

YMMS: 2005 Ford Crown Victoria Police Interceptor  
Engine: 4.6L Eng  
VIN:

Dec 31, 2021  
License:  
Odometer:

## REMOVAL AND INSTALLATION

### Axle Housing

#### Removal

1. If equipped, turn the air suspension switch to the OFF position.

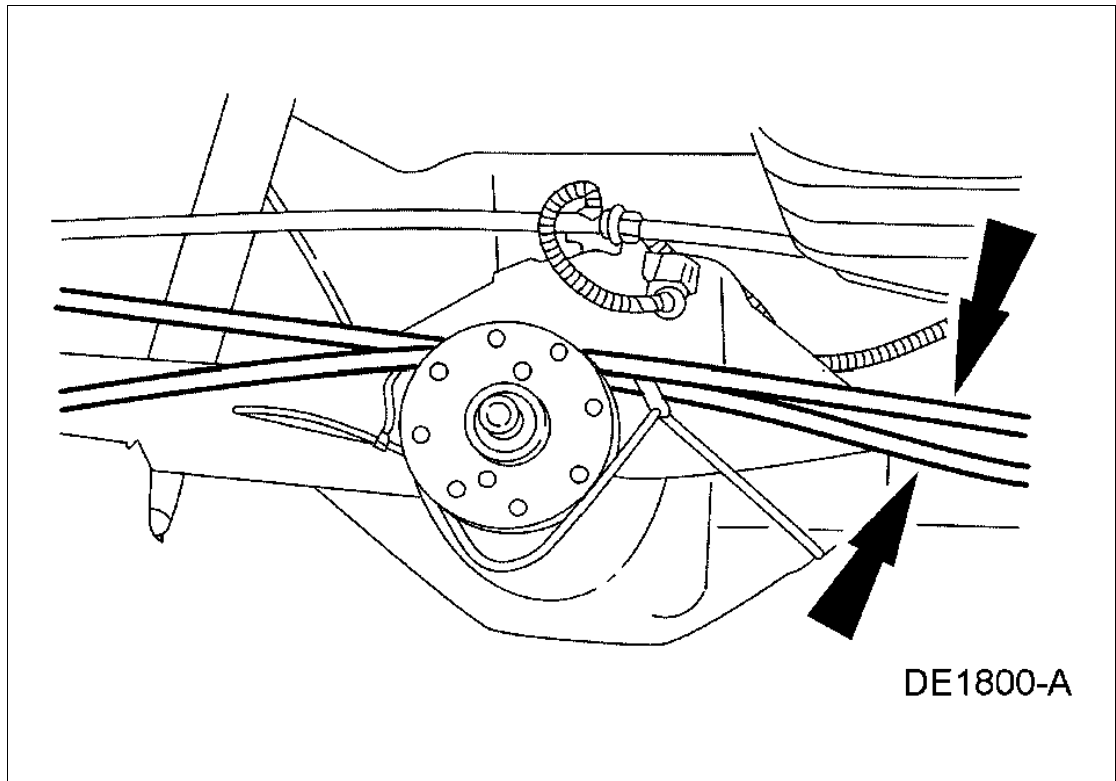
**WARNING:** *The electrical power to the air suspension system must be shut off prior to hoisting, jacking or towing an air suspension vehicle. This can be accomplished by turning off the air suspension switch located in the LH side of the luggage compartment. Failure to do so can result in unexpected inflation or deflation of the air springs, which can result in shifting of the vehicle during these operations.*

2. If equipped with fire suppression system, depower the system.

**WARNING:** *If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

3. Remove the drive pinion. For additional information, refer to DIFFERENTIAL RING AND PINION.
4. Remove the parking brake rear cable and conduit from the parking brake cable equalizer.
  1. Reroute the parking brake rear cable and conduit out of the way.
  2. Repeat for the other side.

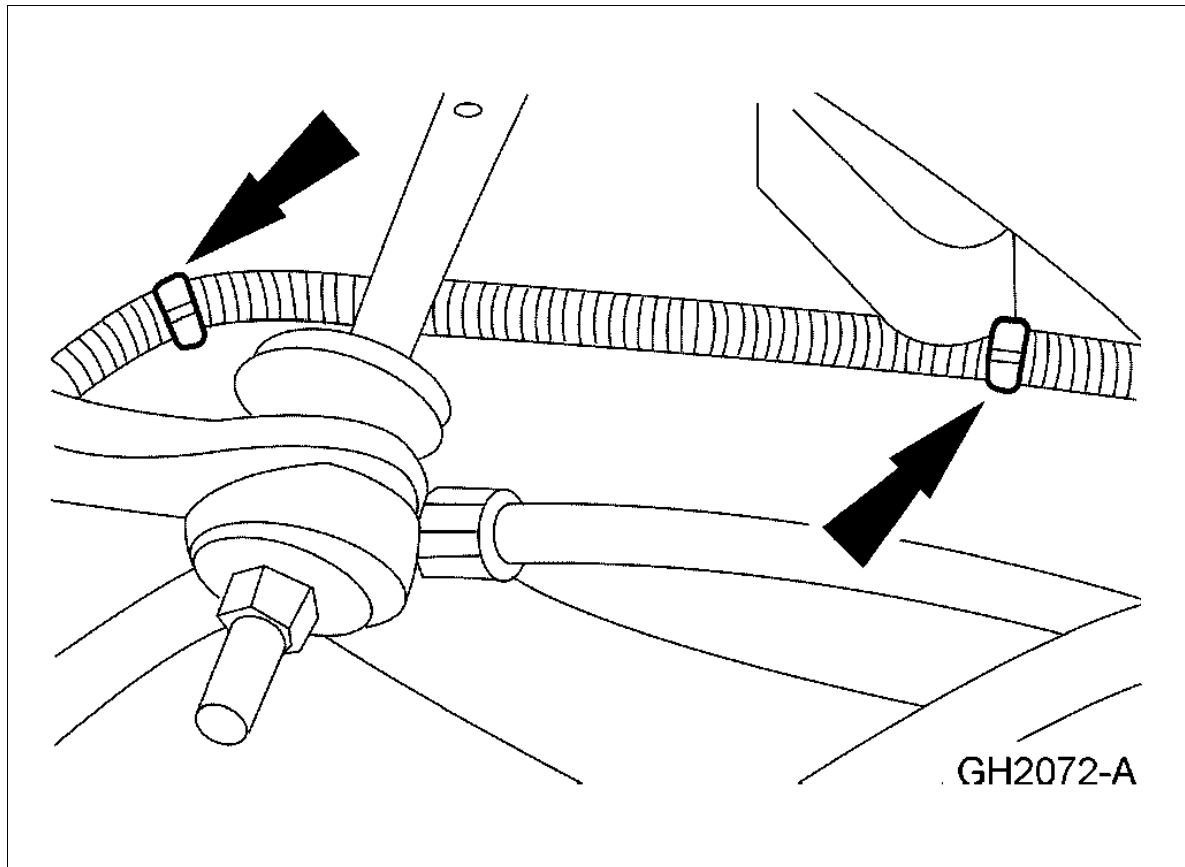
Fig 1: Removing Parking Brake Rear Cable



Courtesy of FORD MOTOR CO.

5. Disconnect the ABS sensor harness routing clips.

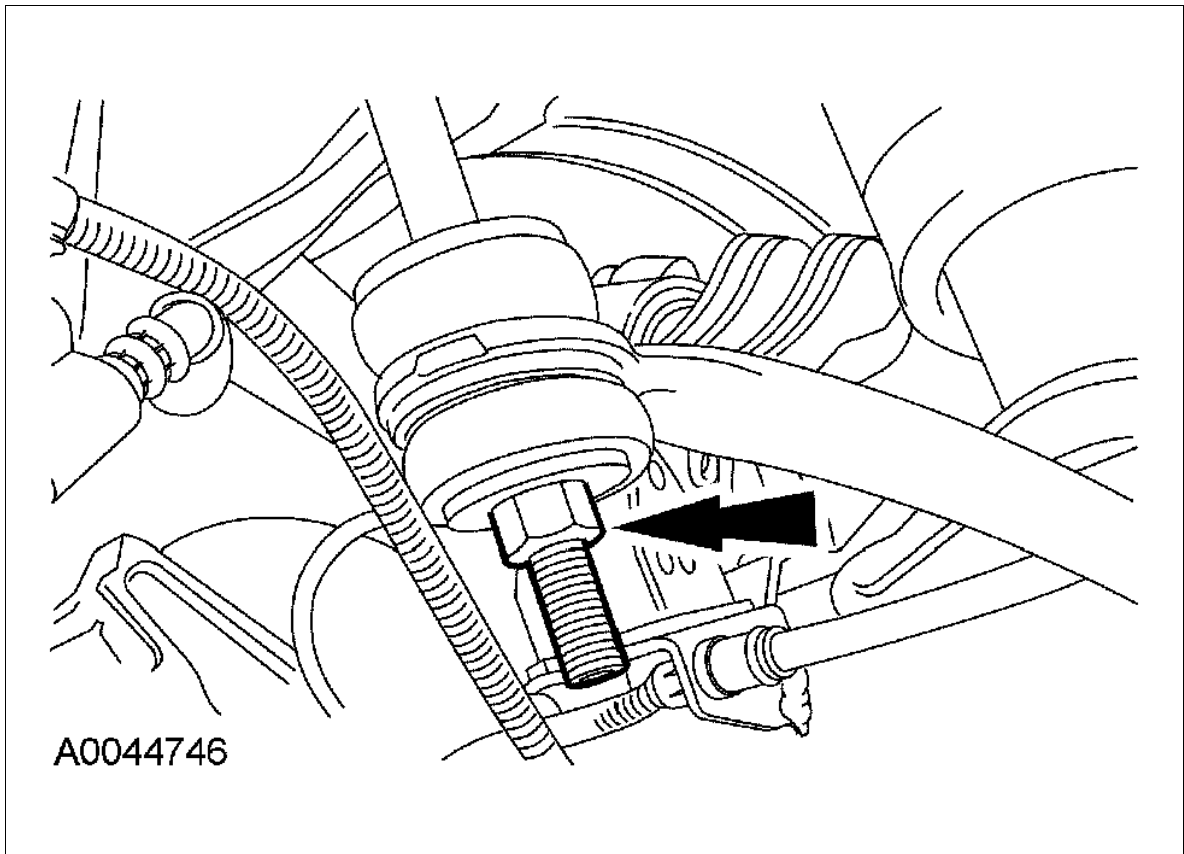
Fig 2: Disconnecting ABS Sensor Harness Routing Clips



Courtesy of FORD MOTOR CO.

6. Remove the rear stabilizer bar from the rear stabilizer bar link and bushing.

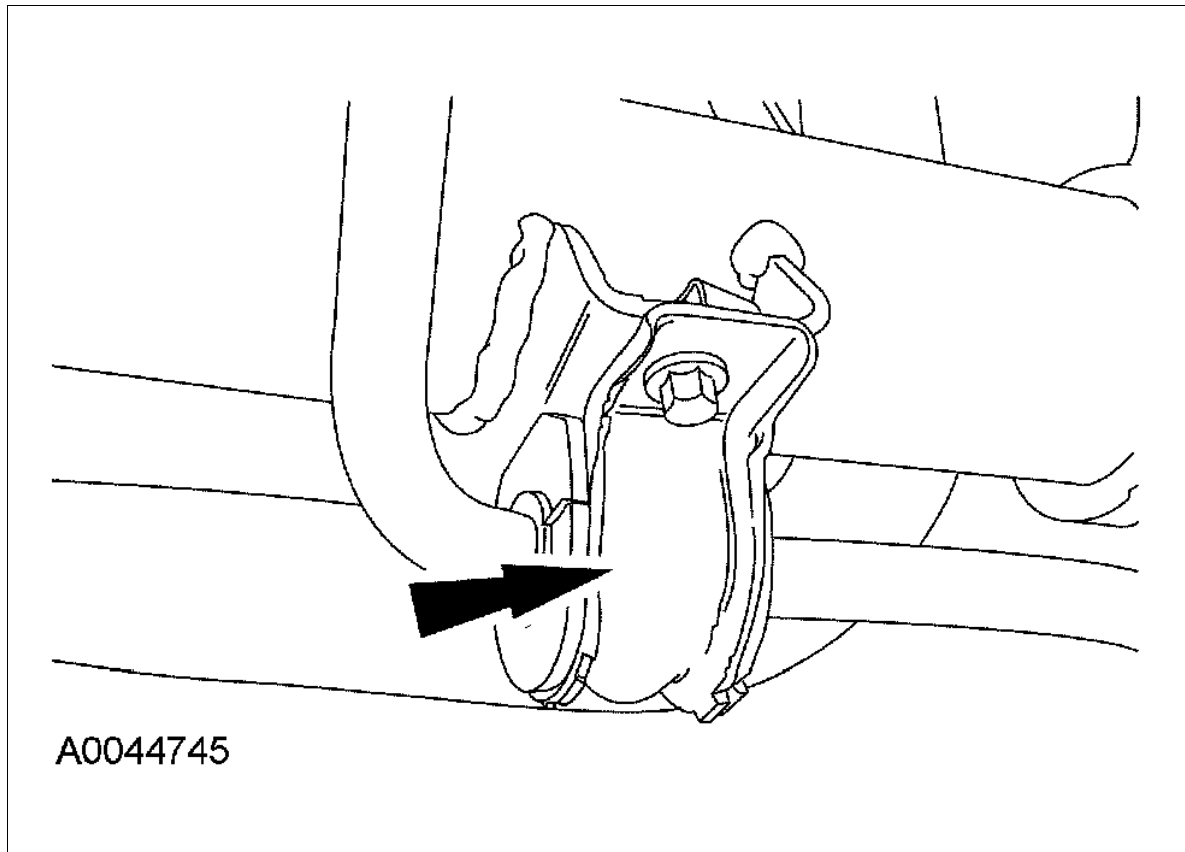
Fig 3: Removing Rear Stabilizer Bar



Courtesy of FORD MOTOR CO.

7. Remove the rear stabilizer bar bracket bolts and the rear stabilizer bar brackets to disconnect the rear stabilizer bar.

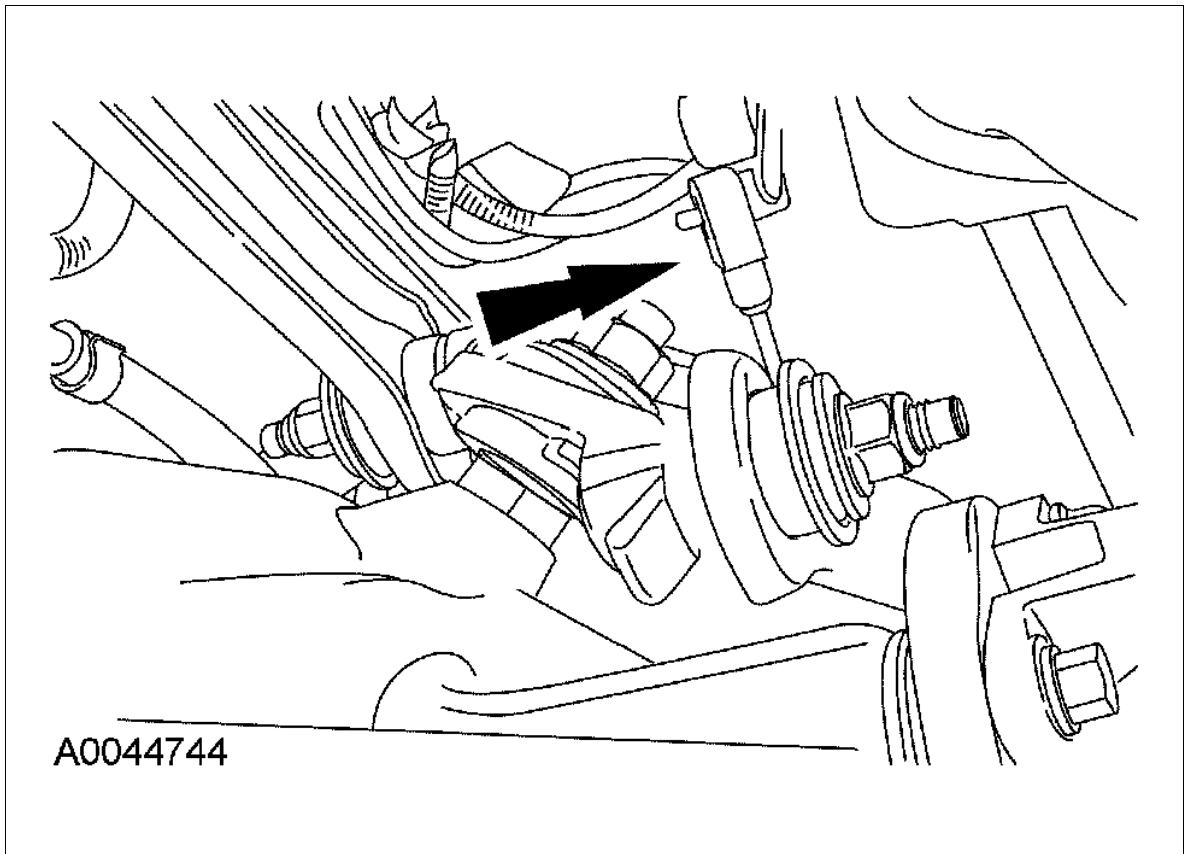
Fig 4: Removing Rear Stabilizer Bar Bracket Bolts



Courtesy of FORD MOTOR CO.

8. If equipped with rear air springs, remove the height sensor.

Fig 5: Removing Height Sensor



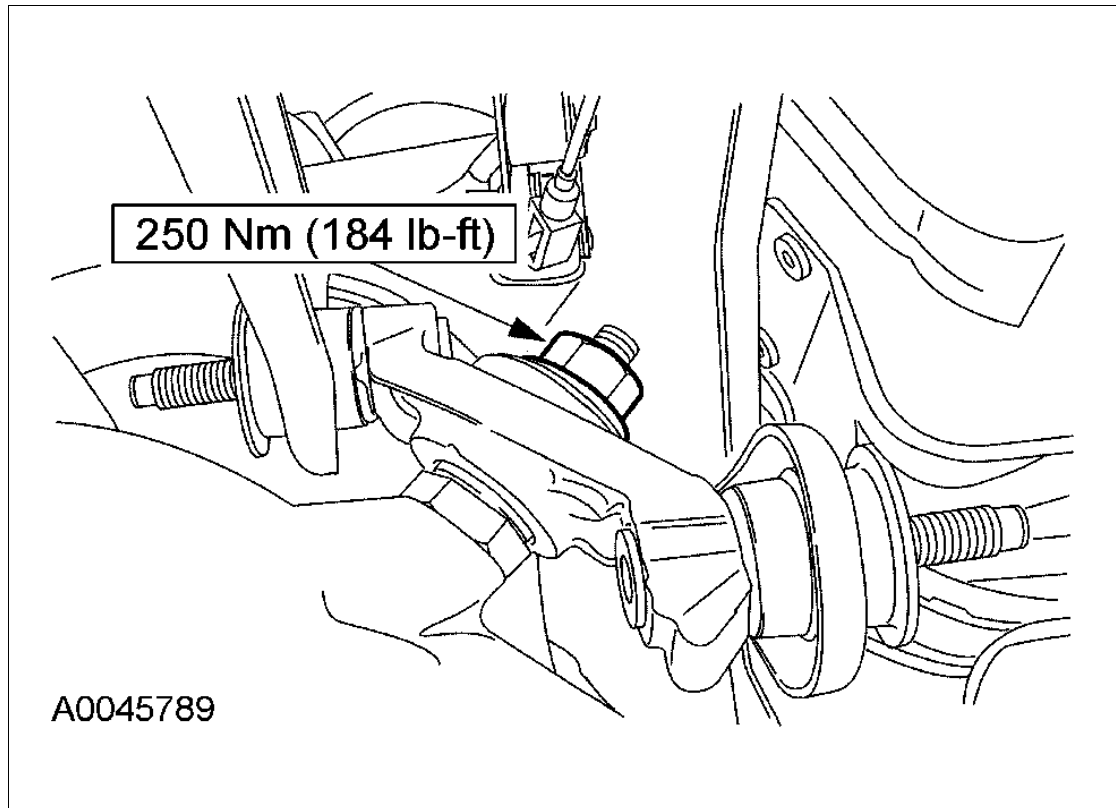
Courtesy of FORD MOTOR CO.

9. Separate the Watts linkage from the rear axle housing.

**CAUTION:** Take care not to damage the threads on the bellcrank stud.

1. Remove the retainer nut from the bellcrank stud.

Fig 6: Removing Retainer Nut From Bellcrank Stud

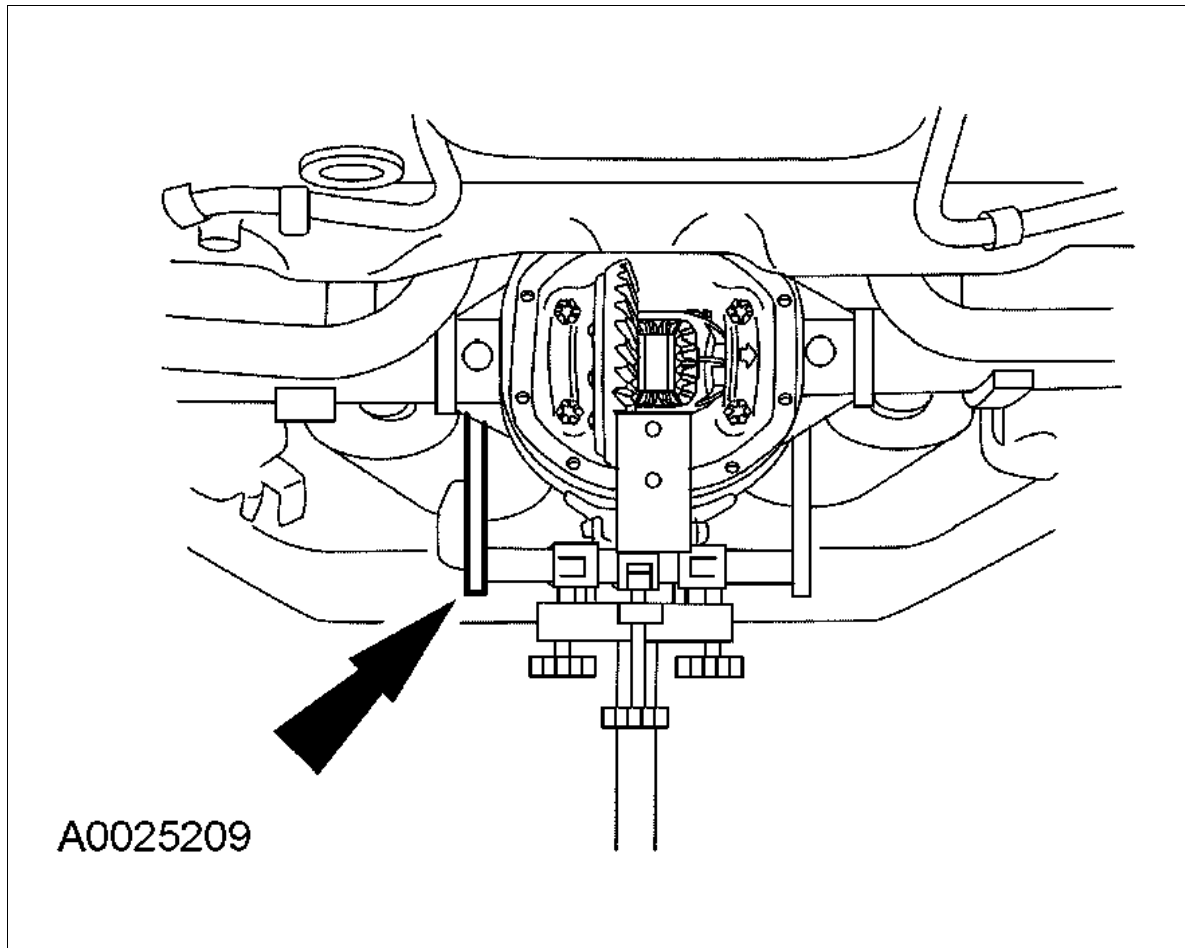


Courtesy of FORD MOTOR CO.

10. Support the rear axle housing with a suitable jack.

**WARNING:** Use additional support straps to secure the rear axle to the jack.

Fig 7: Supporting Rear Axle Housing With A Suitable Jack

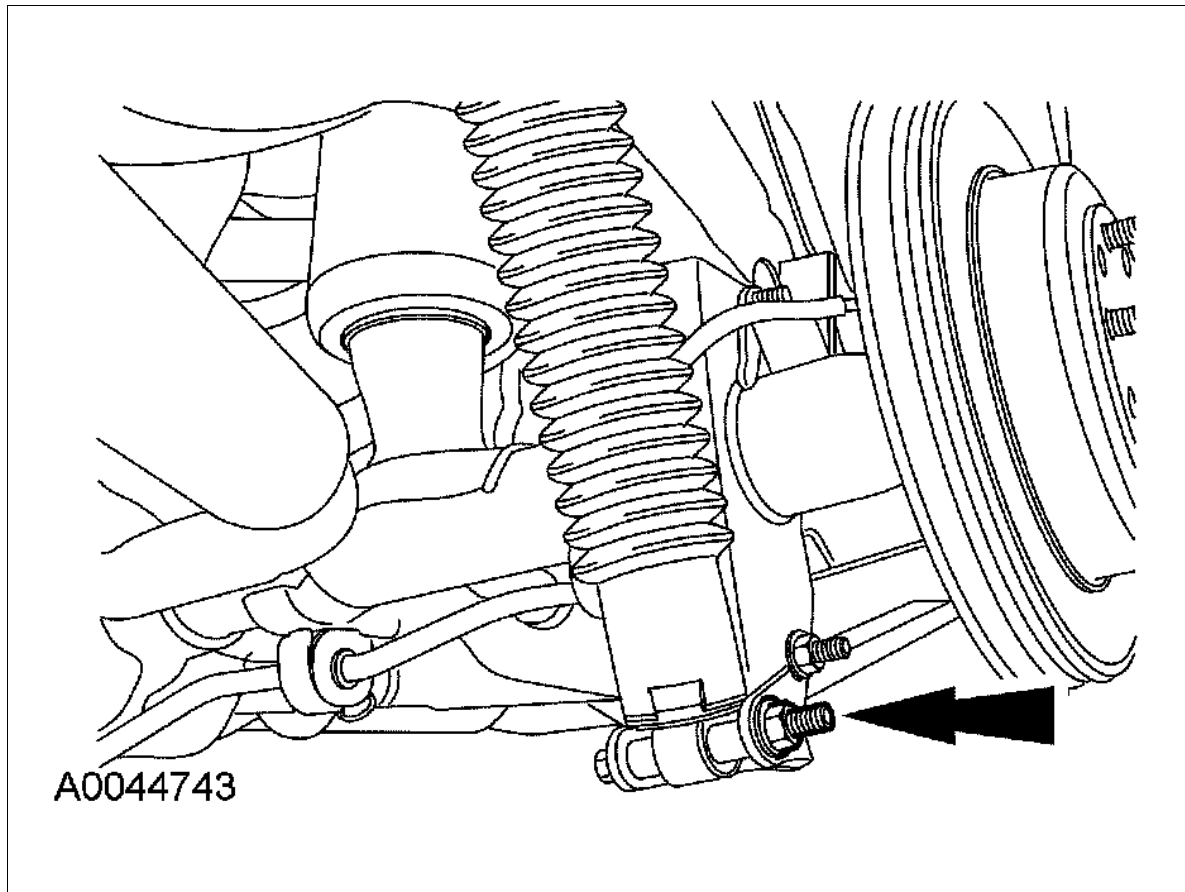


Courtesy of FORD MOTOR CO.

11. Remove the shock absorber lower nuts, then remove the shock absorbers from the retainer brackets.



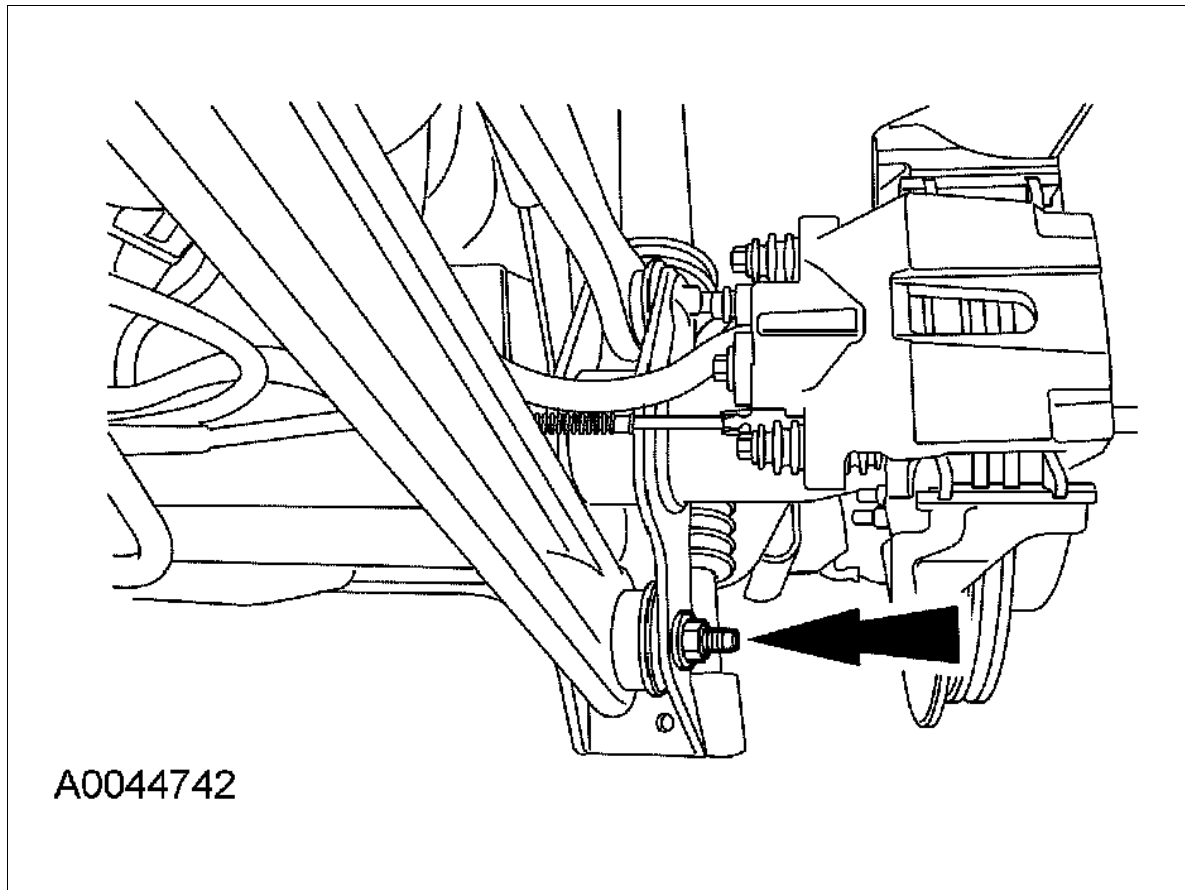
Fig 8: Removing Shock Absorbers From Retainer Brackets



Courtesy of FORD MOTOR CO.

12. Remove the nuts and bolts retaining the LH and RH lower control arms.

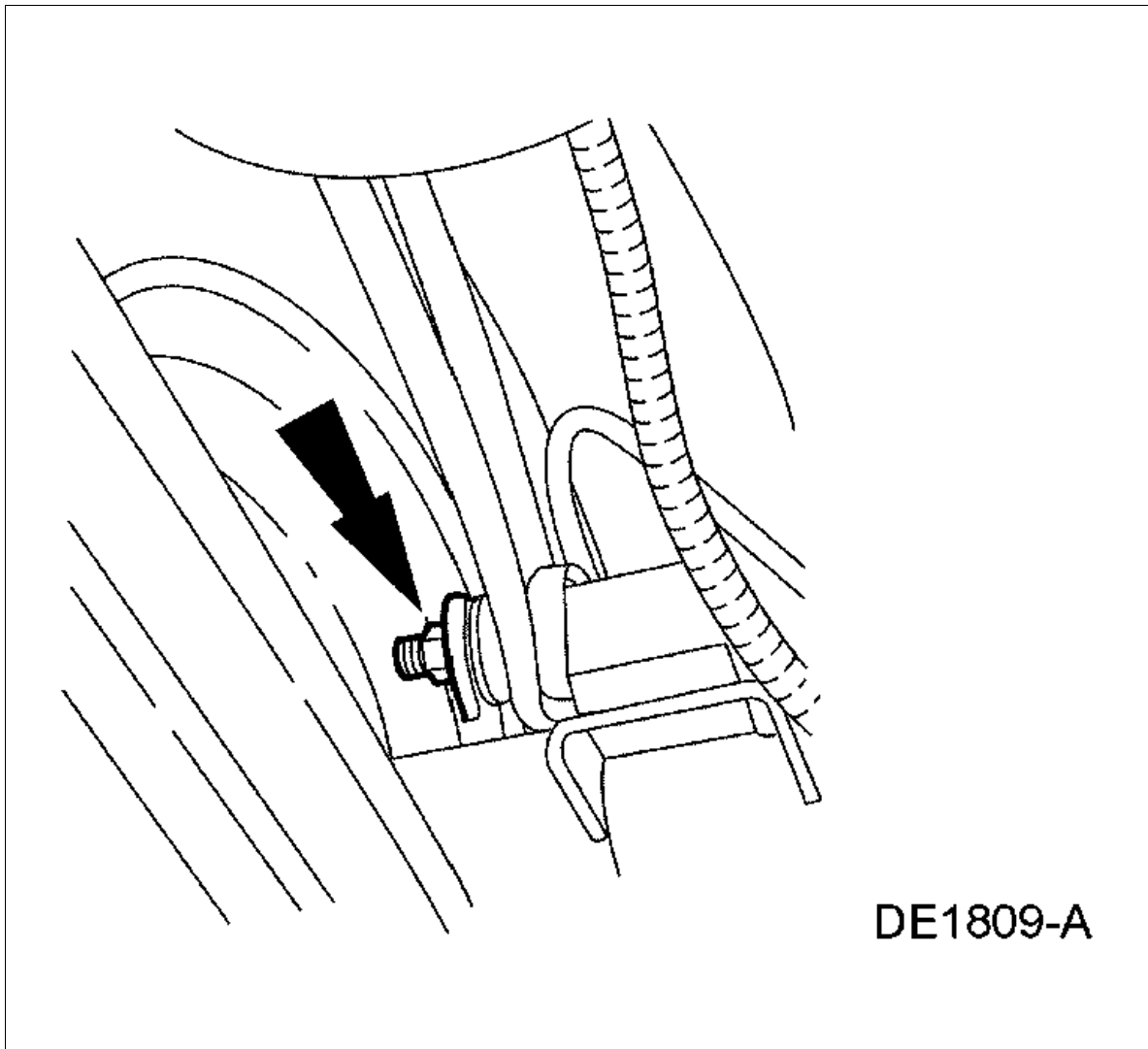
Fig 9: Removing Nuts And Bolts Retaining LH And RH Lower Control Arms



Courtesy of FORD MOTOR CO.

13. Remove the nuts and bolts retaining the LH and RH upper control arms.

Fig 10: Removing Nuts And Bolts Retaining LH And RH Upper Control Arms



Courtesy of FORD MOTOR CO.

14. Unseat the air springs and lower the rear axle from the vehicle.

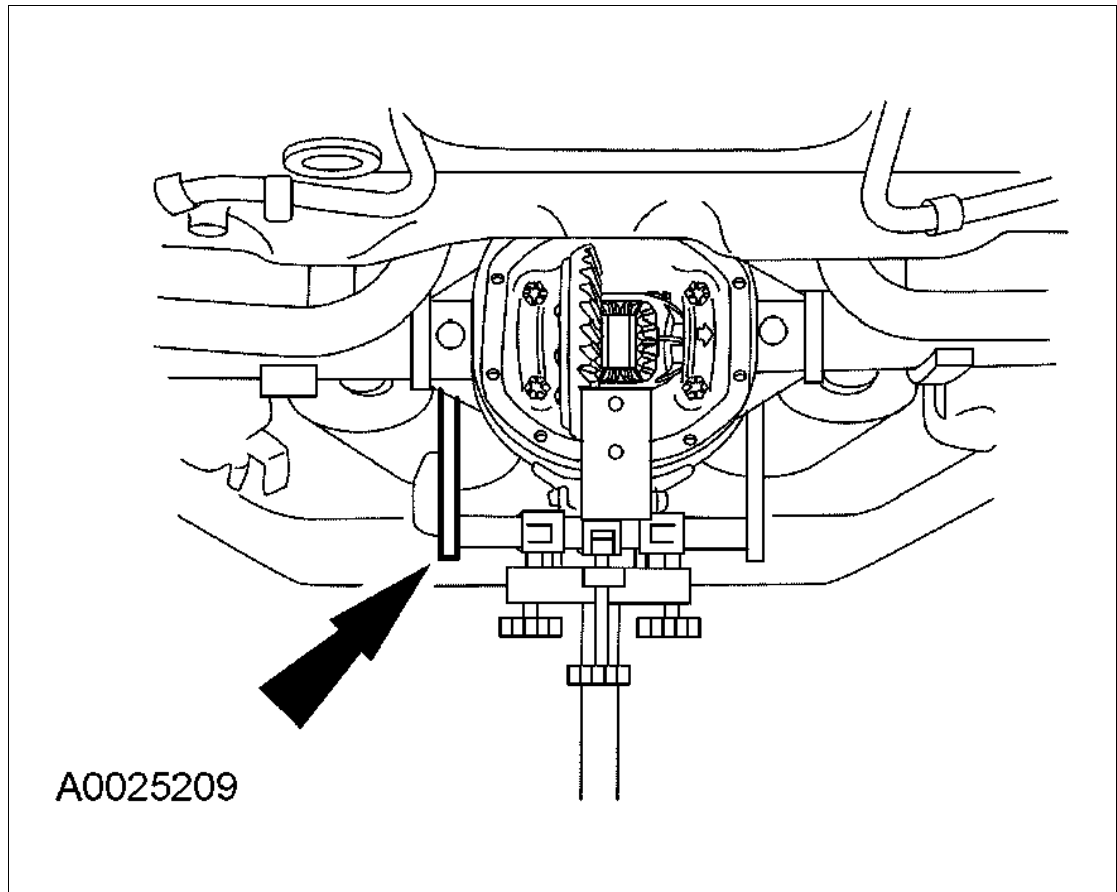
### Installation

1. Raise the rear axle into position, using a High-Lift Transmission Jack.

**WARNING:** Use additional support straps to secure the rear axle to the High-Lift Transmission Jack.

1. Seat the air springs.

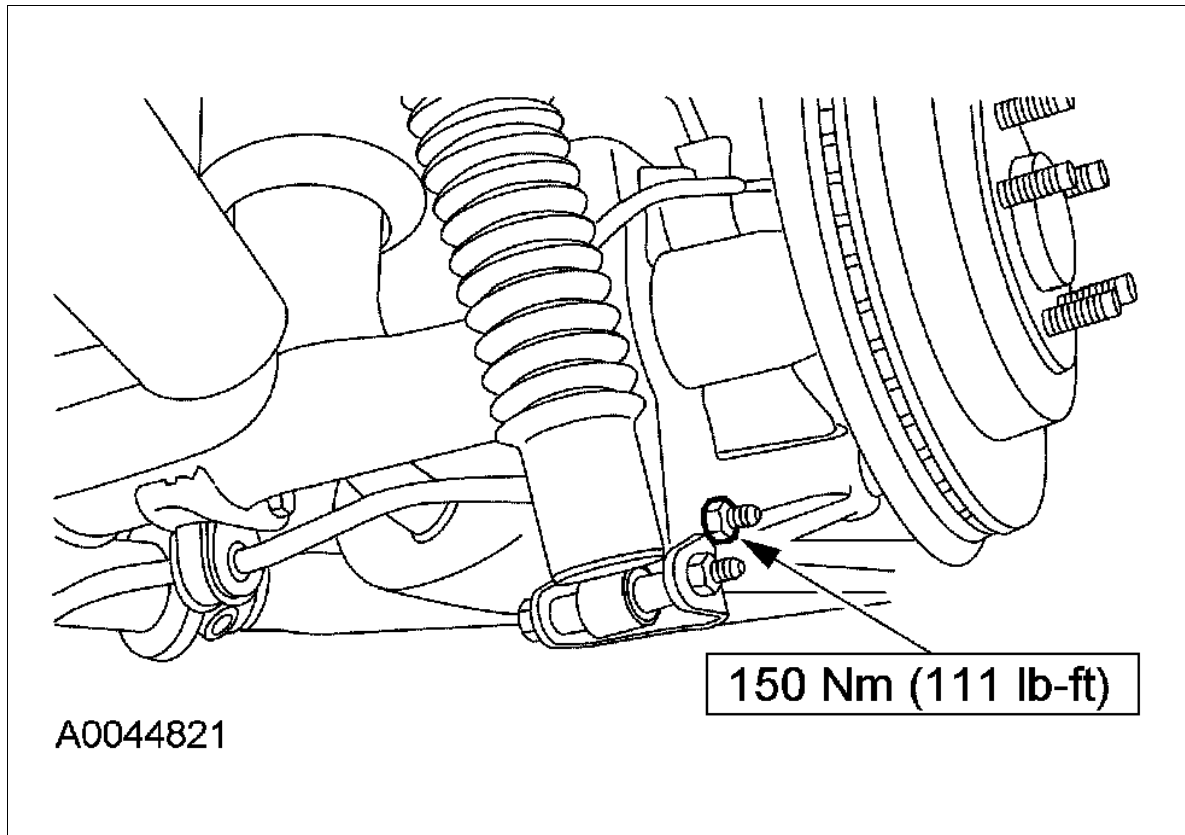
Fig 11: Raising Rear Axle Into Position



Courtesy of FORD MOTOR CO.

2. Install the bolts and nuts.

Fig 12: Installing Bolts And Nuts

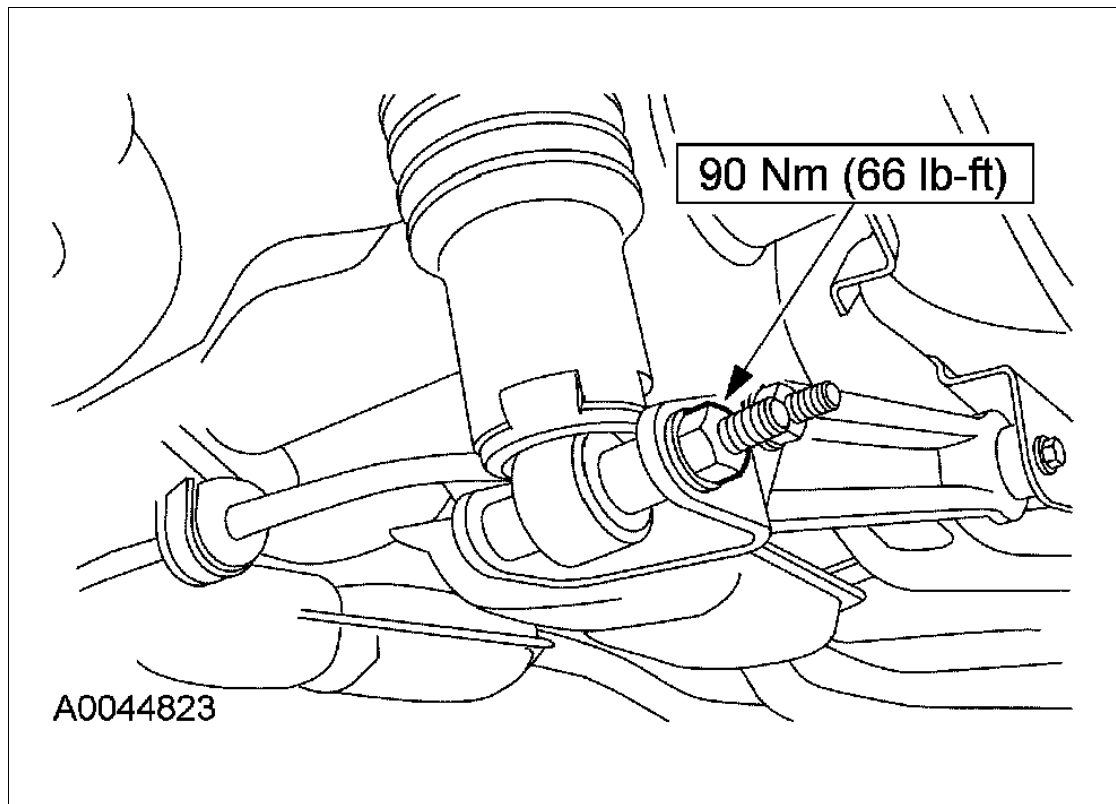


Courtesy of FORD MOTOR CO.

3. Install the shock absorbers.

1. Position the shock absorbers into the retainer brackets, and tighten the nuts and bolts.

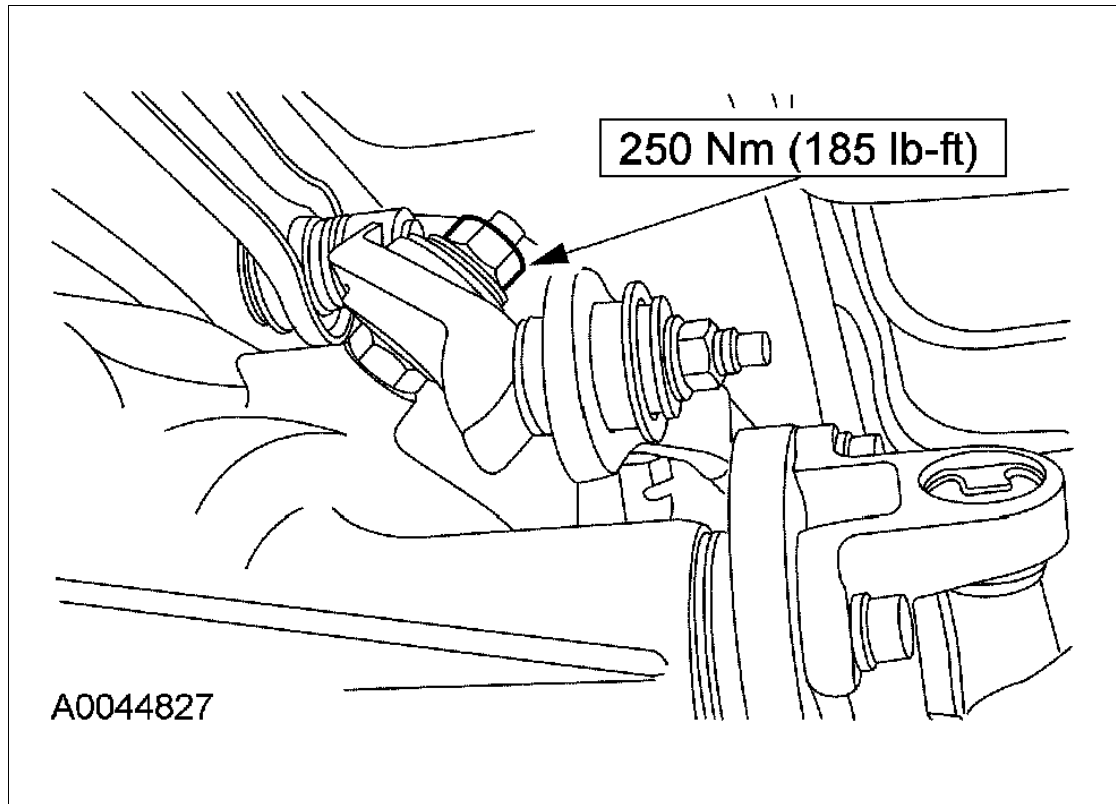
Fig 13: Tightening Nuts And Bolts



Courtesy of FORD MOTOR CO.

4. Remove the High-Lift Transmission Jack.
5. Install the Watts linkage on the rear axle housing.
  1. Install the retainer nut on the bellcrank stud and tighten.

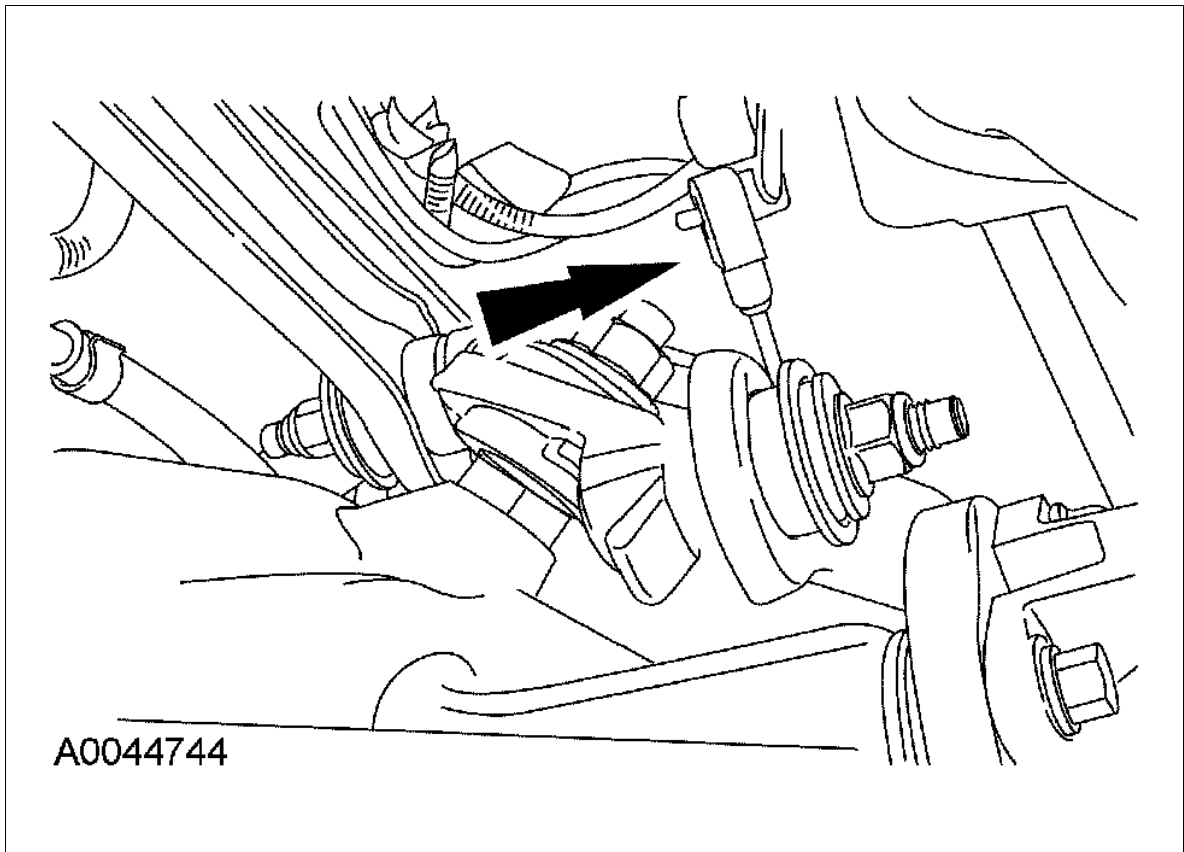
Fig 14: Tightening Retainer Nut On Bellcrank Stud



Courtesy of FORD MOTOR CO.

6. If equipped with rear air springs, install the height sensor.

Fig 15: Installing Height Sensor

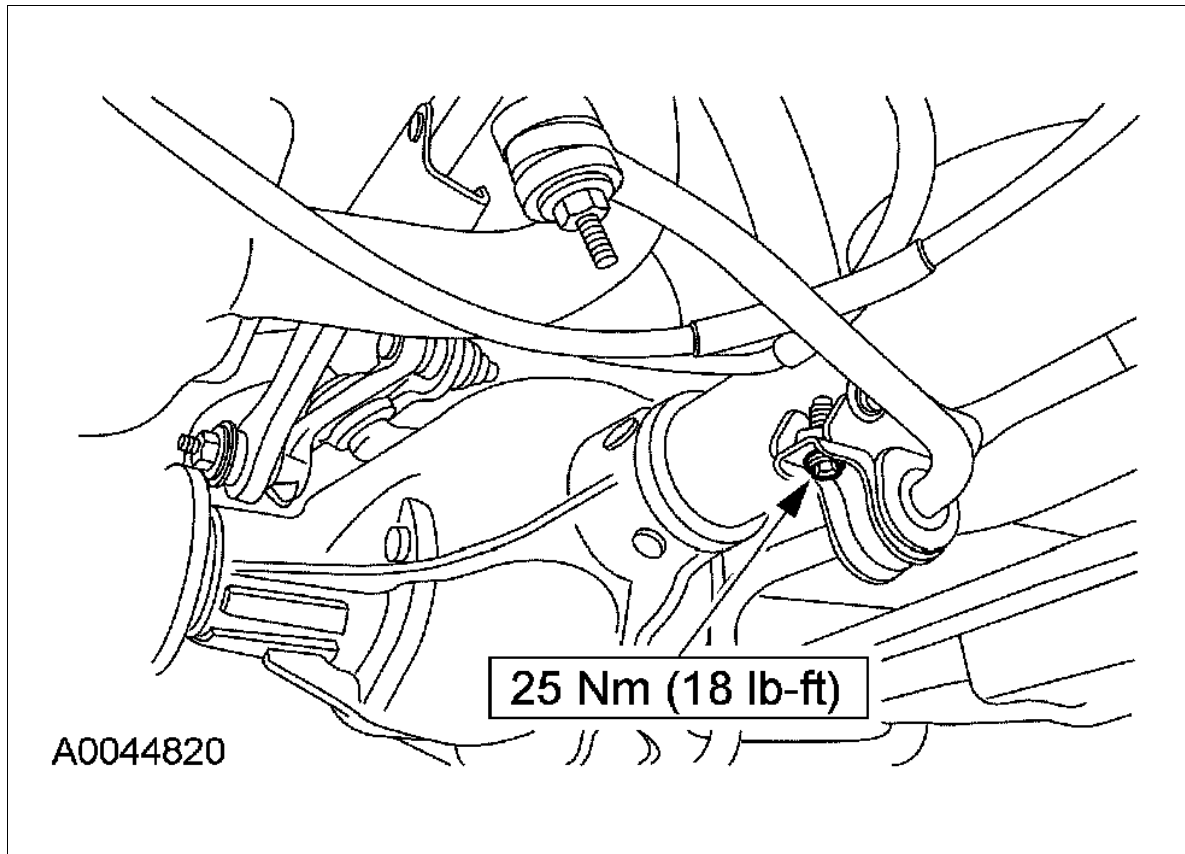


Courtesy of FORD MOTOR CO.

7. Install the rear stabilizer bar retainer bolts and tighten.



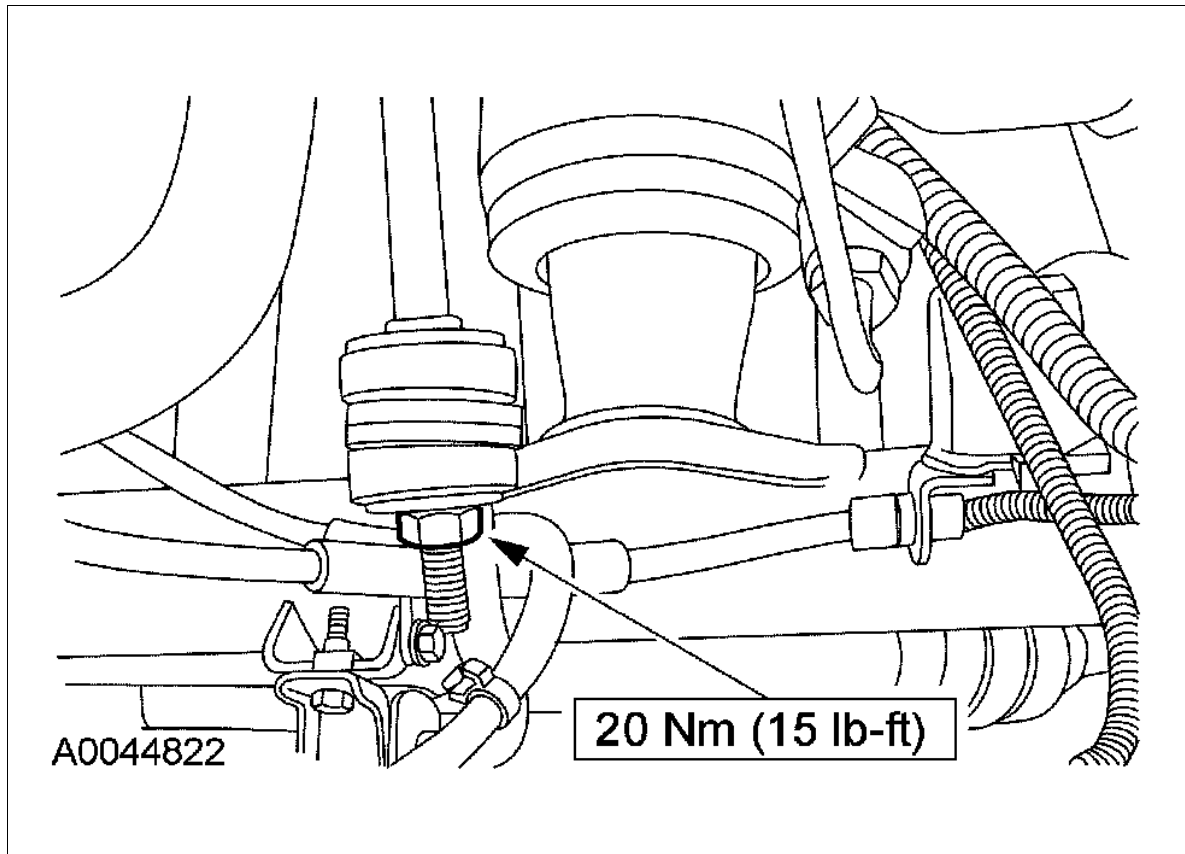
Fig 16: Installing Rear Stabilizer Bar Retainer Bolts



Courtesy of FORD MOTOR CO.

8. Install the rear stabilizer bar retainer bolts and tighten.

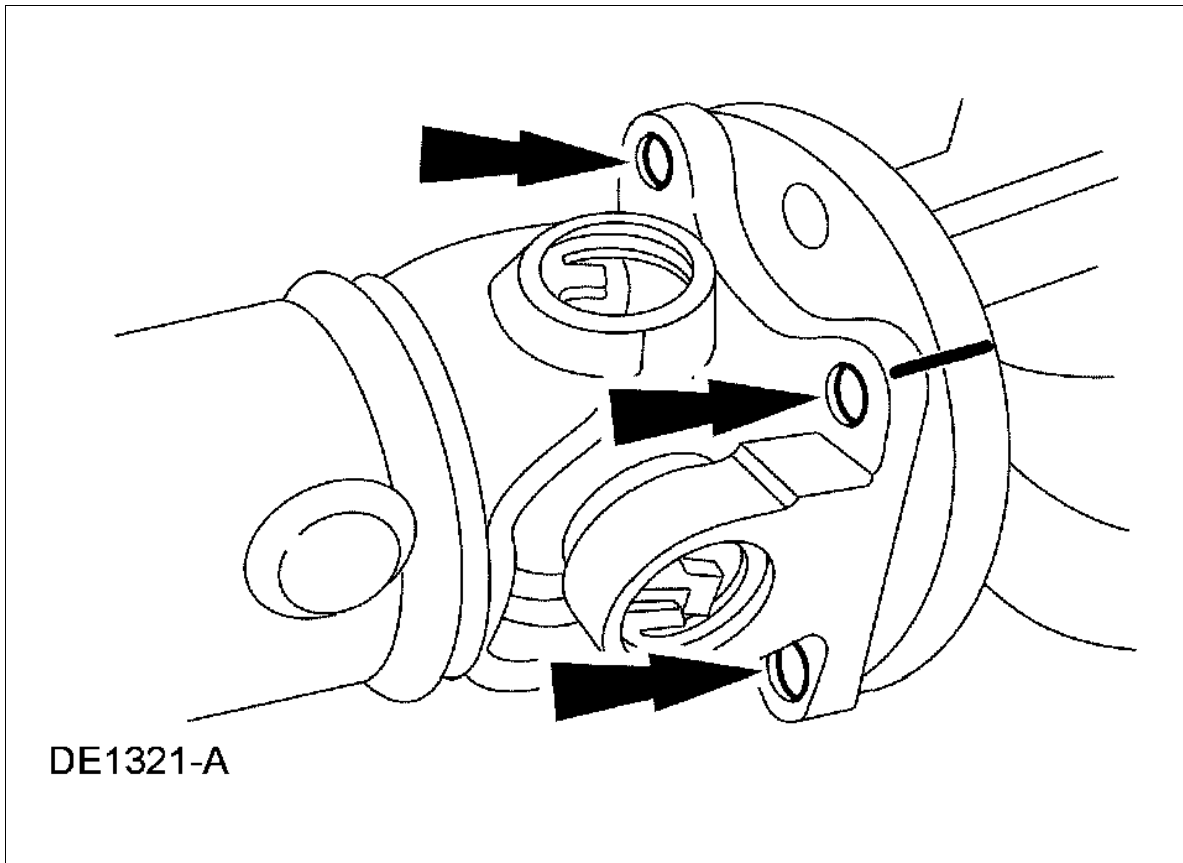
Fig 17: Installing Rear Stabilizer Bar Retainer Bolts



Courtesy of FORD MOTOR CO.

9. Position the rear driveshaft and align the marks on the pinion flange.

Fig 18: Positioning Driveshaft And Align Marks On Pinion Flange

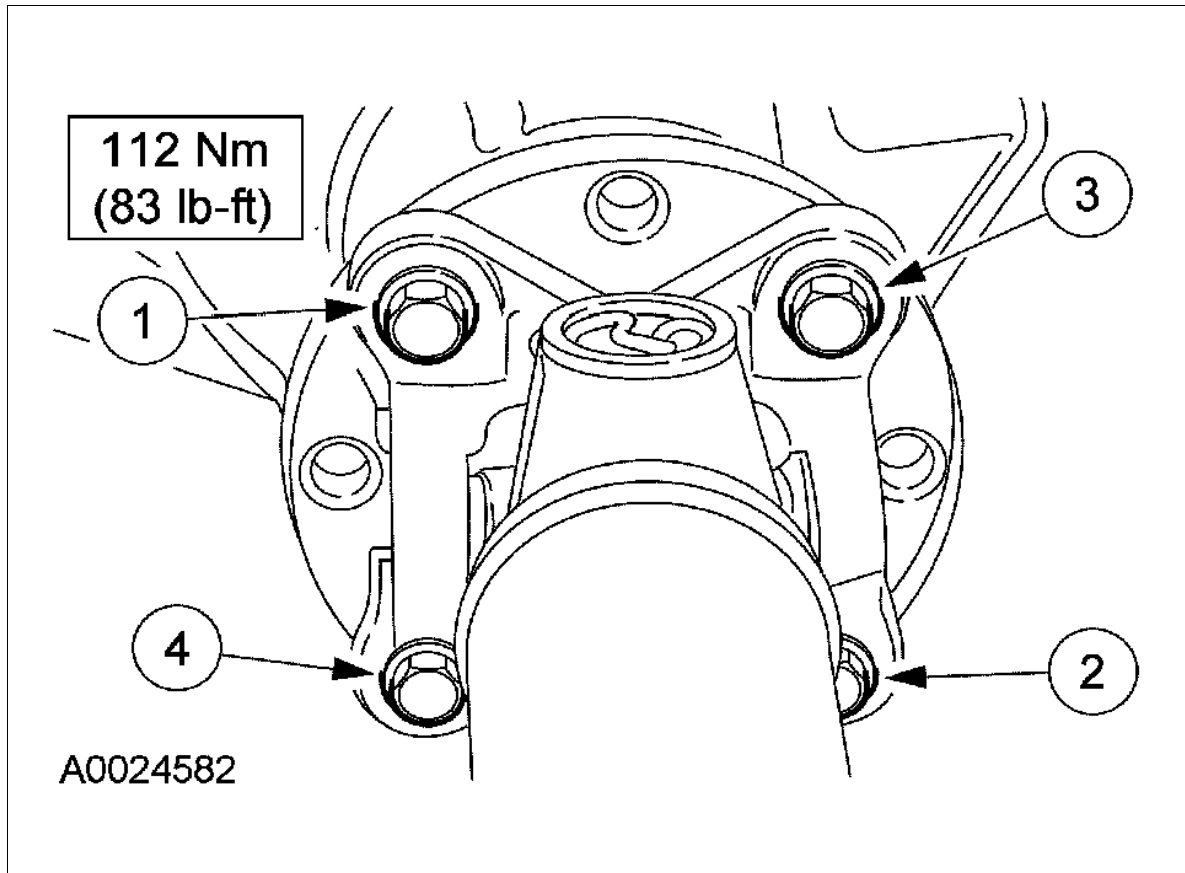


Courtesy of FORD MOTOR CO.

10. Install the four driveshaft retainer bolts.

**CAUTION:** *The driveshaft centering socket yoke fits tightly on the rear axle pinion flange pilot. To make sure that the yoke seats squarely on the flange, tighten the bolts evenly in a cross pattern as shown.*

Fig 19: Bolt Tightening Pattern - With Torque Specification



Courtesy of FORD MOTOR CO.

11. Install the axle shafts. For additional information, refer to AXLE SHAFT.
12. Lower the vehicle.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM.*

13. If equipped, reactivate the air suspension system by turning ON the switch.

## Differential Carrier

### Removal

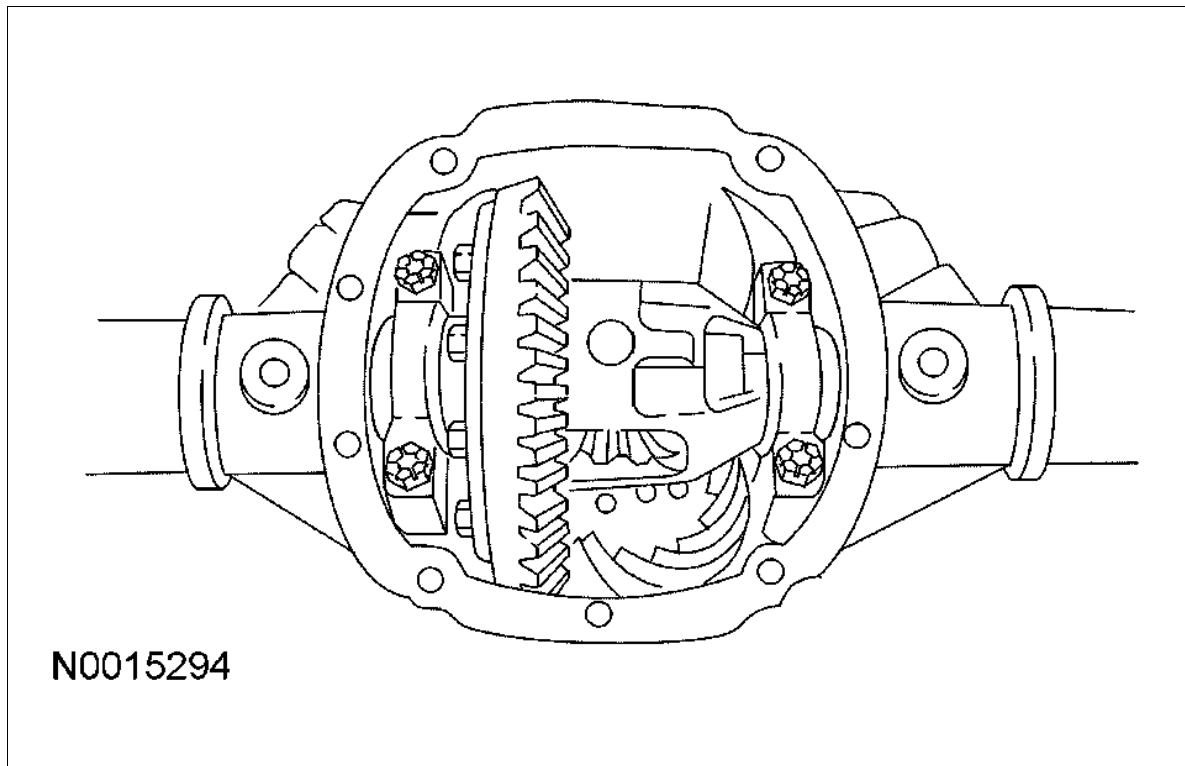
1. Remove the axle shafts. For additional information, refer to AXLE SHAFT.

**WARNING:** *If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM.*

2. Remove the 4 differential bearing cap bolts and the 2 differential bearing caps.

**CAUTION:** Index-mark the position of the differential bearing caps, as arrows may not be visible. The differential bearing caps must be installed in their original locations and positions.

Fig 20: Removing 4 Differential Bearing Cap Bolts And 2 Differential Bearing Caps



Courtesy of FORD MOTOR CO.

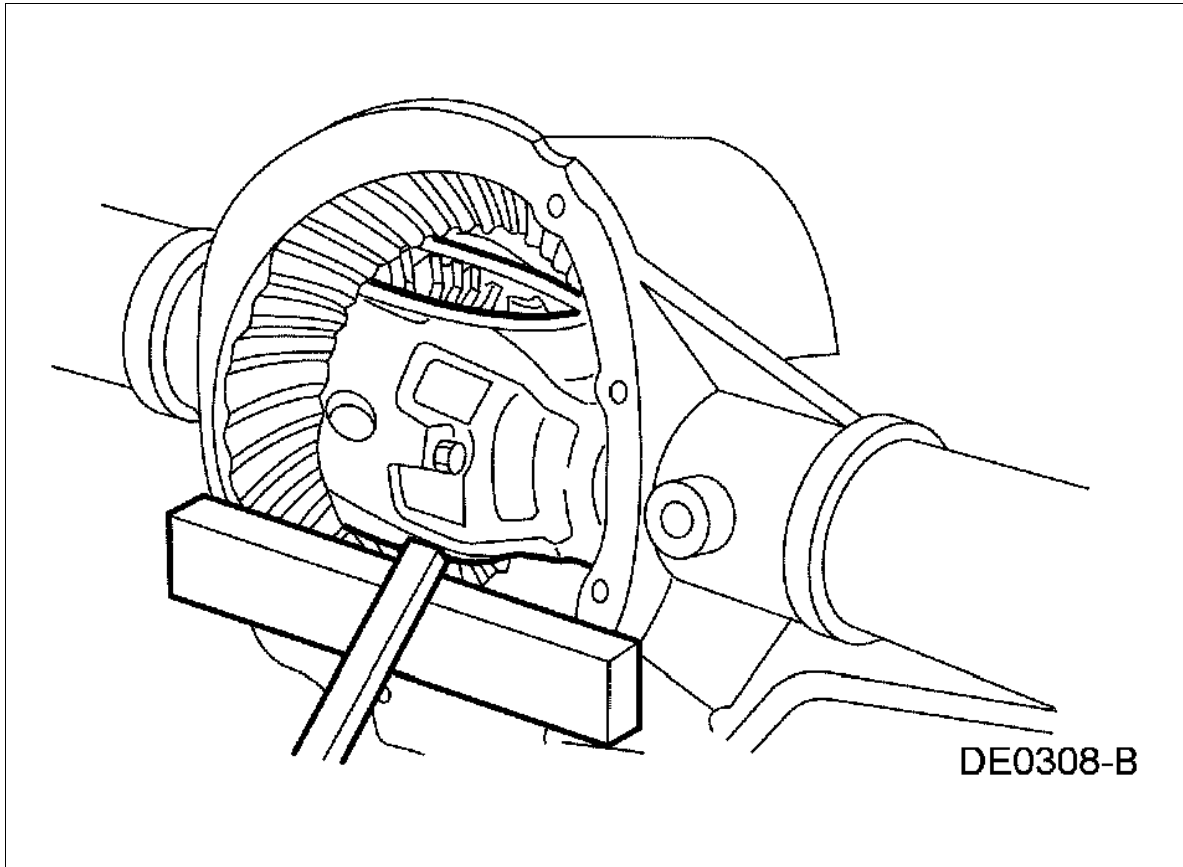
3. Using pry bars and wood blocks, remove the differential carrier assembly from the axle housing.

**WARNING:** Be careful not to allow the differential assembly to fall.

**CAUTION:** Place a wood block between the pry bar and the axle housing to protect the machined surface from damage.

**CAUTION:** Index-mark the position of the differential bearing shims. The differential bearing shims must be installed in their original locations and positions.

Fig 21: Removing Differential Carrier Assembly From Axle Housing

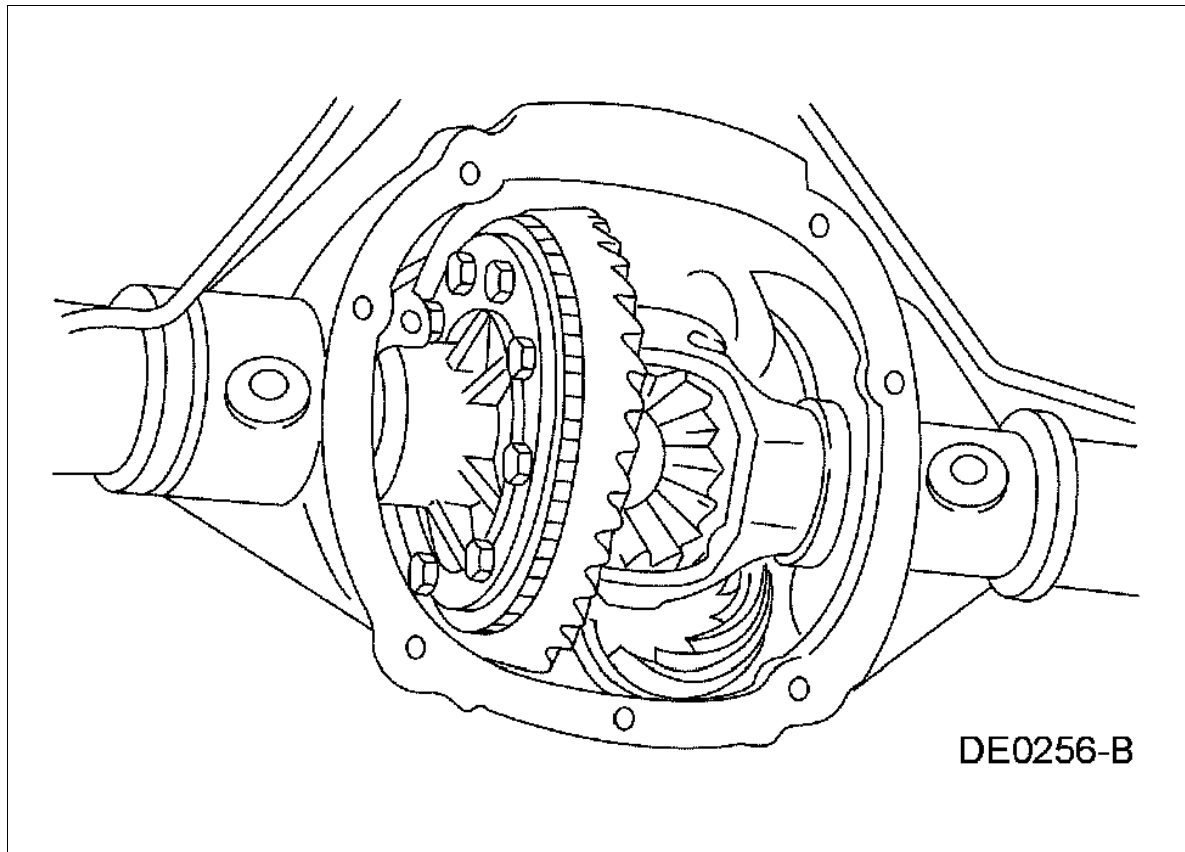


Courtesy of FORD MOTOR CO.

## Installation

1. Position the differential assembly in the axle housing.

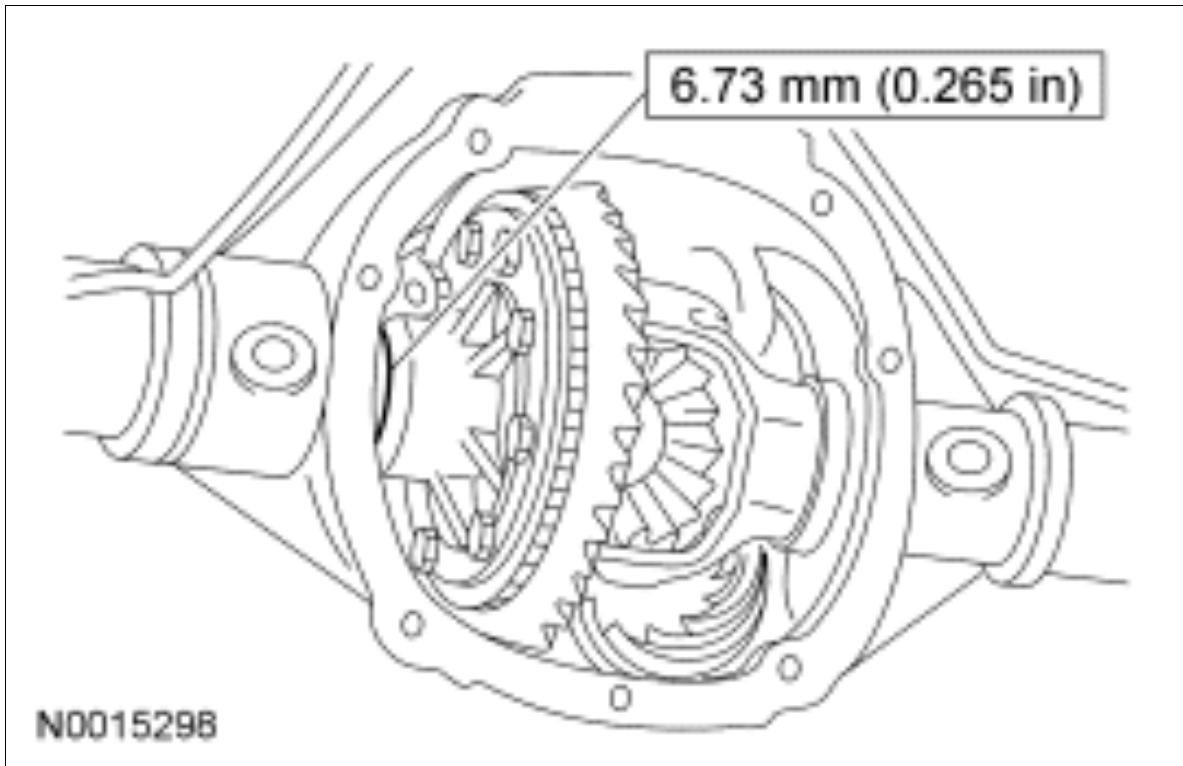
Fig 22: Placing Differential Case In Rear Axle Housing



Courtesy of FORD MOTOR CO.

2. Install the originally removed differential bearing shim on the LH side.

Fig 23: Installing Differential Bearing Shim



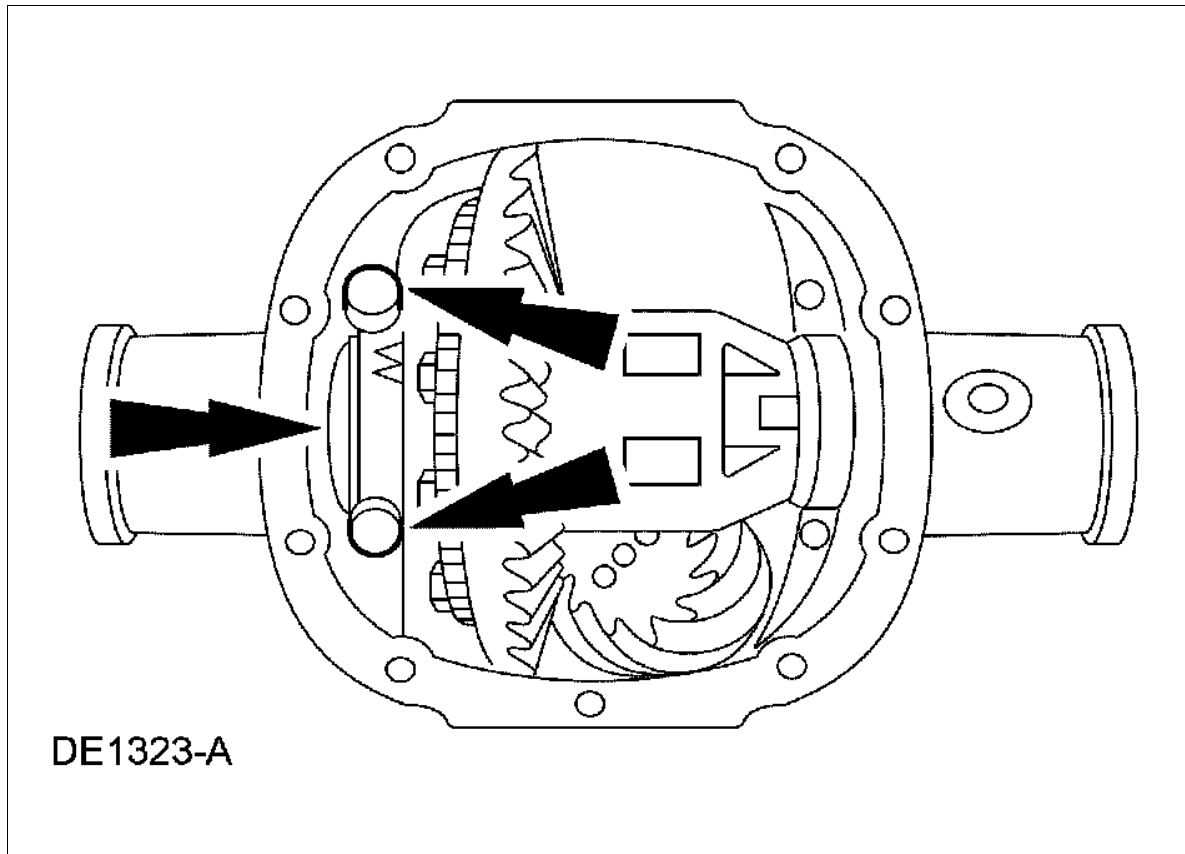
Courtesy of FORD MOTOR CO.

3. Install the LH differential bearing cap and loosely install the differential bearing cap bolts.

**NOTE:** Apply pressure toward the LH side to make sure the LH differential bearing cap is seated.



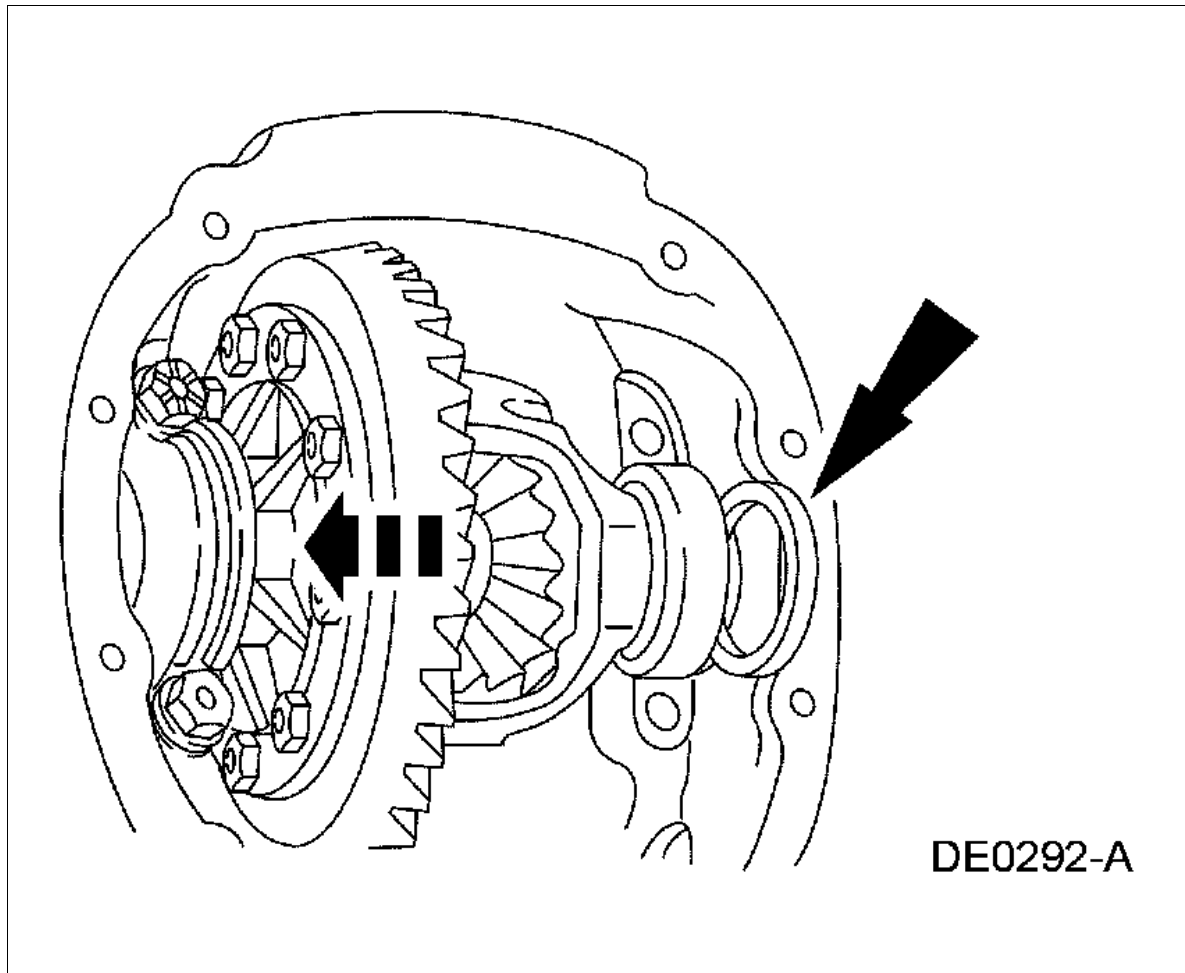
Fig 24: Identifying LH Differential Bearing Cap



Courtesy of FORD MOTOR CO.

4. Install the original differential bearing shim on the RH side.

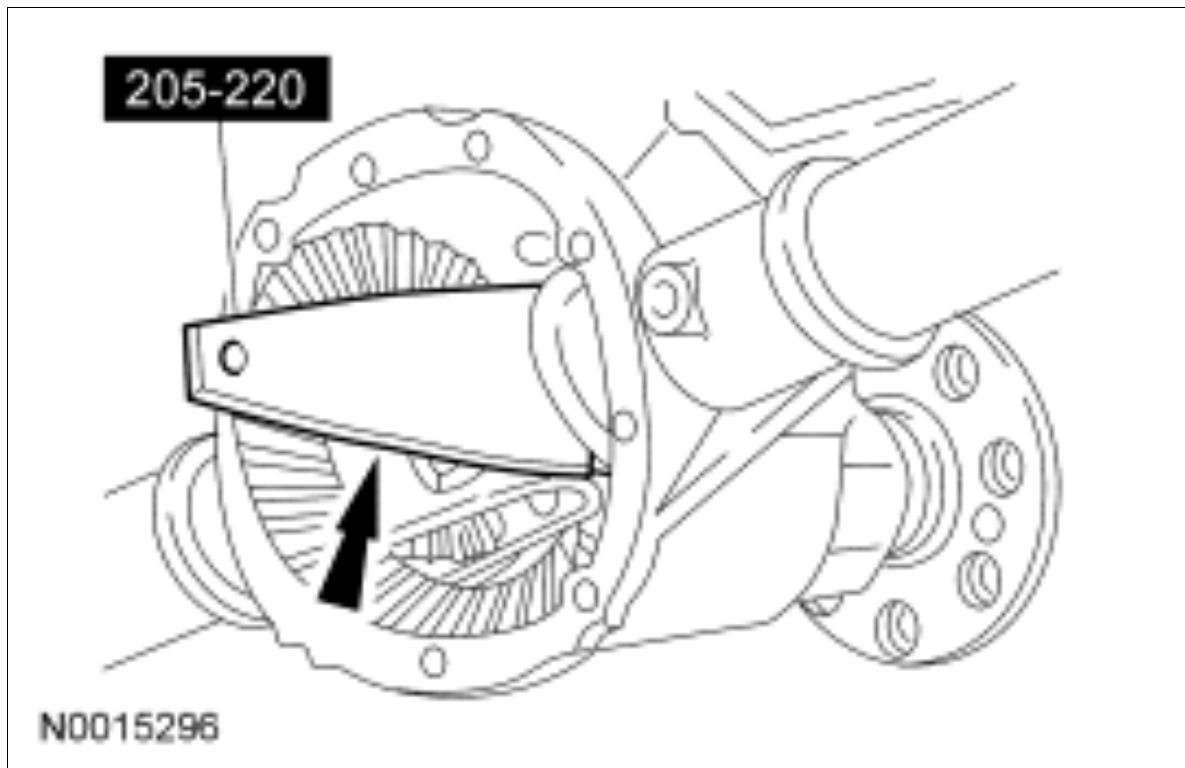
Fig 25: Installing Differential Bearing Shims



Courtesy of FORD MOTOR CO.

5. Using the special tool, fully seat the differential bearing shims.

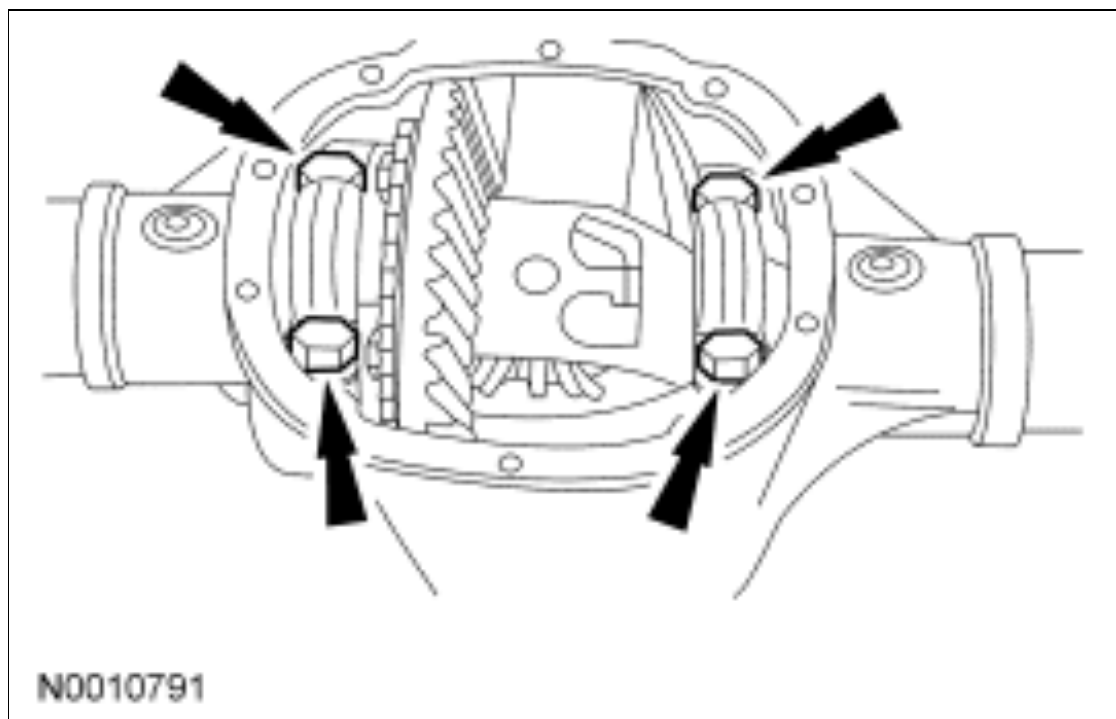
Fig 26: Installing Differential Bearing Shims



Courtesy of FORD MOTOR CO.

6. Install the RH side differential bearing cap and tighten the LH side and RH side differential bearing cap bolts.
  1. Tighten to 105 Nm (77 lb-ft).

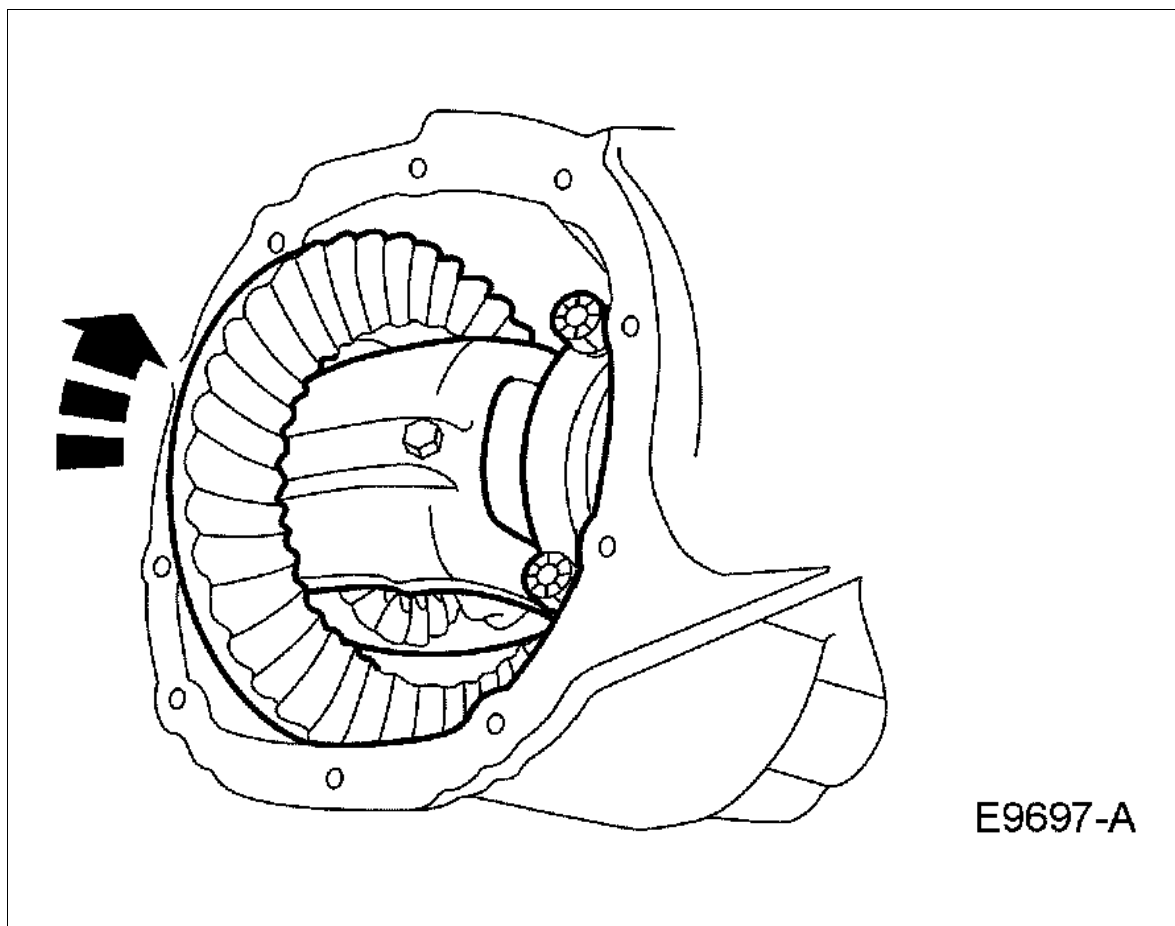
Fig 27: Identifying Differential Bearing Caps And Differential Bearing Cap Bolts



Courtesy of FORD MOTOR CO.

7. Rotate the differential assembly to make sure it rotates freely.

Fig 28: Rotating Differential Carrier



Courtesy of FORD MOTOR CO.

8. Measure the ring and pinion backlash.

9. Install the axle shafts. For additional information, refer to AXLE SHAFT.

**WARNING:** If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .

## IN-VEHICLE REPAIR

### Axle Shaft

### MATERIAL SPECIFICATION

Item	Specification
Premium Long-Life Grease XG-1-C	ESA-M1C75-B

## Removal

1. If equipped, turn the air suspension switch to the OFF position.

**WARNING:** When equipped with rear air springs, the electrical power to the air suspension system must be shut off prior to hoisting, jacking or towing an air suspension vehicle. This can be accomplished by turning off the air suspension switch located in the LH side of the luggage compartment. Failure to do so can result in unexpected inflation or deflation of the air springs, which can result in shifting of the vehicle during these operations.

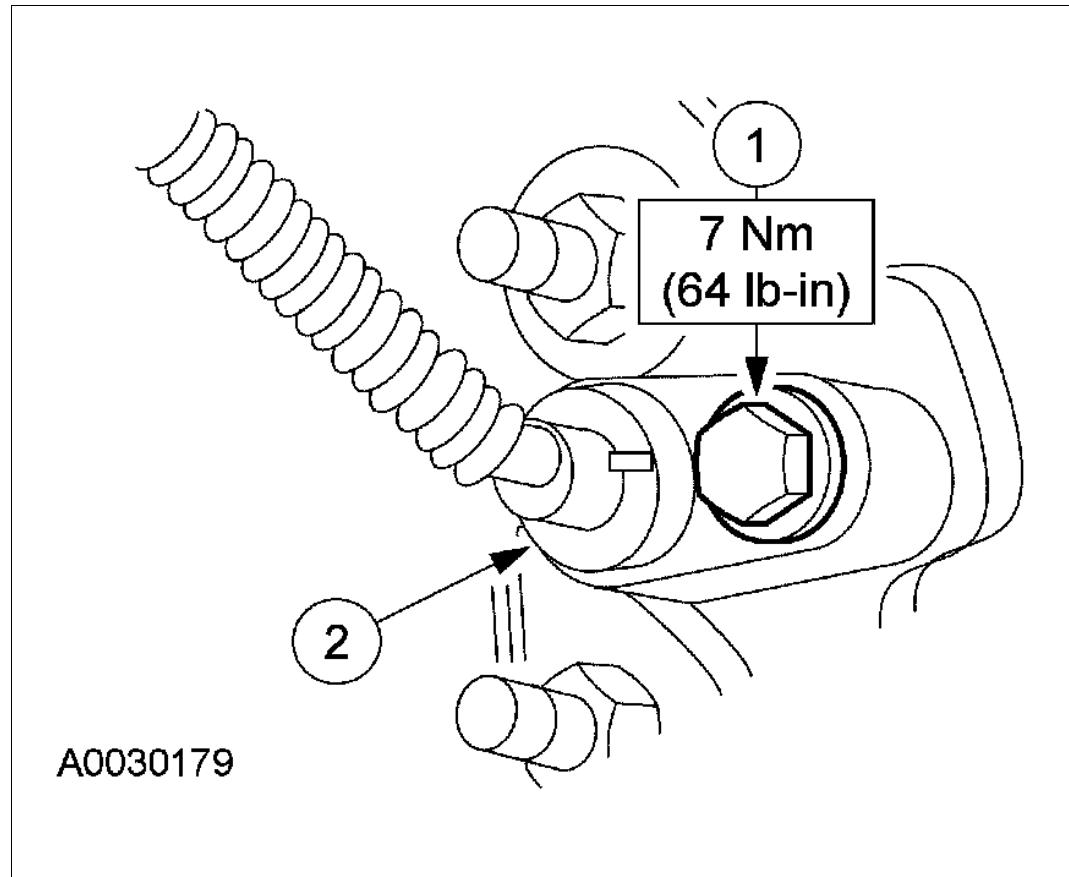
2. Remove the rear brake caliper and the brake disc. For additional information, refer to REAR DISC BRAKE .

**WARNING:** If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .

**NOTE:** When removing the rear brake caliper in this procedure, it is not necessary to disconnect the hydraulic lines.

1. Support the rear brake caliper with mechanics wire.
3. Position the rear brake anti-lock aside.
  1. Remove the bolt.
  2. Remove the sensor.

Fig 29: Removing Bolt And Sensor



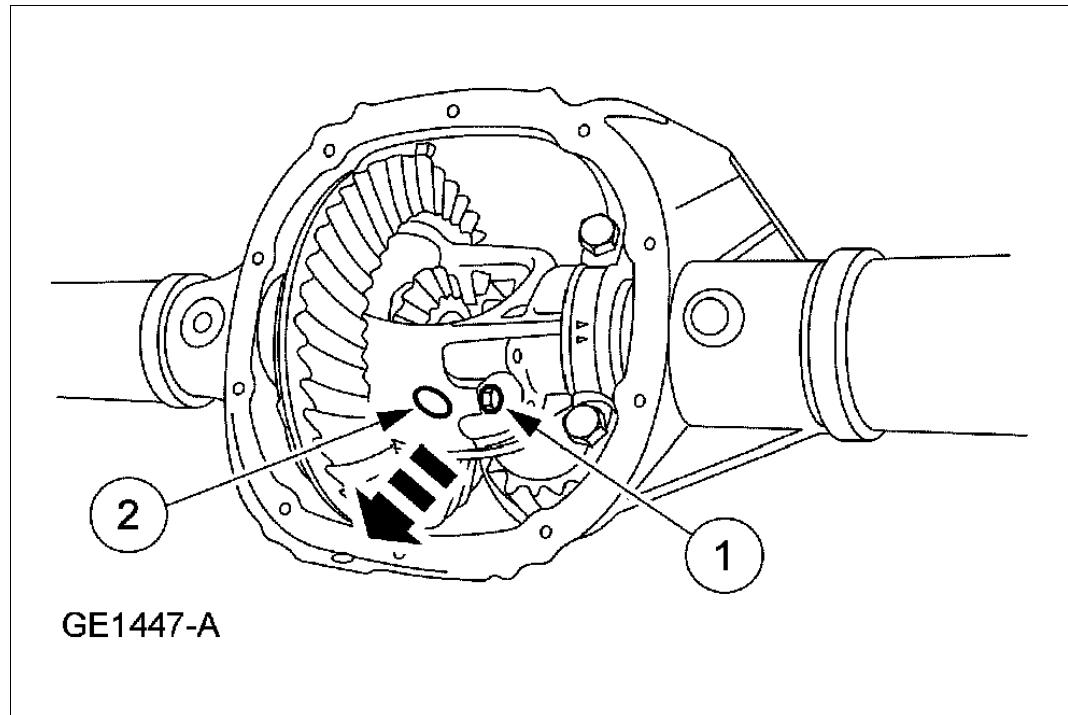
Courtesy of FORD MOTOR CO.

4. Remove the differential housing cover. For additional information, refer to DIFFERENTIAL HOUSING COVER.
5. Remove the differential pinion shaft.

**CAUTION:** Once the differential pinion shaft has been removed, turning the differential case or an axle shaft can cause the differential pinion gears to fall out of the assembly. This can result in chipped or damaged components.

1. Remove the differential pinion shaft lock bolt.
2. Remove the differential pinion shaft.

Fig 30: Removing Differential Pinion Shaft



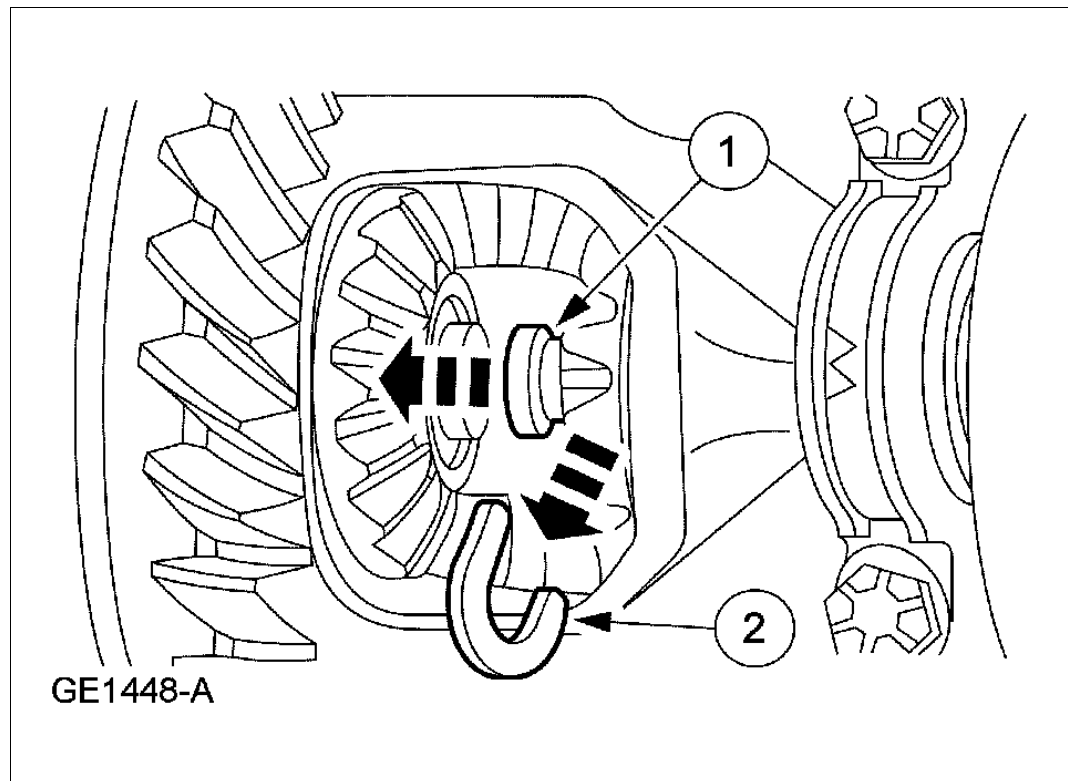
Courtesy of FORD MOTOR CO.

6. Remove the U-washer.

**CAUTION:** Do not damage the rubber O-ring in the U-washer groove.

1. Push the axle shaft inboard.
2. Remove the U-washer.

Fig 31: Removing U-Washer



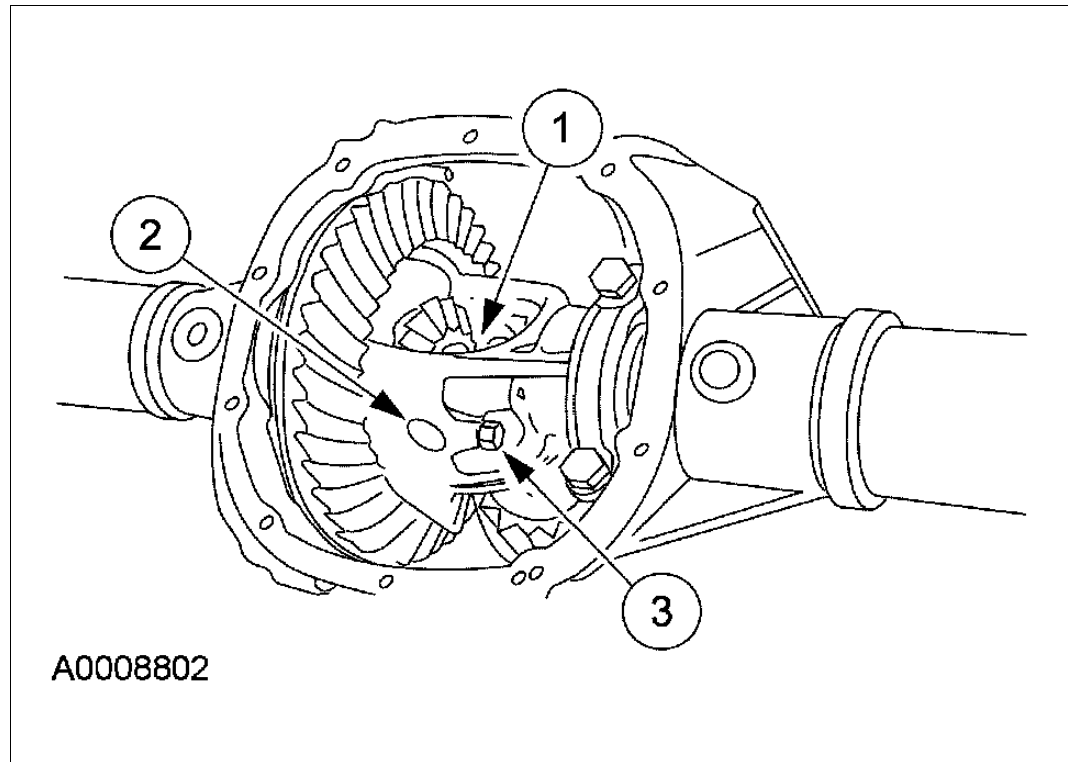
Courtesy of FORD MOTOR CO.

7. Reinstall the differential pinion shaft.

1. Push the axle shaft outboard.
2. Install the differential pinion shaft.
3. Install the differential pinion shaft lock bolt finger-tight.



Fig 32: Installing Differential Pinion Shaft

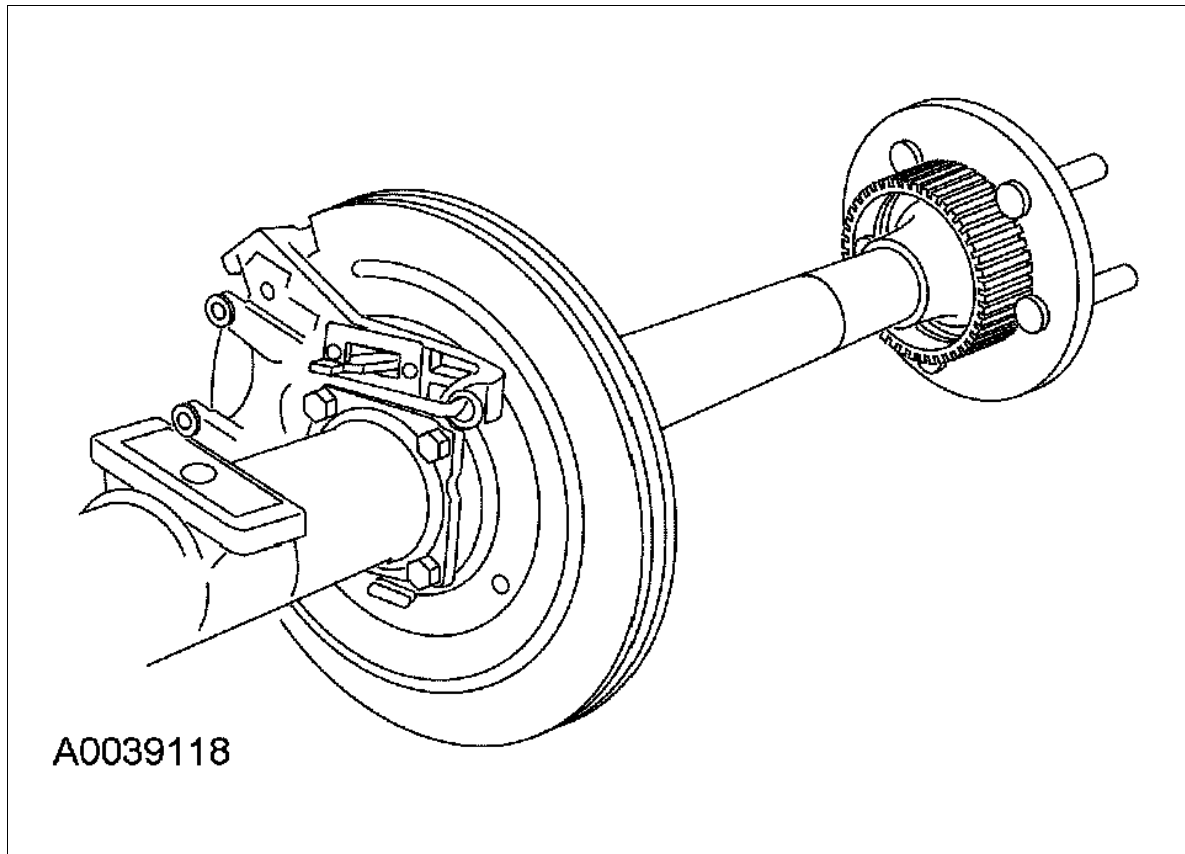


Courtesy of FORD MOTOR CO.

8. Remove the axle shaft.

**CAUTION:** *Do not damage the wheel bearing oil seal.*

Fig 33: Removing Axle Shaft

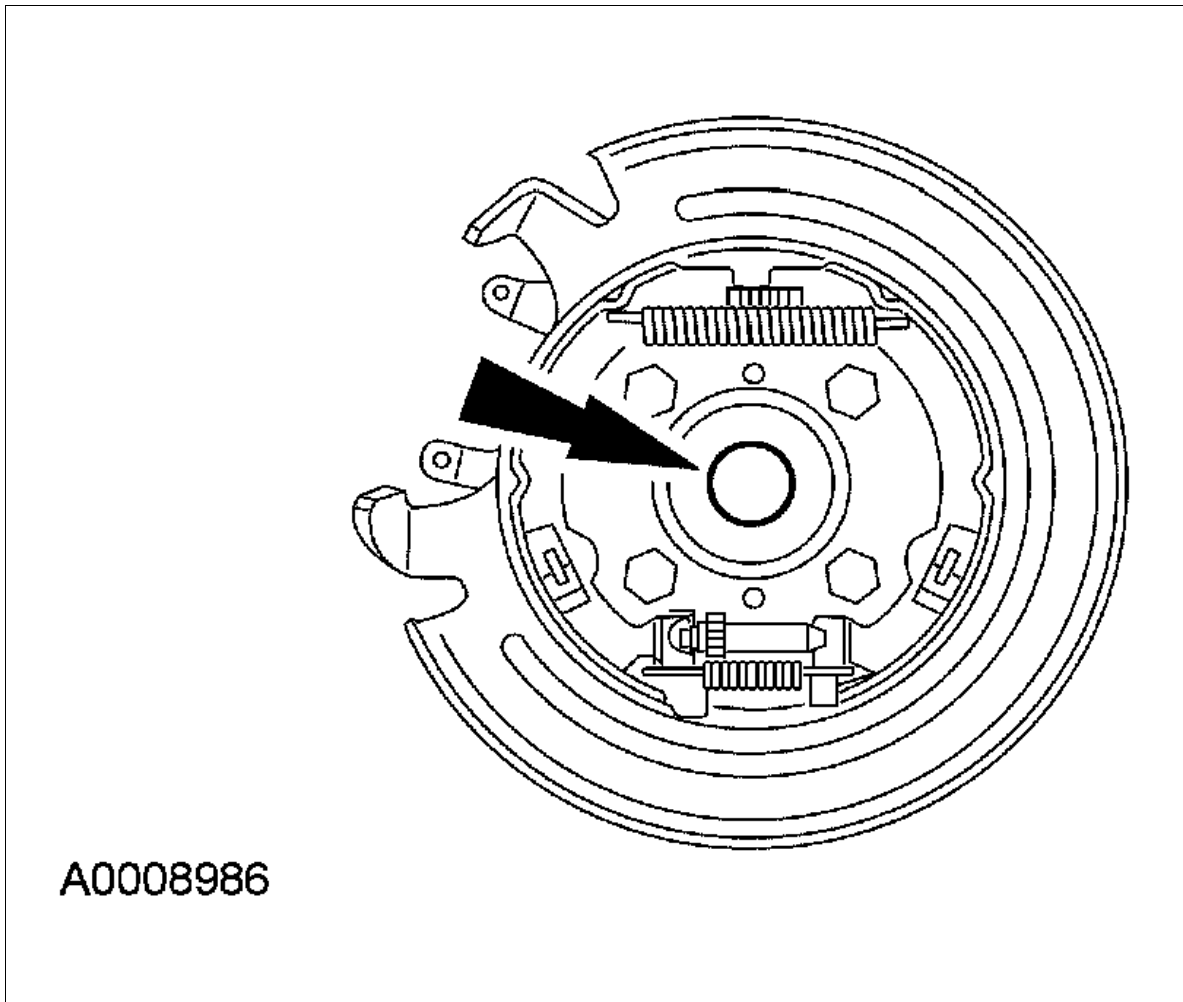


Courtesy of FORD MOTOR CO.

### Installation

1. Lubricate the lip of the wheel bearing oil seal.

Fig 34: Lubricating Lip Of Wheel Bearing Oil Seal



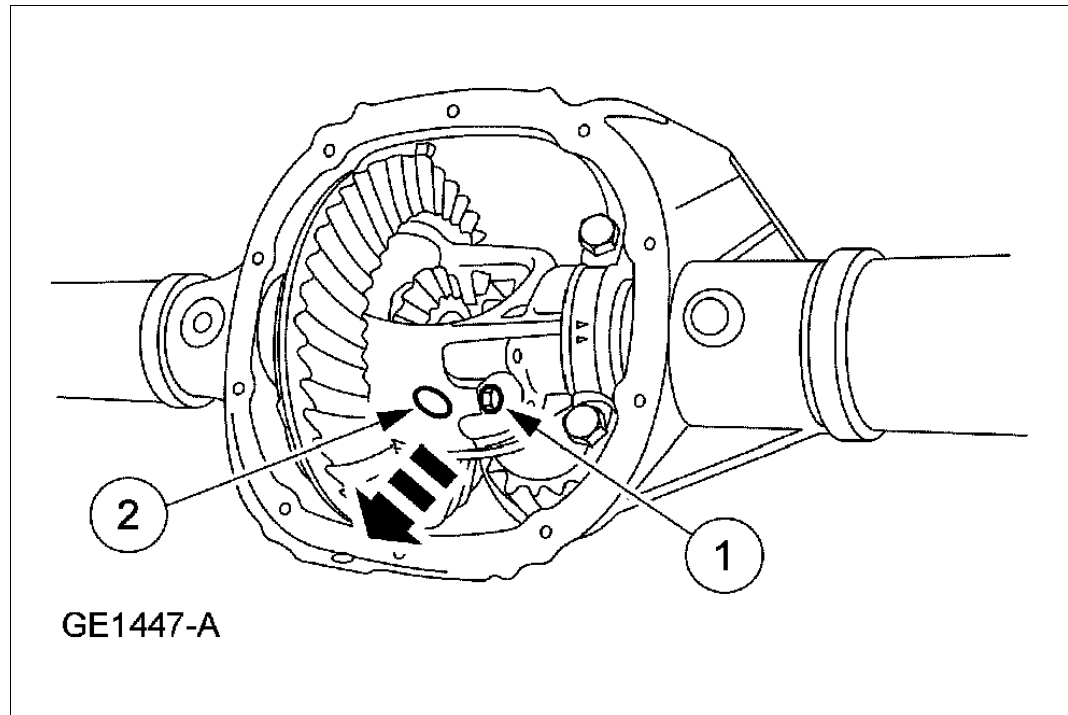
Courtesy of FORD MOTOR CO.

2. Remove the differential pinion shaft.

**CAUTION:** Once the differential pinion shaft has been removed, turning the differential case or an axle shaft can cause the differential pinion gears to fall out of the assembly. This can result in chipped or damaged components.

1. Remove the differential pinion shaft lock bolt.
2. Remove the differential pinion shaft.

Fig 35: Removing Differential Pinion Shaft

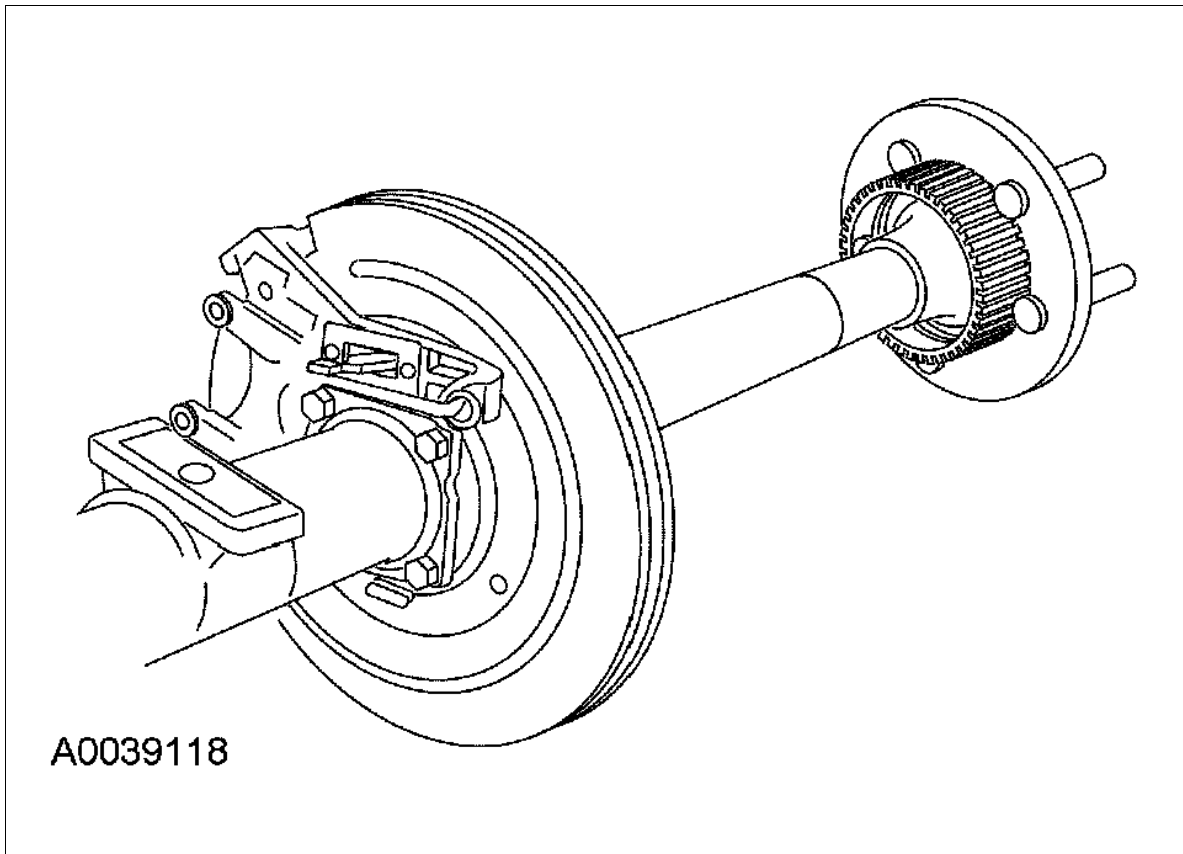


Courtesy of FORD MOTOR CO.

3. Install the axle shaft.

**CAUTION:** *Do not damage the wheel bearing oil seal.*

Fig 36: Installing Axle Shaft



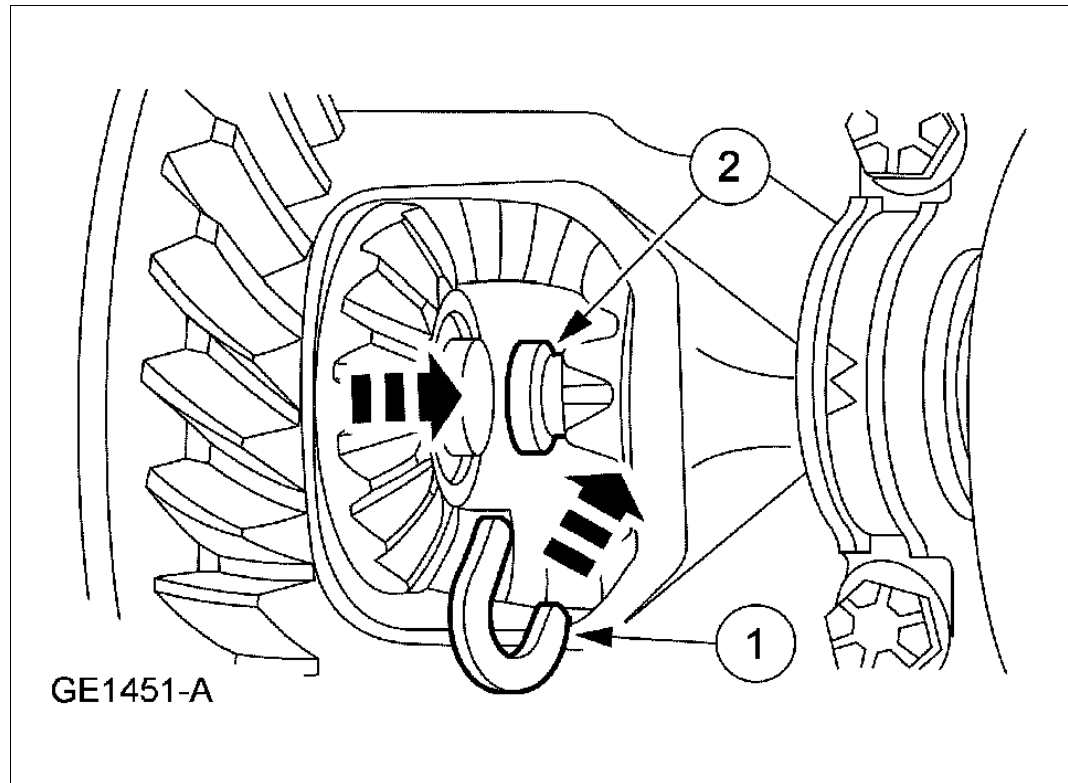
Courtesy of FORD MOTOR CO.

4. Install the U-washer.

**CAUTION:** Do not damage the rubber O-ring in the U-washer groove.

1. Position the U-washer on the button end of the axle shaft.
2. Pull the axle shaft outward to seat the U-washer in the side gear.

Fig 37: Positioning U-Washer On Button End Of Axle Shaft

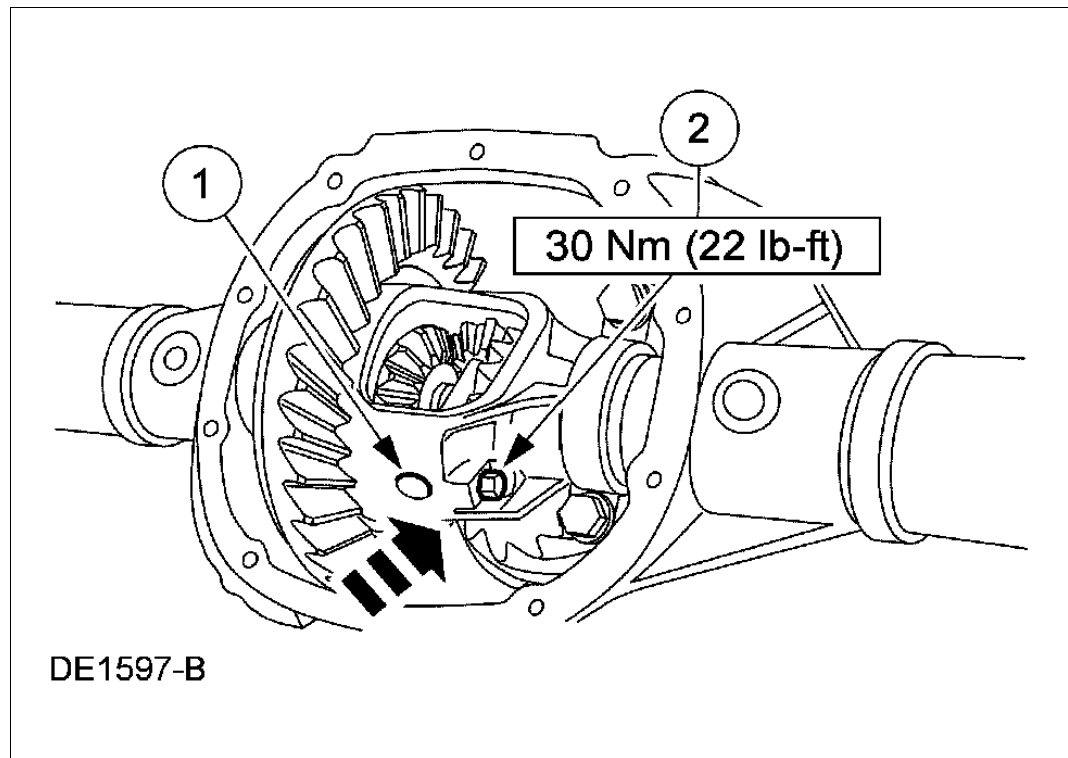


Courtesy of FORD MOTOR CO.

5. Install the differential pinion shaft.

1. Align the hole in the differential pinion shaft with the lock bolt hole.
2. Install the differential pinion shaft lock bolt.

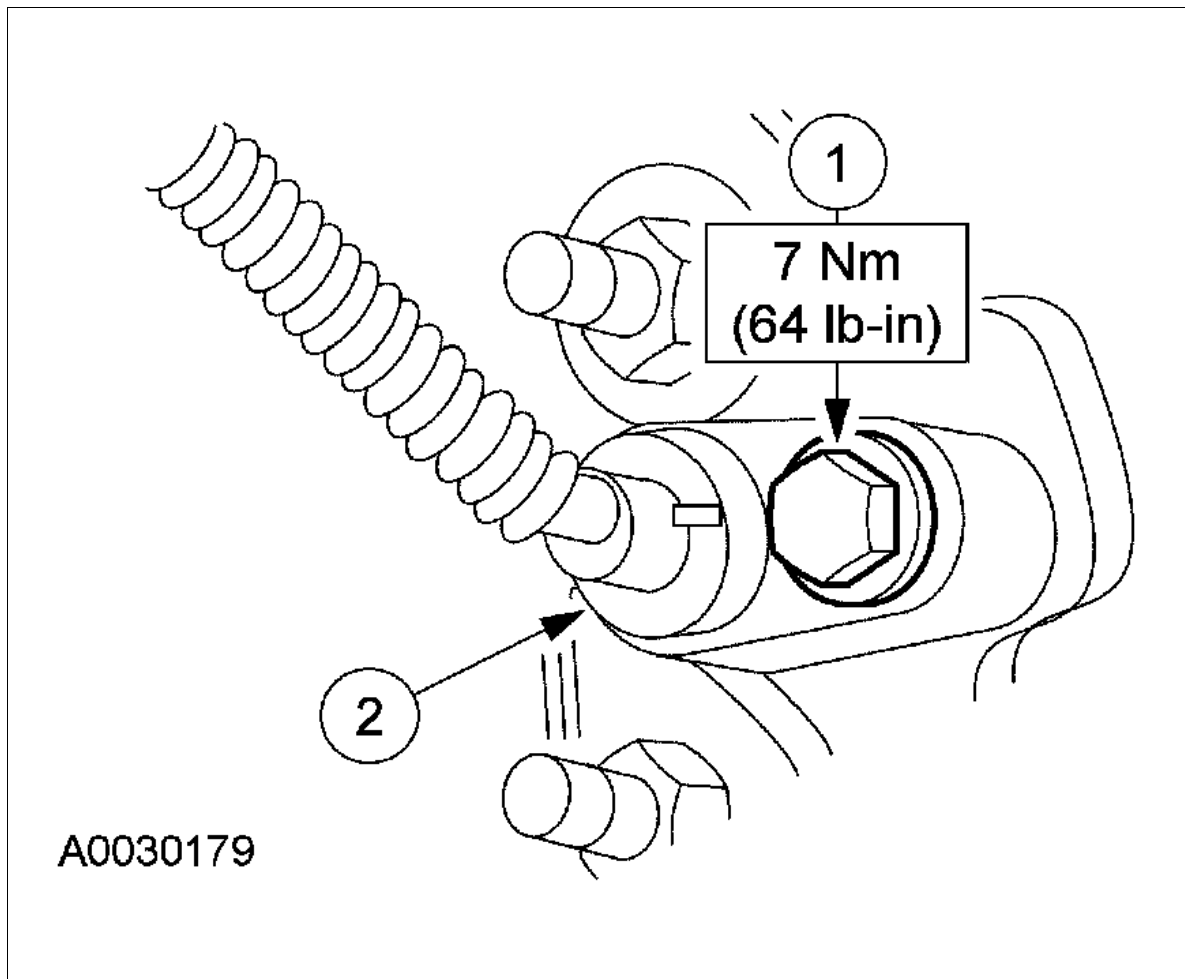
Fig 38: Installing Differential Pinion Shaft Lock Bolt



Courtesy of FORD MOTOR CO.

6. Install the differential housing cover. For additional information, refer to DIFFERENTIAL HOUSING COVER.
7. Install the rear brake anti-lock sensor.

Fig 39: Installing Rear Brake Anti-Lock Sensor



Courtesy of FORD MOTOR CO.

8. Install the brake disc and rear brake caliper. For additional information, refer to REAR DISC BRAKE .
9. If equipped with fire suppression system, repower the system.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

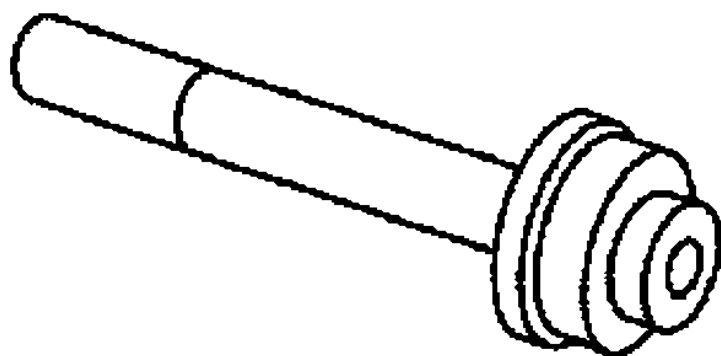
10. If equipped, reactivate the air suspension system by turning ON the switch.

#### Rear Wheel Bearing And Axle Shaft Oil Seal

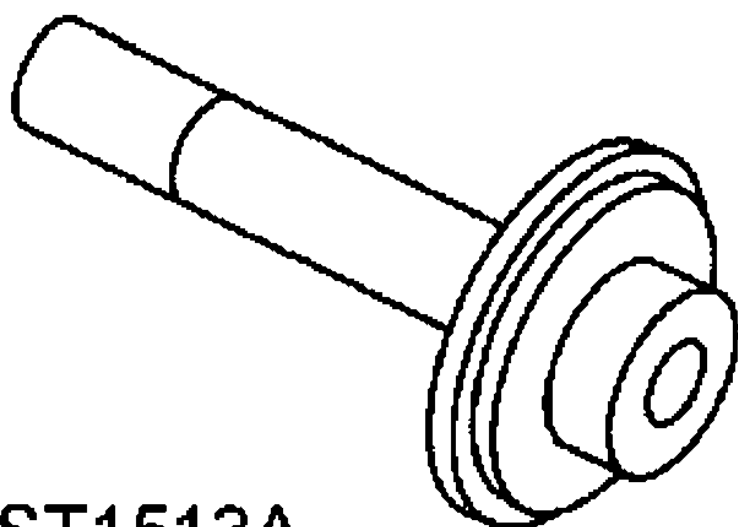
#### SPECIAL TOOL CHART

	Installer, Axle Shaft Bearing 205-124 (T78P-1225-A)
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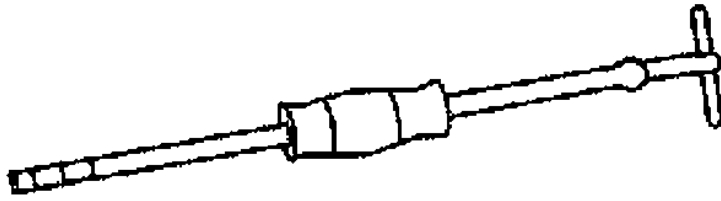
**ST1541A**



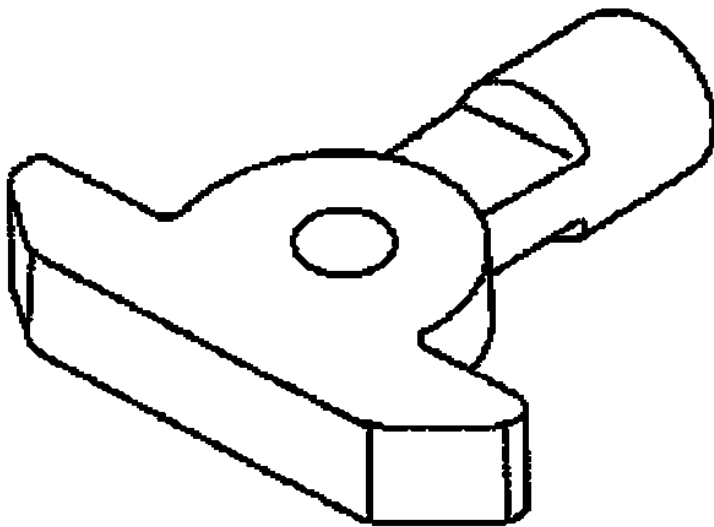
**ST1513A**

Installer, Axle Shaft Oil Seal  
205-123 (T78P-1177-A)

Slide Hammer 100-001 (T50T-100-A)



**ST1185-A**



**ST2035-A**

Remover, Axle Bearing 205-219  
(T85L-1225-AH)

1. Remove the axle shaft. For additional information, refer to AXLE SHAFT.

**WARNING:** If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM.

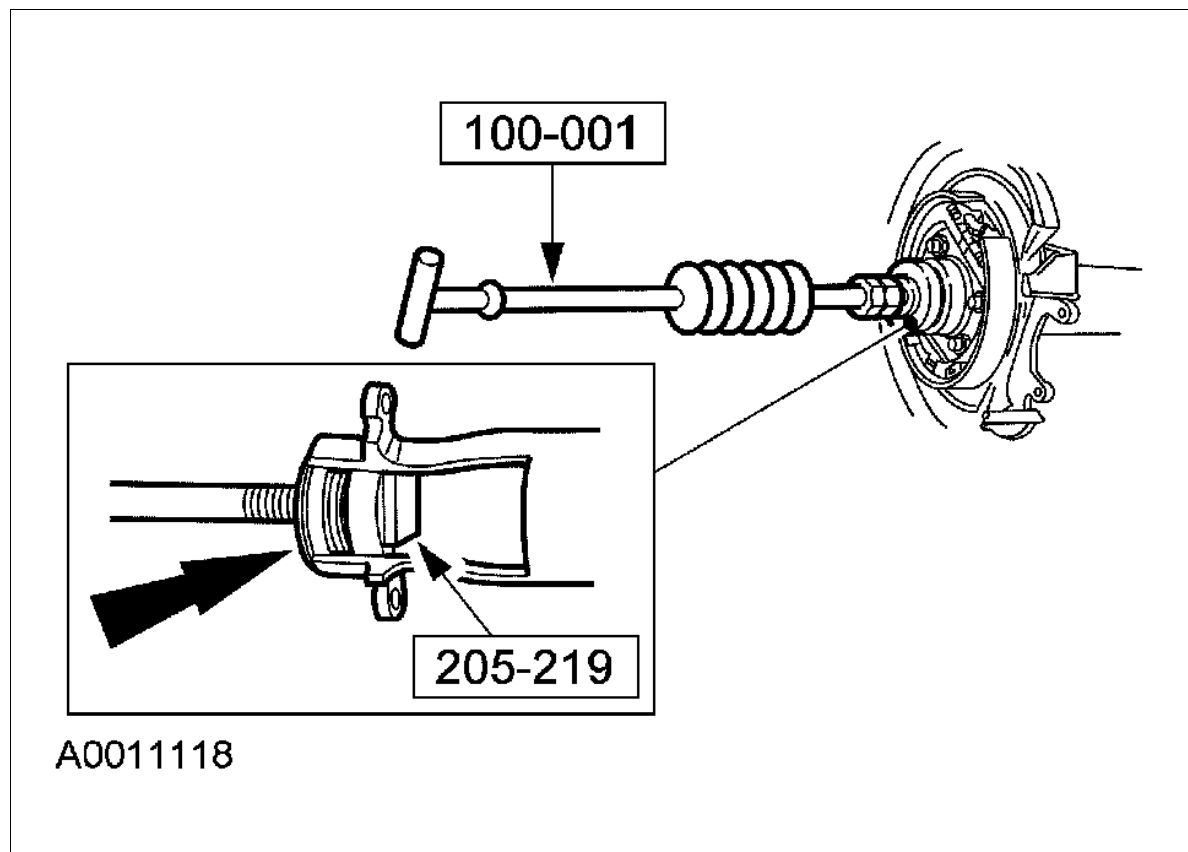
2. Remove the oil seal from the axle tube.

**NOTE:** If the wheel bearing oil seal is leaking, the axle housing vent may be plugged with foreign material.

**NOTE:** If only the seal needs to be replaced, use care to avoid damaging the seal bore.

1. Discard the oil seal.
3. Inspect the rear wheel bearing and axle shaft for wear or damage.
4. If necessary, using the special tools, remove the rear wheel bearing.

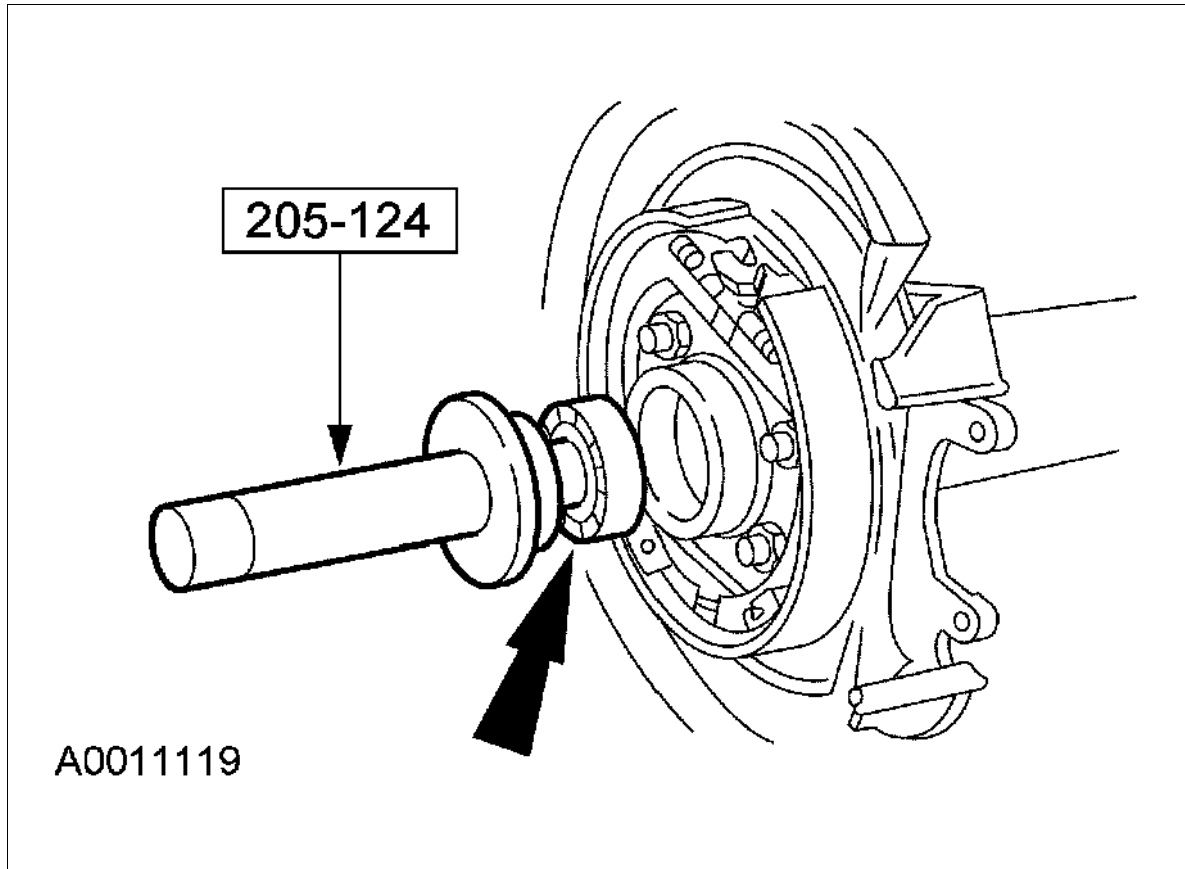
Fig 40: Removing Rear Wheel Bearing



## Installation

1. Lubricate the new rear wheel bearing.
  1. Use SAE 80W-90 Premium Rear Axle Lubricant XY-80W90-QL or equivalent meeting Ford specification WSP-M2C197-A.
2. Using the special tool, install the rear wheel bearing.

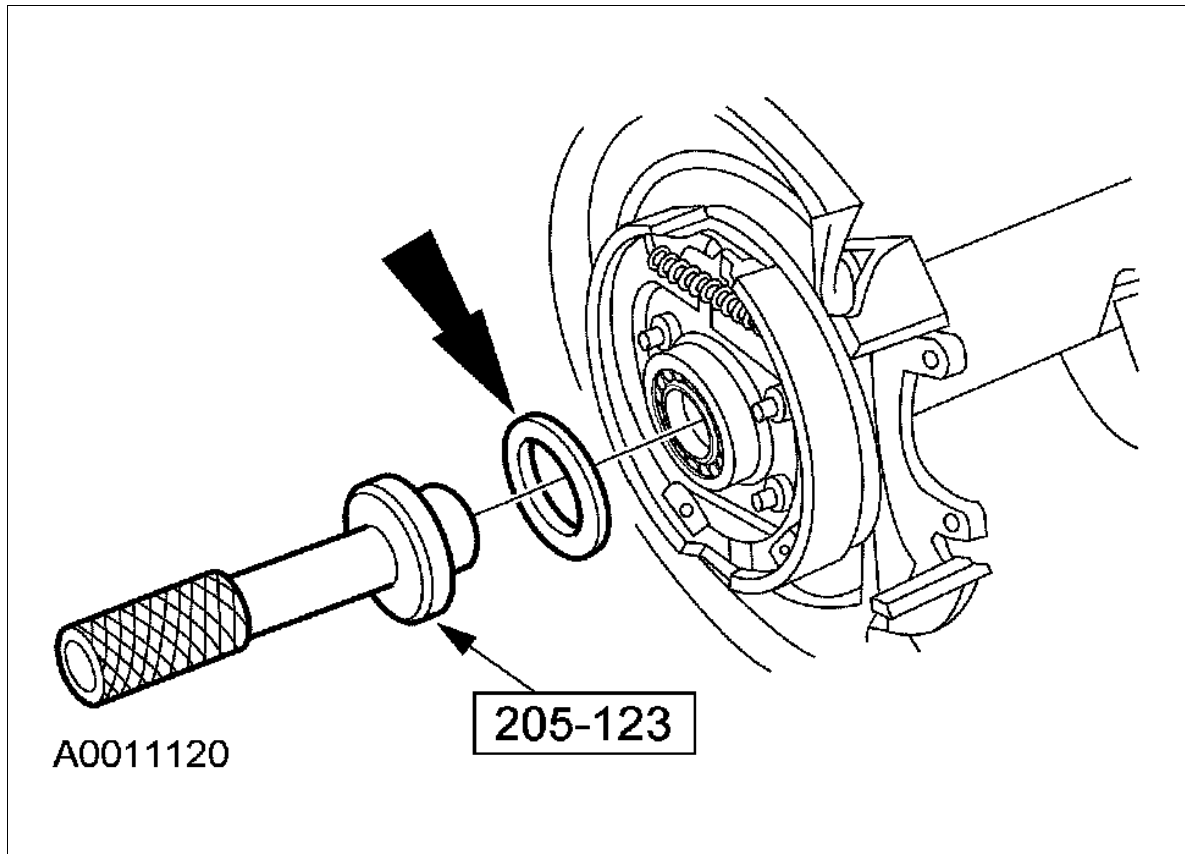
Fig 41: Installing Rear Wheel Bearing



Courtesy of FORD MOTOR CO.

3. Lubricate the lip of the new wheel bearing oil seal.
  1. Use Premium Long-Life Grease XG-I-C or equivalent meeting Ford specification ESA-M1C75-B.
4. Using the special tool, install the wheel bearing oil seal.

Fig 42: Installing Wheel Bearing Oil Seal



Courtesy of FORD MOTOR CO.

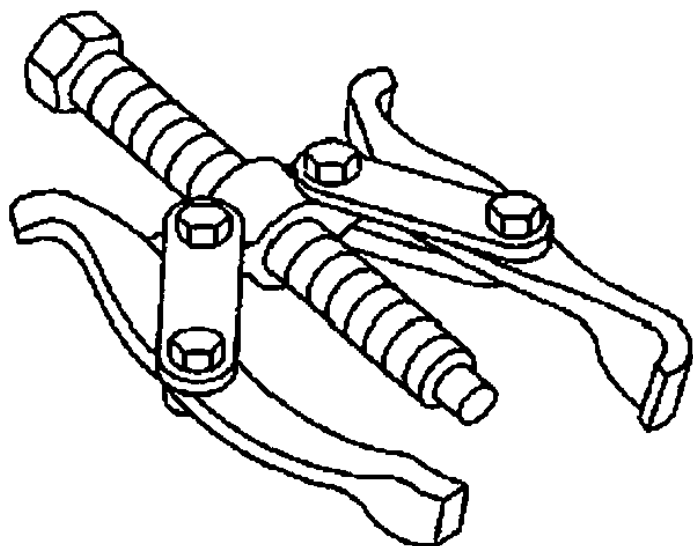
5. Install the axle shaft. For additional information, refer to AXLE SHAFT.
6. Lower the vehicle.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

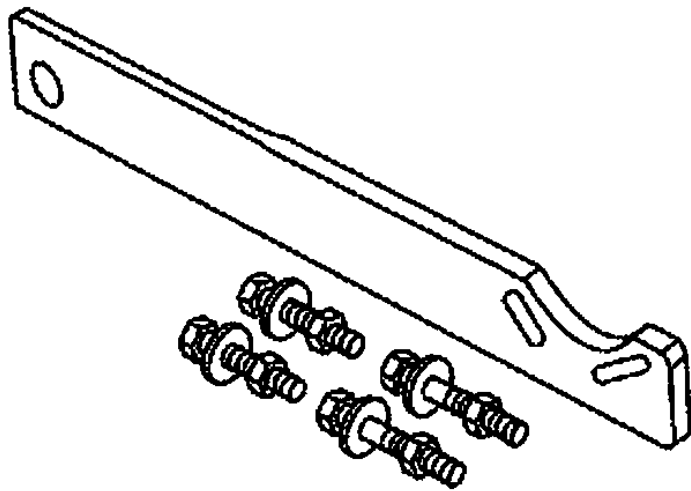
### Drive Pinion Flange And Drive Pinion Seal

#### SPECIAL TOOL CHART

	2-Jaw Puller 205-D072 (D97L-4221-A) or equivalent
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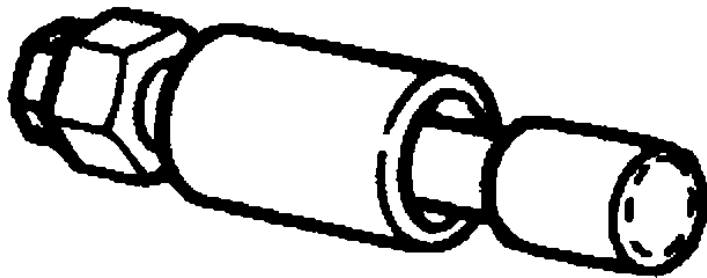


ST2026-A



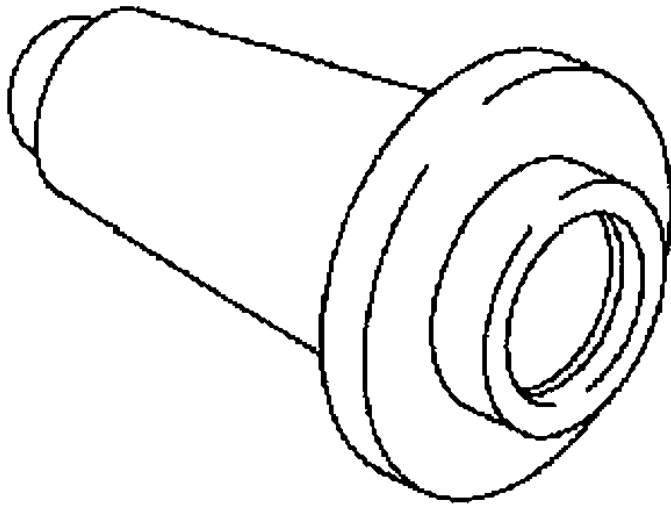
Holding Fixture, Drive Pinion Flange  
205-126 (T78P-4851-A)

ST1257-A

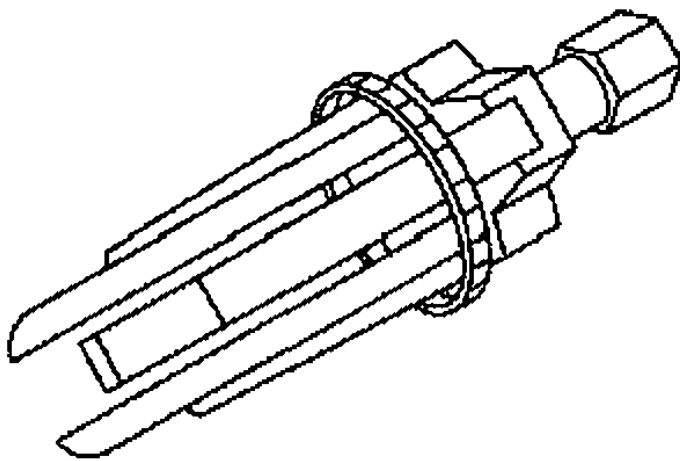


Installer, Drive Pinion Flange 205-002  
(TOOL-4858-E)

Installer, Drive Pinion Oil Seal 205-208  
(T83T-4676-A)



**ST1325-A**

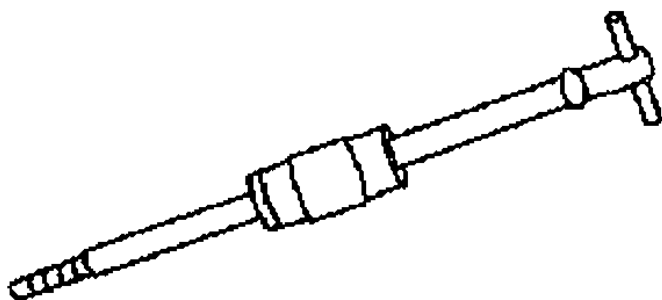


**ST1213-A**

Remover, Bushing 307-001 (TOOL-1175-AC)

Slide Hammer 100-001 (T50T-100-A)





ST1351-A

#### MATERIAL SPECIFICATION

Item	Specification
Premium Long-Life Grease XG-I-C	ESA-M1C75-B
Premium Rear Axle Lubricant XY-80W90-QL	WSP-M2C197-A

#### Removal

1. If equipped, turn the air suspension switch to the OFF position.

**WARNING:** *The electrical power to the air suspension system must be shut off prior to hoisting, jacking or towing an air suspension vehicle. This can be accomplished by turning off the air suspension switch located in the LH side of the luggage compartment. Failure to do so can result in unexpected inflation or deflation of the air springs, which can result in shifting of the vehicle during these operations.*

2. Remove the rear brake discs. For additional information, refer to REAR DISC BRAKE .

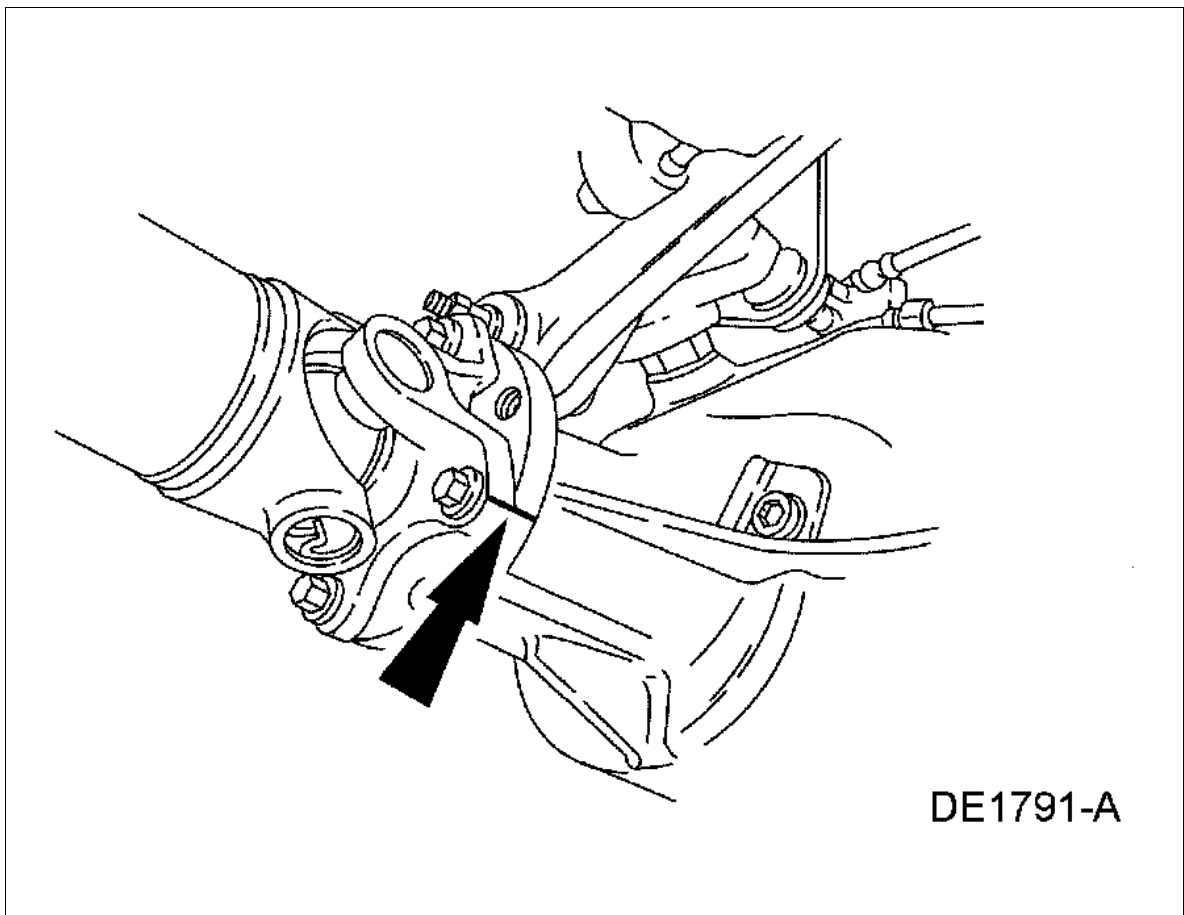
**WARNING:** If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM.

**CAUTION:** Remove the rear brake discs to prevent brake drag during drive pinion bearing preload adjustment.

**NOTE:** When removing the rear brake caliper in this procedure, it is not necessary to disconnect the hydraulic lines.

1. Support the rear brake caliper with mechanics wire.
3. Index-mark the driveshaft flange and pinion flange for correct alignment during installation.

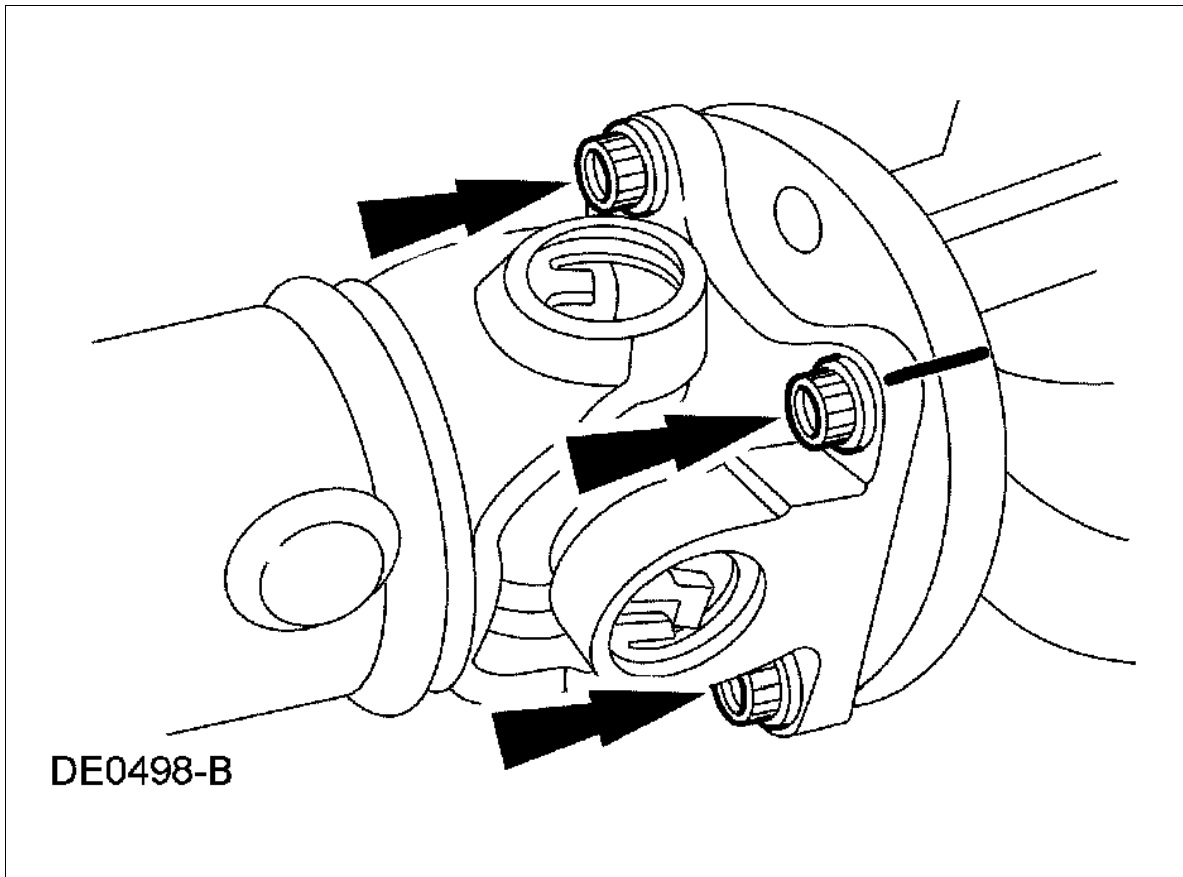
Fig 43: Marking Index-Mark Driveshaft Flange And Pinion Flange For Correct Alignment



Courtesy of FORD MOTOR CO.

4. Remove the four bolts.

Fig 44: Identifying Index-Mark To Driveshaft And Flange Bolts



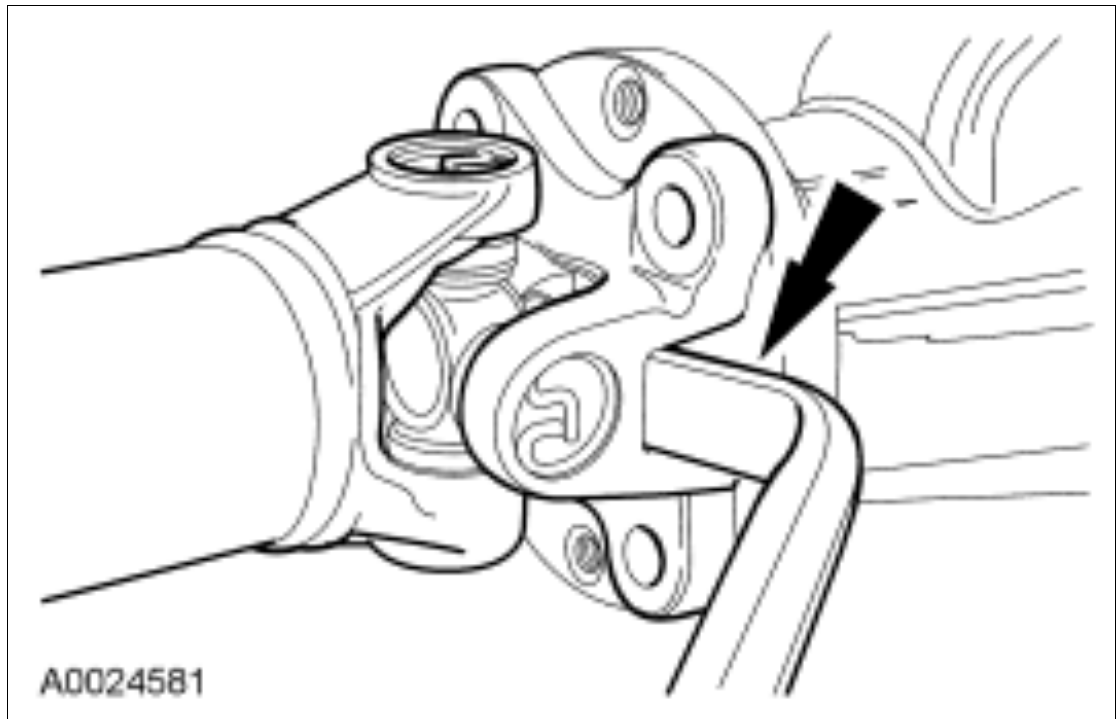
Courtesy of FORD MOTOR CO.

5. Using a suitable tool as shown, disconnect the driveshaft centering socket yoke from the rear axle pinion flange.

**CAUTION:** *The driveshaft centering socket yoke fits tightly on the rear axle pinion flange pilot. Never hammer on the driveshaft or any of its components to disconnect the yoke from the flange. Pry only in the area shown with a suitable tool to disconnect the yoke from the flange.*

1. Position the driveshaft aside.

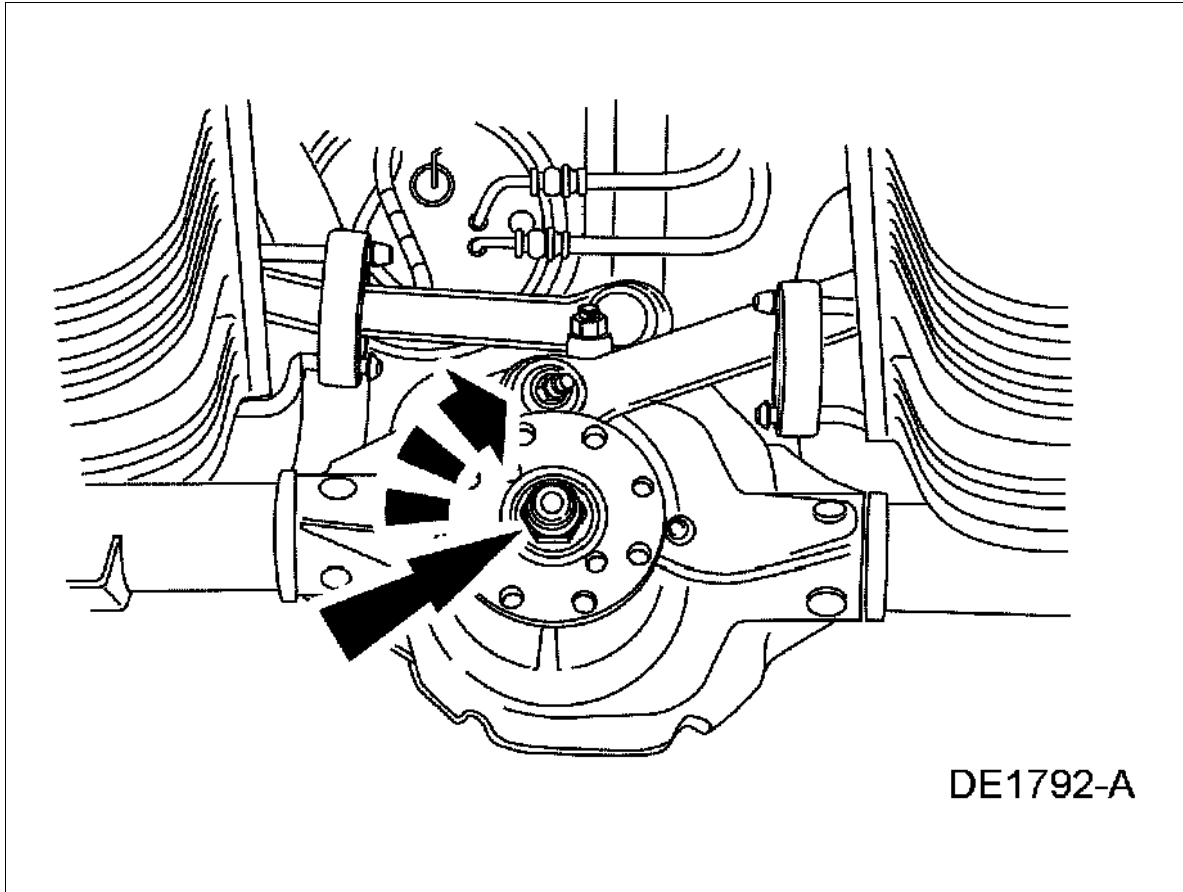
Fig 45: Disconnecting Driveshaft Flange Yoke From Pinion Flange



Courtesy of FORD MOTOR CO.

6. Install a Nm (inch-pound) torque wrench on the nut and record the torque necessary to maintain rotation of the pinion through several revolutions.

Fig 46: Record The Torque Necessary To Maintain Rotation Of The Pinion Through Several Revolutions

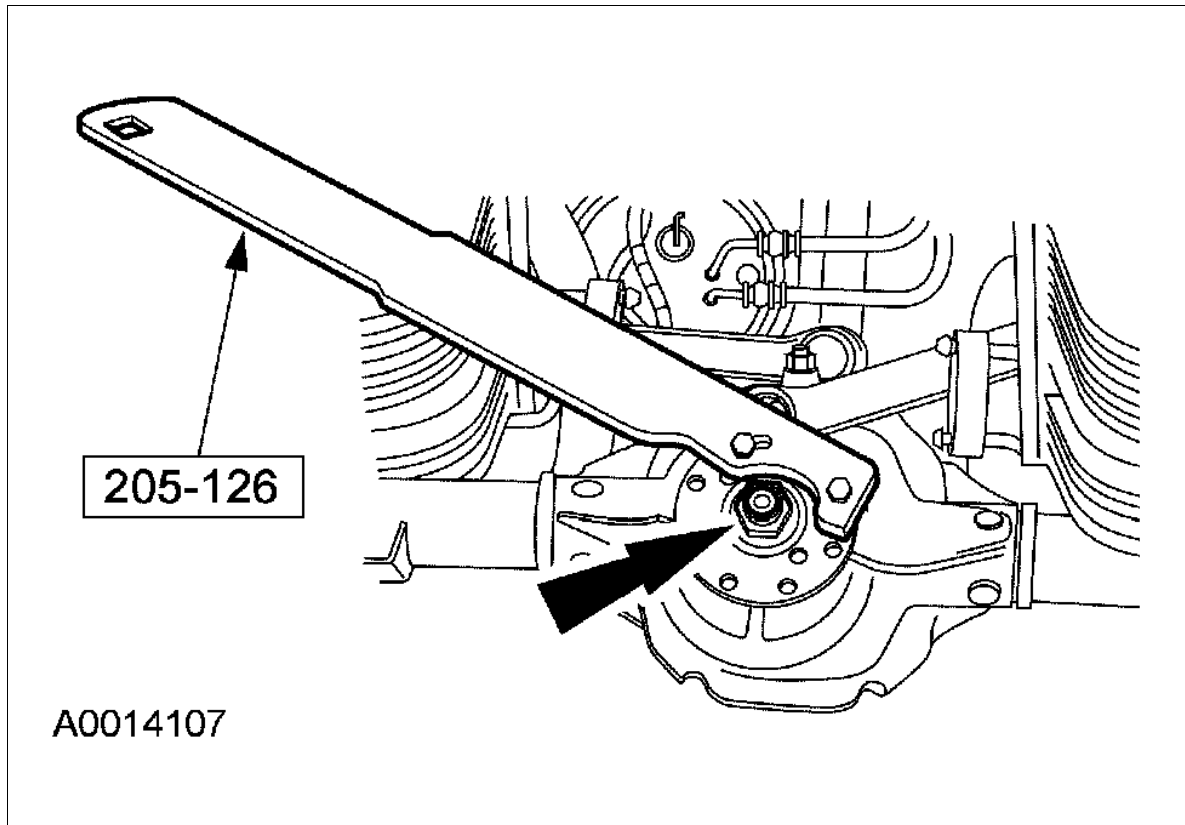


Courtesy of FORD MOTOR CO.

7. Use the special tool to hold the pinion flange while removing the nut.

**CAUTION:** *Discard the nut after removing it. Install a new nut during installation.*

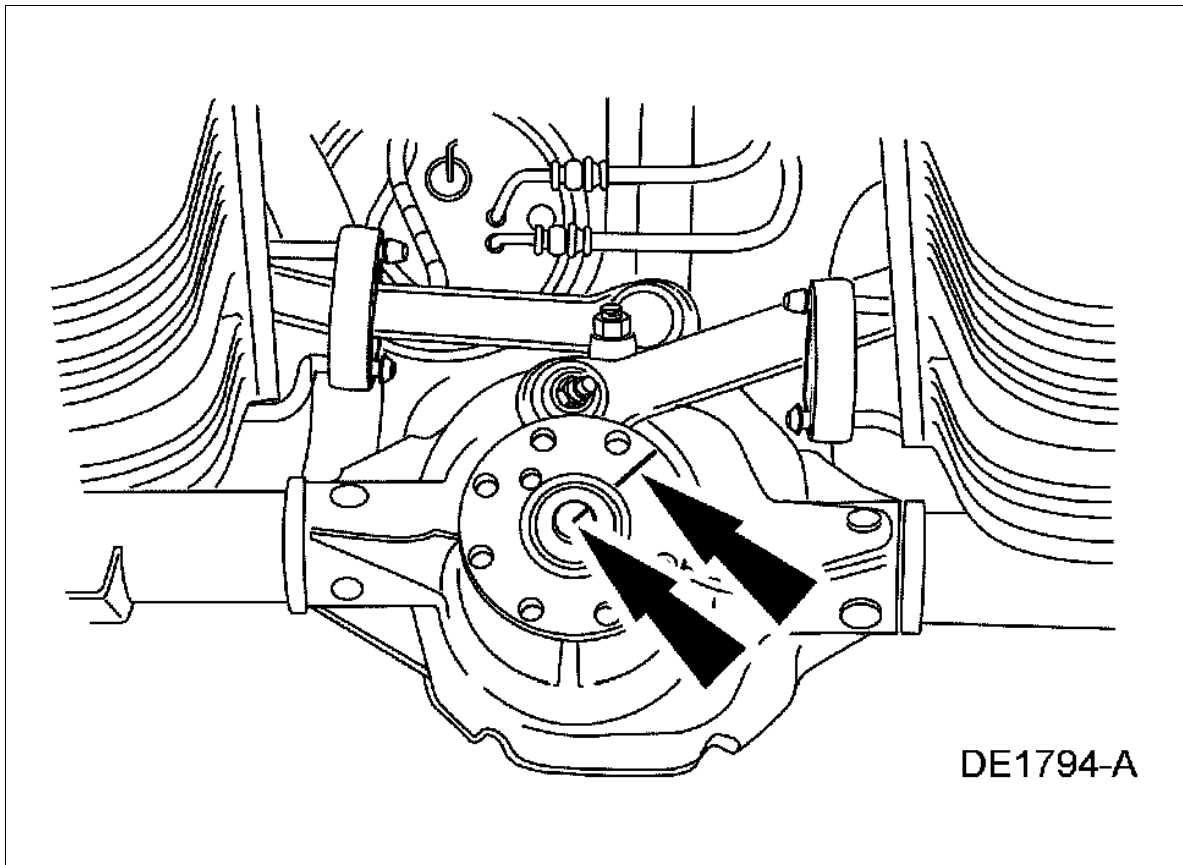
Fig 47: Removing Nut



Courtesy of FORD MOTOR CO.

8. Index-mark the pinion flange and the drive pinion stem for correct alignment during installation.

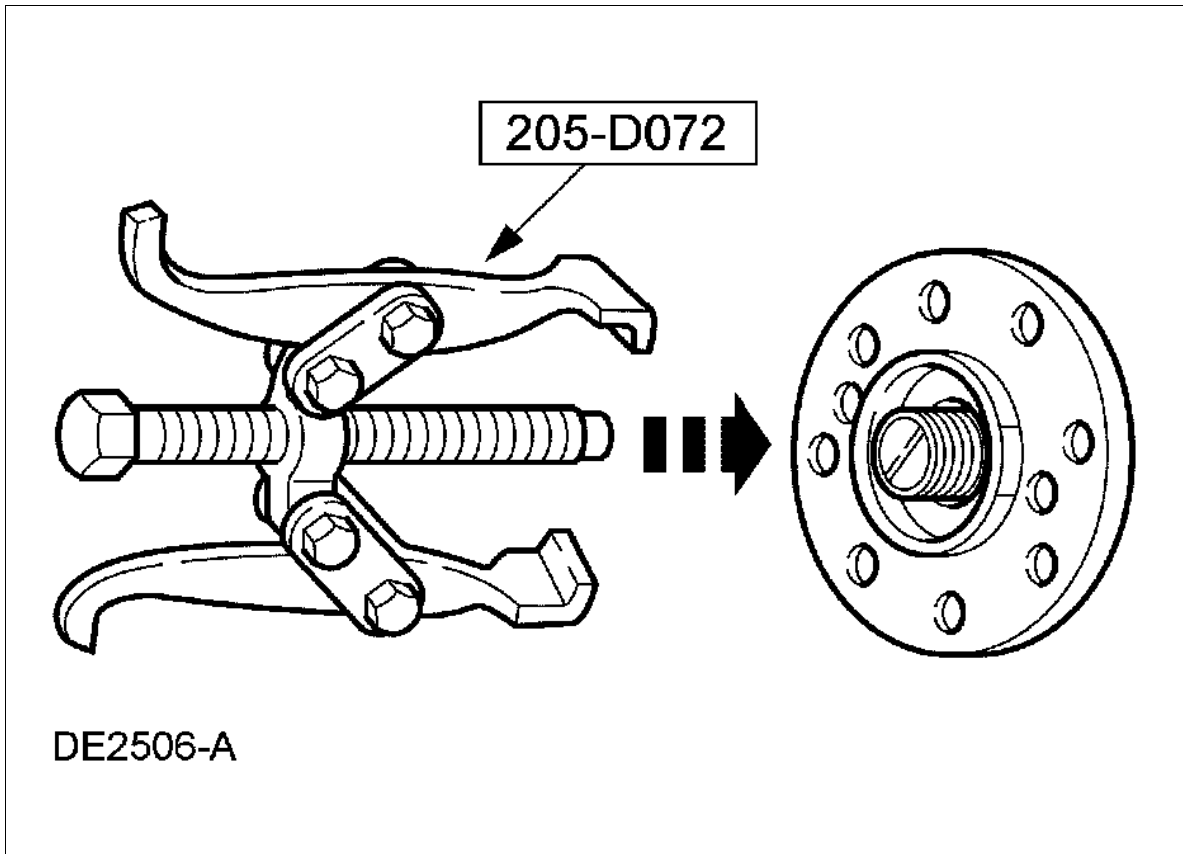
Fig 48: Index-Mark Pinion Flange And Drive Pinion Stem For Correct Installation Alignment



Courtesy of FORD MOTOR CO.

9. Using the special tool, remove the pinion flange.

Fig 49: Removing Pinion Flange

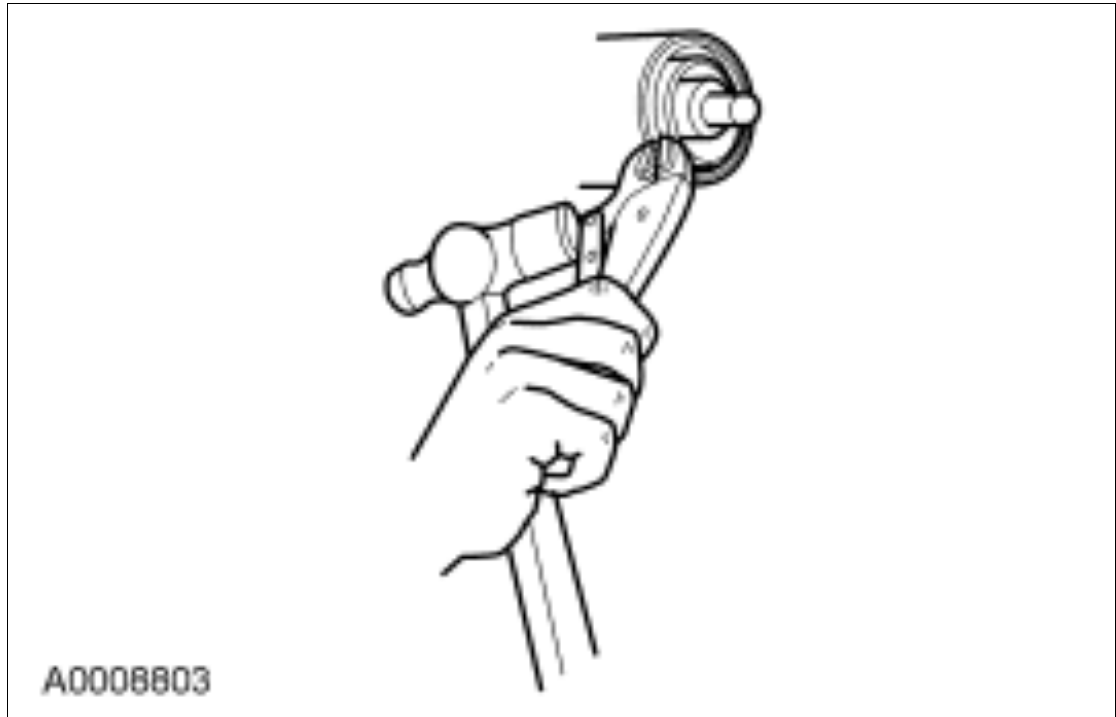


Courtesy of FORD MOTOR CO.

10. Force up on the metal flange of the drive pinion seal. Install gripping pliers and strike with a hammer until the drive pinion seal is removed.
  1. Discard the seal.



Fig 50: Removing Drive Pinion Seal



Courtesy of FORD MOTOR CO.

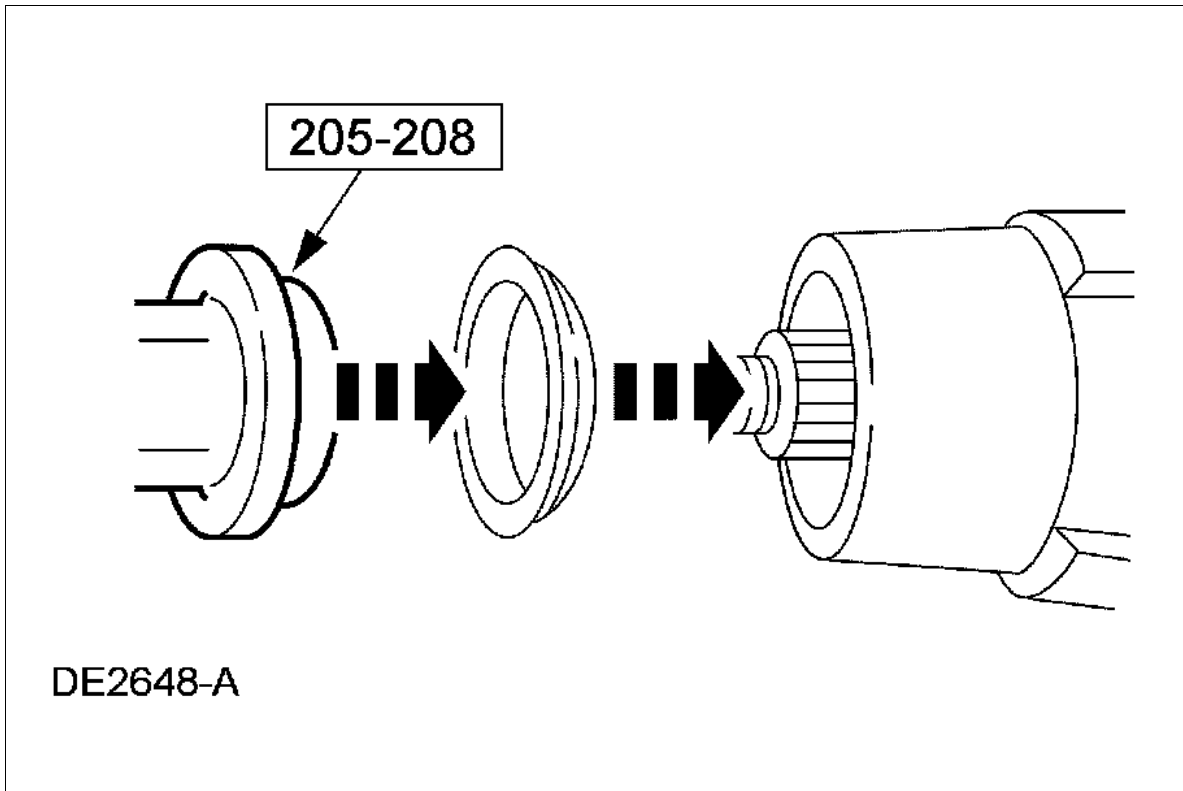
### Installation

1. Coat the new rear axle drive pinion seal lips with grease.
2. Using the special tool, install the rear axle drive pinion seal.

**CAUTION:** *Installation without the correct tool can result in early seal failure.*

**CAUTION:** *If the rear axle drive pinion seal becomes misaligned during installation, remove the seal and install a new seal.*

Fig 51: Installing Rear Axle Drive Pinion Seal

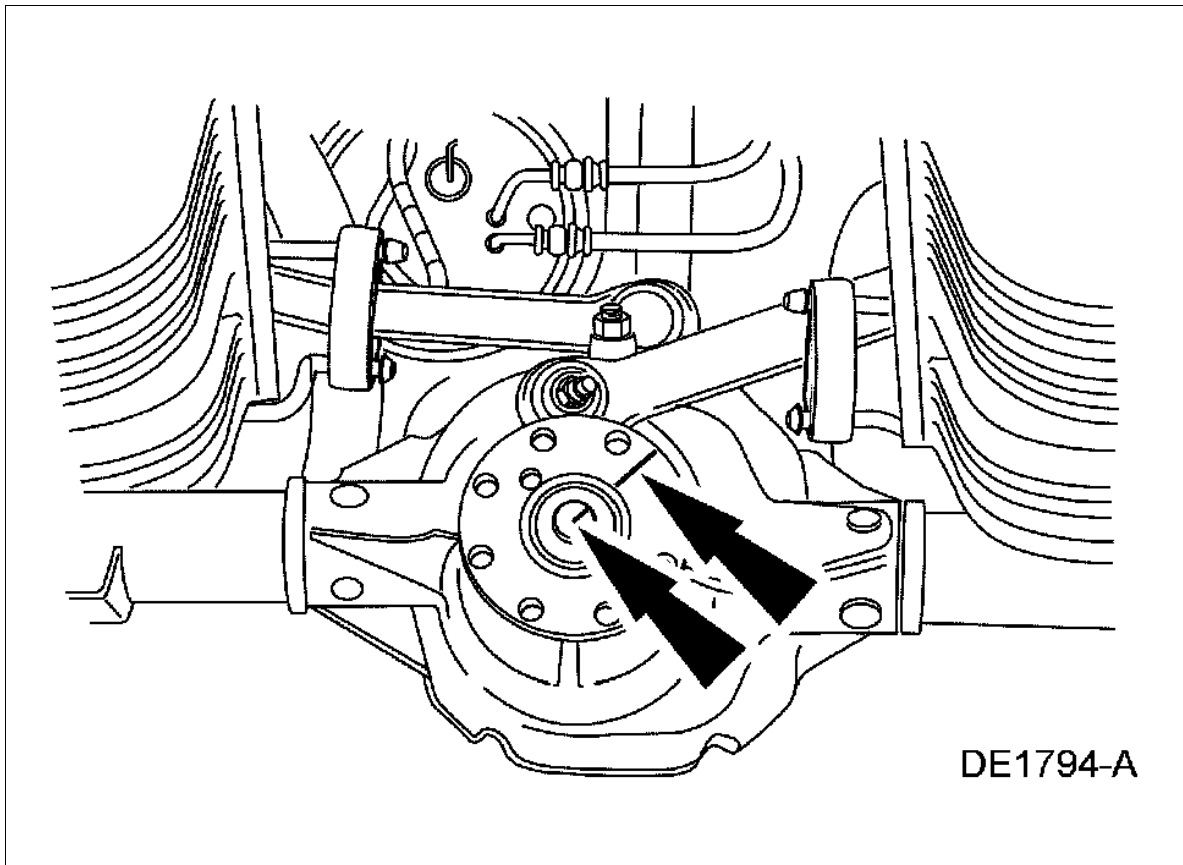


Courtesy of FORD MOTOR CO.

3. Lubricate the pinion flange splines with rear axle lubricant.
4. Position the pinion flange.

**NOTE:** Disregard the index marks if installing a new pinion flange.

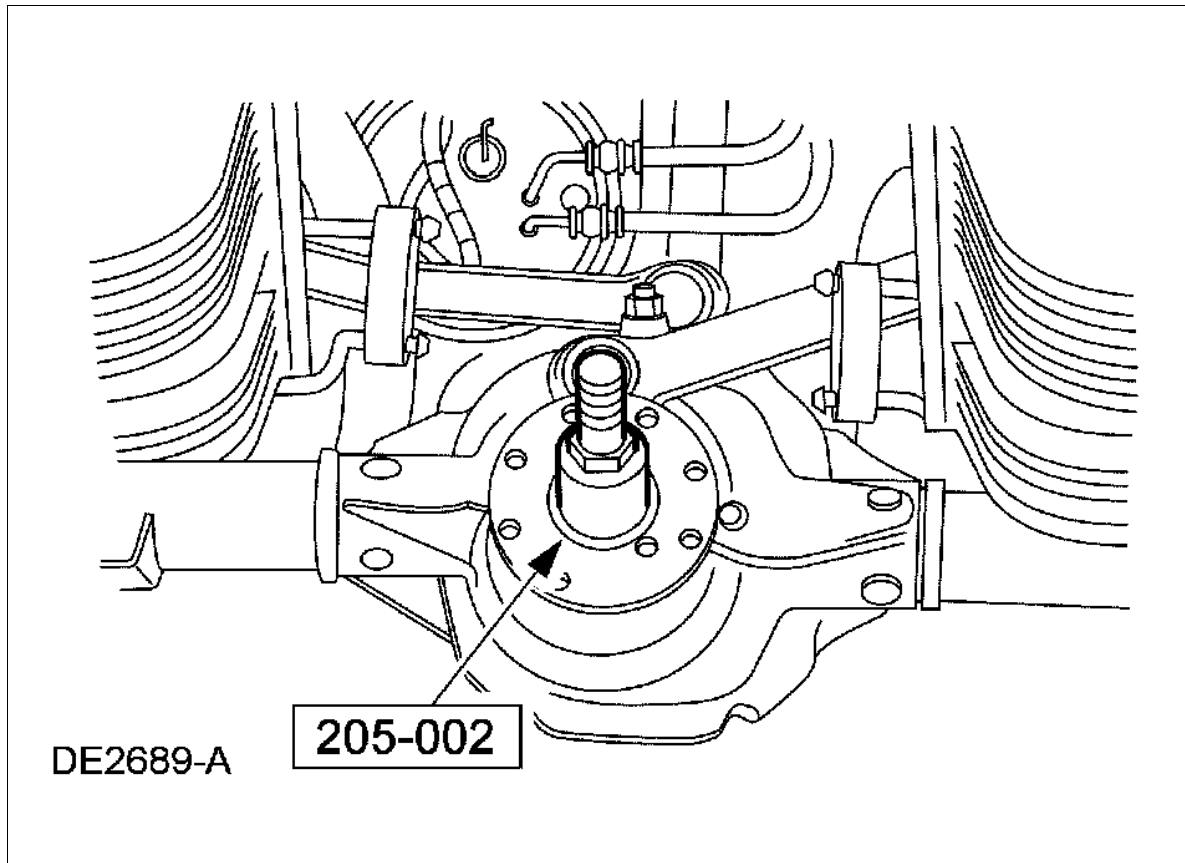
Fig 52: Positioning Pinion Flange



Courtesy of FORD MOTOR CO.

5. Using the special tool, install the pinion flange.

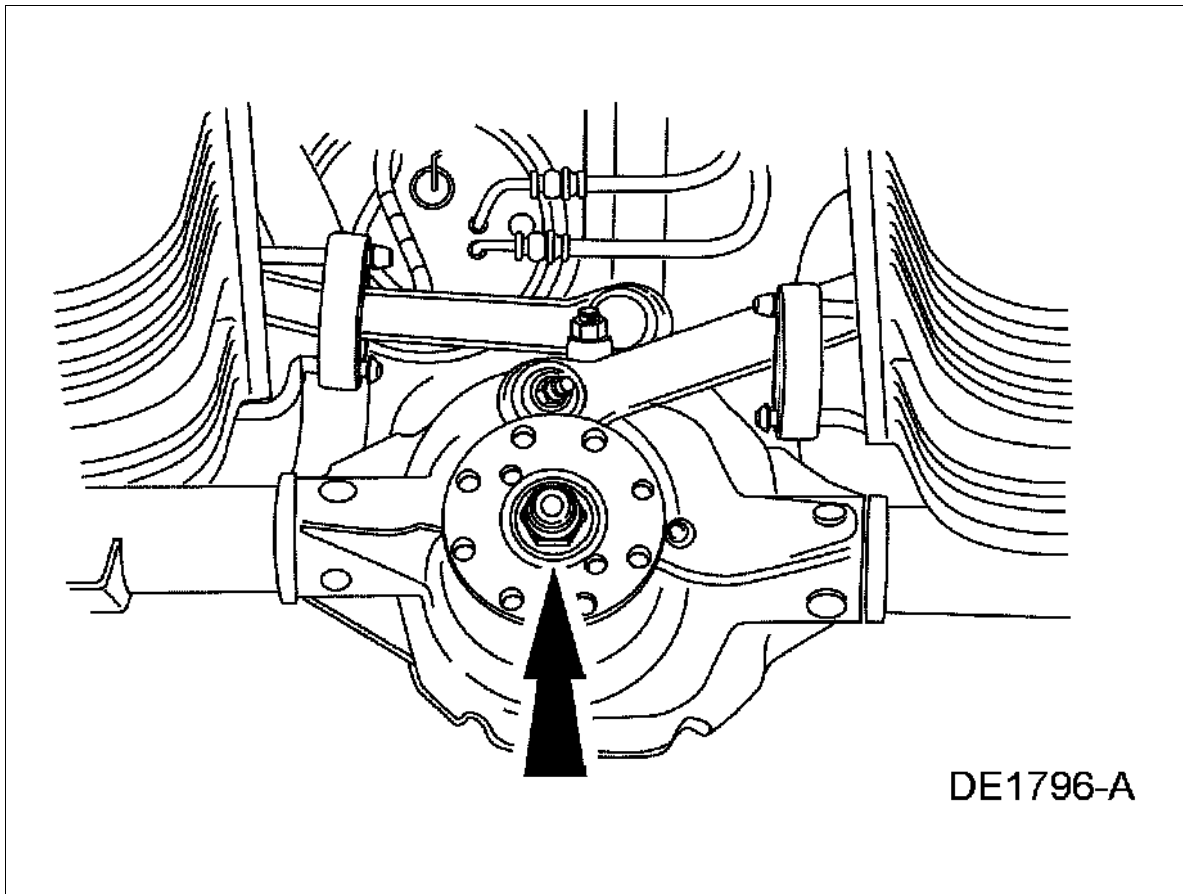
Fig 53: Installing Pinion Flange



Courtesy of FORD MOTOR CO.

6. Position the new nut.

Fig 54: Positioning New Nut



Courtesy of FORD MOTOR CO.

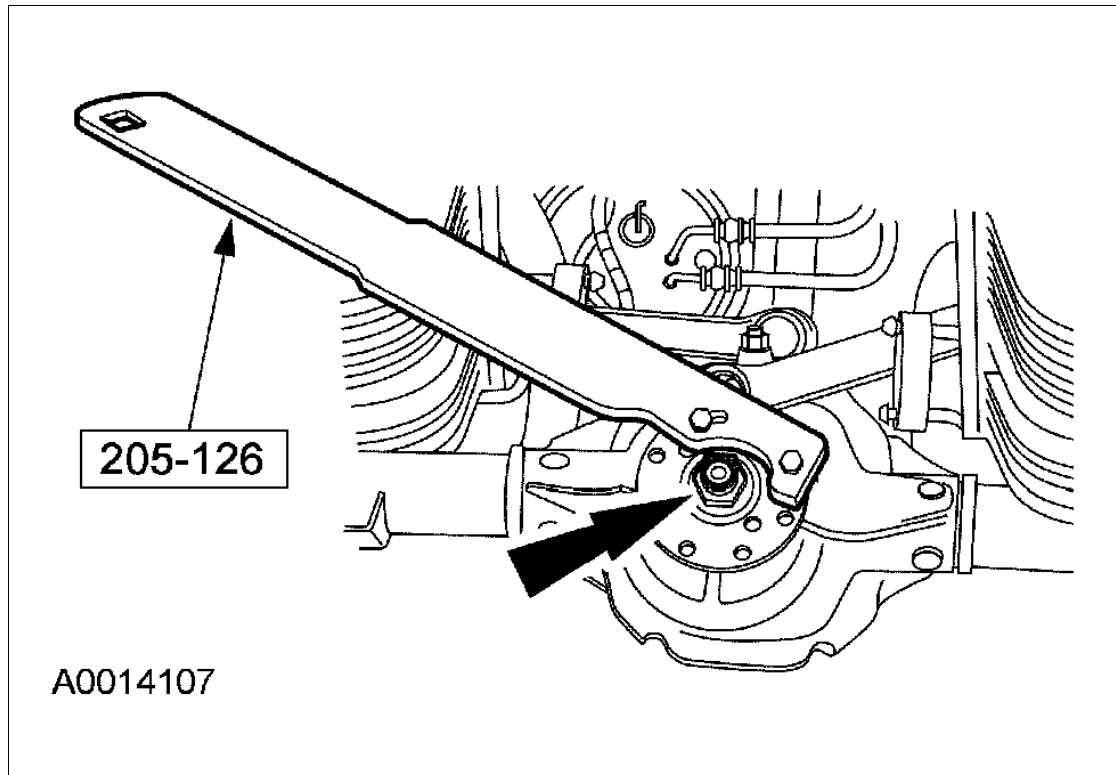
7. Use the special tool to hold the pinion flange while tightening the nut.

**CAUTION:** Do not, under any circumstance, loosen the nut to reduce preload. If it is necessary to reduce preload, install a new collapsible spacer and nut.

**CAUTION:** Remove the special tool while taking preload readings with the Nm (inch-pound) torque wrench.

1. Rotate the pinion occasionally to make sure the differential pinion bearings seat correctly. Take frequent differential pinion bearing preload readings by rotating the pinion with a Nm (inch-pound) torque wrench.
2. If the preload recorded prior to disassembly is lower than the specification for used bearings, tighten the nut to specification. If the preload recorded prior to disassembly is higher than the specification for used bearings, tighten the nut to the original reading as recorded.
3. Refer to TORQUE SPECIFICATIONS for used pinion bearings.

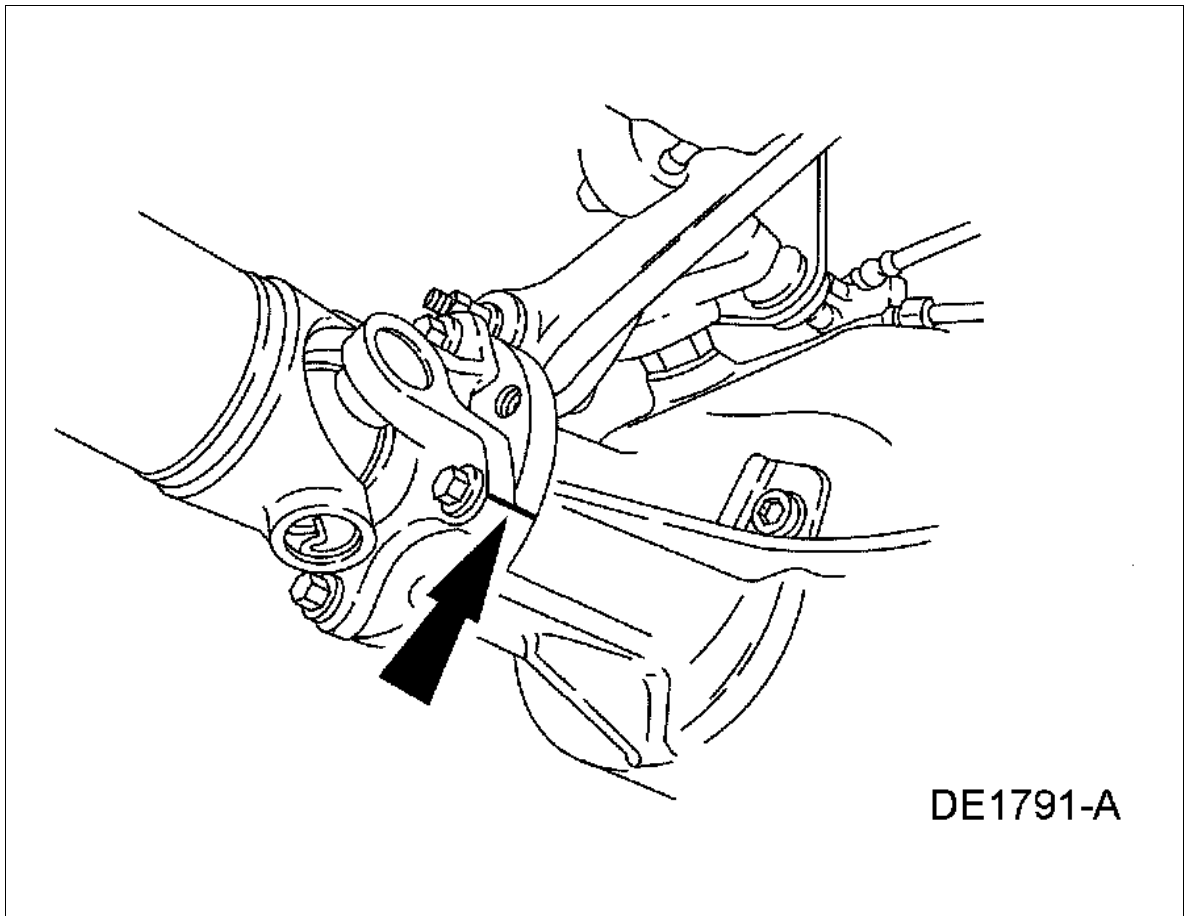
Fig 55: Tightening Nut



Courtesy of FORD MOTOR CO.

8. Align the index marks.

Fig 56: Aligning Index Marks

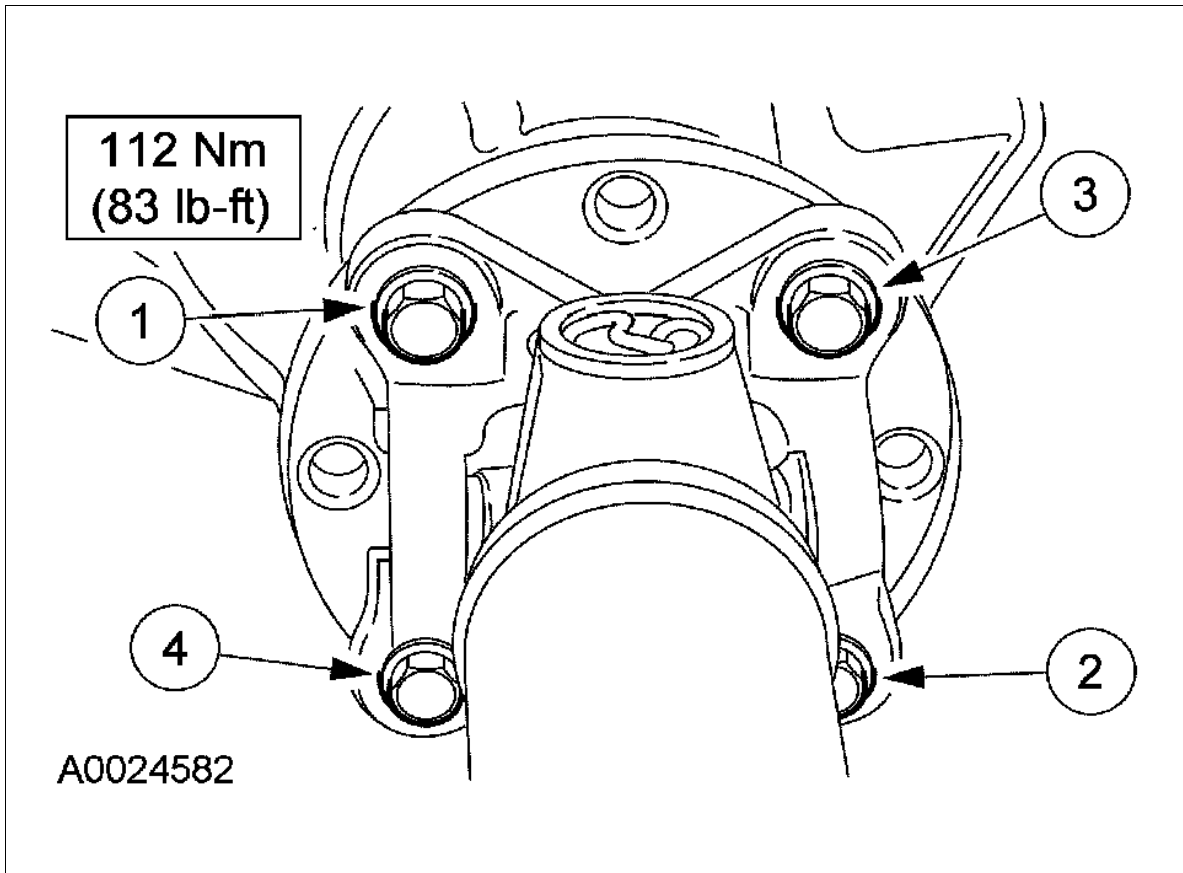


Courtesy of FORD MOTOR CO.

9. Install the driveshaft.

**CAUTION:** *The driveshaft centering socket yoke fits tightly on the rear axle pinion flange pilot. To make sure that the yoke seats squarely on the flange, tighten the bolts evenly in a cross pattern as shown.*

Fig 57: Bolt Tightening Pattern - With Torque Specification



Courtesy of FORD MOTOR CO.

10. Install the rear brake discs and rear brake calipers. For additional information, refer to REAR DISC BRAKE .
11. If equipped with fire suppression system, repower the system.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

12. If equipped, reactivate the air suspension system by turning ON the switch.

### Differential Housing Cover

#### MATERIAL SPECIFICATION

Item	Specification
Silicone Gasket and Sealer F7AZ-19554-EA	WSE-M4G323-A4
Additive Friction Modifier XL-3 (Traction-Lok®)	EST-M2C118-A



SAE 80W-90 Premium Rear Axle Lubricant XY-80W90-QL	WSP-M2C197-A
SAE 75W-140 High Performance Rear Axle Lubricant XY-75W140-QL (police and export only)	WSL-M2C192-A

## Removal

1. If equipped, turn the air suspension switch to the OFF position.

**WARNING:** *The electrical power to the air suspension system must be shut off prior to hoisting, jacking or towing an air suspension vehicle. This can be accomplished by turning off the air suspension switch located in the LH side of the luggage compartment. Failure to do so can result in unexpected inflation or deflation of the air springs, which can result in shifting of the vehicle during these operations.*

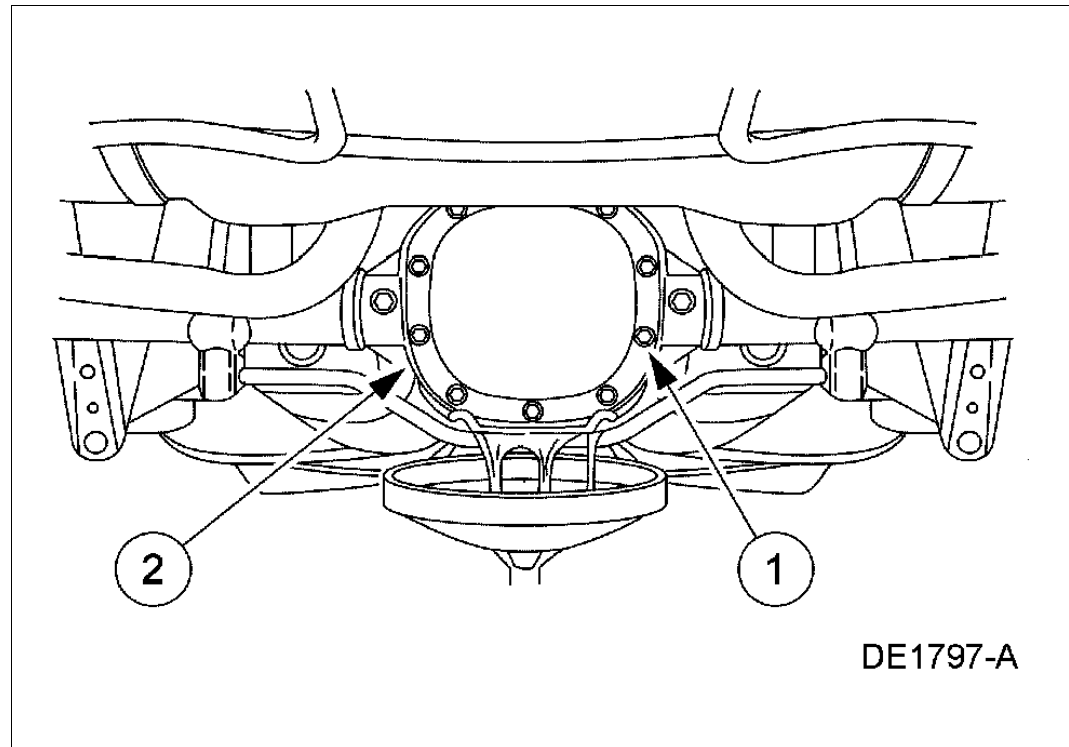
2. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to JACKING AND LIFTING .

**WARNING:** *If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

3. Remove the differential housing cover.

1. Remove the bolts and drain the lubricant from the differential housing.
2. Remove the differential housing cover.

Fig 58: Removing Differential Housing Cover



Courtesy of FORD MOTOR CO.

## Installation

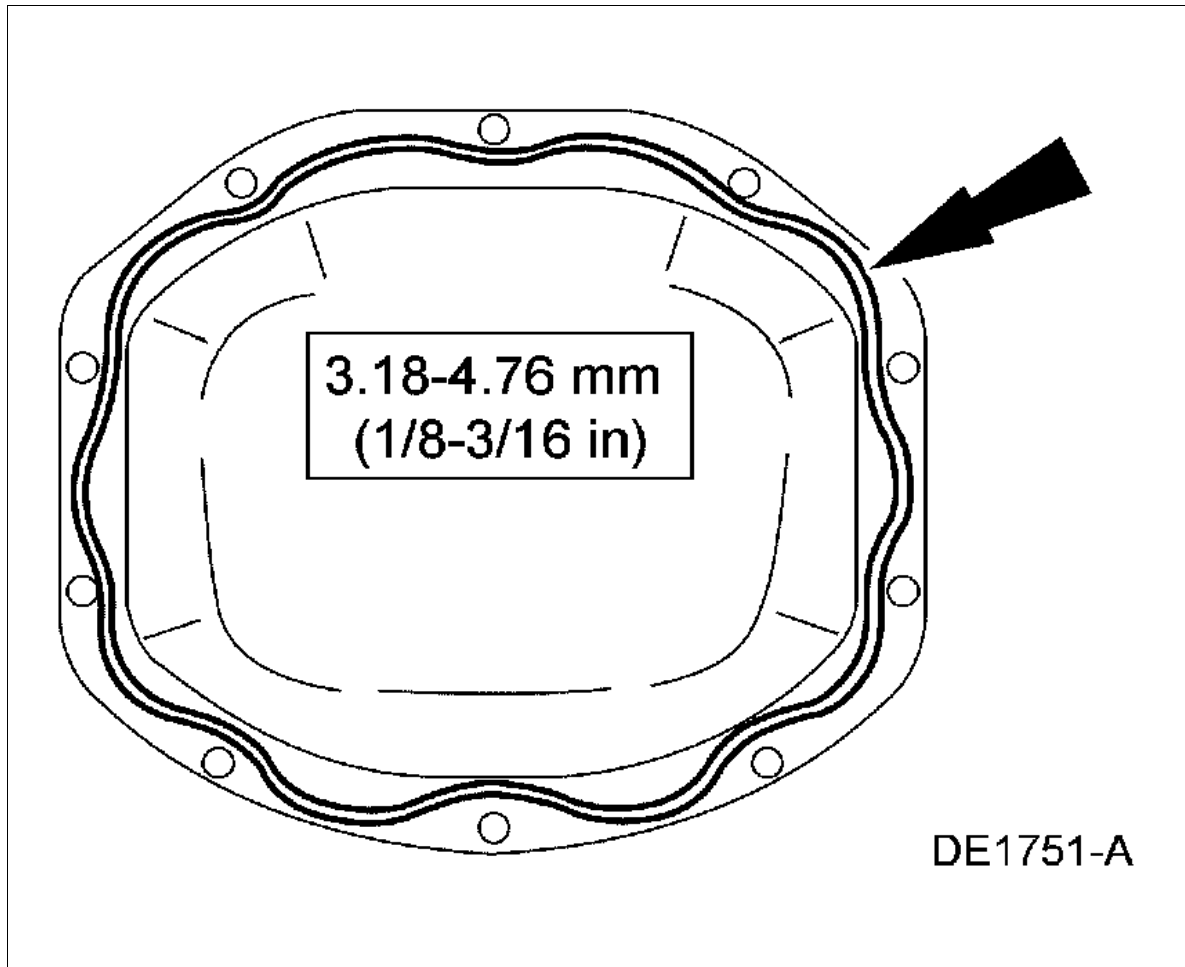
1. Clean the gasket mating surfaces.

**CAUTION:** *The machined surfaces on the differential housing and the differential housing cover must be clean and free of oil before applying the silicone sealant. Cover the inside of the rear axle prior to cleaning the machined surface to prevent contamination.*

2. Apply a continuous bead of silicone gasket and sealer to the differential housing cover.

**CAUTION:** *Install the differential housing cover within 15 minutes of applying the silicone, or it will be necessary to apply new sealant.*

Fig 59: Applying Bead Of Sealant To Differential Housing Cover



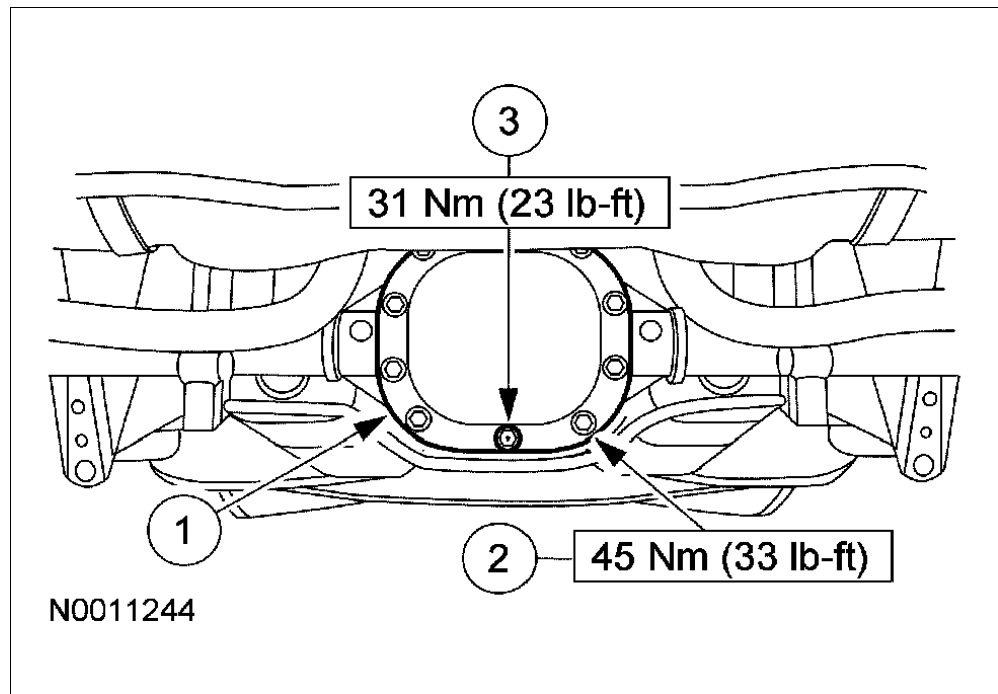
Courtesy of FORD MOTOR CO.

3. Install the differential housing cover.

**NOTE:** *If possible, allow one hour before filling the axle with lubricant to allow the silicone sealant to cure.*

1. Position the differential housing cover.
2. Install the bolts.
3. Install the axle tag bolts.
  1. Tighten the bolts using a star pattern.

Fig 60: Tightening Differential Housing Cover Bolts



Courtesy of FORD MOTOR CO.

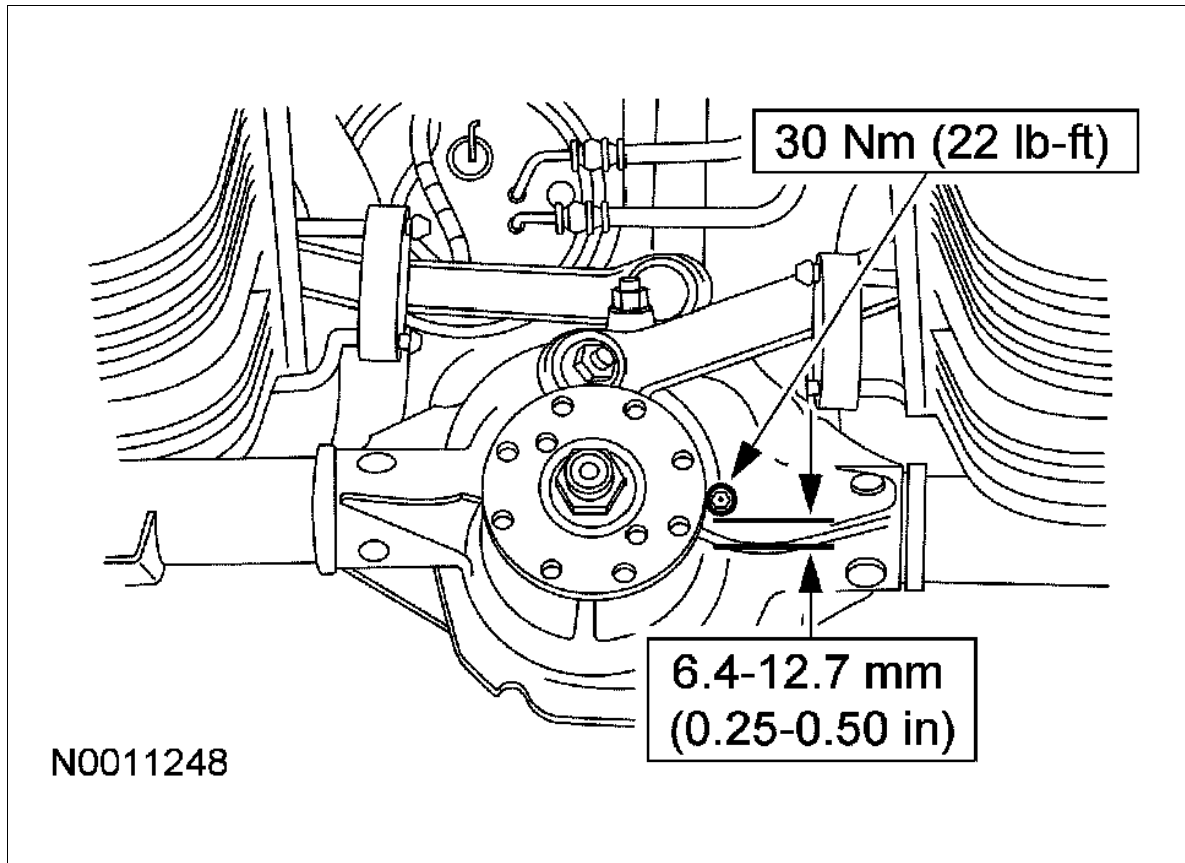
4. Fill the rear axle with 2.37 liters (5.0 pints) of lubricant and install the fill plug.

**CAUTION:** For Traction-Lok® axles, first fill the rear axle with 118 ml (4 oz.) of additive friction modifier.

**CAUTION:** Before attempting to remove the axle fill plug, make sure the tool recess is free of foreign material which may keep the tool from fully engaging the plug. Clean the recess with a small screwdriver or similar tool. Make sure the tool can be fully inserted into the recess before attempting to remove the plug.

**NOTE:** Service refill capacities are determined by filling the rear axle with the specified lubricant to the level shown in the illustration.

Fig 61: Installing Fill Plug



Courtesy of FORD MOTOR CO.

5. Lower the vehicle.

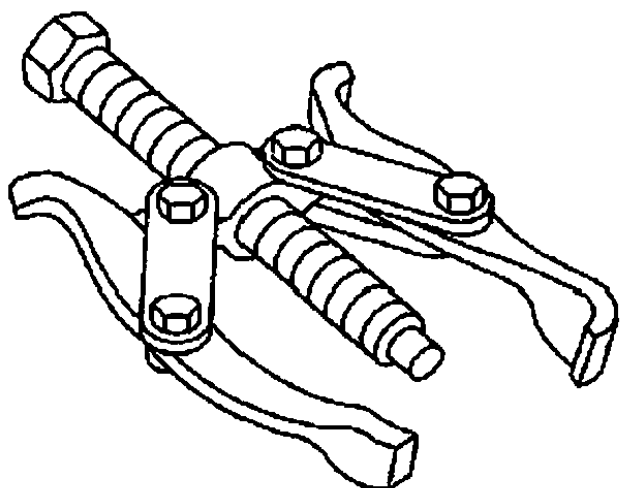
**WARNING:** If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .

6. If equipped, reactivate the air suspension system by turning ON the switch.

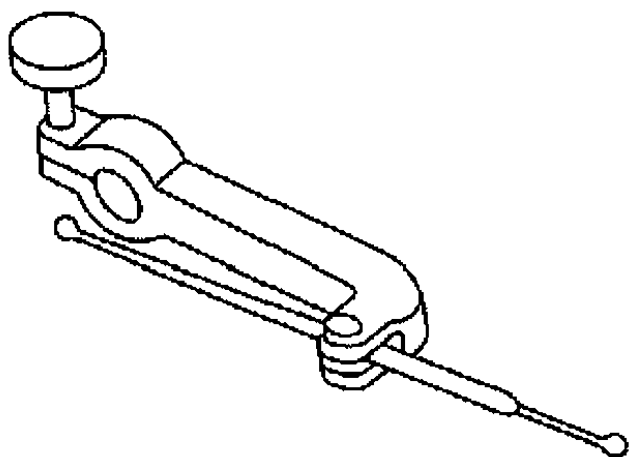
## Differential Case

### SPECIAL TOOL CHART

	2-Jaw Puller 205-D072 (D97L-4221-A) or equivalent
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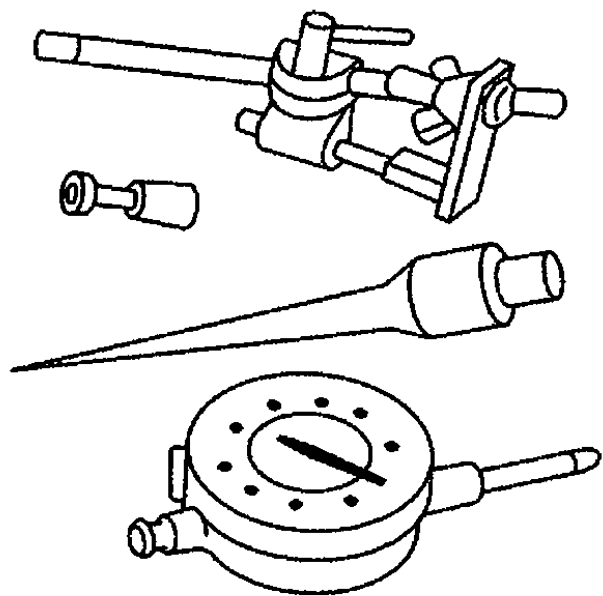
**ST2026-A**



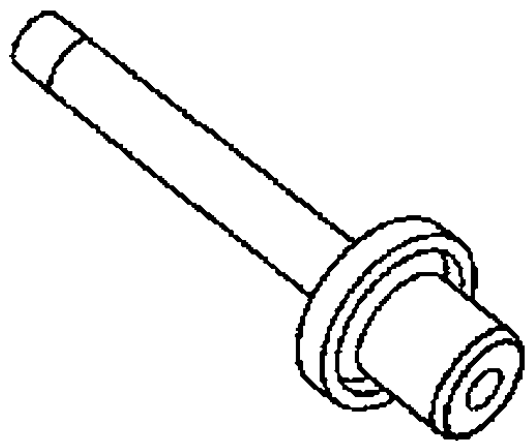
**ST1348-A**

Gauge, Clutch Housing 308-021 (T75L-4201-A)

Dial Indicator Gauge with Holding Fixture  
100-002 (TOOL-4201-C) or equivalent

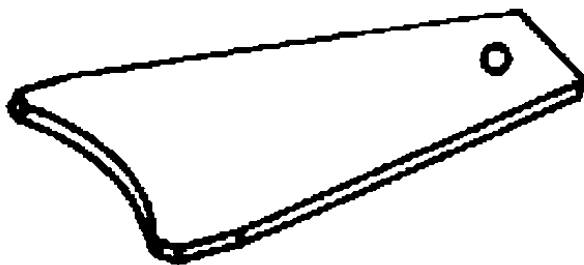


**ST1214-A**



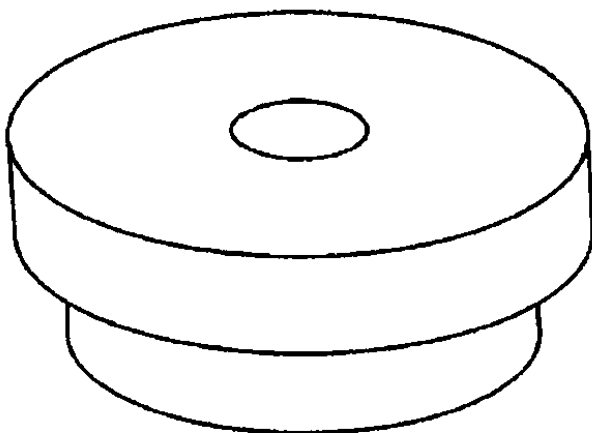
**ST1375-A**

Installer, Differential Side Bearing 205-010  
(T57L-4221-A2)



**ST1485-A**

Installer, Differential Shim 205-220 (T85L-4067-AH)



**ST1543-A**

Step Plate 205-D016 (D80L-630-5) or equivalent

## MATERIAL SPECIFICATION

Item	Specification
Stud and Bearing Mount E0AZ-19554-BA	WSK-M2G349-A1

## Removal

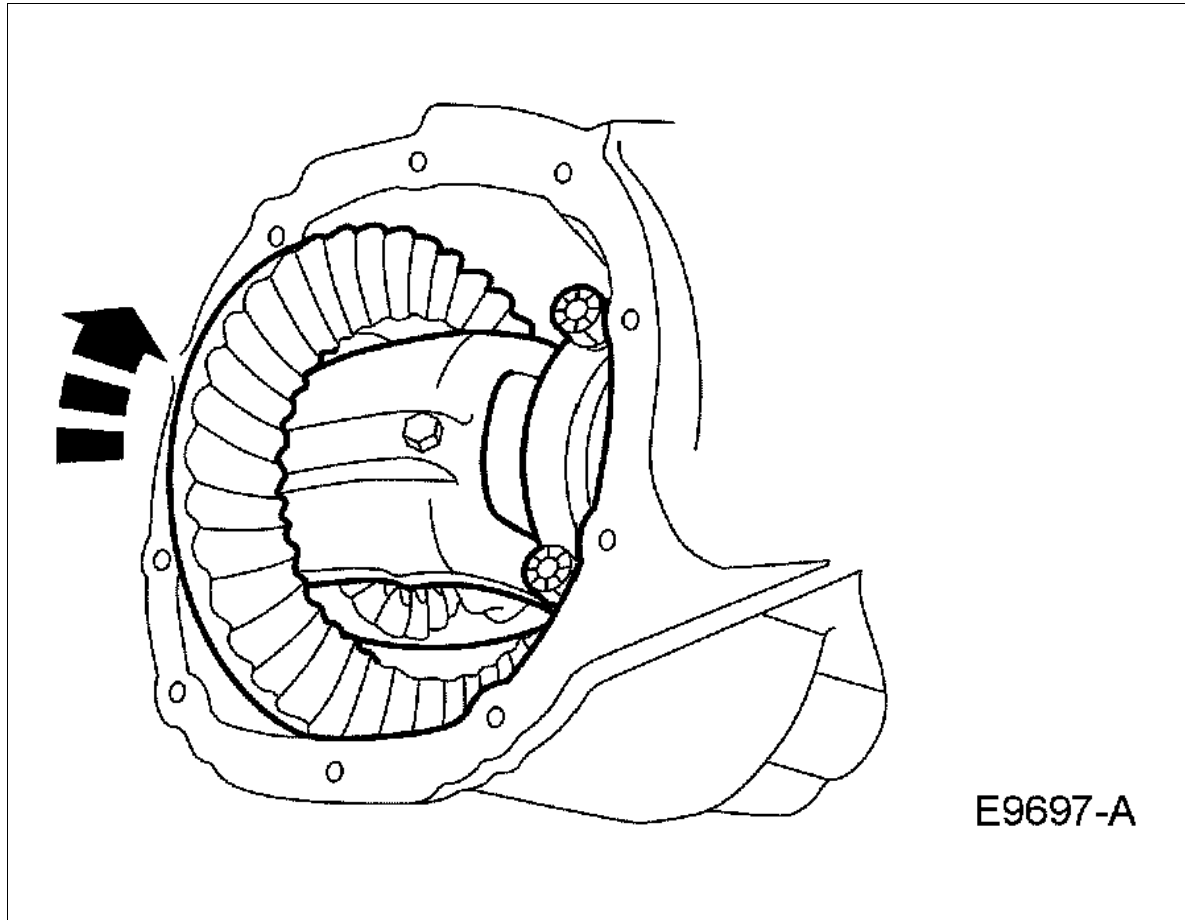
1. Remove the driveshaft. For additional information, refer to DRIVESHAFT .



**WARNING:** If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM.

2. Remove the axle shafts. For additional information, refer to AXLE SHAFT.
3. Wipe the lubricant from the internal working parts and inspect the parts for wear and damage.
4. Rotate the differential assembly to check for roughness indicating bearing/gear damage.

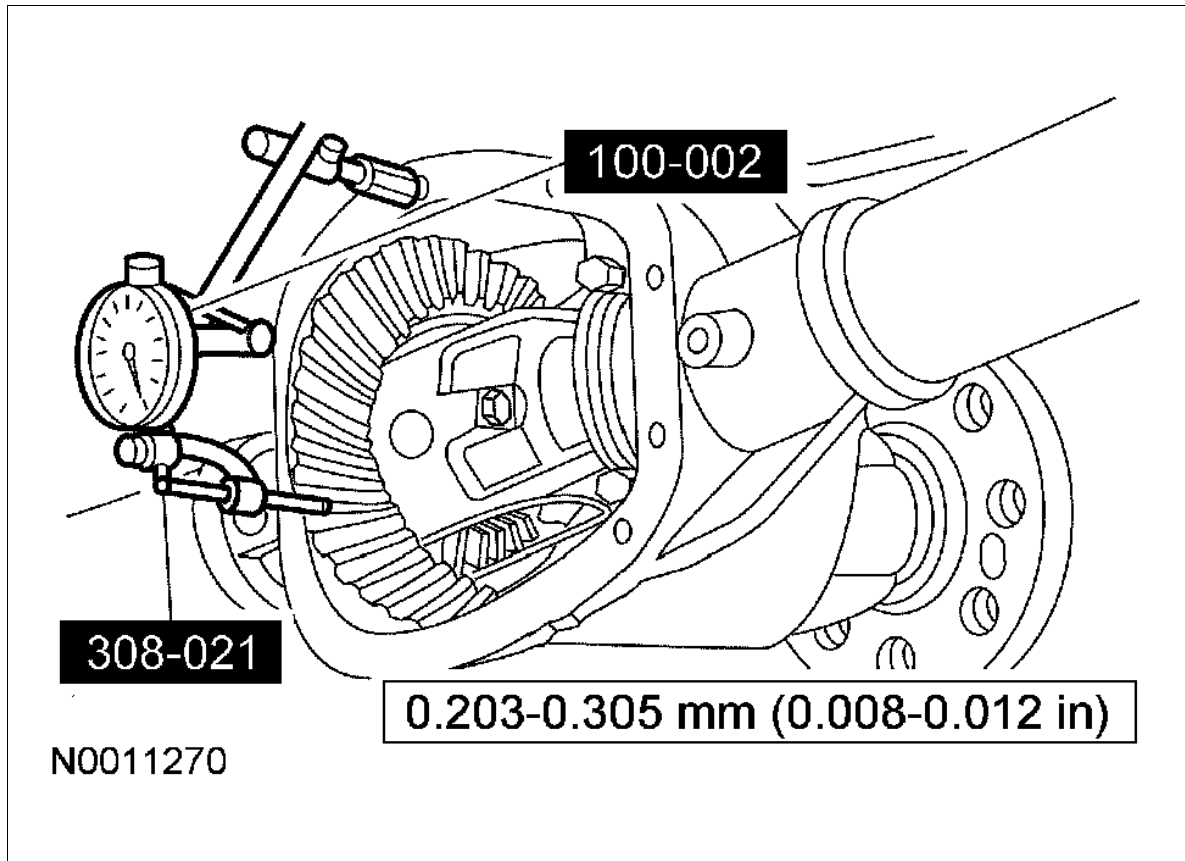
Fig 62: Rotating Differential Carrier



Courtesy of FORD MOTOR CO.

5. Using a suitable dial indicator and the special tool, measure and record the differential ring gear backlash between the teeth in four opposing places.

Fig 63: Measuring Differential Ring Gear Backlash Between Teeth In Four Opposing Places



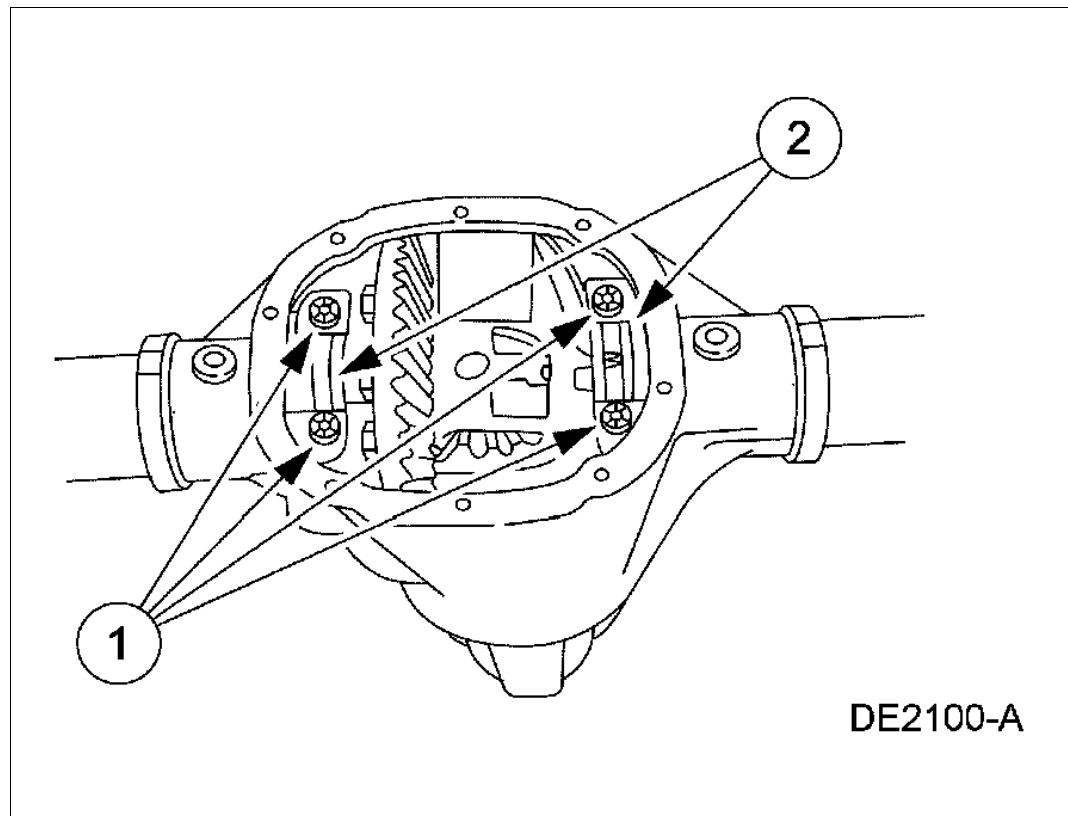
Courtesy of FORD MOTOR CO.

6. Remove the differential bearing caps.

**CAUTION:** Mark the position of the differential bearing caps, as the arrows may not be visible. Always install the bearing caps in their identical locations and positions.

1. Remove the bolts.
2. Remove the differential bearing caps.

Fig 64: Removing Differential Bearing Caps



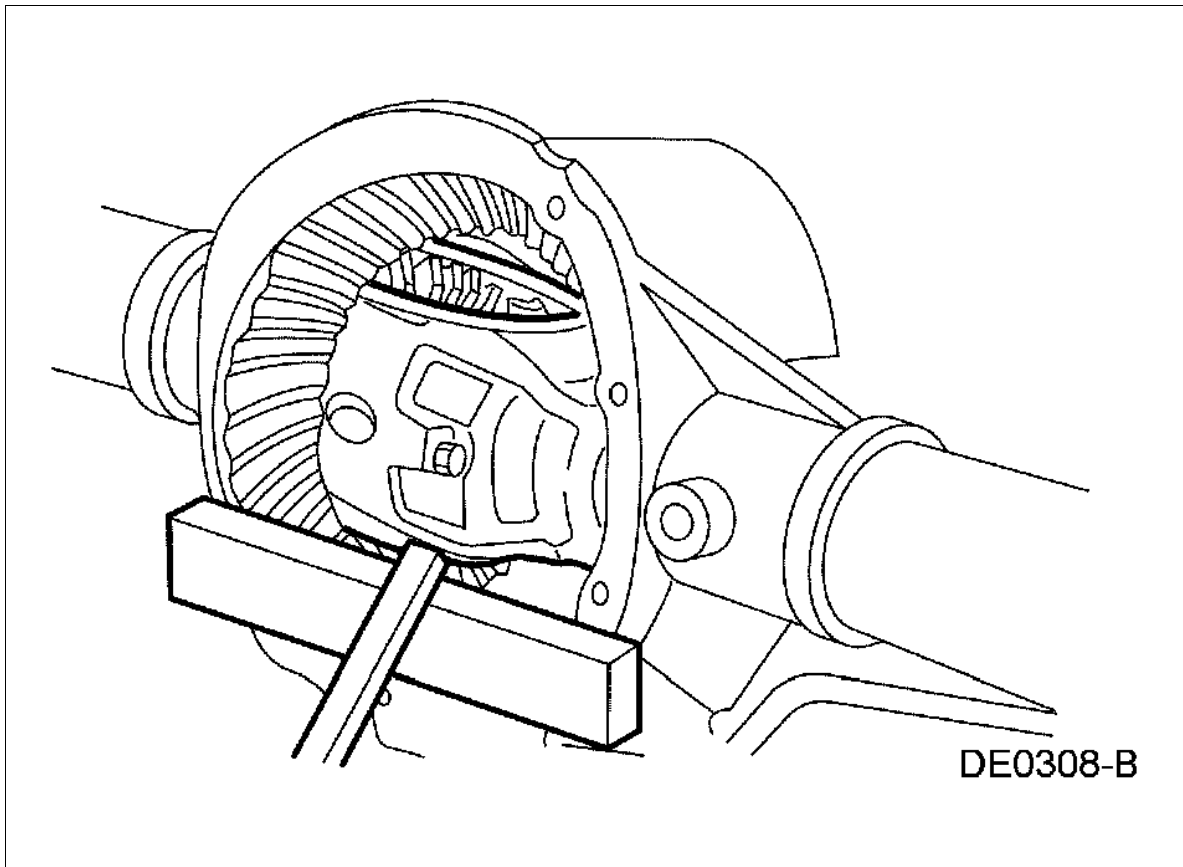
Courtesy of FORD MOTOR CO.

7. Using a pry bar and a wood block, remove the differential assembly from the differential housing.

**WARNING:** *Do not allow the differential assembly to fall.*

**CAUTION:** *Place a wood block between the pry bar and the differential housing to protect the machined surface from damage.*

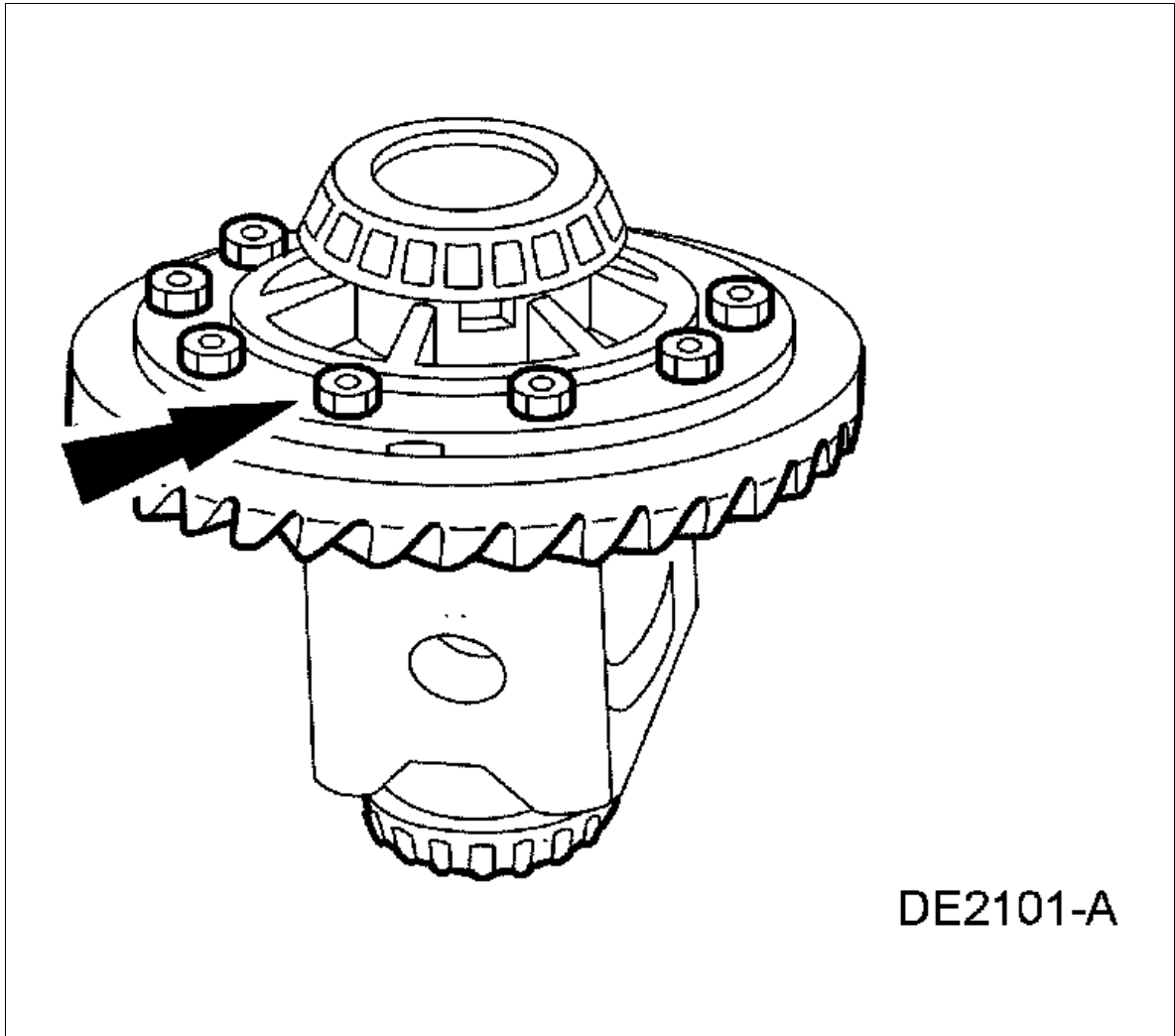
Fig 65: Removing Differential Carrier Assembly From Axle Housing



Courtesy of FORD MOTOR CO.

8. Remove the bolts.

Fig 66: Removing Ring Gear Bolts

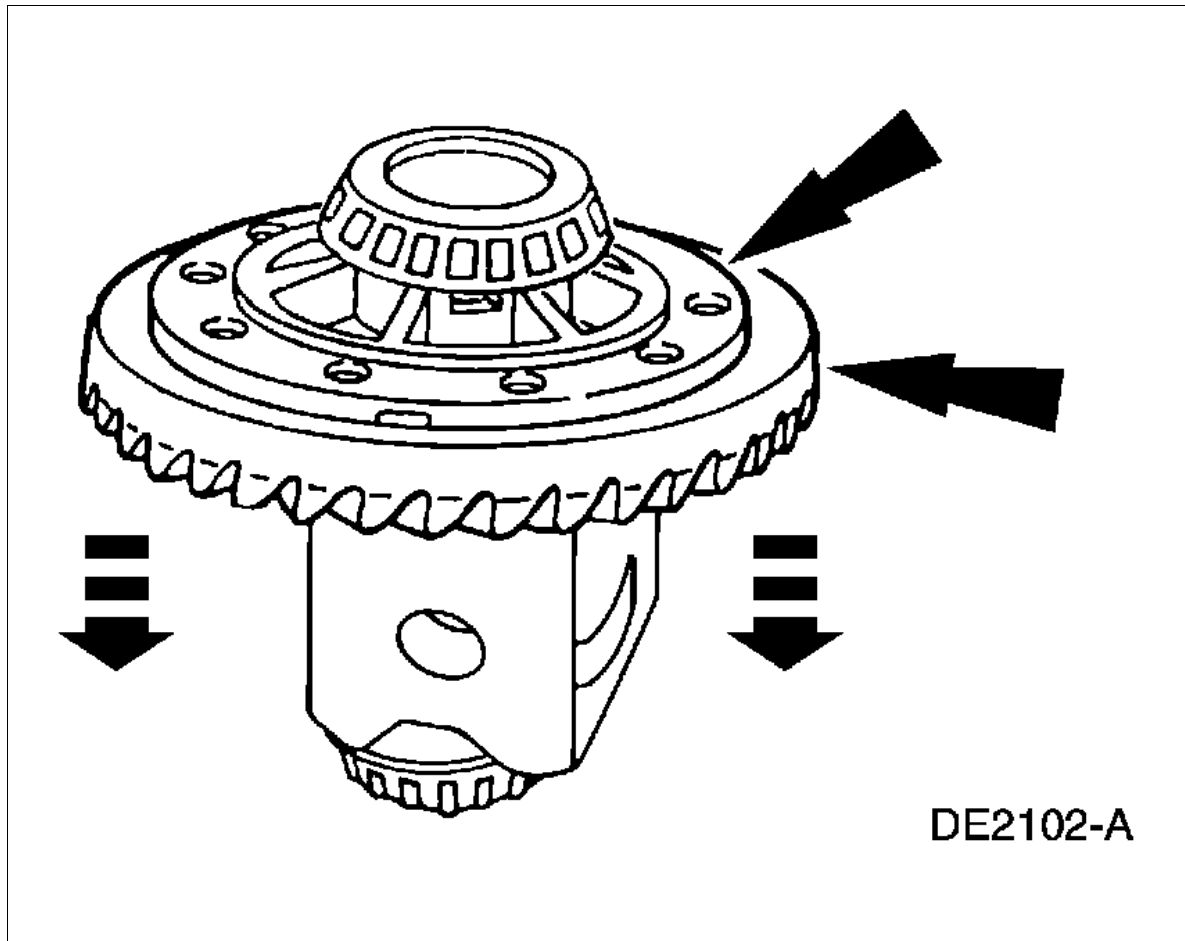


Courtesy of FORD MOTOR CO.

9. Insert a punch in the bolt holes, and drive off the differential ring gear.

**CAUTION:** Do not damage the differential ring gear bolt hole threads.

Fig 67: Inserting Punch In Bolt Holes, And Drive Off Differential Ring Gear

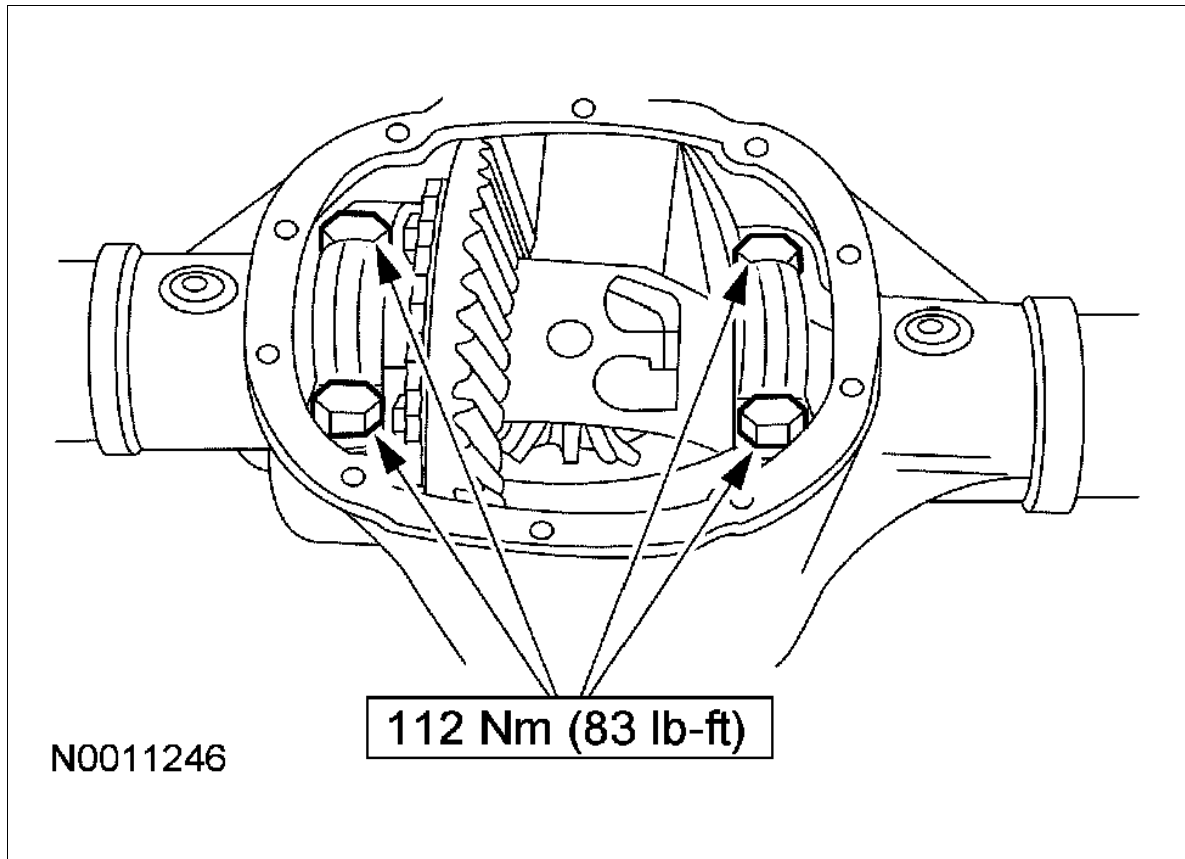


Courtesy of FORD MOTOR CO.

10. If the differential ring gear backlash variation between teeth measurement, taken at the beginning of this procedure, did not exceed the specification, proceed to Step 14. If the differential ring gear backlash variation between teeth measurement, taken at the beginning of this procedure, exceeded the specification, the cause may be a warped differential ring gear or differential case/differential bearing damage. Proceed as follows to verify the cause of the excessive backlash.
11. Position the differential assembly, including the differential bearing cups and differential bearing shims as removed, in the differential housing. Install the differential bearing caps and the bolts.

**NOTE:** Visually inspect the differential bearing cups and cones for discoloration indicating bearing overheating or failure.

Fig 68: Installing Differential Bearing Caps And Bolts

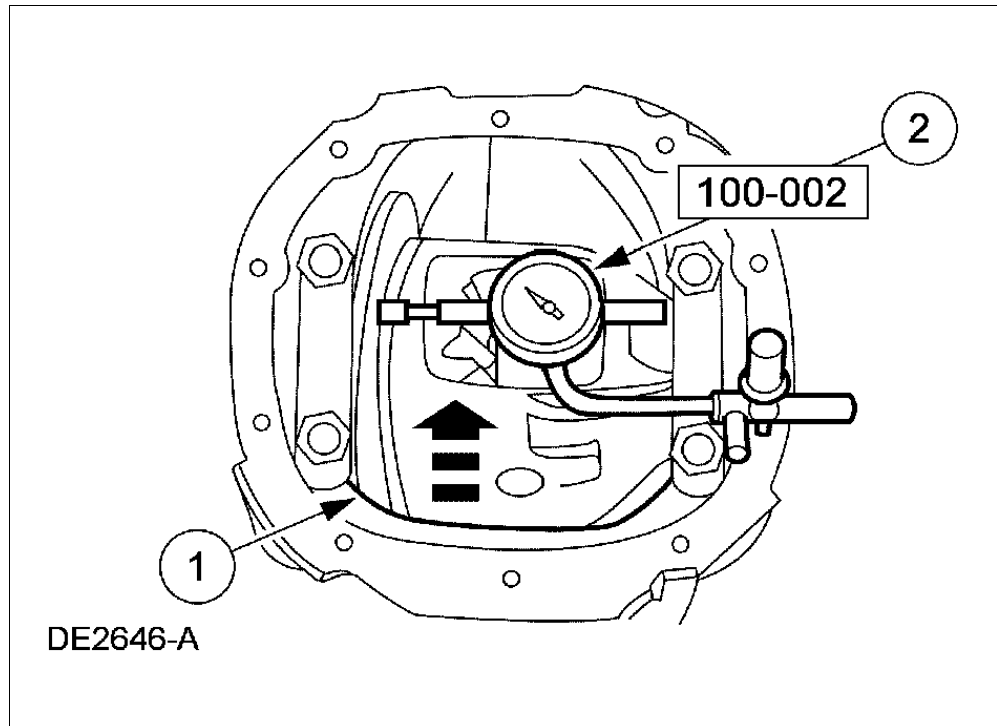


Courtesy of FORD MOTOR CO.

12. Install the special tool.

1. Rotate the differential case to verify that the differential bearings have seated correctly.
2. Position the special tool.
  1. Make sure there is no differential case endplay.

Fig 69: Positioning Special Tool



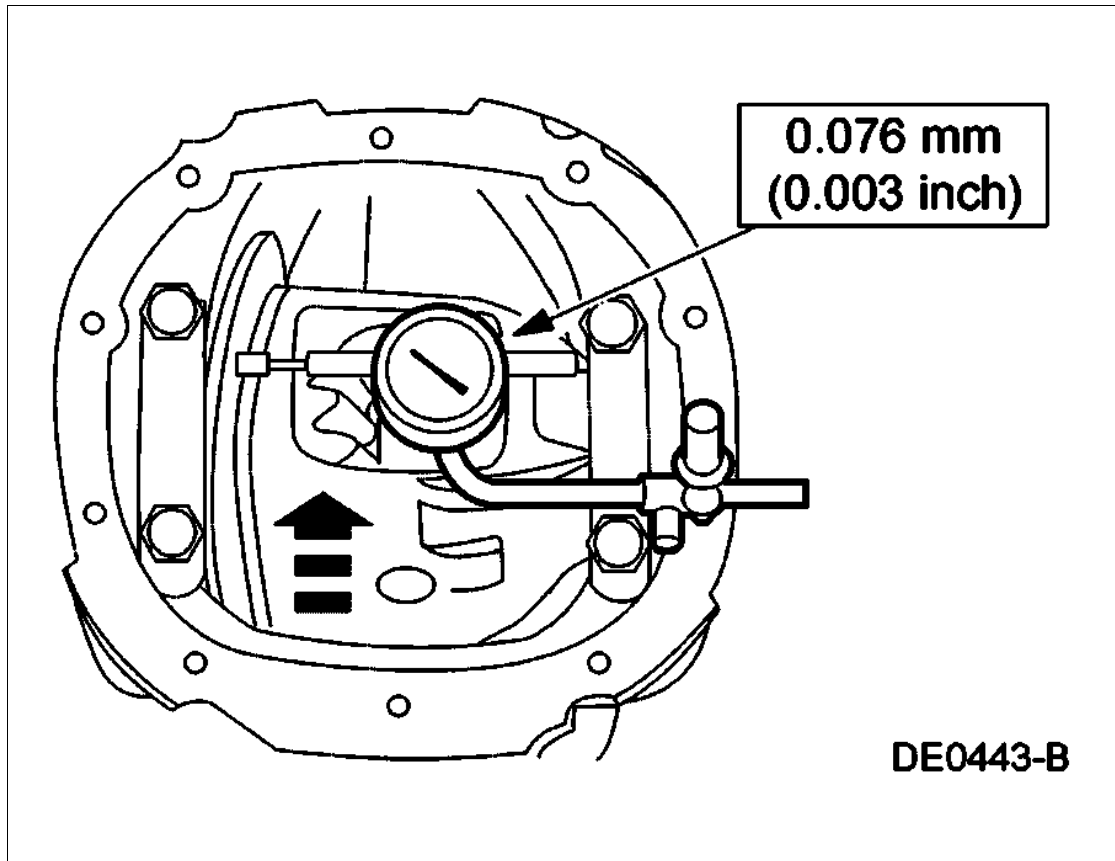
Courtesy of FORD MOTOR CO.

13. Measure and note the differential case runout.

1. If the runout does not exceed the specification, install a new differential ring gear and pinion. For additional information, refer to DIFFERENTIAL RING AND PINION.
2. If the runout exceeds the specification, the differential ring gear is true and the concern is due to differential case/differential bearing damage. Install a new differential case. For additional information, refer to DIFFERENTIAL CASE AND RING GEAR - CONVENTIONAL or DIFFERENTIAL CASE AND RING GEAR - TRACTION-LOK®.



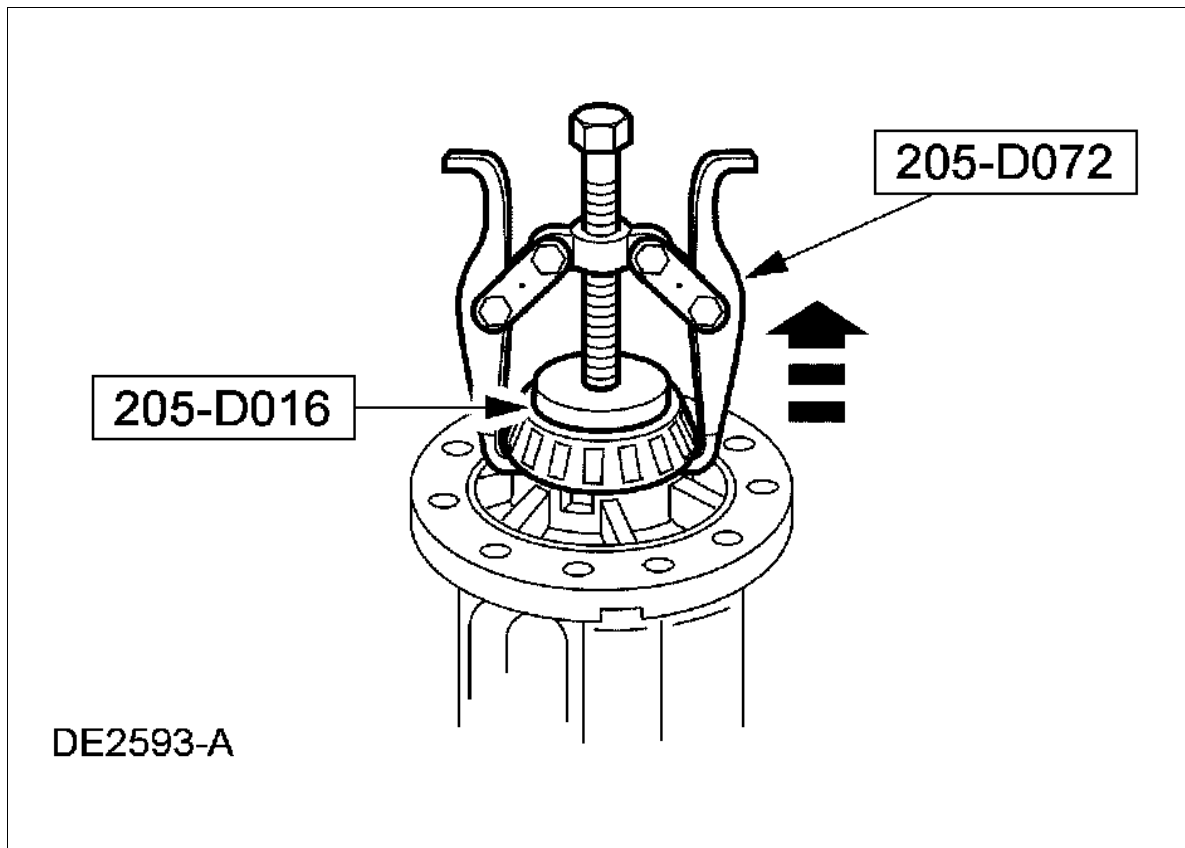
Fig 70: Measuring Differential Case Runout



Courtesy of FORD MOTOR CO.

14. Using the special tools, remove the differential bearings.

Fig 71: Removing Differential Bearings



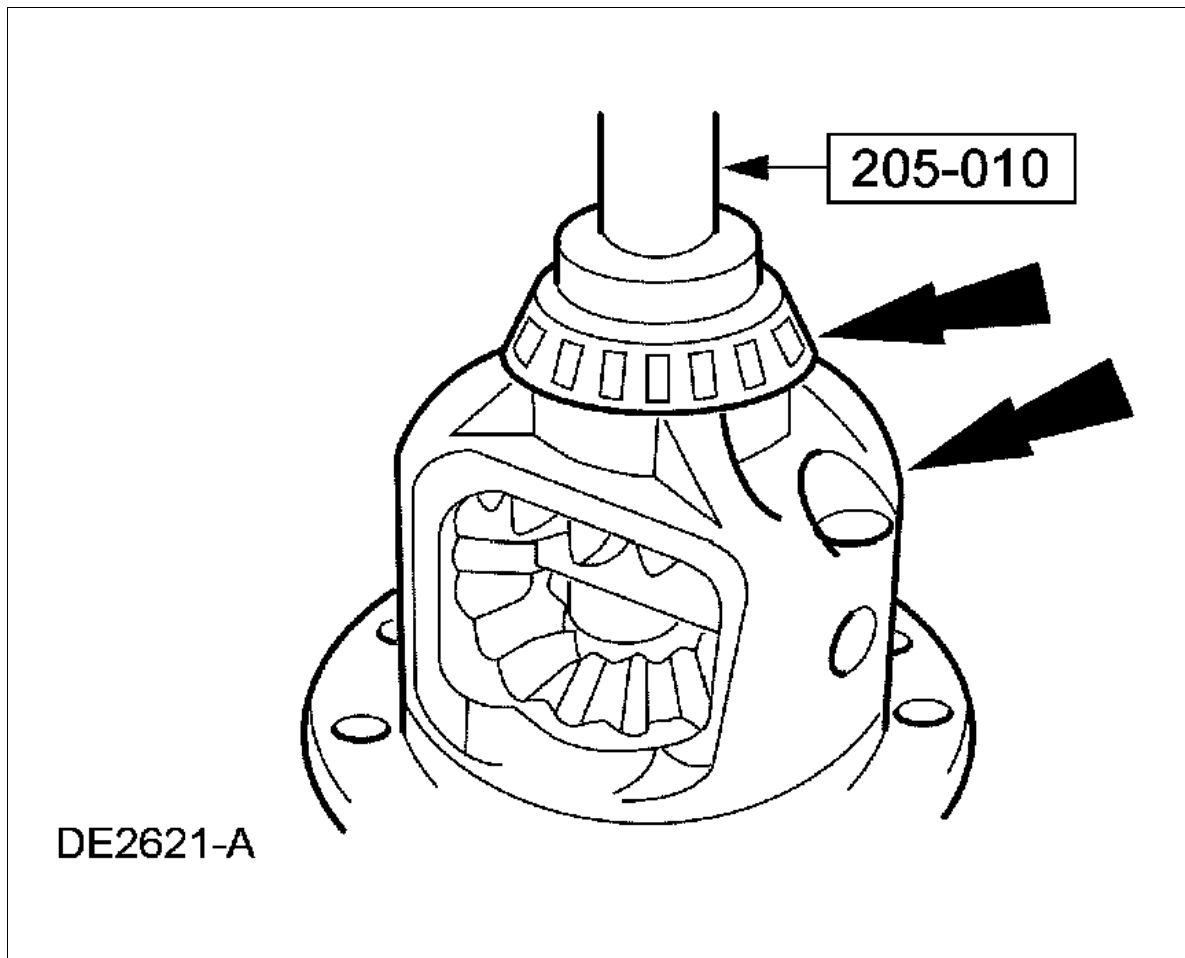
Courtesy of FORD MOTOR CO.

## Installation

### ALL VEHICLES

1. Using the special tool, install the new differential bearings.

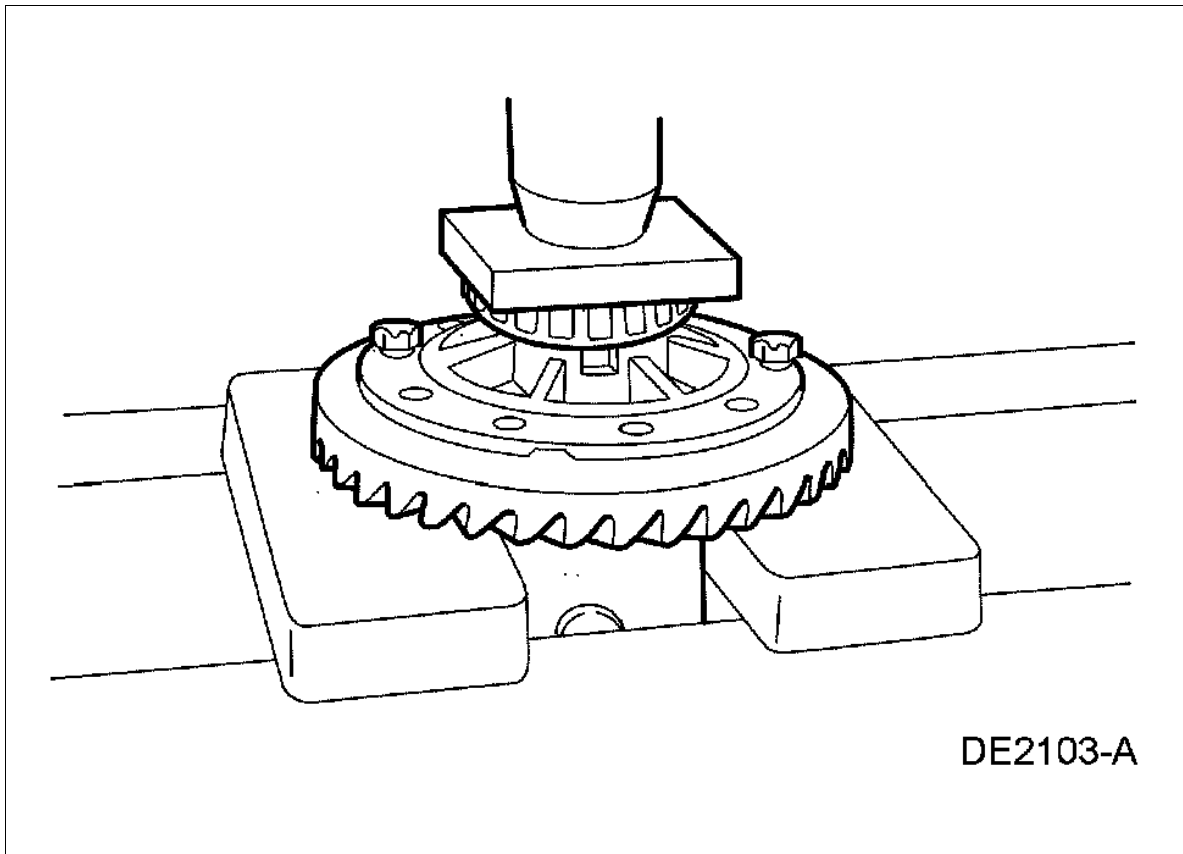
Fig 72: Installing Differential Bearings



Courtesy of FORD MOTOR CO.

2. Position the differential ring gear and the differential case. Align the bolt holes by starting two bolts through the holes in the differential case and the differential ring gear. Press the differential ring gear on the differential case.

Fig 73: Pressing Differential Ring Gear Onto Differential Case



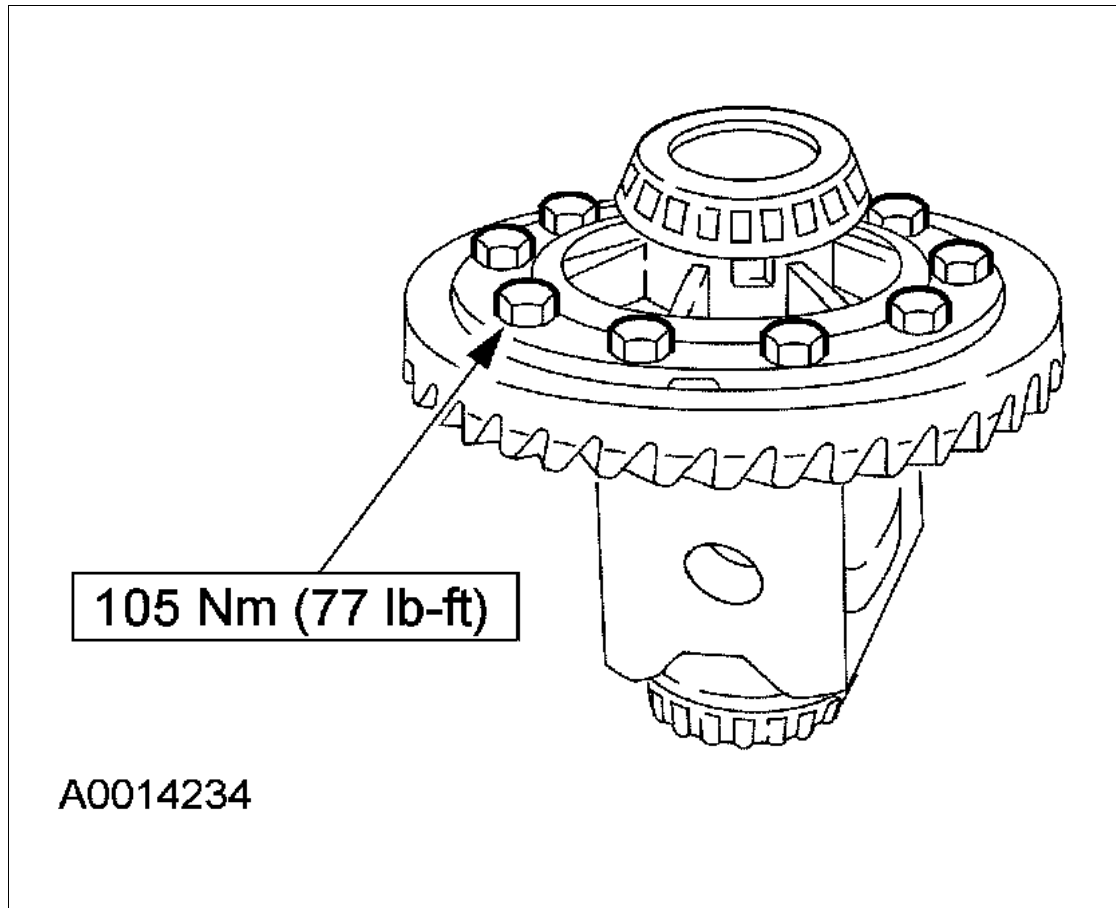
Courtesy of FORD MOTOR CO.

3. Install the bolts.

**NOTE:** Clean the threads of the ring gear bolts. Make sure they are free of foreign material.

1. Apply stud and bearing mount to the bolt threads.

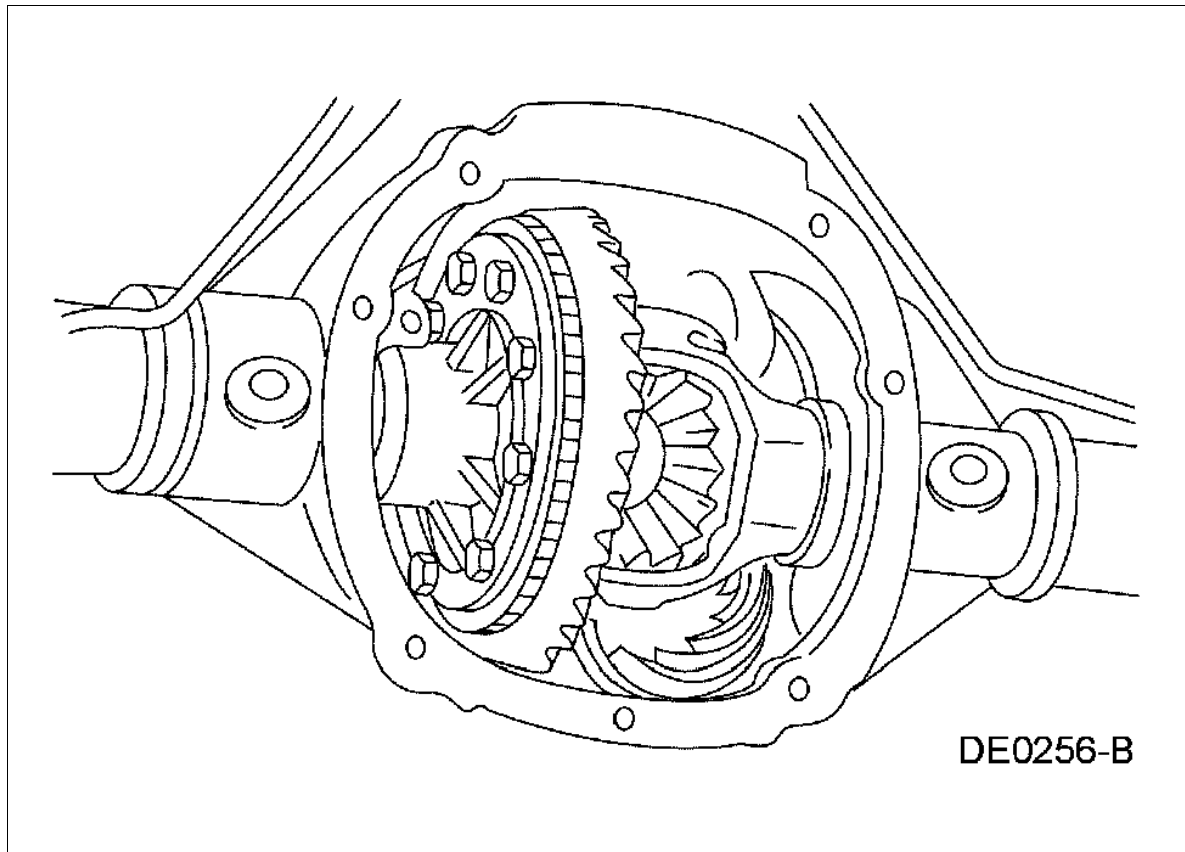
Fig 74: Installing Bolts



Courtesy of FORD MOTOR CO.

4. With the pinion depth set and pinion installed, place the differential assembly in the differential housing.

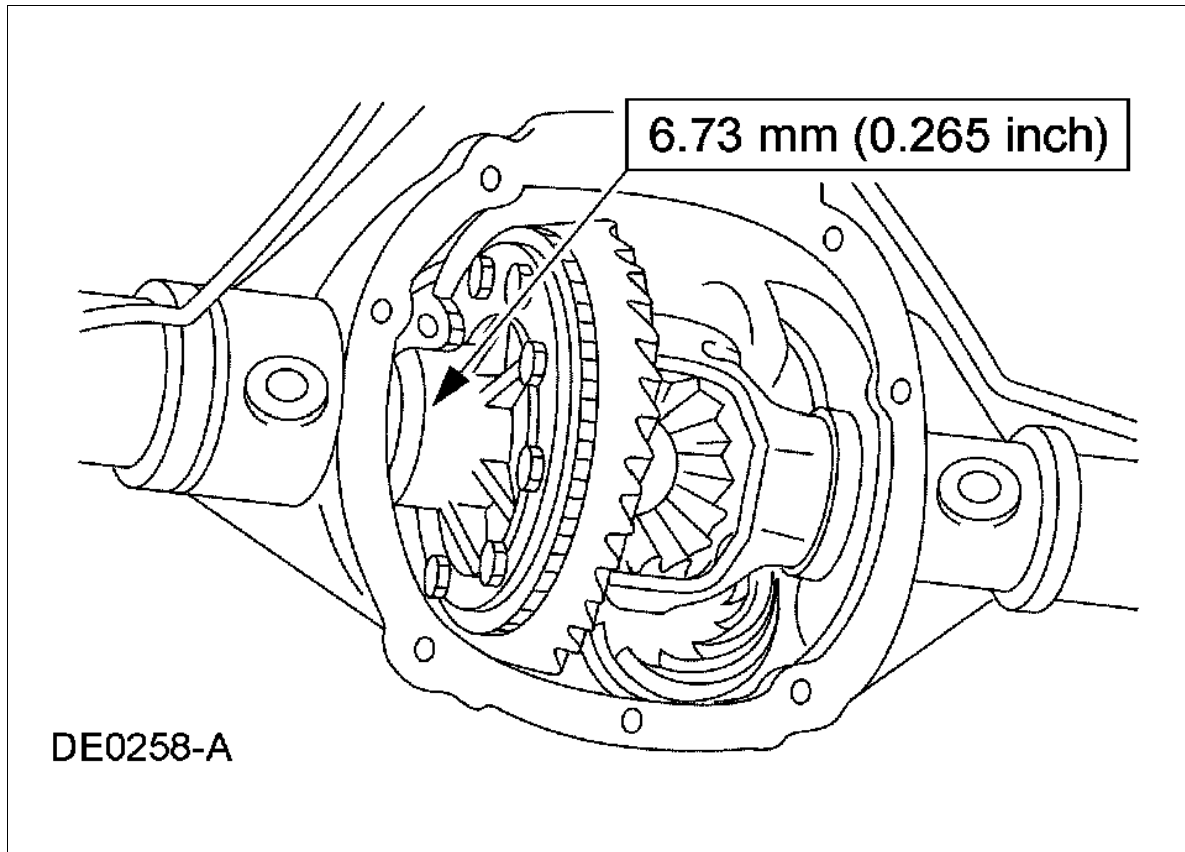
Fig 75: Placing Differential Case In Rear Axle Housing



Courtesy of FORD MOTOR CO.

5. Install a differential bearing shim on the left side.

Fig 76: Installing Differential Bearing Shim On Left Side



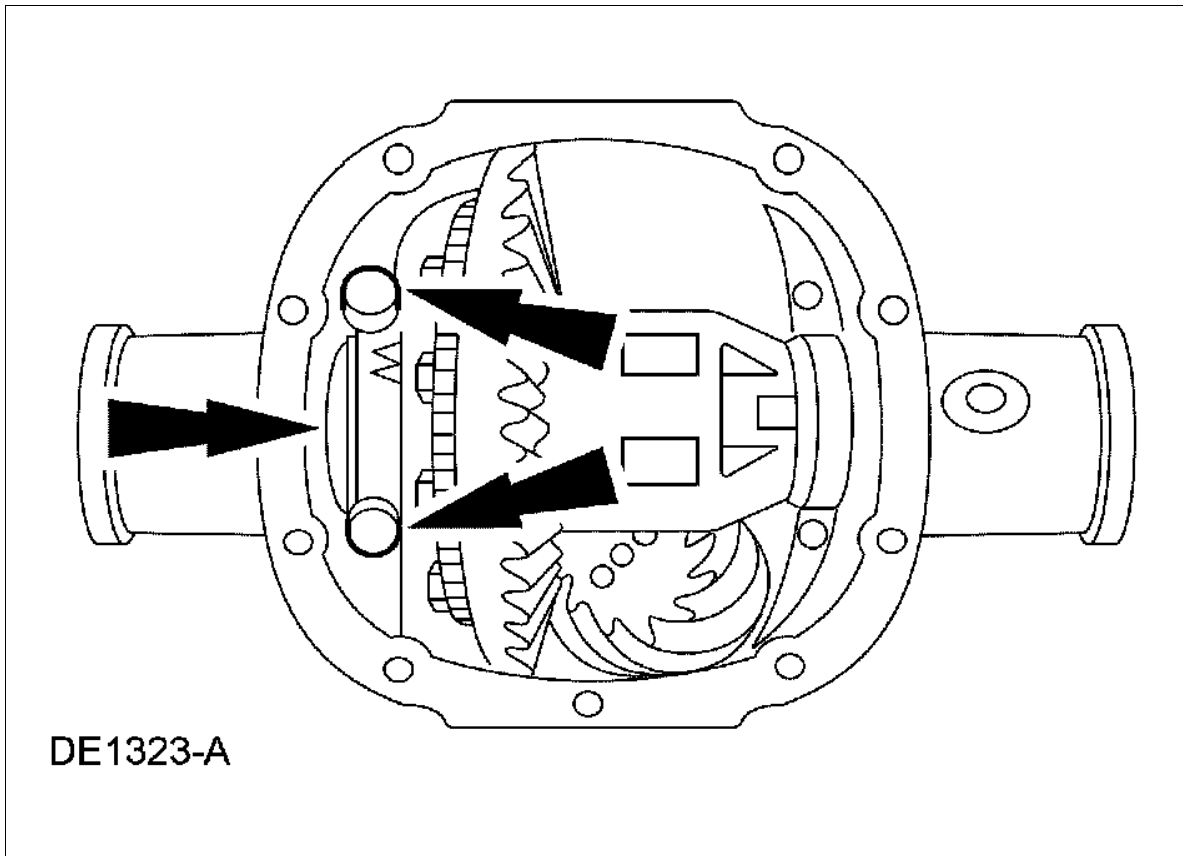
Courtesy of FORD MOTOR CO.

6. Install the left differential bearing cap and loosely install the bolts.

**CAUTION:** Always install the differential bearing caps in their identified locations and positions.

**NOTE:** Apply pressure toward the left side to make sure the left differential bearing cup seats correctly.

Fig 77: Installing Left Differential Bearing Cap And Bolts

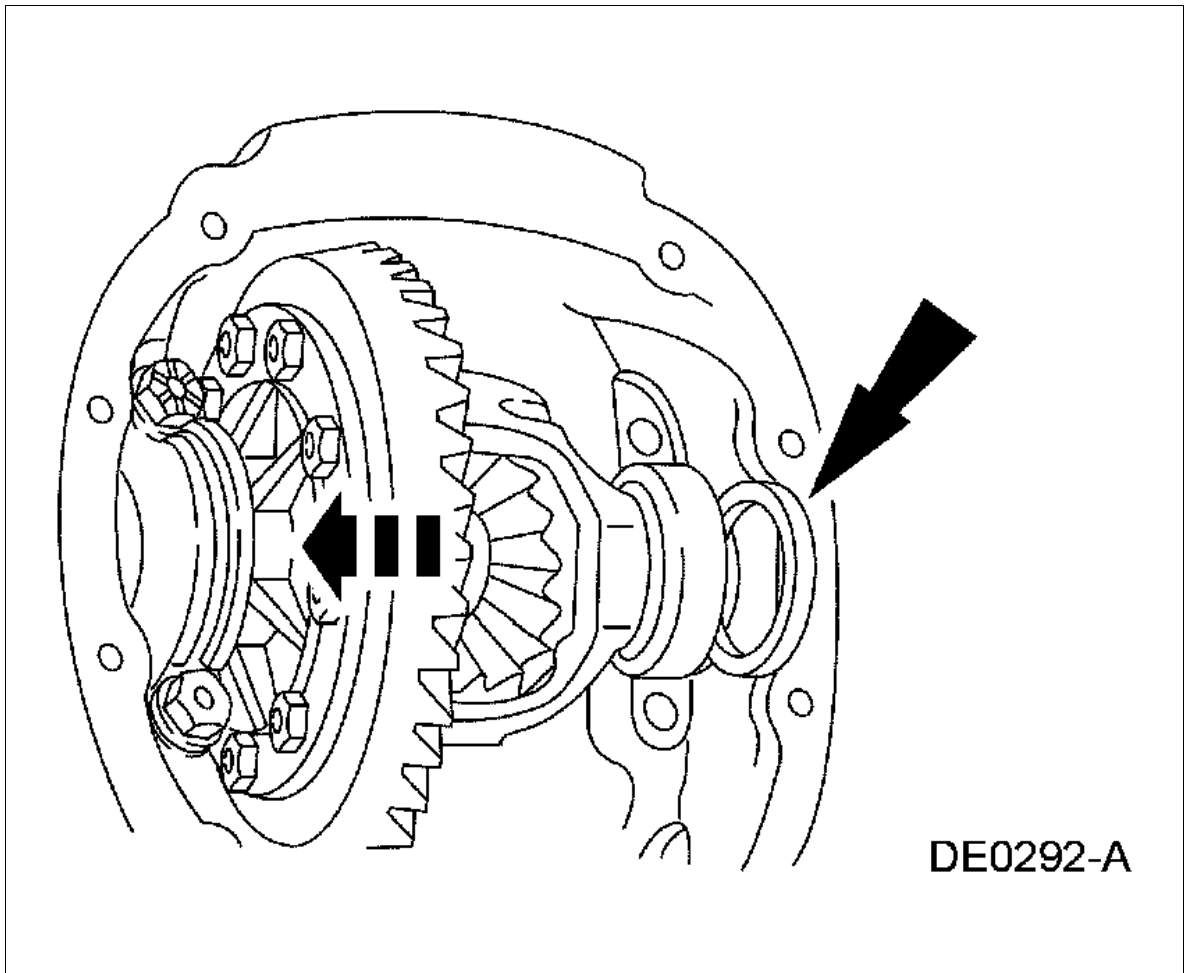


Courtesy of FORD MOTOR CO.

7. Install progressively larger differential bearing shims on the right side until the largest shim selected can be installed by hand.



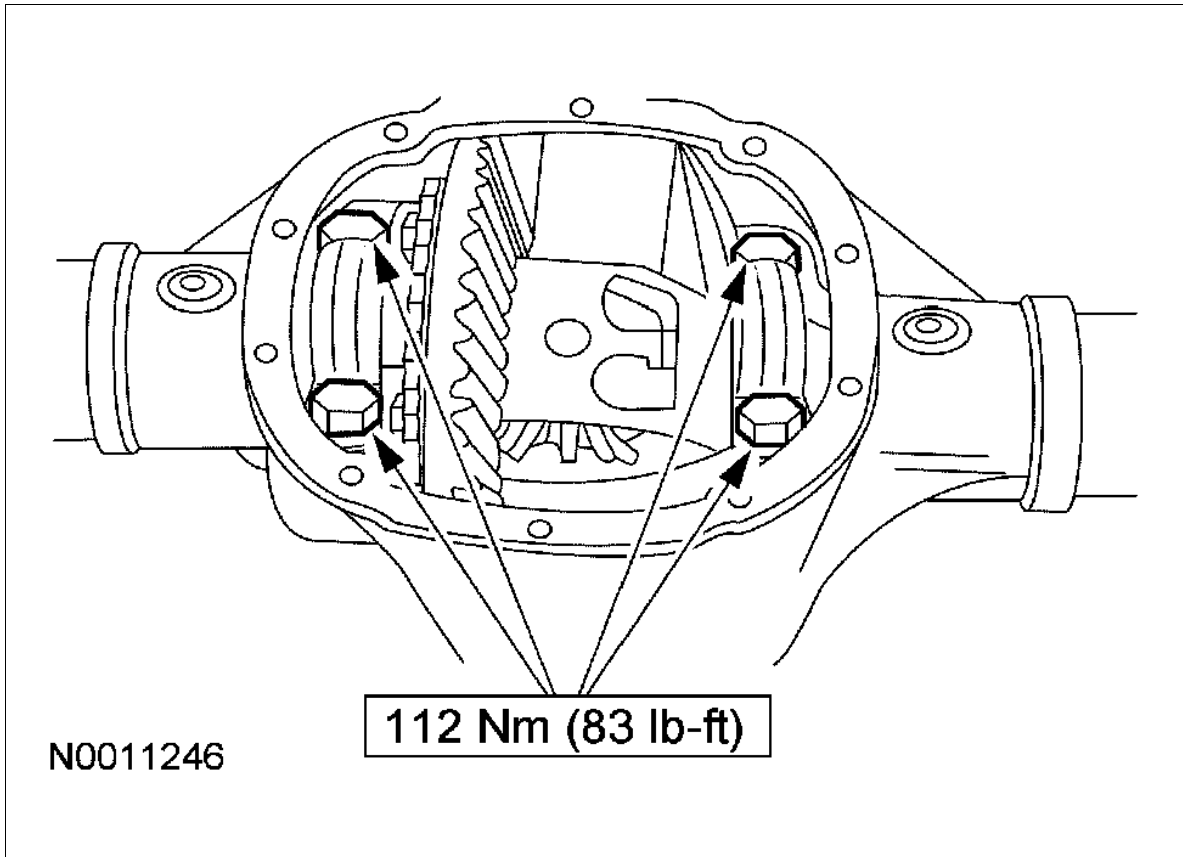
Fig 78: Installing Differential Bearing Shims



Courtesy of FORD MOTOR CO.

8. Install the right side differential bearing cap and tighten the left side and right side bolts to specification.

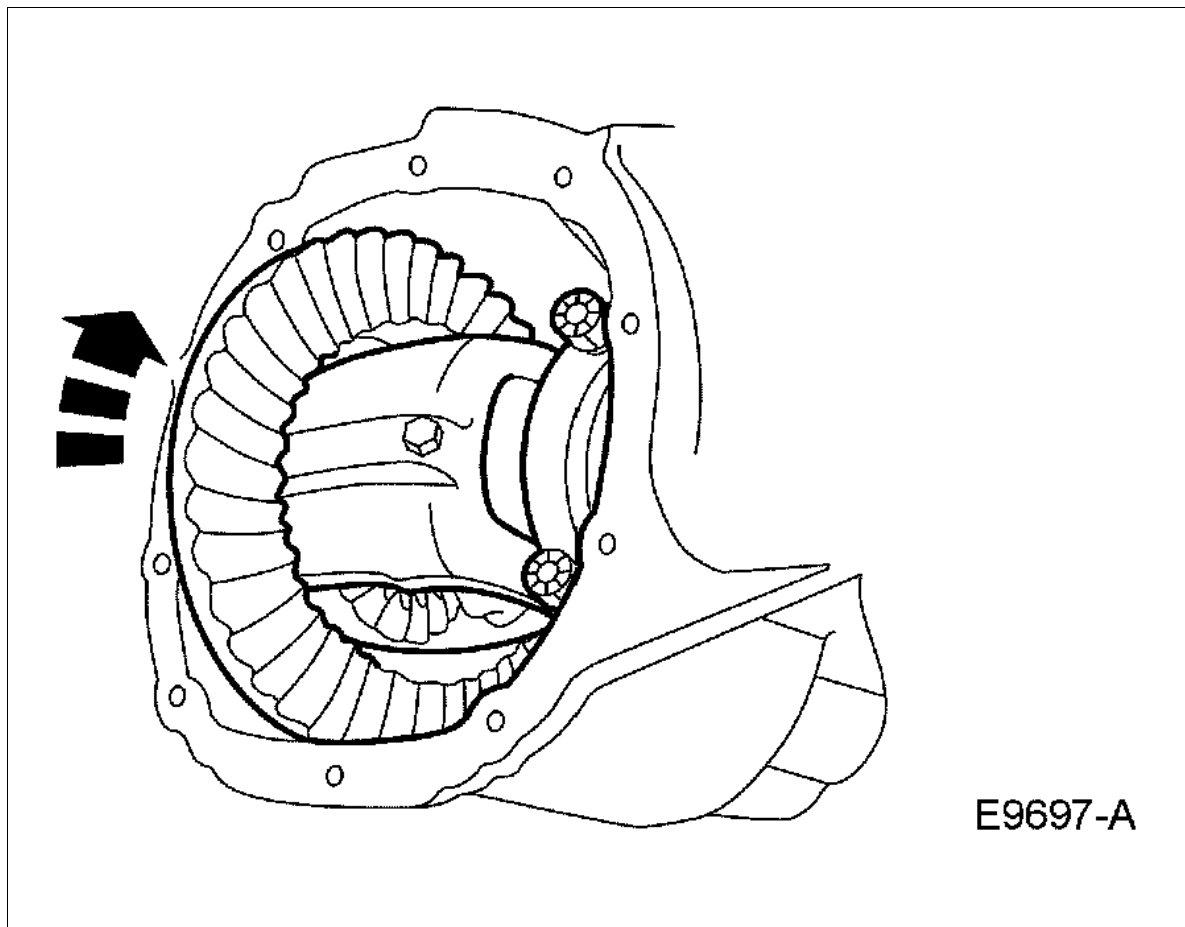
Fig 79: Installing Right Side Differential Bearing Cap And Tightening Left Side And Right Side Bolts



Courtesy of FORD MOTOR CO.

9. Rotate the differential case to make sure it turns freely.

Fig 80: Rotating Differential Carrier



Courtesy of FORD MOTOR CO.

## MEASURING BACKLASH

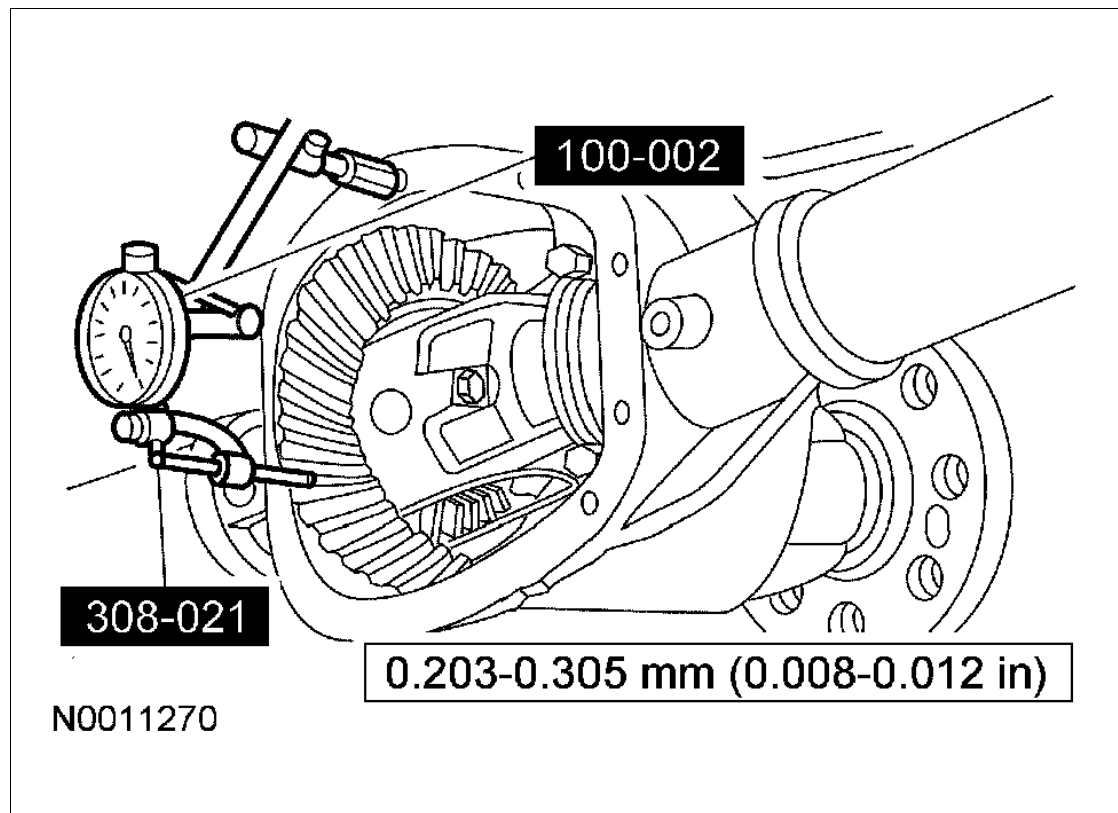
10. Using the special tools, measure and note the differential ring gear backlash.
  1. If backlash is within the specification, refer to BACKLASH WITHIN SPECIFICATION in this procedure.
  2. If a zero backlash condition occurs, refer to ZERO BACKLASH in this procedure.
  3. If backlash is not within the specification, refer to BACKLASH NOT WITHIN SPECIFICATION in this procedure.

### BACKLASH SPECIFICATION

Backlash Change Required		Thickness Change Required	
mm	Inch	mm	Inch
0.025	0.001	0.050	0.002
0.050	0.002	0.050	0.002
0.076	0.003	0.101	0.004
0.101	0.004	0.152	0.006
0.127	0.005	0.152	0.006

0.152	0.006	0.203	0.008
0.177	0.007	0.254	0.010
0.203	0.008	0.254	0.010
0.228	0.009	0.304	0.012
0.254	0.010	0.355	0.014
0.279	0.011	0.355	0.014
0.304	0.012	0.406	0.016
0.330	0.013	0.457	0.018
0.335	0.014	0.457	0.018
0.381	0.015	0.508	0.020

Fig 81: Measuring And Noting Differential Ring Gear Backlash

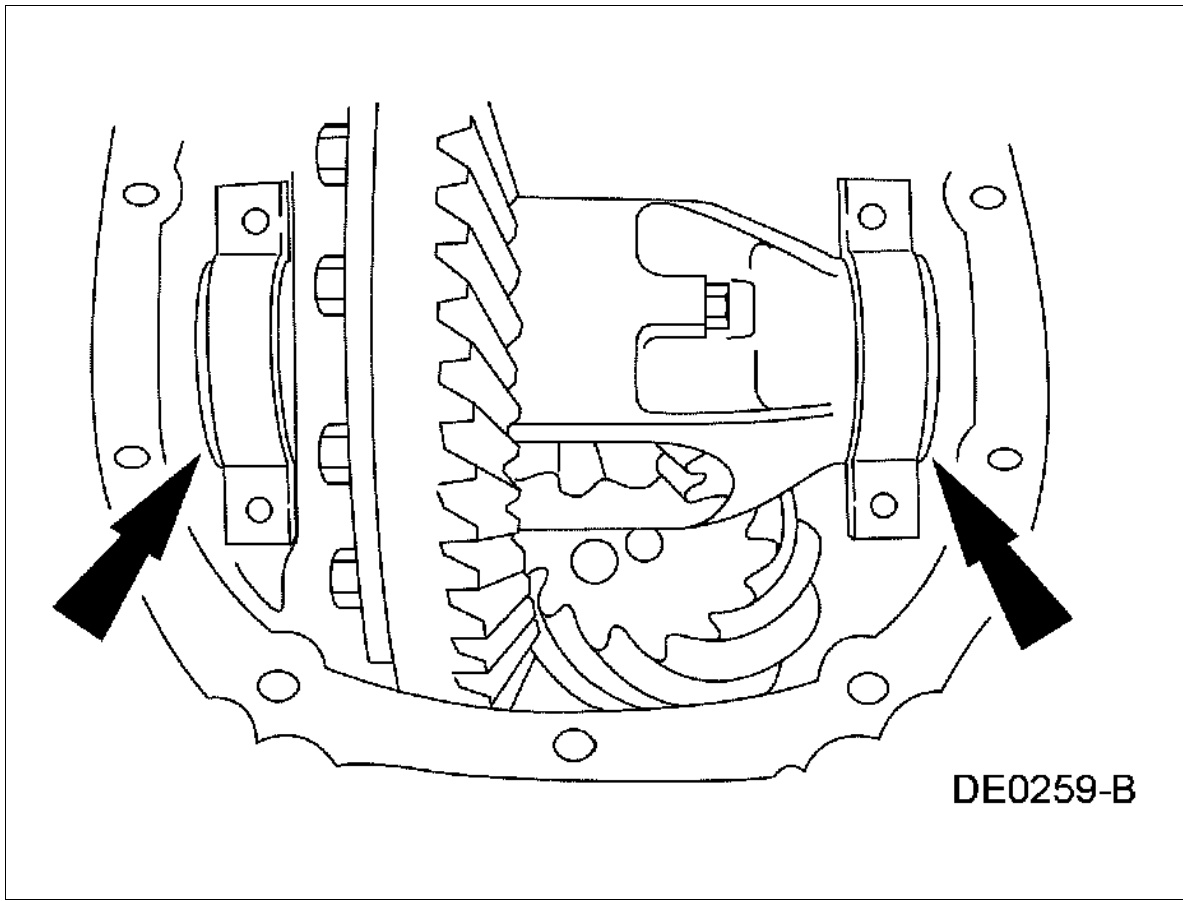


Courtesy of FORD MOTOR CO.

## ZERO BACKLASH

11. If a zero backlash condition occurs, add 0.51 mm (0.020 inch) to the RH side and subtract 0.51 mm (0.020 inch) from the LH side to allow backlash indication. Measure the backlash. Refer to MEASURING BACKLASH in this procedure.

Fig 82: Locating Bearing Caps

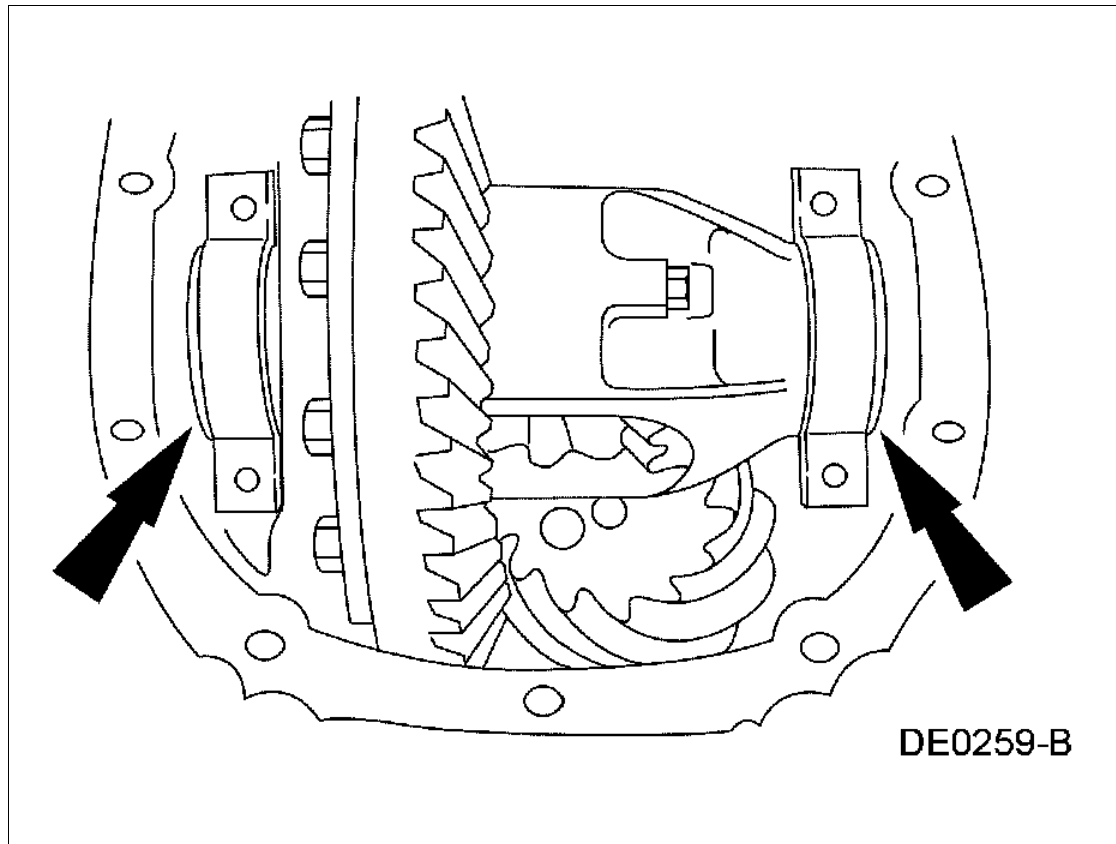


Courtesy of FORD MOTOR CO.

### **BACKLASH NOT WITHIN SPECIFICATION**

12. To increase or decrease backlash, remove the differential bearing caps and install a thicker shim and a thinner shim accordingly.
  1. If backlash is not within the specification, increase the thickness of one differential bearing shim and decrease the thickness of the other differential bearing shim by the same amount.

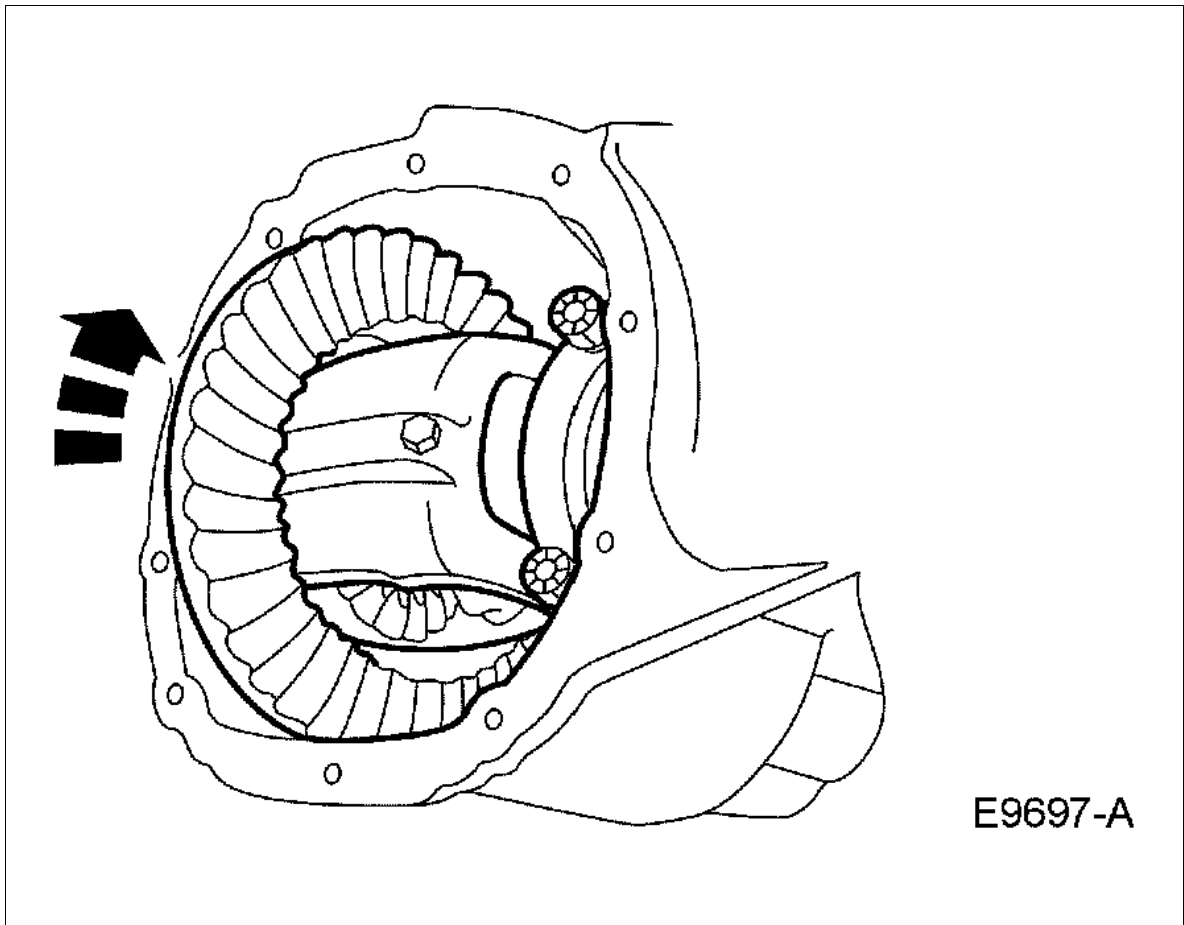
Fig 83: Locating Bearing Caps



Courtesy of FORD MOTOR CO.

13. Rotate the differential assembly several times to verify that the differential bearings seated correctly.

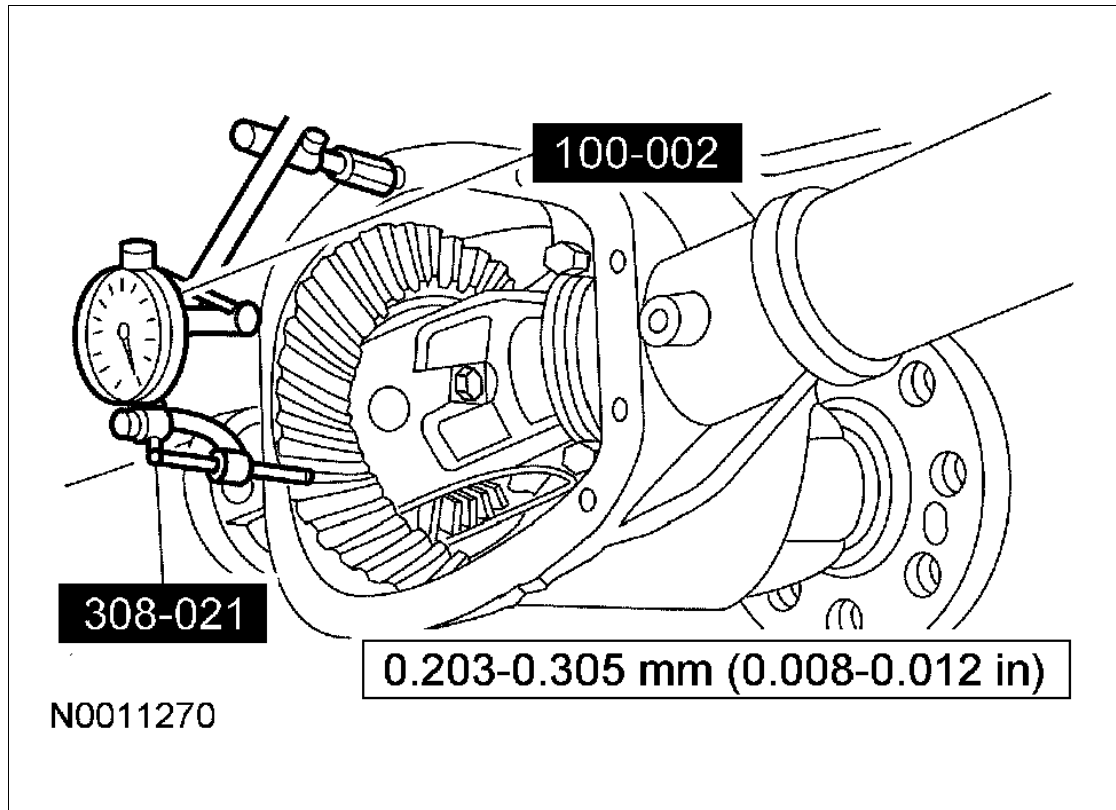
Fig 84: Rotating Differential Carrier



Courtesy of FORD MOTOR CO.

14. Using the special tools, recheck the backlash.
  1. If backlash is within the specification, refer to BACKLASH WITHIN SPECIFICATION in this procedure. If backlash is not within the specification, repeat Backlash not within specification in this procedure.

Fig 85: Rechecking Backlash



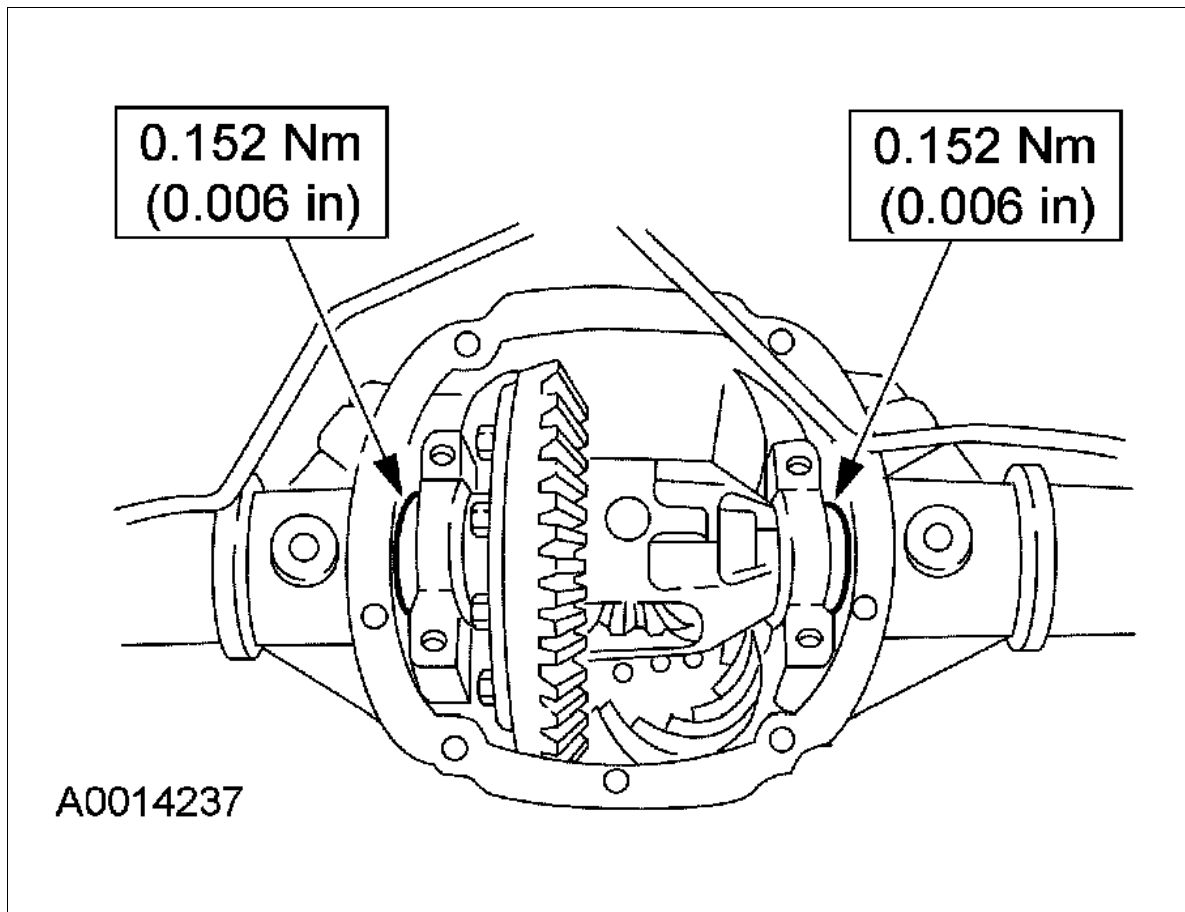
Courtesy of FORD MOTOR CO.

#### **BACKLASH WITHIN SPECIFICATION**

15. Remove the bolts and the differential bearing caps.
16. To establish differential bearing preload, increase both left and right differential bearing shim sizes by the specification shown.



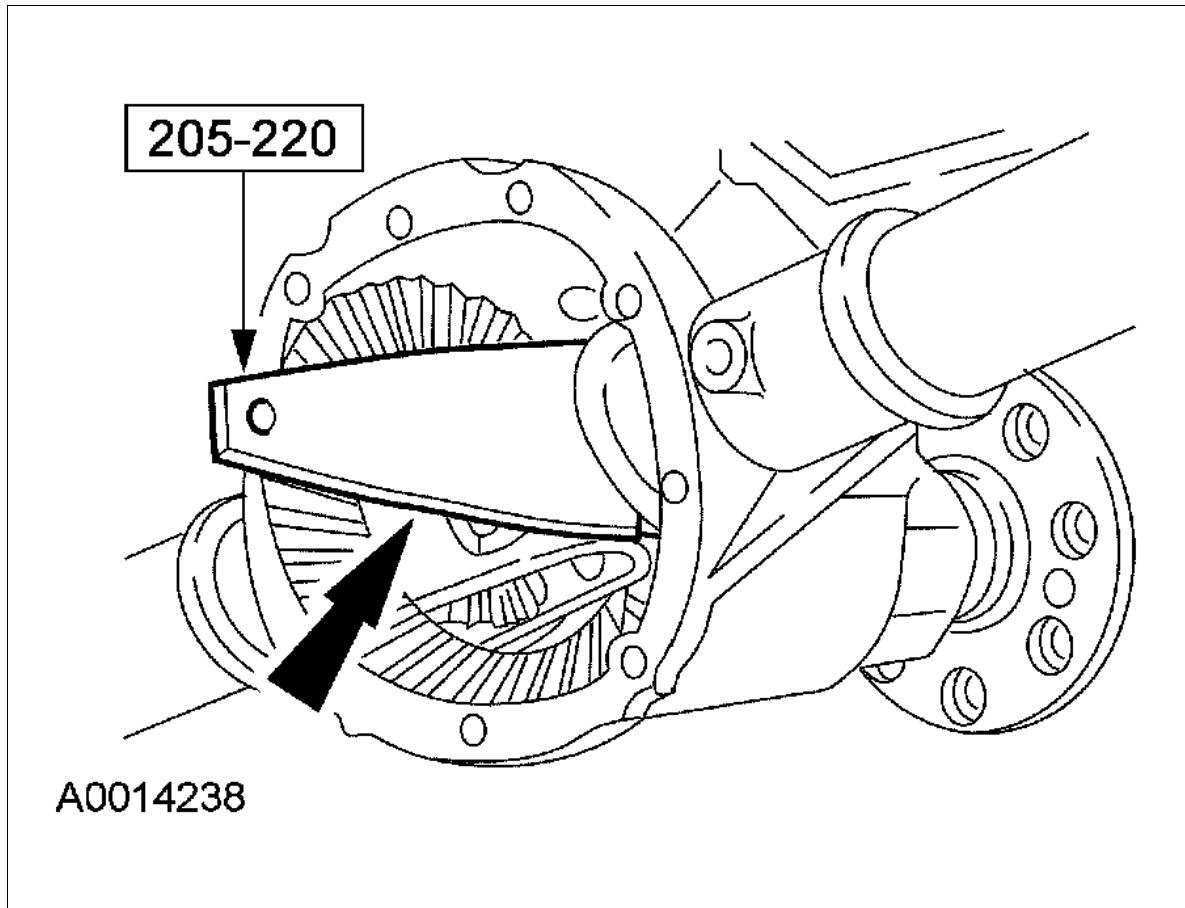
Fig 86: Establishing Differential Bearing Preload



Courtesy of FORD MOTOR CO.

17. Using the special tool, fully seat the differential bearing shims. Make sure the assembly rotates freely.

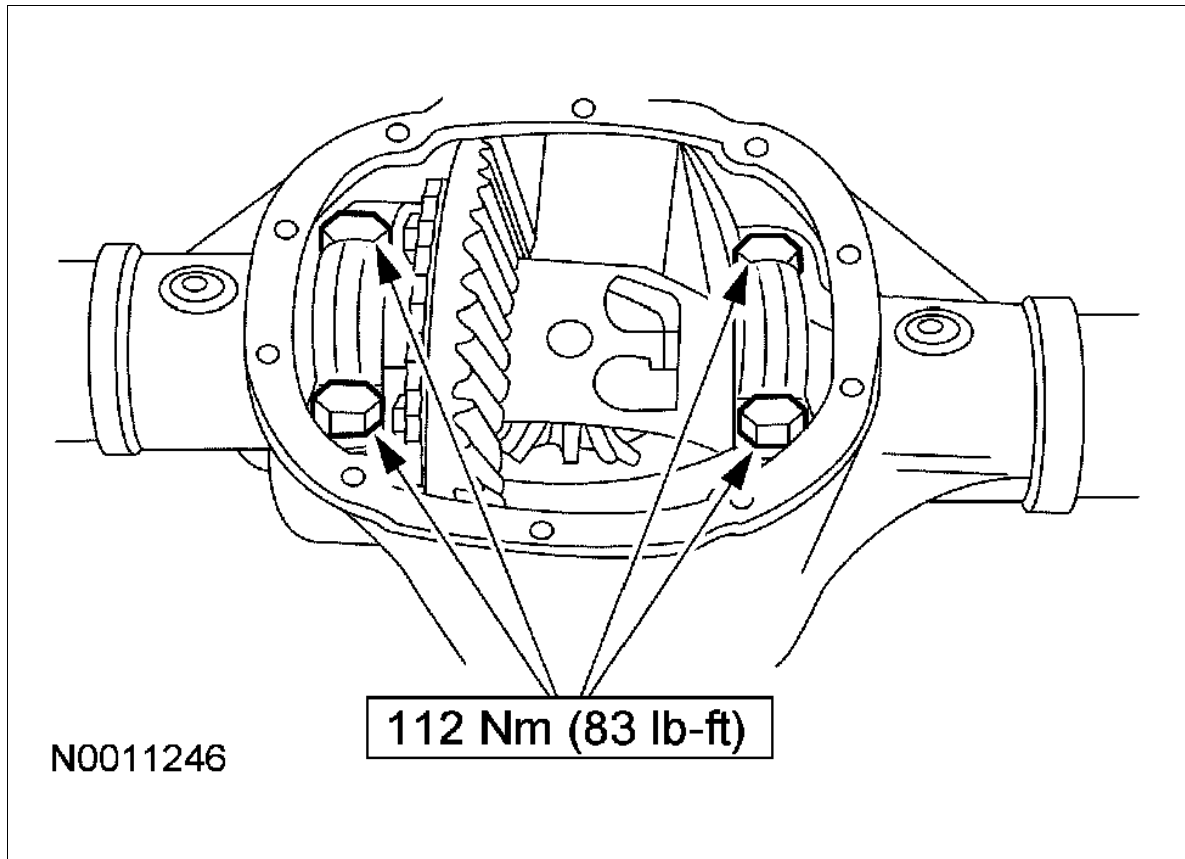
Fig 87: Seating Differential Bearing Shims



Courtesy of FORD MOTOR CO.

18. Install the differential bearing caps and bolts.

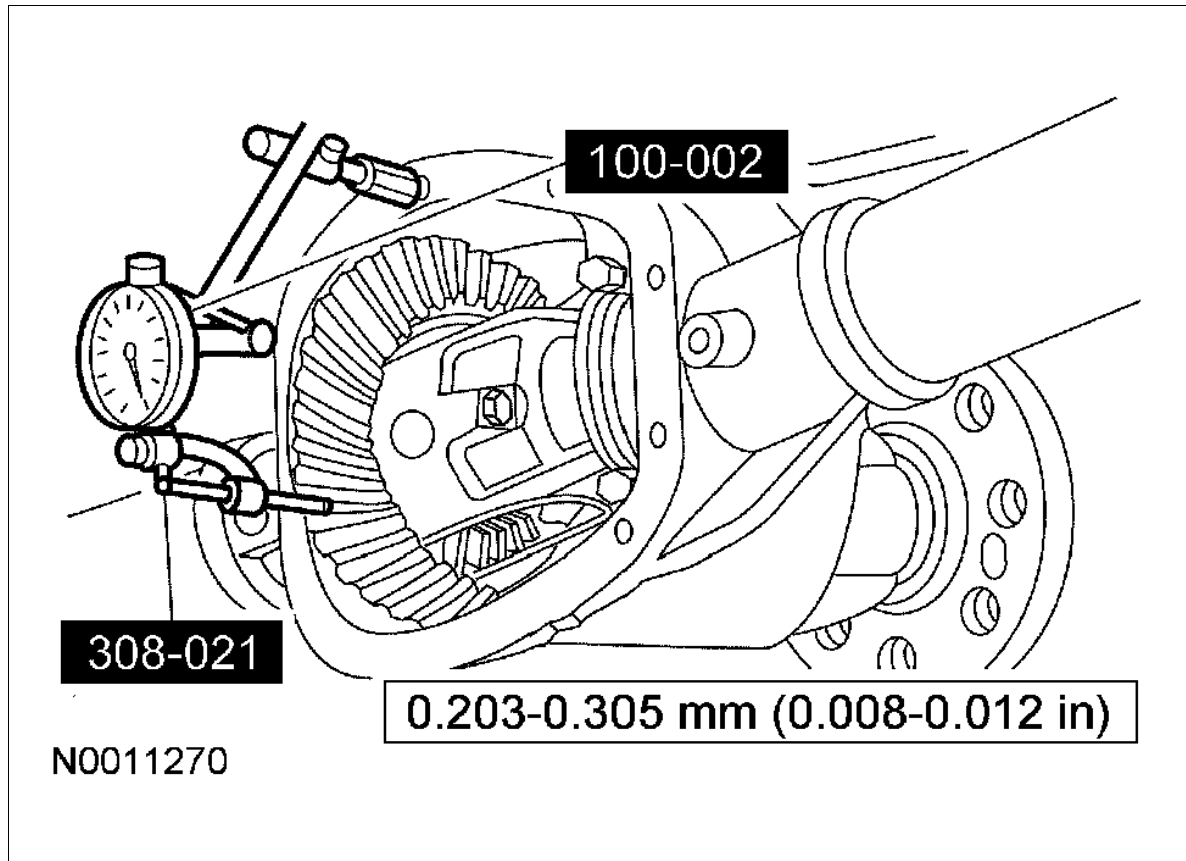
Fig 88: Installing Differential Bearing Caps And Bolts



Courtesy of FORD MOTOR CO.

19. Using the special tools, recheck the backlash.

Fig 89: Rechecking Backlash



Courtesy of FORD MOTOR CO.

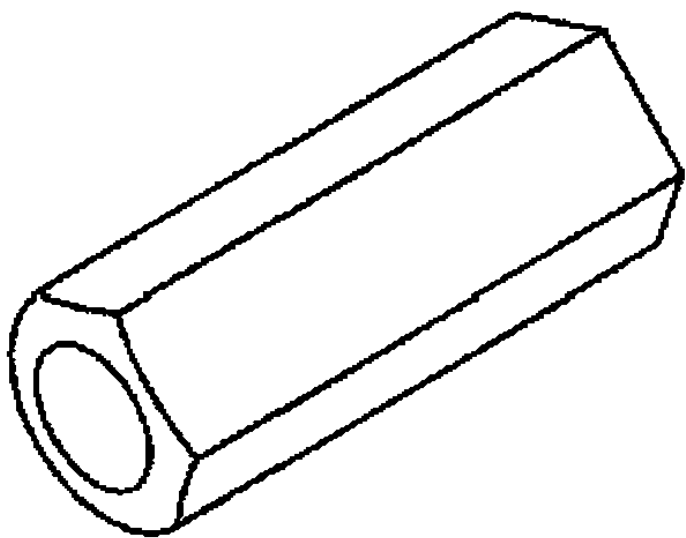
20. Install the axle shafts. For additional information, refer to AXLE SHAFT.
21. Install the driveshaft. For additional information, refer to DRIVESHAFT .
22. If equipped with fire suppression system, repower the system.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

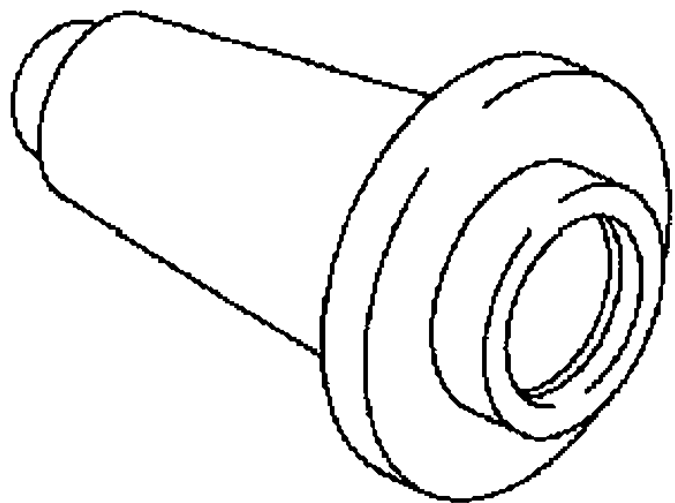
## Differential Ring And Pinion

### SPECIAL TOOL CHART

	Protector, Drive Pinion Thread 205-460
--	--

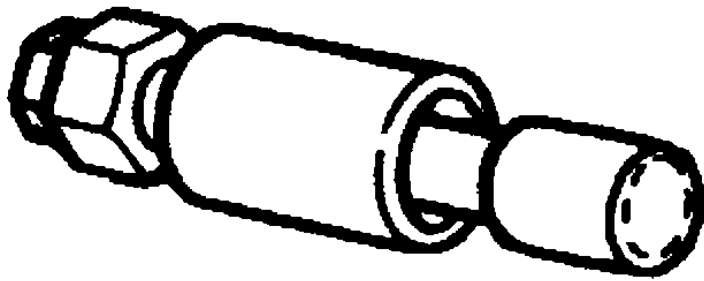


**ST1744-A**

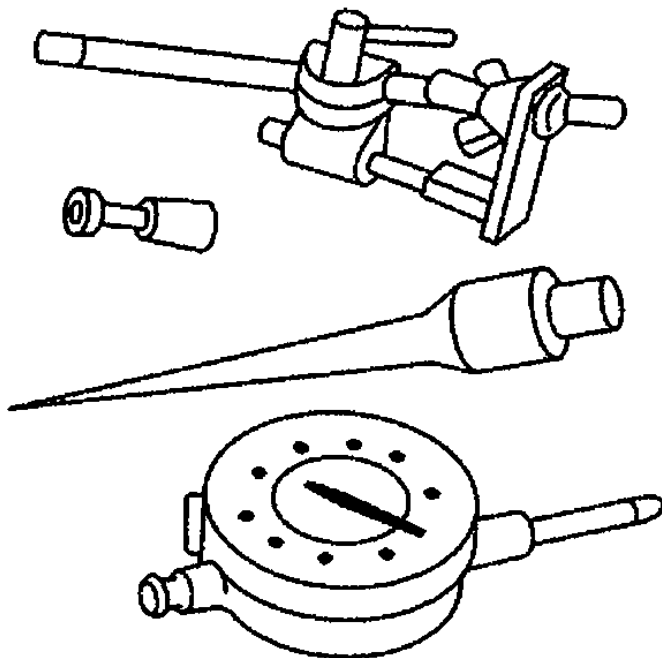


**ST1325-A**

Installer, Drive Pinion Oil Seal 205-208  
(T83T-4676-A)



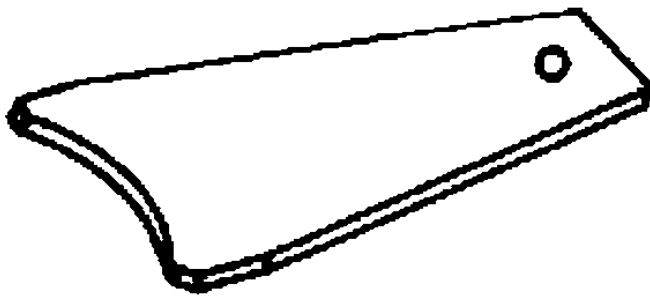
Installer, Drive Pinion Flange 205-002  
(TOOL-4858-E)



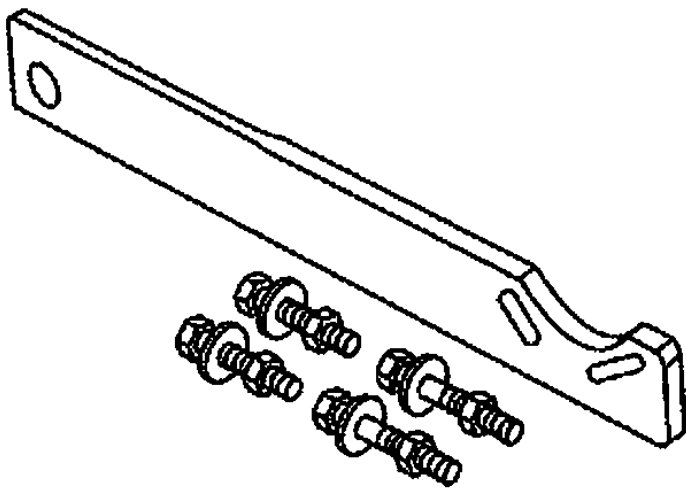
Dial Indicator Gauge With Bracketry  
100-002 (TOOL-4201-C)

**ST1214-A**

Installer, Differential Shim 205-220  
(T85L-4067-AH)



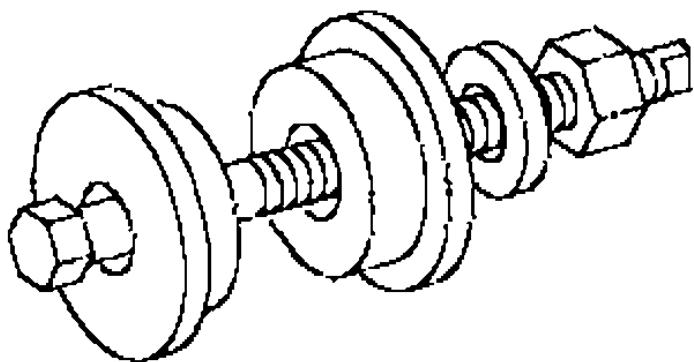
**ST1485-A**



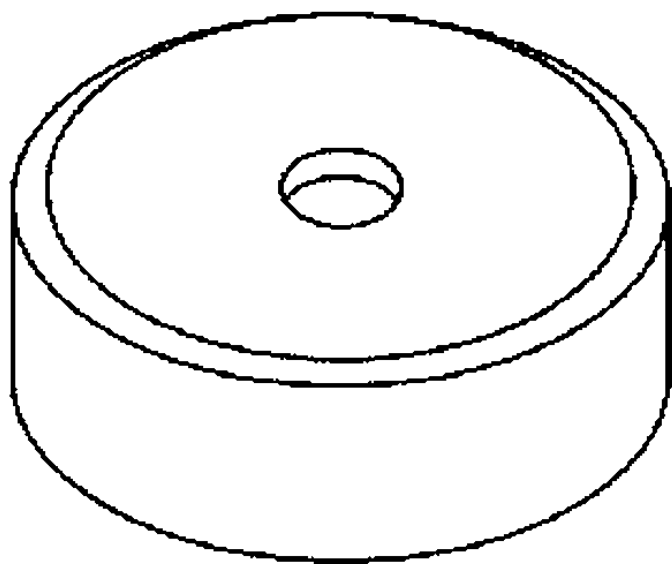
**ST1257-A**

Holding Fixture, Drive Pinion Flange  
205-126 (T78P-4851-A)

Installer, Drive Pinion Bearing Cup  
205-024 (T67P-4616-A)



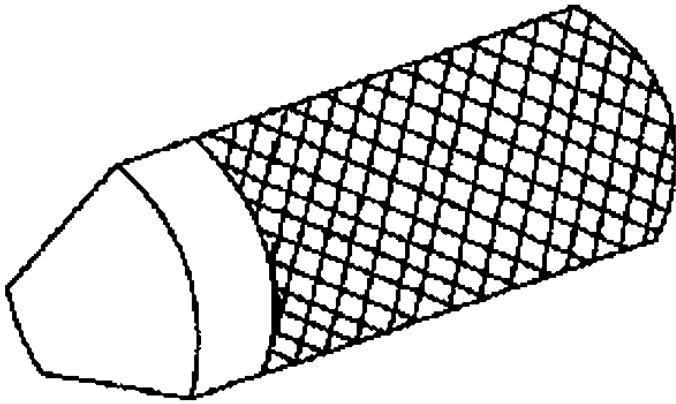
**ST1678-A**



**ST1743-A**

Adapter For 205-S127 205-105 (T76P-4020-A3)





Adapter For 205-S 127 205-111 (T76P-4020-A11)

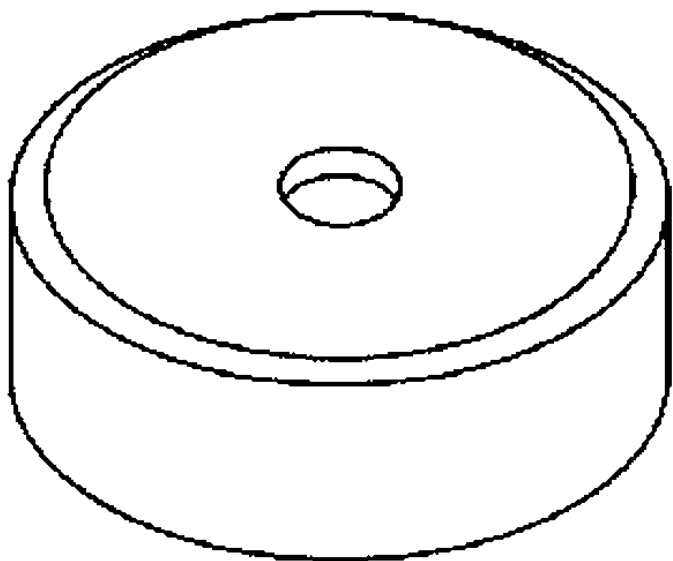
**ST1432-A**



Adapter For 205-S 127 205-109 (T76P-4020-A9)

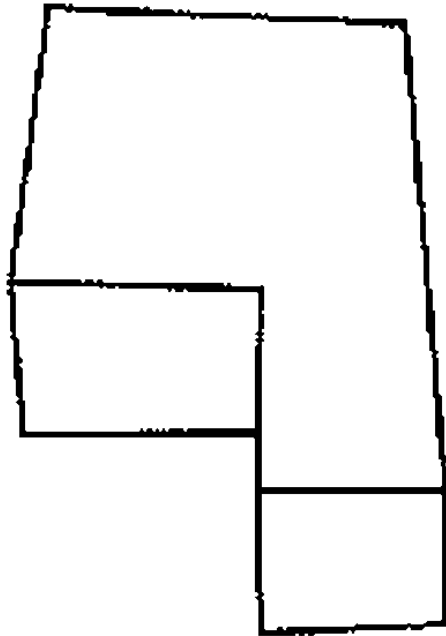
**ST1429-A**

Adapter For 205-S 127 205-129 (T79P-4020-A18)



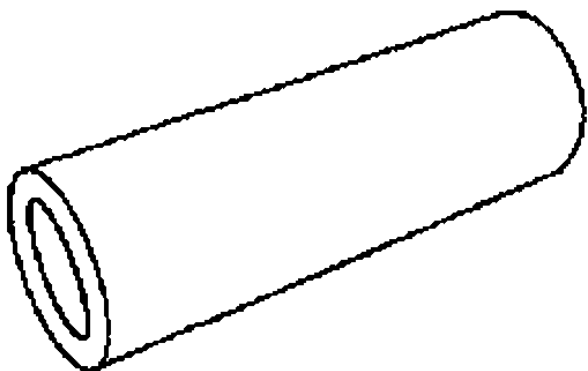
**ST1743-A**

Adapter For 205-S 127 205-110 (T76P-4020-A10)

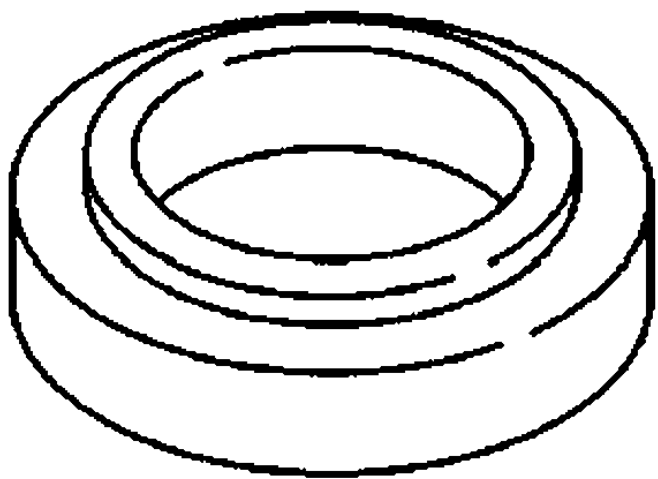


**ST1431-A**

Adapter For 205-S 127 205-130 (T79P-4020-A19)

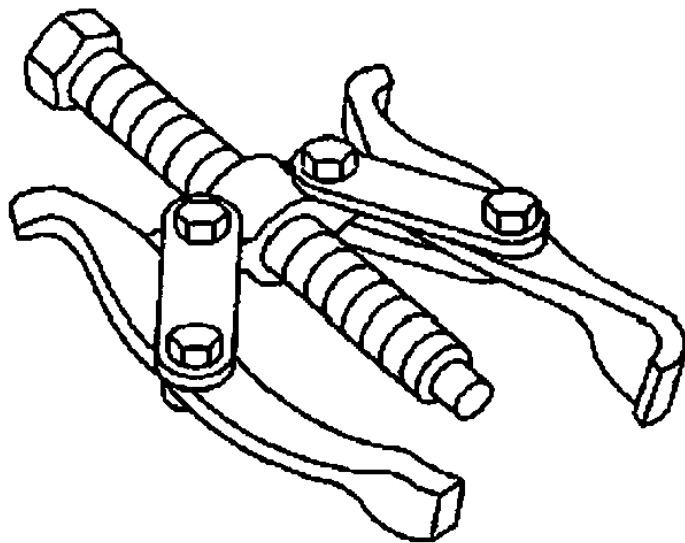


**ST1434-A**



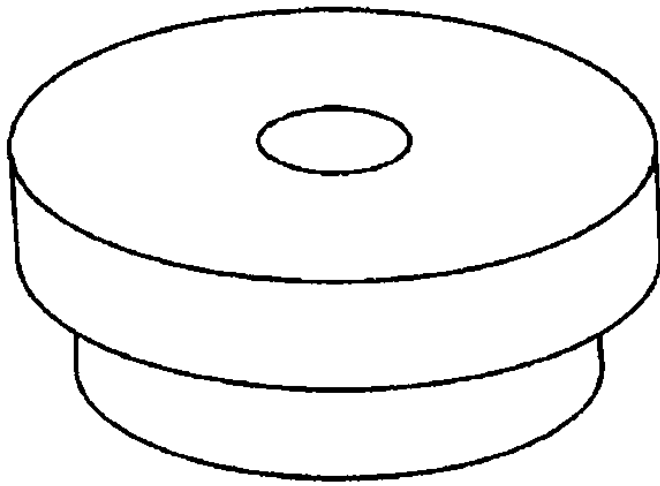
**ST1367-A**

Installer, Drive Pinion Bearing Cone  
205-005 (T53T-4621-C)



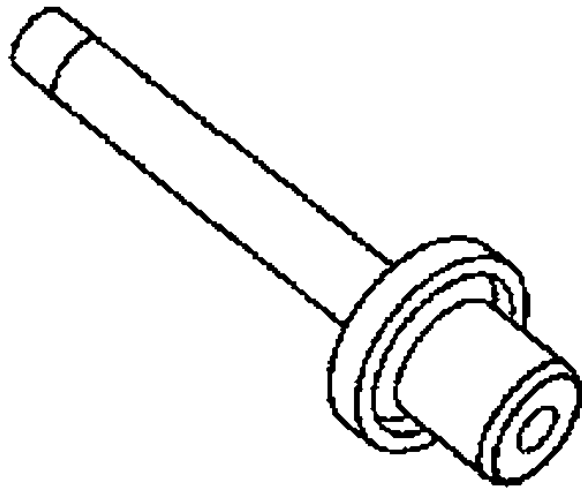
2-Jaw Puller 205-D072 (D79L-4221-A1)  
or equivalent

**ST2026-A**



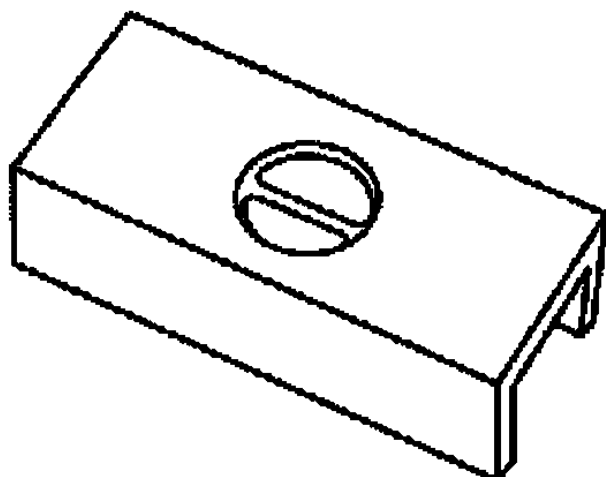
Step Plate 205-D016 (D80L-630-5) or  
equivalent

**ST1543-A**



Installer, Differential Side Bearing  
205-010 (T57L-4221-A2)

**ST1375-A**



Plate, Bearing Oil Seal 205-090 (T75L-1165-B)

**ST1254-A**

#### MATERIAL SPECIFICATION

Item	Specification
Motorcraft SAE 75W-140 High Performance Rear Axle Lubricant XY-75W140-QL (vehicles with the trailer towing option or 4:10 ratio)	WSL-M2C192-A
Additive Friction Modifier XL-3	EST-M2C118-A

#### Removal

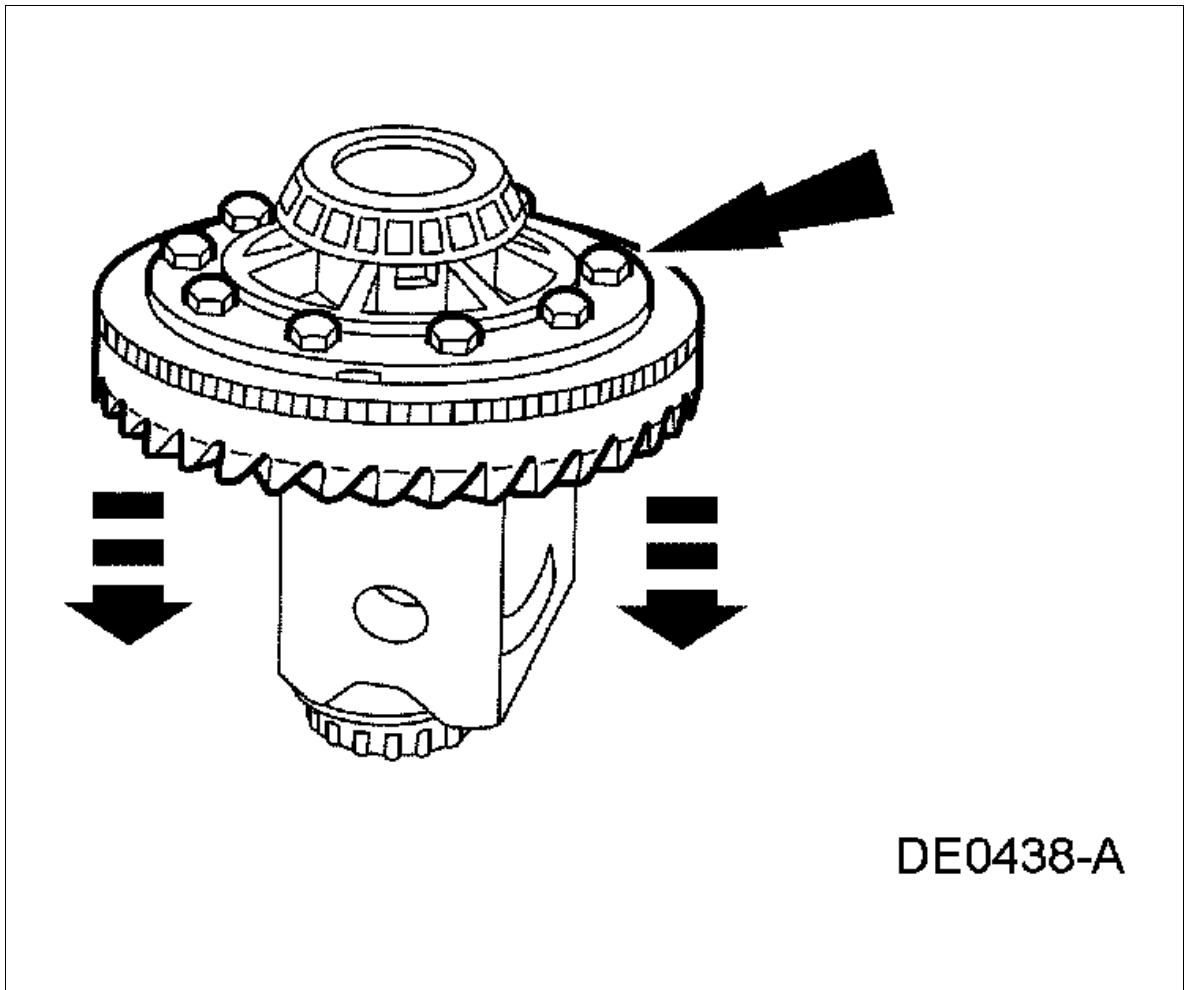
1. Remove the differential carrier assembly. For additional information, refer to DIFFERENTIAL CARRIER.

**WARNING:** *If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

2. Remove the 10 differential ring gear bolts.



Fig 90: Identifying Differential Ring Gear Bolts

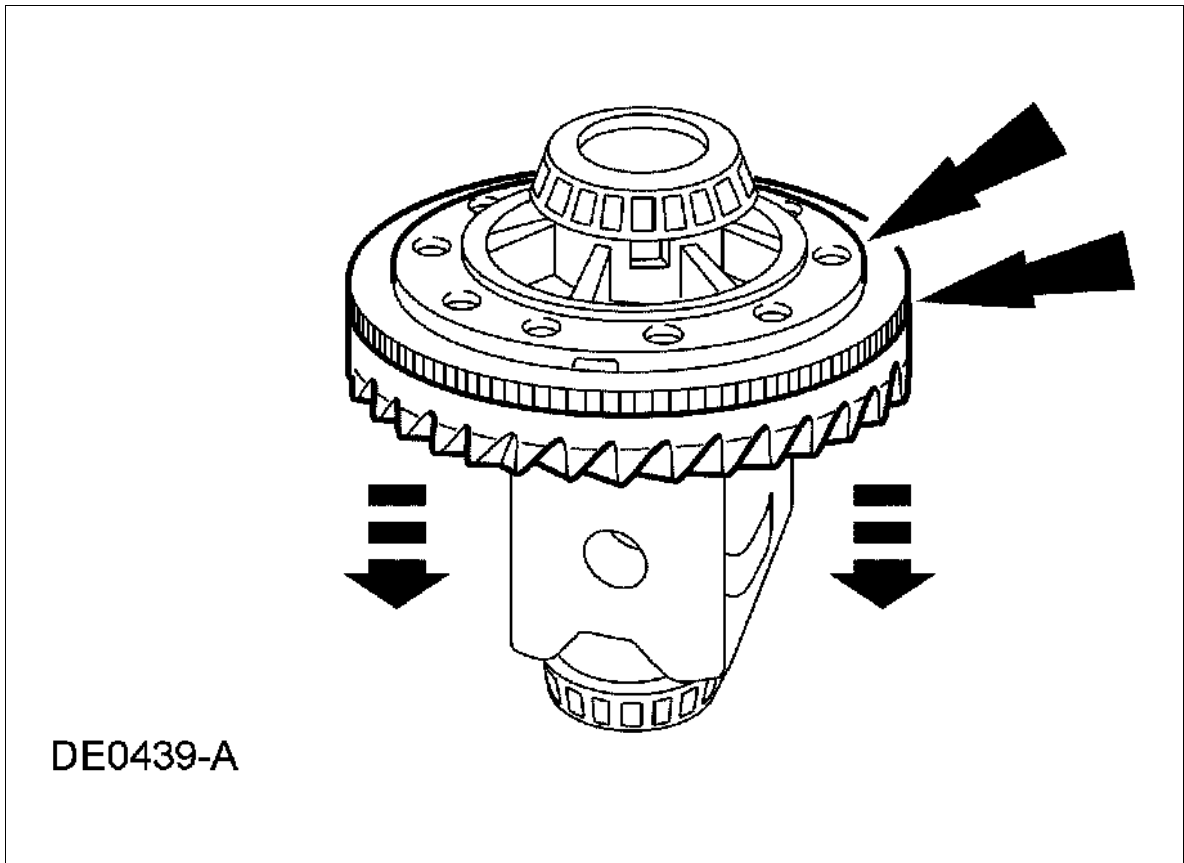


Courtesy of FORD MOTOR CO.

3. Insert a punch in the differential ring gear bolt holes and drive the differential ring gear off.

**CAUTION:** Care should be taken not to damage the differential ring gear bolt hole threads.

Fig 91: Removing Differential Ring Gear

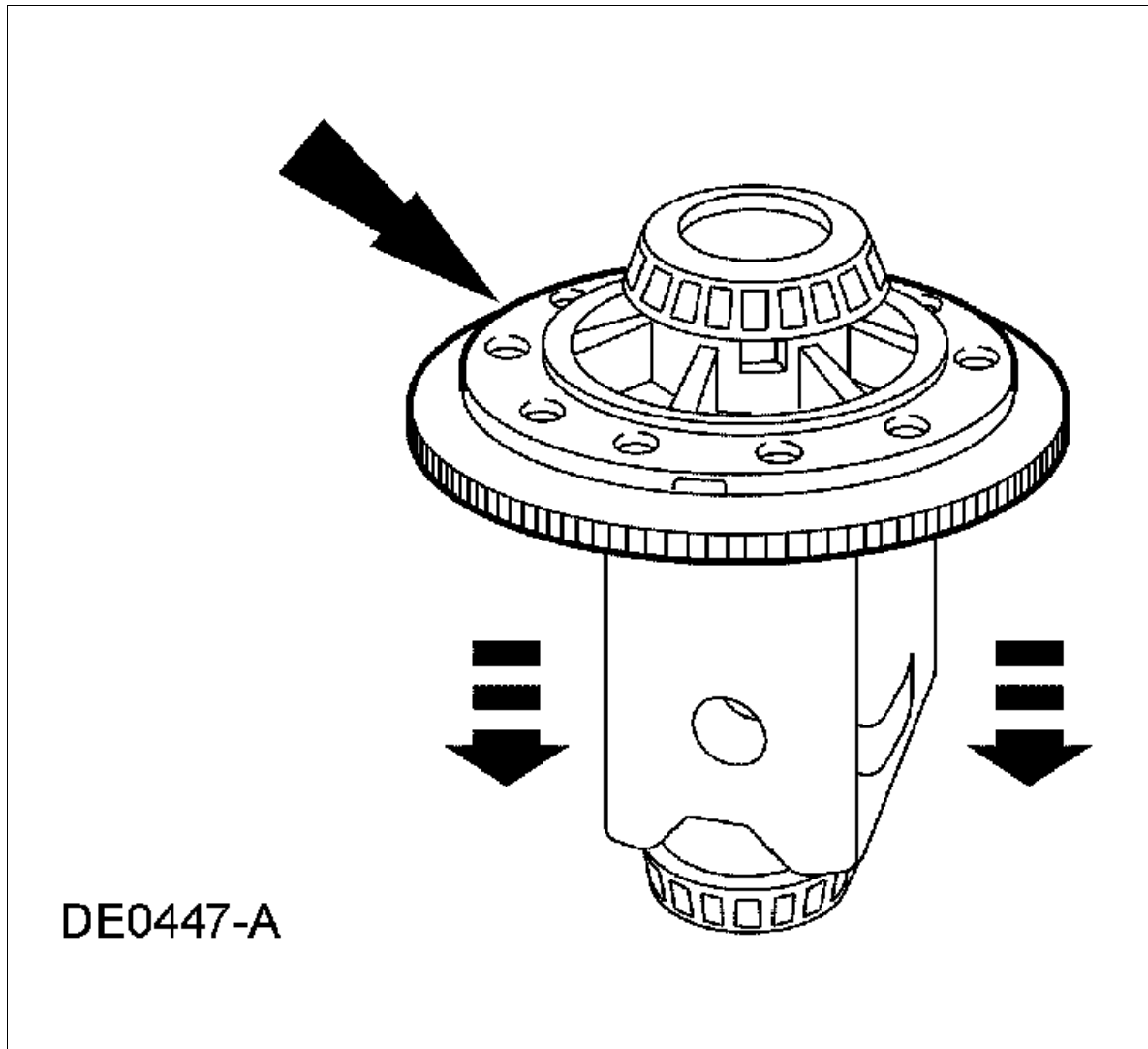


Courtesy of FORD MOTOR CO.

4. If necessary, remove the anti-lock ring.

**NOTE:** *The anti-lock ring cannot be reused once removed. Remove the anti-lock ring only if damaged.*

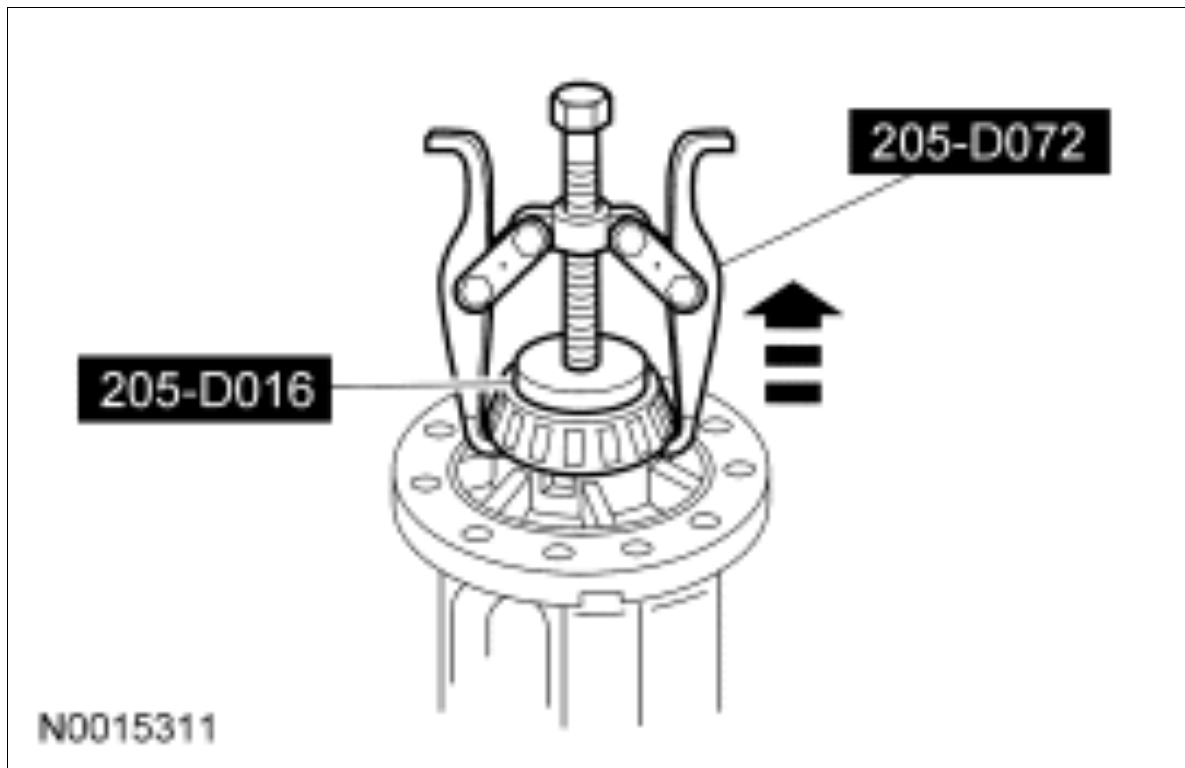
Fig 92: Removing Speed Sensor Ring



Courtesy of FORD MOTOR CO.

5. Using the special tools, remove the differential bearings.

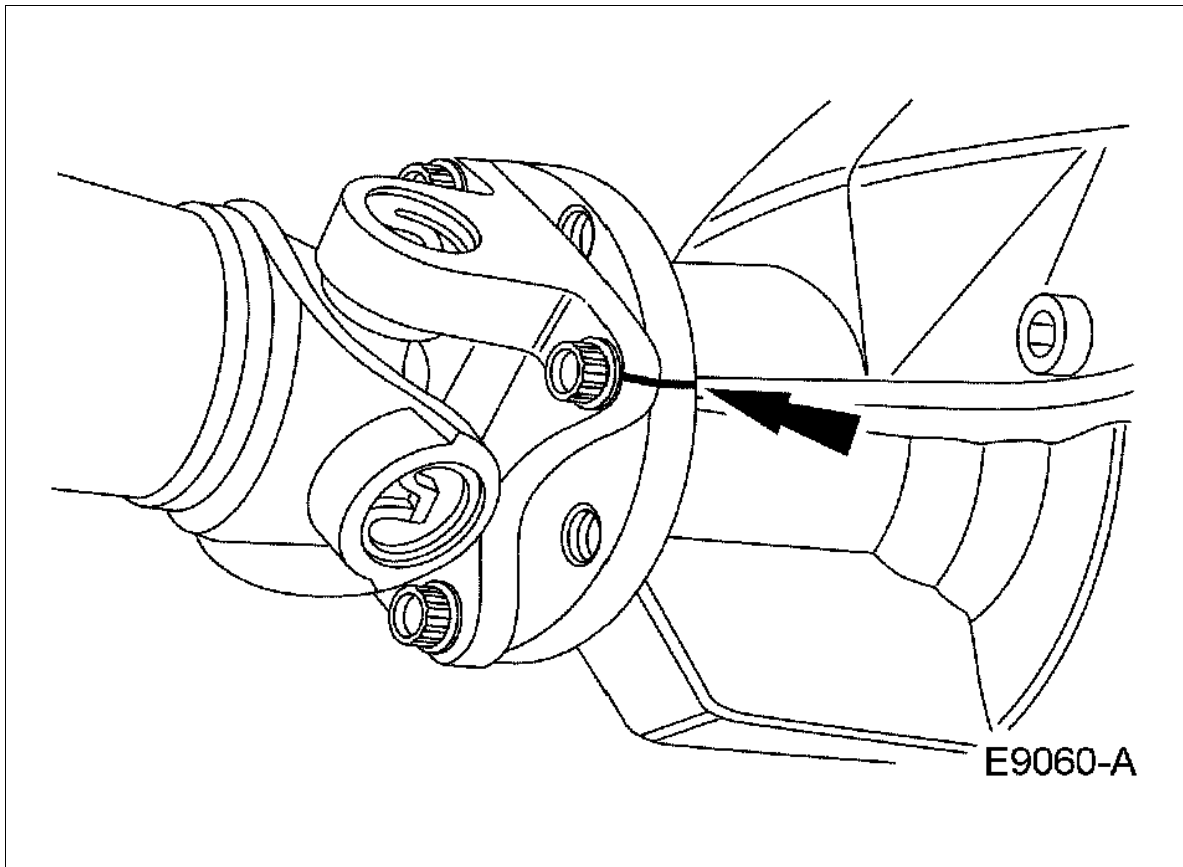
Fig 93: Removing Differential Bearings



Courtesy of FORD MOTOR CO.

6. Index-mark the driveshaft flange and pinion flange for correct alignment during installation.

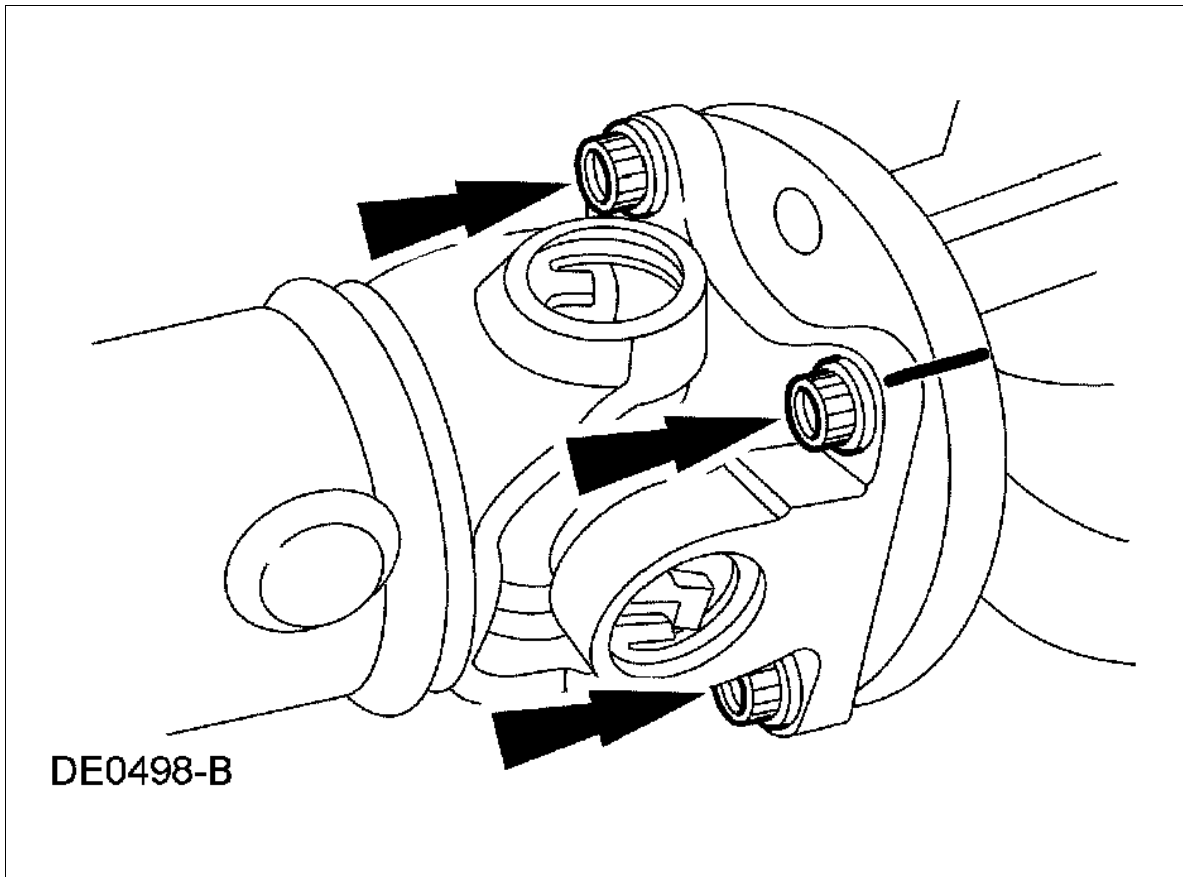
Fig 94: Identifying Index-Mark Driveshaft Flange And Pinion Flange



Courtesy of FORD MOTOR CO.

7. Remove the 4 driveshaft flange bolts.

Fig 95: Removing 4 Driveshaft Flange Bolts



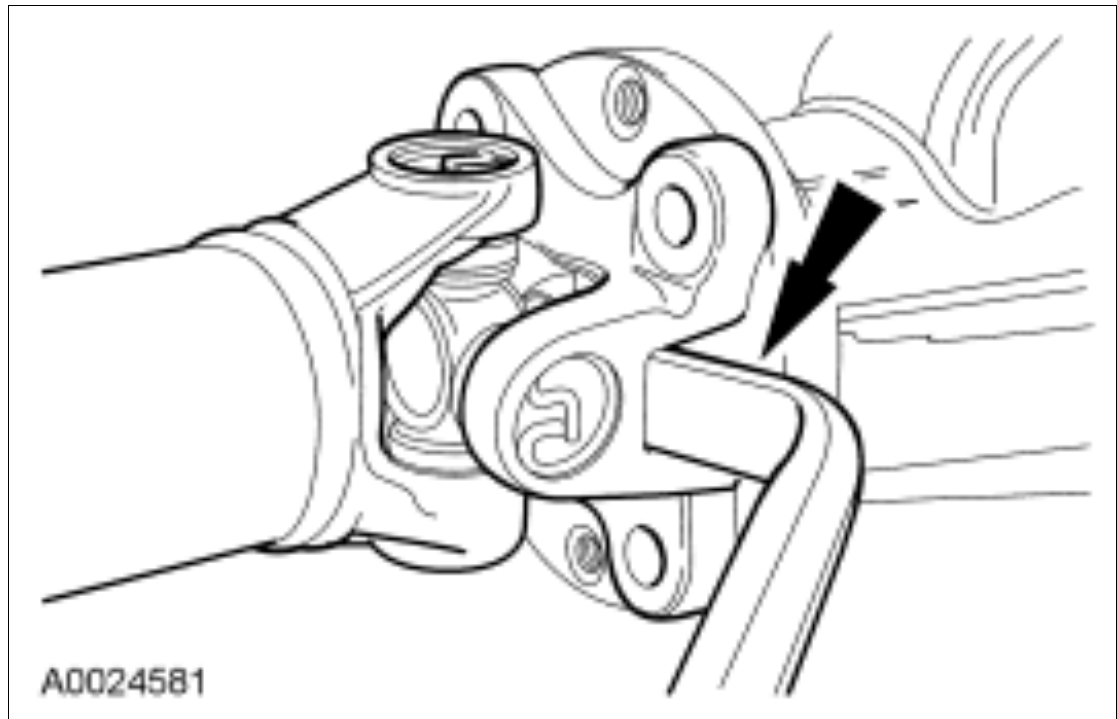
Courtesy of FORD MOTOR CO.

8. Using a suitable tool as shown, disconnect the driveshaft centering socket yoke from the pinion flange.

**CAUTION:** *The driveshaft centering socket yoke fits tightly on the pinion flange pilot. Never hammer on the driveshaft or any of its components to disconnect the driveshaft centering socket yoke from the pinion flange. Pry only in the area shown with a suitable tool to disconnect the driveshaft centering socket yoke from the pinion flange.*

1. Using mechanic's wire, position the driveshaft aside.

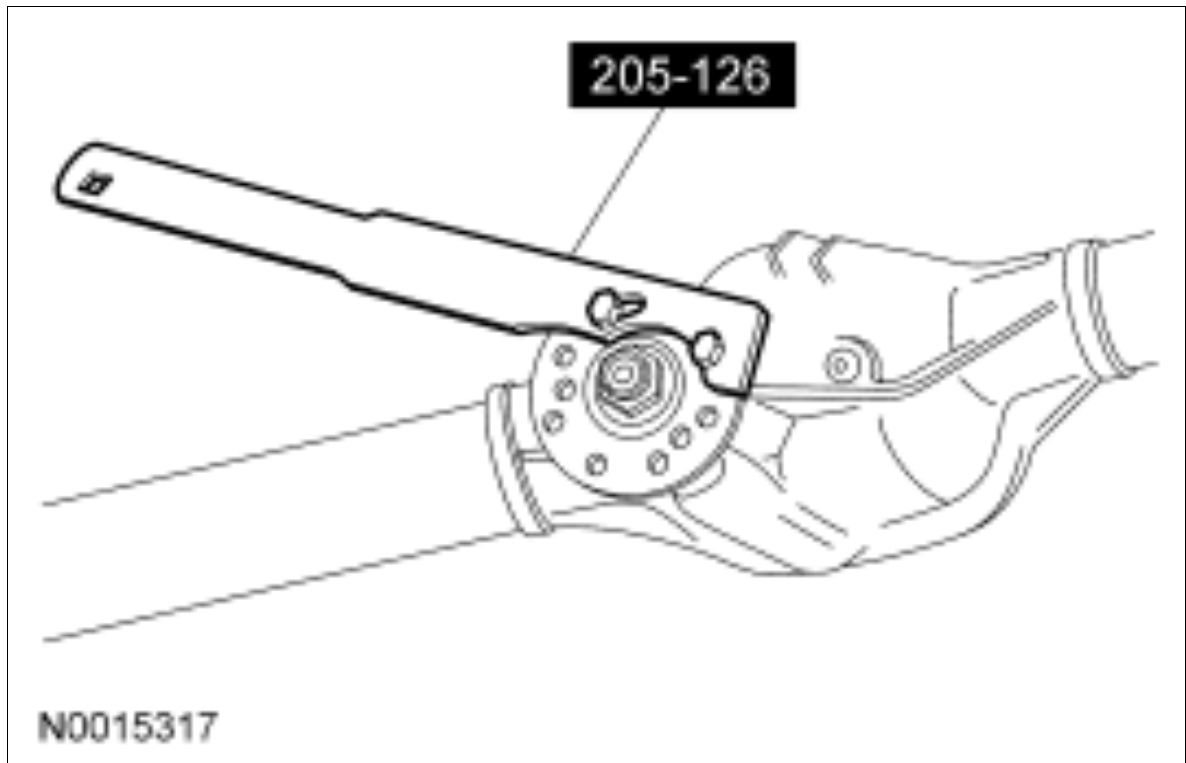
Fig 96: Disconnecting Driveshaft Flange Yoke From Pinion Flange



Courtesy of FORD MOTOR CO.

9. Using the special tool to hold the pinion flange, remove and discard the pinion nut.

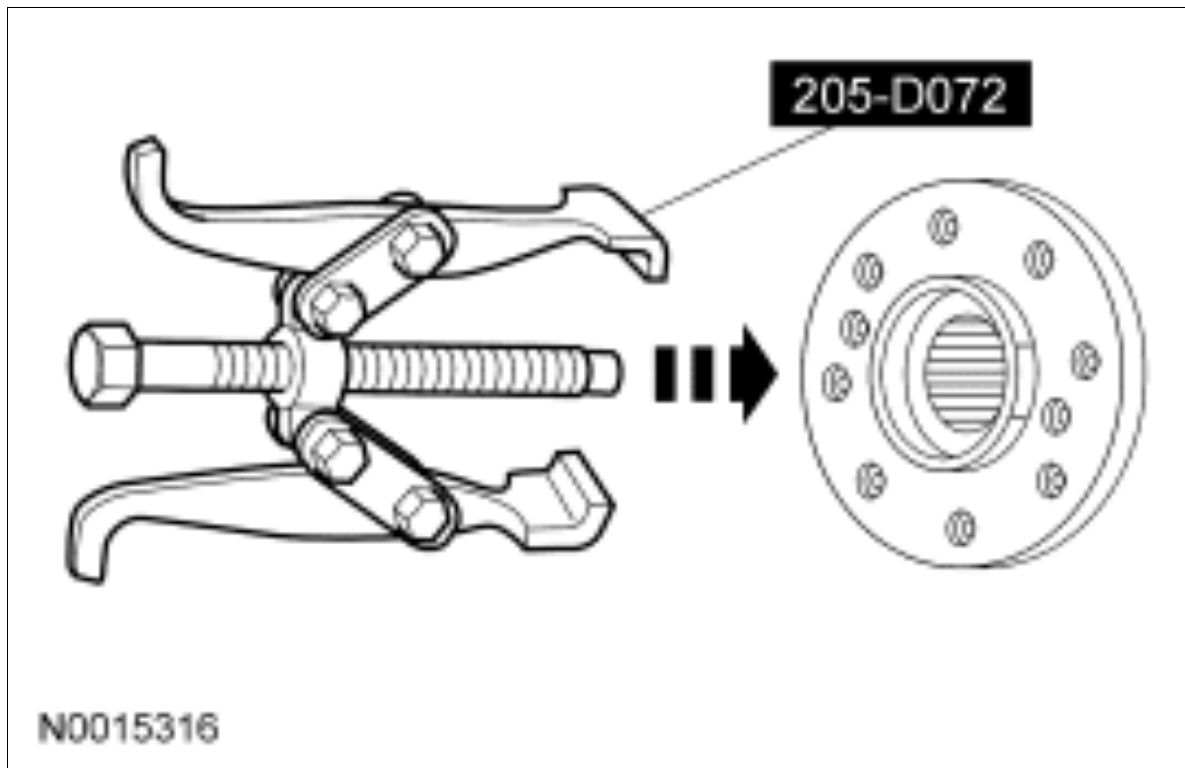
Fig 97: Holding Pinion Flange Using Special Tool



Courtesy of FORD MOTOR CO.

10. Using the special tool, remove the pinion flange.

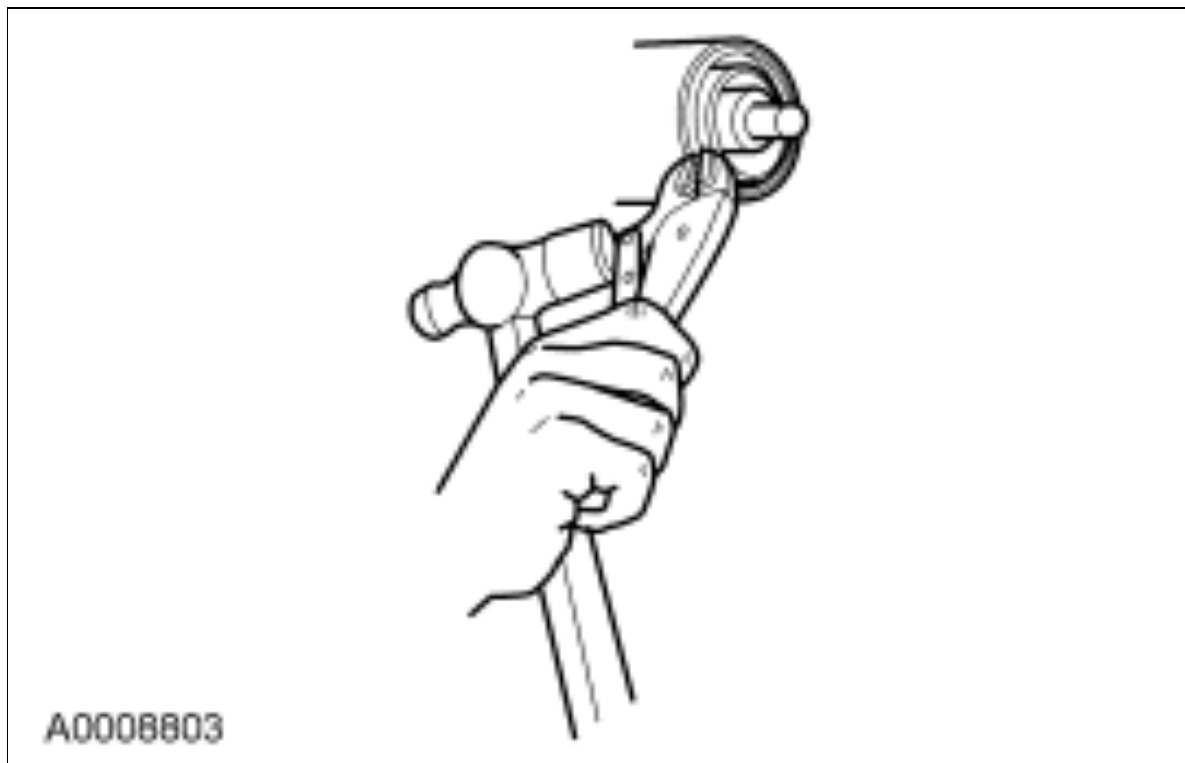
Fig 98: Removing Pinion Flange Using Special Tool



Courtesy of FORD MOTOR CO.

11. Force up on the metal flange of the drive pinion seal. Install gripping pliers and strike with a hammer until the drive pinion seal is removed.

Fig 99: Removing Drive Pinion Seal

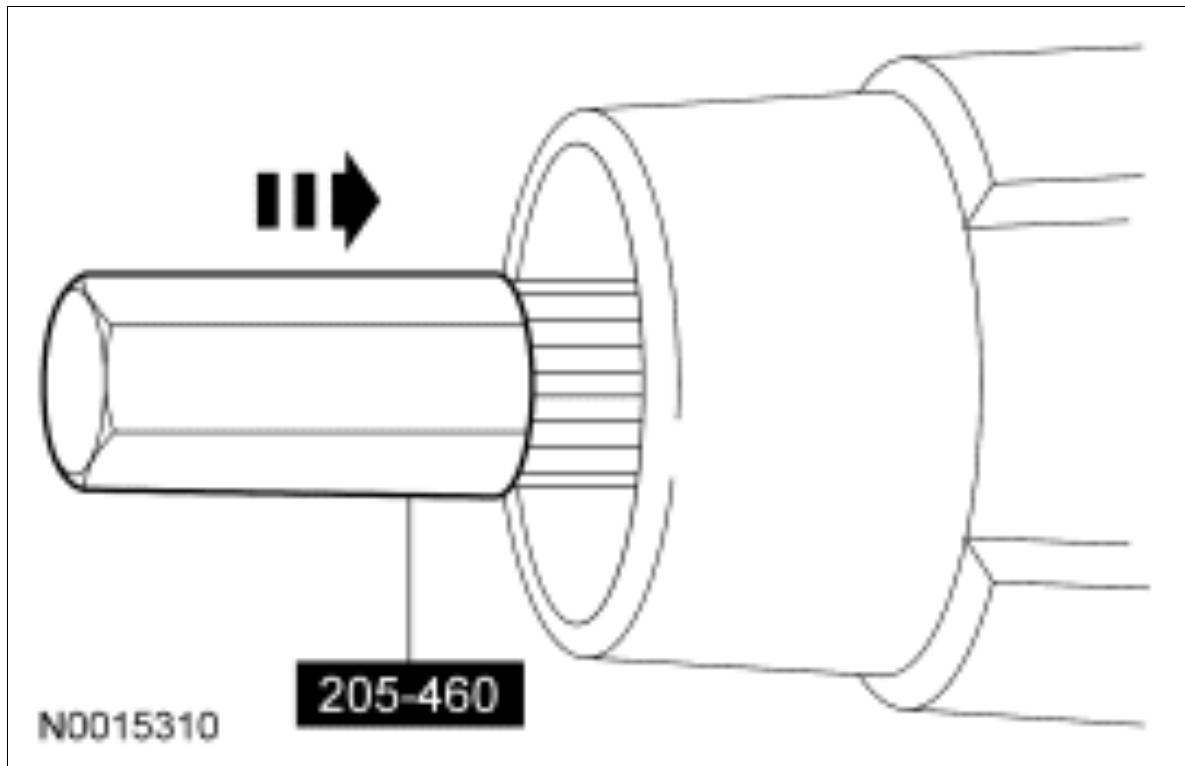


Courtesy of FORD MOTOR CO.



12. Remove the drive pinion shaft oil slinger and the outer drive pinion bearing.
13. Install the special tool. Using a soft-faced hammer, drive the pinion assembly out of the axle housing.

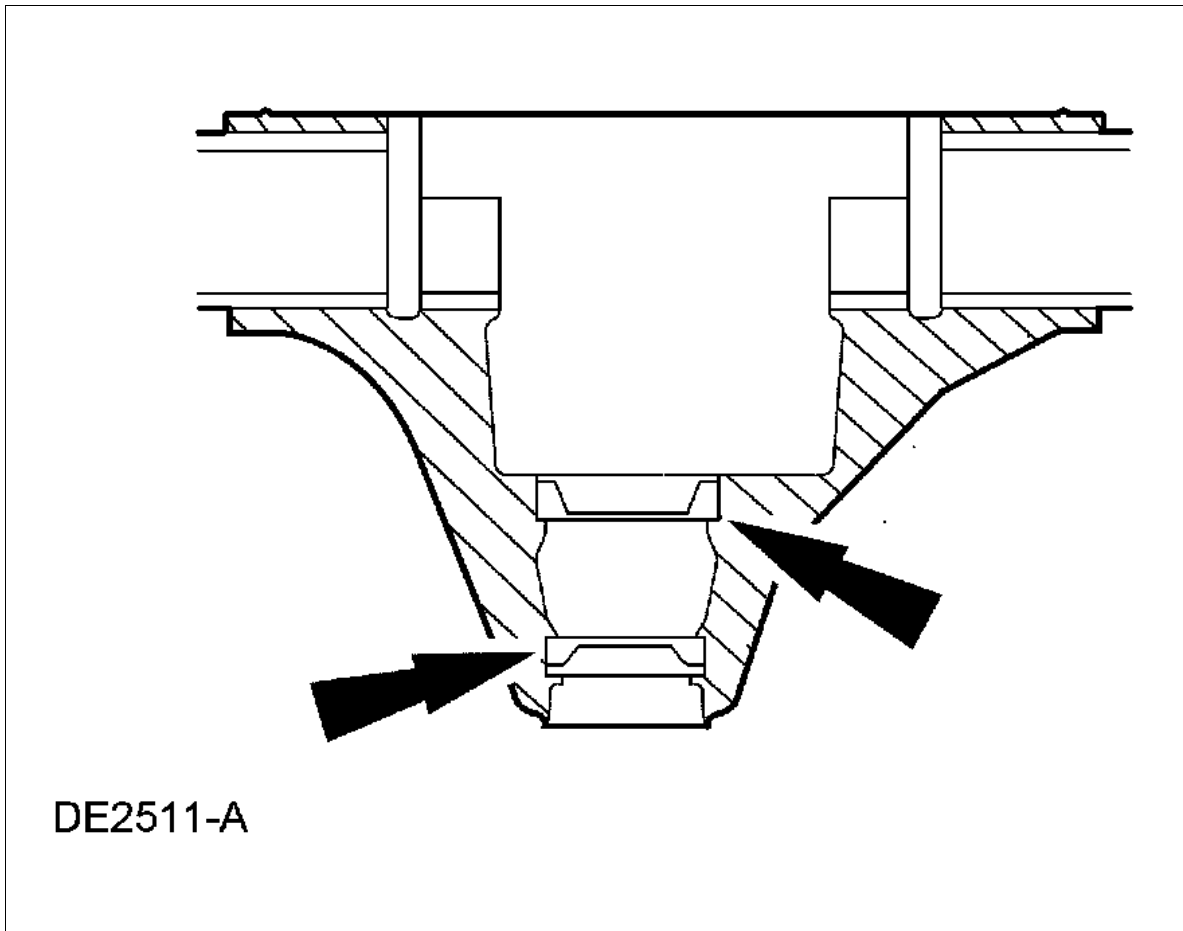
Fig 100: Removing Drive Pinion Shaft Oil Slinger And Outer Drive Pinion Bearing



Courtesy of FORD MOTOR CO.

14. Using a brass drift, remove the drive pinion bearing cups by tapping alternately on opposite sides of the drive pinion bearing cups.

Fig 101: Identifying Pinion Bearing Cups

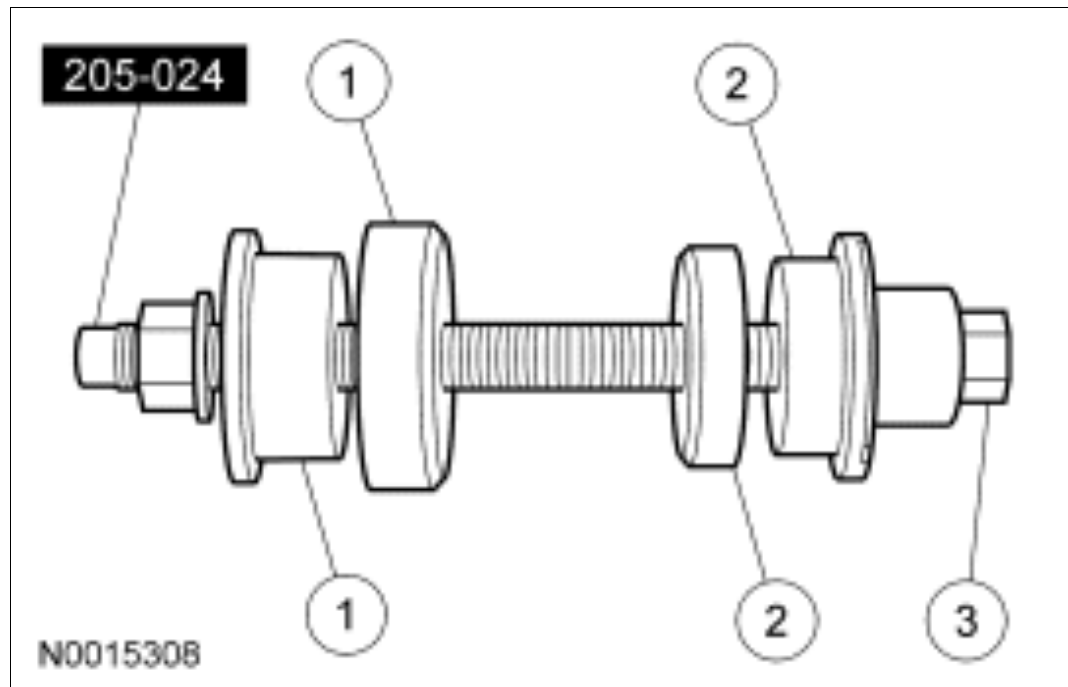


Courtesy of FORD MOTOR CO.

### Installation

1. Position the special tool and the inner and outer drive pinion bearing cups in their respective bores.
  1. After placing the inner and outer drive pinion bearing cups in their bores, place the special tool (inner) on the inner drive pinion bearing cup.
  2. Place the special tool (outer) on the outer drive pinion bearing cup.
  3. Install the special tool.

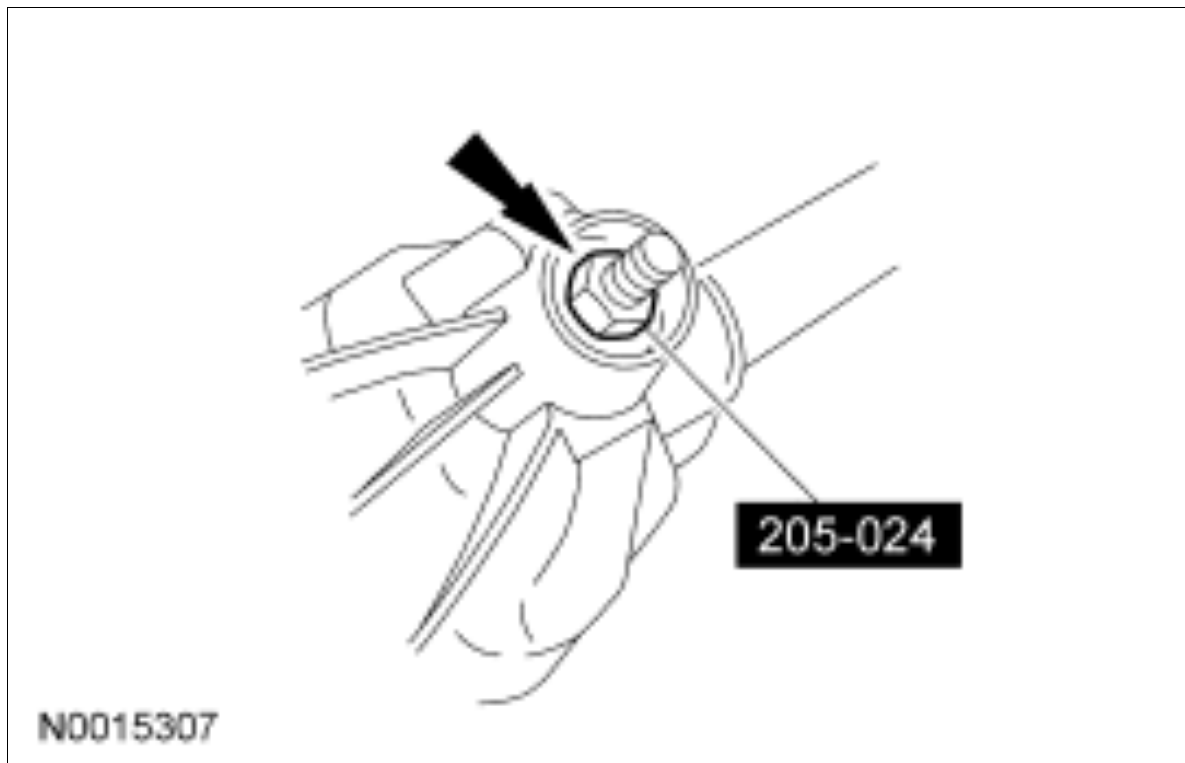
Fig 102: Identifying Special Tool Components



Courtesy of FORD MOTOR CO.

2. Tighten the special tool to seat the drive pinion bearing cups into their bores.

Fig 103: Tightening Special Tool To Seat Drive Pinion Bearing Cups

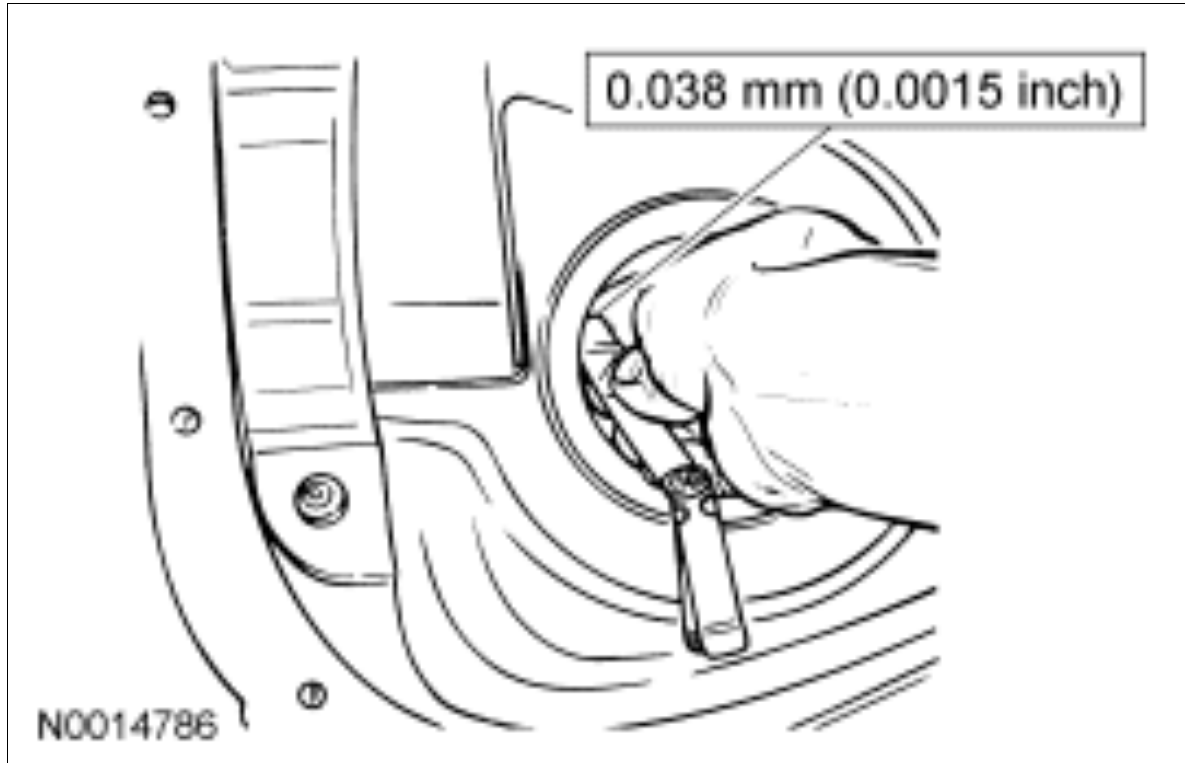


Courtesy of FORD MOTOR CO.

3. Make sure the drive pinion bearing cups are correctly seated in their bores.

**NOTE:** If a feeler gauge can be inserted between a drive pinion bearing cup and the bottom of its bore at any point around the drive pinion bearing cup, the drive pinion bearing cup is not correctly seated.

Fig 104: Measuring Clearance Between Cup And Bottom Of Its Bore

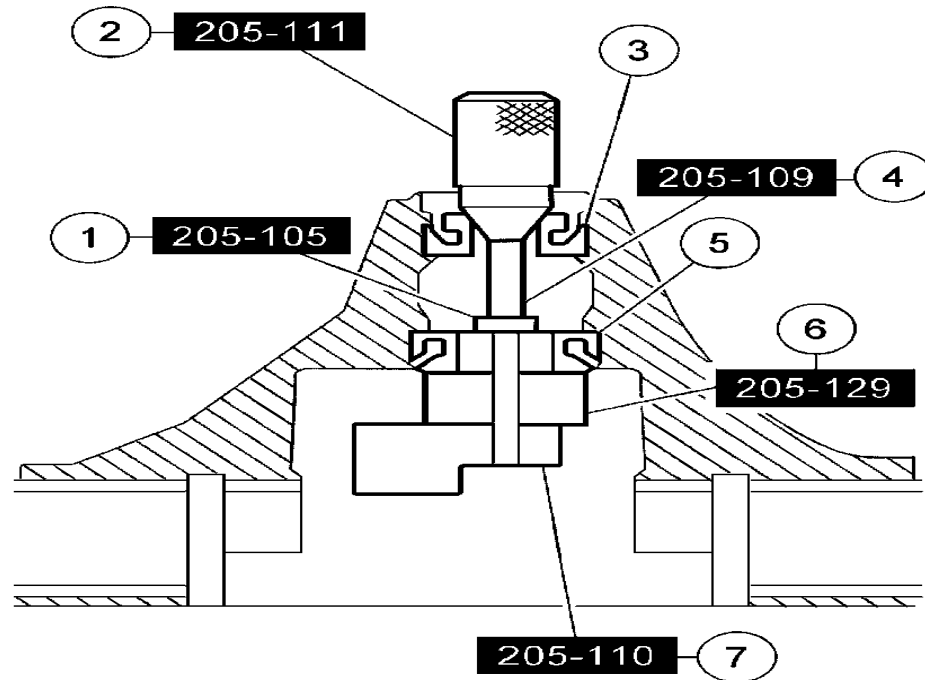


Courtesy of FORD MOTOR CO.

4. Assemble and position the special tools.

**NOTE:** Install new drive pinion bearings without any additional lubricant since the anti-rust oil provides adequate lubricant without upsetting the drive pinion bearing preload settings.

Fig 105: Assembling And Positioning Special Tools



N0015306

Item	Part Number	Description
1	205-105	Adapter for 205-S127 (1.612 inch O.D.) (T76P-4020-A3)
2	205-111	Adapter for 205-S127 (T76P-4020-A11)
3	4621	Drive pinion bearing (outer)
4	205-109	Adapter for 205-S127 (T76P-4020-A9)
5	4630	Drive pinion bearing (inner)
6	205-129	Adapter for 105-S127 (1.1884 inch thick) (T79P-4020-A18)
7	205-110	Adapter for 205-S127 (1.7 inch thick) (T76P-4020-A10)

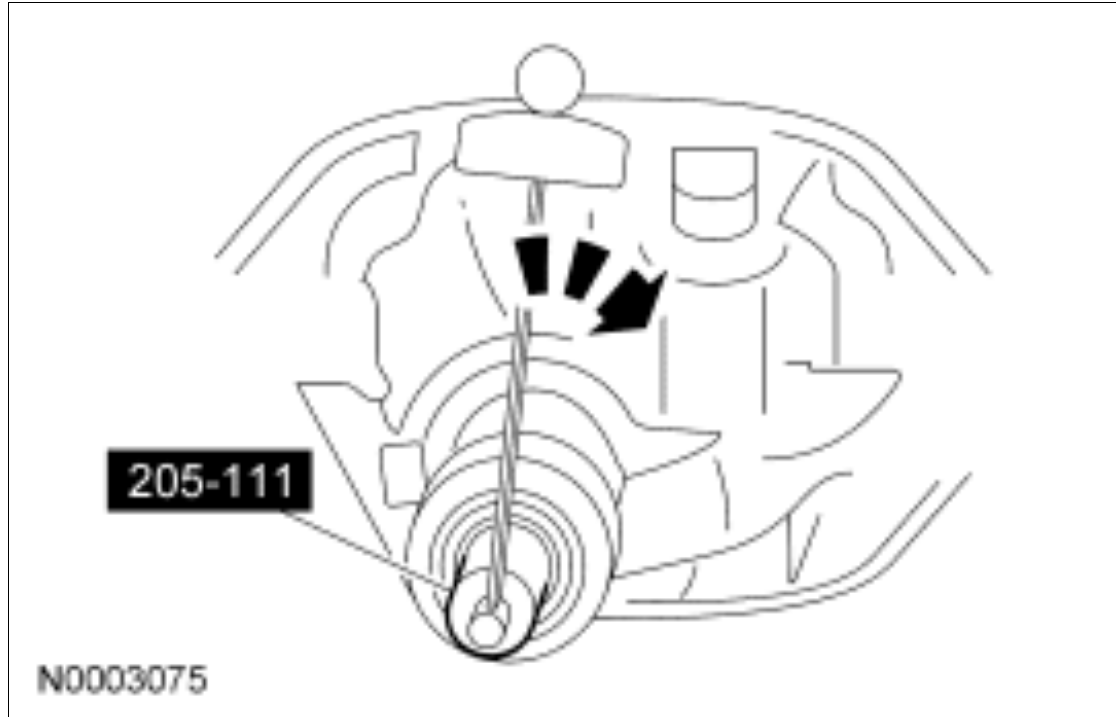
Courtesy of FORD MOTOR CO.

5. Tighten the special tool.

**NOTE:** This step duplicates final drive pinion bearing preload.

1. Tighten to 2.2 Nm (20 lb-in).

Fig 106: Checking Differential Pinion Bearing Preload

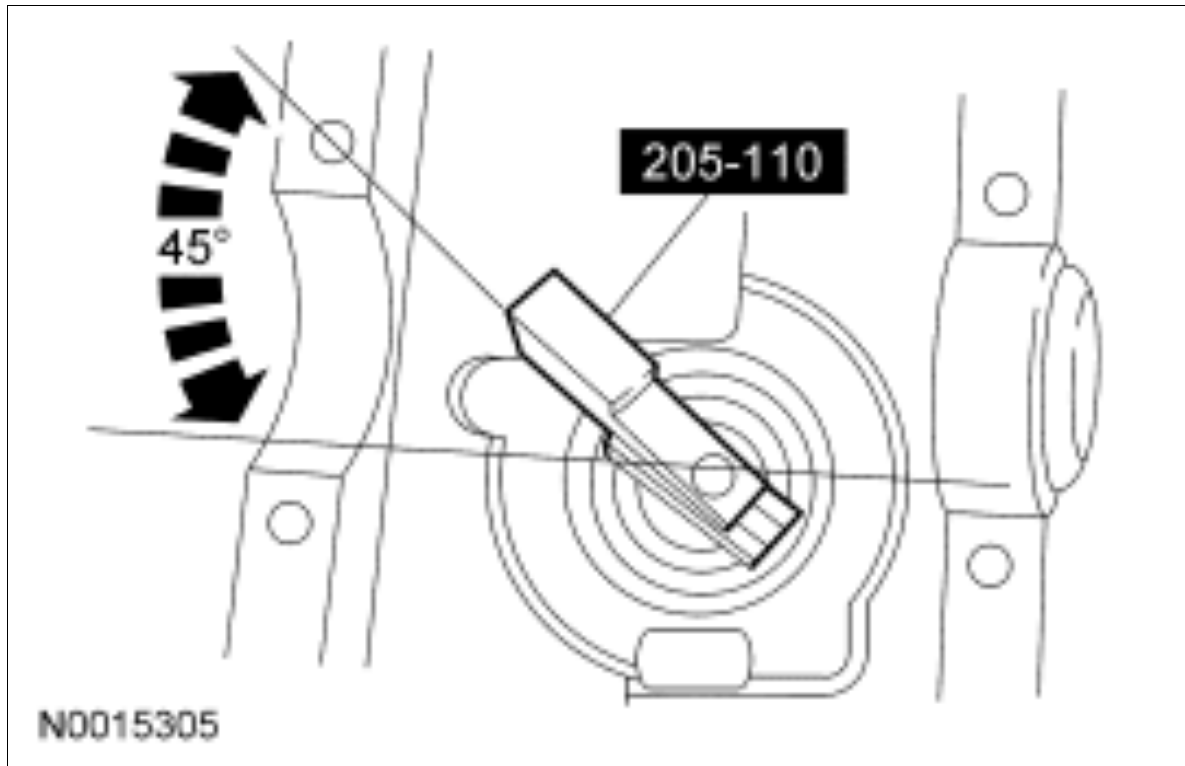


Courtesy of FORD MOTOR CO.

6. Rotate the special tool several half-turns to make sure of correct seating of the drive pinion bearings and position the special tool.

**NOTE:** *The special tool must be offset to obtain an accurate reading.*

Fig 107: Seating Drive Pinion Bearings

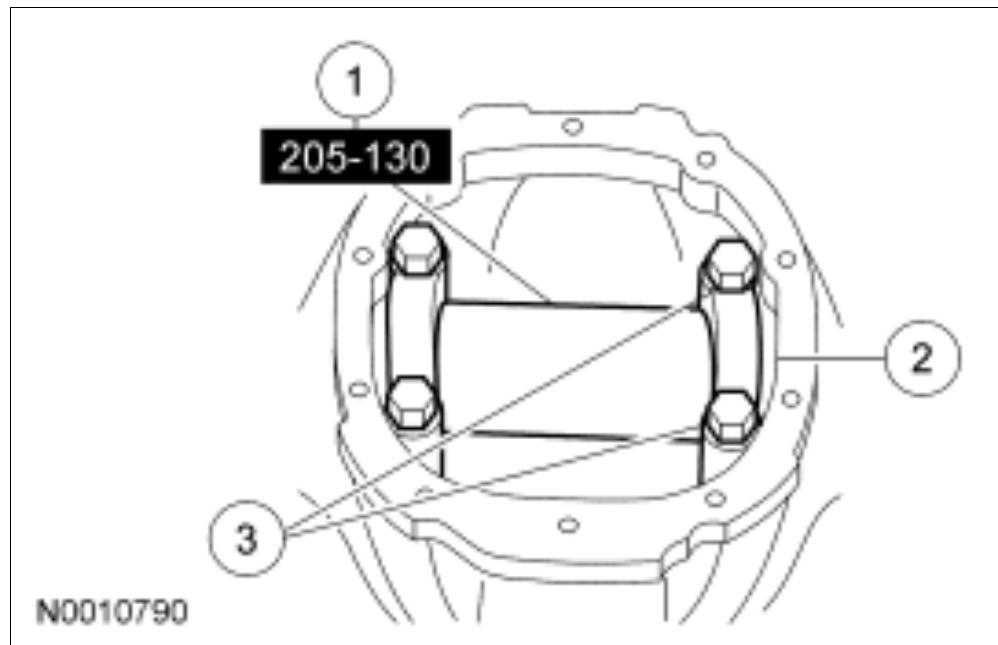


Courtesy of FORD MOTOR CO.

7. Install the special tool.

1. Position the special tool.
2. Install the differential bearing caps.
3. Install the 4 differential bearing cap bolts.
  1. Tighten to 105 Nm (77 lb-ft).

Fig 108: Installing Special Tool



Courtesy of FORD MOTOR CO.

8. Use a drive pinion bearing adjustment shim as a gauge for drive pinion bearing adjustment shim selection.

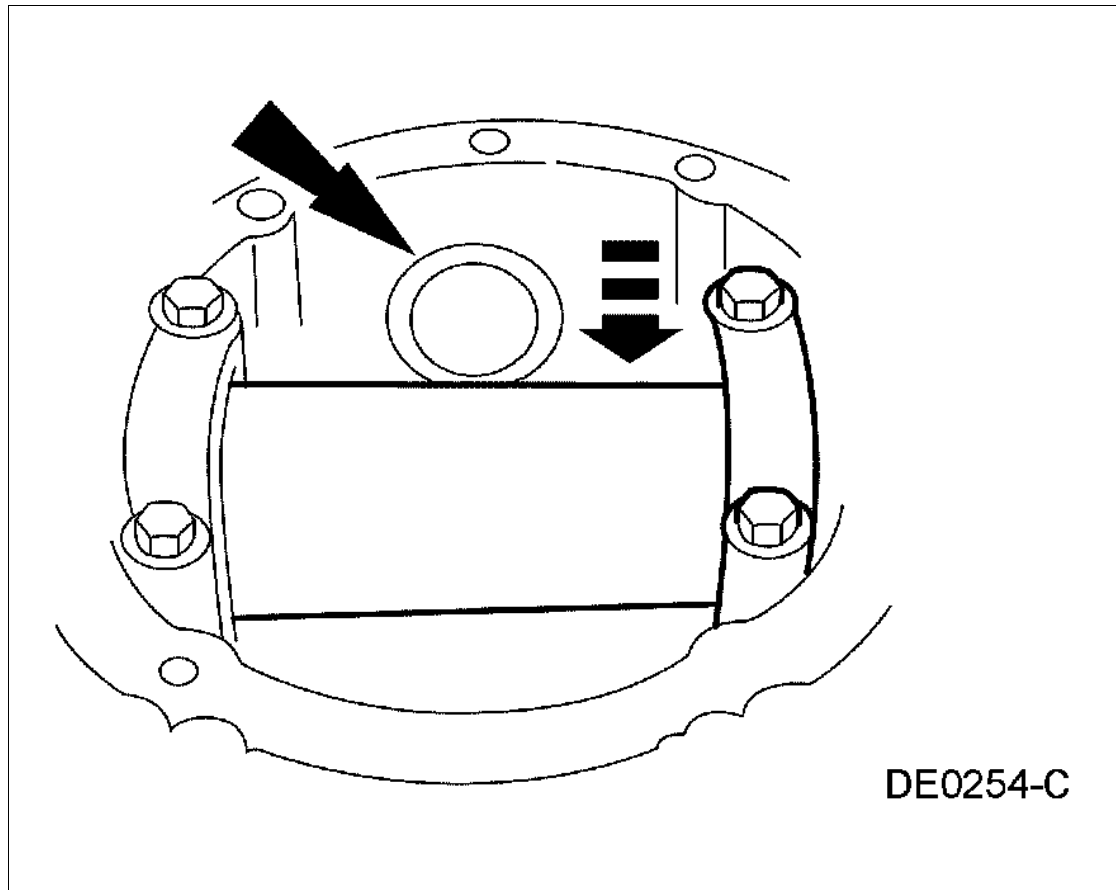
**NOTE:** Drive pinion bearing adjustment shims must be flat and clean.

**NOTE:** A slight drag should be felt for correct drive pinion bearing adjustment shim selection. Do not attempt to force the drive pinion bearing adjustment shim between the gauge block and the gauge tube. This will minimize selection of a drive pinion bearing adjustment shim thicker than required, which results in a deep tooth contact in final assembly of integral axle assemblies.

1. After the correct drive pinion bearing adjustment shim thickness has been determined, remove all of the special tools.



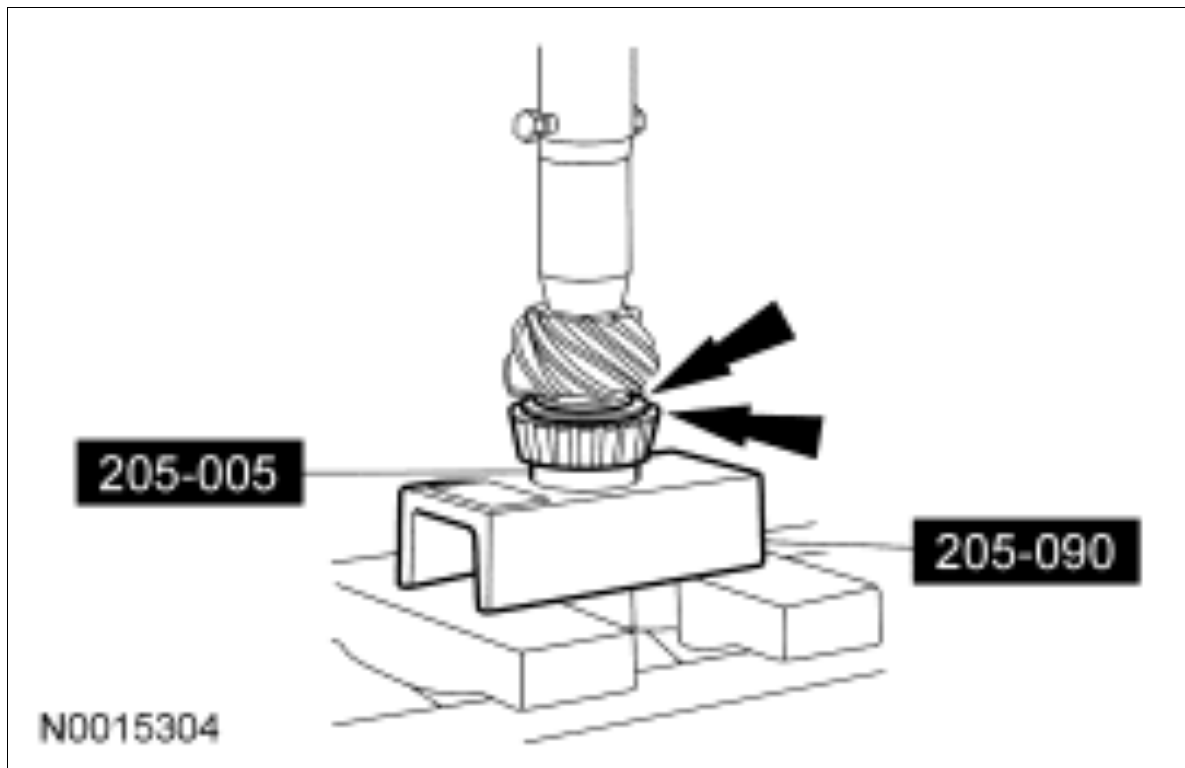
Fig 109: Identifying Drive Pinion Bearing Adjustment Shim



Courtesy of FORD MOTOR CO.

9. Using the special tool and a shop press, drive the inner drive pinion bearing and the selected drive pinion bearing adjustment shim until they are firmly seated on the pinion shaft.

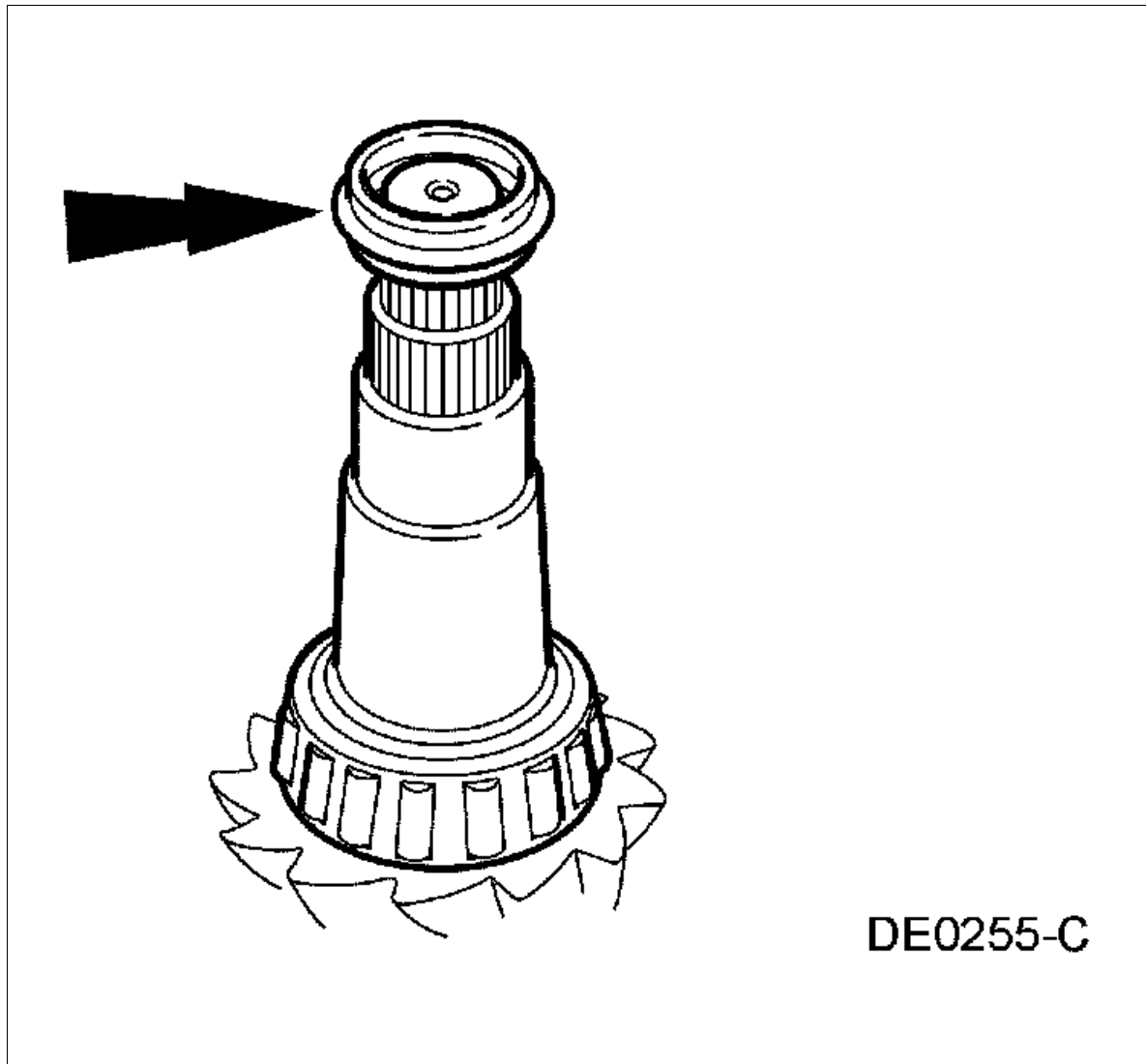
Fig 110: Installing Inner Drive Pinion Bearing



Courtesy of FORD MOTOR CO.

10. Install a new drive pinion collapsible spacer on the pinion shaft against the pinion shaft shoulder.

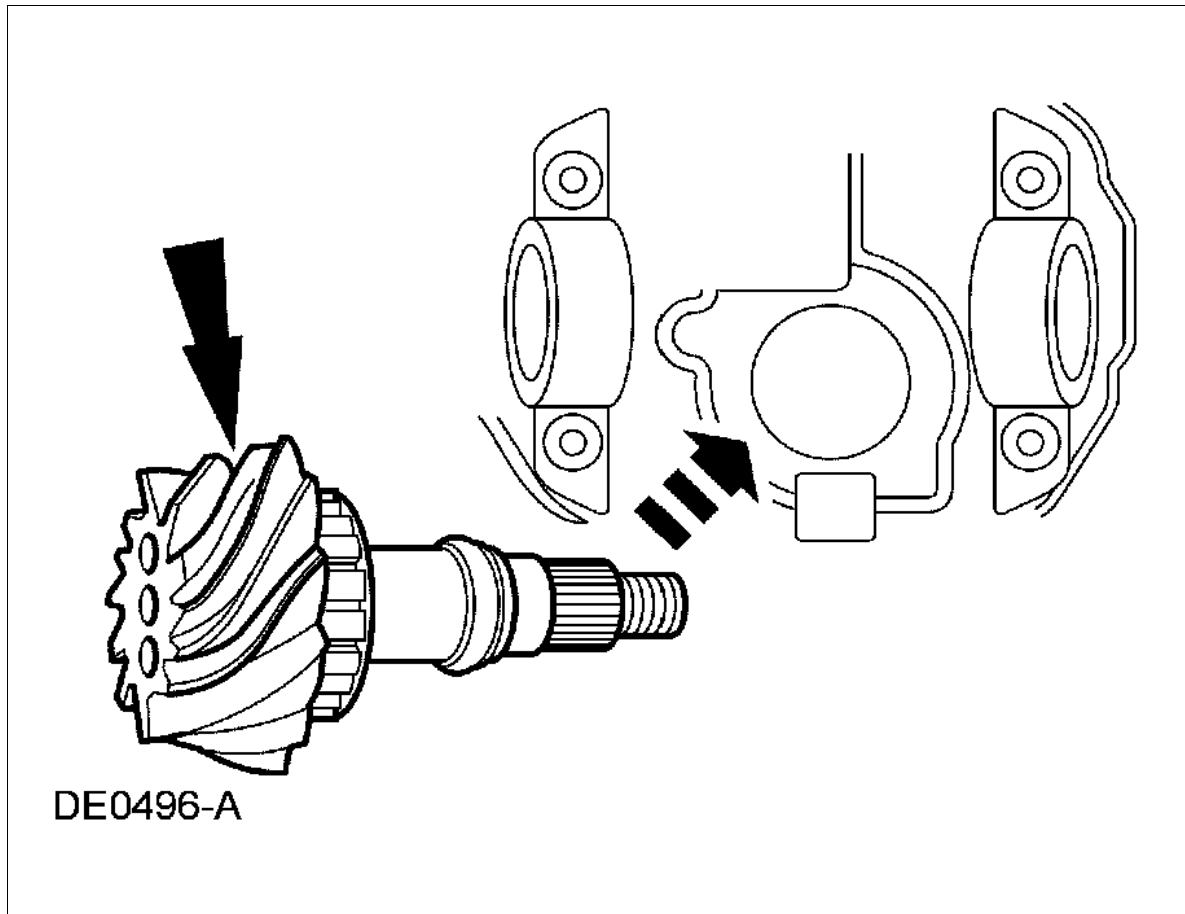
Fig 111: Identifying Drive Pinion Collapsible Spacer



Courtesy of FORD MOTOR CO.

11. Install the drive pinion assembly into the axle housing.

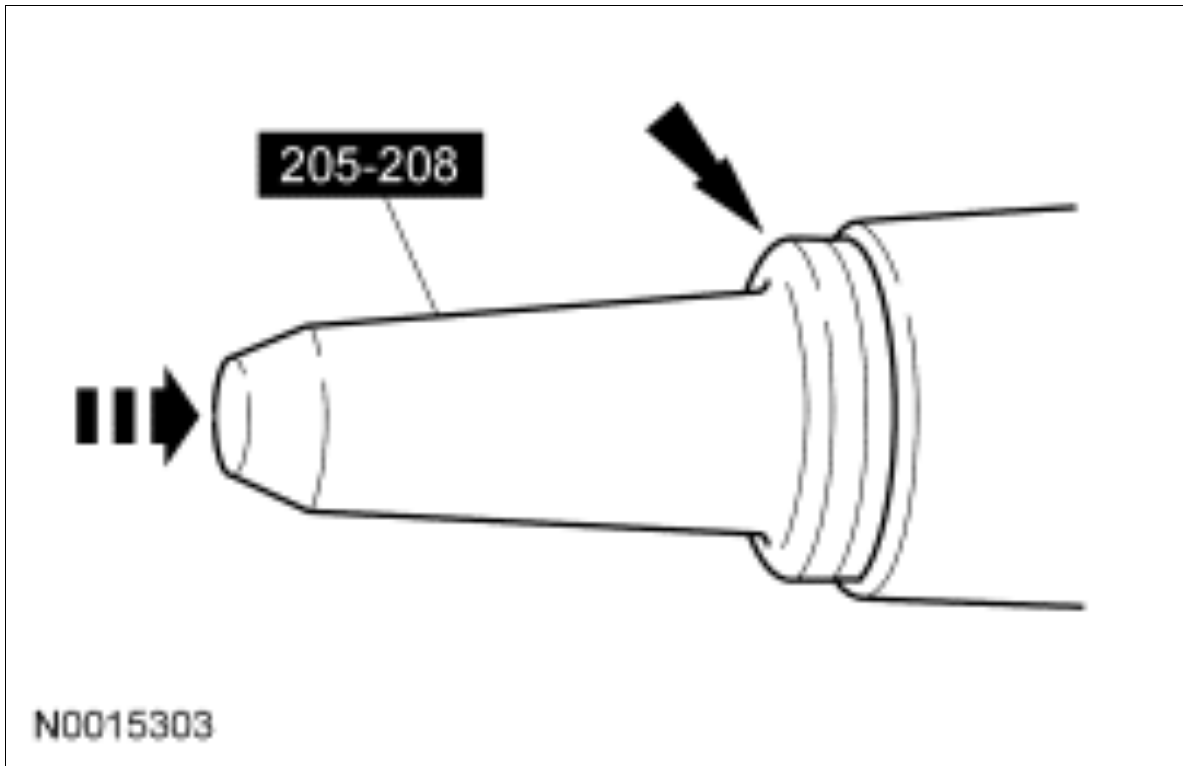
Fig 112: Installing Drive Pinion Assembly Into Axle Housing



Courtesy of FORD MOTOR CO.

12. Install the outer drive pinion bearing and the drive pinion shaft oil slinger.
13. Using the special tools, install the drive pinion seal.

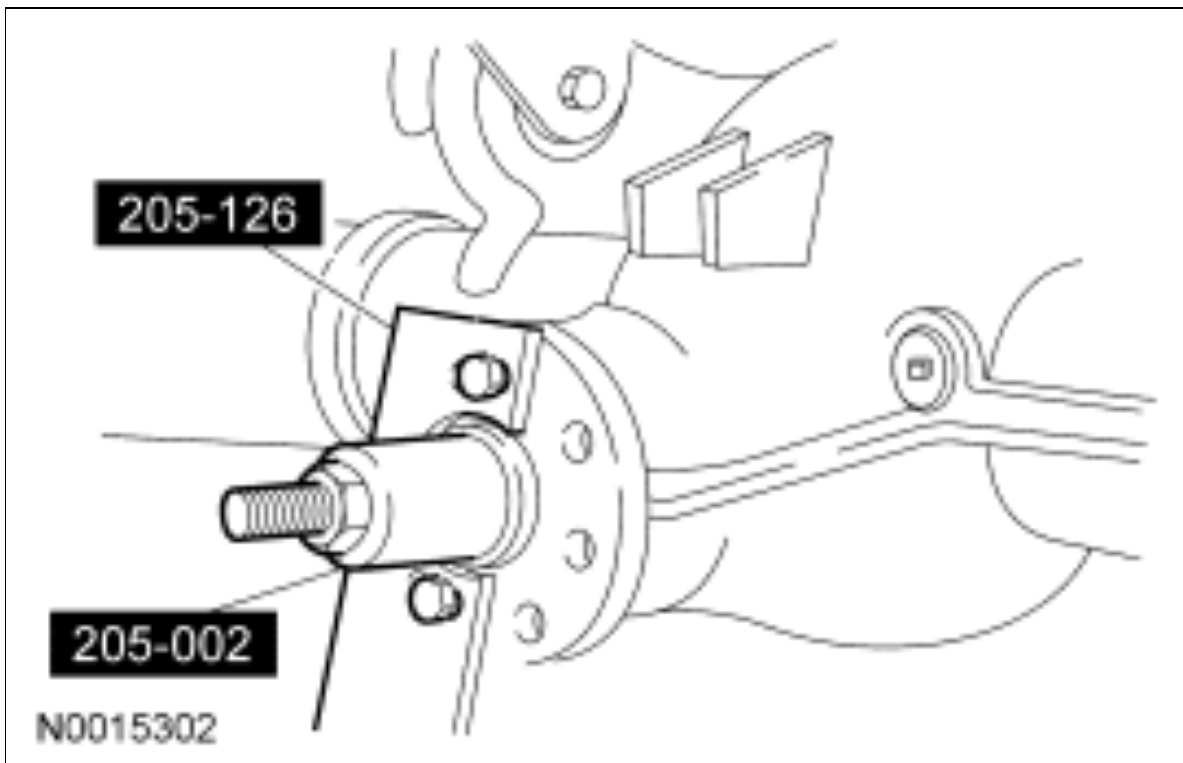
Fig 113: Installing Drive Pinion Seal



Courtesy of FORD MOTOR CO.

14. Using the special tools, install the drive pinion flange.

Fig 114: Installing Drive Pinion Flange



Courtesy of FORD MOTOR CO.

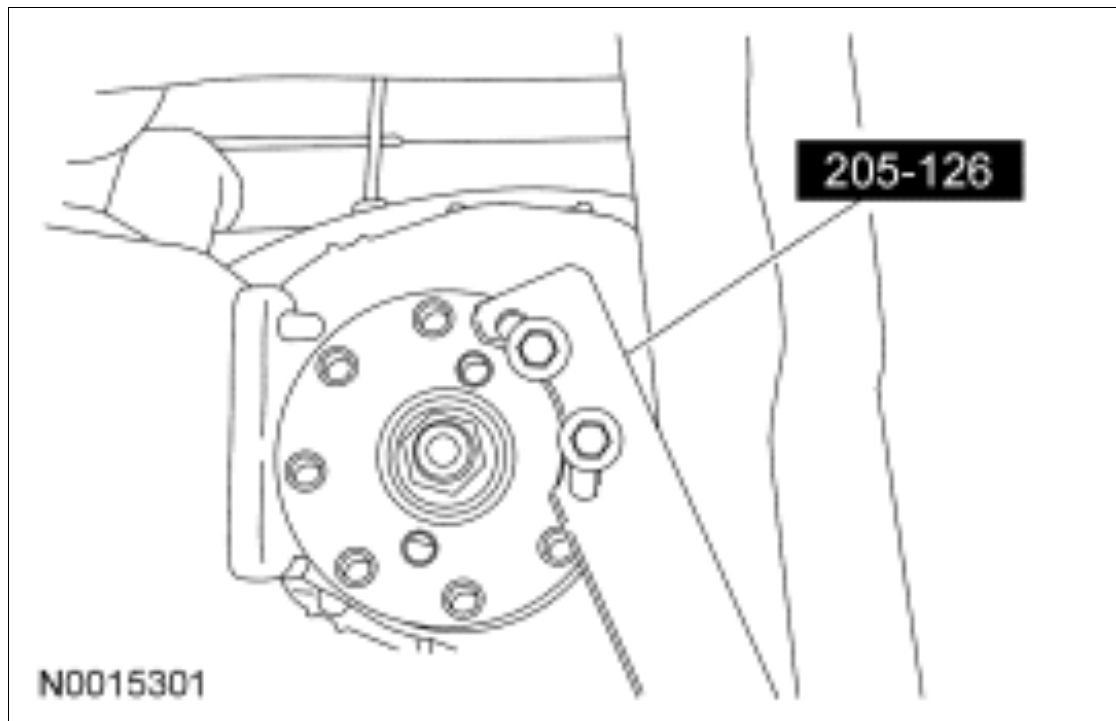
15. Use the special tool to hold the pinion flange while tightening the pinion nut.

**CAUTION:** Do not, under any circumstance, loosen the drive pinion nut to reduce pinion bearing preload. If it is necessary to reduce the preload, install a new drive pinion collapsible spacer and drive pinion nut.

**CAUTION:** Remove the special tool while taking rotational pinion bearing preload checks with the Nm (lb-in) torque wrench.

1. Rotate the pinion occasionally to make sure the differential pinion bearings are seating correctly. Take frequent differential pinion bearing preload checks by rotating the differential pinion with a Nm (lb-in) torque wrench. Tighten the pinion nut in small increments to avoid excessive pinion bearing preload. Tighten the pinion nut until the drive pinion bearing preload is in specification.

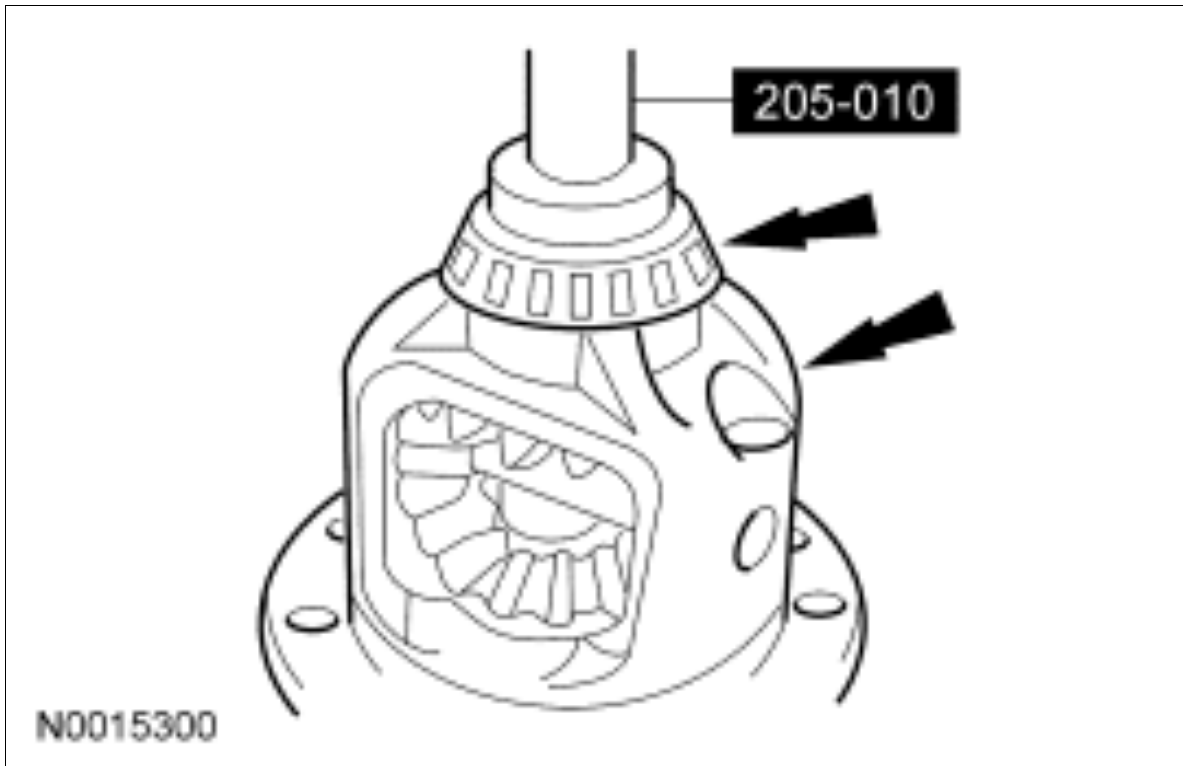
Fig 115: Identifying Pinion Flange Holder



Courtesy of FORD MOTOR CO.

16. Using the special tool, install the new differential bearings.

Fig 116: Installing Differential Bearings On Differential Case



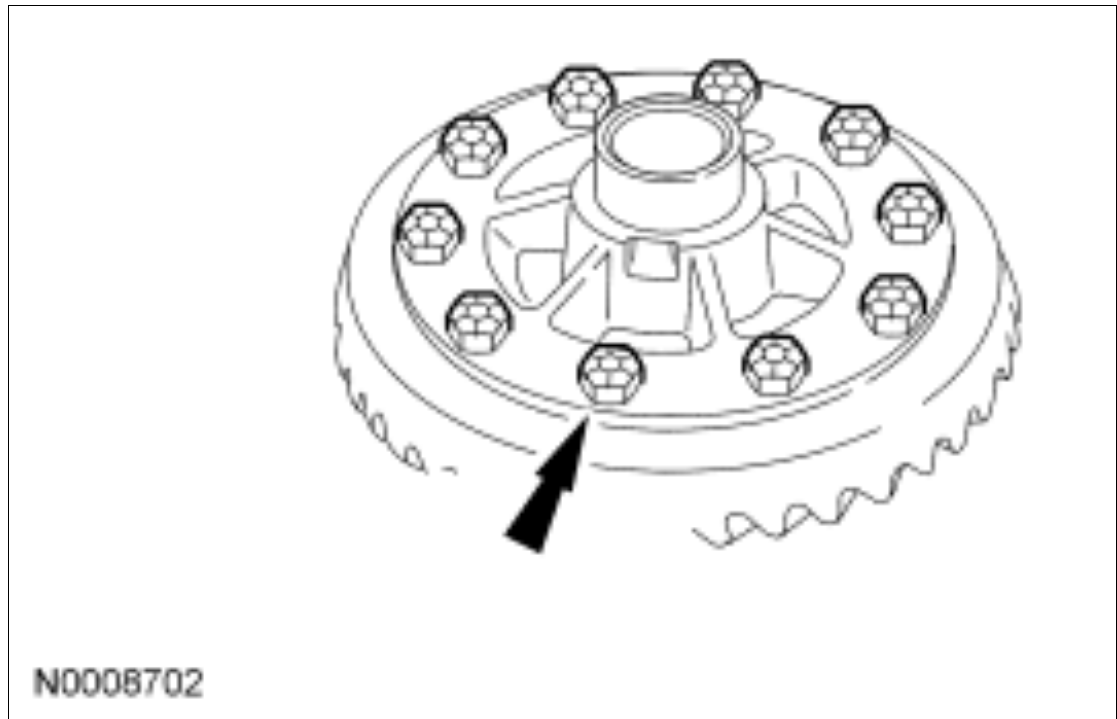
Courtesy of FORD MOTOR CO.

17. Install the differential ring gear bolts.

**NOTE:** *Apply stud and bearing mount to the differential ring gear bolts.*

1. Tighten to 105 Nm (77 lb-ft).

Fig 117: Identifying Differential Ring Gear Bolts

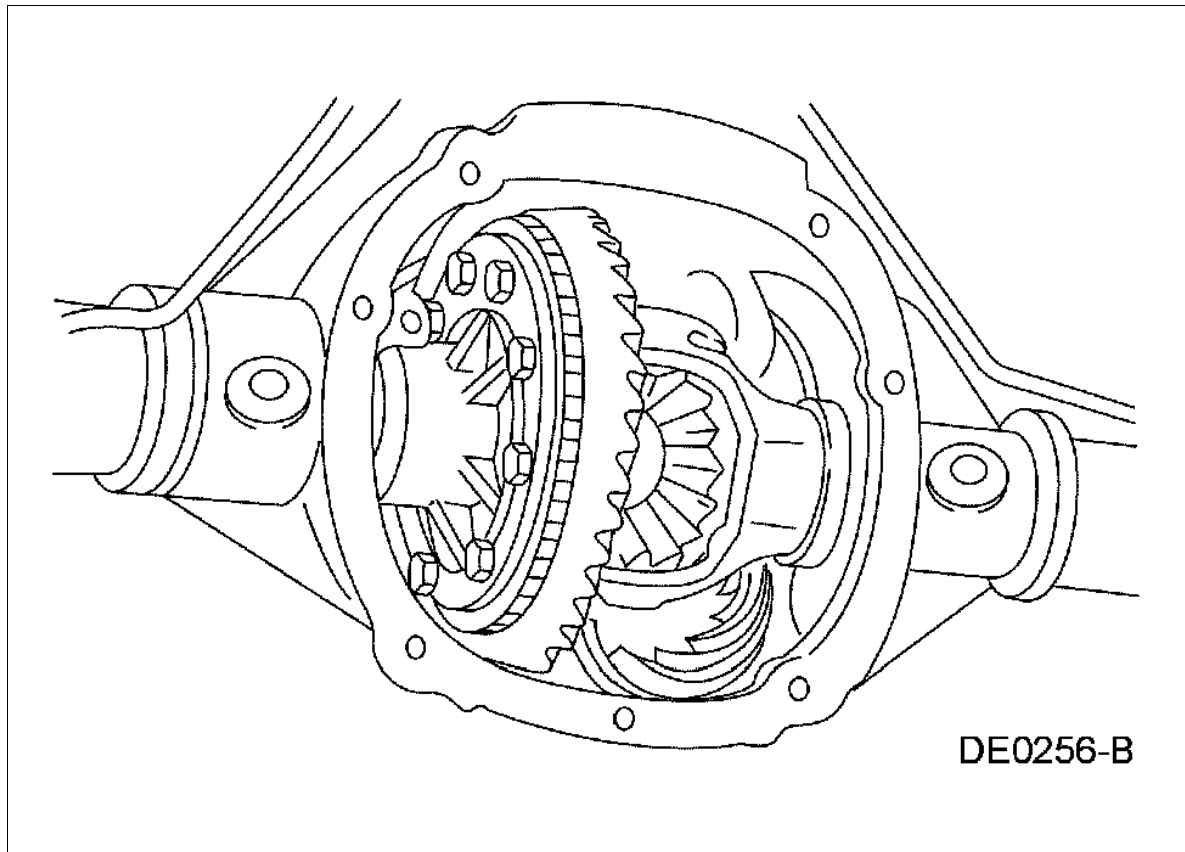


Courtesy of FORD MOTOR CO.

18. Position the differential carrier assembly and the new differential bearing cups in the differential housing.



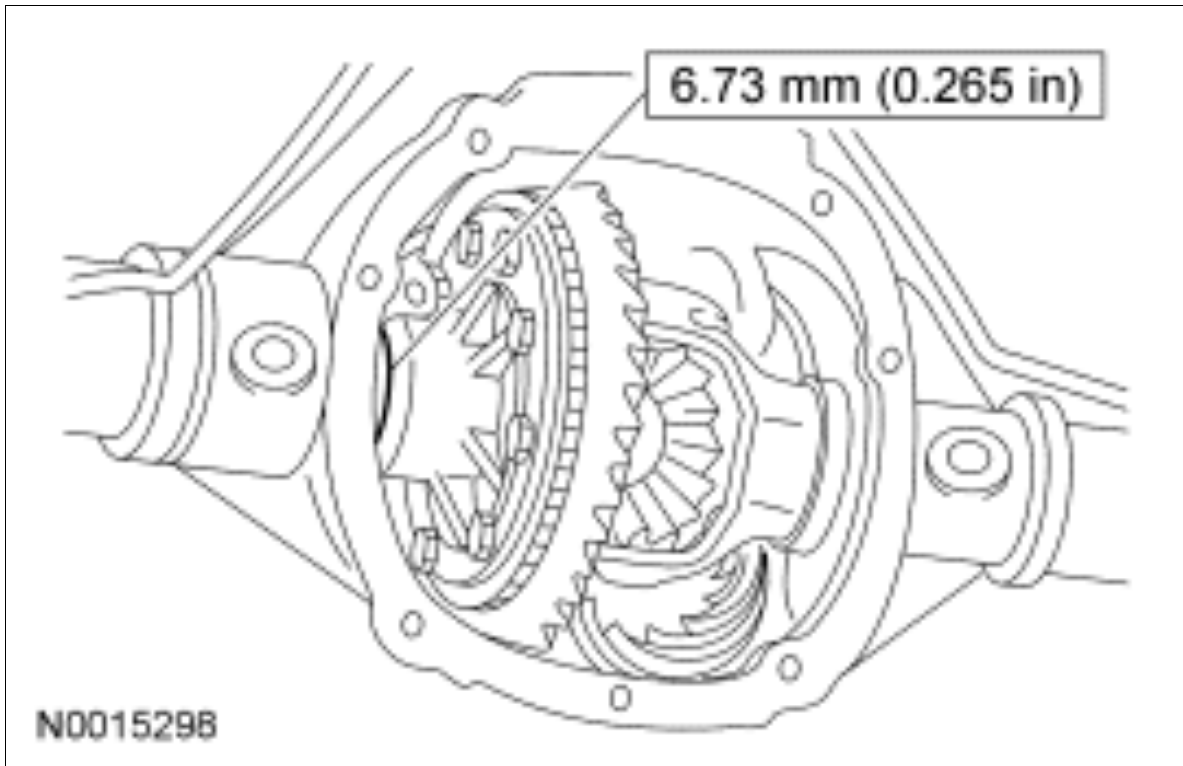
Fig 118: Placing Differential Case In Rear Axle Housing



Courtesy of FORD MOTOR CO.

19. Install a differential bearing shim of the shown dimension on the left side.

Fig 119: Installing Differential Bearing Shim



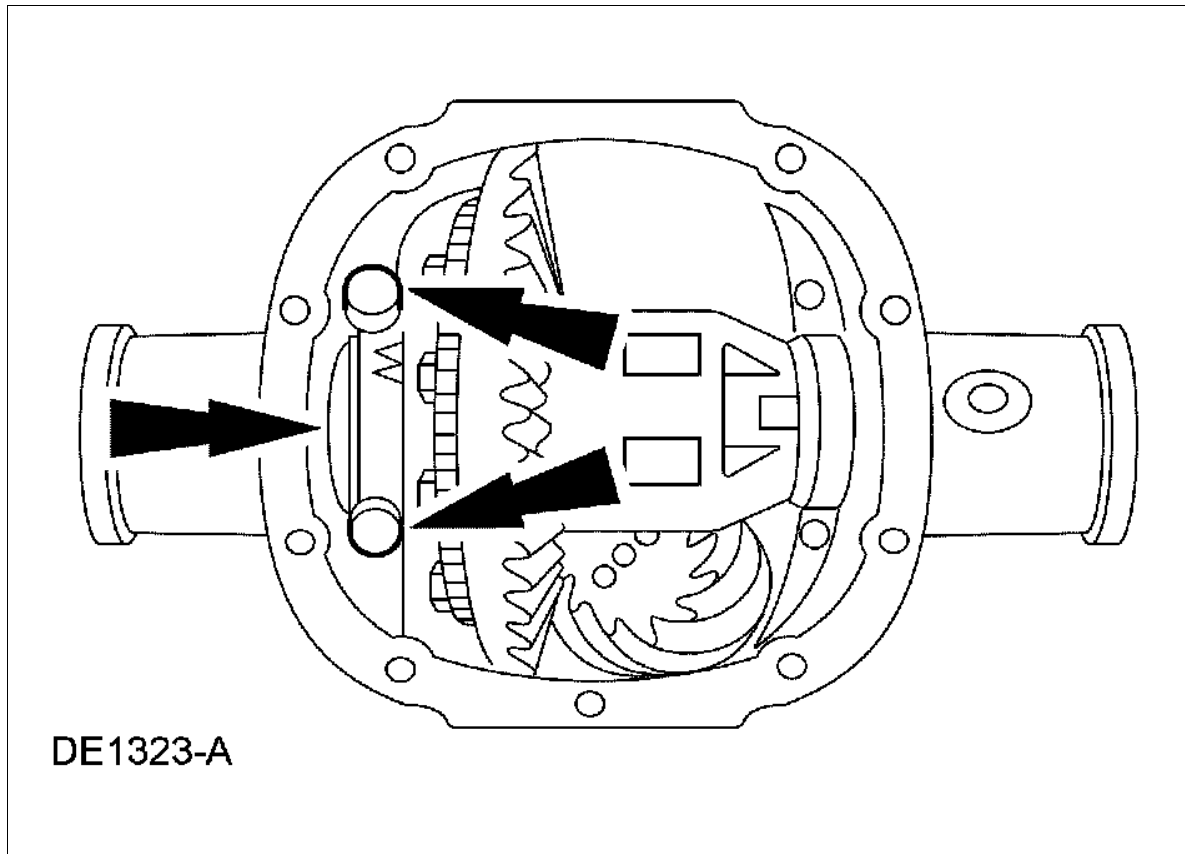
Courtesy of FORD MOTOR CO.

20. Install the LH bearing cap and loosely install the bolts.

**CAUTION:** Always install the bearing caps in their original locations and positions.

**NOTE:** Apply pressure toward the LH side to make sure the left differential bearing cup seats correctly.

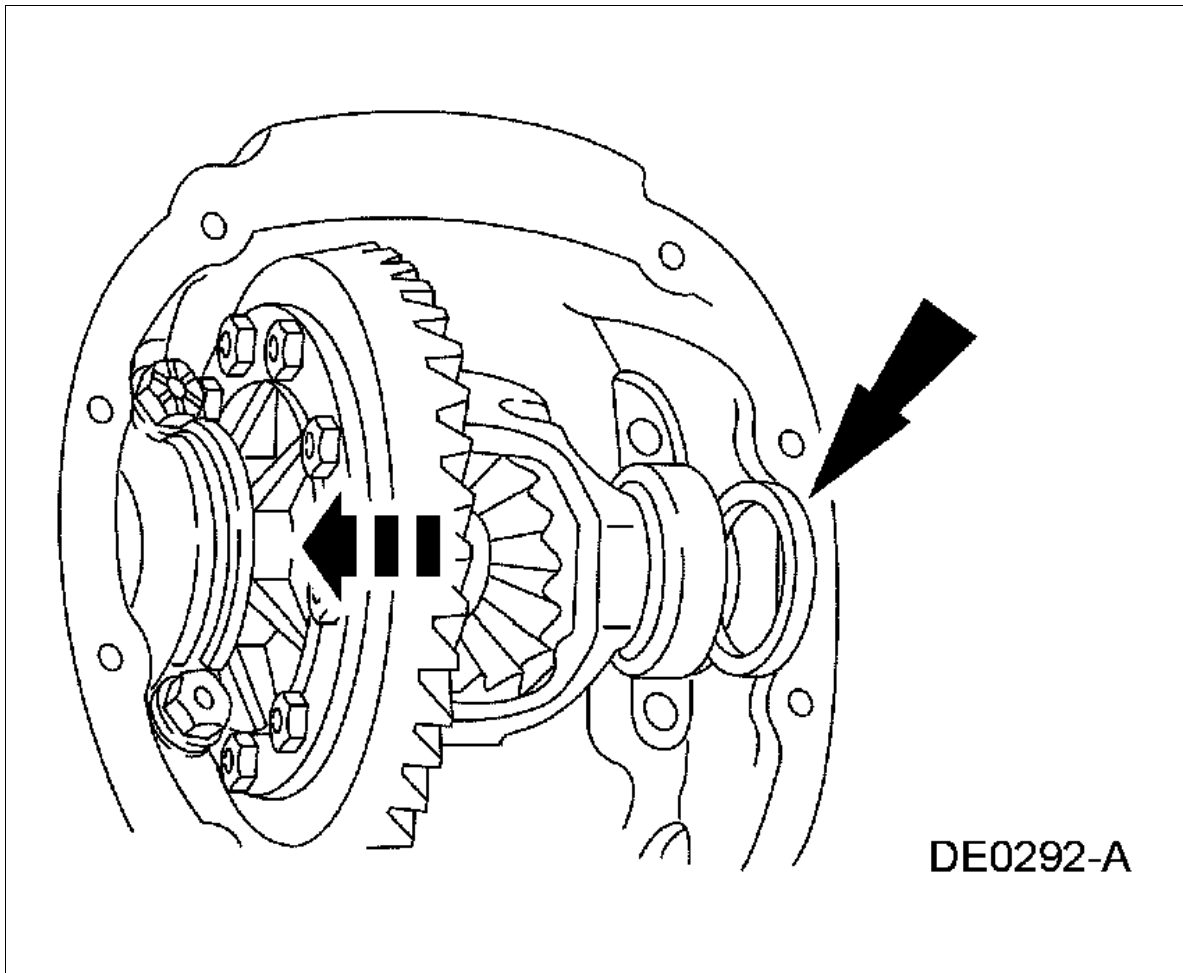
Fig 120: Identifying LH Differential Bearing Cap



Courtesy of FORD MOTOR CO.

21. Install progressively larger differential bearing shims on the RH side until the largest shim is installed by hand.

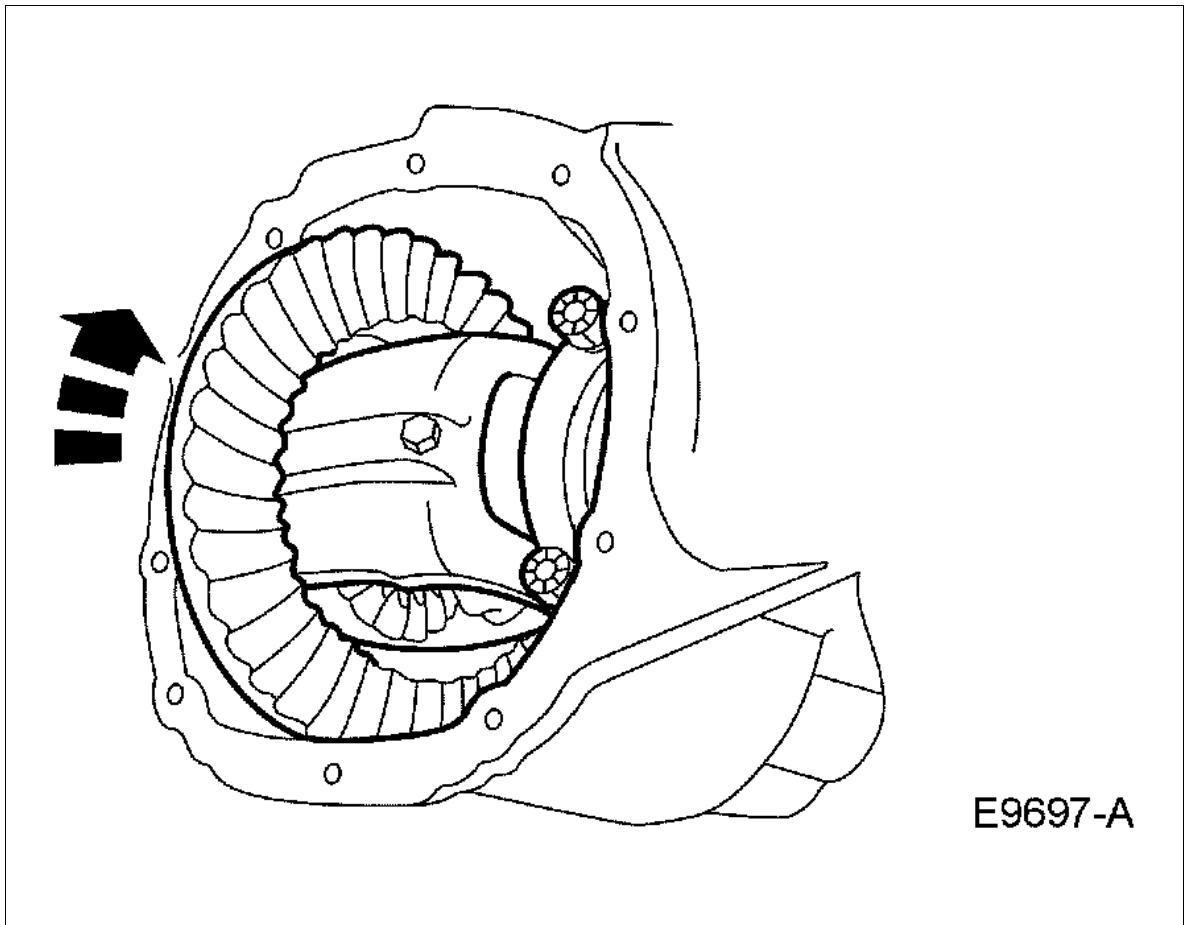
Fig 121: Installing Differential Bearing Shims



Courtesy of FORD MOTOR CO.

22. Install the right side bearing cap and bolts. Tighten the LH and RH bearing cap bolts.
  1. Tighten to 105 Nm (77 lb-ft).
23. Rotate the differential carrier several times to verify the differential bearings have seated correctly.

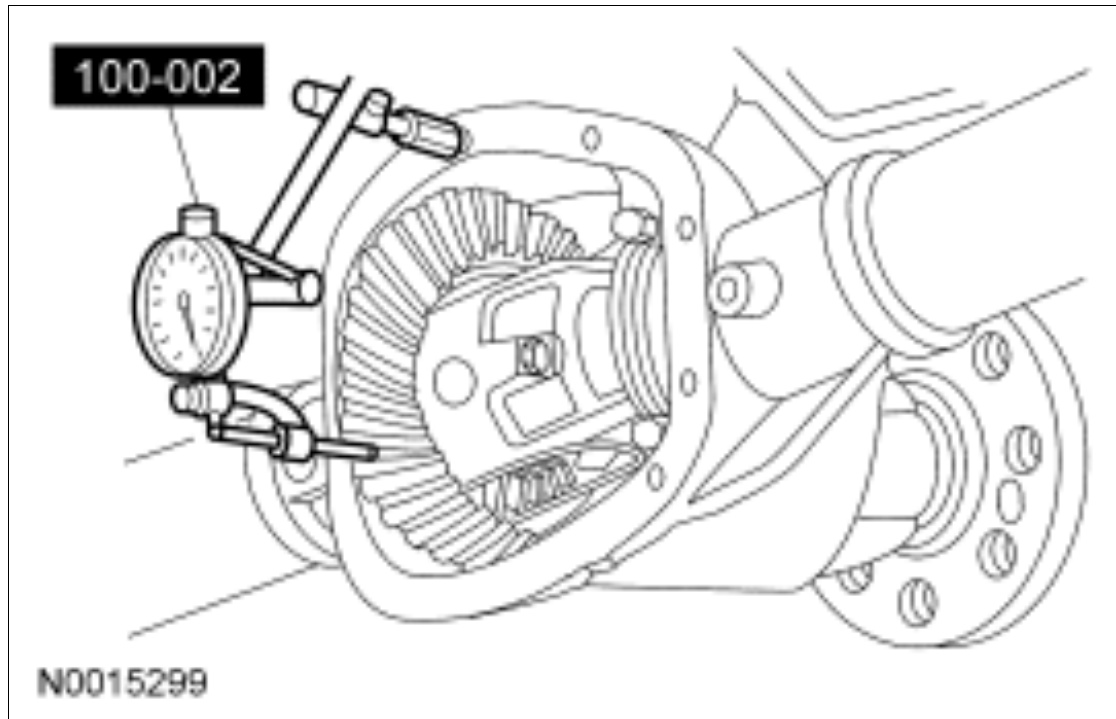
Fig 122: Rotating Differential Carrier



Courtesy of FORD MOTOR CO.

24. Install the special tools and measure the ring gear backlash.
  1. If the backlash is within specification, proceed to Step 27.
  2. If a zero backlash condition occurs, proceed to Step 25.
  3. If the backlash is not within specification, proceed to Step 26.

Fig 123: Measuring Ring Gear Backlash



Courtesy of FORD MOTOR CO.

25. If a zero backlash condition occurs, add 0.50 mm (0.020 in) to the RH hand side shim and subtract 0.50 mm (0.020 in) from the LH side shim to allow a backlash indication. Go back to Step 24.
26. To correct for high or low backlash, increase the thickness of one differential bearing shim and decrease the thickness of the other differential bearing shim by the same amount. Refer to the following BACKLASH SPECIFICATION when adjusting the backlash. When the backlash is within specification, proceed to Step 27.

**BACKLASH SPECIFICATION**

Backlash Change Required		Thickness Change Required	
mm	in	mm	in
0.025	0.001	0.050	0.002
0.050	0.002	0.050	0.002
0.076	0.003	0.101	0.004
0.101	0.004	0.152	0.006
0.127	0.005	0.152	0.006
0.152	0.006	0.203	0.008
0.177	0.007	0.254	0.010
0.203	0.008	0.254	0.010

0.228	0.009	0.304	0.012
0.254	0.010	0.355	0.014
0.279	0.011	0.355	0.014
0.304	0.012	0.406	0.016
0.330	0.013	0.457	0.018
0.335	0.014	0.457	0.018
0.381	0.015	0.508	0.020

#### DIFFERENTIAL SHIM SIZE CHART 4067

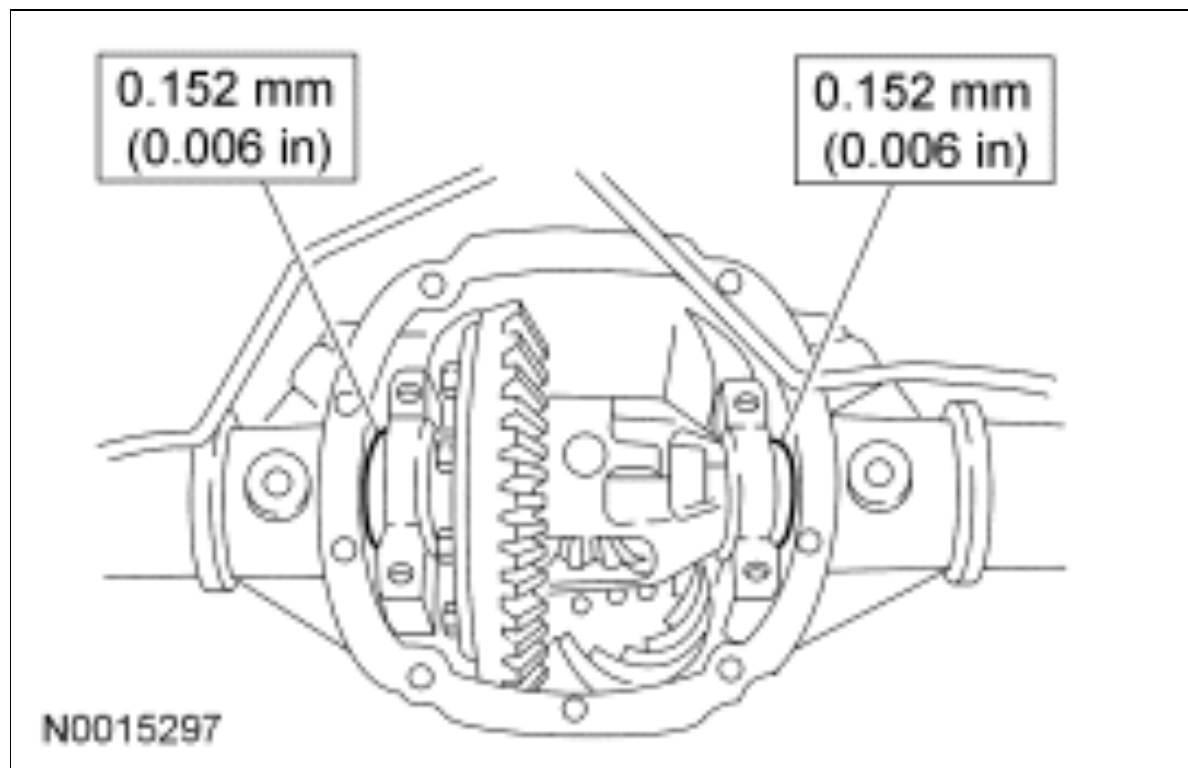
Stripes and Color Code	Dimension A	
	mm	in
2 - C-COAL	7.7978-7.8105	0.3070-0.3075
1 - C-COAL	7.7470-7.7597	0.3050-0.3055
5 - BLU	7.6962-7.7089	0.3030-0.3035
4 - BLU	7.6454-7.6581	0.3010-0.3015
3 - BLU	7.5946-7.6073	0.2990-0.2995
2 - BLU	7.5458-7.5565	0.2970-0.2975
5 - PINK	7.4422-7.4549	0.2930-0.2935
4 - PINK	7.3914-7.4041	0.2910-0.2915
3 - PINK	7.3406-7.3533	0.2890-0.2895
2 - PINK	7.2898-7.3025	0.2870-0.2875
1 - PINK	7.2390-7.2517	0.2850-0.2855
5 - GRN	7.1882-7.2009	0.2830-0.2835
4 - GRN	7.1374-7.1501	0.2810-0.2815
3 - GRN	7.0866-7.0993	0.2790-0.2795
2 - GRN	7.0358-7.0485	0.2770-0.2775
1 - GRN	6.9850-7.0485	0.2750-0.2755
5 - WH	6.9342-6.9469	0.2730-0.2735
4 - WH	6.8834-6.8961	0.2710-0.2715
3 - WH	6.8326-6.8453	0.2690-0.2695
2 - WH	6.7818-6.7945	0.2670-0.2675
1 - WH	6.7310-6.7437	0.2650-0.2655
5 - YEL	6.6802-6.6929	0.2630-0.2635

4 - YEL	6.6294-6.6421	0.2610-0.2615
3 - YEL	6.5786-6.5913	0.2590-0.2595
2 - YEL	6.5278-6.5405	0.2570-0.2575
1 - YEL	6.4770-6.4897	0.2550-0.2555
5 - ORNG	6.4262-6.4389	0.2530-0.2535
4 - ORNG	6.3754-6.3881	0.2510-0.2515
3 - ORNG	6.3246-6.3373	0.2490-0.2495
2 - ORNG	6.2738-6.2865	0.2470-0.2475
1 - ORNG	6.2223-6.2357	0.2450-0.2455
2 - RED	6.1722-6.1849	0.2430-0.2435
1 - RED	6.1214-6.1341	0.2410-0.2415

27. Remove the bearing cap bolts and bearing caps.

28. To establish differential bearing preload, increase both LH and RH differential bearing shim size by the thickness shown.

Fig 124: Identifying Shim Thickness

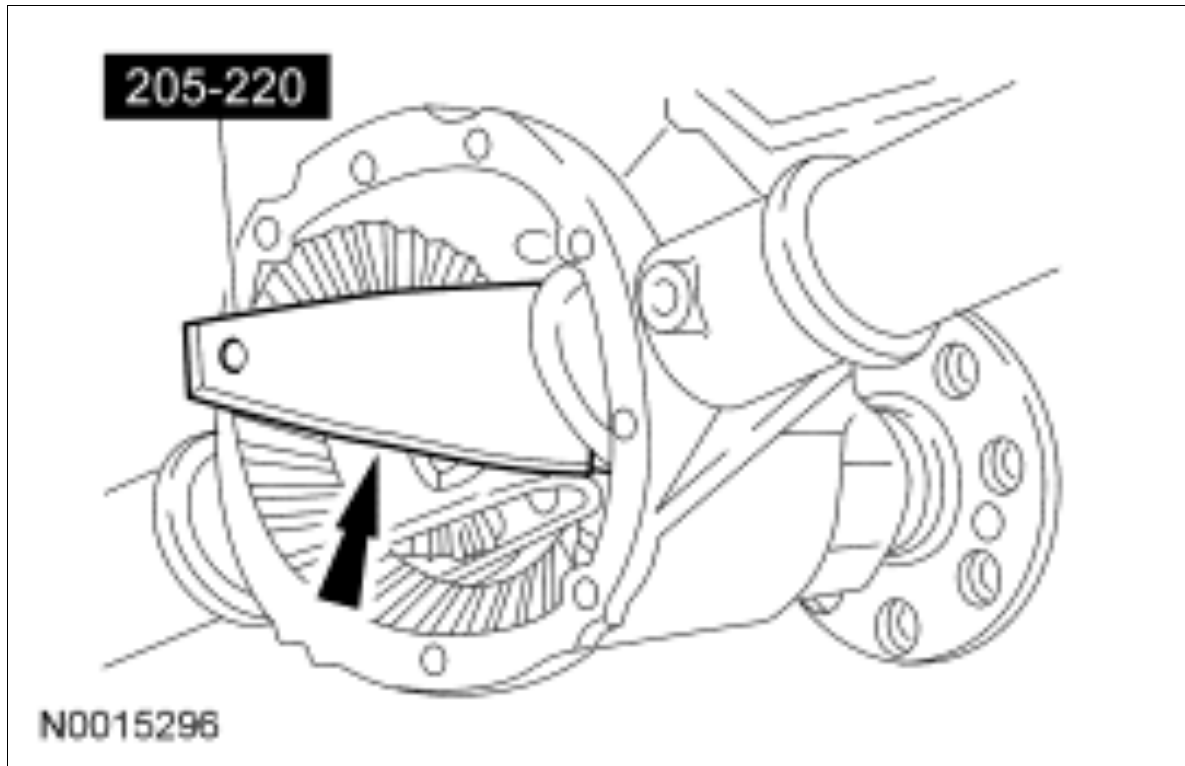


Courtesy of FORD MOTOR CO.

29. Using the special tool, fully seat the differential bearing shims. Make sure the assembly rotates freely.



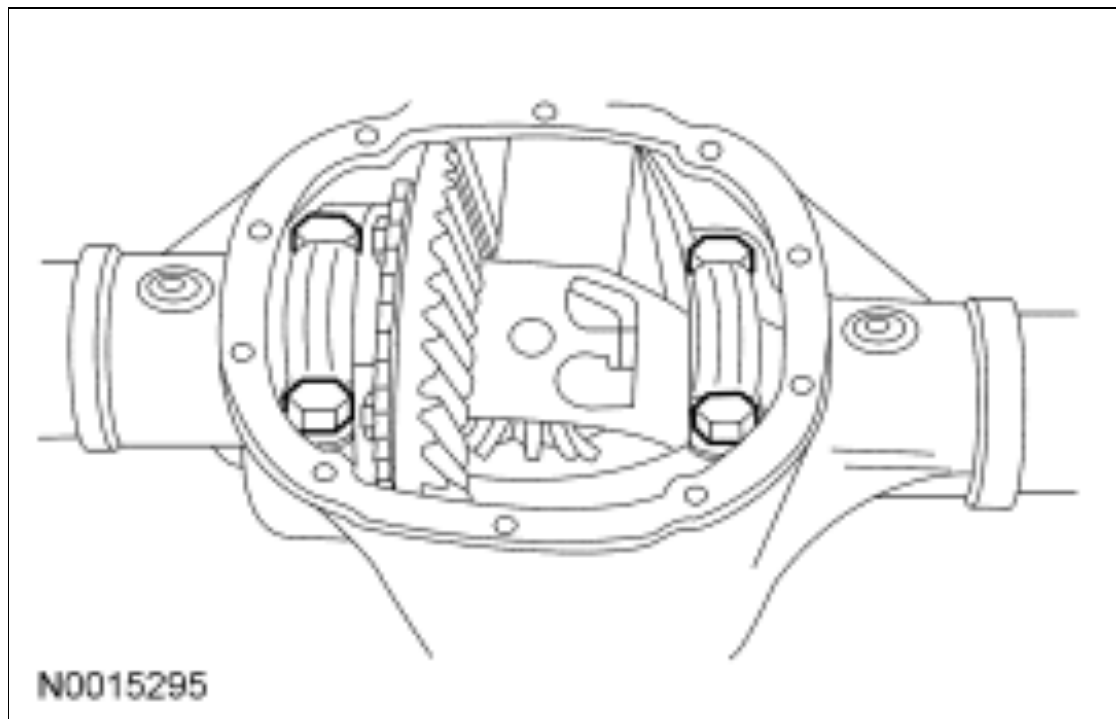
Fig 125: Installing Differential Bearing Shims



Courtesy of FORD MOTOR CO.

30. Install the bearing caps and bolts.
  1. Tighten to 105 Nm (77 lb-ft).

Fig 126: Identifying Bearing Caps And Bolts



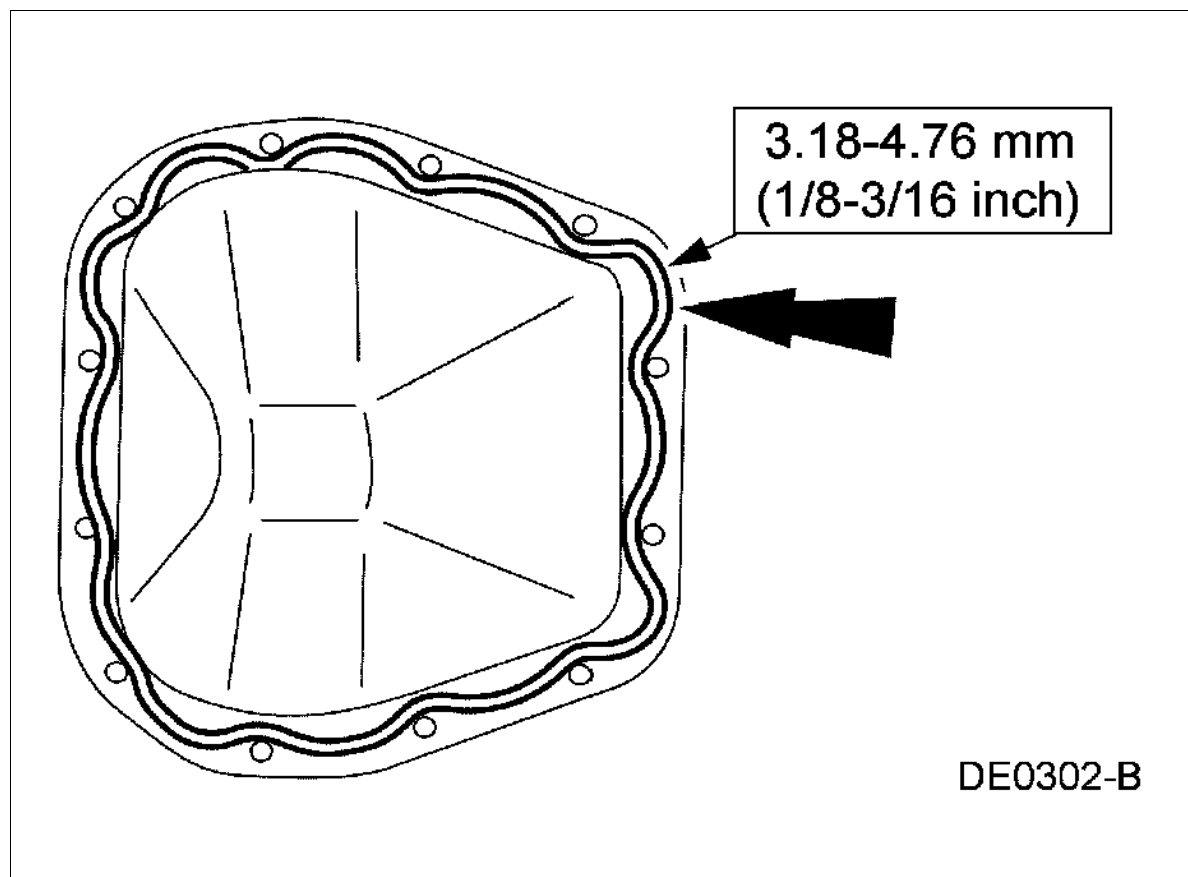
Courtesy of FORD MOTOR CO.

31. Using the special tools, recheck the ring gear backlash.
32. Apply marking compound and rotate the differential assembly 5 complete revolutions.
33. Verify an acceptable pattern check.
34. Install the axle shafts. For additional information, refer to AXLE SHAFT.
35. Clean the gasket mating surface of the axle and the differential housing cover.

**CAUTION:** *Make sure the machined surfaces on both the axle housing and the differential housing cover are clean and free of oil before applying the new silicone sealant. The inside of the axle must be covered when cleaning the machined surface to prevent contamination.*

36. Apply a new, continuous bead of sealant to the differential housing cover.

Fig 127: Applying A New Continuous Bead Of Sealant To Differential Housing Cover



Courtesy of FORD MOTOR CO.

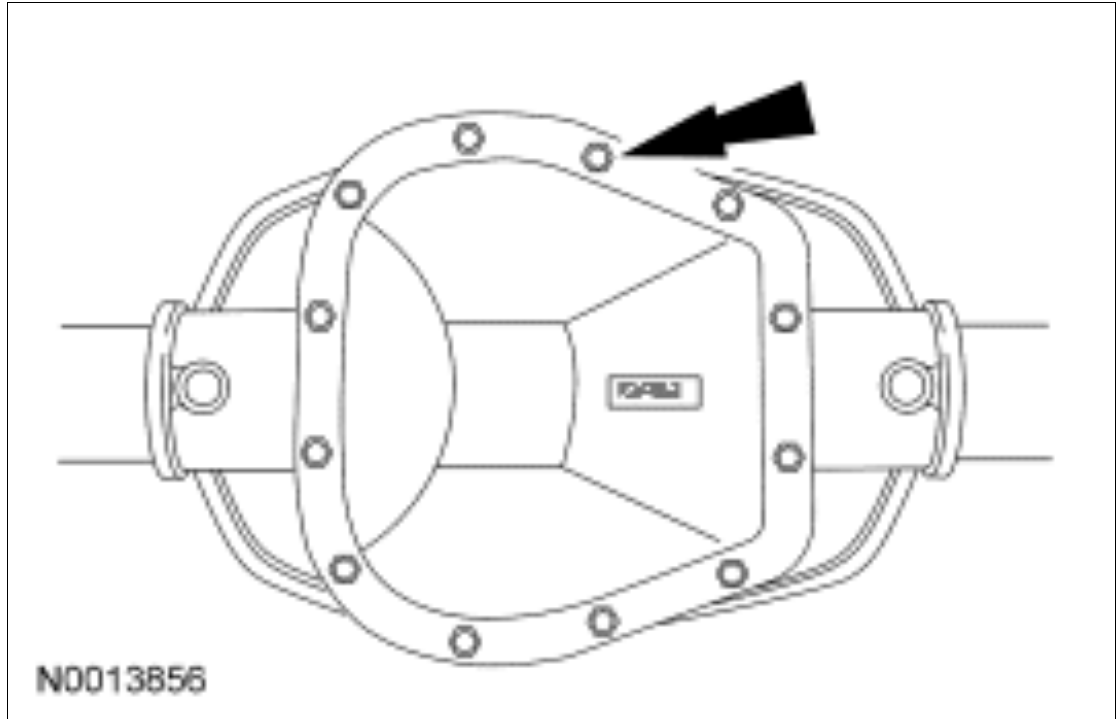
37. Install the differential housing cover and the differential housing cover bolts.

**NOTE:** *The differential housing cover must be installed*

*within 15 minutes of application of the silicone, or new sealant must be applied. If possible, allow one hour before filling with lubricant to ensure the silicone sealant has properly cured.*

1. Tighten to 45 Nm (33 lb-ft).

Fig 128: Identifying Differential Housing Cover



Courtesy of FORD MOTOR CO.

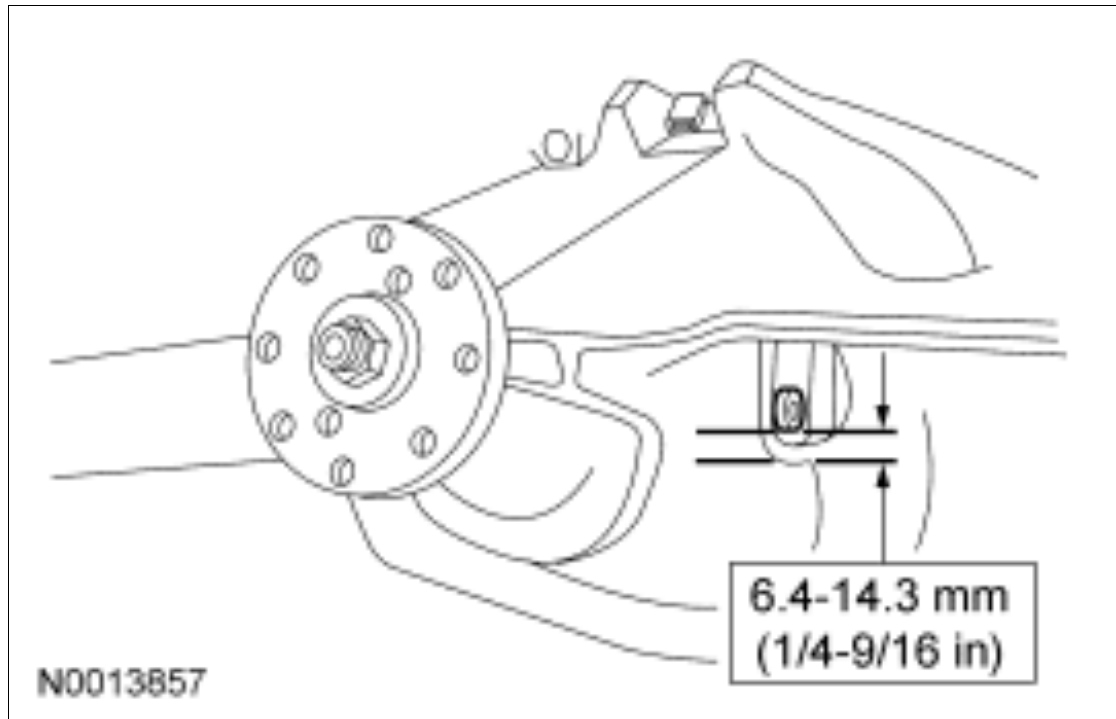
38. Fill the axle to the level shown with axle lubricant and install the filler plug.

**CAUTION:** For Traction-Lok® axles, first fill the axle with 118 ml (4 ounces) of friction modifier.

**NOTE:** Service refill capacities are determined by filling the axle with the specified lubricant to the specified level below the bottom of the filler hole.

1. Tighten to 30 Nm (22 lb-ft).

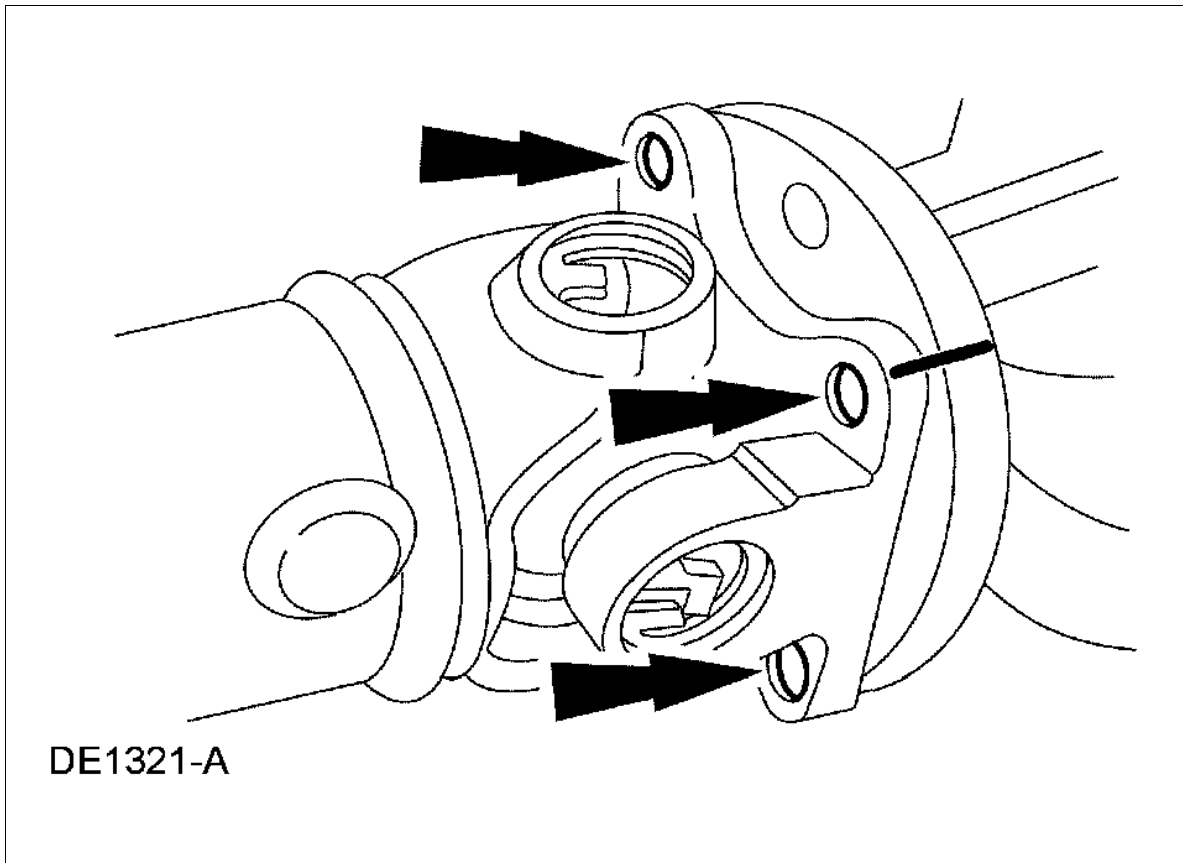
Fig 129: Checking Axle Lubricant Fill Level



Courtesy of FORD MOTOR CO.

39. Position the driveshaft and align the index marks on the pinion flange.

Fig 130: Positioning Driveshaft And Align Marks On Pinion Flange



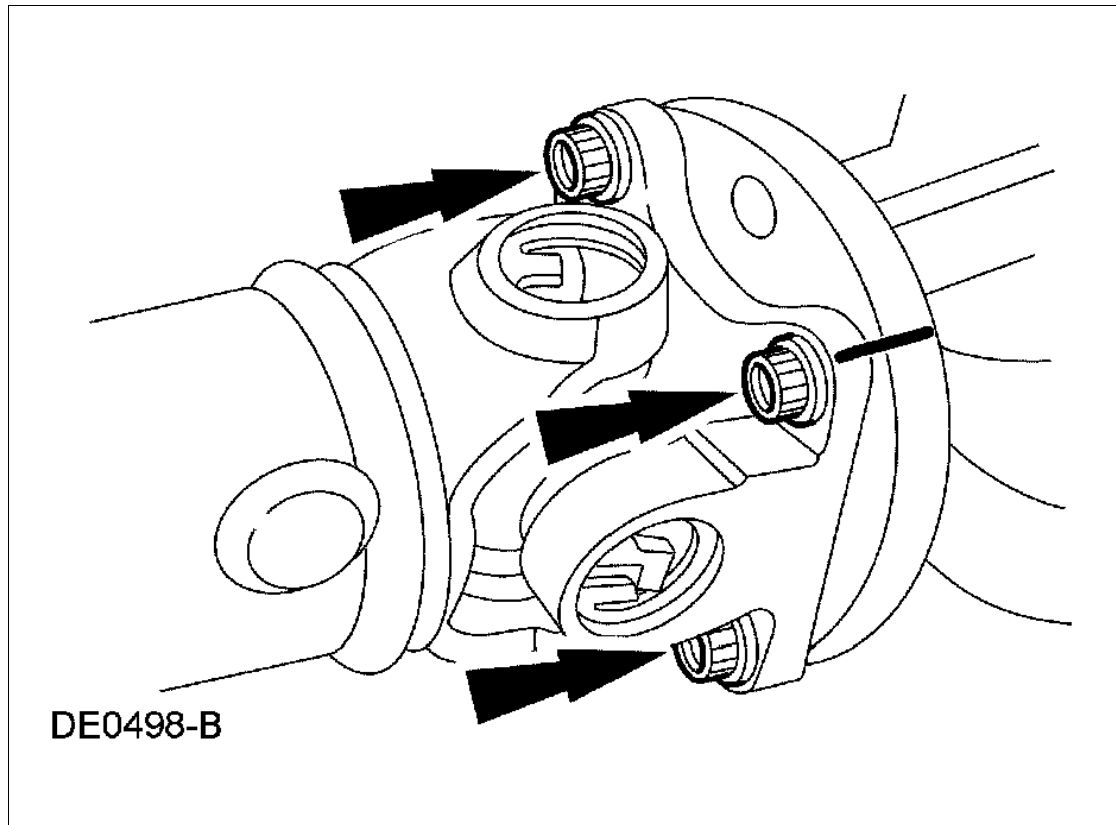
Courtesy of FORD MOTOR CO.

40. Install the driveshaft flange bolts.

**CAUTION:** *The driveshaft centering socket yoke fits tightly on the pinion flange pilot. To make sure that the driveshaft centering socket yoke seats squarely on the pinion flange, tighten the driveshaft flange bolts evenly in a cross pattern.*

1. Tighten to 103 Nm (76 lb-ft).

Fig 131: Identifying Index-Mark To Driveshaft And Flange Bolts



Courtesy of FORD MOTOR CO.

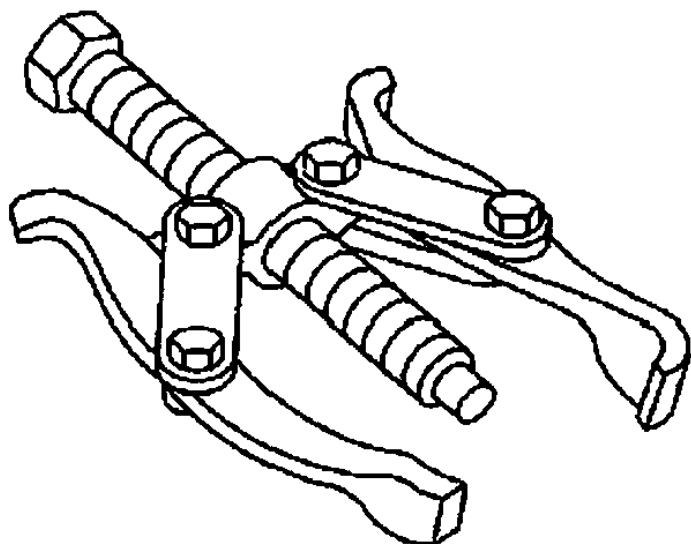
41. Lower the vehicle.

**WARNING:** If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .

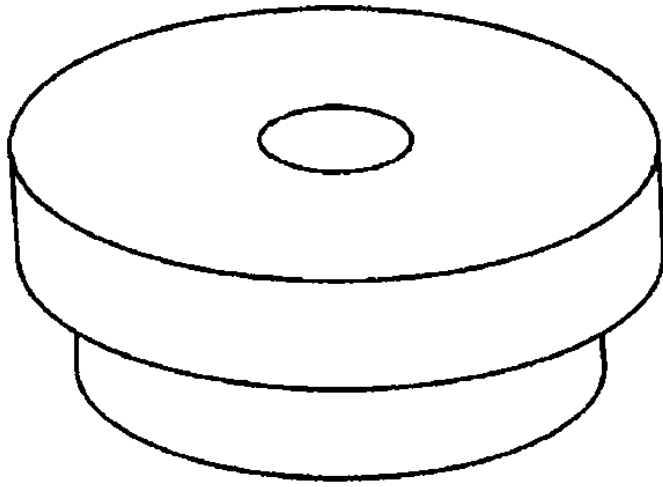
## Differential Bearings

### SPECIAL TOOL CHART

	2-Jaw Puller 205-D072 (D79L-4221-A1)
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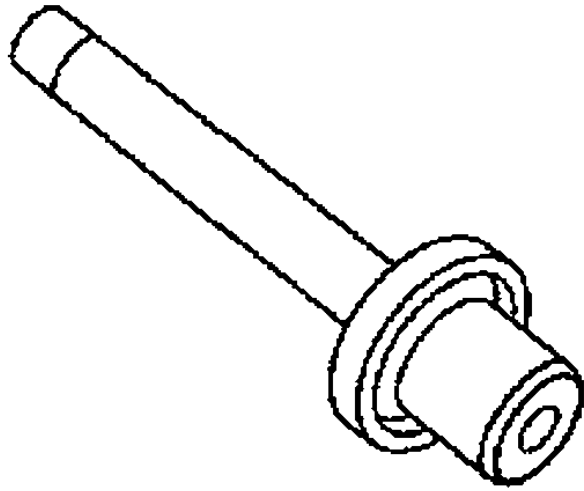
**ST2026-A**



**ST1543-A**

Step Plate 205-D061 (D83T-4205-C2)

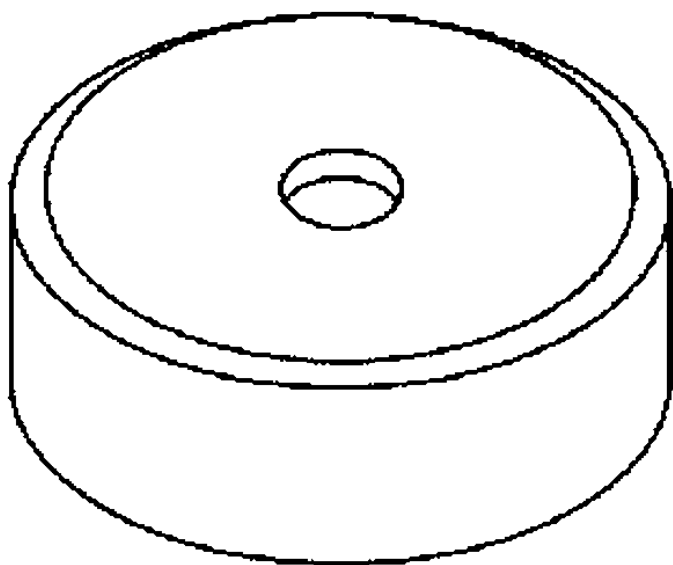




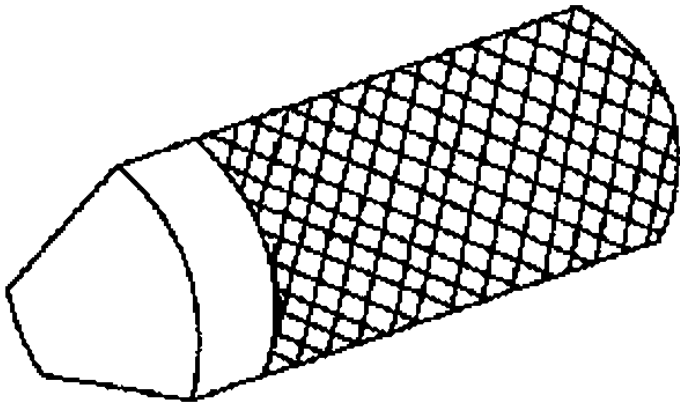
**ST1375-A**

Installer, Differential Side Bearing  
205-010 (T57L-4221-A2)

Adapter For 205-S127 205-105 (T76P-  
4020-A3)



**ST1743-A**



Adapter For 205-S 127 205-111 (T76P-4020-A11)

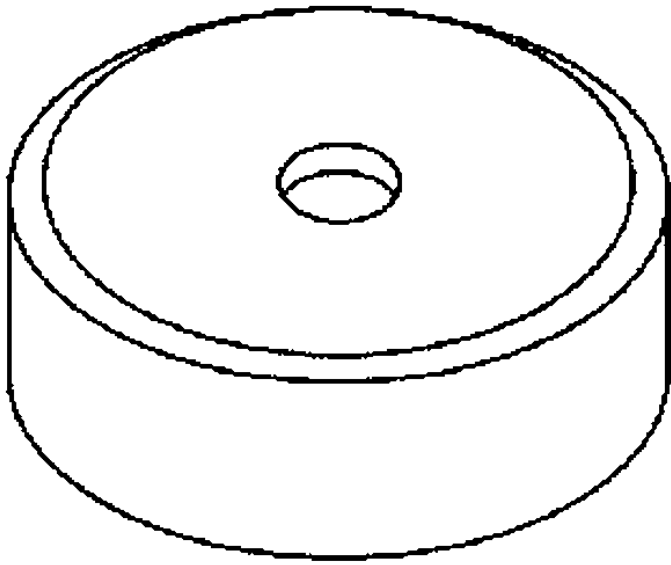
**ST1432-A**



Adapter For 205-S 127 205-109 (T76P-4020-A9)

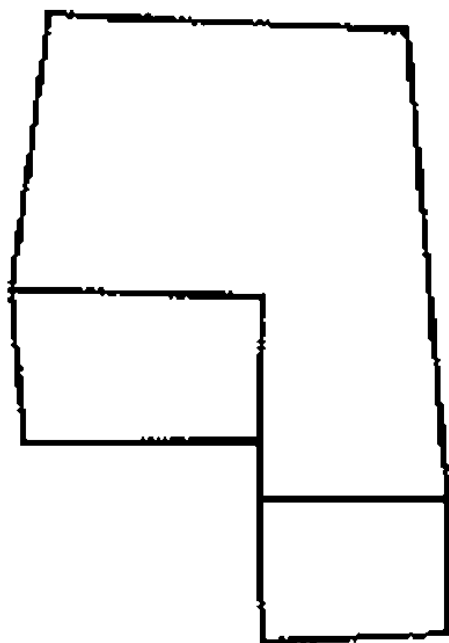
**ST1429-A**

Adapter For 205-S 127 205-129 (T79P-4020-A18)



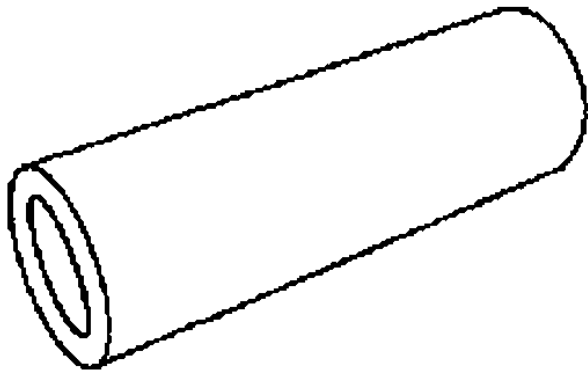
**ST1743-A**

Adapter For 205-S 127 205-110 (T76P-4020-A10)



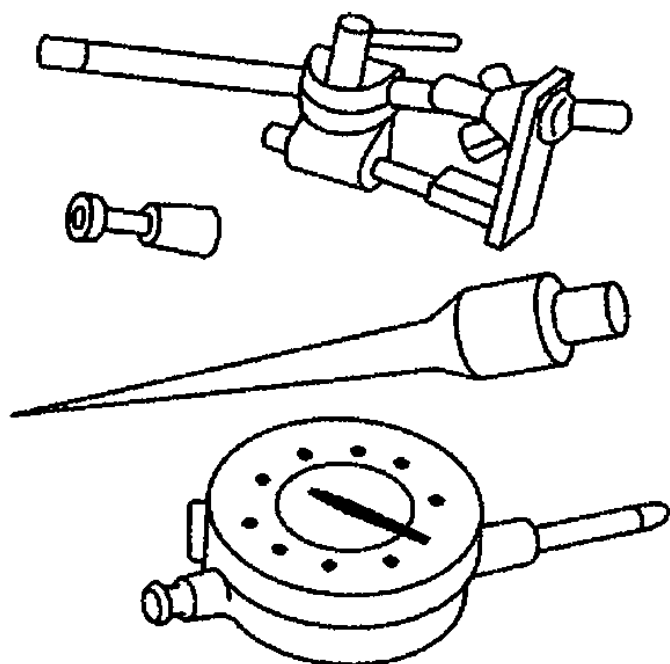
**ST1431-A**

Adapter For 205-S 127 205-130 (T79P-4020-A19)



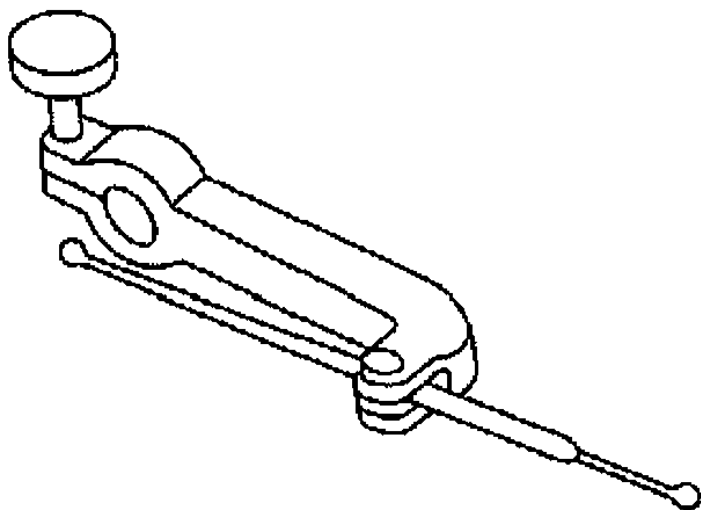
**ST1434-A**

Dial Indicator with Holding Fixture  
100-002 (TOOL-4201-C)

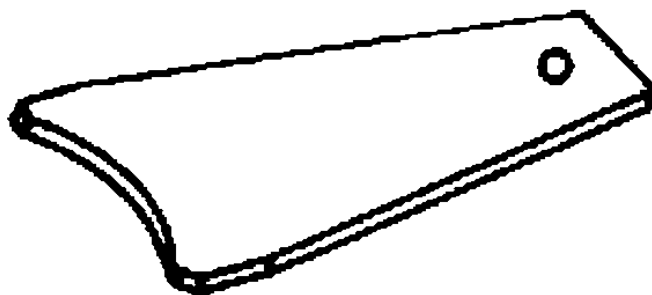


ST1214-A

Gauge, Clutch Housing 308-021 (T57L-4201-A)



**ST1348-A**

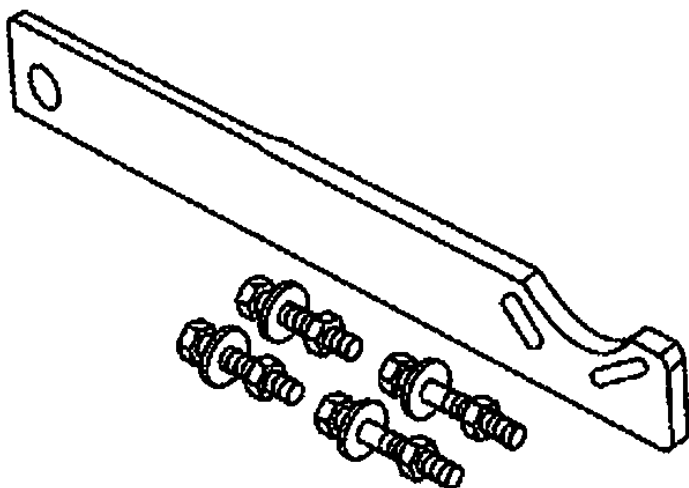


**ST1485-A**

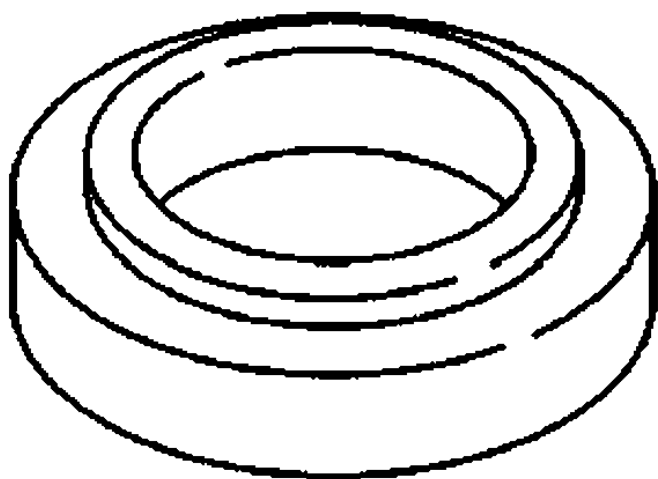
Shim Driver 205-220 (T85L-4067-AH)

Holding Fixture, Drive Pinion Flange  
205-126 (T78P-4851-A)



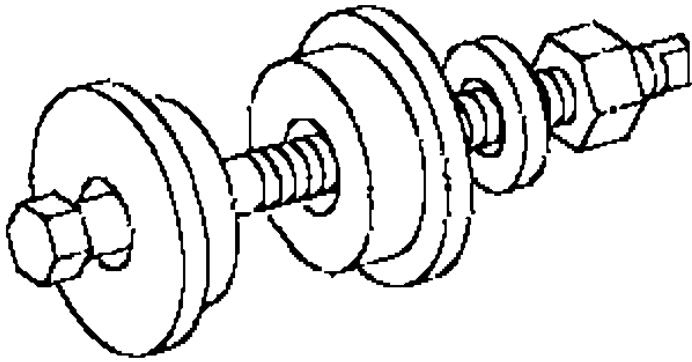


**ST1257-A**



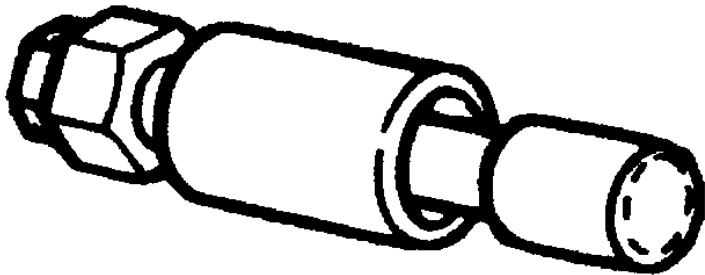
**ST1367-A**

Installer, Drive Pinion Bearing Cone  
205-005 (T53T-4621-C)



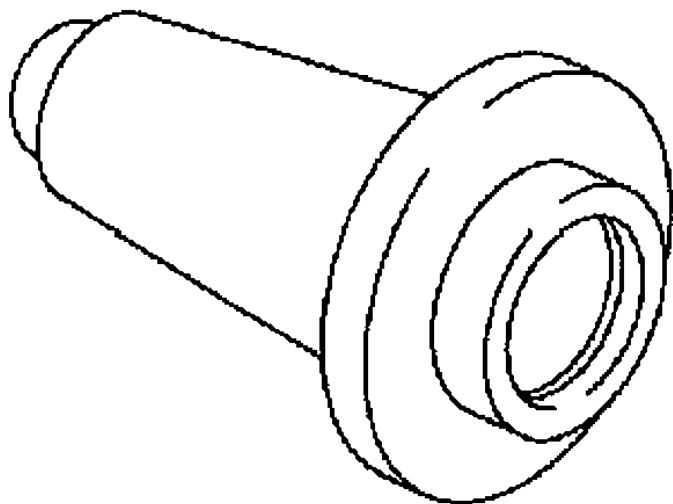
**ST1678-A**

Installer, Drive Pinion Bearing Cup  
205-024 (T67P-4616-A)

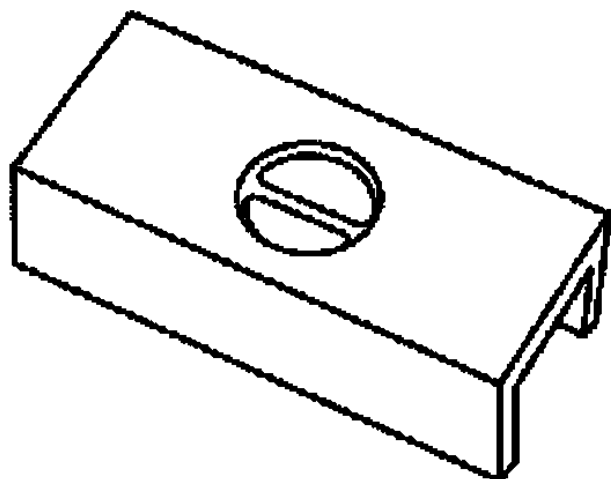


Installer, Drive Pinion Flange 205-002  
(TOOL-4858-E)

Installer, Drive Pinion Oil Seal 205-208  
(T83T-4676-A)

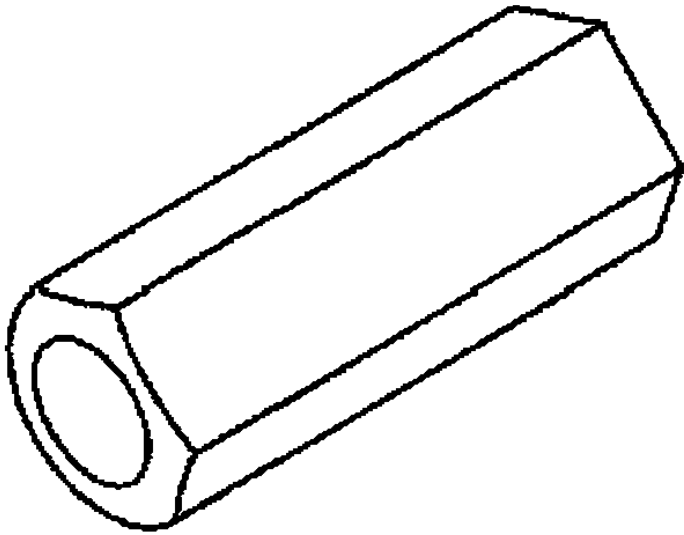


**ST1325-A**



**ST1254-A**

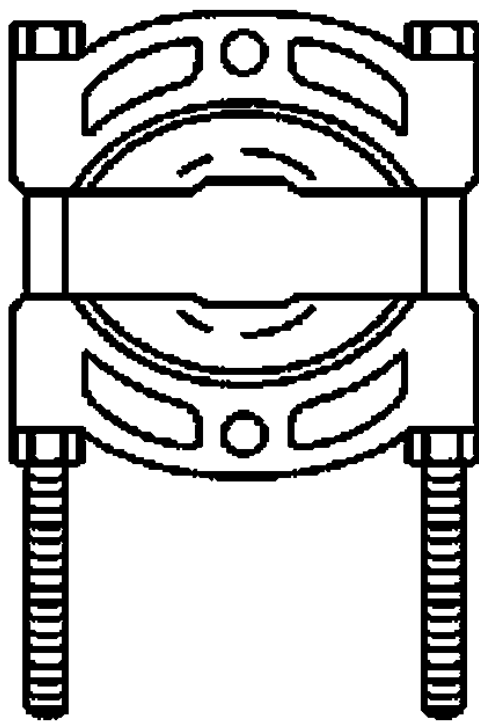
Plate, Bearing Oil Seal 205-090 (T75L-1165-B)



**ST1744-A**

Protector, Drive Pinion Thread 205-460

Puller, Bearing 205-D064 (D84L-1123-A) or equivalent

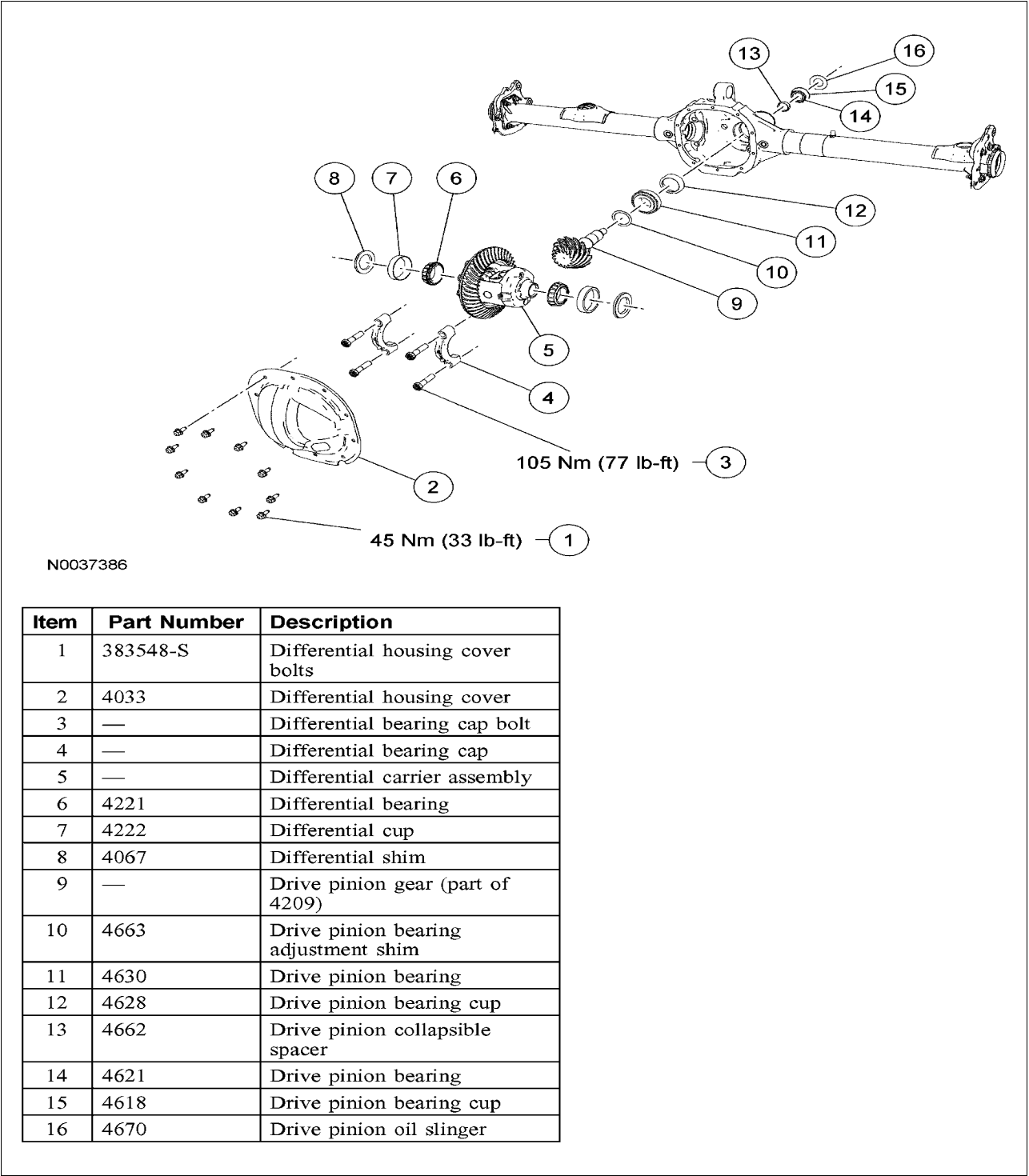


**ST1368-A**

#### **MATERIAL SPECIFICATION**

Item	Specification
Motorcraft SAE 75W-140 High Performance Rear Axle Lubricant XY-75W140-QL (vehicles with the trailer towing option or 4 : 10 ratio)	WSL- M2C192-A
Additive Friction Modifier XL-3	EST- M2C118-A

Fig 132: Identifying Differential Assembly Components



Courtesy of FORD MOTOR CO.

Removal

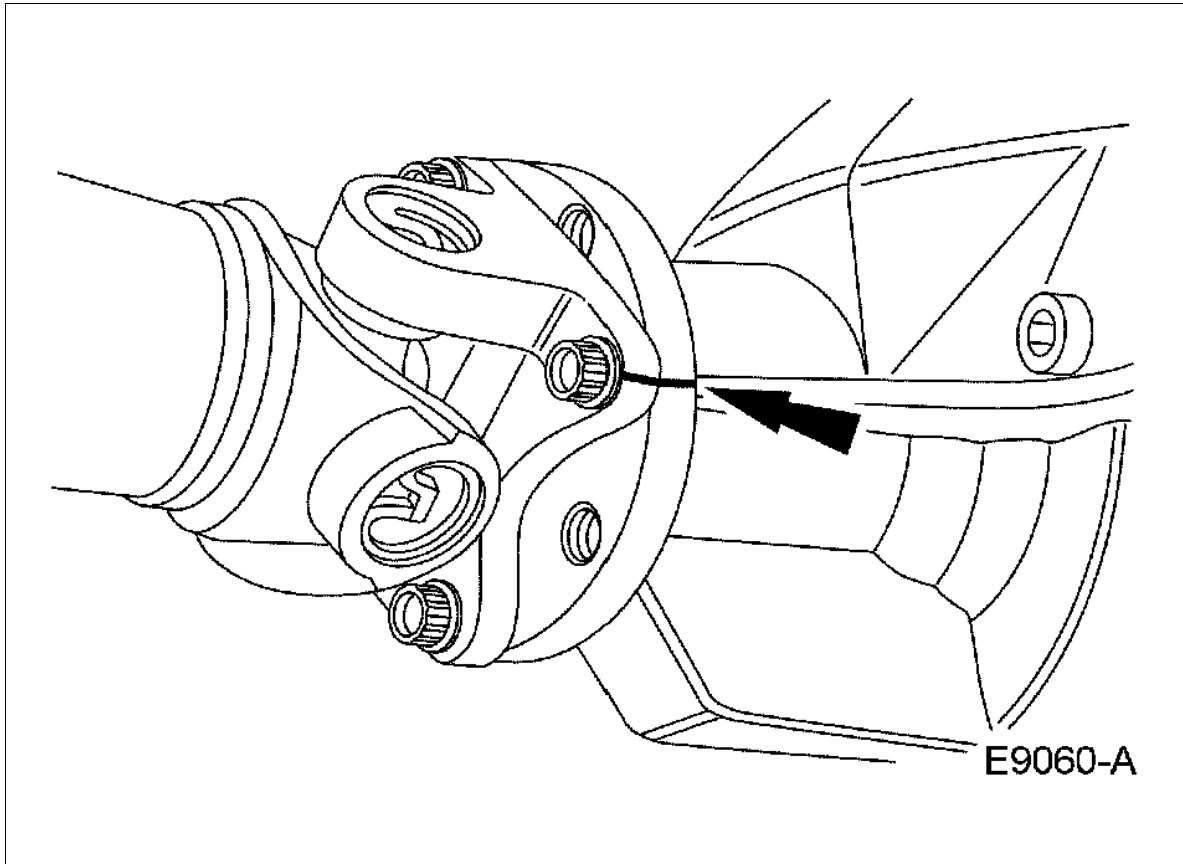
- 1. Remove the differential carrier assembly. For additional information, refer to DIFFERENTIAL CARRIER.

**WARNING:** If equipped with fire suppression system,

*depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

2. Index-mark the driveshaft flange and pinion flange for correct alignment during installation.

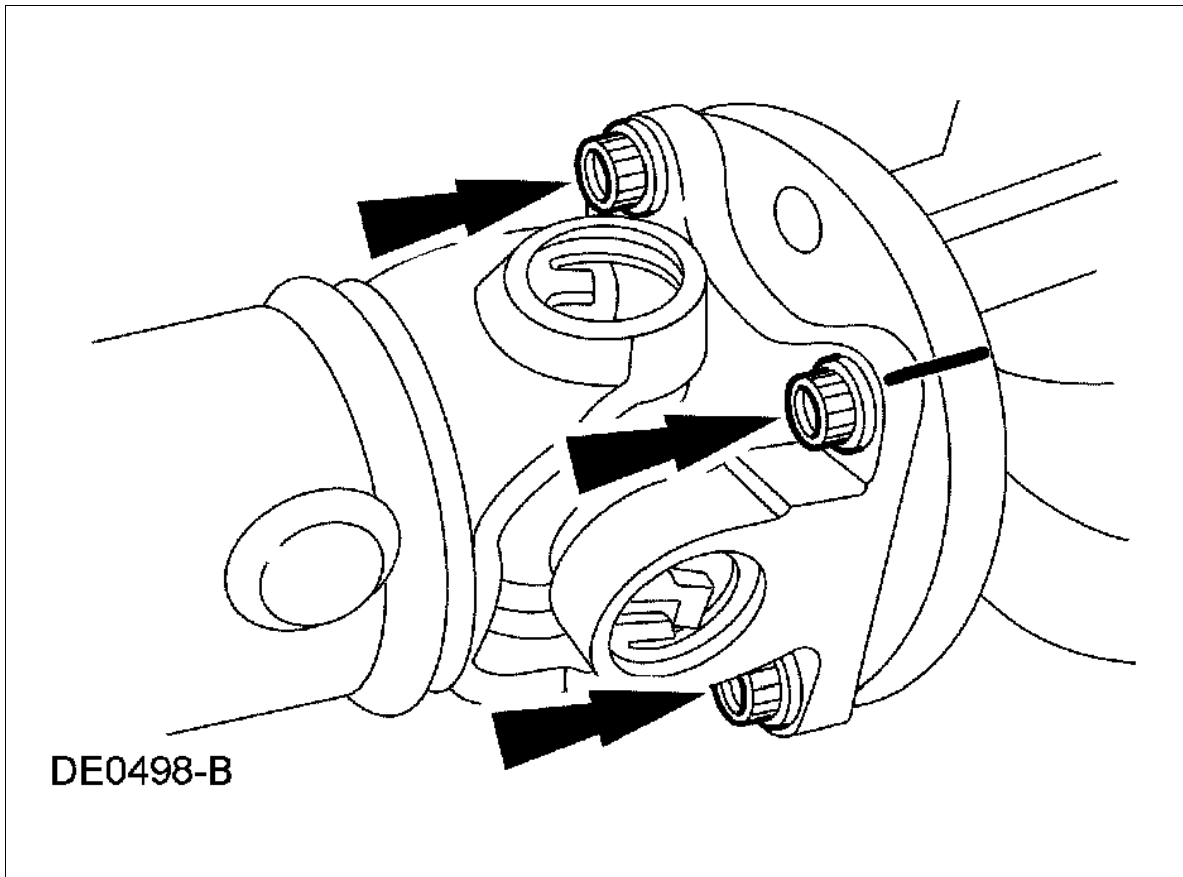
Fig 133: Identifying Index-Mark Driveshaft Flange And Pinion Flange



Courtesy of FORD MOTOR CO.

3. Remove the 4 driveshaft flange bolts.

Fig 134: Identifying Index-Mark To Driveshaft And Flange Bolts



Courtesy of FORD MOTOR CO.

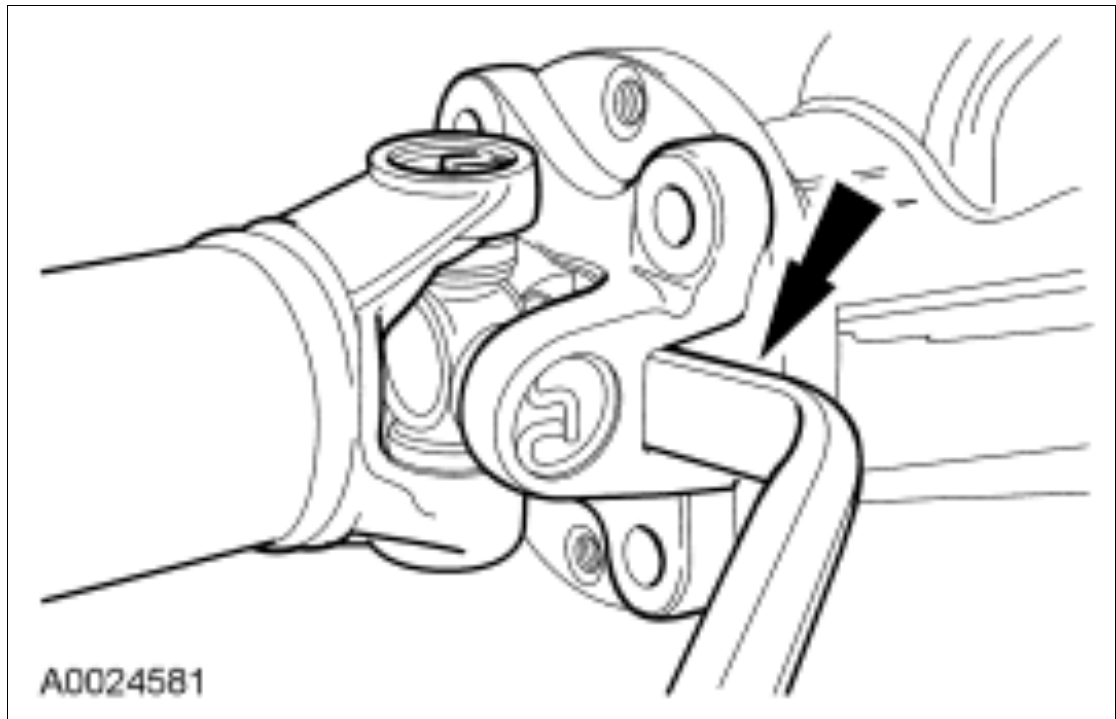
4. Using a suitable tool as shown, disconnect the driveshaft centering socket yoke from the pinion flange.

**CAUTION:** *The driveshaft centering socket yoke fits tightly on the pinion flange pilot. Never hammer on the driveshaft or any of its components to disconnect the driveshaft centering socket yoke from the pinion flange. Pry only in the area shown with a suitable tool to disconnect the driveshaft centering socket yoke from the pinion flange.*

1. Using mechanic's wire, position the driveshaft aside.



Fig 135: Disconnecting Driveshaft Flange Yoke From Pinion Flange

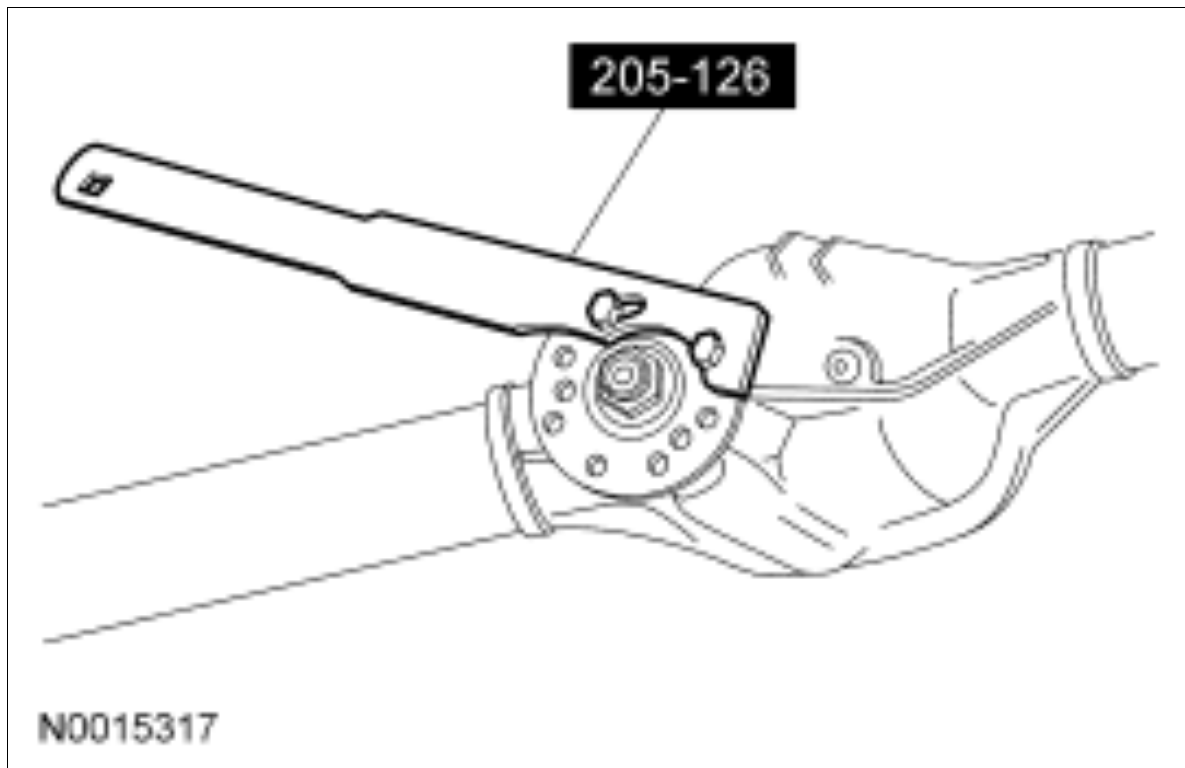


Courtesy of FORD MOTOR CO.

5. Use the special tool to hold the pinion flange while removing the drive pinion nut.

**CAUTION:** *Discard the nut after removal. Use a new nut during installation.*

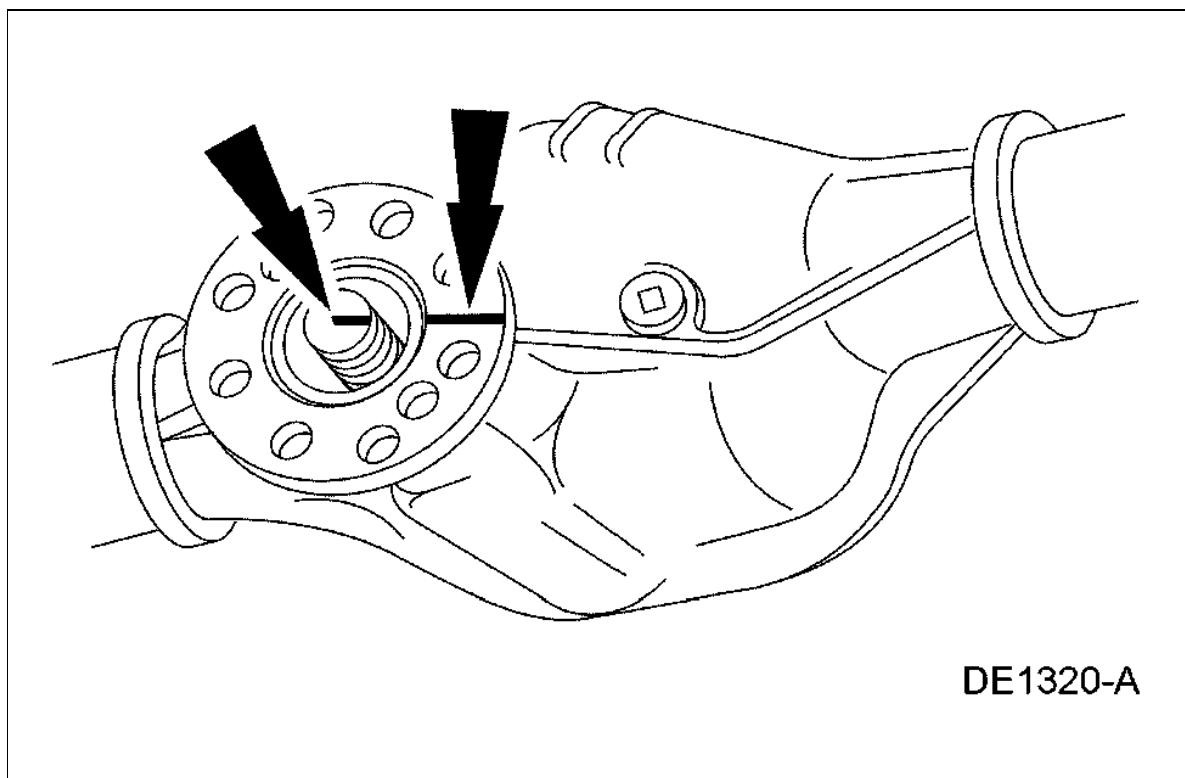
Fig 136: Holding Pinion Flange Using Special Tool



Courtesy of FORD MOTOR CO.

6. Index-mark the pinion flange and the drive pinion stem for correct alignment during installation.

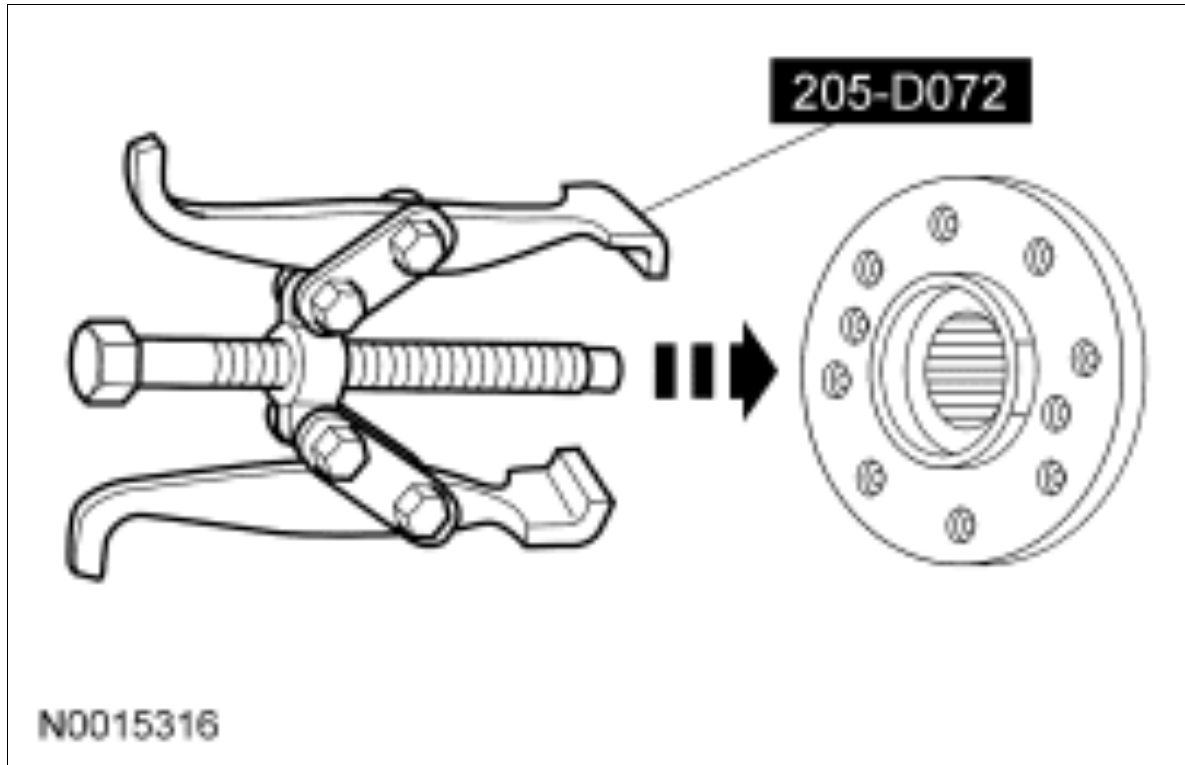
Fig 137: Identifying Pinion Flange And Drive Pinion Shaft Alignment Marks



Courtesy of FORD MOTOR CO.

7. Using the special tool, remove the pinion flange.

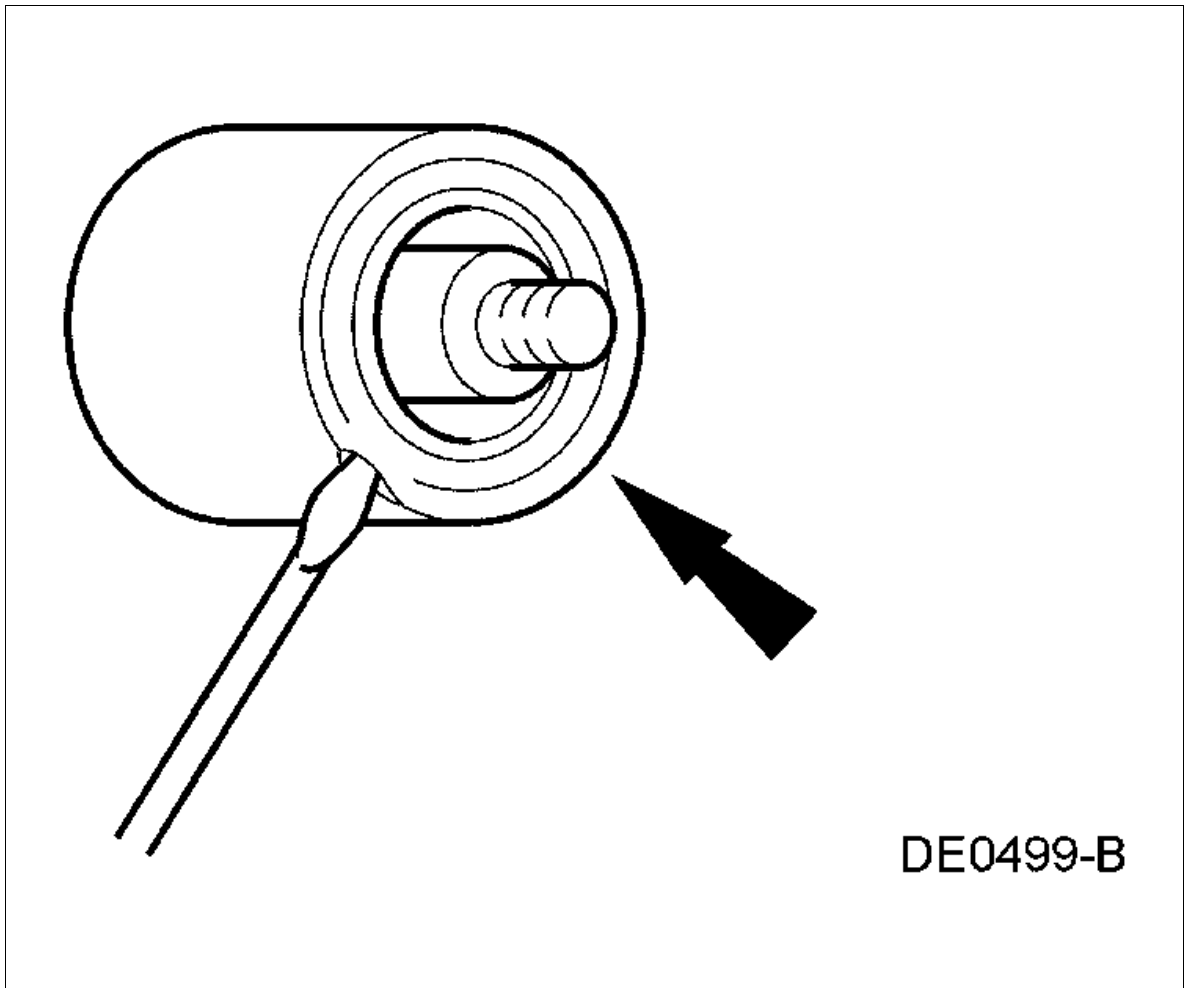
Fig 138: Removing Pinion Flange Using Special Tool



Courtesy of FORD MOTOR CO.

8. Using a screwdriver, force up the rear axle drive pinion seal metal flange.

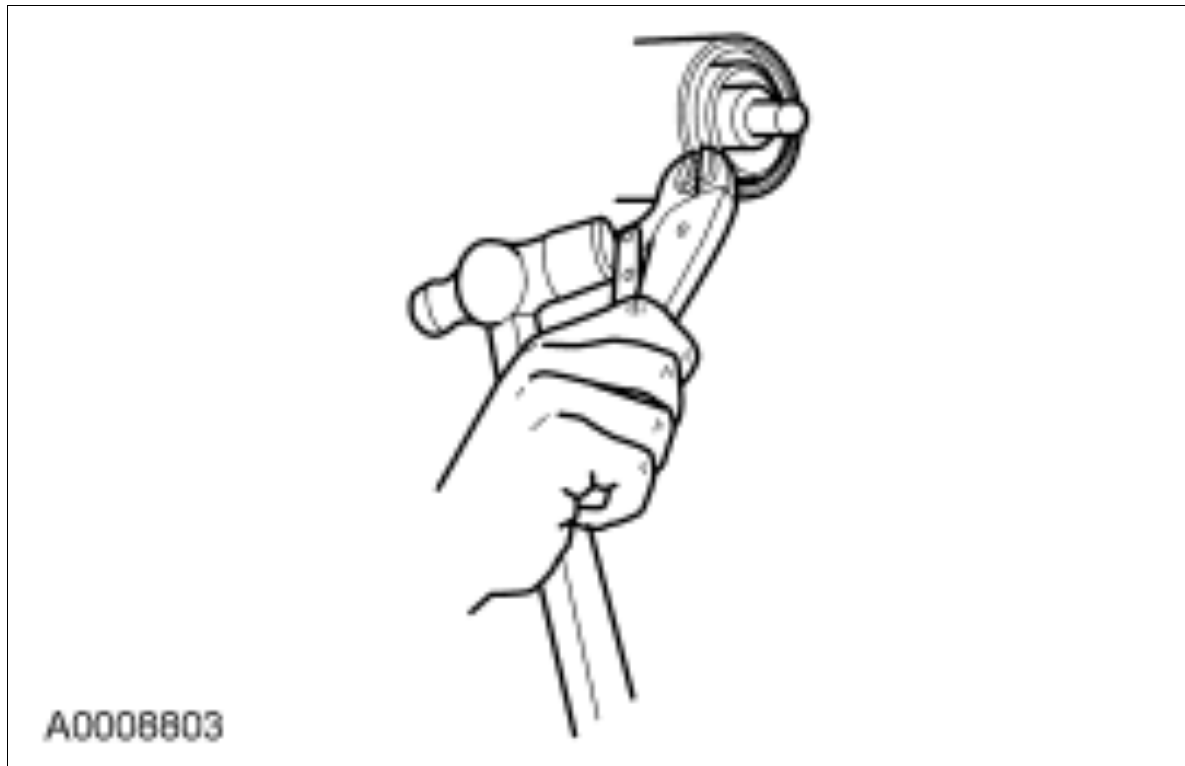
Fig 139: Inserting Screwdriver Into Rear Axle Drive Pinion Seal Metal Flange



Courtesy of FORD MOTOR CO.

9. Using gripping pliers and a hammer, remove the axle drive pinion seal.

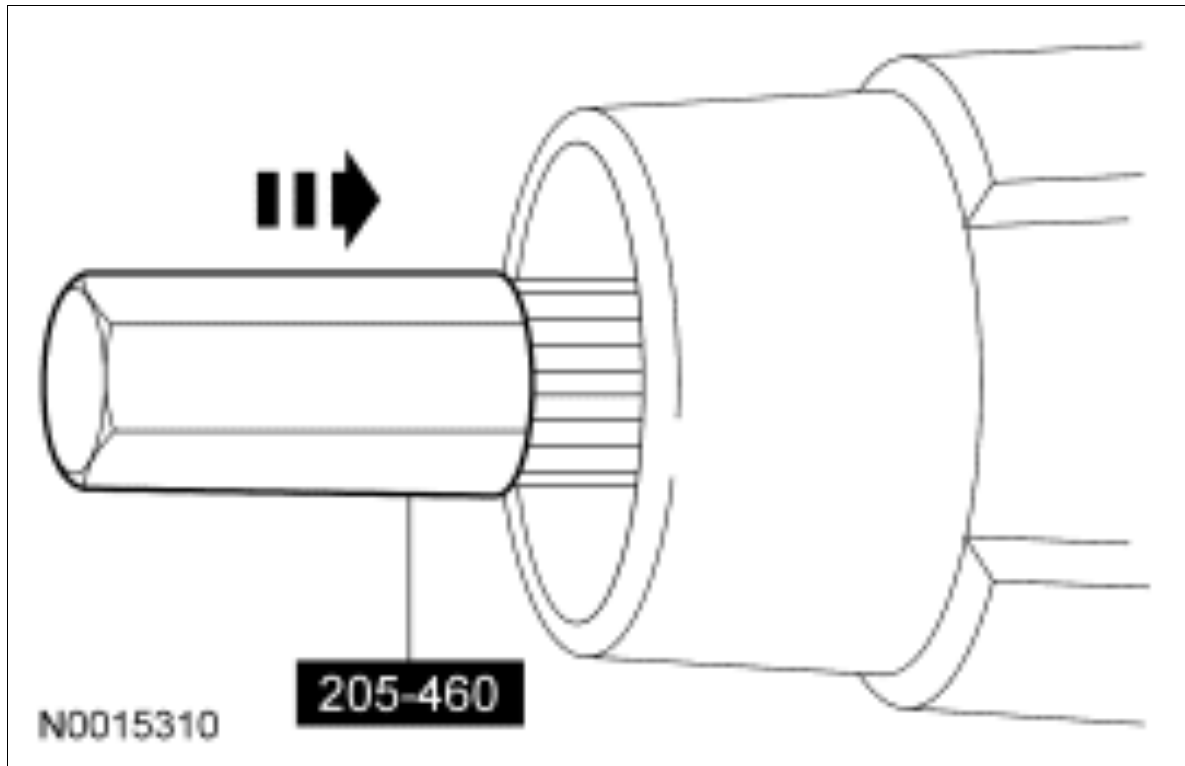
Fig 140: Removing Drive Pinion Seal



Courtesy of FORD MOTOR CO.

10. Remove the axle drive pinion shaft oil slinger.
11. Using the special tool and a soft-faced hammer, drive the pinion assembly out of the outer pinion bearing and remove it through the rear of the differential housing.

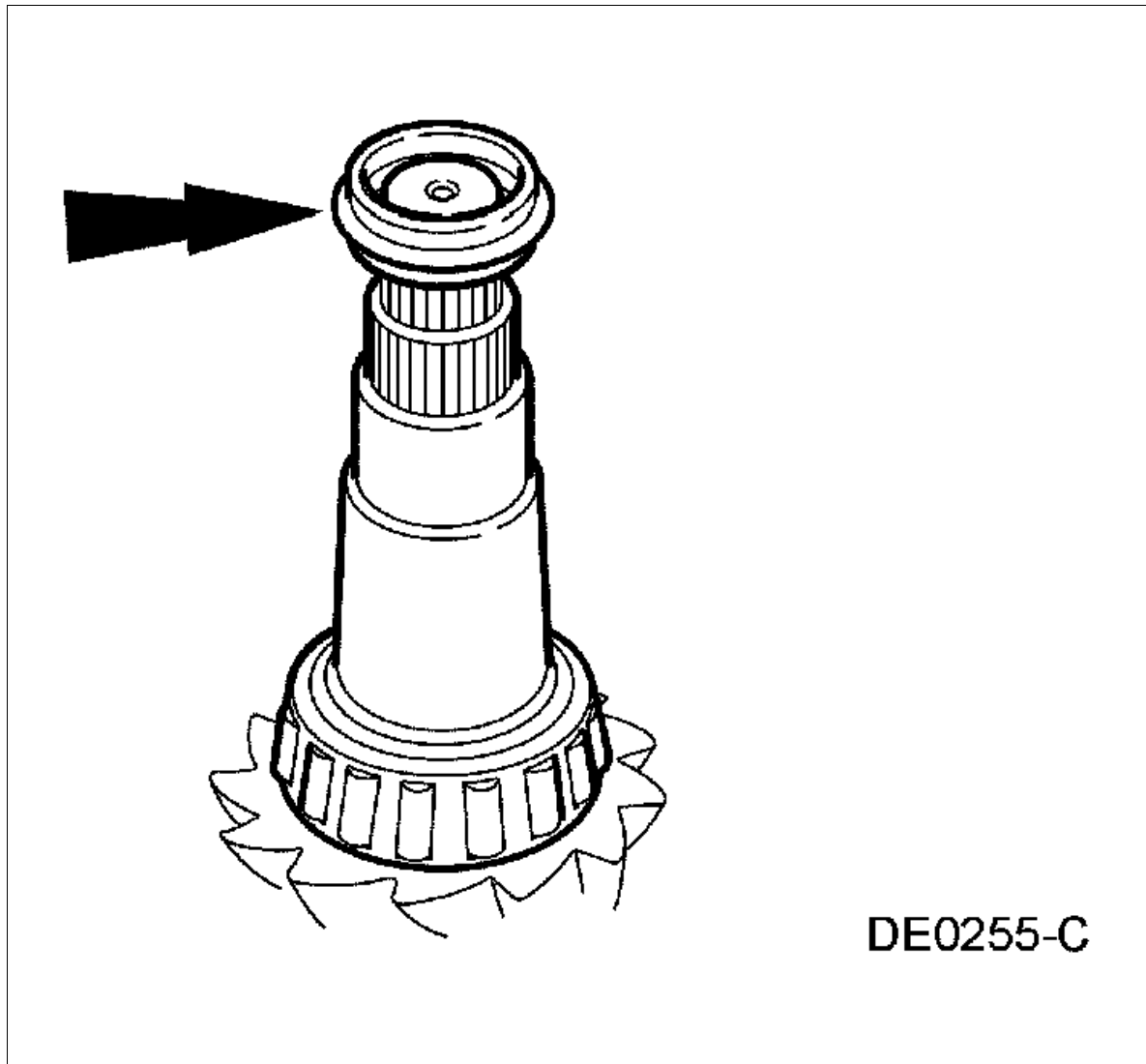
Fig 141: Removing Drive Pinion Shaft Oil Slinger And Outer Drive Pinion Bearing



Courtesy of FORD MOTOR CO.

12. Remove the outer pinion bearing.
13. Remove the drive pinion collapsible spacer and discard it.

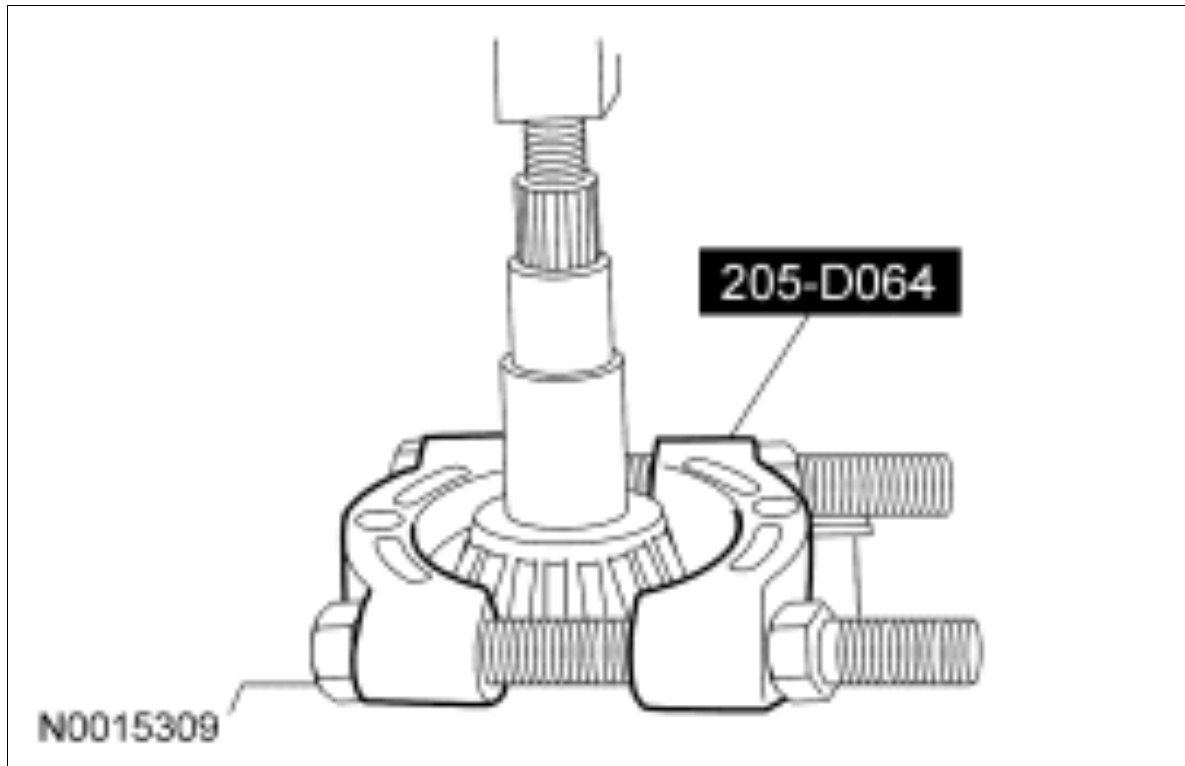
Fig 142: Identifying Drive Pinion Collapsible Spacer



Courtesy of FORD MOTOR CO.

14. Using the special tool and a suitable press, remove the inner pinion bearing.

Fig 143: Removing Inner Pinion Bearing

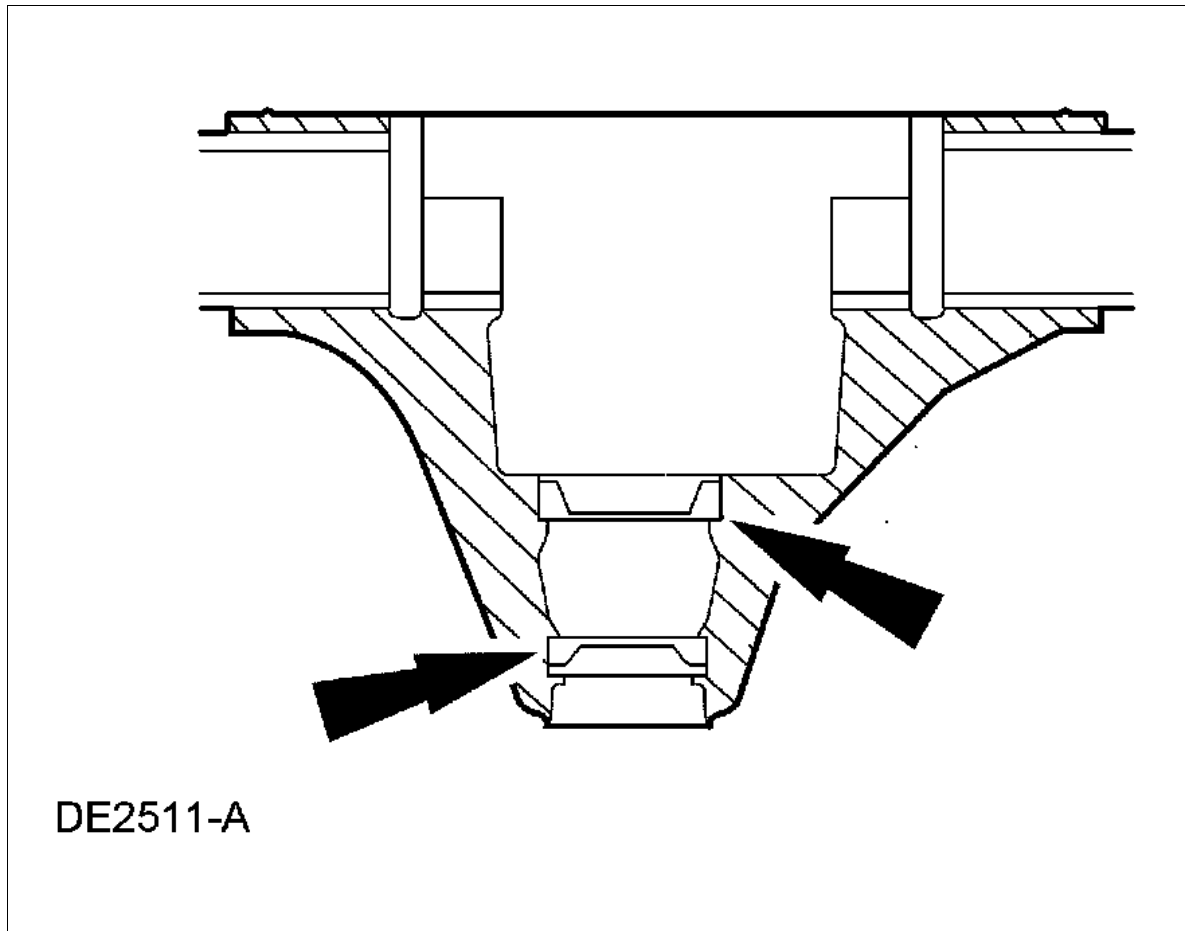


Courtesy of FORD MOTOR CO.

15. Using a brass drift, remove the pinion bearing cups by tapping alternately on opposite sides of the bearing cups.



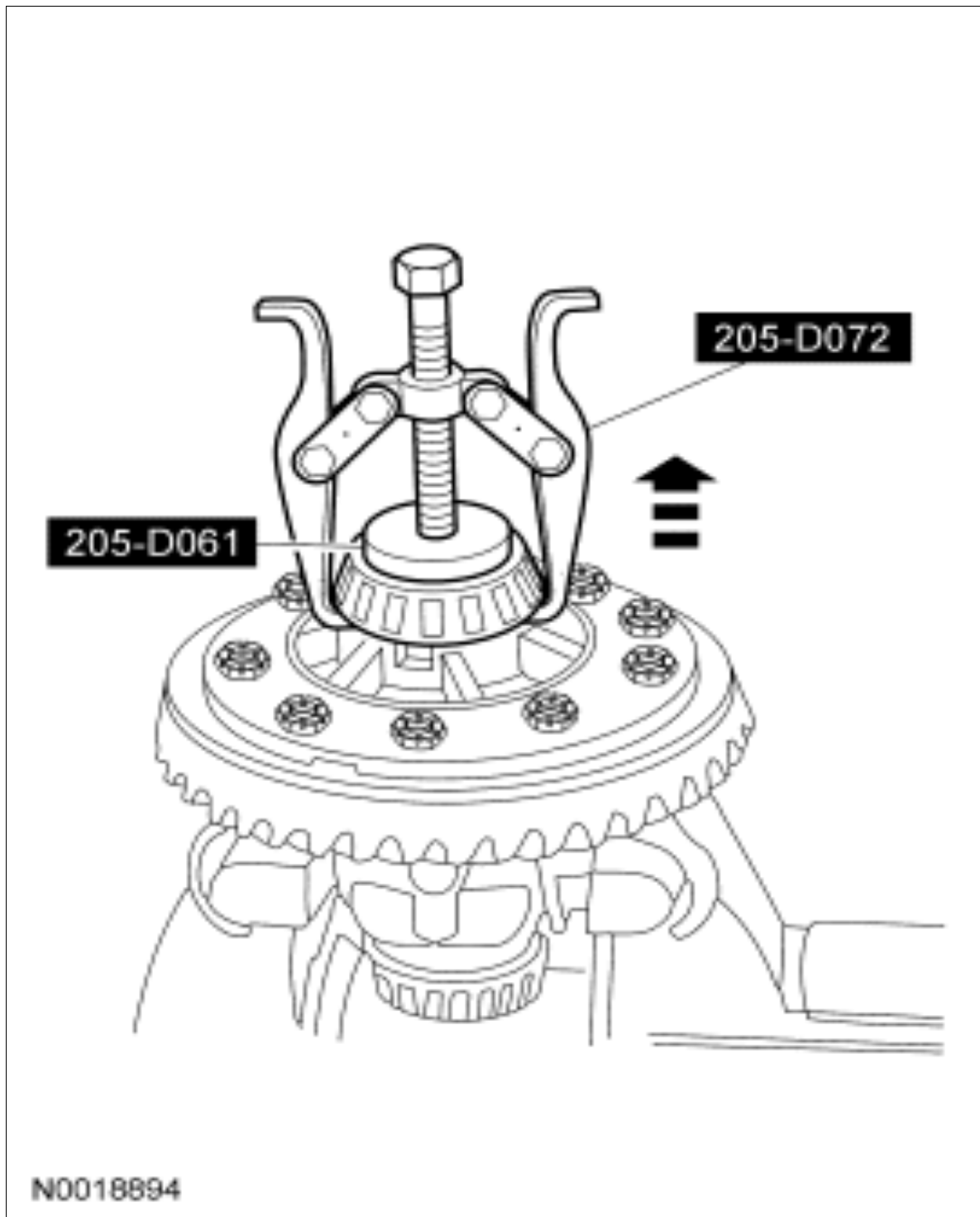
Fig 144: Identifying Pinion Bearing Cups



Courtesy of FORD MOTOR CO.

16. Using the special tools, remove the differential bearings.

Fig 145: Removing Differential Bearings

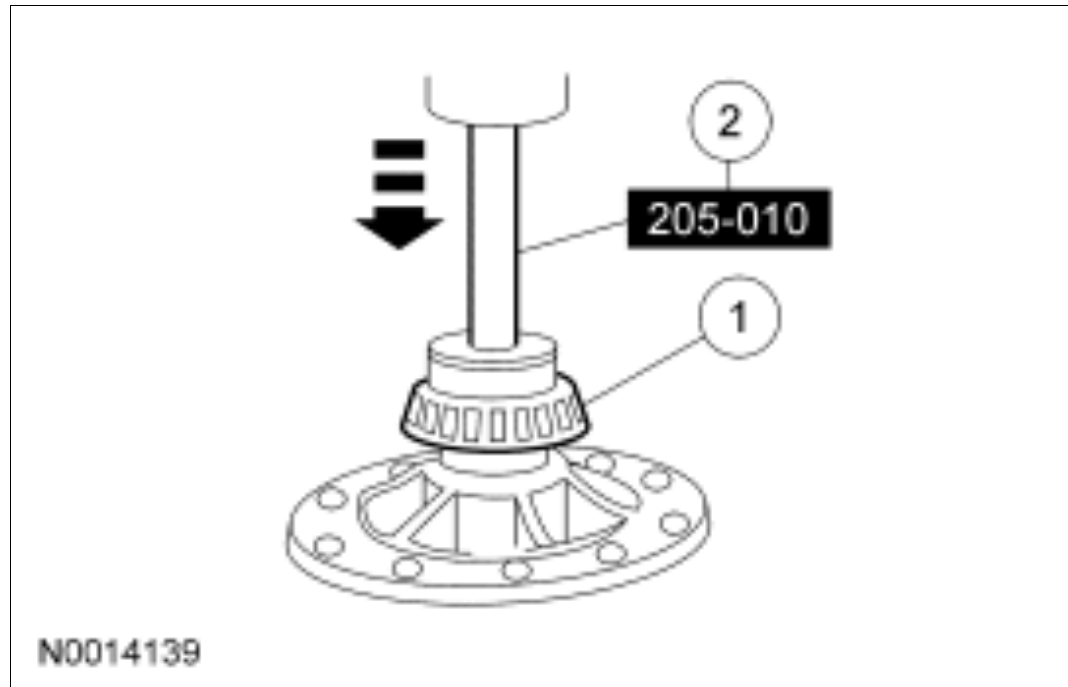


Courtesy of FORD MOTOR CO.

## Installation

1. Press the left and right differential bearing on the differential assembly.
  1. Position the differential bearings.
  2. Using the special tool, press the differential bearings on the differential assembly.

Fig 146: Pressing Differential Bearing Onto Differential Carrier

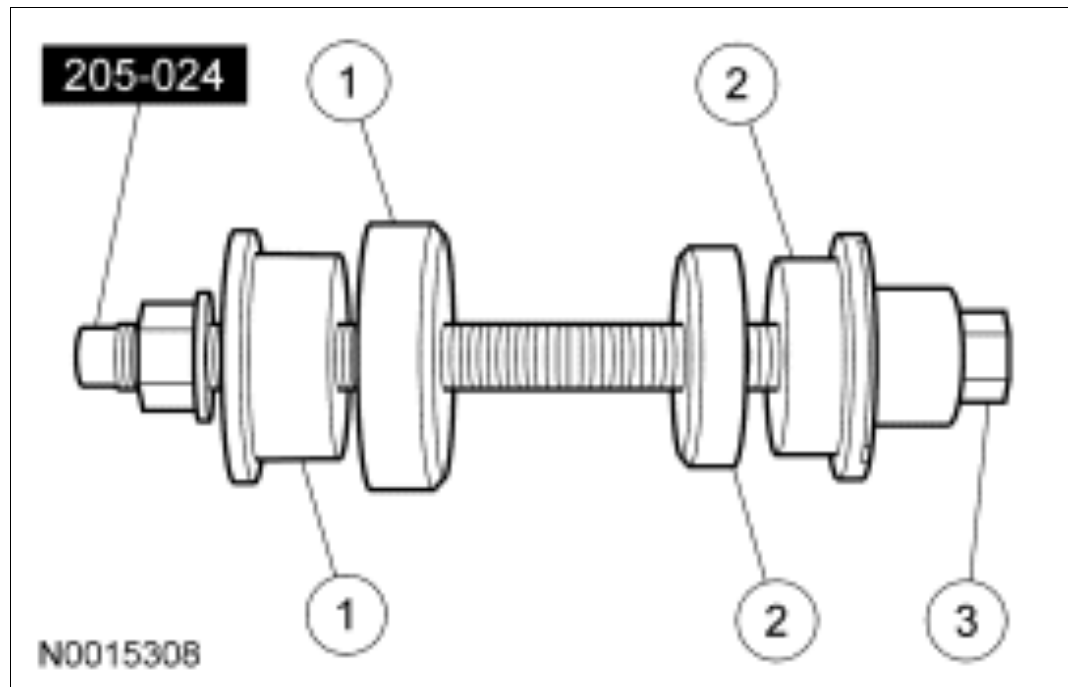


Courtesy of FORD MOTOR CO.

2. Position the special tool and the inner and outer bearing cups in their respective bores.

1. After placing the inner and outer bearing cups in their respective bores, place the special tool of the inner bearing cup.
2. Place the special tool on the outer bearing cup.
3. Install the special tool.

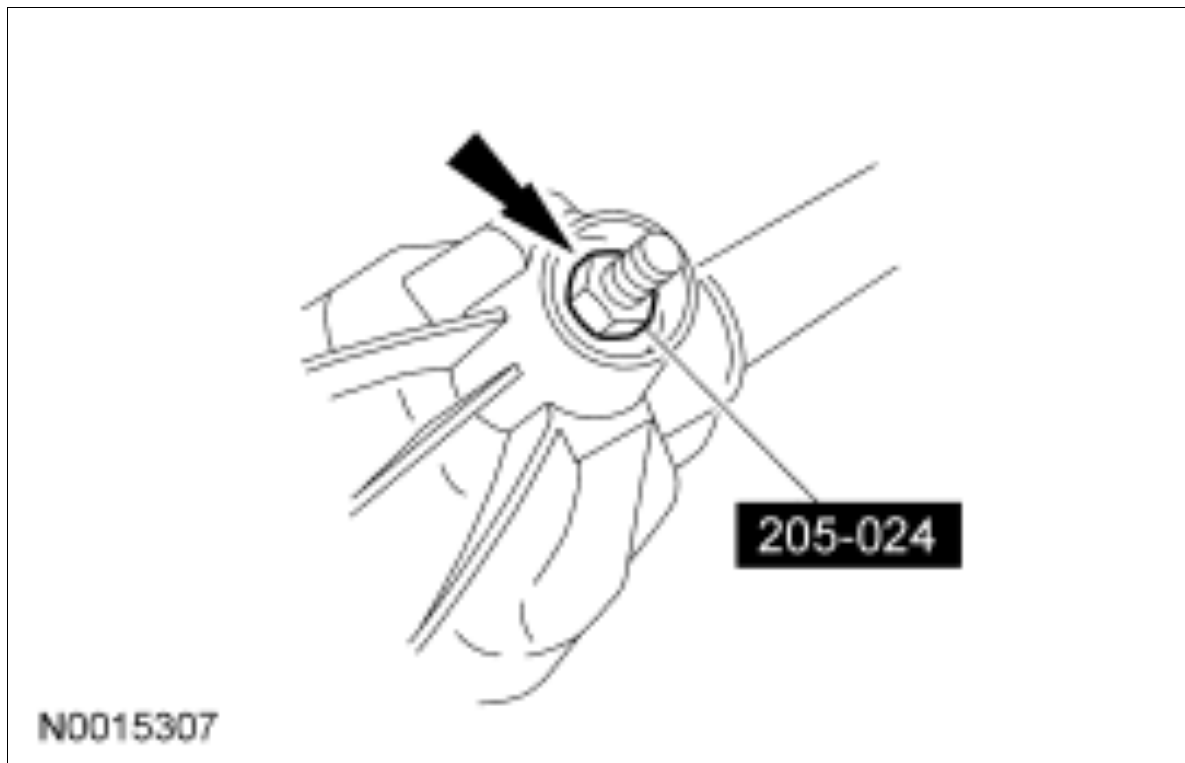
Fig 147: Identifying Special Tool Components



Courtesy of FORD MOTOR CO.

3. Tighten the special tool to seat the pinion bearing cups in their bores.

Fig 148: Tightening Special Tool To Seat Drive Pinion Bearing Cups

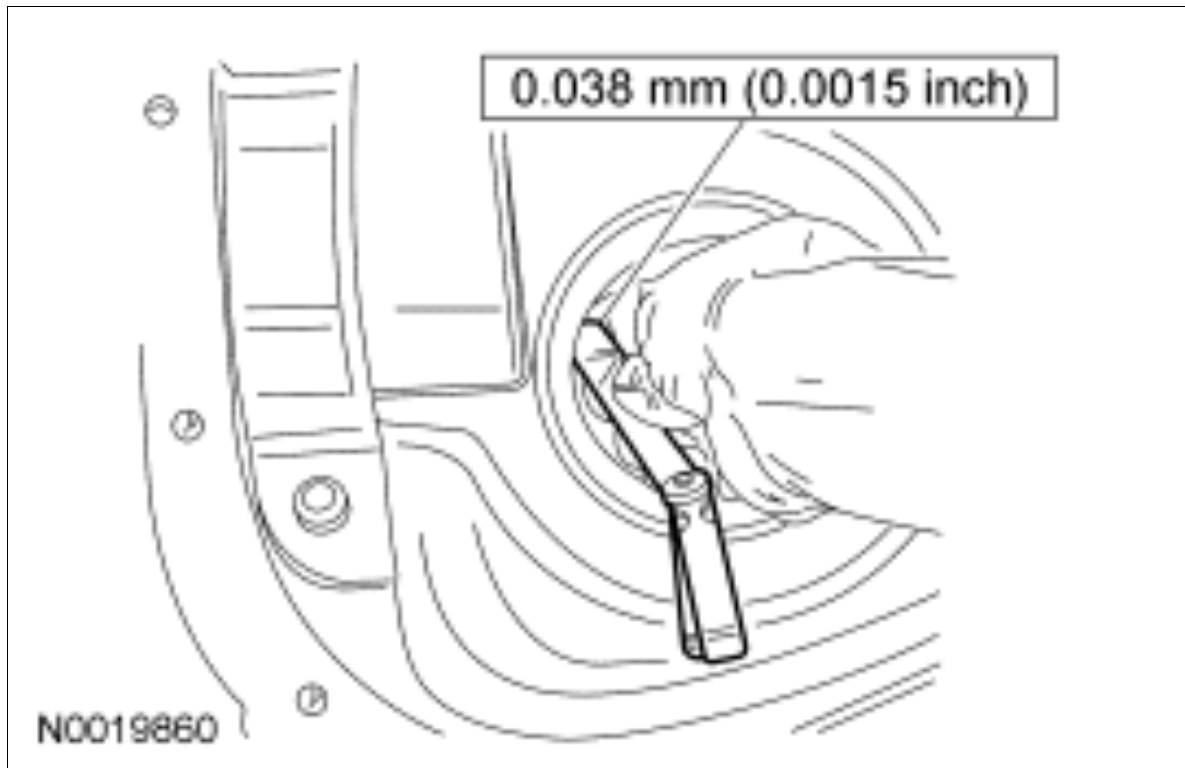


Courtesy of FORD MOTOR CO.

4. Make sure the differential pinion bearing cups are correctly seated.

**NOTE:** If a feeler gauge of the specification shown can be inserted between a cup and the bottom of its bore at any point around the cup, the cup is not correctly seated.

Fig 149: Checking Clearance Between Cup And Bore



Courtesy of FORD MOTOR CO.

5. Assemble and position the drive pinion depth gauge set.

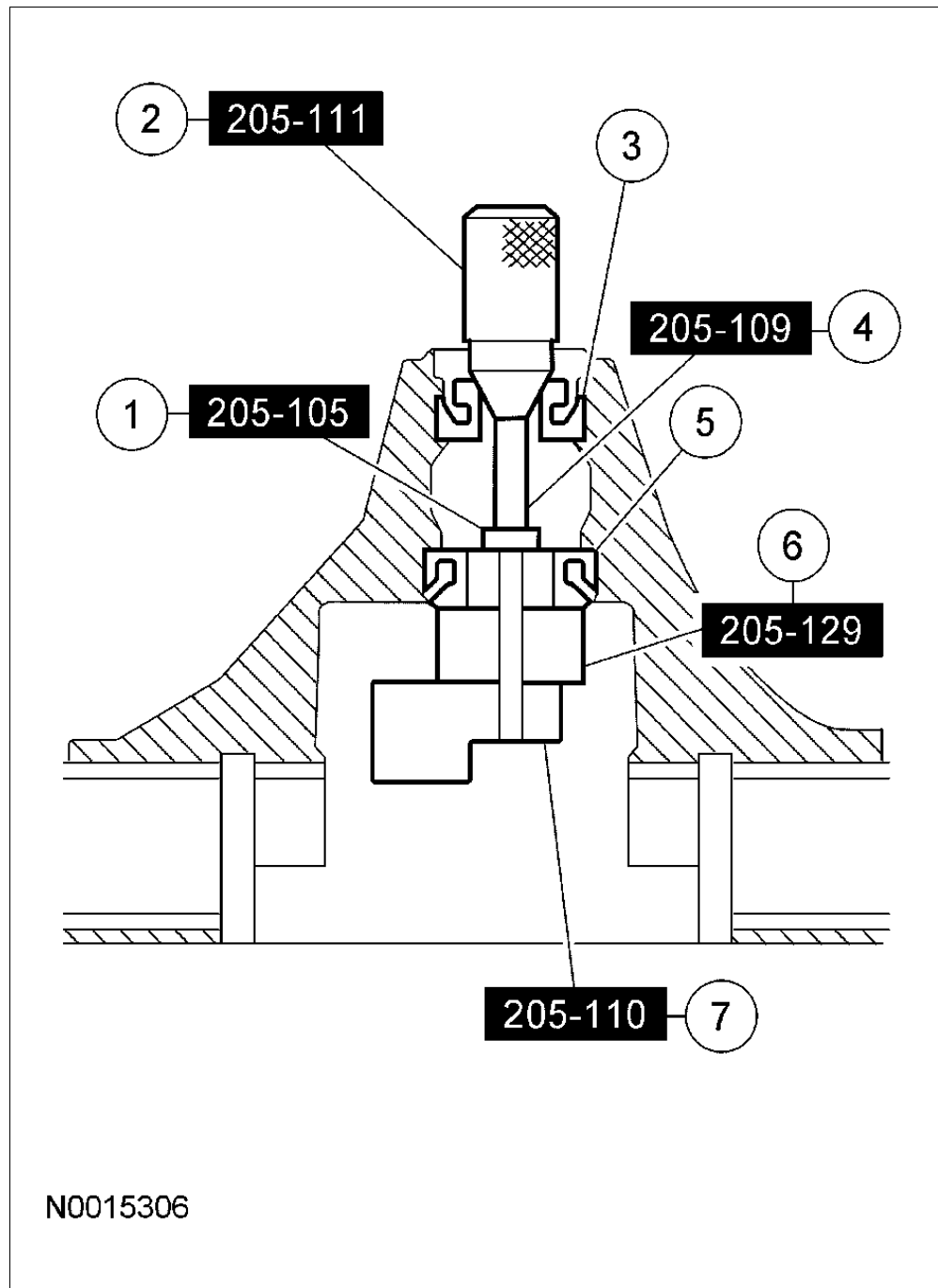
**NOTE:** Install new drive pinion bearings without any additional lubricant since the anti-rust oil provides adequate lubricant without upsetting the drive pinion bearing preload settings.

1. Position the screw.
2. Position the aligning adapter.
3. Position the gauge disc.
4. Position the gauge block.
5. Position the inner drive pinion bearing.
6. Position the outer drive pinion bearing.

7. Thread on the handle and tighten.

1. Tighten to 2.2 Nm (20 lb-in).

Fig 150: Assembling And Positioning Drive Pinion Depth Gauge Set

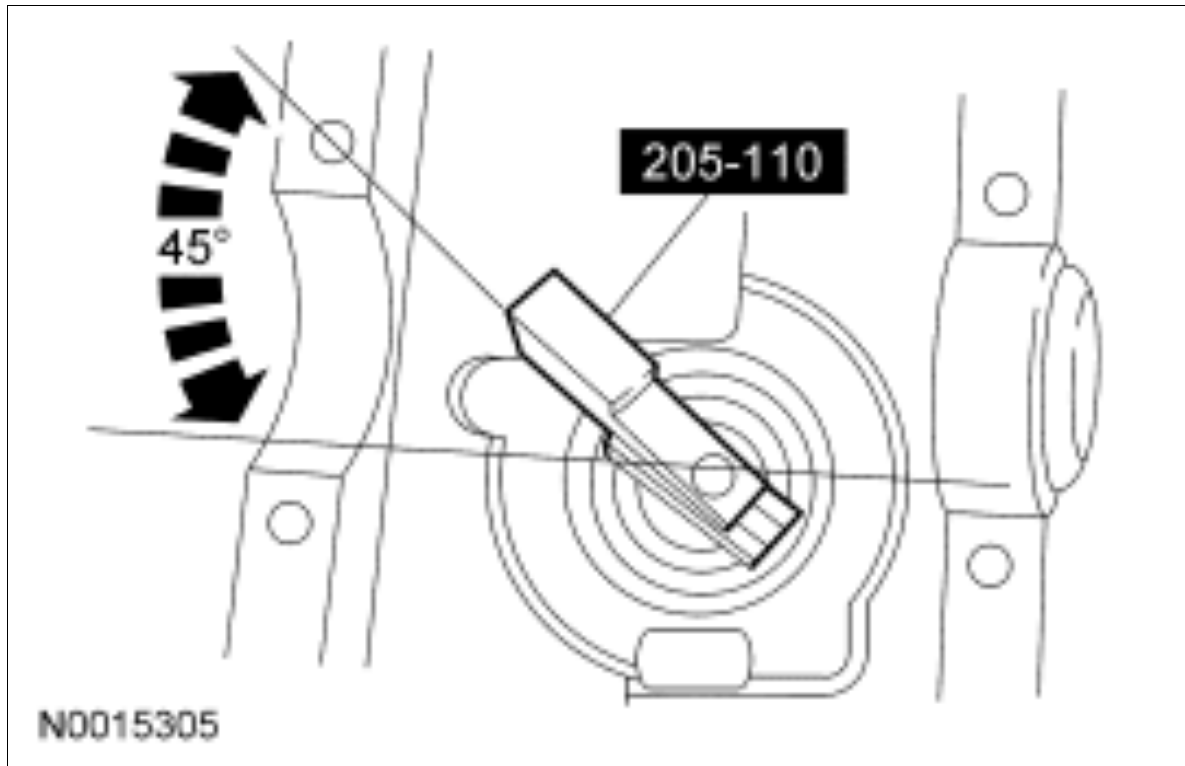


Courtesy of FORD MOTOR CO.

6. Rotate the gauge block several half turns to make sure of correct seating of the drive pinion bearings and position the gauge block.

**NOTE:** The gauge block must be offset to obtain an accurate reading.

Fig 151: Seating Drive Pinion Bearings

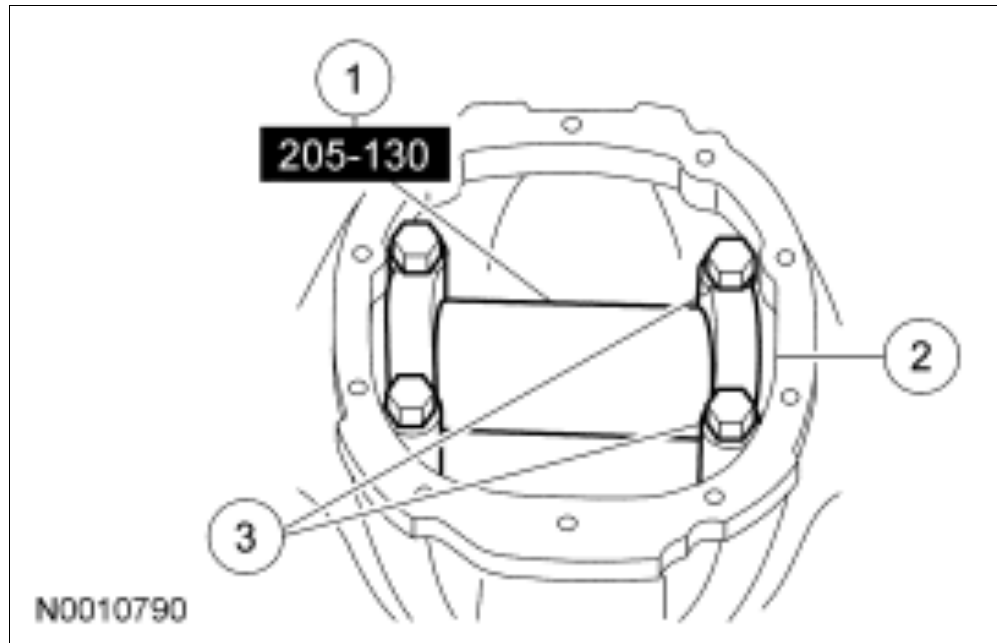


Courtesy of FORD MOTOR CO.

7. Install the special tool.

1. Position the gauge tube and the paper shipping tabs.
2. Install the differential bearing caps.
3. Install the differential bearing cap bolts.
  1. Tighten to 105 Nm (77 lb-ft).

Fig 152: Installing Special Tool



Courtesy of FORD MOTOR CO.

8. Use a drive pinion bearing adjustment shim as a gauge for drive pinion bearing adjustment shim selection.

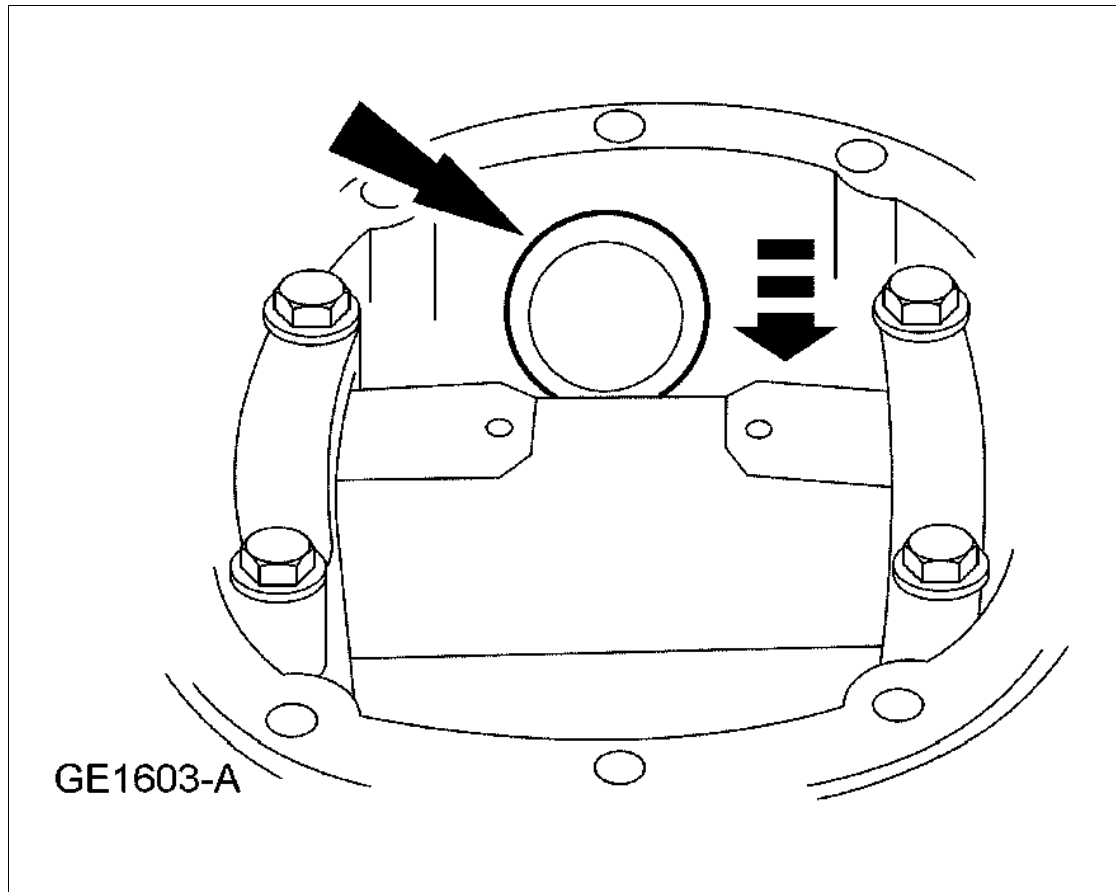
**NOTE:** Drive pinion bearing adjustment shims must be flat and clean.

**NOTE:** A slight drag should be felt for correct drive pinion bearing adjustment shim selection. Do not attempt to force the drive pinion bearing adjustment shim between gauge block and gauge tube. This will minimize selection of a drive pinion bearing adjustment shim thicker than required, which results in a deep tooth contact in final assembly of integral axle assemblies.

1. After the correct drive pinion bearing adjustment shim thickness has been determined, remove all of the special tools.



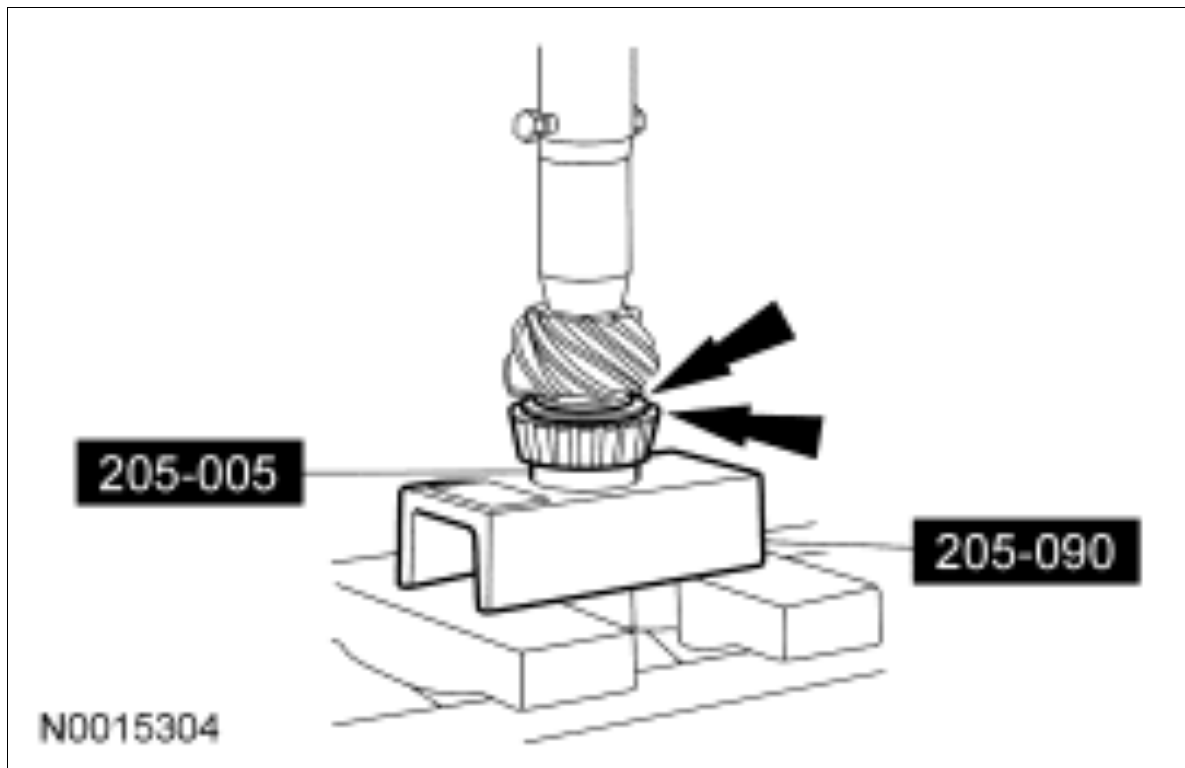
Fig 153: Removing Special Tools



Courtesy of FORD MOTOR CO.

9. Using the special tool and a shop press, drive the inner drive pinion bearing and drive pinion bearing adjustment shim until they are firmly seated on the pinion shaft.

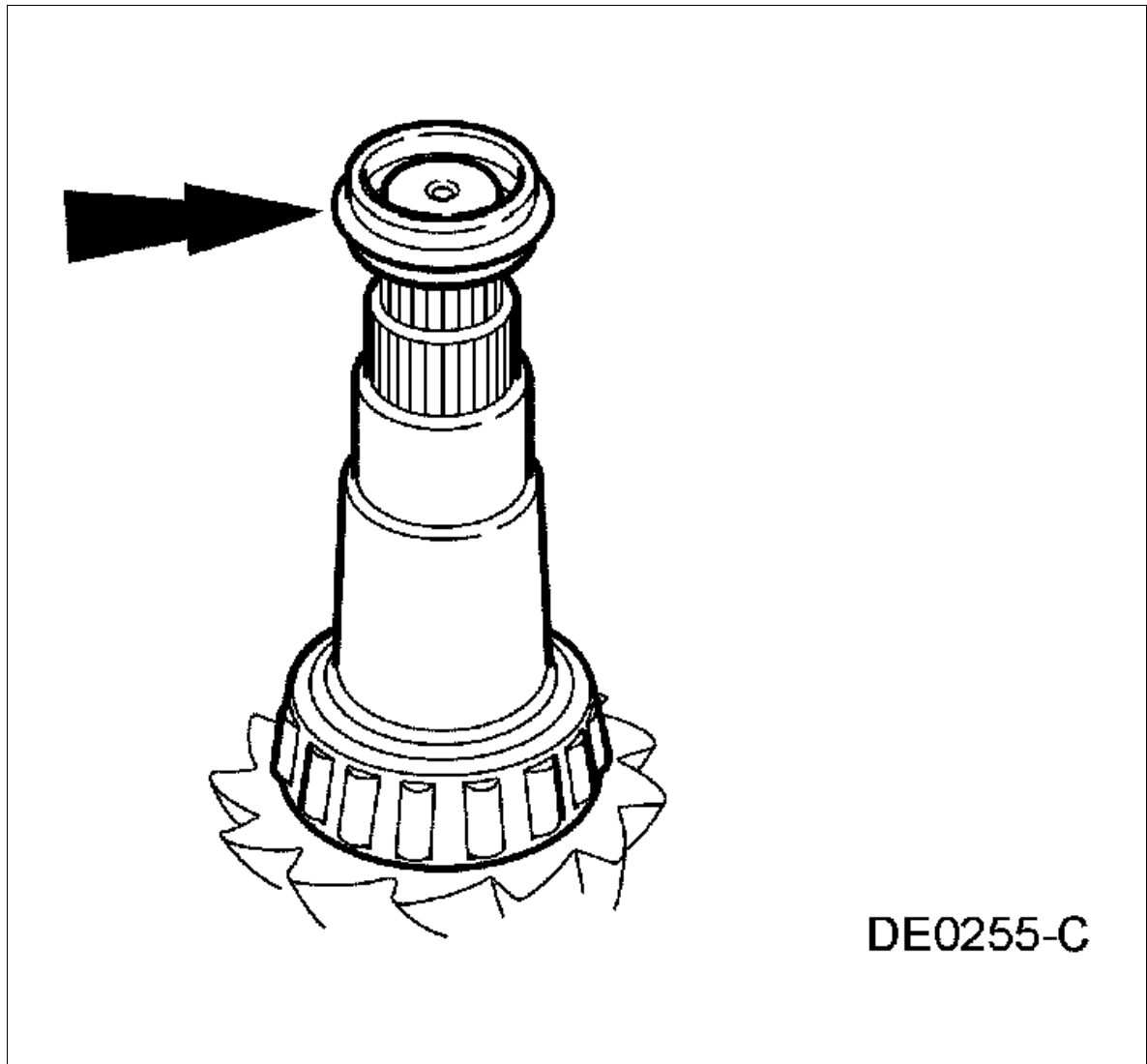
Fig 154: Installing Inner Drive Pinion Bearing



Courtesy of FORD MOTOR CO.

10. Install a new drive pinion collapsible spacer on the pinion shaft against the pinion shaft shoulder.

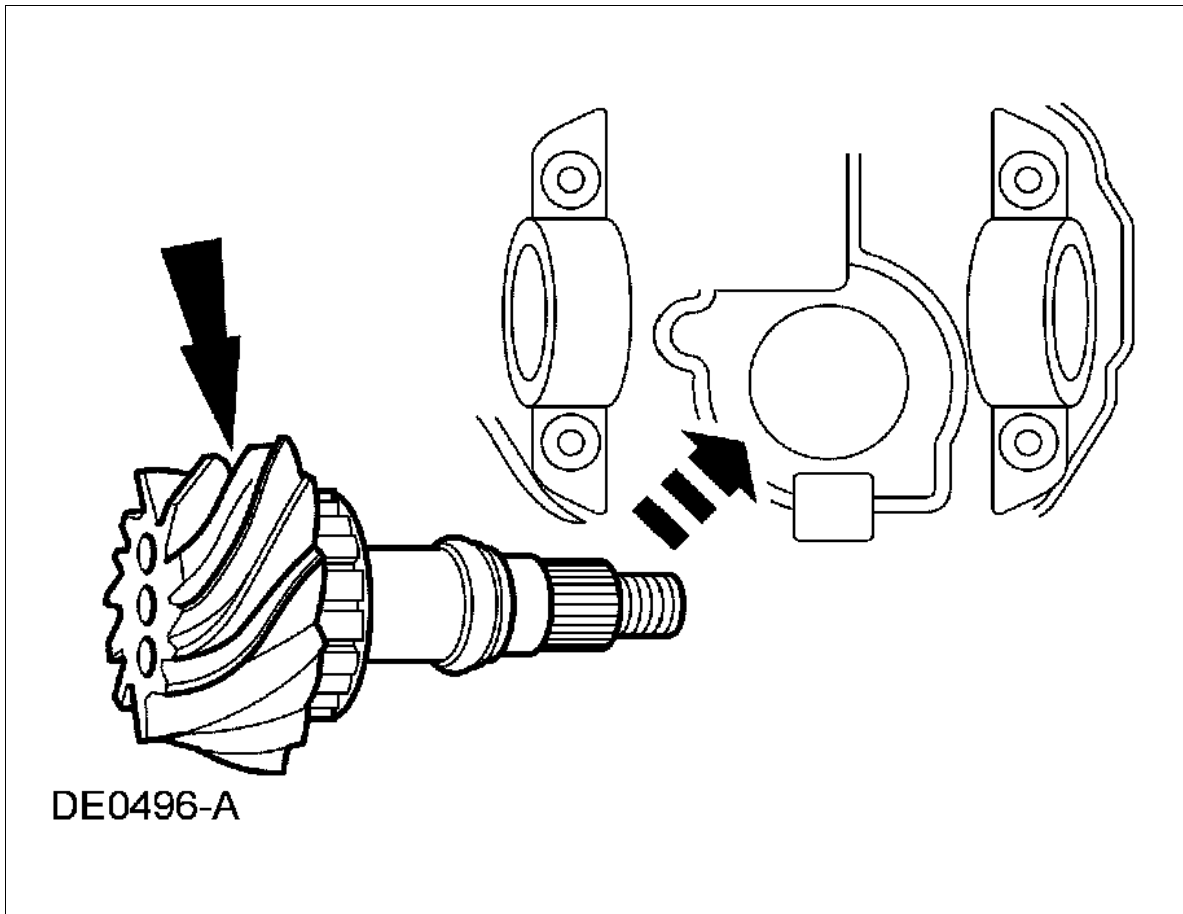
Fig 155: Identifying Drive Pinion Collapsible Spacer



Courtesy of FORD MOTOR CO.

11. Install the drive pinion assembly into the axle housing.

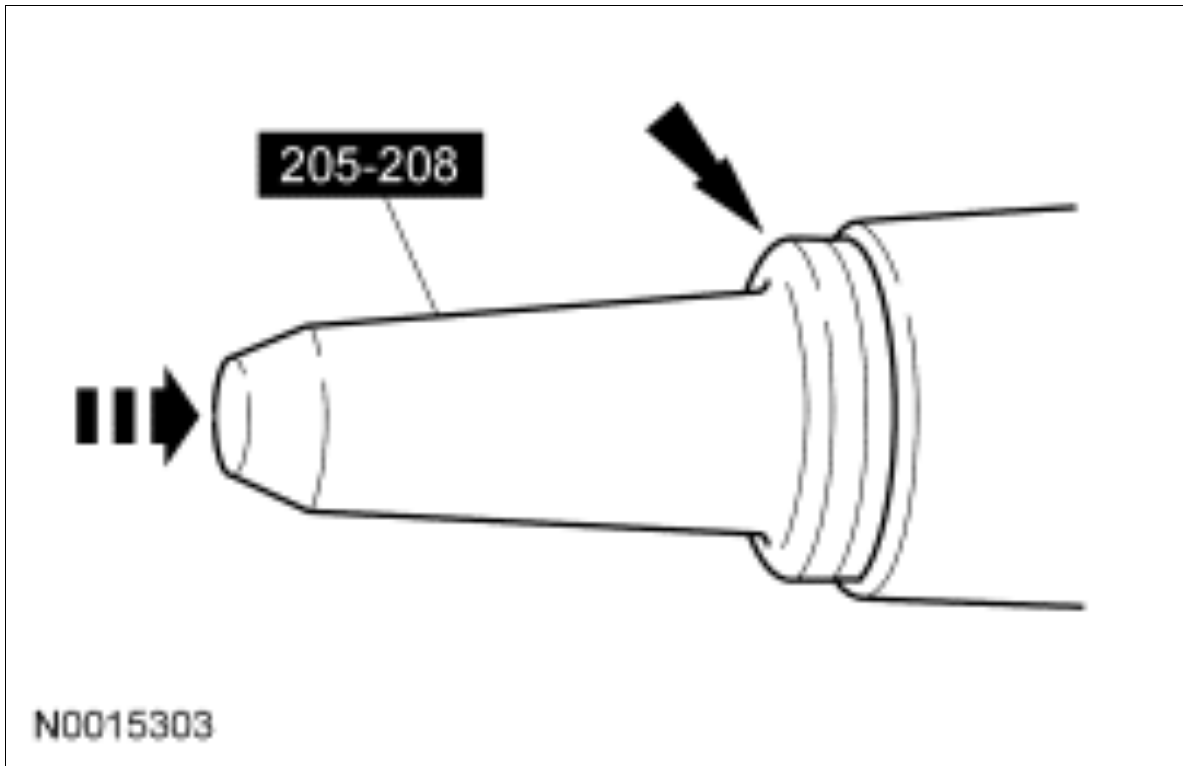
Fig 156: Installing Drive Pinion Assembly Into Axle Housing



Courtesy of FORD MOTOR CO.

12. Install the outer drive pinion bearing and the drive pinion shaft oil slinger.
13. Using the special tool, install the drive pinion seal.

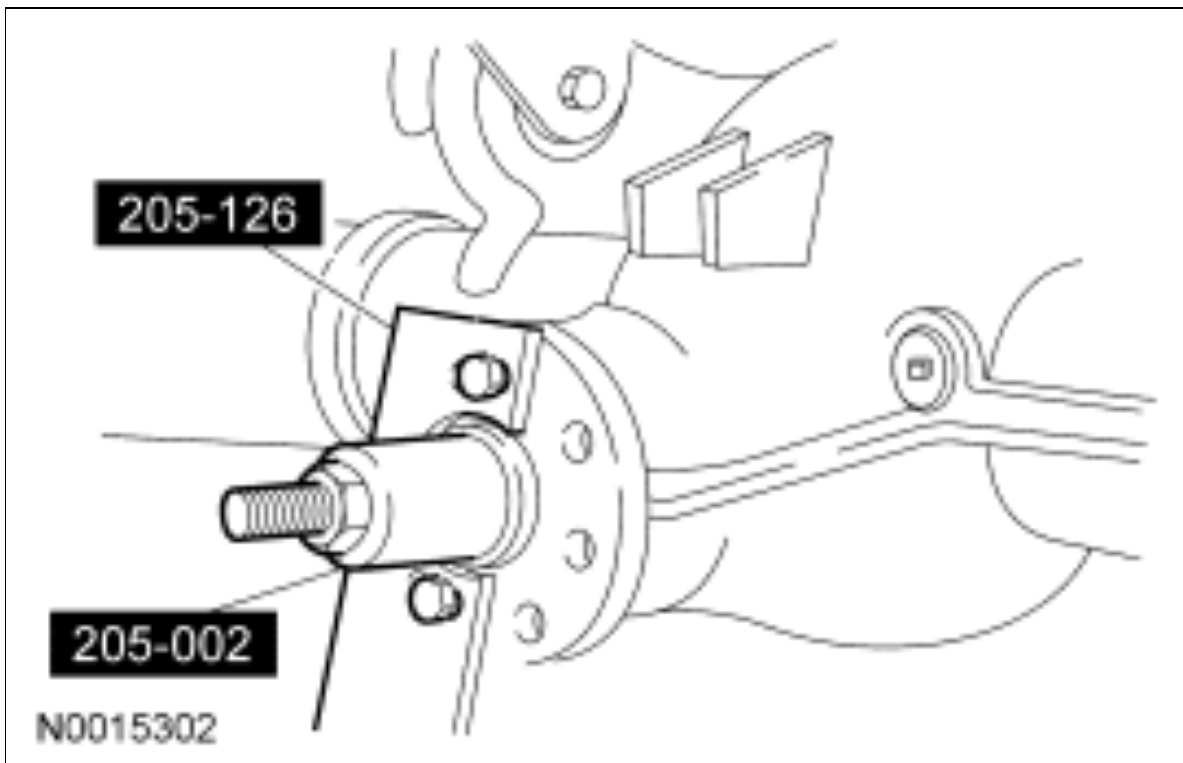
Fig 157: Installing Drive Pinion Seal



Courtesy of FORD MOTOR CO.

14. Using the special tools, install the drive pinion flange.

Fig 158: Installing Drive Pinion Flange



Courtesy of FORD MOTOR CO.

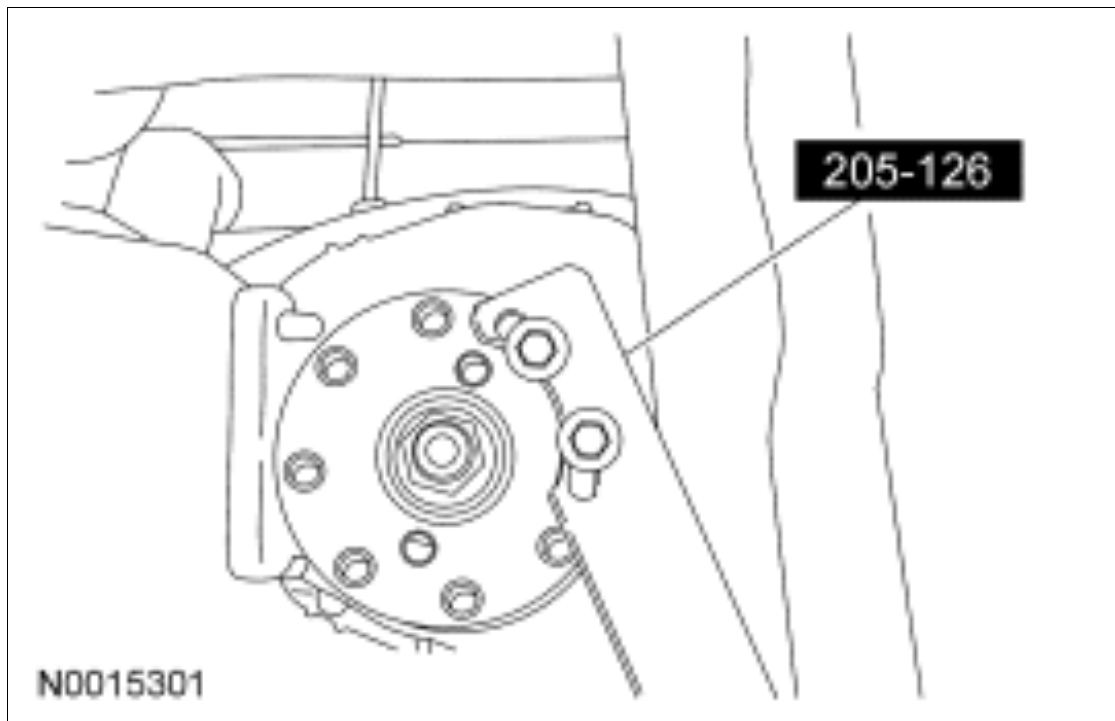
15. Use the special tool to hold the pinion flange while tightening the pinion nut.

**CAUTION:** Do not, under any circumstance, loosen the drive pinion nut to reduce pinion bearing preload. If it is necessary to reduce the preload, install a new drive pinion collapsible spacer and drive pinion nut.

**CAUTION:** Remove the special tool while taking rotational pinion bearing preload checks with the Nm (lb-in) torque wrench.

1. Rotate the pinion occasionally to make sure the differential pinion bearings are seating correctly. Take frequent differential pinion bearing preload checks by rotating the differential pinion with a Nm (lb-in) torque wrench. Tighten the pinion nut in small increments to avoid excessive pinion bearing preload. Tighten the pinion nut until the drive pinion bearing preload is in specification.

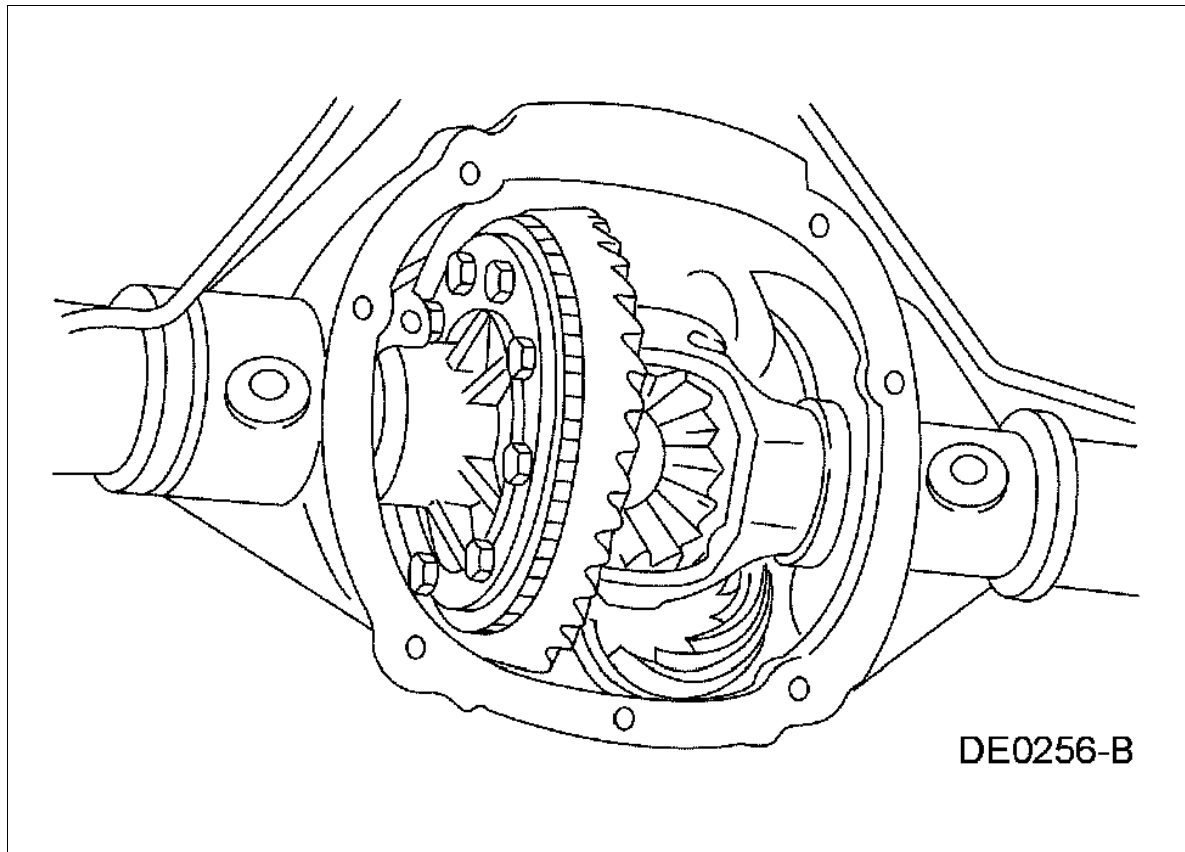
Fig 159: Identifying Pinion Flange Holder



Courtesy of FORD MOTOR CO.

16. Place the differential carrier assembly with the new differential carrier bearing cups in the axle housing.

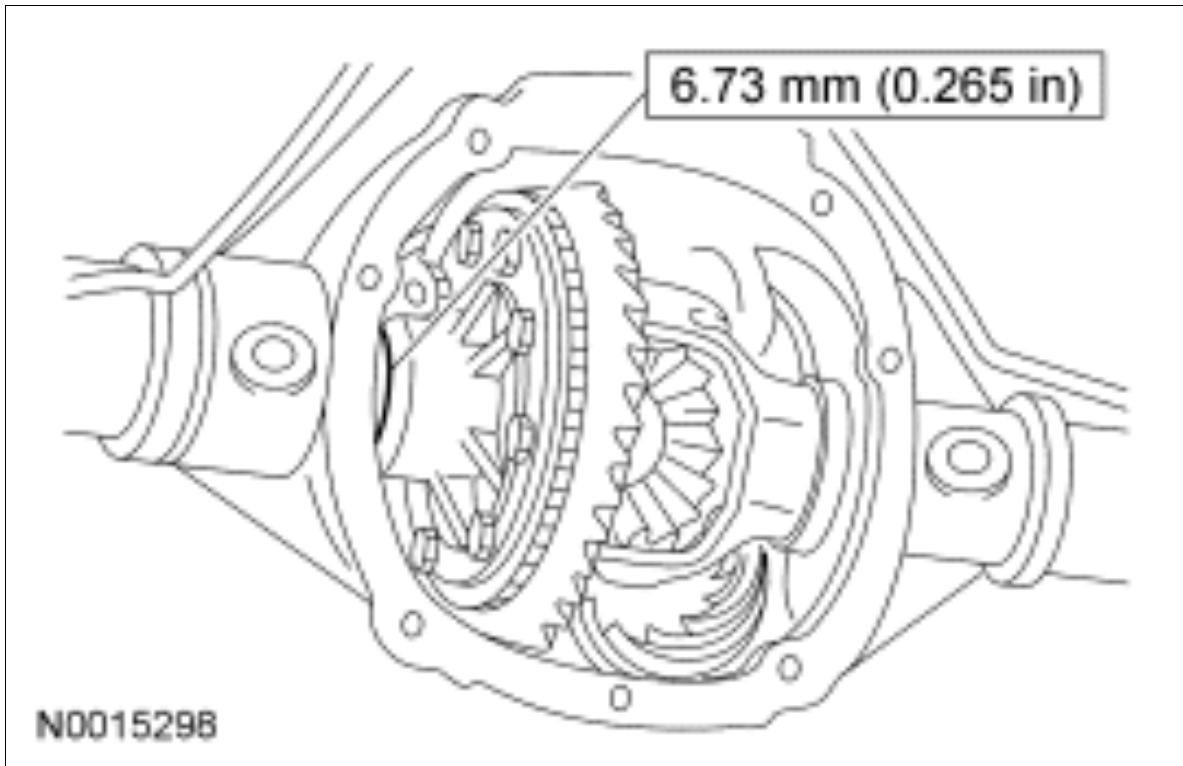
Fig 160: Placing Differential Case In Rear Axle Housing



Courtesy of FORD MOTOR CO.

17. Install a differential bearing shim on the LH side.

Fig 161: Installing Differential Bearing Shim



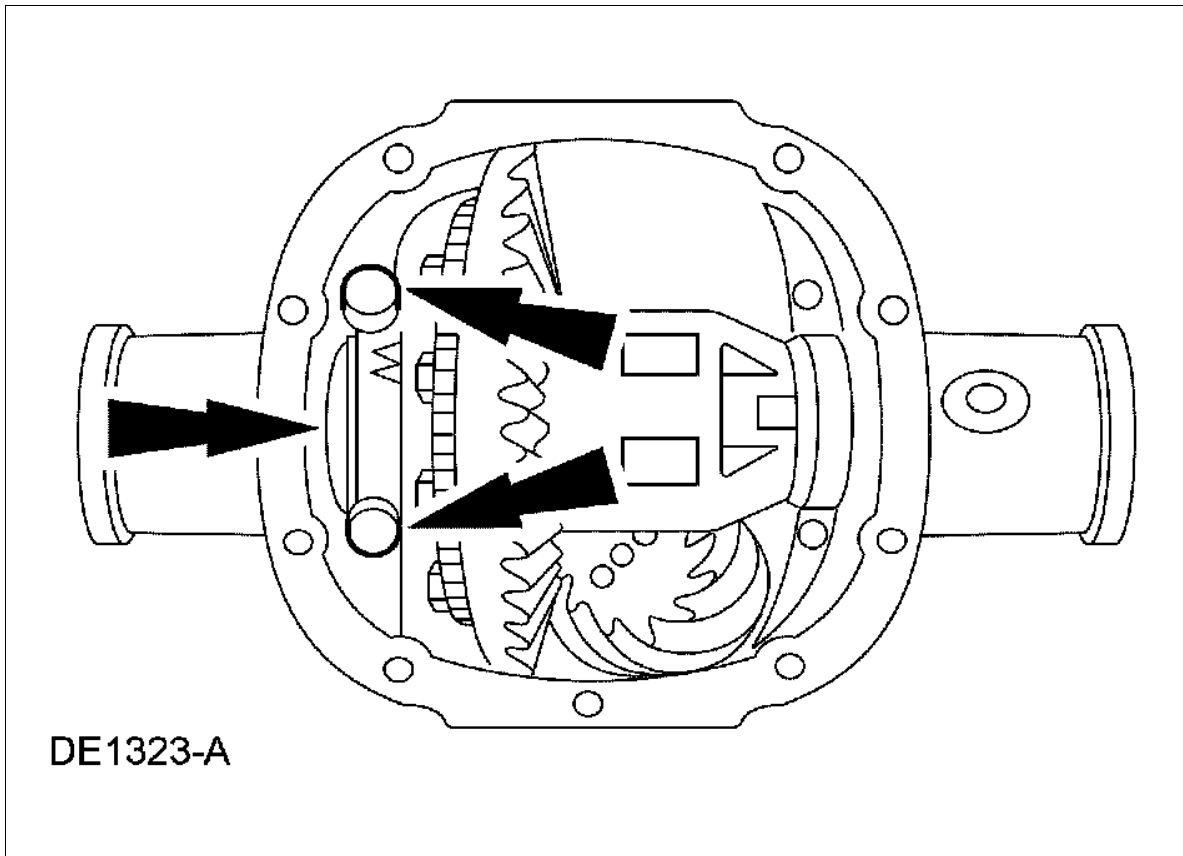
Courtesy of FORD MOTOR CO.

18. Install the LH differential bearing cap and loosely install the differential bearing cap bolts.

**NOTE:** Apply pressure toward the LH side to make sure the left differential bearing cup is seated.



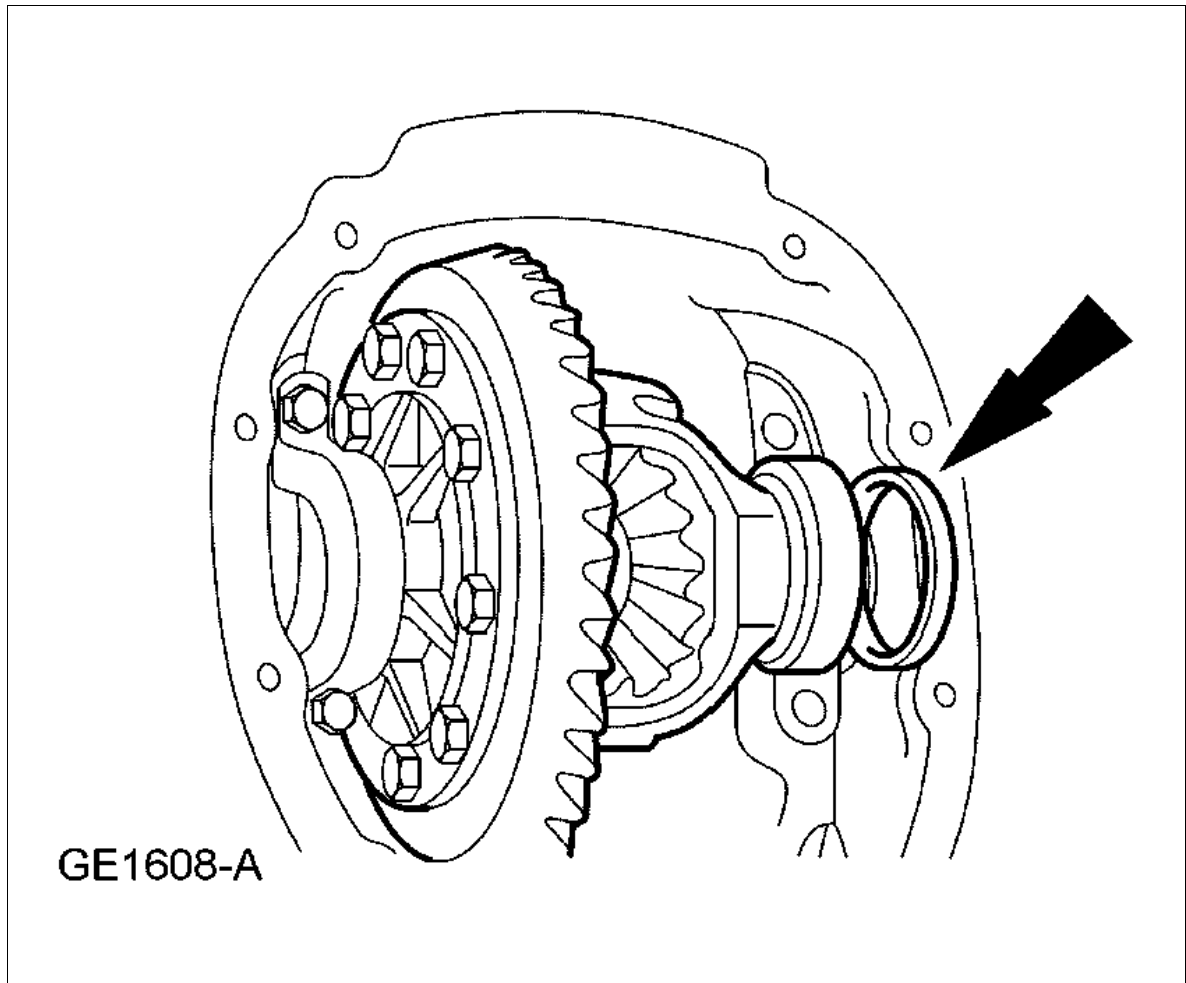
Fig 162: Identifying LH Differential Bearing Cap



Courtesy of FORD MOTOR CO.

19. Install progressively larger differential bearing shims on the RH side until the largest differential bearing shim selected can be inserted by hand.

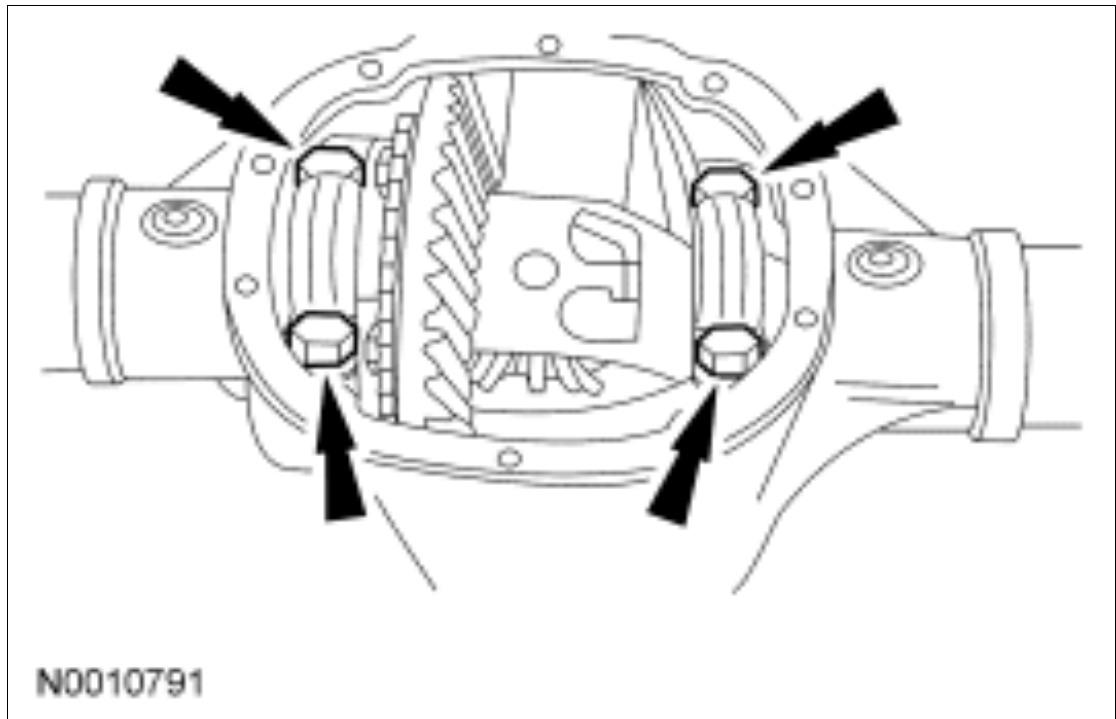
Fig 163: Installing Differential Bearing Shims



Courtesy of FORD MOTOR CO.

20. Install the RH side differential bearing cap and tighten the differential bearing cap bolts.
  1. Tighten to 105 Nm (77 lb-ft).

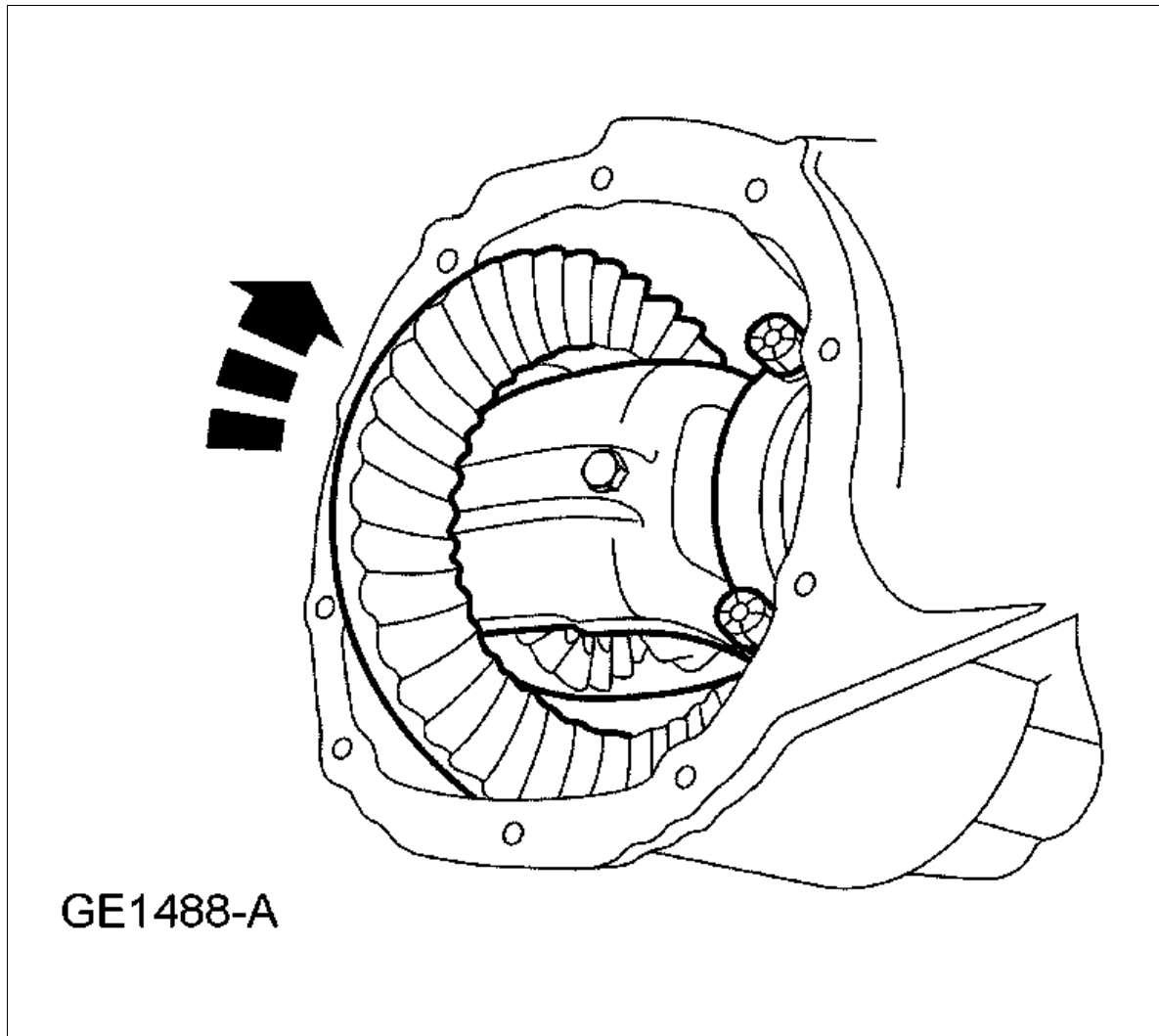
Fig 164: Identifying Differential Bearing Caps And Differential Bearing Cap Bolts



Courtesy of FORD MOTOR CO.

21. Rotate the differential assembly to make sure it rotates freely.

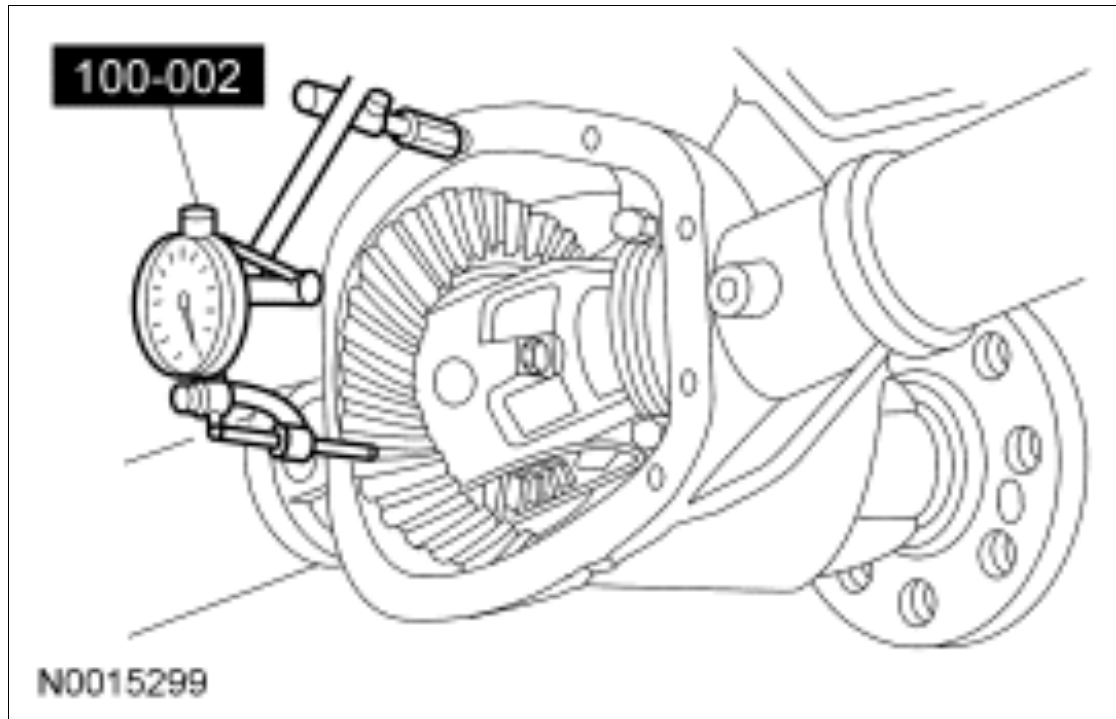
Fig 165: Rotating Differential Assembly



Courtesy of FORD MOTOR CO.

22. Install the special tools and measure the ring gear backlash.
  1. If the backlash is within specification, proceed to Step 25.
  2. If a zero backlash condition occurs, proceed to Step 23.
  3. If the backlash is not within specification, proceed to Step 24.

Fig 166: Measuring Ring Gear Backlash



Courtesy of FORD MOTOR CO.

23. If a zero backlash condition occurs, add 0.50 mm (0.020 in) to the RH side shim and subtract 0.50 mm (0.020 in) from the LH side shim to allow a backlash indication. Go back to Step 22.
24. To correct for high or low backlash, increase the thickness of one differential bearing shim and decrease the thickness of the other differential bearing shim by the same amount. Refer to the following BACKLASH SPECIFICATION table when adjusting the backlash. When the backlash is within specifications, proceed to Step 25.

**BACKLASH SPECIFICATION**

Backlash Change Required		Thickness Change Required	
mm	in	mm	in
0.025	0.001	0.050	0.002
0.050	0.002	0.050	0.002
0.076	0.003	0.101	0.004
0.101	0.004	0.152	0.006
0.127	0.005	0.152	0.006
0.152	0.006	0.203	0.008
0.177	0.007	0.254	0.010
0.203	0.008	0.254	0.010
0.228	0.009	0.304	0.012

0.254	0.010	0.355	0.014
0.279	0.011	0.355	0.014
0.304	0.012	0.406	0.016
0.330	0.013	0.457	0.018
0.335	0.014	0.457	0.018
0.381	0.015	0.508	0.020

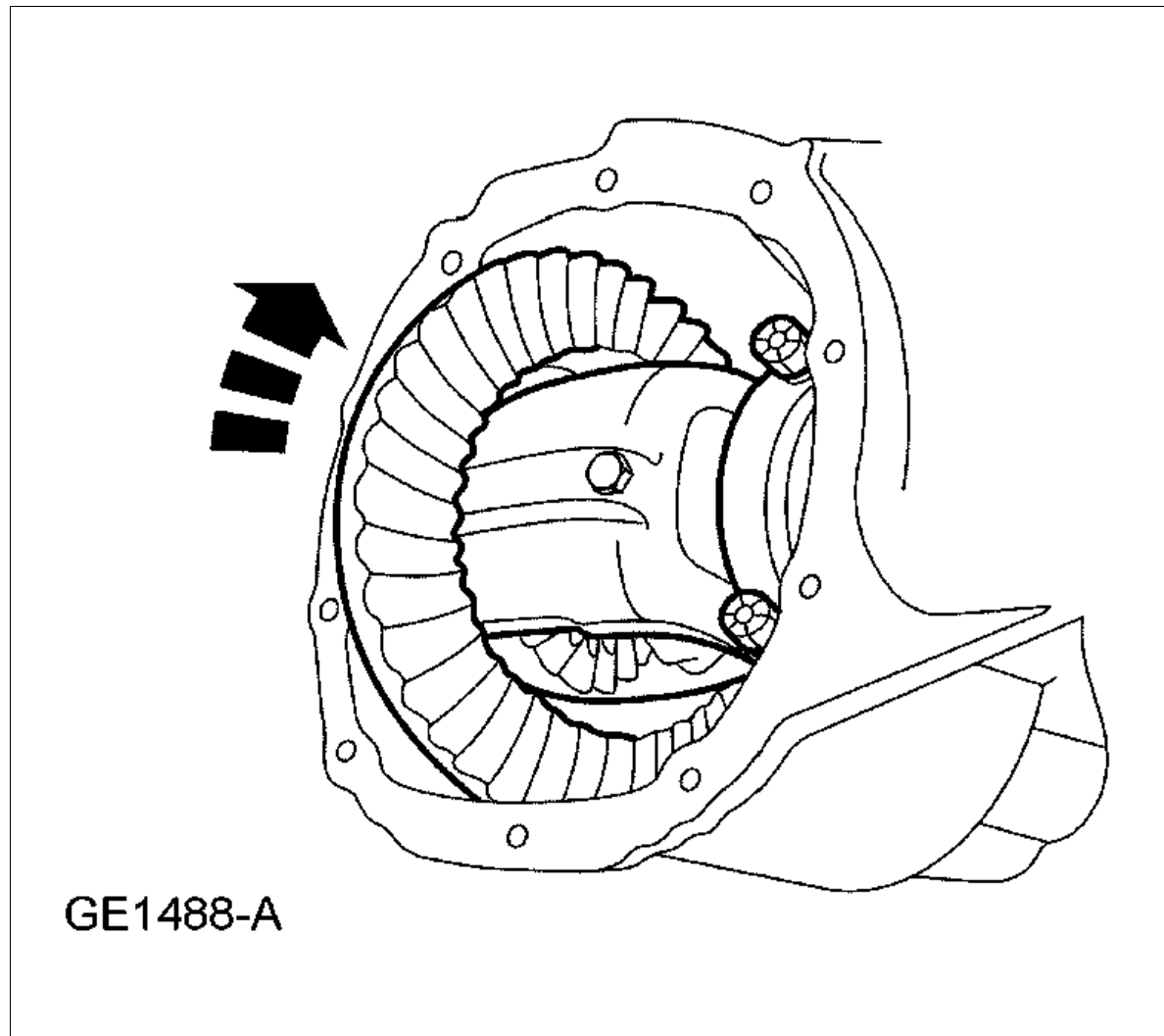
#### DIFFERENTIAL SHIM SIZE CHART 4067

Stripes and Color Code	Dimension A	
	mm	in
2 - C-COAL	7.7978-7.8105	0.3070-0.3075
1 - C-COAL	7.7470-7.7597	0.3050-0.3055
5 - BLU	7.6962-7.7089	0.3030-0.3035
4 - BLU	7.6454-7.6581	0.3010-0.3015
3 - BLU	7.5946-7.6073	0.2990-0.2995
2 - BLU	7.5458-7.5565	0.2970-0.2975
5 - PINK	7.4422-7.4549	0.2930-0.2935
4 - PINK	7.3914-7.4041	0.2910-0.2915
3 - PINK	7.3406-7.3533	0.2890-0.2895
2 - PINK	7.2898-7.3025	0.2870-0.2875
1 - PINK	7.2390-7.2517	0.2850-0.2855
5 - GRN	7.1882-7.2009	0.2830-0.2835
4 - GRN	7.1374-7.1501	0.2810-0.2815
3 - GRN	7.0866-7.0993	0.2790-0.2795
2 - GRN	7.0358-7.0485	0.2770-0.2775
1 - GRN	6.9850-7.0485	0.2750-0.2755
5 - WH	6.9342-6.9469	0.2730-0.2735
4 - WH	6.8834-6.8961	0.2710-0.2715
3 - WH	6.8326-6.8453	0.2690-0.2695
2 - WH	6.7818-6.7945	0.2670-0.2675
1 - WH	6.7310-6.7437	0.2650-0.2655
5 - YEL	6.6802-6.6929	0.2630-0.2635
4 - YEL	6.6294-6.6421	0.2610-0.2615

3 - YEL	6.5786-6.5913	0.2590-0.2595
2 - YEL	6.5278-6.5405	0.2570-0.2575
1 - YEL	6.4770-6.4897	0.2550-0.2555
5 - ORNG	6.4262-6.4389	0.2530-0.2535
4 - ORNG	6.3754-6.3881	0.2510-0.2515
3 - ORNG	6.3246-6.3373	0.2490-0.2495
2 - ORNG	6.2738-6.2865	0.2470-0.2475
1 - ORNG	6.2223-6.2357	0.2450-0.2455
2 - RED	6.1722-6.1849	0.2430-0.2435
1 - RED	6.1214-6.1341	0.2410-0.2415

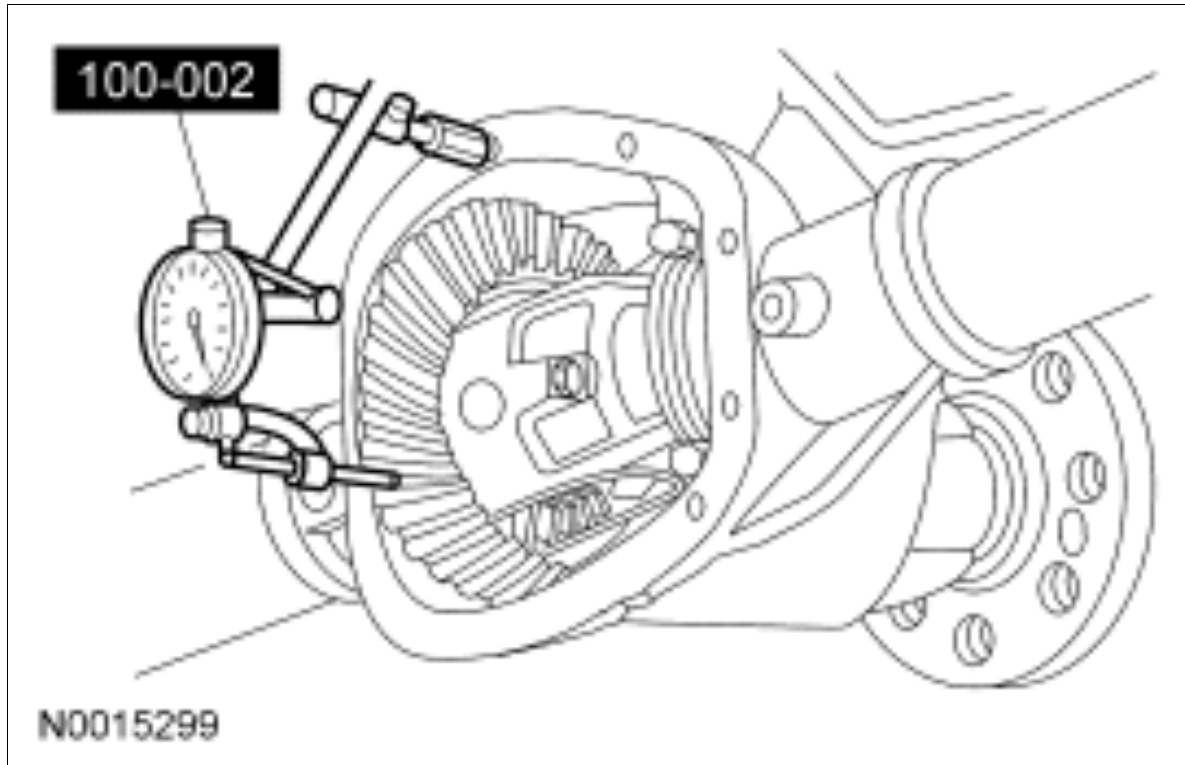
25. Rotate the differential assembly several times to make sure the differential bearings are seated.

Fig 167: Rotating Differential Assembly



26. Using the special tools, recheck the ring gear backlash.

Fig 168: Measuring Ring Gear Backlash



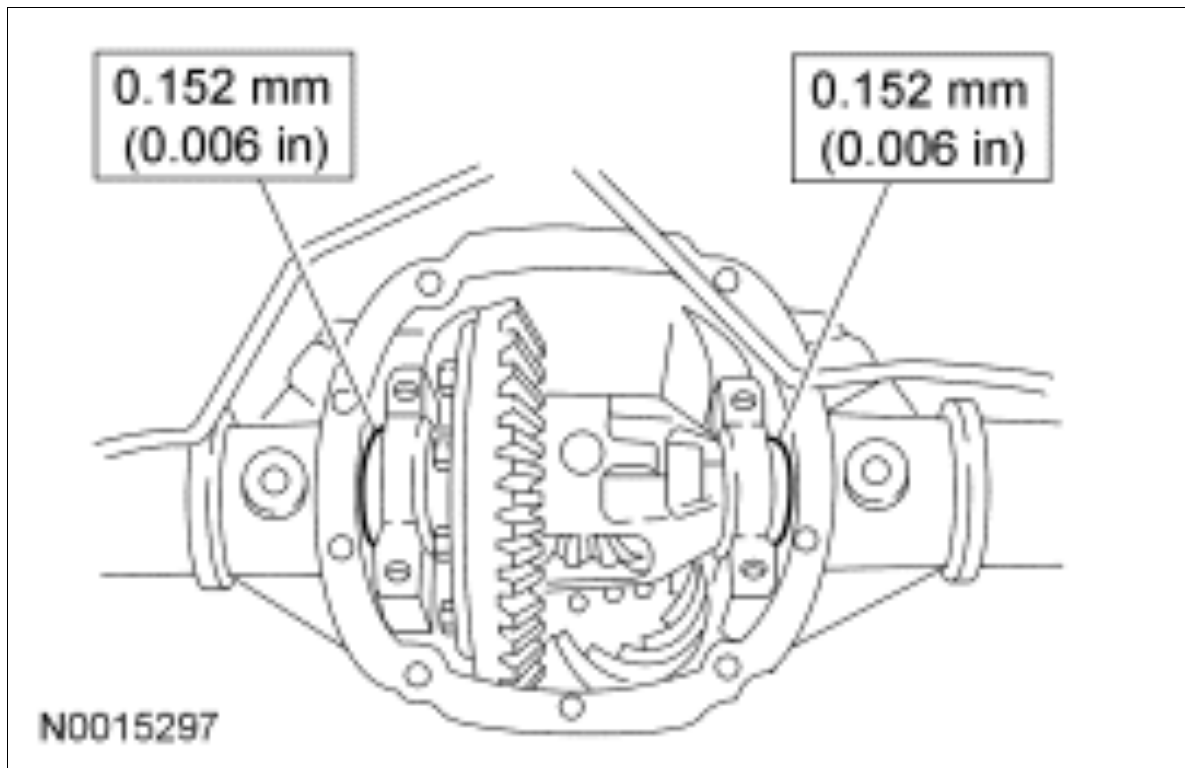
Courtesy of FORD MOTOR CO.

27. Remove the differential bearing cap bolts and differential bearing caps.

28. To establish differential bearing preload, increase both LH and RH differential bearing shim sizes as shown.



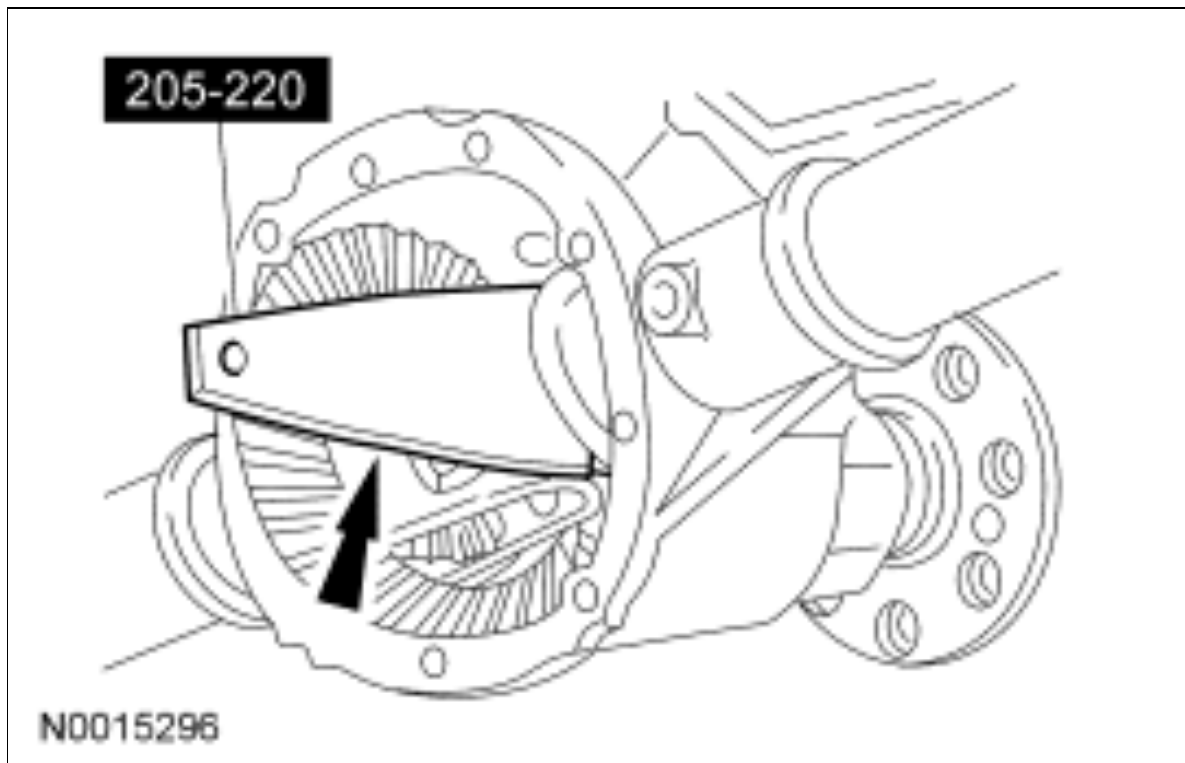
Fig 169: Identifying Shim Thickness



Courtesy of FORD MOTOR CO.

29. Using the special tool, fully seat the differential bearing shims. Make sure the assembly rotates freely.

Fig 170: Installing Differential Bearing Shims

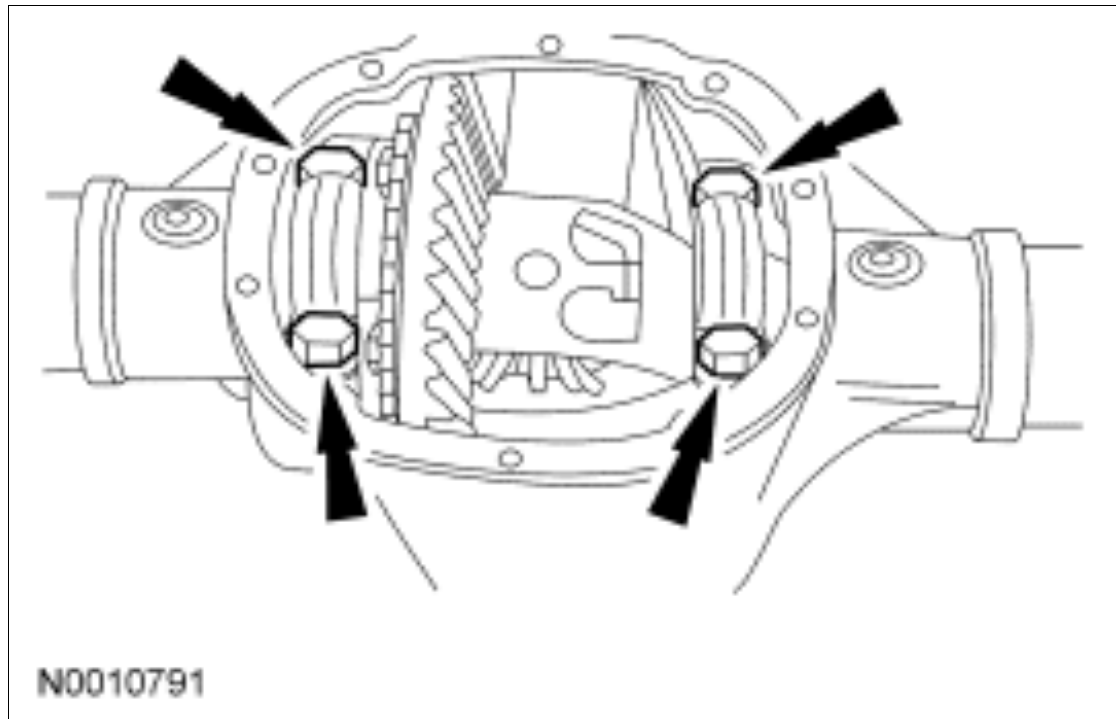


Courtesy of FORD MOTOR CO.

30. Install the differential bearing caps and differential bearing cap bolts.

1. Tighten to 105 Nm (77 lb-ft).

Fig 171: Identifying Differential Bearing Caps And Differential Bearing Cap Bolts



Courtesy of FORD MOTOR CO.

31. Using the special tools, recheck the backlash.

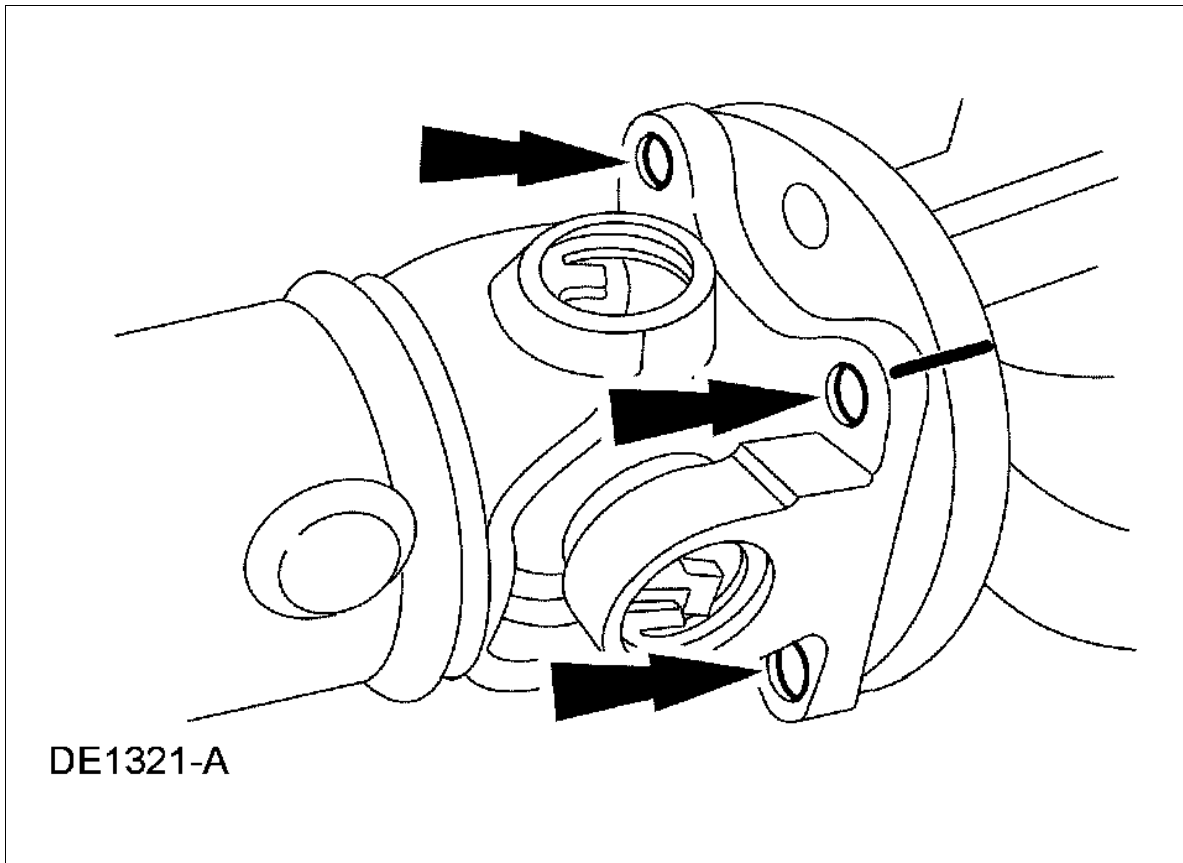
32. Apply marking compound and rotate the differential assembly 5 complete revolutions.

33. Verify an acceptable pattern check.

34. Install the axle shafts. For additional information, refer to AXLE SHAFT.

35. Position the driveshaft and align the index marks on the pinion flange.

Fig 172: Positioning Driveshaft And Align Marks On Pinion Flange



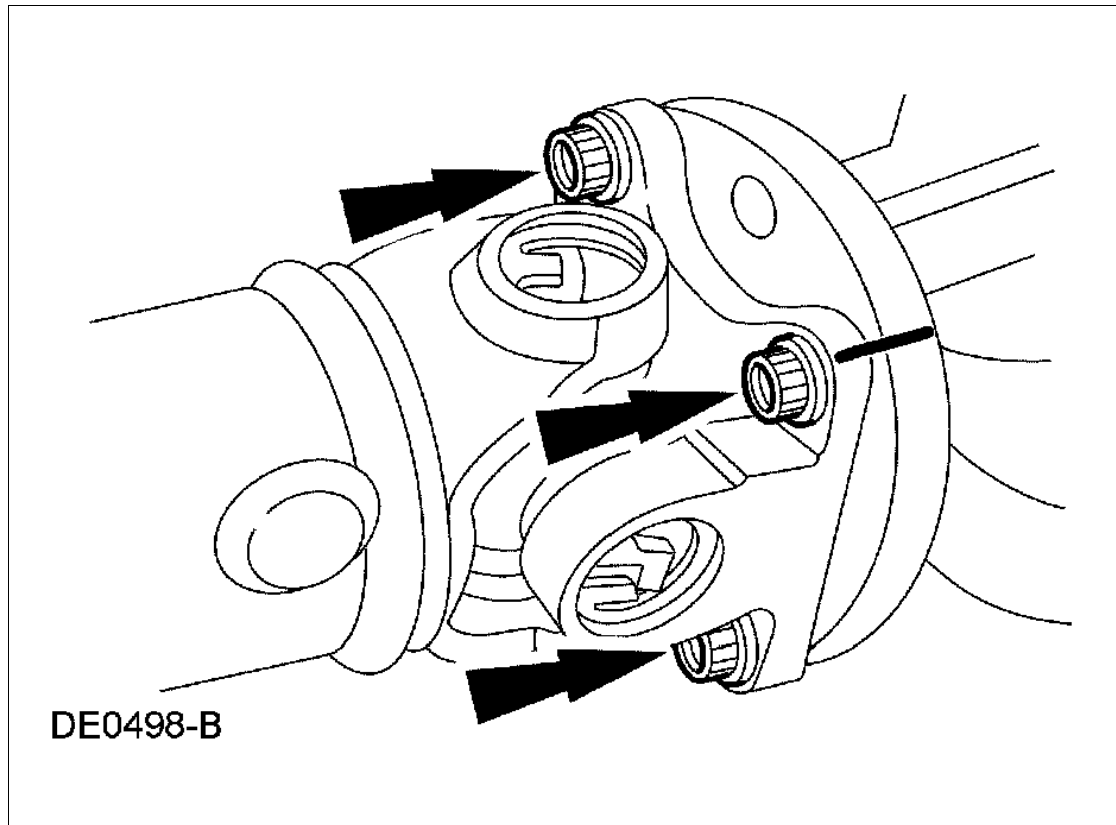
Courtesy of FORD MOTOR CO.

36. Install the driveshaft flange bolts.

**CAUTION:** *The driveshaft centering socket yoke fits tightly on the pinion flange pilot. To make sure that the driveshaft centering socket yoke seats squarely on the pinion flange, tighten the driveshaft flange bolts evenly in a cross pattern.*

1. Tighten to 103 Nm (76 lb-ft).

Fig 173: Identifying Index-Mark To Driveshaft And Flange Bolts



Courtesy of FORD MOTOR CO.

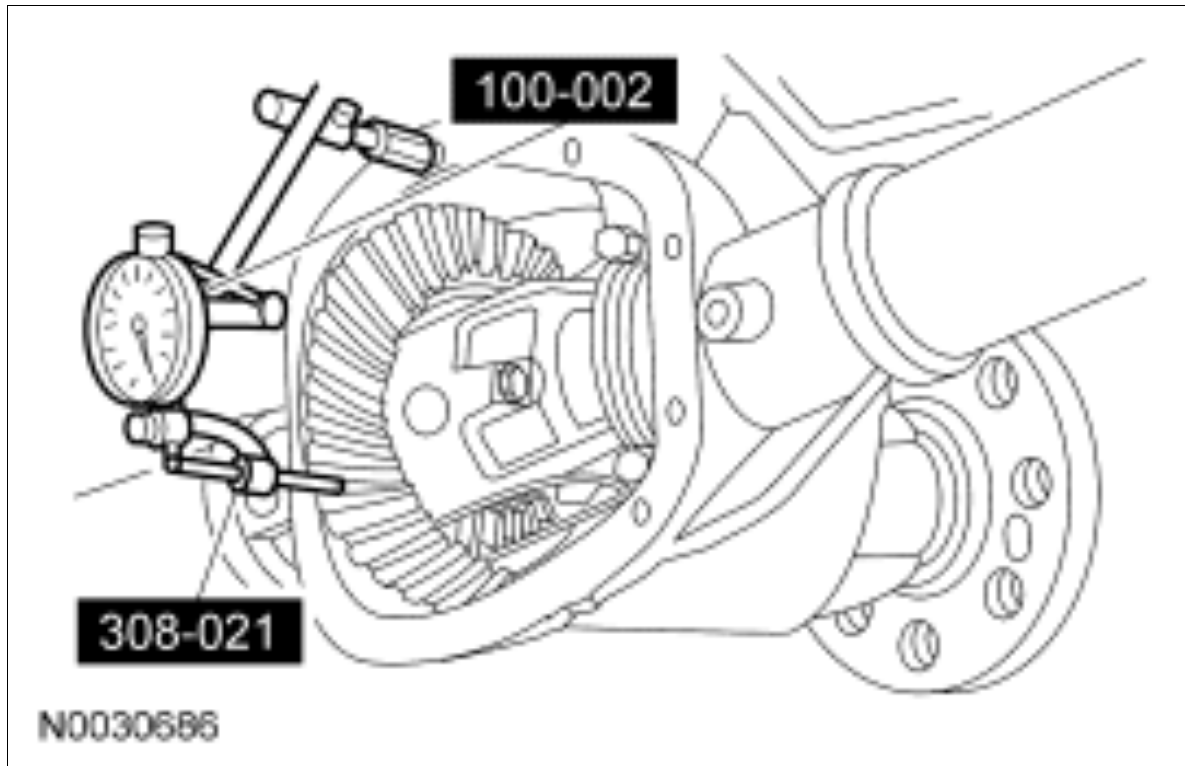
37. Lower the vehicle.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM.*

### Checking Differential Ring Gear Backlash

1. Remove the differential housing cover.
2. Using a suitable dial indicator and the special tool, measure and record the differential ring gear backlash in 4 opposing points on the ring gear.

Fig 174: Checking Differential Ring Gear Backlash



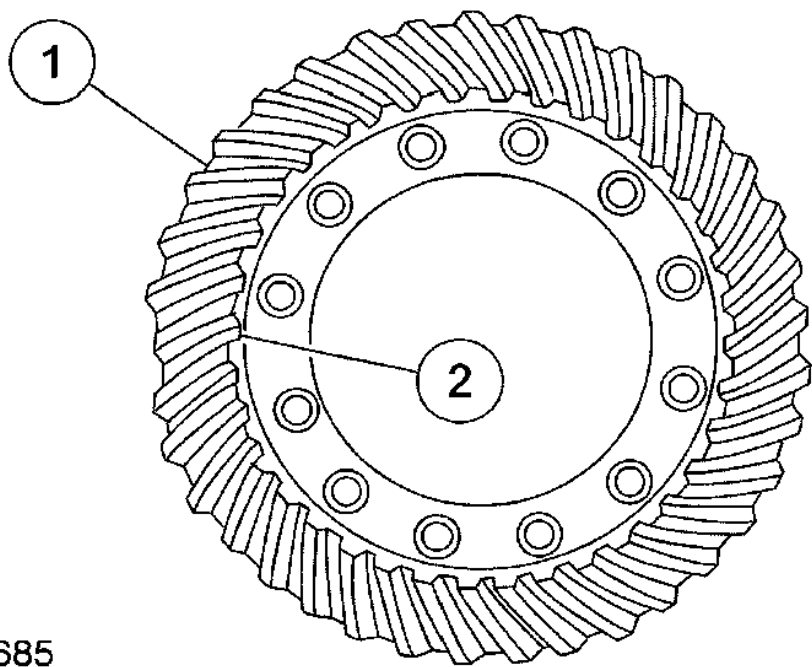
Courtesy of FORD MOTOR CO.

### Checking Tooth Contact Pattern And Condition Of The Ring And Pinion

There are 2 basic types of conditions that will produce ring and pinion noise. The first type is a howl or chuckle produced by broken, cracked, chipped, scored or forcibly damaged gear teeth and is usually quite audible over the entire speed range. The second type of ring and pinion noise pertains to the mesh pattern of the gear pattern. This gear noise can be recognized as it produces a constant pitch or whine. Ring and pinion noise tends to peak in a narrow speed range or ranges, and will tend to remain constant in pitch.

**NOTE:** *In the following steps, the movement of the contact pattern along the length is indicated as toward the "heel" or "toe" of the differential ring gear.*

Fig 175: Identifying Differential Ring Gear Heel And Toe



N0030685

Item	Part Number	Description
1	—	Heel
2	—	Toe

Courtesy of FORD MOTOR CO.

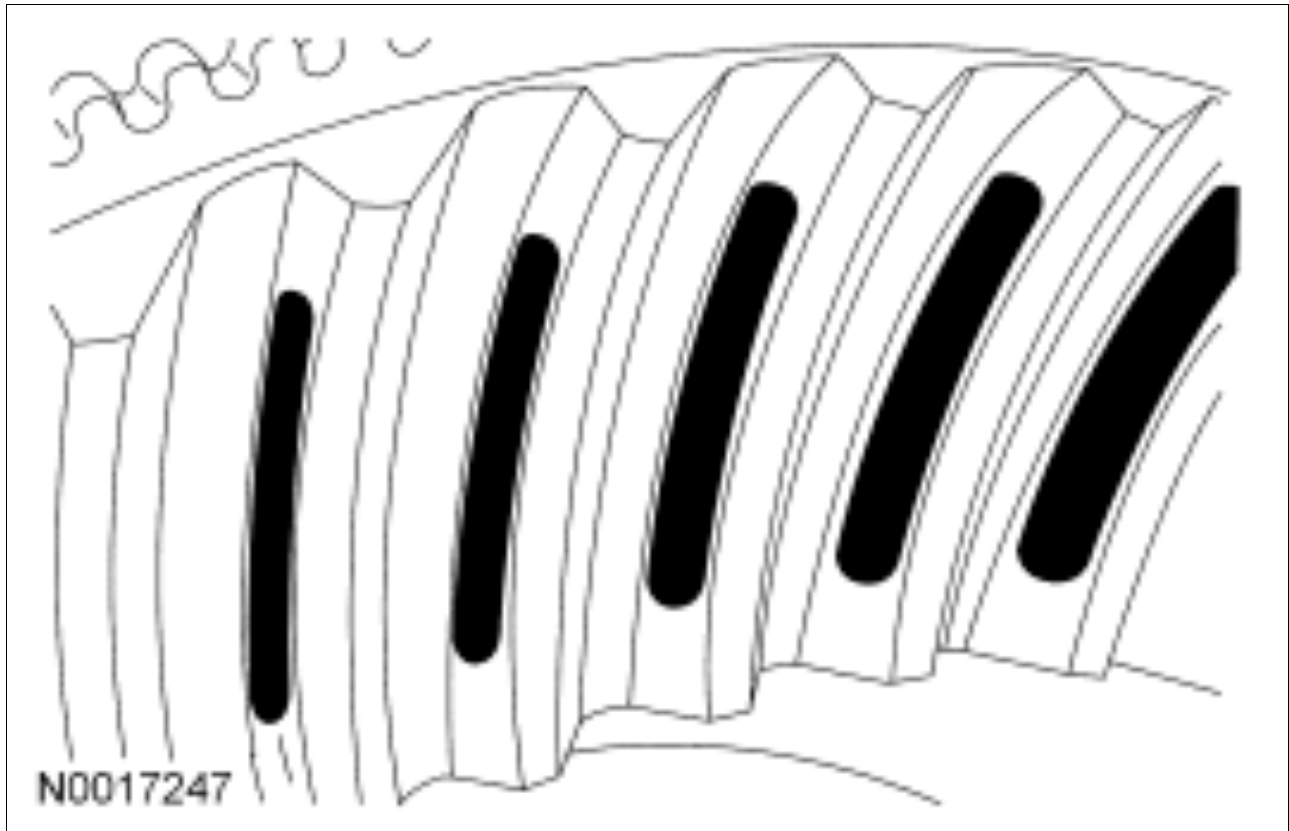
Apply a marking compound to a third of the gear teeth on the differential ring gear. Rotate the differential ring gear several complete turns in both directions until a good, clear tooth pattern is obtained. Compare the contact patterns on the ring gear teeth with the following illustrations.

**Good Contact Pattern**

Pattern inspection allows the technician to detect gross errors in set up prior to complete assembly of the differential assembly. Pattern contact should be within the primary area of the ring gear tooth section. Avoid narrow or hard contact with the outer perimeter of the ring gear tooth. Pattern inspection should be on the drive side of the tooth. Correct assembly of the drive pattern will result in satisfactory coast performance.

**NOTE:** *If a gross pattern error is detected with the correct backlash, check the pinion shim selection.*

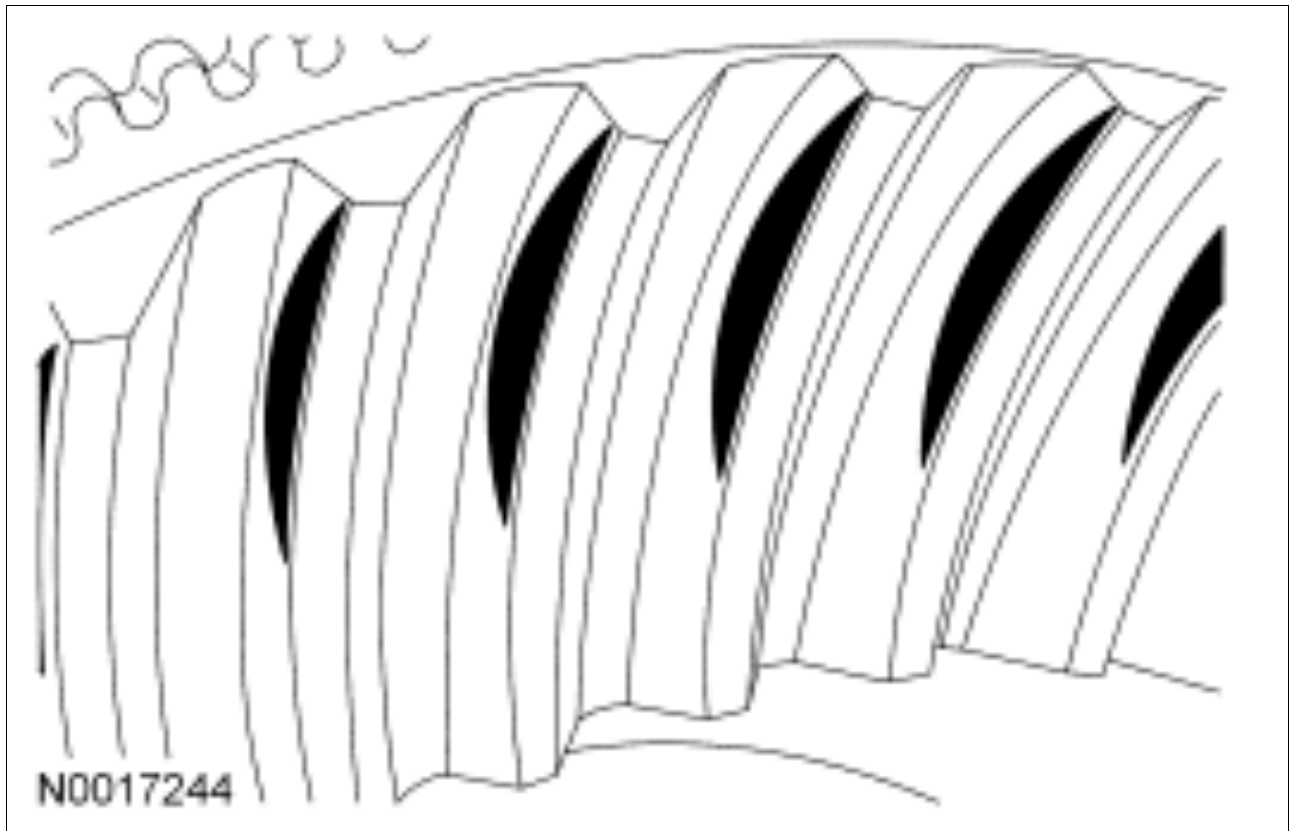
Fig 176: Identifying Tooth Contact Pattern (Good Contact Pattern)



Courtesy of FORD MOTOR CO.

**Low Contact Pattern That Is Contacting More Toward The Heel**

Fig 177: Identifying Low Contact Pattern (Contacting More Toward Heel)

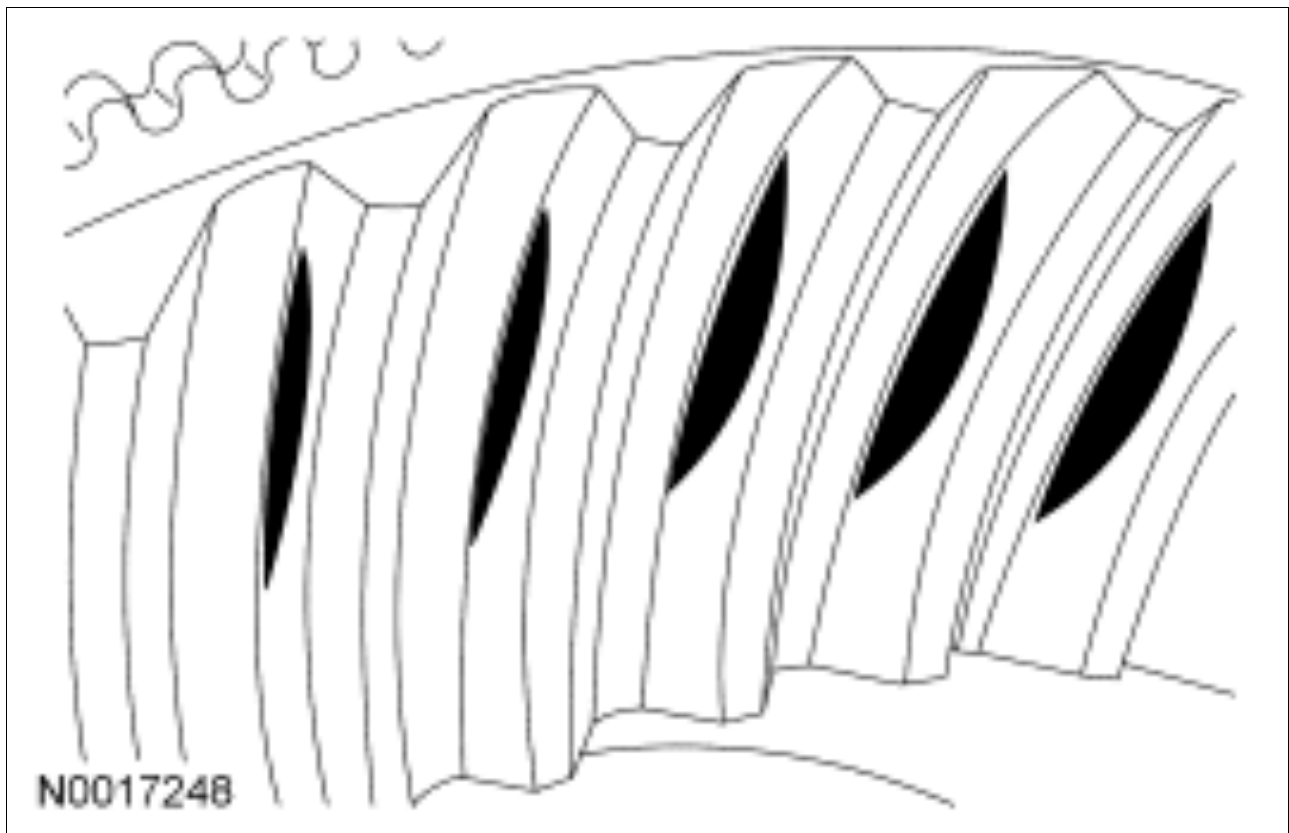


Courtesy of FORD MOTOR CO.

**High, Thin Contact Pattern In The Center Of The Tooth**



Fig 178: Identifying Tooth Contact Pattern (High, Thin Contact Pattern)



Courtesy of FORD MOTOR CO.

**Thick Contact Pattern That Is Contacting Tooth Toward The Toe**

Fig 179: Identifying Thick Tooth Contact Pattern (Contacting Tooth Toward Heel)



Courtesy of FORD MOTOR CO.

**Thick Contact Pattern That Is Contacting Tooth Toward The Heel**

Fig 180: Identifying Tooth Contact Pattern (Thick Contact Pattern - Toe)



Courtesy of FORD MOTOR CO.

## Differential Seals

For additional information on differential seals, refer to REAR DRIVE AXLE/DIFFERENTIAL - FORD 8.8-INCH RING GEAR .

## Drive Pinion Stem And Pinion Flange

Check the pinion flange runout when all other checks have failed to show the cause of vibration.

One cause of excessive pinion flange runout is incorrect installation of the axle drive pinion seal. Check to see if the spring on the seal lip has been dislodged before installing a new ring gear and pinion.

## Inspection And Verification

**WARNING:** *If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

The technician should have a thorough knowledge of driveline system operation and accepted general driveline guidelines to detect any problems.

A gear driven unit will produce a certain amount of noise. Some noise is acceptable and audible at certain speeds or under various driving conditions. Certain conditions, such as road conditions and

weather, will amplify normal vehicle noise.

Certain rear axle and driveline concern symptoms are also common to the engine, transmission, rear wheel bearings and tire. For this reason, be sure the cause of the concern is in the axle before repairing or installing any axle components.

The following is a guide to diagnose a driveline concern:

- Verify and document the customer concern.
- Carry out a preliminary investigation.
- Road test the vehicle.
- Find the cause of the problem.
- Inspect the components.

1. Verify and document the customer concern.

1. When was it first noticed?
2. Did it appear suddenly or gradually?
3. Did anything unusual occur that would coincide with it or precede it?
4. Has the driveline system been repaired before or new components installed?
  1. Check the vehicle service record. Note any repairs other than driveline, such as brakes or suspension.
5. Are there any special conditions affecting the concern or will alter the concern? For example:
  1. Road speed.
  2. Type of road.
  3. Drive mode.
  4. Temperature.
  5. Vehicle loaded or unloaded.
6. Is the condition constant or intermittent? Can the concern be duplicated at any time?
7. Check for TSBs.

2. Do a preliminary investigation. Visually inspect for obvious signs of damage.

**NOTE:** *If the inspection reveals an obvious concern, repair the vehicle.*

1. Inspect the driveshaft:

1. For build up of any foreign material.
2. For damage, such as a bent tube or missing weights.
3. U-joints or flex couplers for wear or damage.

2. Inspect the axle:

1. For signs of leakage at the drain or fill plug, differential seal, vent or halfshaft seals.
  1. A plugged vent will cause a leak.
2. For damage, such as cracks, bent halfshafts or dented rear cover.

3. For missing fasteners.

3. Inspect other suspect components/systems:

1. Inspect the halfshaft assemblies for damaged CV joints or torn CV boots.
2. Inspect the suspension for broken springs, damaged shock absorbers and worn suspension bushings.
3. Inspect the rear brake components - lines, cables and calipers.
4. Inspect the tires; are they in good condition and do they match?

3. Road test the vehicle.

**NOTE:** *A road test is necessary for any customer concern of noise or vibration.*

1. During the road test, use the following driving methods to diagnose the problem. Is the concern most noticeable:

1. From a stop?
2. On shifts from REVERSE to DRIVE?
3. On turns?
  1. Sweeping type turn.
  2. Tight turn (to the stop).
4. In DRIVE?
  1. Accelerating the vehicle, definite throttle depression, applying engine torque?
5. In CRUISE?
  1. Maintain a constant speed with the throttle applied?
6. In COAST?
  1. Decelerating with the throttle closed?

2. Record when the concern occurs. Write down the kp/h (mph) range at which the noise/vibration occurs.

4. Find the cause of the problem.

1. Compare the inspection and road test results with the following chart.
2. Use the following Diagnostic Routine Chart to identify the probable cause, and know what corrective actions should be taken to repair the component/vehicle and to prevent a reoccurrence.

#### DIAGNOSTIC ROUTINE CHART

Condition	Action
1. Fluid loss	1. GO to DIAGNOSTIC ROUTINE - FLUID LOSS
1. Noise louder on turns (sweeping turn)	1. GO to DIAGNOSTIC ROUTINE - NOISE LOUDER ON TURNS (SWEEPING)
1. Axle noise (growl) <sup>(1)</sup> in tight turn	1. GO to DIAGNOSTIC ROUTINE - NOISE (GROWL) IN TIGHT TURN

1. Axle noise (chatter/shudder) <sup>(1)</sup> in tight turn, limited slip differential	1. GO to DIAGNOSTIC ROUTINE - NOISE (CHATTER/SHUDDER) IN TIGHT TURNS, LIMITED SLIP DIFFERENTIAL
1. Axle noise (whine) <sup>(1)</sup> in all or more than one drive mode	1. GO to DIAGNOSTIC ROUTINE - NOISE (WHINE) IN ALL OR MORE THAN ONE DRIVE MODES
1. Axle noise (tick/click) <sup>(1)</sup> in all or more than one drive mode (drive, cruise, coast)	1. GO to DIAGNOSTIC ROUTINE - NOISE (TICK/CLICK) IN ALL OR MORE THAN ONE DRIVE MODES
1. Axle noise (howl/moan) <sup>(1)</sup> in all or more than one drive mode (drive, cruise, coast)	1. GO to DIAGNOSTIC ROUTINE - NOISE (HOWL/MOAN) IN ALL OR MORE THAN ONE DRIVE MODES
1. Axle noise (clunk) <sup>(1)</sup> on changes in speed or direction of power	1. GO to DIAGNOSTIC ROUTINE - NOISE (CLUNK) ON CHANGES IN SPEED OR DIRECTION OF POWER
1. Vibration	1. For information on driveline vibration diagnostics, REFER to NOISE, VIBRATION AND HARSHNESS .
<sup>(1)</sup> Refer to NOISE, VIBRATION AND HARSHNESS for a glossary of noise-related terms.	

#### 5. Inspect the axle components.

**NOTE:** *If the conclusion of the road test points to an axle center section (ring and pinion or differential case) concern, carry out a visual inspection of the axle.*

1. Remove the differential housing cover. Drain the axle lubricant through a white cloth. Check the fluid for:

1. Any foreign material.
2. Metal particles.
3. Burnt odor.

2. Inspect the axle components.

**NOTE:** *When inspecting the axle, do not clean the components immediately. Cleaning may remove diagnostic evidence.*

1. Look for:

1. Loose fasteners.
2. Notches or visible steps or grooves created by wear.
3. Pitting or cracking along gear contact lines.
4. Scuffing or deformations.

5. Discolorations.
6. Nicks or ridges on gear teeth.
2. Clean the axle components for inspection.
  1. Remove as much lubricant as possible with clean solvent. Wipe the components or blow them dry with compressed air.
3. Re-inspect for:
  1. Loose fasteners.
  2. Notches or visible steps or grooves created by wear.
  3. Pitting or cracking along gear contact lines.
  4. Scuffing or deformations.
  5. Discolorations.
  6. Nicks or ridges on gear teeth.
4. Check backlash and carry out a ring and pinion pattern test. Refer to CHECKING DIFFERENTIAL RING GEAR BACKLASH and CHECKING TOOTH CONTACT PATTERN AND CONDITION OF THE RING AND PINION.

### Pinion Flange Runout Check - Circular

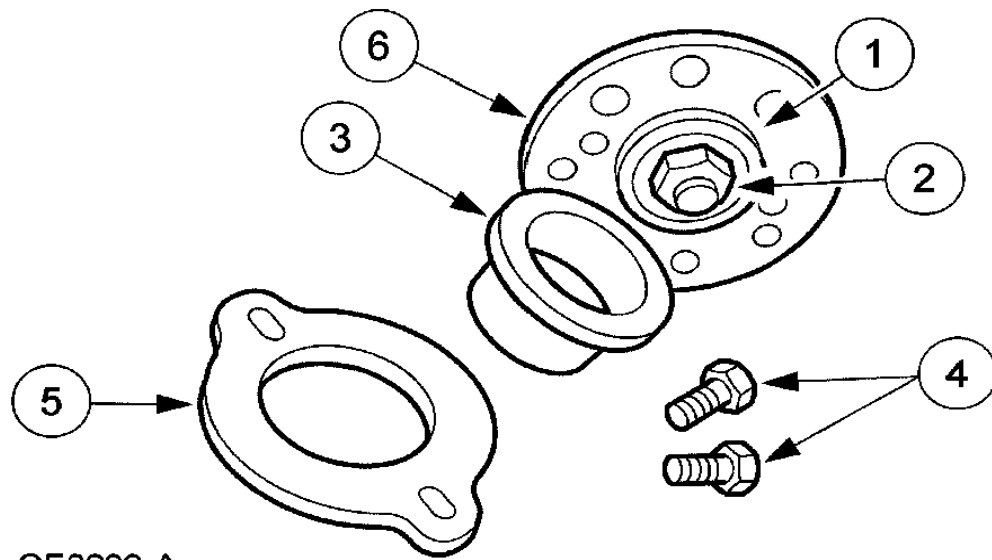
**WARNING:** *If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

**WARNING:** *The electrical power to the air suspension system must be shut off prior to hoisting, jacking or towing an air suspension vehicle. This can be accomplished by turning off the air suspension switch. Failure to do so can result in unexpected inflation or deflation of the air springs, which can result in shifting of the vehicle during these operations.*

**CAUTION:** *Pinion bearing preload must be reset if the pinion nut has been loosened or removed for pinion flange reindexing or installation.*

1. Raise the vehicle on a twin-post hoist that supports the rear axle.
2. Remove the driveshaft. For addition information, refer to DRIVESHAFT .
3. Check the pinion flange for damage.
4. Position Drive Pinion Flange Runout Gauge on the pinion flange.

Fig 181: Positioning Drive Pinion Flange Runout Gauge On The Pinion Flange



GE0802-A

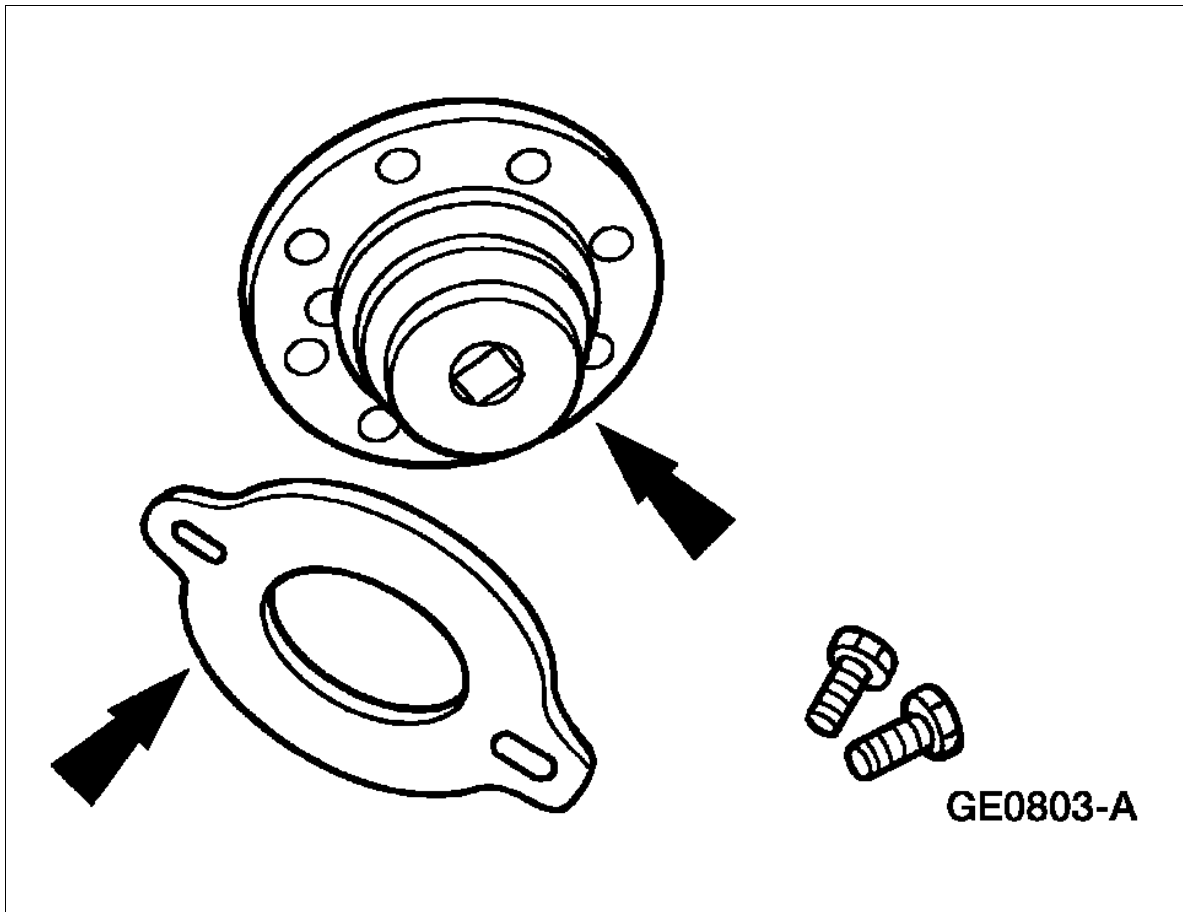
Item	Part Number	Description
1	—	Pilot (part of 205-319 [T92L-4851-b])
2	—	Pinion nut
3	205-319	Drive pinion flange runout gauge
4	—	Bolts (2 req'd) (part of 205-320 [T92L-4851-C])
5	205-320	Driveshaft clamp plate
6	4851	Pinion flange

Courtesy of FORD MOTOR CO.

5. Position the Driveshaft Plate onto the Drive Pinion Flange Runout Gauge.



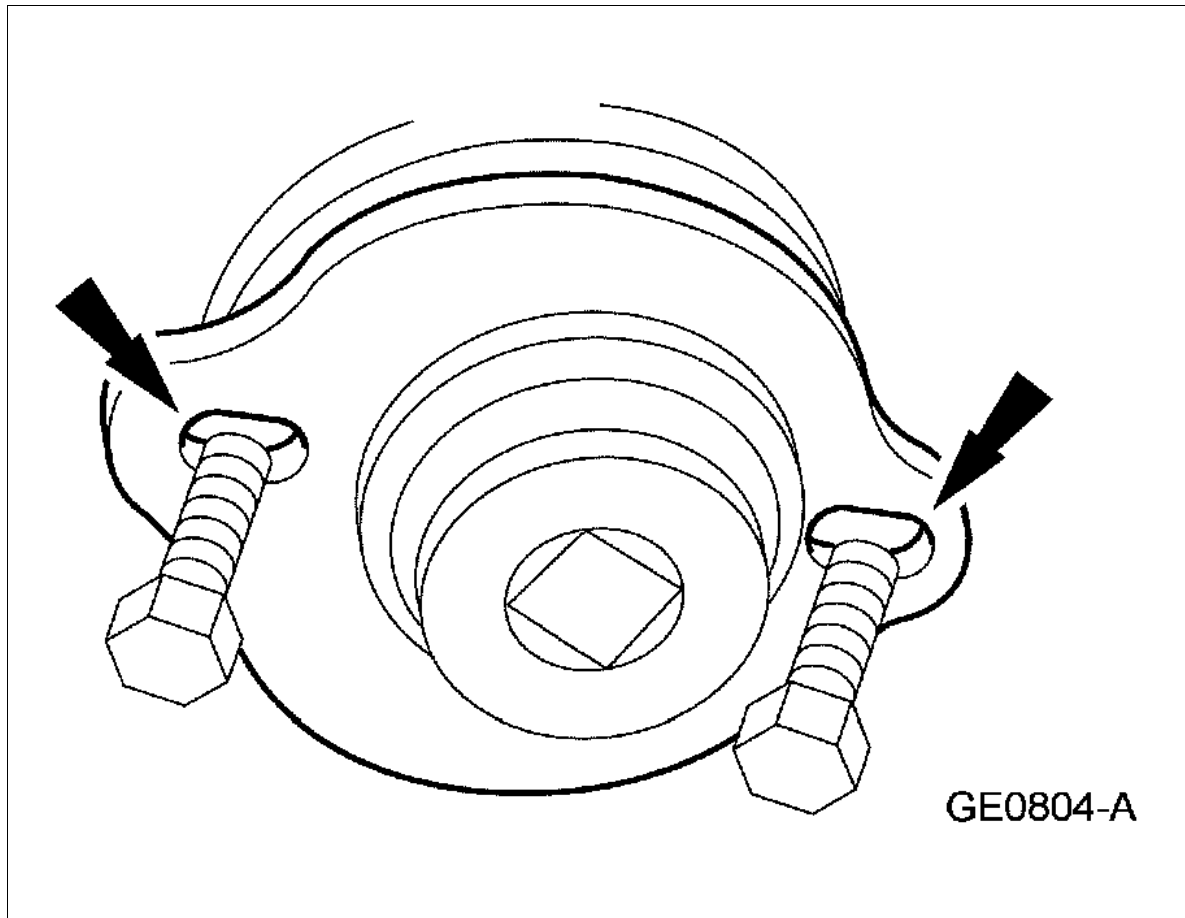
Fig 182: Positioning Driveshaft Plate Onto Drive Pinion Flange Runout Gauge



Courtesy of FORD MOTOR CO.

6. Align the holes on the Driveshaft Plate with the holes in the pinion flange and install the bolts. Snug the bolts evenly.

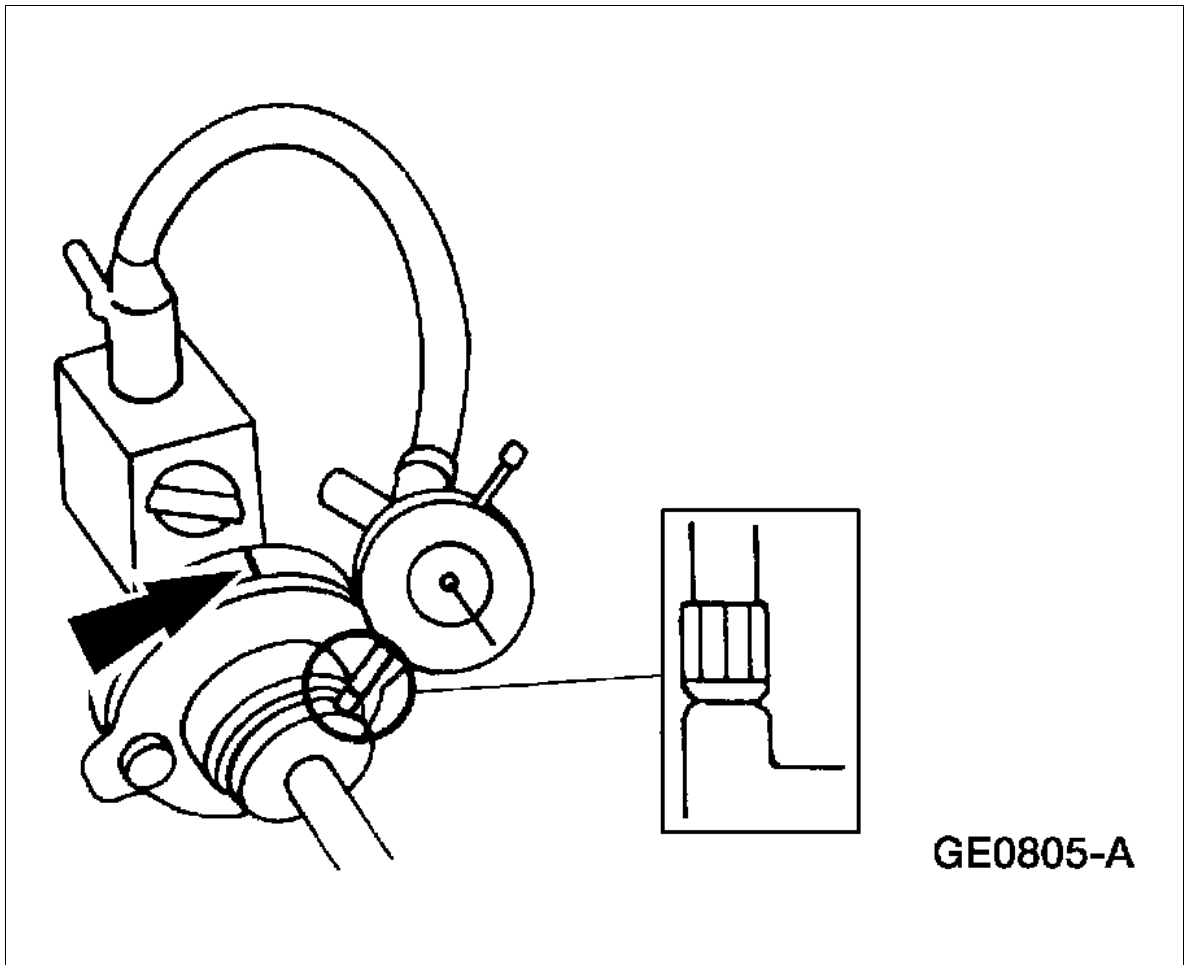
Fig 183: Locating Bolts



Courtesy of FORD MOTOR CO.

7. Position the Dial Indicator Gauge with Holding Fixture as shown. Turn the Drive Pinion Flange Runout Gauge, and locate and mark the high spot on the pinion flange with yellow paint.

Fig 184: Positioning Dial Indicator Gauge With Holding Fixture

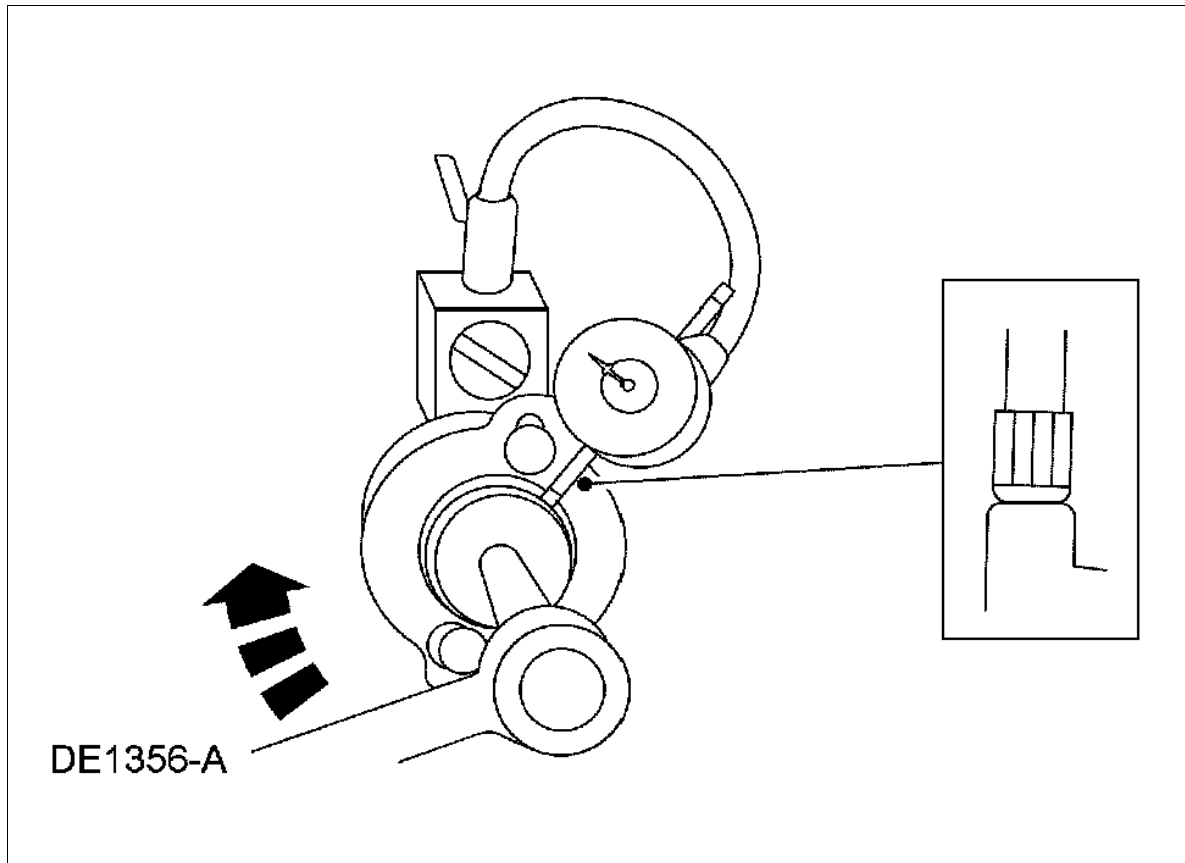


Courtesy of FORD MOTOR CO.

If the flange runout exceeds 0.25 mm (0.010 inch), remove the pinion flange, reindex the flange one-half turn on the pinion, and reinstall it. For additional information, refer to REAR DRIVE AXLE/DIFFERENTIAL - FORD 8.8-INCH RING GEAR .

8. Check the runout again. If necessary, rotate the flange until an acceptable runout is obtained. If the flange runout is still more than 0.25 mm (0.010 inch), install a new pinion flange.

Fig 185: Checking Runout



Courtesy of FORD MOTOR CO.

9. If excessive runout is still evident after installation of the pinion flange, install a new ring and pinion. Repeat the above checks until the runout is within specifications.
10. Install the driveshaft. For additional information, refer to DRIVESHAFT .
11. If equipped with fire suppression system, repower the system.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

### Traction-Lok® Differential Check Road Test

1. Place one wheel on a dry surface and the other wheel on ice, mud or snow.
2. Gradually open the throttle to obtain maximum traction prior to break away. The ability to move the vehicle demonstrates correct operation of a Traction-Lok® rear axle assembly.
3. When starting with one wheel on an excessively slippery surface, a slight application of the parking brake may be necessary to help energize the Traction-Lok® feature of the differential. Release the brake when traction is established. Use light throttle on starting to provide maximum traction.

4. If, with unequal traction, both wheels slip, the limited slip rear axle has done all it can possibly do.
5. In extreme cases of differences in traction, the wheel with the least traction may spin after the Traction-Lok® has transferred as much torque as possible to the non-slipping wheel.

### **Traction-Lok® Differential Operation Check**

A Traction-Lok® differential can be checked for correct operation without removing it from the rear axle housing.

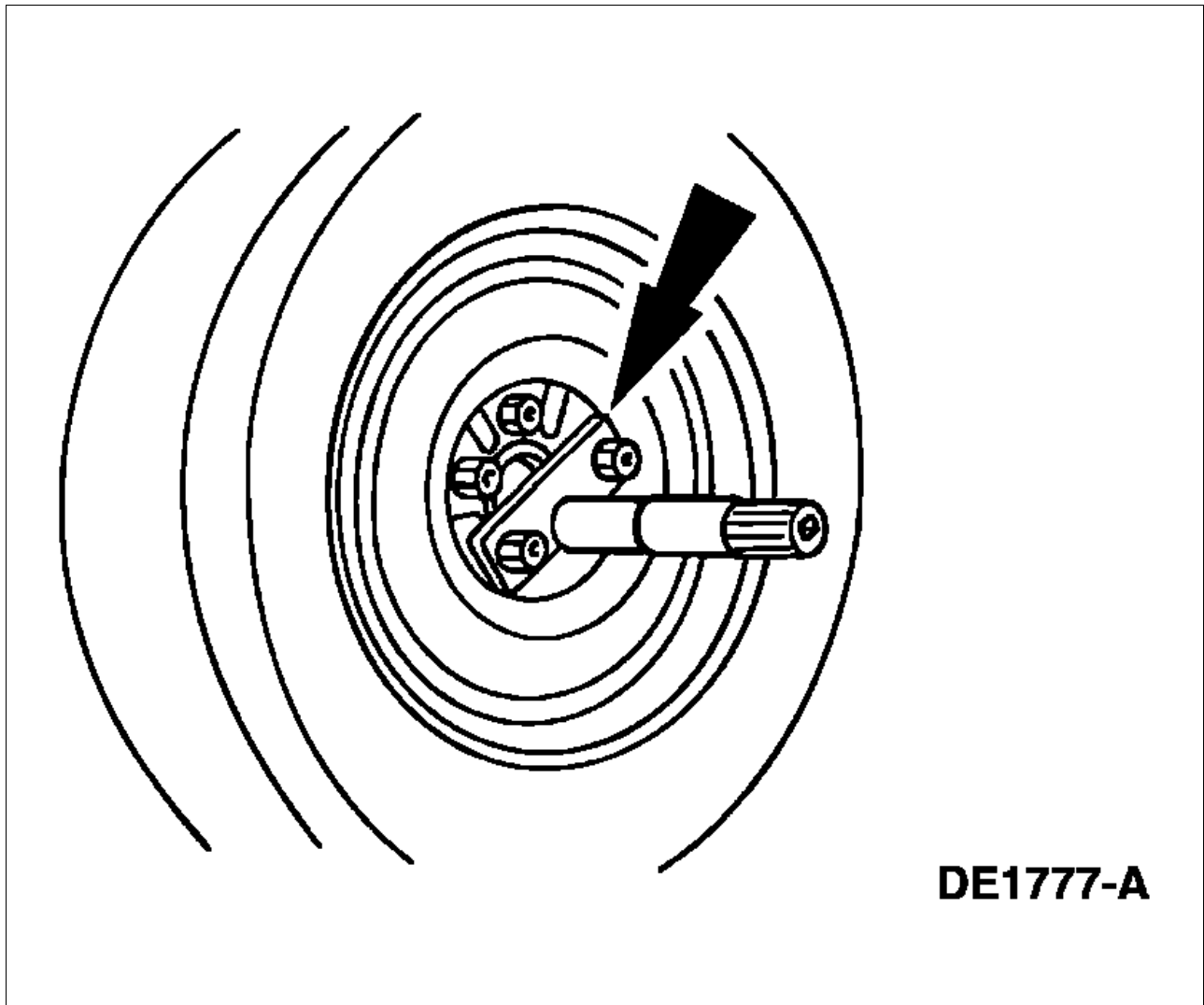
**WARNING:** *A vehicle equipped with a Traction-Lok® differential will always have both wheels driving. If only one wheel is raised off the floor and the rear axle is driven by the engine, the wheel on the floor could drive the vehicle off the stand or jack. Be sure both rear wheels are off the floor.*

**WARNING:** *The electrical power to the air suspension system must be shut off prior to hoisting, jacking or towing an air suspension vehicle. This can be accomplished by turning off the air suspension switch. Failure to do so can result in unexpected inflation or deflation of the air springs, which can result in shifting of the vehicle during these operations.*

**WARNING:** *If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

Raise only one rear wheel. Install the Differential Clutch Gauge on the wheel bolts.

Fig 186: Installing Differential Clutch Gauge On Wheel Bolts

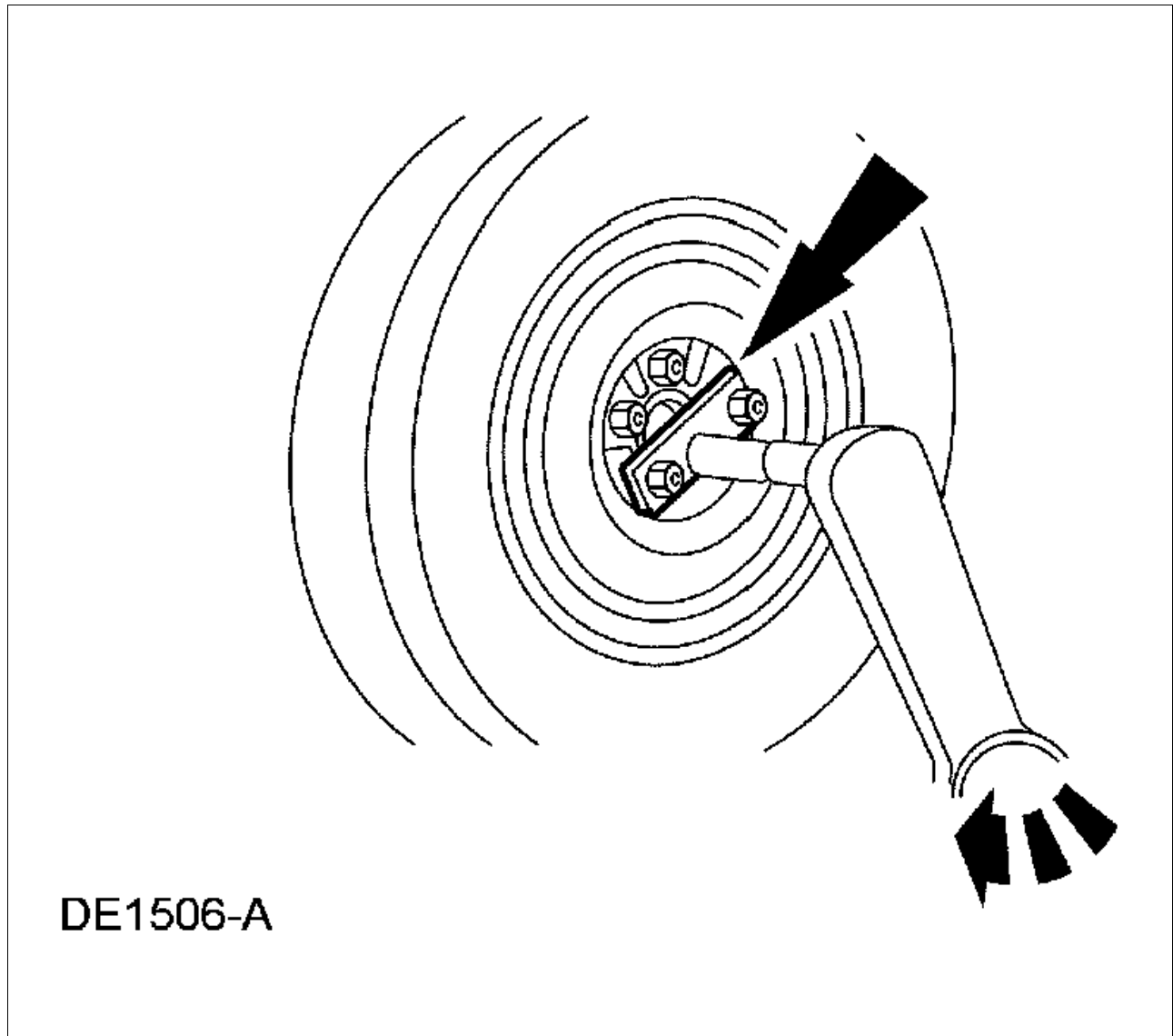


**DE1777-A**

Courtesy of FORD MOTOR CO.

Use a torque wrench with the capacity of at least 271 Nm (200 lb-ft) to rotate the axle shaft. Be sure that the transmission is in NEUTRAL, and that one rear wheel is on the floor while the other rear wheel is raised off the floor. The breakaway torque required to start rotation must be at least 27 Nm (20 lb-ft). The initial breakaway torque may be higher than the continuous turning torque.

Fig 187: Rotating Axle Shaft With Torque Wrench



Courtesy of FORD MOTOR CO.

The axle shaft must turn with even pressure throughout the check without slipping or binding. If the torque reading is less than specified, check the differential case. For additional information, refer to REAR DRIVE AXLE/DIFFERENTIAL - FORD 8.8-INCH RING GEAR .

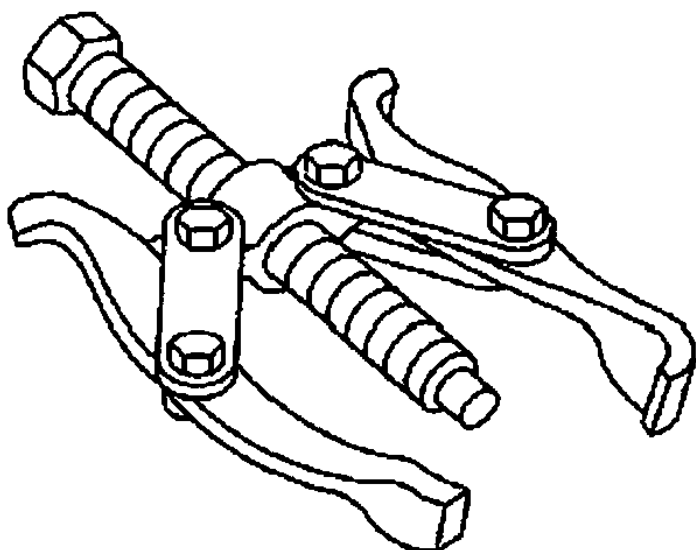
**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

If equipped with fire suppression system, repower the system.

## DISASSEMBLY AND ASSEMBLY

### Differential Case And Ring Gear - Conventional

## SPECIAL TOOL CHART

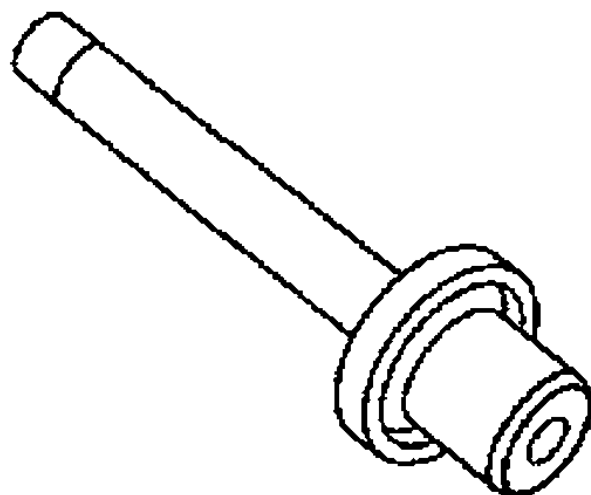


**ST2026-A**

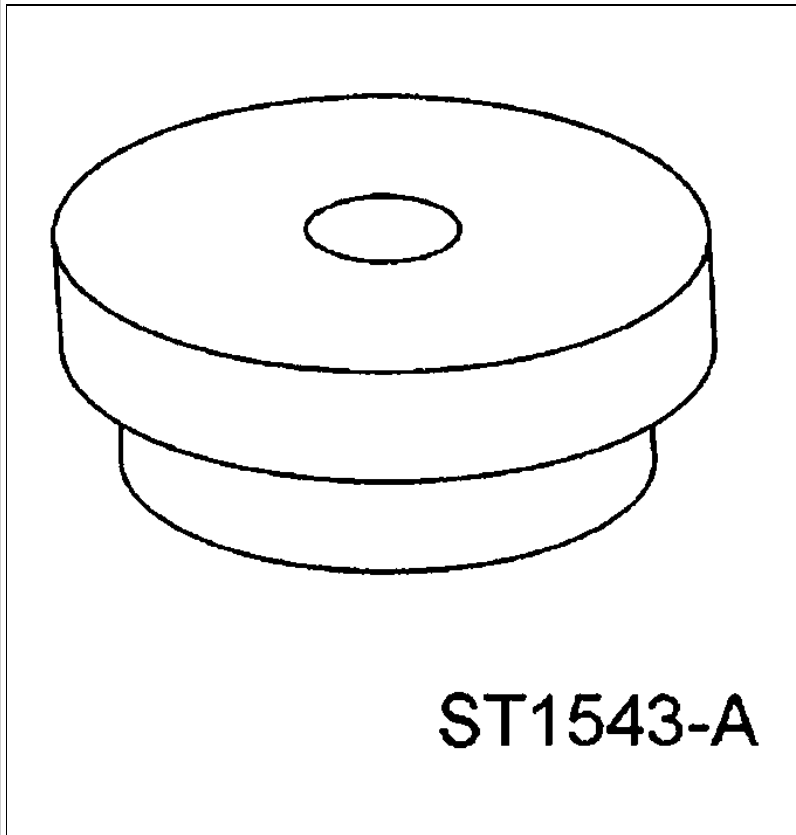
2-Jaw Puller 205-D072 (D97L-4221-A)  
or equivalent

Installer, Differential Side Bearing  
205-010 (T57L-4221-A2)





**ST1375-A**

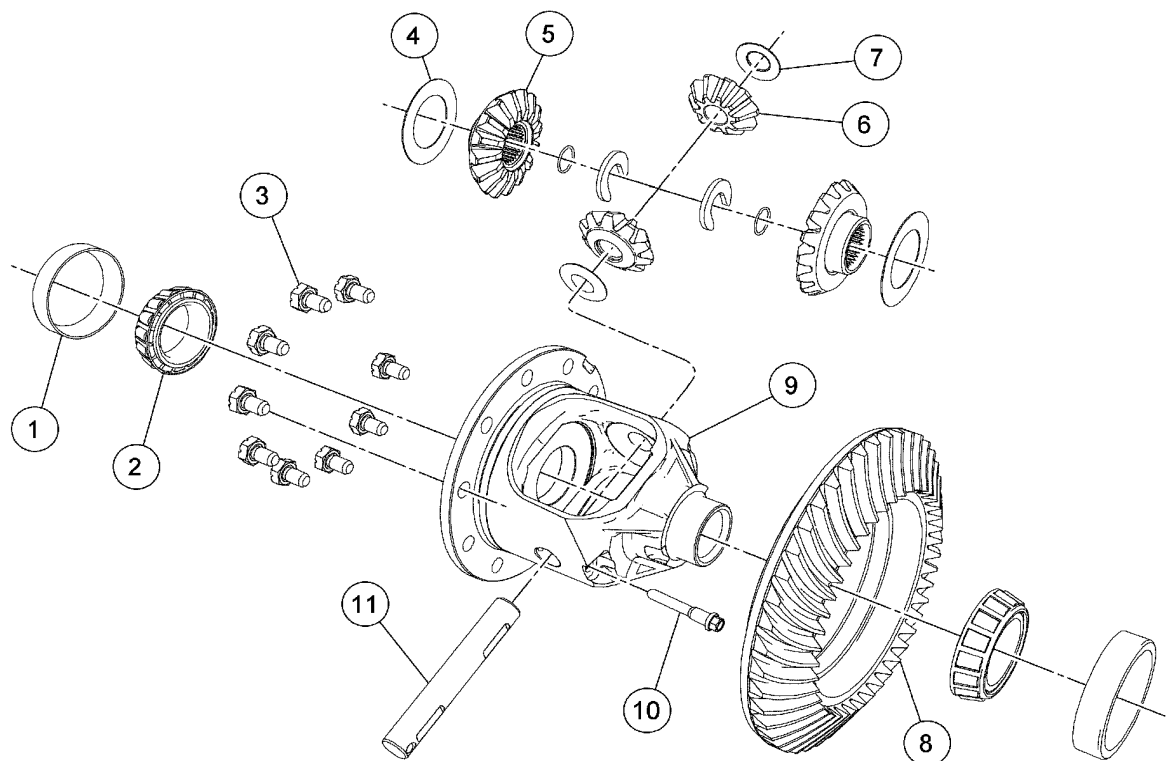


Step Plate 205-D016 (D80L-630-5) or equivalent

#### MATERIAL SPECIFICATION

Item	Specification
Motorcraft 80W-90 Premium Axle Lubricant XY-80W90-QL	WSP-M2C197-A
Stud and Bearing Mount TA-27	WSK-M2G349-A1
Threadlock and Sealer TA-25	WSK-M2G351-A5

Fig 188: Identifying Differential Assembly Components



N0040338

Item	Part Number	Description
1	4222	Differential bearing cup
2	4221	Differential bearing
3	4216	Differential ring gear bolt
4	4228	Differential side gear thrust washer
5	4236	Differential side gear
6	4215	Differential pinion gear
7	4230	Differential pinion gear thrust washer
8	4209	Differential ring gear
9	4204	Differential case
10	4241	Differential pinion shaft lock bolt
11	4211	Differential pinion shaft

Courtesy of FORD MOTOR CO.

## Disassembly

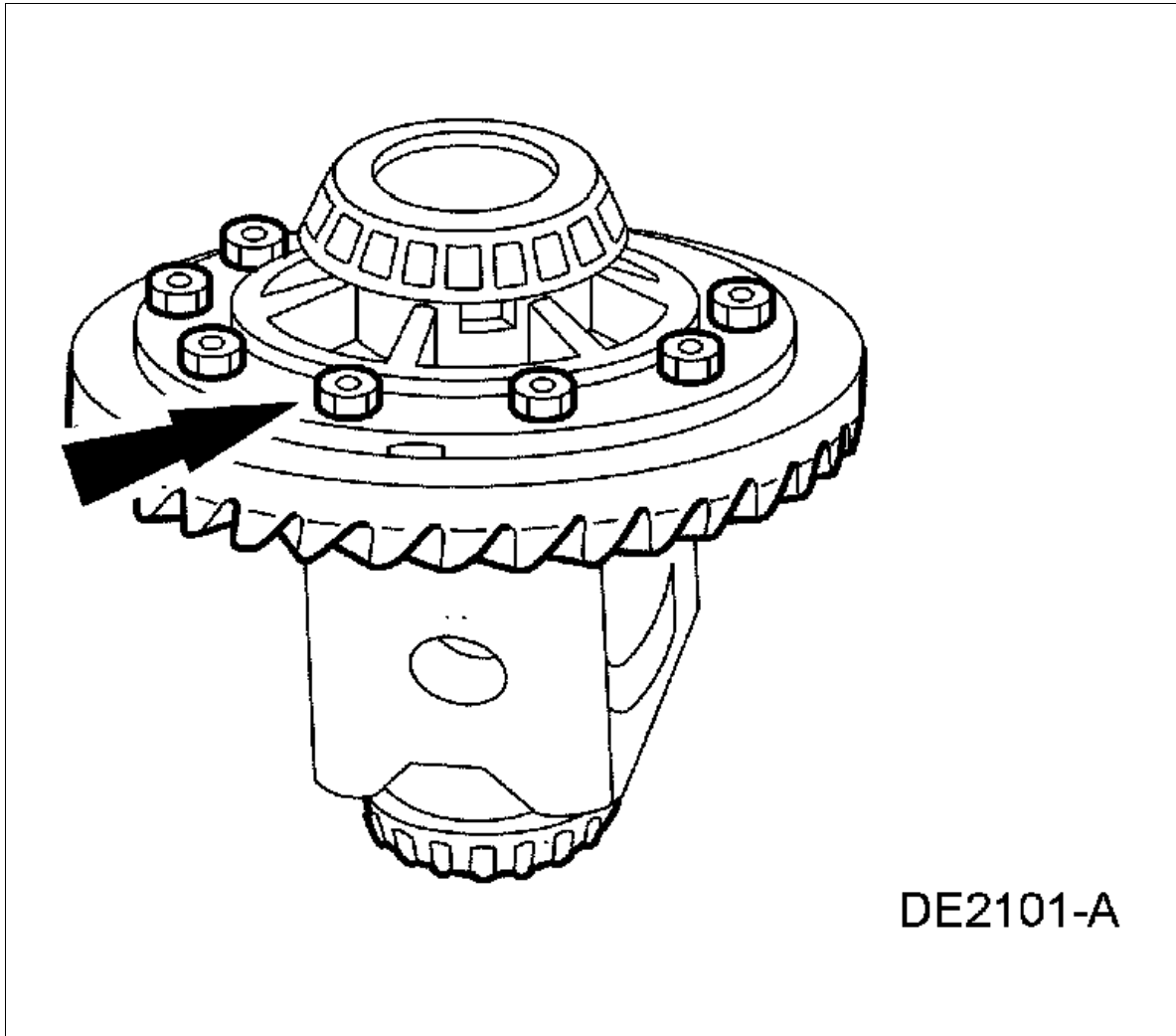
1. Remove the differential assembly from the differential housing. For additional information, refer to DIFFERENTIAL CARRIER.

**WARNING:** If equipped with fire suppression system,

depower the system. For important safety warnings and procedures, refer to *FIRE SUPPRESSION SYSTEM*.

2. Remove the differential ring gear bolts.

Fig 189: Removing Differential Ring Gear Bolts

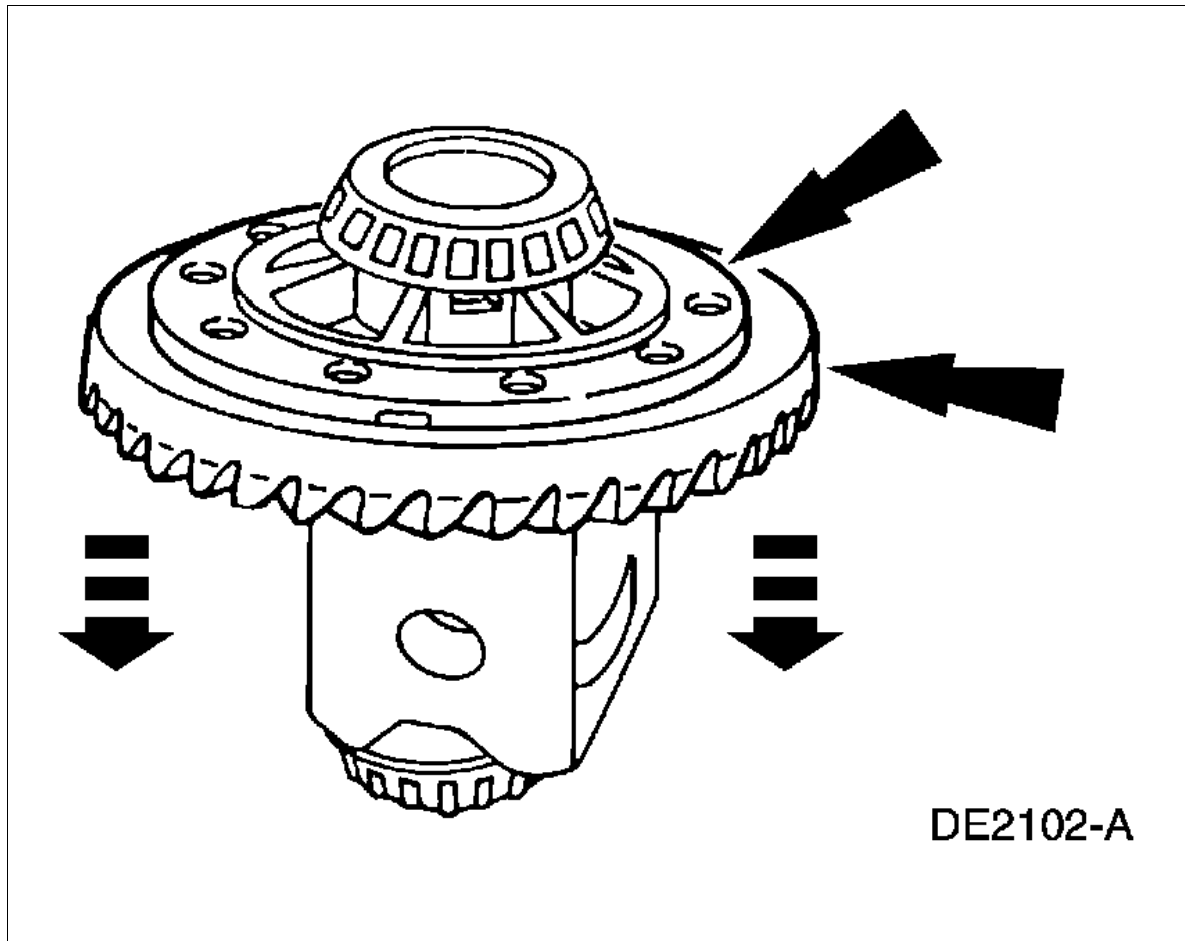


Courtesy of FORD MOTOR CO.

3. Insert a punch in the bolt holes and drive off the differential ring gear.

**CAUTION:** Do not damage the bolt hole threads.

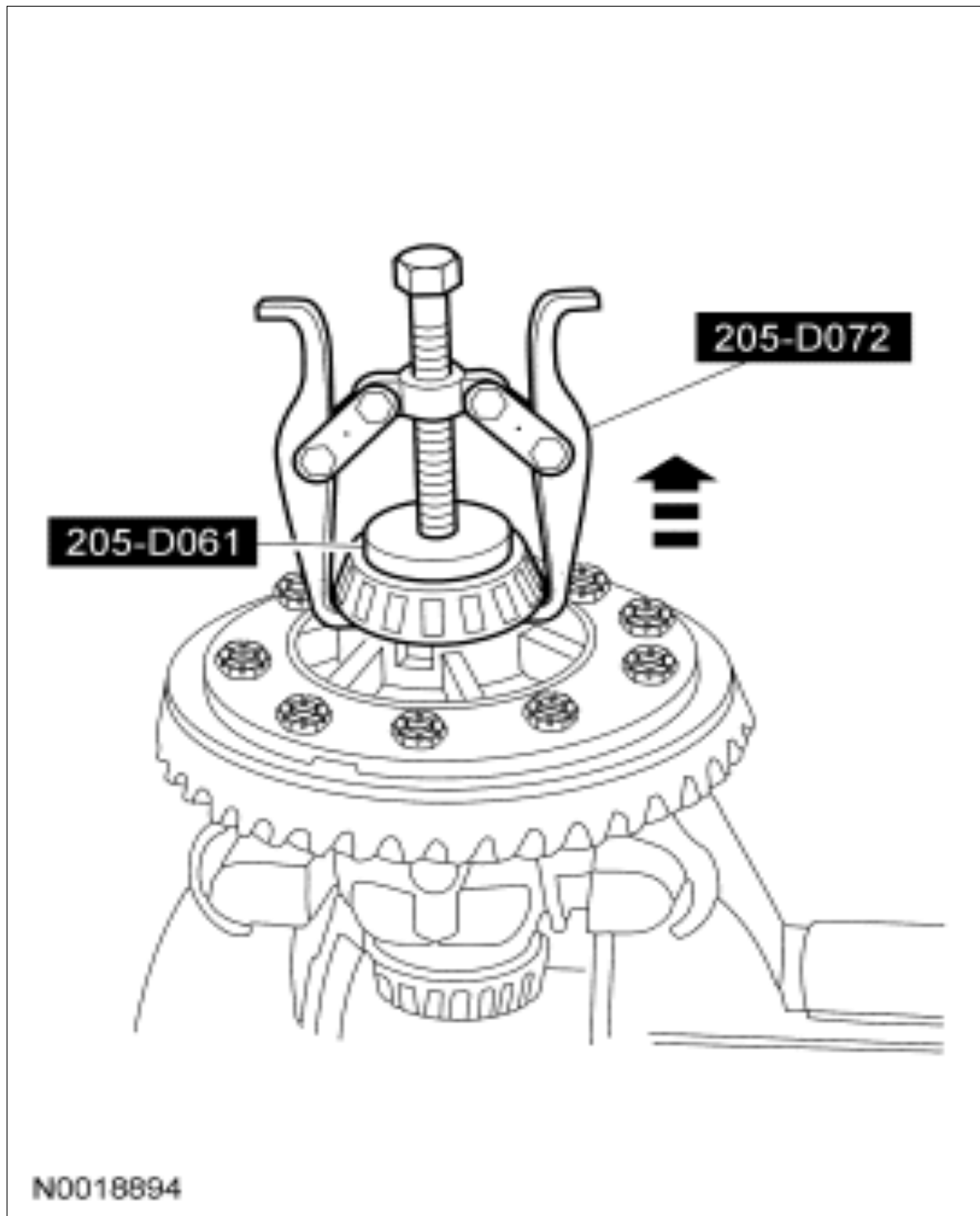
Fig 190: Removing Ring Gear



Courtesy of FORD MOTOR CO.

4. Using the special tools, remove the differential bearings, if necessary.

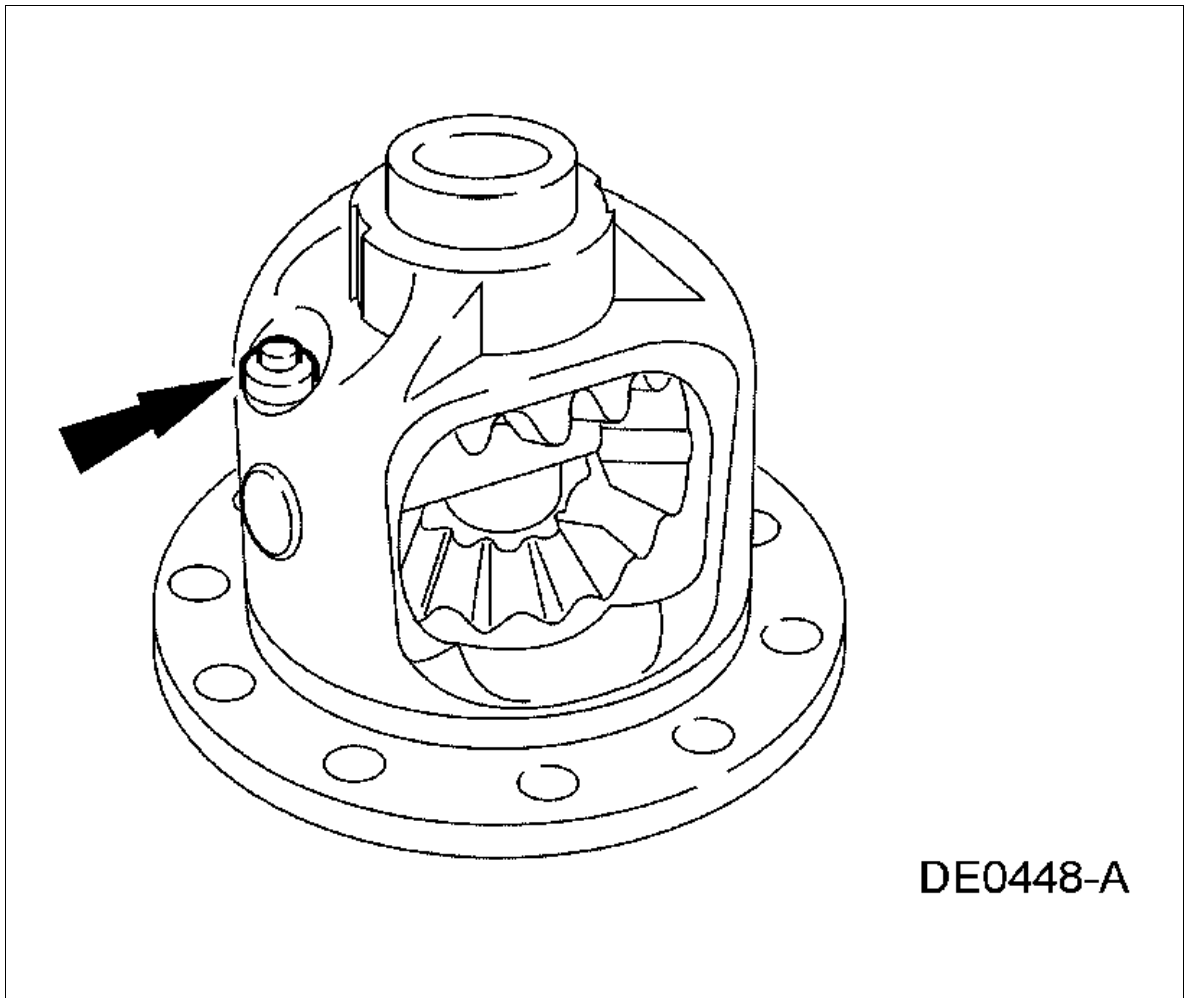
Fig 191: Removing Differential Bearings



Courtesy of FORD MOTOR CO.

5. Remove the differential pinion shaft bolt.

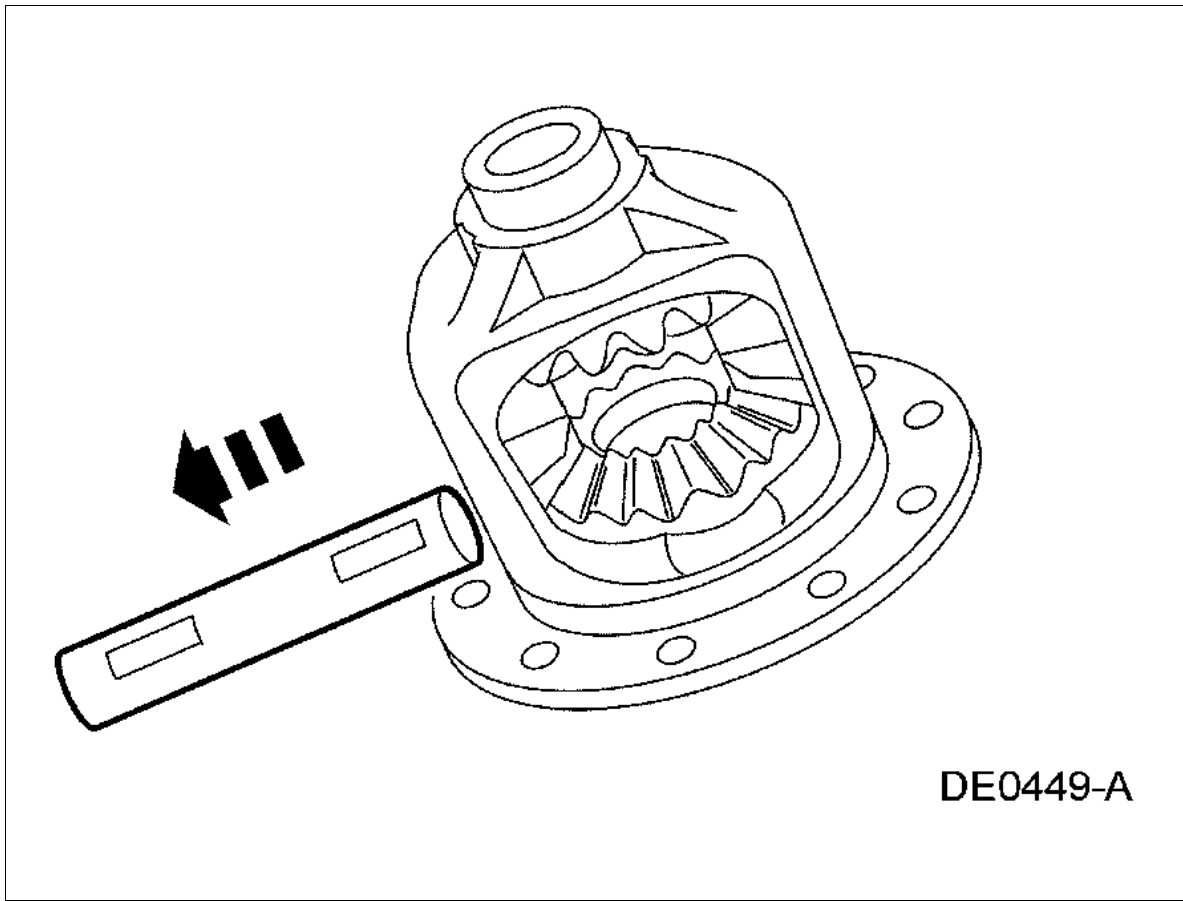
Fig 192: Locating Differential Pinion Shaft Lock Bolt



Courtesy of FORD MOTOR CO.

6. Remove the differential pinion shaft.

Fig 193: Removing Differential Pinion Shaft

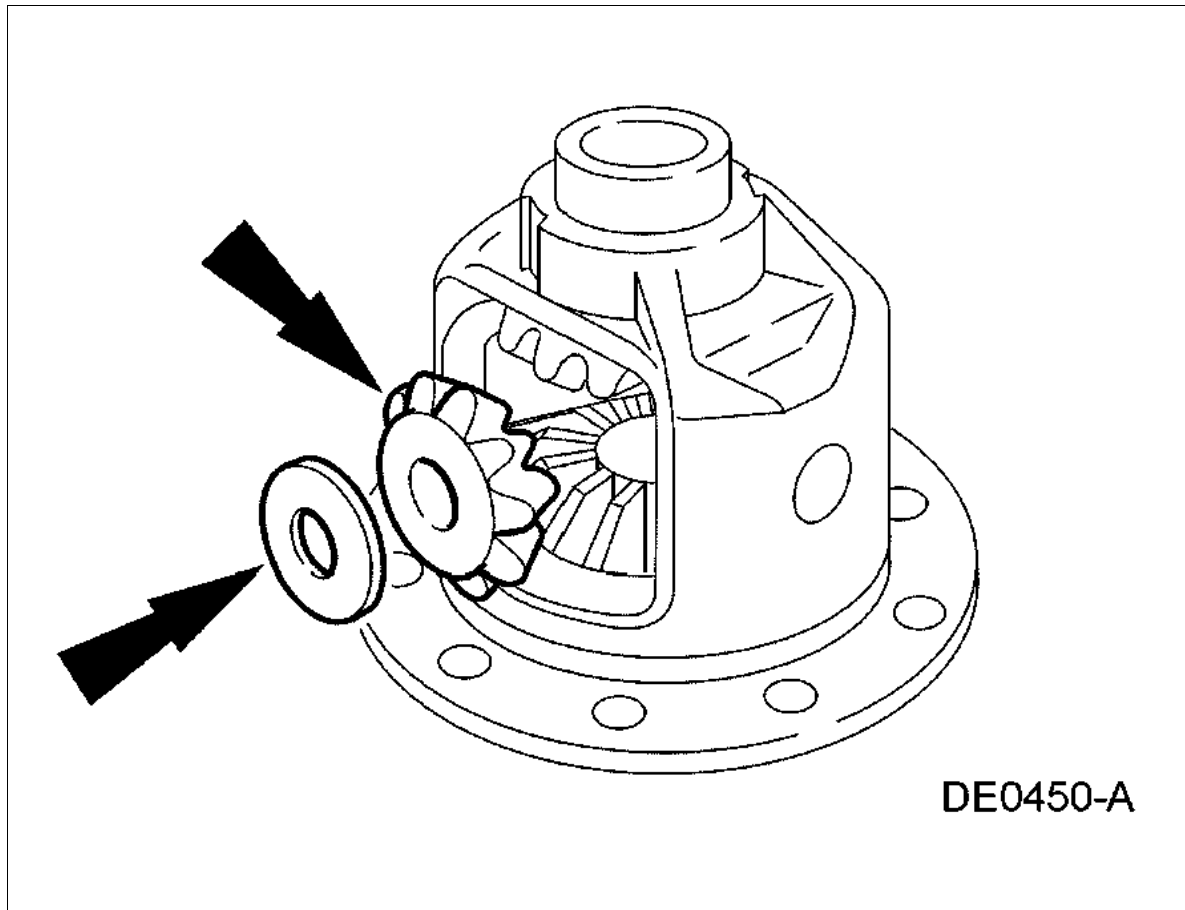


Courtesy of FORD MOTOR CO.

7. Rotate and remove the differential pinion gears and differential pinion thrust washers.



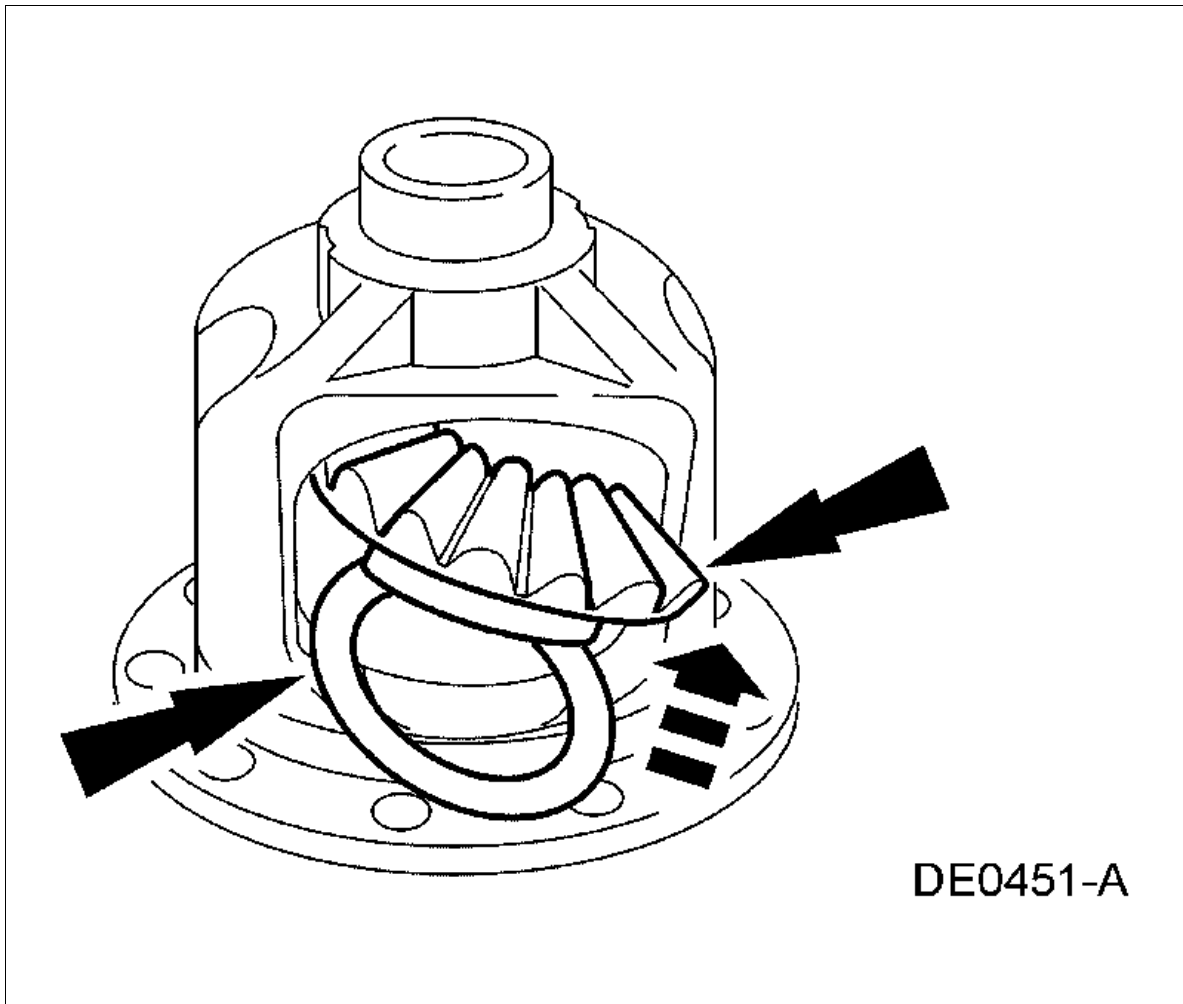
Fig 194: Identifying Differential Pinion Gears And Differential Pinion Thrust Washer



Courtesy of FORD MOTOR CO.

8. Remove the differential side gears and differential side gear thrust washers.

Fig 195: Removing Differential Side Gears And Differential Side Gear Thrust Washers

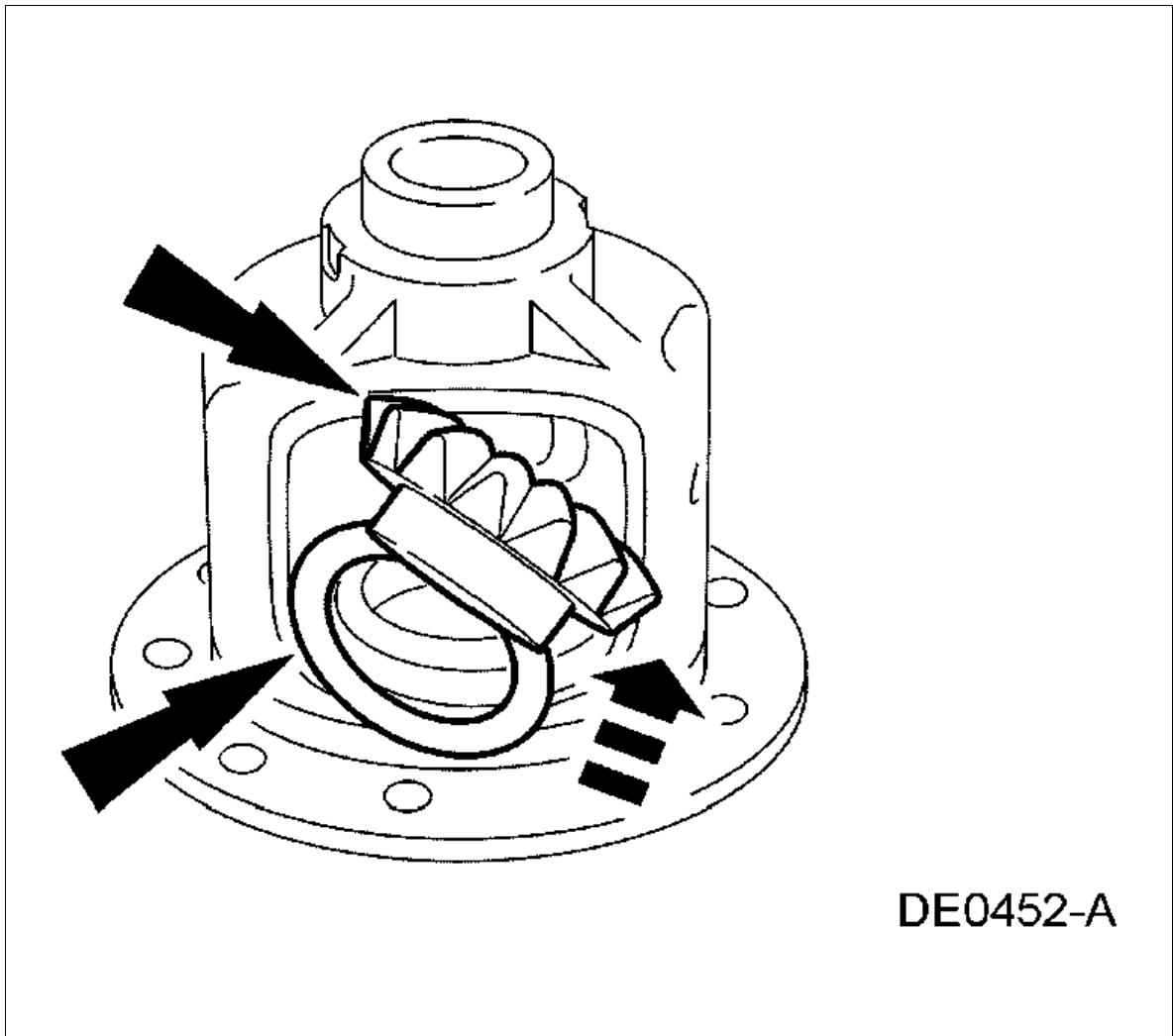


Courtesy of FORD MOTOR CO.

### Assembly

1. Lubricate the differential side gear thrust washers and the differential side gear journals with rear axle lubricant.
2. Position the differential side gear thrust washers on the differential side gears.

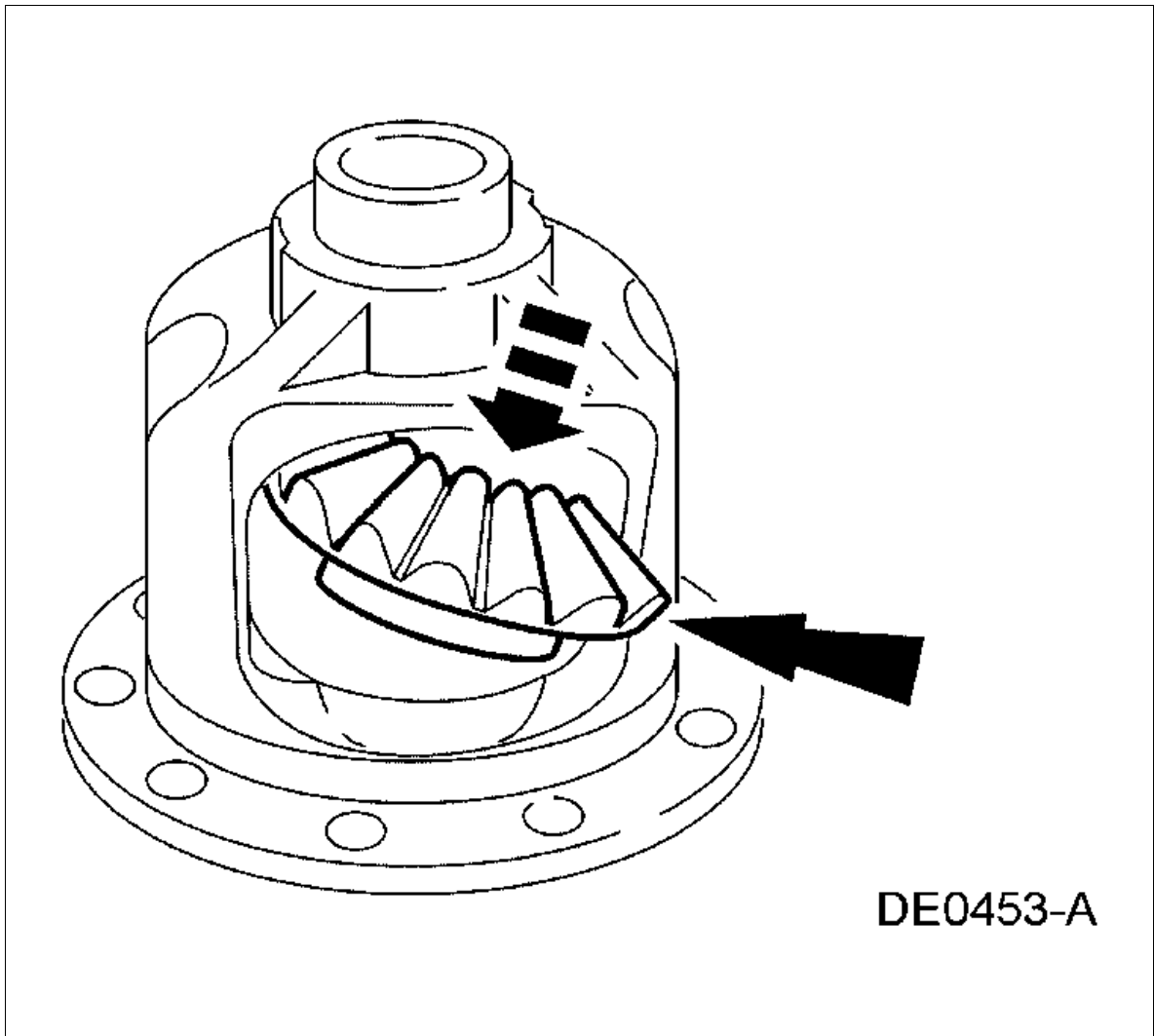
Fig 196: Positioning Differential Side Gear Thrust Washers On Differential Side Gears



Courtesy of FORD MOTOR CO.

3. Position the differential side gear and thrust washer assemblies in the differential case.

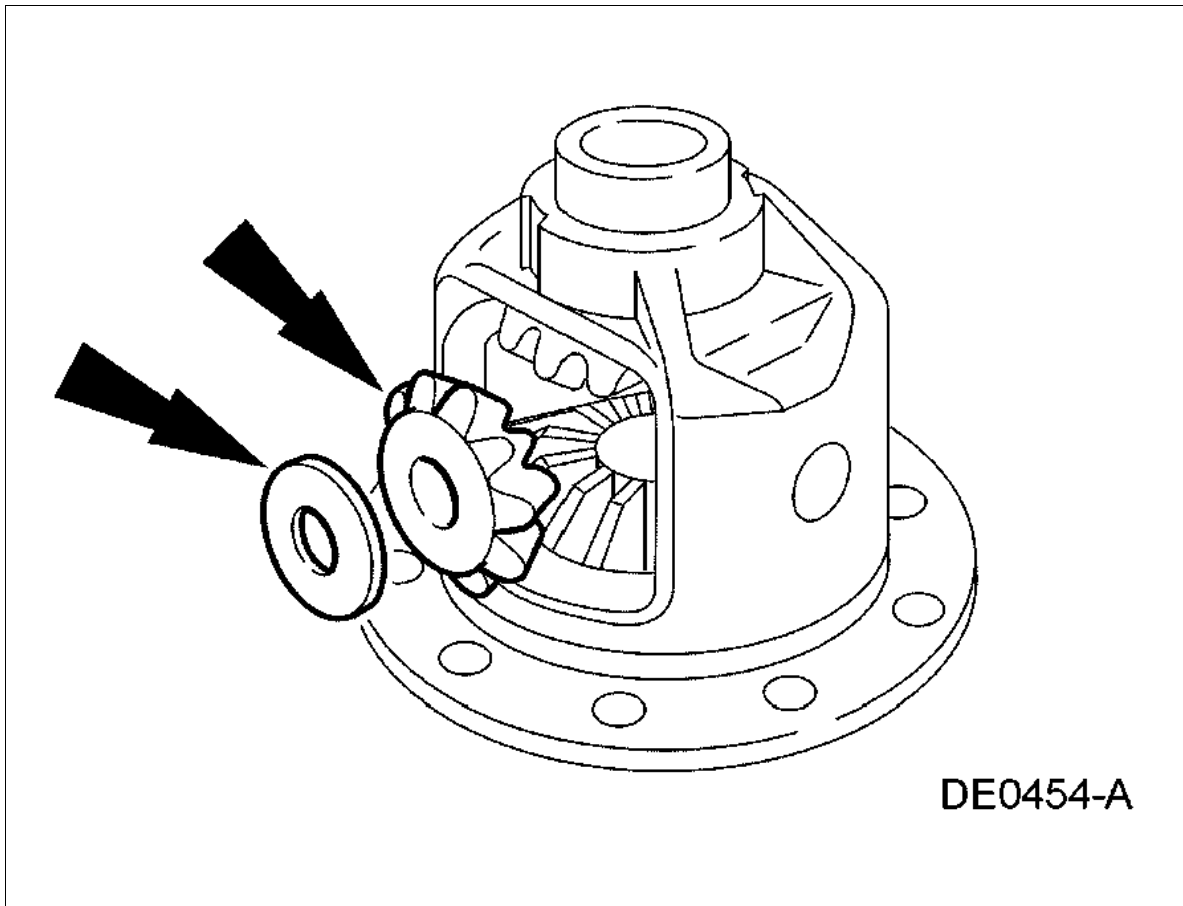
Fig 197: Positioning Differential Side Gear And Thrust Washer Assemblies In Differential Case



Courtesy of FORD MOTOR CO.

4. Lubricate the differential pinion thrust washers and differential pinion gears with rear axle lubricant and assemble.

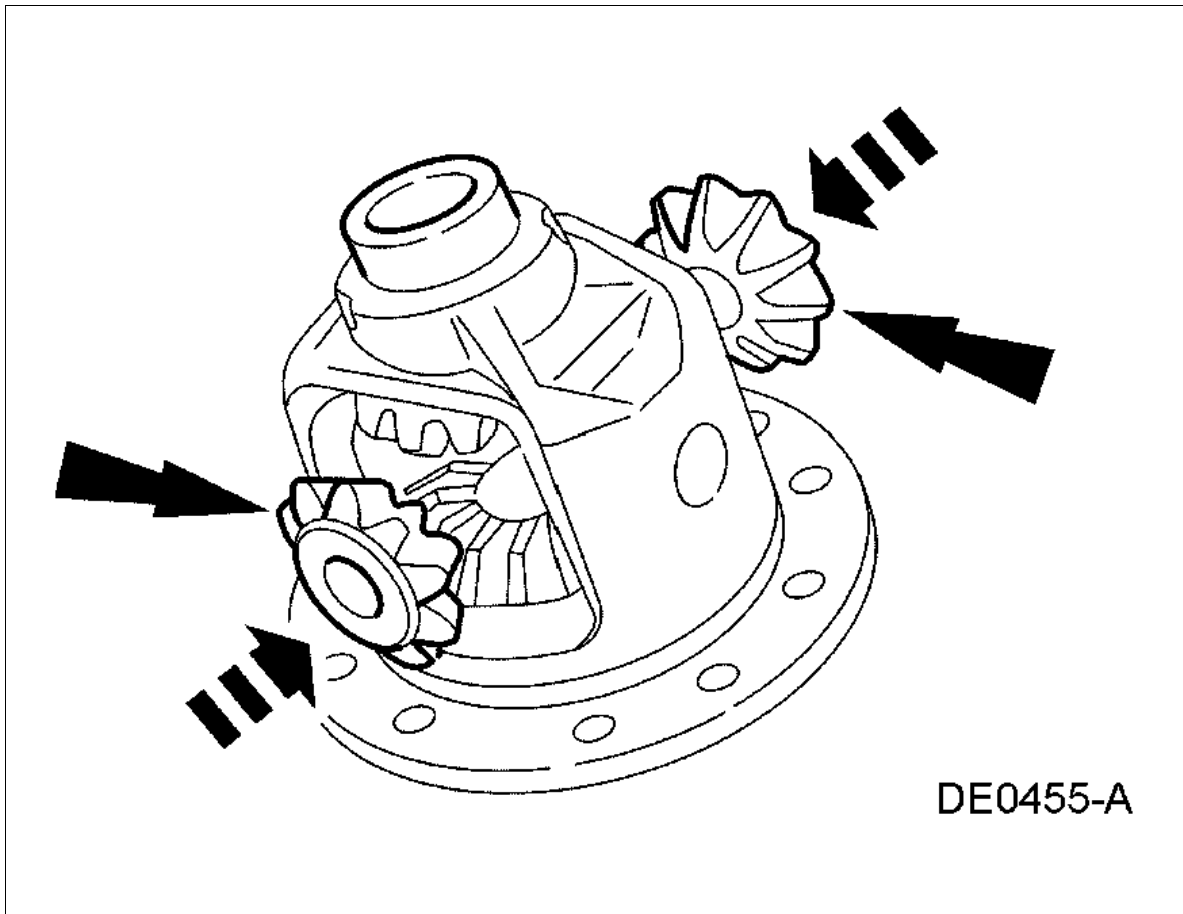
Fig 198: Installing Differential Pinion Thrust Washers And Differential Pinion Gears



Courtesy of FORD MOTOR CO.

5. Engage the differential pinion gears opposite the differential side gears.

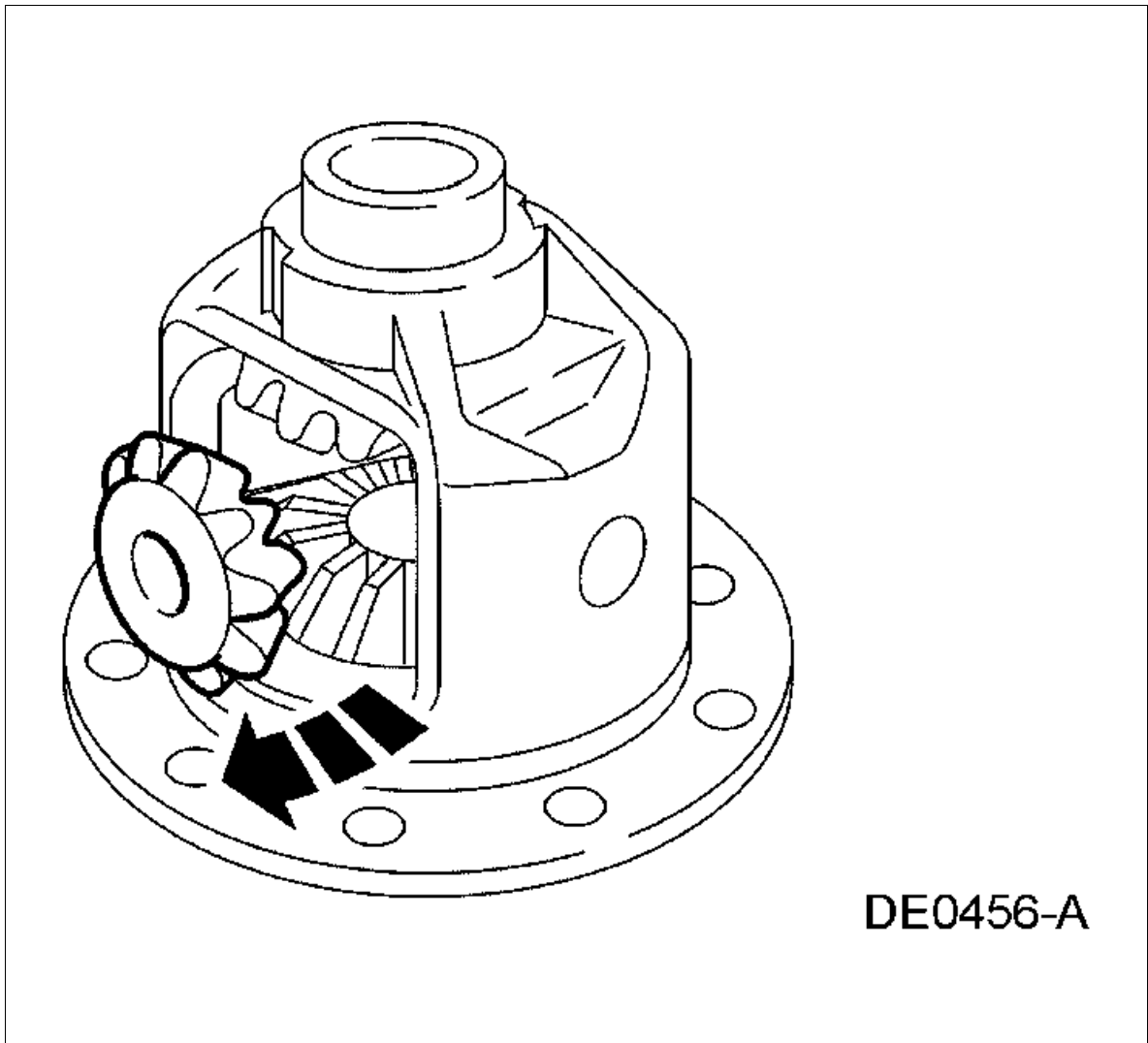
Fig 199: Engaging Differential Pinion Gears With Differential Side Gears



Courtesy of FORD MOTOR CO.

6. Rotate the differential pinion gears to align with the differential pinion shaft bore.

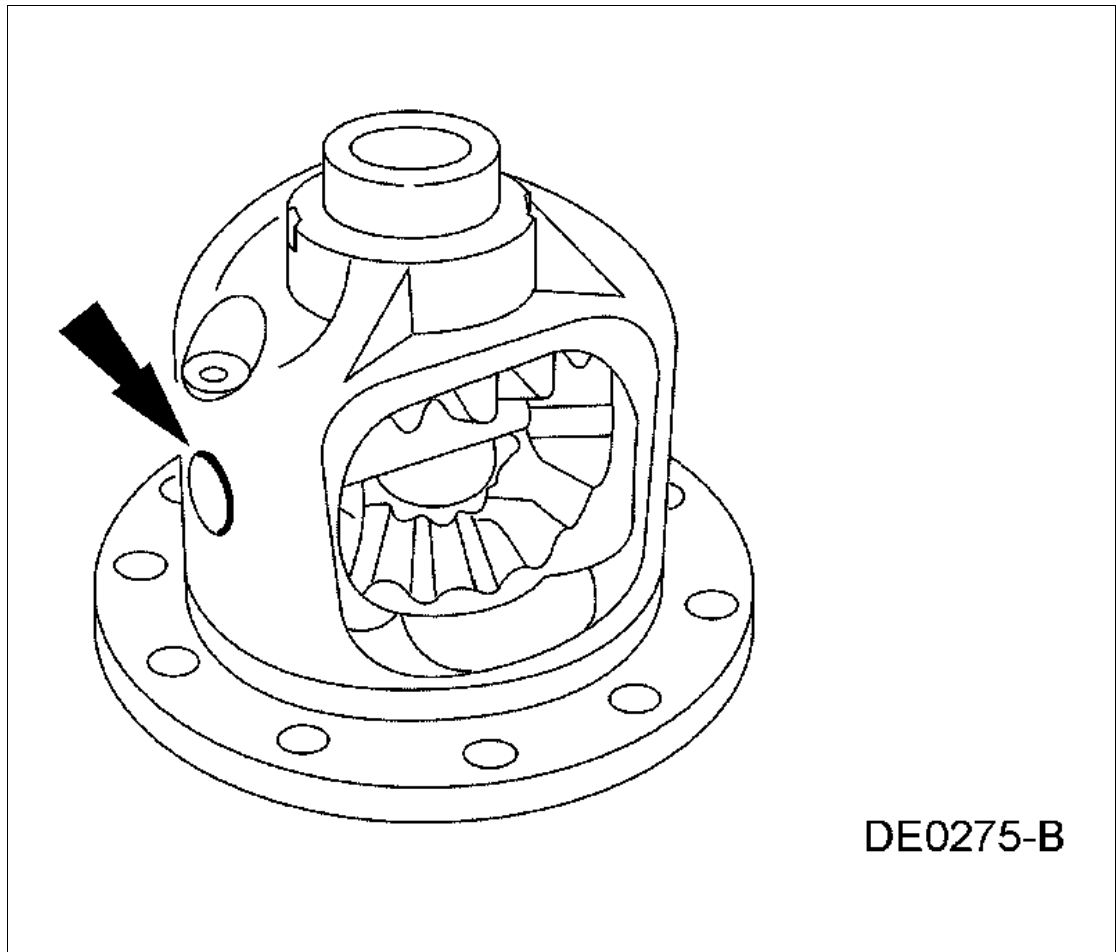
Fig 200: Aligning Differential Pinion Shaft Bore



Courtesy of FORD MOTOR CO.

7. Insert the differential pinion shaft.
  1. Align the bolt hole in the differential pinion shaft with the bolt hole in the differential case.

Fig 201: Aligning Bolt Hole In Differential Pinion Shaft



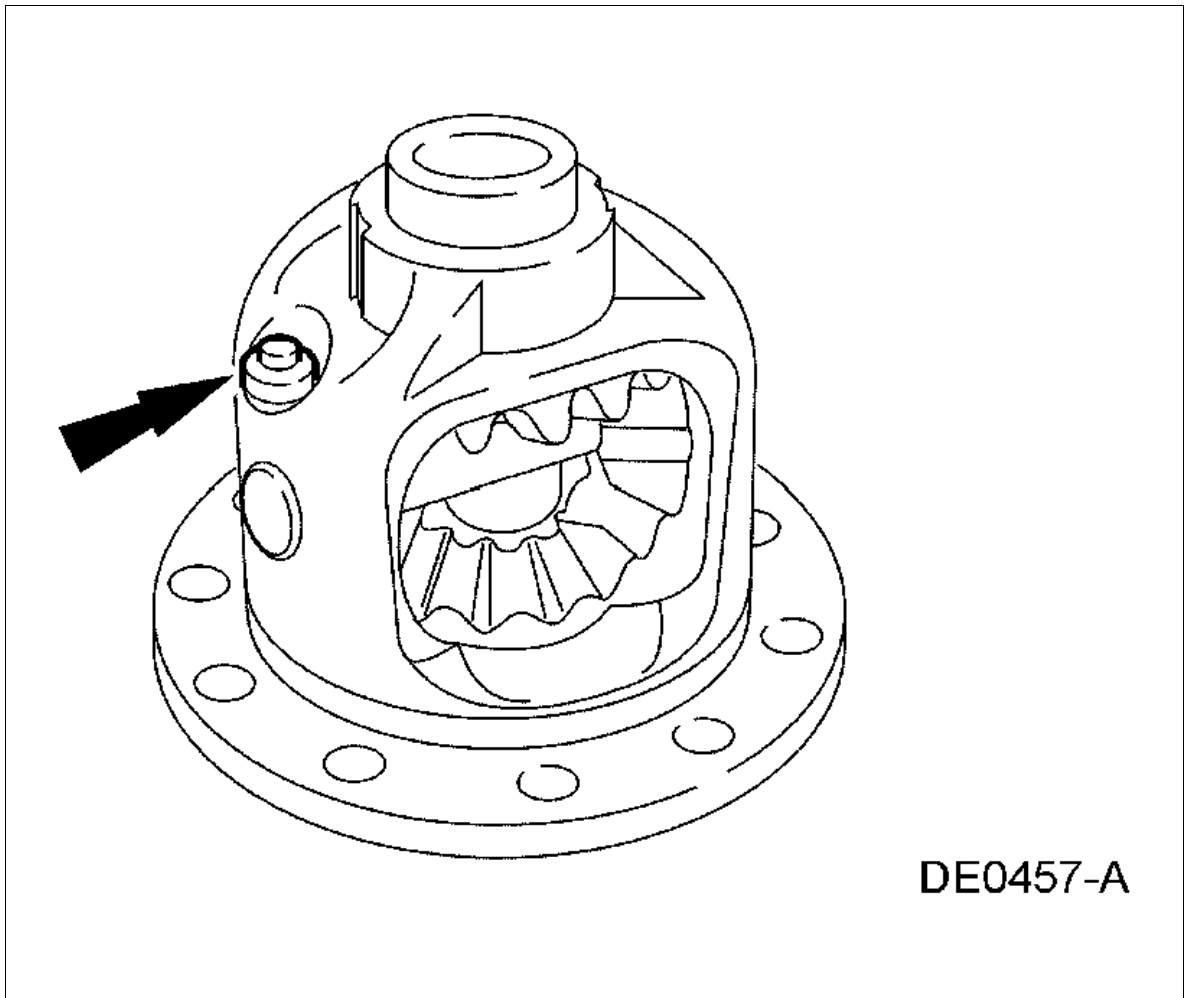
Courtesy of FORD MOTOR CO.

8. Install a new differential pinion shaft bolt finger-tight.

**NOTE:** *If a new bolt is unavailable, coat the threads with threadlock and sealer prior to installation.*



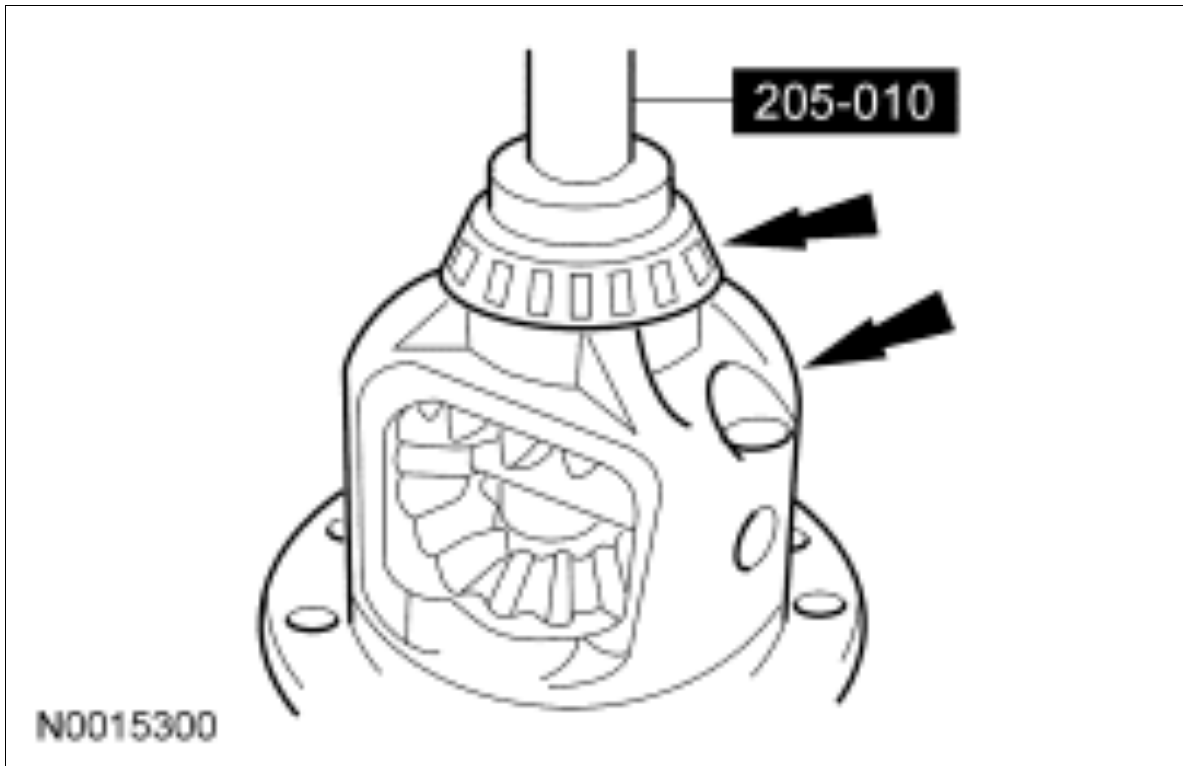
Fig 202: Identifying Differential Pinion Shaft Lock Bolt



Courtesy of FORD MOTOR CO.

9. Using the special tool, install the new differential bearings.

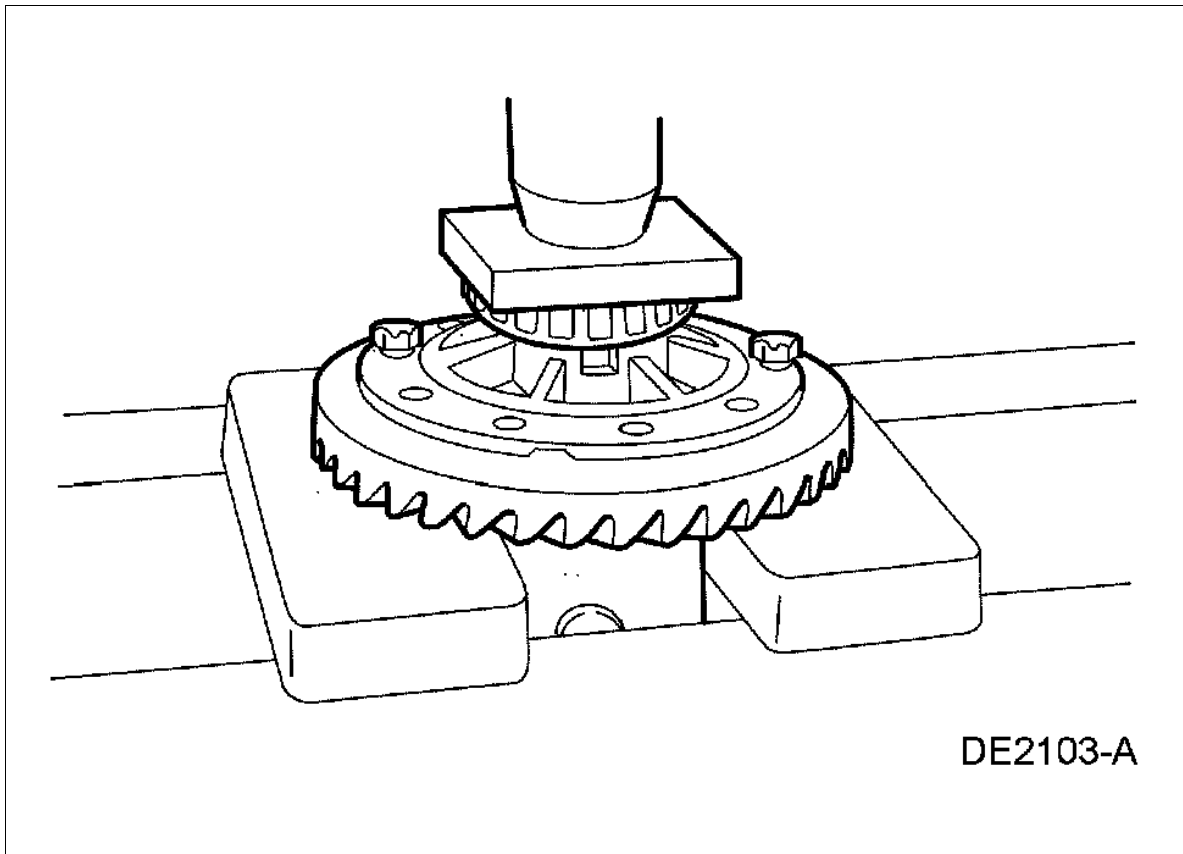
Fig 203: Installing Differential Bearings On Differential Case



Courtesy of FORD MOTOR CO.

10. Position the differential ring gear and the differential case. Align the bolt holes by starting 2 bolts through the holes in the differential case and the differential ring gear. Press the differential ring gear on the differential case.

Fig 204: Pressing Differential Ring Gear Onto Differential Case



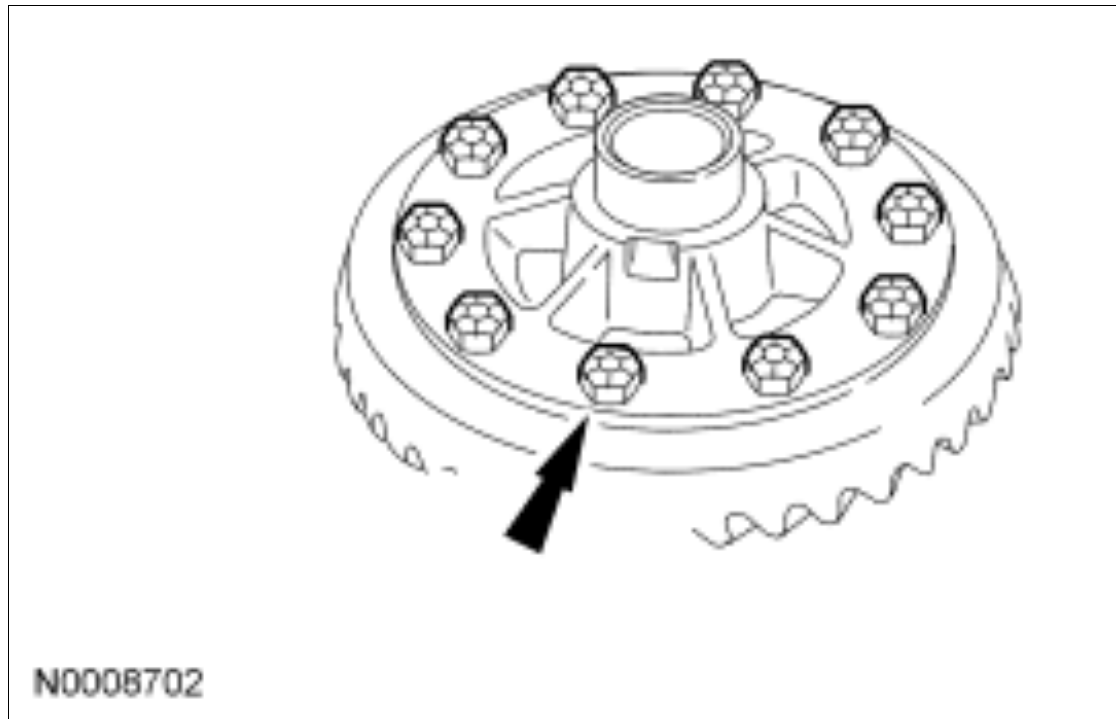
Courtesy of FORD MOTOR CO.

11. Install the differential ring gear bolts.

**NOTE:** *Apply stud and bearing mount to the bolt threads.*

1. Tighten to 105 Nm (71 lb-ft).

Fig 205: Identifying Differential Ring Gear Bolts



Courtesy of FORD MOTOR CO.

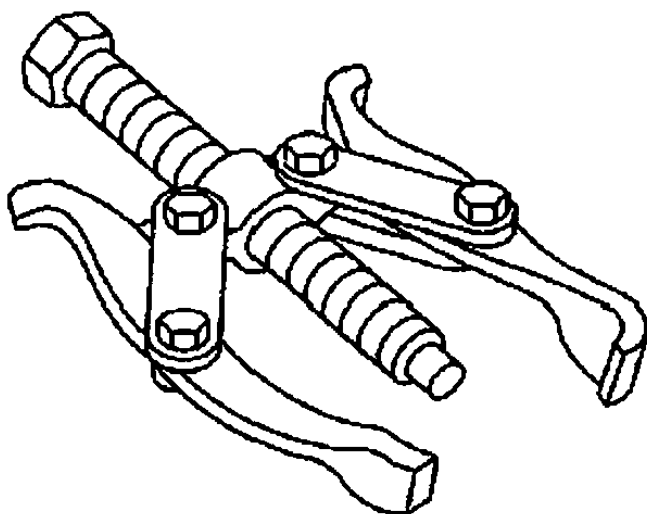
12. Install the differential assembly. For additional information, refer to DIFFERENTIAL CARRIER.
13. If equipped with fire suppression system, repower the system.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

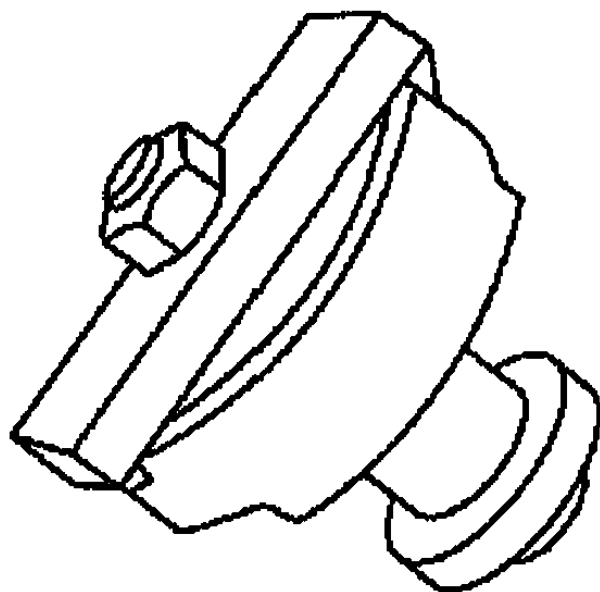
#### Differential Case And Ring Gear - Traction-Lok®

#### SPECIAL TOOL CHART

	2-Jaw Puller 205-D072 (D97L-4221-A) or equivalent
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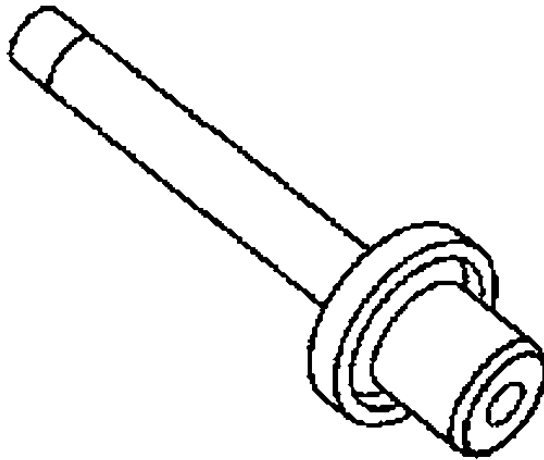


**ST2026-A**



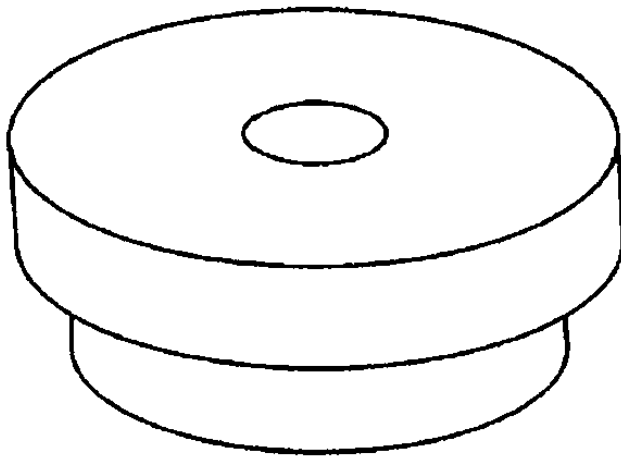
**ST1374-A**

Gauge, Differential Clutch (Excluding  
Mandrel) 205-135 (T80P-4946-A)



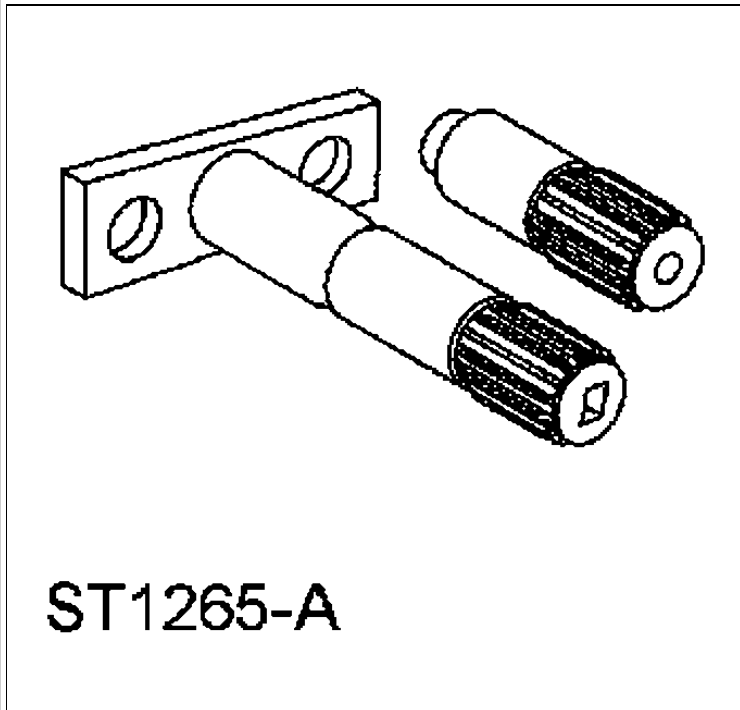
Installer, Differential Side Bearing 205-010  
(T57L-4221-A2)

**ST1375-A**



Step Plate 205-D016 (D80L-630-5) or  
equivalent

**ST1543-A**



Gauge, Differential Clutch 205-013 (T59L-4204-A)

#### MATERIAL SPECIFICATION

Item	Specification
Additive Friction Modifier XL-3	EST-M2C118-A
Stud and Bearing Mount TA-27	WSK-M2G349-A1

#### Disassembly

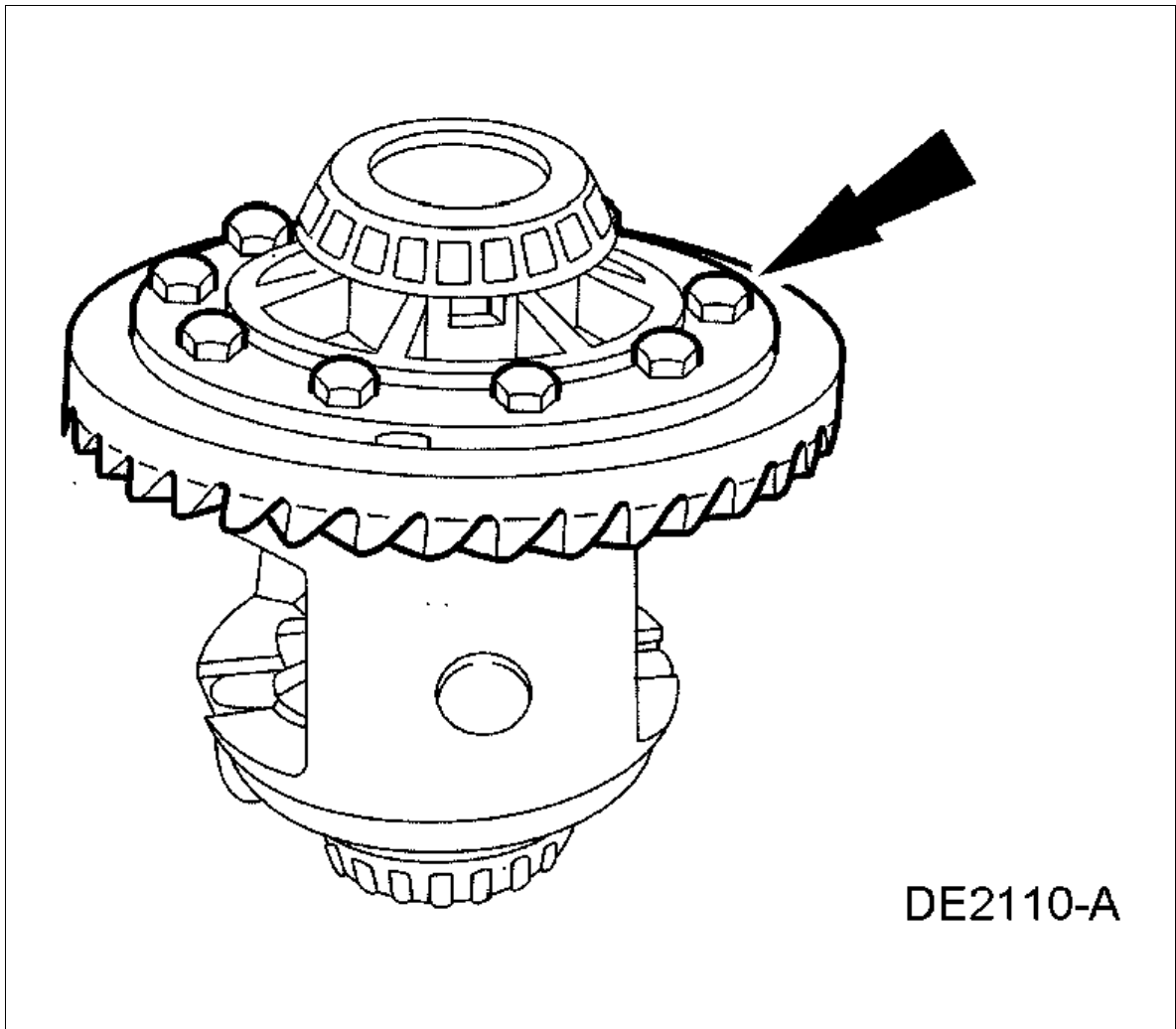
1. Remove the differential assembly from the differential housing. For additional information, refer to DIFFERENTIAL CASE.

**WARNING:** *If equipped with fire suppression system, depower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*

2. Remove the differential ring gear bolts.



Fig 206: Removing Differential Ring Gear Bolts

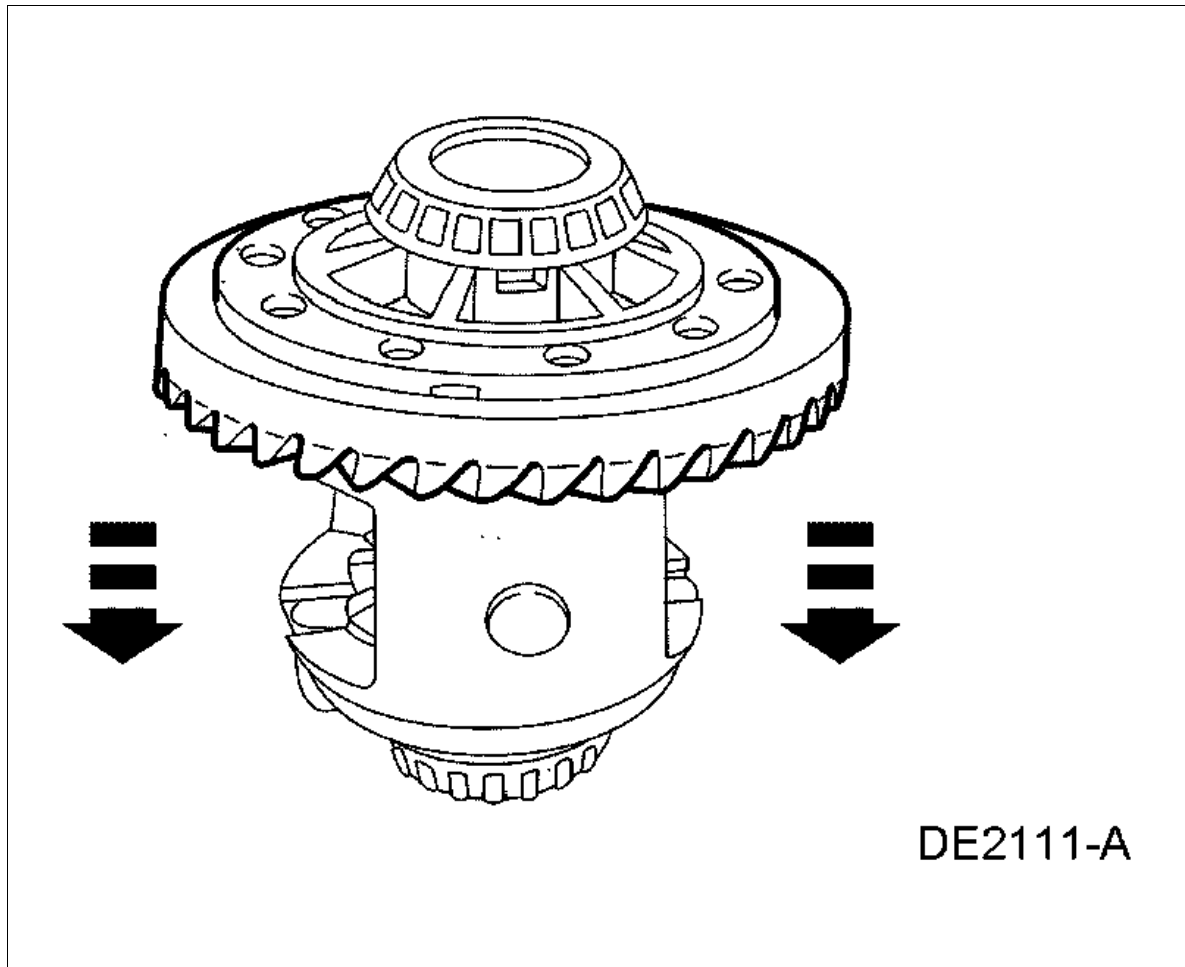


Courtesy of FORD MOTOR CO.

3. Insert a punch in the bolt holes and drive off the differential ring gear.

**CAUTION:** *Do not damage the bolt hole threads.*

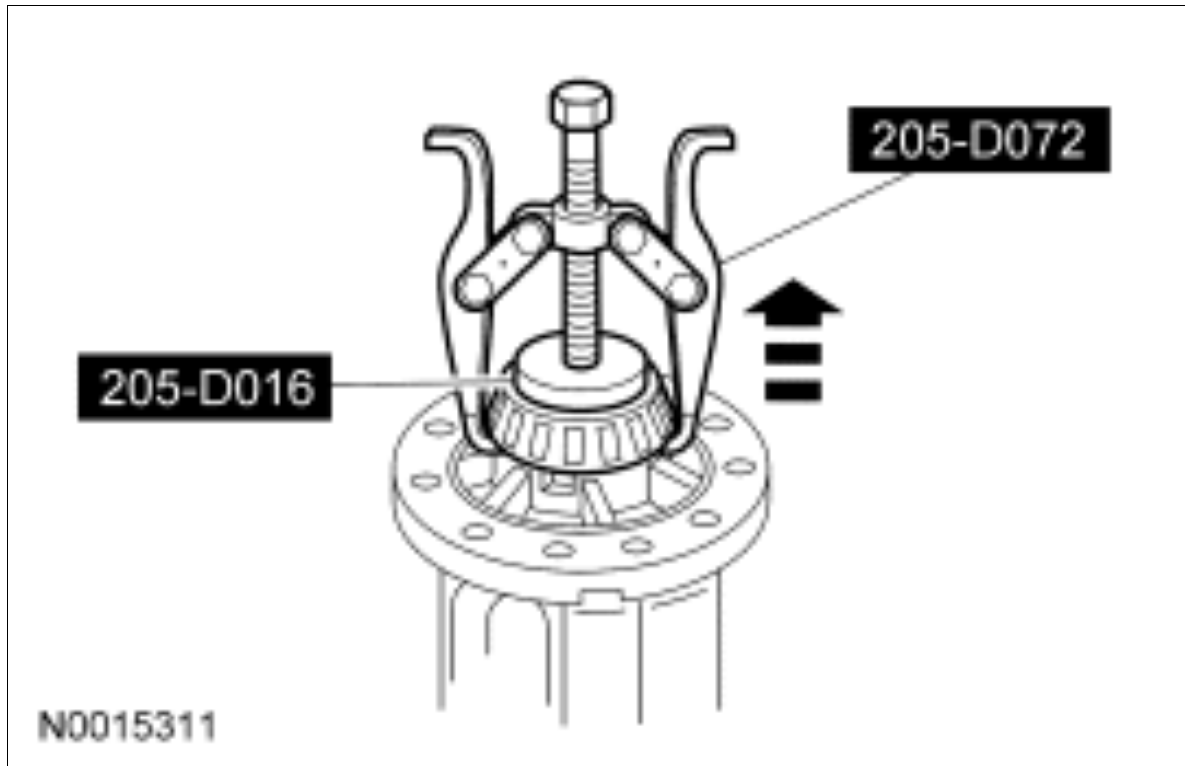
Fig 207: Removing Ring Gear



Courtesy of FORD MOTOR CO.

4. Using the special tools, remove the differential bearings.

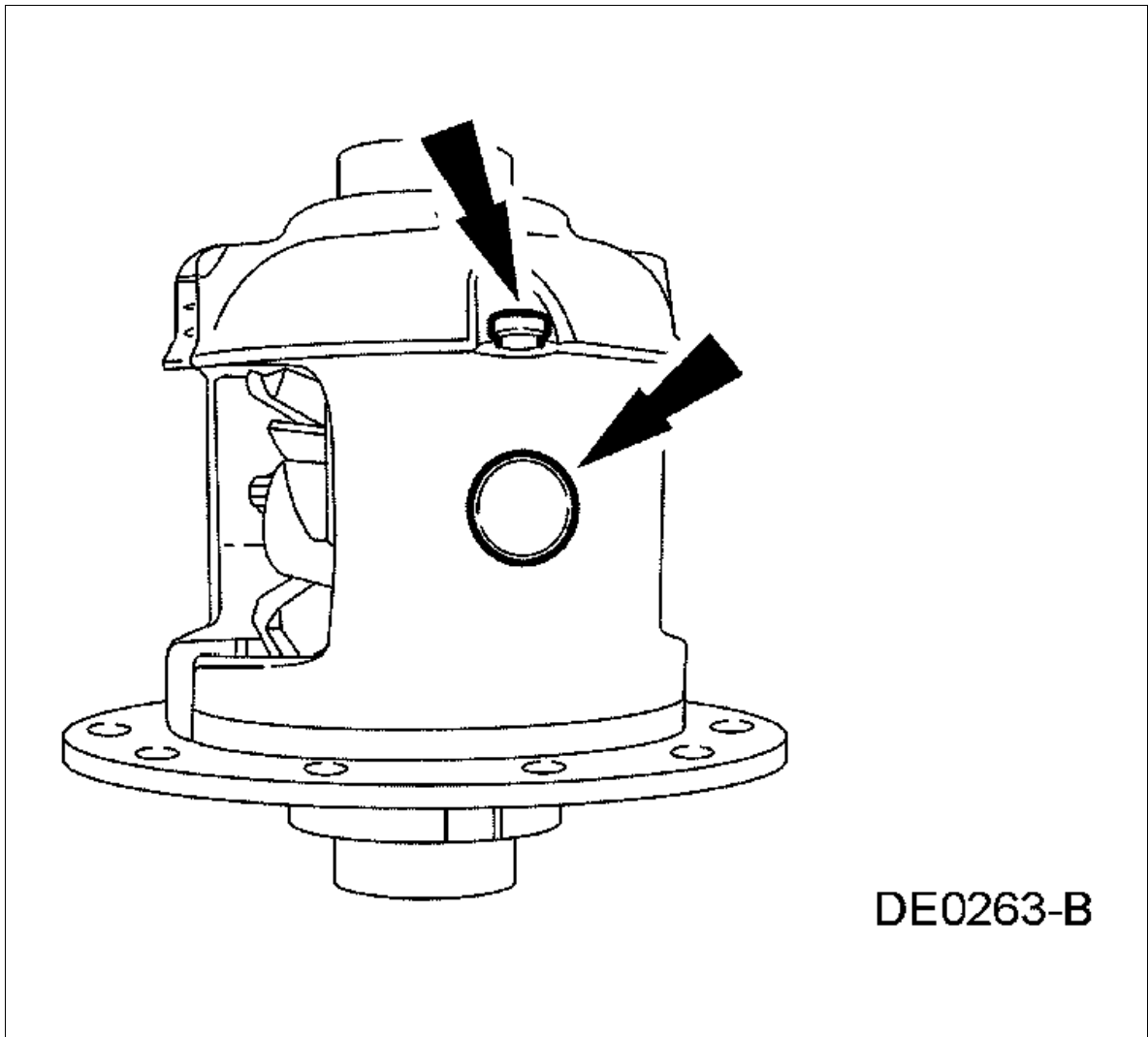
Fig 208: Removing Differential Bearings



Courtesy of FORD MOTOR CO.

5. Remove the differential pinion shaft bolt and remove the differential pinion shaft.

Fig 209: Removing Differential Pinion Shaft

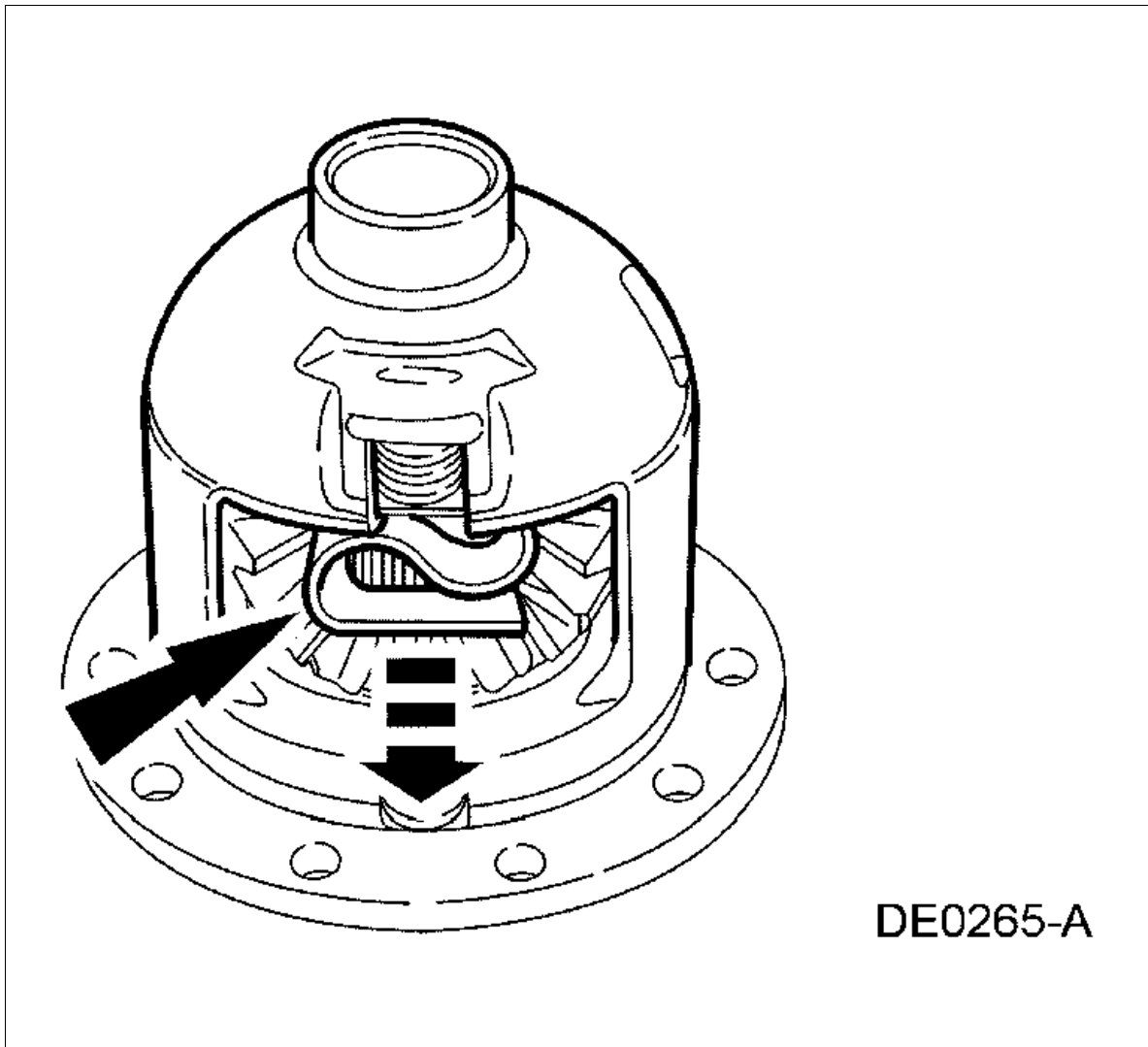


Courtesy of FORD MOTOR CO.

6. Remove the differential clutch spring.

**WARNING:** *Due to the spring tension, use care when removing the differential clutch spring.*

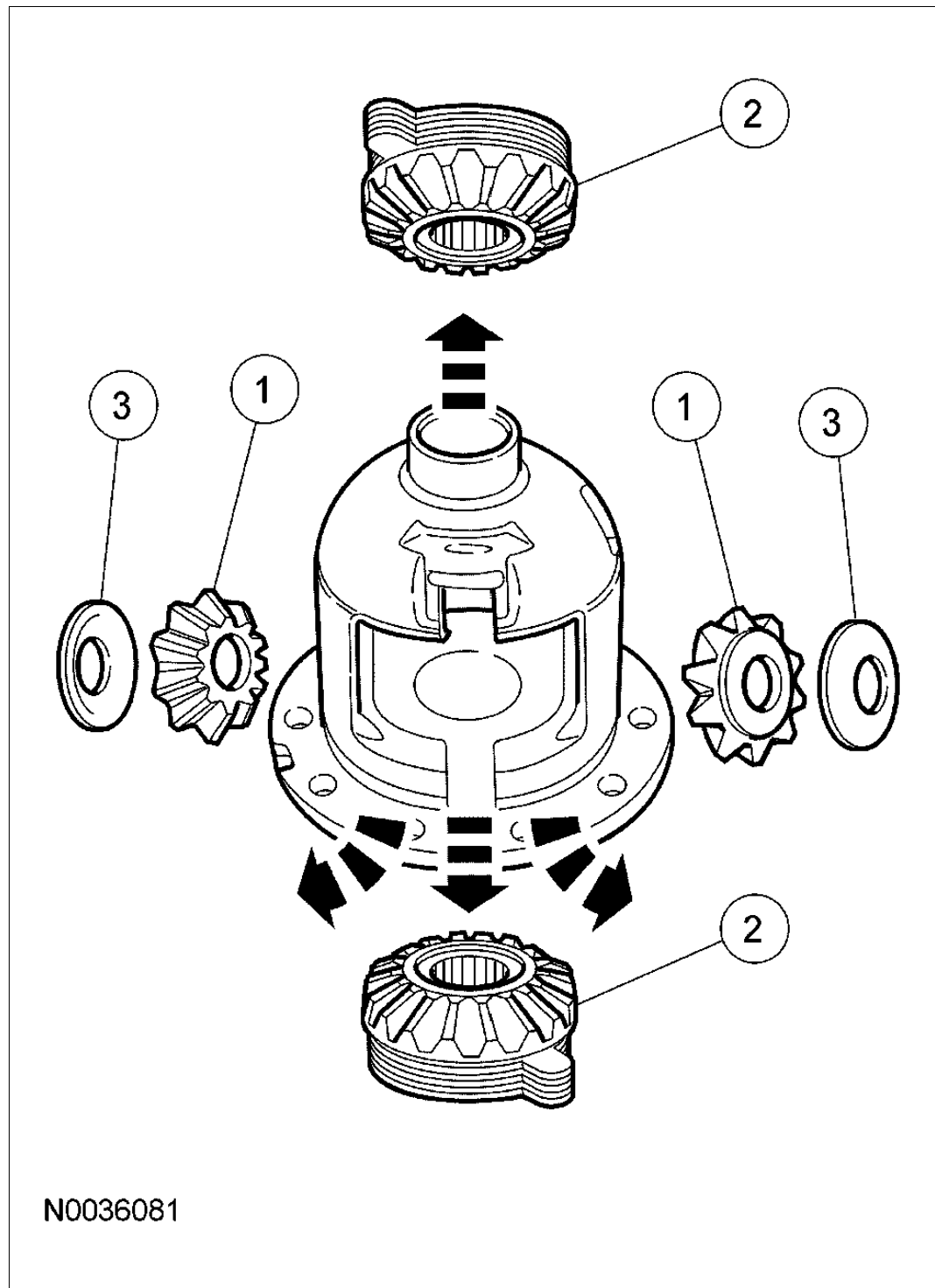
Fig 210: Removing Differential Clutch Spring



Courtesy of FORD MOTOR CO.

7. Remove the differential gears.
  1. Remove the 2 differential pinion gears.
  2. Remove the 2 differential side gears.
  3. Remove the 2 differential pinion thrust washers.

Fig 211: Removing Differential Gears



Courtesy of FORD MOTOR CO.

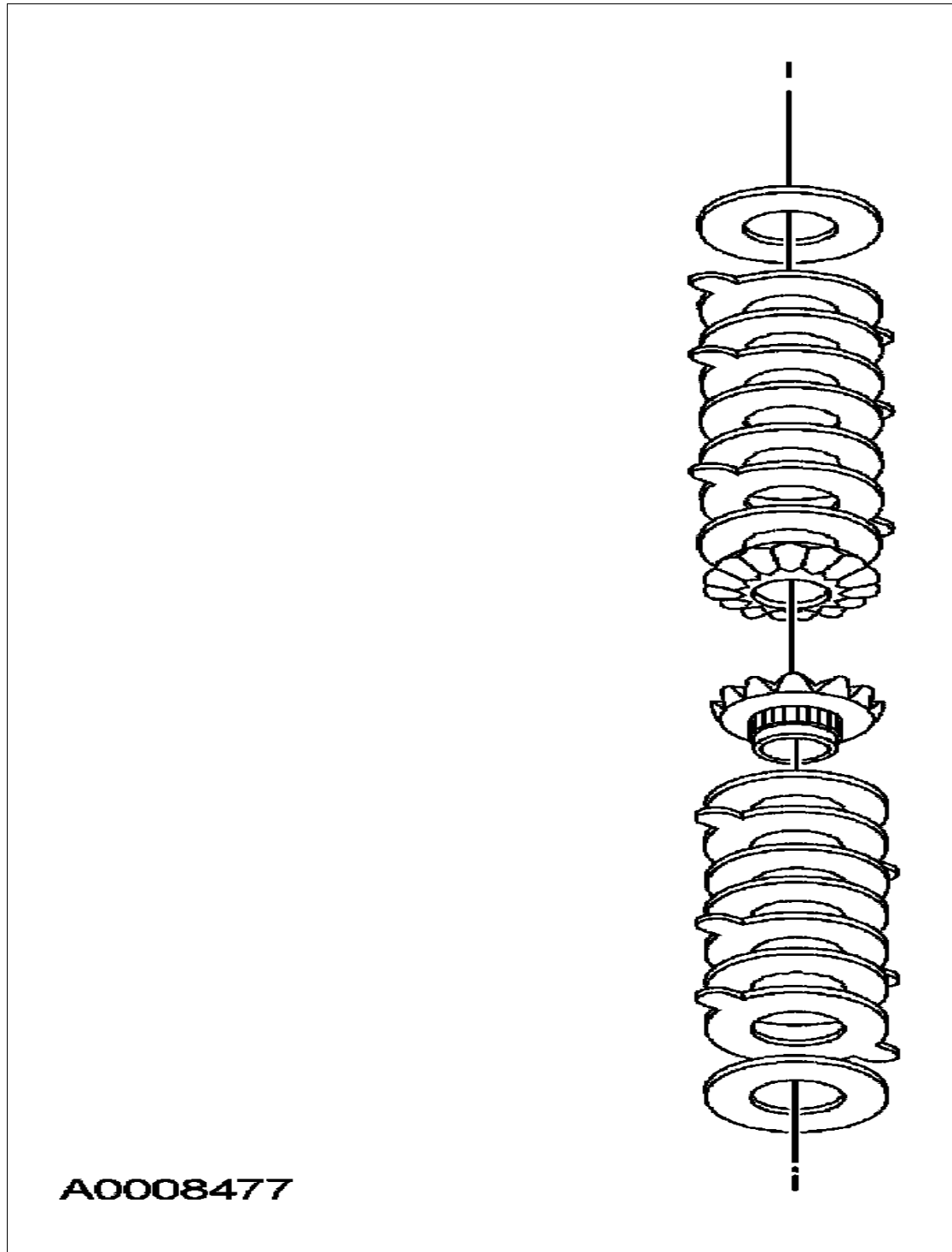
8. Separate the differential clutch packs and shims from the differential side gears and tag them "right" and "left."

**CAUTION:** Keep the differential clutch packs in order.  
Do not mix them. Always reassemble them in the same

sequence.

1. Clean and inspect the remaining differential components for wear and damage and install new parts as necessary.

Fig 212: Cleaning And Inspecting Remaining Differential Components



Courtesy of FORD MOTOR CO.

9. Clean and inspect the differential clutch packs for wear and damage and install new parts as necessary.

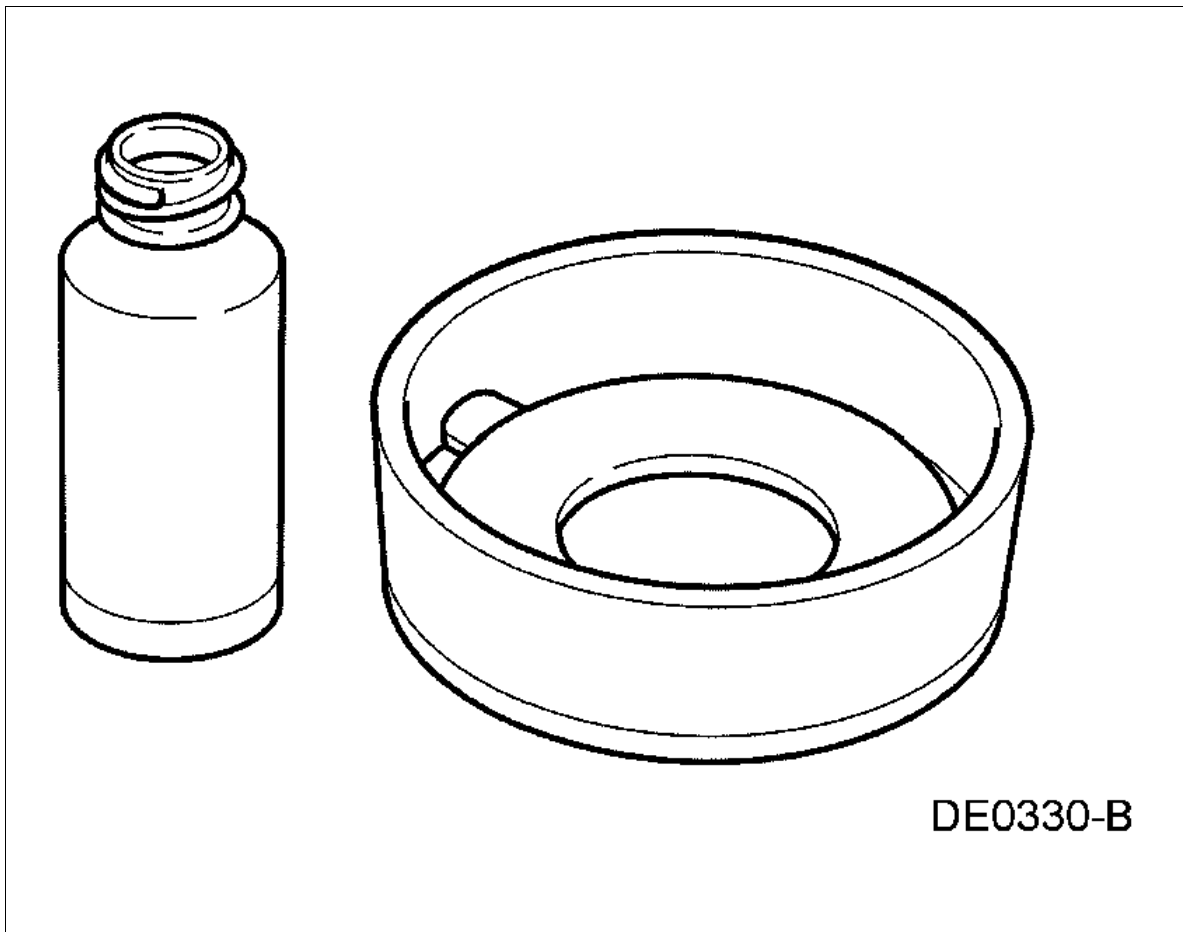
**CAUTION:** Do not use acids or solvents when cleaning the differential clutch packs. Wipe the components only with a clean, lint-free cloth.

## Assembly

1. Using the modifier, lubricate each steel clutch plate and soak all the friction plates for no less than 15 minutes.

**CAUTION:** 118 ml (4 oz.) of the Additive Friction Modifier must be used in the axle.

Fig 213: Prelubricating Each Steel Clutch Plate



Courtesy of FORD MOTOR CO.

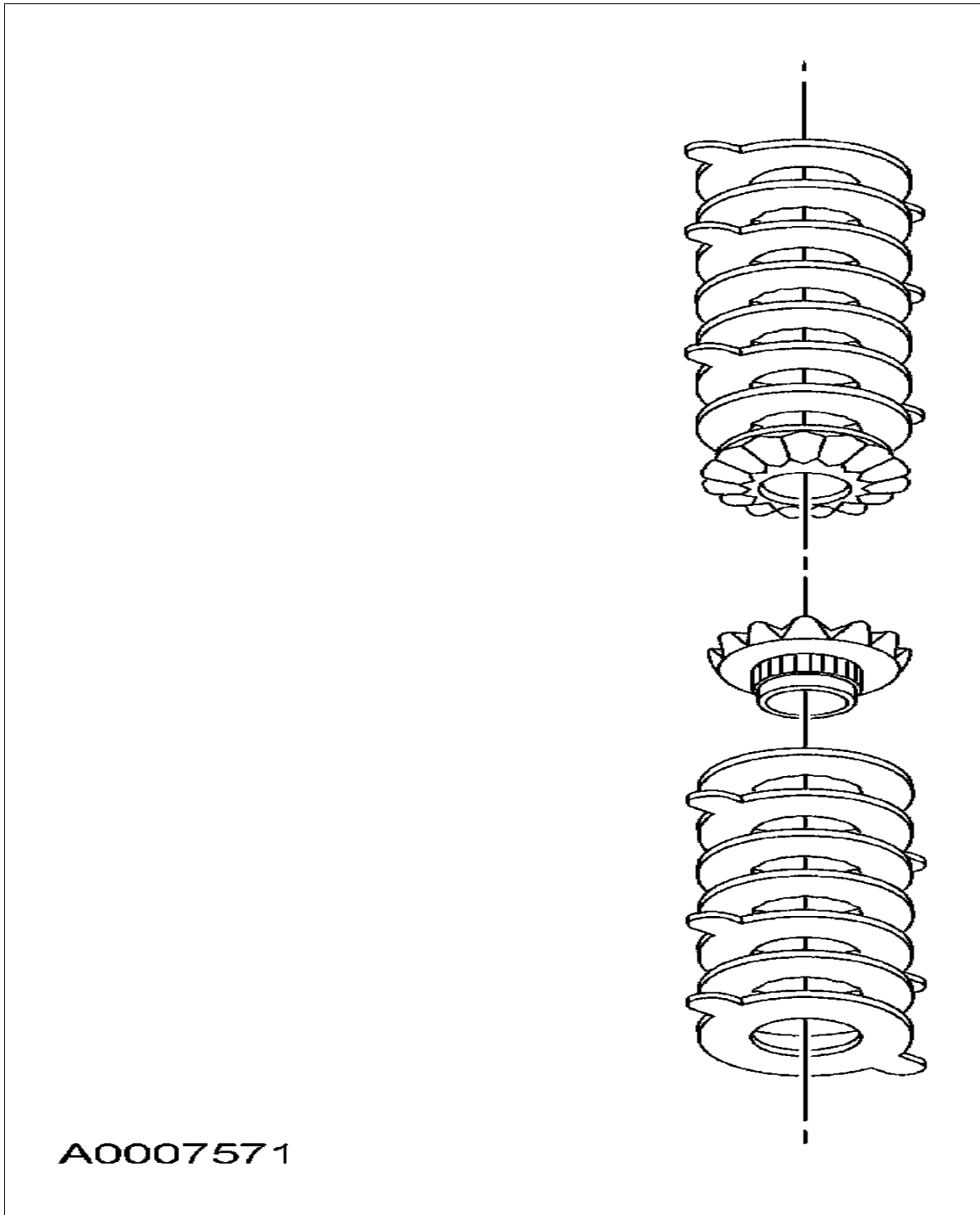
2. Assemble the differential clutch packs (without the shims) on their respective differential side gear.

**CAUTION:** Do not mix the clutch plates, clutch discs



*or shim from one side with the other.*

Fig 214: Identifying Differential Clutch Packs And Differential Side Gears

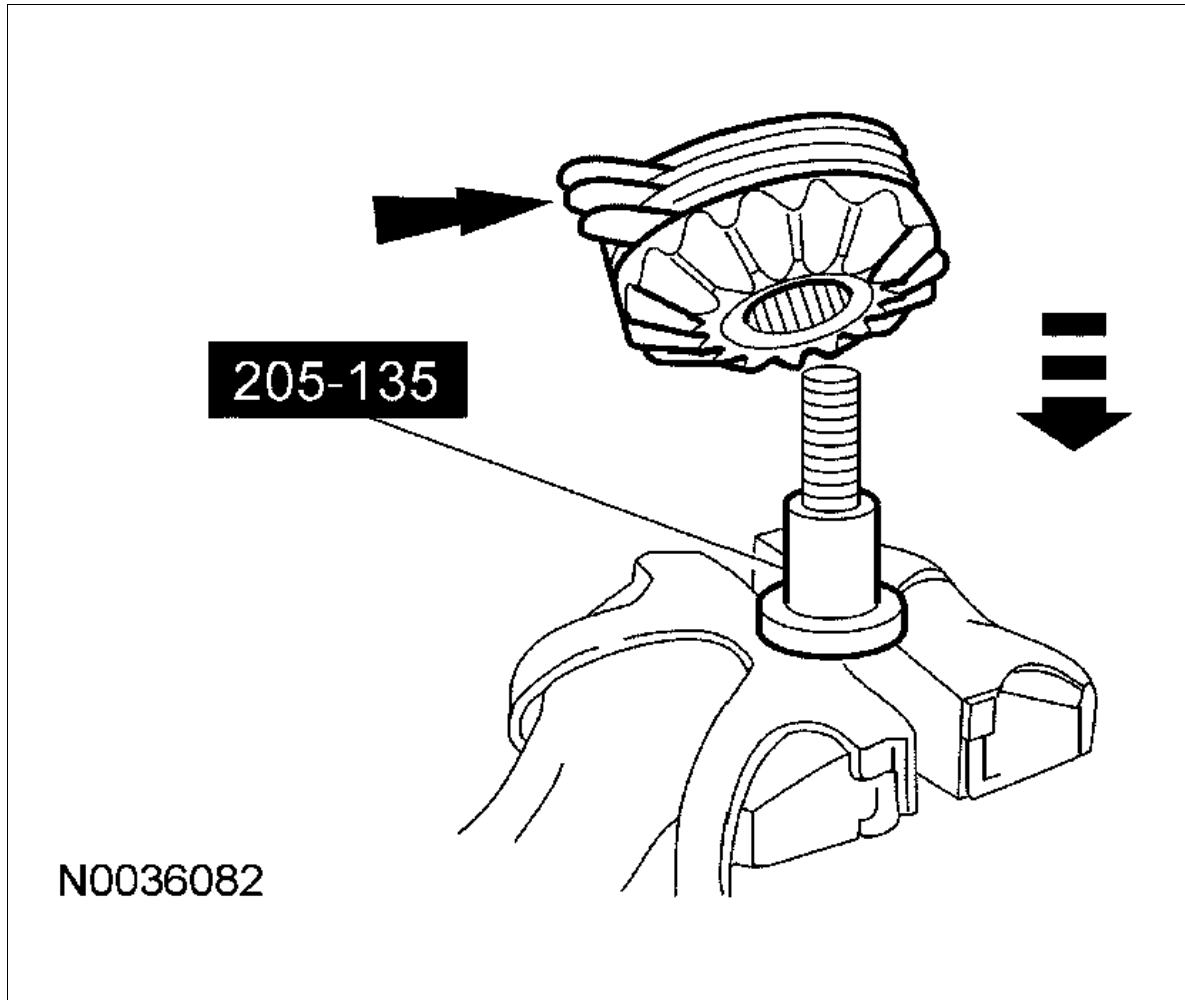


Courtesy of FORD MOTOR CO.

3. Place the base portion of the special tool in a vise. Install the differential side gear and differential clutch pack (without the shim) on the tool.

**CAUTION:** Use the correct mandrel with the special tool.

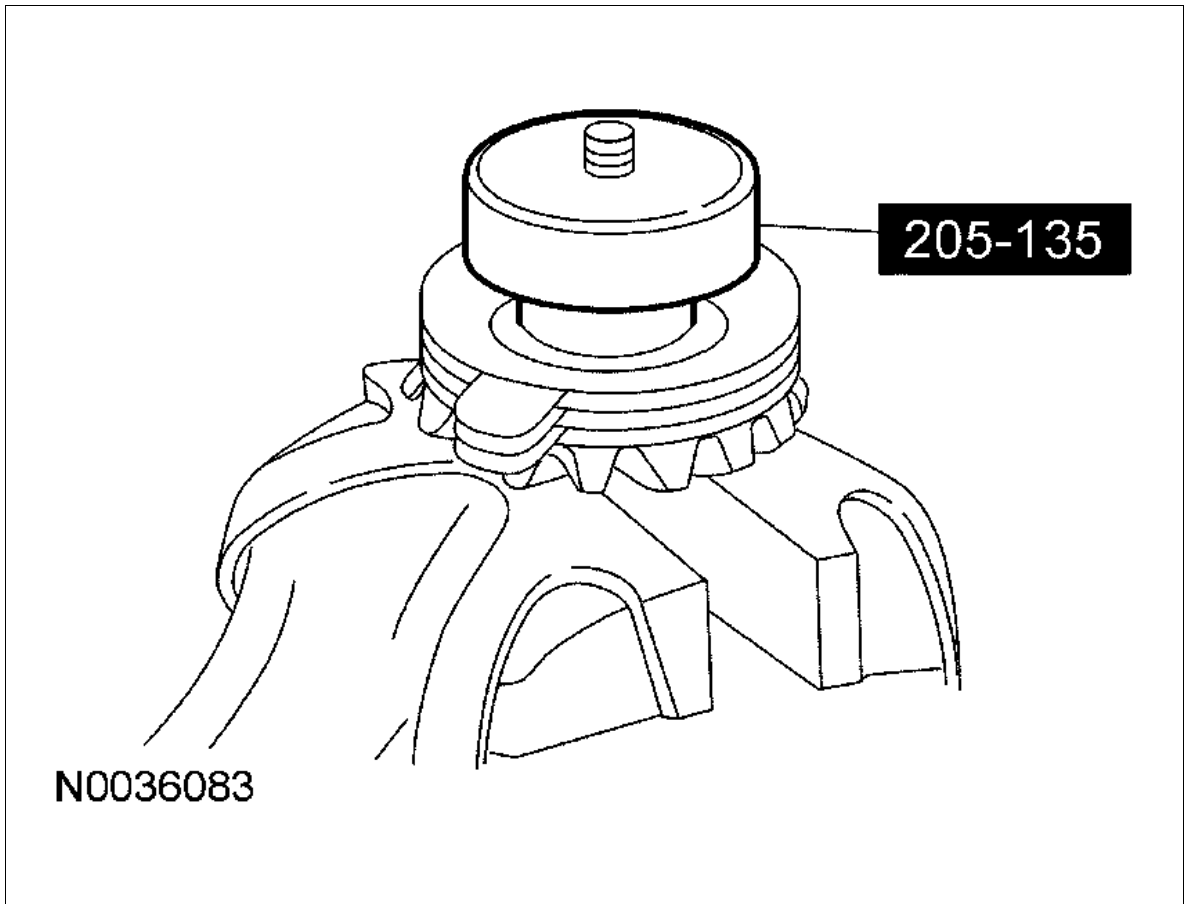
Fig 215: Installing Differential Side Gear And Differential Clutch Pack On Tool



Courtesy of FORD MOTOR CO.

4. Position the special tool hand-tight on top of the differential clutch pack.

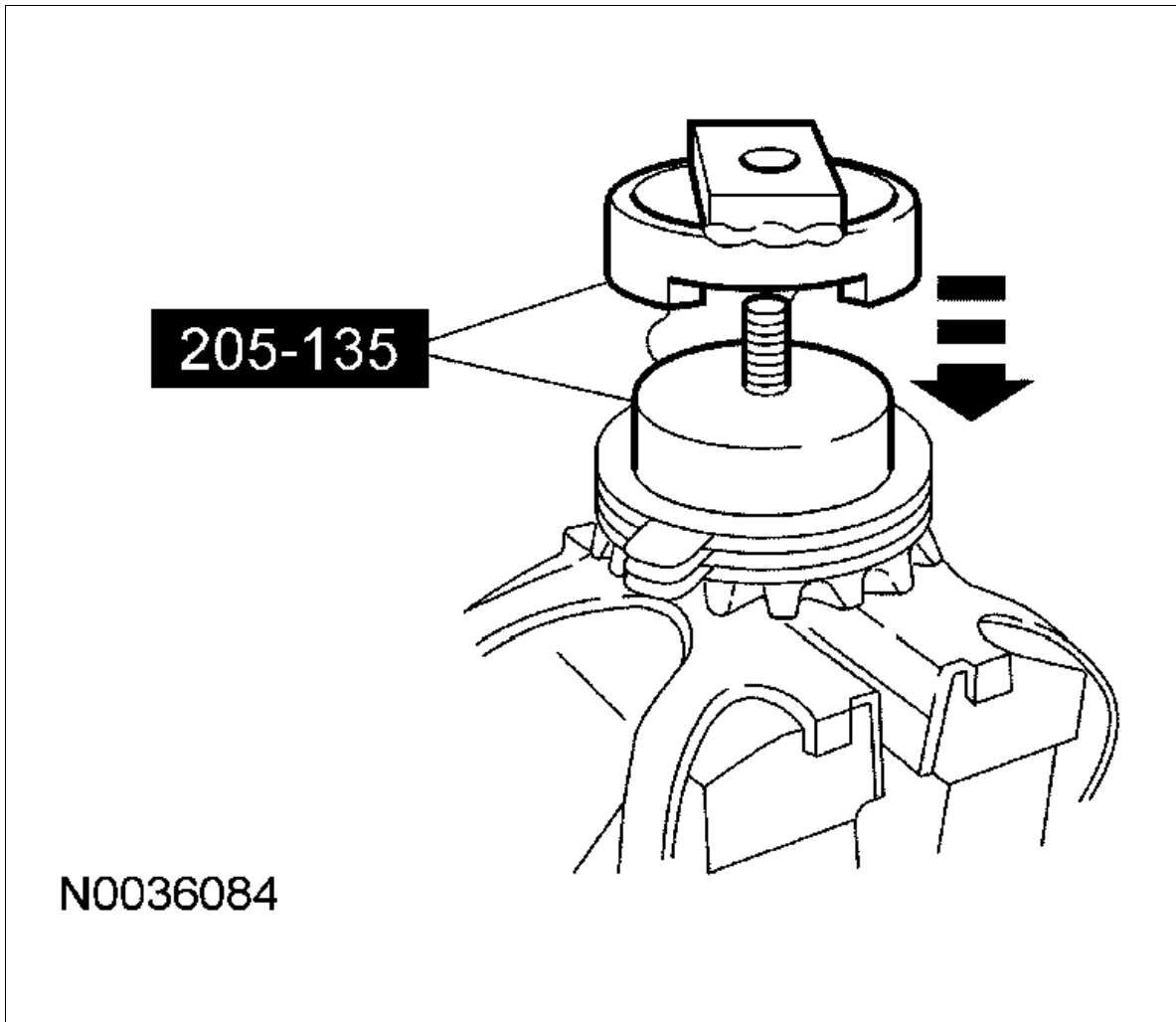
Fig 216: Positioning Special Tool Hand-Tight On Top Of Differential Clutch Pack



Courtesy of FORD MOTOR CO.

5. Install the special tool over the disc and differential clutch pack.

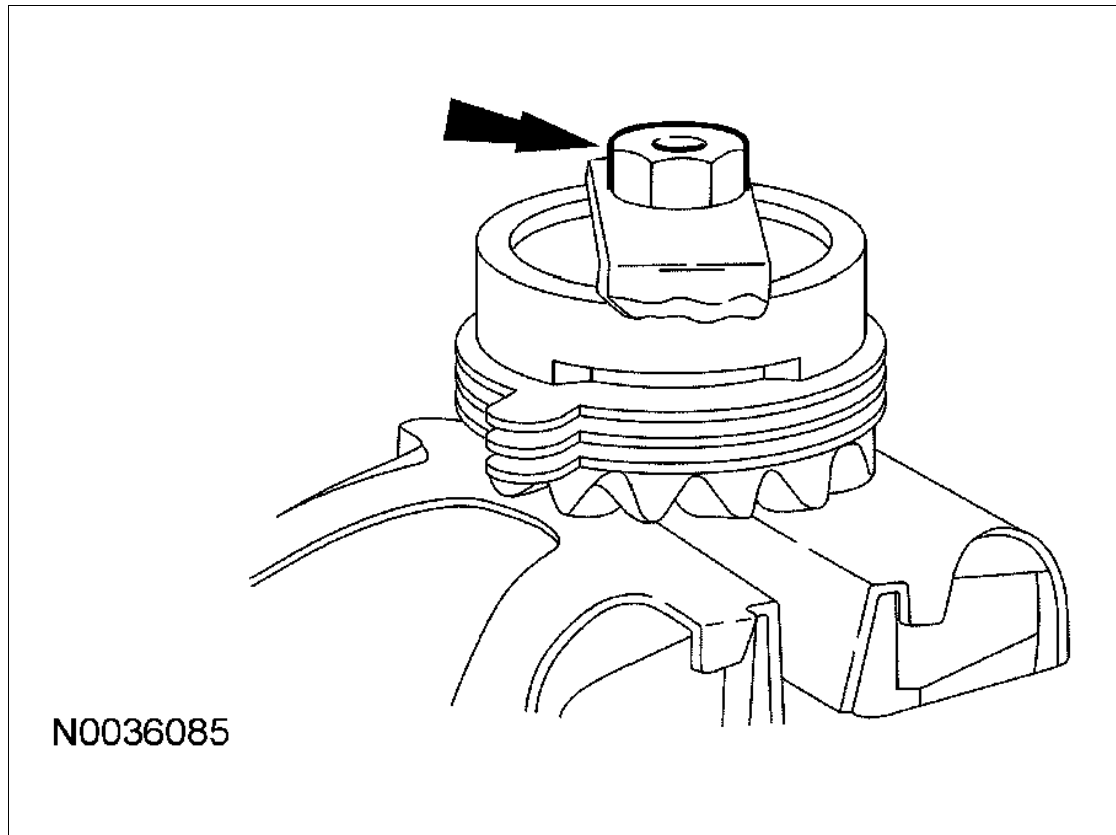
Fig 217: Installing Special Tool Over Disc And Differential Clutch Pack



Courtesy of FORD MOTOR CO.

6. Install the nut.
  1. Tighten to 6.7 Nm (60 lb-in).

Fig 218: Installing Nut



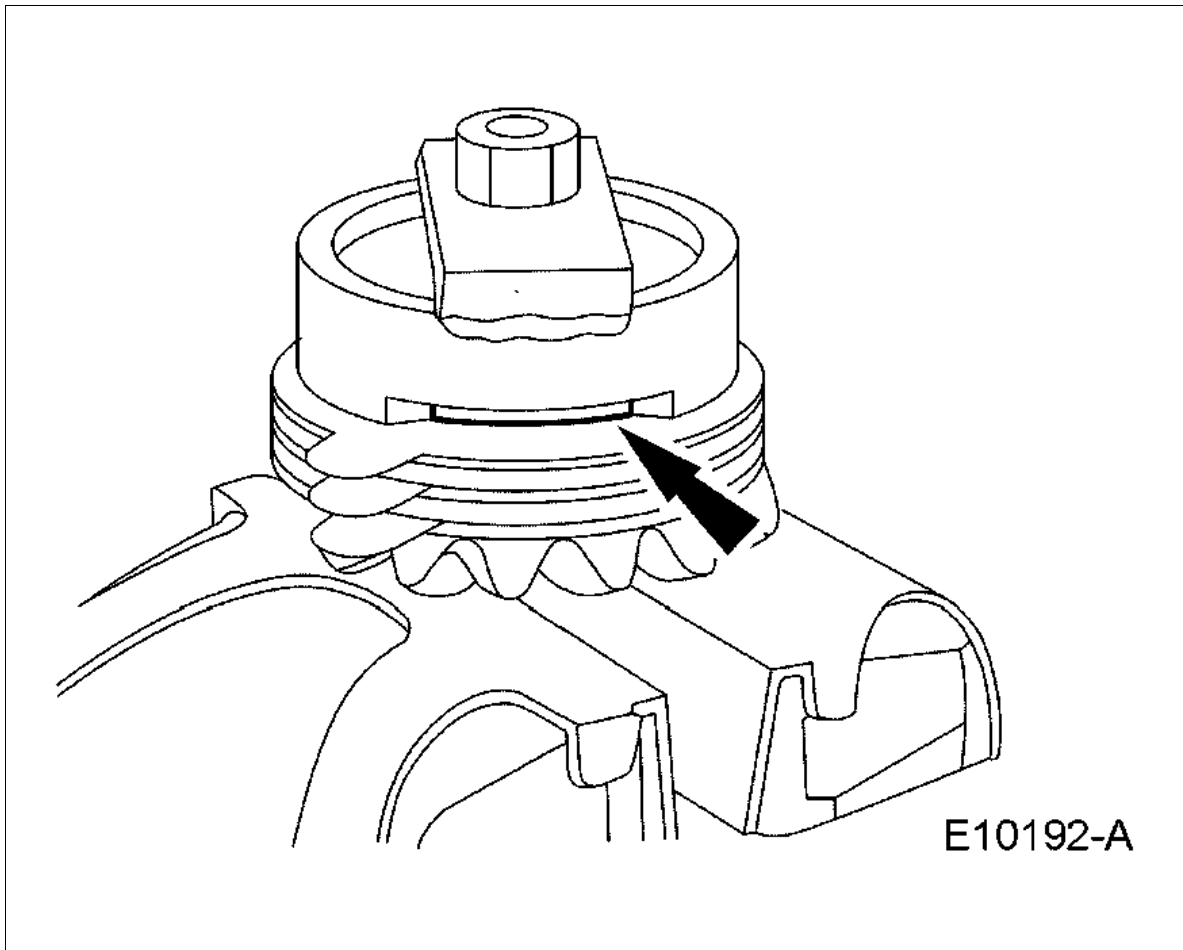
Courtesy of FORD MOTOR CO.

7. Select and insert the thickest feeler gauge blade that will enter between the tool and the differential clutch pack. The reading will be the thickness of the new clutch shim.

**SELECTIVE SHIM SPECIFICATIONS**

Part Number	Description
EOAZ-4A324-G	0.025 inch
EOAZ-4A324-H	0.030 inch
EOAZ-4A324-C	0.035 inch
EOAZ-4A324-D	0.040 inch
EOAZ-4A324-F	0.045 inch

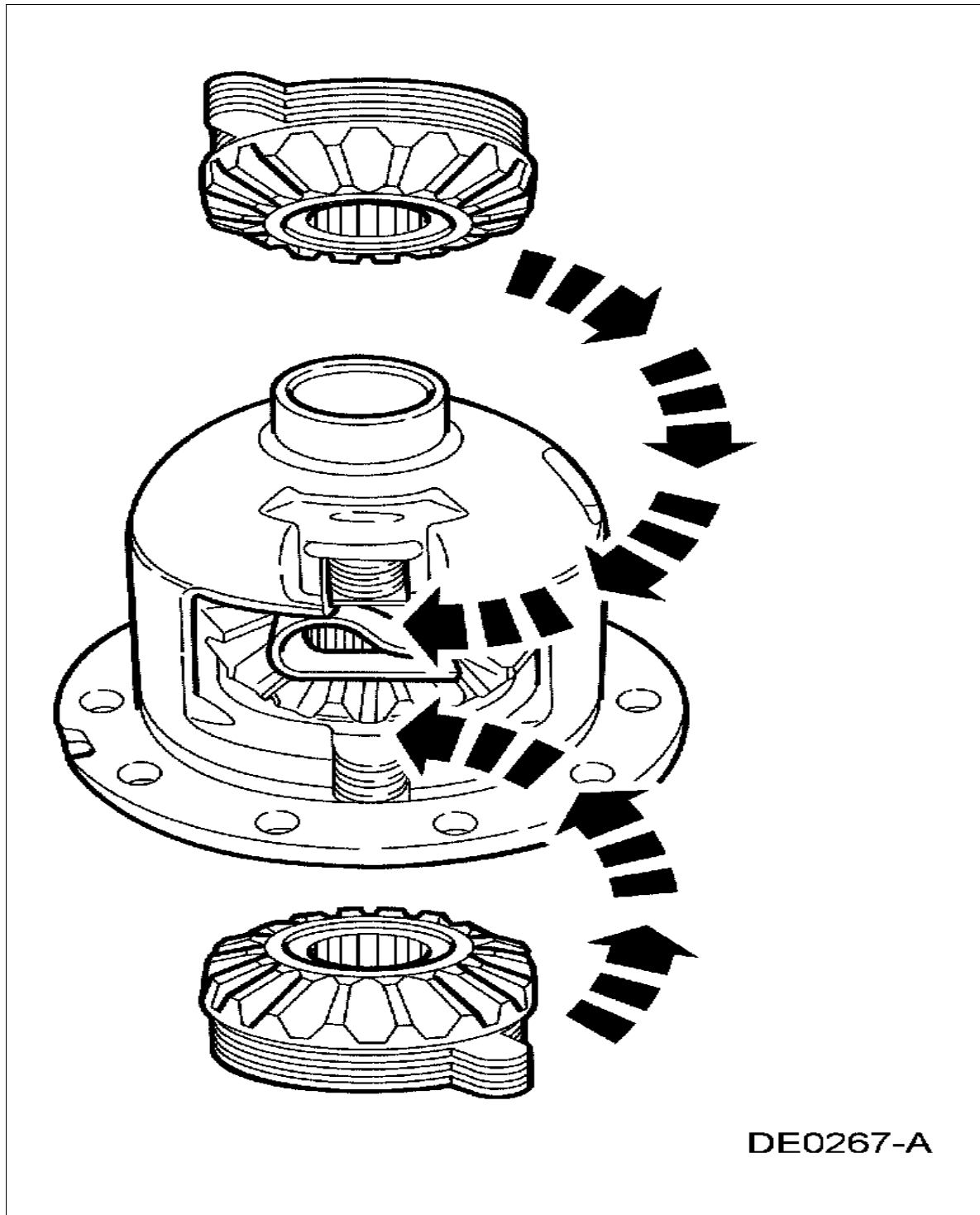
Fig 219: Inserting Feeler Gauge Between Tool And Differential Clutch Pack



Courtesy of FORD MOTOR CO.

8. Remove the special tool from the differential clutch pack and differential side gear assembly.
9. Install the shim(s) on the differential clutch pack and differential side gear assembly.
10. Install the differential side gear assemblies in the differential case.

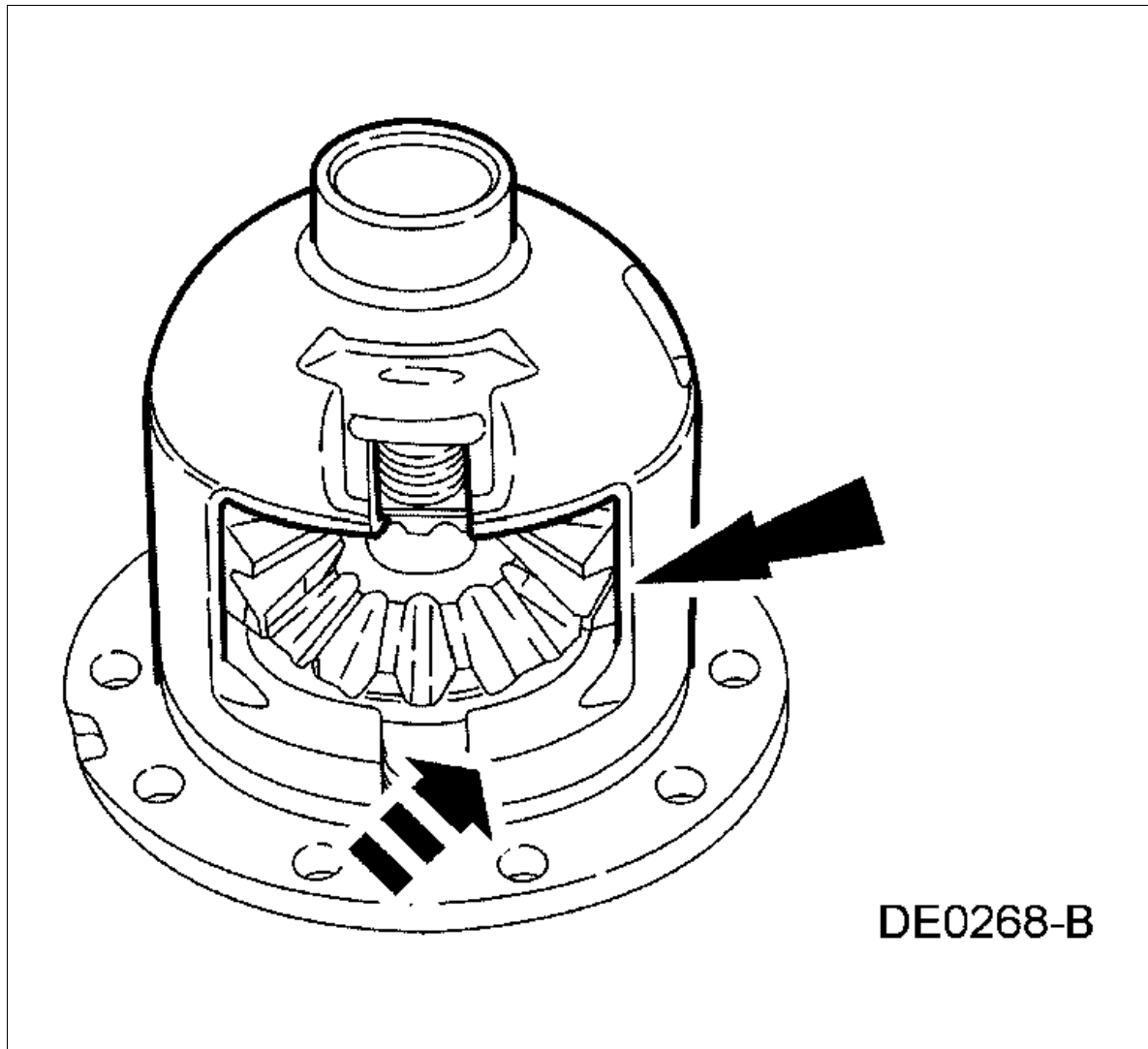
Fig 220: Installing Differential Side Gear Assemblies In Differential Case



Courtesy of FORD MOTOR CO.

11. Install the differential pinion gear and differential pinion thrust washer assemblies in the differential case.

Fig 221: Installing Differential Pinion Gear And Differential Pinion Thrust Washer Assemblies

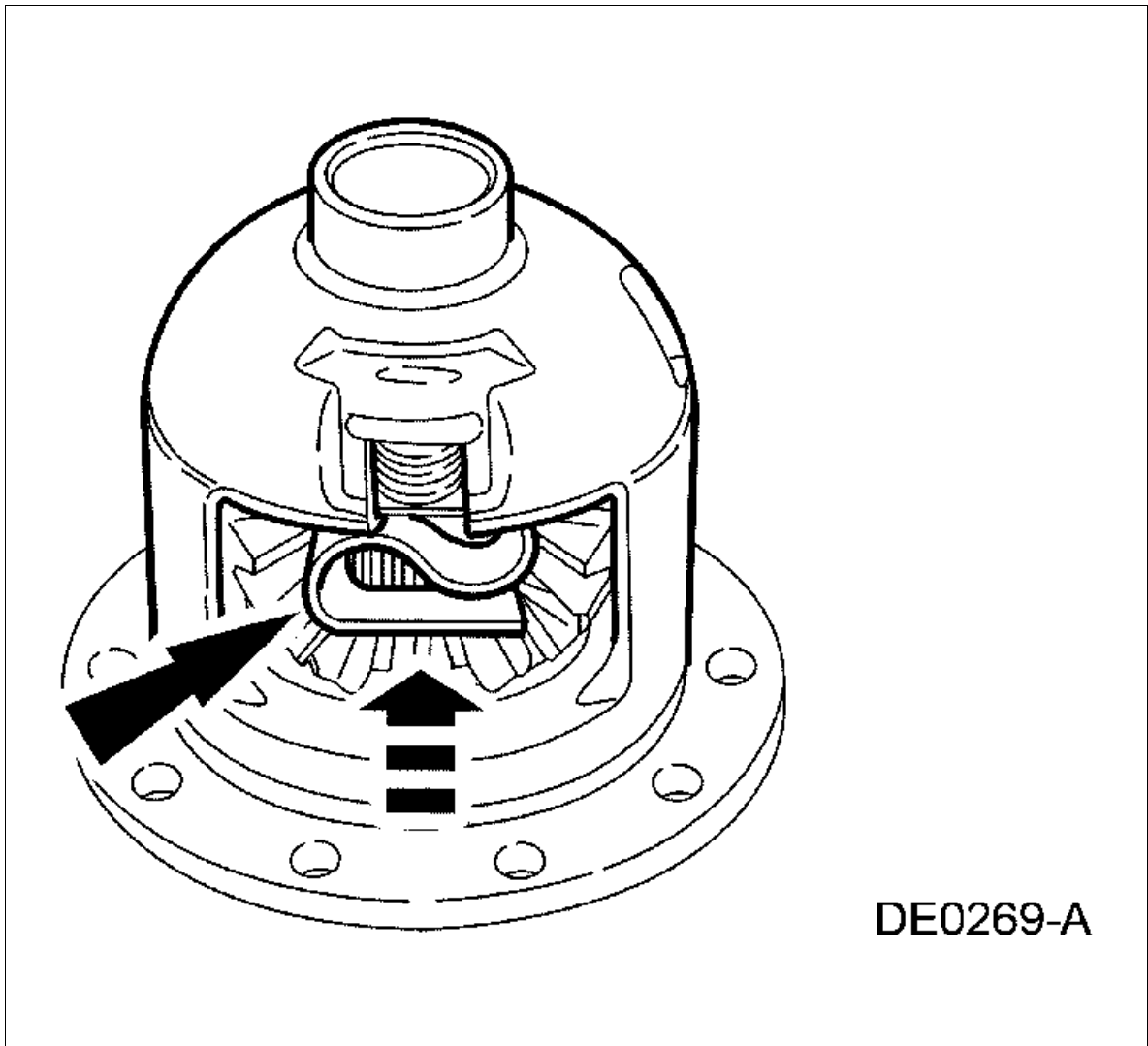


Courtesy of FORD MOTOR CO.

12. Using a soft-faced hammer, install the differential clutch spring.



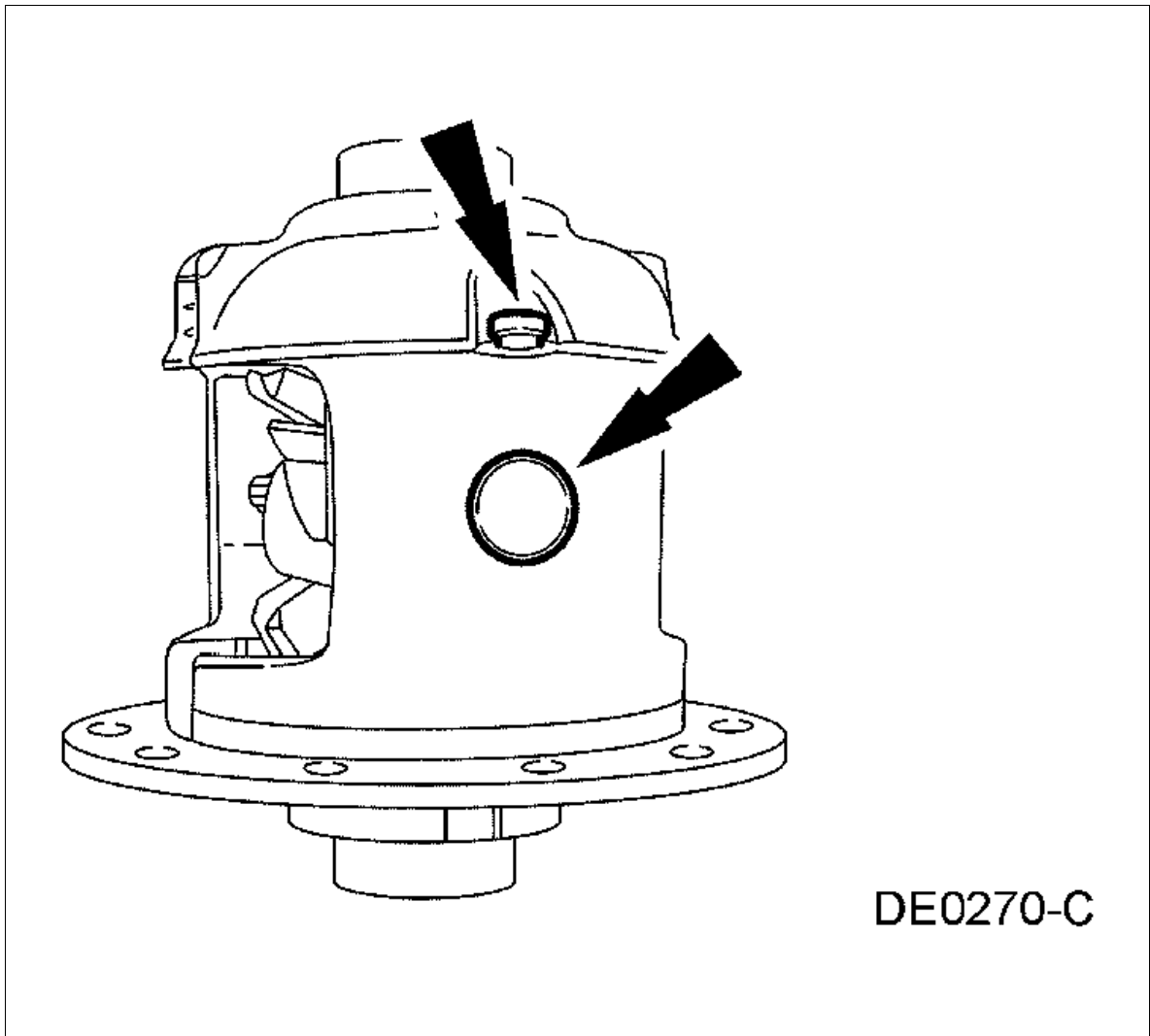
Fig 222: Installing Differential Clutch Spring



Courtesy of FORD MOTOR CO.

13. Install the differential pinion shaft and install a new bolt finger-tight.

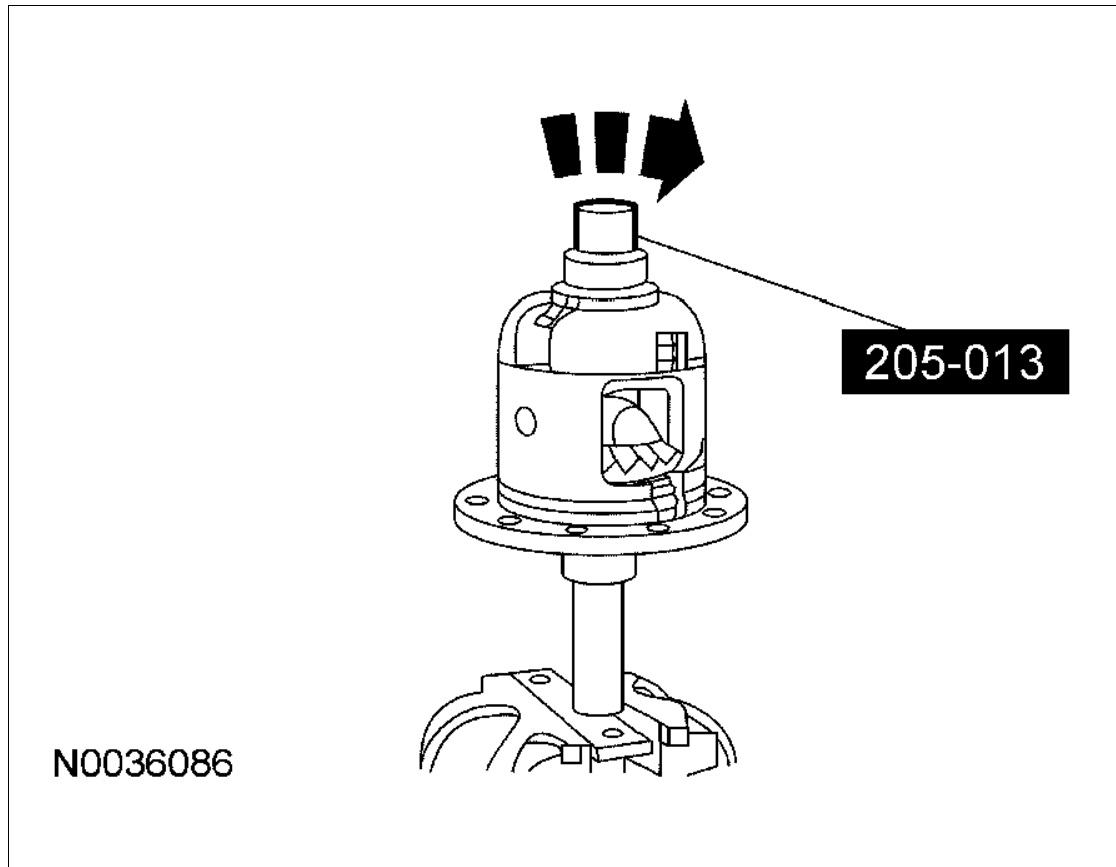
Fig 223: Installing Differential Pinion Shaft



Courtesy of FORD MOTOR CO.

14. Mount the differential case and the special tool in a vise. Using the special tool, check the torque necessary to rotate one differential side gear.
  1. If reusing the original clutch plates, the initial minimum break-away torque must be no less than the specification. The minimum rotating torque necessary to keep the differential side gear turning with new clutch plates may vary.

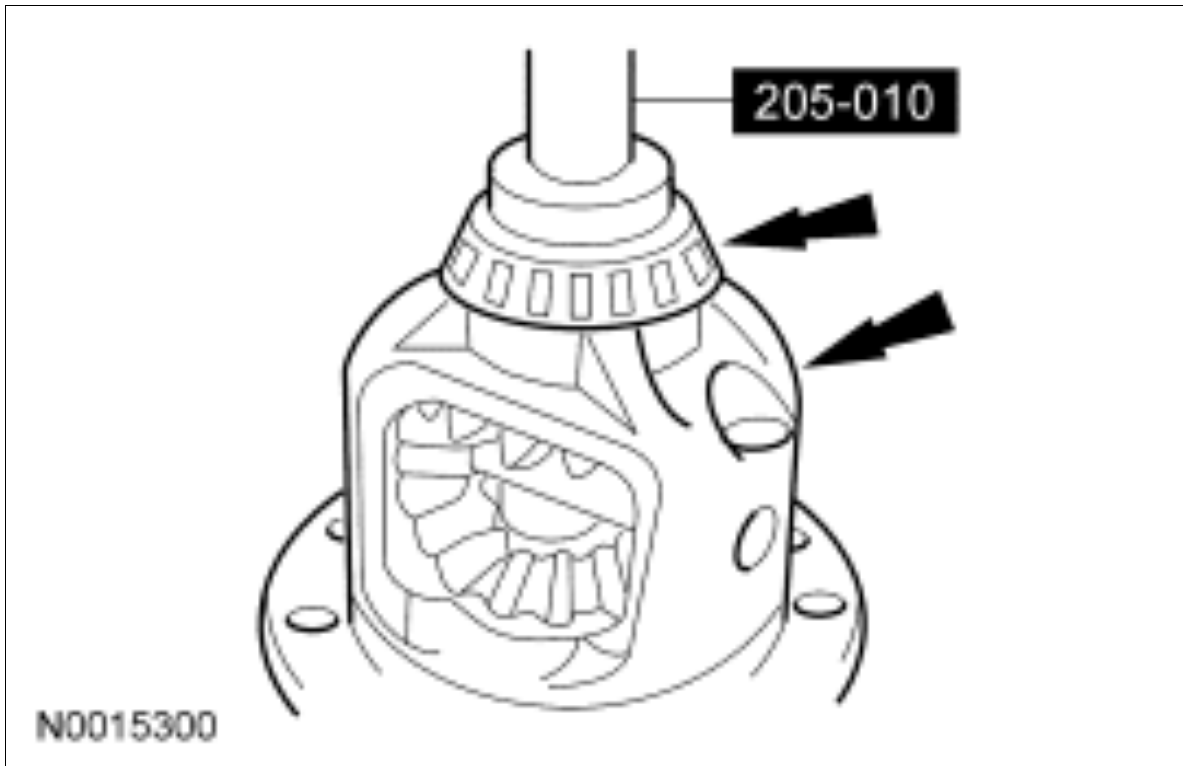
Fig 224: Mounting Differential Case And Special Tool In A Vise



Courtesy of FORD MOTOR CO.

15. Using the special tool, install the differential bearings.

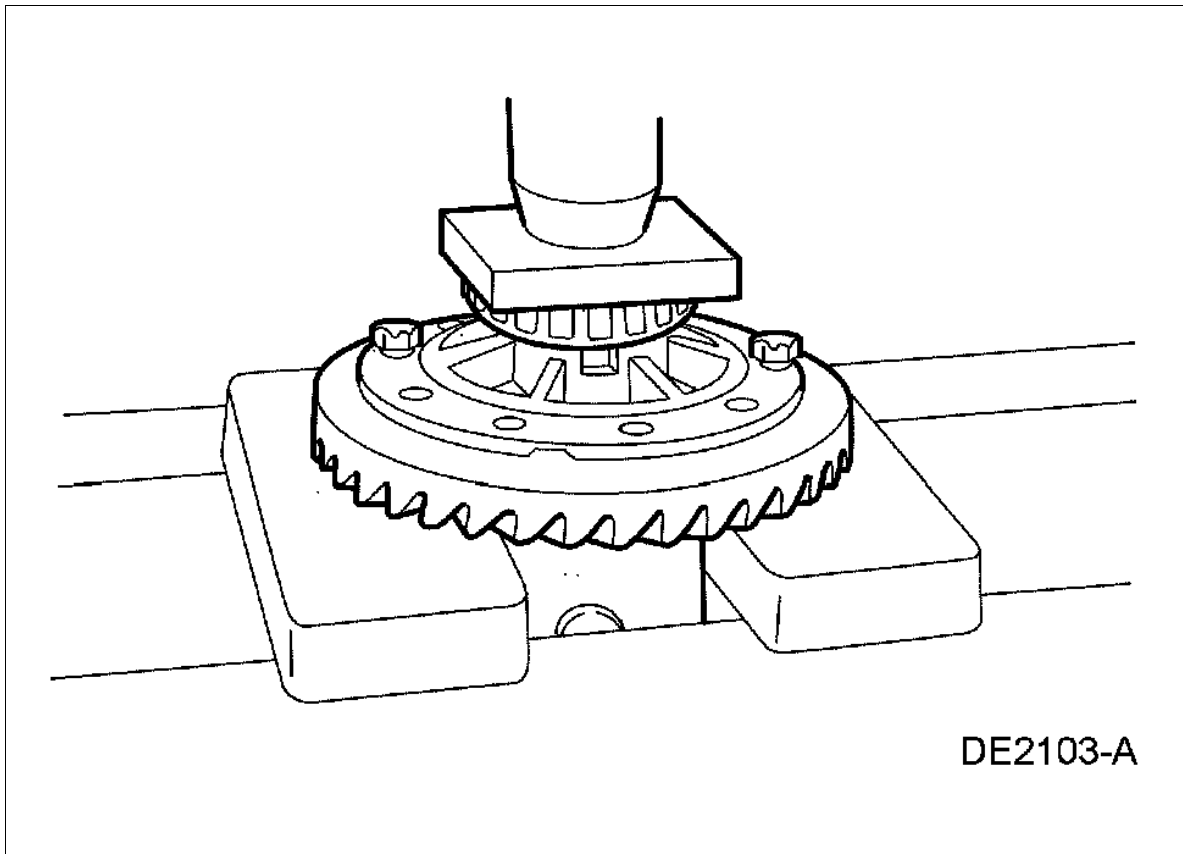
Fig 225: Installing Differential Bearings On Differential Case



Courtesy of FORD MOTOR CO.

16. Position the differential ring gear and the differential case. Align the bolt holes by starting 2 bolts through the holes in the differential case and the differential ring gear. Press the differential ring gear on the differential case.

Fig 226: Pressing Differential Ring Gear Onto Differential Case



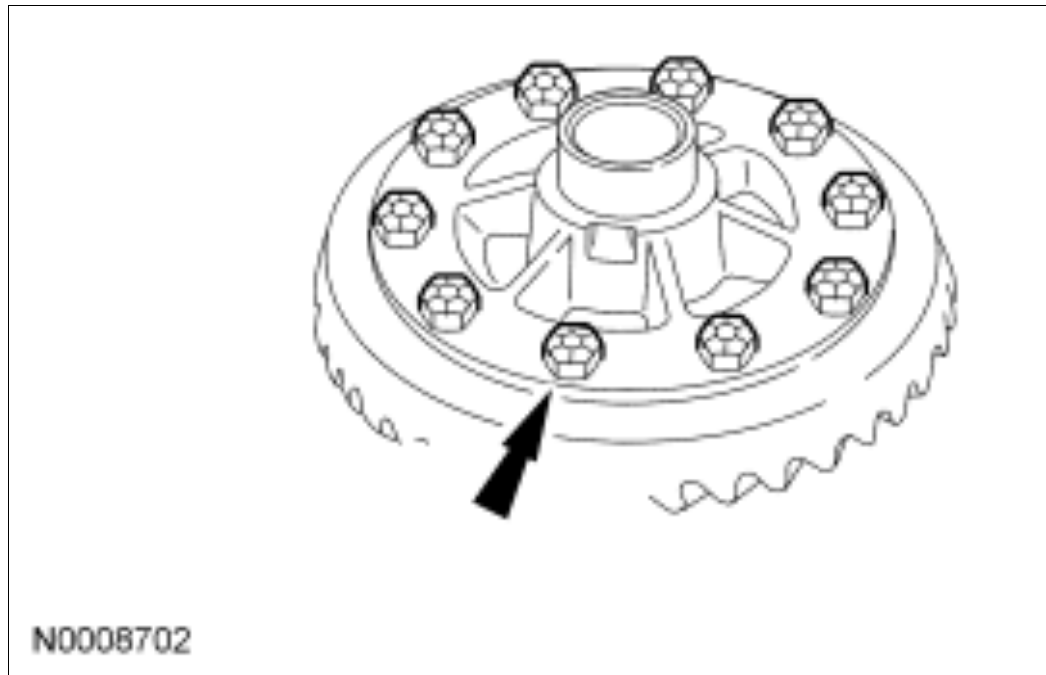
Courtesy of FORD MOTOR CO.

17. Apply stud and bearing mount to the differential ring gear bolt threads and install the bolts.

**NOTE:** *Clean bolt threads to make sure the bolts are free of foreign material.*

1. Install new bolts.
  1. Tighten to 105 Nm (77 lb-ft).

Fig 227: Identifying Differential Ring Gear Bolts



Courtesy of FORD MOTOR CO.

18. Install the differential assembly. For additional information, refer to DIFFERENTIAL CASE.

19. If equipped with fire suppression system, repower the system.

**WARNING:** *If equipped with fire suppression system, repower the system. For important safety warnings and procedures, refer to FIRE SUPPRESSION SYSTEM .*