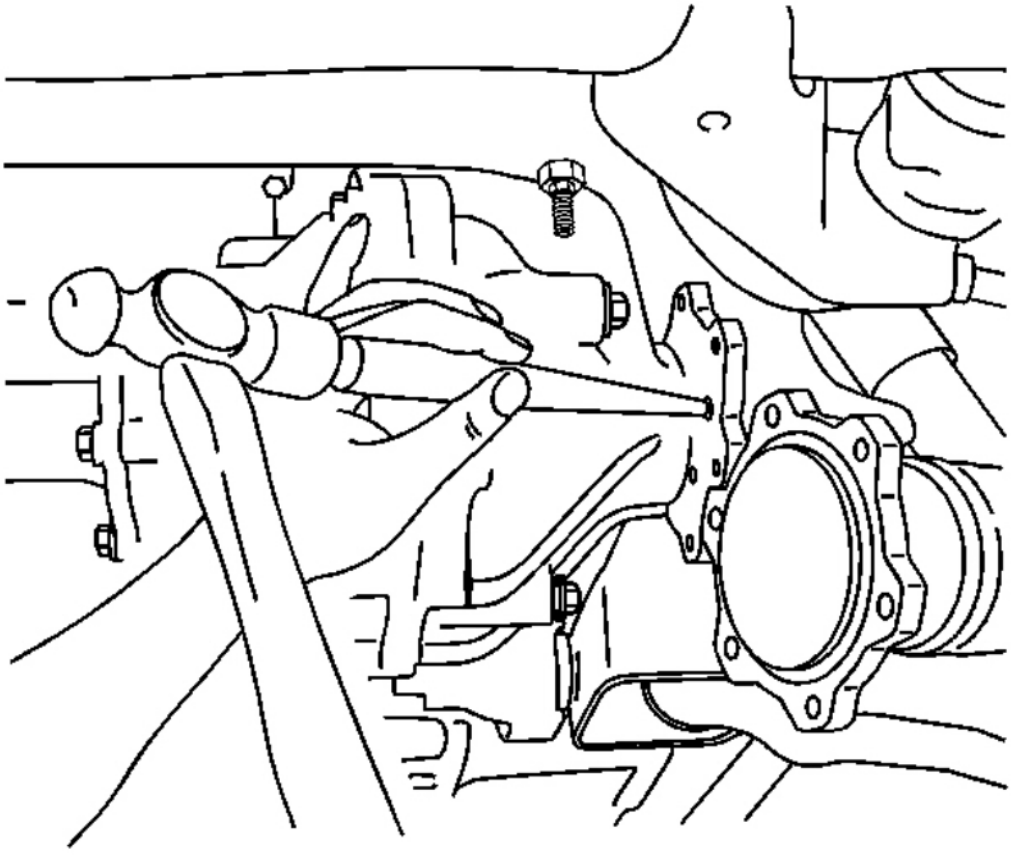


Fig. 75: Removing Inner Axle Shaft Using Hammer & Drift
Courtesy of GENERAL MOTORS CORP.

5. If replacing both the left side seal and bearing, perform the following steps:
   A. Remove the differential carrier assembly. Refer to **Differential Carrier Assembly Replacement**.
   B. Place the differential carrier assembly into a vise.

      Clamp only on the mounting flange of the differential carrier assembly case.

   C. Remove the inner axle shaft using a hammer and a brass drift.
   D. Install the **J 29369-1** , 8.25 inch axle, or the **J 29369-2** , 9.25 inch axle (1), behind the inner axle shaft seal or the inner axle shaft bearing as necessary.
   E. Install the **J 2619-01** (2) to the **J 29369-1** or the **J 29369-2** .
   F. Remove the inner axle shaft seal and/or the inner axle shaft bearing using the **J 2619-01** .

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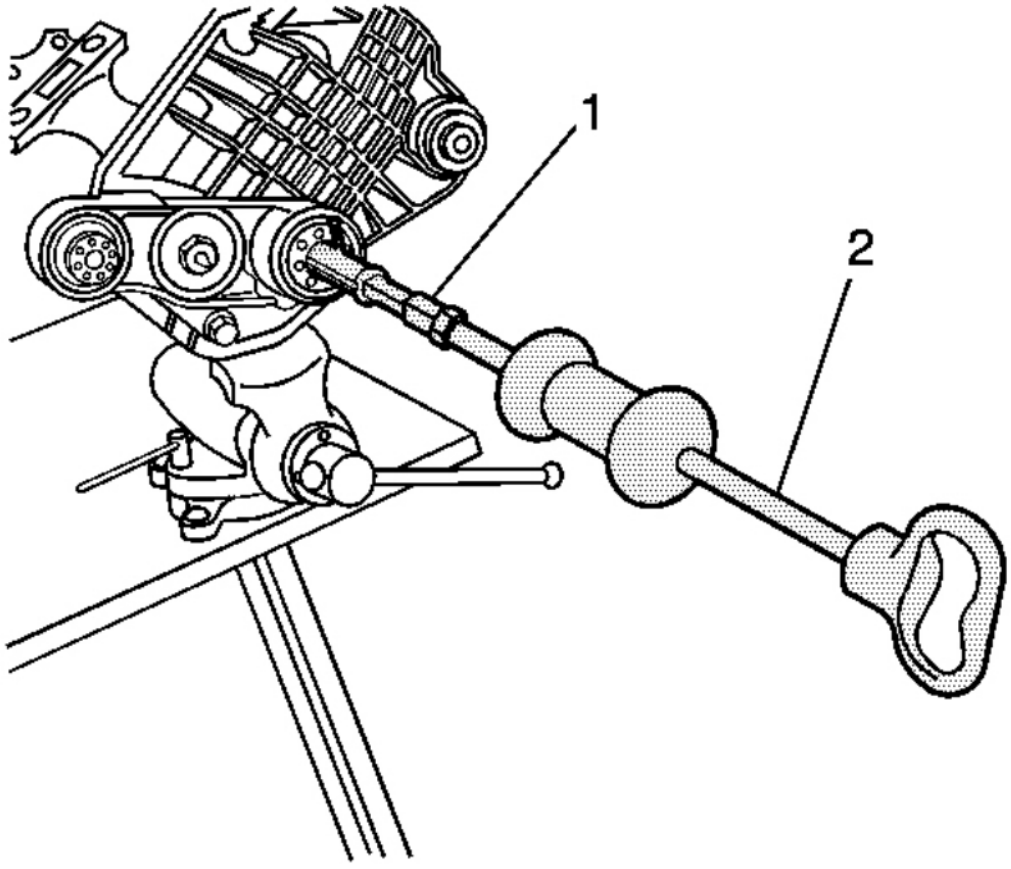


Fig. 76: Removing Inner Axle Shaft Seal & Bearing Using J 29369 & J 2619-01
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the right side bearing with the square shoulder in using the **J 36609** (1) and the **J 8092** (2).

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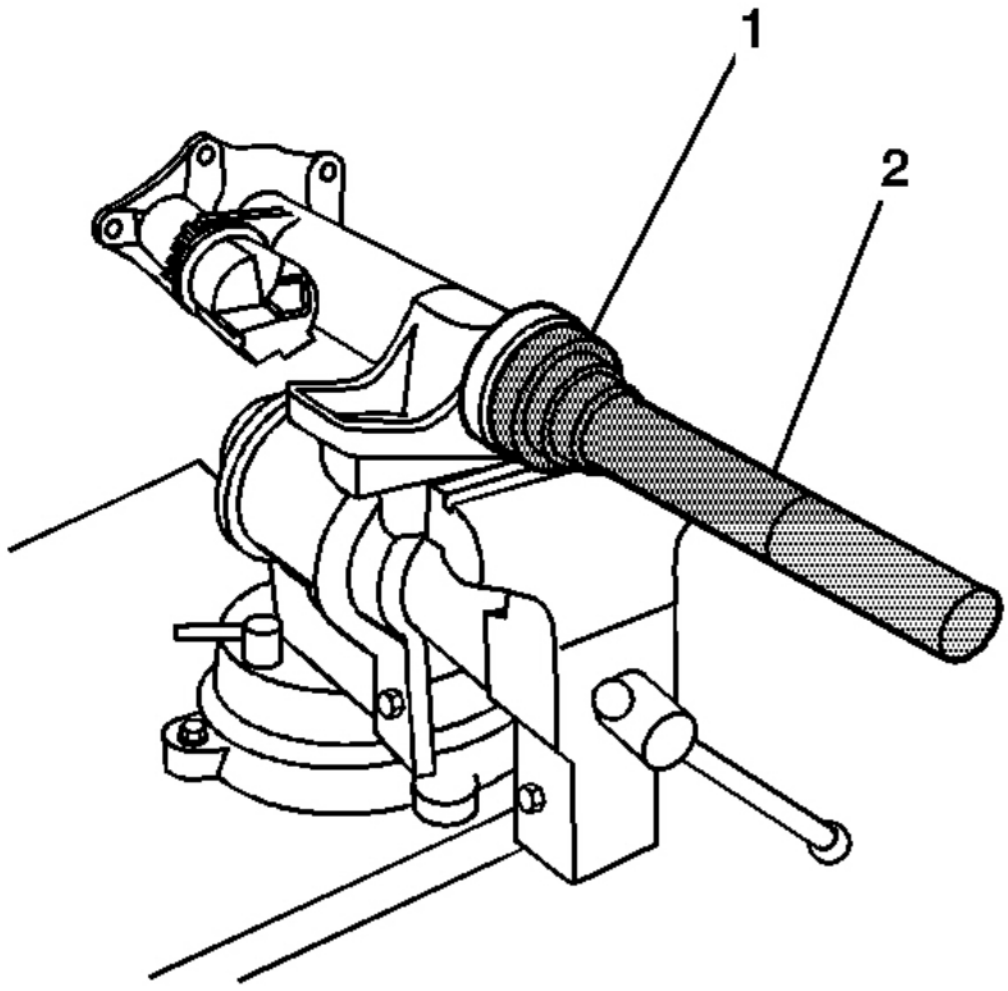


Fig. 77: Installing Right Side Inner Shaft Bearing Using J 36609 & J 8092
Courtesy of GENERAL MOTORS CORP.

2. Install the new axle shaft seal using the **J 45225** (1) and the **J 8092** (2).

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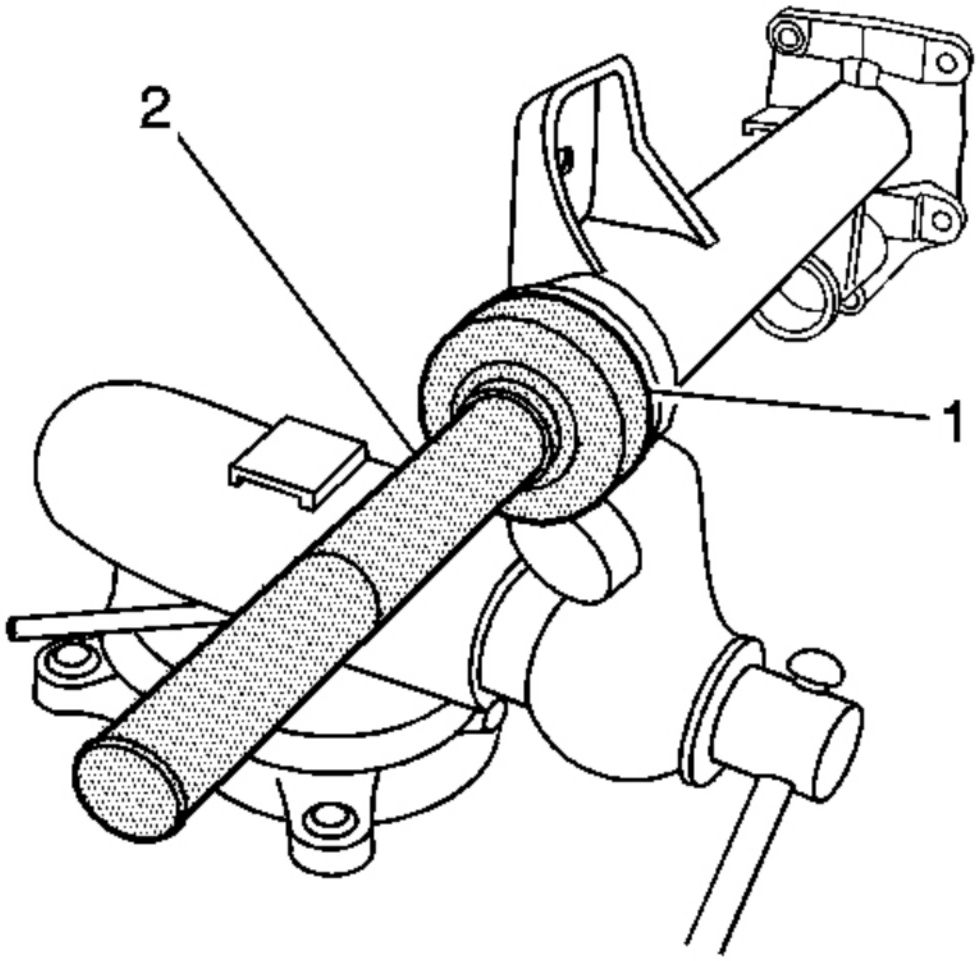


Fig. 78: Installing Right Side Inner Axle Shaft Seal Using J 45225 & J 8092
Courtesy of GENERAL MOTORS CORP.

3. Install the inner axle shaft into the inner axle shaft housing.

   Carefully tap the inner axle shaft into place with a soft-faced mallet.

4. Install the clutch fork assembly components. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle)**.
5. Install the inner axle shaft and housing assembly to the differential carrier case assembly. Refer to **Inner Shaft and/or Housing Replacement - Front Drive Axle (8.25 S4WD and 9.25 Axles)** or **Inner Shaft**

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and/or Housing Replacement - Front Drive Axle (8.25 F4WD Axle).

6. If both the left side bearing and seal was removed, perform the following step. Install the left side bearing with the square shoulder in using the **J 36609** (1) and the **J 8092** (2).

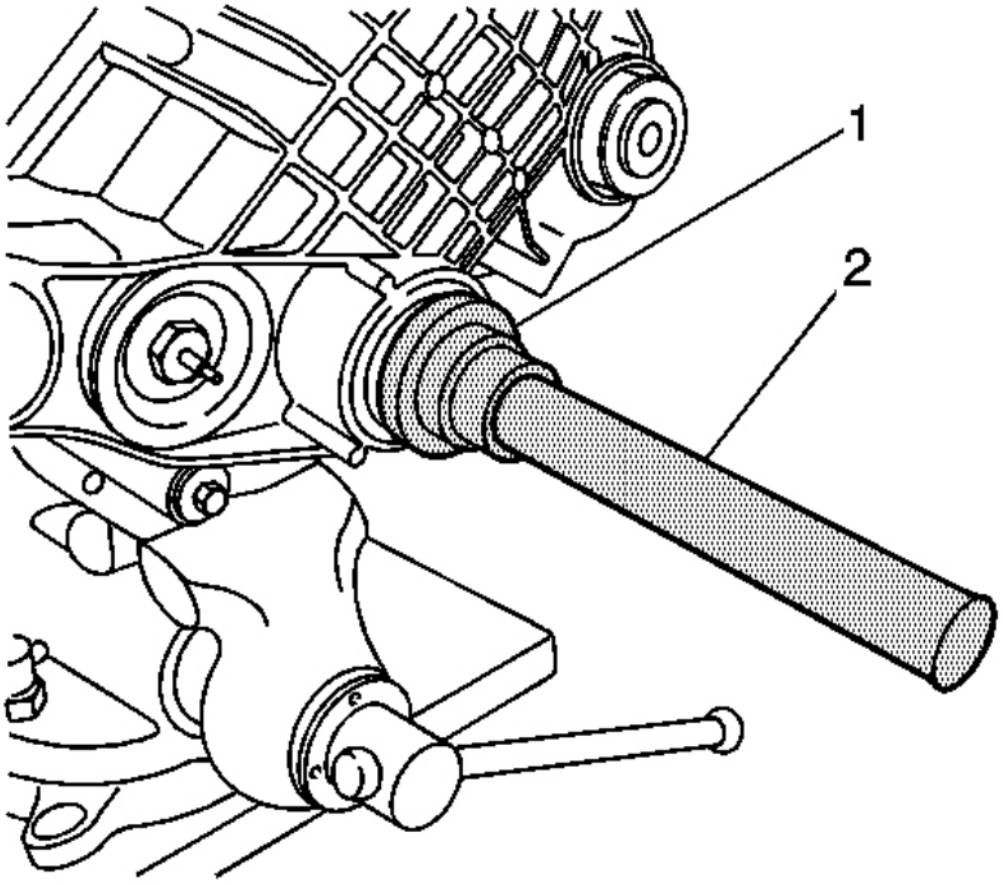


Fig. 79: Installing Left Side Bearing Using J 36609 & J 8092
Courtesy of GENERAL MOTORS CORP.

7. If both the left side bearing and seal was removed, perform the following step. Install the new axle shaft seal using the **J 45225** (1) and the **J 8092** (2).

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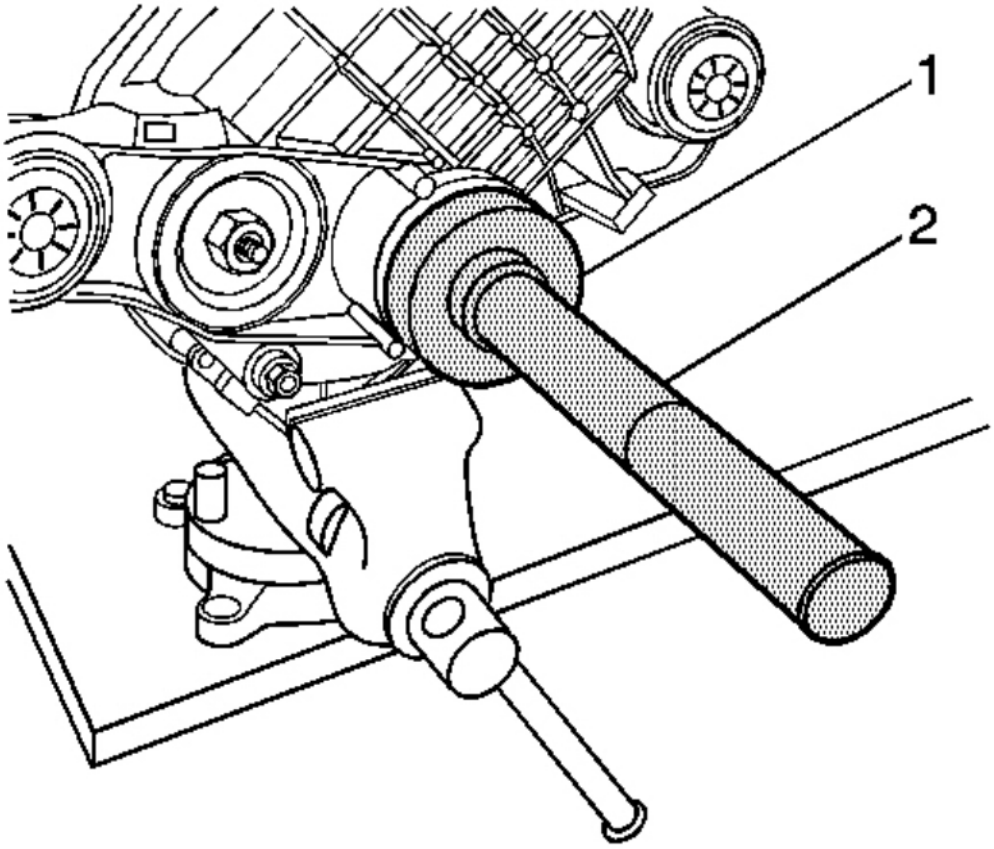


Fig. 80: Installing Left Side Axle Shaft Seal Using J 45225 & J 8092
Courtesy of GENERAL MOTORS CORP.

8. If both the left side bearing and seal was removed, perform the following step. Install the inner axle shaft into the differential case side gear using a soft-faced mallet until the retaining ring on the inner axle shaft is fully seated within the groove in the differential case side gear.

   Pull back on the inner axle shaft to ensure that the inner axle shaft is properly retained in the differential case side gear.

9. If both the left side bearing and seal was removed, perform the following step. Install the front differential carrier assembly. Refer to **Differential Carrier Assembly Replacement**.
10. If only the left side seal was removed, perform the following step. Install the seal using the **J 45225** and a soft-faced mallet.

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Tap only on the center portion of the **J 45225** in order to drive the seal in evenly.

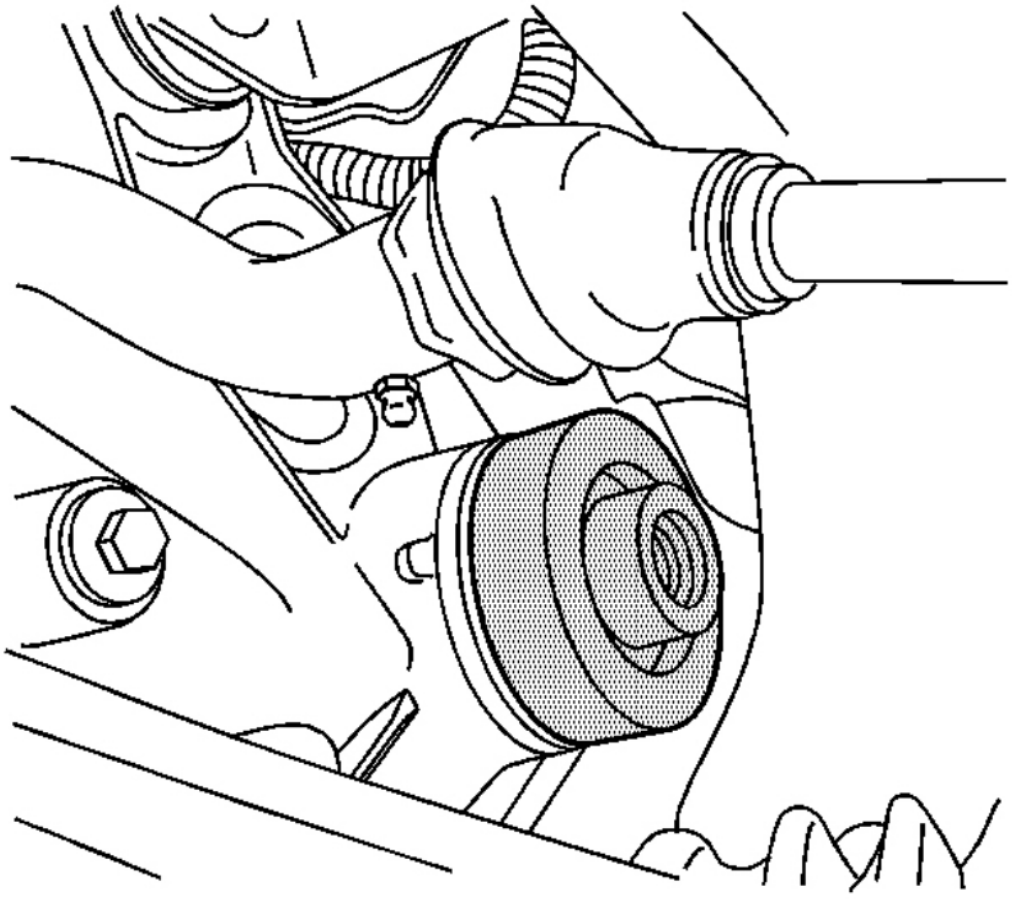


Fig. 81: Installing Left Side Seal using J 45225
Courtesy of GENERAL MOTORS CORP.

11. If only the left side seal was removed, perform the following step. Install the inner axle shaft into the differential case side gear using a soft-faced mallet until the retaining ring on the inner axle shaft is fully seated within the groove in the differential case side gear.

    Pull back on the inner axle shaft to ensure that the inner axle shaft is properly retained in the differential case side gear.

12. If only the left side seal was removed, perform the following step. Install the wheel drive shaft to the inner axle shaft.

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

13. If only the left side seal was removed, perform the following step. Install the wheel drive shaft to the inner axle shaft bolts.

    Tighten: Tighten the wheel drive shaft to inner axle shaft bolts to 79 N.m (58 lb ft).

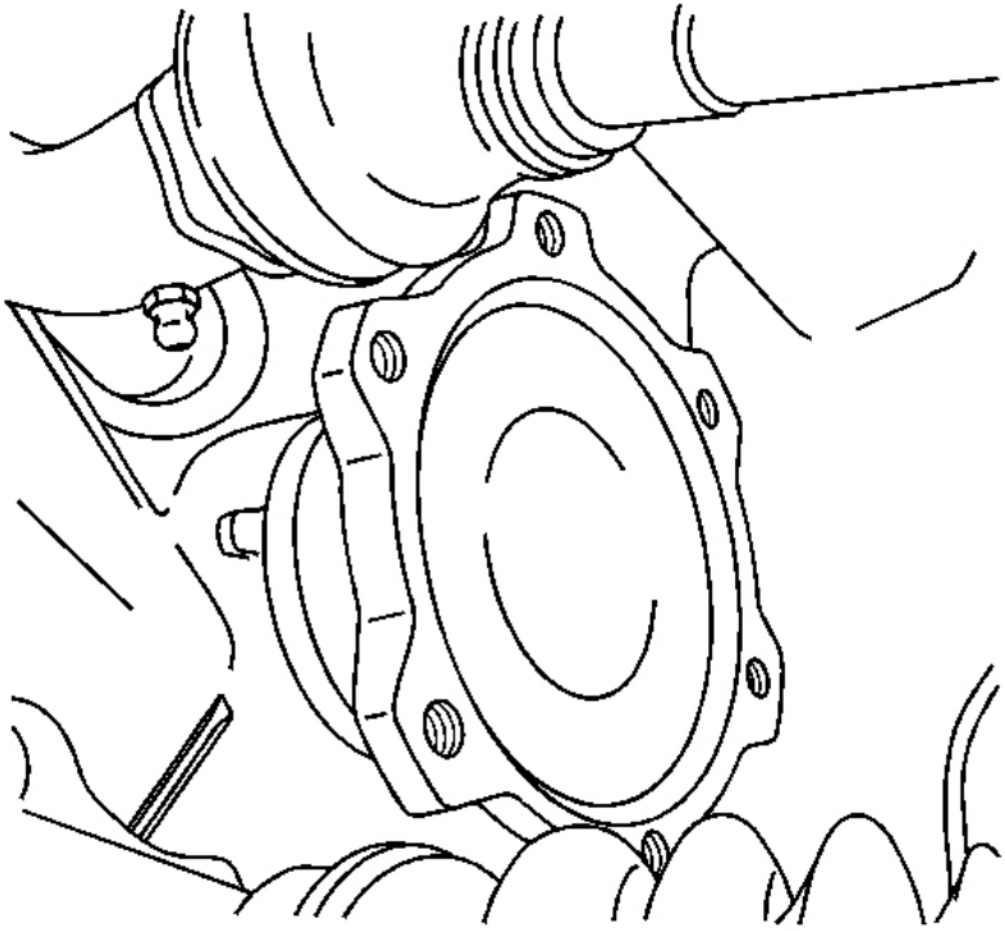


Fig. 82: View Of Inner Axle Shaft
Courtesy of GENERAL MOTORS CORP.

14. Fill the differential carrier assembly. Use the correct fluid. Refer to **Lubricant Replacement - Front Drive Axle**.
15. Lower the vehicle.

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INNER AXLE SHAFT SHIM ADJUSTMENT

Tools Required

- **J 34672** Depth Micrometer. See **Special Tools and Equipment**.
- **J 8001** Dial Indicator Set

The front drive axle clutch gear shim needs to be measured and adjusted if any of the following parts are replaced:

- The inner axle shaft
- The inner axle shaft housing
- The output shaft
- The differential carrier case
- The ring and pinion gears
- The differential case assembly
- The differential bearings
- The carrier connector

Front drive axle clutch shims are available in the following sizes:

Front Drive Axle Clutch Shims

8.25 Inch Axle	9.25 Inch Axle
1.27 mm (0.05 in)	1.30 mm (0.05 in)
1.52 mm (0.06 in)	1.52 mm (0.06 in)
1.78 mm (0.07 in)	1.80 mm (0.07 in)
2.03 mm (0.08 in)	2.03 mm (0.08 in)
2.29 mm (0.09 in)	2.30 mm (0.09 in)
2.54 mm (0.10 in)	2.54 mm (0.10 in)
2.70 mm (0.11 in)	2.80 mm (0.11 in)
3.05 mm (0.12 in)	3.05 mm (0.12 in)
3.30 mm (0.13 in)	3.30 mm (0.13 in)
3.56 mm (0.14 in)	3.55 mm (0.14 in)
3.81 mm (0.15 in)	3.80 mm (0.15 in)
-	4.05 mm (0.16 in)
-	4.30 mm (0.17 in)
-	4.55 mm (0.18 in)
-	4.80 mm (0.19 in)

1. Install the inner axle bearing and the inner axle seal, if necessary. Refer to **Inner Axle Seal and/or Bearing Replacement - Front Drive Axle**.
2. Install the following components into the inner axle shaft housing, 8.25 inch axle:

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A. Install the inner axle shaft (1) into the front drive axle housing (4).
B. Install the thrust washer (5).
C. Install the retaining ring (7) into the front drive axle clutch gear (6).
D. Install the front drive axle clutch gear (6) onto the inner axle shaft (1).

Drive the front drive axle clutch gear (6) into place with a plastic hammer.

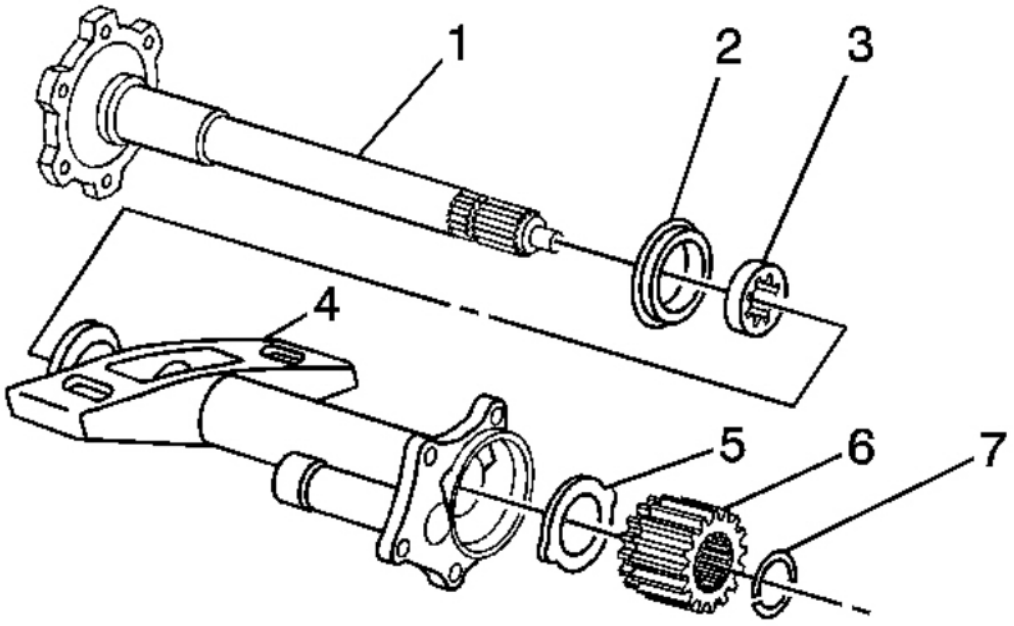


Fig. 83: Disassembled View Of Inner Axle Shaft Housing (8.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

3. Install the following components into the inner axle shaft housing, 9.25 inch axle:
   A. Install the inner axle shaft (1) into the front drive axle housing (4).
   B. Install the thrust washers (5, 6).
   C. Install the retaining ring (7) into the inner axle shaft (1).

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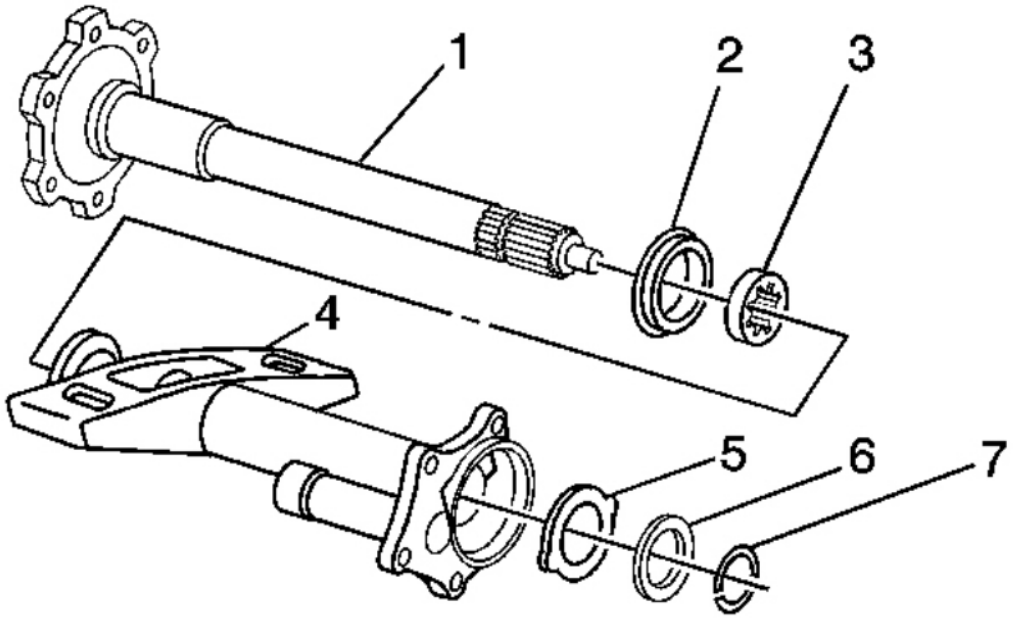


Fig. 84: Disassembled View Of Inner Axle Shaft Housing (9.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: In order to obtain an accurate measurement, the inner axle shaft must be moved outwards before measuring.

4. Push on the inner end of the inner axle shaft and move the shaft outboard as far as it will go.
5. Using the **J 34672** , measure the distance from the edge of the front drive axle clutch gear to the machined flange surface of the inner axle housing.

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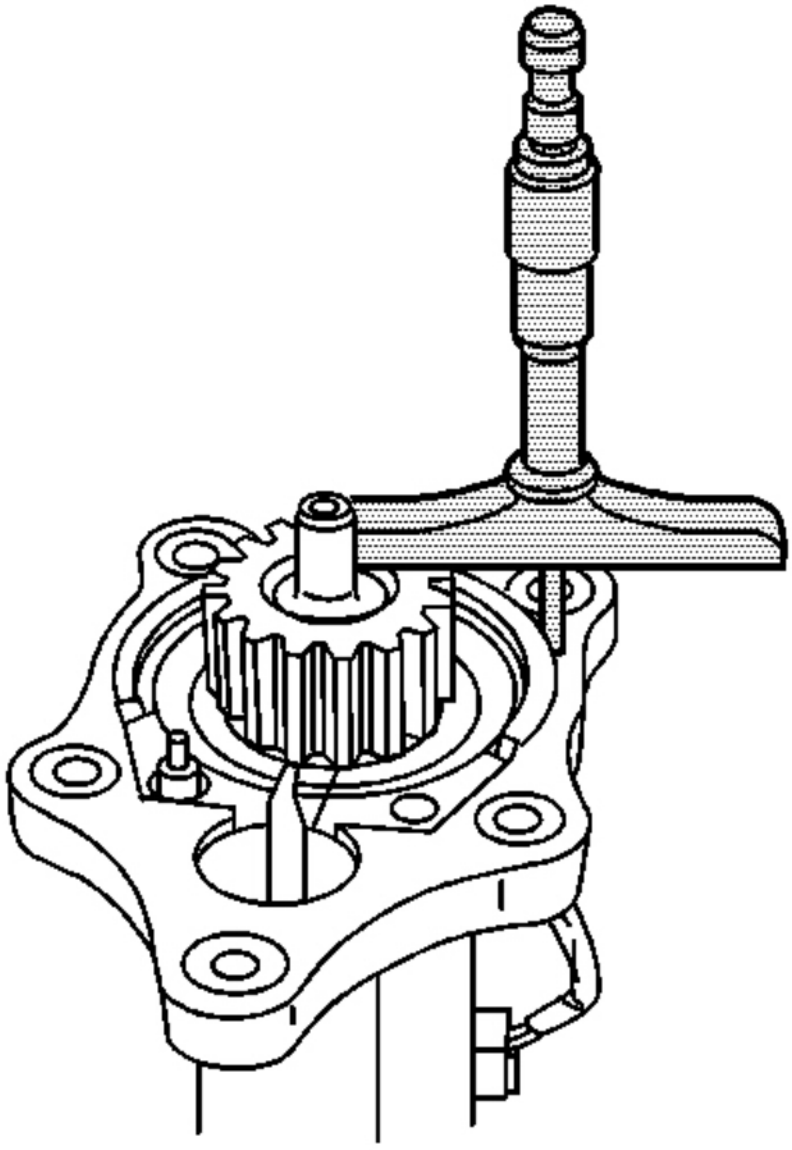


Fig. 85: Measuring Distance From Front Drive Axle Clutch To Inner Axle Housing Using J 34672
Courtesy of GENERAL MOTORS CORP.

6. Using the **J 34672** , measure the distance from the machined surface of the differential carrier housing to the outer surface of the front drive axle clutch shaft.

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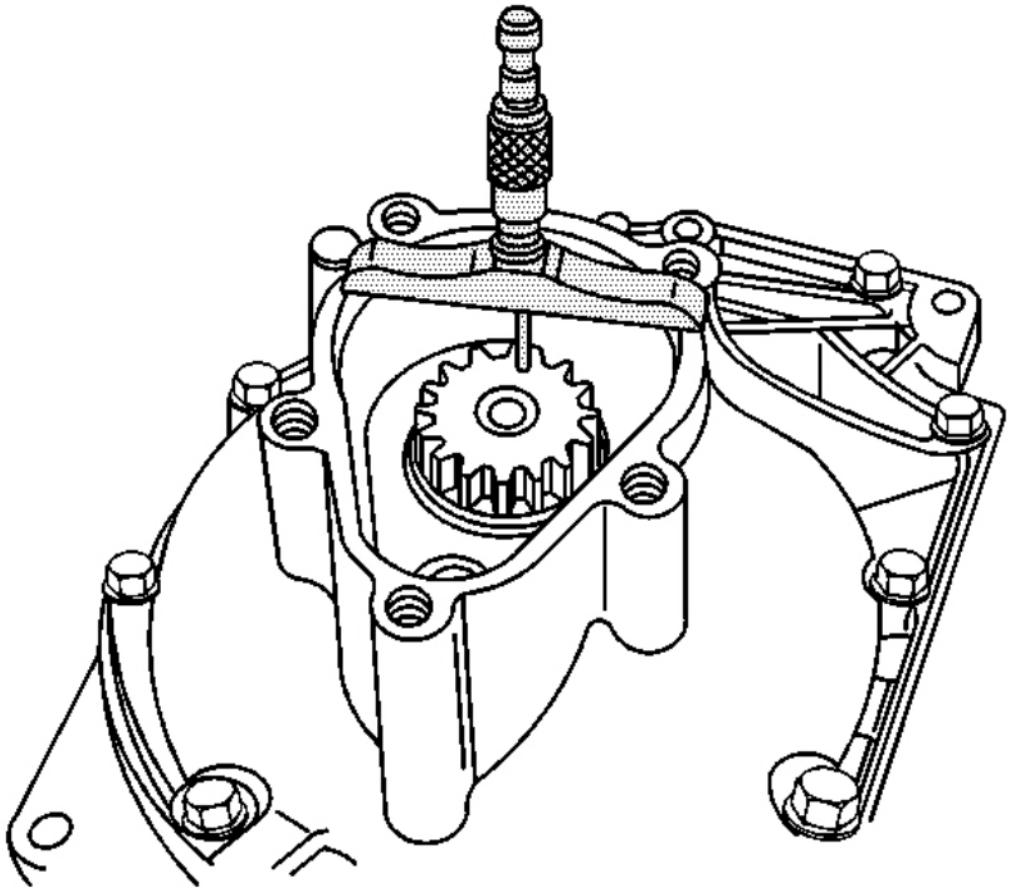


Fig. 86: Measuring Distance From Differential Carrier Housing To Front Drive Axle Clutch Shaft Using J 34672
Courtesy of GENERAL MOTORS CORP.

7. Subtract the measurement obtained in step 6 from the measurement obtained in step 7.
8. The correct shim size will be one size smaller than the figure obtained in the previous step.

Note the following examples:

- If the figure obtained in step 8 was 3.53 mm (0.139 in), use a 3.30 mm (0.130 in) shim.
- If the figure obtained in step 8 was 3.30 mm (0.130 in), use a 3.05 mm (0.120 in) shim.

Alternate Adjustment Method

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IMPORTANT: Use this method only if the proper tools for calculating the shim size are unavailable.

1. Install the original shim to the shaft.

   Use the chassis grease in order to hold the shim in place.

2. Install the assembled axle tube and the shaft to the carrier.

   Do not use sealer at this time.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the bolts.

   Tighten: Tighten the bolts to 40 N.m (30 lb ft).

4. Measure the shaft end play using the following procedure:
   A. Install the **J 8001** or the equivalent on the axle tube end.

      The plunger of the indicator must be at a right angle to the axle flange.

   B. Move the shaft back and forth and read the end play.

      The correct end play is 0.03-0.51 mm (0.001-0.020 in).

   C. If the end play is incorrect, install a thicker or thinner shim as needed in order to bring the end play into the specified range.

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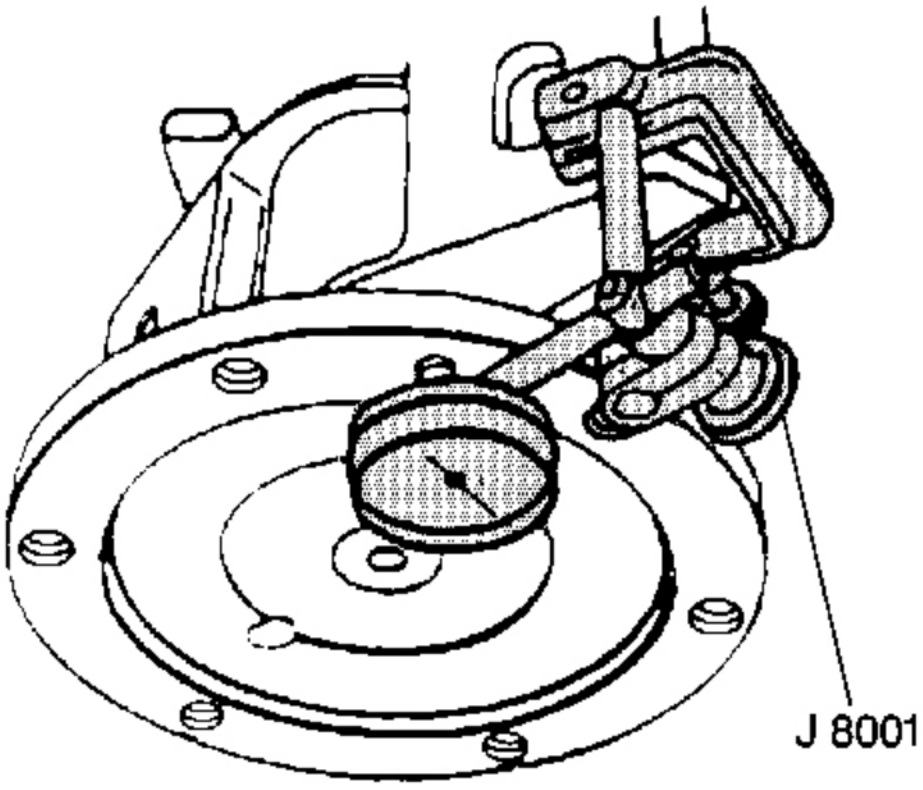


Fig. 87: Measuring Shaft End Play Using J 8001
Courtesy of GENERAL MOTORS CORP.

DIFFERENTIAL DRIVE PINION FLANGE/YOKE, SEAL, AND DUST DEFLECTOR REPLACEMENT - FRONT

Tools Required

- **J 8614-01** Flange and Pulley Holding Tool. See **Special Tools and Equipment**.
- **J 36366** Pinion Oil Seal Installer

Removal Procedure

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

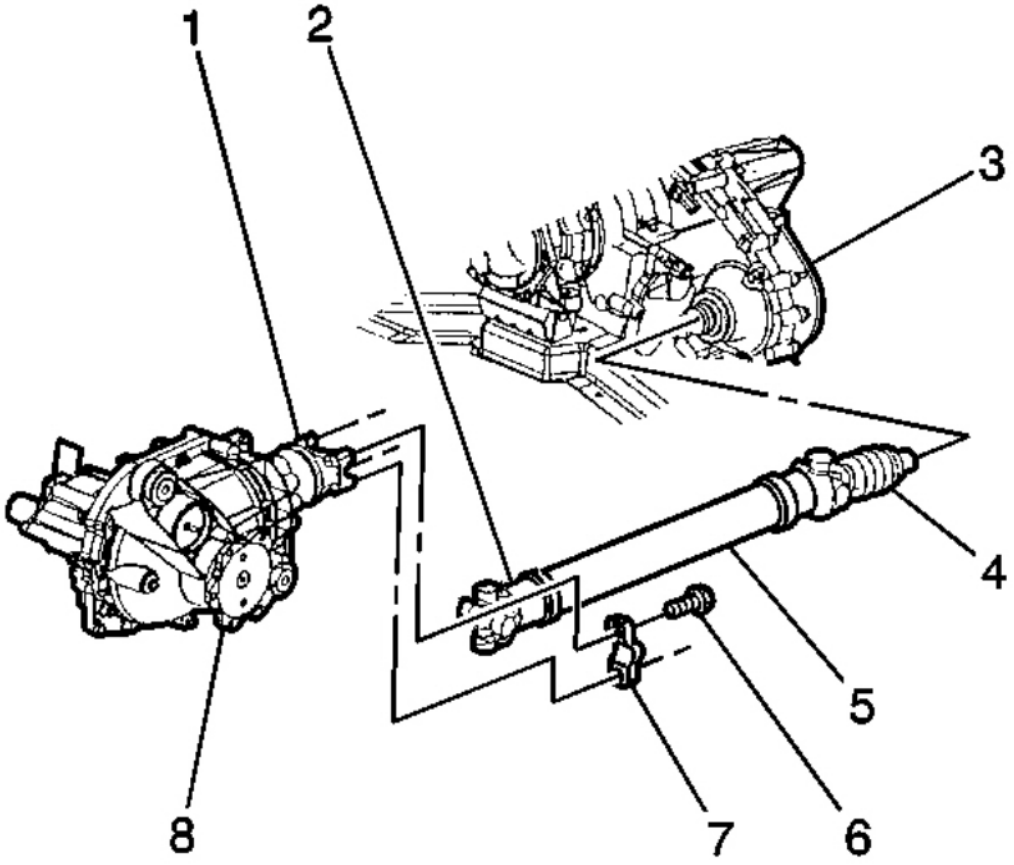
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3. Remove the brake calipers. Refer to **Brake Caliper Replacement - Front** in Disc Brakes.
4. Remove the differential carrier assembly shield, if equipped. Refer to **Shield Replacement**.
5. Reference mark the relationship of the propeller shaft to the front axle pinon yoke.
6. Remove the yoke retainer bolts (6) and the yoke retainers (7) from the front axle pinion yoke (1).

NOTE: **When removing the propeller shaft, do not attempt to remove the shaft by pounding on the yoke ears or using a tool between the yoke and the universal joint. If the propeller shaft is removed by using such means, the injection joints may fracture and lead to premature failure of the joint.**

7. Disconnect the propeller shaft universal joint (2) from the front axle pinion yoke (1).

   Wrap the bearing caps with tape in order to prevent the loss of bearing rollers.



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Fig. 88: View Of Propeller Shaft Universal Joint, Front Axle Pinion Yoke & Components
Courtesy of GENERAL MOTORS CORP.

8. Support the propeller shaft and move out of the way as necessary.
9. Measure the torque required in order to rotate the pinion. Use an inch-pound torque wrench. Record the torque value for reassembly. This will give the combined preload for the following components:
    - The pinion bearings
    - The pinion seal
    - The carrier bearings
    - The axle bearings
    - The axle seals

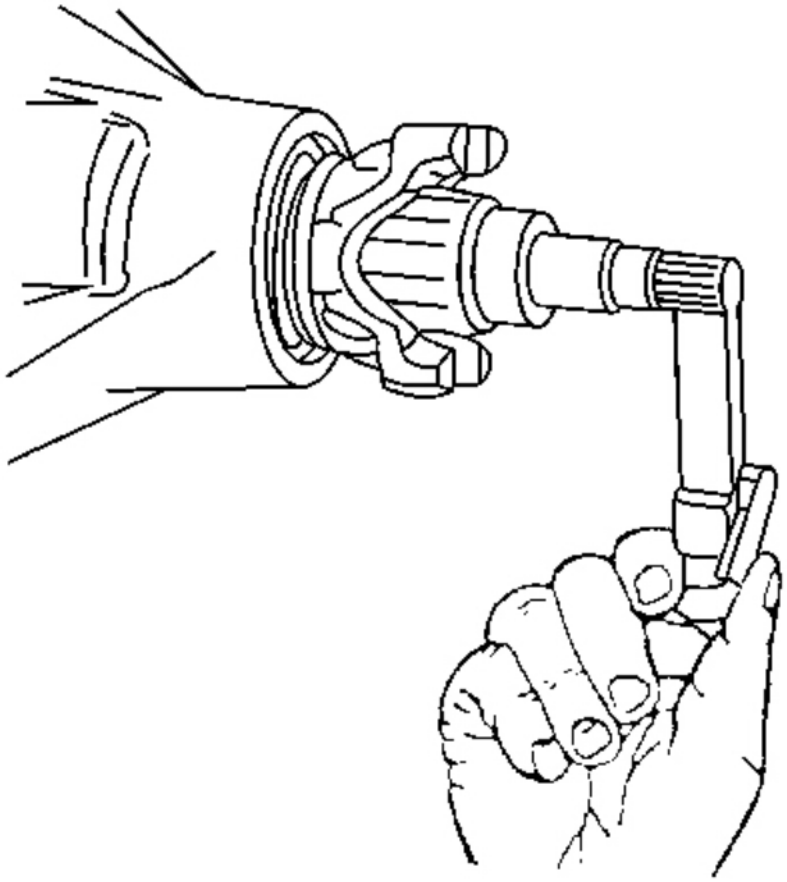


Fig. 89: Measuring Torque Required For Pinion Rotation

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Courtesy of GENERAL MOTORS CORP.

10. Scribe an alignment line between the pinion shaft and the pinion yoke.

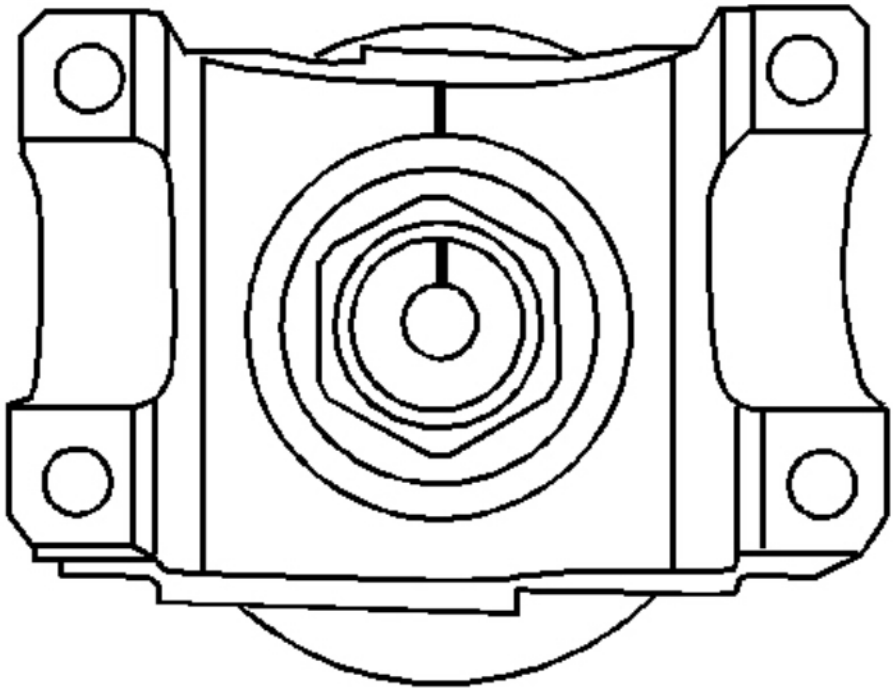


Fig. 90: View Of Pinion Shaft & Pinion Yoke Alignment Marks
Courtesy of GENERAL MOTORS CORP.

11. Install the **J 8614-01** onto the pinion as shown.
12. Remove the pinion nut while holding the **J 8614-01** .

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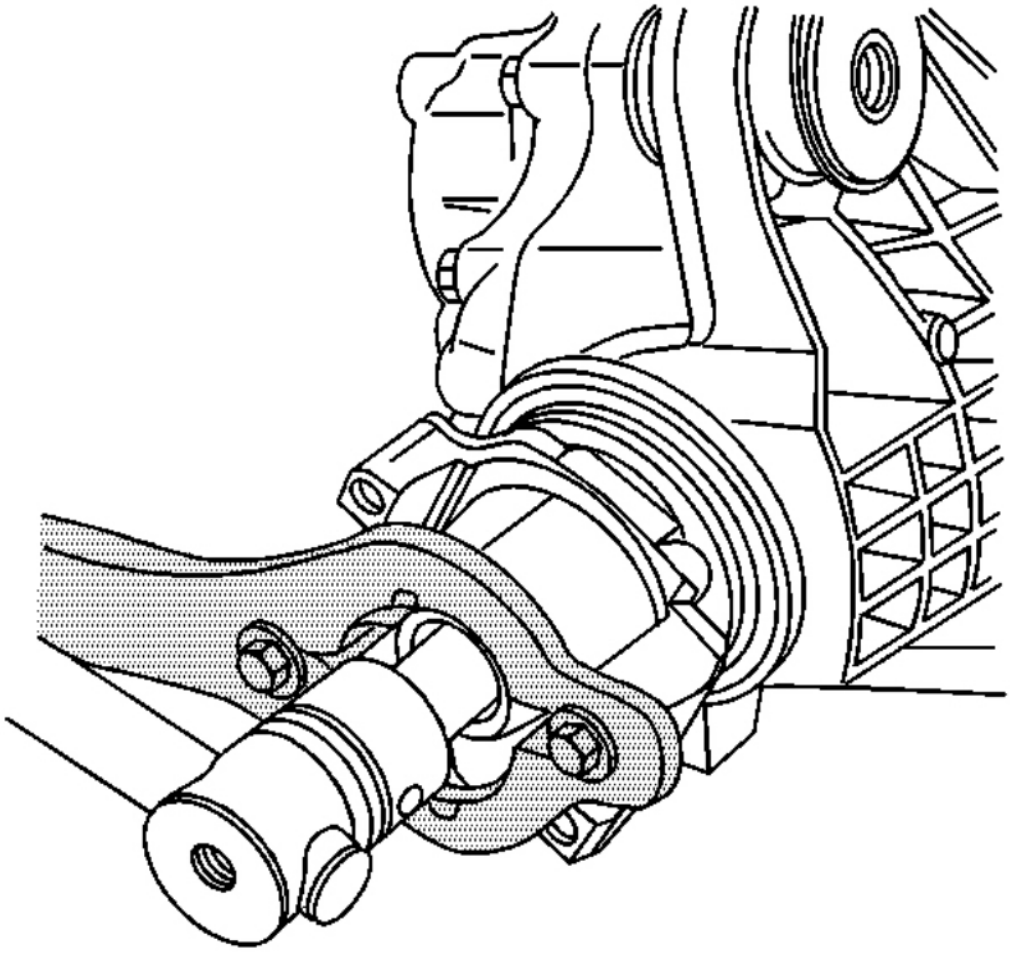


Fig. 91: Holding Pinion Flange Using Special Tool
Courtesy of GENERAL MOTORS CORP.

13. Install the J 8614-2 (2) and the J 8614-3 (3) into the **J 8614-01** (1) as shown.
14. Remove the pinon yoke by turning the J 8614-3 (3) clockwise while holding the **J 8614-01** (1).

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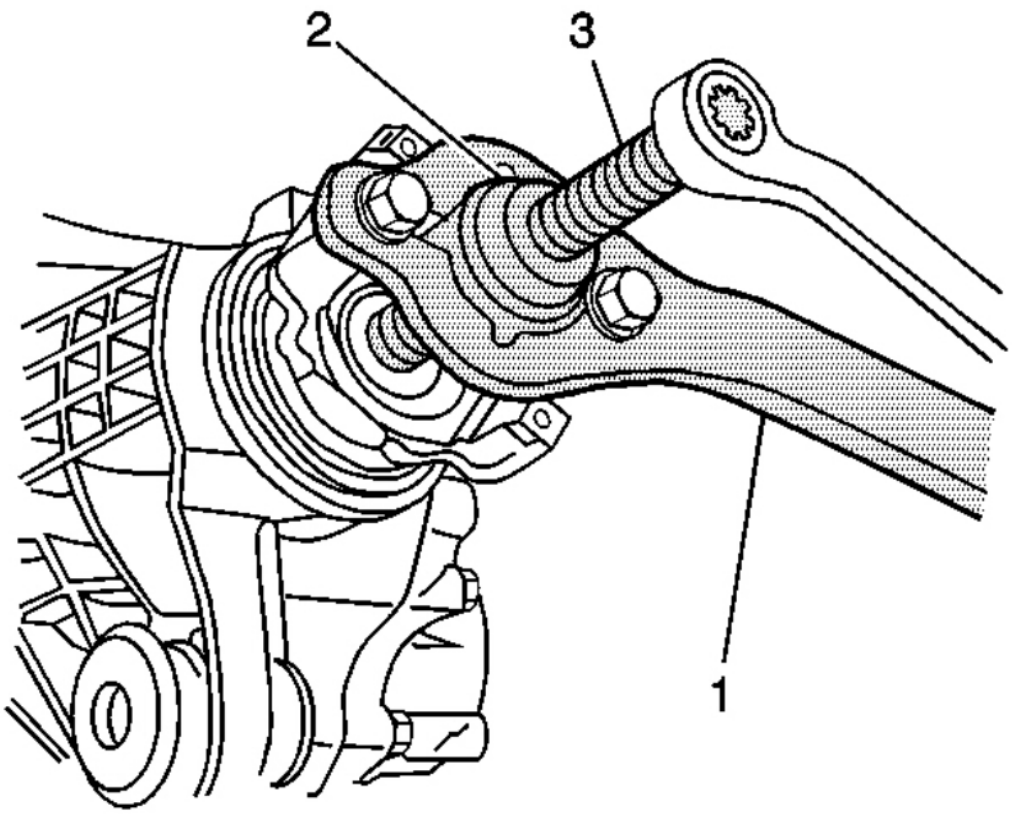


Fig. 92: Removing Pinion Yoke
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Carefully remove the oil seal from the bore. Do not distort or scratch the aluminum case.

15. Remove the oil seal using a suitable seal removal tool.

Installation Procedure

1. Install the oil seal by doing the following:
   A. Position the oil seal over the seal bore.
   B. Install the **J 36366** over the oil seal.
   C. Strike the **J 36366** with a hammer until the seal flange seats on the axle housing surface.
2. Apply sealant GM P/N 12346004 (Canadian P/N 10953480) or equivalent to the splines of the drive pinion yoke.

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3. Install the pinion yoke.

   Align the reference marks made during removal.

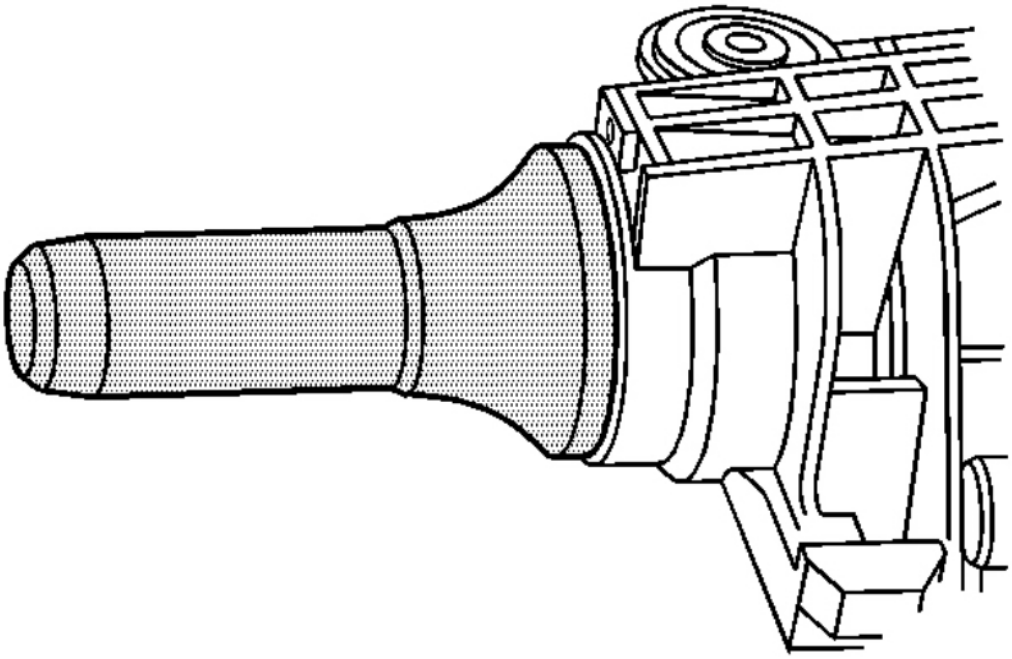


Fig. 93: Installing Oil Seal Using J 36366
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Pinion Flange/Yoke Installation Notice in Cautions and Notices.

4. Seat the pinion yoke onto the pinion shaft by tapping it with a soft-faced hammer until a few pinion shaft threads show through the yoke.
5. Install the washer and a new pinion nut.
6. Install the **J 8614-01** onto the pinion yoke as shown.

NOTE: Refer to Fastener Notice in Cautions and Notices.

IMPORTANT: If the rotating torque is exceeded, the pinion will have to be removed and a new collapsible spacer installed.

7. Tighten the pinion nut while holding the **J 8614-01** .

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Tighten: Tighten the pinion nut until the pinion end play is just taken up. Rotate the pinion while tightening the nut to seat the bearings.

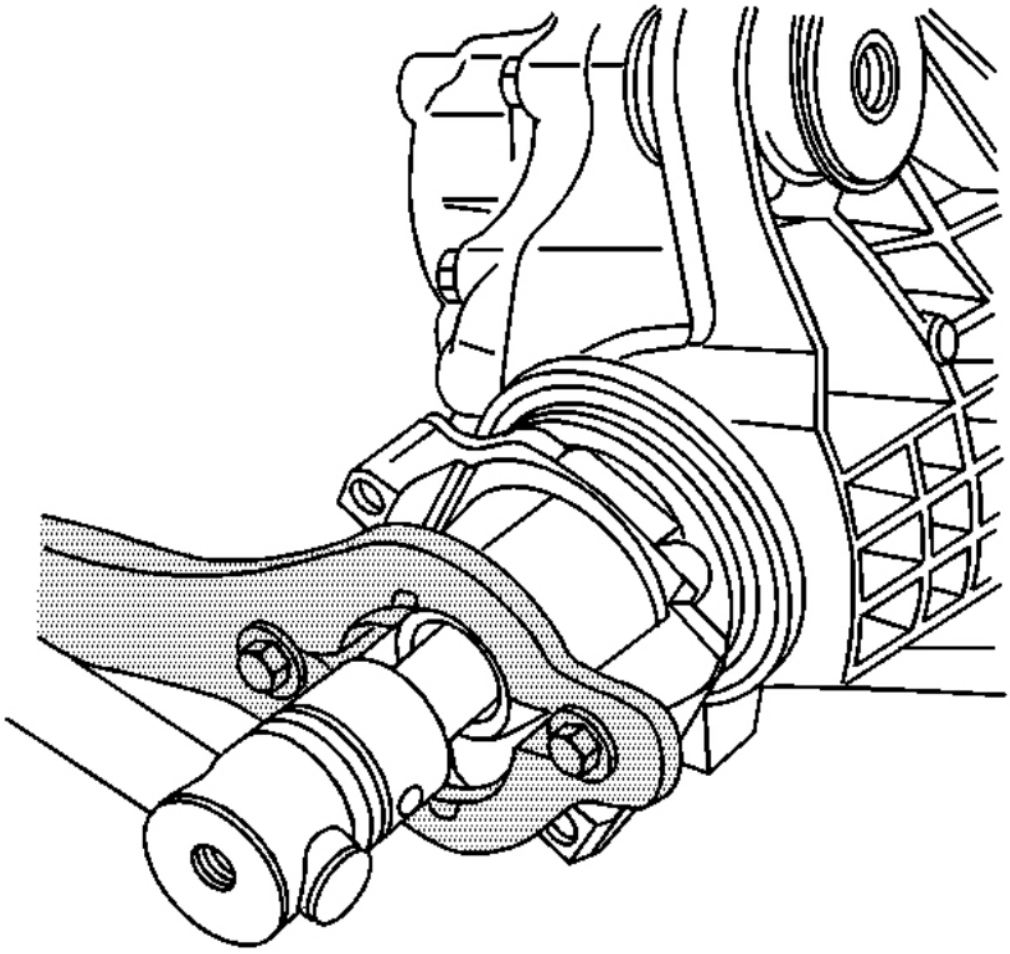


Fig. 94: Holding Pinion Flange Using Special Tool
Courtesy of GENERAL MOTORS CORP.

8. Measure the rotating torque of the pinion using an inch-pound torque wrench.

   Compare the measurement with the rotating torque recorded earlier.

   Tighten: Tighten the pinion nut, in small increments, as needed, until the torque required in order to rotate the pinion is 0.40-0.57 N.m (3-5 lb in) greater than the torque recorded during removal.

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9. Once the specified torque is obtained, rotate the pinion several times to ensure the bearings have seated. Recheck the rotating torque and adjust if necessary.
10. Install the propeller shaft universal joint (2) to the pinion yoke (1).

    Align the reference marks made during removal.

11. Install the yoke retainers (7) and the yoke retainer bolts (6) to the pinion yoke (1).

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

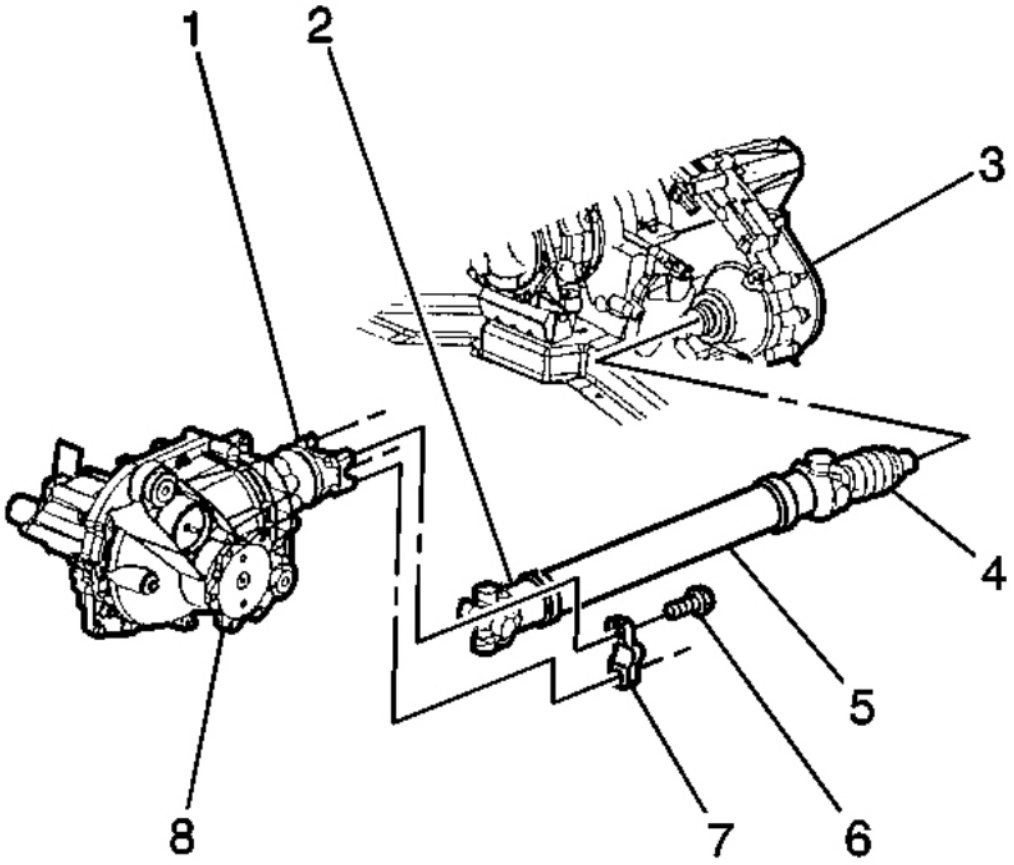


Fig. 95: View Of Propeller Shaft Universal Joint, Front Axle Pinion Yoke & Components
Courtesy of GENERAL MOTORS CORP.

12. Inspect the axle lubricant level, and add, if necessary. Refer to **Lubricant Level Inspection - Front Drive Axle**.

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13. Install the differential carrier assembly shield, if equipped. Refer to **Shield Replacement**.
14. Install the brake calipers. Refer to **Brake Caliper Replacement - Front** in Disc Brakes.
15. Install the tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation** in Tires and Wheels.
16. Lower the vehicle.

DIFFERENTIAL CARRIER ASSEMBLY BUSHING REPLACEMENT

Tools Required

- **J 33791** Carrier Bushing Remover/Installer. See **Special Tools and Equipment**.
- **J 36616** Axle Mount Bushing Remover/Installer

Removal Procedure

1. Remove the differential carrier assembly. Refer to **Differential Carrier Assembly Replacement**.
2. Remove the upper differential carrier assembly bushing by performing the following steps:
   A. Install the J 36616-2 (1), the J 33791-1 (2), the thrust bearing (3), the J 21474-18 (4), and the forcing screw as shown.
   B. Remove the upper differential carrier assembly bushing by holding the forcing screw and slowly tightening the J 21474-18.

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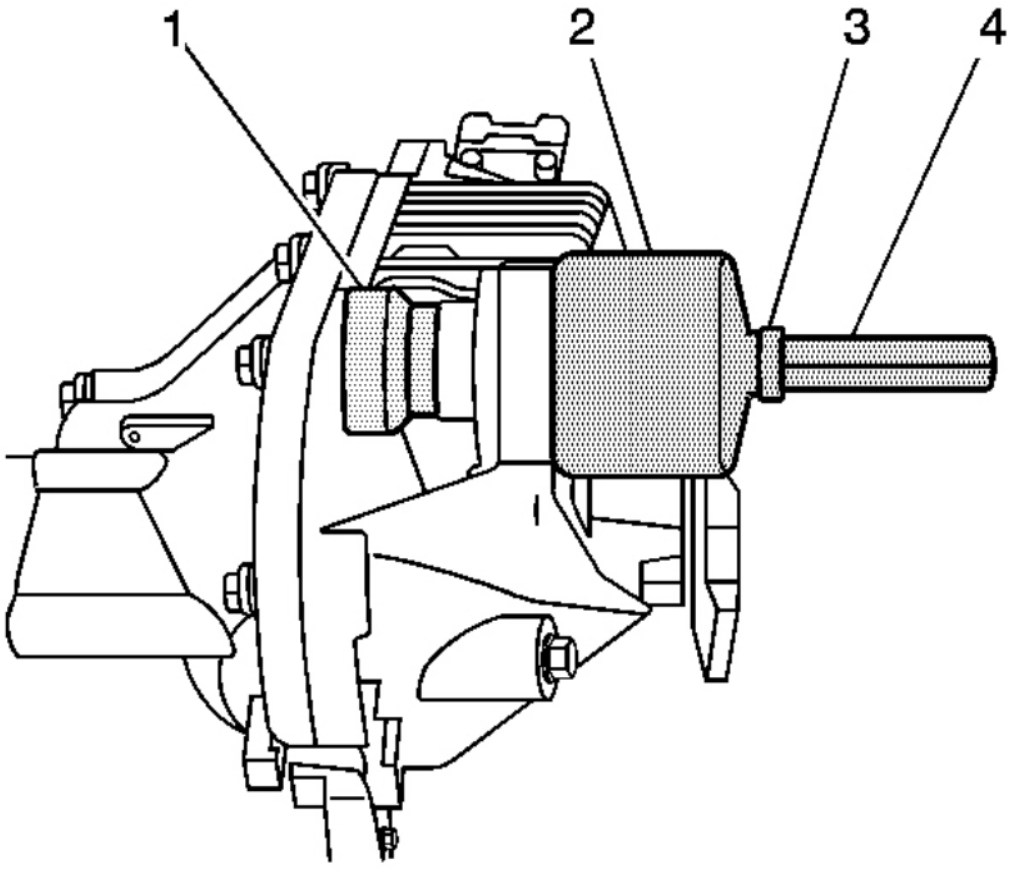


Fig. 96: Removing Upper Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

3. Remove the lower differential carrier assembly bushing by performing the following steps:
    1. Install the J 21474-18 (1), the thrust bearing (2), the J 33791-1 (3), the J 36616-2 (4), and the forcing screw as shown.
    2. Remove the lower differential carrier assembly bushing by holding the forcing screw and slowly tightening the J 21474-18.

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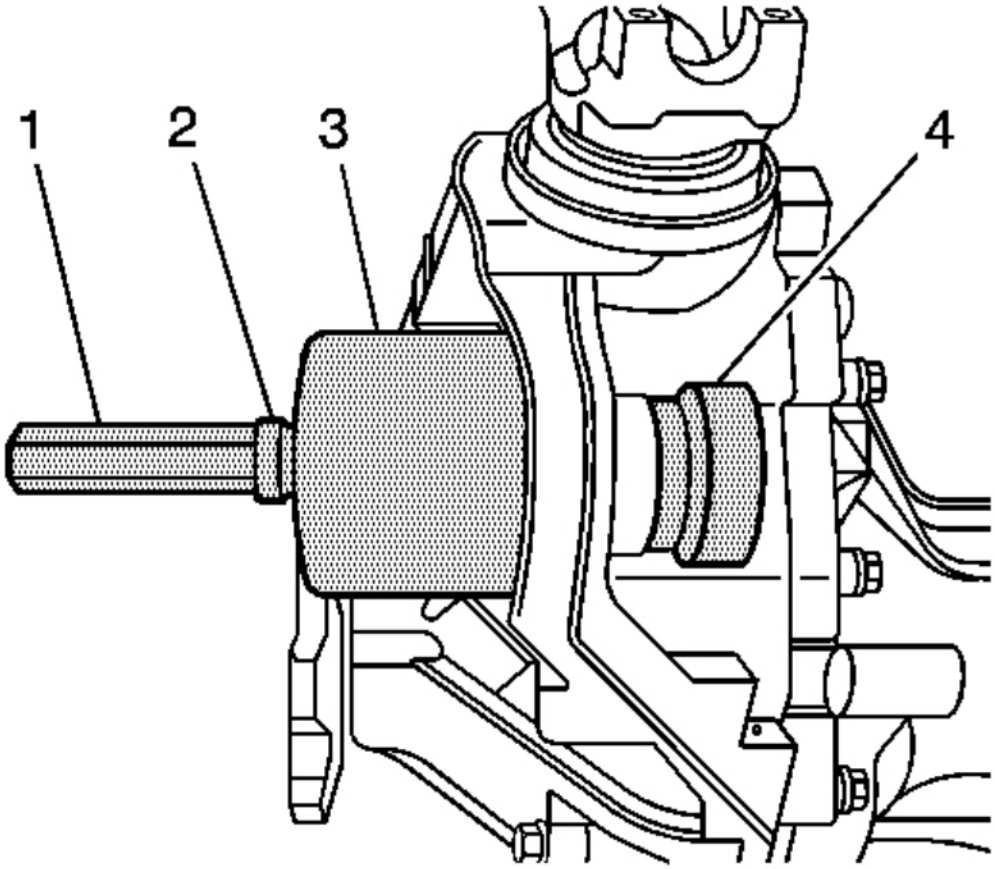


Fig. 97: Removing Lower Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the lower differential carrier assembly bushing by performing the following steps:
   A. Install the J 21474-18 (1), the thrust bearing (2), the J 36616-2 (3), the J 36616-1 (4), and the forcing screw (5) as shown.
   B. While holding the forcing screw, slowly tighten the J 21474-18 until the bushing has stopped against the step on the bushing and is centered within the differential carrier assembly bushing bore.

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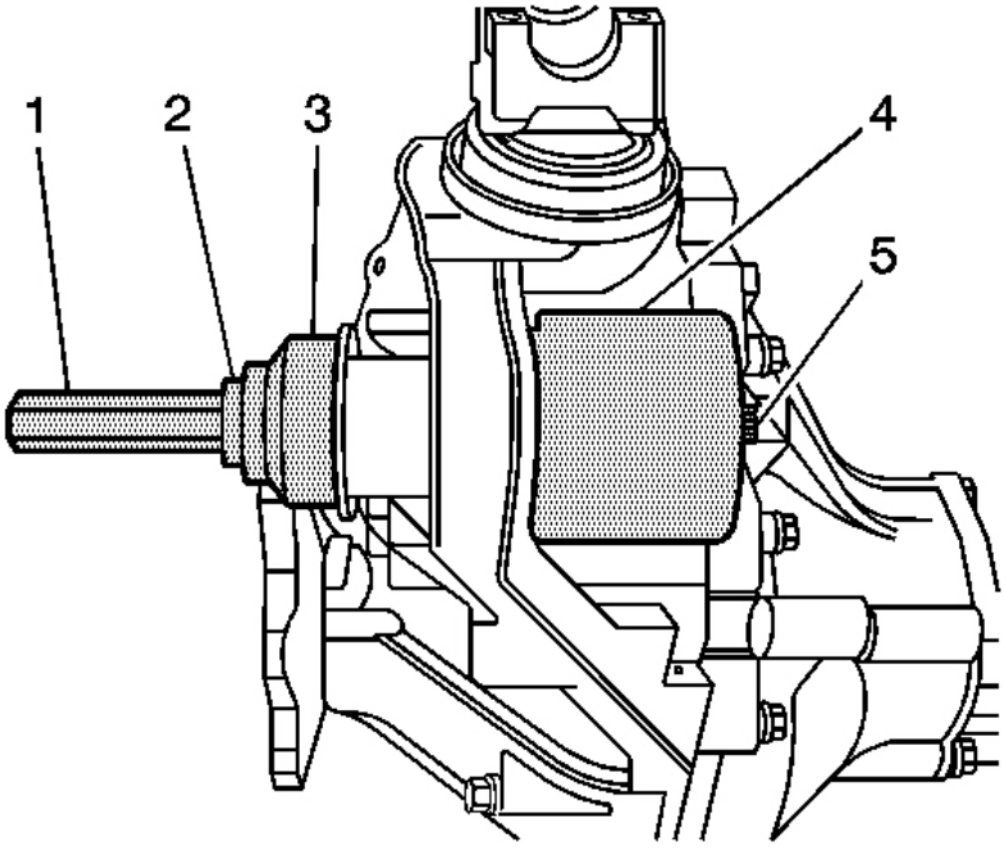


Fig. 98: Installing Lower Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

2. Install the upper differential carrier assembly bushing by performing the following steps:
   A. Install the J 21474-18 (1), the thrust bearing (2), the J 36616-2 (3), the J 36616-1 (4), and the forcing screw (5) as shown.
   B. While holding the forcing screw, slowly tighten the J 21474-18 until the bushing has stopped against the step on the bushing and is centered within the differential carrier assembly bushing bore.

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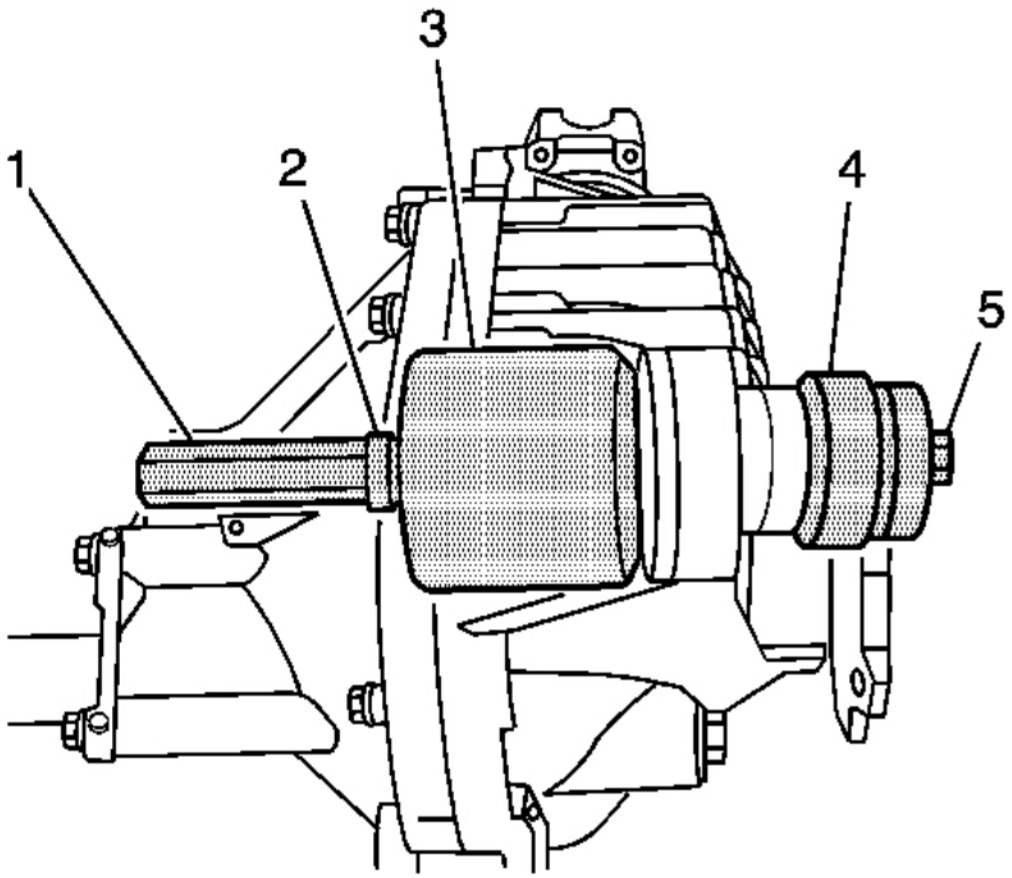


Fig. 99: Installing Upper Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

3. Install the differential carrier assembly. Refer to **Differential Carrier Assembly Replacement**.

DIFFERENTIAL CARRIER ASSEMBLY REPLACEMENT

Removal Procedure

1. Turn the steering wheel all the way to the left.
2. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
3. Place jack or utility stands at the rear end of the vehicle.
4. Remove the engine protection shield. Refer to **Engine Protection Shield Replacement** in Frame and Underbody.

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5. Remove the front differential carrier assembly shield, if equipped. Refer to **Shield Replacement**.
6. Drain the differential carrier assembly. Refer to **Lubricant Replacement - Front Drive Axle**.
7. Disconnect the front propeller shaft from the differential carrier assembly. Refer to **Propeller Shaft Replacement - Front** in Propeller Shaft.
8. Remove the relay rod. Refer to **Relay Rod Replacement** in Steering Linkage.
9. Support the differential carrier assembly with a transmission jack or equivalent.
10. Remove the wheel drive shaft inboard flange bolts from the inner axle shaft, both sides.

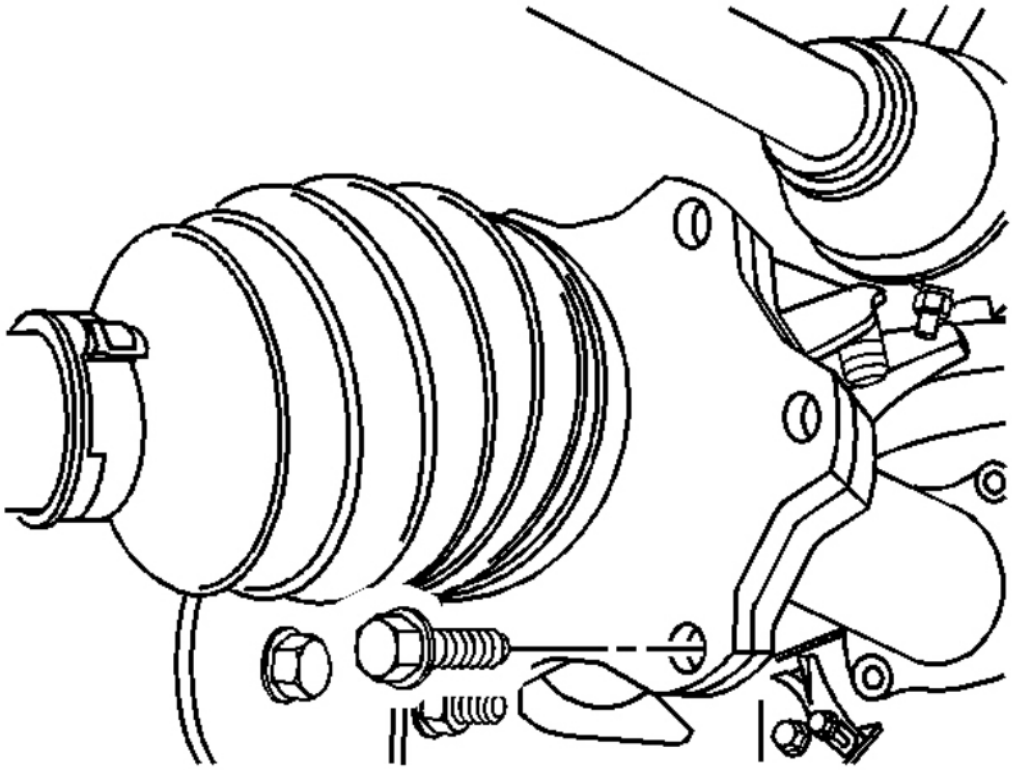


Fig. 100: View Of Wheel Drive Shaft Inboard Flange Bolt - Front Drive Axle
Courtesy of GENERAL MOTORS CORP.

11. Disconnect the electrical connector from the front axle actuator, S4WD axle only.

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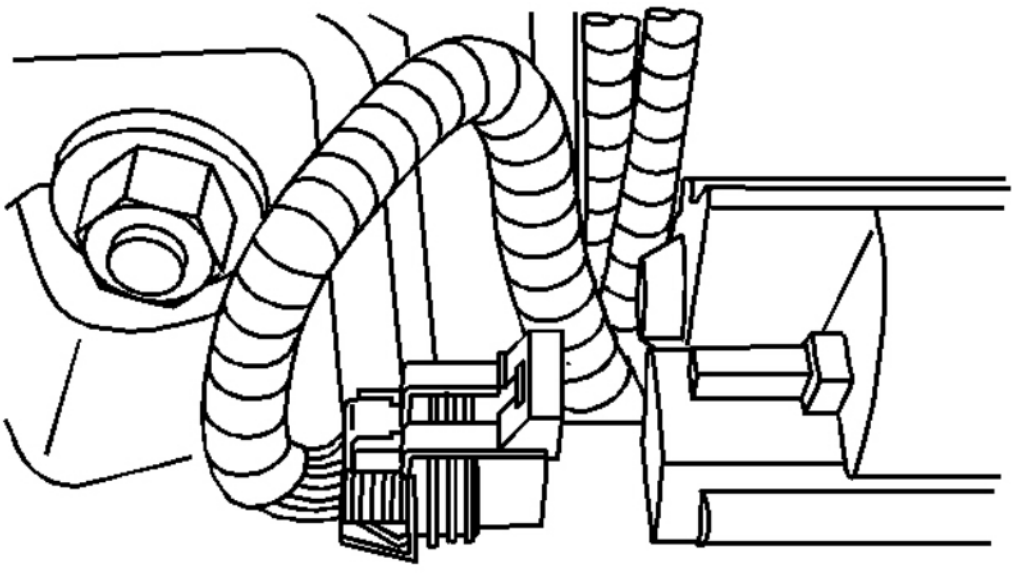


Fig. 101: View Of Front Axle Actuator Electrical Connector
Courtesy of GENERAL MOTORS CORP.

12. Disconnect the wire harness from the inner axle shaft housing, S4WD axle only.

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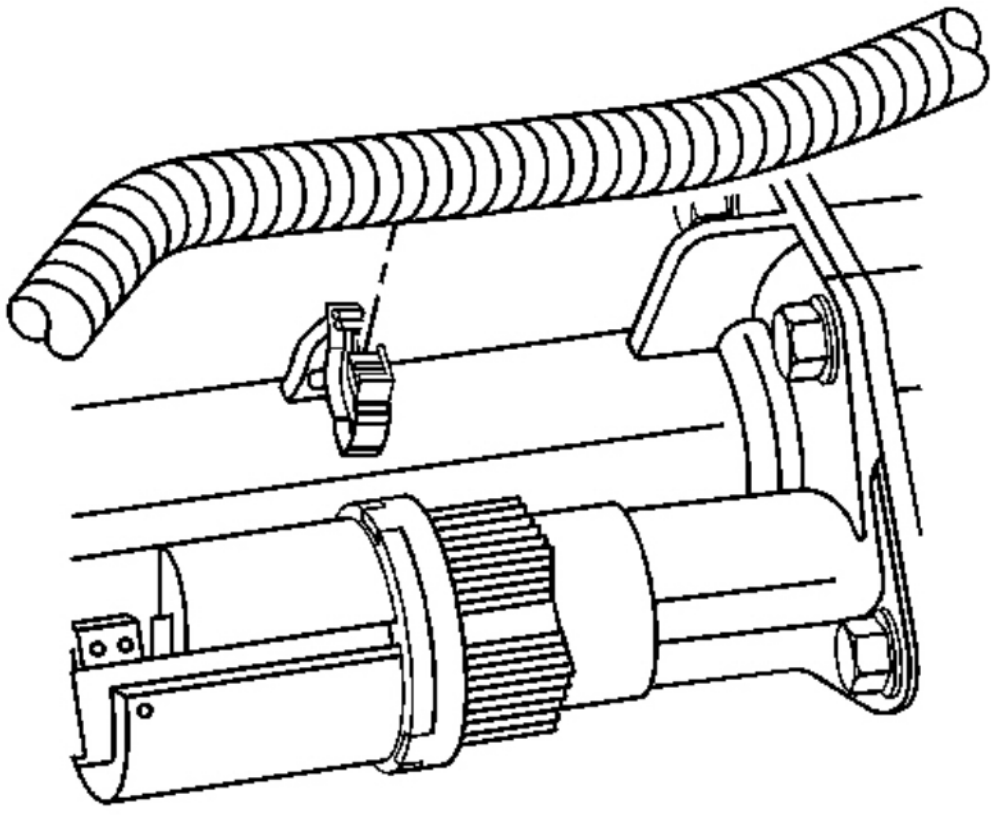


Fig. 102: View Of Wire Harness To Inner Axle Shaft Housing (S4WD)
Courtesy of GENERAL MOTORS CORP.

13. Disconnect the wire harness from the differential carrier assembly, S4WD axle only.

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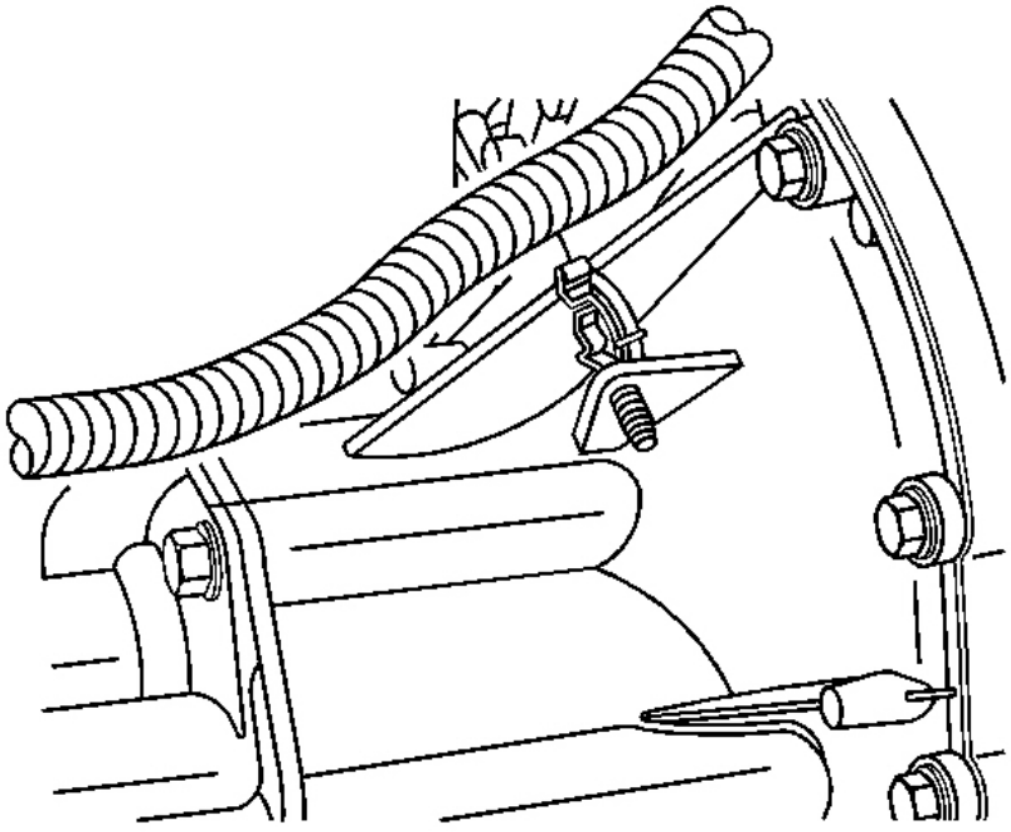


Fig. 103: View Of Wire Harness To Differential Carrier Assembly (S4WD)
Courtesy of GENERAL MOTORS CORP.

14. Disconnect the vent hose from the differential carrier assembly.

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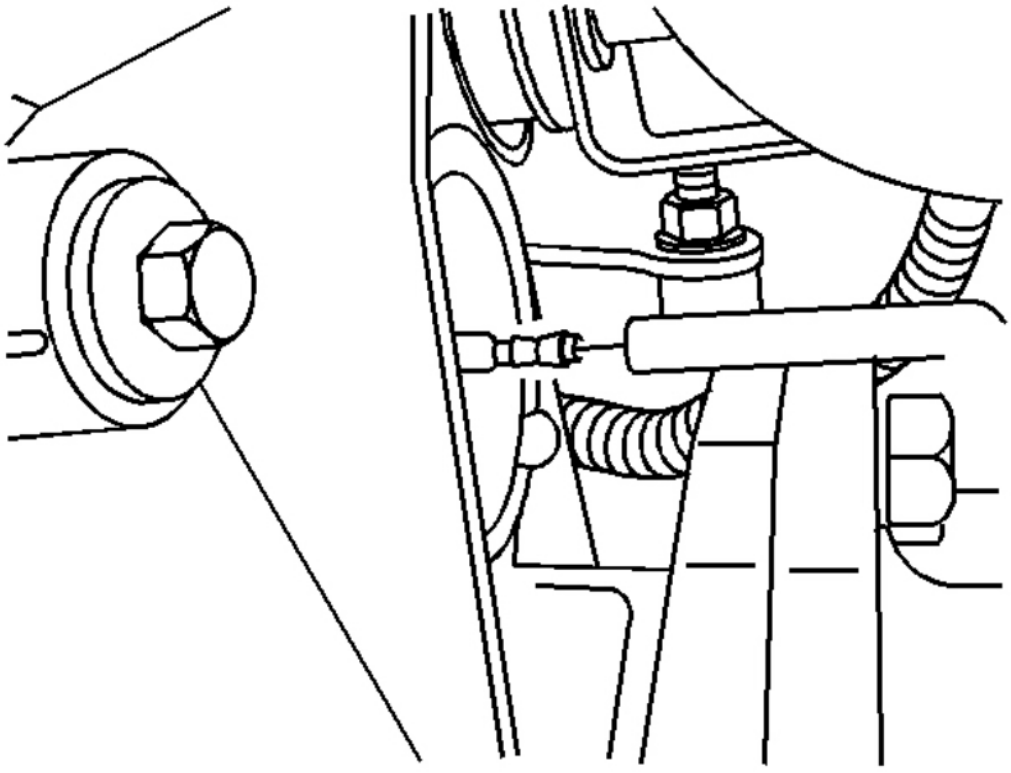


Fig. 104: View Of Vent Hose To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

15. Remove the inner axle housing nuts and washers from the bracket.

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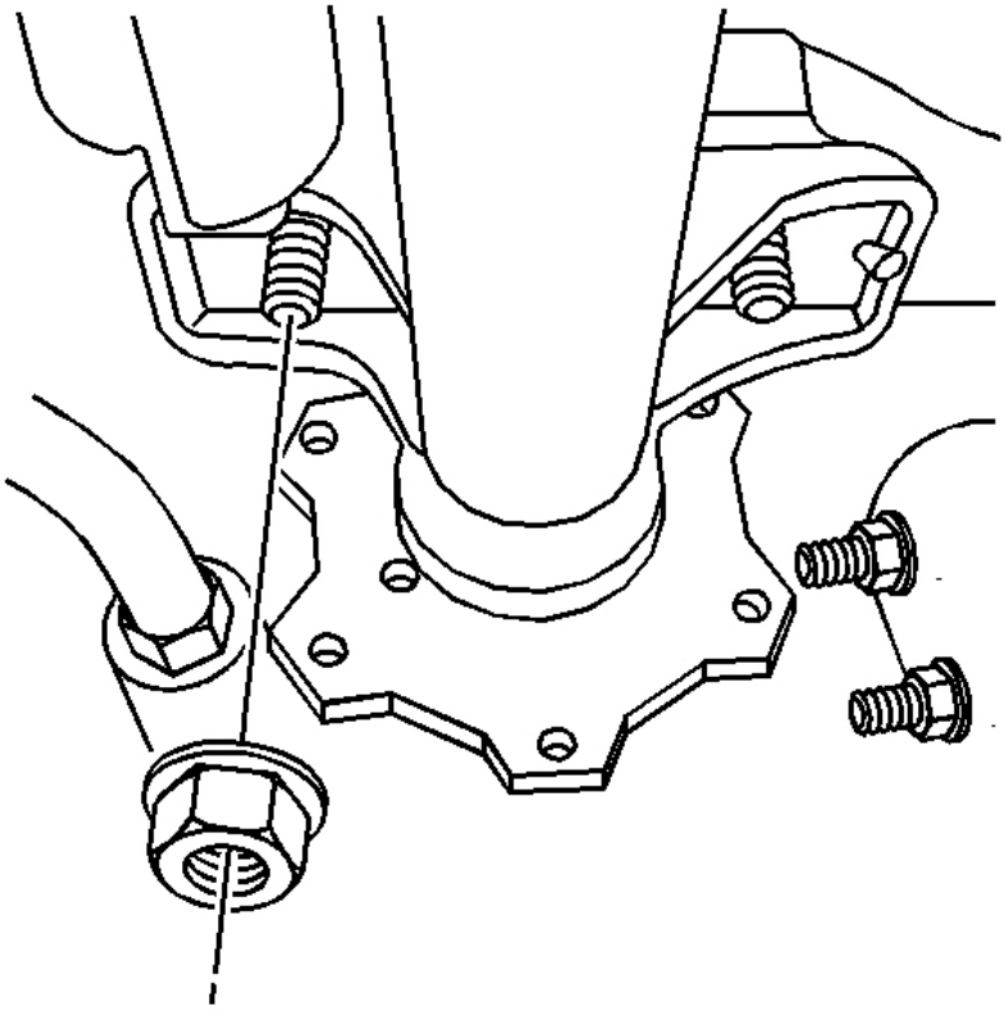


Fig. 105: View Of Inner Axle Housing Nuts
Courtesy of GENERAL MOTORS CORP.

16. Remove the differential carrier assembly upper mounting bolt and the nut.

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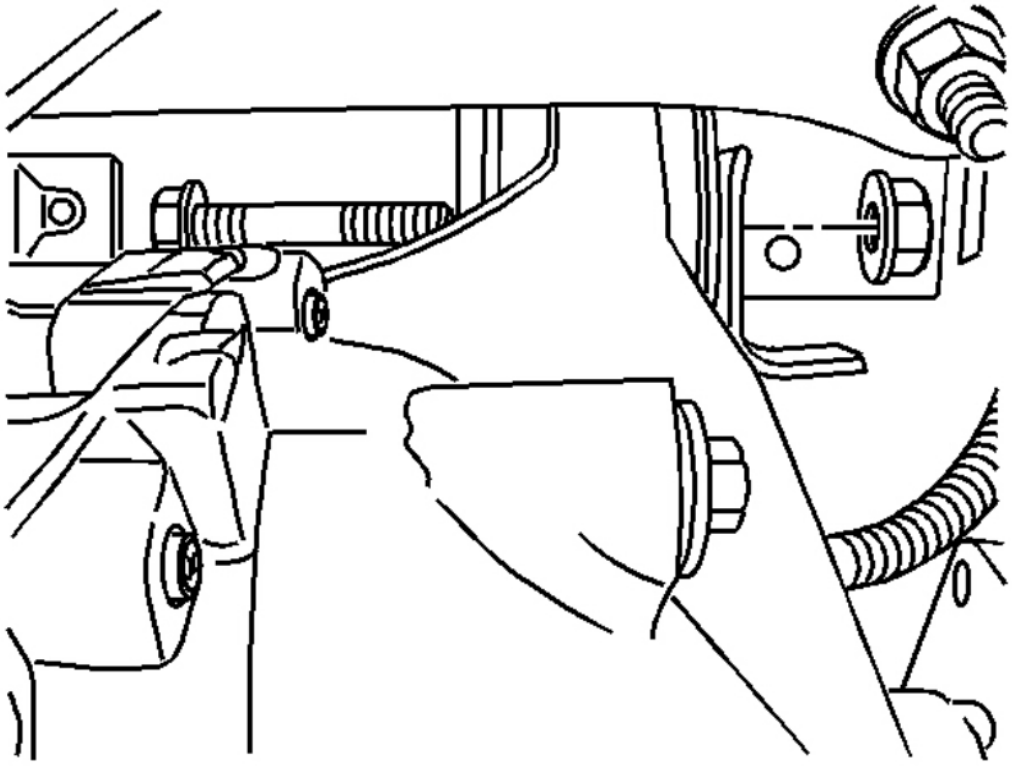


Fig. 106: View Of Differential Carrier Upper Mounting Bolt
Courtesy of GENERAL MOTORS CORP.

17. Pivot the differential carrier assembly forward and down on the lower mount bolt while it is being supported by the transmission jack.
18. Secure the differential carrier assembly to the jack.
19. Remove the differential carrier assembly lower mounting bolt and the nut.

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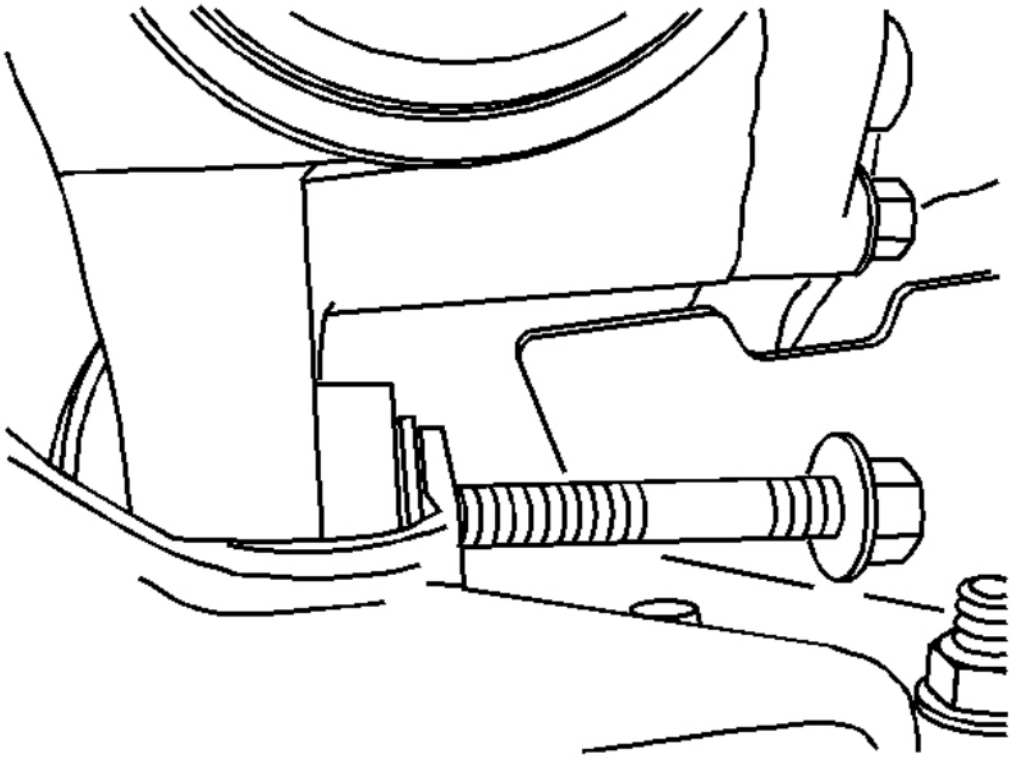


Fig. 107: View Of Differential Carrier Lower Mounting Bolt
Courtesy of GENERAL MOTORS CORP.

20. Remove the differential carrier assembly.

Installation Procedure

1. Install the differential carrier assembly.
2. Install the differential carrier assembly lower mounting bolt and the nut.

   Do not tighten the bolt at this time.

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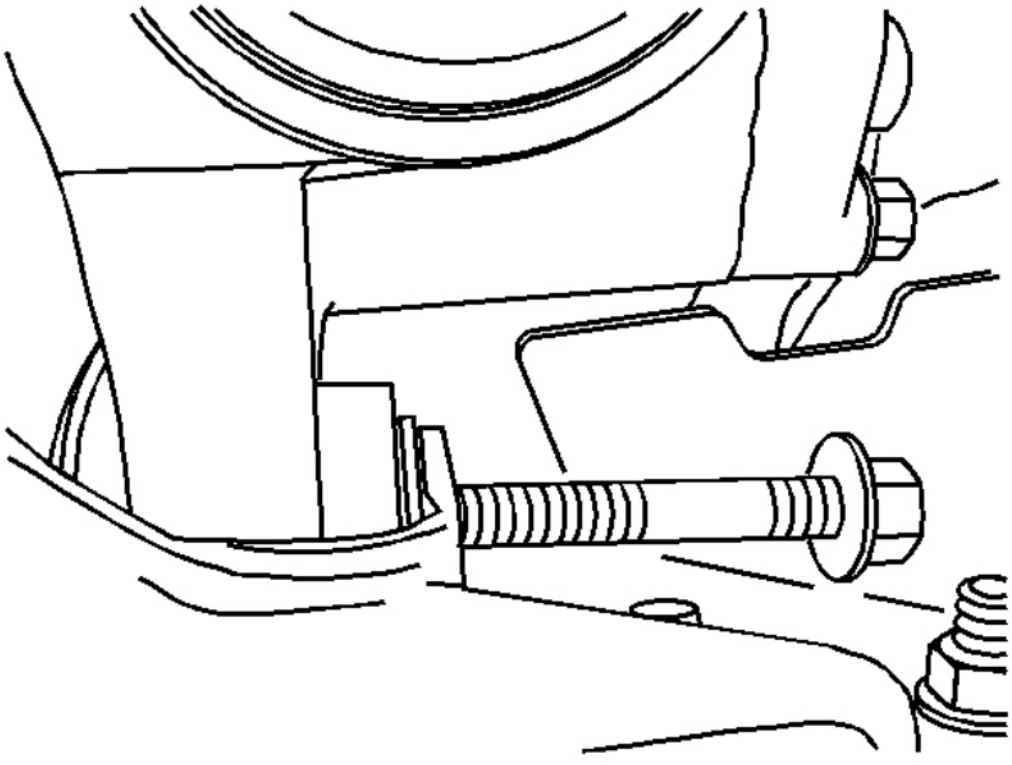


Fig. 108: View Of Differential Carrier Lower Mounting Bolt
Courtesy of GENERAL MOTORS CORP.

3. Pivot the differential carrier assembly up and back on the lower mount bolt while it is being supported by the transmission jack.
4. Install the differential carrier assembly upper mounting bolt and the nut.

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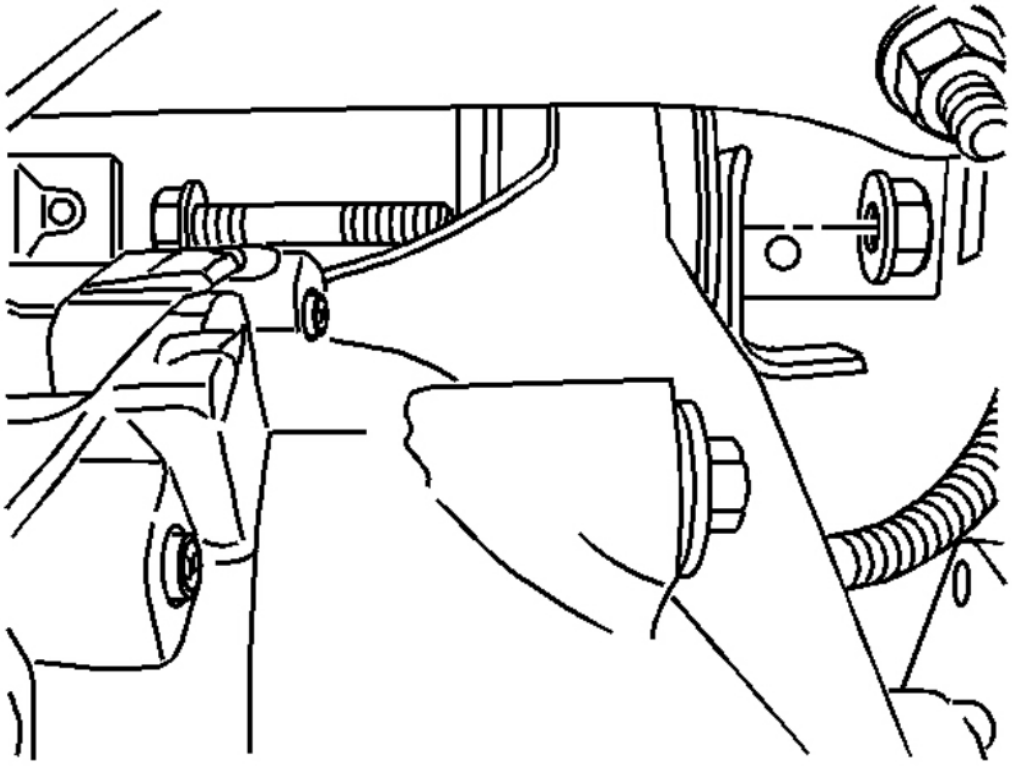


Fig. 109: View Of Differential Carrier Upper Mounting Bolt
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

5. Install the inner axle housing washers and nuts to the bracket.

Tighten:

- Tighten the inner axle housing nuts to 100 N.m (75 lb ft).
- Tighten the upper and the lower differential carrier assembly bolts to 100 N.m (75 lb ft).

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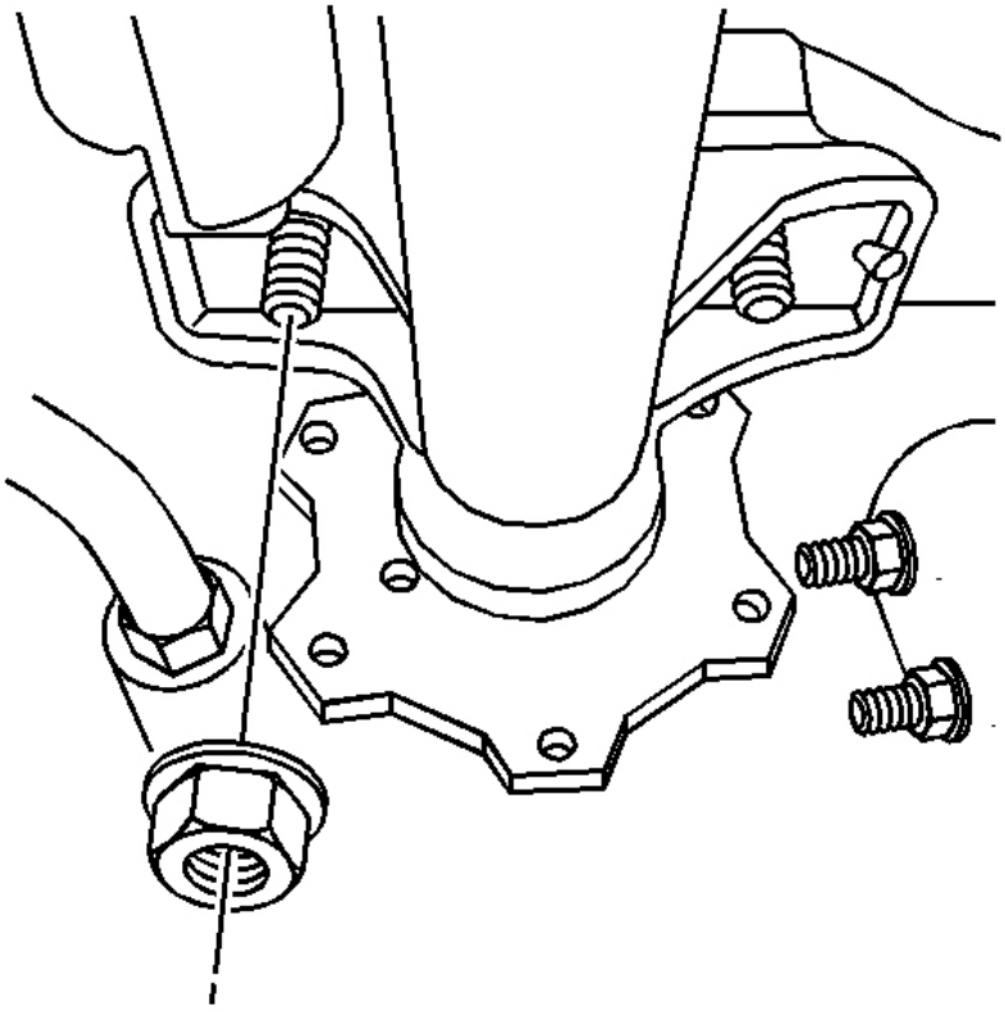


Fig. 110: View Of Inner Axle Housing Nuts
Courtesy of GENERAL MOTORS CORP.

6. Connect the vent hose to the differential carrier assembly.

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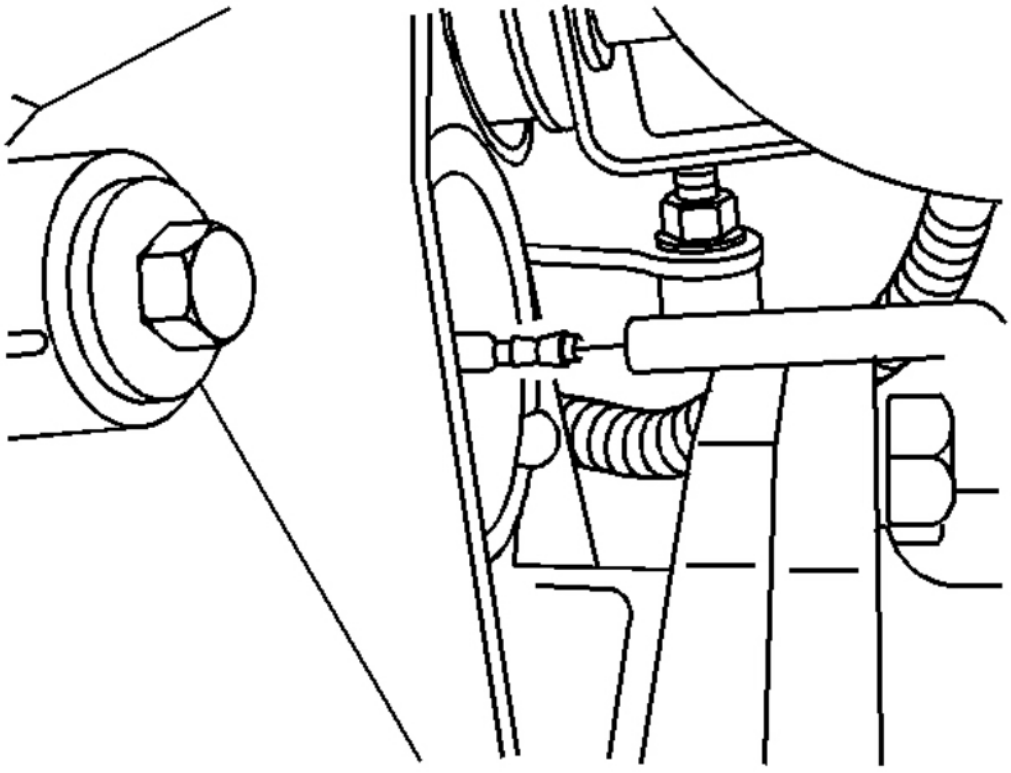


Fig. 111: View Of Vent Hose To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

7. Remove the transmission jack.
8. Connect the wire harness to the differential carrier assembly, S4WD axle only.

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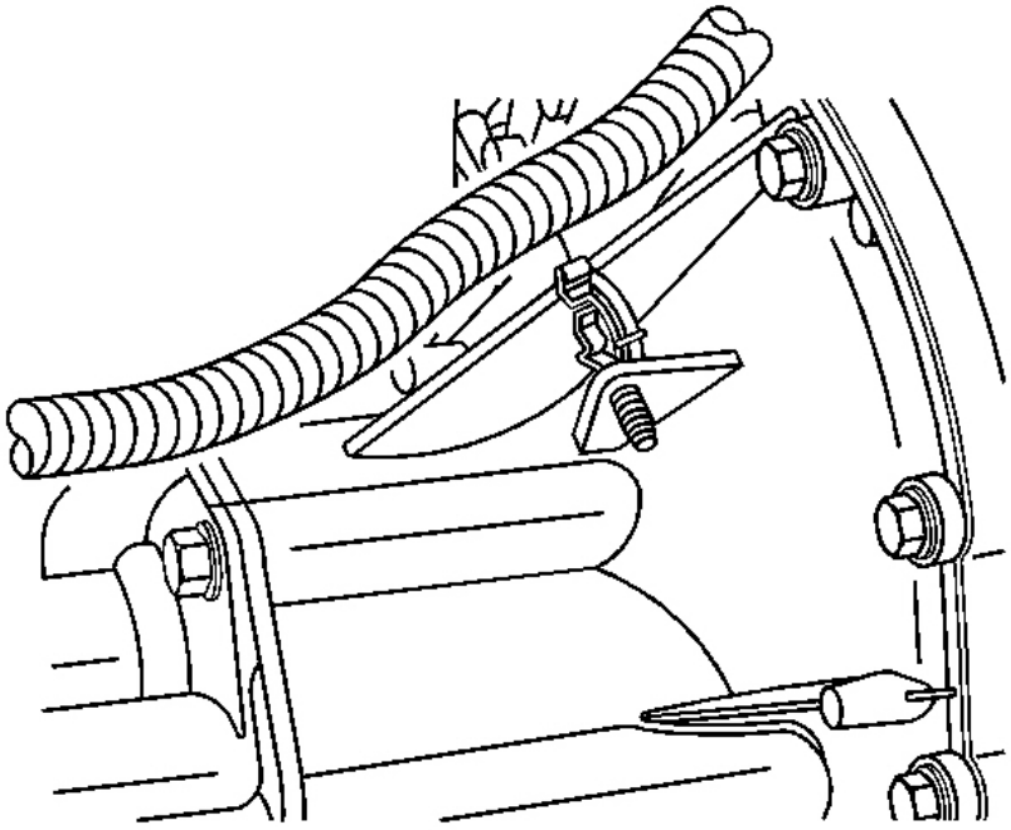


Fig. 112: View Of Wire Harness To Differential Carrier Assembly (S4WD)
Courtesy of GENERAL MOTORS CORP.

9. Connect the wire harness to the inner axle shaft housing, S4WD axle only.

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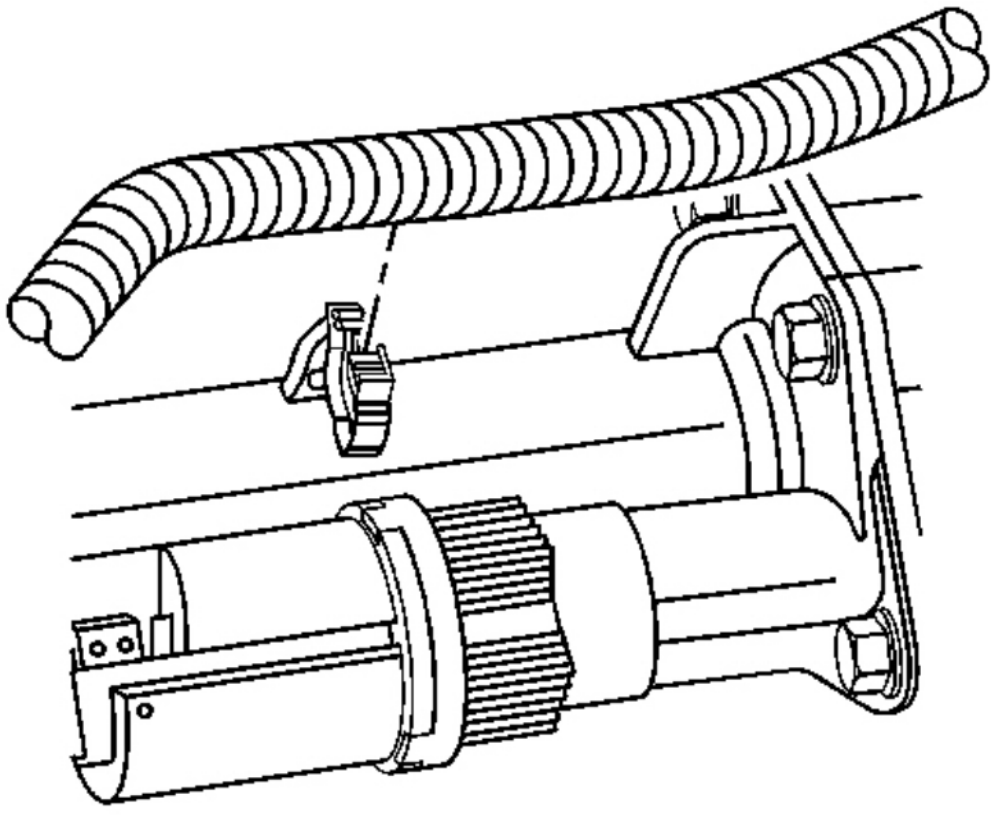


Fig. 113: View Of Wire Harness To Inner Axle Shaft Housing (S4WD)
Courtesy of GENERAL MOTORS CORP.

10. Connect the electrical connector to the front axle actuator, S4WD axle only.

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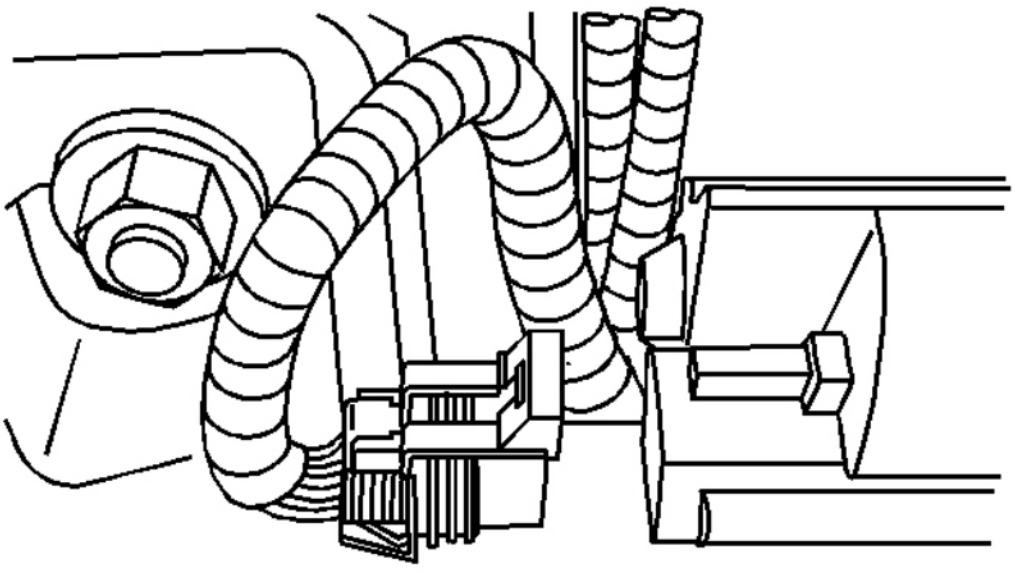


Fig. 114: View Of Front Axle Actuator Electrical Connector
Courtesy of GENERAL MOTORS CORP.

11. Install the wheel drive shaft inboard flange to inner axle shaft bolts, both sides.

    Tighten: Tighten the wheel drive shaft inboard flange to inner axle shaft bolts to 79 N.m (58 lb ft).

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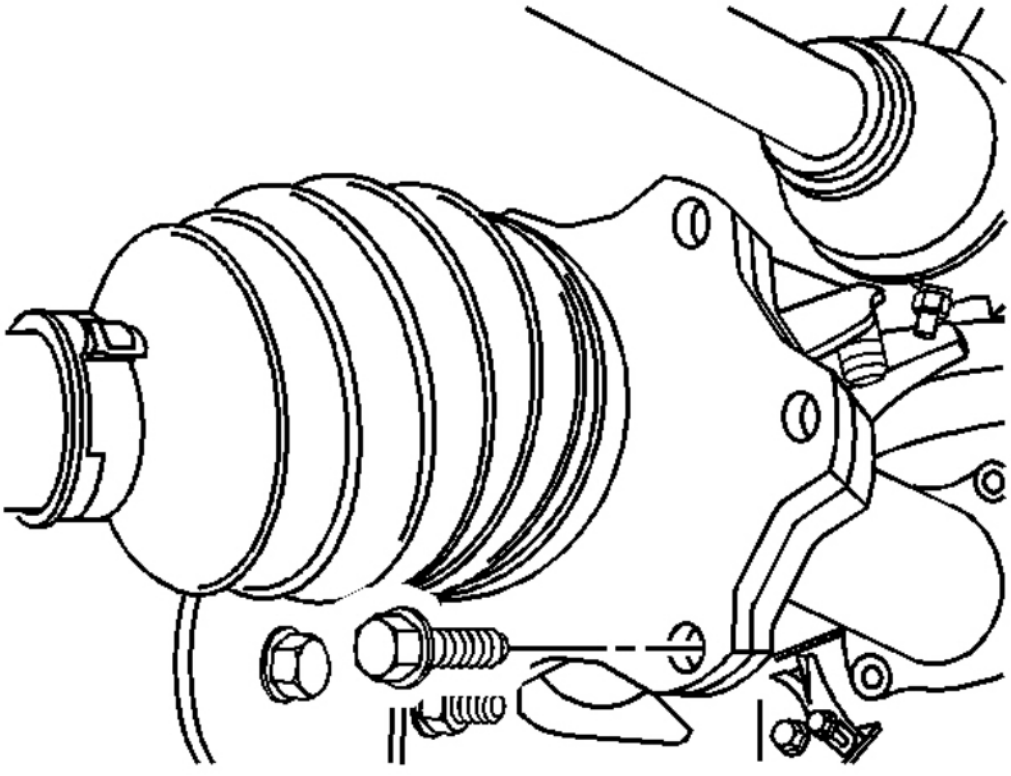


Fig. 115: View Of Wheel Drive Shaft Inboard Flange Bolt - Front Drive Axle
Courtesy of GENERAL MOTORS CORP.

12. Install the relay rod. Refer to **Relay Rod Replacement** in Steering Linkage.
13. Install the front propeller shaft to the differential carrier assembly. Refer to **Propeller Shaft Replacement - Front** in Propeller Shaft.
14. Fill the differential carrier assembly. Use the correct fluid. Refer to **Lubricant Replacement - Front Drive Axle**.
15. Install the front differential carrier assembly shield, if equipped. Refer to **Shield Replacement**.
16. Install the engine protection shield. Refer to **Engine Protection Shield Replacement** in Frame and Underbody.
17. Remove the utility stands.
18. Lower the vehicle.

BRACKET REPLACEMENT (15 SERIES)

Removal Procedure

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1. Raise the vehicle on a hoist. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the differential carrier assembly. Refer to **Differential Carrier Assembly Replacement**.
3. Remove the nuts and the washers from the bracket.
4. Remove the bolt from the bracket.
5. Remove the bracket from the vehicle.

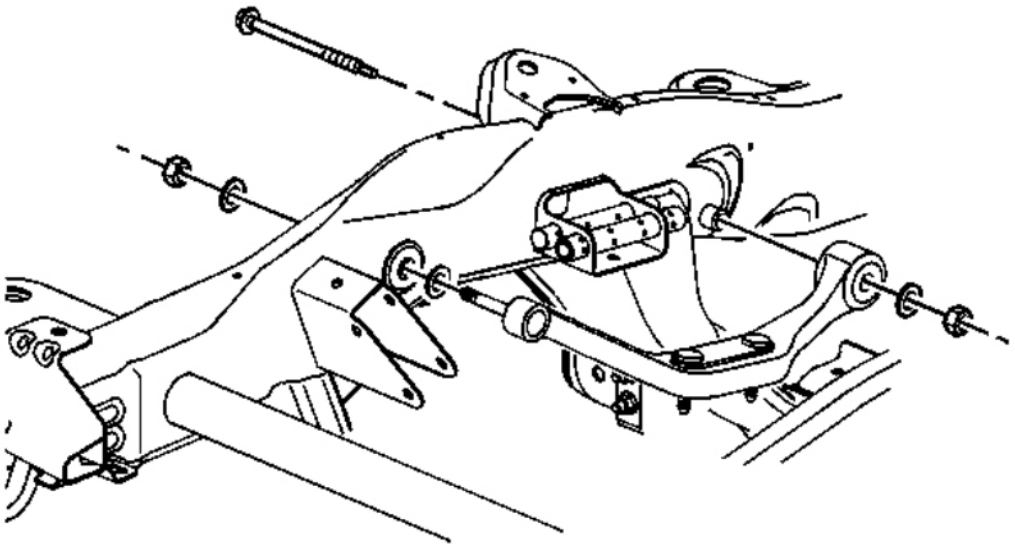


Fig. 116: View Of Front Axle Mounting Bracket (15 Series)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the bracket to the vehicle.
2. Install the bolt to the frame and to the bracket.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the washers and the nuts to the bracket.

Tighten: Tighten the nuts to 90 N.m (70 lb ft).

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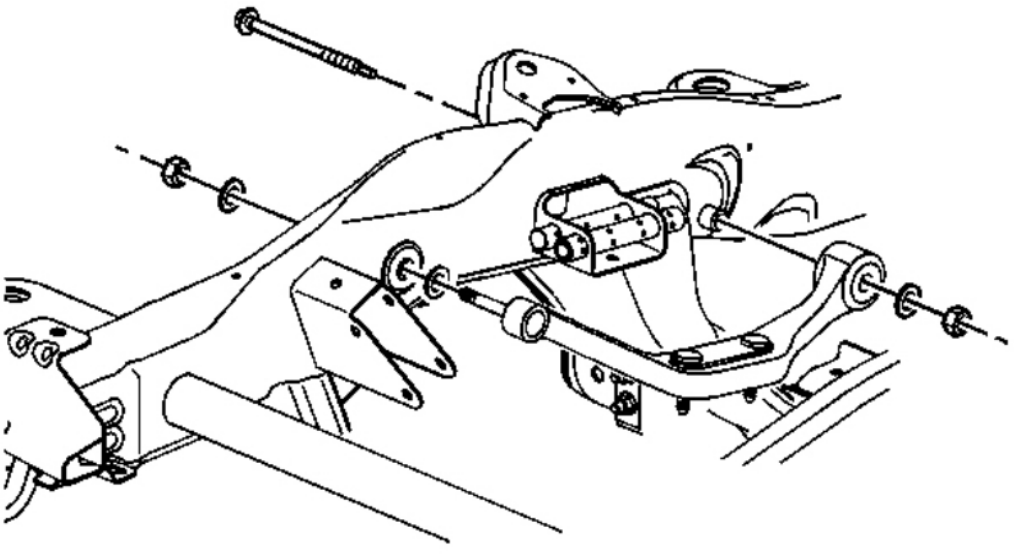


Fig. 117: View Of Front Axle Mounting Bracket (15 Series)
Courtesy of GENERAL MOTORS CORP.

4. Install the differential carrier assembly. Refer to **Differential Carrier Assembly Replacement**.
5. Lower the vehicle.

BRACKET REPLACEMENT (25 SERIES)

Removal Procedure

1. Raise the vehicle. Refer to **Lifting and Jacking the Vehicle** in General Information.
2. Remove the differential carrier assembly. Refer to **Differential Carrier Assembly Replacement**.
3. Remove the air conditioning compressor - 4.8 L, 5.3 L and 6.0 L engines. Refer to **Compressor Replacement (L18)** or **Compressor Replacement (LR4, LM7, and LQ4)** in Heating, Ventilation and Air Conditioning.
4. Remove the nuts and the washers from the bracket.
5. Remove the bracket from the vehicle.

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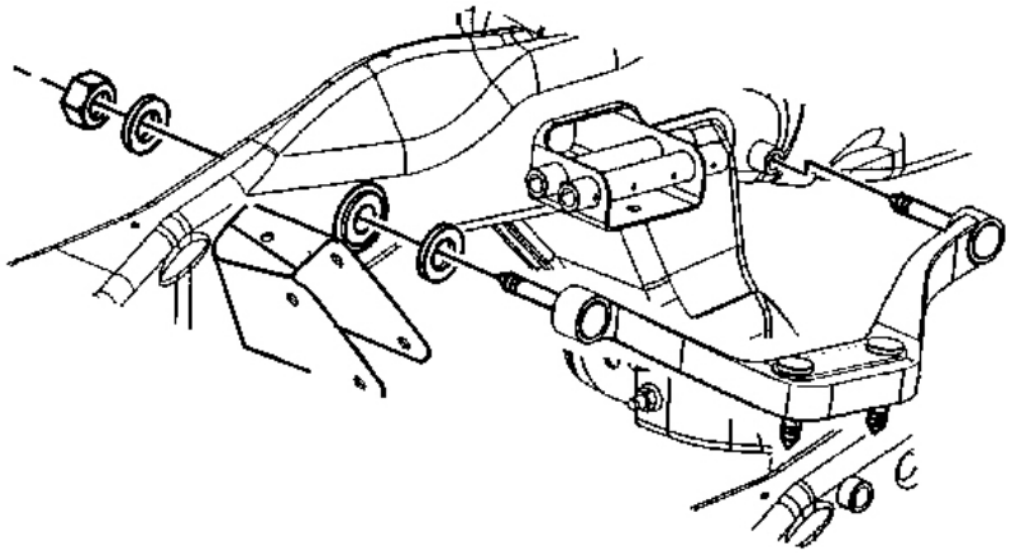


Fig. 118: View Of Front Axle Mounting Bracket (25/35 Series)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the bracket to the vehicle.

   NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the washers and the nuts to the bracket.

   Tighten: Tighten the bracket to frame nuts to 90 N.m (67 lb ft).

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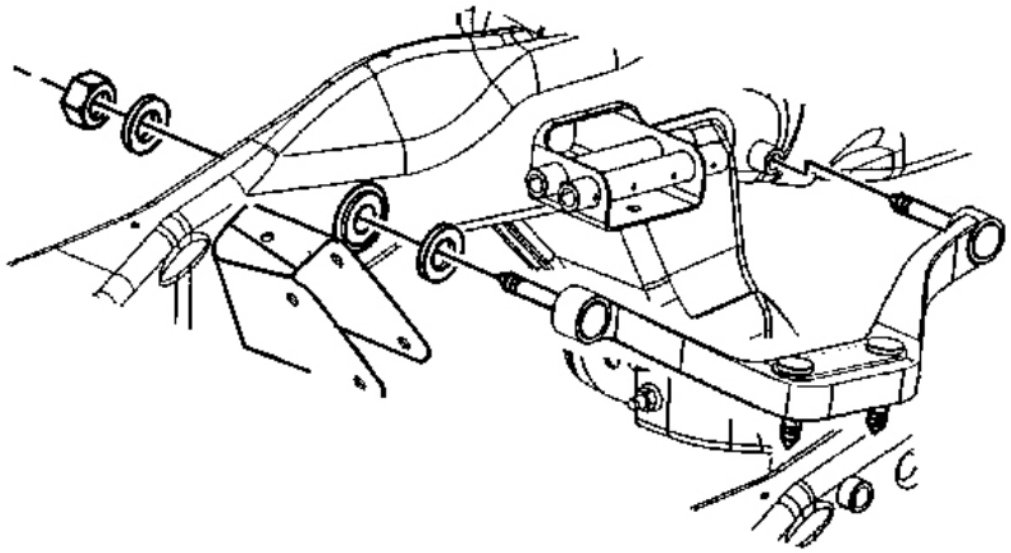


Fig. 119: View Of Front Axle Mounting Bracket (25/35 Series)
Courtesy of GENERAL MOTORS CORP.

3. Install the air conditioning compressor -4.8 L, 5.3 L and 6.0 L engines. Refer to **Compressor Replacement (L18)** or **Compressor Replacement (LR4, LM7, and LQ4)** in Heating, Ventilation and Air Conditioning.
4. Install the differential carrier assembly. Refer to **Differential Carrier Assembly Replacement**.
5. Lower the vehicle.

DIFFERENTIAL CARRIER ASSEMBLY - DISASSEMBLE (9.25 INCH AXLE)

Tools Required

- **J 22912-01** Split-Plate Bearing Puller. See **Special Tools and Equipment**.
- **J 2619-01** Slide Hammer
- **J 29369-2** Bushing and Bearing Remover (2-3 in)
- **J 33791** Carrier Bushing Remover/Installer
- **J 34011** Pilot Bearing Remover
- **J 36599-A** Side Bearing Nut Wrench
- **J 36615** Side Bearing Nut Wrench
- **J 36616** Axle Mount Bushing Remover/Installer
- **J 45754** Pinion Bearing Race Remover/Installer - 9.25 inch Axle

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- **J 45765** Pinion Remover
- **J 8614-01** Flange and Pulley Holding Tool

Inspection Procedure

Perform the following before disassembling the axle:

1. Remove the fill plug from the axle.
2. Remove the drain plug from the axle.
3. Drain the axle lubricant.
4. Inspect the oil and the case for metal chips.

   Determine the source of the metal chips, such as a broken gear or bearing cage.

5. Check the ring gear backlash. Refer to **Backlash Inspection and Adjustment**.

This information can be used in order to determine the cause of the axle problem. The information will also help when setting up and preloading the differential case.

Determine the cause of the axle problem before disassembly, if possible.

Disassembly Procedure

1. Remove the upper differential carrier assembly bushing by performing the following steps:
   A. Install the J 36616-2 (1), the J 33791-1 (2), the thrust bearing (3), the J 21474-18 (4), and the forcing screw as shown.
   B. Remove the upper differential carrier assembly bushing by holding the forcing screw and tightening the J 21474-18.

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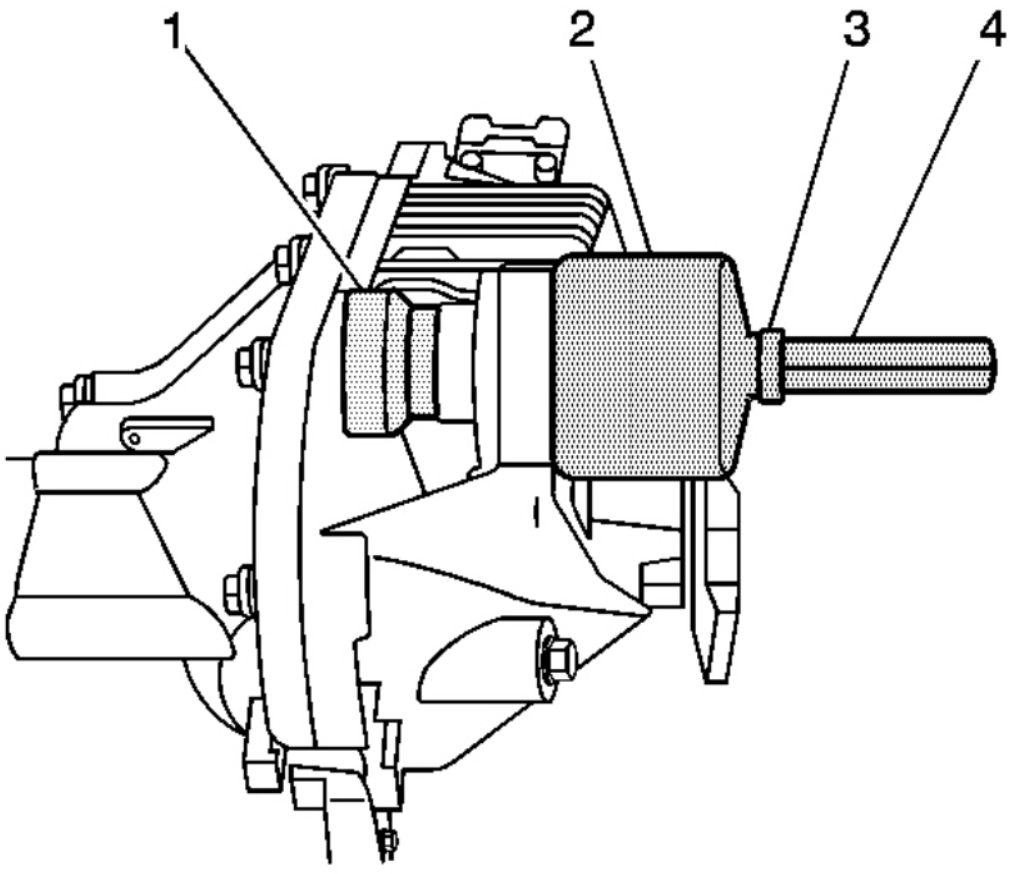


Fig. 120: Removing Upper Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

2. Remove the lower differential carrier assembly bushing by performing the following steps:
   A. Install the J 21474-18 (1), the thrust bearing (2), the J 33791-1 (3), the J 36616-2 (4), and the forcing screw as shown.
   B. Remove the lower differential carrier assembly bushing by holding the forcing screw and tightening the J 21474-18.

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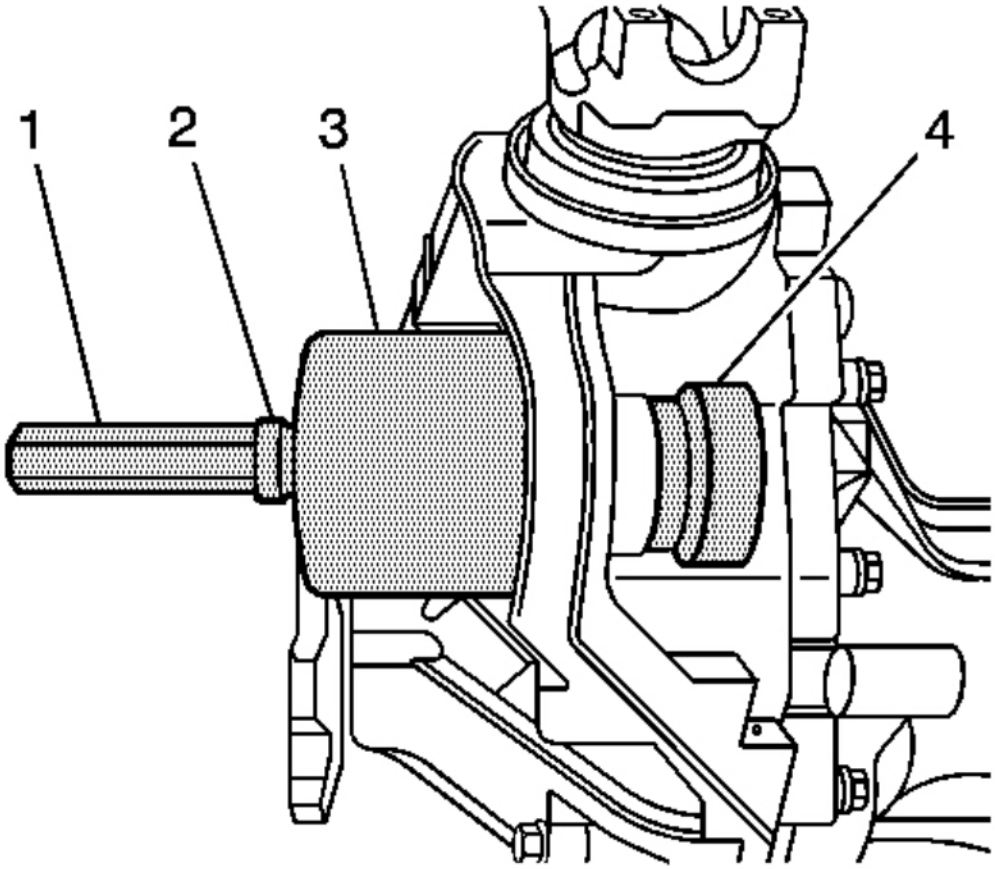


Fig. 121: Removing Lower Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

3. Remove the front axle actuator.
4. Remove the inner axle shaft housing to differential carrier assembly bolts.

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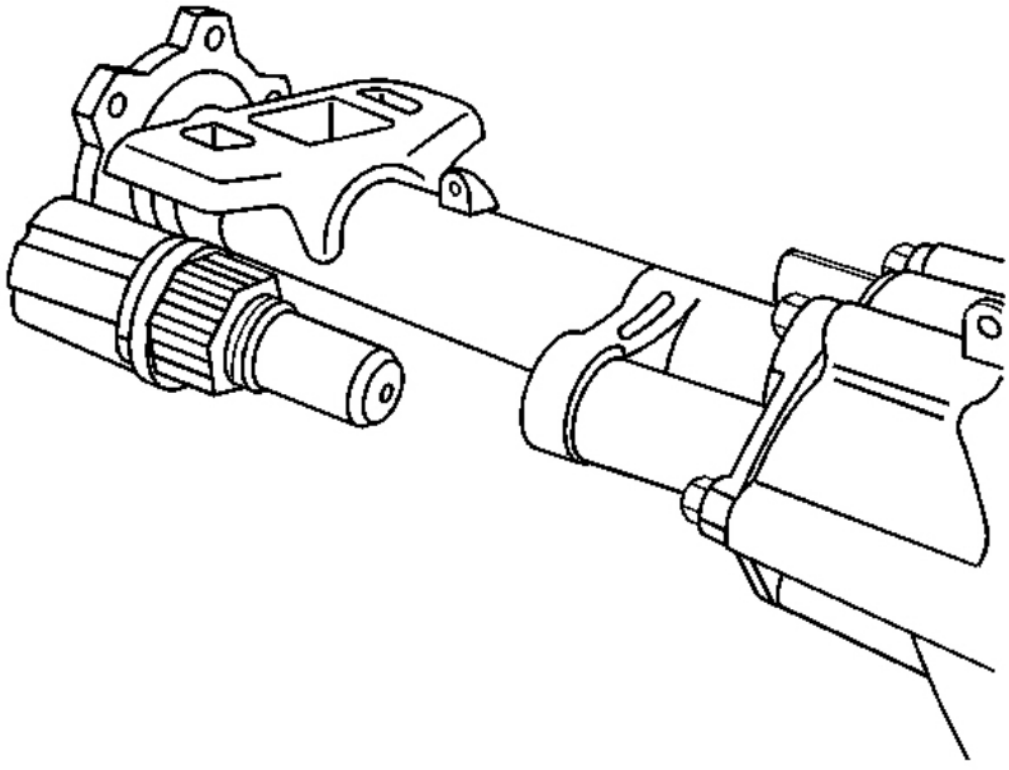


Fig. 122: View Of Front Axle Actuator
Courtesy of GENERAL MOTORS CORP.

5. Carefully remove the inner axle shaft housing with the inner axle shaft and clutch fork components from the differential carrier assembly.

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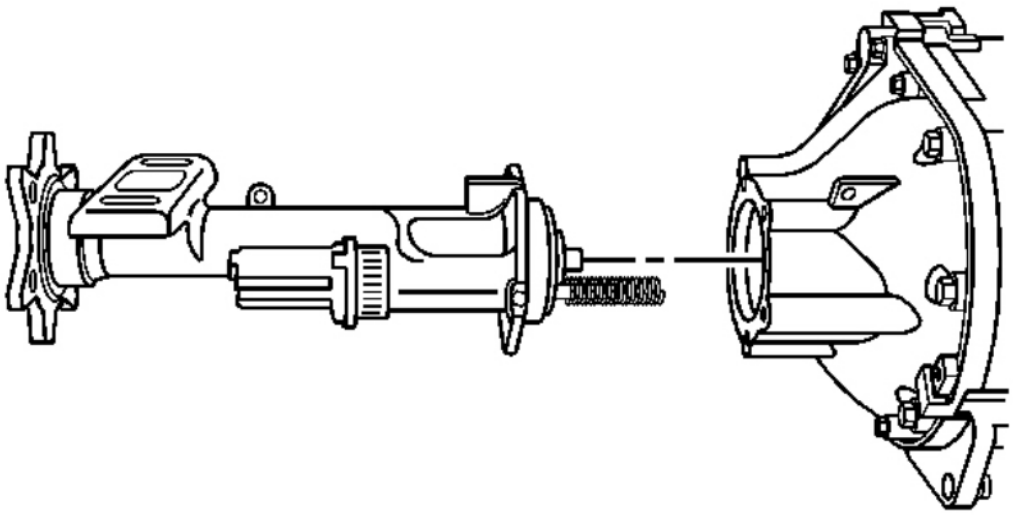


Fig. 123: View Of Inner Axle Shaft Housing Assembly To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

6. Remove the following components from the inner axle shaft housing (4):
   A. The clutch fork inner spring (10)
   B. The clutch fork assembly (11)
   C. The clutch shaft shim (9)
   D. The clutch shaft sleeve (8)
   E. The retainer ring (7)
   F. The thrust washers (5, 6)

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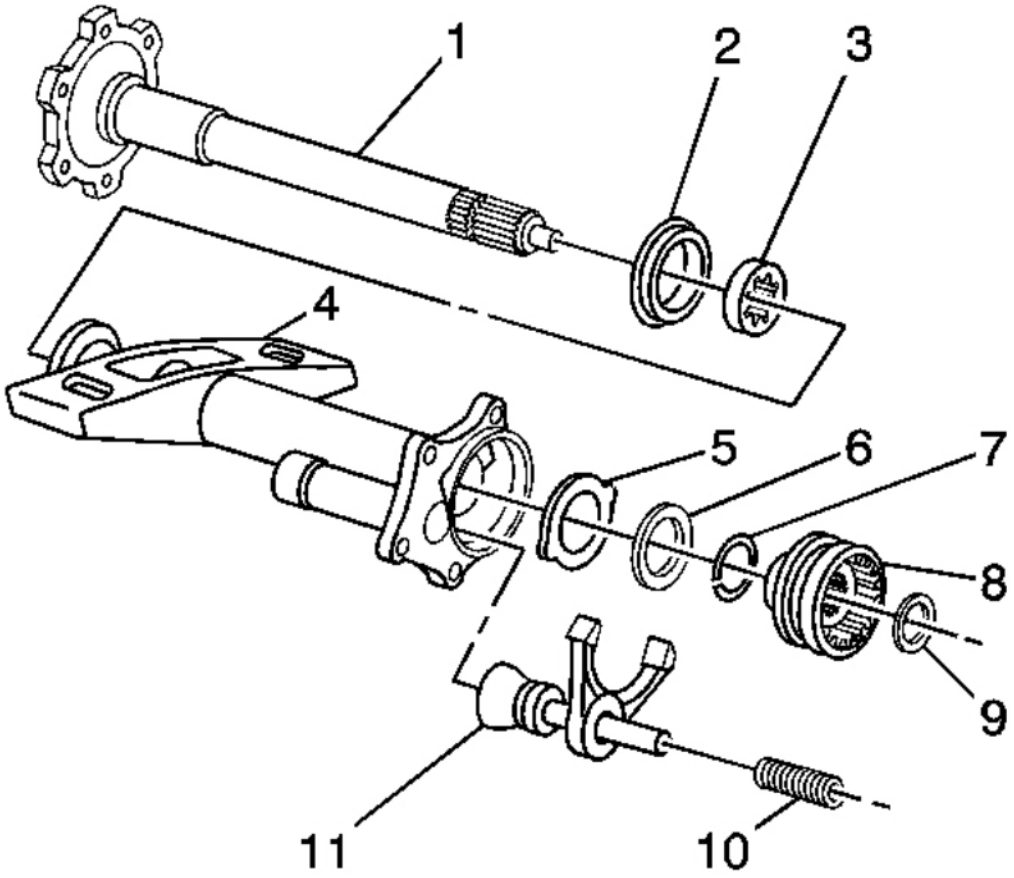


Fig. 124: Exploded View Of Inner Axle Shaft Housing (9.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

7. Remove the inner axle shaft (2).

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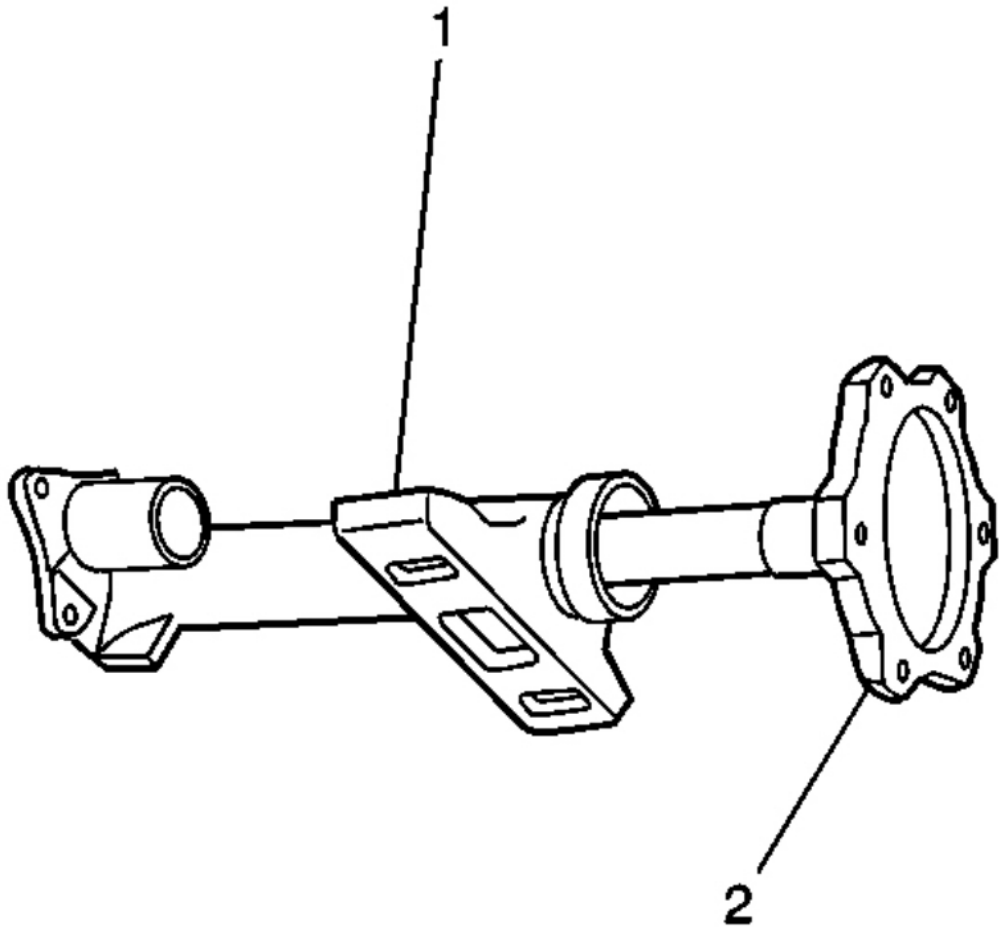


Fig. 125: View Of Inner Axle Shaft
Courtesy of GENERAL MOTORS CORP.

8. Remove the inner axle shaft bearing and the inner axle shaft seal by performing the following steps:
   A. Install the inner axle shaft housing into a vise.

      Clamp only on the mounting flange of the inner axle shaft housing.

   B. Install the **J 29369-2** (1) behind the inner axle shaft bearing.
9. Install the **J 2619-01** (2) to the **J 29369-2** (1).

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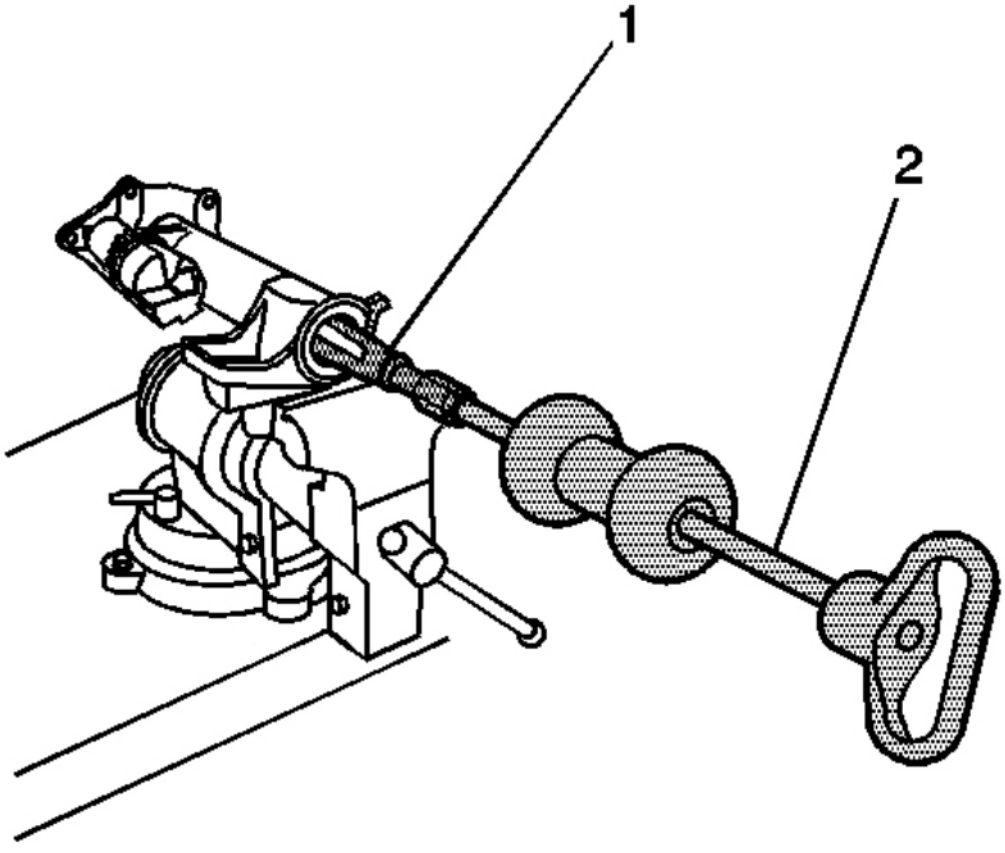


Fig. 126: Installing J 2619-01 To J 29369
Courtesy of GENERAL MOTORS CORP.

10. Remove the inner axle shaft bearing and the inner axle shaft bearing and the seal using the **J 2619-01** .
11. Remove the inner axle shaft housing from the vise.
12. Remove the front drive axle clutch shaft.
13. Use the **J 34011** in order to remove the clutch shaft bearing.

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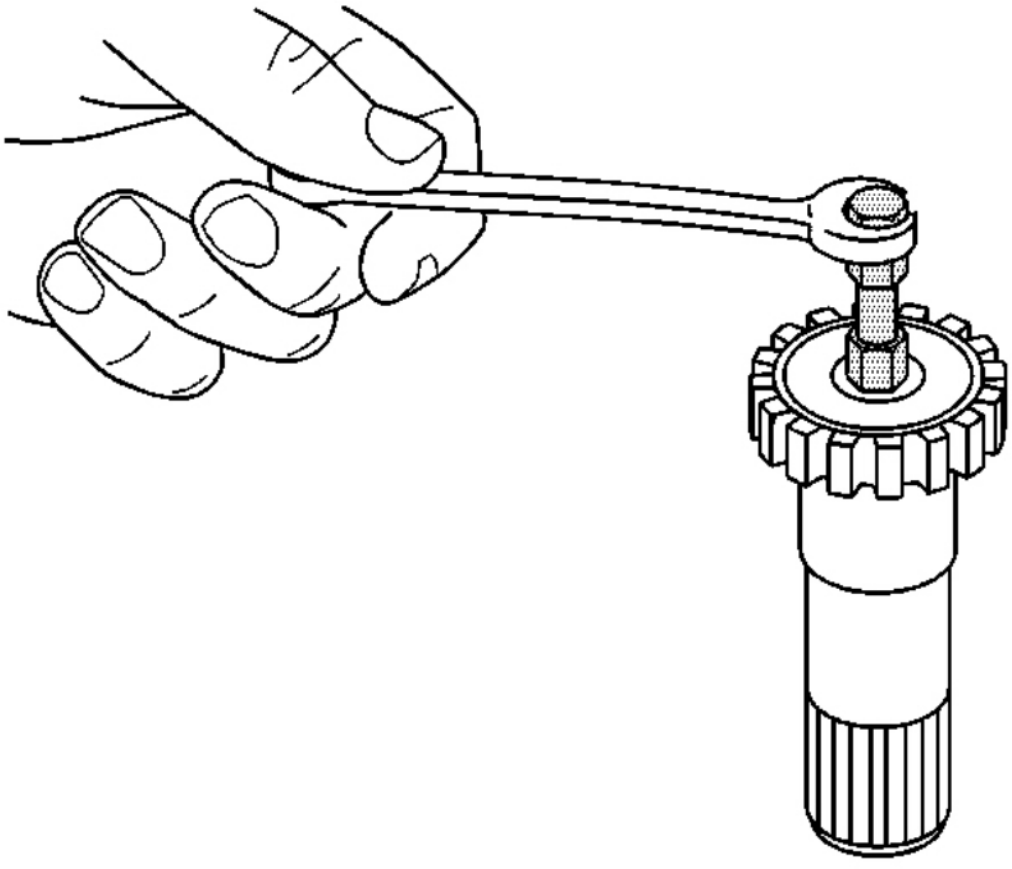


Fig. 127: Removing Clutch Shaft Pilot Bearing Using J 34011
Courtesy of GENERAL MOTORS CORP.

14. Place the differential carrier assembly into a vise.

    Clamp only on the mounting flange of the differential carrier assembly case.

15. Remove the inner axle shaft using a hammer and a brass drift.
16. Install the **J 29369-2** (1) behind the inner axle shaft bearing.
17. Install the **J 2619-01** (2) to the **J 29369-2** (1).

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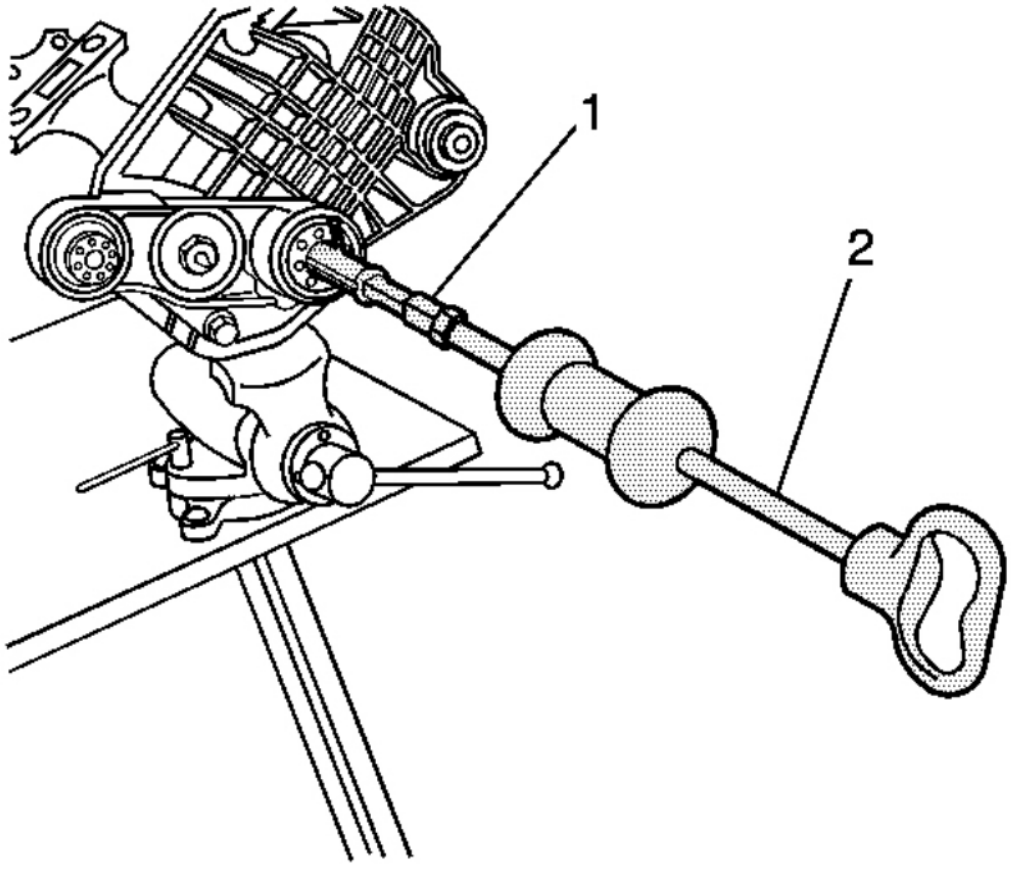


Fig. 128: Removing Inner Axle Shaft Seal & Bearing Using J 29369 & J 2619-01
Courtesy of GENERAL MOTORS CORP.

18. Remove the inner axle shaft bearing and the inner axle seal bearing and the seal using the **J 2619-01** .
19. Remove the differential carrier assembly from the vise.
20. Remove the vent connector.

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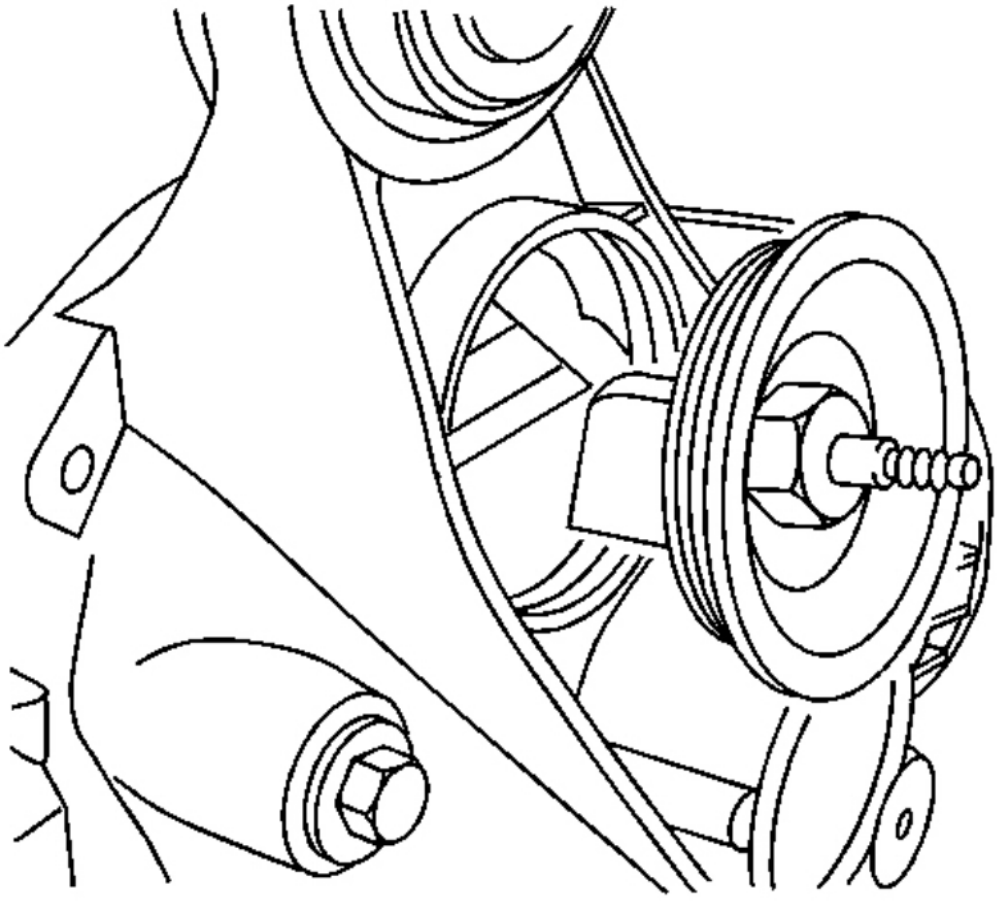


Fig. 129: View Of Vent Hose Connector
Courtesy of GENERAL MOTORS CORP.

21. Remove the differential carrier assembly bolts.
22. Separate the left carrier case half from the right carrier case half by tapping on the on the carrier case with a hammer and a brass drift.
23. Remove the differential case assembly.

Disconnect the right side differential bearing adjuster nut lock from the differential bearing adjuster nut by prying up on the lock.

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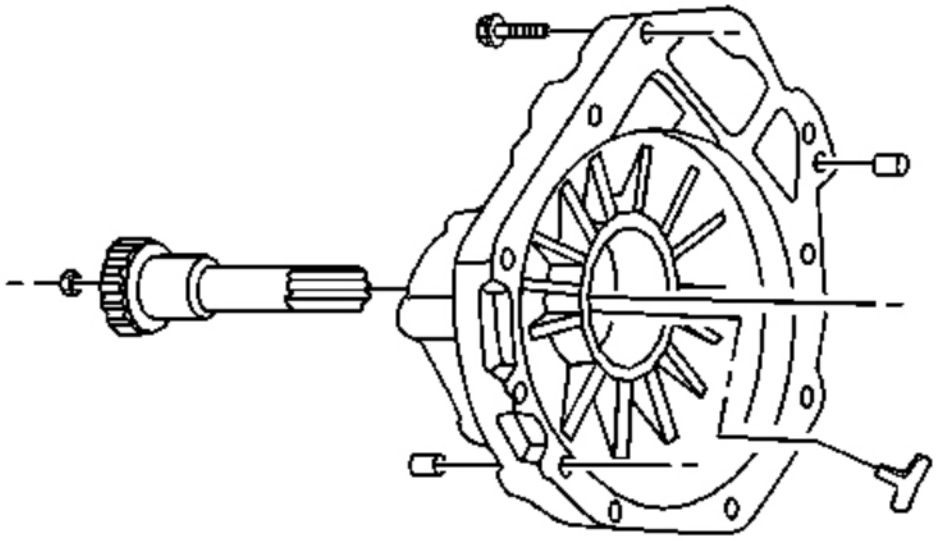


Fig. 130: View Of Clutch Shaft To Differential Carrier Case Half
Courtesy of GENERAL MOTORS CORP.

24. Remove the left side differential bearing adjuster nut lock and the bolt.

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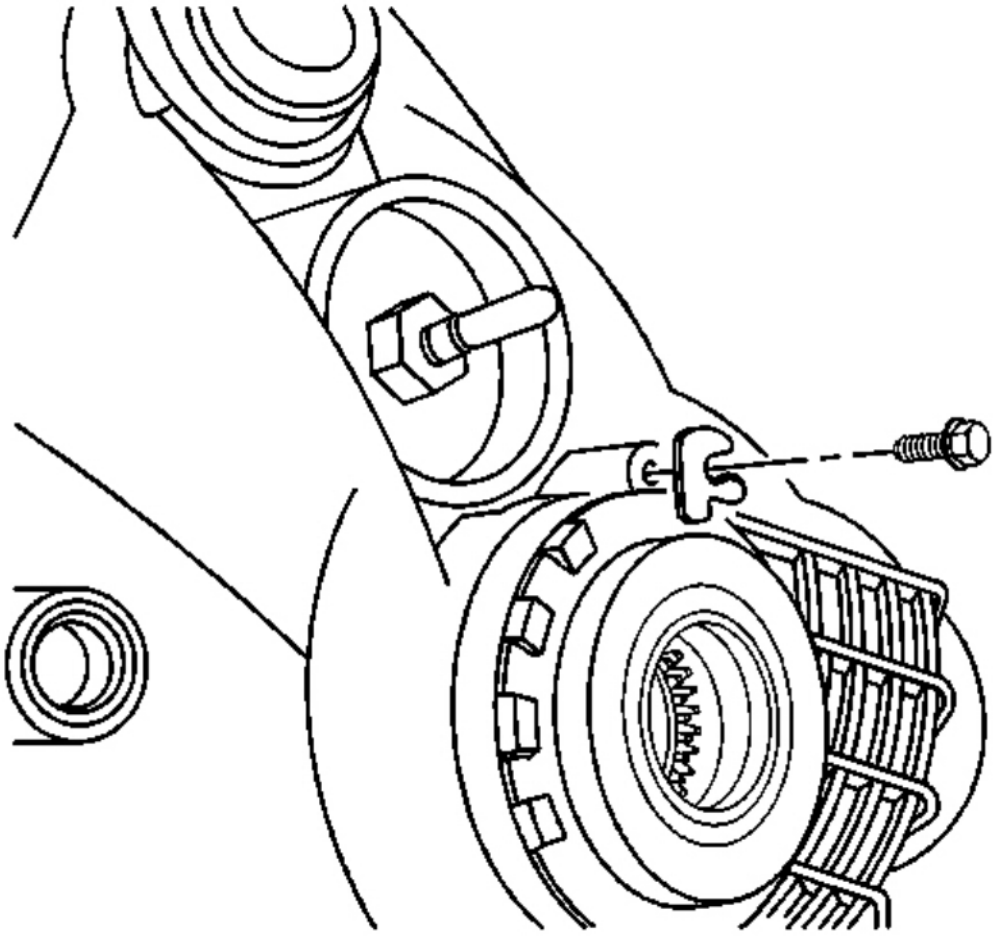


Fig. 131: View Of Left Side Differential Bearing Adjuster Nut Lock & Bolt
Courtesy of GENERAL MOTORS CORP.

25. Remove the left side differential bearing adjuster by doing the following:
    1. Install the **J 36615** onto the differential bearing adjuster nut as shown.
    2. Turn the **J 36615** counterclockwise in order to remove the differential bearing adjuster nut and the O-ring.

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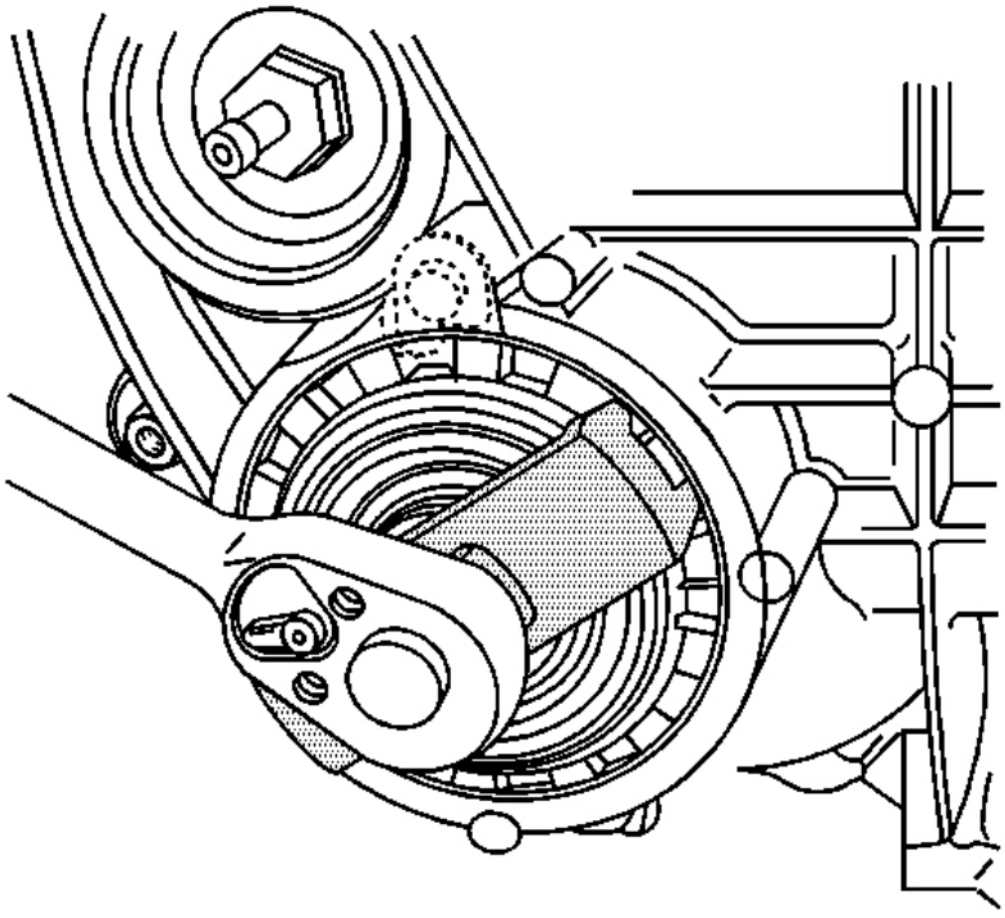


Fig. 132: View Of J 36615 On Left Side Differential Bearing Adjuster Nut
Courtesy of GENERAL MOTORS CORP.

26. Remove the right side differential bearing adjuster by doing the following:
    1. Install the **J 36599-A** onto the differential bearing adjuster nut.
    2. Turn the **J 36599-A** clockwise in order to push the bearing cup out of the bore.
27. Remove the right side differential bearing adjuster nut sleeve using a hammer and brass drift.

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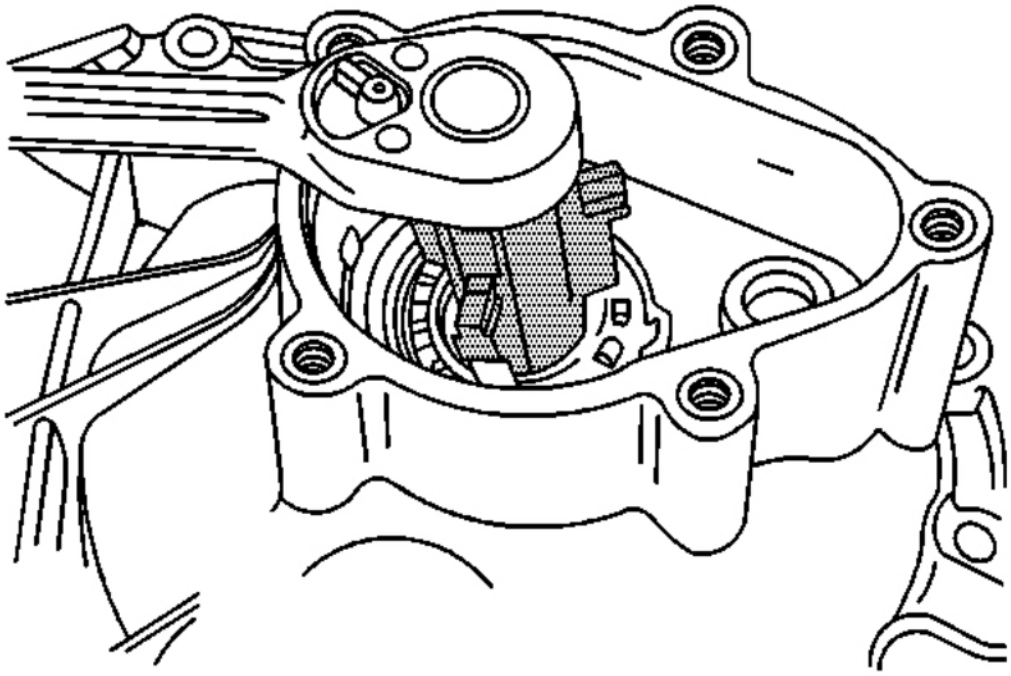


Fig. 133: View Of J 36599-A On Right Side Differential Bearing Adjuster Nut
Courtesy of GENERAL MOTORS CORP.

28. Install the **J 8614-01** as shown.

    Remove the pinion nut while holding the **J 8614-01** .

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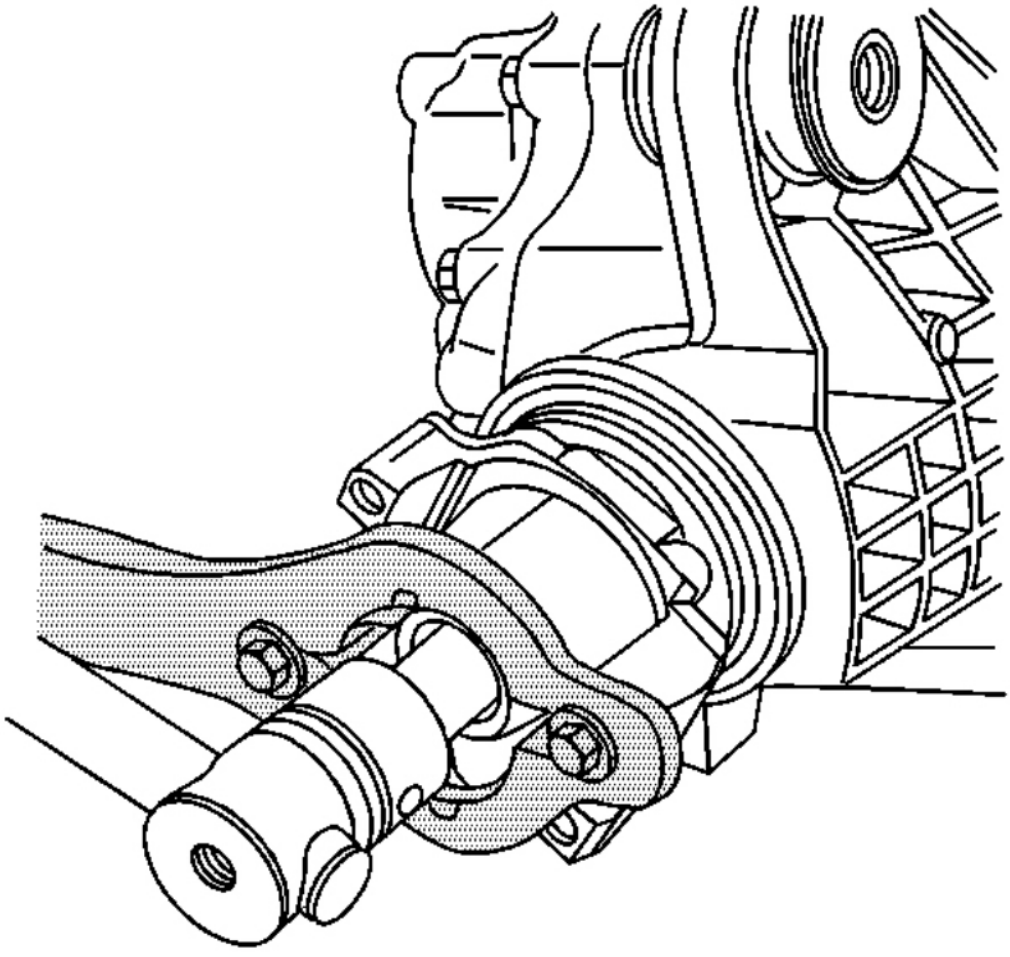


Fig. 134: Holding Pinion Flange Using Special Tool
Courtesy of GENERAL MOTORS CORP.

29. Remove the washer.
30. Install the J 8614-2 (2) and the J 8614-3 (3) into the **J 8614-01** (1) as shown.
31. Remove the pinion yoke by turning the J 8614-3 (3) clockwise while holding the **J 8614-01** (1).

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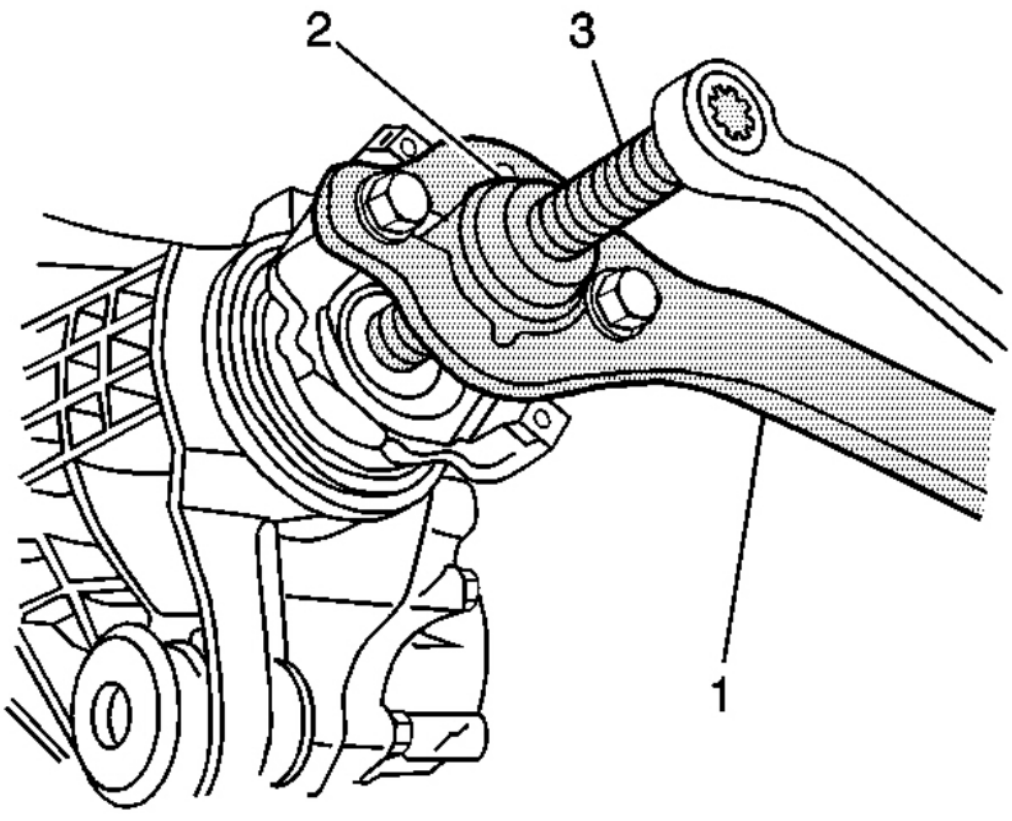


Fig. 135: Removing Pinion Yoke
Courtesy of GENERAL MOTORS CORP.

32. Install the **J 45765** to the left side differential carrier case half over the drive pinion as shown.

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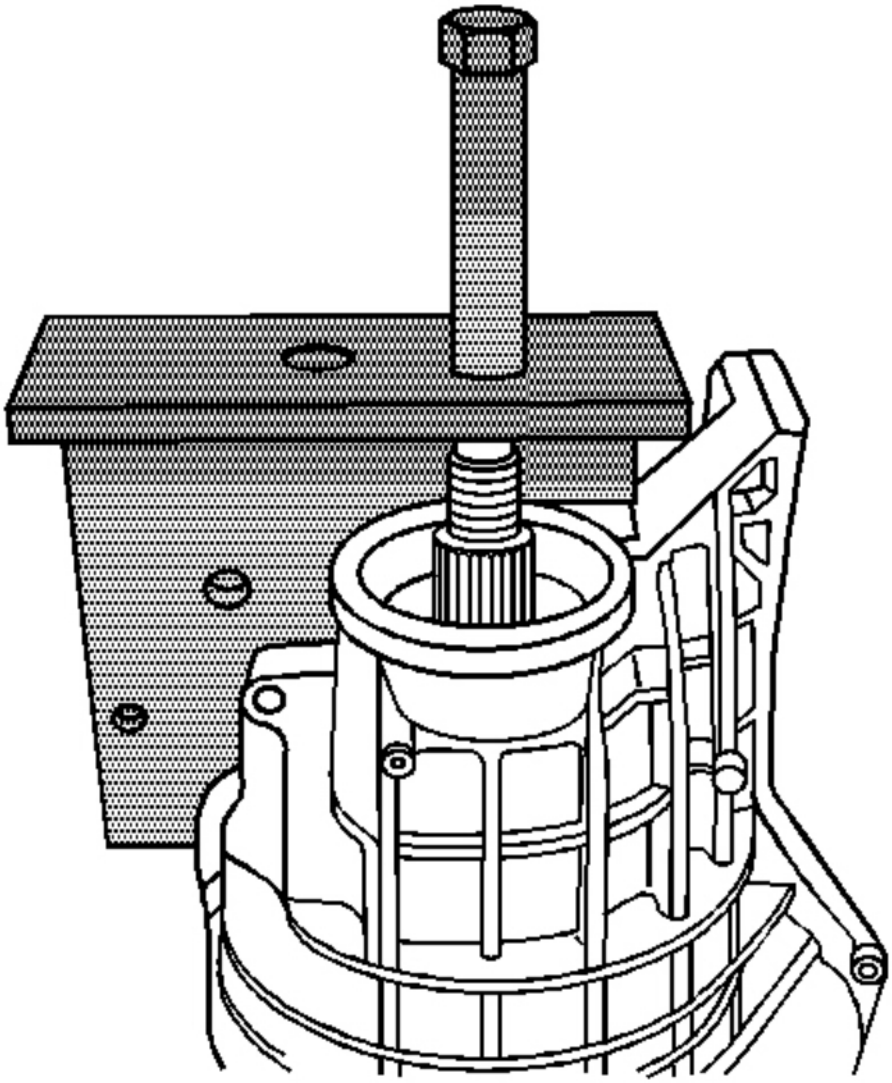


Fig. 136: View Of J 45765 Installed To Left Side Differential Carrier Case Half
Courtesy of GENERAL MOTORS CORP.

33. Turn the forcing screw of the **J 45765** clockwise to remove the following components from the left side differential carrier case half:
    - The drive pinion gear
    - The pinion gear selectable shim

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- The inner pinion bearing
- The collapsible spacer

34. Remove the drive pinion seal using a suitable seal remover.
35. Remove the outer pinion bearing from the differential carrier case half.
36. Install the J 45754-3 over the inner pinion bearing cup.

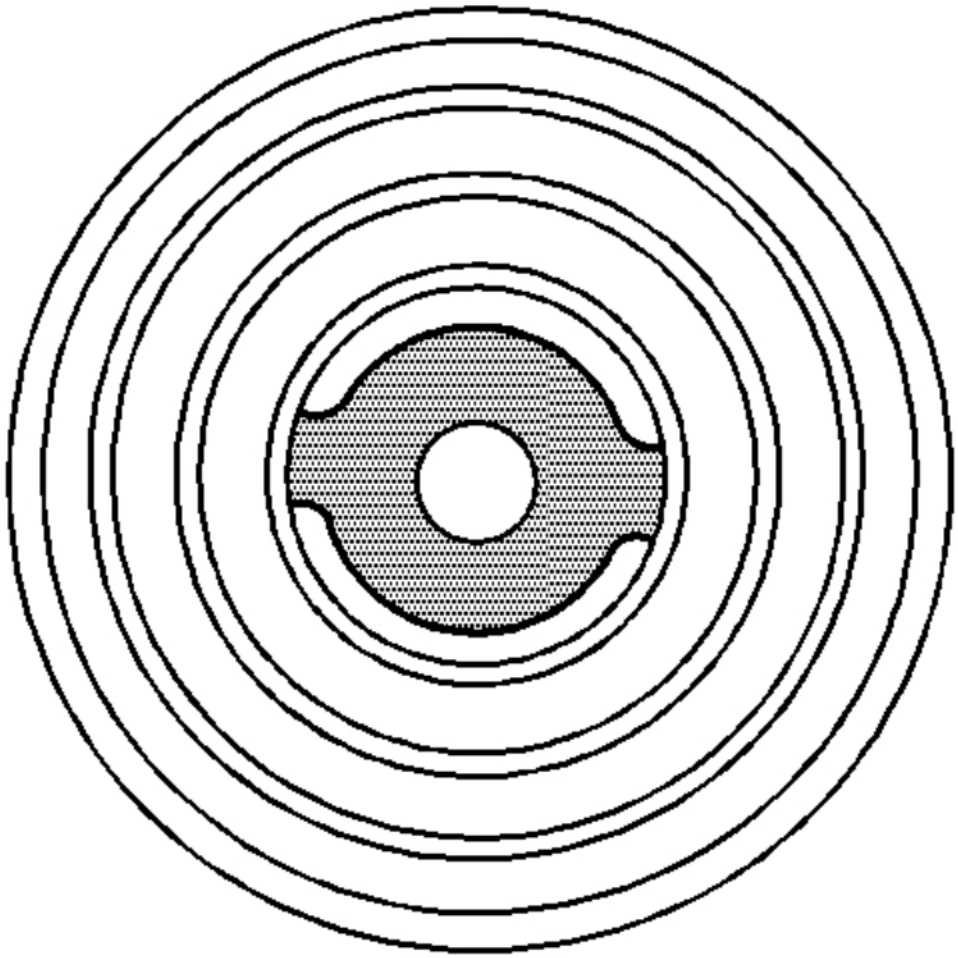


Fig. 137: View Of J 45754-3 Over Inner Pinion Bearing Cup
Courtesy of GENERAL MOTORS CORP.

37. Install the forcing screw (1) of the J 45754 into the J 45754-3 (2).

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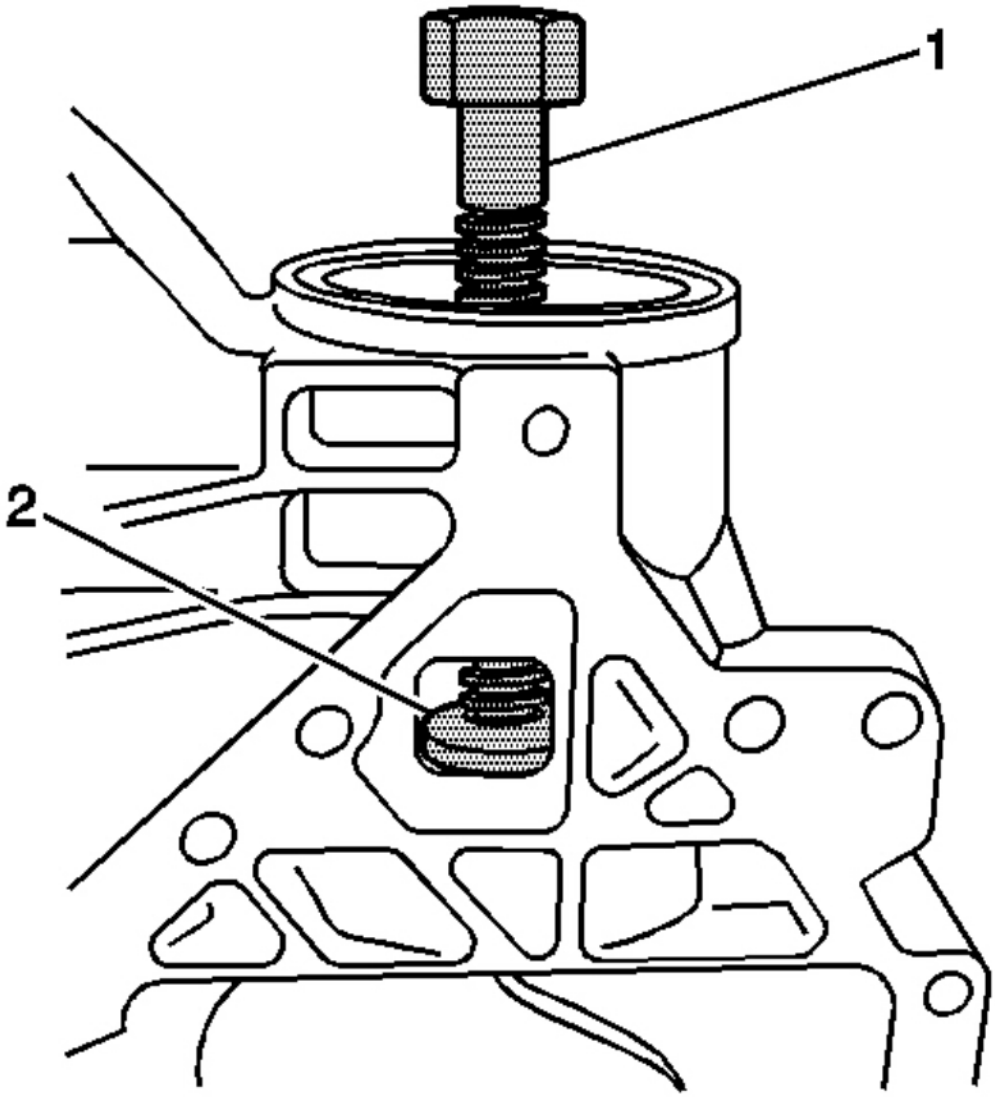


Fig. 138: View Of Forcing Screw Installed Into J 45754-3
Courtesy of GENERAL MOTORS CORP.

38. Drive out the inner pinion bearing cup by pounding on the forcing screw with a hammer.
39. Install the J 45754-2 (2) and the forcing screw (1) over the outer pinion bearing cup bore.

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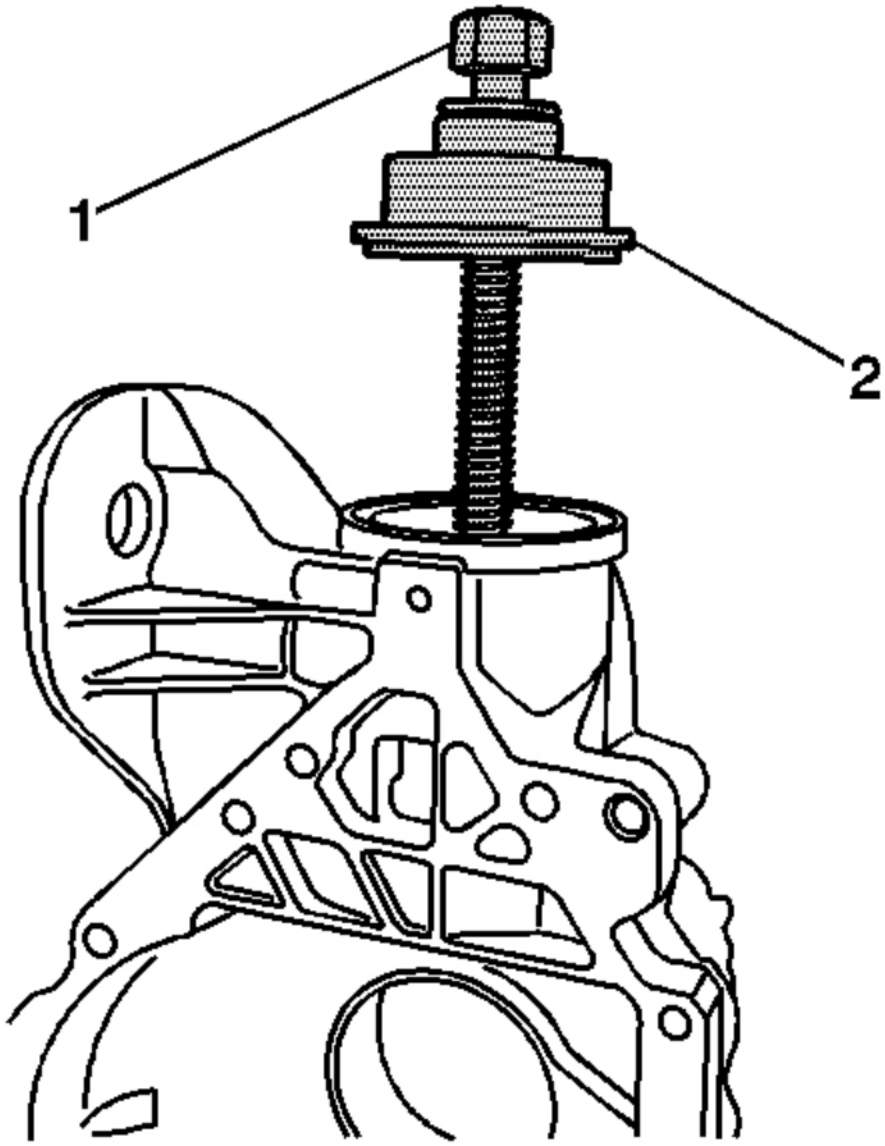


Fig. 139: View Of J 45754-2 & Forcing Screw Installed Over Outer Pinion Bearing Cup Bore
Courtesy of GENERAL MOTORS CORP.

40. Install the J 45754-4 (3) into the pinion bearing bore behind the outer pinion bearing cup.

    Slowly turn the forcing screw (1) until the J 45754-4 is evenly seated behind the outer pinion bearing cup bore and the J 45754-2 (2) is evenly seated over the outer pinion bearing cup bore.

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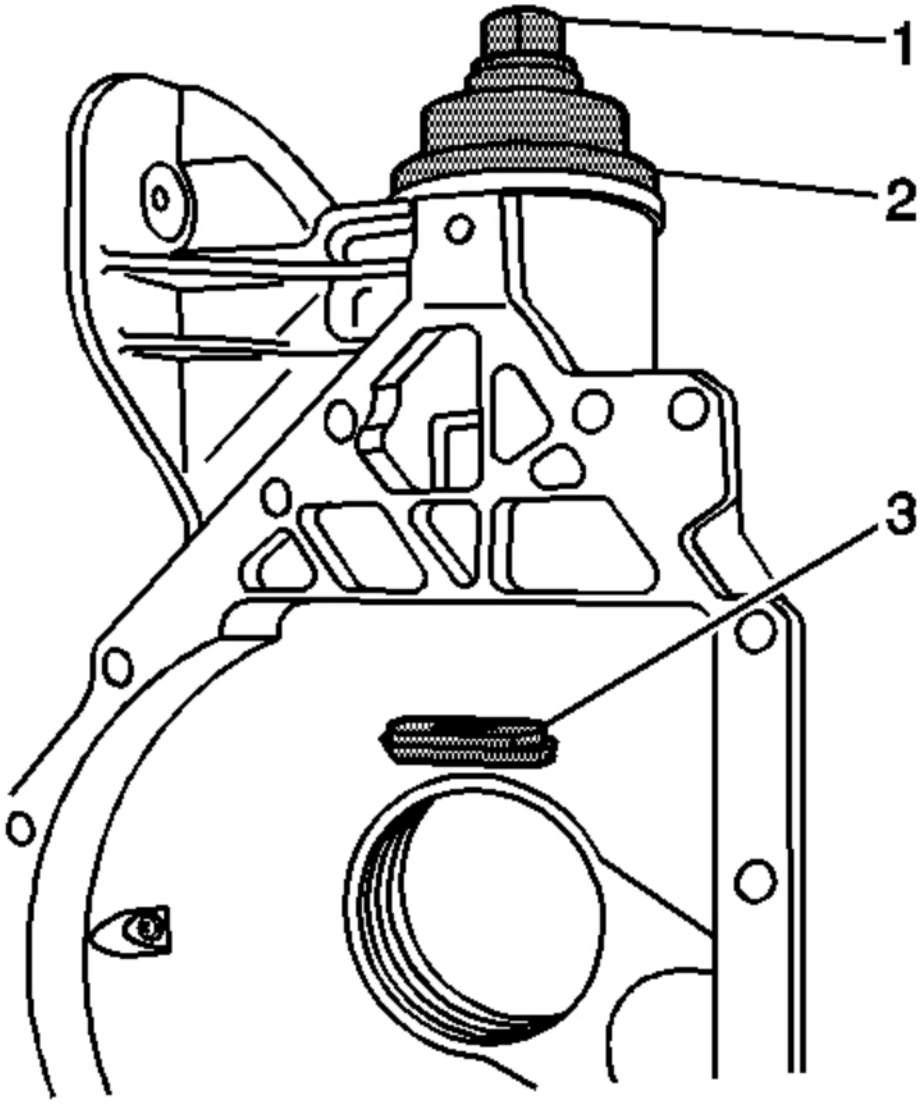


Fig. 140: View Of J 45754-4 Installed In Pinion Bearing Bore
Courtesy of GENERAL MOTORS CORP.

41. Remove the outer pinion bearing cup by turning the forcing screw clockwise.
42. Install the **J 22912-01** between the pinion bearing and the drive pinion.
43. Remove the inner pinion bearing using the **J 22912-01** and a hydraulic press.

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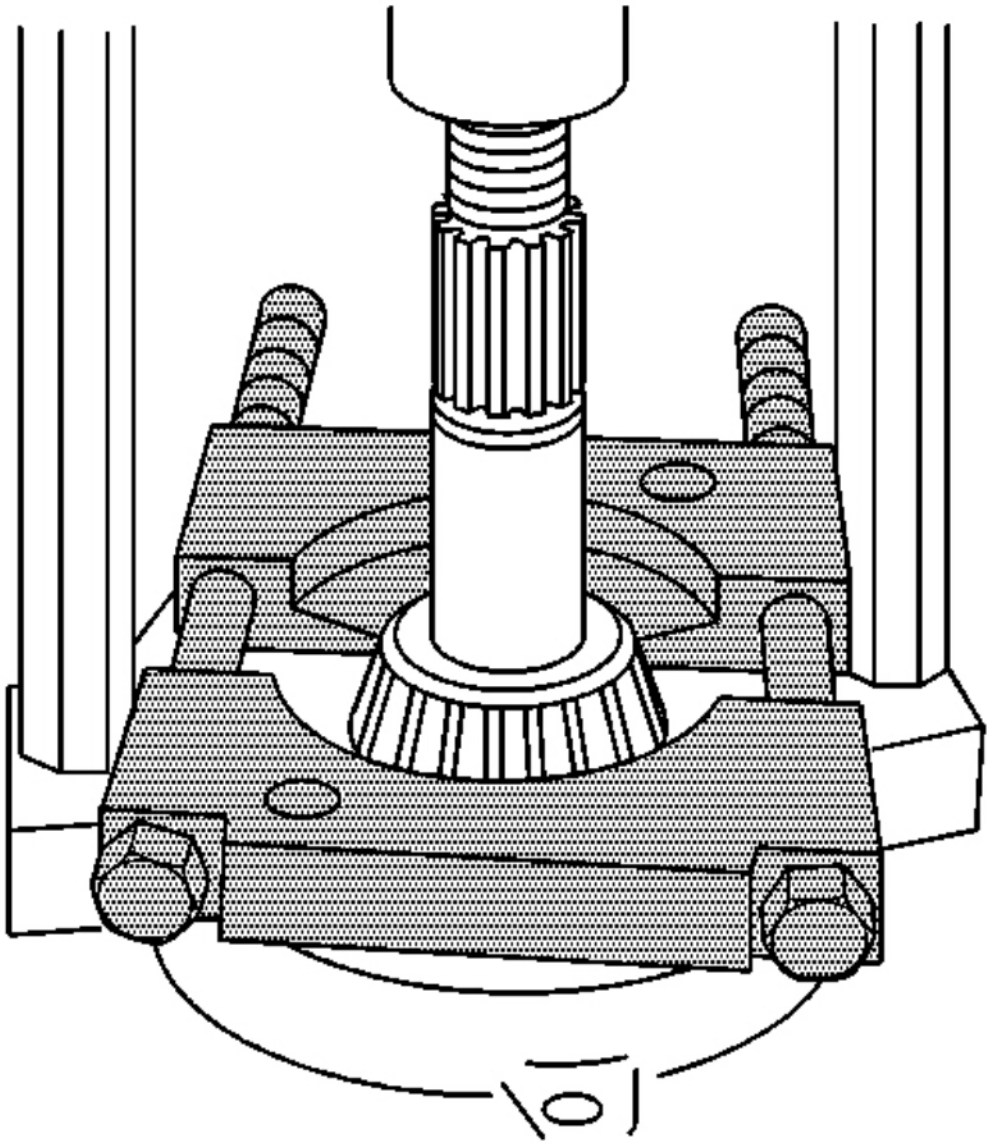


Fig. 141: Removing Inner Pinion Bearing Using Hydraulic Press
Courtesy of GENERAL MOTORS CORP.

44. Remove the pinion gear selectable shim.

DIFFERENTIAL CARRIER ASSEMBLY - DISASSEMBLE (8.25 INCH AXLES)

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Tools Required

- **J 22912-01** Split-Plate Bearing Puller. See **Special Tools and Equipment**.
- **J 2619-01** Slide Hammer
- **J 29369-1** Bushing and Bearing Remover
- **J 33791** Carrier Bushing Remover/Installer
- **J 34011** Pilot Bearing Remover
- **J 36598** Holding Fixture
- **J 36599-A** Side Bearing Nut Wrench
- **J 36616** Axle Mount Bushing Remover/Installer
- **J 45765** Pinion Remover
- **J-45858** Front Axle Bearing Race Remover/Installer - 8.25 Inch Axle
- **J 8614-01** Flange and Pulley Holding Tool

Inspection Procedure

Perform the following before disassembling the axle:

1. Remove the drain plug from the axle.
2. Drain the axle lubricant.
3. Inspect the oil and the case for metal chips.

   Determine the source of the metal chips, such as a broken gear or bearing cage.

4. Check the ring gear backlash. Refer to **Backlash Inspection and Adjustment**.

This information can be used in order to determine the cause of the axle problem. The information will also help when setting up and preloading the differential case.

Determine the cause of the axle problem before disassembly, if possible.

Disassembly Procedure

1. Remove the upper differential carrier assembly bushing by performing the following steps:
   A. Install the J 36616-2 (1), the J 33791-1 (2), the thrust bearing (3), the J 21474-18 (4), and the forcing screw as shown.
   B. Remove the upper differential carrier assembly bushing by holding the forcing screw and tightening the J 21474-18.

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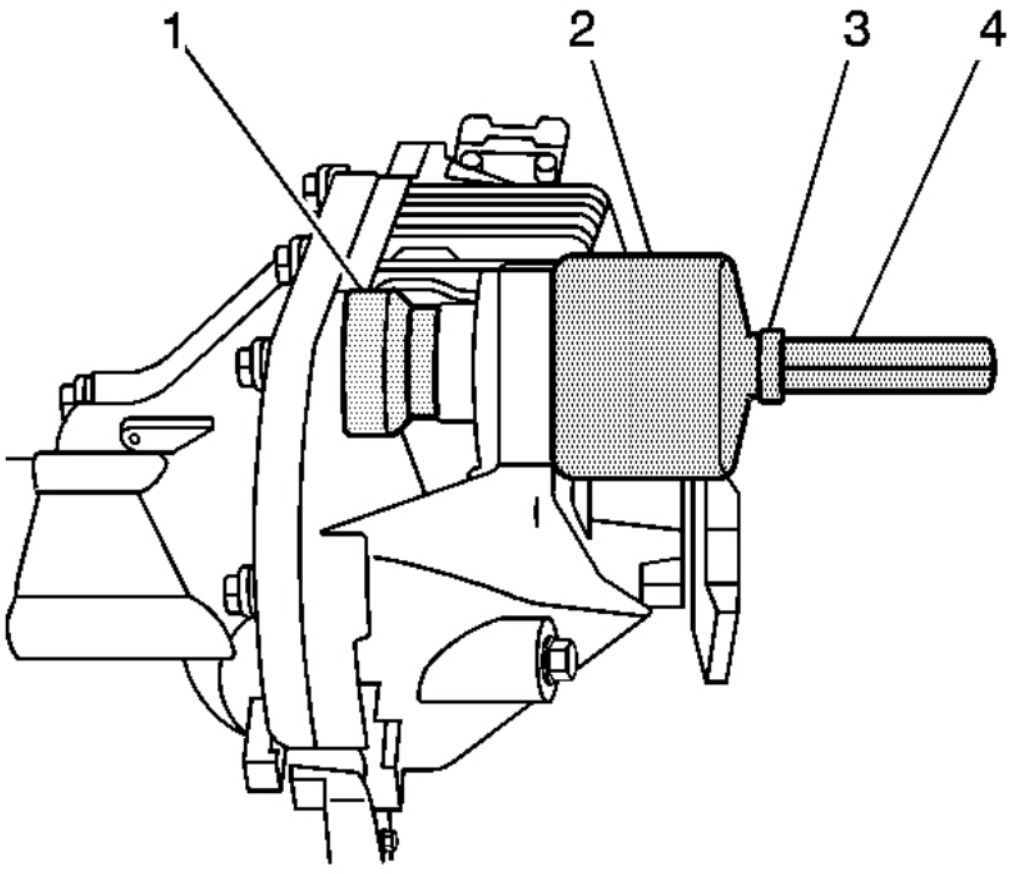


Fig. 142: Removing Upper Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

2. Remove the lower differential carrier assembly bushing by performing the following steps:
   A. Install the J 21474-18 (1), the thrust bearing (2), the J 33791-1 (3), the J 36616-2 (4), and the forcing screw as shown.
   B. Remove the lower differential carrier assembly bushing by holding the forcing screw and tightening the J 21474-18.

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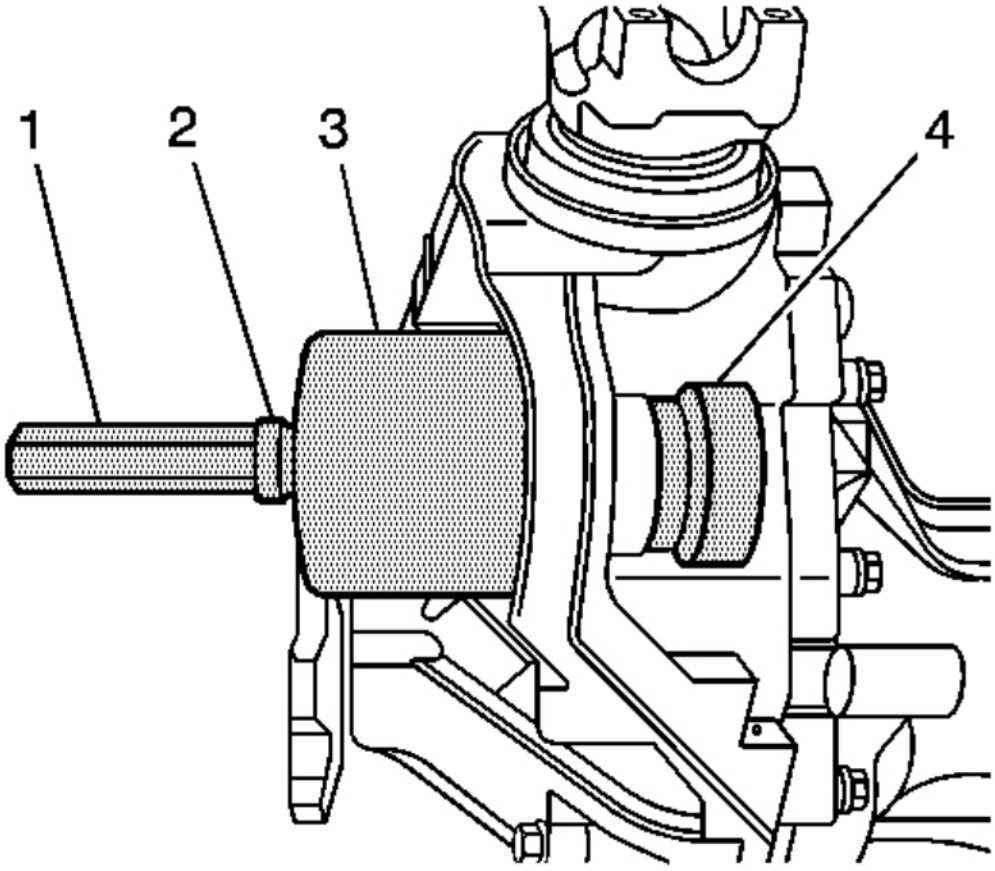


Fig. 143: Removing Lower Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

3. Remove the front axle actuator, S4WD axle only.
4. Disconnect the right side inner axle shaft from the differential side gear using a hammer and a brass drift, F4WD axle only.
5. Remove the inner axle shaft, F4WD axle only.
6. Remove the inner axle shaft housing to differential carrier assembly bolts.
7. Remove the inner axle shaft housing, F4WD axle only.

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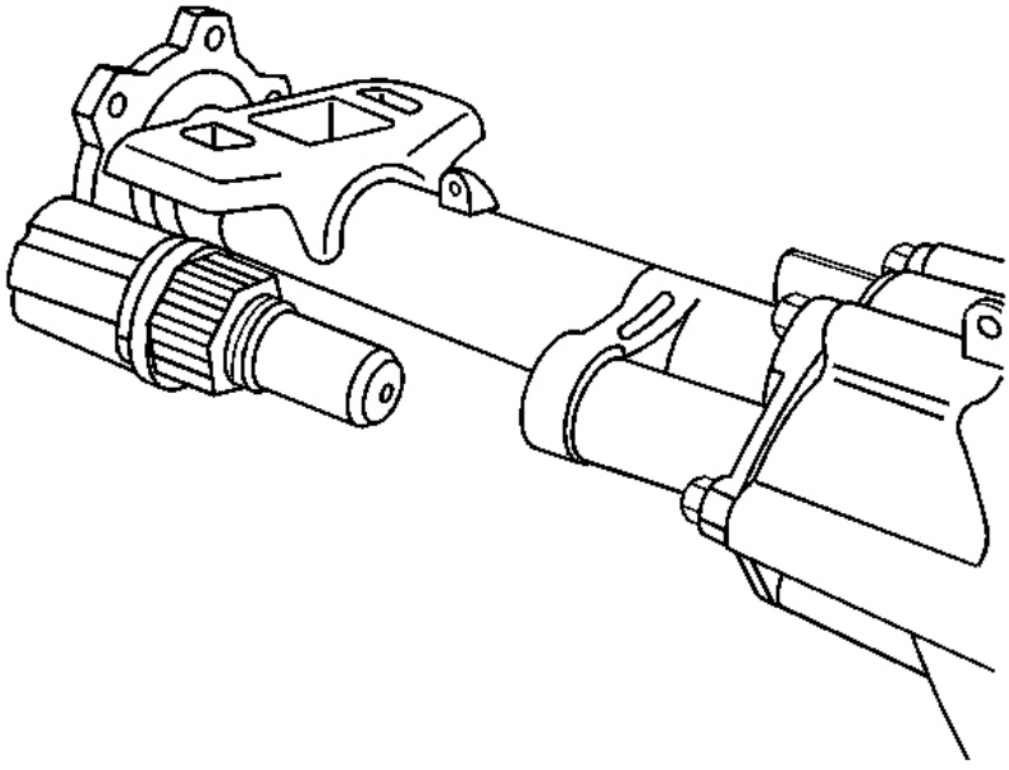


Fig. 144: View Of Front Axle Actuator
Courtesy of GENERAL MOTORS CORP.

8. Carefully remove the inner axle shaft housing with the inner axle shaft and clutch fork components from the differential carrier assembly, S4WD axle only.

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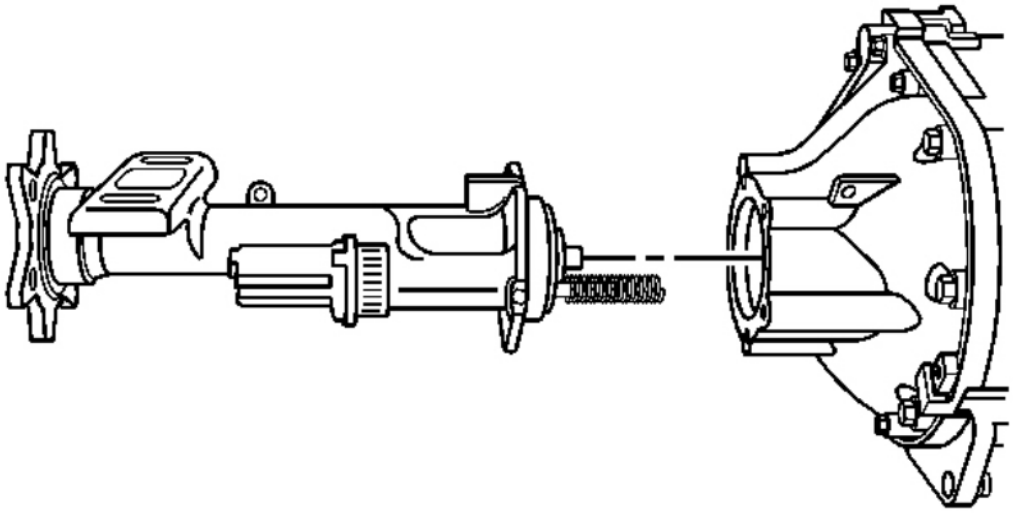


Fig. 145: View Of Inner Axle Shaft Housing Assembly To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

9. Remove the following components from the inner axle shaft housing, S4WD axle only:
   A. The clutch fork inner spring (10)
   B. The clutch fork assembly (11)
   C. The clutch shaft shim (9)
   D. The clutch shaft sleeve (8)
   E. The front drive axle clutch gear (6) by doing the following:
      1. Clamp the inner axle shaft housing (4) in a vise.

         Clamp only on the mounting flange.

      2. Strike the inside surface of the shaft (1) flange with a hammer and a brass drift in order to dislodge the front drive axle clutch gear (6) from the inner axle shaft (1).
   F. Remove the front drive axle clutch gear (6)
   G. Remove the thrust washer (5)
   H. Remove the inner axle shaft (1)

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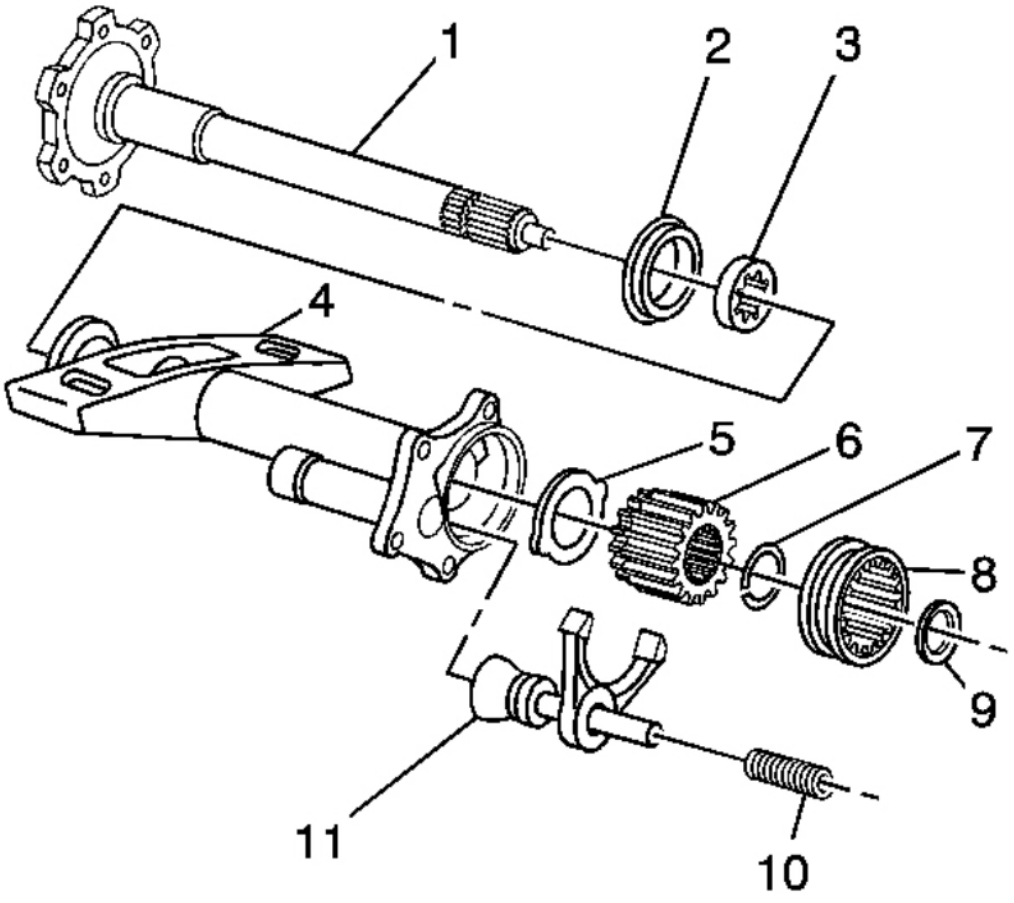


Fig. 146: Exploded View Of Inner Axle Shaft Housing (8.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

10. Remove the inner axle shaft bearing and the inner axle shaft seal by performing the following steps:
    A. Install the inner axle shaft housing into a vise.

       Clamp only on the mounting flange of the inner axle shaft housing.

    B. Install the **J 29369-1** (1) behind the inner axle shaft bearing.
    C. Install the **J 2619-01** (2) to the **J 29369-1** (1).
    D. Remove the inner axle shaft bearing and the seal using the **J 2619-01** .

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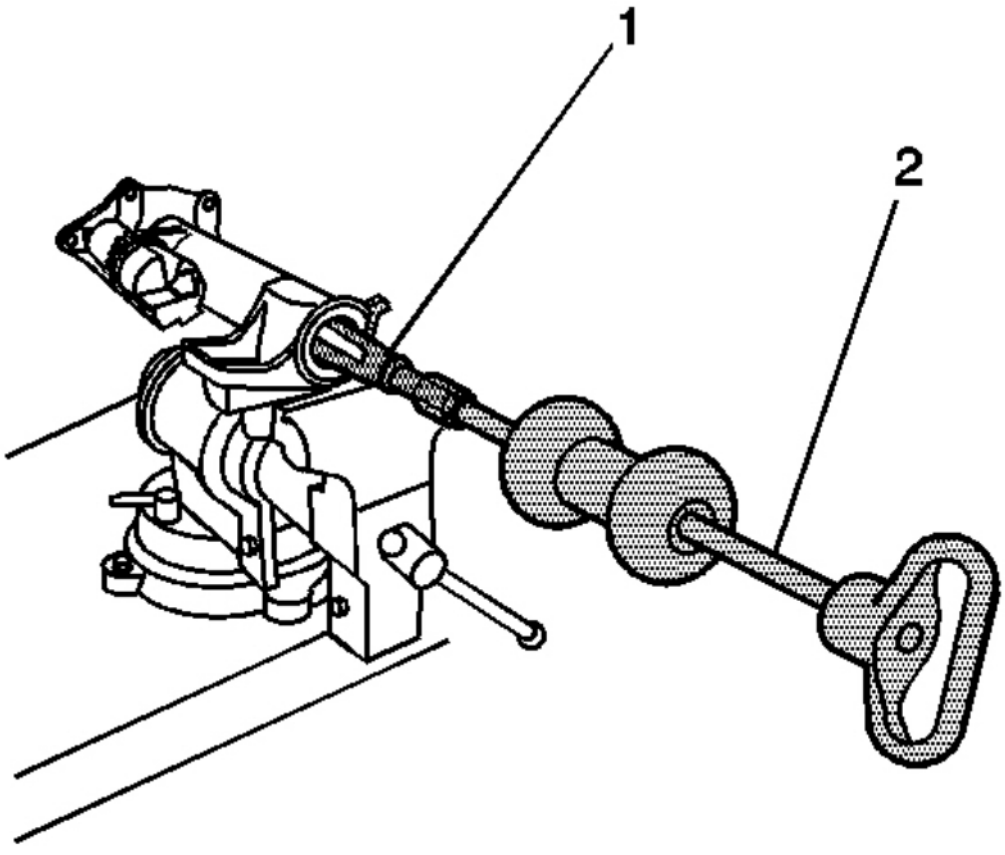


Fig. 147: Installing J 2619-01 To J 29369
Courtesy of GENERAL MOTORS CORP.

11. Remove the inner axle shaft bearing and the inner axle shaft seal by performing the following steps:
    A. Place the differential carrier assembly into a vise.

       Clamp only on the mounting flange of the differential carrier assembly case.

    B. Install the **J 29369-1** (1) behind the inner axle shaft bearing.
    C. Install the **J 2619-01** (2) to the **J 29369-1** .
    D. Remove the inner axle shaft bearing and the inner axle shaft seal using the **J 2619-01** .

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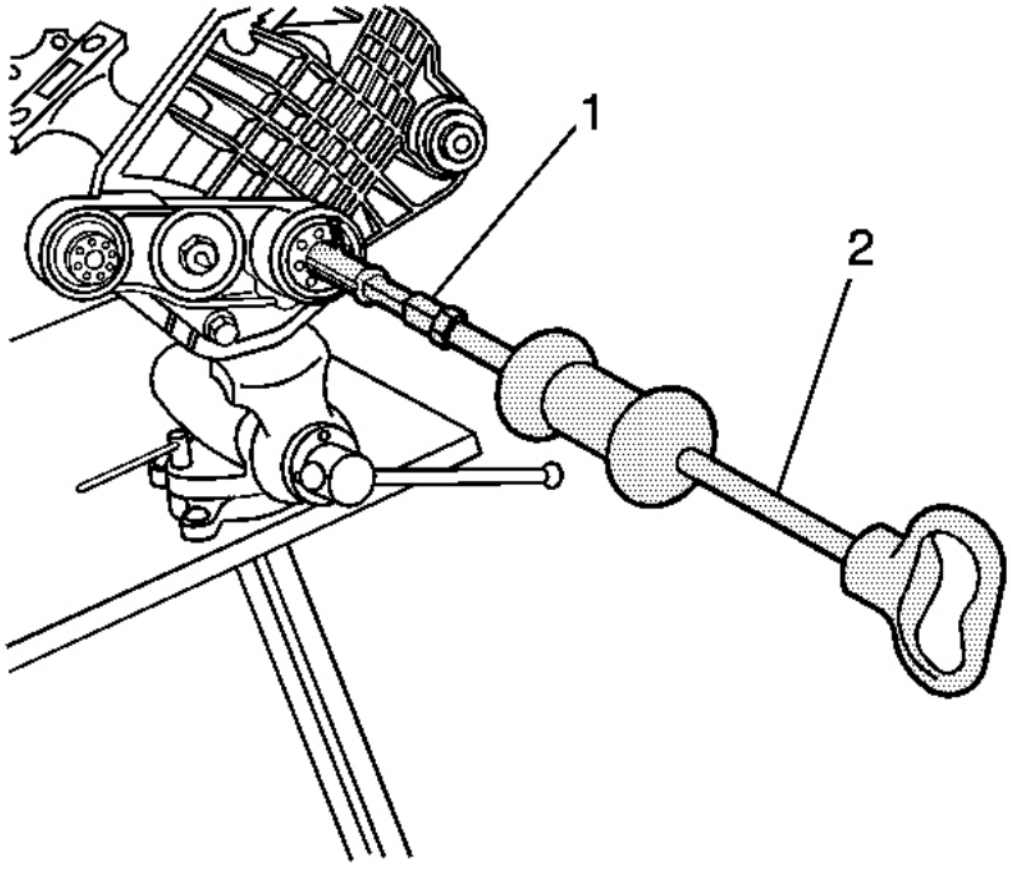


Fig. 148: Removing Inner Axle Shaft Seal & Bearing Using J 29369 & J 2619-01
Courtesy of GENERAL MOTORS CORP.

12. Remove the differential carrier assembly from the vise.
13. Remove the front drive axle clutch shaft, S4WD axle only.
14. Use the **J 34011** in order to remove the clutch shaft bearing, S4WD axle only.

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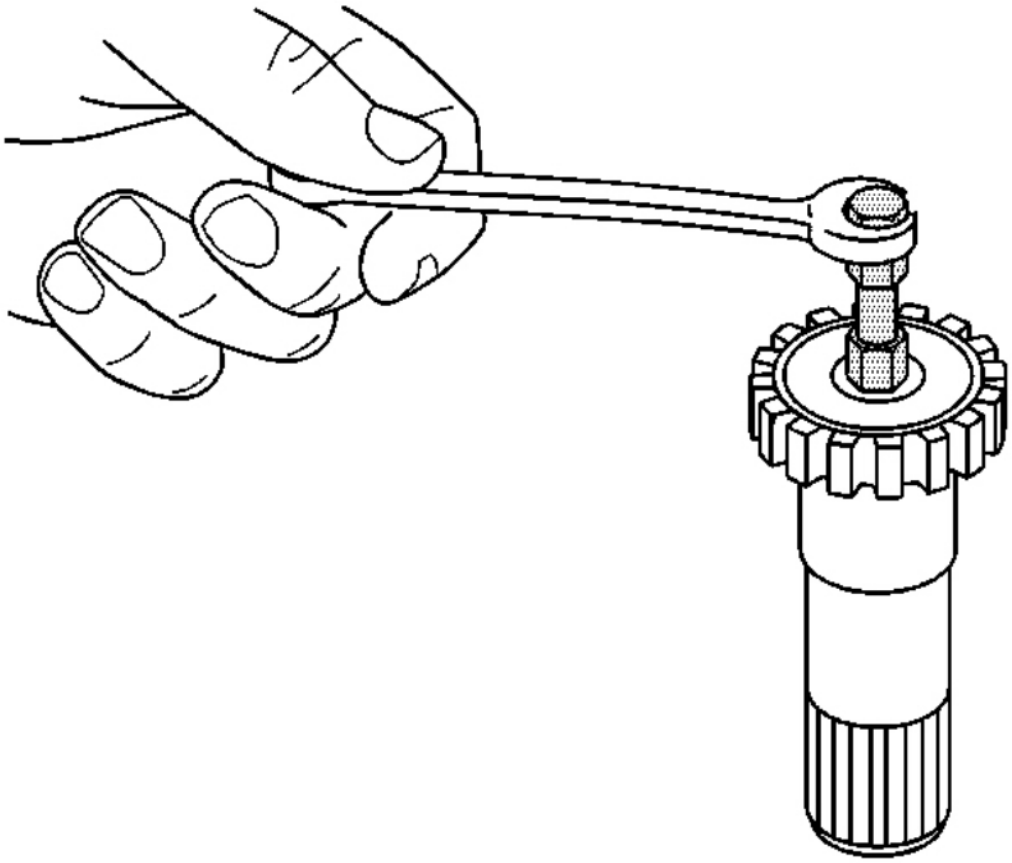


Fig. 149: Removing Clutch Shaft Pilot Bearing Using J 34011
Courtesy of GENERAL MOTORS CORP.

15. Remove the vent connector.

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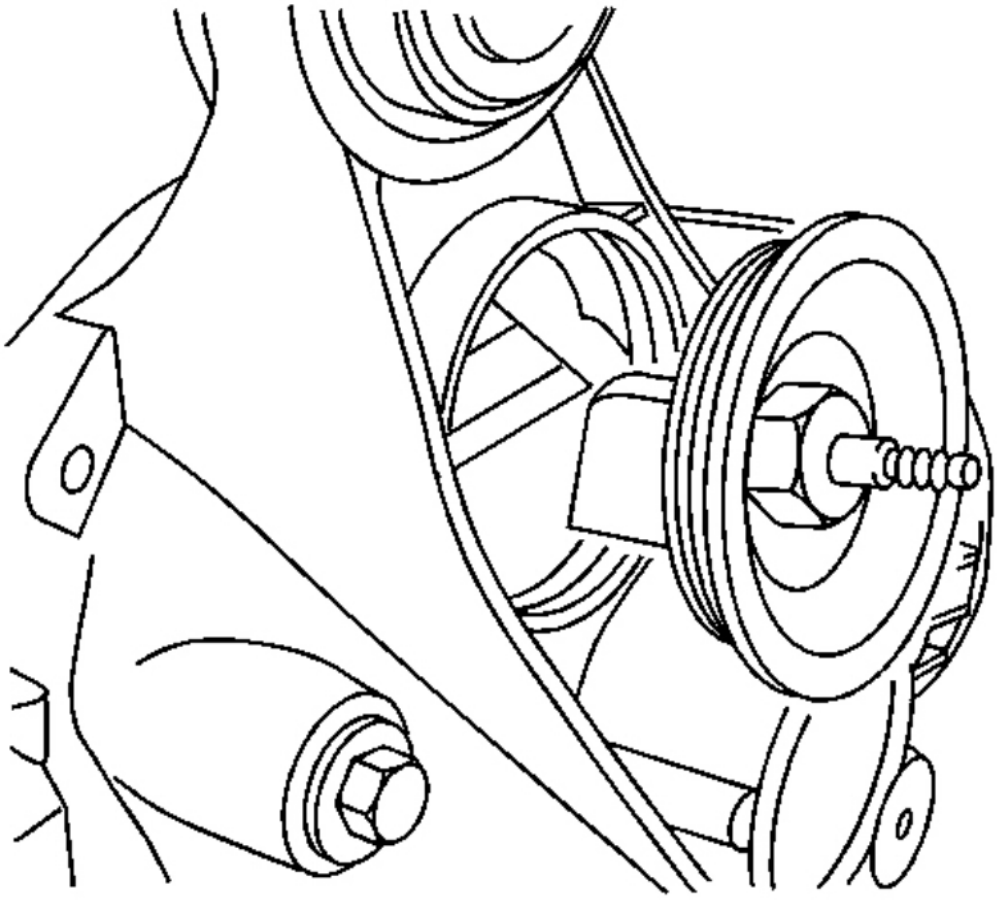


Fig. 150: View Of Vent Hose Connector
Courtesy of GENERAL MOTORS CORP.

16. Remove the differential carrier assembly bolts.

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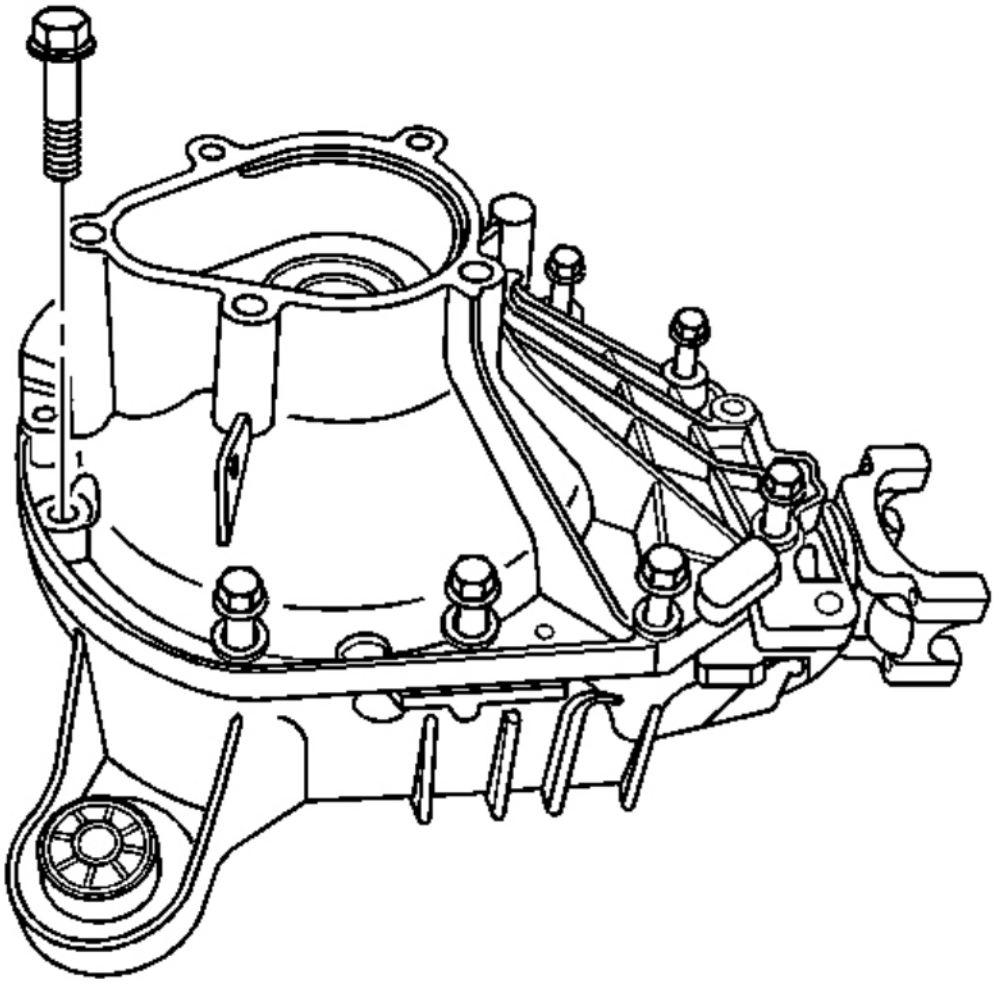


Fig. 151: View Of Differential Carrier Assembly Bolts
Courtesy of GENERAL MOTORS CORP.

17. Separate the left carrier case half from the right carrier case half by tapping on the on the carrier case with a hammer and a brass drift.
18. Remove the differential case assembly.

Disconnect the differential bearing adjuster nut locks from the differential bearing adjuster nut by prying up on the locks, S4WD axle - both sides, F4WD axle - left side.

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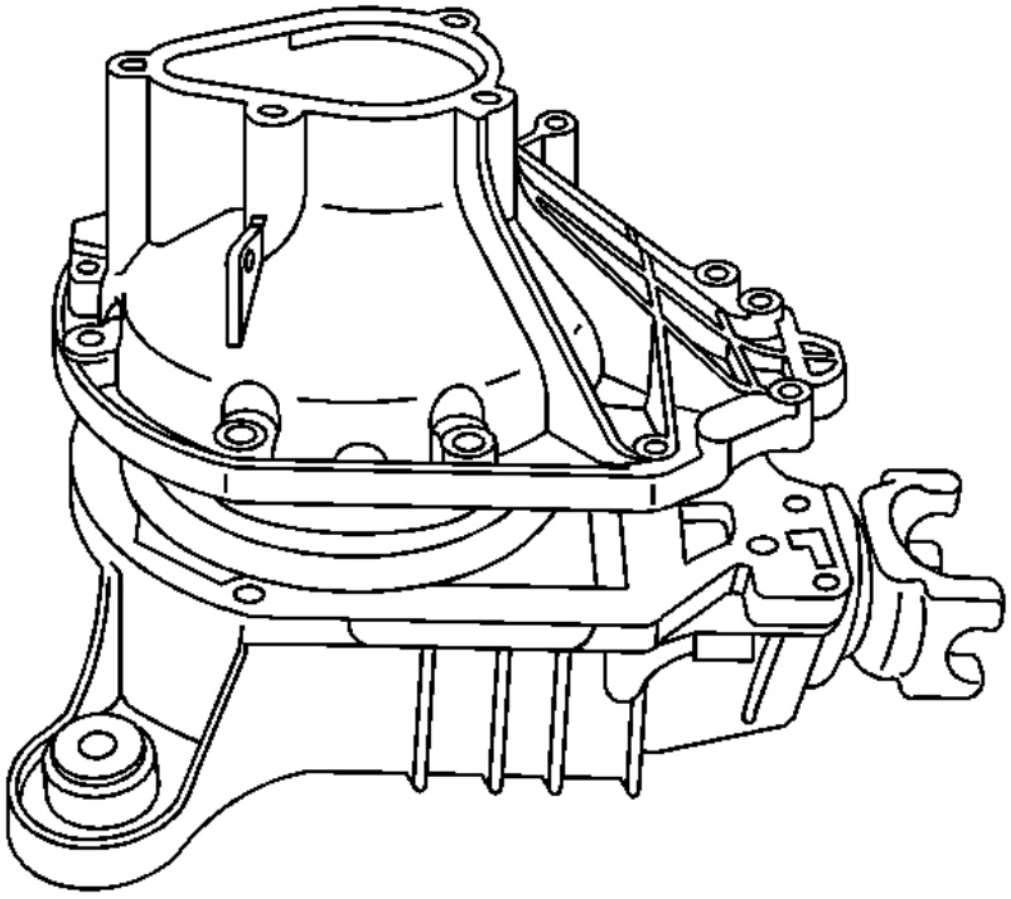


Fig. 152: View Of Right Differential Carrier Case Half To Left Differential Carrier Case Half
Courtesy of GENERAL MOTORS CORP.

19. Remove the differential bearing adjuster nuts and the differential bearing cups by doing the following, S4WD axle - both sides, F4WD axle - left side:
    1. Install the **J 36599-A** onto the differential bearing adjuster nut.
    2. Turn the **J 36599-A** clockwise in order to push the differential bearing adjuster nut and the bearing cup out of the bore.

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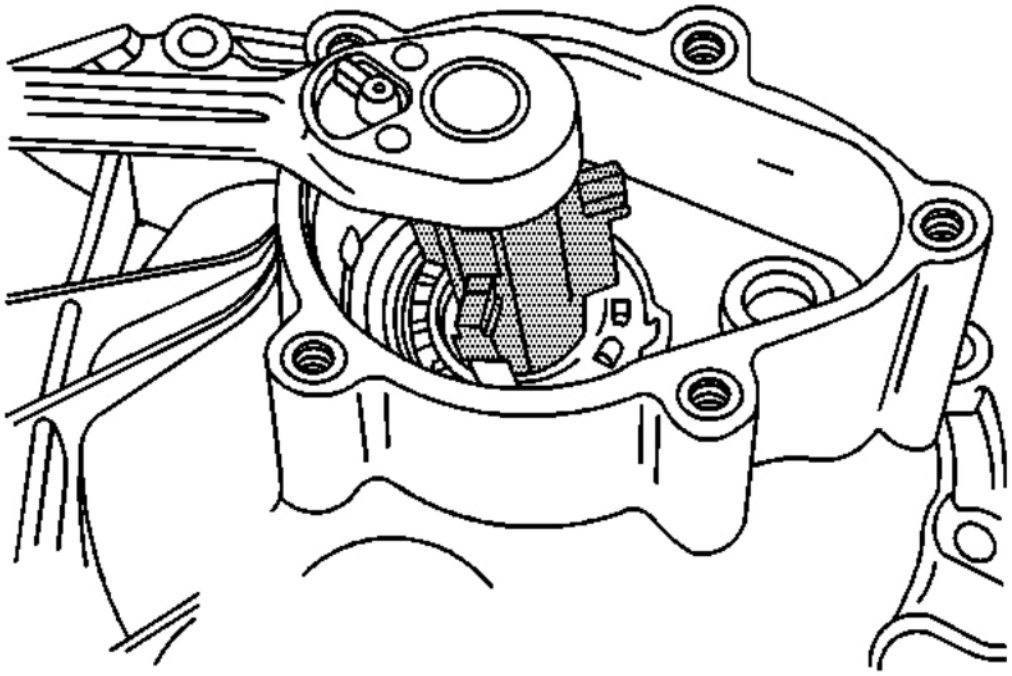


Fig. 153: View Of J 36599-A On Right Side Differential Bearing Adjuster Nut
Courtesy of GENERAL MOTORS CORP.

20. Remove the differential bearing adjuster nut sleeves using a hammer and brass drift, S4WD axle - both sides, F4WD axle - left side.
21. Install the **J 8614-01** as shown.

    Remove the pinion nut while holding the **J 8614-01** .

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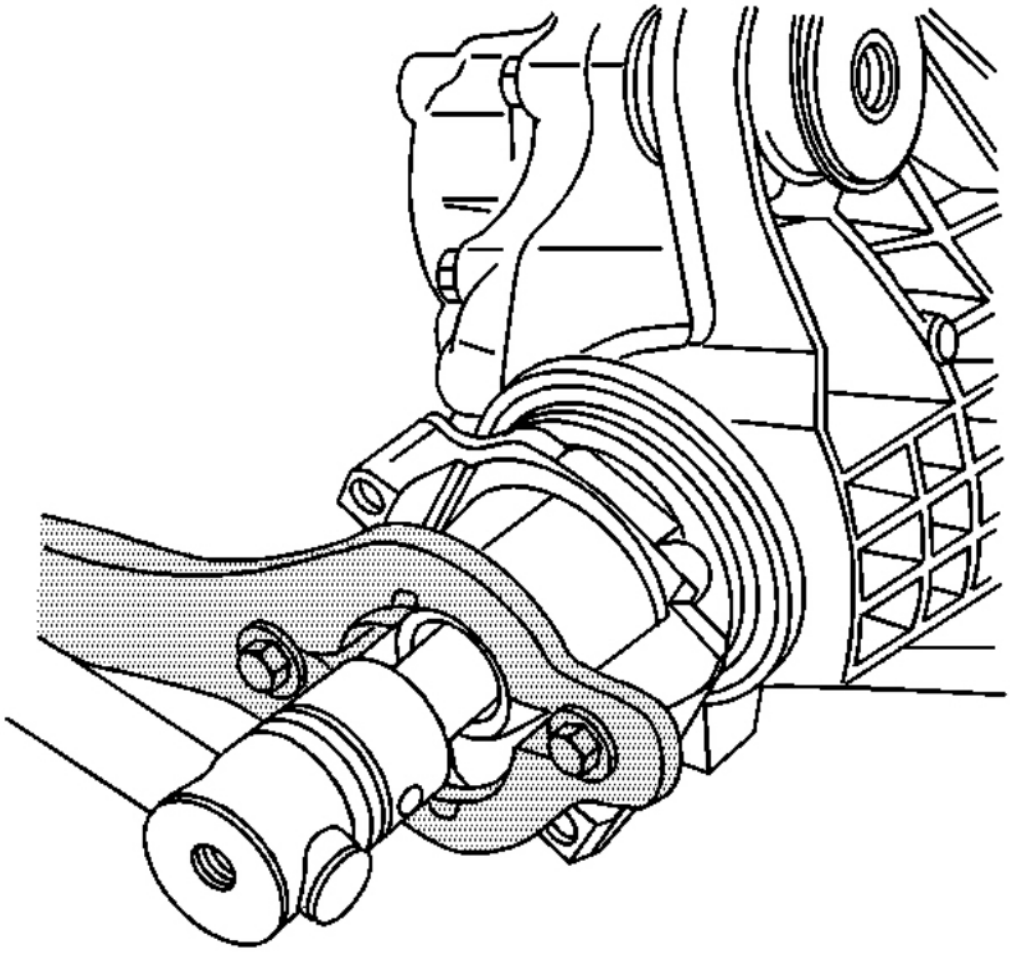


Fig. 154: Holding Pinion Flange Using Special Tool
Courtesy of GENERAL MOTORS CORP.

22. Remove the washer.
23. Install the J 8614-2 (2) and the J 8614-3 (3) into the **J 8614-01** (1) as shown.
24. Remove the pinion yoke by turning the J 8614-3 (3) clockwise while holding the **J 8614-01** (1).

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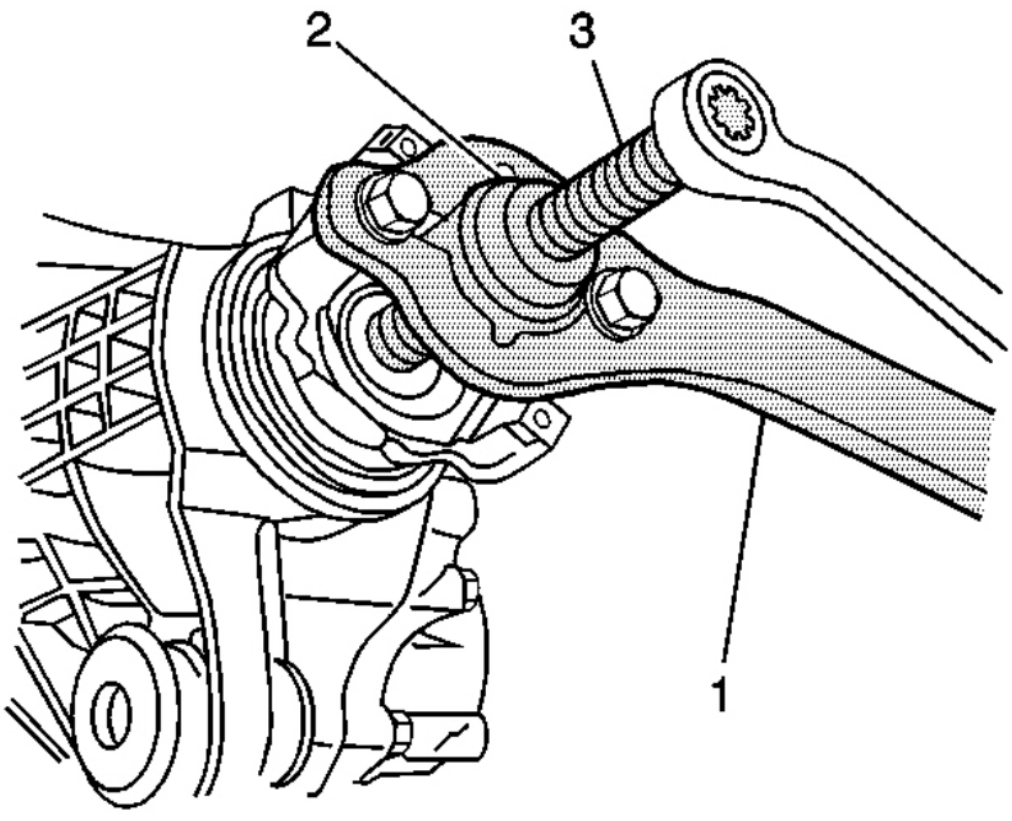


Fig. 155: Removing Pinion Yoke
Courtesy of GENERAL MOTORS CORP.

25. The steps below explain how to remove the drive pinion and pinion bearing cups using the **J 36598** or the **J 45765** and the **J-45858** . Follow the appropriate steps depending on what tool is available.
26. Install the **J 36598** into a vise.
27. Install the left differential carrier case half onto the **J 36598** and the J 36598-6.
28. While holding the forcing screw of the **J 36598** , turn the handle of the **J 36598** counterclockwise in order to remove the pinion with the following components:
    - The pinion gear selectable shim
    - The inner pinion bearing
    - The collapsible spacer

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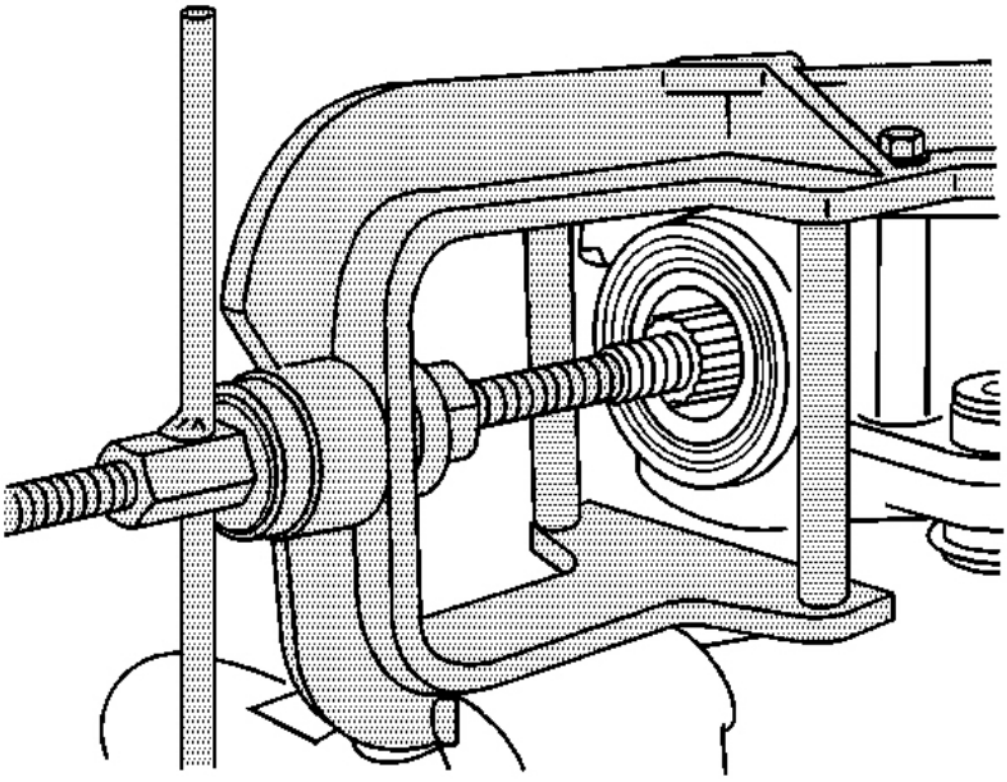


Fig. 156: Installing Left Differential Carrier Case Half Onto J 36598
Courtesy of GENERAL MOTORS CORP.

29. Install the J 36598-5 (3) behind the inner pinion bearing cup.
30. Thread the forcing screw of the **J 36598** (1) onto the J 36598-5 (3) until fully seated.
31. While holding the forcing screw of the **J 36598** (1), turn the handle of the **J 36598** (2) counterclockwise and press the inner bearing cup out from the differential carrier case.

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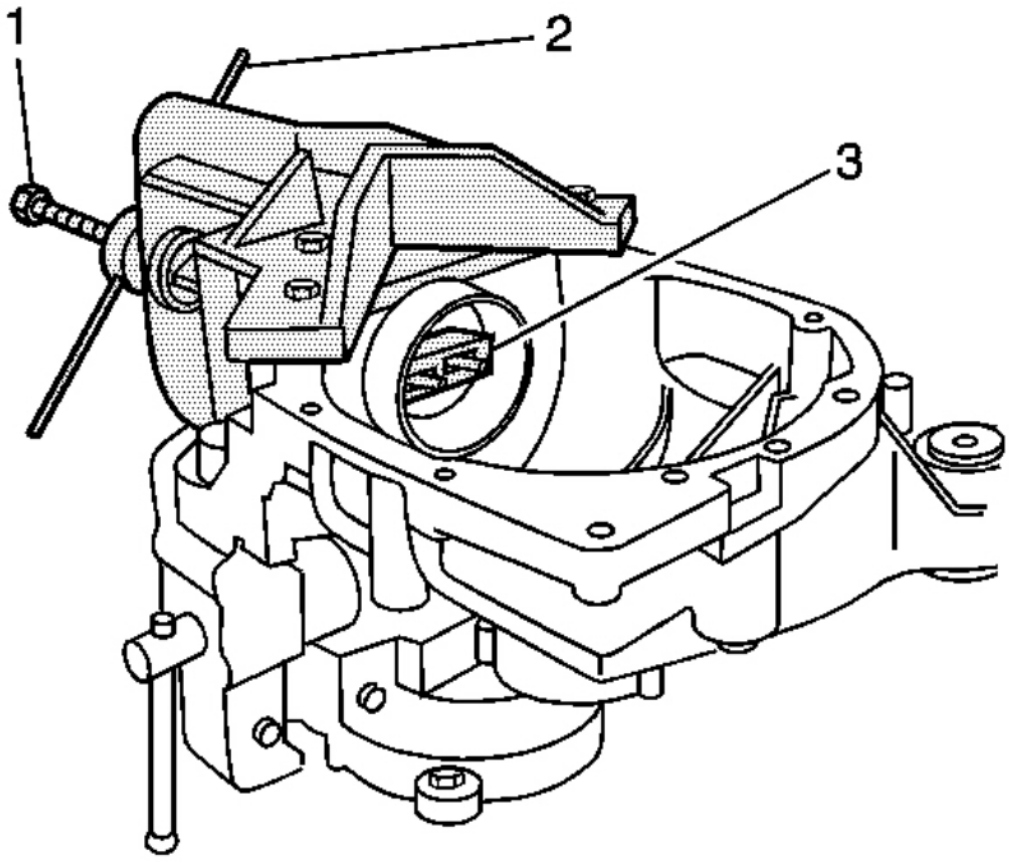


Fig. 157: Pressing Inner Bearing Cup Out From Differential Carrier Case
Courtesy of GENERAL MOTORS CORP.

32. Install the J 36598-5 (2) behind the outer pinion bearing cup.
33. Install the forcing screw of the **J 36598** (1) to the J 36598-5 (2).
34. While holding the forcing screw of the **J 36598** , turn the handle of the **J 36598** clockwise in order to remove the following components:
    - The pinion oil seal
    - The pinion outer bearing
    - The pinion outer bearing cup

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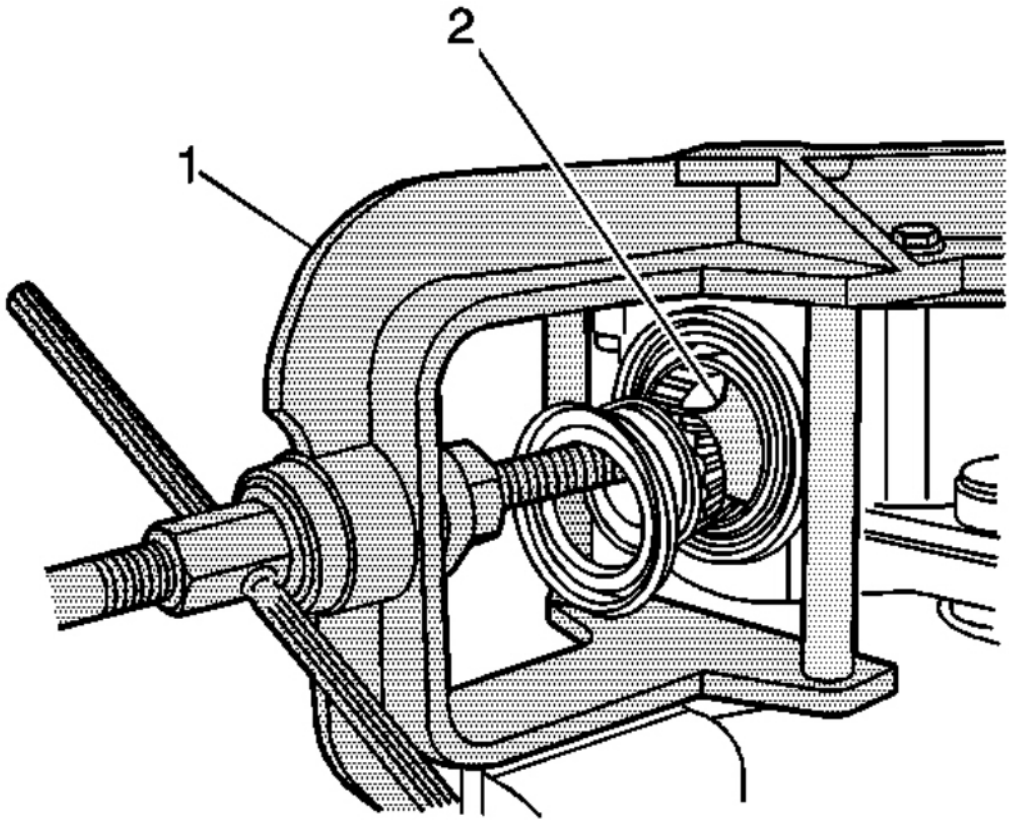


Fig. 158: Installing J 36598 To J 36598-5
Courtesy of GENERAL MOTORS CORP.

35. Install the **J 45765** to the left side differential carrier case half over the drive pinion as shown.

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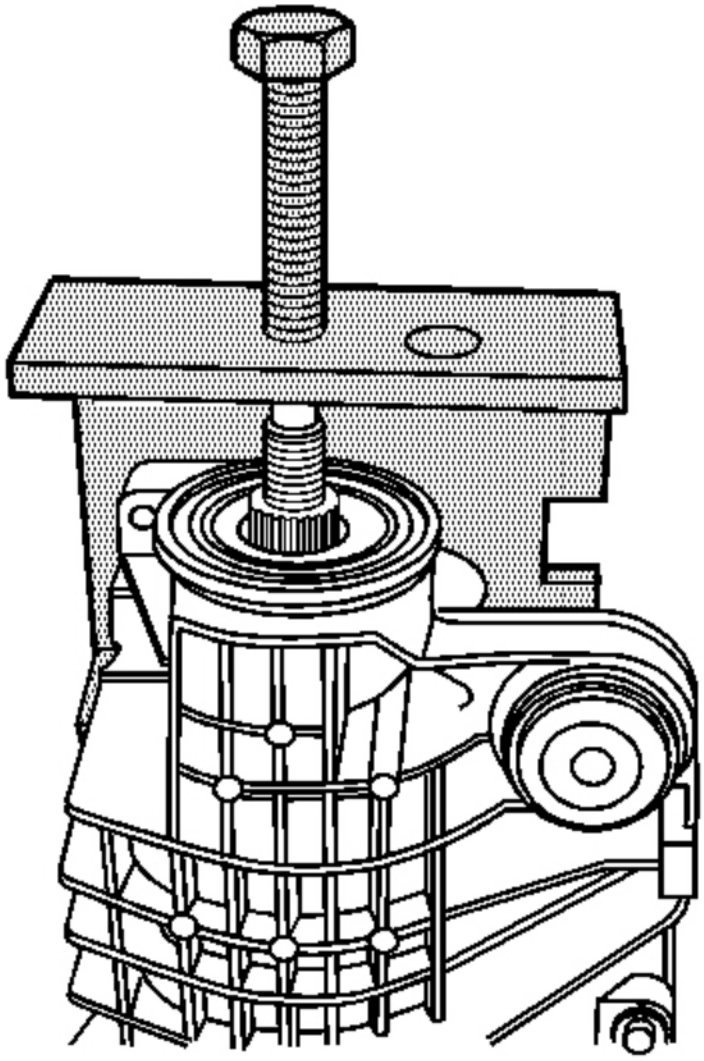


Fig. 159: Installing J 45765 To Left Side Differential Carrier Case Half Over Drive Pinion
Courtesy of GENERAL MOTORS CORP.

36. Turn the forcing screw of the **J 45765** clockwise to remove the following components from the left side differential carrier case half:
    - The drive pinion gear
    - The pinion gear selectable shim
    - The inner pinion bearing

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- The collapsible spacer

37. Remove the drive pinion seal using a suitable seal remover.
38. Remove the outer pinion bearing from the differential carrier case half.
39. Install the J 45858-4 over the inner pinion bearing cup.

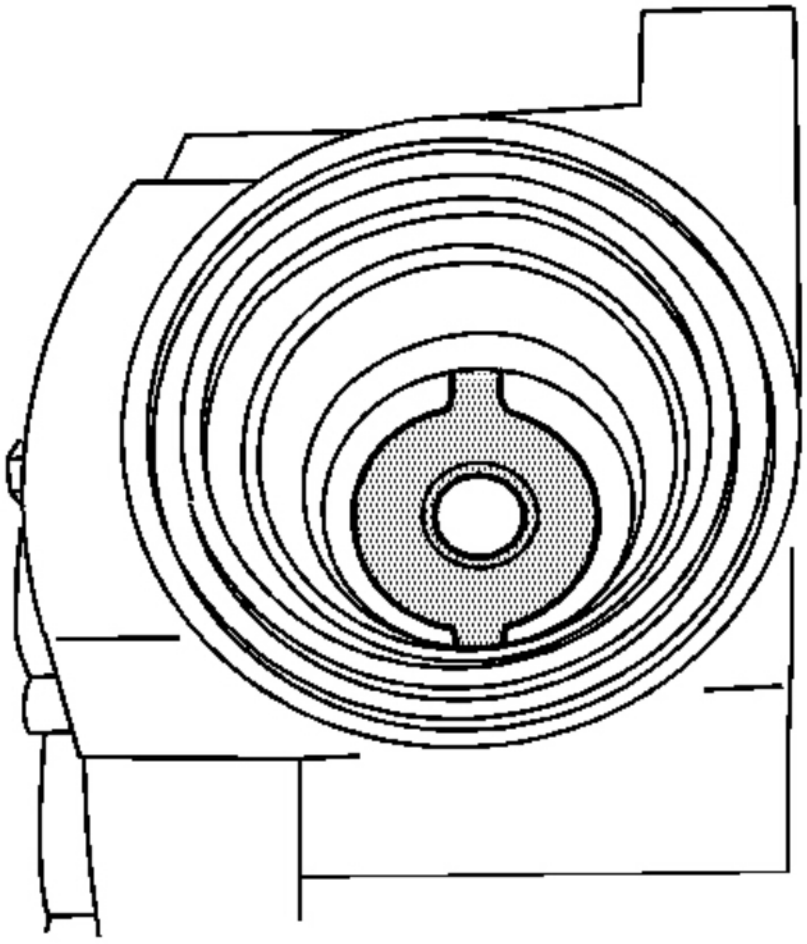


Fig. 160: Installing J 45858-4 Over Inner Pinion Bearing Cup
Courtesy of GENERAL MOTORS CORP.

40. Install the forcing screw (1) of the J 45858 into the J 45858-4 (2).
41. Drive out the inner pinion bearing cup by pounding on the forcing screw with a hammer.

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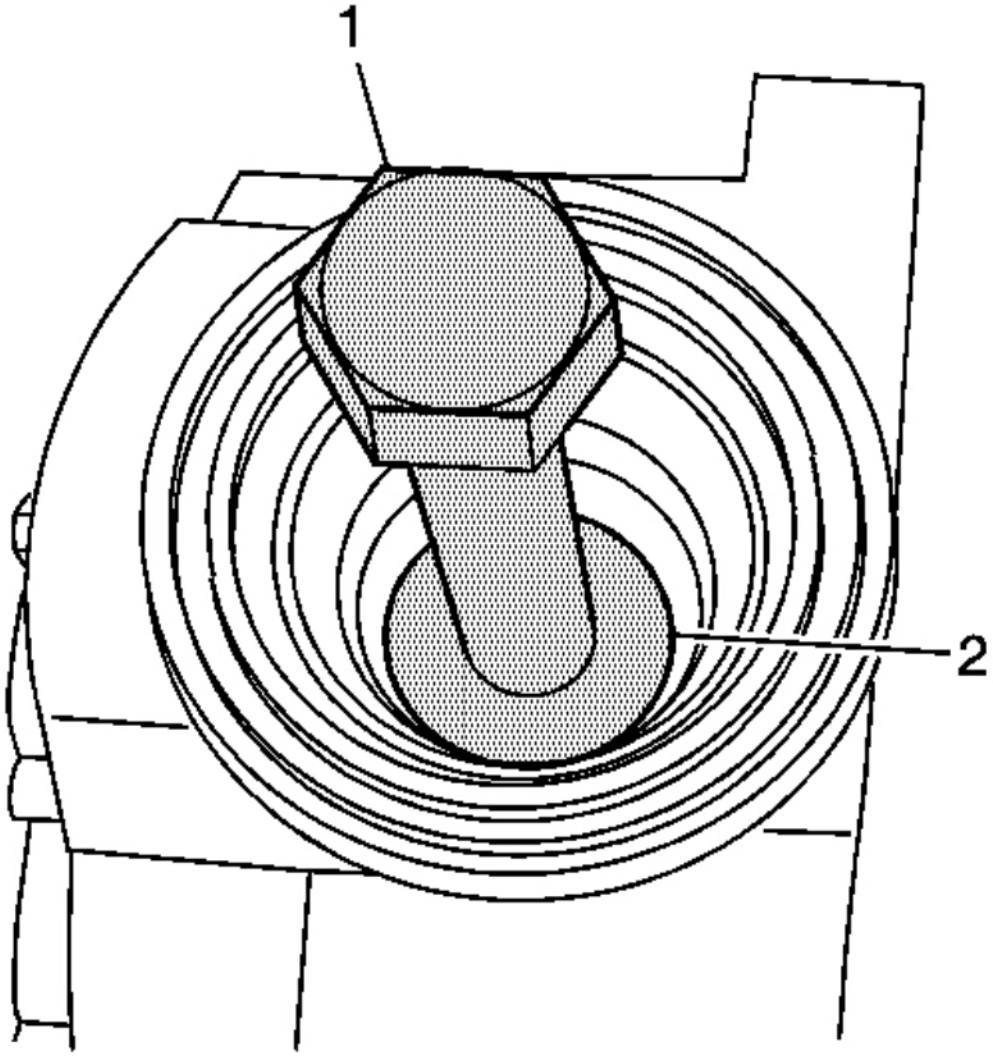


Fig. 161: Installing Forcing Screw Into J 45858-4
Courtesy of GENERAL MOTORS CORP.

42. Install the J 45858-3 (3), the thrust bearing and the washer (2), and the forcing screw (1) over the outer pinion bearing cup bore.

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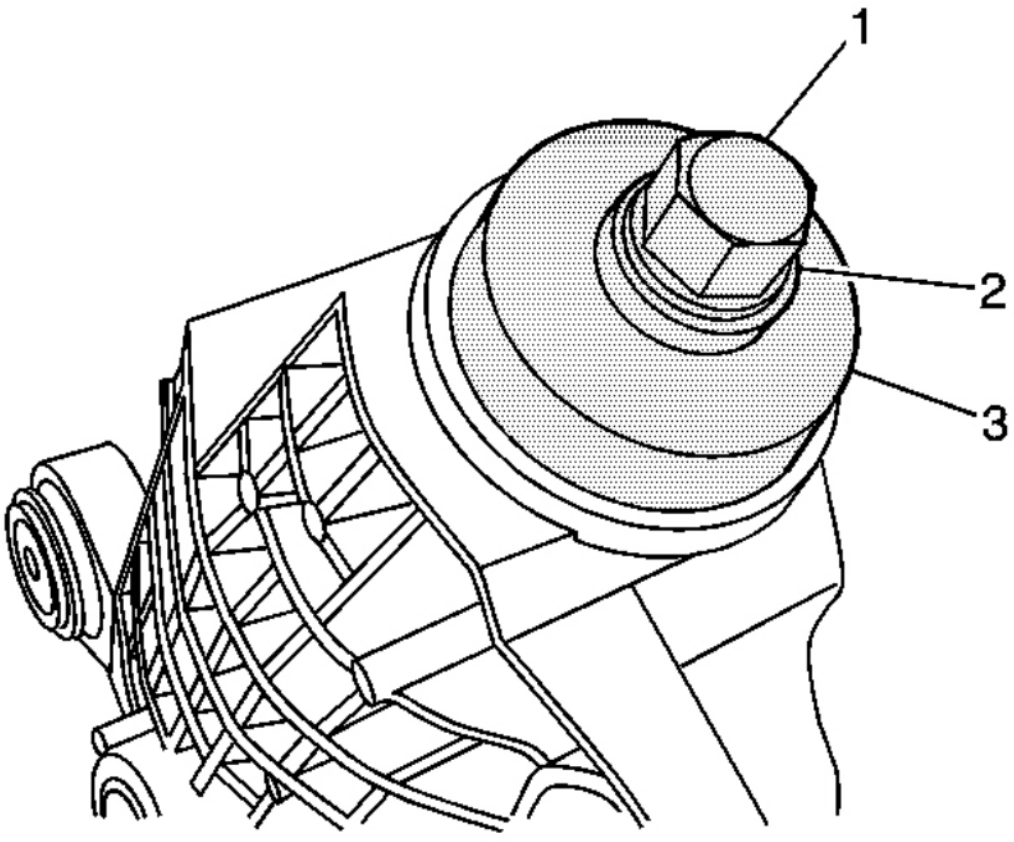


Fig. 162: Installing Special Tools Over Outer Pinion Bearing Cup Bore
Courtesy of GENERAL MOTORS CORP.

43. Install the J 45858-5 into the pinion bearing bore behind the outer pinion bearing cup.

    Slowly turn the forcing screw clockwise until the J 45858-5 is evenly seated behind the outer pinion bearing cup bore and the J 45858-3 is evenly seated over the outer pinion bearing cup bore.

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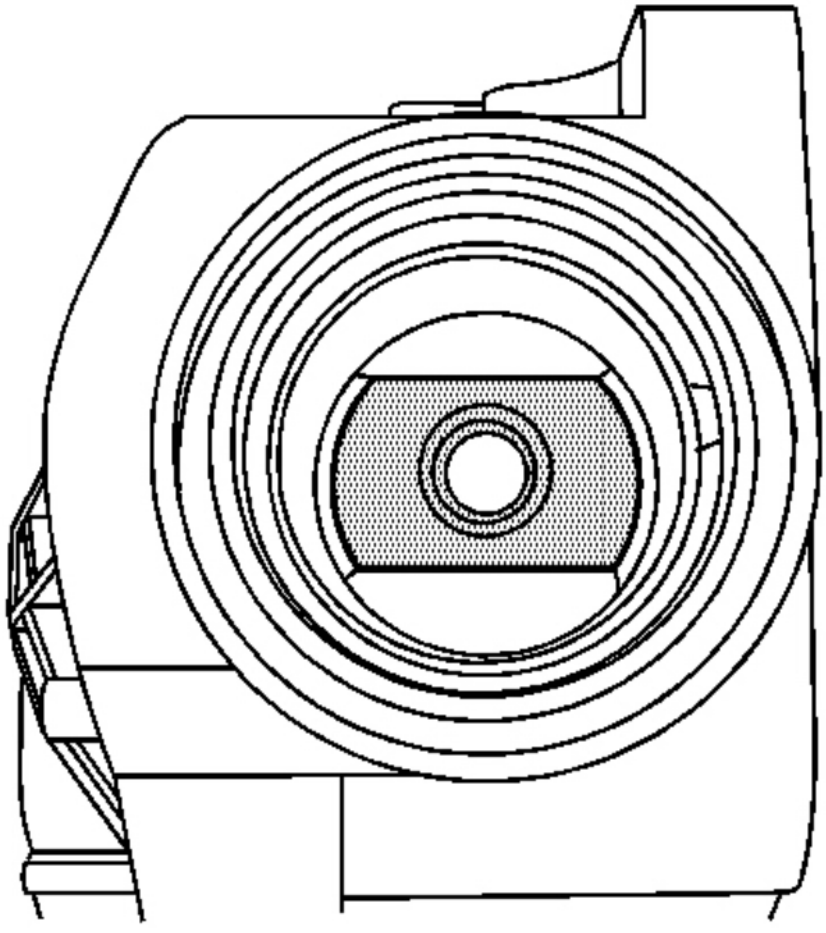


Fig. 163: Installing J 45858-5 Into Pinion Bearing Bore
Courtesy of GENERAL MOTORS CORP.

44. Remove the outer pinion bearing cup by turning the forcing screw clockwise.
45. Remove the collapsible spacer from the drive pinion.
46. Install the **J 22912-01** between the pinion bearing and the drive pinion.
47. Remove the inner pinion bearing using the **J 22912-01** and a hydraulic press.

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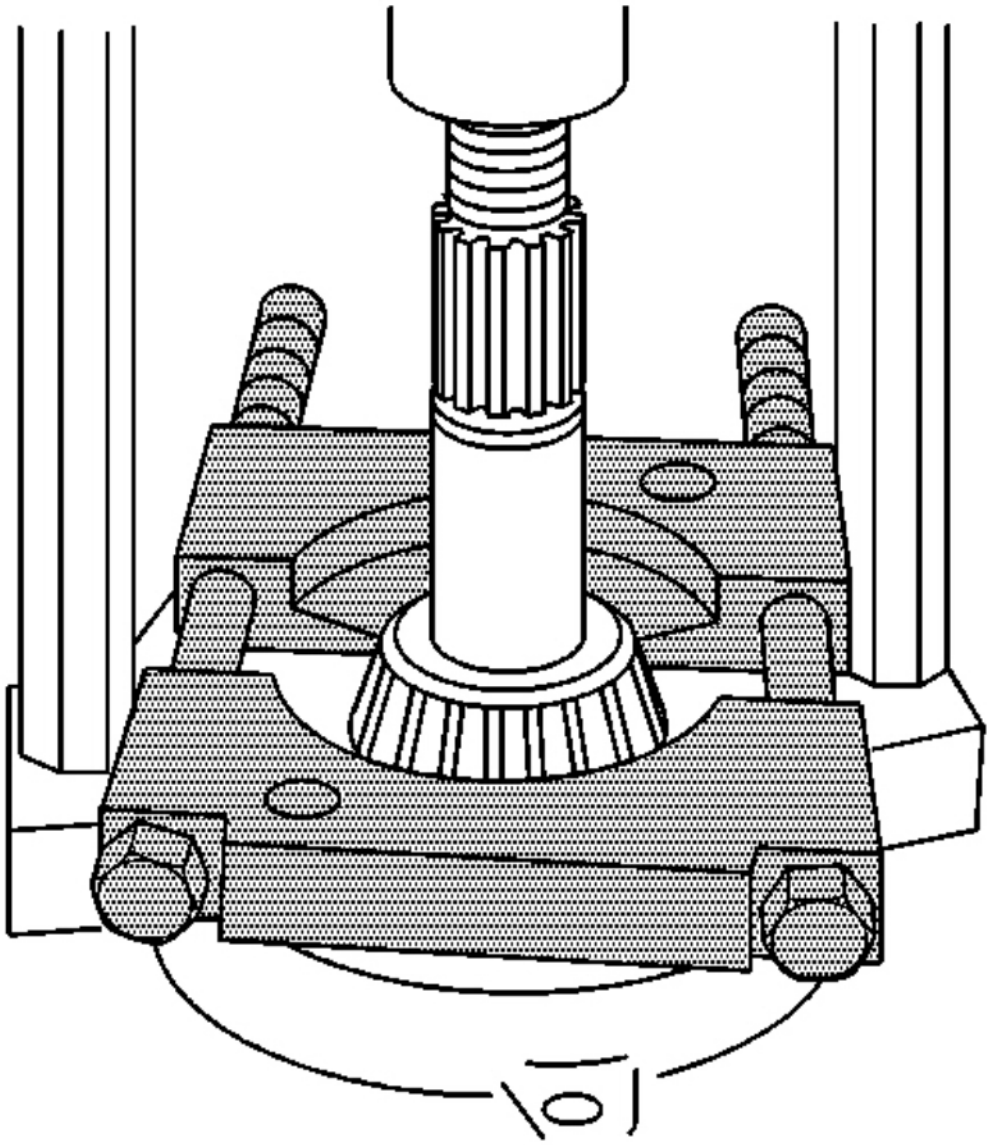


Fig. 164: Removing Inner Pinion Bearing Using Hydraulic Press
Courtesy of GENERAL MOTORS CORP.

48. Remove the pinion gear selectable shim.

DIFFERENTIAL CASE ASSEMBLY DISASSEMBLE (8.25 INCH AXLE)

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Tools Required

J 22888-D Side Bearing Remover Kit. See **Special Tools and Equipment**.

1. Remove the differential side bearing by performing the following steps:
    1. Place the differential case in a vise.
    2. Install the J 22888-20A (2) and the J 8107-2 (1) as shown.
    3. Remove the differential side bearings using the J 22888-20A.

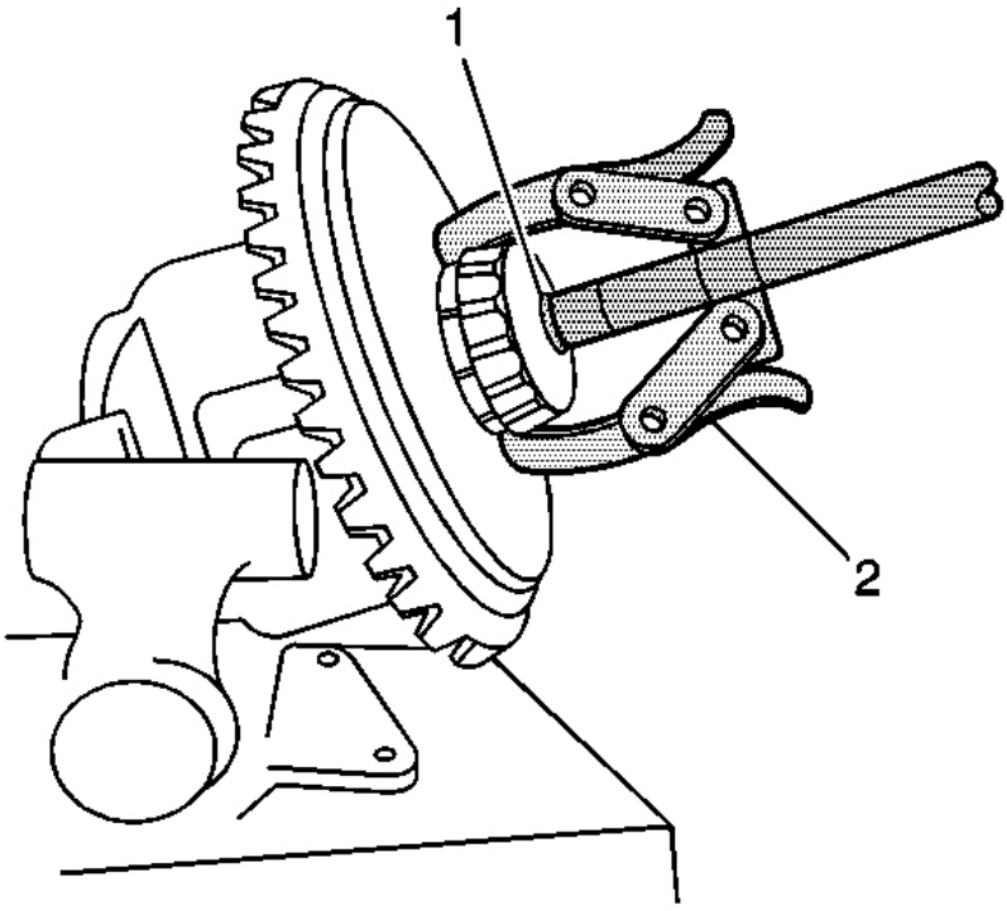


Fig. 165: Removing Differential Side Bearing
Courtesy of GENERAL MOTORS CORP.

2. Remove the differential assembly from the vise.

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IMPORTANT: The ring gear bolts have left-hand threads.

3. Remove the ring gear bolts. Discard the bolts.

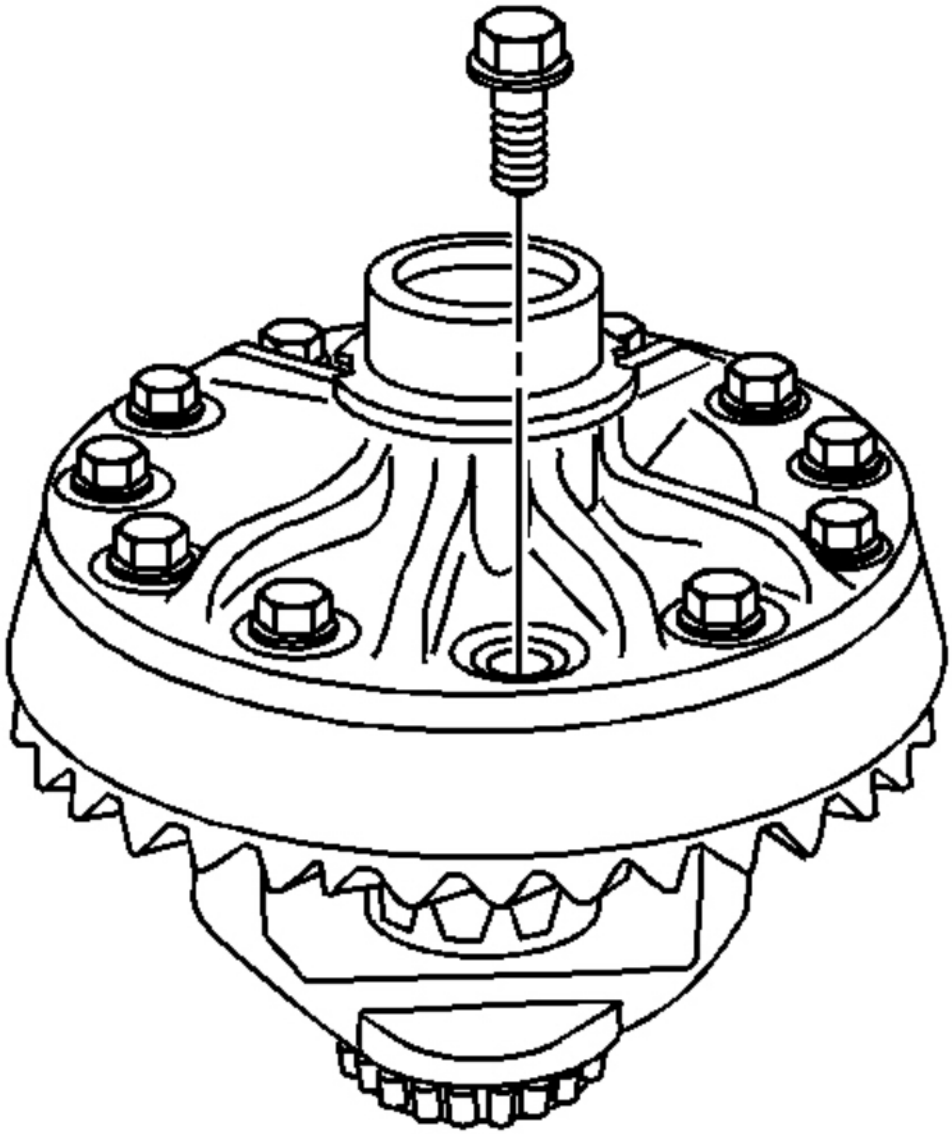


Fig. 166: Identifying Ring Gear Bolts
Courtesy of GENERAL MOTORS CORP.

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NOTE: **Do not pry the ring gear from the differential case. Prying the ring gear from the differential case may cause damage to the ring gear and/or the differential case.**

4. Remove the ring gear from the differential case.

   Drive the ring gear off with a brass drift if necessary.

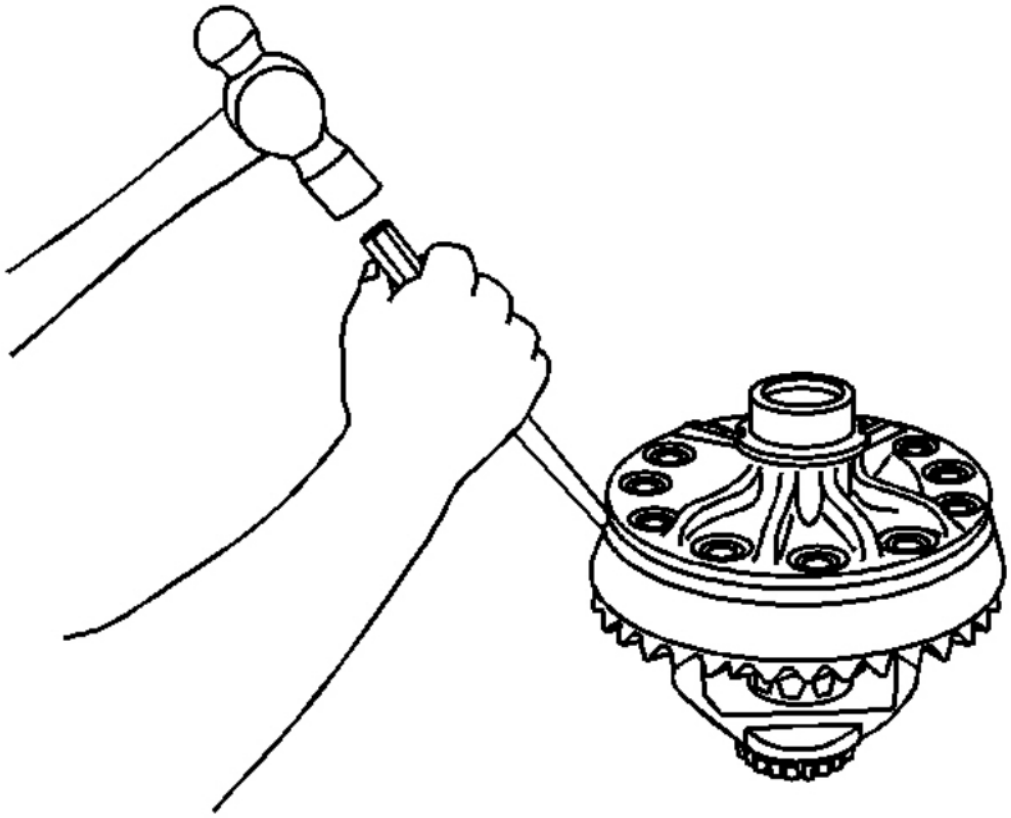


Fig. 167: Removing Ring Gear From Differential
Courtesy of GENERAL MOTORS CORP.

5. Remove the pinion shaft pin.

   Use a hammer and a drift pin in order to drive out the pin.

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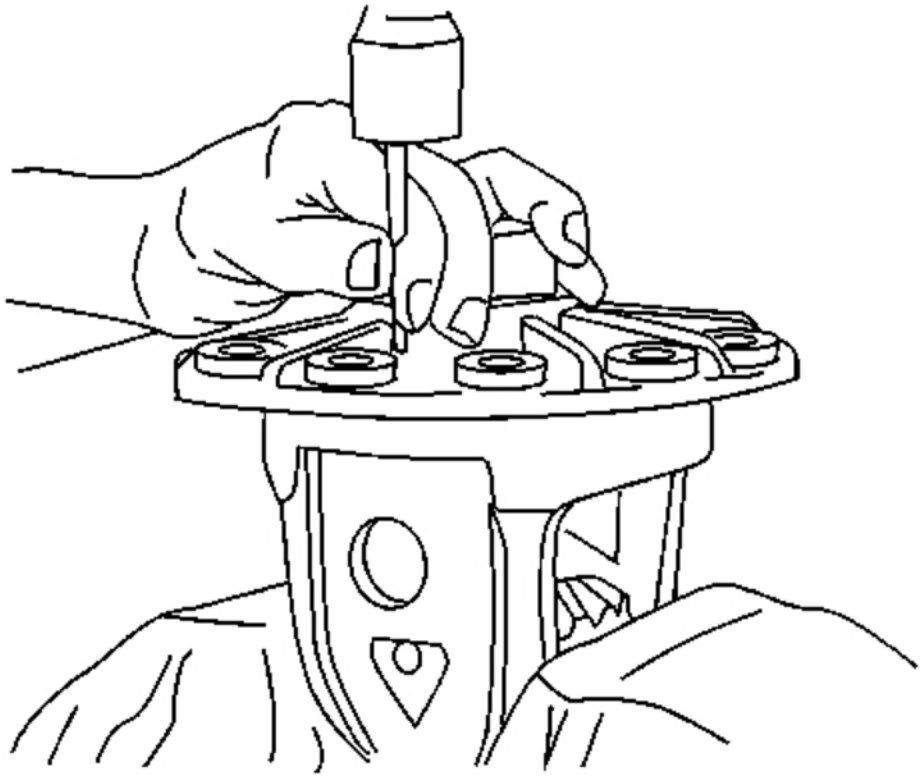


Fig. 168: Removing Pinion Shaft Pin
Courtesy of GENERAL MOTORS CORP.

6. Remove the pinion shaft.

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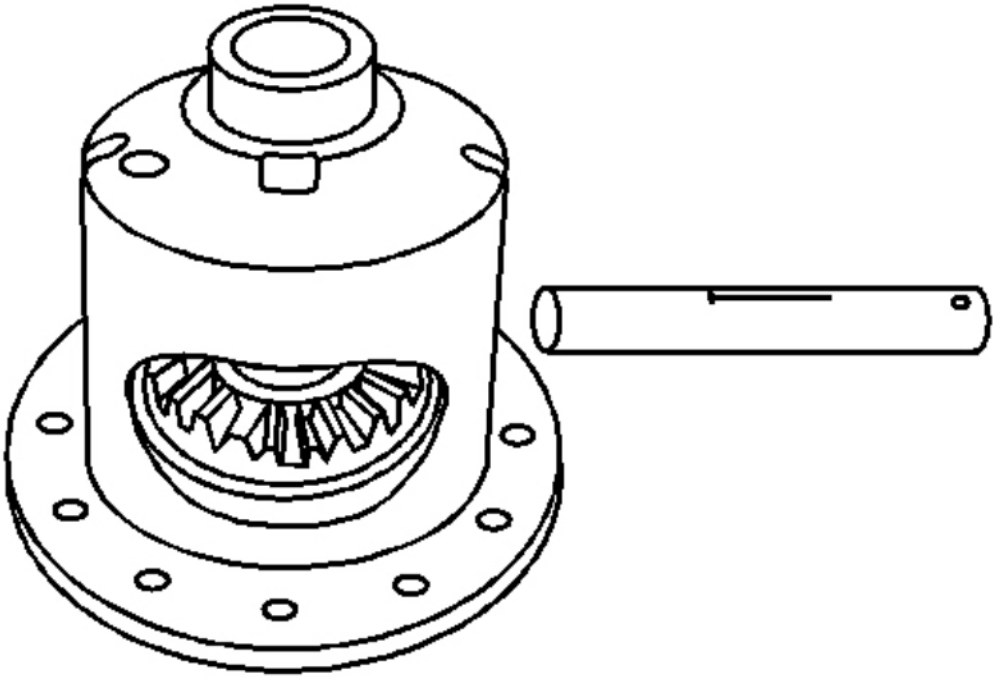


Fig. 169: View Of Differential And Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

7. Remove the differential pinion gears and the differential side gears by performing the following steps:
    1. Roll the differential pinion gears out of the case with the pinion gear thrust washers.
    2. Remove the differential side gears and the side gear thrust washers.

    Mark the pinion gears and thrust washers top and bottom and the differential side gears and thrust washers left and right.

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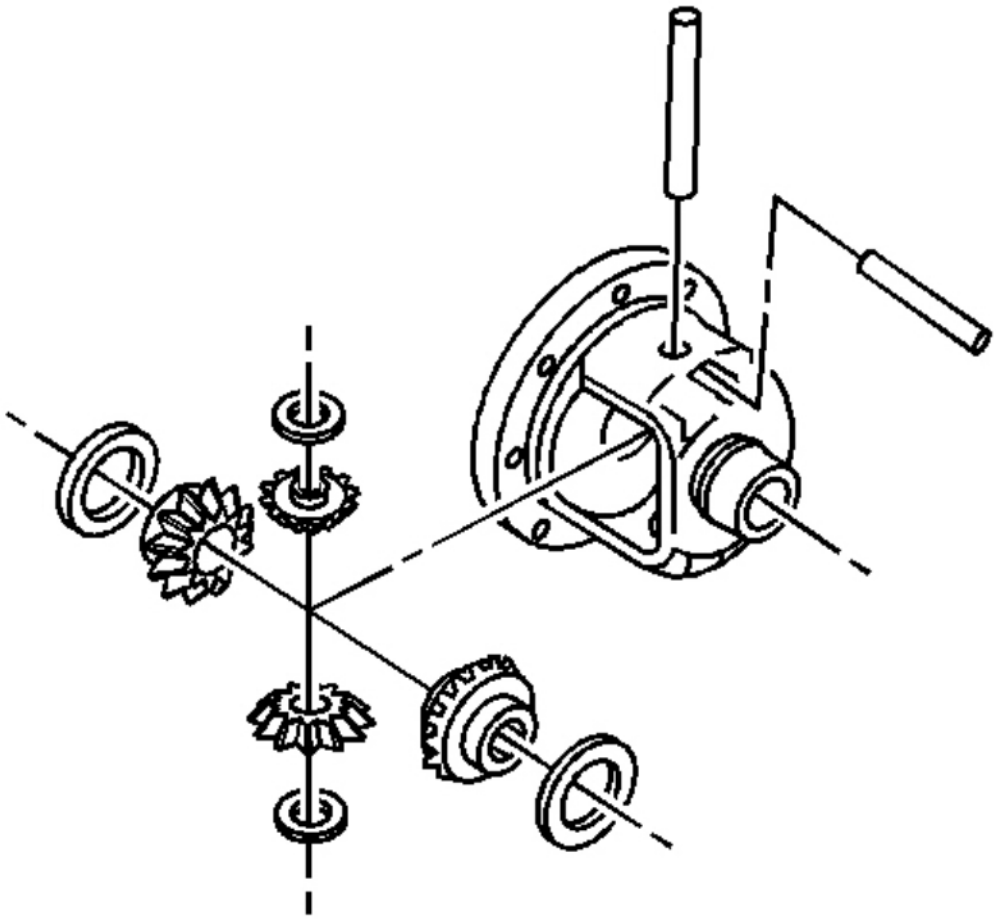


Fig. 170: Exploded View Of Differential Case
Courtesy of GENERAL MOTORS CORP.

DIFFERENTIAL CASE ASSEMBLY DISASSEMBLE (9.25 INCH AXLE)

Tools Required

- **J 22888-D** Side Bearing Remover Kit. See **Special Tools and Equipment**.
- **J 36597** Side Bearing Puller Pilot - 9.25 in Axle

1. Remove the differential side bearing by performing the following steps:
    1. Place the differential case in a vise.
    2. Install the **J 22888-20A** (2) and the **J 36597** (1) as shown.

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3. Remove the differential side bearings using the **J 22888-20A** .

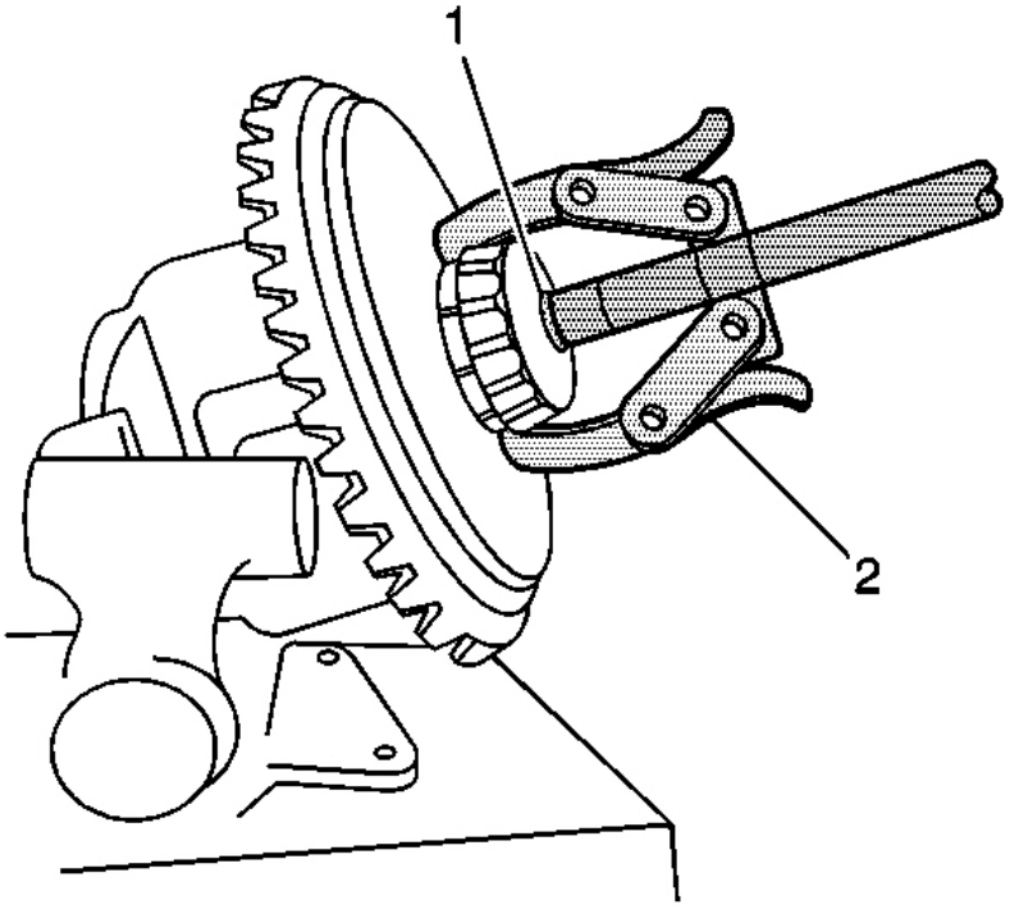


Fig. 171: Removing Differential Side Bearing
Courtesy of GENERAL MOTORS CORP.

2. Remove the differential assembly from the vise.

IMPORTANT: The ring gear bolts have left-hand threads.

3. Remove the ring gear bolts. Discard the bolts.

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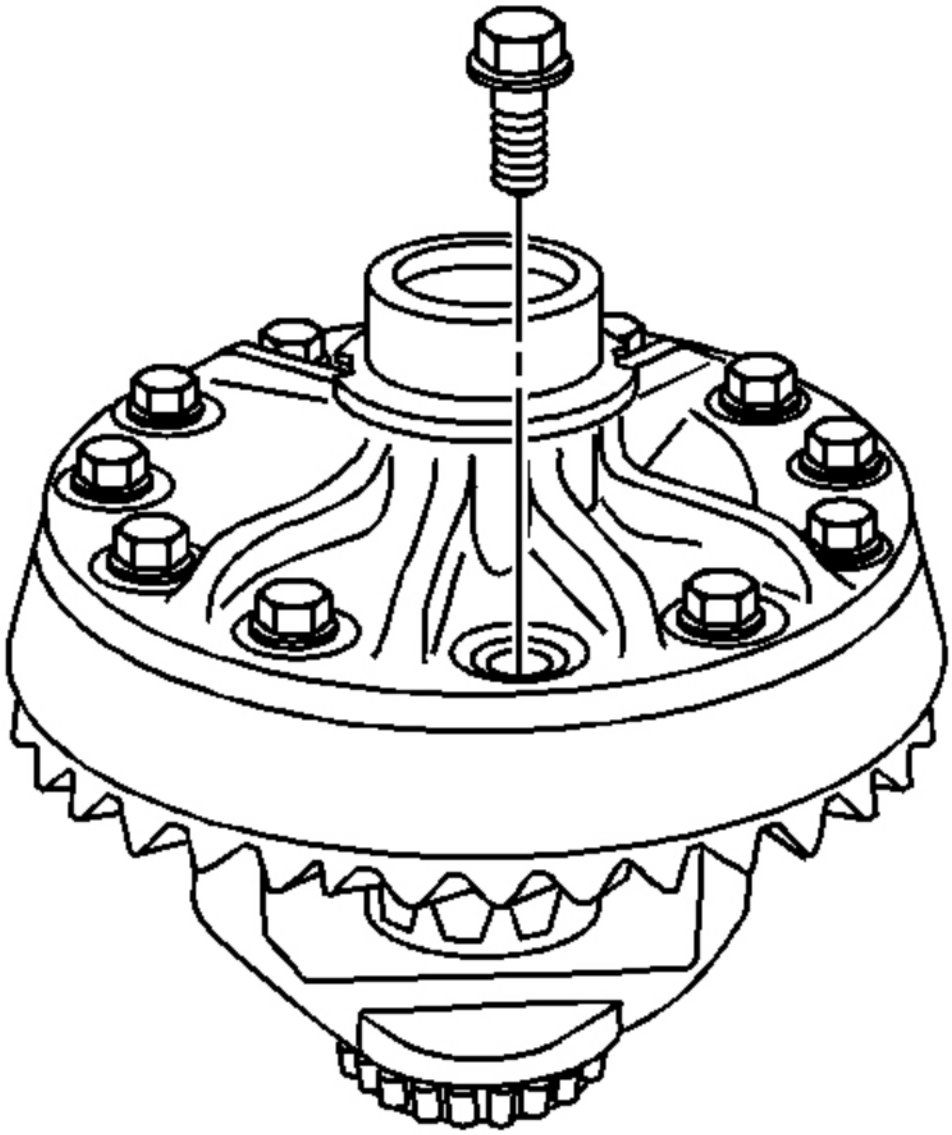


Fig. 172: Identifying Ring Gear Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: **Do not pry the ring gear from the differential case. Prying the ring gear from the differential case may cause damage to the ring gear and/or the differential case.**

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4. Remove the ring gear from the differential case.

   Drive the ring gear off with a brass drift if necessary.

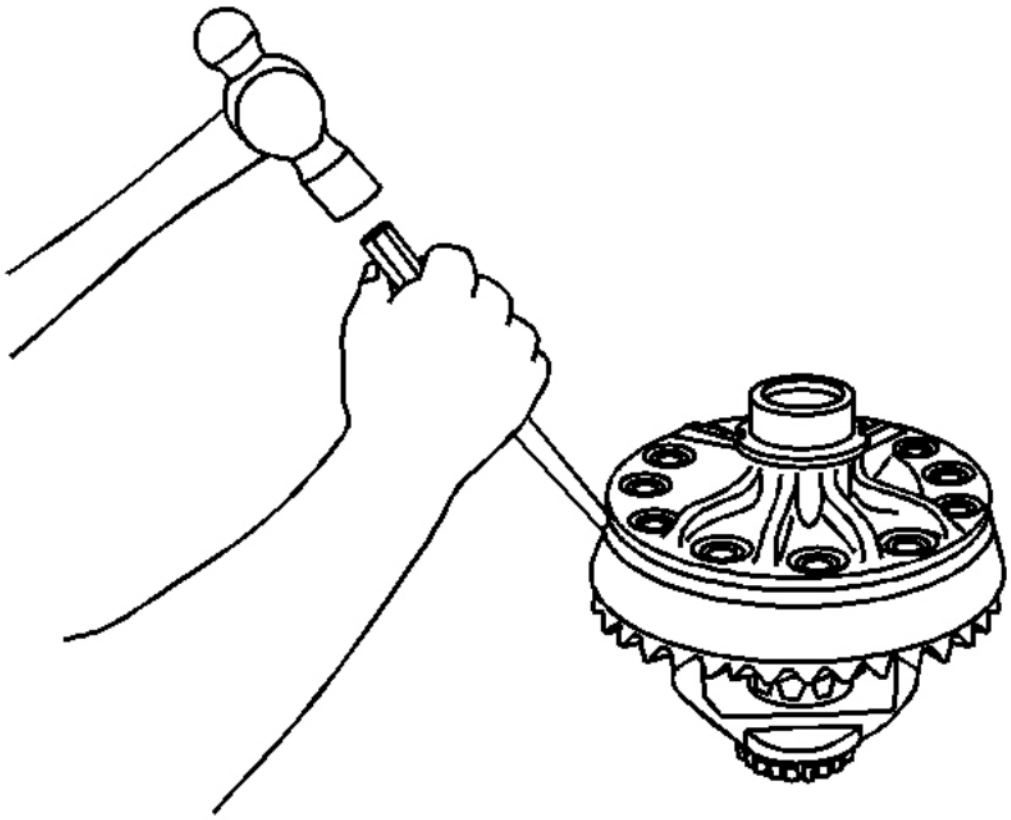


Fig. 173: Removing Ring Gear From Differential
Courtesy of GENERAL MOTORS CORP.

5. Remove the pinion shaft lock bolt.

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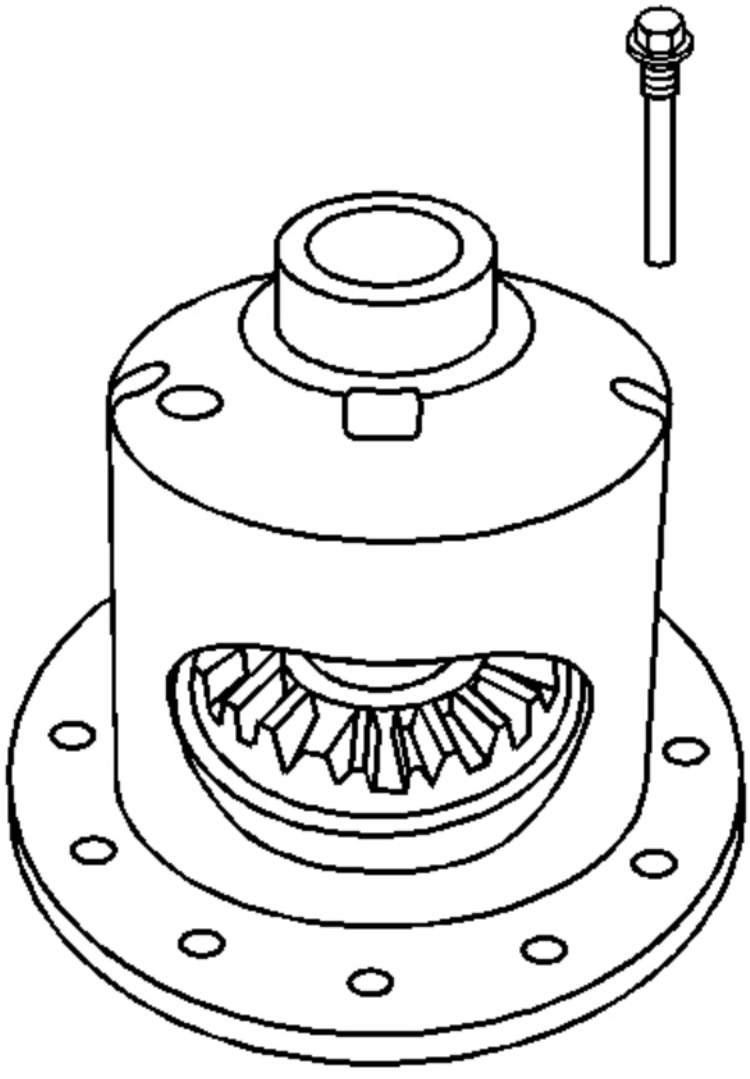


Fig. 174: View Of Pinion Shaft Lock Bolt
Courtesy of GENERAL MOTORS CORP.

6. Remove the pinion shaft.
7. Remove the differential side gear spacers.

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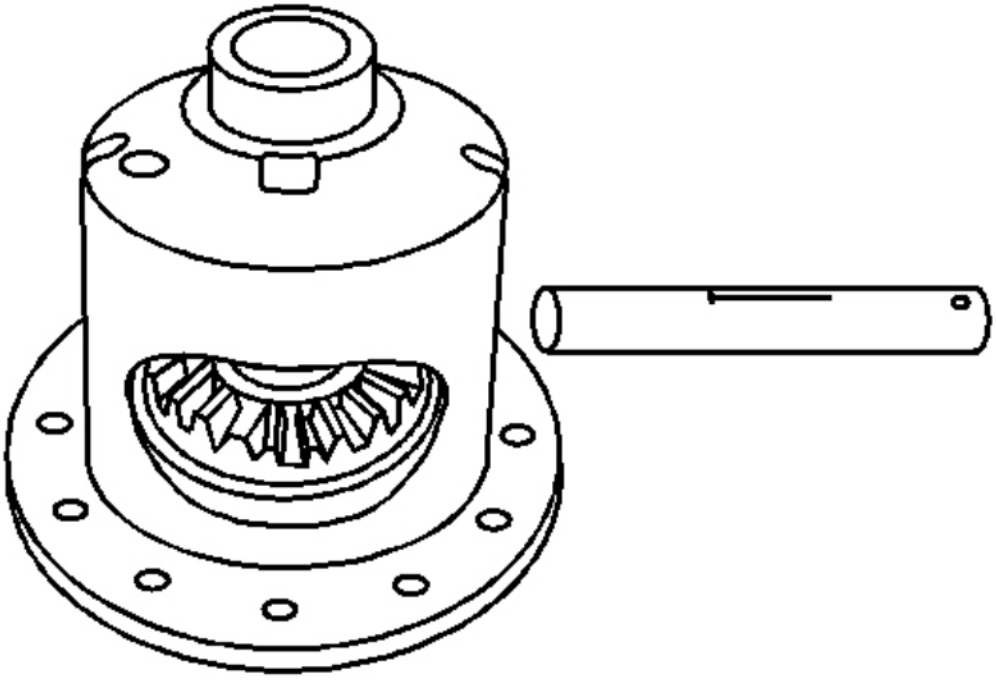


Fig. 175: View Of Differential And Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

8. Remove the differential pinion gears and thrust washers by performing the following steps:
    1. Drive the pinion gear thrust washers out from the differential case using a hammer and a brass drift.
    2. Roll the differential pinion gears out of the differential case.

    Mark the pinion gears and thrust washers top and bottom.

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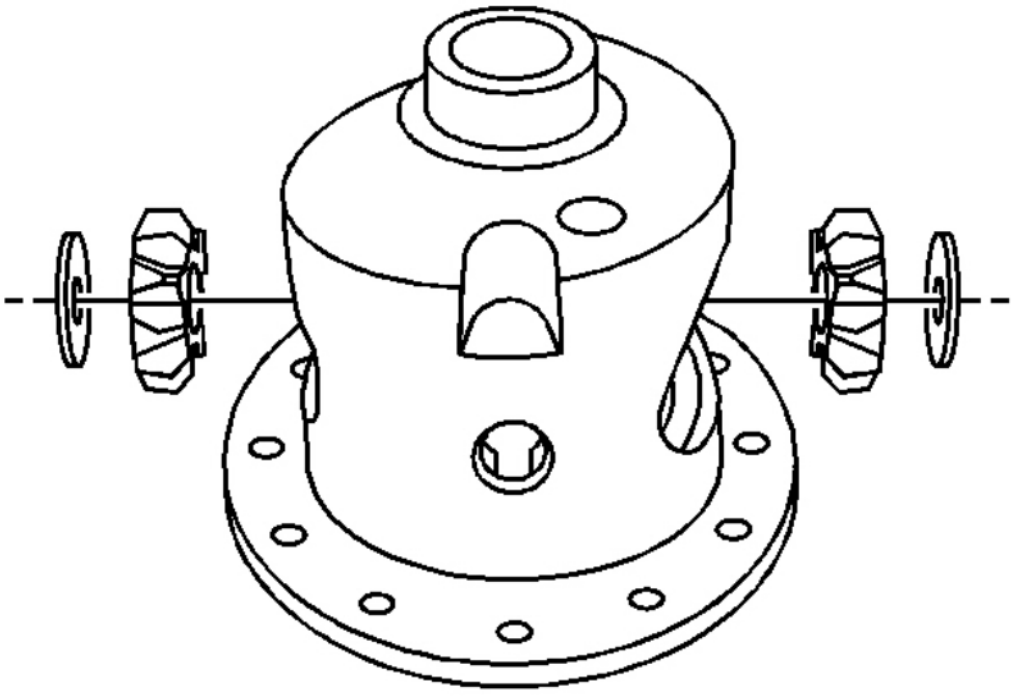


Fig. 176: Identifying Differential Pinion Gears & Thrust Washers
Courtesy of GENERAL MOTORS CORP.

9. Remove the differential side gears and thrust washers.

   Mark the differential side gears and thrust washers left and right.

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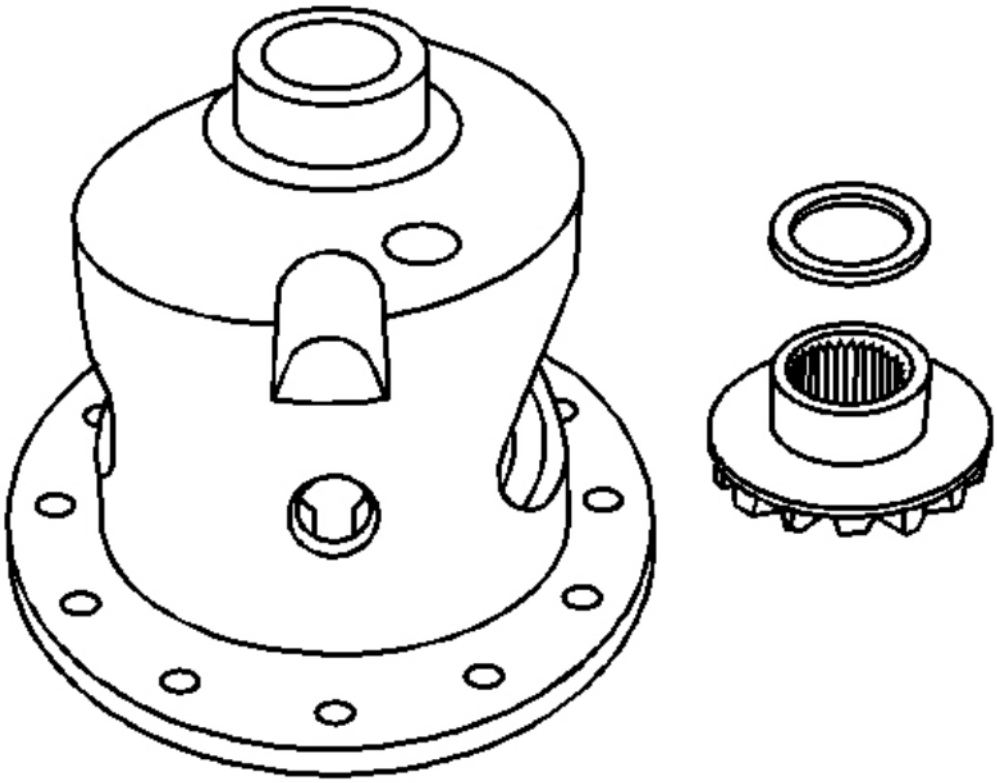


Fig. 177: Differential Side Gears & Thrust Washers
Courtesy of GENERAL MOTORS CORP.

DIFFERENTIAL CASE BEARINGS INSPECTION

IMPORTANT:

- **When replacing the worn or cracked bearings and the cups, replace the bearings in sets.**
- **The low mileage bearings may have very small scratches and pits on the rollers and the bearing cups from the initial preload.**

  Do not replace a bearing for this reason.

1. Inspect the bearings for smooth rotation after oiling.
2. Inspect the bearing rollers for wear.
3. Inspect the bearing cups for the following conditions:
   - Wear

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- Cracks
- Brinelling
- Scoring

DIFFERENTIAL CASE AND GEARS INSPECTION

1. Inspect the following components for excessive wear and/or fit:
   - The pinion gear shaft
   - The thrust washers
   - The differential case for wear, cracks and scoring
   - The fit of the pinion gear shaft in the differential case
   - The fit of the differential side gears in the differential case
   - The fit of the side gears on the axle shafts
2. Inspect the teeth of the pinion gears and the differential side gears for the following conditions:
   - Wear
   - Cracks
   - Scoring
   - Spalling
3. Replace any worn or poor fitting components as necessary.

PINION AND RING GEAR INSPECTION

1. The ring and pinion gears are matched sets and must be replaced any time a replacement of either is necessary.
2. Inspect the pinion and the ring gear teeth for the following conditions:
   - Cracking
   - Chipping
   - Scoring
   - Excessive wear
3. Inspect the pinion gear splines for wear.
4. Inspect the pinion flange splines for wear.
5. Inspect the fit of the pinion flange on the pinion gear.
6. Inspect the sealing surface of the pinion flange for nicks, burrs, or rough tool marks which will damage the inside diameter of the pinion seal and result in an oil leak.
7. Inspect all of the parts for wear and replace as necessary.

THRUST WASHERS, SHIMS, AND ADJUSTER SLEEVES INSPECTION

1. Inspect the shims and the thrust washers for cracks and chips.

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The damaged shims should be replaced with an equally sized service shim.

2. Inspect the adjuster sleeves for damaged threads. Replace if required.

DIFFERENTIAL CASE ASSEMBLY ASSEMBLE (8.25 INCH AXLE)

Tools Required

- **J 8092** Universal Driver Handle - 3/4 in - 10. See **Special Tools and Equipment**.
- **J 22761** Differential Side Bearing Installer
- **J 22888-D** Side Bearing Remover Kit

1. Lubricate the pinion and side gears using axle lubricant. Use the correct fluid. Refer to **Sealers, Adhesives, and Lubricants**.
2. Install the thrust washers and the differential side gears into the differential case.

   If the same differential side gears and the thrust washers are being used, install the gears and the washers to the original locations.

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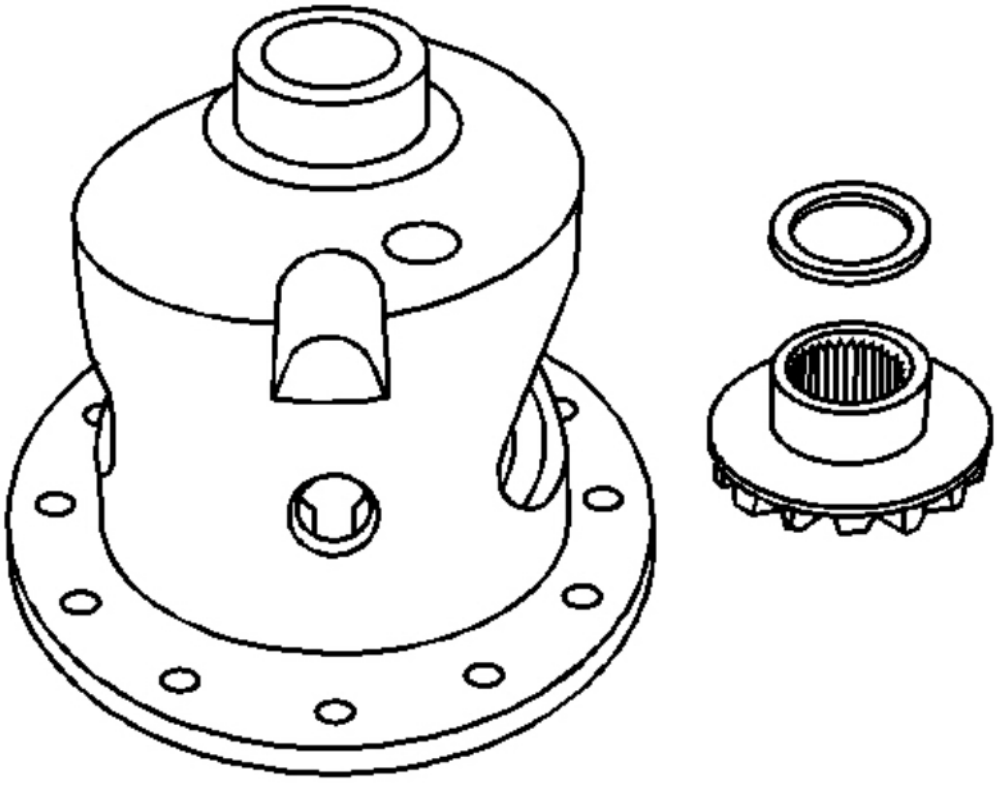


Fig. 178: Differential Side Gears & Thrust Washers
Courtesy of GENERAL MOTORS CORP.

3. Install the differential pinion gears by performing the following steps:
    1. Position both pinion gears between the differential side gears directly opposite of each other.
    2. Rotate the differential side gears until the pinion gears are opposite the opening in the differential case in line with the pinion shaft opening.
4. Install the thrust washers.

    Rotate the pinion gears toward the differential case opening in order to permit the sliding in of the thrust washers.

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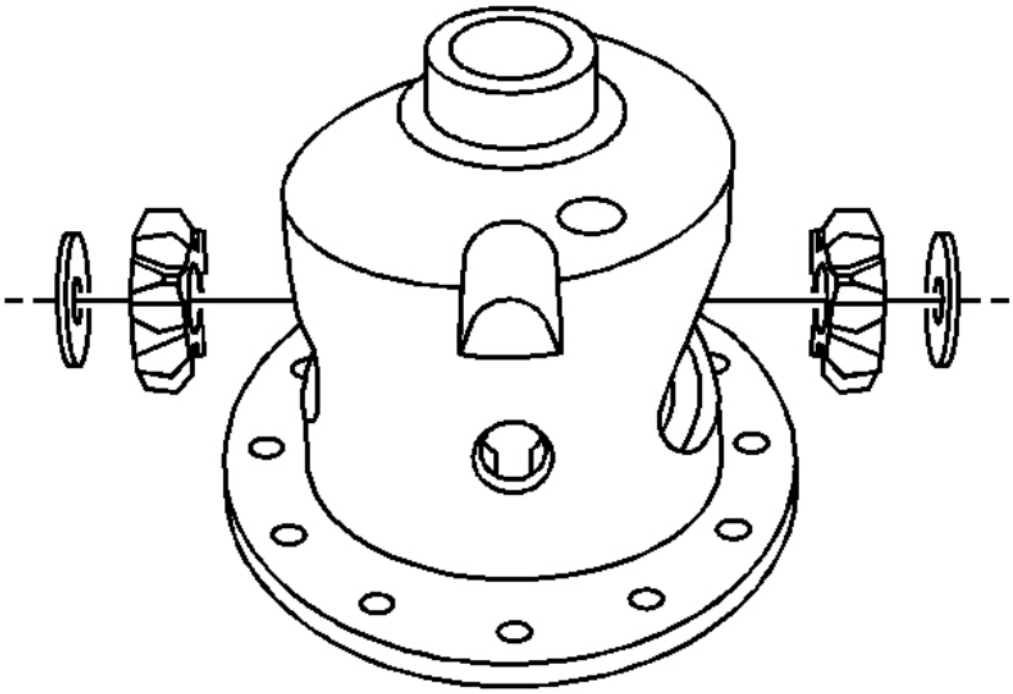


Fig. 179: Identifying Differential Pinion Gears & Thrust Washers
Courtesy of GENERAL MOTORS CORP.

5. Install the pinion gear shaft.
6. Install the new pinion gear shaft lock pin using a hammer and a brass drift.

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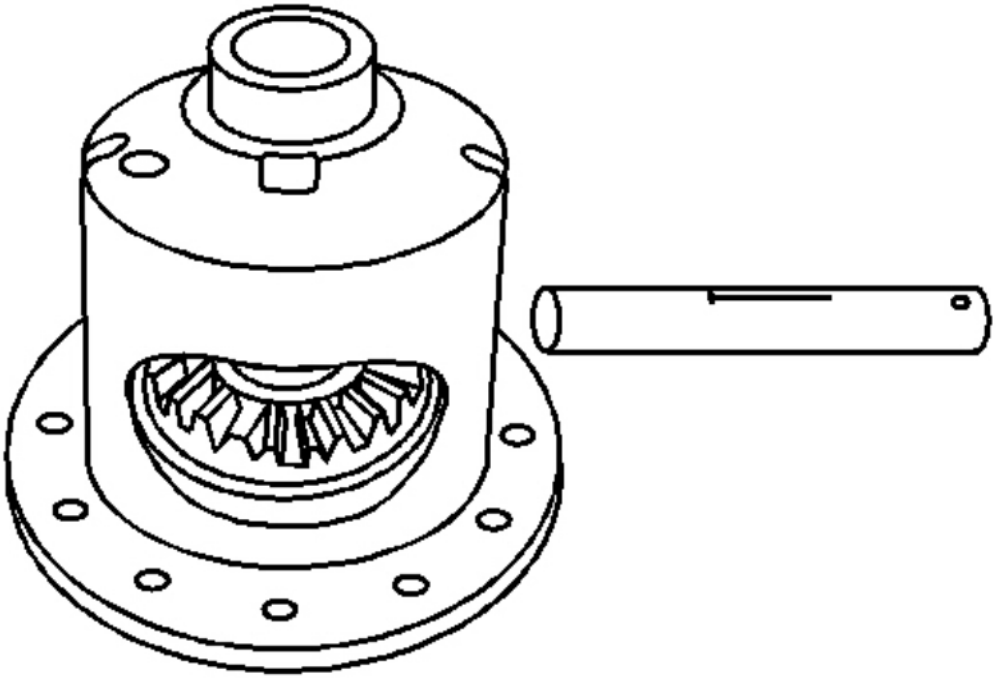


Fig. 180: View Of Differential And Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The mating surface of the ring gear and the differential case must be clean and free of burrs before installing the ring gear.

7. Install the ring gear onto the differential case.

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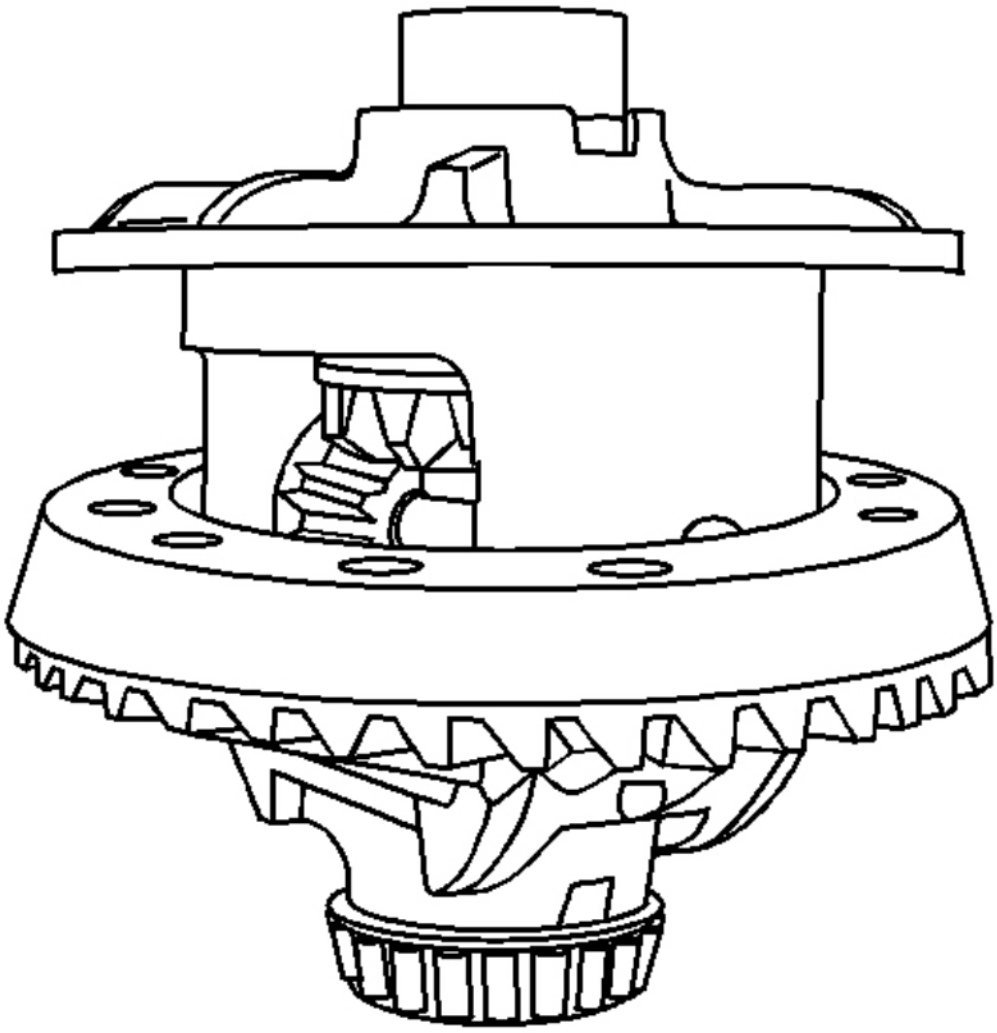


Fig. 181: Ring Gear & Differential Case
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The ring gear bolts have left-hand threads.

8. Install the new ring gear bolts.

   Hand start each bolt to ensure that the ring gear is properly installed to the differential case.

NOTE: Refer to Fastener Notice in Cautions and Notices.

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9. Tighten the ring gear bolts. Tighten the ring gear bolts alternately and in stages, gradually pulling the ring gear onto the differential case.

   Tighten: Tighten the ring gear bolts in sequence to 120 N.m (89 lb ft).

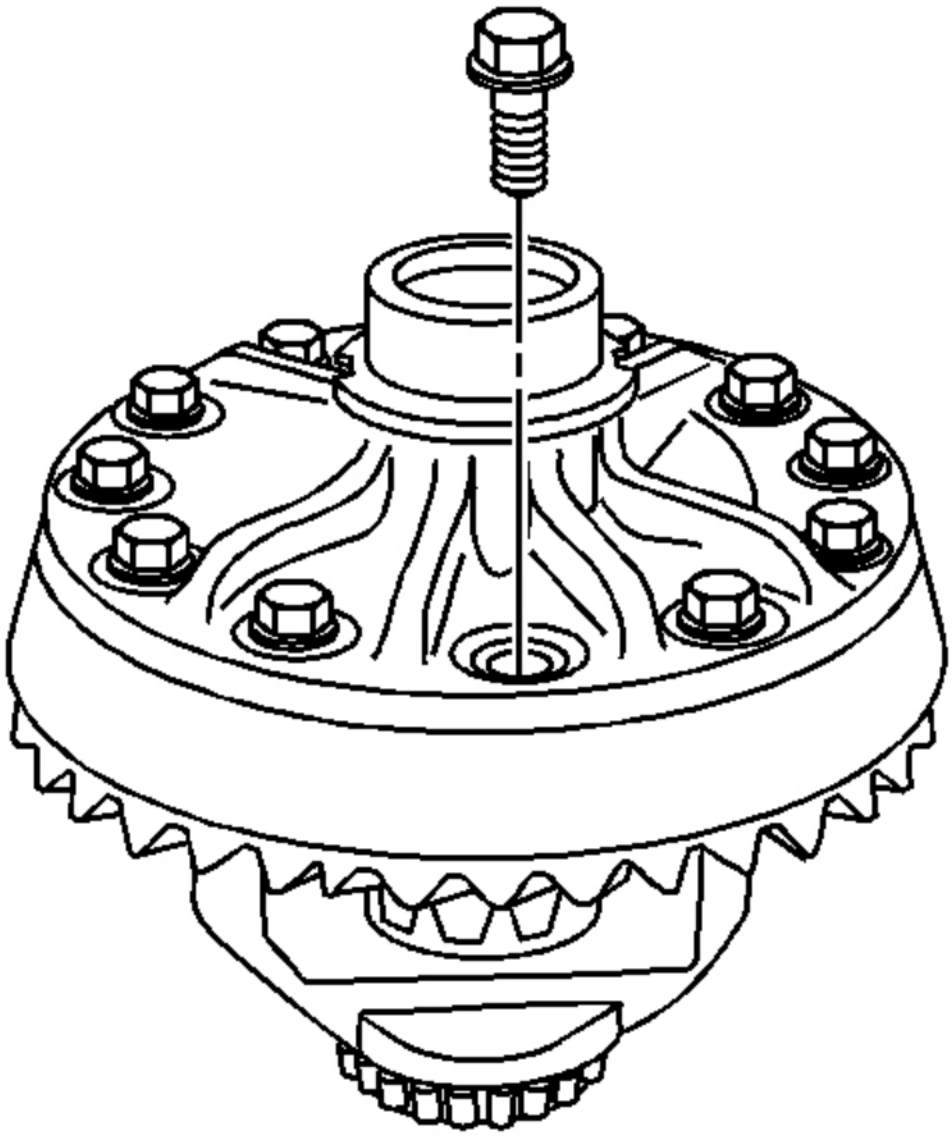


Fig. 182: Identifying Ring Gear Bolts
Courtesy of GENERAL MOTORS CORP.

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10. Install the differential side bearings by performing the following steps:
    1. In order to protect the differential case, install the J 8107-2 in the case on the side opposite the bearing installation.
    2. Install the **J 22761** (2) and the **J 8092** (1) onto the differential case bearing as shown.
    3. Drive the differential case bearing onto the case using the **J 22761** and the **J 8092** .

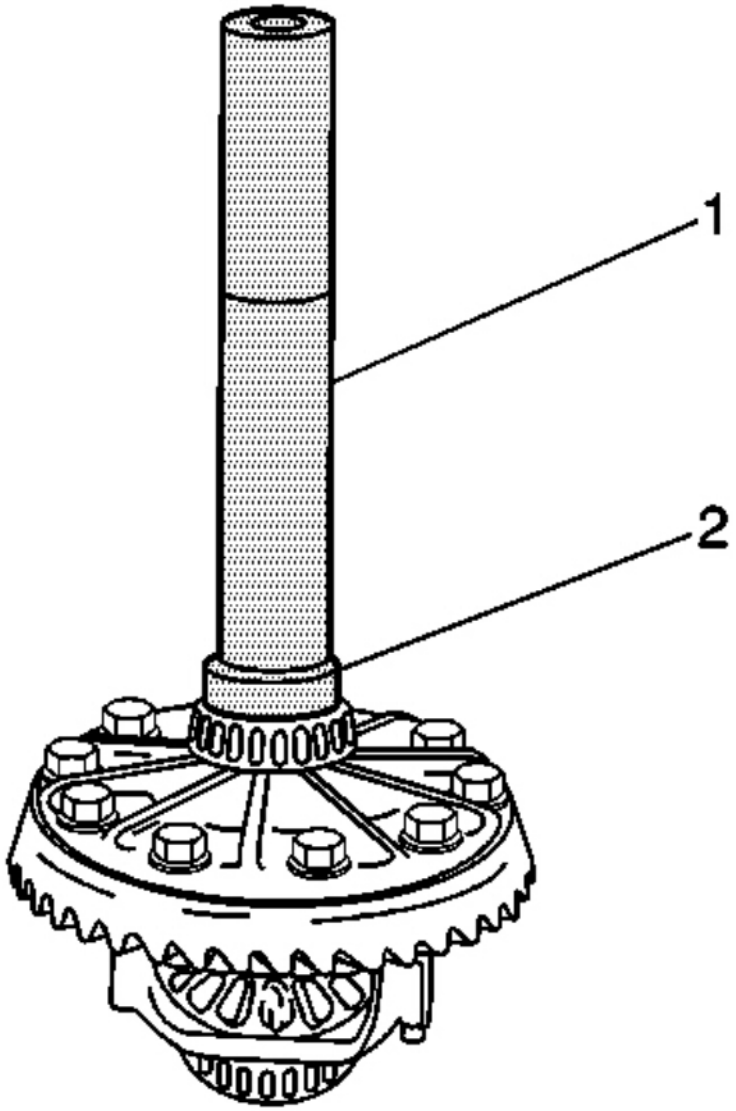


Fig. 183: Installing Differential Side Bearing

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Courtesy of GENERAL MOTORS CORP.

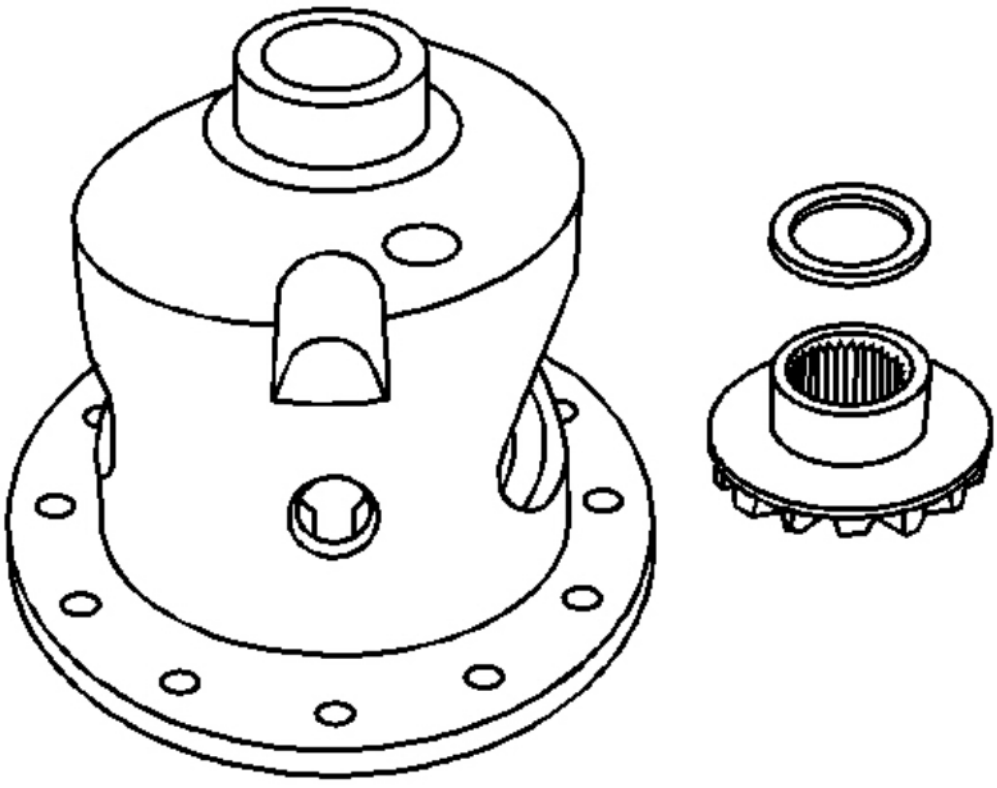
DIFFERENTIAL CASE ASSEMBLY ASSEMBLE (9.25 INCH AXLE)

Tools Required

- **J 8092** Universal Driver Handle - 3/4 in - 10. See **Special Tools and Equipment**.
- **J 29710** Differential Side Bearing Installer
- **J 36597** Side Bearing Puller Pilot - 9.25 in Axle

1. Lubricate the pinion and side gears using axle lubricant. Use the correct fluid. Refer to **Sealers, Adhesives, and Lubricants**.
2. Install the thrust washers and the differential side gears into the differential case.

   If the same differential side gears and the thrust washers are being used, install the gears and the washers to the original locations.



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Fig. 184: Differential Side Gears & Thrust Washers
Courtesy of GENERAL MOTORS CORP.

3. Install the differential pinion gears by performing the following steps:
    1. Position both pinion gears between the differential side gears directly opposite of each other.
    2. Rotate the differential side gears until the pinion gears are opposite the opening in the differential case in line with the pinion shaft opening.
4. Install the thrust washers in between the pinion gear and differential case using a hammer and brass drift.
5. Install the differential side gear spacers.

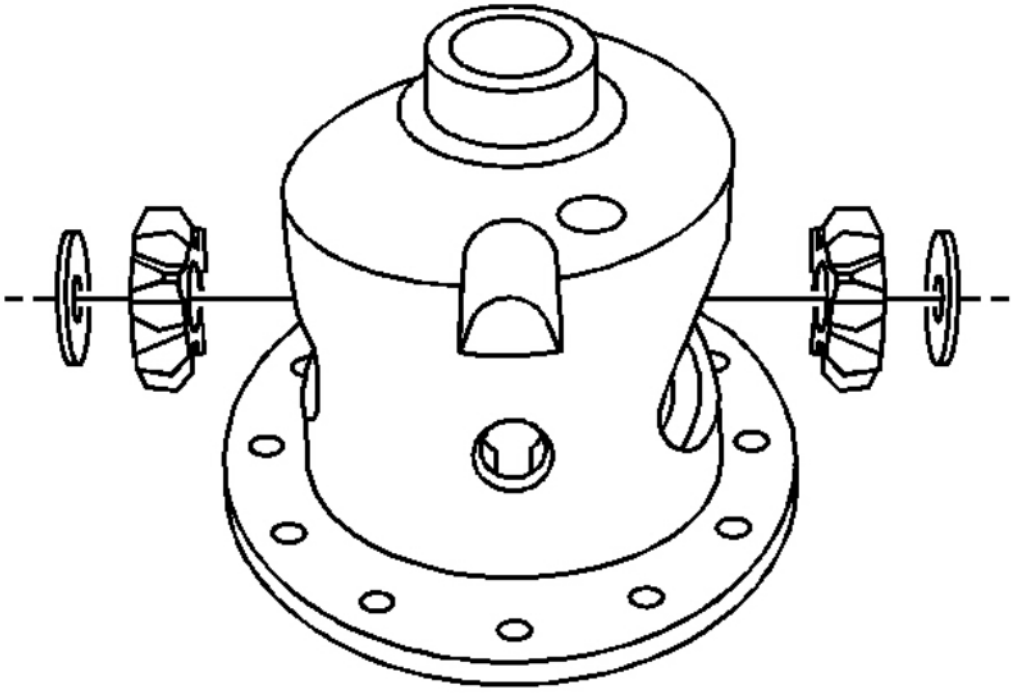


Fig. 185: Identifying Differential Pinion Gears & Thrust Washers
Courtesy of GENERAL MOTORS CORP.

6. Install the pinion gear shaft.

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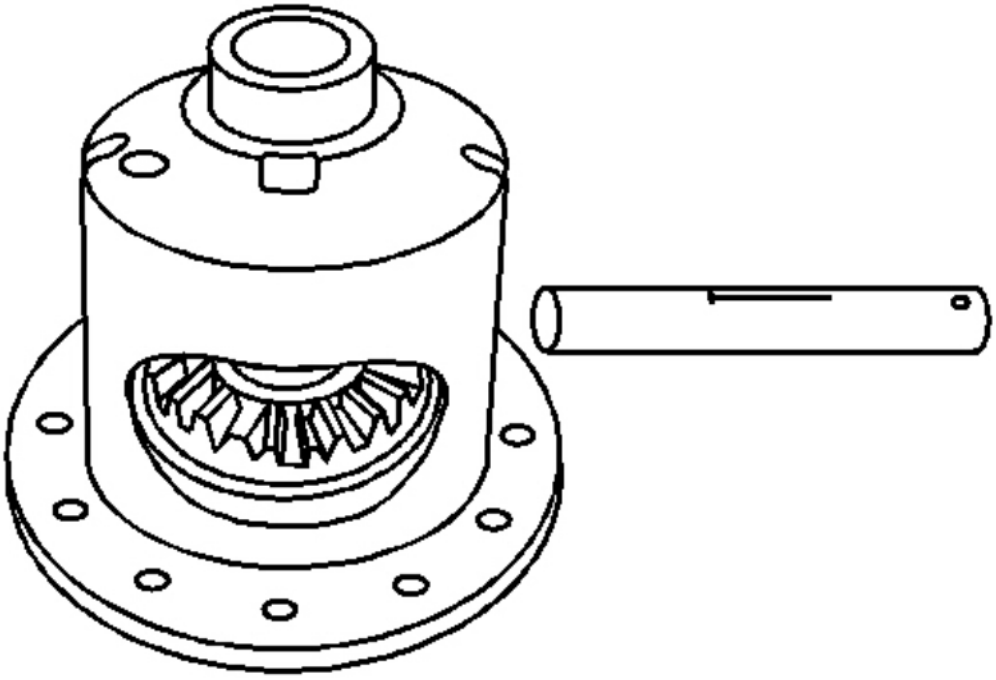


Fig. 186: View Of Differential And Pinion Shaft
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

7. Install the pinion shaft lock bolt.

   Tighten: Tighten the pinion shaft lock bolt to 53 N.m (39 lb ft).

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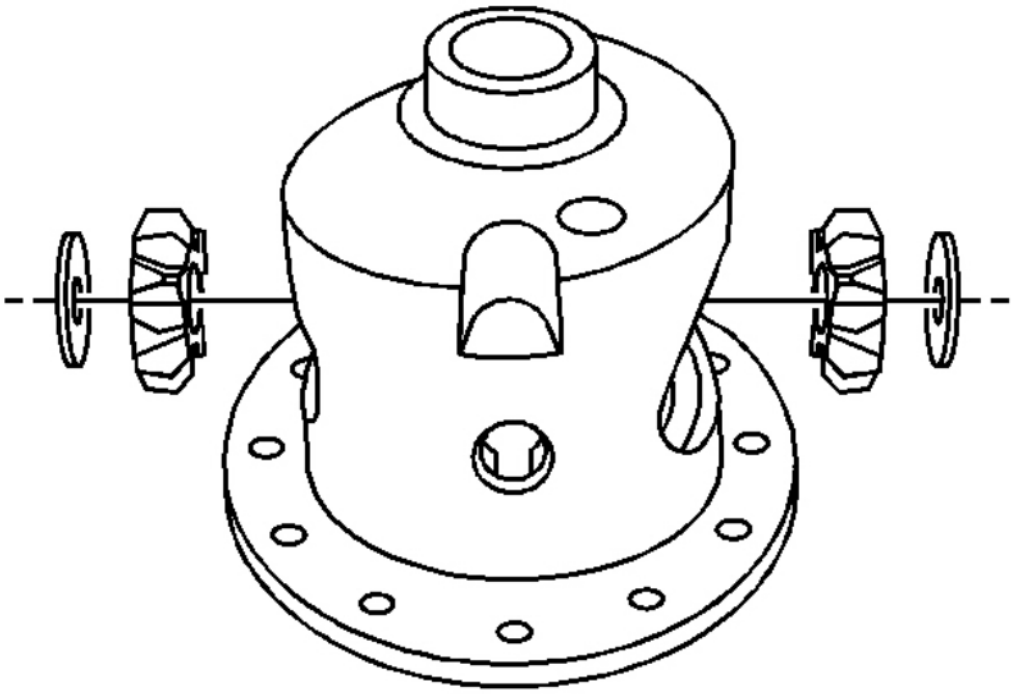


Fig. 187: Identifying Differential Pinion Gears & Thrust Washers
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The mating surface of the ring gear and the differential case must be clean and free of burrs before installing the ring gear.

8. Install the ring gear onto the differential case.

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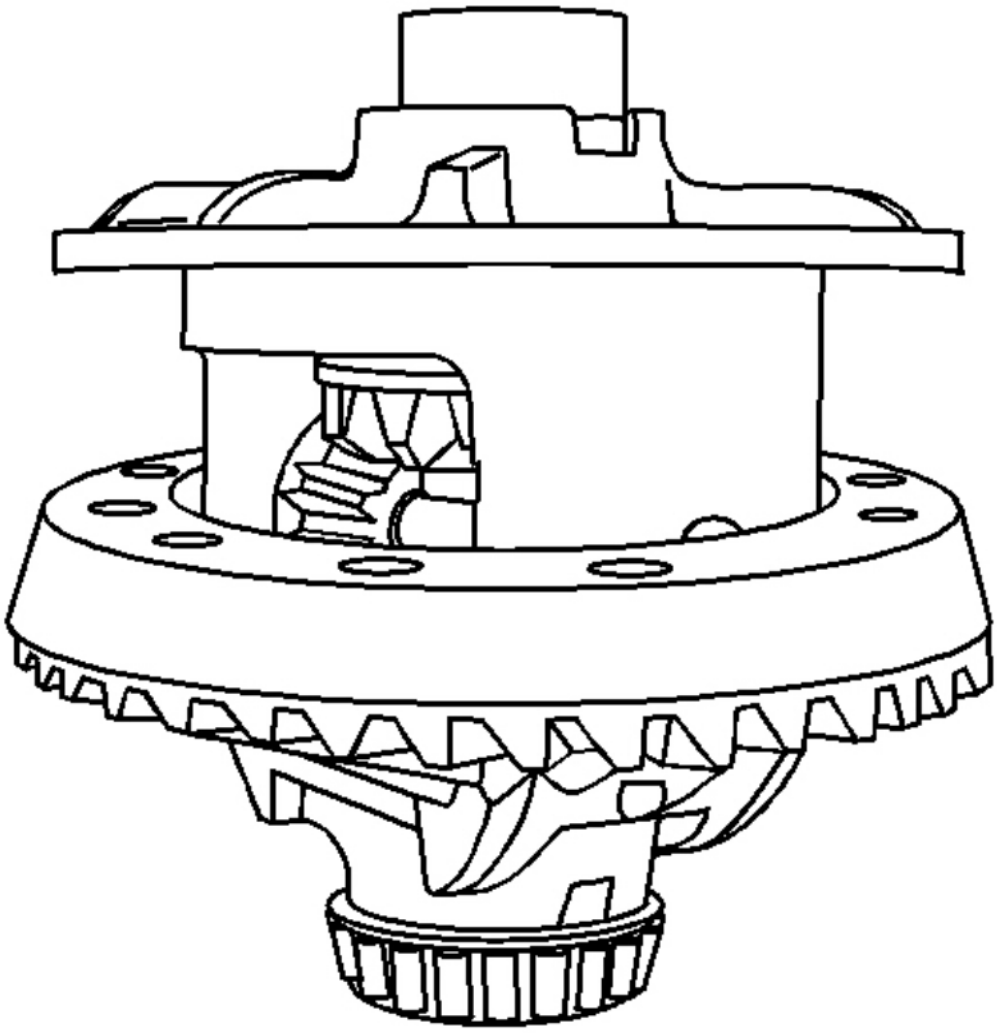


Fig. 188: Ring Gear & Differential Case
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The ring gear bolts have left-hand threads.

9. Install the new ring gear bolts.

   Hand start each bolt to ensure that the ring gear is properly installed to the differential case.

10. Tighten the new ring gear bolts. Tighten the ring gear bolts alternately and in stages, gradually pulling the

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ring gear onto the differential case.

Tighten: Tighten the ring gear bolts in sequence to 138 N.m (102 lb ft).

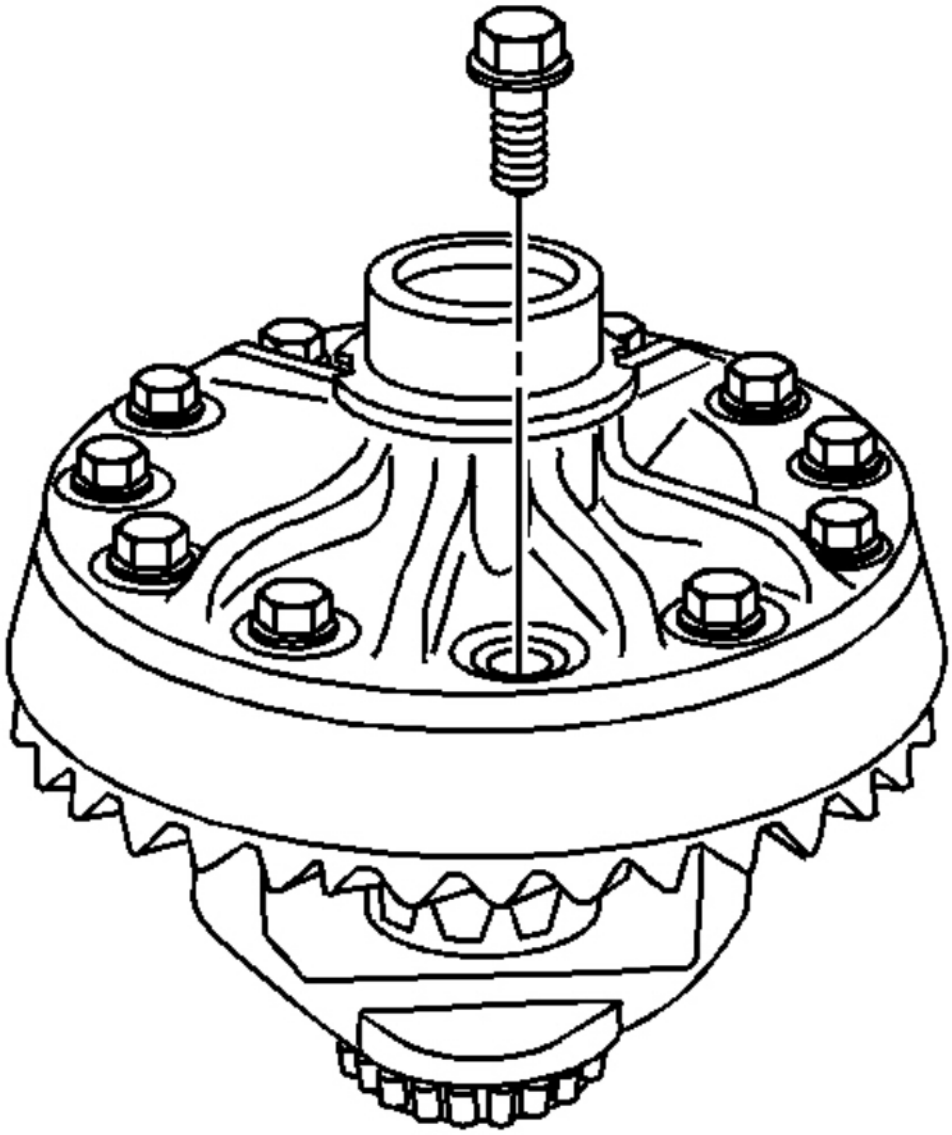


Fig. 189: Identifying Ring Gear Bolts
Courtesy of GENERAL MOTORS CORP.

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11. Install the differential side bearings by performing the following steps:
    1. In order to protect the differential case, install the **J 36597** in the case on the side opposite the bearing installation.
    2. Install the **J 29710** (2) and the **J 8092** (1) onto the differential case bearing as shown.
    3. Drive the differential case bearing onto the case using the **J 29710** and the **J 8092** .

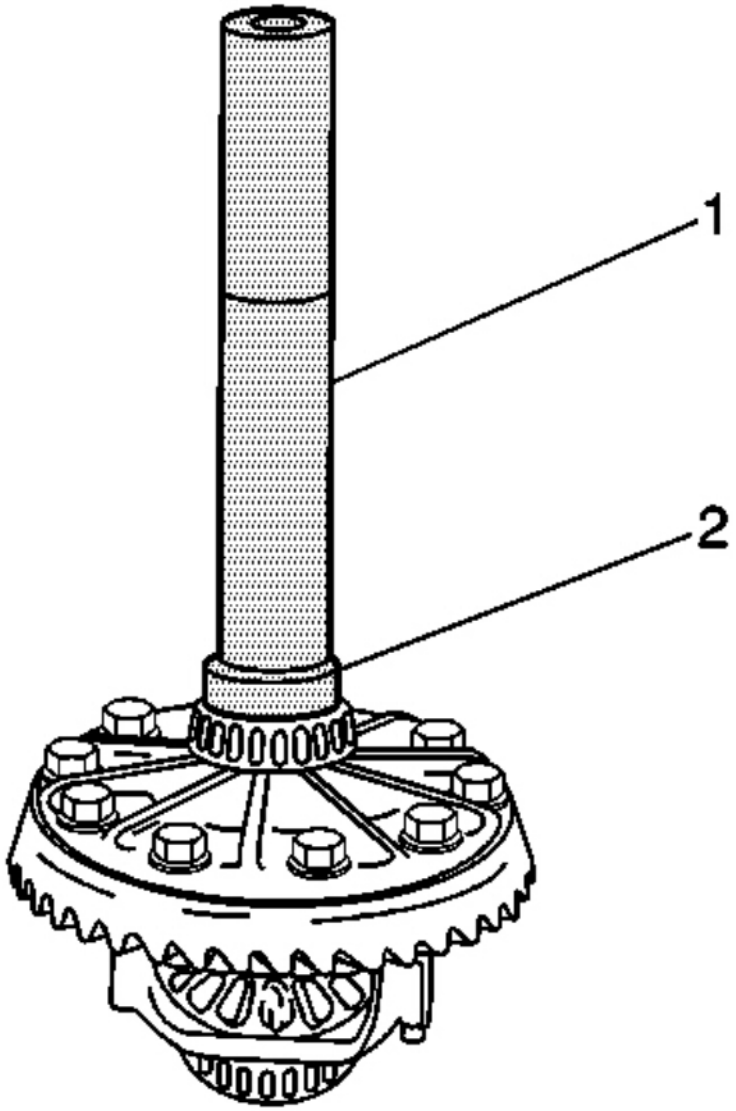


Fig. 190: Installing Differential Side Bearing

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Courtesy of GENERAL MOTORS CORP.

PINION BEARING CUP INSTALLATION (8.25 INCH AXLE W/J 45858)

Tools Required

J-45858 Pinion Bearing Race Remover/Installer - 8. See **Special Tools and Equipment**.25 in Axle

1. Before assembly, lubricate the following parts with axle lubricant. Use the proper fluid. Refer to **Sealers, Adhesives, and Lubricants**.
   - The pinion bearings
   - The pinion and the differential gears
   - The thrust washers
   - The pinion bearing cups
2. Install the J 45858-3 (3), the thrust bearing and the washer (2), and the J 45858-6 (1) over the outer pinion bearing cup bore.

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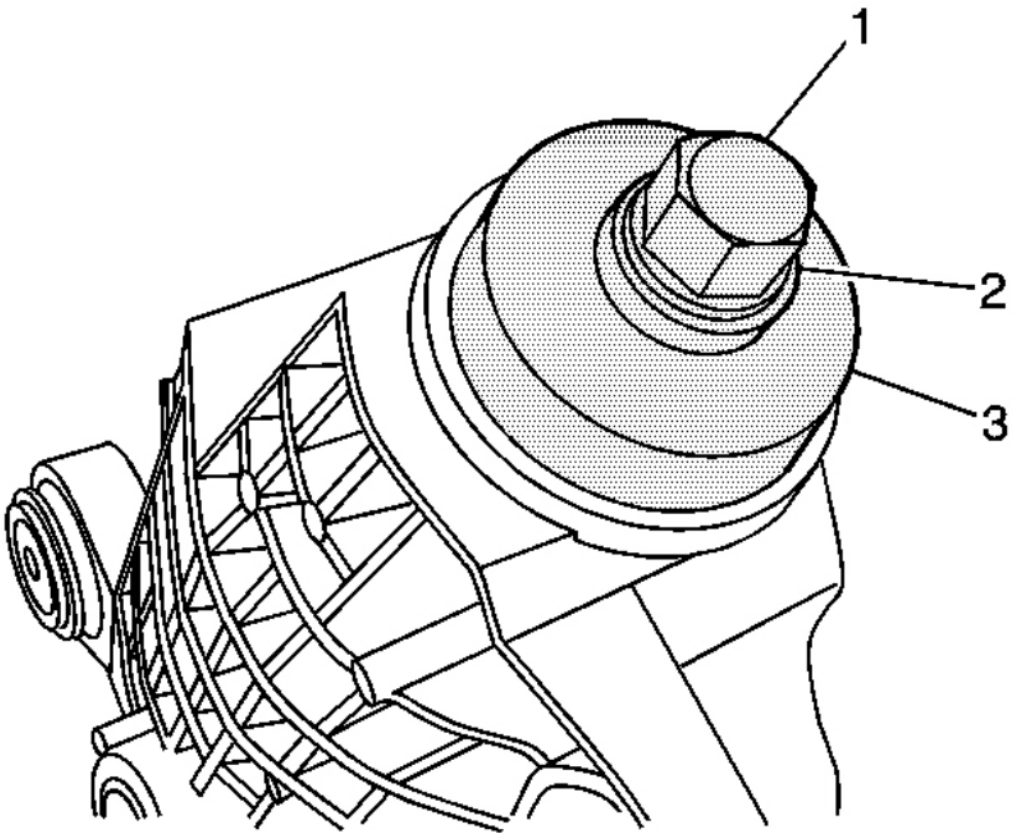


Fig. 191: Installing Special Tools Over Outer Pinion Bearing Cup Bore
Courtesy of GENERAL MOTORS CORP.

3. Install the inner pinion bearing cup and the J 45858-2 (4) to the J 45858-6 (1).

   Slowly turn the J 45858-6 until the inner pinion bearing cup is evenly seated over the inner pinion bearing cup bore.

4. Turn the J 45858-6 clockwise slowly in order to draw the inner pinion bearing cup into the inner pinion bearing cup bore.

   Inspect the position of the inner pinion bearing cup as it is being drawn into the inner pinion bearing cup bore to ensure the bearing cup is being pulled straight into the pinion bearing cup bore. If the pinion bearing cup is not being pulled straight into the bearing cup bore, remove the **J-45858** and the inner pinion bearing cup and reposition the inner pinion bearing cup.

5. Tighten the J 45858-6 until the inner pinion bearing cup is seated in the inner pinion bearing cup bore.

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6. Remove the **J-45858** .

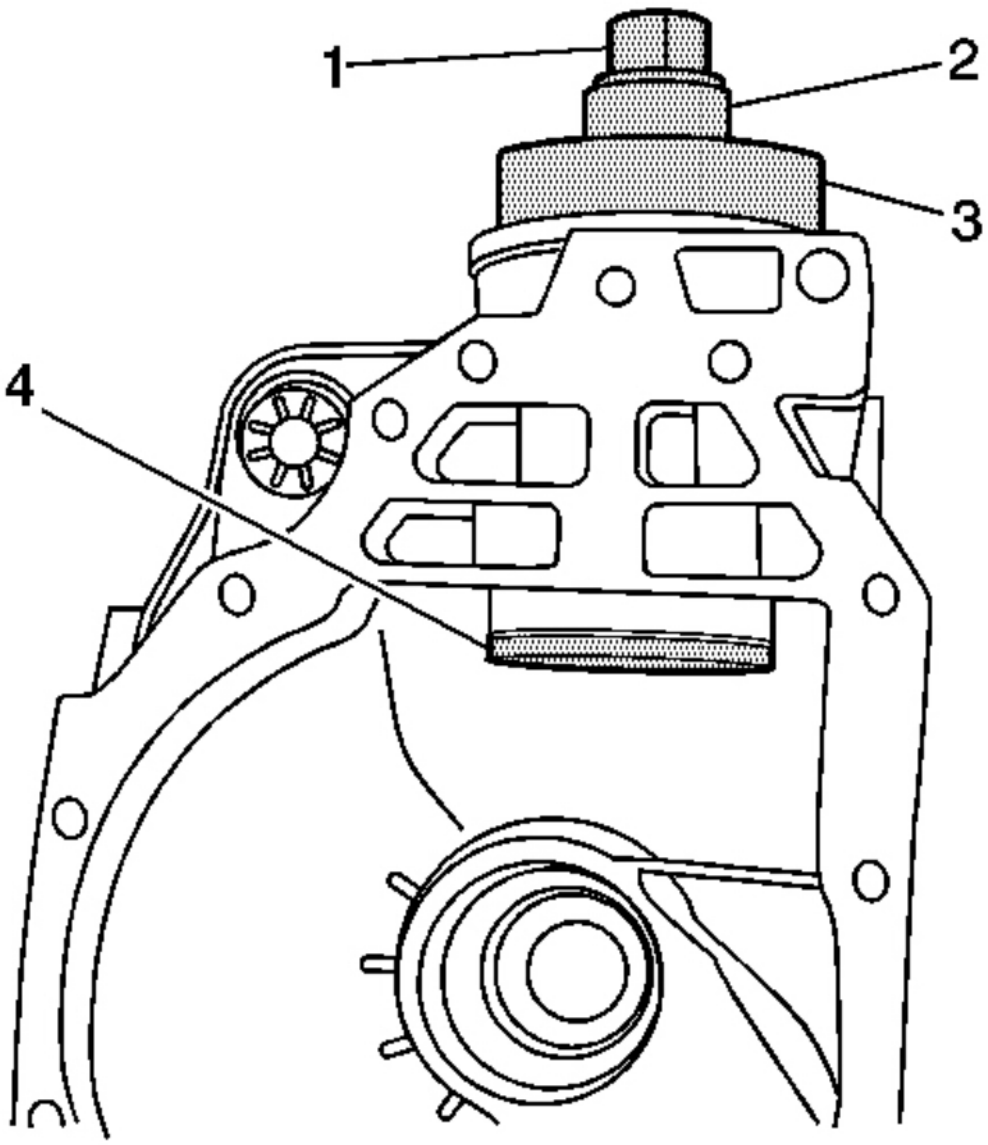


Fig. 192: Installing Inner Pinion Bearing Cup & J 45858-2 To J 45858-6
Courtesy of GENERAL MOTORS CORP.

7. Install the outer pinion bearing cup and the J 45858-1 over the outer pinion bearing cup bore.

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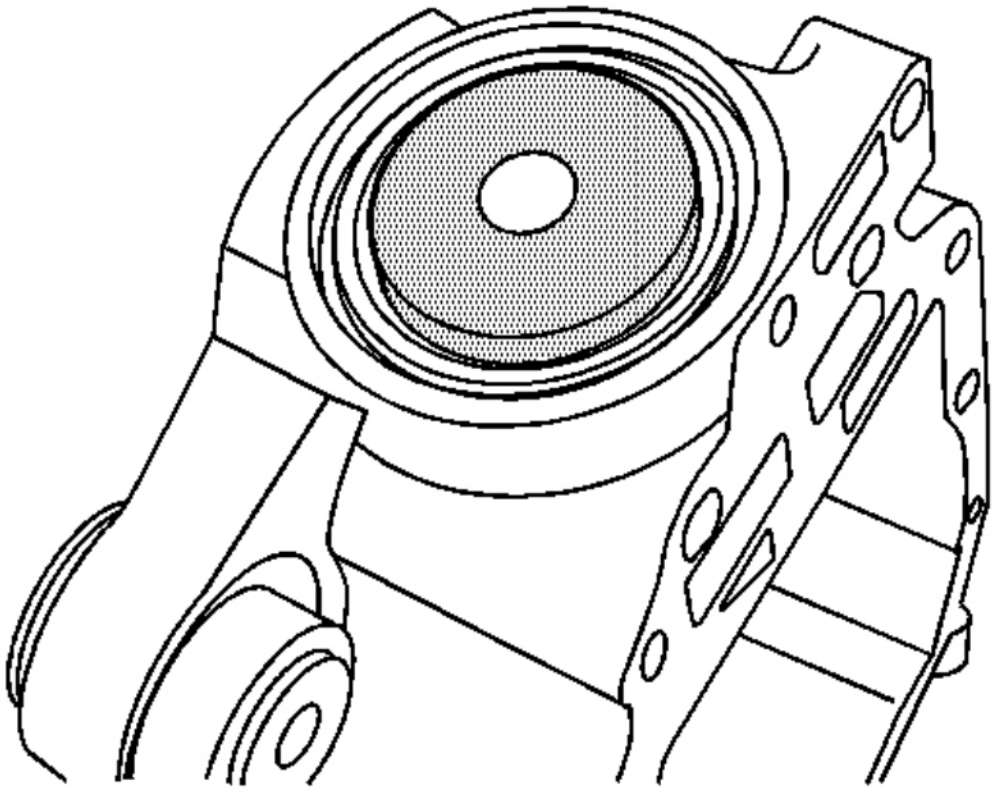


Fig. 193: Installing Outer Pinion Bearing Cup & J 45858-1 Over Bore
Courtesy of GENERAL MOTORS CORP.

8. Install the thrust bearing and the washer (2), the J 45858-6 (1), and the J 45858-2 (3) as shown.
9. Slowly turn the J 45858-6 until the outer pinion bearing cup is evenly seated over the outer pinion bearing cup bore and the J 45858-2 is evenly seated within the inner pinion bearing cup.
10. Turn the J 45858-6 clockwise slowly in order to draw the outer pinion bearing cup into the outer pinion bearing cup bore.

    Inspect the position of the outer pinion bearing cup as it is being drawn into the outer pinion bearing cup bore to ensure the bearing cup is being pulled straight into the pinion bearing cup bore. If the pinion bearing cup is not being pulled straight into the bearing cup bore, remove the **J-45858** and the outer pinion bearing cup and reposition the outer pinion bearing cup.

11. Tighten the forcing screw until the outer pinion bearing cup is seated in the outer pinion bearing cup bore.
12. Remove the **J-45858** .

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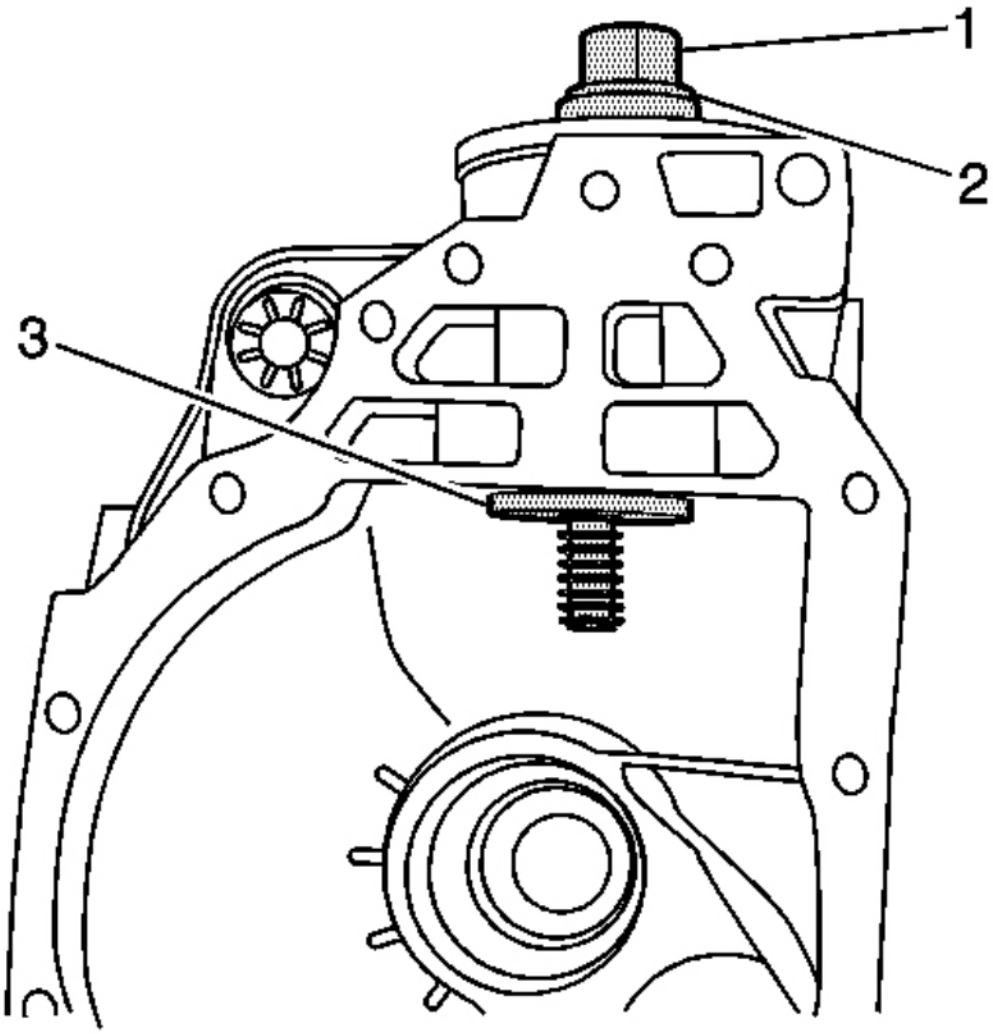


Fig. 194: Installing Thrust Bearing & Washer, J 45858-6 & J 45858-2
Courtesy of GENERAL MOTORS CORP.

13. Measure the pinion depth and determine the selectable pinion shim thickness. Refer to **Pinion Depth Adjustment**.

PINION BEARING CUP INSTALLATION (9.25 INCH AXLE W/J 45754)

Tools Required

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J 45754 Pinion Bearing Race Remover/Installer - 9.25 in Axle. See **Special Tools and Equipment**.

1. Before assembly, lubricate the following parts with axle lubricant. Use the correct fluid. Refer to **Sealers, Adhesives, and Lubricants**.
   - The pinion bearings
   - The pinion and the differential gears
   - The thrust washers
   - The pinion bearing cups
2. Install the outer pinion bearing cup into the outer pinion bearing cup bore.

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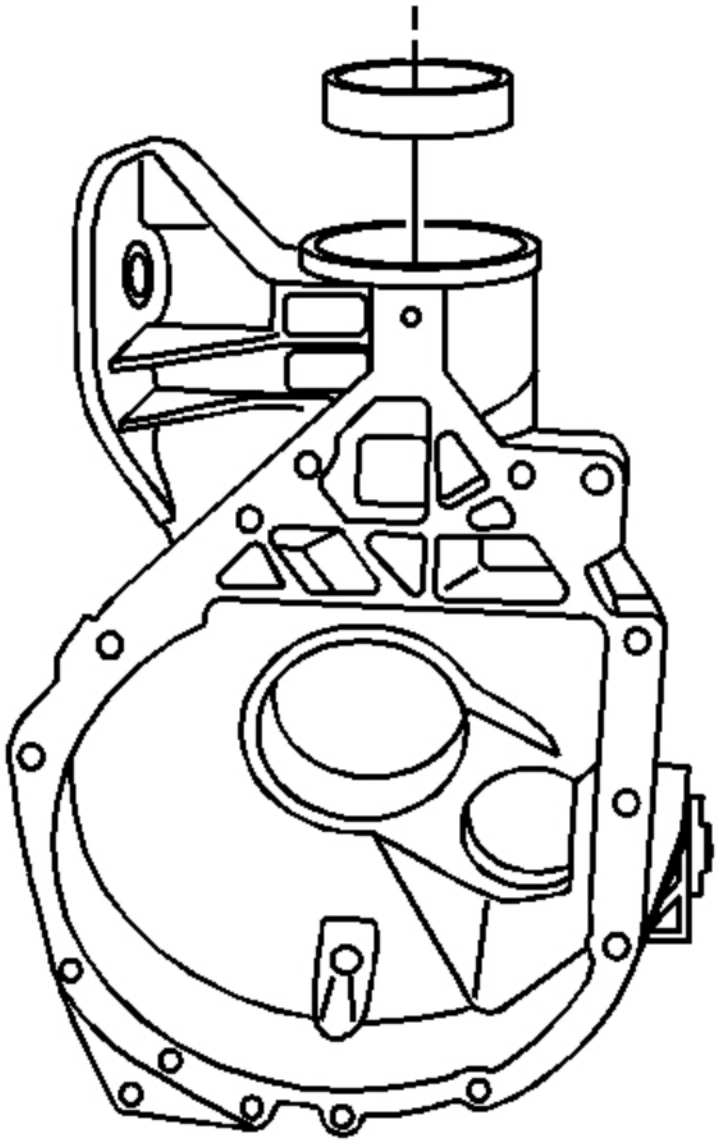


Fig. 195: View Of Outer Pinion Bearing Cup & Bore
Courtesy of GENERAL MOTORS CORP.

3. Install the J 45754-1 over the outer pinion bearing cup.

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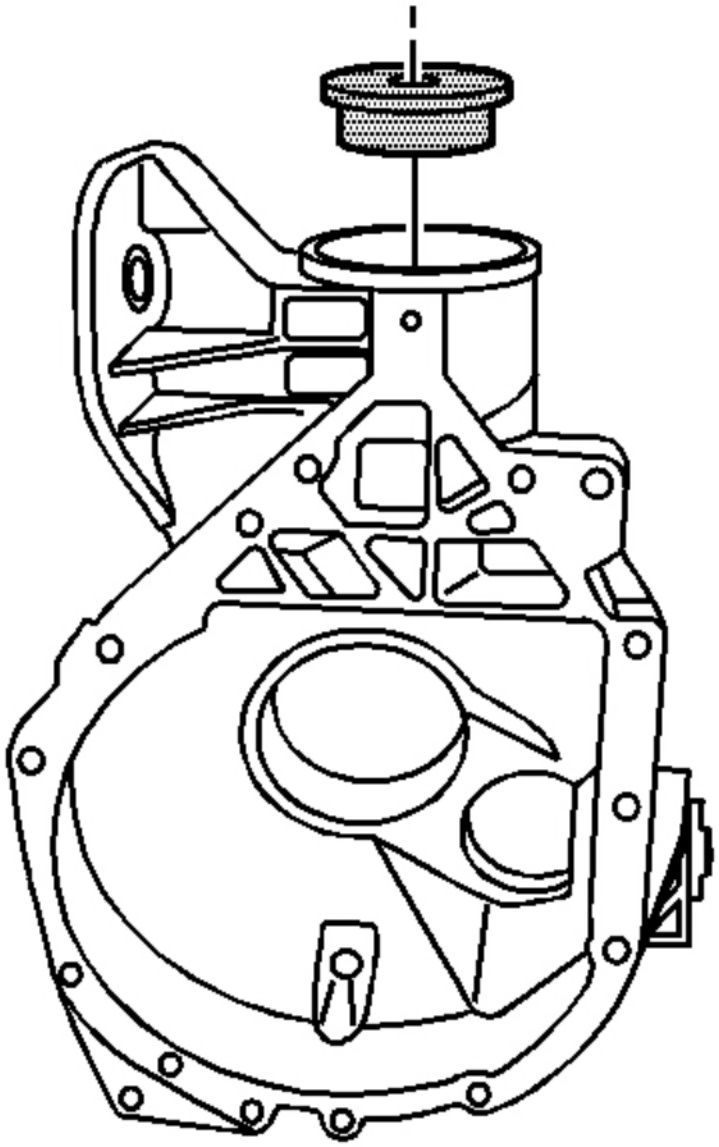


Fig. 196: Installing J 45754-1 Over Outer Pinion Bearing Cup
Courtesy of GENERAL MOTORS CORP.

4. Install the forcing screw (1), the J 45754-2 (2) into the inner pinion bearing cup bore.
5. Attach the forcing screw to the J 45754-1.

Slowly turn the forcing screw until the J 45754-1 is evenly seated over the outer pinion bearing cup bore

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and the J 45754-2 with the inner pinion bearing cup is evenly seated over the inner pinion bearing cup bore.

6. Turn the forcing screw clockwise slowly in order to draw the outer pinion bearing cup into the outer pinion bearing cup bore.

   Inspect the position of the outer pinion bearing cup as it is being drawn into the outer pinion bearing cup bore to ensure the bearing cup is being pulled straight into the pinion bearing cup bore. If the pinion bearing cup is not being pulled straight into the bearing cup bore, remove the **J 45754** and the outer pinion bearing cup and reposition the outer pinion bearing cup.

7. Tighten the forcing screw until the outer pinion bearing cup is seated in the outer pinion bearing cup bore.
8. Remove the **J 45754** .

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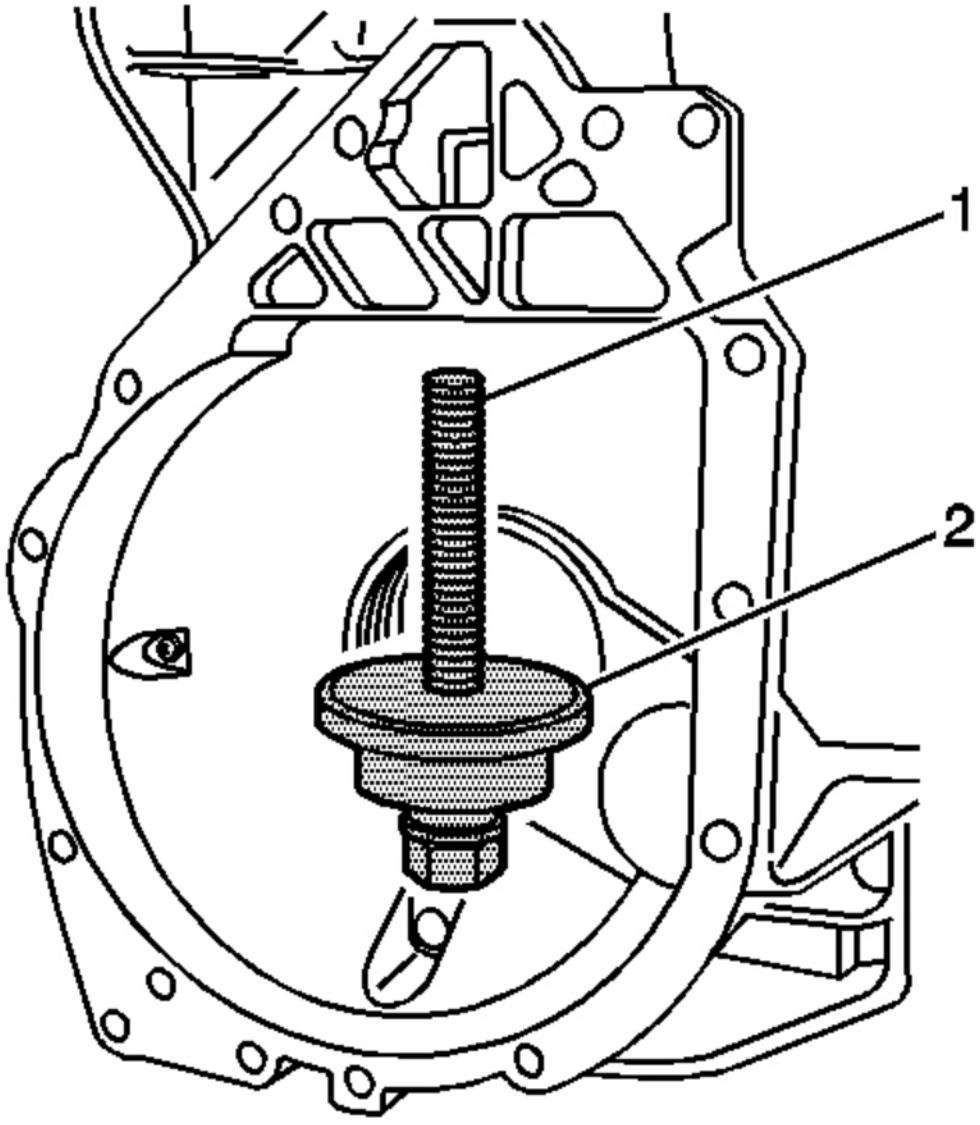


Fig. 197: Installing Forcing Screw, J 45754-2 Into Inner Pinion Bearing Cup Bore
Courtesy of GENERAL MOTORS CORP.

9. Install the inner pinion bearing cup onto the J 45754-2 (2) and the forcing screw (1).
10. Install the J 45754-2 (2), the forcing screw (1), and the inner pinion bearing cup into the pinion bearing cup bore.

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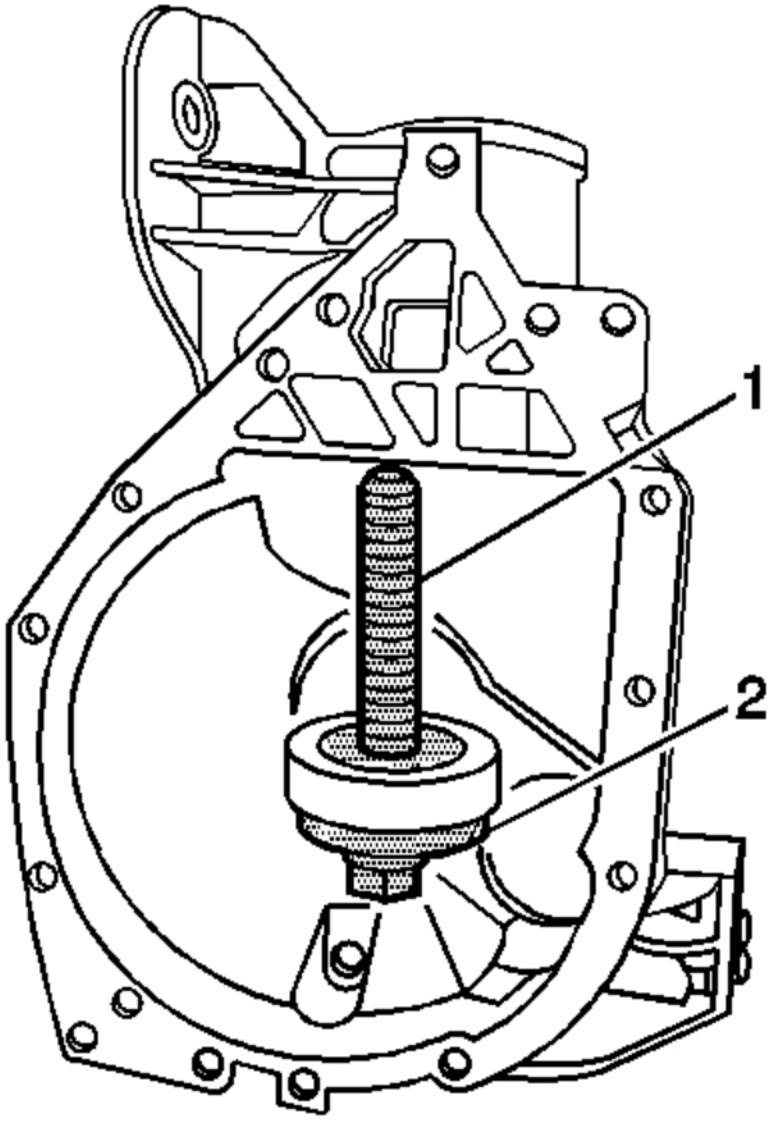


Fig. 198: Installing J 45754-2, Forcing Screw & Inner Pinion Bearing Cup Into Bore
Courtesy of GENERAL MOTORS CORP.

11. Install the J 45754-1 over the outer pinion bearing cup.
12. Attach the forcing screw to the J 45754-1.

Slowly turn the forcing screw until the J 45754-1 is evenly seated over the outer pinion bearing cup bore

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and the J 45754-1 with the inner pinion bearing cup is evenly seated over the inner pinion bearing cup bore.

13. Turn the forcing screw clockwise slowly in order to draw the inner pinion bearing cup into the inner pinion bearing cup bore.

    Inspect the position of the inner pinion bearing cup as it is being drawn into the inner pinion bearing cup bore to ensure the bearing cup is being pulled straight into the pinion bearing cup bore. If the pinion bearing cup is not being pulled straight into the bearing cup bore, remove the **J 45754** and the inner pinion bearing cup and reposition the inner pinion bearing cup.

14. Tighten the forcing screw clockwise until the inner pinion bearing cup is seated in the inner pinion bearing cup bore.
15. Remove the **J 45754** .

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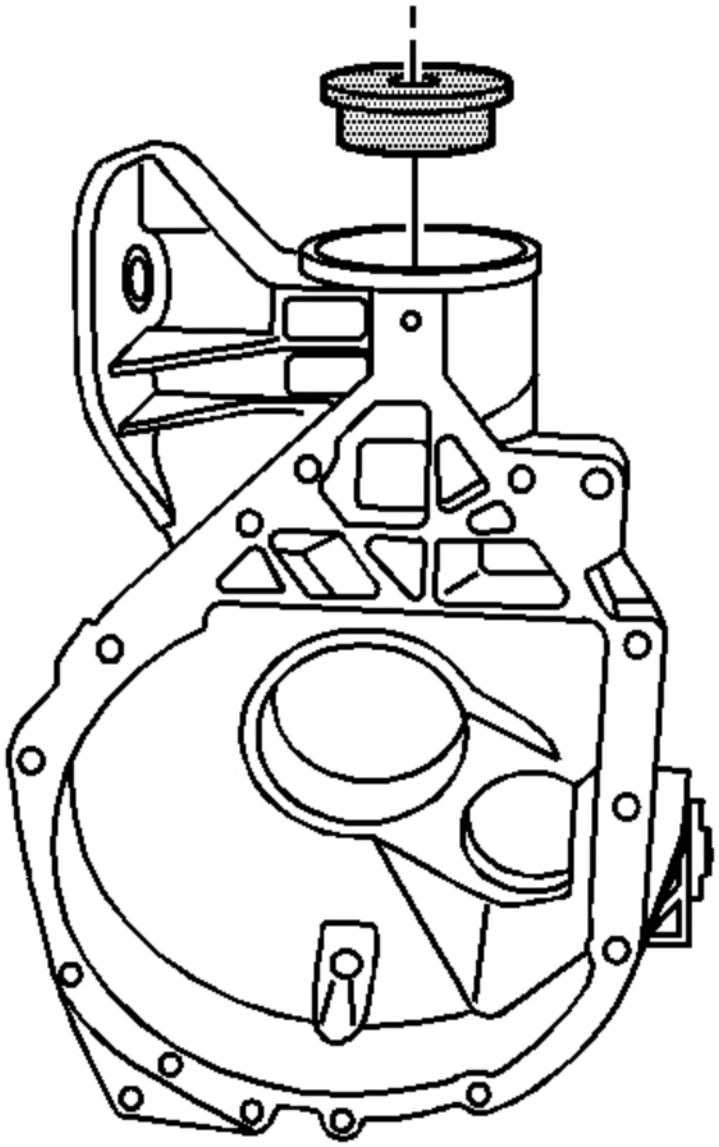


Fig. 199: Installing J 45754-1 Over Outer Pinion Bearing Cup
Courtesy of GENERAL MOTORS CORP.

16. Measure the pinion depth and determine the selectable pinion shim thickness. Refer to **Pinion Depth Adjustment**.

PINION BEARING CUP INSTALLATION (8.25/9.25 INCH AXLES W/J 36598)

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Tools Required

J 36598 Holding Fixture. See **Special Tools and Equipment**.

1. Before assembly, apply axle lubricant to the pinion bearing cups. Refer to **Sealers, Adhesives, and Lubricants**.
2. Install the **J 36598** into a vise.
3. Install the left differential carrier case half into the **J 36598** and the J 36598-6, 8.25 inch axle, or the **J 36598** (1), 9.25 inch axle.

   Tighten the attaching bolts securely.

4. Install the J 36598-3, 8.25 inch axle, or the J 36598-4, 9.25 inch axle (2), onto the forcing screw of the **J 36598** .
5. Install the outer pinion bearing cup into the differential carrier case.
6. Install the J 36598-3, 8.25 inch axle, or the J 36598-4, 9.25 inch axle (2) onto the outer pinion bearing cup.

   Rotate the J 36598-3 or the J 36598-4 and the outer pinion bearing cup several time in order to seat the outer pinion bearing cup evenly within the outer pinion bearing cup bore.

7. Install the outer pinion bearing cup into the differential carrier case half by holding the forcing screw of the **J 36598** and turning the handle counterclockwise.

   Inspect the position of the outer pinion bearing cup as it is being installed into the outer pinion bearing cup bore to ensure the bearing cup is being installed evenly. If the pinion bearing cup is not being installed evenly, loosen the **J 36598** and remove the outer pinion bearing cup. Reposition the outer pinion bearing cup over the outer pinion bearing cup bore and re-install.

8. Remove the J 36598-3 or the J 36598-4 from the forcing screw of the **J 36598** .

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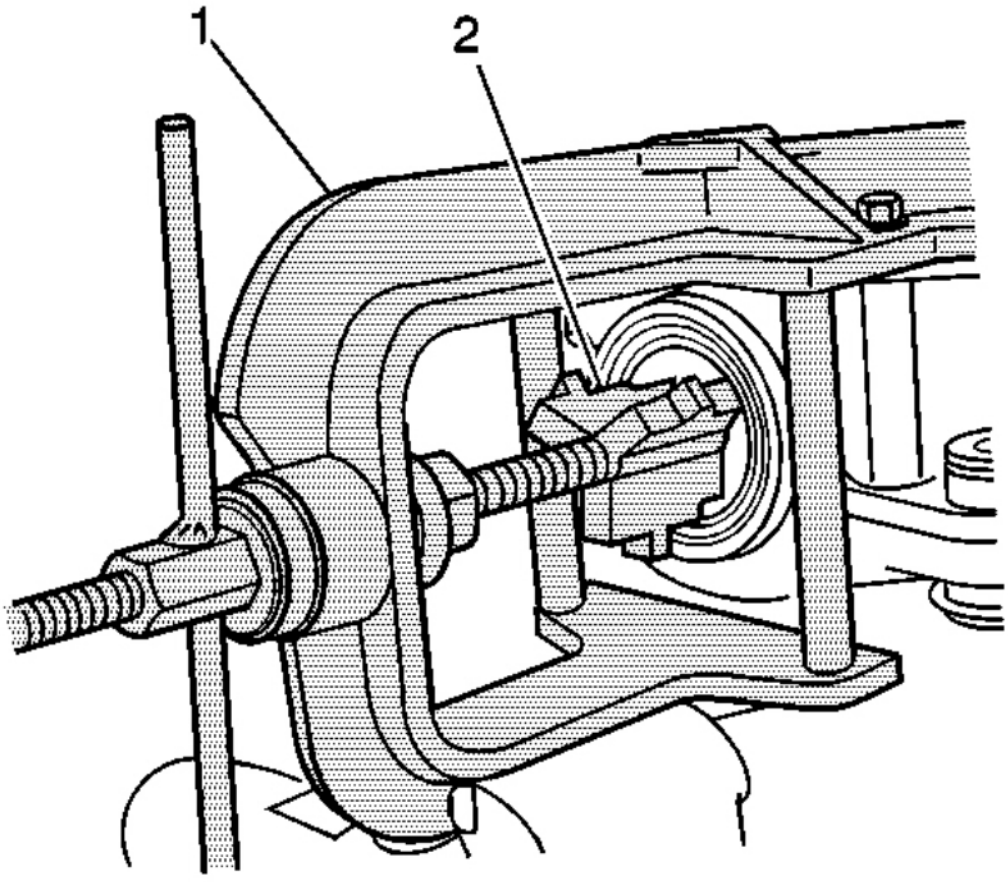


Fig. 200: Installing Outer Pinion Bearing Cup Using J 36598 & J 36598-4
Courtesy of GENERAL MOTORS CORP.

9. Install the J 36598-15 (2) into the outer pinion bearing cup.
10. Install the inner pinion bearing cup into the inner pinion bearing cup bore.

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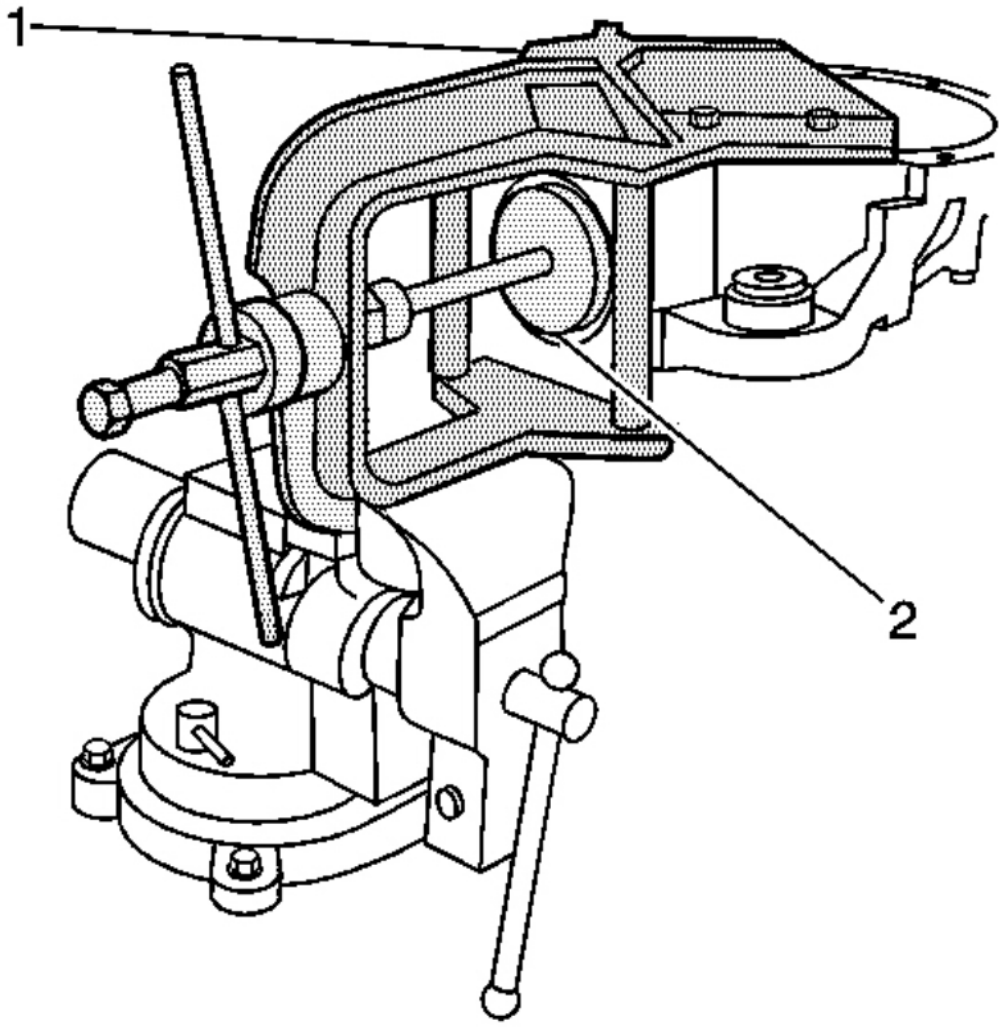


Fig. 201: Installing J 36598-15 Into Outer Pinion Bearing Cup
Courtesy of GENERAL MOTORS CORP.

11. Place the J 36598-3, 8.25 inch axle, or the J 36598-4, 9.25 inch axle (2), over the inner pinion bearing cup.
12. Extend the forcing screw of the J 36598 (1) through the J 36598-15 and thread it into the J 36598-3 or the J 36598-4 (2) until fully seated.
13. Rotate the J 36598-3 or the J 36598-4 several times in order to ensure the inner pinion bearing cup is evenly seated and not mis-aligned in the bore.
14. Install the inner pinion bearing cup into the differential carrier case half by holding the forcing screw of

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the J 36598 and turning the handle clockwise.

Inspect the position of the inner pinion bearing cup as it is being drawn into the inner pinion bearing cup bore to ensure the bearing cup is being installed evenly. If the pinion bearing cup is not being installed evenly, loosen the **J 36598** and remove the inner pinion bearing cup. Reposition the inner pinion bearing cup over the inner pinion bearing cup bore and re-install.

15. Remove the J 36598-3 or the J 36598-4 and the J 36598-15.
16. Remove the differential carrier case.
17. Remove the J 36598 from the vise.

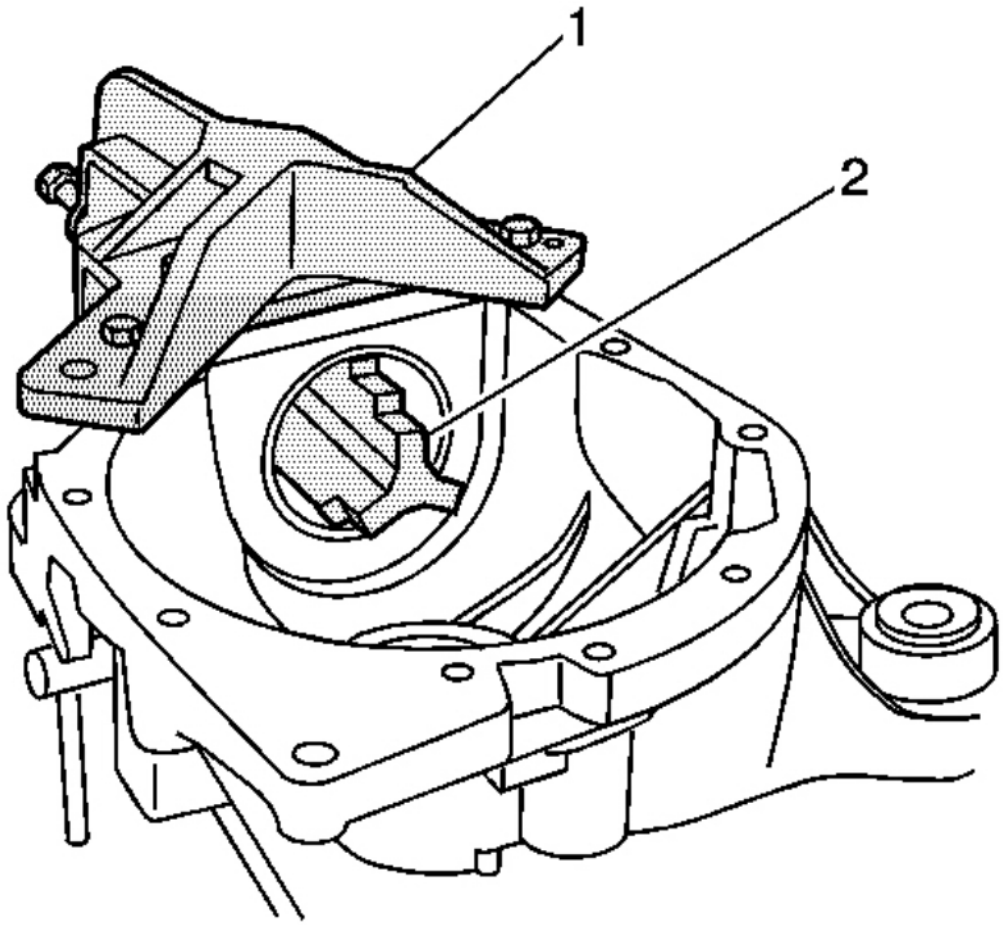


Fig. 202: Installing Inner Pinion Bearing Cup Using J 36598 & J 36598-4
Courtesy of GENERAL MOTORS CORP.

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18. Determine the selective shim thickness for the pinion. Refer to **Pinion Depth Adjustment**.

PINION DEPTH ADJUSTMENT

Tools Required

- **J 36601** Pinion Shim Selector. See **Special Tools and Equipment**.
- **J 29763** Static Timing Gage.

IMPORTANT: Make sure all of the tools, the pinion bearings, and the pinion bearing cups are clean before proceeding.

1. Before assembly, lubricate the pinion bearings with axle lubricant. Use the correct fluid. Refer to **Sealers, Adhesives, and Lubricants**.

IMPORTANT: The J 36601 uses two different measuring arms to measure the pinion depth. The J 36601-4 is used to measure the pinion depth for the 8.25 inch axle and the J 36601-3 is used to measure the pinion depth for the 9.25 inch axle.

2. Install the J 36601-4 or the J 36601-3 (4) to the J 36601-7 (1).
3. Install the J 21777-35 for the 8.25 inch axle or the J 21777-8 for the 9.25 inch axle (3) to the J 36601-7 (1).
4. Install the inner pinion bearing into the differential carrier case half.
5. Insert the J 36601-7 (1) with the J 21777-35 or the J 21777-8 (3) through the inner pinion bearing and the differential carrier case half.
6. Install the outer pinion bearing.

IMPORTANT: Each end of the J 36601-5 is sized specifically for the 8.25 inch or the 9.25 inch outer pinion bearing. Ensure the correct end is being used when installing the J 36601-5 into the outer pinion bearing.

7. While holding the outer pinion bearing in position, install the J 36601-5 (2), the washer, and the nut to the J 36601-7 (1).

NOTE: Refer to Fastener Notice in Cautions and Notices.

8. While holding the J 36601-7 (1) stationary with a wrench, tighten the nut on the J 36601-7 (1).

Tighten: Tighten the nut until all of the end play is removed from the **J 36601** .

9. Rotate the assembly several times in both directions in order to seat the pinion bearings.
10. While holding the J 36601-4 or the J 36601-3 (4) stationary, measure the rotating torque of the **J 36601** using an inch-pound torque wrench.

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Specification: The rotating torque of the **J 36601** should be between 1.1-2.3 N.m (10-20 lb in).

11. If the torque is less than 1.0 N.m (10 lb in), continue to tighten the nut on the J 36601-7 until a rotating torque of 1.1-2.3 N.m (10-20 lb in) is obtained.

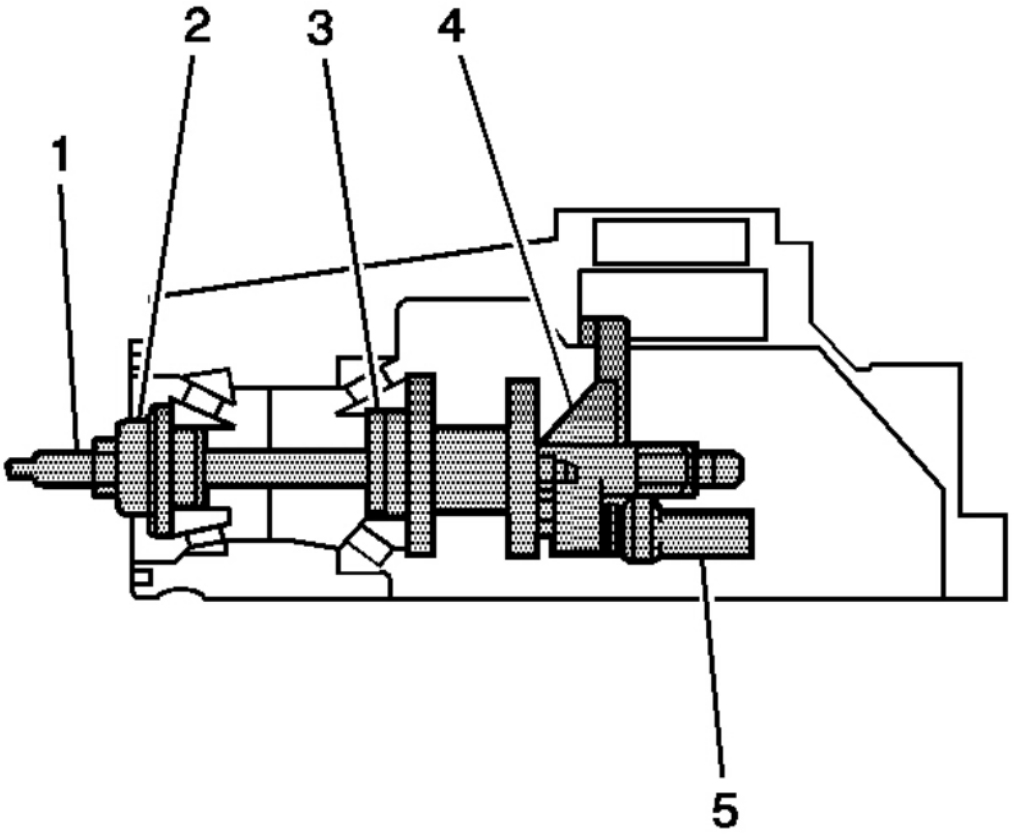


Fig. 203: View Of J 36601 & J 21777 Assembly
Courtesy of GENERAL MOTORS CORP.

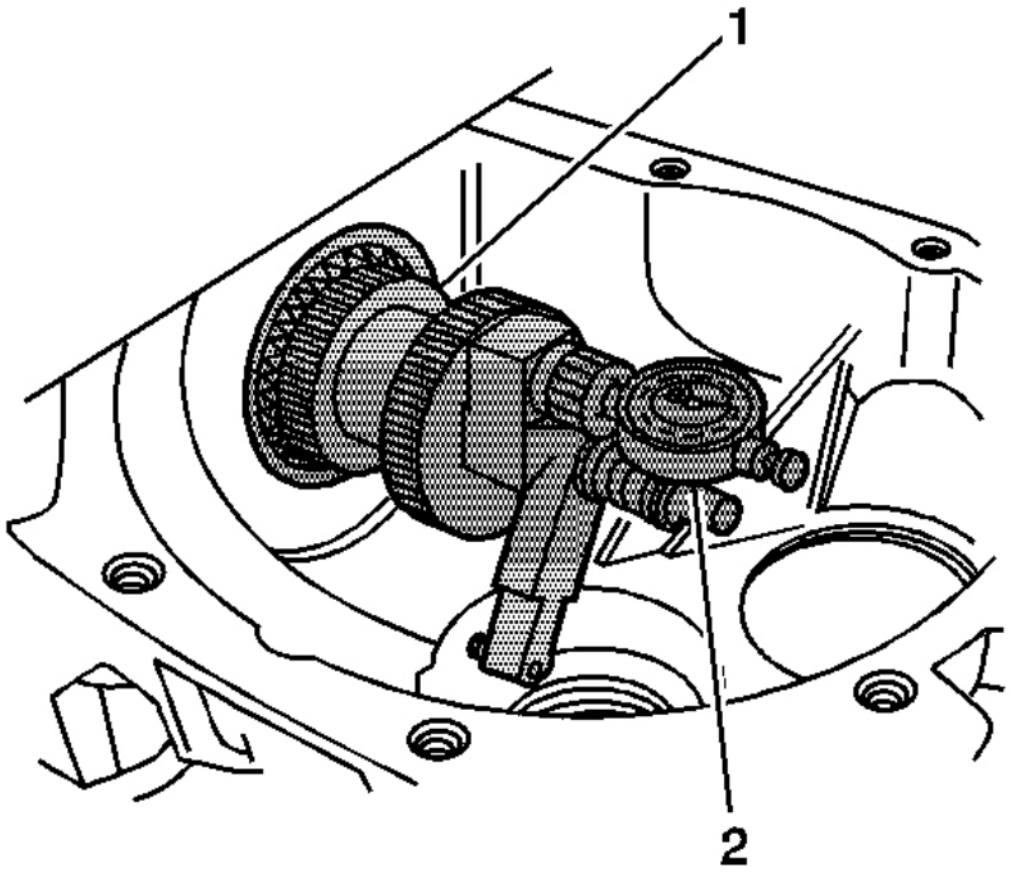
12. Install the adjustment screw and the lock nut of the **J 29763** (2) to the J 36601-4 or the J 36601-3.
13. Install the **J 29763** to the adjustment screw and lock nut assembly.

Tighten the lock nut to hold the **J 29763** in place.

IMPORTANT: The left side differential bearing adjuster assembly on the 9.25 inch axle must be removed prior to placing the J 36601-3 in the differential side bearing bore.

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14. Place the contact pad of the J 36601-4 or to the J 36601-3 into the differential side bearing bore.
15. Adjust the **J 29763** to the differential bearing bore by doing the following:
    1. Loosen the lock nut on the **J 29763** .
    2. Place the contact pad of the J 36601-4 or the J 36601-3 onto the differential side bearing bore.
    3. With the contact pad of the J 36601-4 or the J 36601-3 touching the differential side bearing bore, push down on the **J 29763** until the needle of the **J 29763** has turned 3/4 of a turn clockwise.
    4. Tighten the lock nut of the **J 29763** .
16. Rotate the J 36601-4 or the J 36601-3 (1) back and forth until the needle of the **J 29763** (2) indicates the lowest point in the differential side bearing bore.
17. At the lowest point of deflection, move the housing of the **J 29763** until the needle indicates ZERO.
18. Move the J 36601-4 or the J 36601-3 back and forth again to verify the zero setting. Adjust the housing of the **J 29763** as necessary to set the needle to ZERO.



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Fig. 204: View Of J 36601-3 & J 29763 In Differential Side Bearing Bore
Courtesy of GENERAL MOTORS CORP.

19. After the ZERO setting is obtained and verified, grasp the J 36601-4 or the J 36601-3 (1) by the flats and move the J 36601-4 or the J 36601-3 out of the differential side bearing bore.

IMPORTANT: The unit of measurement for the J 29763 is in hundredths of a millimeter.

20. The value indicated on the **J 29763** (2) is the thickness of the shim needed in order to set the depth of the pinion.
21. Select the shim that indicates the correct thickness. Measure the shim with a micrometer in order to verify that the thickness is correct.
22. Remove the pinion depth setting tools.
23. Remove the pinion bearings.

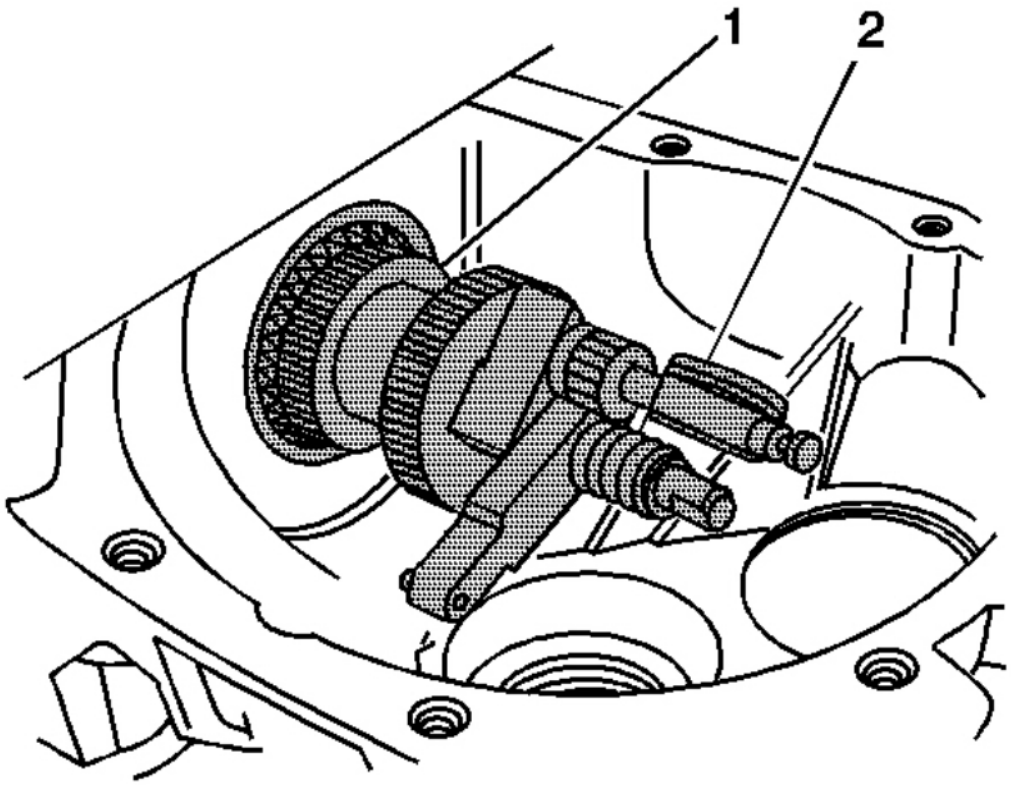


Fig. 205: Obtaining Shim Thickness Using J 36601-3 & J 29763
Courtesy of GENERAL MOTORS CORP.

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24. Install the pinion shim between the drive pinion and the inner pinion bearing and assemble the differential carrier. Refer to **Differential Carrier Assembly - Assemble**.

Differential pinion gear shims are available in the following sizes:

Shim Sizes

8.25 Inch Axle	9.25 Inch Axle
0.508 mm (0.020 in)	0.5131 mm (0.0202 in)
0.533 mm (0.021 in)	0.5395 mm (0.0212 in)
0.559 mm (0.022 in)	0.5639 mm (0.0222 in)
0.584 mm (0.023 in)	0.5893 mm (0.0232 in)
0.610 mm (0.024 in)	0.6147 mm (0.0242 in)
0.635 mm (0.025 in)	0.6401 mm (0.0252 in)
0.660 mm (0.026 in)	0.6655 mm (0.0262 in)
0.686 mm (0.027 in)	0.6909 mm (0.0272 in)
0.711 mm (0.028 in)	0.7163 mm (0.0282 in)
0.737 mm (0.029 in)	0.7417 mm (0.0292 in)
0.762 mm (0.030 in)	0.7671 mm (0.0302 in)
0.787 mm (0.031 in)	0.7925 mm (0.0312 in)
0.813 mm (0.032 in)	0.8179 mm (0.0322 in)
0.838 mm (0.033 in)	0.8433 mm (0.0332 in)
0.864 mm (0.034 in)	0.8687 mm (0.0342 in)
0.889 mm (0.035 in)	0.8941 mm (0.0352 in)
0.914 mm (0.036 in)	0.9195 mm (0.0362 in)
0.940 mm (0.037 in)	0.9449 mm (0.0372 in)
0.965 mm (0.038 in)	-
0.991 mm (0.039 in)	-
1.016 mm (0.040 in)	-
1.041 mm (0.041 in)	-
1.067 mm (0.042 in)	-
1.092 mm (0.043 in)	-
1.118 mm (0.044 in)	-
1.143 mm (0.045 in)	-
1.168 mm (0.046 in)	-
1.194 mm (0.047 in)	-
1.219 mm (0.048 in)	-
1.245 mm (0.049 in)	-
1.270 mm (0.050 in)	-

DIFFERENTIAL CARRIER ASSEMBLY - ASSEMBLE

Tools Required

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- **J 8092** Universal Driver Handle - 3/4 in - 10. See **Special Tools and Equipment**.
- **J 8614-01** Flange and Pulley Holding Tool
- **J 35512** Inner Pinion Bearing Installer
- **J 36366** Pinion Oil Seal Installer
- **J 36599-A** Side Bearing Nut Wrench
- **J 36603** Side Bearing Cup Installer
- **J 36609** Axle Tube Bearing Installer
- **J 36612** Output Shaft Bearing Installer
- **J 36614** Inner Pinion Bearing Installer
- **J 36615** Side Bearing Nut Wrench (9.25 inch axle)

1. Install the pinion bearing cups into the differential carrier assembly, if necessary. Refer to **Pinion Bearing Cup Installation (8.25 Inch Axle w/J 45858)** or **Pinion Bearing Cup Installation (9.25 Inch Axle w/J 45754)** or **Pinion Bearing Cup Installation (8.25/9.25 Inch Axles w/J 36598)**.
2. Install the selective shim between the inner pinion bearing and the shoulder of the pinion gear.
3. Install the inner pinion bearing onto the pinion gear using the **J 35512** , 8.25 inch axle, or the **J 36614** , 9.25 inch axle.

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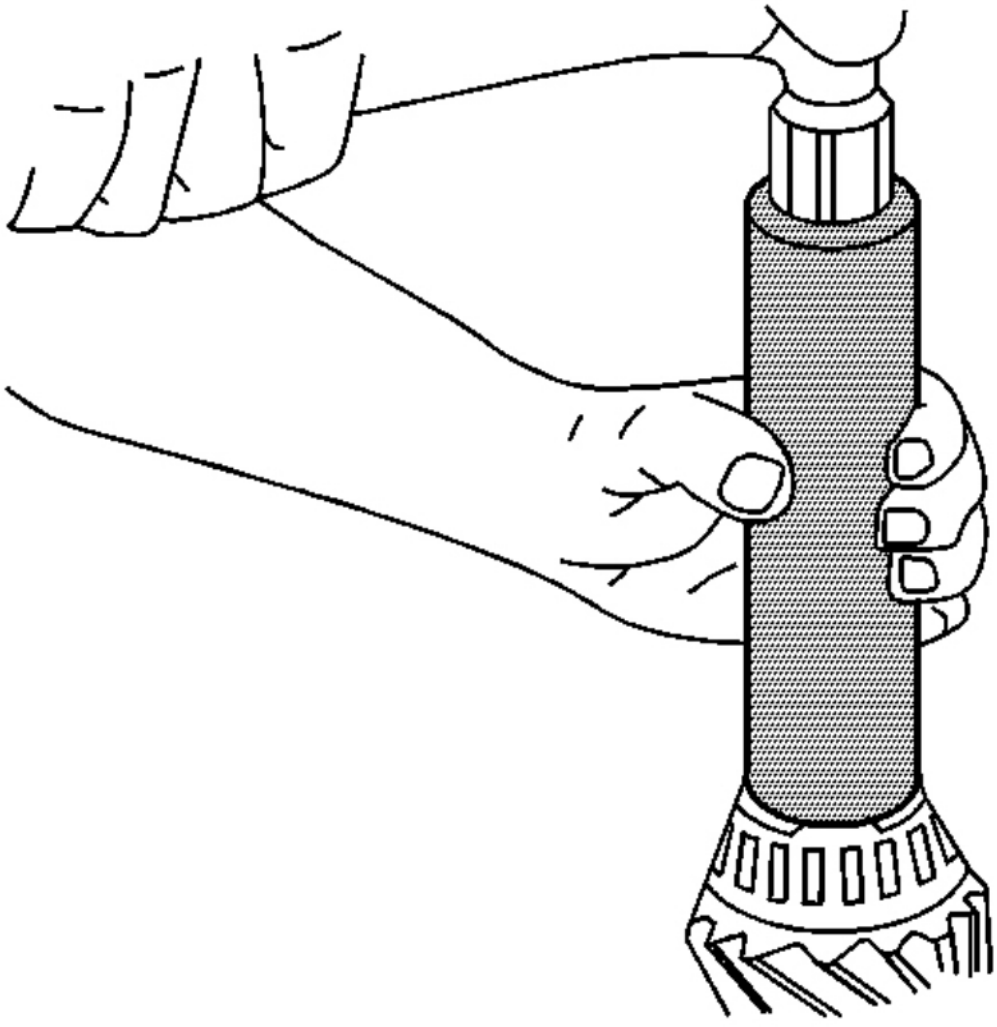


Fig. 206: Installing Inner Pinion Bearing Onto Pinion Gear
Courtesy of GENERAL MOTORS CORP.

4. Install the new collapsible spacer onto the pinion gear.
5. Install the outer pinion bearing into the differential carrier case half.
6. Install the pinion oil seal using **J 36366** .

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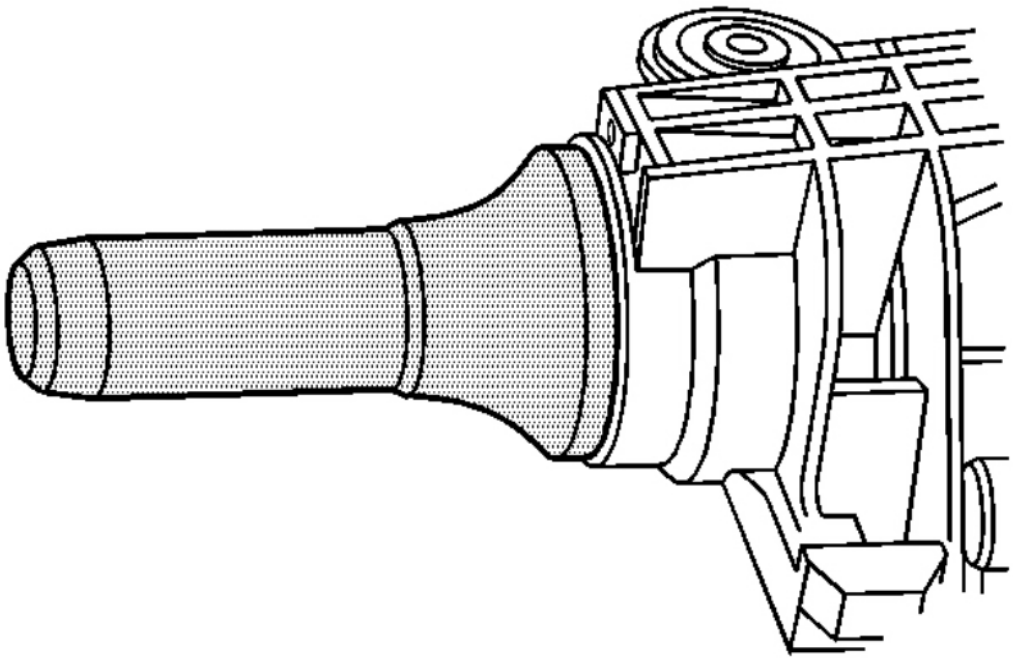


Fig. 207: Installing Oil Seal Using J 36366
Courtesy of GENERAL MOTORS CORP.

7. Install the pinion gear, with the inner pinion bearing and the new collapsible spacer, into the left differential carrier case half.
8. Apply sealant to the splines of the pinion yoke. Use the correct sealant. Refer to **Sealers, Adhesives, and Lubricants**.
9. Install the pinion yoke.

NOTE: Refer to Pinion Flange/Yoke Installation Notice in Cautions and Notices.

10. Seat the pinion yoke onto the pinion shaft by tapping it with a soft-faced hammer until a few pinion shaft threads show through the yoke.
11. Install the washer and a new pinion nut.

If the new pinion nut cannot be installed, perform the following steps in order to seat the pinion yoke onto the pinion so that the washer and new pinion nut can be installed:

A. Remove the pinion nut washer.
B. Install the old pinion nut.

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C. Tighten the nut until a few of the shaft threads show through the nut so that the washer and new pinion nut can be installed.
D. Remove the old pinon nut.
E. Install the pinion nut washer.
F. Install the new pinion nut.

12. Install the **J 8614-01** onto the pinion yoke as shown.

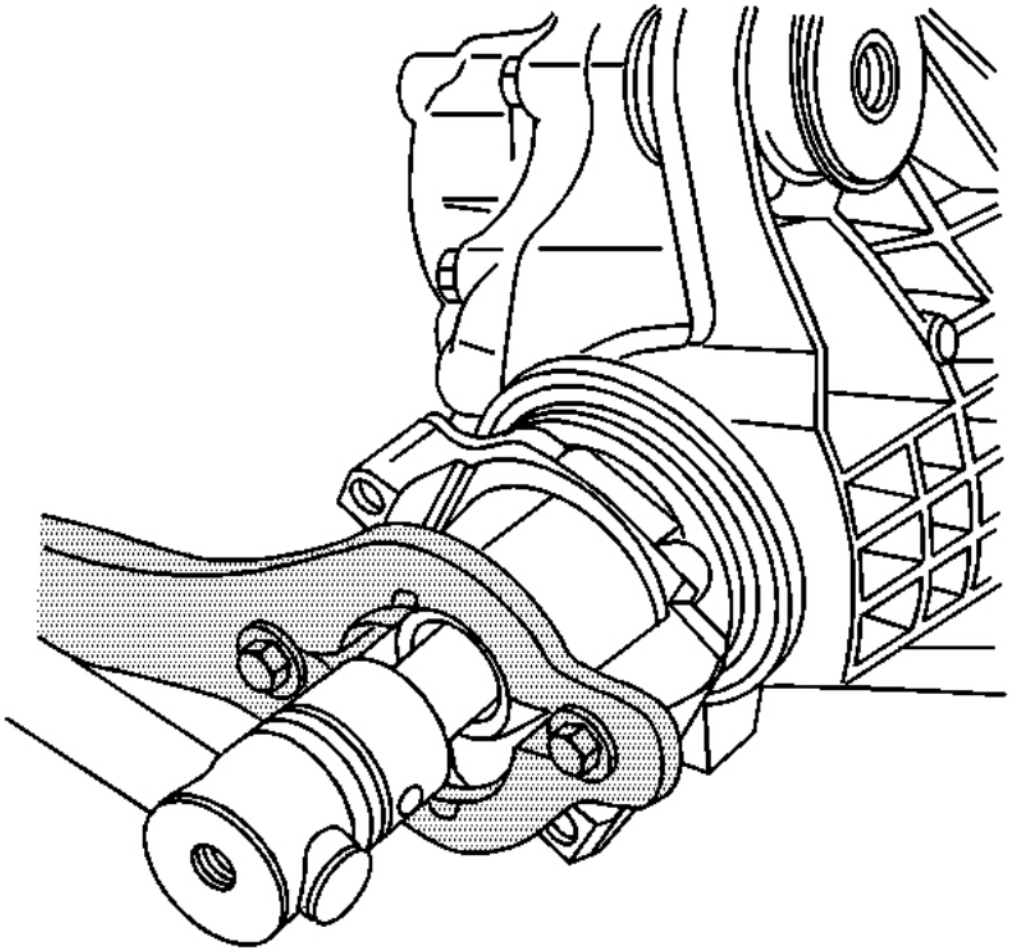


Fig. 208: Holding Pinion Flange Using Special Tool
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

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IMPORTANT: If the rotating torque is exceeded, the pinion will have to be removed and a new collapsible spacer installed.

13. Tighten the pinion nut while holding the **J 8614-01** .

    Tighten: Tighten the pinion nut until the pinion end play is just taken up. Rotate the pinion while tightening the nut in order to seat the bearings.

14. Remove the **J 8614-01** .
15. Measure the rotating torque of the pinion using an inch-pound torque wrench.

    Specification: The rotating torque of the pinion should be 1.0-2.3 N.m (10-20 lb in) for used bearings, or 1.7-3.4 N.m (15-30 lb in) for new bearings.

16. If the rotating torque measurement is below 1.0 N.m (10 lb in) for used bearings, or 1.7 N.m (15 lb in) for new bearings, reinstall the **J 8614-01** and continue to tighten the pinion nut.

    Specification: The rotating torque of the pinion should be 1.0-2.3 N.m (10-20 lb in) for used bearings, or 1.7-3.4 N.m (15-30 lb in) for new bearings.

17. Once the specified torque is obtained, rotate the pinion several times to ensure the bearings have seated.

    Recheck the rotating torque and adjust if necessary.

18. Remove the **J 8614-01** .
19. Assemble the differential adjuster nut into the differential nut sleeve until fully seated, 8.25 inch axle - left and right sides, 9.25 inch axle, right side.
20. Install the axle shaft bearings into the differential adjuster nut sleeve using the **J 36612** (2) and the **J 8092** (1), 8.25 inch S4WD axle - left and right sides, 8.25 inch F4WD axle - left side, 9.25 inch axle - right side.

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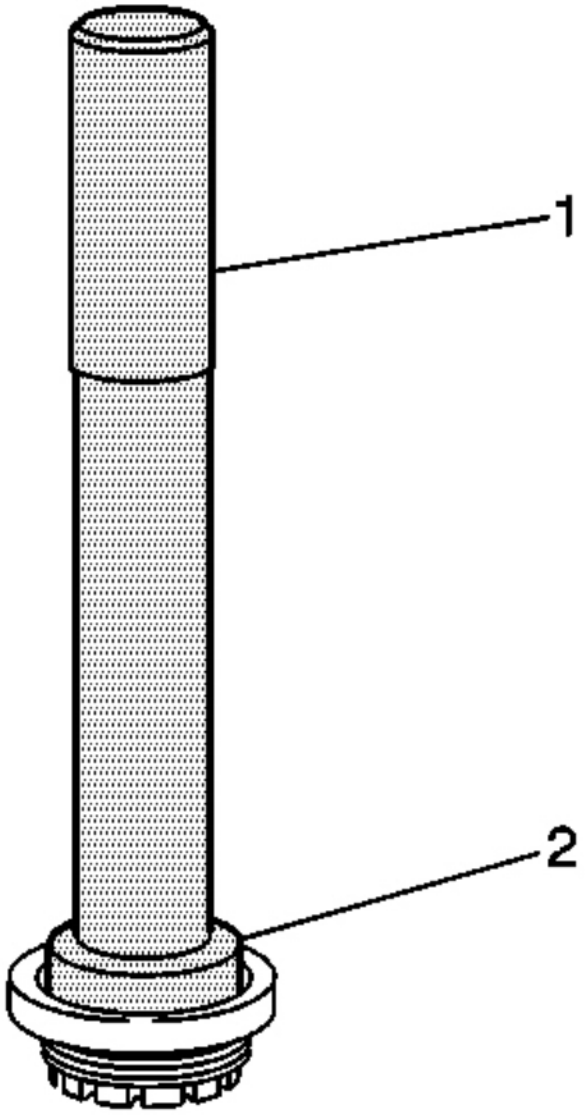


Fig. 209: Installing Axle Shaft Bearings Using J 36612 & J 8092
Courtesy of GENERAL MOTORS CORP.

21. Install the axle shaft bearing into the differential adjuster nut sleeve using the **J 36609** and the **J 8092** , 9.25 inch axle - left side.
22. Install the differential adjuster nut assembly and new adjuster lock nut tabs into the differential carrier case using the **J 36609** and the **J 8092** , 8.25 inch axle - left and right sides, 9.25 inch axle - right side.

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23. Install the differential adjuster nut assembly into the differential carrier case, 9.25 inch axle - left side.
24. Install the differential case side bearing cups to the differential carrier case using the **J 36603** (2) and the **J 8092** (1), 8.25 inch axle - left and right sides, 9.25 inch axle - right side.

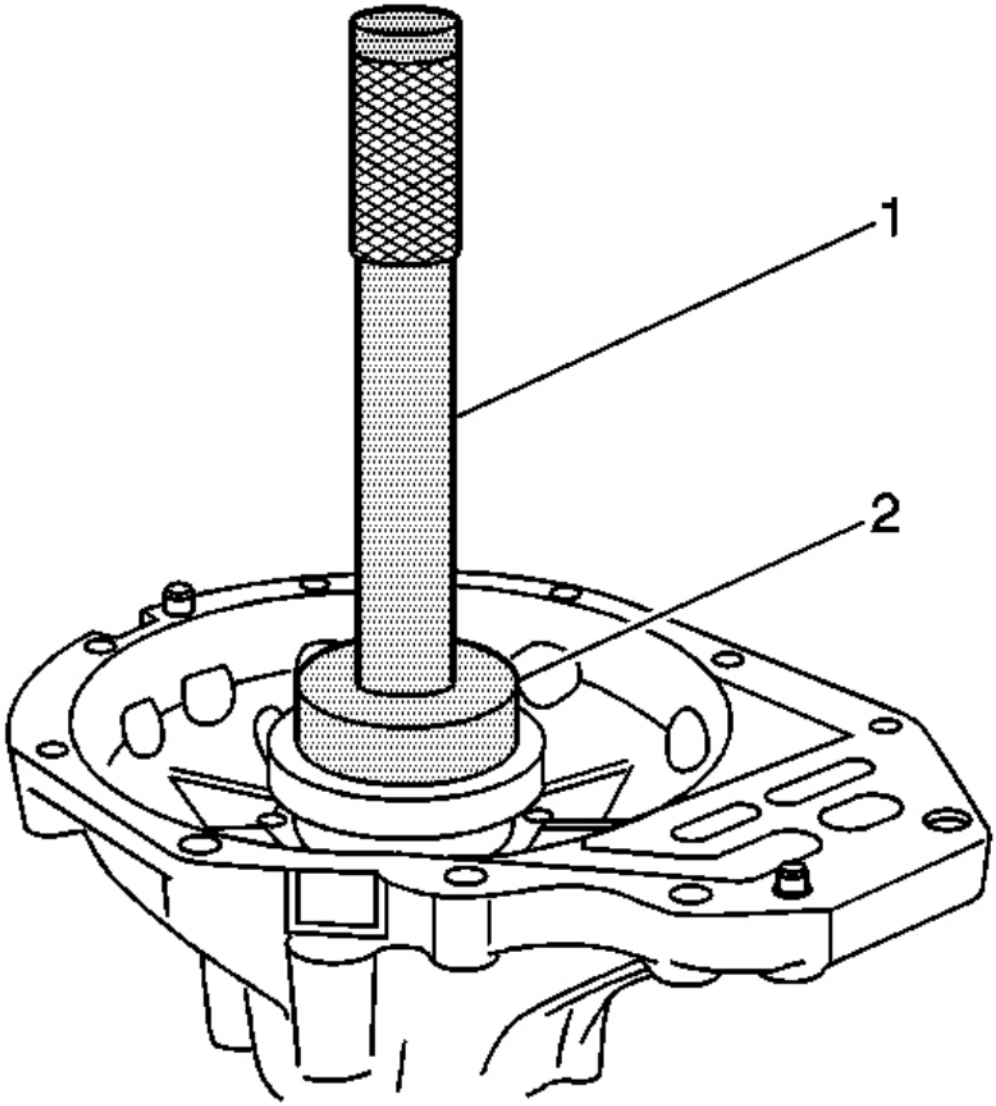


Fig. 210: Installing Differential Case Side Bearing Cups Using J 36603 & J 8092
Courtesy of GENERAL MOTORS CORP.

25. Install the differential case assembly into the left differential carrier case half.

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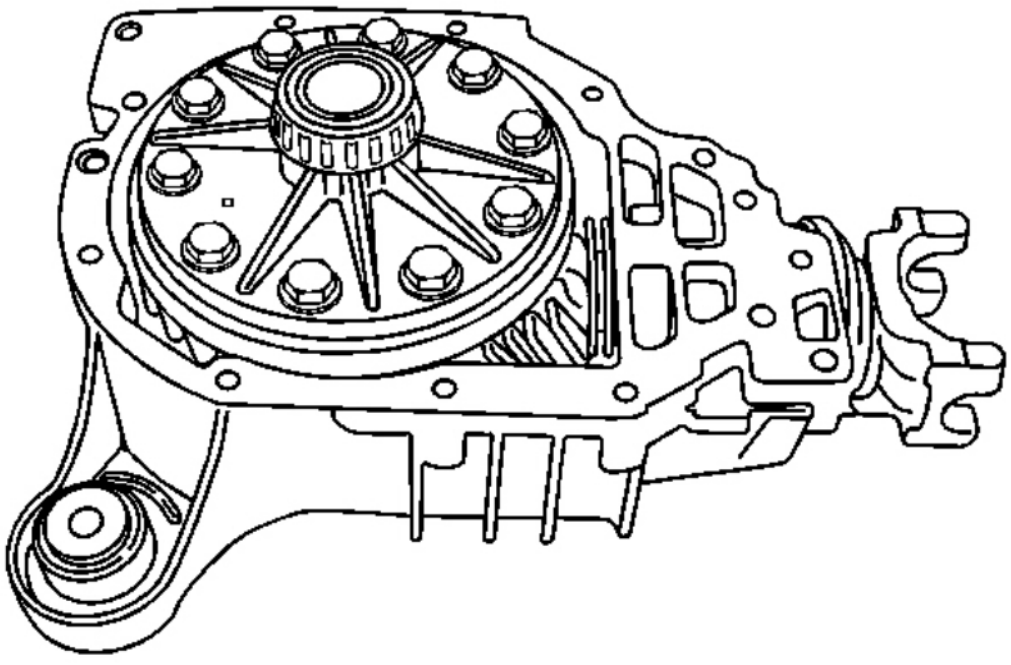


Fig. 211: View Of Differential Case Assembly To Left Differential Carrier Case Half
Courtesy of GENERAL MOTORS CORP.

26. Install the right differential carrier case half to the left differential carrier case half.

    Do not use sealer at this time.

    If the carrier case halves do not make complete contact, use the **J 36599-A** in order to back out the right differential adjuster nut sleeve until the differential carrier case halves make contact.

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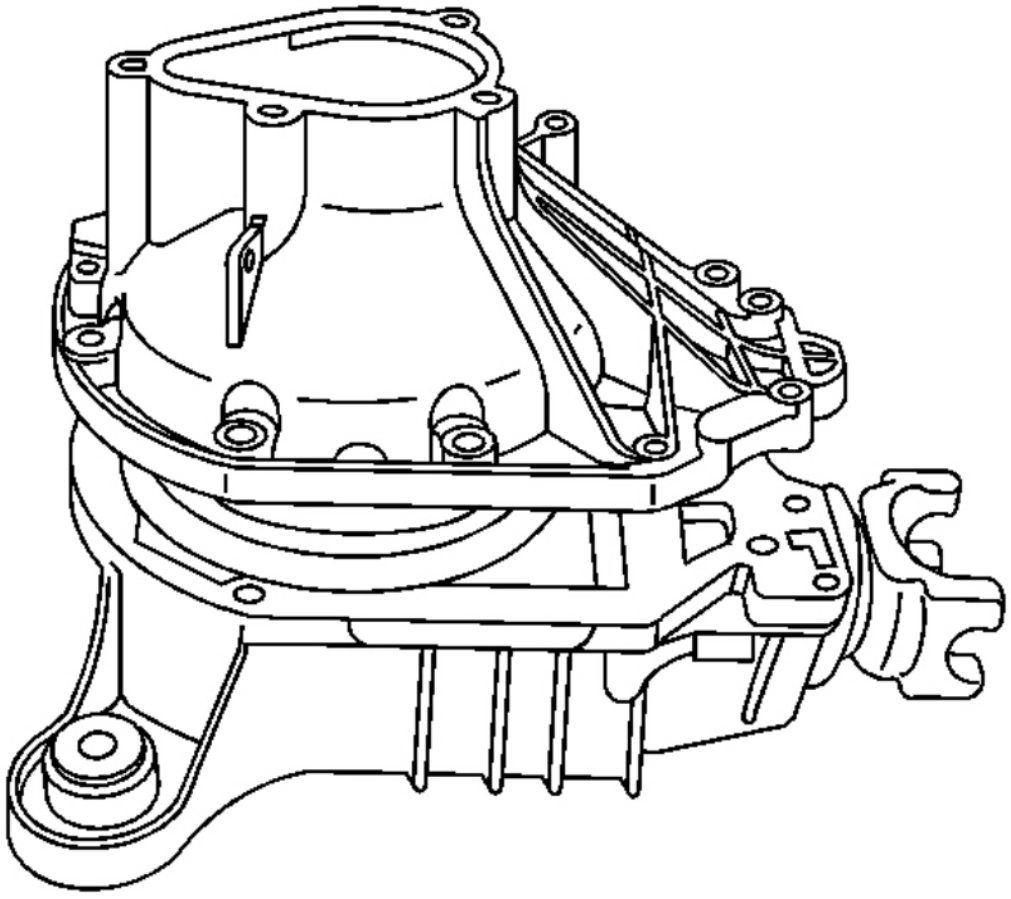


Fig. 212: View Of Right Differential Carrier Case Half To Left Differential Carrier Case Half
Courtesy of GENERAL MOTORS CORP.

27. Install the differential carrier case bolts.

    Tighten: Tighten the differential carrier case bolts to 47 N.m (35 lb ft).

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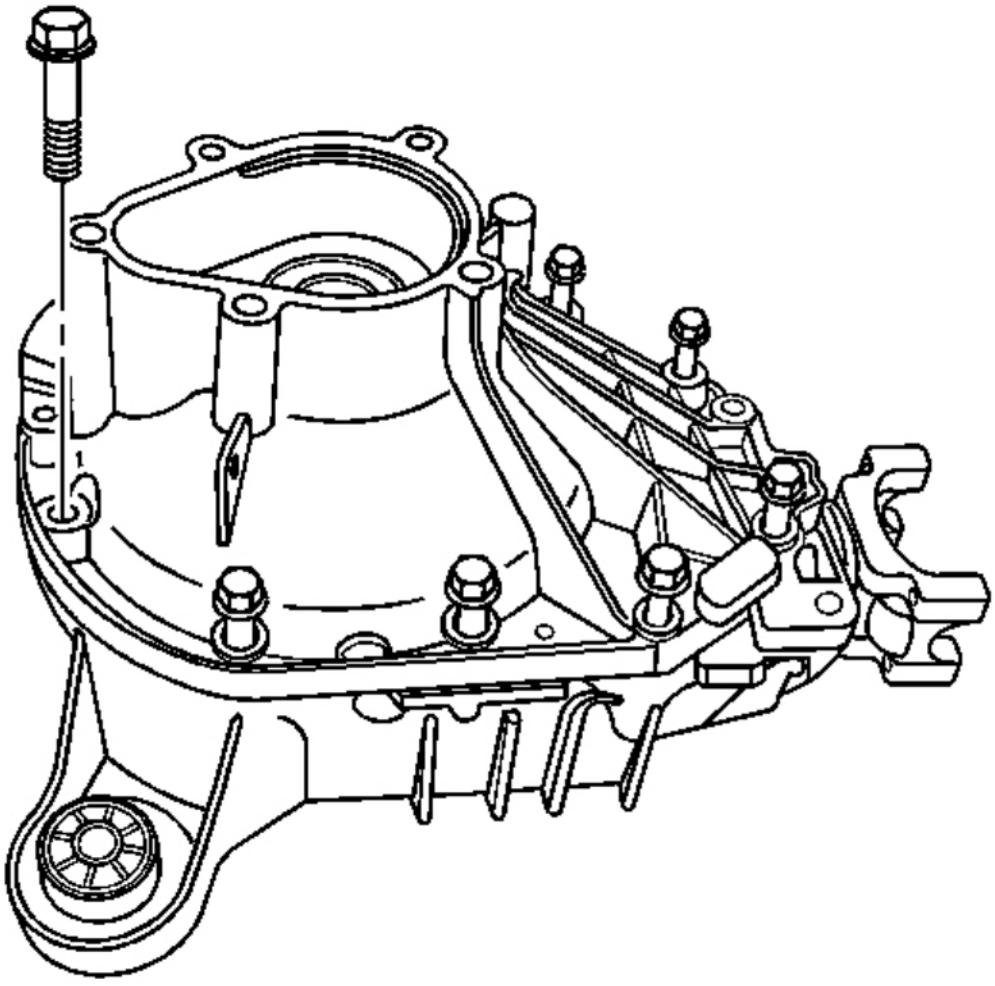


Fig. 213: View Of Differential Carrier Assembly Bolts
Courtesy of GENERAL MOTORS CORP.

28. Install the differential carrier assembly into a vise.
29. Turn the right side differential adjuster nut sleeve clockwise 11/2 revolutions using the **J 36599-A** .

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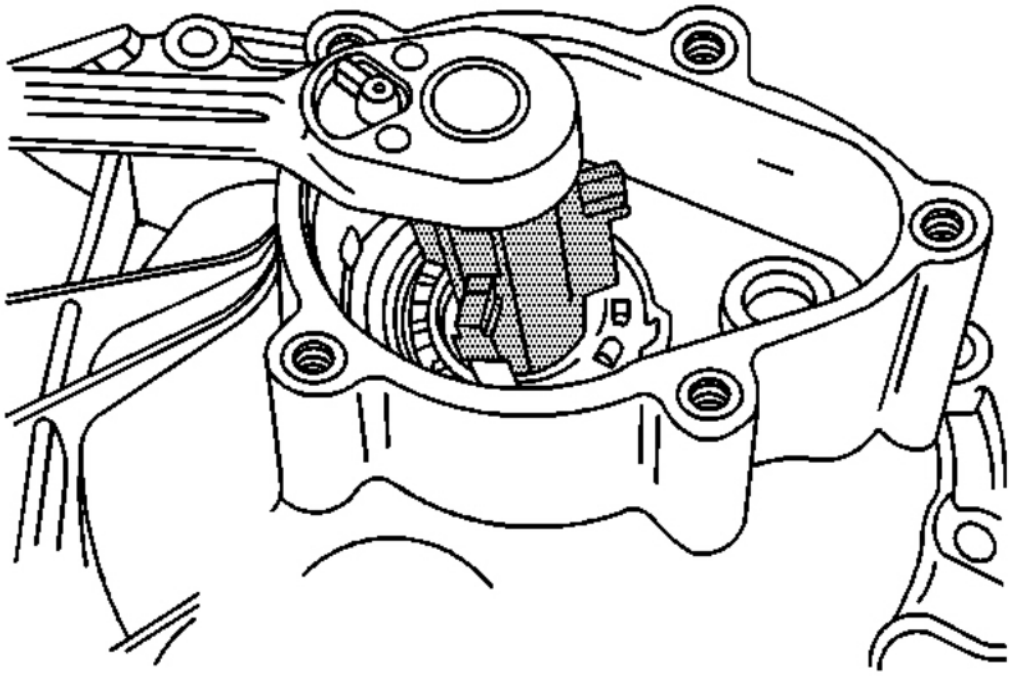


Fig. 214: View Of J 36599-A On Right Side Differential Bearing Adjuster Nut
Courtesy of GENERAL MOTORS CORP.

30. For the 8.25 inch axle, turn the left side differential adjuster nut sleeve clockwise using the **J 36599-A** in order to preload the differential side bearings against the differential side bearing cups.

    Tighten: Tighten the differential adjuster nut to 75 N.m (55 lb ft).

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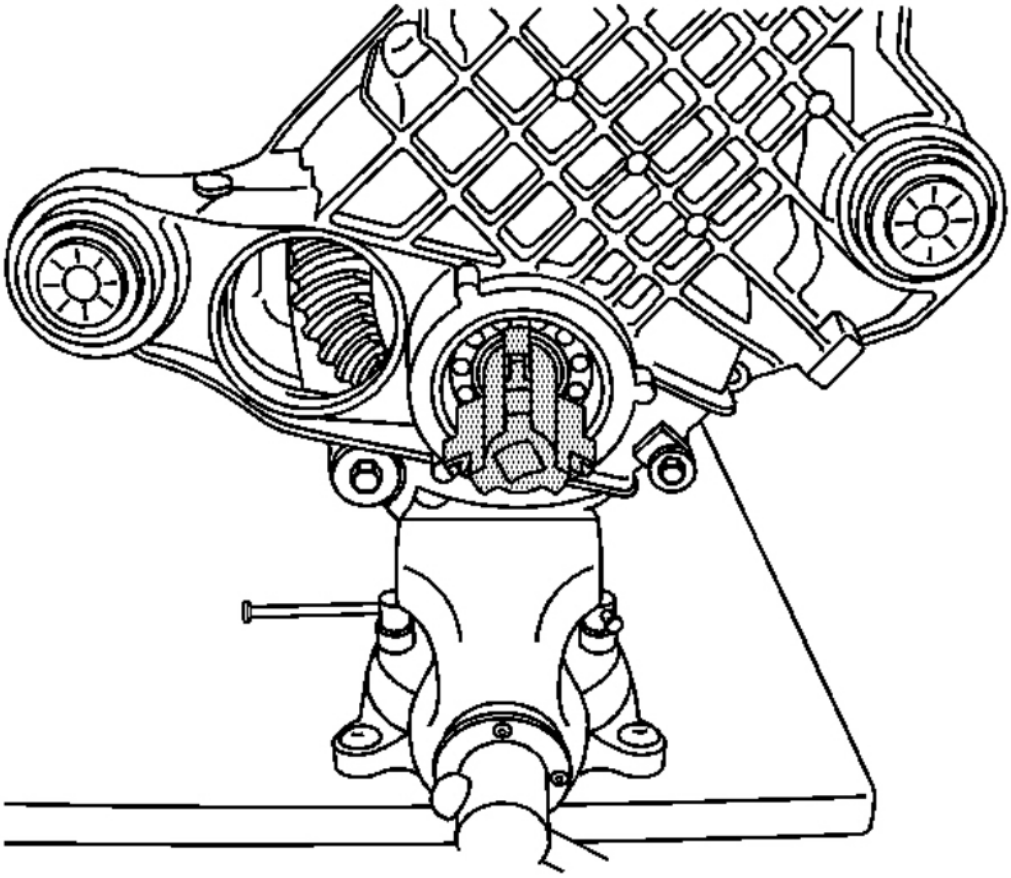


Fig. 215: View Of J 36599-A On Left Side Differential Adjuster Nut Sleeve
Courtesy of GENERAL MOTORS CORP.

31. For the 9.25 inch axle, turn the left side differential adjuster nut clockwise using the **J 36615** in order to preload the differential side bearings against the differential side bearing cups.

    Tighten: Tighten the differential adjuster nut to 75 N.m (55 lb ft).

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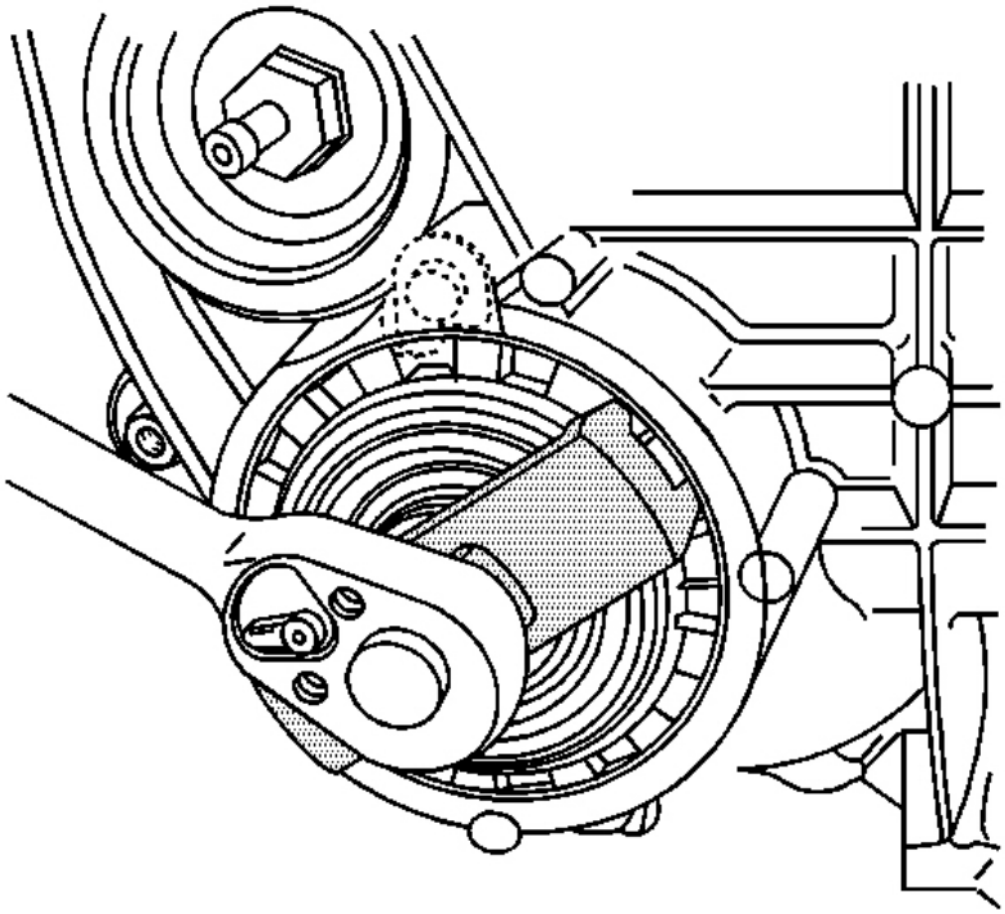


Fig. 216: View Of J 36615 On Left Side Differential Bearing Adjuster Nut
Courtesy of GENERAL MOTORS CORP.

32. Rotate the pinion several times in order to seat the pinion and differential side bearings.
33. Measure the rotating torque of the drive pinion and differential assembly using an inch-pound torque wrench.

    Specification: The rotating torque of the pinion and differential assembly should be 3.4-6.2 N.m (30-55 lb in) for new bearings or 2.8-5.1 N.m (25-45 lb in) for used bearings.

34. If the rotating torque measurement is below 2.8 N.m (25 lb in) for used bearings, or 3.4 N.m (30 lb in) for new bearings, adjust the differential side bearing preload using the following steps:
    A. Place an alignment mark between the differential adjuster nut sleeve and the differential carrier case, left and right sides.

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B. Using the **J 36599-A** or the **J 36615** , turn the left and the right side differential adjuster nut sleeves in or clockwise one notch.
C. Measure the rotating torque of the pinion and differential assembly using an inch-pound torque wrench.
D. Compare the new measurement to the specification listed in step 36, if the rotating torque of the pinion and differential assembly is not within specifications, continue to tighten the left and right side differential adjuster nut sleeves one notch at a time on each side until the rotating torque of the pinion and differential assembly is within specifications

35. If the rotating torque measurement is above 5.1 N.m (45 lb in) for used bearings, or 6.2 N.m (55 lb in) for new bearings, adjust the differential side bearing preload using the following steps:
    1. Place an alignment mark between the differential adjuster nut sleeve and the differential carrier case, left and right sides.
    2. Using the **J 36599-A** or the **J 36615** , turn the left and the right side differential adjuster nut sleeves out or counterclockwise one notch.
    3. Measure the rotating torque of the pinion and differential assembly using an inch-pound torque wrench.
    4. Compare the new measurement to the specification listed in step 36, if the rotating torque of the pinion and differential assembly is not within specifications, continue to loosen the left and right side differential adjuster nut sleeves one notch at a time on each side until the rotating torque of the pinion and differential assembly is within specifications

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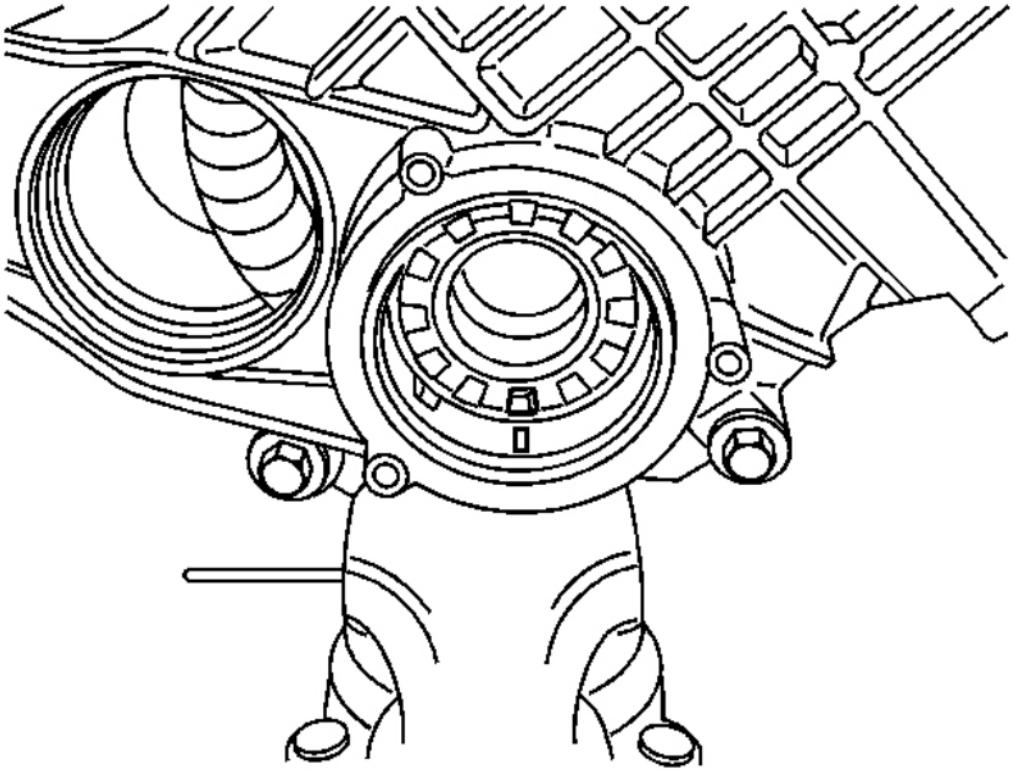


Fig. 217: View Of Alignment Mark Between Differential Adjuster Nut Sleeve & Differential Carrier Case
Courtesy of GENERAL MOTORS CORP.

36. Once the specified rotating torque is obtained, rotate the pinion several times to ensure the bearings have seated.

    Recheck the rotating torque and adjust if necessary.

37. Measure the drive pinion to ring gear backlash. Refer to **Backlash Inspection and Adjustment**.

BACKLASH INSPECTION AND ADJUSTMENT

Tools Required

- **J 8001** Dial Indicator Set. See **Special Tools and Equipment**.
- **J 36599-A** Side Bearing Nut Wrench
- **J 36615** Side Bearing Nut Wrench

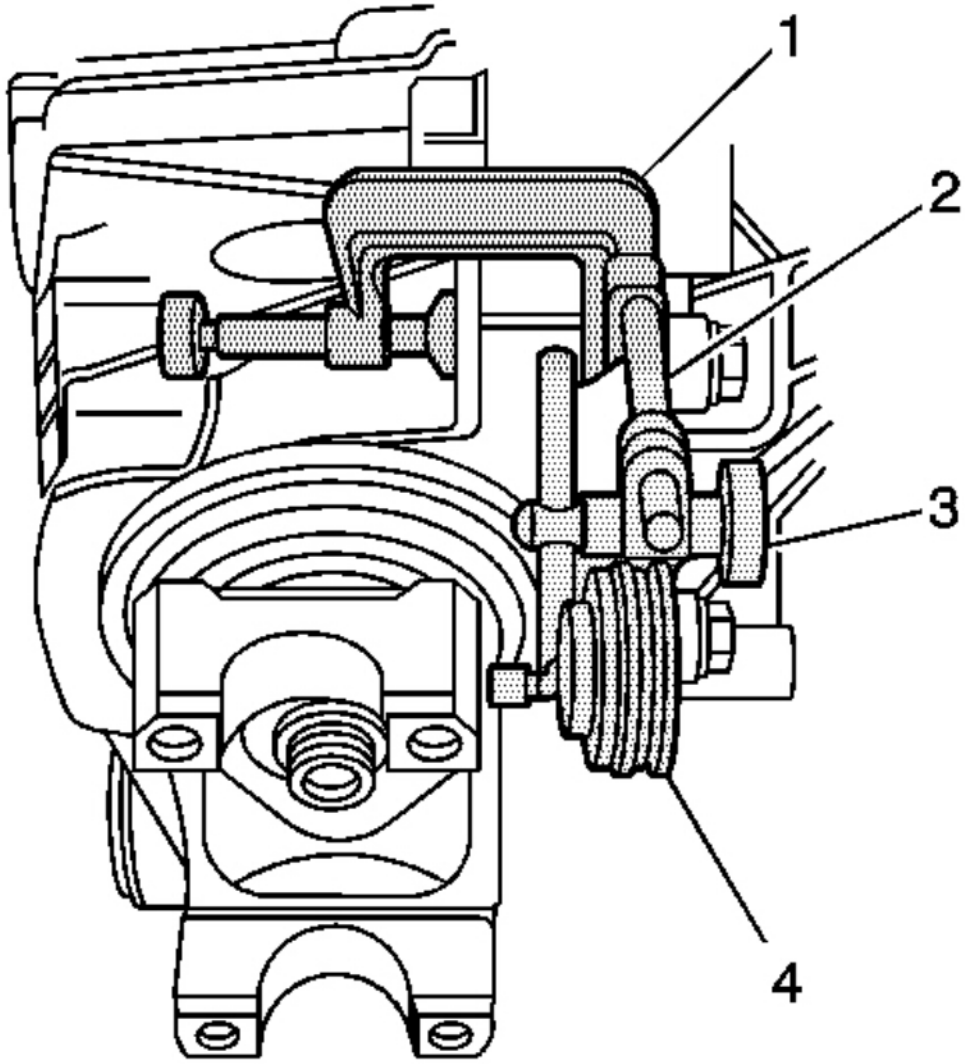
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1. Mark the location of the differential adjuster nut sleeves in relation to the differential carrier halves.

   Ensure that the notches can be counted when turned.

2. Install the J 8001-1 (1, 2), the J 8001-2 (3), and the J 8001-3 (4) as shown.

   Ensure that the button contacts the outer edge of the pinion yoke and that the plunger is at a right angle to the pinion yoke.



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Fig. 218: View Of J 8001-1, J 8001-2 & J 8001-3
Courtesy of GENERAL MOTORS CORP.

3. Move the pinion yoke back and forth through the pinion yoke's free play while not allowing the ring gear to move.
4. Record the dial indicator reading.
5. To determine the actual backlash, divide the dial indicator reading by 2.

   An actual dial indicator reading of 0.16 mm (0.006 in) means that there is actually 0.08 mm (0.003 in) backlash.

   Specification: The backlash between the ring gear and the drive pinion should be between 0.08-0.25 mm (0.003-0.010 in) with a preferred specification of 0.13-0.18 mm (0.005-0.007 in).

   IMPORTANT: When adjusting the backlash, observe the following:

   - **Always turn the left and the right differential adjuster nut sleeves in equal amounts.**
   - **Turning the differential adjuster nut sleeves one notch will change the backlash about 0.08 mm (0.003 in).**

6. If the backlash is too small, increase the backlash by turning the left differential adjuster nut sleeve in one notch using the **J 36599-A** , 8.25 inch axle, or the **J 36615** , 9.25 inch axle, and the right differential adjuster nut sleeve out one notch using the **J 36599-A** .
7. If the backlash is too large, decrease the backlash by turning the right differential adjuster nut sleeve in one notch using the **J 36599-A** and the left differential adjuster nut sleeve out one notch using the **J 36599-A** , 8.25 inch axle, or the **J 36615** , 9.25 inch axle.
8. Recheck the backlash and adjust as necessary.
9. Recheck the rotating torque of the pinion and differential assembly and adjust as necessary.
10. Once the backlash and rotating torque of the pinion and differential assembly is correct, perform a gear tooth contact pattern check to ensure proper contact between the pinion and the ring gear. Refer to **Gear Tooth Contact Pattern Inspection**.

DIFFERENTIAL CARRIER ASSEMBLY - FINAL ASSEMBLY (8.25 F4WD AXLE)

Tools Required

- **J 8092** Universal Driver Handle - 3/4 in - 10. See **Special Tools and Equipment**.
- **J 33791** Carrier Bushing Remover/Installer
- **J 36609** Axle Tube Bearing Installer
- **J 36616** Axle Mount Bushing Remover/Installer
- **J 45225** Axle Seal Installer

1. Bend the differential adjuster nut lock tabs over the differential adjuster nut sleeves.

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2. Remove the differential carrier assembly bolts.

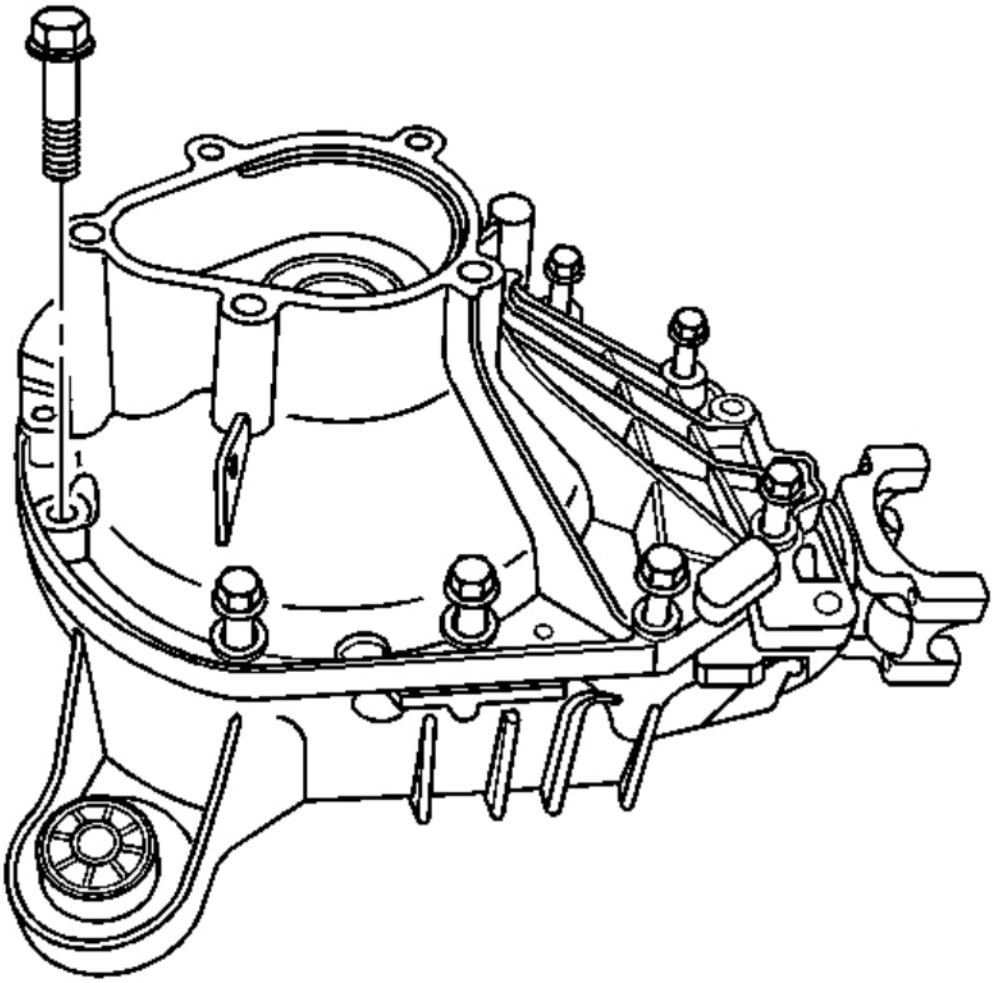


Fig. 219: View Of Differential Carrier Assembly Bolts
Courtesy of GENERAL MOTORS CORP.

3. Remove the right differential carrier case half.
4. Clean the sealing surface of each half of the differential carrier case and the inner axle housing to differential carrier assembly.

   The surfaces must be clean of all the grease and the oil.

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5. Apply a bead of sealer to one differential carrier case half sealing surface. Use the correct sealer. Refer to **Sealers, Adhesives, and Lubricants**.
6. Install the right differential carrier case half.

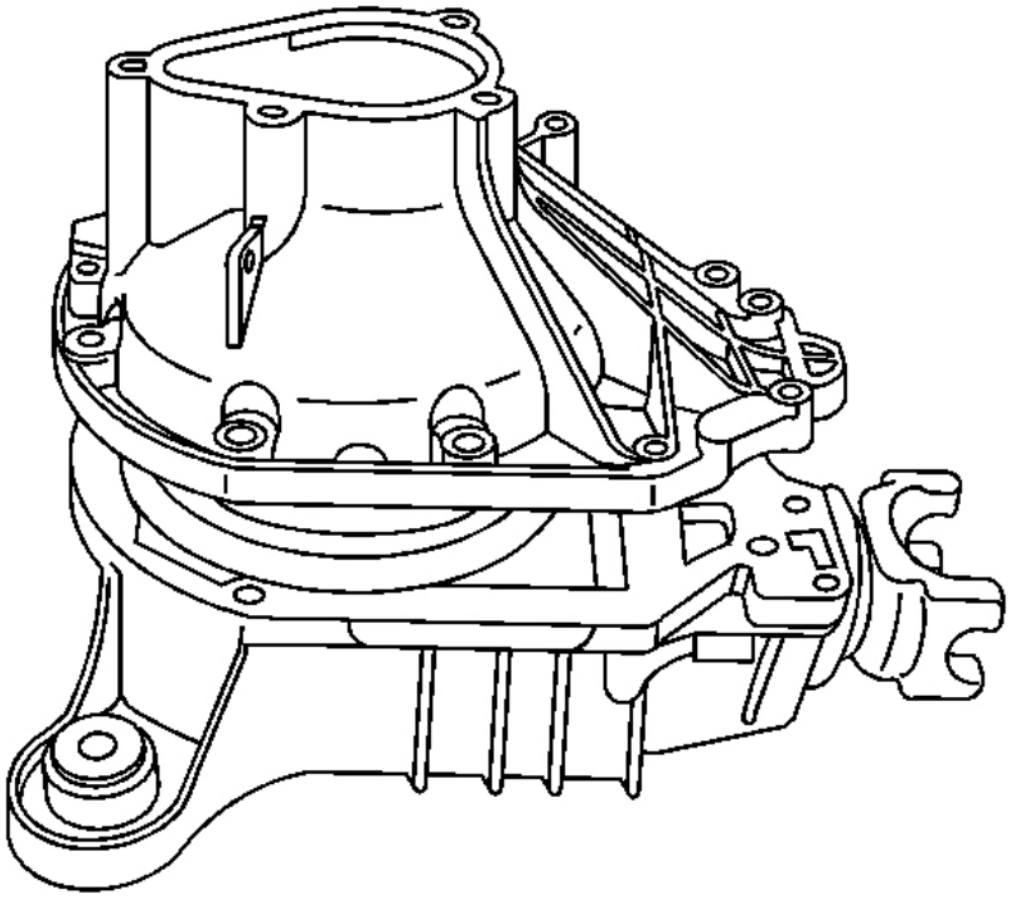


Fig. 220: View Of Right Differential Carrier Case Half To Left Differential Carrier Case Half
Courtesy of GENERAL MOTORS CORP.

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

7. Install the differential carrier case bolts.

Tighten: Tighten the differential carrier case bolts to 47 N.m (35 lb ft).

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

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8. Install the vent hose connector.

   Tighten: Tighten the vent hose connector to 28 N.m (21 lb ft).

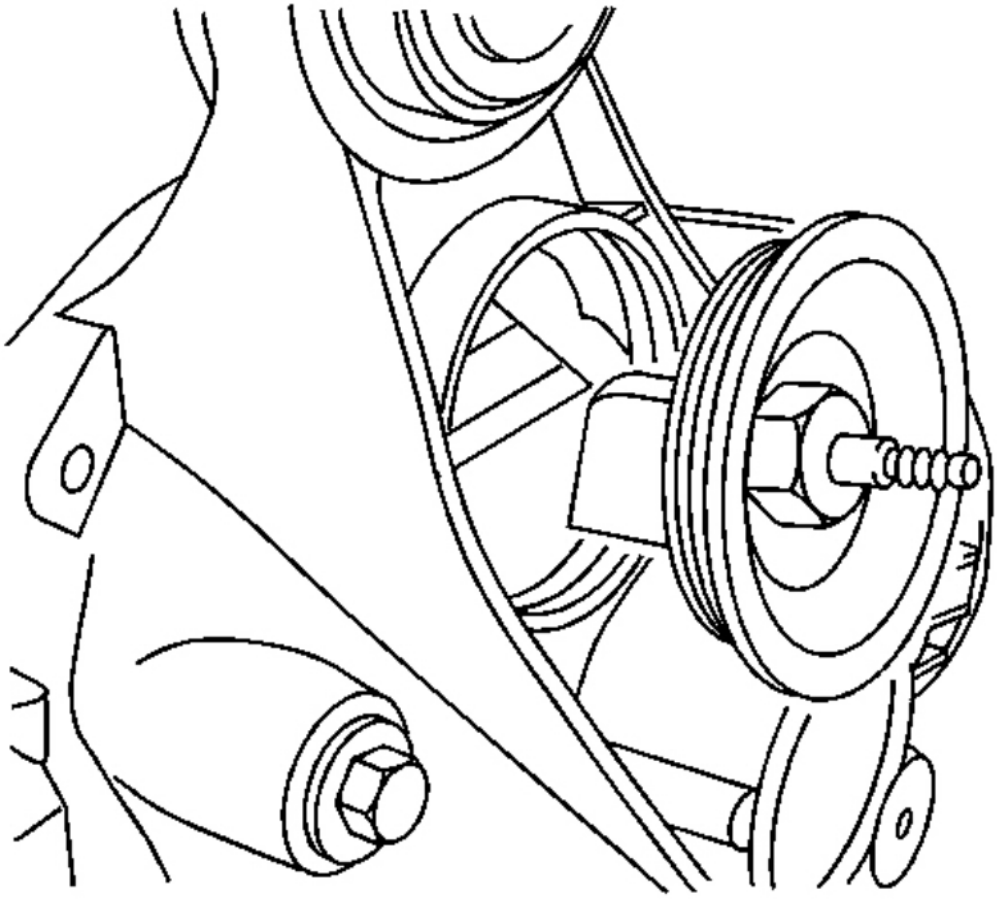


Fig. 221: View Of Vent Hose Connector
Courtesy of GENERAL MOTORS CORP.

9. Install the differential carrier assembly into a vise.
10. Install the new left side axle shaft seal using the **J 45225** (1) and the **J 8092** (2).

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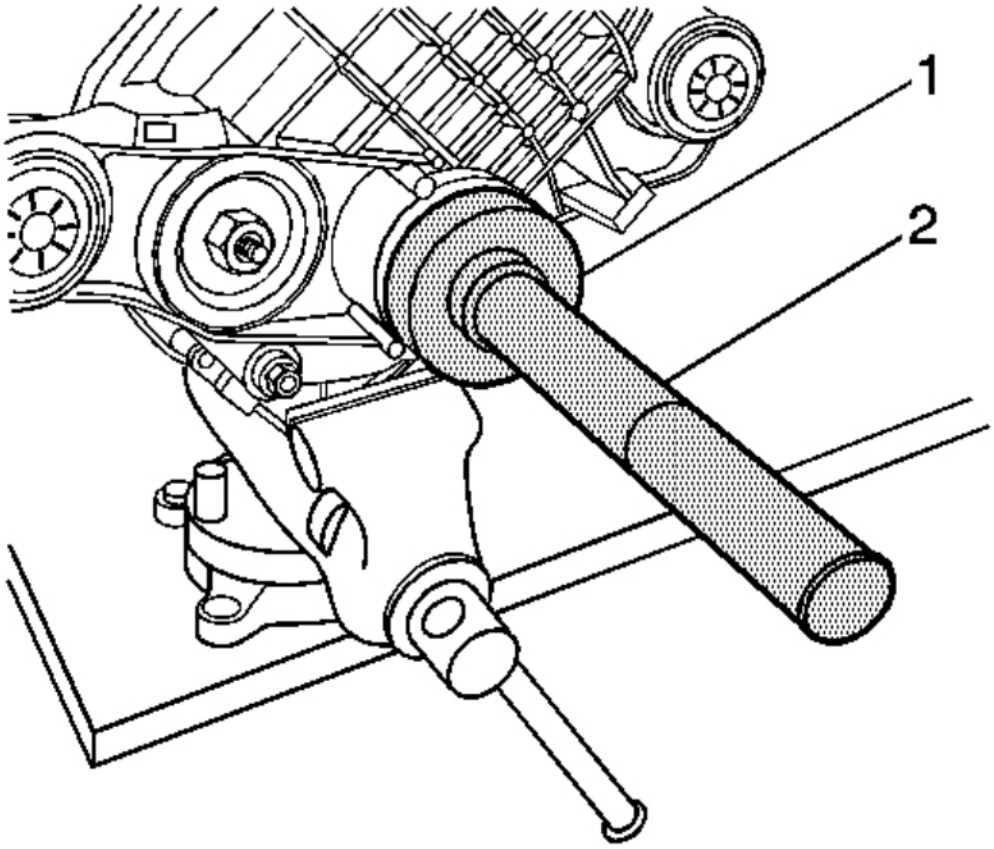


Fig. 222: Installing Left Side Axle Shaft Seal Using J 45225 & J 8092
Courtesy of GENERAL MOTORS CORP.

11. Install the new left side inner axle shaft retainer ring.
12. Install the left side inner axle shaft by doing the following:
    A. Install the left side inner shaft into the differential carrier assembly until the inner shaft is seated against the differential side gear.
    B. While holding the inner shaft against the differential side gear, turn the inner shaft in order to align the splines of the inner shaft with the splines on the differential side gear.
    C. Drive the inner shaft into the differential case side gear using a soft-faced mallet until the retaining ring on the inner shaft is fully seated within the groove in the differential case side gear.

       Pull back on the inner shaft to ensure that the inner shaft is properly retained in the differential case side gear.

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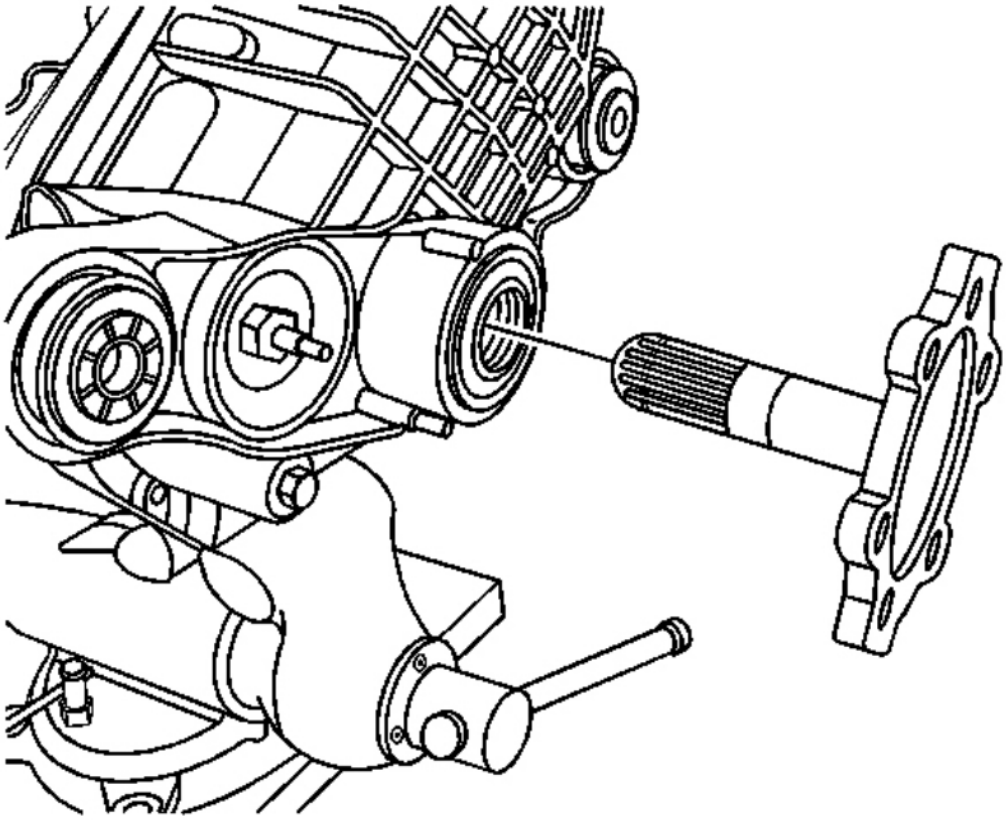


Fig. 223: View Of Left Side Inner Axle Shaft
Courtesy of GENERAL MOTORS CORP.

13. Install the right side inner shaft bearing into the inner shaft housing by performing the following steps:
    1. Install the inner axle shaft housing into a vise.

       Clamp only on the mounting flange of the inner axle shaft housing.

    2. Install the bearing with the square shoulder in using the **J 36609** (1) and the **J 8092** (2).

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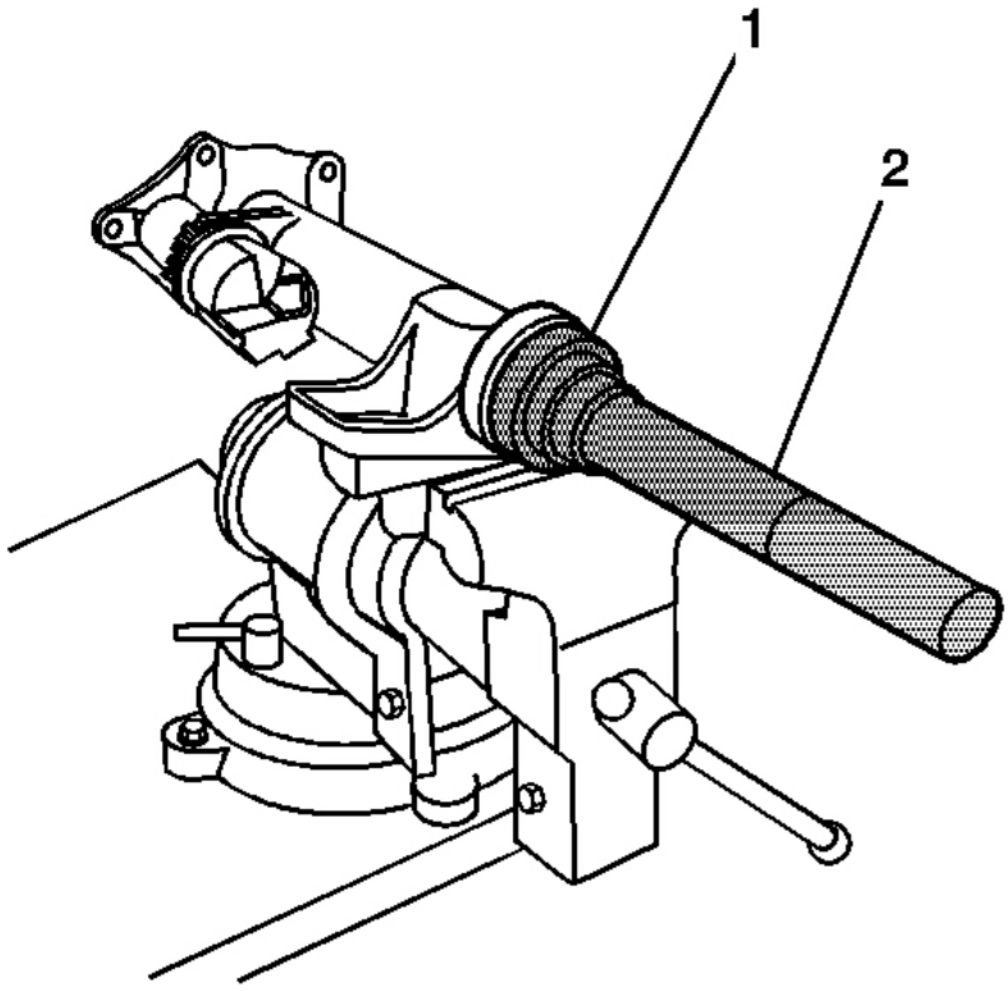


Fig. 224: Installing Right Side Inner Shaft Bearing Using J 36609 & J 8092
Courtesy of GENERAL MOTORS CORP.

14. Install the new inner shaft seal using the **J 45225** (1) and the **J 8092** (2).

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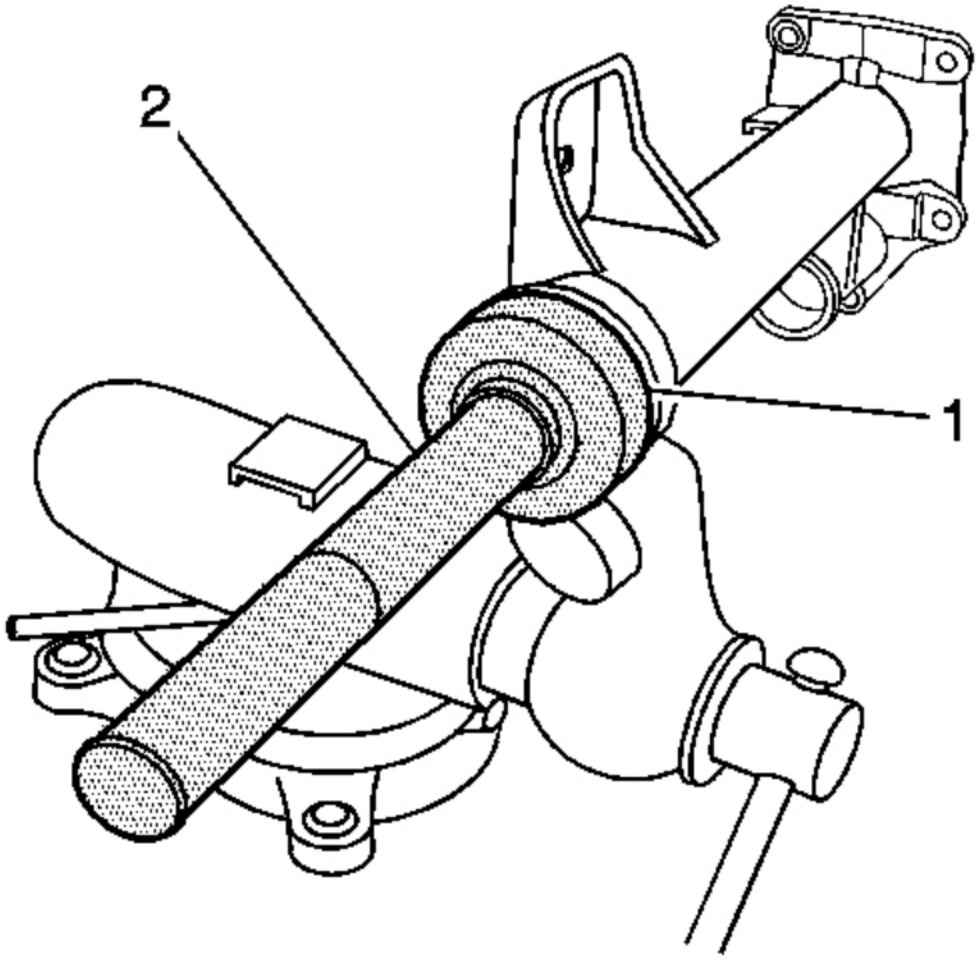


Fig. 225: Installing Right Side Inner Axle Shaft Seal Using J 45225 & J 8092
Courtesy of GENERAL MOTORS CORP.

15. Apply sealant to the inner axle housing to differential carrier sealing surface. Use the correct sealant. Refer to **Sealers, Adhesives, and Lubricants**.
16. Install the inner shaft housing to the differential carrier assembly case.
17. Install the inner shaft housing bolts.

    Tighten: Tighten the inner axle shaft housing bolts to 40 N.m (30 lb ft).

18. Install the inner shaft (2) into the inner shaft housing (1) by doing the following:

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A. Install the inner shaft into the inner axle shaft housing until the inner shaft is seated against the differential side gear.
B. While holding the inner shaft against the differential side gear, turn the inner shaft in order to align the splines of the inner shaft with the splines on the differential side gear.
C. Drive the inner shaft into the differential case side gear using a soft-faced mallet until the retaining ring on the inner shaft is fully seated within the groove in the differential case side gear.

   Pull back on the inner shaft to ensure that the inner shaft is properly retained in the differential case side gear.

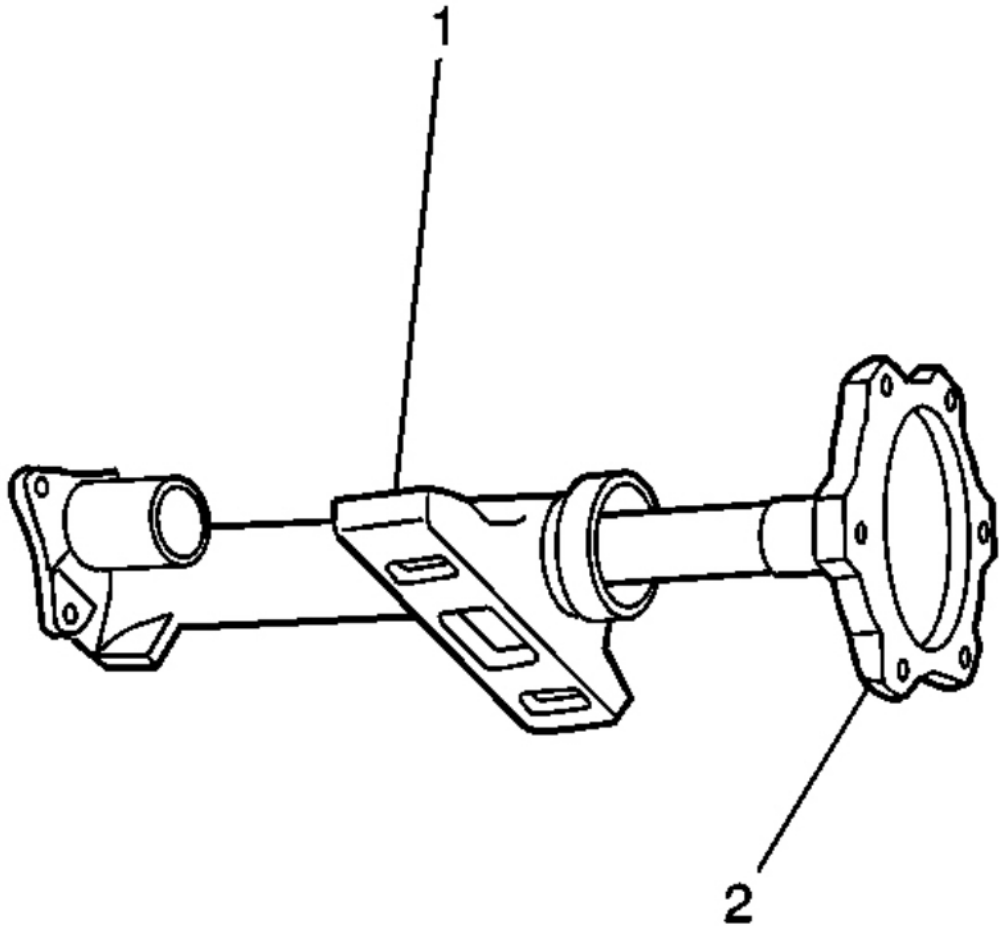


Fig. 226: View Of Inner Axle Shaft
Courtesy of GENERAL MOTORS CORP.

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19. Install the drain plug and the washer.
20. Install the fill plug and the washer.

    Tighten: Tighten the drain plug and the fill plug to 33 N.m (24 lb ft).

21. Install the lower differential carrier assembly bushing by performing the following steps:
    1. Install the J 21474-18 (1), the thrust bearing (2), the J 36616-2 (3), the J 36616-1 (4), and the forcing screw (5) as shown.
    2. While holding the forcing screw, slowly tighten the J 21474-18 until the bushing has stopped against the step on the bushing and is centered within the differential carrier assembly bushing bore.

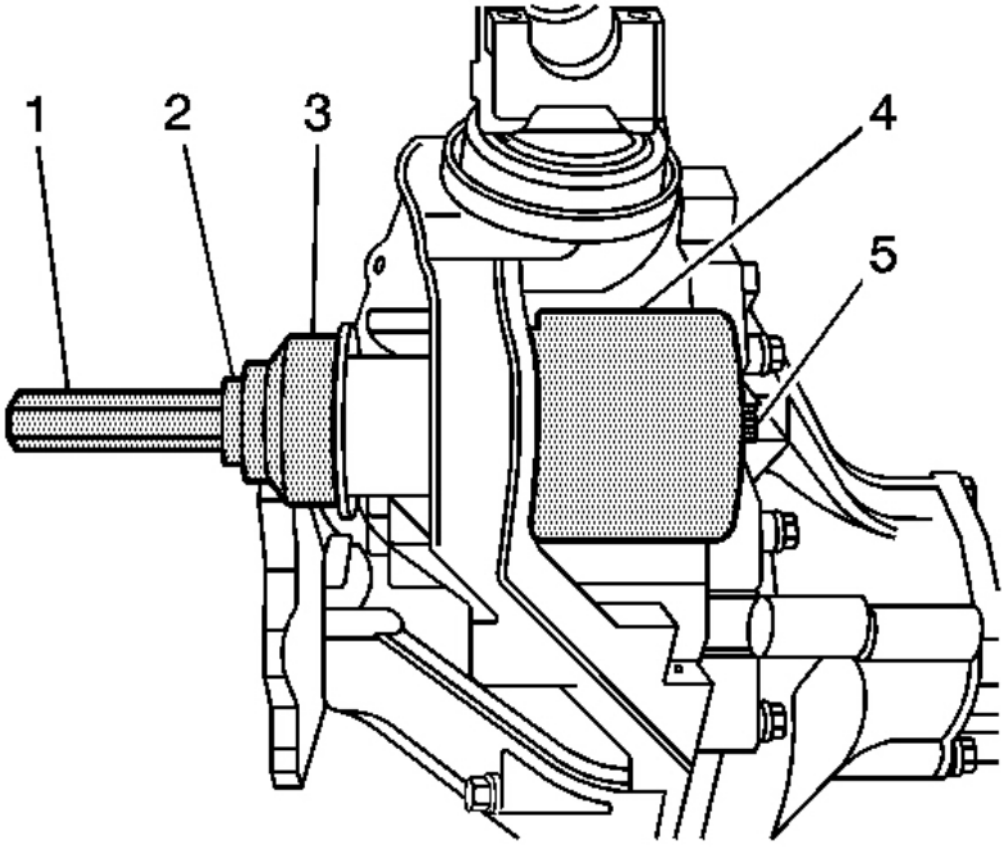


Fig. 227: Installing Lower Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

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22. Install the upper differential carrier assembly bushing by performing the following steps:
    1. Install the J 21474-18 (1), the thrust bearing (2), the J 36616-2 (3), the J 36616-1 (4), and the forcing screw (5) as shown.
    2. While holding the forcing screw, slowly tighten the J 21474-18 until the bushing has stopped against the step on the bushing and is centered within the differential carrier assembly bushing bore.

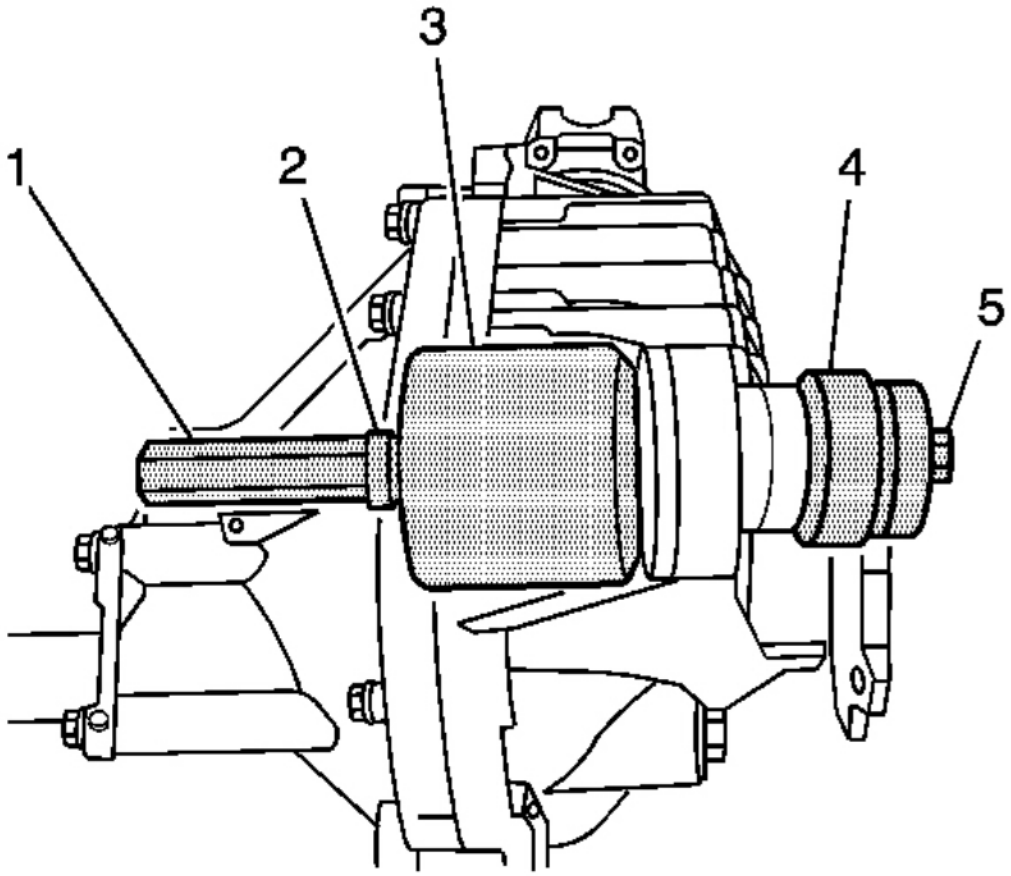


Fig. 228: Installing Upper Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

DIFFERENTIAL CARRIER ASSEMBLY - FINAL ASSEMBLY (8.25 S4WD AND 9.25 AXLES)

Tools Required

- **J 8092** Universal Driver Handle - 3/4 in - 10. See **Special Tools and Equipment**

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- **J 33842** Pilot Bearing Installer
- **J 36609** Axle Tube Bearing Installer
- **J 36616** Axle Mount Bushing Remover/Installer
- **J 45225** Axle Seal Installer

1. Bend the differential adjuster nut lock tabs over the differential adjuster nut sleeves, 8.25 inch axle - both sides, 9.25 inch axle - right side.
2. Install the differential adjuster nut lock, 9.25 inch axle - left side.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Install the differential adjuster nut lock bolt.

   Tighten: Tighten the differential adjuster lock nut bolt to 20 N.m (15 lb ft).

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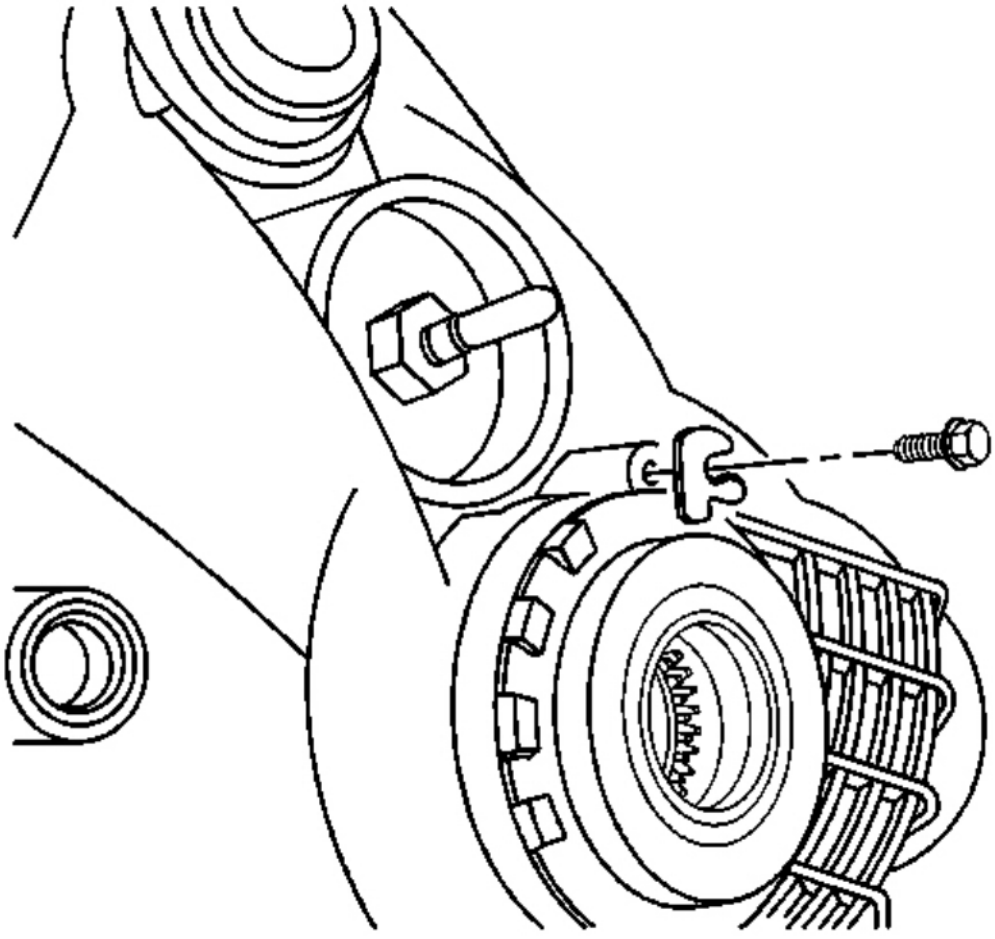


Fig. 229: View Of Left Side Differential Bearing Adjuster Nut Lock & Bolt
Courtesy of GENERAL MOTORS CORP.

4. Remove the differential carrier assembly bolts.

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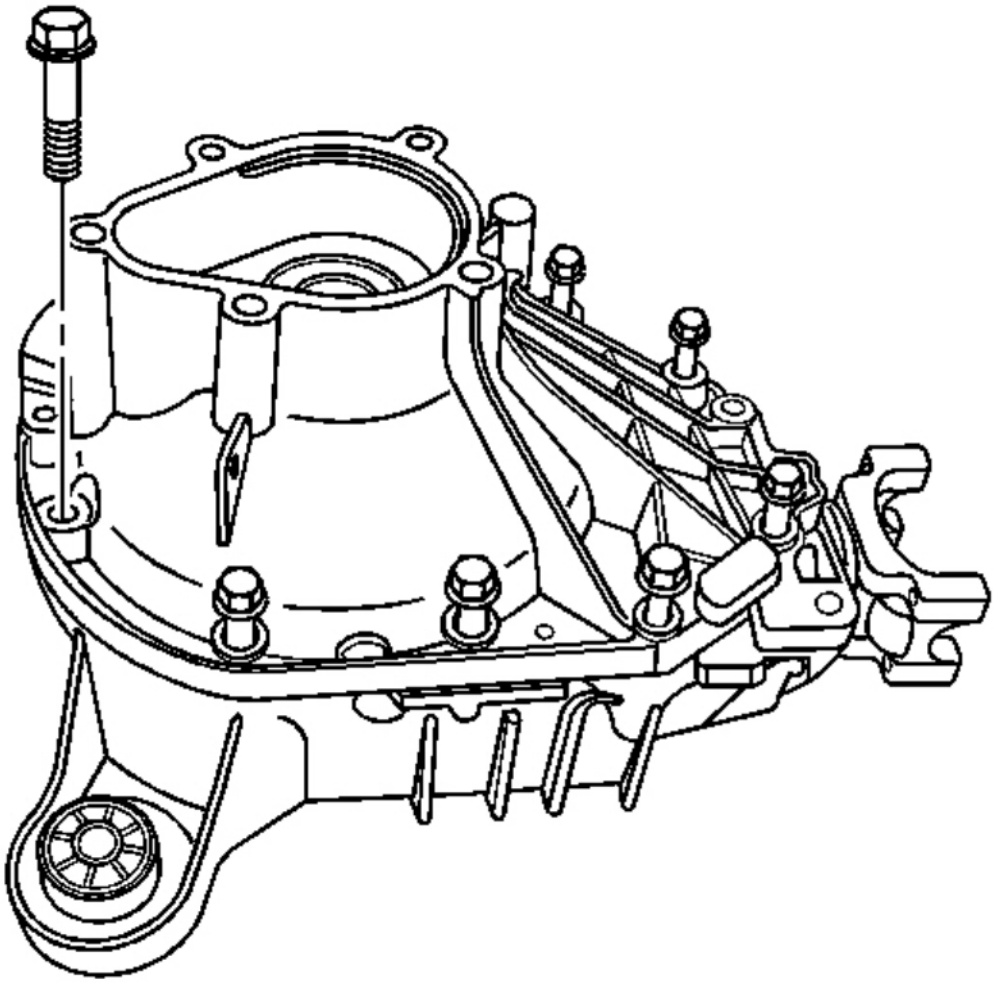


Fig. 230: View Of Differential Carrier Assembly Bolts
Courtesy of GENERAL MOTORS CORP.

5. Remove the right differential carrier case half.
6. Clean the sealing surface of each half of the differential carrier case and the inner axle housing to differential carrier assembly.

   The surfaces must be clean of all the grease and the oil.

7. Apply a bead of sealer to 1 differential carrier case half sealing surface. Use the correct sealer. Refer to **Sealers, Adhesives, and Lubricants**.

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8. Install the right differential carrier case half.

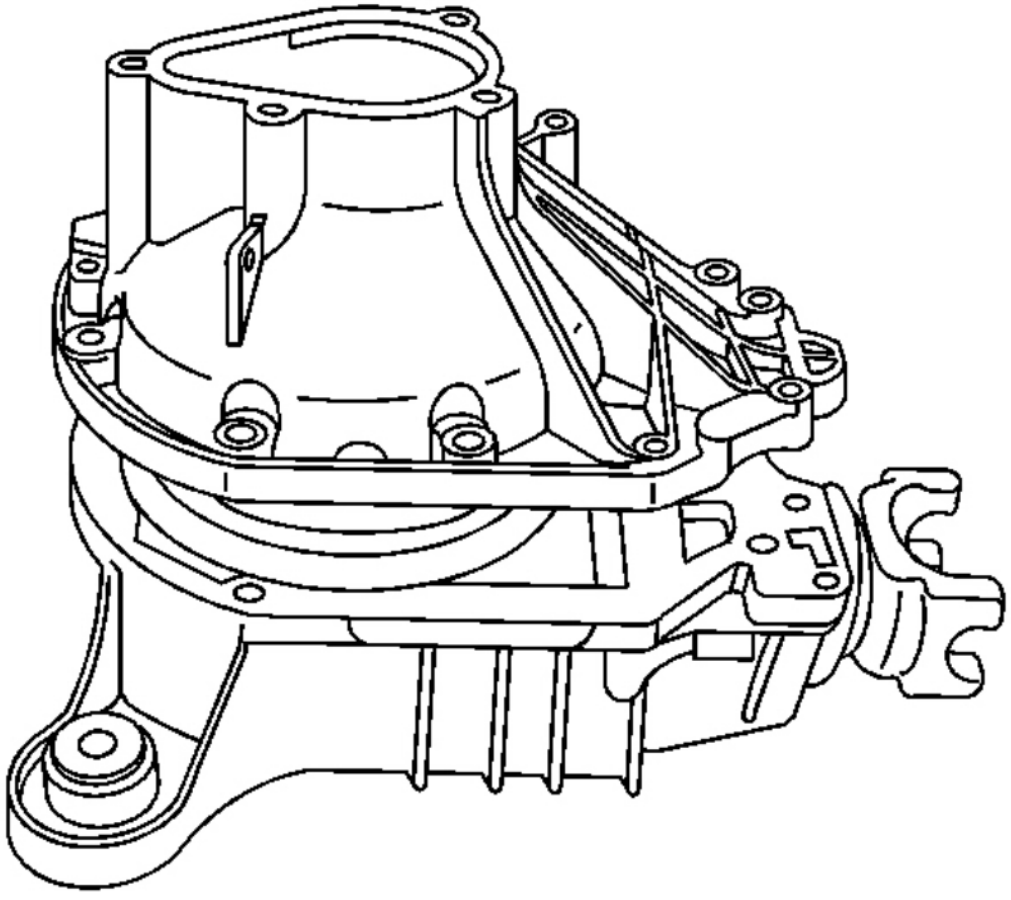


Fig. 231: View Of Right Differential Carrier Case Half To Left Differential Carrier Case Half
Courtesy of GENERAL MOTORS CORP.

9. Install the differential carrier case bolts.

   Tighten: Tighten the differential carrier case bolts to 47 N.m (35 lb ft).

10. Lubricate the clutch shaft pilot bearing with axle lubricant. Use the correct fluid. Refer to **Sealers, Adhesives, and Lubricants**.
11. Install the clutch shaft pilot bearing using the **J 33842** .

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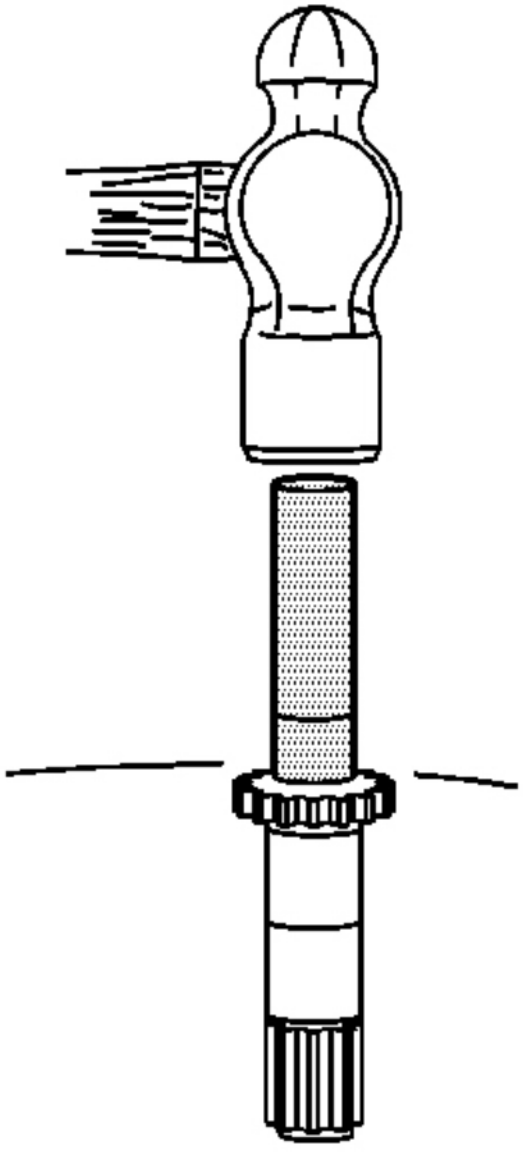


Fig. 232: Installing Clutch Shaft Pilot Using J 33842
Courtesy of GENERAL MOTORS CORP.

12. Install the clutch shaft to the differential carrier case half.

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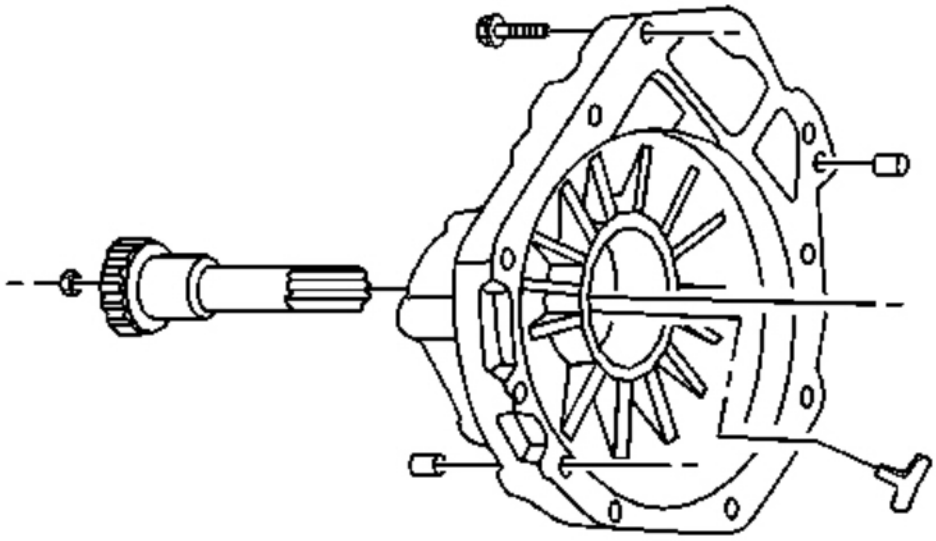


Fig. 233: View Of Clutch Shaft To Differential Carrier Case Half
Courtesy of GENERAL MOTORS CORP.

13. Install the vent hose connector.

Tighten: Tighten the vent hose connector to 28 N.m (21 lb ft).

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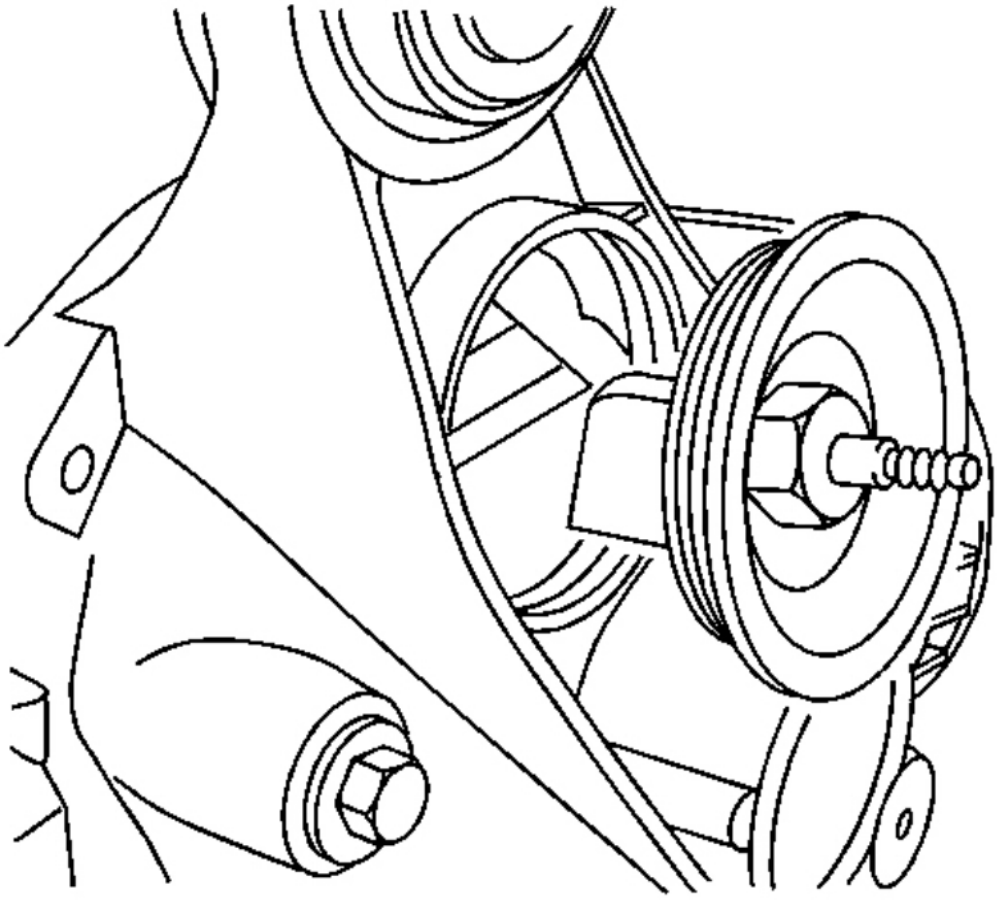


Fig. 234: View Of Vent Hose Connector
Courtesy of GENERAL MOTORS CORP.

14. Install the new left side axle shaft seal using the **J 45225** (1) and the **J 8092** (2).

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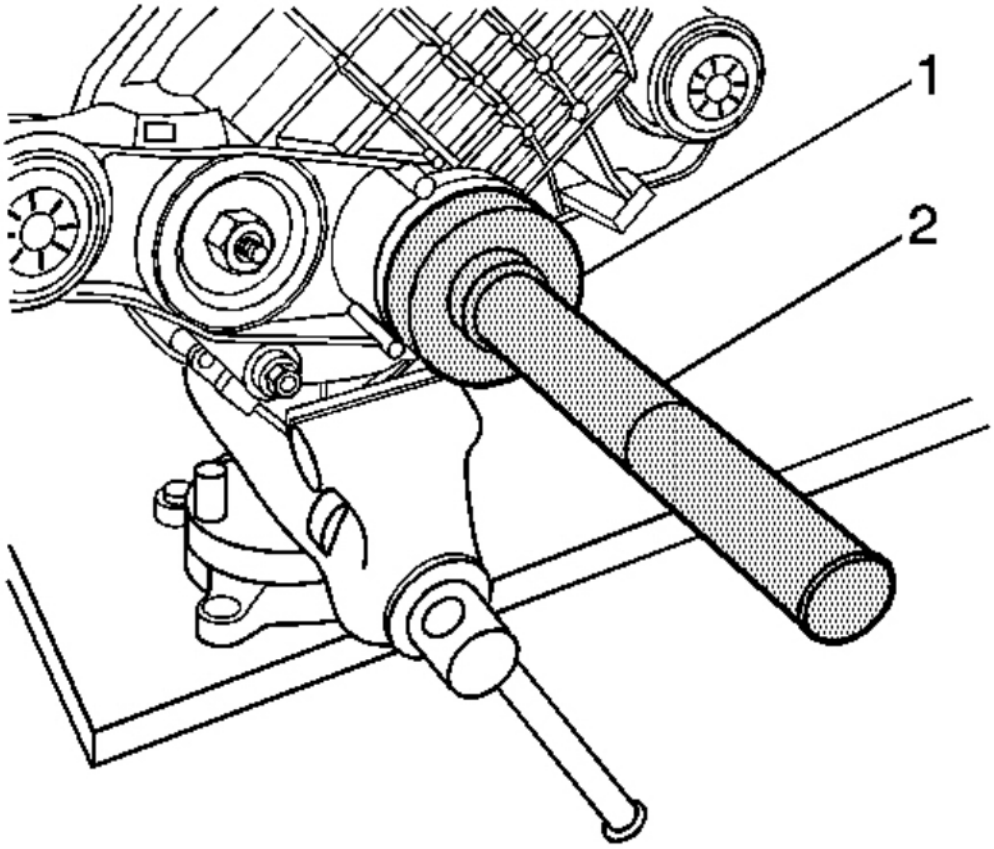


Fig. 235: Installing Left Side Axle Shaft Seal Using J 45225 & J 8092
Courtesy of GENERAL MOTORS CORP.

15. Install the new left side inner axle shaft retainer ring.
16. Install the left side inner axle shaft by doing the following:
    A. Install the left side inner shaft into the differential carrier assembly until the inner shaft is seated against the differential side gear.
    B. While holding the inner shaft against the differential side gear, turn the inner shaft in order to align the splines of the inner shaft with the splines on the differential side gear.
    C. Drive the inner shaft into the differential case side gear using a soft-faced mallet until the retaining ring on the inner shaft is fully seated within the groove in the differential case side gear.

       Pull back on the inner shaft to ensure that the inner shaft is properly retained in the differential case side gear.

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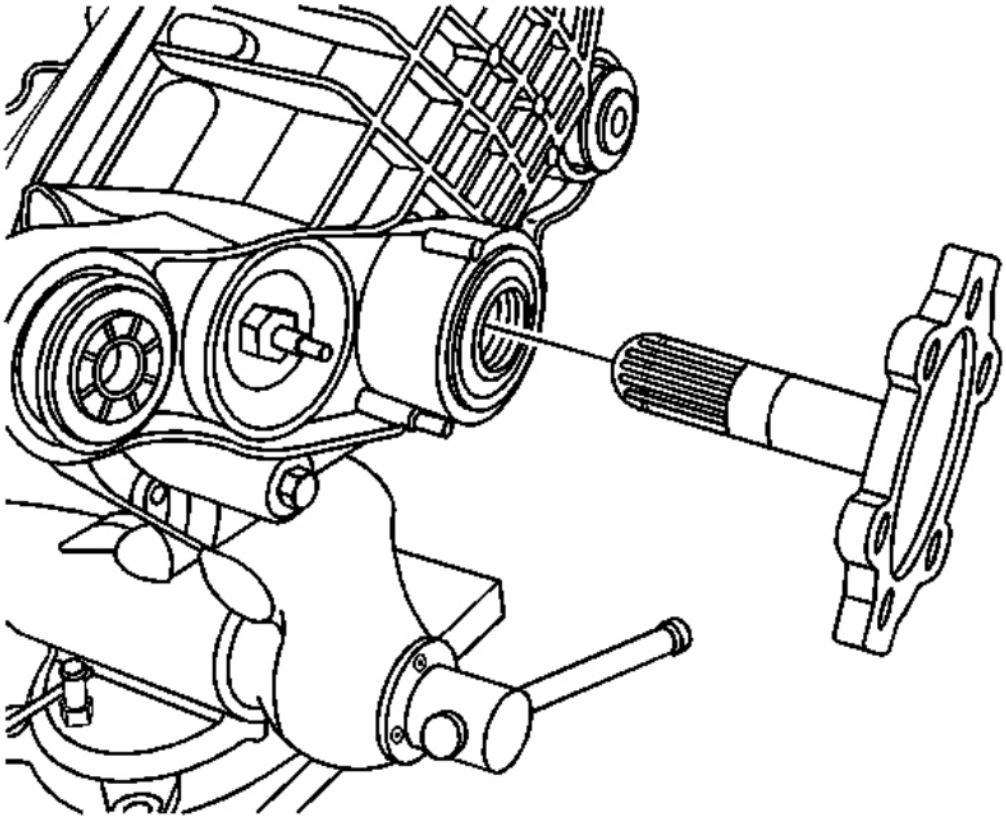


Fig. 236: View Of Left Side Inner Axle Shaft
Courtesy of GENERAL MOTORS CORP.

17. Install the right side inner shaft bearing into the inner shaft housing by performing the following steps:
    1. Install the inner axle shaft housing into a vise.

       Clamp only on the mounting flange of the inner axle shaft housing.

    2. Install the bearing with the square shoulder in using the **J 36609** (1) and the **J 8092** (2).

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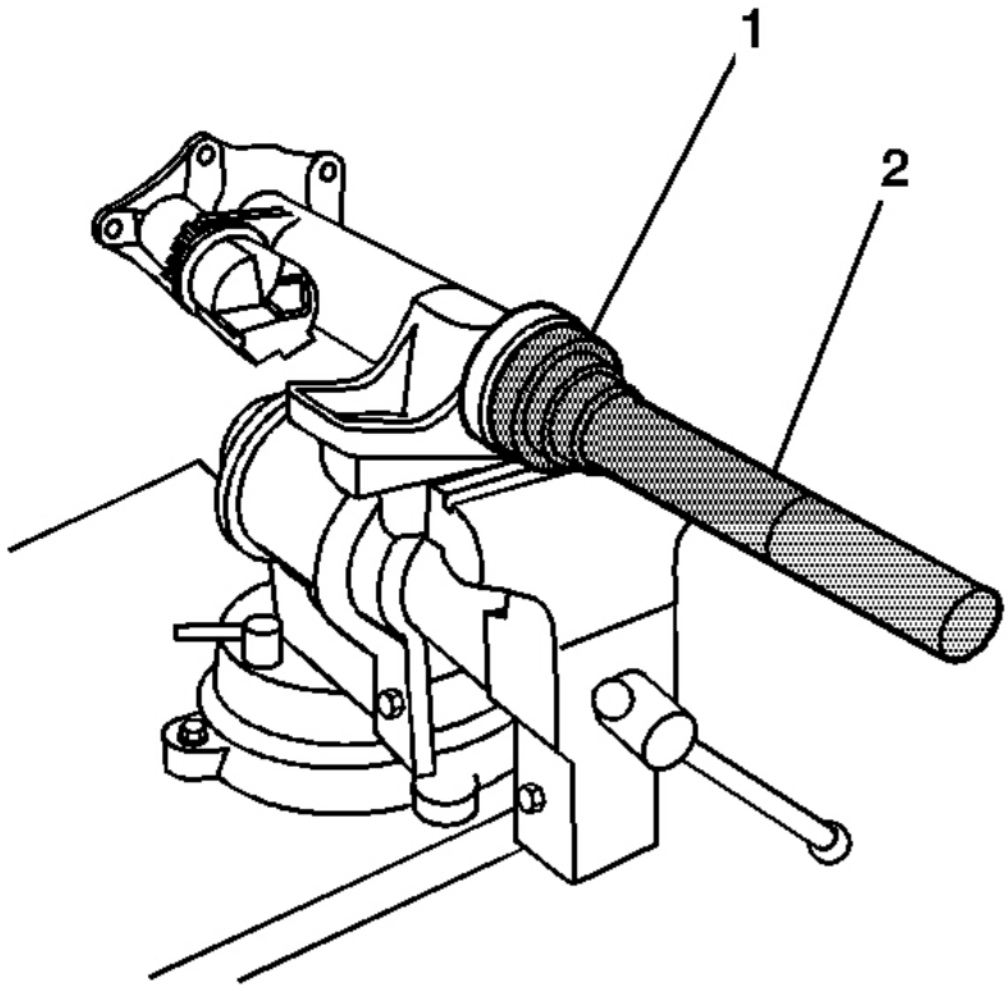


Fig. 237: Installing Right Side Inner Shaft Bearing Using J 36609 & J 8092
Courtesy of GENERAL MOTORS CORP.

18. Install the new right side inner axle shaft seal using the **J 45225** (1) and the **J 8092** (2).

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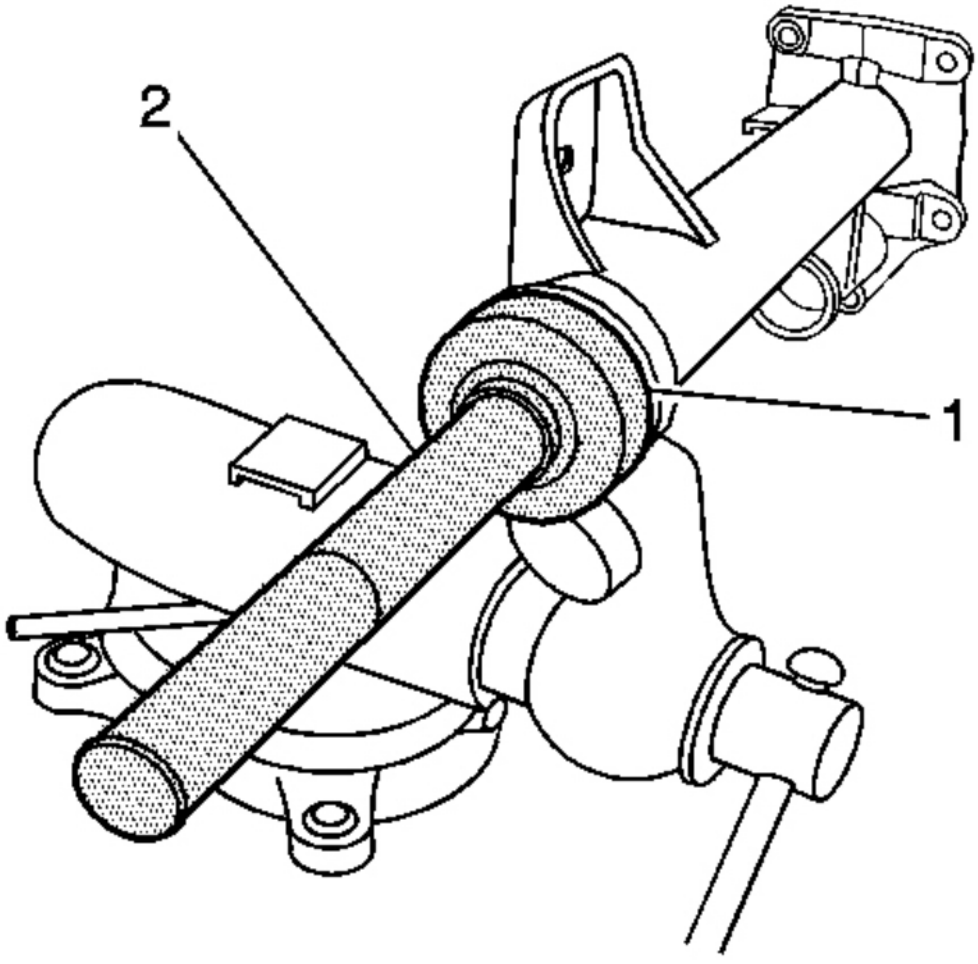


Fig. 238: Installing Right Side Inner Axle Shaft Seal Using J 45225 & J 8092
Courtesy of GENERAL MOTORS CORP.

19. Install the inner axle shaft into the inner shaft housing.

    Carefully tap the inner axle shaft into place with a soft-faced mallet.

20. For the 8.25 inch axle, assemble the following components into the inner shaft housing:
    A. Install the inner axle shaft (1).
    B. Place the inner axle housing on end so that the splines of the inner axle shaft are facing up.

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IMPORTANT: Use chassis grease in order to hold the thrust washer in place.

C. Install the thrust washer (5).

   Ensure the tabs on the thrust washer are aligned with the slots in the inner shaft housing (4).

D. Install the new retainer ring (7) into the clutch gear (6).
E. Install the clutch gear (6) onto the inner axle shaft (1).

   Drive the clutch gear into place with a plastic hammer.

F. Determine the clutch gear shim thickness. Refer to **Inner Axle Shaft Shim Adjustment**.
G. Install the clutch gear shim (9).
H. Install the clutch sleeve (8).
I. Install the clutch fork assembly (11).
J. Install the clutch fork inner spring (10).

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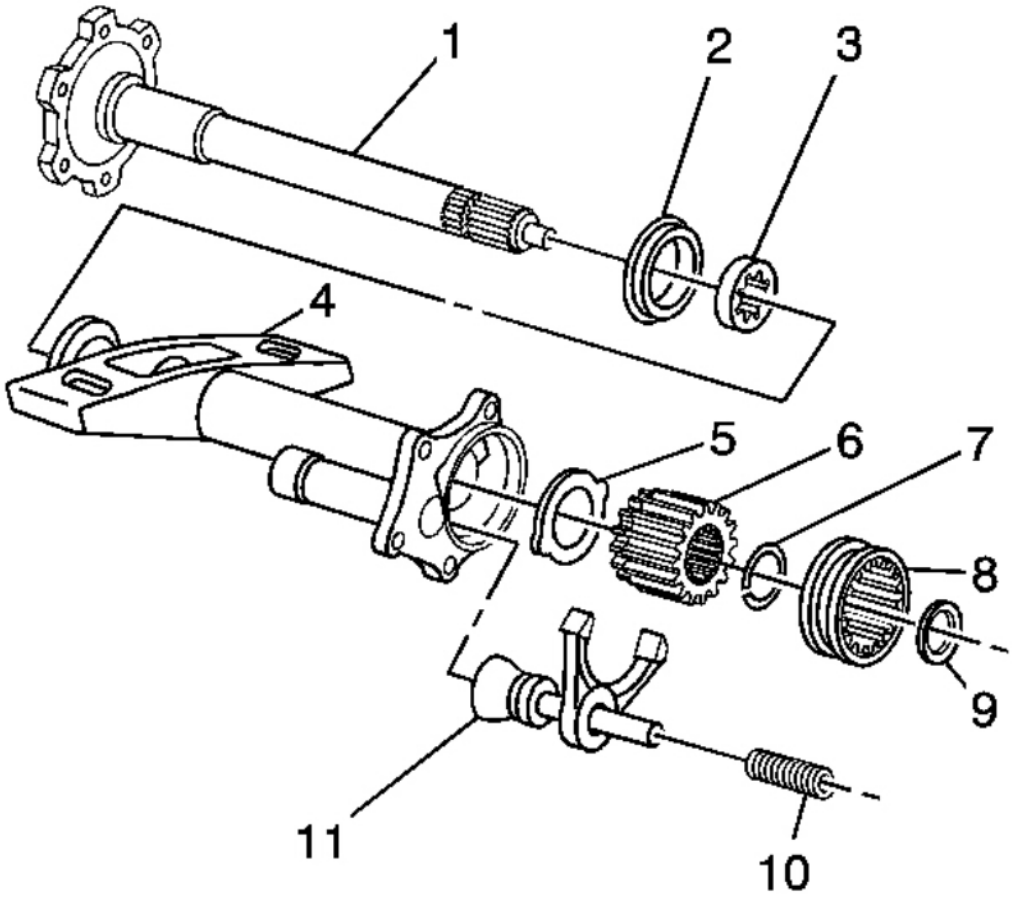


Fig. 239: Exploded View Of Inner Axle Shaft Housing (8.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

21. For the 9.25 inch axle, install the following components into the inner shaft housing:
    A. Install the inner axle shaft (1).
    B. Place the inner axle housing on end so that the splines of the inner axle shaft are facing up.

IMPORTANT: Use chassis grease in order to hold the thrust washer in place.

    C. Install the thrust washer (5).

    Ensure the tabs on the thrust washer are aligned with the slots in the inner shaft housing.

    D. Install the second thrust washer (6) into the inner axle shaft housing.

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E. Install the new retainer ring (7) onto the inner axle shaft (1).
F. Determine the clutch gear shim thickness. Refer to **Inner Axle Shaft Shim Adjustment**.
G. Install the clutch gear shim (9).
H. Install the clutch sleeve (8).
I. Install the clutch fork assembly (11).
J. Install the clutch fork inner spring (10).

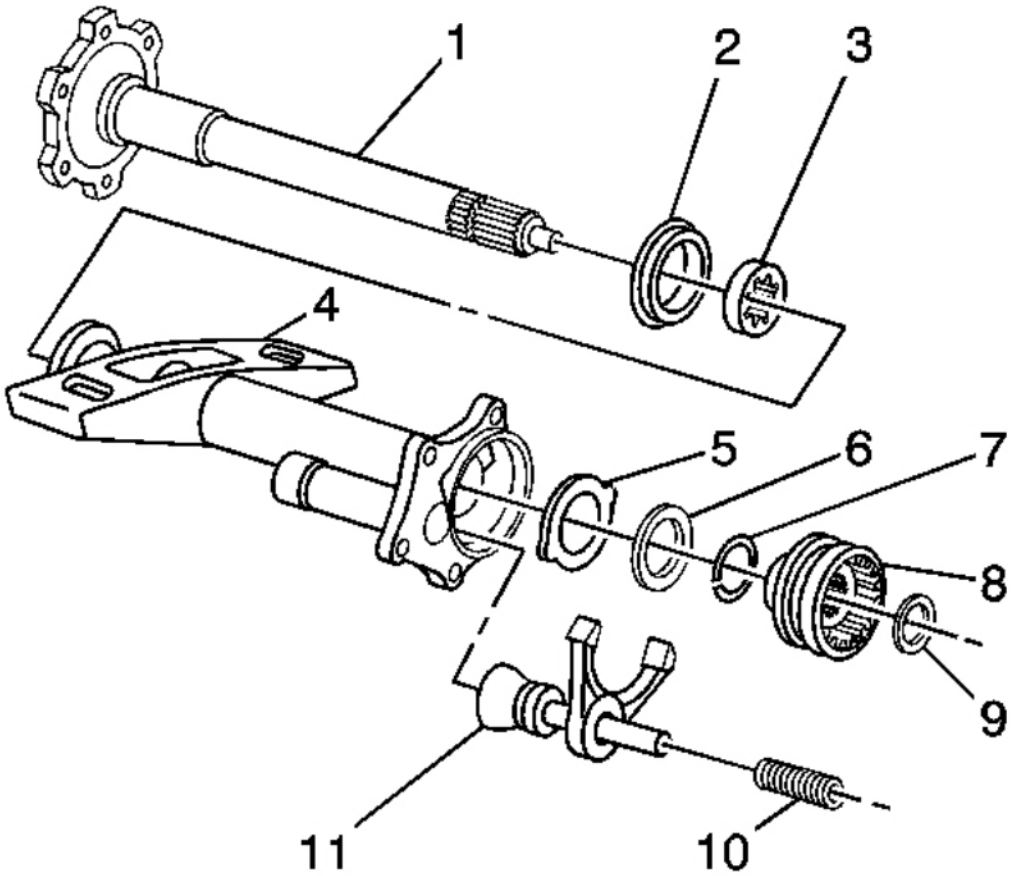


Fig. 240: Exploded View Of Inner Axle Shaft Housing (9.25 Inch Axle)
Courtesy of GENERAL MOTORS CORP.

22. Apply sealant to the inner shaft housing to differential carrier sealing surface. Use the correct sealant. Refer to **Sealers, Adhesives, and Lubricants**.
23. Install the inner shaft housing to the differential carrier assembly case.

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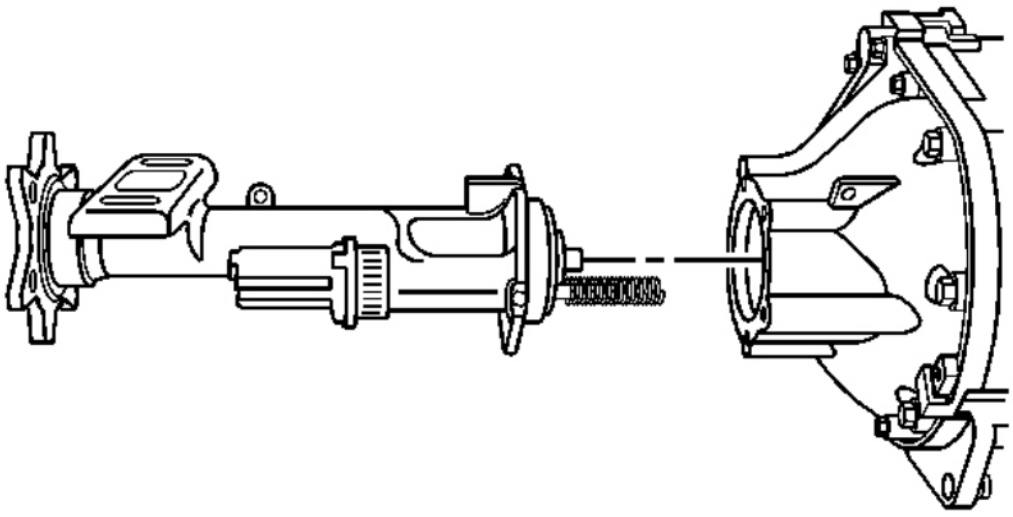


Fig. 241: View Of Inner Axle Shaft Housing Assembly To Differential Carrier Assembly
Courtesy of GENERAL MOTORS CORP.

24. Install the inner shaft housing bolts.

    Tighten: Tighten the inner shaft housing bolts to 40 N.m (30 lb ft).

25. Install the drain plug and the washer.
26. Install the fill plug and the washer.

    Tighten: Tighten the drain plug and the fill plug to 33 N.m (24 lb ft).

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

27. Install the front drive axle actuator.

    Apply sealant to the threads of the front axle actuator. Use the correct sealant. Refer to **Sealers, Adhesives, and Lubricants**.

    Tighten: Tighten the front drive axle actuator to 20 N.m (15 lb ft).

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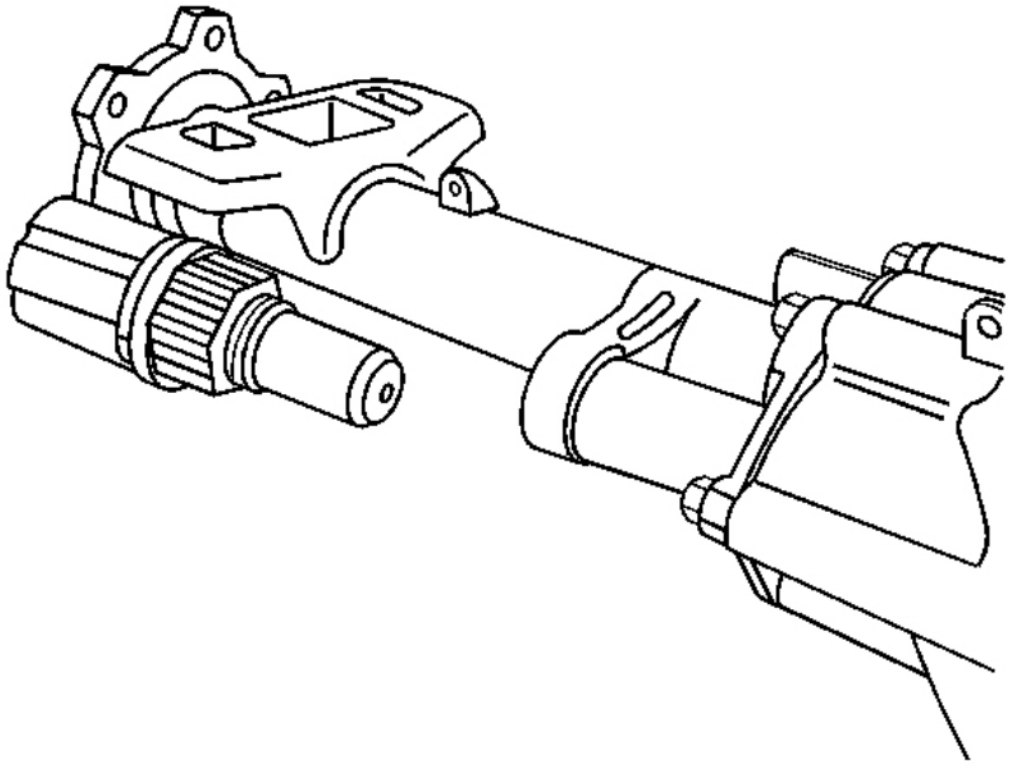


Fig. 242: View Of Front Axle Actuator
Courtesy of GENERAL MOTORS CORP.

28. Install the lower differential carrier assembly bushing by performing the following steps:
    1. Install the J 21474-18 (1), the thrust bearing (2), the J 36616-2 (3), the J 36616-1 (4), and the forcing screw (5) as shown.
    2. While holding the forcing screw, slowly tighten the J 21474-18 until the bushing has stopped against the step on the bushing and is centered within the differential carrier assembly bushing bore.

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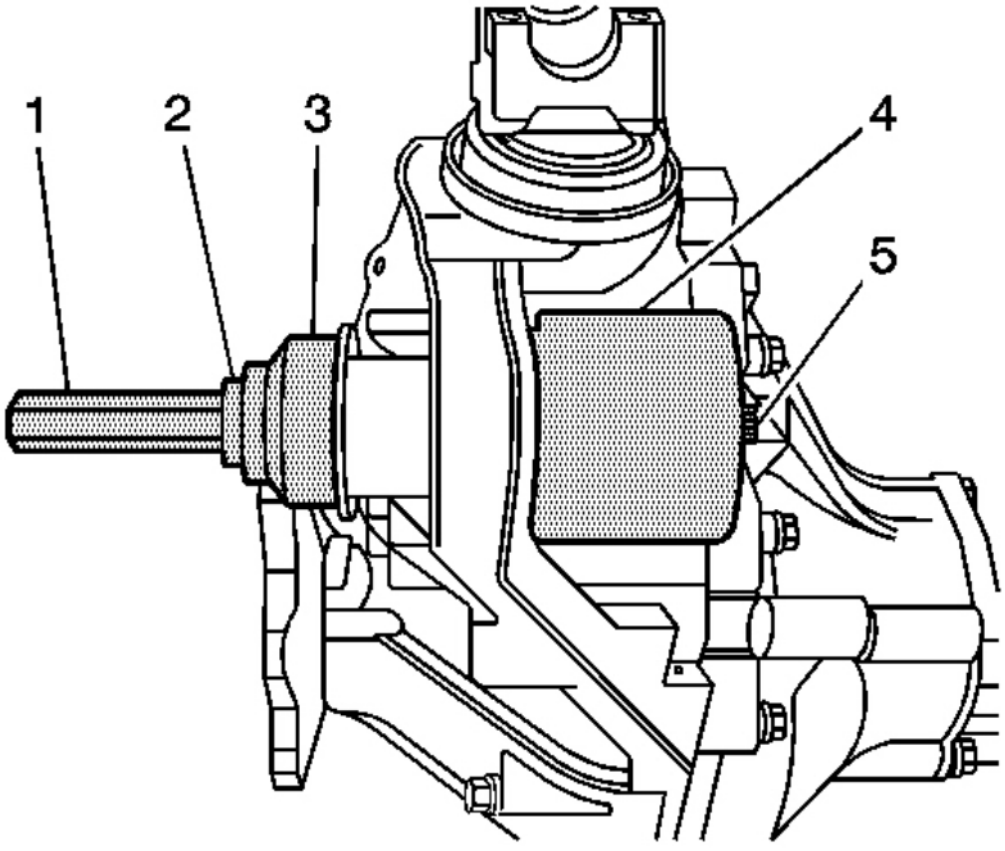


Fig. 243: Installing Lower Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

29. Install the upper differential carrier assembly bushing by performing the following steps:
    1. Install the J 21474-18 (1), the thrust bearing (2), the J 36616-2 (3), the J 36616-1 (4), and the forcing screw (5) as shown.
    2. While holding the forcing screw, slowly tighten the J 21474-18 until the bushing has stopped against the step on the bushing and is centered within the differential carrier assembly bushing bore.

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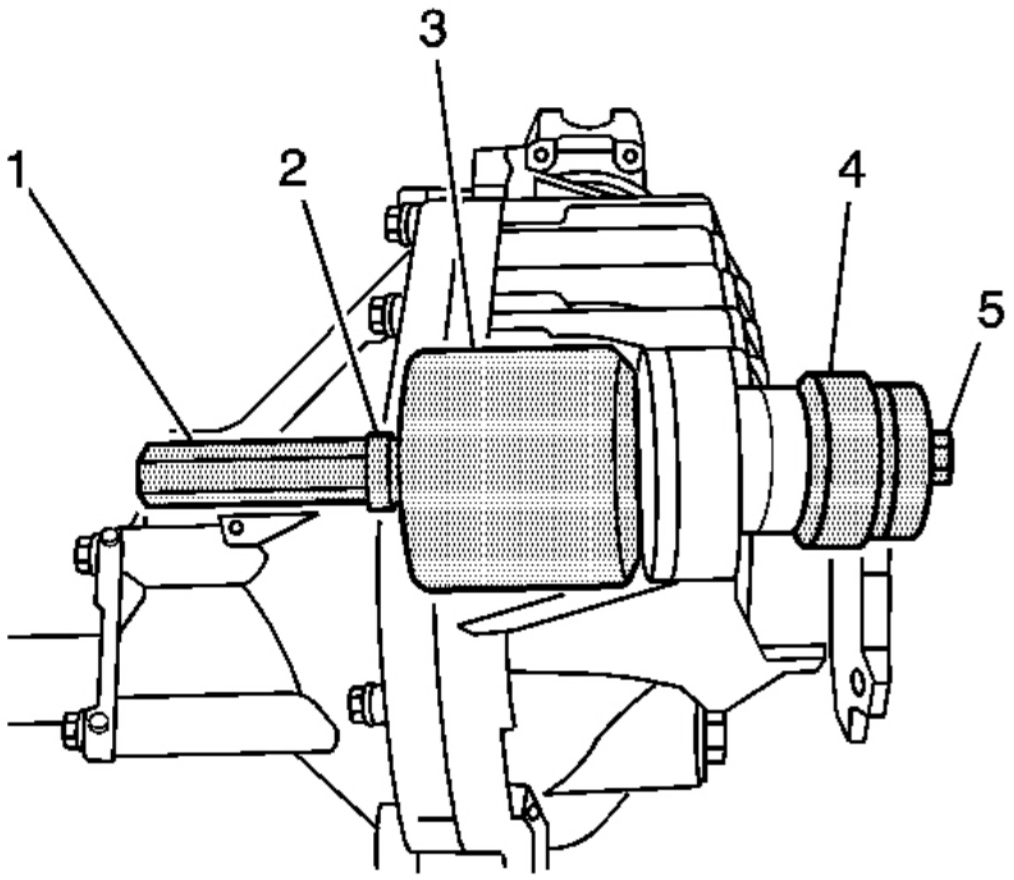


Fig. 244: Installing Upper Differential Carrier Assembly Bushing Using Special Tools
Courtesy of GENERAL MOTORS CORP.

GEAR TOOTH CONTACT PATTERN INSPECTION

The contact pattern check 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 the drive pinion. Gear sets which are not positioned properly may be noisy and/or have a short life. A pattern check ensures the best contact between the ring gear and the drive pinion for low noise and long life.

Gear Tooth Nomenclature

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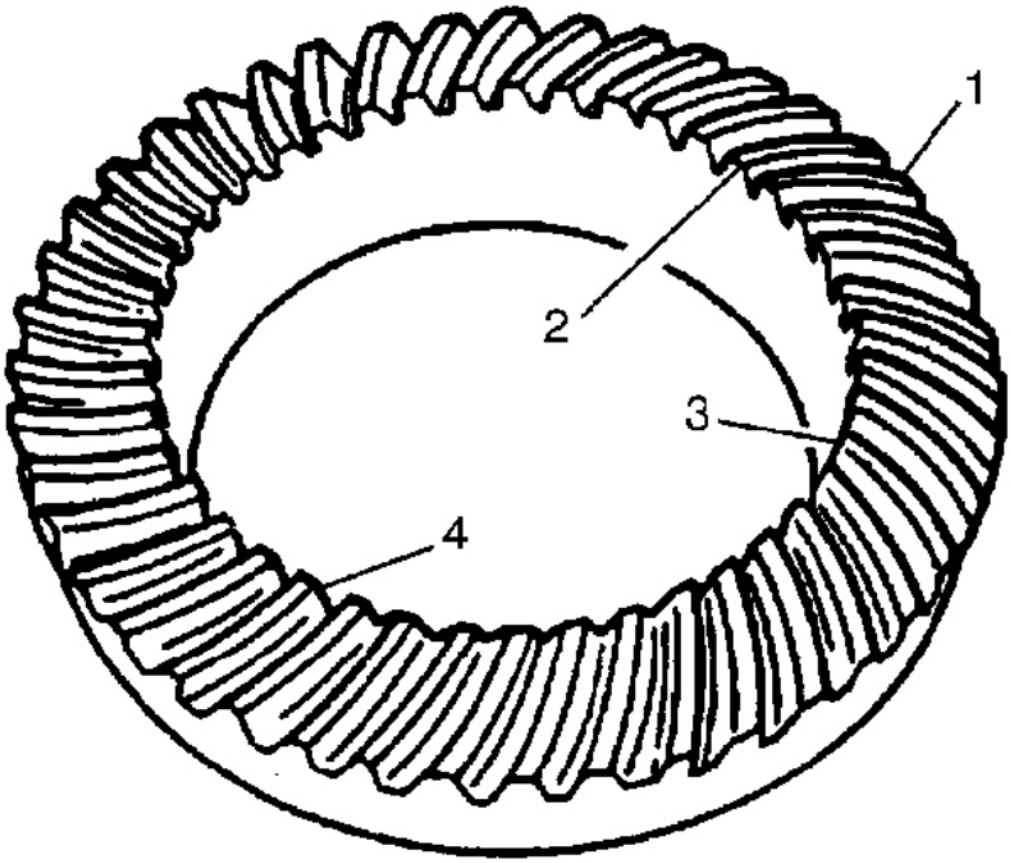


Fig. 245: Defining Gear Tooth Nomenclature
Courtesy of GENERAL MOTORS CORP.

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).

Adjustments Affecting Tooth Contact

The following 2 adjustments affect the tooth contact pattern:

- Backlash adjustment
- Pinion depth adjustment

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

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Pinion Depth Adjustment

Adjust the position of the 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.

Backlash Adjustment

Adjust the backlash by means of moving the side bearing adjuster sleeves which move the case and ring gear assembly closer to or farther from the pinion. Also use the adjuster sleeves in order to set the side bearing preload.

- If the left side adjuster sleeve is moved in, along with an equal outward movement of the right side adjuster, the backlash will increase.
- If the left side adjuster sleeve is moved out, along with an equal inward movement of the right side adjuster, the backlash will decrease.

Testing Procedure

1. Wipe clean the differential case, the ring gear and the differential carrier housing of lubricant. Carefully clean each tooth of the ring gear.
2. Use a medium stiff brush in order to sparingly apply gear marking compound GM P/N 1052351 (Canadian P/N 10953497) or equivalent to all of the ring gear teeth.

IMPORTANT: Avoid turning the ring gear excessively.

3. Using a wrench, turn the drive pinion flange/yoke so that the ring gear rotates at least 3 full revolutions.
4. Turn the drive pinion flange/yoke in the opposite direction so that the ring gear rotates at least 3 full revolutions in the opposite direction.

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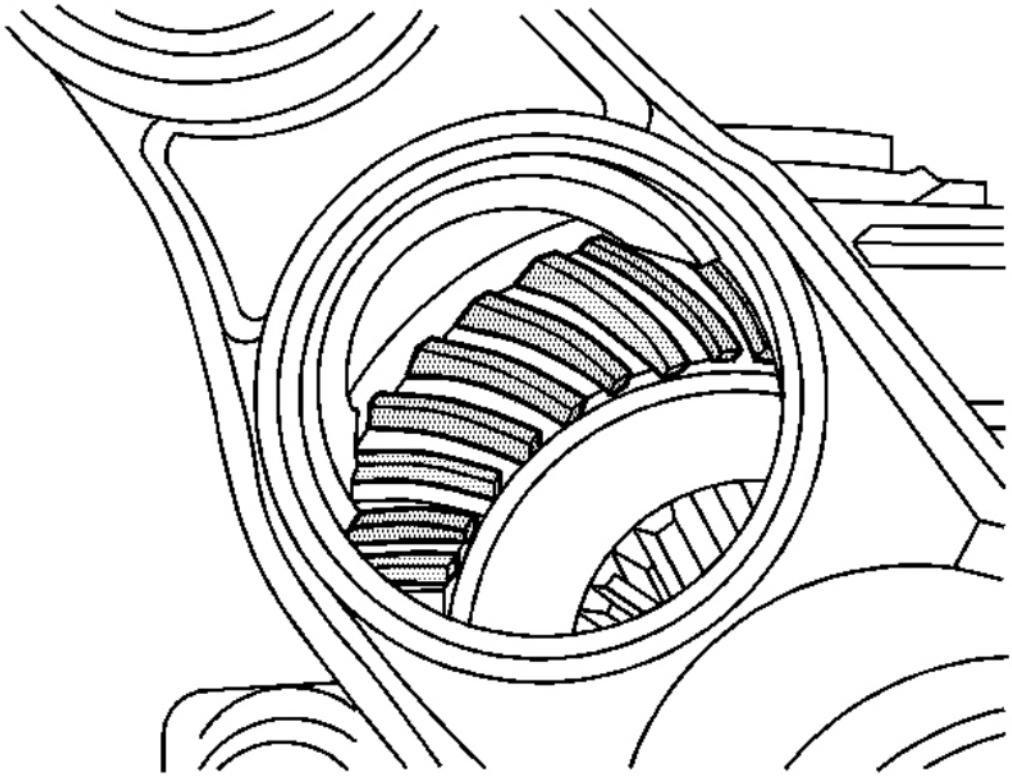


Fig. 246: Rotating Ring Gear
Courtesy of GENERAL MOTORS CORP.

5. Observe the pattern on the ring gear teeth. Compare the pattern with the following illustrations.

Correct Contact Pattern

Condition

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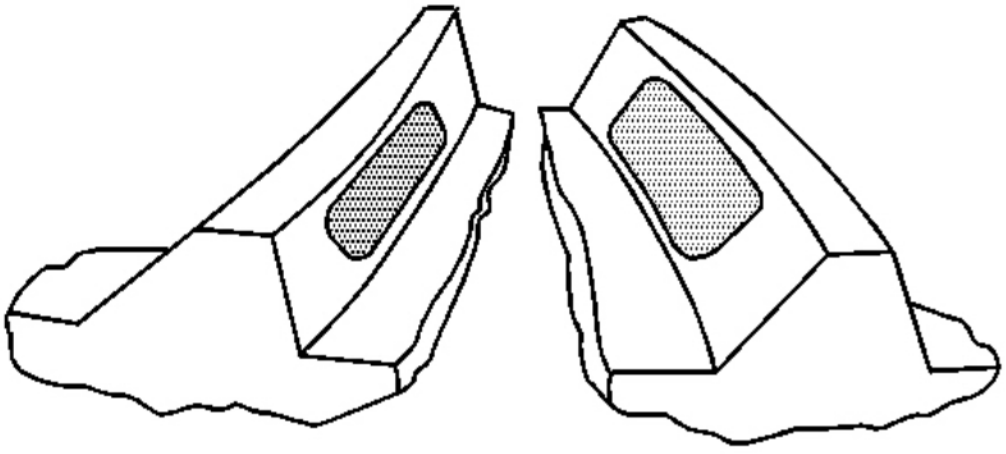


Fig. 247: Identifying Correct Gear Tooth Contact Pattern
Courtesy of GENERAL MOTORS CORP.

The backlash and pinion depth is correct.

Correction

None required.

Service Hints

Loose bearing on the drive pinion or in the differential case may cause patterns that vary. If the contact pattern varies, inspect the following preload settings:

- Total assembly
- Differential case
- Drive pinion

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

Drive Side Heel - Coast Side Toe Contact Pattern

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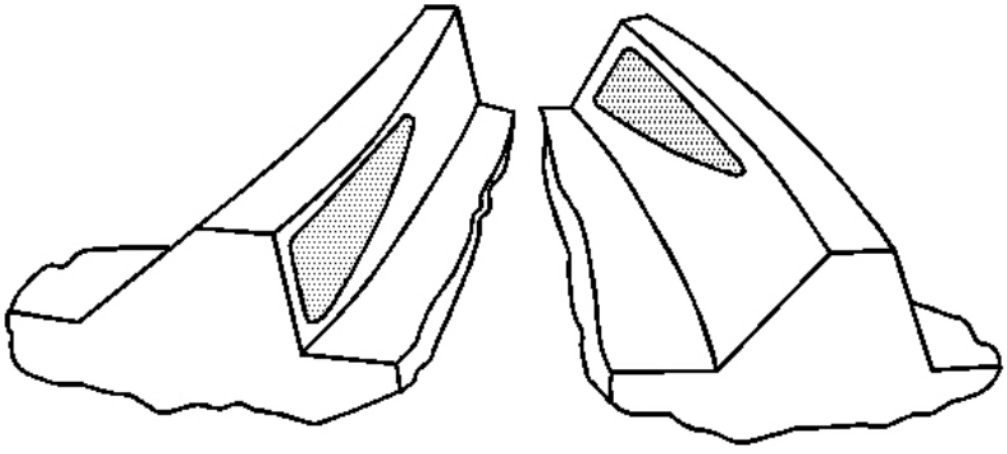


Fig. 248: Identifying Drive Side Heel - Coast Side Toe Contact Pattern
Courtesy of GENERAL MOTORS CORP.

Condition

The pinion depth is incorrect. The drive pinion is too far away from the ring gear.

Correction

Adjust the pinion depth of drive pinion. Refer to **Pinion Depth Adjustment**.

Drive Side Toe - Coast Side Heel Contact Pattern

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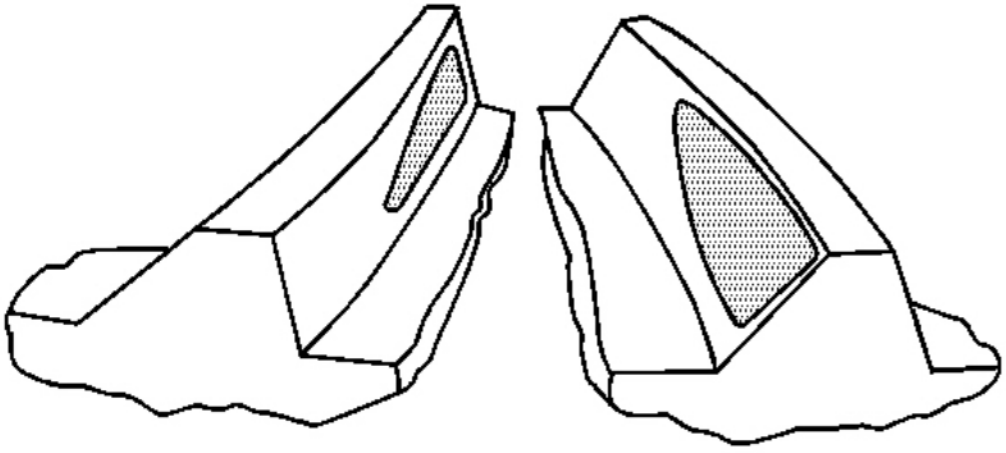


Fig. 249: Identifying Drive Side Toe - Coast Side Heel Contact Pattern
Courtesy of GENERAL MOTORS CORP.

Condition

The pinion depth is incorrect. The drive pinion is too close to the ring gear.

Correction

Adjust the pinion depth of drive pinion. Refer to **Pinion Depth Adjustment**.

Drive Side Heel - Coast Side Heel Contact Pattern

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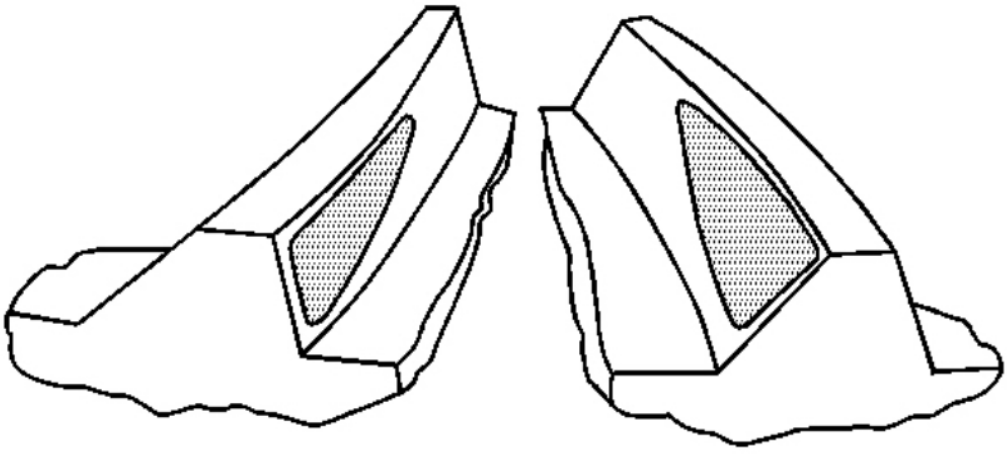


Fig. 250: Identifying Drive Side Heel - Coast Side Heel Contact Pattern
Courtesy of GENERAL MOTORS CORP.

Condition

The backlash is incorrect. The ring gear is too far away from the drive pinion.

Correction

Decrease the backlash. Move the ring gear closer to the drive pinion by adjusting the side bearing adjuster sleeves. Refer to **Backlash Inspection and Adjustment**.

Drive Side Toe - Coast Side Toe Contact Pattern

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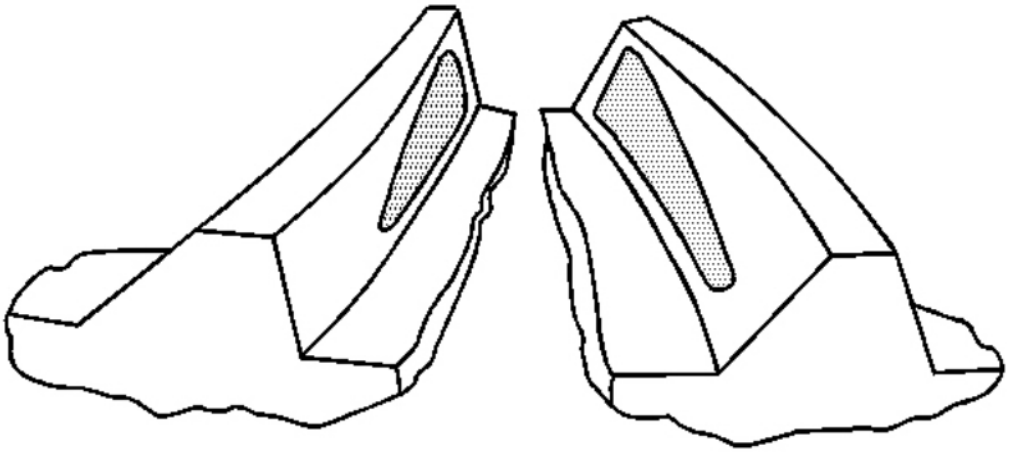


Fig. 251: Identifying Drive Side Toe - Coast Side Toe Contact Pattern
Courtesy of GENERAL MOTORS CORP.

Condition

The backlash is incorrect. The ring gear is too close to the drive pinion.

Correction

Increase the backlash. Move the ring gear away from the drive pinion by adjusting the side bearing adjuster sleeves. Refer to **Backlash Inspection and Adjustment**.

DESCRIPTION AND OPERATION

FRONT DRIVE AXLE DESCRIPTION AND OPERATION

Selectable Four Wheel Drive (S4WD) Front Axle Description and Operation

The Selectable Four Wheel Drive (S4WD) Front Axle consist of the following components:

- Differential Carrier Housing
- Differential Assembly
- Output Shafts (Left and Right Side)
- Inner Axle Shaft Housing
- Inner Axle Shaft (Right Side)
- Clutch Fork

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- Clutch Fork Sleeve
- Electric Motor Actuator

The front axle on Selectable Four Wheel Drive model vehicles uses a central disconnect feature in order to engage and disengage the front axle. When the driver engages the 4WD system, the Transfer Case Control Module sends a signal to the electric motor actuator to energize and extend the plunger inside. The extended plunger moves the clutch fork and clutch fork sleeve across the inner axle shaft and the clutch fork shaft and locks the two shafts together. The locking of the two shafts allows the axle to operate in the same manner as a semi-floating rear axle. A propeller shaft connects the transfer case to the front axle. The differential carrier assembly uses a conventional ring and pinion gear set to transmit the driving force of the engine to the wheels. The open differential allows the wheels to turn at different rates of speed while the axle continues to transmit the driving force. This prevents tire scuffing when going around corners and premature wear on internal axle parts. The ring and pinion set and the differential are contained within the carrier. The axle identification number is located on top of the differential carrier assembly or on a label on the bottom of the right half of differential carrier assembly. The drive axles are completely flexible assemblies consisting of inner and outer constant velocity CV joints protected by thermoplastic boots and connected by a wheel drive shaft.

Full-Time Four Wheel Drive (F4WD) Front Axle Description and Operation

The Full-Time Four Wheel Drive (F4WD) Front Axle consist of the following components:

- Differential Carrier Housing
- Differential Assembly
- Output Shaft (Left Side)
- Inner Axle Shaft Housing
- Inner Axle Shaft (Right Side)

The front axle on Full-Time Four Wheel Drive model vehicles does not have a central disconnect feature in order to engage and disengage the front axle. The left and right axle shafts are connected directly to the differential case assembly. This allows the axle shafts and the propeller shaft to spin continuously. The transfer case controls the amount of torque applied to the front axle. The remaining components are the same as the selectable four wheel drive axle.

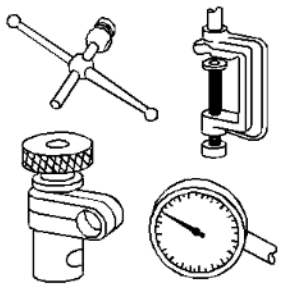
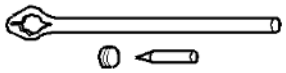
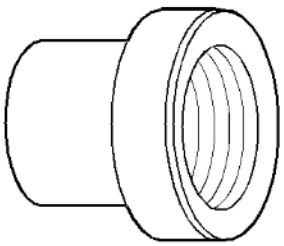
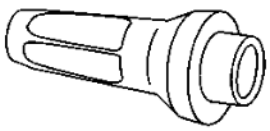
SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

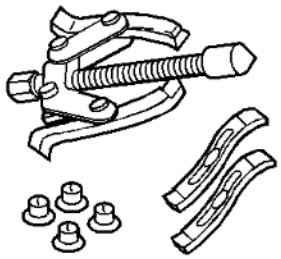
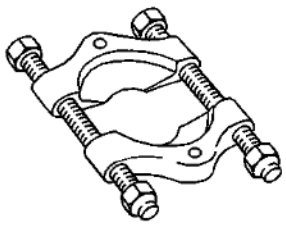
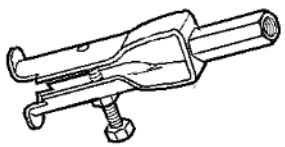
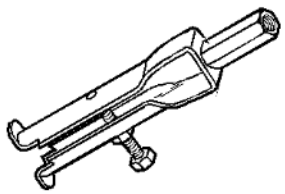
Special Tools

Illustration	Tool Number/ Description
	J 2619-01 Slide Hammer

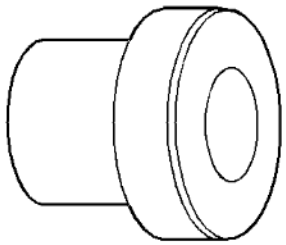
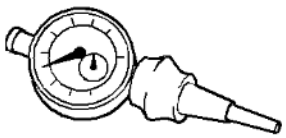
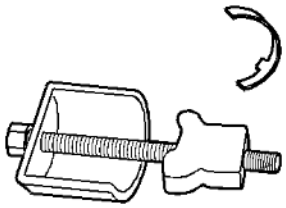
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	J 8001 Dial Indicator Set
	J 8092 Driver Handle - 3/4 in - 10
	J 8614-01 Flange and Pulley Holding Tool
	J 22761 Differential Side Bearing Installer
	J 22833 Housing Drive Gear Seal Installer

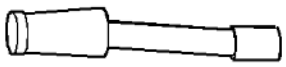
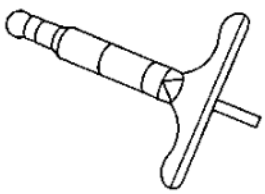
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	J 22888-D Side Bearing Remover Kit
	J 22912-01 Splite-Plate Bearing Puller
	J 29369-1 Bushing and Bearing Remover
	J 29369-2 Bushing and Bearing Remover - 2-3 in
	J 29710 Differential Side Bearing Installer

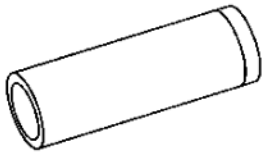
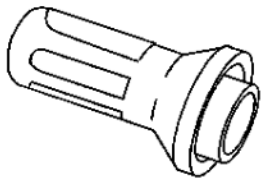
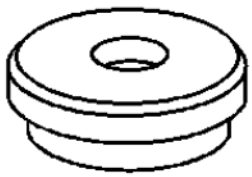
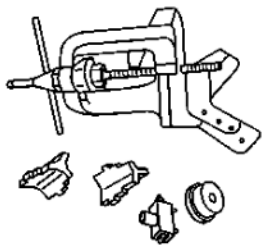
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	J 29763 Static Timing Gage
	J 33791 Carrier Bushing Remover/Installer
	J 33842 Pilot Bearing Installer

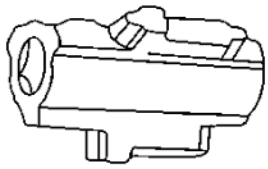
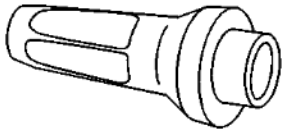
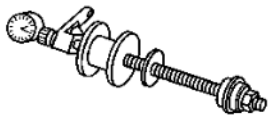
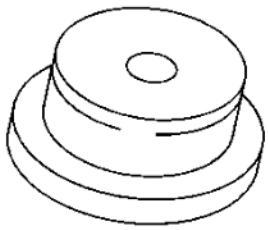
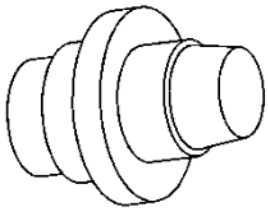
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	J 34011 Pilot Bearing Remover
	J 34672 Depth Micrometer

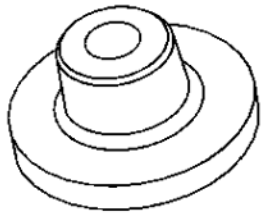
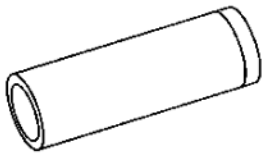
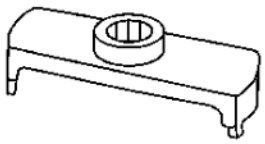
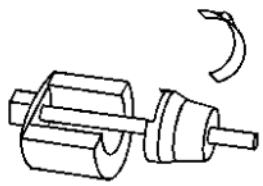
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	J 35512 Inner Pinion Bearing Installer
	J 36366 Pinion Oil Seal Installer
	J 36597 Side Bearing Puller Pilot - 9.25 Inch Axle
	J 36598 Holding Fixture
	J 36599-A Side Bearing Nut Wrench

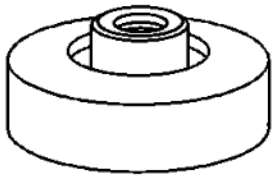
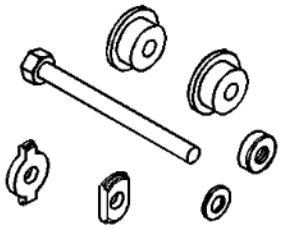
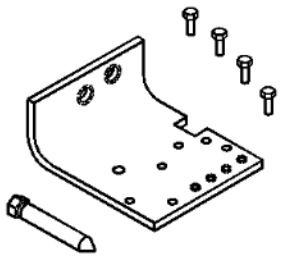
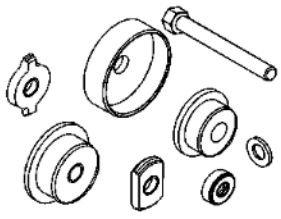
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	J 36600 Output Shaft Seal Installer
	J 36601 Pinion Shim Selector
	J 36603 Side Bearing Cup Installer
	J 36609 Axle Tube Bearing Installer

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	J 36612 Output Shaft Bearing Installer
	J 36614 Inner Pinion Bearing Installer
	J 36615 Side Bearing Nut Wrench
	J 36616 Axle Mount Bushing Remover/Installer
	J 45225 Axle Seal Installer

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	J 45754 Pinion Bearing Race Remover/Installer - 9.25 Inch Axle
	J 45765 Pinion Remover
	J 45858 Pinion Bearing Race Remover/Installer - 8.25 Inch Axle

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