



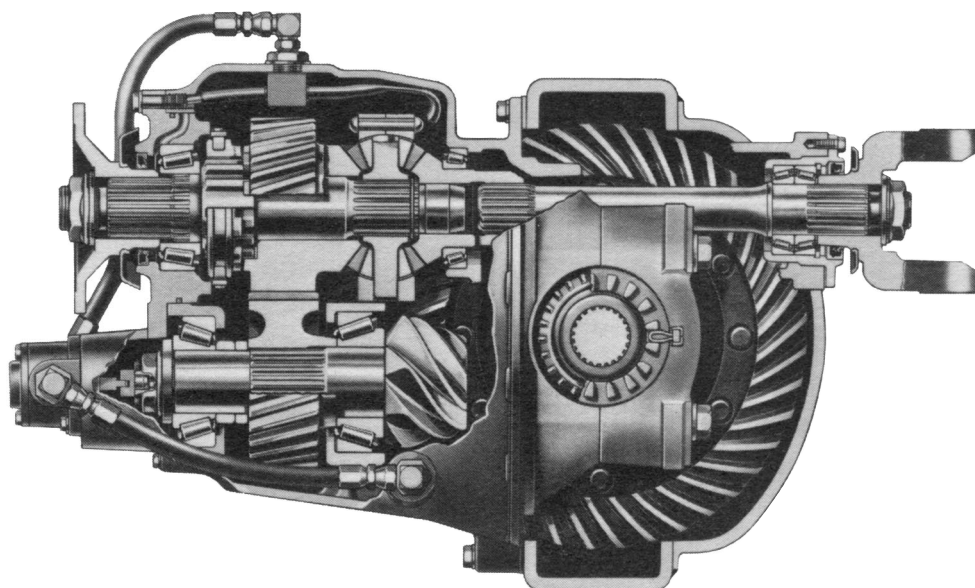
MERITOR®

an **ArvinMeritor** brand

Issued 09-88
\$2.50

Tandem Axle Forward Rear Drive Units

Maintenance Manual 5B



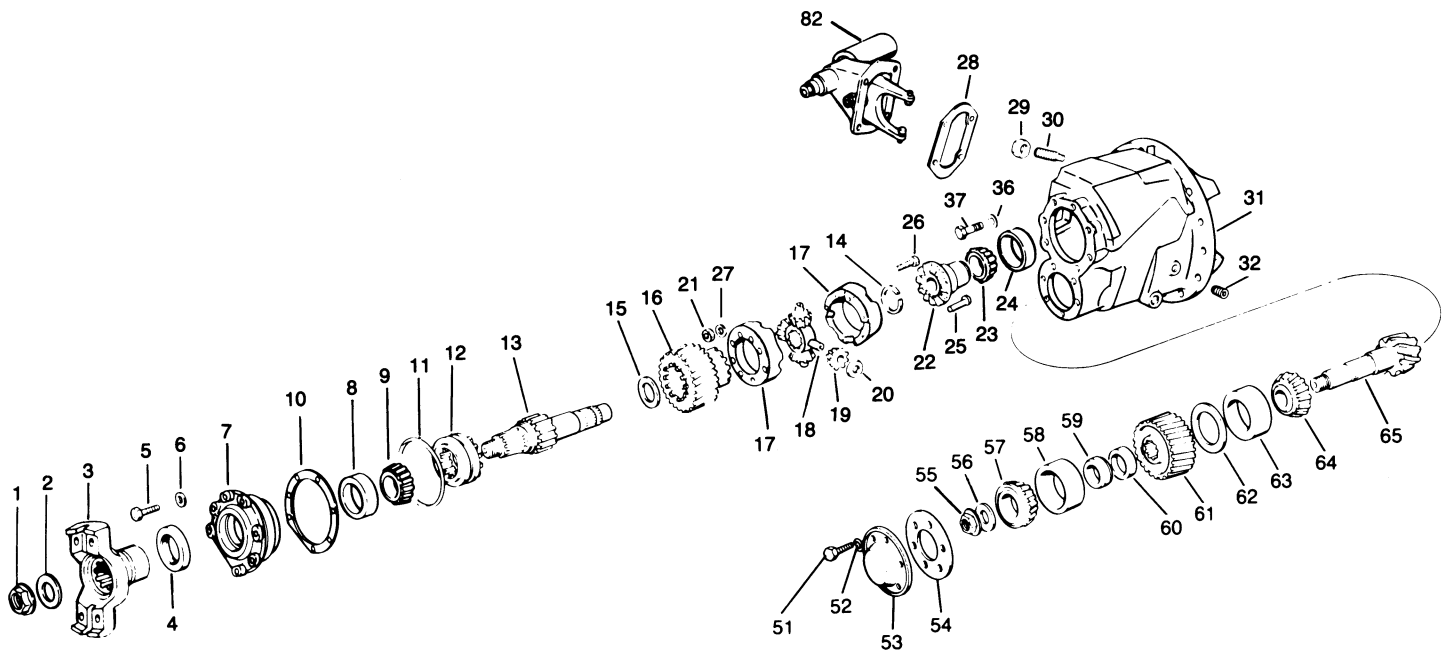
Models Without Oil Pump

- SSHD
- STHD
- SUHD

Models With Oil Pump

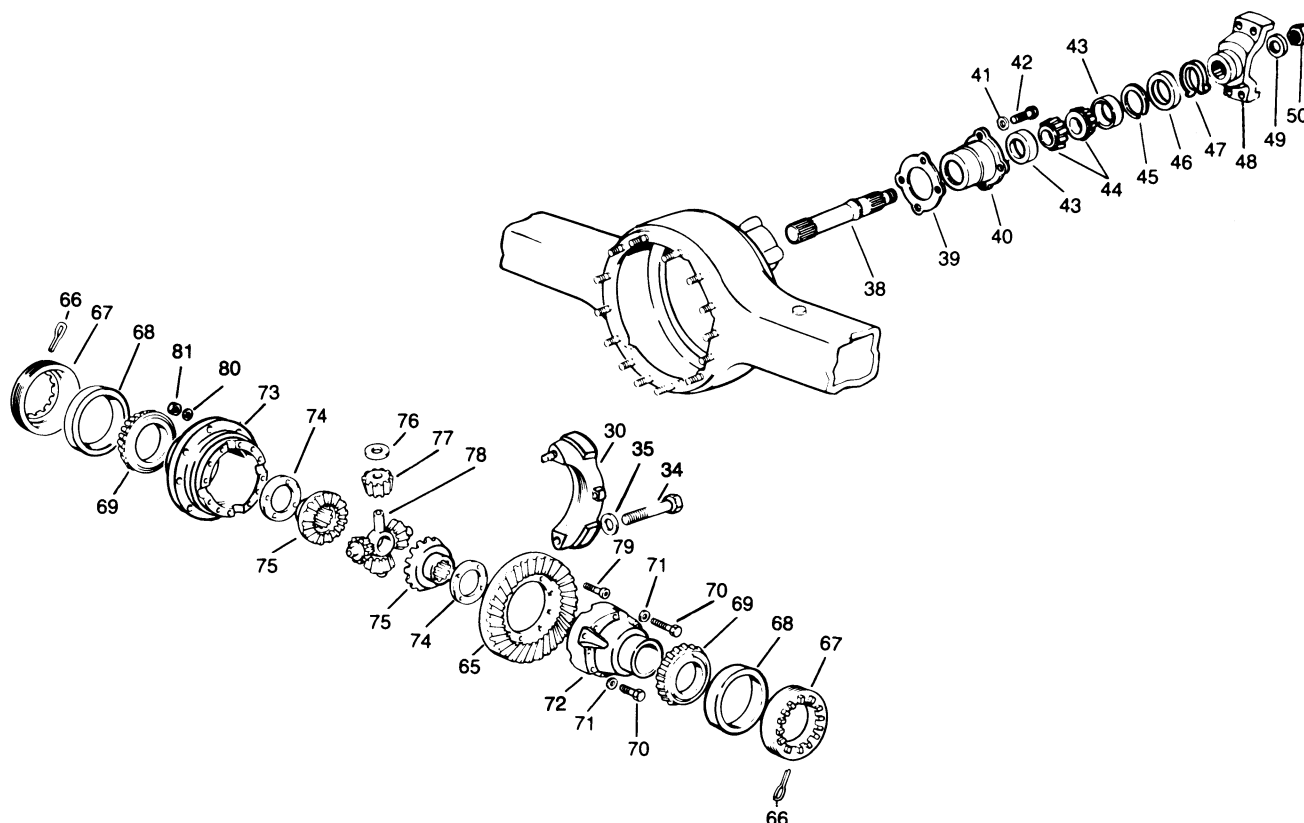
- SSHP
- STHP
- SUHP

SSHD, STHD, SUHD FORWARD REAR AXLE



OPTIONAL OIL PUMP

ITEM	DESCRIPTION
A	Differential Carrier
B	Valve Body Assy.
C	Ball-oil tube
D	Spring-relief valve
E	Washer-relief valve spring
F	Retainer-valve spring
G	Washer-relief valve
H	Nut-valve retainer
I	Elbow Assys.
J	Hose Assy.
K	Filter Screen
L	Adapter-filter screen
M	Hose Assy.
N	Elbow Assys.
O	Pump Assy.
P	Cover-pinion shaft
Q	Capscrew-pinion cover
R	Washer-pinion cover
S	Capscrew-pump to cover
T	Washer-pump to cover
U	Drive Button-pump



ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Nut-input shaft	29	Nut-thrust screw	57	Outer Brg. Cone-pinion
2	Washer-input shaft nut	30	Thrust screw	58	Outer Brg. Cup-pinion
3	Yoke/Flange-input shaft	31	Differential Carrier	59	Spacer-brg. cone
4	Oil Seal-input shaft	32	Plug-fill	60	Spacer-gear
5	Capscrew-bearing cage	33	Bearing Cap-main diff.	61	Gear-lower helical
6	Washer-bearing cage	34	Capscrew-brg. cap	62	Shims-pinion brg.
7	Bearing cage-input shaft	35	Washer-brg. cap	63	Inner Brg. Cup-pinion
8	Fwd. Brg. Cup-input shaft	36	Washer-carrier to hsg.	64	Inner Brg. Cone-pinion
9	Fwd. Brg. Cone-input shaft	37	Capscrew-carrier to hsg.	65	Ring Gear and Pinion Assy.
10	Shims-input shaft	38	Output Shaft	66	Cotter Pins/Roll Pins-adj. ring
11	O-ring-fwd. bearing	39	Gasket-output shaft	67	Adj. Rings-diff. brgs.
12	Clutch Collar	40	Brg. Cage-output shaft	68	Brg. Cups-adj. rings
13	Input Shaft	41	Washer-brg. cage	69	Brg. Cones-adj. rings
14	Retainer-snap ring	42	Capscrew-brg.cage	70	Capscrew-diff. case
15	Thrust Washer	43	Brg. Cups-output shaft	71	Washer-diff. case
16	Gear-input drive	44	Brg. Cones-output shaft	72	Diff. Case-plain half
17	Diff. Case-inter-axle diff.	45	Snap Ring-output shaft	73	Diff. Case-flange half
18	Spider-inter-axle diff.	46	Oil Seal-output shaft	74	Thrust Washers-side gear
19	Pinion-inter-axle diff.	47	Thrust Washer-output shaft	75	Side Gear-main diff.
20	Thrust Washer-inter-axle diff.	48	Yoke/Flange-output shaft	76	Thrust Washer-diff. pinion
21	Nut-inter-axle diff.	49	Washer-output shaft nut	77	Pinion-differential
22	Side Gear-inter-axle diff.	50	Nut-output shaft	78	Spider-differential
23	Rear Brg. Cone-input shaft	51	Capscrew-pinion bearing cover	79	Bolt/Rivet-gear to case
24	Rear Brg. Cup-input shaft	52	Washer-pinion bearing cover	80	Washer-gear to case
25	Rivet-inter-axle diff.	53	Cover-pinion bearing	81	Nut-gear to case
26	Bolt-inter-axle diff.	54	Gasket pinion bearing cover	82	Shift Unit Assy.-inter-axle diff.
27	Washer-inter-axle diff.	55	Nut-hypoid pinion		
28	Gasket-shift hsg.	56	Washer-hypoid pinion nut		

Service Notes

Before You Begin

This manual provides maintenance and service instructions for Meritor’s forward rear drive unit of the following tandem axles: SSHD, STHD and SUHD. Before you begin procedures:

1. Read and understand all instructions and procedures before you begin to service components.
2. Read and observe all Caution and Warning safety alerts that precede instructions or procedures you will perform. These alerts help to avoid damage to components, serious personal injury, or both.
3. Follow your company’s maintenance and service, installation, and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.

Safety Alerts, Torque Symbol and Notes

 WARNING	A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury.
 CAUTION	A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components.
	A torque symbol alerts you to tighten fasteners to a specified torque value.
NOTE	A Note provides information or suggestions that help you correctly service a component.

Access Product and Service Information in the DriveTrain Plus™ by ArvinMeritor Tech Library on our Web Site

Enter the following address in your browser’s address box. The screen will display an index of publications by category. Bookmark this screen for quick access to the Tech Library.

arvinmeritor.com/tech_library/home.asp

To Order Information by Phone

Call ArvinMeritor’s Customer Service Center at 800-535-5560 to order the following item.

- Drivetrain Plus™ by ArvinMeritor Technical Electronic Library on CD. Features product and service information on most Meritor, ZF Meritor and Meritor WABCO products. \$20. Order TP-9853.

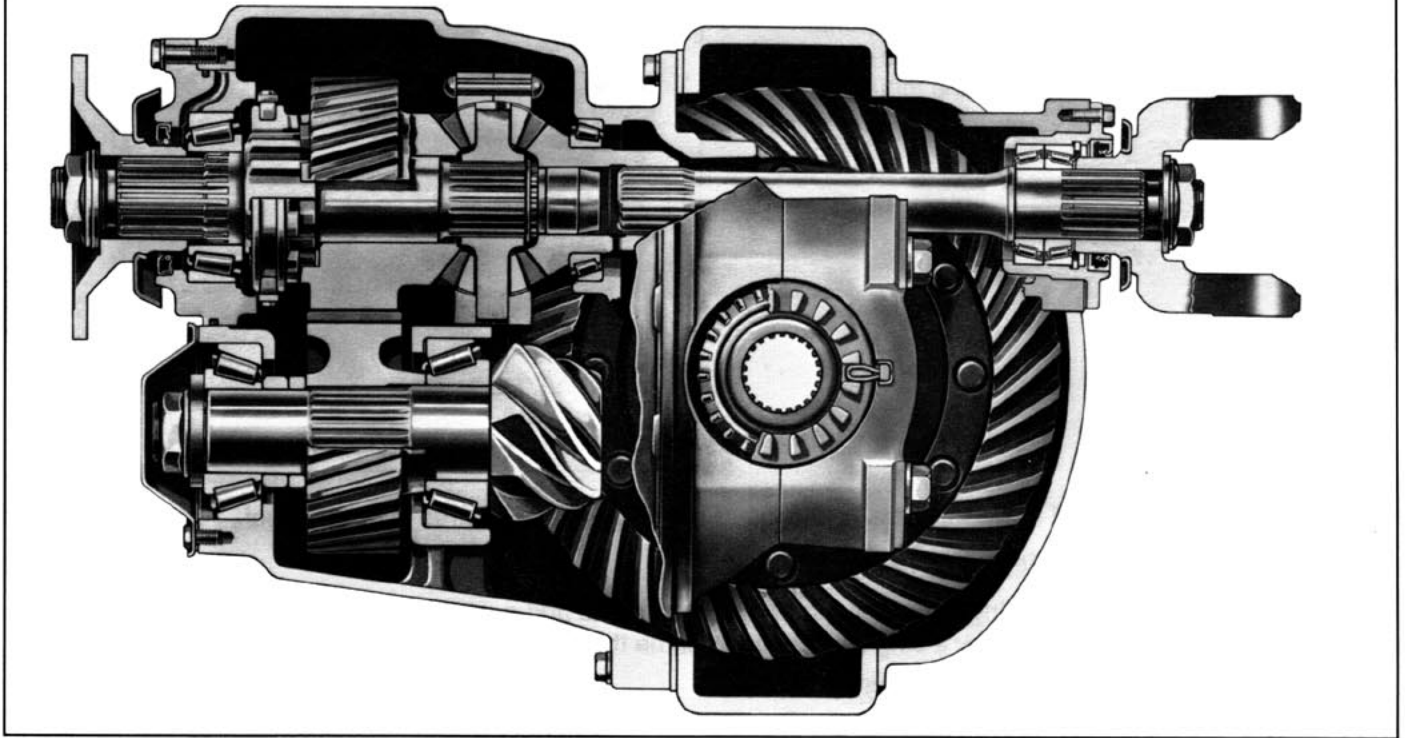
Table of Contents

SUBJECT	PAGE
1. INTRODUCTION	3
2. DISASSEMBLY	
Remove Differential Carrier from Axle Housing	5
Disassemble Output Shaft and Bearing cage Assembly	7
Disassemble Inter-Axle Differential Shift Unit	10
Remove Inter-Axle Differential and Cage Assembly	10
Disassemble Inter-Axle Differential Assembly	14
Remove Main Differential Case and Ring Gear Assembly	19
Disassemble Main Differential Case and Ring Gear Assembly	20
Remove and Disassemble Drive Pinion Assembly	22
Remove and Disassemble Oil Valve Assembly	23
Remove Oil Filter Screen Assembly from Carrier	25
Servicing the Oil Pump	25
3. PREPARE PARTS FOR ASSEMBLY	
Clean Parts	26
Inspect Parts	26
Repair or Replace Parts	28
Repair Axle by Welding	28
4. GENERAL INFORMATION	
Dri-Loc Fasteners, Meritor Liquid Adhesive and Loctite 277	30
Application of Silicone Gasket Material	31
Install Tight Fit Yokes with Three-Piece Pilot Tool	32
Gear Set Information (Drive Pinion and Ring Gear Marks)	32
5. ASSEMBLY	
Adjust Thickness of Shim Pack for Hypoid Pinion	34
Install Hypoid Pinion Assembly	35
Assemble Main Differential and Ring Gear	36
Check Rotating Resistance of Differential Gears	38
Install Differential and Ring Gear Assembly	39
Adjust Preload of Differential Bearings	40
Check Runout of Ring Gear	42
Adjust Backlash of Ring Gear	42
Check Tooth Contact Pattern of Ring Gear Set	43
Adjust Preload of Pinion Bearings	47
Assemble and Install Oil Valve Assembly	51
Install Oil Filter Screen Assembly	52
Install Oil Pump Assembly	54
Assemble Inter-Axle Differential Assembly	55
Install Input Assembly Into Carrier	60
Adjust Input Shaft End Play	61
Install Ring Gear Thrust Screw	63
Install Differential Carrier Into Housing	63

Table of Contents (Continued)

SUBJECT	PAGE
5. ASSEMBLY (Continued)	
Assemble Output Shaft, Bearings and Seal	.65
Adjust Output Bearings	.66
Install Output Shaft Assembly Into Housing	.68
Assemble Inter-Axle Differential Shift Unit	.69
Adjust the Shift Shaft	.70
6. LUBRICATION	.71
7. FASTENER TORQUE CHART	72
8. ADJUSTMENTS AND SPECIFICATIONS	73

Figure 1



SSHD/SSHP, STHD/STHP AND SUHD/SUHP SERIES TANDEM AXLE FORWARD REAR DRIVE UNITS

The forward axle drive units of these tandem axles have single-reduction, through drive carriers. The drive gearing is made of a two helical gear train and a hypoid ring gear and pinion. Bevel gears are used in the main differential and the inter-axle differential.

NOTE:

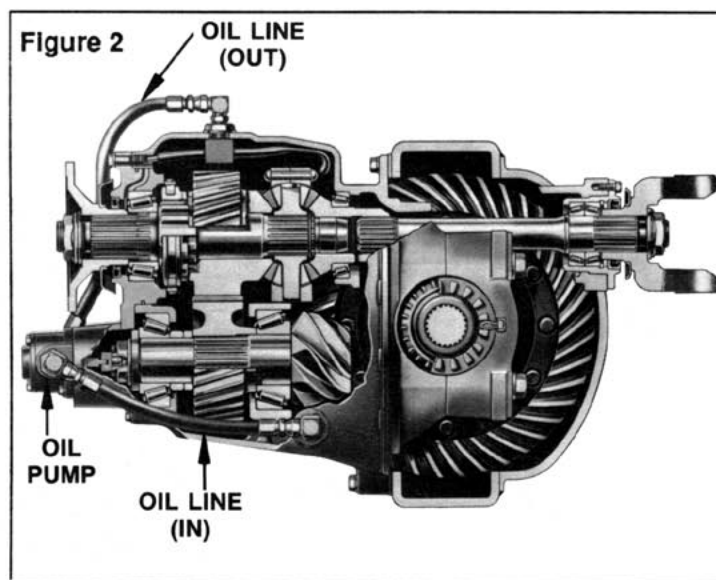
*The hypoid gear set in these carriers **MUST** be serviced as a matched set only. Also, we recommend that the main and inter-axle differential pinion gears, thrust washers, side gears and side gear thrust washers be replaced as a complete set.*

The SSHD, STHD, and SUHD tandem forward axle carriers are lubricated by the standard (splash) system using special baffles and reservoirs to hold and direct the lubricant. **Figure 1.**

Section 1

Introduction

The SSHP, STHP and SUHP tandem forward carriers are equipped with a forced lubrication system. These models have an externally mounted oil pump which is driven by the shaft of the hypoid pinion. The pump circulates additional lubricant to the inter-axle differential and the forward and rear bearings on the input shaft. **Figure 2.**



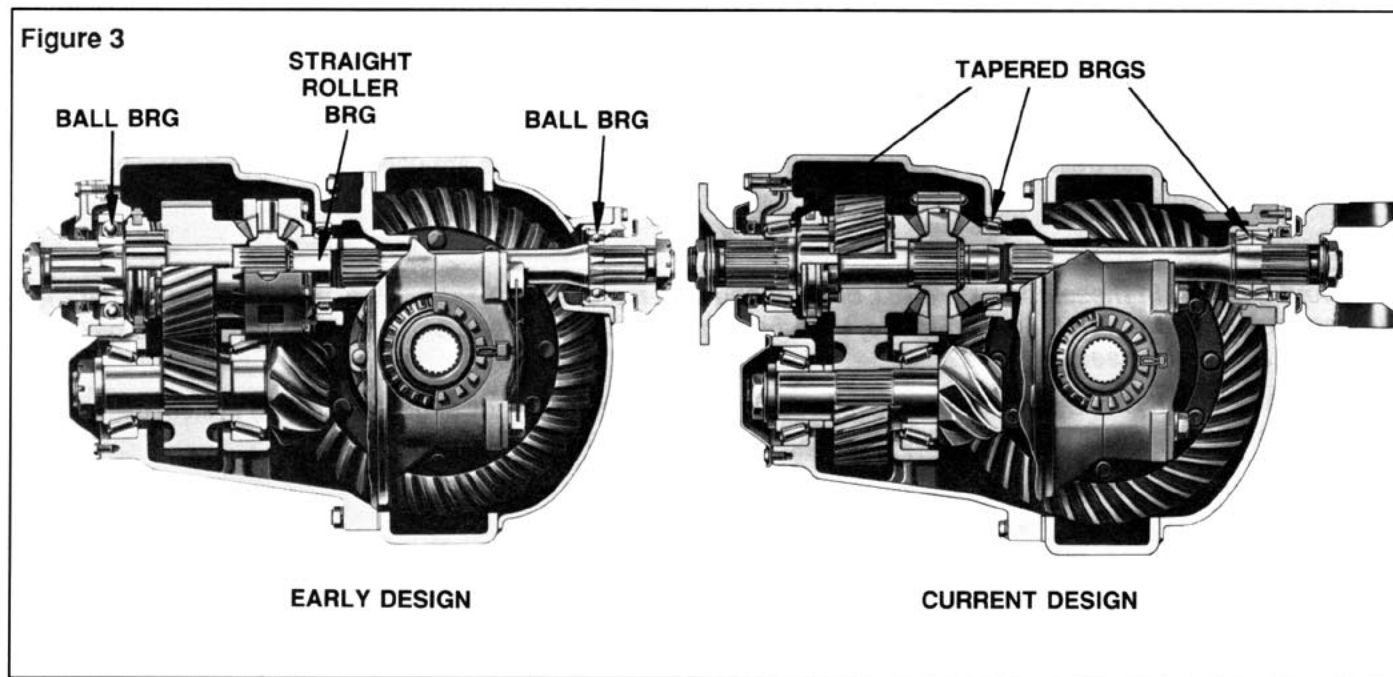
There are two basic designs of these tandems in service. Both designs are covered in this manual. **Figure 3.**

Early Design Models (Before February 1978):

The input shaft is supported by a single ball bearing at the forward end and a straight roller bearing at the rear side gear. The output shaft is supported by a single ball bearing at the rear of the axle housing.

Current Design Models (After January 1978):

The input shaft, rear side gear and output shaft are supported completely by tapered roller bearings.



Remove Differential Carrier From Axle Housing

1. Remove the oil drain plug from the bottom of the axle housing and drain lubricant from the assembly.
2. Remove the stud nuts and washers from the flanges of both axle shafts.
3. Loosen the tapered dowels in the flanges of both axle shafts.

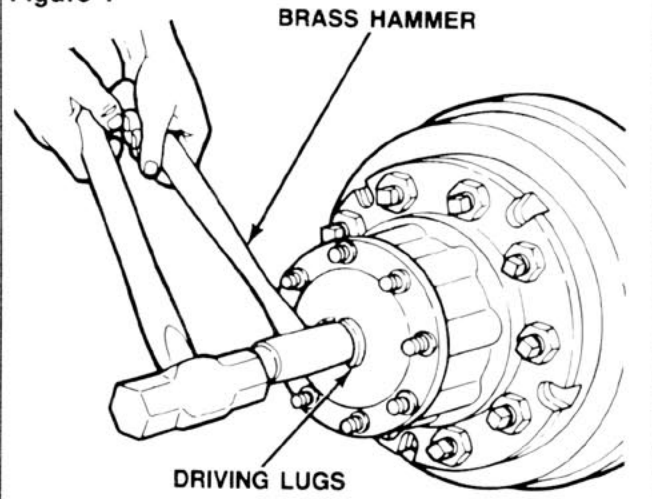


WARNING:

Wear safe eye protection. Do not directly hit the round driving lugs on the flanges of the axle shafts. The lugs can break and cause injury.

- A. Hold a 1-1/2 inch diameter brass drift against the center of the axle shaft, **INSIDE THE ROUND DRIVING LUGS**. **Figure 4.**

Figure 4



NOTE:

A 1-1/2 inch diameter brass hammer can be used as a drift.

- B. Hit the end of the drift with a large hammer (five to six pounds) and the axle shaft and tapered dowels will loosen.



CAUTION:

Do not use a chisel or wedge to loosen the axle shafts and dowels. The chisel or wedge can damage the hub, axle shafts, and if used, the oil seals.

4. Remove the tapered dowels and both axle shafts from the axle assembly.
5. Disconnect the forward and rear drive shafts.
6. Disconnect the air lines at the shift unit.
7. Remove the output shaft nut, washer and yoke or flange. If necessary, use a yoke or flange puller to remove the yoke from the shaft.



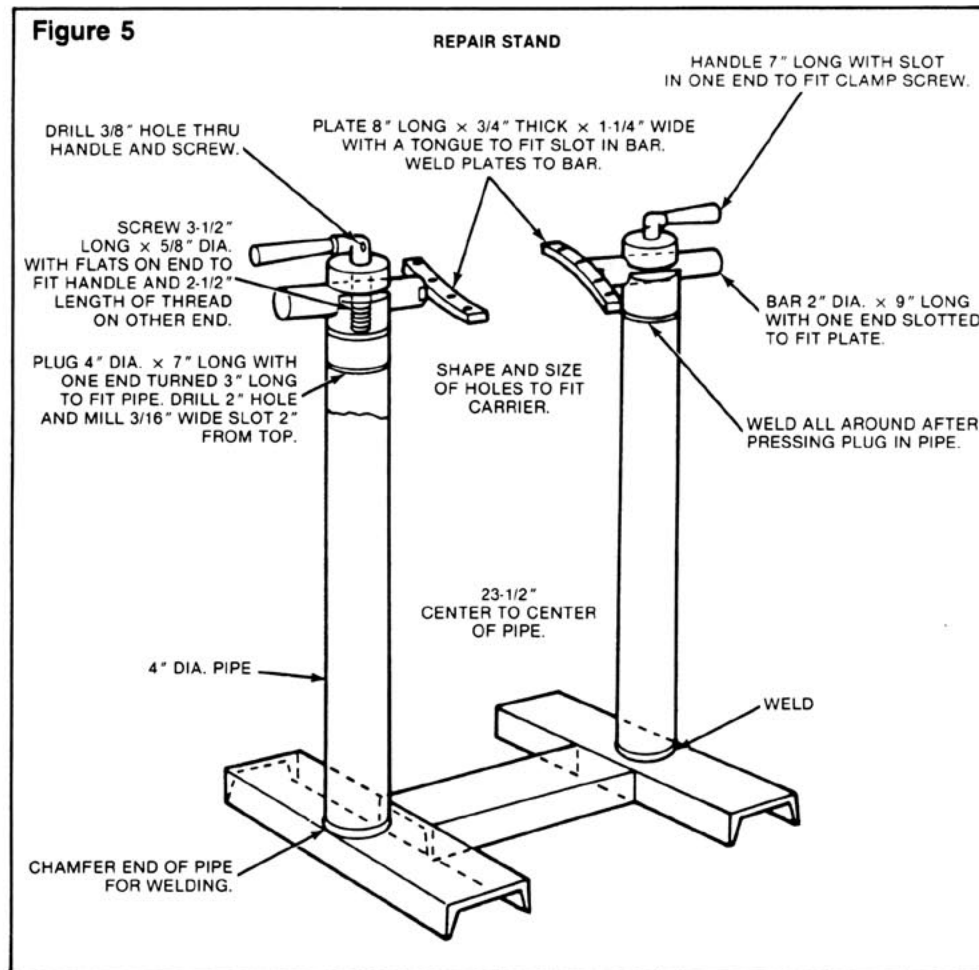
CAUTION:

Do not use a hammer to loosen the yoke or flange. A hammer can damage the parts and cause alignment problems.

8. Remove the bearing cage capscrews and washers. Pull the bearing cage, bearings and shaft assembly from the axle housing. If necessary, loosen the cage from the housing with a soft mallet. Be careful that the oil seal is not damaged when the output shaft is removed.
9. Remove and discard the bearing cage to housing gasket, if used.
10. Put a hydraulic roller jack under the differential carrier to support the assembly.
11. Remove all but the top two carrier to housing fasteners.
12. Loosen, but do not remove, the top two carrier to housing fasteners for one turn only. The fasteners will hold the carrier in the housing.
13. Loosen the differential carrier in the axle housing. Use a soft mallet to hit the mounting flange of carrier at several points.
14. After the carrier is loosened, remove the top two fasteners that hold the assembly in the axle housing.

Section 2

Disassembly



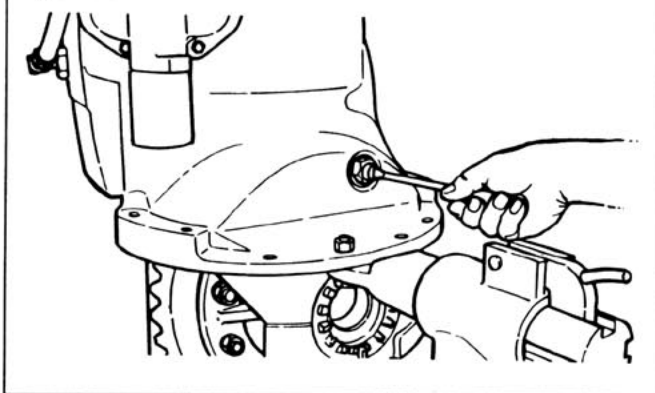
15. Carefully remove the carrier from the axle housing using the hydraulic roller jack. Use a pry bar that has a round end to help remove the carrier from the housing.

CAUTION:

When using a pry bar be careful not to damage the carrier or housing flange. Damage to these surfaces will cause oil leaks.

16. Remove and discard the carrier to housing gasket or gasket material.
17. Lift the differential carrier by the input yoke or flange and put the assembly in a repair stand. Use a lifting tool for this procedure. **DO NOT LIFT BY HAND.**
18. A repair stand can be made by using the drawing in **Figure 5**. A repair stand, part number J 3409-01 is available from Kent Moore, Heavy-Duty Division, 29784 Little Mack, Roseville, Michigan 48066-2298.
19. Loosen the thrust screw jam nut and remove the thrust screw from the side of the carrier. **Figure 6.**

Figure 6

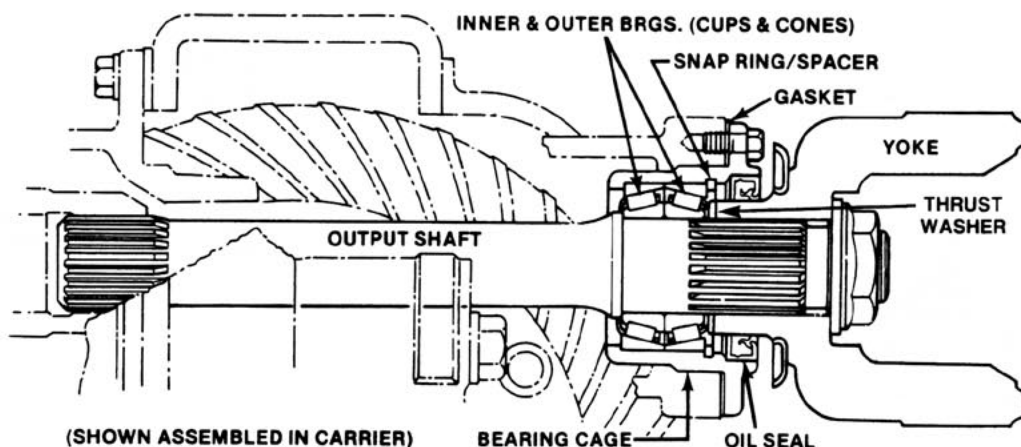


NOTE:

Some early carrier models also have a thrust block. The thrust block will fall away from the ring gear inside the carrier when the thrust screw is removed.

Figure 7

CURRENT MODEL-TAPERED BEARINGS



Disassemble Output Shaft and Bearing Cage Assembly

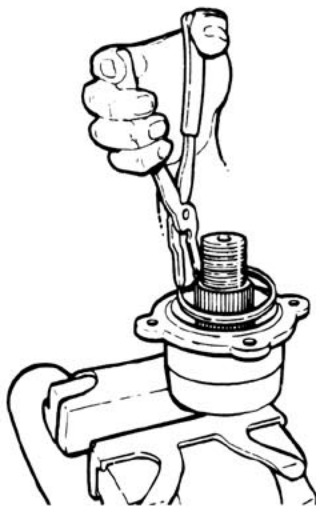
Current Models (Tapered Bearings)

1. Pry the oil seal from the bearing cage. Be careful that you do not damage the mounting surfaces of the bearing cage.

If the oil seal is a one-piece design (without mounting flange), discard the seal.

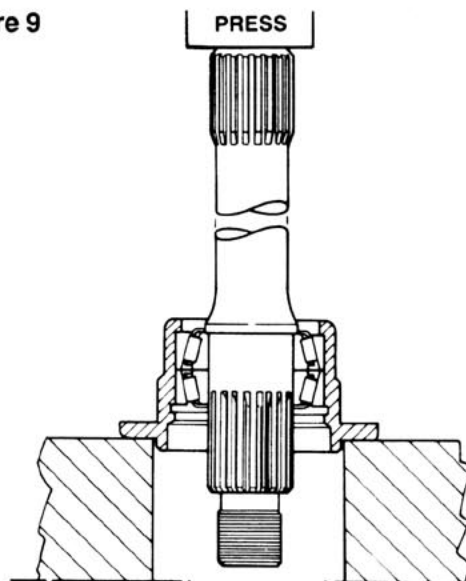
If the oil seal is a triple-lip design (with flange), inspect the seal for damage. If the surface of the triple-lip seal is not worn or damaged, and the mounting surface of the yoke or flange is smooth and not damaged, the seal can be used again when the carrier is assembled.

Figure 8



2. Remove the snap ring from the bearing cage with snap ring pliers. **Figure 8.** Remove the thrust washer from the output shaft.

Figure 9



3. Remove the output shaft from the bearing cage assembly. Put the assembly in a press with the threaded end of the shaft at the bottom. Press the shaft through the cage. **Figure 9.**

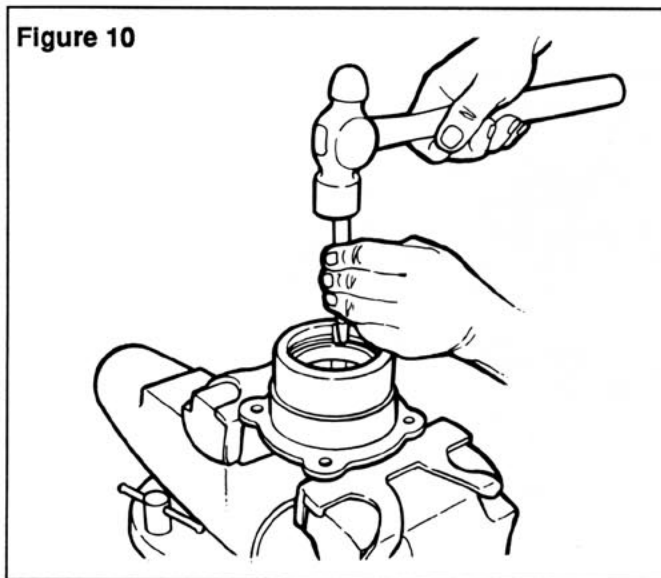
Both bearing cones will remain on the shaft. The inner bearing cup will remain in the cage and the outer cup will be loose.

4. Inspect the bearing cups and cones for wear and damage. (See page 27). If necessary, remove the bearings as follows:

Section 2

Disassembly

Figure 10



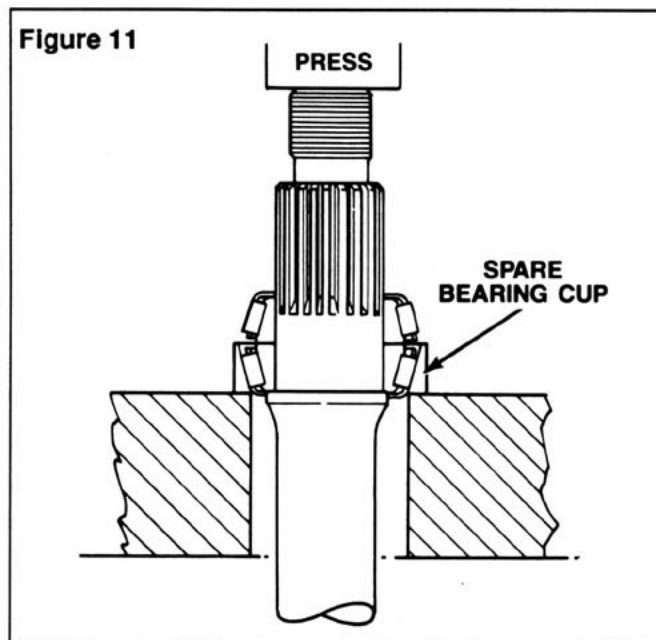
A. Use a soft drift and hammer to tap the inner bearing cup from the cage. **Figure 10.**



WARNING:

Do not hit the bearing cup directly with a hammer or steel drift. Parts can break and chips can cause injury.

Figure 11



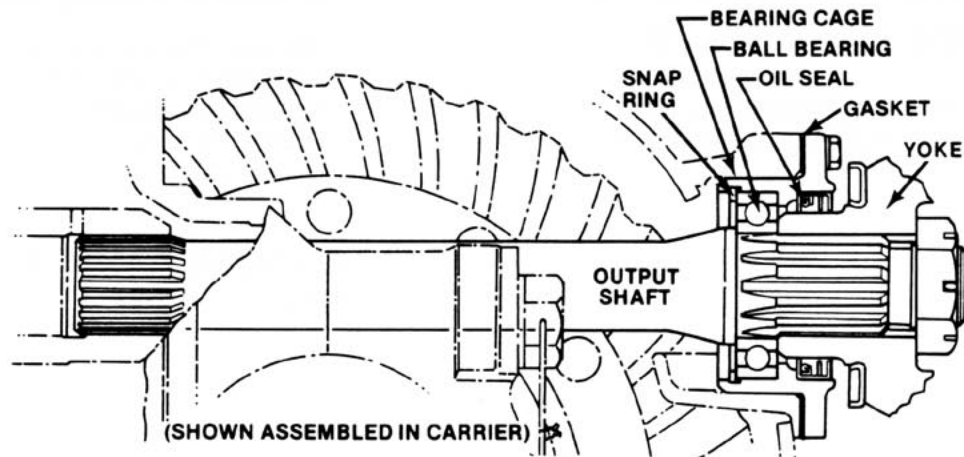
B. Put an old bearing cup over the inner bearing cone to protect the bearings **Figure 11.** Remove the bearing cones from the shaft with a press or bearing puller.

Section 2

Disassembly

Figure 12

ORIGINAL MODEL-BALL BEARING

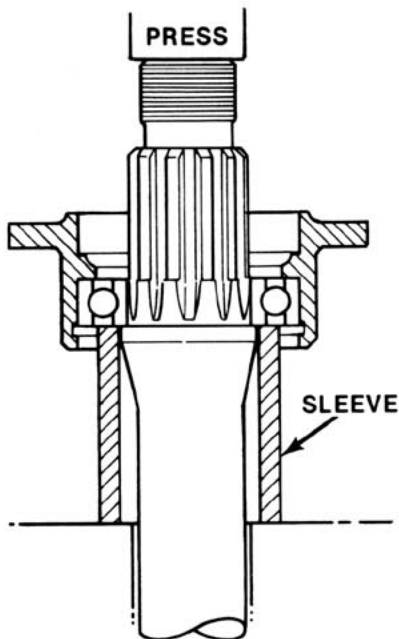


Early Models (Ball Bearings)

1. Pry the oil seal from the bearing cage. Be careful that you do not damage the mounting surfaces of the bearing cage.
2. Remove the snap ring from the bearing cage with snap ring pliers.

3. Put the output shaft and cage assembly in a press with the threaded end of the shaft at the top. Support the assembly with a sleeve under the inner race of the bearing. **Figure 13.**
4. Press the shaft from the bearing and cage.
5. Put the cage and bearing assembly in a vise with soft metal jaws. Tap the bearing from the cage with a small brass drift and hammer. Be careful that you do not damage the inner surface of the cage.

Figure 13



WARNING:

Do not hit the bearing directly with a hammer or steel drift. Parts can break and chips can cause injury.

Section 2

Disassembly

Disassemble Inter-axle Differential Shift Unit

1. Remove the shift unit housing to carrier capscrews and washers. Pull the shift unit from the carrier. **Figure 14.**

Figure 14

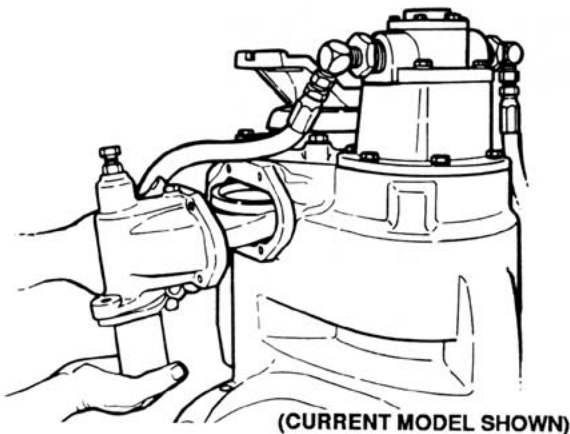
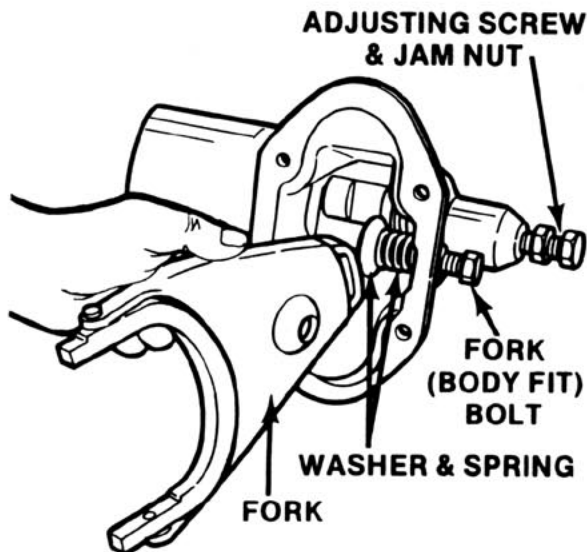


Figure 15



2. If disassembly of the shift unit is necessary, first remove the attaching cotter pin, if used, and lock nut for the shift fork bolt. Then tap the fork bolt back enough to remove the ball and fork from the housing. **Figure 15.**

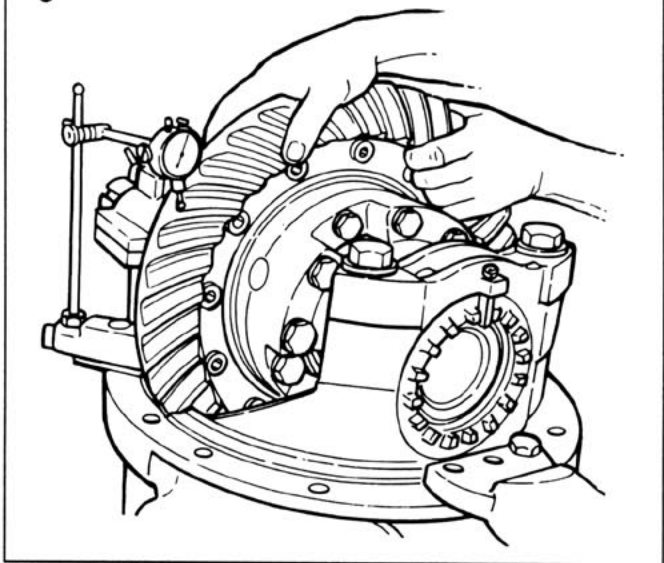
3. Remove the adjusting screw and jam nut, and the air chamber to housing attaching nuts and washers.
4. Use snap ring pliers to expand the snap ring so that it will clear the groove in the air chamber shaft. Pull the chamber assembly from the housing. When the chamber is removed the snap ring, retainer washer and spring will fall from the shaft.

Remove Inter-Axle Differential and Cage Assembly

NOTE:

Before you start work on the differential carrier, inspect the hypoid gear set for wear or damage. (See page 28). If the inspection shows no damage, the gear set can be used again.

Figure 16

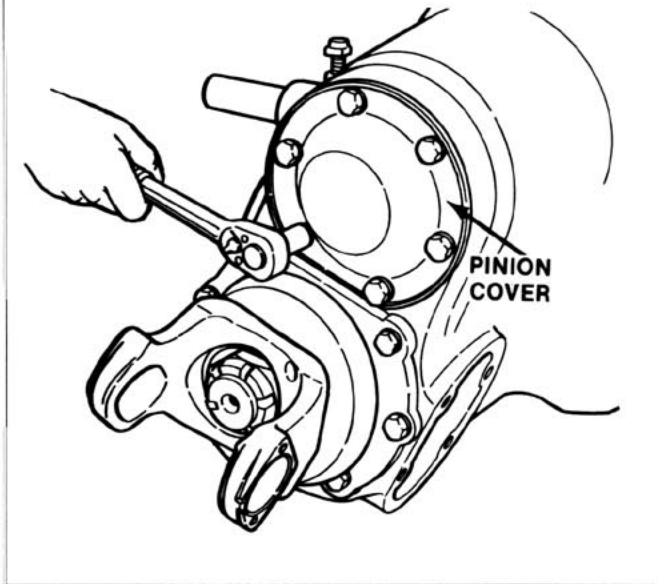


1. Measure the backlash of the gear set and make a note of the dimension. (See procedure on page 42). Adjust the backlash to the same dimension when the gear set is installed back into the carrier. **Figure 16.**

Section 2

Disassembly

Figure 17

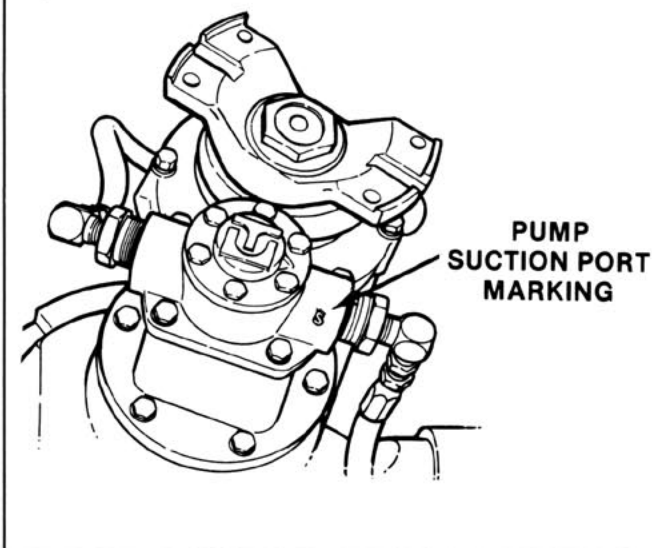


2. Turn the carrier to a horizontal position in the carrier stand with the bottom of the carrier on top.

Figure 17.

- A. For axles without the oil pump (SSHD, STHD and SUHD), remove the pinion bearing cover to carrier capscrews and washers. Remove the cover and gasket. Discard the gasket.

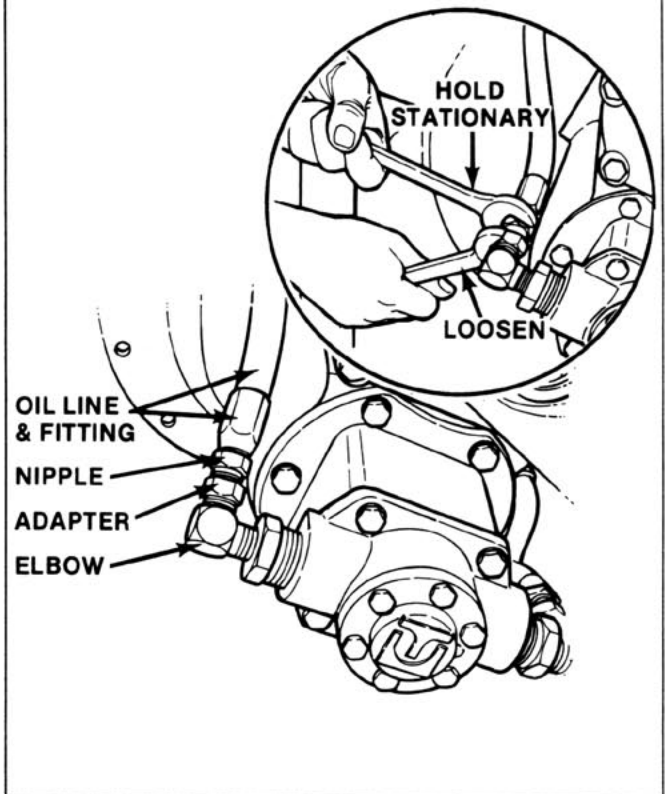
Figure 18



- B. For axles with the oil pump (SSHP, STHP, and SUHP), first make sure that the suction (input) port of the pump is marked for identification at

assembly. The "S" marking is at the port boss. Re-mark the boss if necessary. Figure 18.

Figure 19



- 1) Disconnect both oil lines from the elbow fittings in the pump. Hold the nipple stationary and loosen the adapter fitting from the elbow. Figure 19.



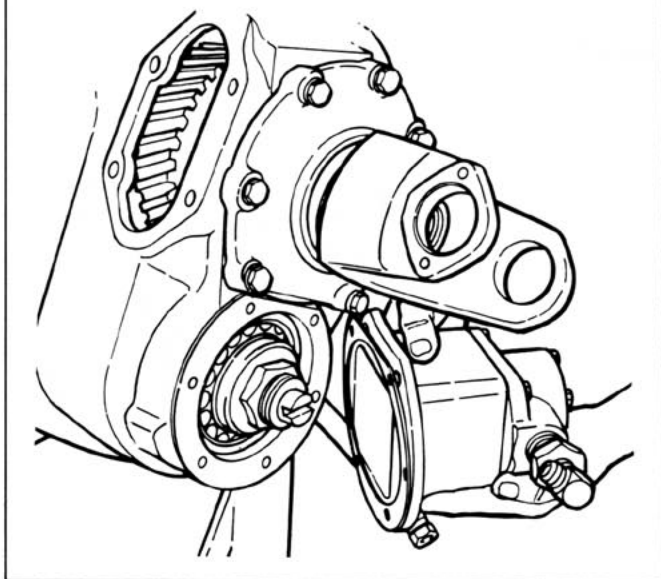
CAUTION:

There will be oil remaining in the pump and oil lines. Be careful when you disconnect and remove the parts. Use a container to catch any oil that spills.

Section 2

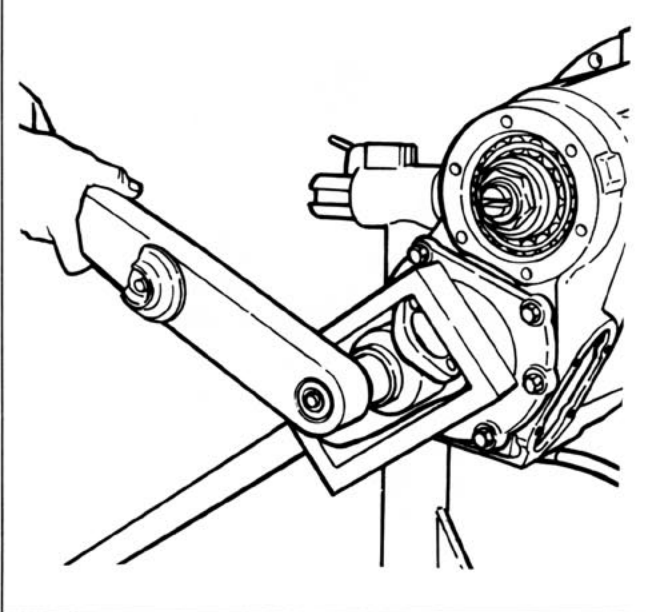
Disassembly

Figure 20



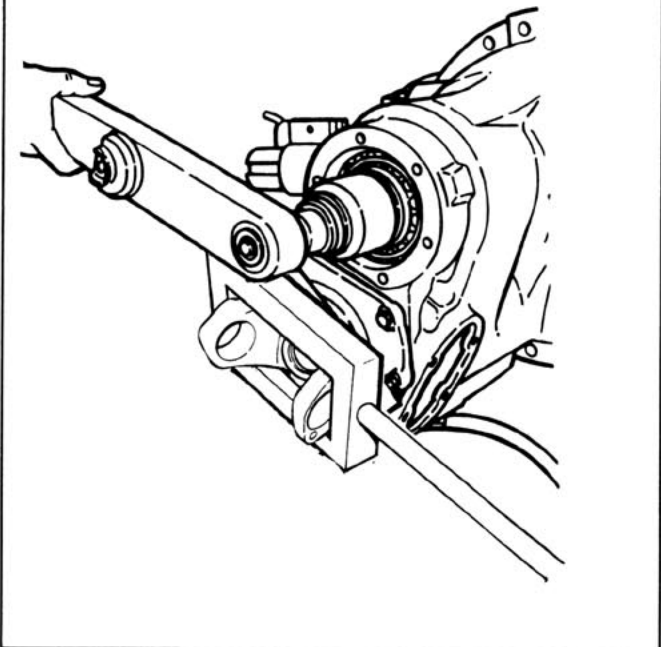
- 2) Remove the pinion cover to carrier capscrews and washers. Remove the pump and cover assembly and gasket, if used. **Figure 20.** Discard the gasket. (See page 25 for pump service information).

Figure 22



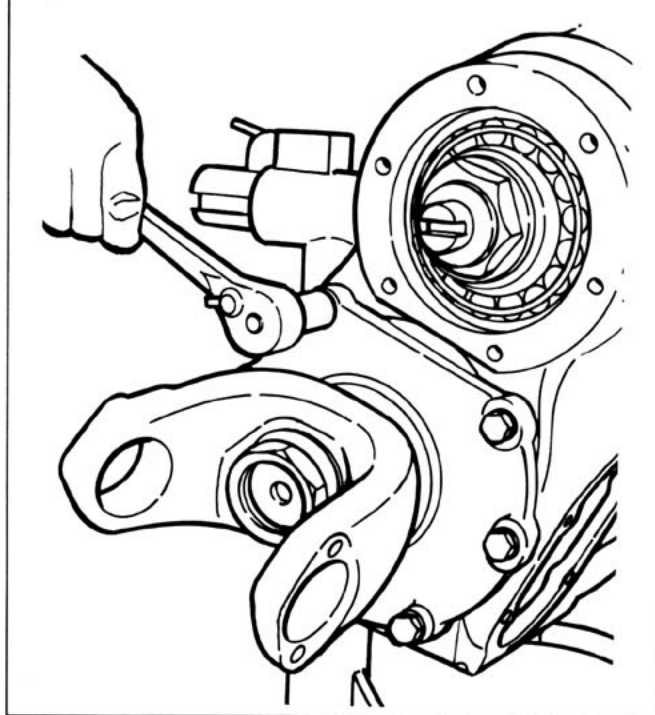
4. Loosen the the yoke or flange nut for a couple of turns but **DO NOT REMOVE** the nut, yoke or flange at this time. The yoke or flange will be used to lift the assembly from the carrier. **Figure 22.**

Figure 21



3. Use a holding bar on the input yoke or flange and loosen but **DO NOT REMOVE** the pinion nut. **Figure 21.**

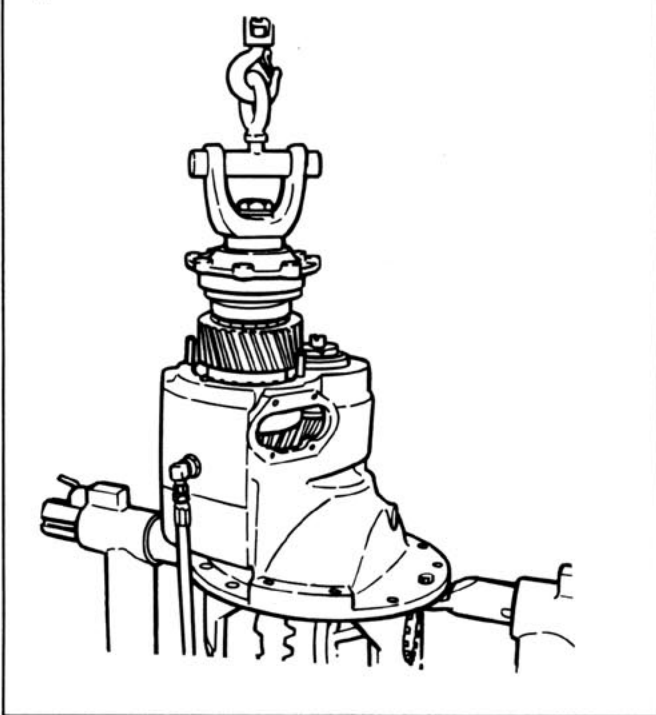
Figure 23



5. Remove the input shaft bearing cage to carrier capscrews and washers. **Figure 23**

Section 2 Disassembly

Figure 24



6. Turn the carrier to a vertical position in the carrier stand and carefully lift the inter-axle differential assembly from the carrier by the input yoke or flange. **Figure 24.**

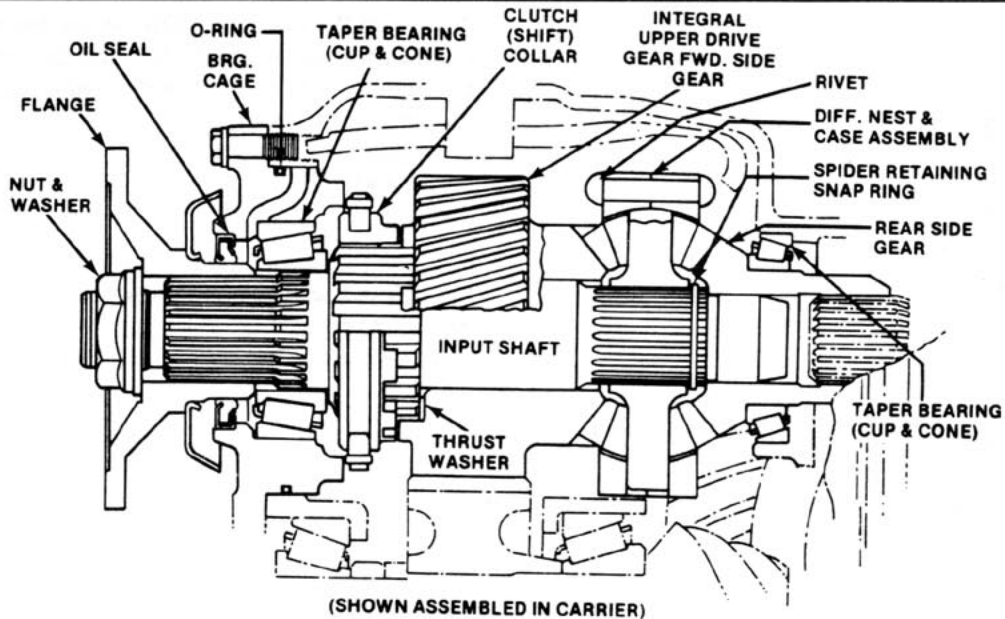
As you lift the inter-axle differential, tap the bearing cage with a soft mallet to free the assembly. It may be necessary to rotate the input shaft so that a flat on the inter-axle differential case will clear the lower drive gear. The rear tapered bearing (cup and cone) and the rear side gear will remain in the carrier.

7. Remove the input bearing cage shim pack. Keep all the shims from the shim pack together. Replace any damaged shims with shims of the same thickness when the carrier is assembled.

Section 2

Disassembly

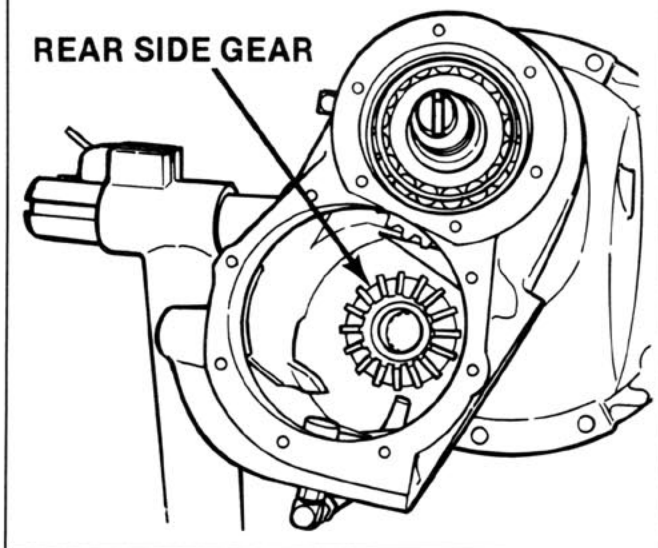
Figure 25



Disassemble Inter-axle Differential Assembly

Current Models (Tapered Bearings)

Figure 26



1. Remove the rear side gear and bearing cone from the carrier. **Figure 26.** The bearing cup will remain in the carrier.
2. Inspect the bearing cup and cone for wear or damage. (See page 27).
3. If bearing replacement is necessary:

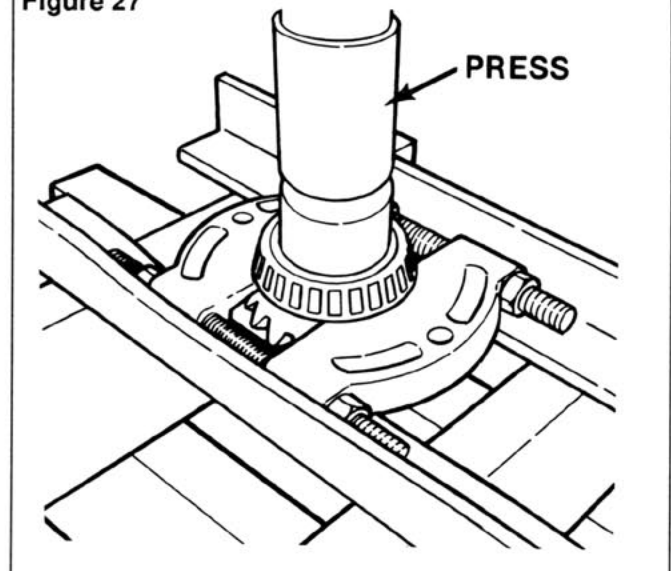
- A. Remove the bearing cup from the carrier **AFTER** the main differential is removed. Use a brass drift and hammer to tap the cup from the main differential side of the carrier.



WARNING:

Do not hit the bearing cup directly with a hammer or steel drift. Parts can break and chips can cause injury.

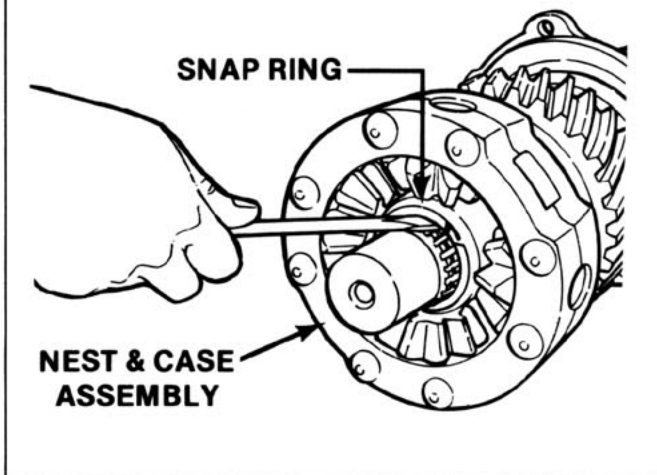
Figure 27



- B. Use a press and bearing puller to remove the bearing cone from the rear side gear. **Figure 27.**

Section 2 Disassembly

Figure 28

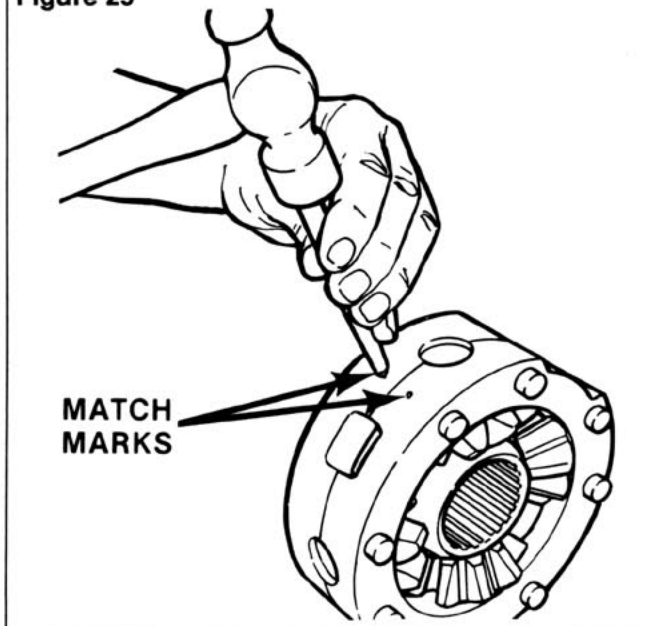


4. Remove the retainer snap ring from the input shaft and slide the inter-axle differential assembly from the shaft. **Figure 28.**
5. Inspect the inter-axle differential assembly for wear and damage. If any part is damaged, replace all the parts as a complete assembly.

NOTE:

Some inter-axle differential assemblies are contained in a welded case. These assemblies cannot be disassembled and require replacement as a complete assembly.

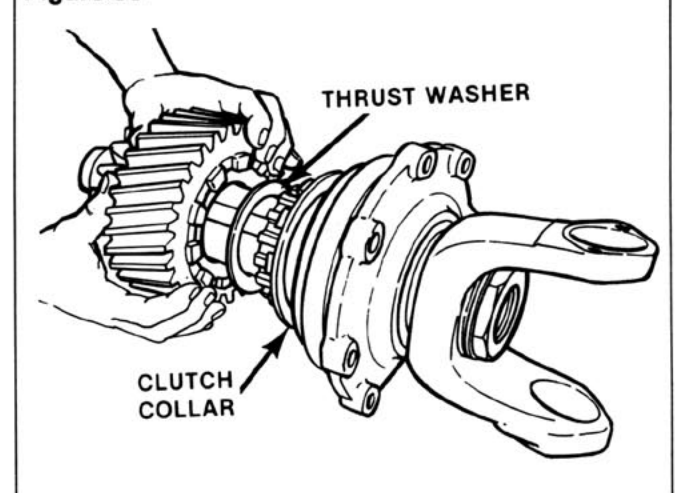
Figure 29



6. If it is necessary to disassemble the inter-axle differential, first mark each case half for correct alignment at assembly. **Figure 29.**

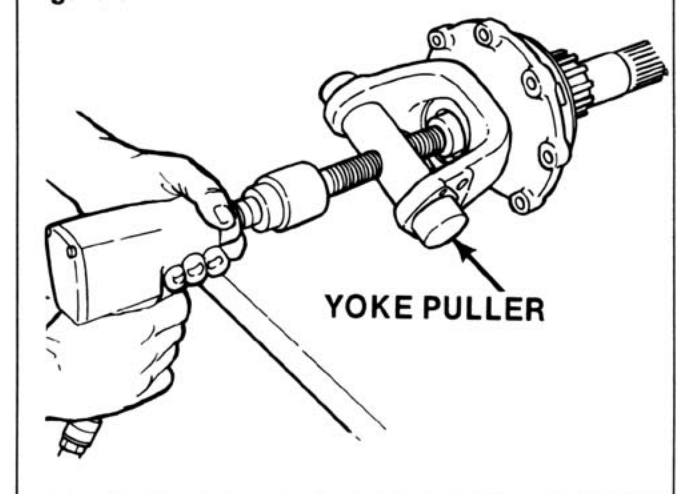
7. To disassemble the inter-axle differential case halves, remove the nuts, bolts and washers (or drill out the rivets, if used) and remove the spider, pinions and thrust washers. (See "Disassemble the Main Differential Case and Ring Gear Assembly" on page 21, Step 5 for instructions to remove rivets).

Figure 30



8. Slide the helical drive gear, thrust washer and clutch collar from the input shaft. **Figure 30.**

Figure 31



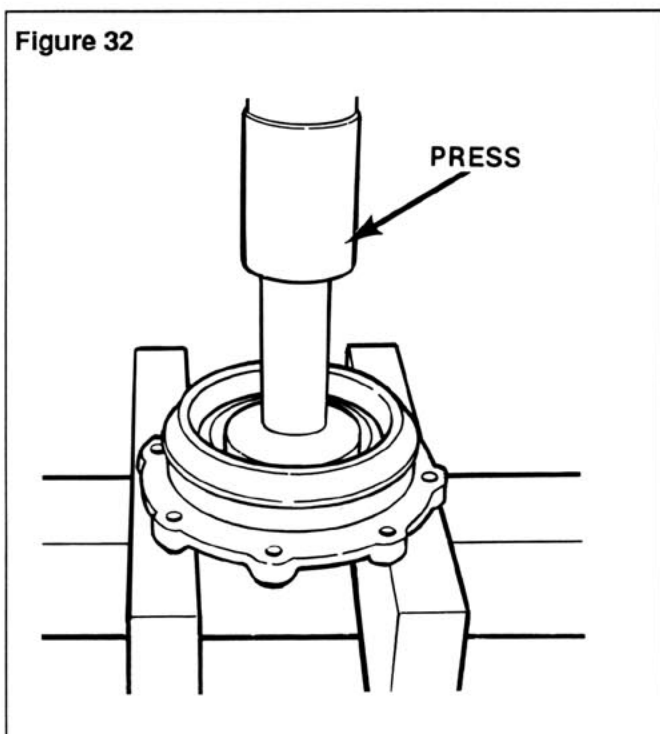
9. Remove the yoke or flange nut and washer from the input shaft. Remove the yoke or flange with a puller. **Figure 31.**

Section 2

Disassembly

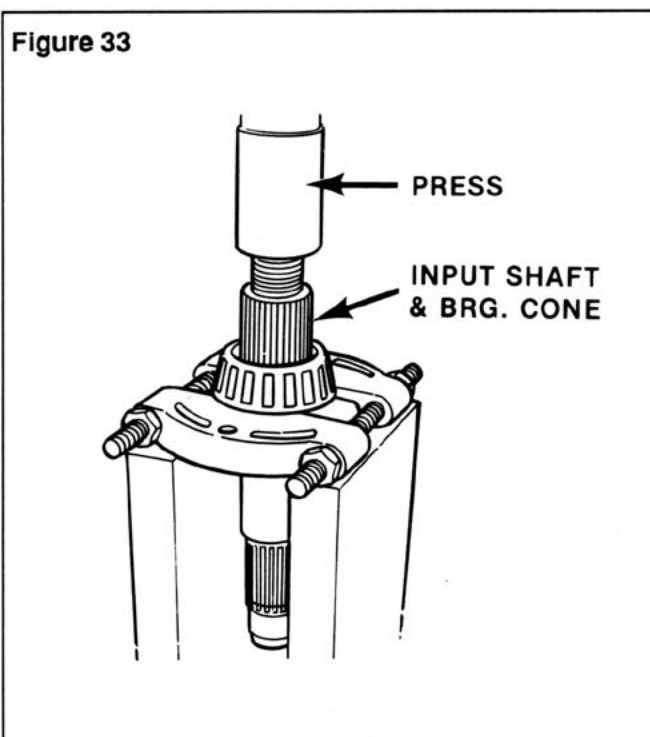
10. Pull the bearing cage from the shaft. The bearing cup will remain in the cage and the bearing cone will remain on the shaft.
11. Remove the O-ring from its groove in the O.D. of the bearing cage. Inspect the O-ring for wear, breaks or cracks. If the O-ring is damaged, replace it when the carrier is assembled.

Figure 32



12. Remove the oil seal from the bearing cage with a press and sleeve. **Figure 32.** Be careful that you do not damage the mounting surfaces of the bearing cage.
If the oil seal is a one-piece design (without mounting flange), discard the seal. If the oil seal is a triple-lip design (with mounting flange), inspect the seal for damage. If the surface of the triple-lip seal is not worn or damaged, and the mounting surface of the yoke or flange is smooth and not damaged, the seal can be used again when the carrier is assembled.
13. Inspect the bearing cup and cone for wear or damage. (See page 27).

Figure 33



14. If necessary, remove the bearing cone from the input shaft with a press, sleeve and bearing puller. **Figure 33.** Remove the bearing cup from the cage with a brass drift and a hammer.

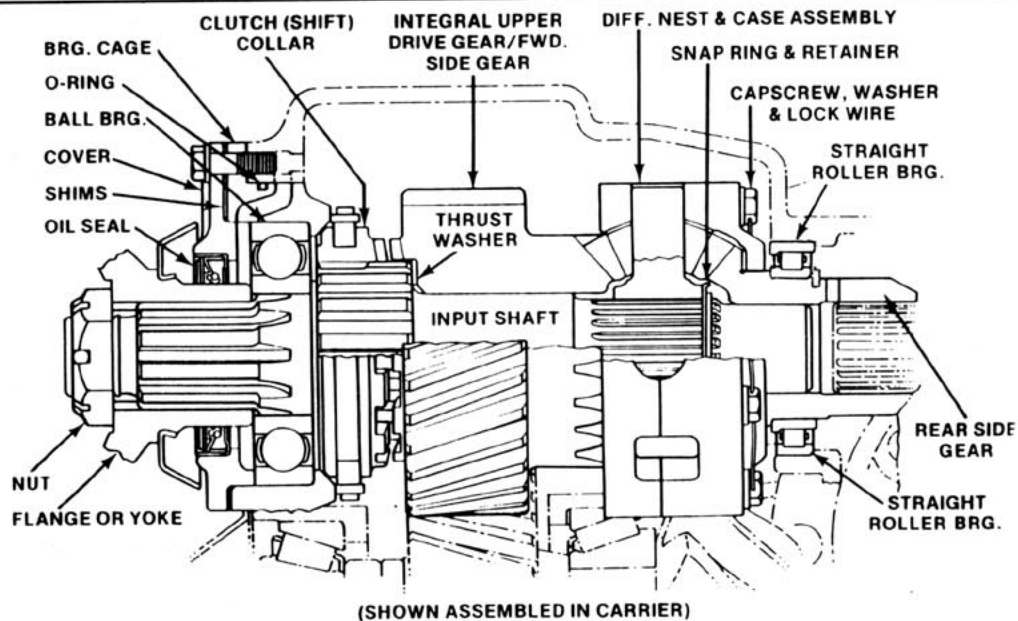


WARNING:

Do not hit the bearing cup directly with a hammer or steel drift. Parts can break and chips can cause injury.

Section 2 Disassembly

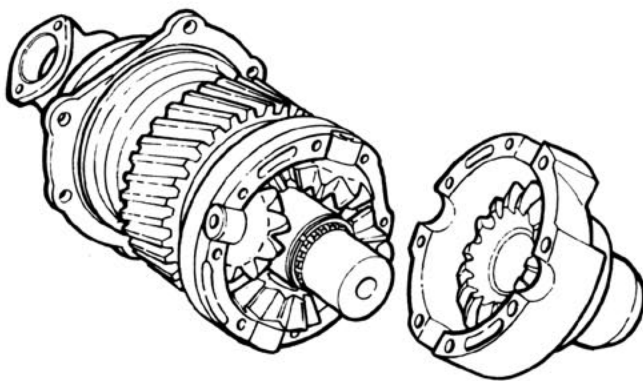
Figure 34



Early Models (Ball Bearings and Straight Roller Bearings)

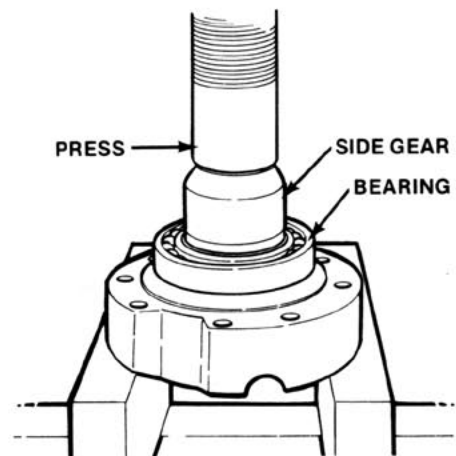
1. Cut and remove the lock wire from the differential case bolts.
2. Mark each half of the differential case for correct alignment at assembly.

Figure 35



3. Remove the case bolts and washers and separate the case halves. **Figure 35.**

Figure 36

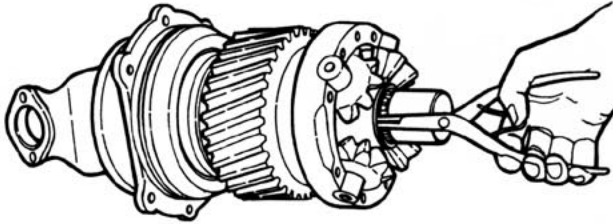


4. Put the rear case half, side gear and bearing assembly in a press with the gear teeth at the bottom. Press the side gear through the case half. **Figure 36.**

Section 2

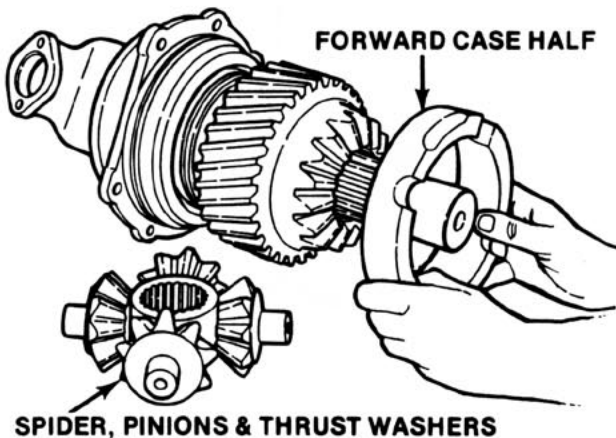
Disassembly

Figure 37



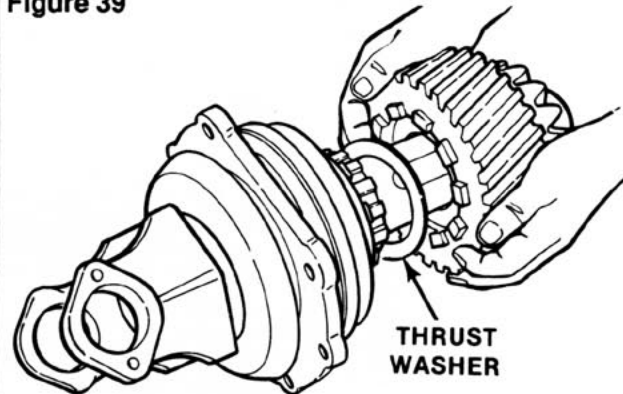
5. Push the spider and snap ring retainer forward on the input shaft to release the tension and remove the snap ring from the shaft. **Figure 37.**
6. Slide the retainer ring and the differential nest assembly from the input shaft.

Figure 38



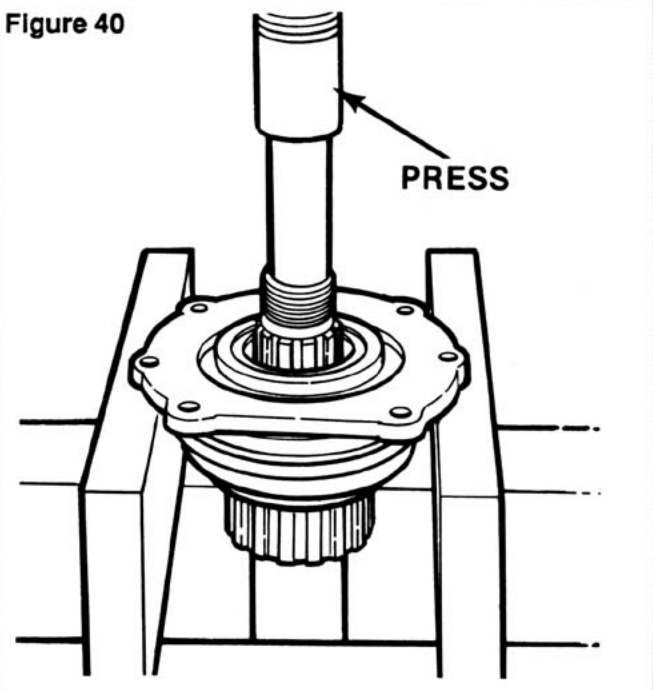
7. Remove the forward case half of the differential. **Figure 38.**

Figure 39



8. Remove the helical gear, thrust washer and clutch collar from the input shaft. **Figure 39.**
9. Remove the input shaft nut and remove the yoke or flange with a yoke or flange puller.
10. Remove the bearing cage cover, oil seal and shims from the input bearing cage. Keep the shims for use at assembly.
11. Remove the O-ring from its groove in the O.D. of the bearing cage. Inspect the O-ring for wear, breaks or cracks. If the O-ring is damaged, replace it when the carrier is assembled.

Figure 40



12. Put the input shaft and cage assembly in a press with the threaded end of the shaft on top. Press the shaft through the cage. **Figure 40.**

Section 2

Disassembly

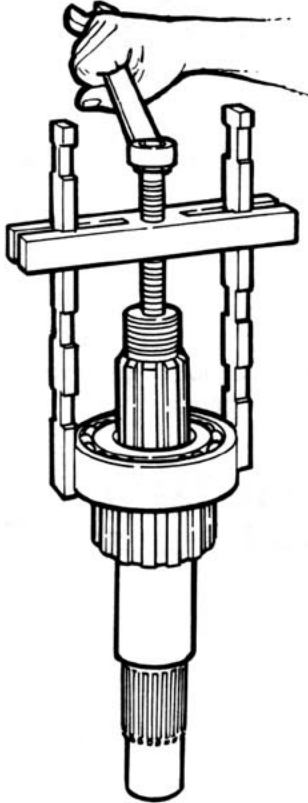
If a press is not available, put the assembly in a vise with soft metal jaw covers clamped on the cage O.D. Tap the shaft from the cage with a soft mallet.



WARNING:

Do not hit the shaft directly with a steel hammer. Parts can break and chips can cause injury.

Figure 41



13. If the bearing remains on the input shaft, remove the bearing with a press or bearing puller. **Figure 41.**

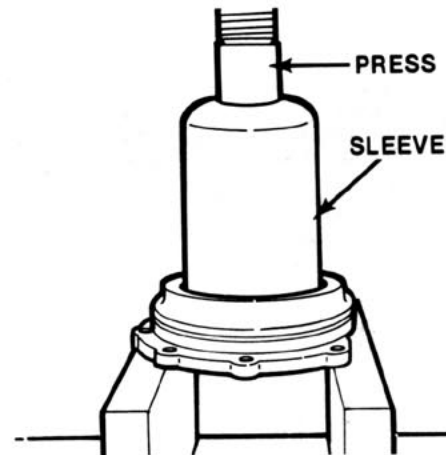
If the bearing remains in the cage, remove the bearing with a press and sleeve that presses against the outer race of the bearing. If a press is not available, put the assembly in a vise with soft metal jaw covers clamped on the cage O.D. Tap the bearing from the cage with a hammer and sleeve pressed against the bearing outer race.



WARNING:

Do not hit the bearing directly with a steel hammer. Parts can break and chips can cause injury.

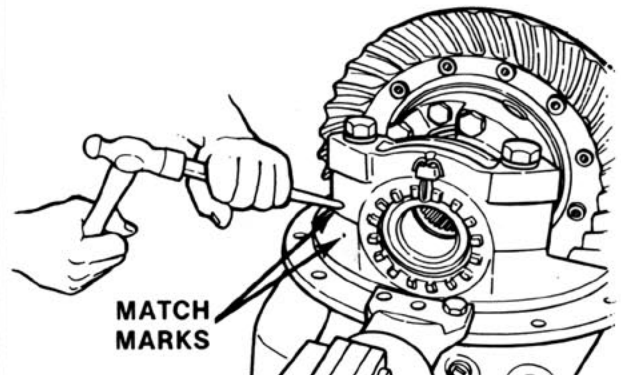
Figure 42



14. Press the oil seal from the bearing cage cover. **Figure 42.** Discard the seal.
15. If the rear bearing needs replacing, remove the outer race from the carrier with a bearing puller.

Remove Differential Case and Ring Gear Assembly

Figure 43

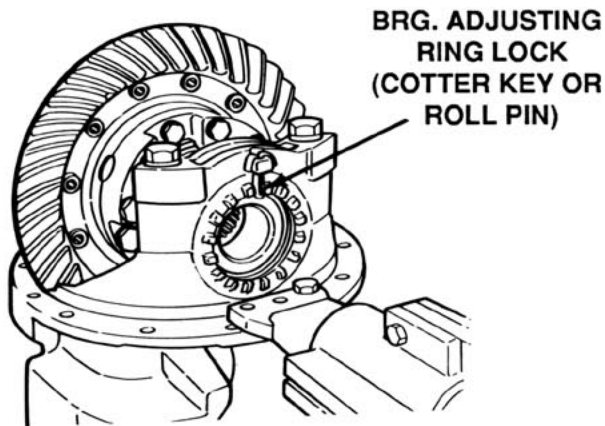


1. Mark one carrier leg and one bearing cap so that the parts can be correctly matched when the carrier is assembled. Use a center punch and hammer. **Figure 43.**

Section 2

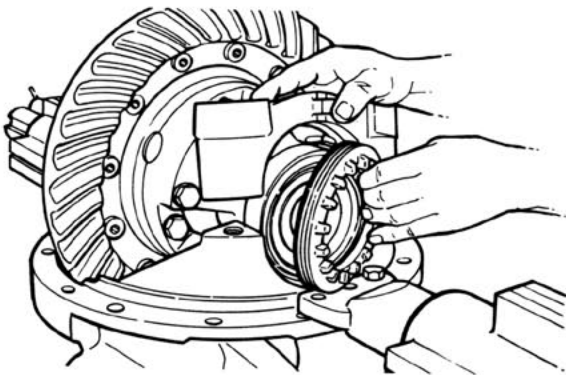
Disassembly

Figure 44



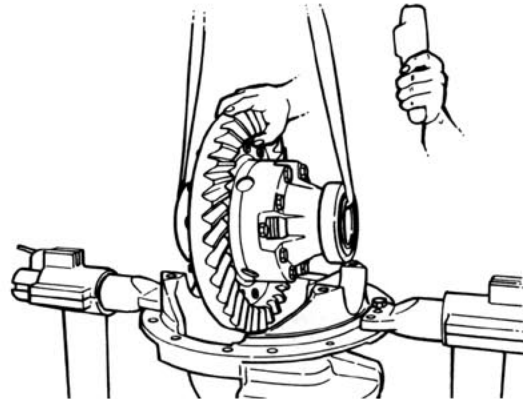
2. Remove the cotter keys or roll pins that hold the two bearing adjusting rings in position. **Figure 44.** (Some models use a lockplate held in position with capscrews and lock wire).
3. Remove the capscrews and washers that hold the two bearing caps on the carrier.

Figure 45



4. Remove the two bearing caps and adjusting rings from the carrier. **Figure 45.**

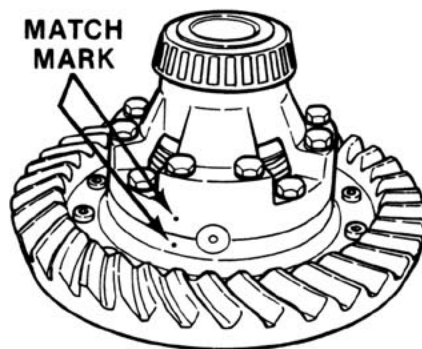
Figure 46



5. Safely lift the main differential and ring gear assembly from the carrier. **Figure 46.** Put the assembly on a work bench.

Disassemble Main Differential Case and Ring Gear Assembly

Figure 47



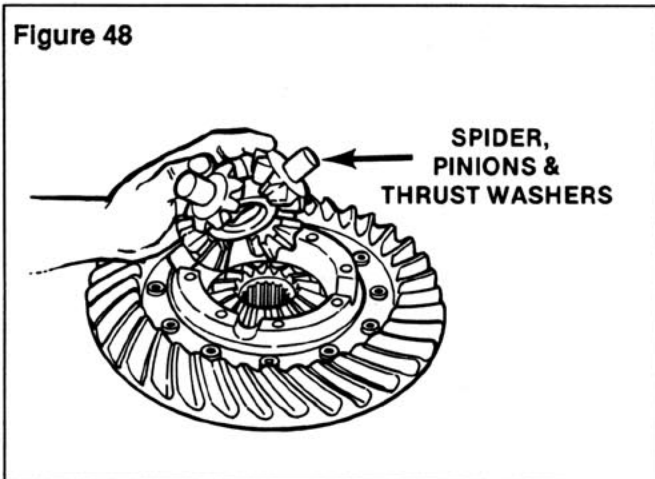
1. If the matching marks on the case halves of the differential assembly are not visible, mark each case half with a center punch and hammer. **Figure 47.** The purpose of the marks is to match the plain half and flange half correctly at assembly.
2. Remove the capscrews and washers that hold the case halves together.

Section 2

Disassembly

3. Separate the case halves. If necessary, use a soft mallet to loosen the parts.

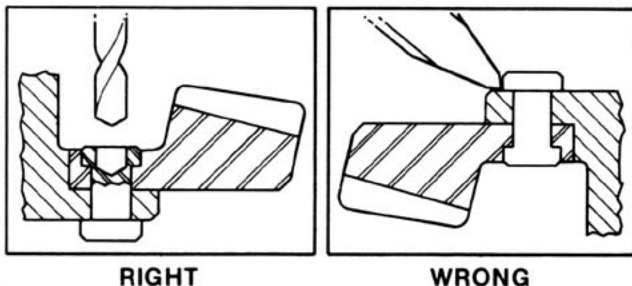
Figure 48



4. Remove the differential spider (cross), four pinion gears, two side gears and six thrust washers from inside the case halves. **Figure 48.**
5. If the ring gear needs to be replaced, remove the bolts, nuts and washers that hold the gear to the flange case half. If rivets hold the gear to the case half, remove the rivets as follows:

- A. Center punch each rivet head on the ring gear side of the assembly.

Figure 49



- B. Drill each rivet head on the ring gear side of the assembly to a depth equal to the thickness of one rivet head. Use a drill bit that is 1/32 of an inch smaller than the body diameter of the rivets. **Figure 49.**

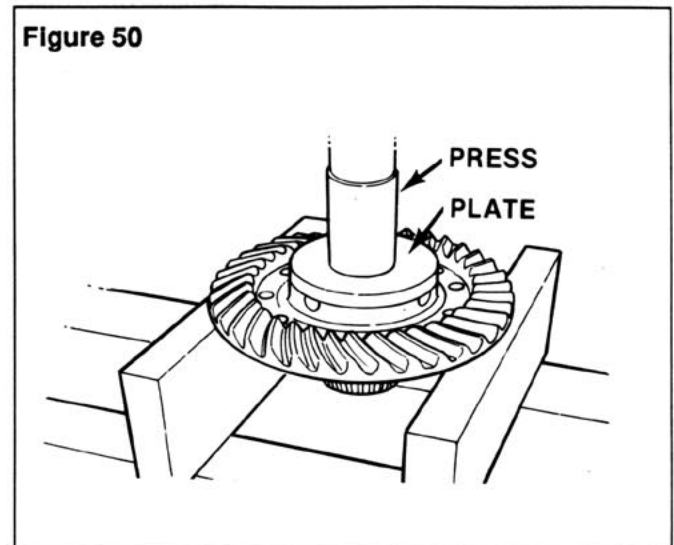
- C. Press the rivets through the holes in the ring gear and case half. Press from the drilled rivet head.



CAUTION:

Do not remove the rivets or rivet heads with a chisel and hammer. The chisel can damage the flange case half.

Figure 50

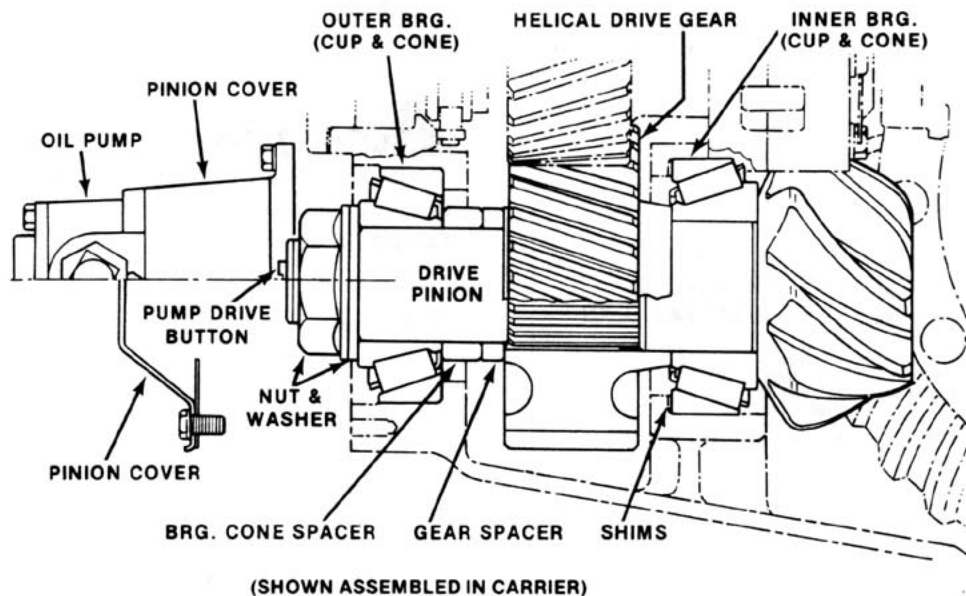


6. Separate the case half and ring gear using a press. Support the assembly under the ring gear with metal or wood blocks and press the case half through the gear. **Figure 50.**
7. Inspect the differential for wear and damage. (See page 28). If the bearings need to be replaced, remove the bearing cones from the case halves. Use a bearing puller or press.

Section 2

Disassembly

Figure 51



Remove and Disassemble Drive Pinion Assembly

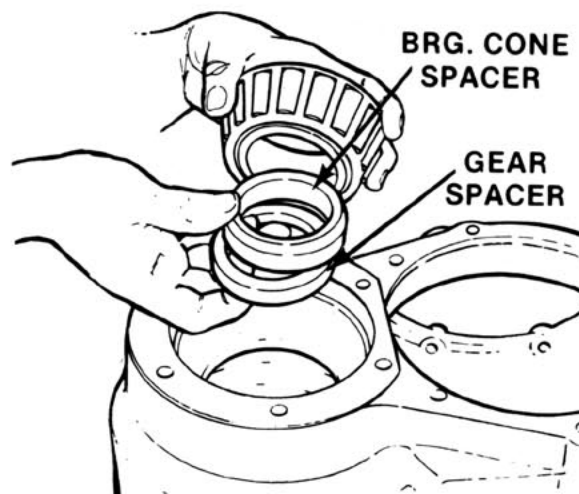
1. Remove the nut and washer from the drive pinion.
2. Put the carrier in a press so that the threaded end of the pinion shaft is on top. Put supports under the mounting flange of the carrier and put a protector on the top of the shaft of the drive pinion.

WARNING:

Make sure that the drive pinion does not fall to the floor when the pinion is pressed from the carrier. Personal injury and damage to the pinion can result.

3. Press the pinion through the outer bearing cone and the helical drive gear. Remove the drive pinion from the bottom of the carrier.
4. Lift the outer bearing cone, two spacers, and the helical drive gear from the carrier. **Figure 52.**

Figure 52

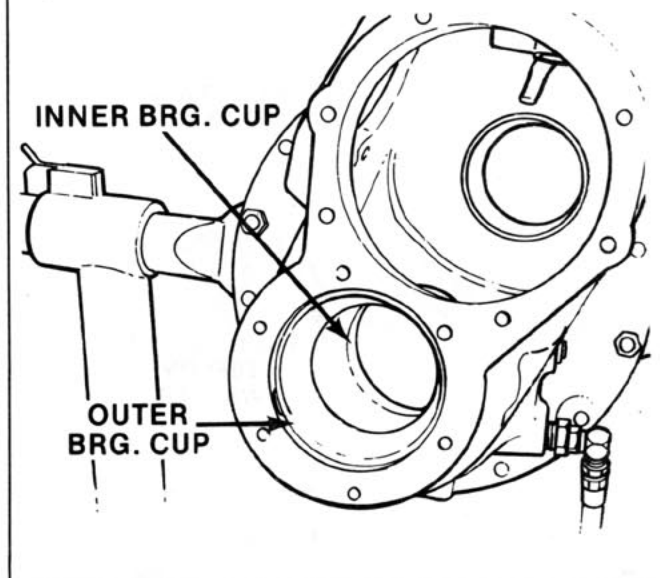


5. Inspect both the inner and outer bearings (cups and cones) for wear or damage. (See page 26).
6. If necessary, remove the bearing cups and cones:

Section 2

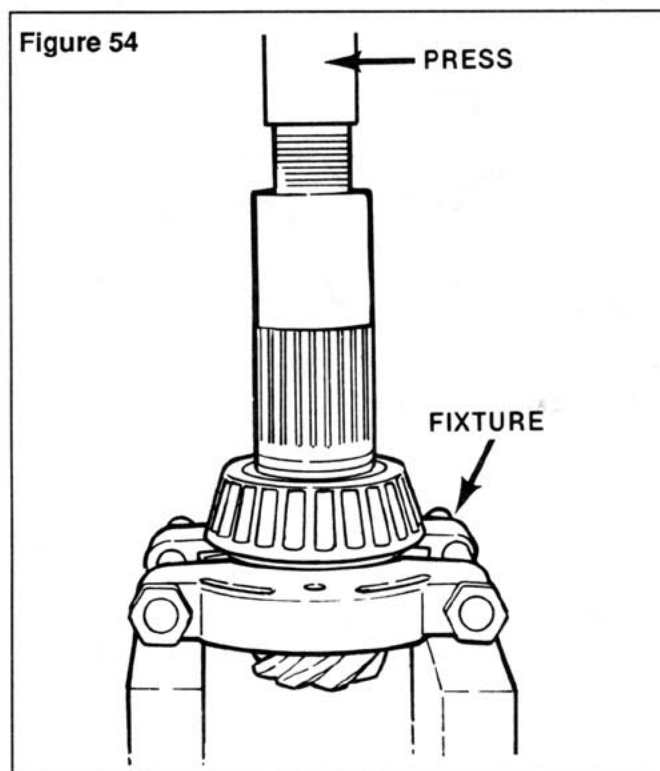
Disassembly

Figure 53



A. Use a hammer and a long brass drift to remove the inner and outer bearing cups from the carrier. **Figure 53.** Remove the shims that are between the inner bearing cup and the carrier. Replace any shims that are damaged. Keep the shim pack and spacers for use at assembly.

Figure 54

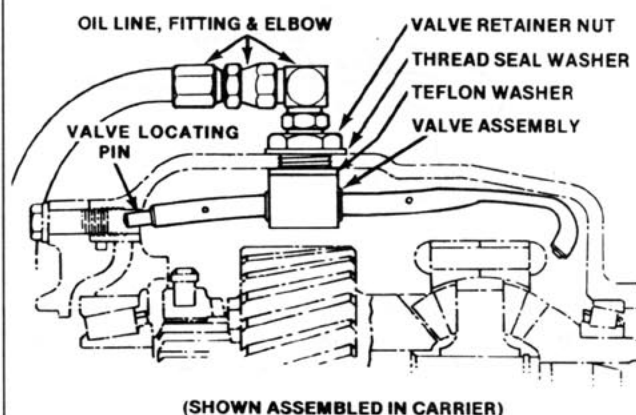


B. Remove the inner bearing cone from the drive pinion. Put a bearing puller under the inner race to support the bearing. Put a protector on top of the pinion shaft and press the drive pinion out of the bearing cone. **Figure 54.**

Remove and Disassemble Oil Valve Assembly

(SSHP, STHP and SUHP Models Only)

Figure 55



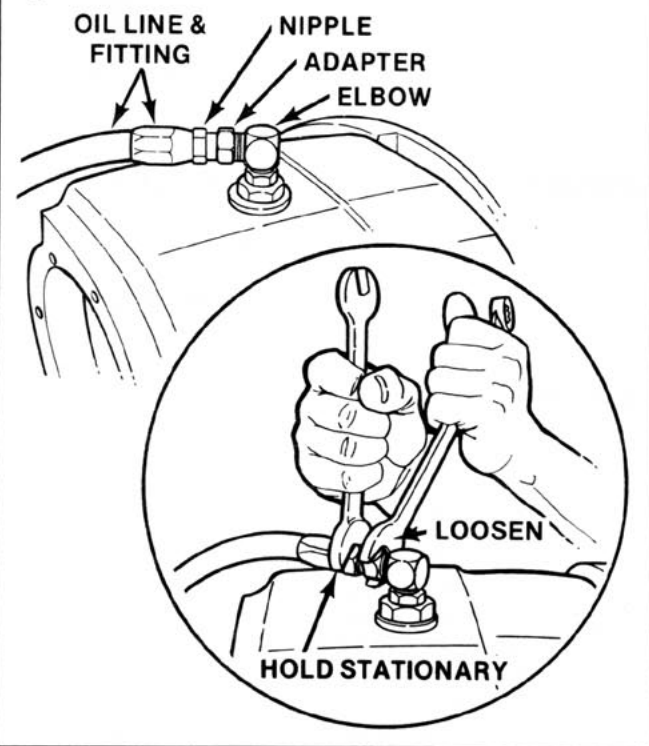
CAUTION:

When you remove and disassemble the oil valve components, be careful that you do not damage the fitting threads, bevel seats, O-ring or oil lines.

Section 2

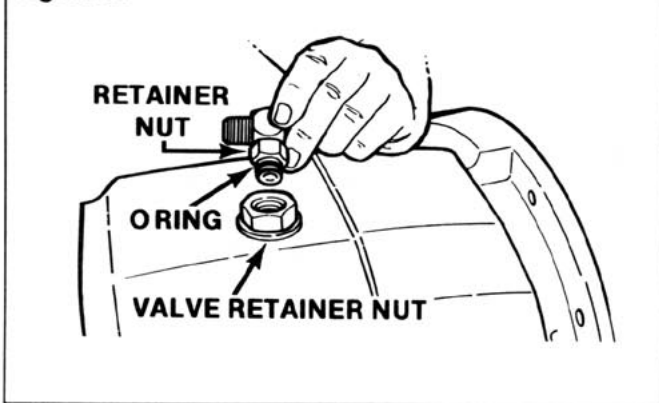
Disassembly

Figure 56



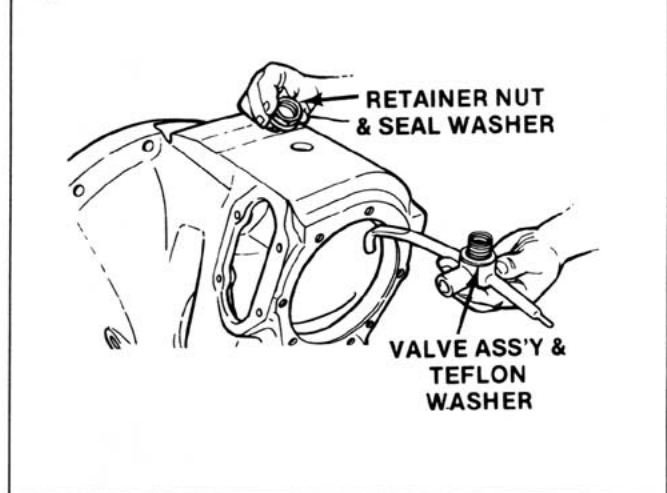
1. Disconnect the oil line from the elbow at the top of the carrier. Hold the nipple (center hex of the fitting) stationary and loosen the adapter from the elbow. **Figure 56.**

Figure 57



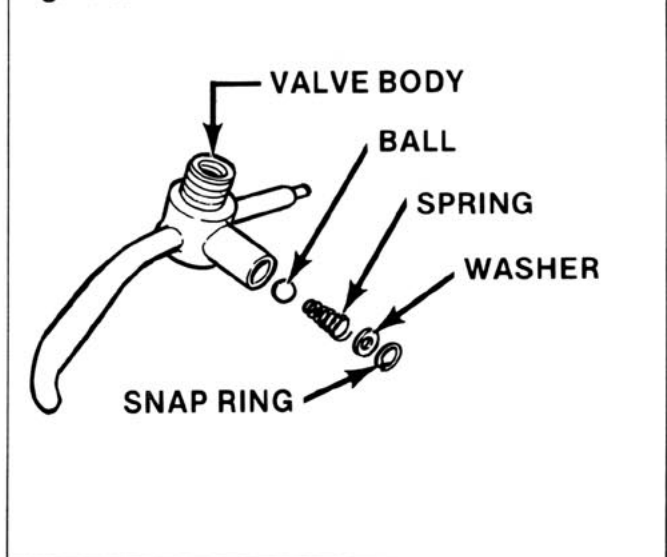
2. Loosen the retainer nut (small hex below the elbow) and remove the elbow from the valve tube. Inspect the O-ring at the seat of the elbow for breaks or cracks. If the O-ring is damaged, replace it. **Figure 57.**

Figure 58



3. To remove the oil valve from the carrier, disassemble the retainer nut and seal washer from the valve tube. While the nut is loosened, hold the valve in position inside the carrier to prevent it from falling. Pull the valve assembly down and out from inside the carrier. **Figure 58.**
4. Inspect the seal washer and the teflon washer for damage. Replace the washers if necessary.

Figure 59



5. If necessary, disassemble the oil valve. Remove the snap ring, washer, spring and ball from the valve opening. **Figure 59.**

Remove Oil Filter Screen Assembly From Carrier

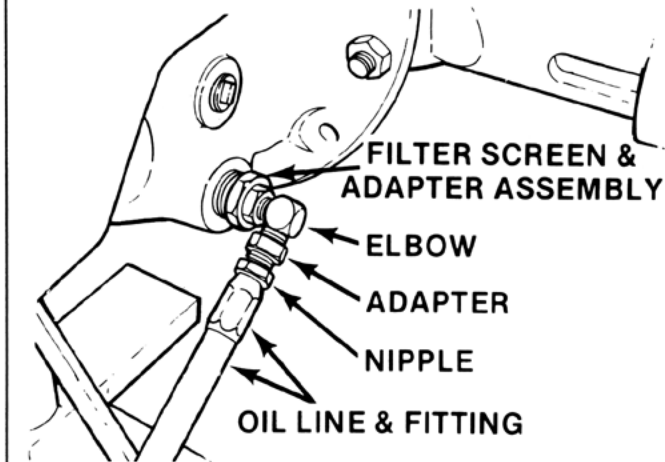
(SSHP, STHP and SUHP Models Only)



CAUTION:

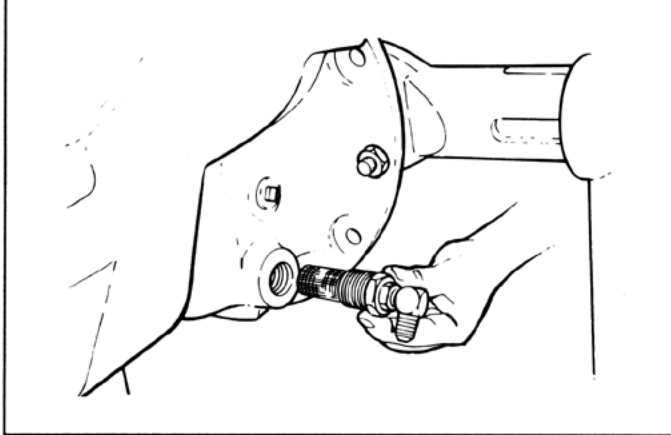
When you remove the oil filter screen components, be careful that you do not damage the fitting threads, bevel seats, O-ring or oil lines.

Figure 60



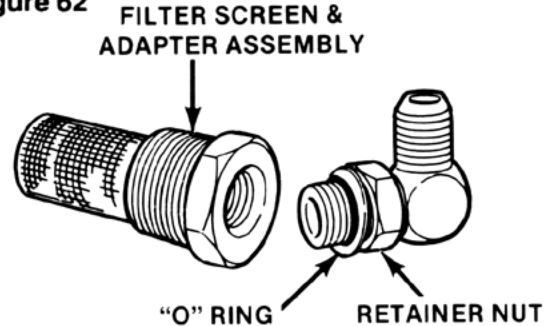
1. Disconnect the oil line from the elbow at the lower left side of the carrier. Hold the nipple (center hex of the fitting) stationary and loosen the adapter from the elbow. **Figure 60.**

Figure 61



2. To remove the elbow and filter screen and adapter assembly from the carrier, remove the adapter (large hex under the elbow). **Figure 61.**

Figure 62

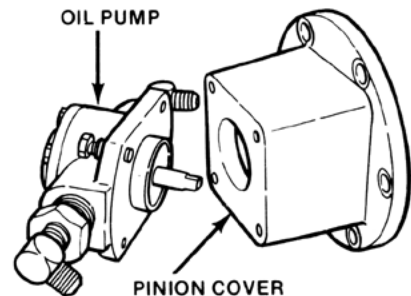


3. If necessary, disassemble the elbow from the adapter by loosening the retainer nut (small hex under the elbow) and remove the elbow from the adapter. **Figure 62.**
4. If the filter screen is damaged, discard and replace it before assembly.

Servicing the Oil Pump

(SSHP, STHP and SUHP Models Only)

Figure 63



1. To disassemble the oil pump from the pinion cover, remove the four capscrews and washers. **Figure 63.**
2. Remove the pump to cover gasket. If the gasket is damaged, replace it at assembly.

NOTE:

Do not disassemble the oil pump assembly unless required. If the pump is not operating correctly, replace the pump as a complete assembly (Meritor Part No. A-3303-H-8). For pump service information contact:

Tuthill Pump Co.
12500 South Crawford Avenue
Chicago, Illinois 60658
Ask for pump model 2RFD-1.

Section 3

Prepare Parts for Assembly

Clean Ground and Polished Parts

1. Use a cleaning solvent to clean ground or polished parts or surfaces. Kerosene or diesel fuel oil can be used for this purpose. **DO NOT USE GASOLINE.**



WARNING:

Be careful when using cleaning solvents. Follow the solvent manufacturer's instructions for safe use to prevent injury.

2. Use a knife if required, to remove gasket material from parts. Be careful not to damage the ground surfaces.
3. To prevent corrosion, **DO NOT** clean ground or polished parts in a hot solution tank, water, steam or alkaline solutions.

Clean Rough Parts

1. Clean rough parts the same as cleaning ground and polished parts.
2. Rough parts can be cleaned in hot solution tanks with a weak alkaline solution.
3. Parts must remain in hot solution tanks until completely cleaned and heated.



WARNING:

Be careful when using hot solution tanks and alkaline solutions. Follow the alkaline manufacturer's instructions for safe use to prevent injury.

4. Parts must be washed with water until the alkaline solution is removed.

Clean Axle Assemblies

1. A completely assembled axle assembly can be steam cleaned on the outside to remove heavy amounts of dirt.

2. Before the axle is steam cleaned, close or put a cover over all openings in the axle assembly. Examples of openings are breathers or vents in air chambers.

Dry Parts That Have Been Cleaned

1. Parts must be dried immediately after cleaning and washing.
2. Dry the parts using soft clean paper or cloth rags.
3. Except for bearings, parts can be dried with compressed air.



CAUTION:

Damage to bearings can be caused if dried by rotating with compressed air.

Prevent Corrosion and Rust on Cleaned Parts

1. Apply axle lubricant to cleaned and dried parts that are not damaged and are to be immediately assembled.
2. If parts are to be stored, apply a special material and paper that prevents corrosion and rust to all surfaces.

Inspect Parts

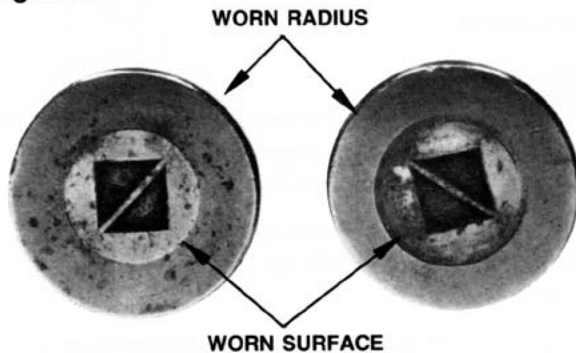
It is very important to inspect all parts carefully and completely before the axle or carrier is assembled. Check all parts for wear or stress and replace damaged parts. Replacement of damaged parts now, will prevent complete failure of the assembly later.

1. Inspect tapered roller bearings:
Inspect the cup, cone, rollers and cage of all tapered roller bearings in the assembly. If any of the following conditions exist, the bearing **MUST** be replaced.

Section 3

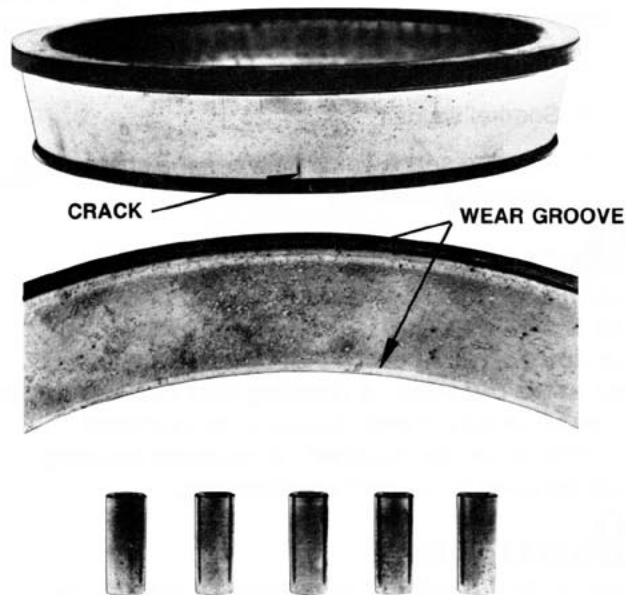
Prepare Parts for Assembly

Figure 64



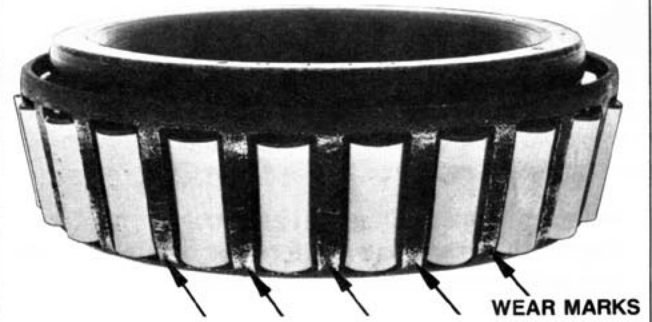
- A. The center of large diameter end of rollers worn level with or below the outer surface. **Figure 64.**
- B. The radius at large diameter end of rollers worn to a sharp edge. **Figure 64.**

Figure 65



- C. A visible roller groove in the cup or cone inner race surfaces. The groove can be seen at the small or large diameter end of both parts. **Figure 65.**
- D. Deep cracks or breaks in the cup, cone inner race or roller surfaces. **Figure 65.**

Figure 66



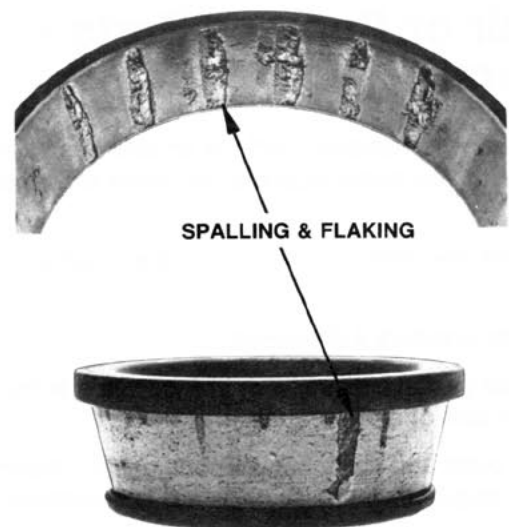
- E. Bright wear marks on the outer surface of the roller cage. **Figure 66.**

Figure 67



- F. Damage on rollers and on surfaces of the cup and cone inner race that touch the rollers. **Figure 67.**

Figure 68



- G. Damage on the cup and cone inner race surfaces that touch the rollers. **Figure 68.**

Section 3

Prepare Parts for Assembly

2. Inspect hypoid pinions and gears for wear or stress. Gears that are damaged **MUST** be replaced.

CAUTION:

Hypoid drive pinions and ring gears are machined in a matched set. When a drive pinion or ring gear of a hypoid gear set needs to be replaced, both gears must be replaced at the same time.

3. Inspect the main differential assembly: Inspect the following parts for wear or stress. Parts that are damaged **MUST** be replaced.
 - A. Inside surfaces of both case halves.
 - B. Both surfaces of all thrust washers.
 - C. The four trunnion ends of the spider (cross).
 - D. Teeth and splines of both differential side gears.
 - E. Teeth and bore of all differential pinions.

CAUTION:

Always replace thrust washers, differential side gears and pinions in sets. A higher stress on parts and an early failure of the assembly will occur if a new part is used with parts that are old.

4. Inspect axle shafts:
 - A. Inspect axle shafts for wear, stress and cracks at the flange, shaft and splines. Replace axle shaft if required.

Repair or Replace Parts - General:

Replace worn or damaged parts of an axle assembly. The following are some examples to check for, repair or replace.

1. Replace any fastener if corners of the head are worn.
2. Replace washers if damaged.
3. Replace gaskets, oil seals or grease seals at the time of axle or carrier repair.
4. Clean parts and apply new silicone gasket material where required when axle or carrier is assembled.
5. Remove nicks, marks and burrs from parts having machined or ground surfaces. Use a fine file, india stone, emery cloth or crocus cloth for this purpose.

6. Clean and repair threads of fasteners and holes. Use a die or tap of the correct size or a fine file for this purpose.

CAUTION:

Threads must be without damage and clean so that accurate adjustments and correct torque values can be applied to fasteners and parts.

7. Tighten all fasteners to the correct torque values. See the chart on page 72 for torque values of fasteners. 
8. DO NOT repair rear axle housings by bending or straightening.

WARNING:

Repair of axle housings by bending or straightening will cause poor or unsafe operation of the axle and early failure.

Repair Axle By Welding

1. Meritor Automotive, Inc. will permit repairing drive axle assemblies by welding **ONLY** in the following areas:
 - A. Cover welds.
 - B. Snorkel welds.
 - C. Housing seam welds between the suspension attaching brackets.

CAUTION:

Welding can be used when the crack or damaged area is within the old weld material. Replace the axle housing if the crack extends into the metal next to the old weld. A housing that has damage in the seam or cover weld because of overload conditions can be repaired. A repaired housing must be used in correct applications.

WARNING:

Using wrong welding procedures or welding at locations other than the three areas permitted by Meritor will make the heat-treated component weak. A weak component will cause poor or unsafe operation of the axle and early failure. The following procedure must be used.

2. Welding Procedure:
 - A. Drain the lubricant from the axle assembly.
 - B. Remove the axle shafts and differential carrier from the axle housing.

Section 3

Prepare Parts for Assembly



WARNING:

Be careful when using a cleaning solvent. Follow the solvent manufacturer's instructions for safe use to prevent injury.

- C. Clean the damaged area inside and outside the housing. Cleaning solvent can be used.
- D. Grind the damaged weld to the base metal.
- E. Warm the complete axle housing to a temperature of 70° F - 80° F (21° C - 27° C) or higher.
- F. Before you start welding, heat the damaged area to be repaired to approximately 300° F (149° C).
- G. Use a 70,000 psi tensile weld material and the correct voltage and amperage for the diameter weld rod used. Examples of weld rod that can be used are E-7018 or ER-70S-3.



CAUTION:

If the E-7018 weld is used, the rod must be kept dry. Electrodes that are not stored in correct sealed containers must be heated at 700° F (371° C) for one hour before welding. Wet electrodes must be dried at 180° F (82° C) for one to two hours and then heated at 700° F (371° C) for one hour before welding.

H. Fill in the weld gap as follows:



CAUTION:

Do not connect the ground cable to any point on the axle assembly that will put the bearings between the ground cable and the weld area. If the bearings are between the ground cable and the weld, the bearings will be damaged because of electric arcing. A good location to connect the ground cable is the spring mounting pad on the housing.

1. The snorkle weld MUST be a .375 inch (9.5 mm) fillet.
2. The opening in cover welds MUST be filled level with the old weld.
3. The opening in seam welds MUST be ground out to 70% of the wall thickness. The wall thickness can be measured at the carrier opening of housing.
4. Clean the new weld area. Carefully remove all rough weld material.
5. Install the differential carrier and axle shafts.
6. Fill the axle assembly with the correct amount of lubricant. See Meritor Maintenance Manual 1 for information on lubricants.

NOTE:

To weld brackets or other components to the axle housing, use the procedure in Meritor Technical Service Aid, TSA-2-95.

Section 4

General Information

Use of Dri-Loc Fasteners and Meritor Liquid Adhesive 2297-C-3747 Or Loctite 277

Install New Dri-Loc Fasteners:

1. Clean the oil and dirt from threaded holes. There is no special cleaning required.
2. Assemble parts using the new Dri-Loc fasteners.



CAUTION:

Do not apply adhesives or sealants on new Dri-Loc fasteners or in the threaded holes. If other adhesives or sealants are used, the new Dri-Loc adhesive will not function correctly.

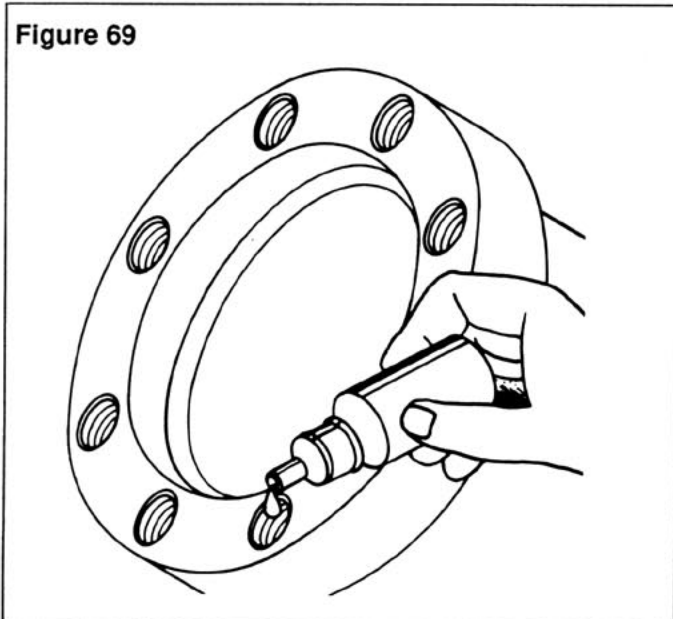
3. Tighten the Dri-Loc fasteners to the required torque value for that size fastener. There is no special procedure or torque value required. See the torque chart on page 72. **T**

NOTE:

There is no drying time required for Dri-Loc fasteners.

Install Old Dri-Loc Fasteners Using Meritor Liquid Adhesive 2297-C-3747 or Loctite 277:

Figure 69



1. Clean the oil and dirt from threaded holes. There is no special cleaning required and it is not necessary to remove the old Dri-Loc adhesive from the threads.
2. Apply four or five drops of Meritor Liquid Adhesive or Loctite 277 to the threaded holes ONLY. Make sure the adhesive is on the threads. **Figure 69.**



CAUTION:

Do not apply adhesive to the fastener threads. Air pressure in the hole will push the adhesive out as the fastener is installed.

3. Tighten the fasteners to the required torque value for that size fastener. There is no special procedure or torque value required. See the torque chart on page 72. **T**

NOTE:

There is no drying time required for Meritor Liquid Adhesive 2297-C-3747 or Loctite 277.

Check Torque Values Of Dri-Loc Fasteners Not Requiring Removal:



CAUTION:

If Dri-Loc fasteners do not require removal from the component, check the component for correct torque value as follows:

1. Apply the MINIMUM amount of torque required for that size fastener. See the torque chart on page 72. The fastener MUST NOT rotate. **T**
2. If the fastener rotates any amount, remove the fastener from the component and apply adhesive to the threaded hole. Follow the procedure for installing old Dri-Loc fasteners.

Remove Dri-Loc Fasteners:

If it is difficult to remove Dri-Loc fasteners from components, the strength of Dri-Loc, Meritor adhesive or Loctite 277 can be decreased by heating. Use the following procedure:

1. Heat the fastener for three to five seconds ONLY and try to loosen the fastener with a wrench. DO NOT use an impact wrench to loosen the fastener or hit the fastener with a hammer.
2. Repeat Step 1 until the fastener can be removed.

Section 4

General Information



CAUTION:

Do not exceed 350° F. (+177° C.) maximum.
Heating must be done slowly to prevent thermal stresses in the other components.

Application of Silicone Gasket Material

NOTE:

The following silicone gasket products can be used on Meritor components.

1. Dow Corning Silicone Rubber Sealant, No. 732 Black.
2. General Electric No. RTV-1473 Black.
3. From Meritor Automotive, Inc.:
 - 40 pound containers, Part No. 1199-Q-2981
 - Ten ounce tubes, Part No. 1250-X-388
 - Three ounce tubes, Part No. 1199-T-3842



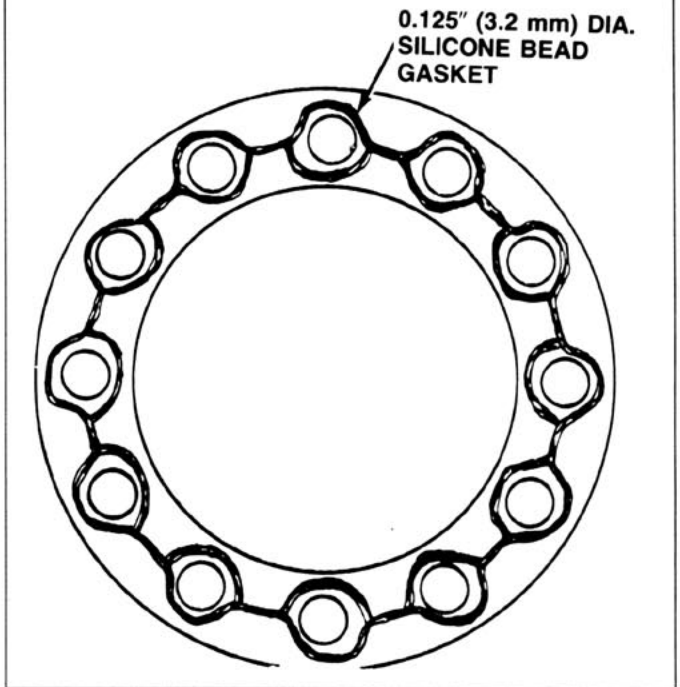
WARNING:

Small amounts of acid vapor are present when silicone gasket material is applied. To prevent possible injury, be sure there is good ventilation in the work area.

If silicone gasket material gets in your eyes, flush your eyes for 15 minutes with water. Have your eyes checked by a doctor.

1. Remove all old gasket material from both surfaces.
2. Clean the surfaces where silicone gasket material will be applied. Remove all oil, grease, dirt and moisture.
3. Dry both surfaces.
4. Apply a .125 inch diameter continuous bead of the silicone gasket material around one surface. Also apply the gasket material around the edge of all fastener holes in that surface. **Figure 70.**

Figure 70



CAUTION:

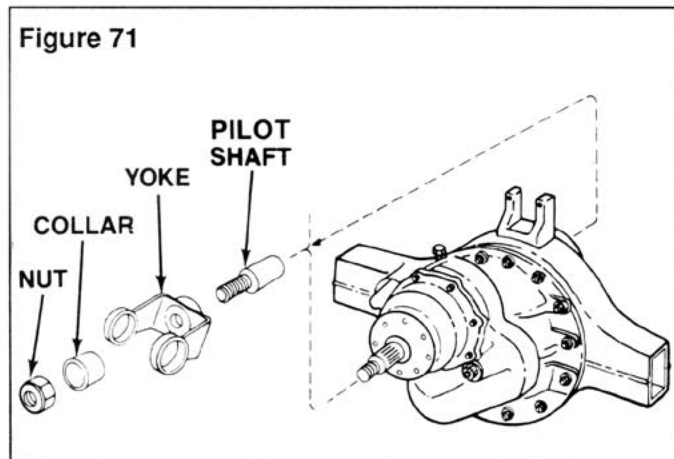
The amount of silicone gasket material applied must not exceed a .125 inch diameter bead. Too much gasket material can block lubrication passages.

5. Assemble the components immediately to permit the silicone gasket material to compress evenly between the parts. Tighten fasteners to the required torque value for that size fastener. There is no special procedure or torque value required. See Torque Chart on page 72. **T**
6. Wait 20 minutes before the assembly is filled with lubricant.

Section 4

General Information

Install Tight Fit Yokes with the Three Piece Pilot Tool



NOTE:

A three piece installation tool is required to correctly install yokes with interference fit splines. The yoke installation tools are not available from Meritor Automotive, Inc. but can be made from drawings shown in Meritor Technic Aids Section 8 A, B, C and D. The tools are also available from Kent Moore Heavy-Duty Division, 29874 Little Mack, Roseville, MI 48066-2298 and OTC Tool and Equipment Division, 655 Eisenhower Drive, Owatonna, MN 55060. Specify the Meritor axle model when ordering.



CAUTION:

Do not install tight fit yokes on shafts using a hammer or mallet. A hammer or mallet will damage the yoke.

1. Apply axle lubricant on the yoke seal.
2. Check all surfaces of the yoke hub for damage. If necessary, polish the yoke hub with an india stone, emery cloth or crocus cloth.
3. Install the pilot shaft on the input shaft of the assembly. **Figure 71.**
4. Slide the yoke over the pilot shaft. Align the yoke splines with the shaft splines.
5. Put the collar on the pilot shaft and slide it against the yoke.



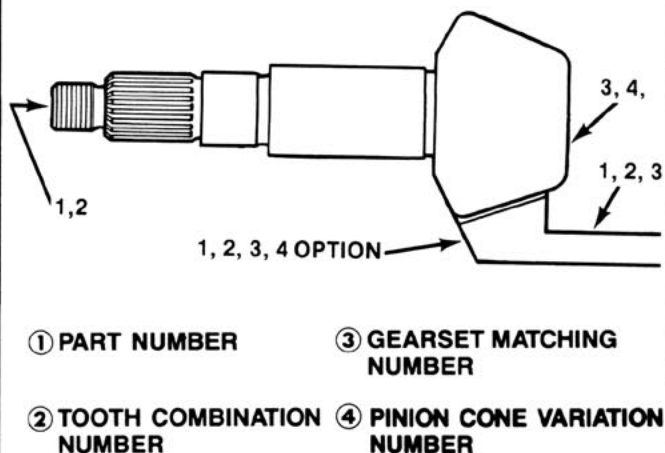
CAUTION:

Do not use the assembly yoke nut for installation purposes. Use the nut that is supplied with the three piece tool set.

6. Install the nut on the pilot shaft and against the collar. Tighten the nut against collar until the yoke is completely in position on the shaft. Sometimes a torque value of 200 lb. ft. on the nut is required to install the yoke correctly.
7. Remove all parts of the pilot tool from the shaft. (Pilot shaft, collar and nut).
8. Install the washer (if required) and yoke nut on the shaft. Tighten the nut to the required torque value. See the torque chart on page 72. **T**

Gear Set Information (Drive Pinion and Ring Gear Marks)

Figure 72



NOTE:

Before a new gear set is installed in the carrier, read the following information. **ALWAYS CHECK THE GEAR SET FOR CORRECT MARKS TO MAKE SURE THE GEARS ARE A MATCHED SET.**

The location of the marks are shown in **Figure 72.**

1. Part Number:
 - A. Examples of gear set part numbers:
Ring gear - 36786, Drive pinion - 36787.
 - B. Location on Drive Pinion: End at splines.
 - C. Location on Ring Gear: Front face or outer diameter.
2. Tooth Combination Number:
 - A. Example of a tooth combination number: 5-37.

Section 4

General Information

NOTE:

A 5-37 gear set has a 5 tooth drive pinion and a 37 tooth ring gear.

B. Location on Drive Pinion: End at splines.

C. Location on Ring Gear: Front face or outer diameter.

3. Gear Set Match Number:

Meritor drive pinions and ring gears are available only as matched sets. Both gears of a set have the same match number.

A. Example of a gear set match number: M29.

NOTE:

A gear set match number has any combination of a letter and number.

B. Location on Drive Pinion: End of gear head.

C. Location on Ring Gear: Front face or outer diameter.

4. Pinion Cone Variation Number:

NOTE:

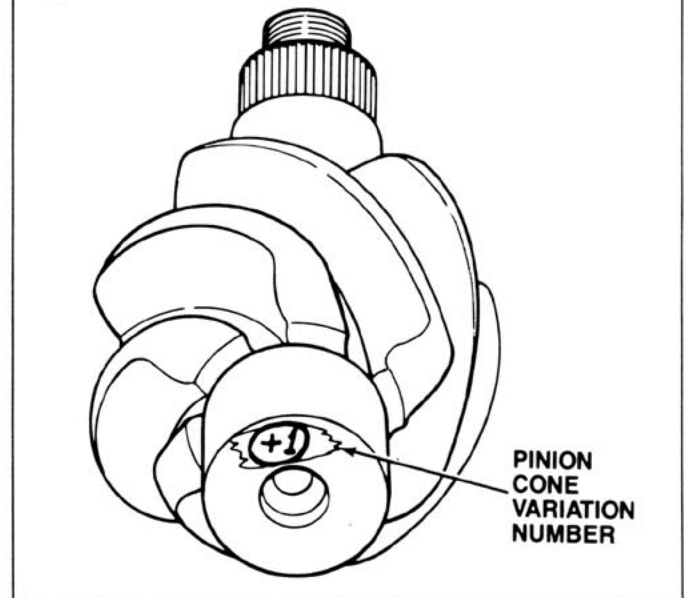
The pinion cone variation number is not used when checking for a matched gear set. The number is used when you adjust the depth of the pinion in the carrier. See the procedure for adjusting the shim pack thickness under the pinion cage on page 34.

A. Examples of pinion cone variation numbers:

PC+3, PC-5, +2, -1, +.01mm or -.02mm.

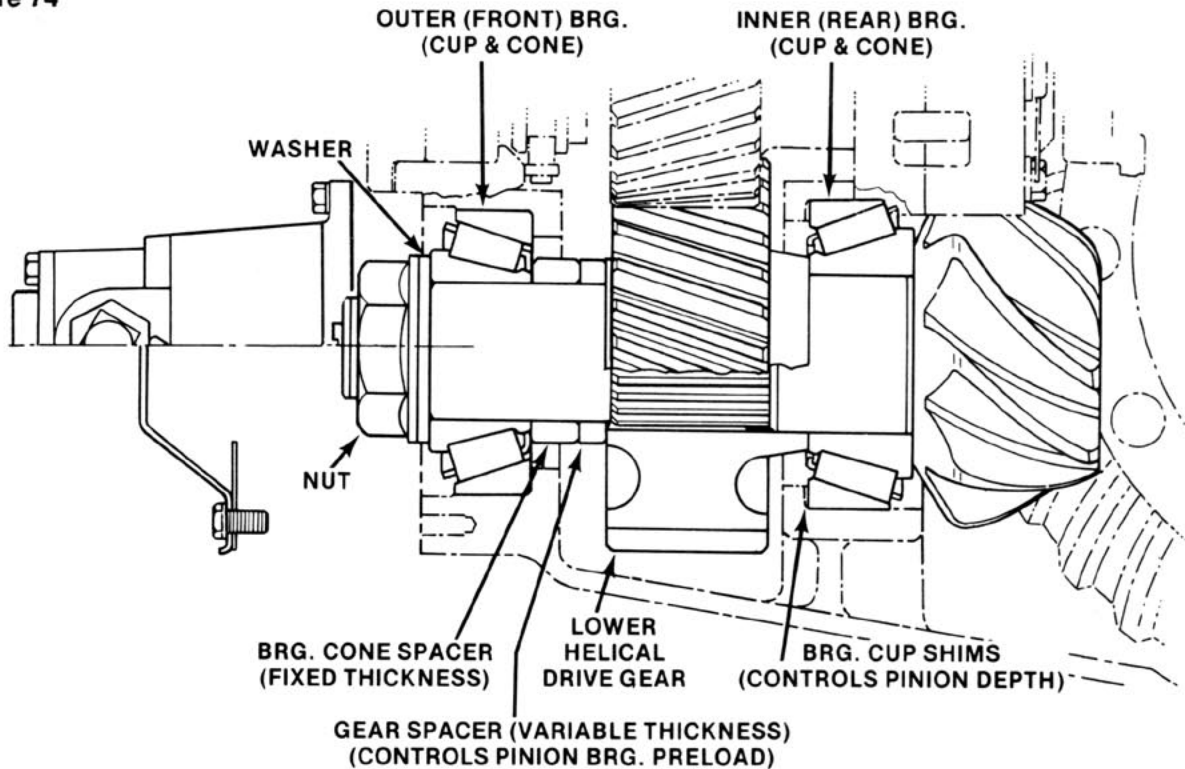
B. Location on Gear Set: End of pinion gear head or outer diameter of ring gear. **Figure 73.**

Figure 73



Section 5 Assembly

Figure 74



NOTE:

If the original ring gear and pinion are being installed, proceed to "Install Hypoid Pinion Assembly" on page 35.

If a new ring gear and pinion are to be installed, the correct thickness of the shim pack between the inner bearing and the carrier must first be determined.

Follow these procedures:

Adjust Thickness of Shim Pack for Hypoid Pinion (Depth of Pinion)

NOTE:

Use this procedure if a new hypoid pinion and a ring gear set is installed, or if the depth of the original pinion has to be adjusted.

1. Use a micrometer to measure the thickness of the shim pack that was removed from the differential carrier. Record the measurement for later use.

2. Look at the pinion cone ('PC') variation number on the hypoid pinion that is being replaced. See "Gear Set Information", Step 4 on page 33 for examples and location of the number. Record the number for later use.

NOTE:

The pinion cone number can be either 1,000ths of an inch (0.000 inch) or 100ths of a millimeter (0.00 mm). See the following examples:

PC+3, PC-3, +3 or -3 equals 0.003 inch.

PC+.03, PC-.03mm, +.03mm or -.03 equals 0.03 mm.

To change inches to millimeters, multiply inches by 25.40. To change millimeters to inches, multiply millimeters by 0.039.

3. If the old pinion cone number is a plus (+), add the cone number to the thickness of the old shim pack that was measured in Step 1.
4. If the old pinion cone number is a minus (-), subtract the cone number from the thickness of the old shim pack that was measured in Step 1.
5. Look at the pinion cone ('PC') variation number on the new pinion that will be installed. Record the number for later use.

6. If the new pinion cone number is a plus (+), subtract the number from the standard shim pack thickness that was calculated in Step 3 or 4.
7. If the new pinion cone number is a minus (-), add the number to the standard shim pack thickness that was calculated in Step 3 or 4.
8. The value calculated in Step 6 or 7 is the thickness of the new shim pack to be installed. See the examples in **Figure 75**.

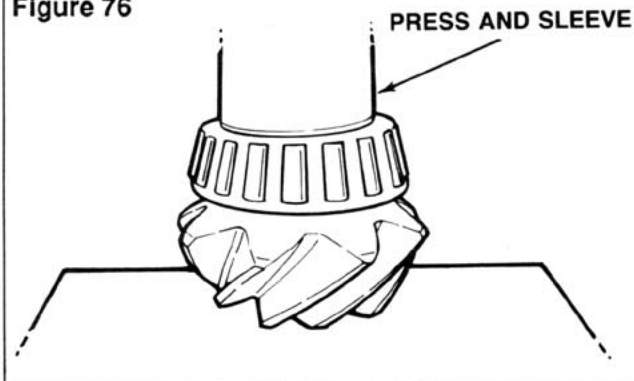
Figure 75

Example	Inches	mm
1. Old Shim Pack Thickness Old PC Number, PC + 2	0.030 + 0.002	0.76 + 0.05
Standard Shim Pack Thickness New PC Number, PC + 5	0.032 - 0.005	0.81 - 0.12
New Shim Pack Thickness	0.027	0.69
2. Old Shim Pack Thickness Old PC Number, PC - 2	0.030 - 0.002	0.76 - 0.05
Standard Shim Pack Thickness New PC Number, PC + 5	0.028 - 0.005	0.71 - 0.12
New Shim Pack Thickness	0.023	0.59
3. Old Shim Pack Thickness Old PC Number, PC + 2	0.030 + 0.002	0.76 + 0.05
Standard Shim Pack Thickness New PC Number, PC - 5	0.032 + 0.005	0.81 + 0.12
New Shim Pack Thickness	0.037	0.93
4. Old Shim Pack Thickness Old PC Number, PC - 2	0.030 - 0.002	0.76 - 0.05
Standard Shim Pack Thickness New PC Number, PC - 5	0.028 + 0.005	0.71 + 0.12
New Shim Pack Thickness	0.033	0.83

9. Put together a new shim pack of the correct thickness. Use a minimum of three shims in the pack. If the pack is made from different thickness shims, install the thinnest shims on both sides of the pack for maximum sealing.
10. Assemble and temporarily install the hypoid pinion.

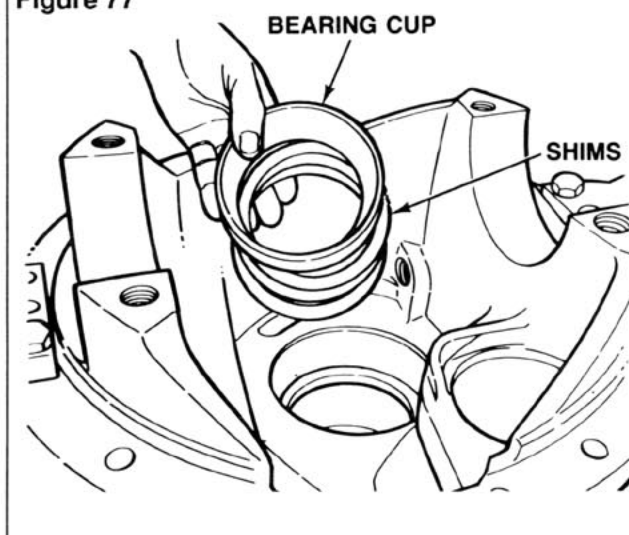
Install Hypoid Pinion Assembly

Figure 76



1. If removed, install the inner bearing cone on the pinion with a press and sleeve. Put the sleeve on the inner race of the bearing. Apply pressure until the bottom of the cone touches the shoulder on the pinion. **Figure 76**.
2. Apply the same lubricant used in the axle housing to the bearing cups and cones.
3. If removed, install the shim pack and the inner bearing cup in the carrier:

Figure 77

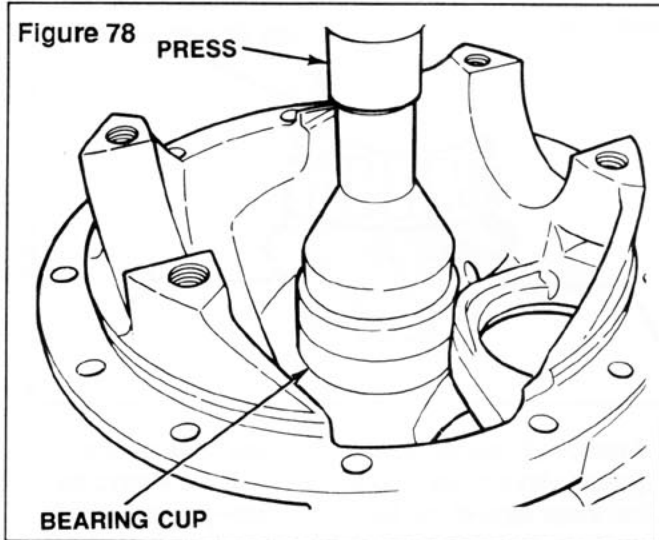


- A. Put the carrier on a press so that the legs of the carrier are toward the top of the press. **Figure 77**.
- B. Install the shim pack of the correct thickness in the carrier bore for the inner bearing cup.

Section 5 Assembly

- C. Put the inner bearing cup in the bore.
- D. Put supports under the differential carrier so that the carrier is level.

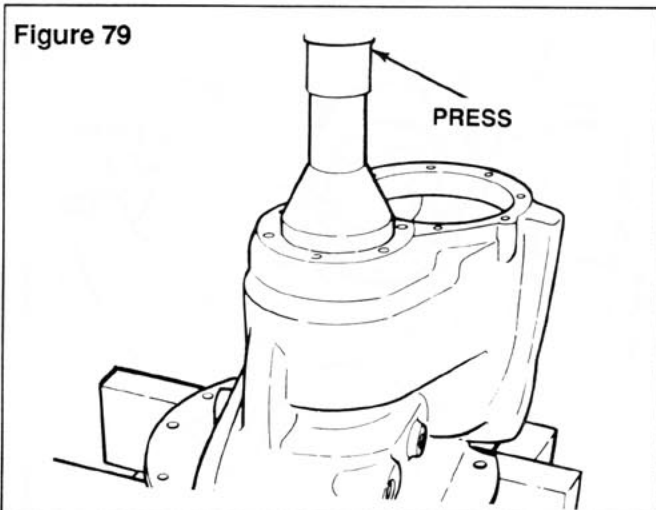
Figure 78



- E. Put a sleeve on the bearing cup and press the cup into the bore until the bottom of the cup is against the shims. **Figure 78.** If a press is not available, use a sleeve, a brass drift and a hammer to install the cup.

- 5. If removed, install the outer bearing cup in the carrier:

Figure 79



- A. Put the carrier in a press so that the legs of the carrier are toward the bottom of the press. Put supports under the carrier so that the carrier is level. **Figure 79.**
- B. Put the outer bearing cup for the drive pinion in the bore of the carrier.

- C. Use a sleeve and a press to install the cup. Press the cup into the carrier until the bottom of the cup is against the bottom of the bore. If a press is not available, use a sleeve or a brass drift and a hammer to install the cup.

- 6. Install the pinion in the carrier:

- A. Put the pinion into the carrier so that the pinion is up and through the inner and the outer bearing cups.
- B. Put a support under the head of the pinion so that the inner bearing cone on the pinion shaft touches the inner bearing cup in the carrier.
- C. Use a press and sleeve to install the outer bearing cone on the pinion shaft. Apply two tons pressure to the bearing cone.

- 7. Install the washer and the nut on the shaft of the drive pinion. Put a wood block between the teeth of the pinion and the inner wall of the carrier to prevent the pinion from turning. Tighten the nut to only 100 lb.-ft. (135 N.m) at this time.

Assemble Main Differential Case and Ring Gear



CAUTION:

Do not press a cold ring gear on to the differential case. A cold ring gear will damage the case because of the tight fit. Metal particles between the parts will cause gear runout.

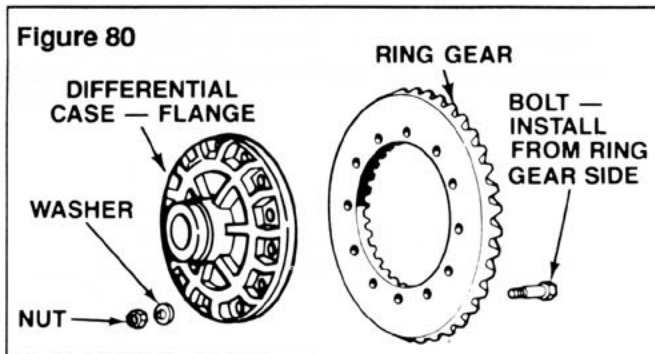
- 1. Expand the ring gear by heating the gear in a tank of water to a temperature of 160 to 180 degrees F (71 to 82 degrees C) for 10 to 15 minutes. **DO NOT USE AN OPEN FLAME OR A TORCH FOR THIS PROCEDURE.**



WARNING:

Wear safe clothing and gloves that will protect you from injury when you touch the hot ring gear.

- 2. Use a lifting tool to lift the ring gear from the tank of water.
- 3. Immediately install the ring gear on the flanged half of the differential case. If the ring gear does not fit easily on the flange, heat the gear again in a tank of hot water. Repeat Steps 1 and 2.
- 4. Rotate the ring gear to align the fastener holes in the differential case with the holes in the gear.



5. If the fasteners are bolts, install the bolts, washers and nuts that are used to fasten the ring gear to the flange. Install the bolts from the gear side of the assembly. The heads of the bolts must be against the ring gear. **Figure 80.**
6. Install the washers and nuts on the bolts from the flange side of the assembly and tighten to the correct torque. See the Torque Chart on page 72.
7. If rivets are used to hold the ring gear to the flange case half, install the rivets as follows:

CAUTION:

Do not heat rivets before installation. Use only cold rivets to fasten the ring gear correctly on the flange case half.

- A. Install 5/8" (.625") diameter rivets in pairs opposite each other from the case half side of the assembly. The rivet heads **MUST** be against the flange case half.
- B. Upset the rivets from the ring gear side of the assembly. Use a riveter machine to apply a 90,000 lb. pressure.

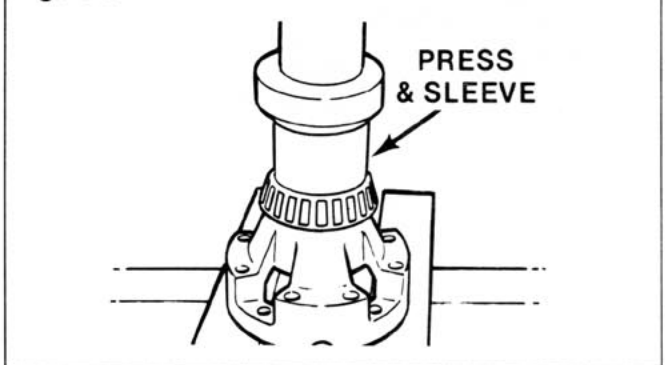
CAUTION:

The pressure on the rivets must be held for approximately one minute so that the rivet body will fill the hole.

- C. After the rivets are installed, check for gaps between the back surface of the ring gear and the case flange. Use a .003 inch (.08 mm) feeler gauge and check at four points around the assembly.
If the feeler gauge fits more than one half the distance between the outer diameter of the flange and the pilot diameter of the gear, remove the ring gear. See the procedure on page 20 and the following Steps D and E. If the gap is less than .003 inch (.08 mm), continue by following Step 8.

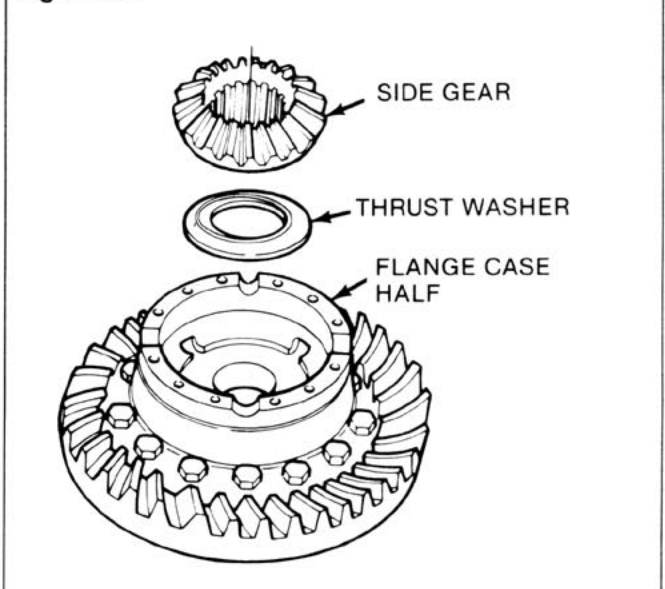
- D. Check the flange case half and ring gear for the problem that causes the gap. Repair or replace the parts.
- E. After the parts are repaired or replaced, assemble the ring gear on the flange case half. Repeat Steps A to C.

Figure 81



8. If necessary, install the bearing cones on both of the case halves. Use a press and sleeve of the correct size to press against the inner bearing race only. **Figure 81.**
9. Apply axle lubricant to the inside surfaces of both case halves, spider (cross), thrust washers, side gears and differential pinions.
10. Put the flange case half on a bench, ring gear teeth on top.

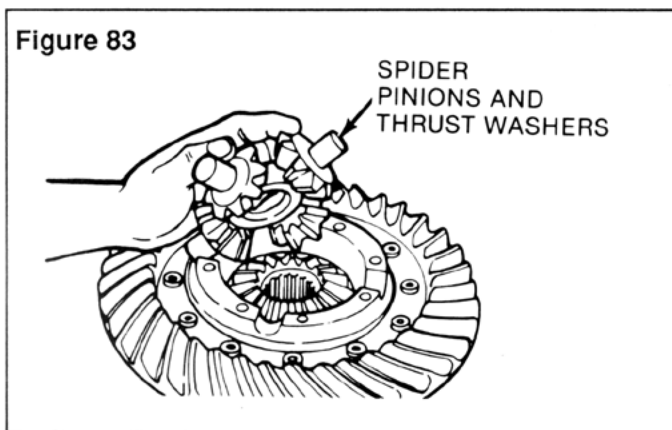
Figure 82



11. Install one thrust washer and side gear into the flange case half. **Figure 82.**

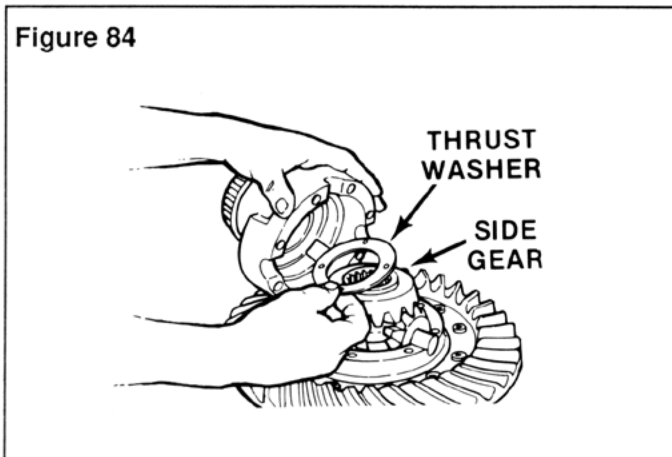
Section 5 Assembly

Figure 83



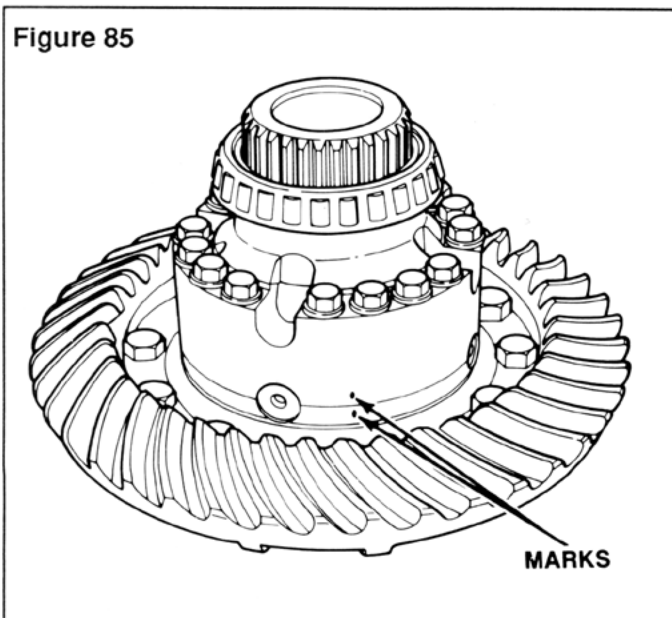
12. Install the spider (cross), four pinions and four thrust washers into the flange case half. **Figure 83.**

Figure 84



13. Install the second side gear and thrust washer over the spider and differential pinions. **Figure 84.**

Figure 85



14. Put the plain case half of the differential case over the flange half and gears. Rotate the plain case half as needed to align the alignment marks. **Figure 85.**

NOTE:

Meritor recommends using new Dri-Loc fasteners or applying Meritor Liquid Adhesive (Loctite #227) or equivalent to the fastener holes in the main differential case. See the procedures on page 30.

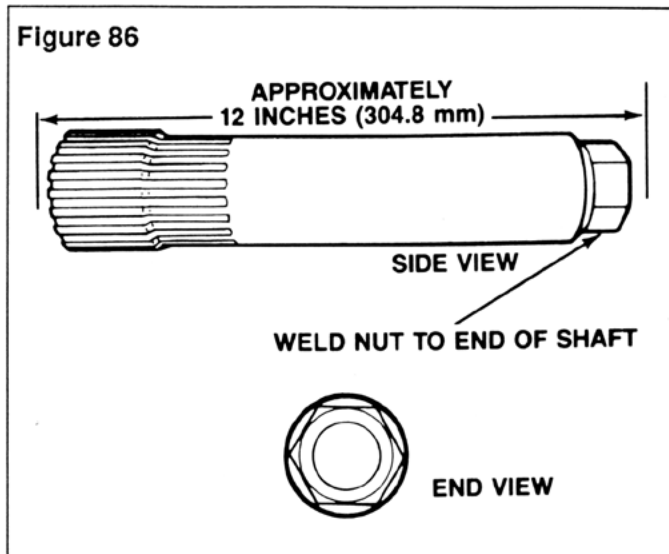
15. Install four capscrews at equal positions in the case halves. Evenly tighten the four capscrews to pull the case halves together.
16. Install the remaining capscrews and tighten all the capscrews to the specified torque. See the Torque Chart on page 72. **T**
17. Check the rotating resistance of the side gears in the main differential case as described below.

Check Rotating Resistance of Differential Gears

Specification:

50 lb-ft (67 N.m) maximum torque applied to one side gear.

Figure 86



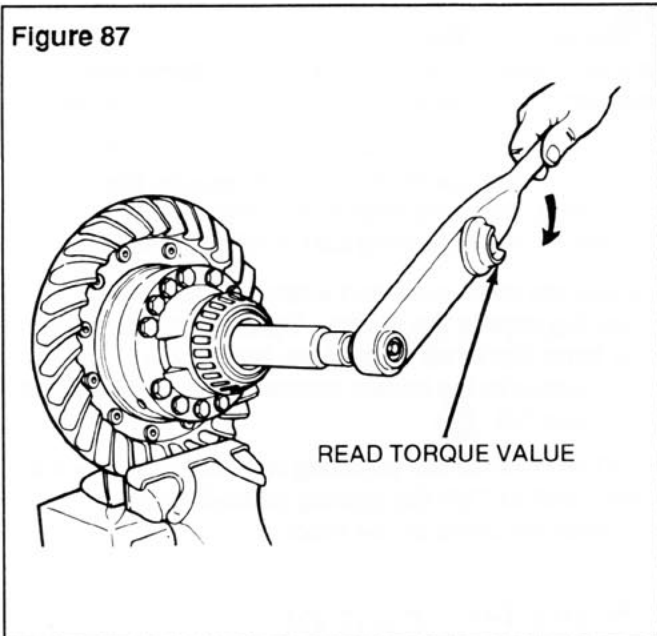
NOTE:

*Make a tool for checking the rotating resistance of the side gears in the main differential case. The tool can be made from an axle shaft that matches the spline size of the differential side gear. **Figure 86.***

1. Install soft metal covers over the vise jaws to protect the ring gear.

2. Put the differential and ring gear assembly in the vise.
3. Install the tool into the differential so that the splines of the tool are engaged with only one side gear.

Figure 87



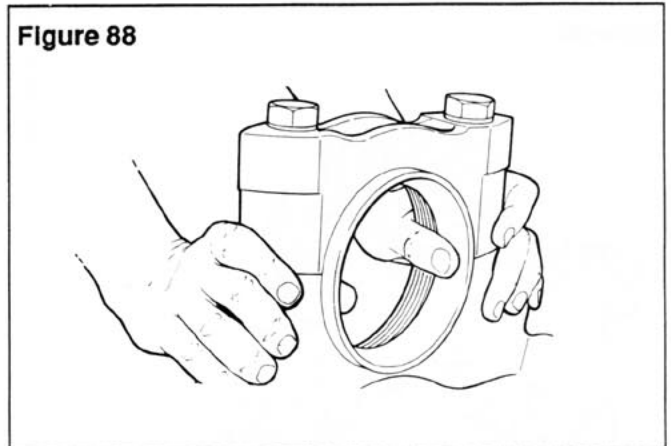
4. Attach a torque wrench to the nut of the tool and rotate the gears in the differential case. When the gears rotate, read the value indicated on the torque wrench. **Figure 87.**
5. If the torque value exceeds 50 lb-ft, separate the halves of the differential case.
6. Check the case halves, spider, gears and thrust washers for the problem that causes the torque value to exceed the specification. Repair or replace the parts.
7. After the parts are repaired or replaced, assemble the main differential case and repeat Steps 1-5 of this procedure.
8. Install the differential and ring gear assembly into the carrier.

Install Differential and Ring Gear Assembly

1. Temporarily install the bearing cups, threaded adjusting rings and bearing caps. The caps must be installed in the correct location as marked before disassembly. Tighten the bearing cap capscrews to the correct torque. (See Torque Chart on page 72).

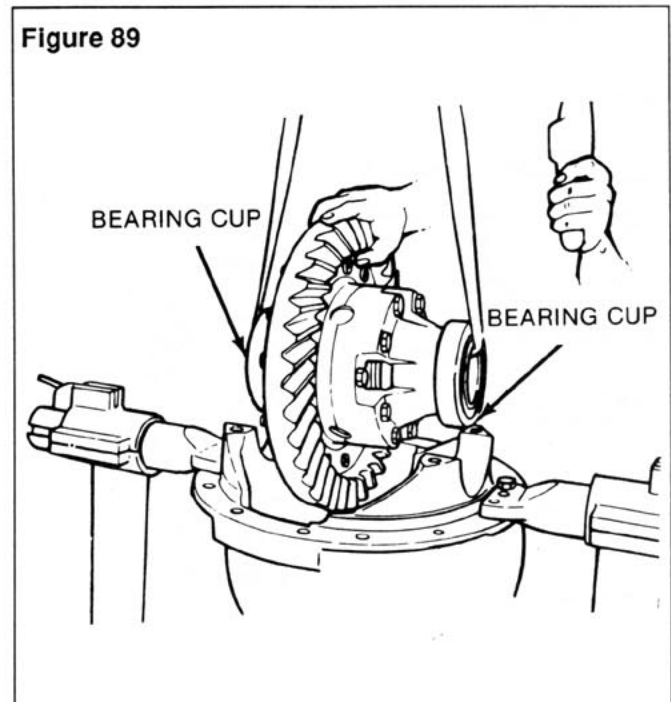


Figure 88



2. The bearing cups must be of a hand push fit in the bores, **Figure 88.** Otherwise the bores must be reworked with a scraper or emery cloth until a hand push fit is reached. Use a blued bearing cup as a gauge and check the fit as the work progresses.
3. Lubricate the bearing cups and cones with the lubricant used in the axle housing.
4. Install the bearing cups over the bearing cones on the differential case assembly.

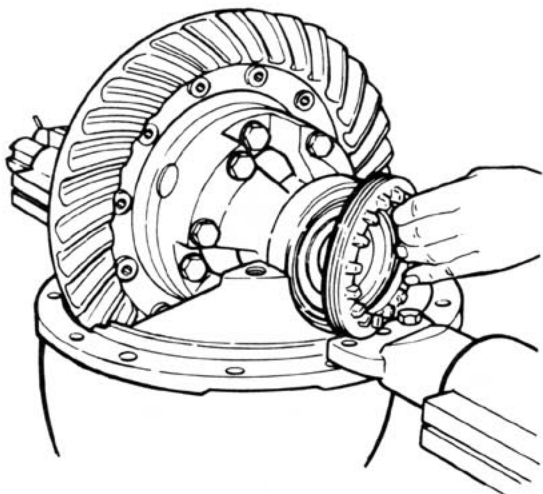
Figure 89



5. Safely lift the main differential case and ring gear assembly and install it in the carrier. **Figure 89.** The bearing cups **MUST** be flat against the bores between the carrier legs.

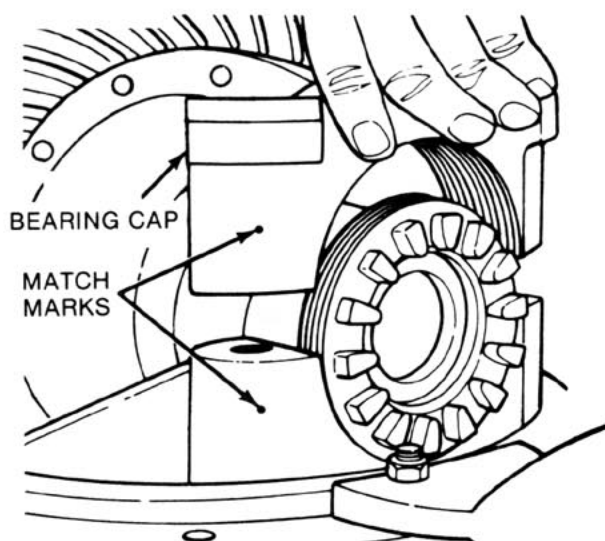
Section 5 Assembly

Figure 90



6. Install both of the bearing adjusting rings into position between the carrier legs. Turn each adjusting ring hand tight against the bearing cup. **Figure 90.**

Figure 91



7. Install the bearing caps over the bearings and adjusting rings in the correct location as marked before removal. **Figure 91.**

! CAUTION:

The bearing caps must be correctly installed or the adjusting rings will be damaged by cross threading. Forcing the caps into position will damage the caps and the carrier housing.

! WARNING:

Wear safe eye protection. Do not hit parts with a steel hammer. Parts can break and cause injury.

8. Tap each bearing cap into position with a soft mallet. The caps **MUST** fit easily against the bearings, adjusting rings and carrier. **DO NOT FORCE THE BEARING CAPS INTO POSITION.**
9. Install the capscrews and washers that hold the bearing caps to the carrier. Tighten the capscrews by hand four to six turns, then, tighten the capscrews to the correct torque. (See Torque Chart on page 72). **T**
10. **DO NOT** install the adjusting ring cotter keys or roll pins until **AFTER** the bearing preload and tooth contact adjustments are made.

Adjust Preload of Differential Bearings

Specification:

Preload of Differential Side Bearings: 15-35 lb-in (1.7-3.9 N.m) torque

Or

Expansion Between Bearing Caps: .006-.010 Inch (.15-.22 mm)

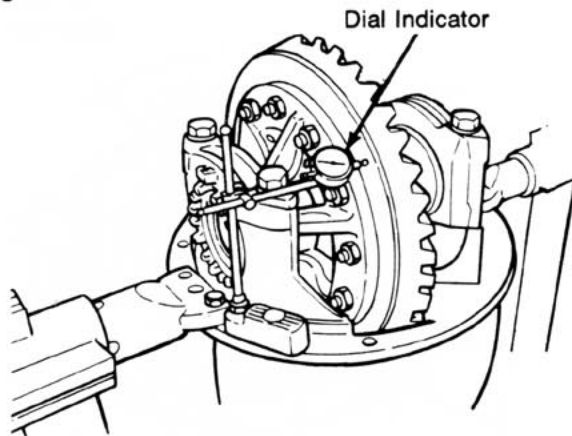
There are two methods for checking and adjusting the preload on the differential side bearings:

- Dial Indicator Method
- Micrometer Method

Dial Indicator Method:

1. Attach a dial indicator on the mounting flange of the carrier.

Figure 92

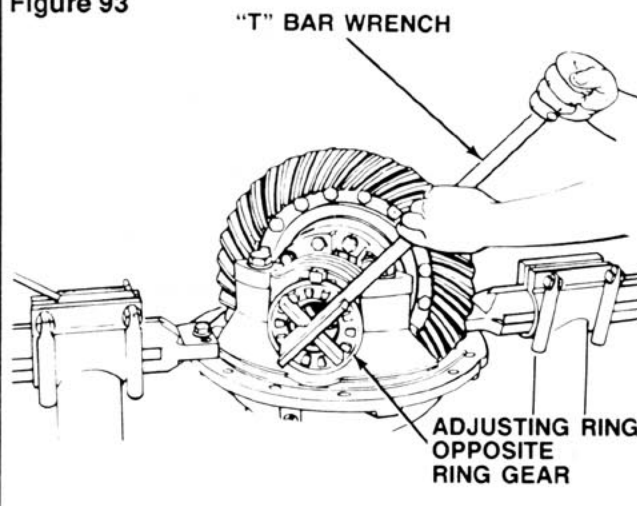


2. Adjust the dial indicator so that the plunger or pointer is against the back surface of the ring gear. Figure 92.

CAUTION:

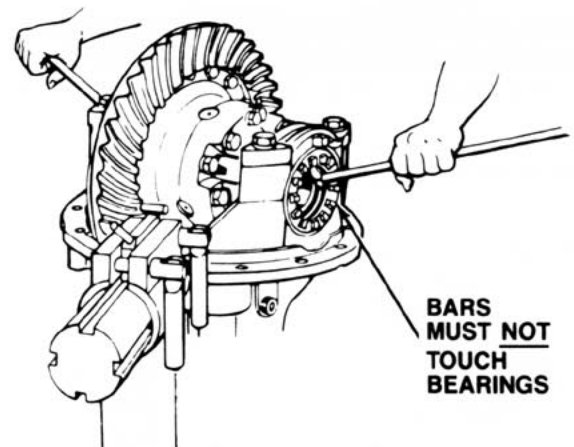
When you turn the adjusting rings, always use a tool that engages two or more opposite notches in a ring. A "T" bar wrench can be used for this purpose. If the tool does not correctly fit into the notches, damage to the lugs will occur.

Figure 93



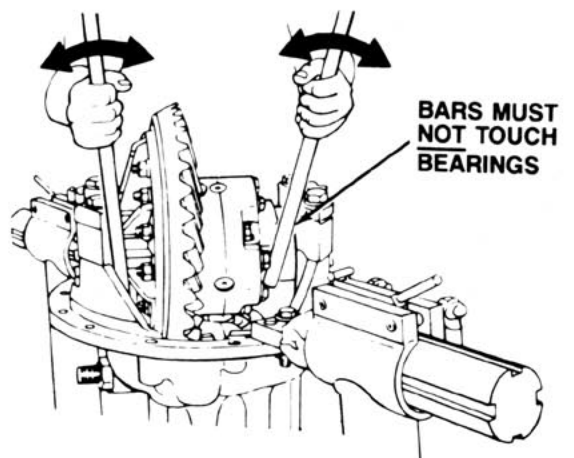
3. Loosen the bearing ring that is opposite the ring gear so that a small amount of end play shows on the dial indicator. Move the differential and ring gear to the right and left with pry bars while you read the dial indicator. Figure 93. Use one of the following methods:

Figure 94



- A. Use two pry bars that fit between the bearing adjusting rings and the ends of the differential case. The pry bars **MUST NOT** touch the differential bearings. Figure 94.

Figure 95



- B. Use two pry bars between the differential case or the ring gear and the carrier at locations other than those described in Step A. The pry bars must not touch the differential bearings. Figure 95.

4. Tighten the same bearing adjusting ring so that no end play shows on the dial indicator. Move the differential to the left and right as needed. Repeat Step A or B.
5. Tighten each bearing adjusting ring one notch from the zero end play measured in Step 4. The side bearings of the differential now have a preload of 15-35 lb-in (1.7-3.9 N.m).

Section 5

Assembly

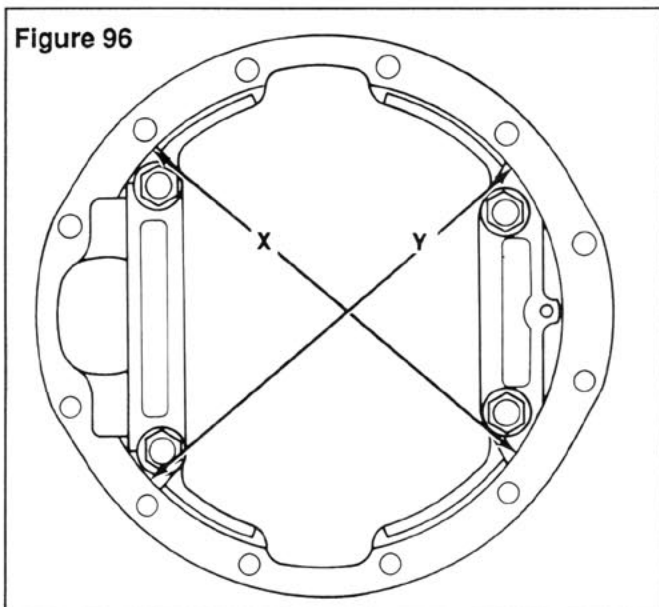
6. Continue by checking the runout of the ring gear.

Micrometer Method:

A second method of checking preload is to measure the expansion between the bearing caps after you tighten the adjusting rings. Use the following procedure:

1. Turn both adjusting rings hand tight against the differential bearings.

Figure 96



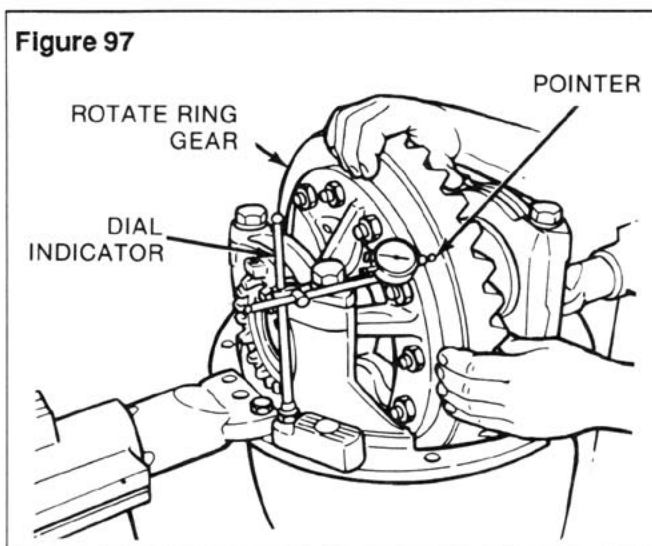
2. Measure the distances X and Y between opposite surfaces of the bearing caps with a large micrometer. Make a note of the measurement. **Figure 96.**
3. Tighten each adjusting ring one to two notches. Rotate the ring gear in both directions 120° to 180° a minimum of six times to seat the bearings.
4. Measure the distances X and Y again. Compare the dimensions with the distances X and Y measured in Step 2. The difference between the two dimensions is the amount the bearing caps have expanded.
5. If the dimension is at or within specifications (.006" to .010"), continue by checking runout of the ring gear. If the dimension is less than specifications, repeat Steps 3 and 4 as needed.

Check Runout of Ring Gear

Specification: .008 Inch (.20 mm)

1. Attach a dial indicator on the mounting flange of the carrier.

Figure 97



2. Adjust the dial indicator so that the plunger or pointer is against the back surface of the ring gear. **Figure 97.**
3. Adjust the dial of the indicator to zero (0).
4. Rotate the differential and ring gear assembly while you read the dial indicator. The runout of the ring gear must not exceed .008 inch (.02 mm). If the runout of the ring gear exceeds specification, remove the differential and ring gear assembly from the carrier.
5. Check the differential parts, including the carrier, for the problem that caused the runout of the ring gear to exceed specifications. Repair or replace parts as needed.
6. After the parts are repaired or replaced, install the main differential case and ring gear assembly into the carrier. See the procedure on page 39.
7. Repeat the preload adjustment of the differential side bearings. See the procedure on page 40.

Adjust Backlash of Ring Gear

Specification:

Range of Backlash Setting: .005-.015 inch (.13-.38 mm)

Backlash Setting for New Gear Sets: .010 inch (.25 mm)

If the original gear set is installed, adjust the backlash to the setting that was measured before the carrier was disassembled.

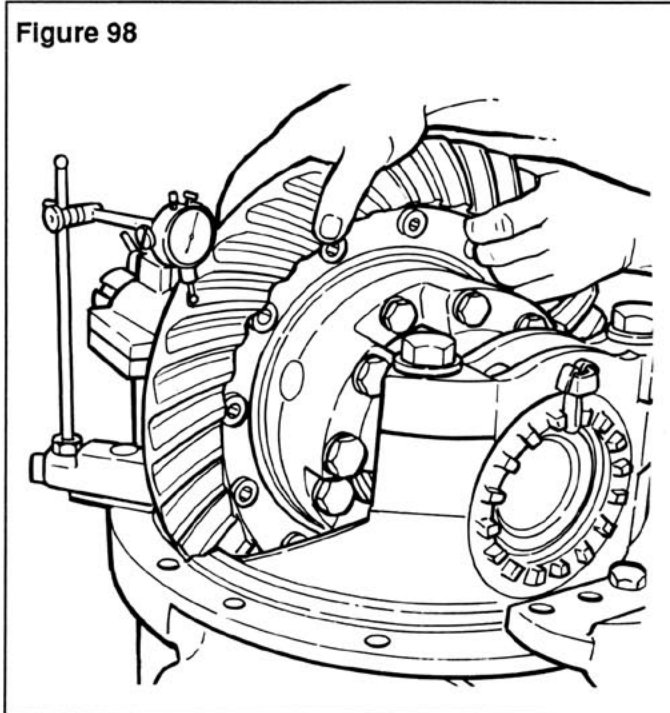
If a new gear set is installed, adjust the backlash to .010 inch (.25 mm).

NOTE:

During tooth contact patterns adjustment, the backlash can be readjusted within the limits of .005-.015 inch (.13-.38 mm).

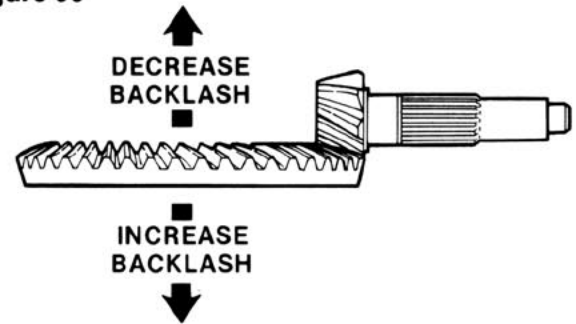
1. Attach a dial indicator on the mounting flange of the carrier.

Figure 98



2. Adjust the dial indicator so that the plunger or pointer is against a tooth surface. **Figure 98.**
3. Adjust the dial indicator to zero (0).
4. Hold the drive pinion in position.
5. While you read the dial indicator, rotate the differential and ring gear a small amount in both directions, against the teeth of the drive pinion. If the backlash reading is within specification, continue by checking tooth contact patterns. If the backlash reading is not within specifications, adjust backlash as needed.
6. Loosen one bearing adjusting ring one notch, then tighten the opposite ring the same amount.
7. Backlash is increased by using the adjusting rings to move the ring gear away from the drive pinion. Backlash is decreased by using the adjusting rings to move the ring gear toward the drive pinion. **Figure 99.**

Figure 99



NOTE:

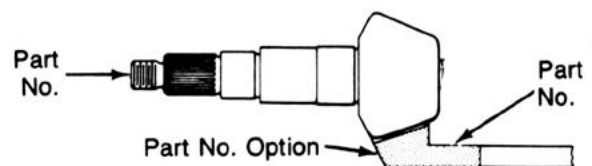
When you adjust backlash, only move the ring gear. DO NOT move the drive pinion.

8. Repeat Steps 2-6 until the backlash is within specifications.

Check Tooth Contact Patterns of Ring Gear Set

Meritor carriers can have a conventional hypoid gear set or a GENEROID hypoid gear set. The tooth contact patterns are different for each type of gear set.

Figure 100



Look at the part numbers to determine what type of gear set is in the carrier. See **Figure 100** for the location of the part numbers.

Examples of part numbers for conventional hypoid gear sets are:

36786 for the ring gear
36787 for the drive pinion

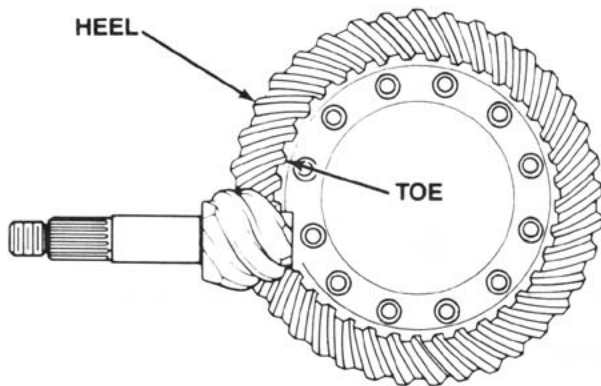
Examples of part numbers for GENEROID hypoid gear sets are:

36786-K or 36786-K2 for the ring gear
36787-k or 36787-K2 for the drive pinion

Section 5

Assembly

Figure 101

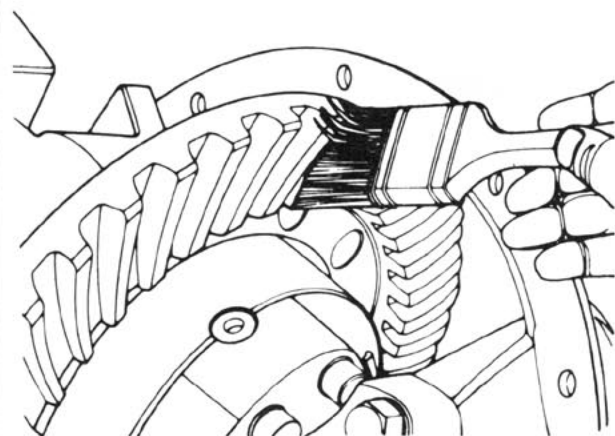


In the following procedures, movement of the contact pattern in the length of the tooth is indicated as toward the "heel" or "toe" of the ring gear. **Figure 101.**

Always check the tooth contact patterns on the drive side of the gear teeth.

1. Adjust the backlash of a new gear set to 0.010 inch (0.25 mm).
Adjust the backlash of an old gear set to the setting that was measured before the carrier was disassembled. See the procedure on page 42.

Figure 102



2. Apply a marking compound to approximately 12 gear teeth of the ring gear. Rotate the ring gear so that the 12 gear teeth are next to the drive pinion. **Figure 102.**
3. Rotate the ring gear forward and backward so that the 12 gear teeth go past the drive pinion six times

to get the contact pattern. Repeat if needed to get a more clear pattern.

4. Look at the contact patterns on the ring gear teeth. Compare the patterns to **Figures 103 A or B, 104 A or B and 105 A or B.**

The location of a good hand-rolled contact pattern for an old gear set **MUST** match the wear pattern established in the ring gear. The contact pattern will be smaller in area than the wear pattern.

The location of a good hand-rolled contact pattern for a new gear set **MUST** be:

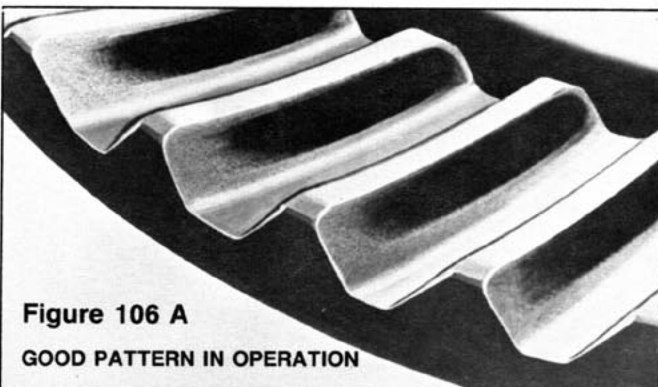
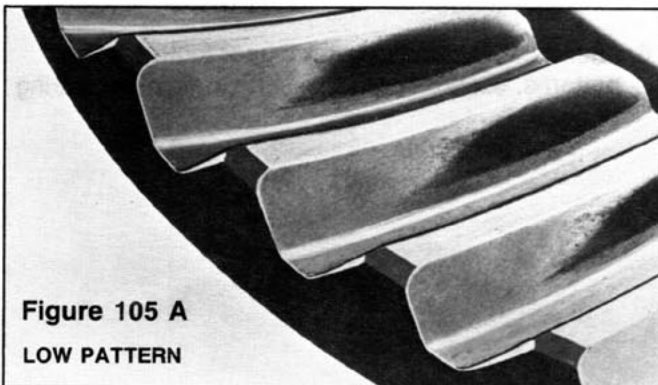
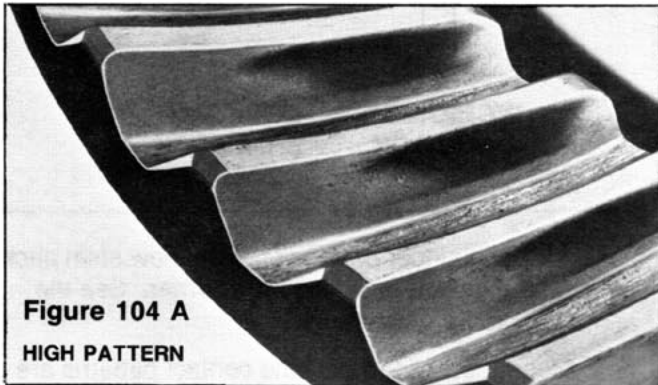
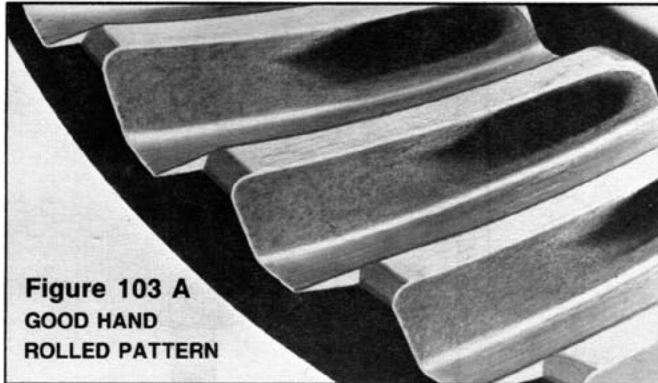
- A. New Conventional Gear Sets - toward the toe of the gear tooth and in the center between the top and the bottom of the tooth. **Figure 103 A.**
- B. New Generoid Gear Sets - between the center and toe of the tooth and in the center between the top and bottom of the tooth. **Figure 103 B.**

When the carrier is being operated, a good pattern extends approximately the full length of the tooth. The top of the pattern will be near the top of the gear tooth. **Figure 106 A or B.**

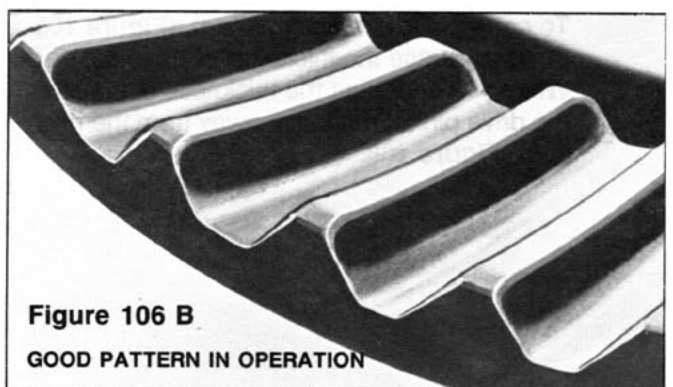
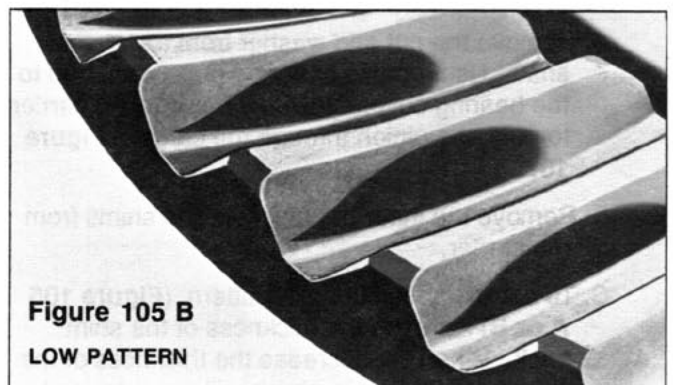
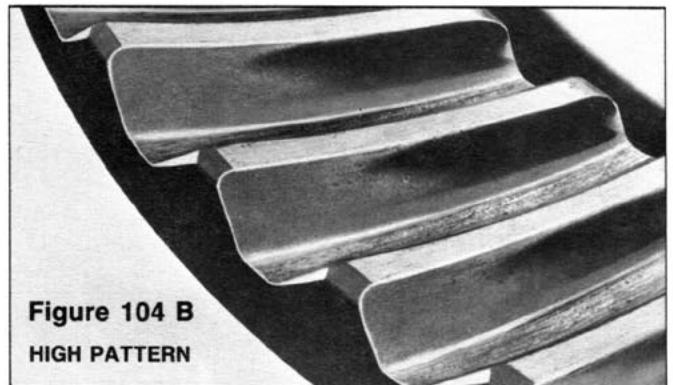
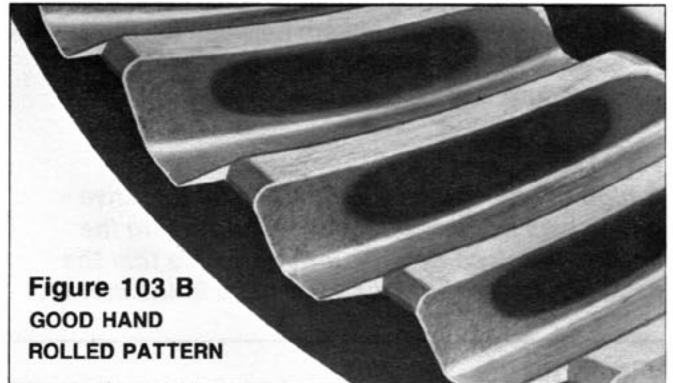
If the contact pattern requires adjustment, continue by following Step 5 to move the contact patterns between the top and bottom of the gear teeth.

If the contact patterns are in the center of the gear teeth, continue to Step 6.

CONVENTIONAL GEARS



GENEROID GEARS



Section 5

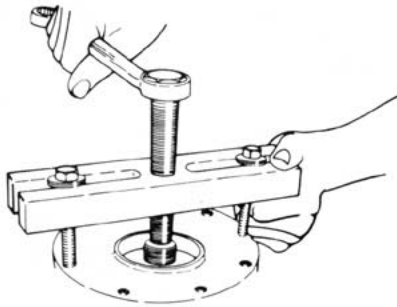
Assembly

5. Change the thickness of the shim pack between the pinion inner bearing cup and the differential carrier to move the contact pattern between the top and the bottom of the gear teeth. Use the following procedure:

NOTE:

A high contact pattern indicates that the drive pinion was not installed deep enough into the carrier. A low contact pattern indicates that the drive pinion was installed too deep in the carrier.

Figure 107

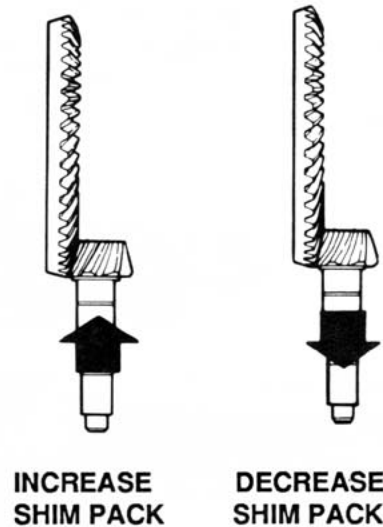


- A. Remove the nut and washer from the pinion shaft. Use a press or flange puller fastened to the bearing cover capscrow holes in the carrier to push the pinion through the carrier. **Figure 107.**

- B. Remove the inner bearing cup and shims from the carrier.

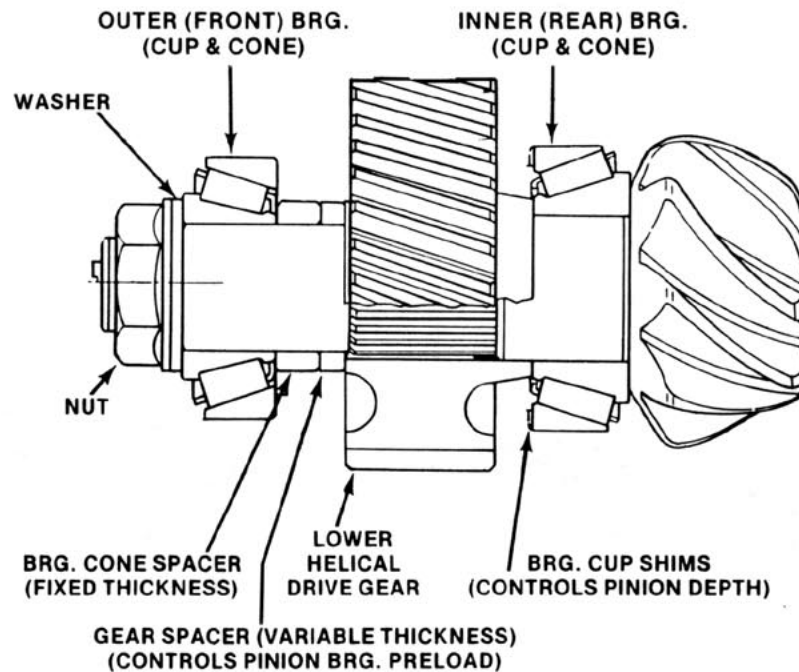
- C. To correct a high contact pattern, (**Figure 105 A or B**) increase the thickness of the shim pack. When you increase the thickness of the shim pack, the drive pinion will move toward the ring gear. **Figure 108.**
To correct a low contact pattern, (**Figure 105 A or B**) decrease the thickness of the shim pack. When you decrease the thickness of the shim the drive pinion will move away from the ring gear. **Figure 108.**

Figure 108



- D. Install the inner bearing cup, the new shim pack and the drive pinion into the carrier. See the procedure on page 35.
- E. Repeat Steps 2-4 until the contact patterns are in the center between the top and bottom of the gear teeth.
6. After establishing the correct gear tooth contact patterns, continue with adjusting the pinion bearing preload.

Figure 109



Adjust Preload of Pinion Bearings

Specifications:

New Pinion Bearings: 5-25 lb-in (0.56-2.82 N.m)

Rotational Torque

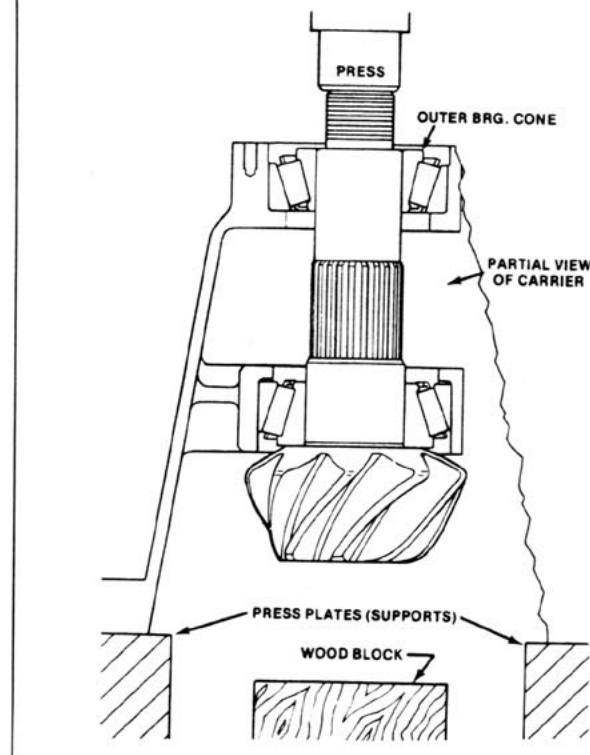
Used Pinion Bearings: 5-15 lb-in (0.56-1.69 N.m)

Rotational Torque

The preload on the inner and outer bearings of the drive pinion is adjusted by changing the thickness of the gear spacer between the helical gear and the outer bearing. This spacer is available in several different sizes. The bearing cone spacer between the inner bearing and the helical gear is available in only one size. **Figure 109.**

1. Check and record the backlash of the ring gear. See the procedure on page 42.
2. Remove the main differential case and ring gear assembly from the differential carrier. See the procedure on page 19.
3. Remove the nut and the washer from the drive pinion.

Figure 110

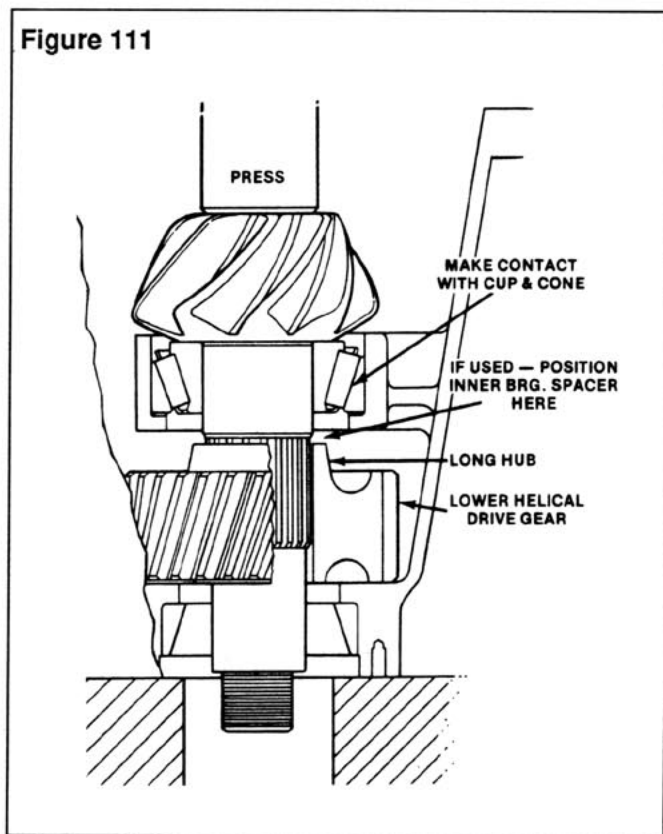


4. Put the carrier in a press so that the threaded end of the pinion is toward the top of the press. Put supports under the flange of the carrier so that the carrier is level. Put a wood block under the head of the pinion. **Figure 110.**

Section 5 Assembly

5. Press the drive pinion out of the outer bearing cone. Remove the cone.

Figure 111



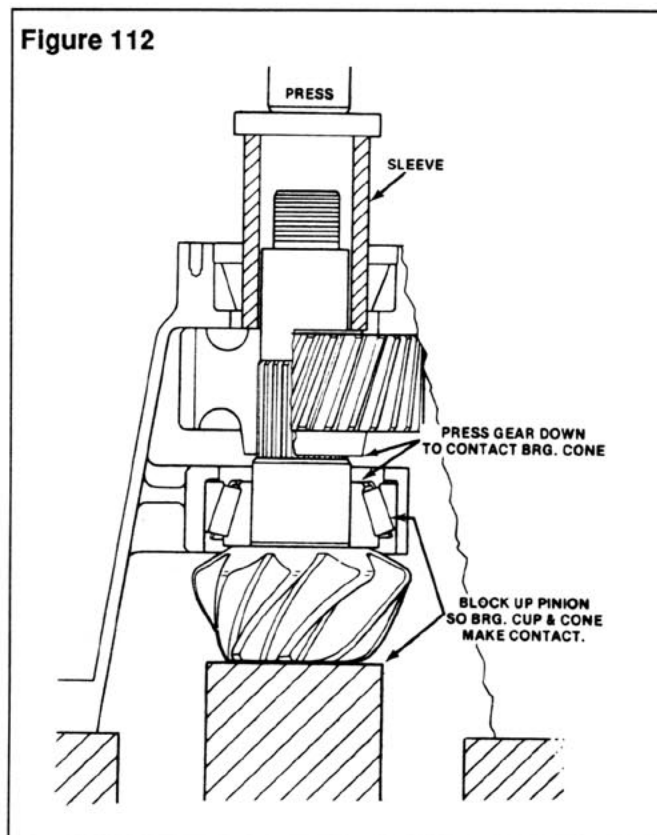
6. Turn the carrier over so that the legs of the carrier are toward the top of the press. Put supports under the carrier so that the carrier is level. **Figure 111.**
7. Put the helical gear over the pinion bore in the carrier so that the long hub of the gear is on top. Some models have an inner bearing cone spacer. If this spacer is used, put it over the long gear hub.
8. Install the drive pinion into the helical gear. Make sure the splines on the pinion engage the splines inside the gear.

CAUTION:

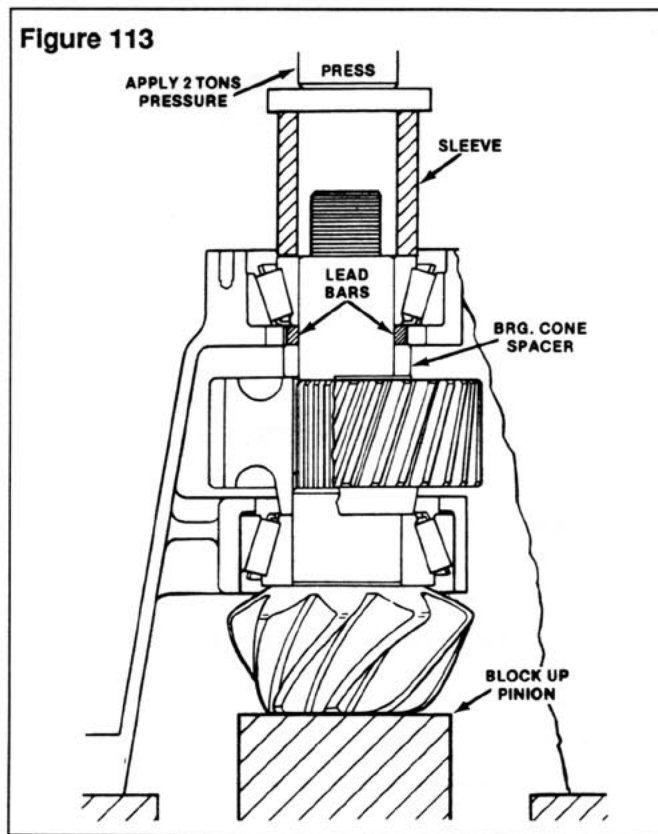
Do not apply pressure after the inner bearing cone touches the inner bearing cup. If pressure is applied, the cup, cone and drive pinion can be damaged.

9. Press the pinion into the carrier until the inner bearing cone on the pinion touches the bearing cup in the carrier. At this time, the helical gear will not be completely installed on the drive pinion.

Figure 112



10. Turn the carrier in the press so that the threaded end of the pinion is on top. Put supports under the flange of the carrier so that the carrier is level. Put a wood block under the head of the pinion so that the inner pinion bearing cone touches the bearing cup. **Figure 112.**
11. Press the helical gear completely on to the splines of the drive pinion. Use a sleeve that fits over the pinion shaft and presses against the hub of the gear. Press the gear on the drive pinion until the gear touches the inner bearing cone or spacer, if used.



12. Install the thick (fixed thickness) outer bearing cone spacer on to the pinion shaft and against the helical gear hub. Do NOT install the variable thickness gear spacer at this time.
13. Cut two pieces of lead or solder approximately 9/16 inch (14 mm) long and 5/8 inch (16 mm) wide. Use the two pieces of solder or lead as gauge blocks to determine correct thickness of the spacer between the helical gear and the outer bearing.
14. Set the two pieces of lead so that the pieces are opposite each other on top of the bearing cone spacer. **Figure 113.**
15. Put the outer bearing cone over the pinion shaft. With a correct size sleeve, press the cone into position against the lead pieces with TWO TONS of pressure. The pressure of the press will compress the lead to the correct size. DO NOT APPLY MORE THAN 2 TONS OF PRESSURE.
16. Remove the wood block from under the head of the drive pinion and press the shaft of the drive pinion through the outer bearing cone only. DO NOT PRESS THE SHAFT OF THE DRIVE PINION THROUGH THE HELICAL GEAR.

17. Remove the outer bearing cone, both pieces of lead and the outer bearing cone spacer from the pinion shaft.

18. Use a micrometer to measure the thicknesses of the compressed pieces of lead. Add the measurements of the two pieces and divide by two (2) to determine the average thickness of the pieces.
Add 0.004 inch (0.100 mm) to the average thickness. Use this dimension to determine the correct thickness of the spacer to install between the helical gear and the outer bearing.

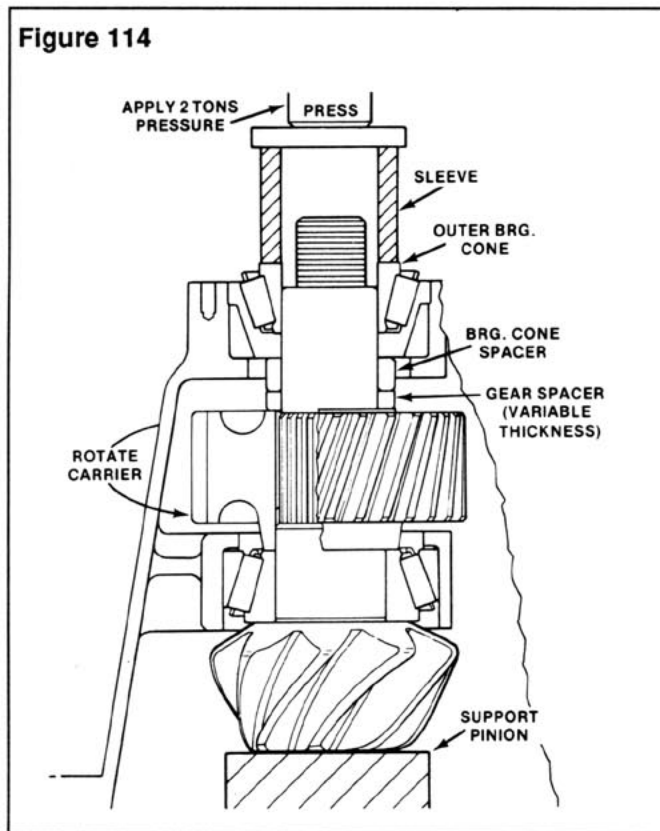
Example:

	Inch	MM.
Thickness of Piece No.1	0.504	12.80
Add Thickness of Piece No.2	0.506	12.85
Total Thickness	1.010	25.65
Divide By Two (2) To Get		
Average Thickness	0.505	12.82
Add 0.004 Inch (0.10 mm)	0.004	0.10
To Get Thickness of Spacer	0.509	12.92

19. Put a wood block under the head of the drive pinion so that the inner bearing cone on the pinion touches the inner bearing cup in the carrier.
20. With a sleeve that bears against the hub of the helical gear, press the helical gear completely on to the pinion shaft until it touches the inner bearing cone or spacer.
21. Install the correct thickness of gear spacer, as calculated in Step 18, and the fixed outer bearing cone spacer on to the pinion shaft. THE GEAR SPACER MUST BE ASSEMBLED FIRST ON TO THE PINION SHAFT AGAINST THE HELICAL GEAR.

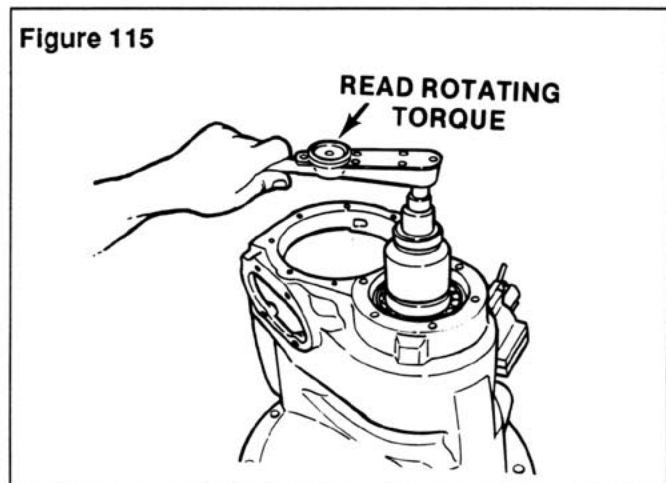
Section 5 Assembly

Figure 114



22. Continue to support the head of the pinion and press the outer bearing cone on to the pinion shaft. Use a sleeve that fits against the inner race of the cone and apply press pressure of two (2) tons. While the pressure is applied, rotate the carrier in both directions to seat the bearings. **Figure 114.**
23. Remove the carrier from the press and put the carrier in a repair stand.
24. Install the washer and the nut on the drive pinion. Prevent the drive pinion assembly from rotating by using a fixture to hold the teeth of the helical driven gear or put wood blocks between the head of the pinion and the carrier wall. Tighten the nut to the specified torque. See the Torque Chart on page 72. Remove the holding fixture or the wood blocks. **T**
25. Use an inch-pound torque wrench or a spring scale to check the preload of the bearings on the drive pinion. See the following procedures:

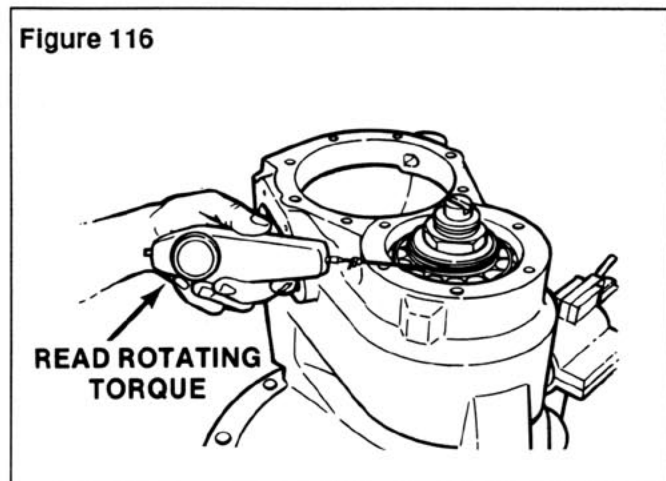
Figure 115



Torque Wrench Method:

- A. Put an inch pound torque wrench and the correct socket on the nut of the drive pinion.
- B. Use the torque wrench to rotate the drive pinion assembly. Look at the reading on the torque wrench. USE ROTATING TORQUE, NOT STARTING TORQUE. **Figure 115.**

Figure 116



Spring Scale Method:

- A. Wind a cord around the washer under the nut of the drive pinion.
- B. Attach a spring scale to the end of the cord. Pull the spring scale and cord in a horizontal direction while reading the spring scale. **Figure 116.**
- C. Measure the outer diameter of the washer under the pinion nut. Divide the diameter of the washer by two (2) to get the radius of the washer. Multiply the radius of the washer by the reading on the scale to get the pound inch torque value.

Section 5 Assembly

EXAMPLE:

Assume the outer diameter of washer to be 3.00 Inches (76.2 mm.) and the scale reading to be 9 lbs (4 kg.)

	Inch	MM.
Diameter of Washer	3.00	76.2
Divide Diameter by Two (2) To Get Radius Of Washer	1.50	38.1
Multiply Radius Of Washer By Spring Scale Reading	x9 lbs	x4 Kg
Torque Value	13.5 lb-in	152 N.m

26. The preload of the drive pinion bearings must be within the following limits:

New Pinion Bearings: 5-25 lb-in (0.56-2.82 N.m) Rotational Torque.

Used Pinion Bearings: 5-15 lb-in (0.56-1.69 N.m) Rotational Torque.

If preload is not within the specified limits, remove and replace the gear spacer between the bearing cone spacer and the helical gear. (See Step 18). Install a thicker spacer to decrease the preload. Install a thinner spacer to increase the preload.

NOTE:

If a change in pinion depth is required after establishing the pinion bearing preload, the same change must be made in the thickness of the gear spacer. If the thickness of the shim pack is increased or decreased, the thickness of the gear spacer must be increased or decreased the same amount.

27. After correct pinion bearing preload is established, install the main differential case and ring gear assembly into the carrier. Adjust the differential bearing preload, hypoid gear backlash and check the gear tooth contact patterns again.

28. After all adjustments are within specifications, lock the bearing adjusting rings in position with the cotter keys or roll pins.

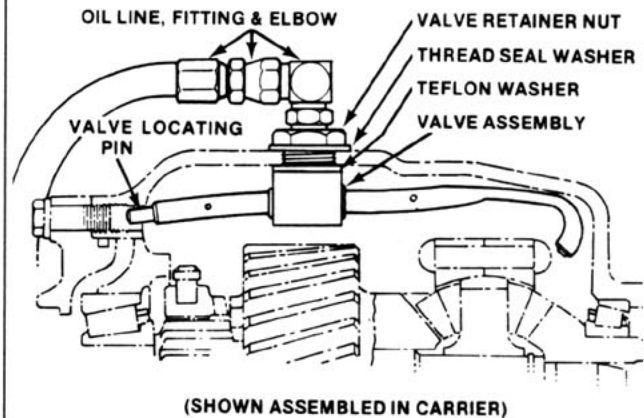


CAUTION:

Some models use a roll pin in place of a cotter key to lock the adjusting rings. If your carrier was built using cotter keys, lock the adjusting rings only with cotter keys. If the carrier was built with roll pins, reuse the roll pins or lock the rings with cotter keys. Do not force a roll pin into a cotter pin hole.

Assemble and Install Oil Valve Assembly (Pump Models Only)

Figure 117

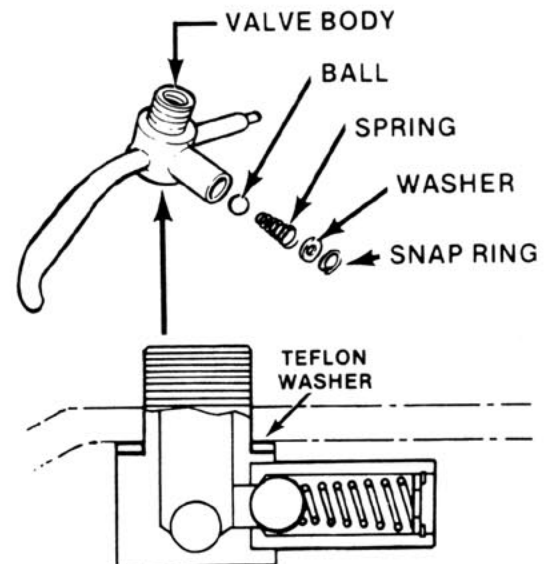


CAUTION:

When you assemble and install the oil valve components, be careful that you do not damage the fitting threads, bevel seats, O-rings and oil lines.

1. If it was disassembled, install the ball into the valve body opening. Install the spring, small diameter first. Then install the washer. Fasten the parts in the valve with the snap ring. **Figure 118.**

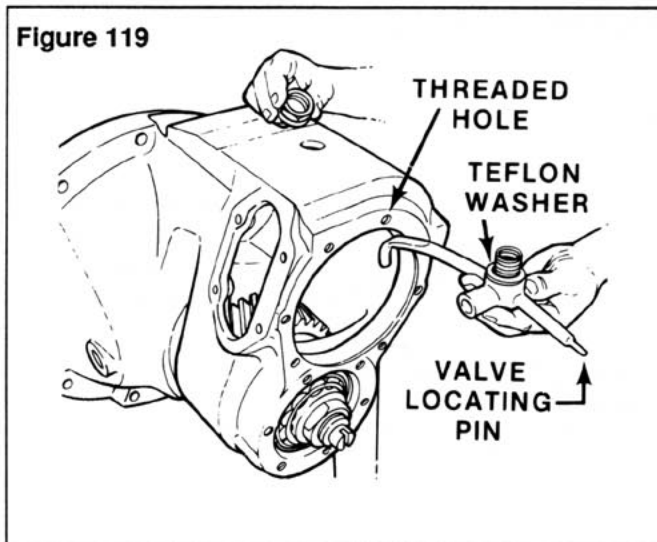
Figure 118



Section 5 Assembly

- Put the teflon washer in position over the threaded part of the valve body.

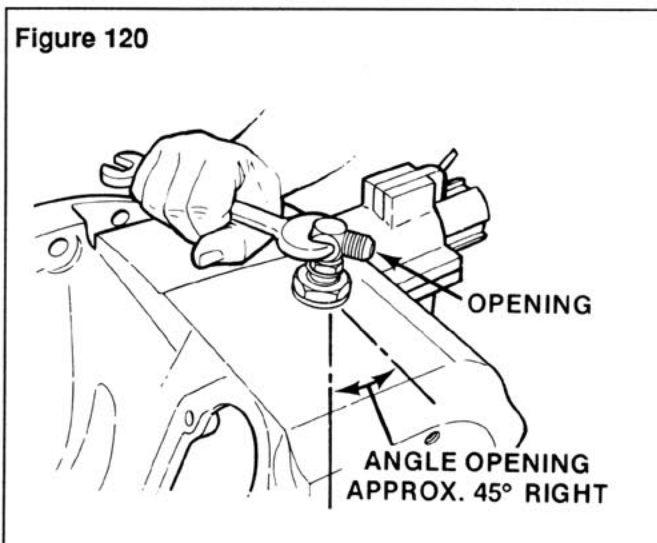
Figure 119



- Working from inside of the carrier housing, put the valve locating pin in position in the threaded capscrow hole at the front of the carrier. Put the threaded part of the valve body through the hole in the top of the carrier.

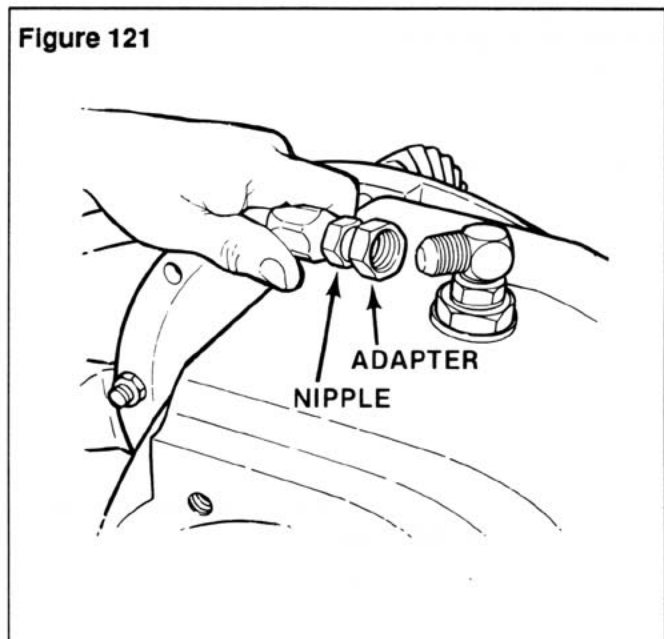
- Hold the valve in this position and install the thread seal washer and valve retainer nut on to the valve body. Tighten the nut to 40-65 lb-ft. **Figure 119. T**

Figure 120



- Install the elbow fitting into the valve body until it touches the bottom. Loosen the elbow until its opening is toward the right front of the carrier (shift unit side) at approximately 45°. Tighten the elbow retainer nut to 20-30 lb-ft. **Figure 120. T**

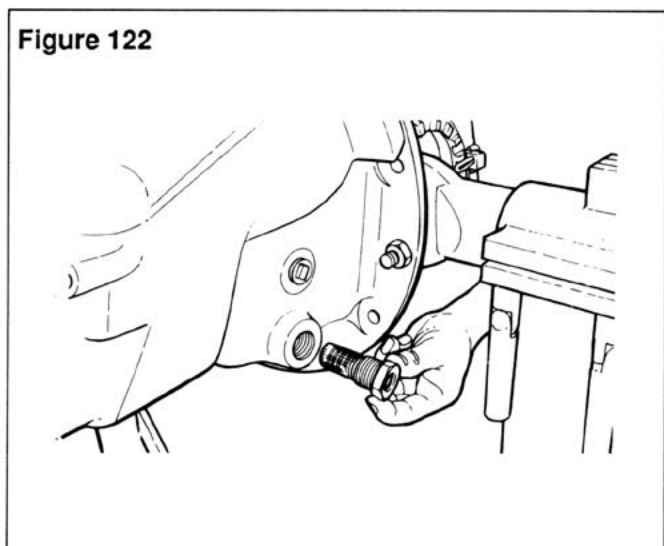
Figure 121



- To connect the oil line to the elbow, install the adapter fitting on to the elbow. Hold the nipple (middle hex of fitting) stationary while you tighten the adapter to 20-30 lb-ft. **Figure 121. T**

Install Oil Filter Screen Assembly (Pump Models Only)

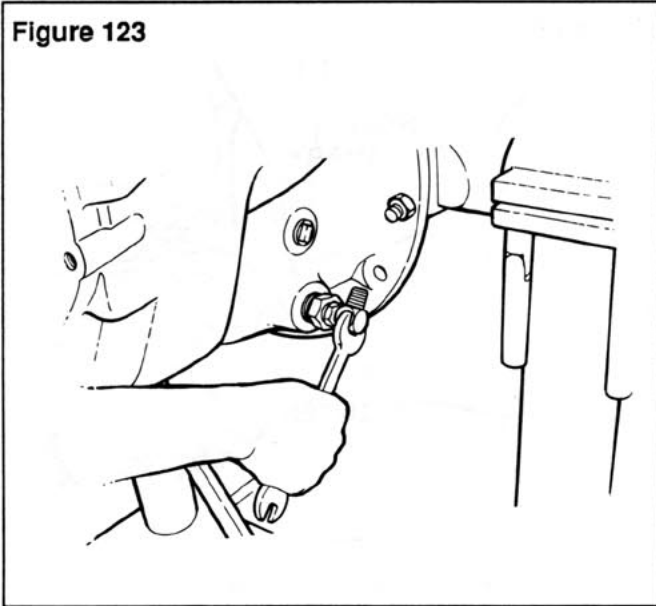
Figure 122



- Install the tube adapter and filter screen assembly into the bottom left side of the carrier. Tighten the assembly to a minimum of 80 lb-ft. **Figure 122. T**

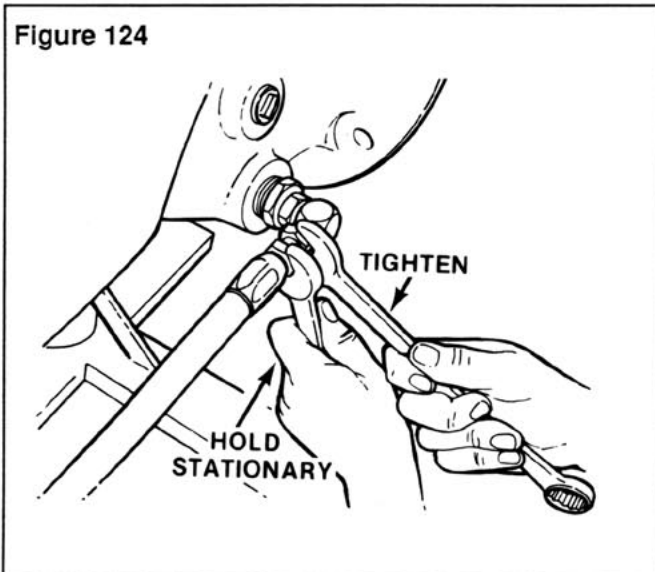
Section 5 Assembly

Figure 123



2. Install the elbow fitting into the tube adapter until it touches the bottom. Loosen the elbow until its opening is horizontal and is toward the front of the carrier. Tighten the elbow retainer nut to 20-30 lb-ft. **Figure 123.** **T**

Figure 124

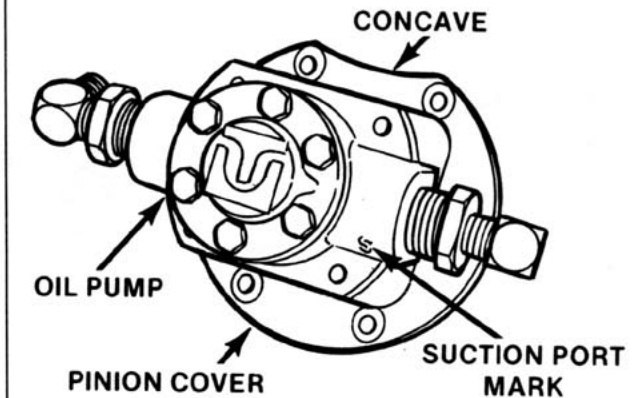


3. To connect the oil line to the elbow, install the adapter fitting on to the elbow. Hold the nipple (middle hex of fitting) stationary while you tighten the adapter to 20-30 lb-ft. **Figure 124.** **T**

Install Oil Pump Assembly (Pump Models Only)

1. Apply a 0.125 inch bead of silicone gasket material completely around the bottom of the oil pump and around all the fastener holes. See page 31.

Figure 125

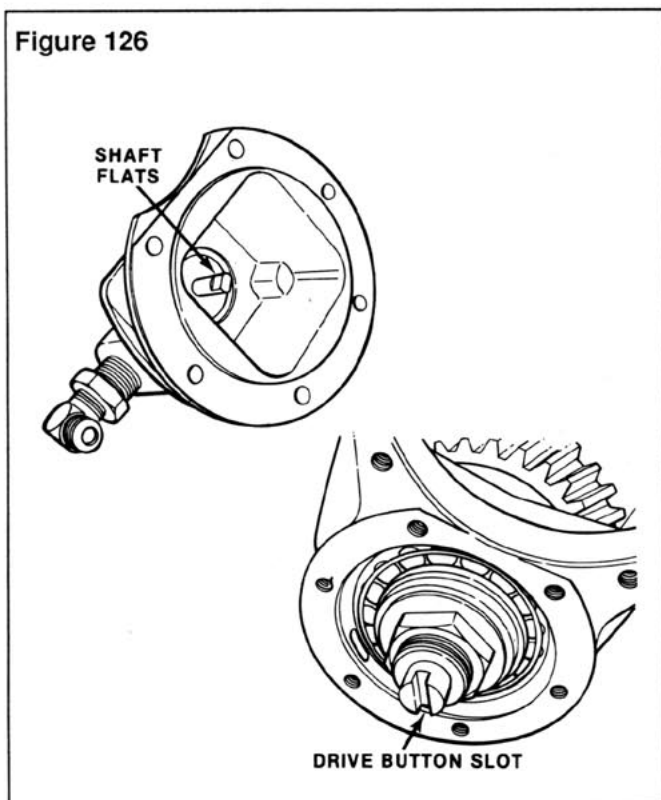


2. Hold the pinion cover with the concave edge of the mounting flange at the top. Put the pump in position on the cover so that the input port (marked "SUCTION" or "S") is toward the right. Install the capscrews and washers. Tighten the capscrews to 20-30 lb-ft. **Figure 125.**
3. Apply a 0.125 inch bead of silicone gasket material completely around the bottom of the pinion cover and around all the fastener holes. See page 31.

Section 5

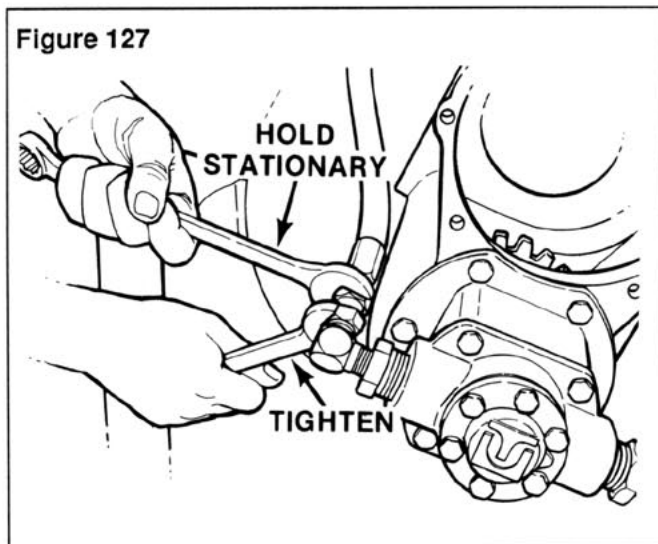
Assembly

Figure 126



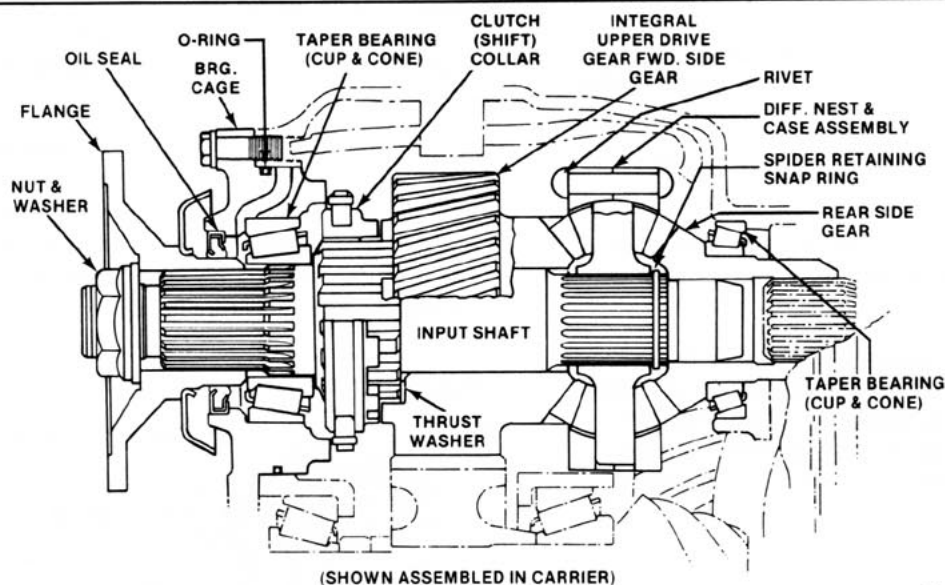
4. Put the pump and cover assembly over the drive pinion with the flats of the pump shaft engaged in the slot of the drive button on the pinion shaft. Rotate the cover as required until the concave edge of the flange fits the cage bore in the carrier. Install the capscrews and washers. Tighten the capscrews to 35-50 lb-ft. **Figure 126. T**

Figure 127



5. Connect both oil lines to their ports in the pump. Install the adapter fittings on to the elbows. Hold the nipple (middle hex of fitting) stationary while you tighten the adapters to 20-30 lb-ft. **Figure 127. T**

Figure 128



Assemble Inter-Axle Differential Assembly

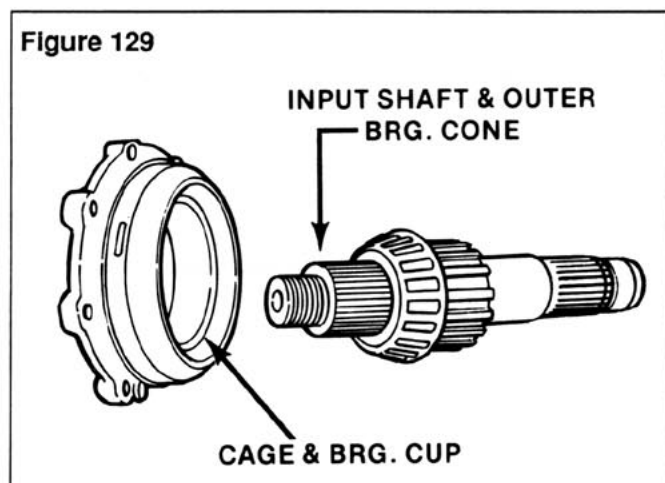
Current Models (Tapered Bearings)

NOTE:

Apply axle lubricant to the parts as they are being assembled.

1. Press the forward bearing cone on to the input shaft until it is flat against the shoulder. Use a sleeve that presses against the inner race only.

Figure 129



2. Press the forward bearing cup into the bearing cage until it is flat against the shoulder. Use a sleeve that presses against the back face of the cup. **Figure 129.**

3. Install a new oil seal into the bearing cage.

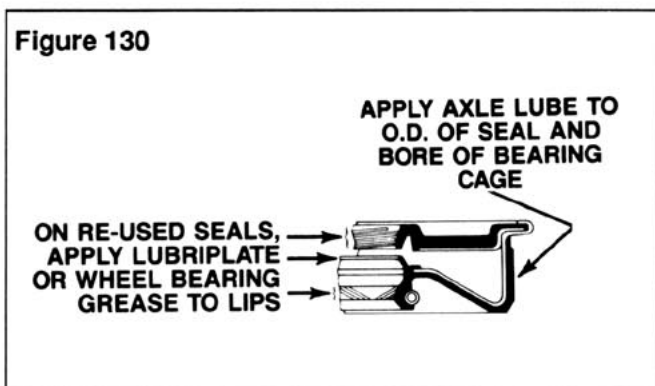
Single-Lip Oil Seals:

- A. Apply Lubriplate or wheel bearing grease to the lip of the seal.
- B. Apply a sealing compound on the outer surface of the seal.
- C. Install the oil seal into the bore in front of the bearing cage with a press and sleeve or seal driver and mallet. Press or tap the seal until it is even with the face of the cage.

Triple-Lip Oil Seals

- A. The old triple-lip seal can be installed into the bearing cage if the seal is not worn or damaged.

Figure 130



- B. Apply the same lubricant used in the axle housing to the outer surface of the seal and the seal bore in the bearing cage. **Figure 130.**

Section 2

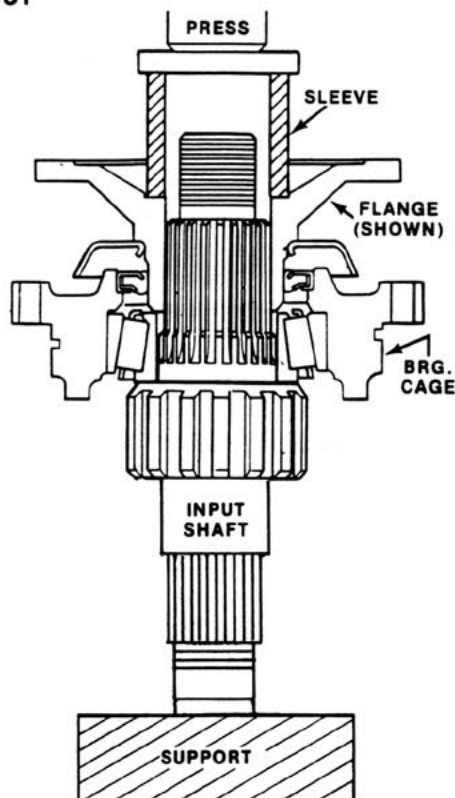
Disassembly

CAUTION:

Make sure that the seal lips are clean and free from dirt and particles that will cause a leak between the yoke and the seal.

- C. On re-used seals, apply Lubriplate or wheel bearing grease to the seal lips.
 - D. Install the seal into the bearing cage until the flange of the seal is flat against the face of the bearing cage.
 - E. After the seal is installed, a gap of .015-.030 inch (.38-.76 mm) between the flange and the bearing cage is acceptable. Check the gap with a feeler gauge at several points around the seal. The difference between the largest and smallest gap measurement must not be more than .010 inch (.25 mm).
4. If removed, install the O-ring in the groove on the O. D. of the bearing cage.

Figure 131



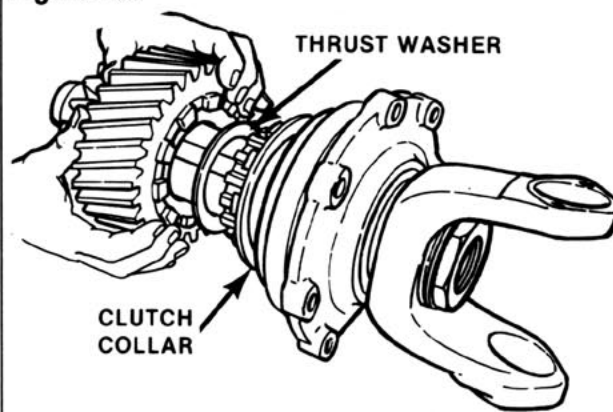
5. Put the cage in position over the input shaft against the forward bearing cone. Install the yoke or flange on to the shaft. **Figure 131.**

CAUTION:

Do not use a hammer and mallet to drive the yoke or flange on to the shaft. Damage to the splines will result.

6. Carefully align the splines of the yoke or flange with the splines of the input shaft. Use a press and sleeve or three-piece pilot tool (see page 32) for installation. Install the input shaft nut and washer and tighten the nut to the specified torque. See the Torque Chart on page 72. 

Figure 132



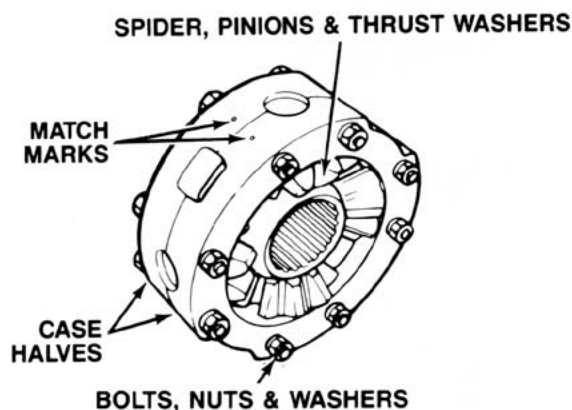
7. Put the clutch collar into position over the input shaft splines. The collar teeth must be toward the rear of the shaft and the smooth side of the collar next to the bearing. **Figure 132.**
8. Put the thrust washer in the pilot bore on the end of the helical drive gear. Install the gear and thrust washer on the input shaft so that the thrust washer is against the shaft shoulder.
9. If disassembled, assemble the inter-axle differential.

NOTE:

*Some inter-axle differential nests are contained in a welded case. These assemblies cannot be disassembled and require replacement as a complete assembly. If the disassembled case was held together with bolts or rivets, use Grade 8 service replacement bolts, nuts and washers to assemble the unit. **DO NOT USE RIVETS.***

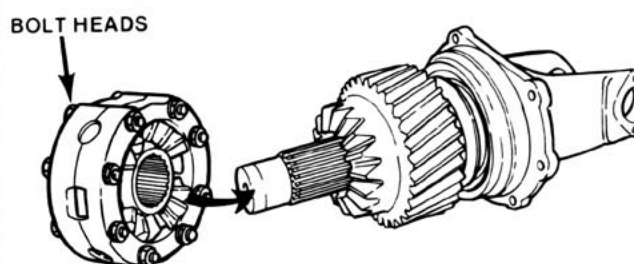
Section 5 Assembly

Figure 133



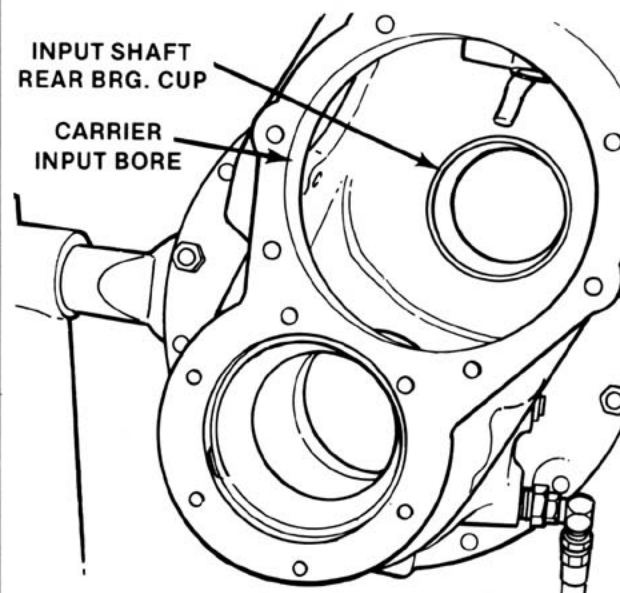
- A. Lubricate the inside of the case halves, spider, pinions and thrust washers with axle lubricant.
- B. Install the spider, pinions and thrust washers into one case half.
- C. Put the second case half in position over the assembly. Make sure that the match marks are aligned. **Figure 133.**
- D. Use four equally spaced bolts, nuts and washers to pull the case halves together.
- E. Install the remaining bolts, nuts and washers. Tighten all of the fasteners to 50-65 lb-ft. **T**

Figure 134



10. Install the inter-axle differential assembly on the input shaft with the bolt heads toward the rear. Engage the teeth of the pinions with the teeth on the helical drive gear. Install the retainer snap ring into the groove on the input shaft. **Figure 134.**
11. Press the rear bearing cone on to the hub part of the rear side gear until it is flat against the shoulder. Use a sleeve that presses only against the inner race of the bearing.

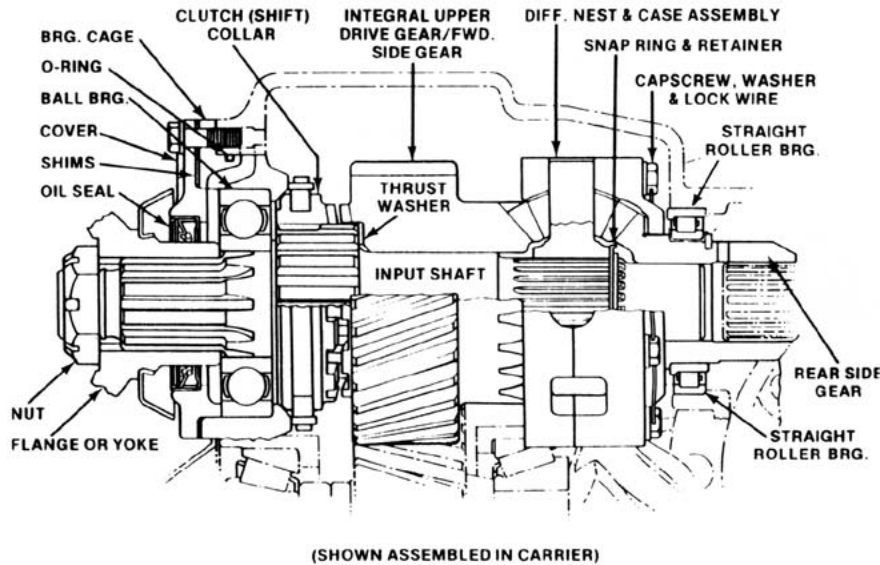
Figure 135



12. Press the rear bearing cup into its bore in the carrier until it is flat against the shoulder. **Figure 135.** If a press is not available, use a sleeve or long drift and hammer to tap the bearing cup into position.

Section 5 Assembly

Figure 136



Early Models (Ball and Straight Roller Bearings)

NOTE:

Apply axle lubricant to the parts as they are being assembled.

1. Press the ball bearing into the input bearing cage until the bearing touches the bottom of its bore. Use a sleeve that presses against the outer race only.



CAUTION:

Stop the press pressure when the bearing touches the bottom of the bore.

2. Press the input cage and bearing assembly on to the input shaft until it is flat against the shoulder on the shaft. Use a sleeve that presses against the inner race of the bearing only.
3. Press a new oil seal into the bearing cage cover until the seal touches the bottom of its bore.



CAUTION:

Stop the press pressure when the seal touches the bottom of the bore.

4. Apply Lubriplate or the grease used on wheel bearings to the seal lips and cavities between the lips.
5. If removed, install the cage to carrier O-ring in the groove on the O.D. of the bearing cage.
6. Put the cover and oil seal assembly, less shims, in position over the bearing cage on the input shaft.

7. Install the yoke or flange on to the input shaft splines and push it against the ball bearing. Be careful that you do not damage the oil seal. If it is difficult to install the yoke or flange by hand, use a press and sleeve for installation.

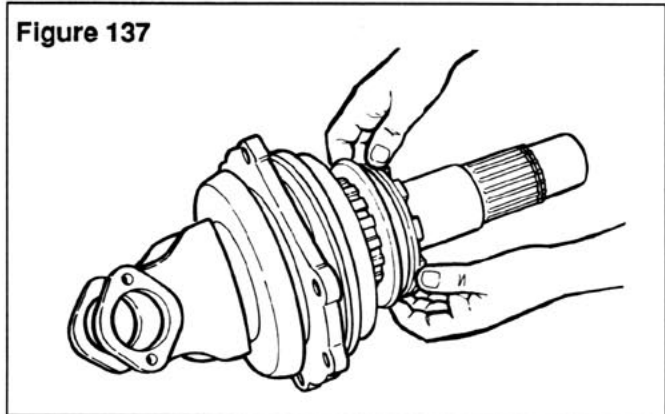
8. Tighten the yoke or flange nut and washer, if used, to the specified torque. See Torque Chart on page 72. **T**



CAUTION:

Do not use a hammer or mallet to drive the yoke or flange on to the shaft. Damage to the splines will result.

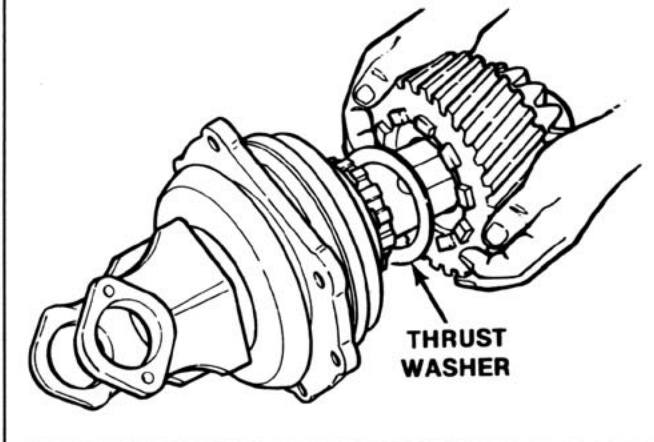
Figure 137



9. Install the clutch collar on to the input shaft with the smooth side of the collar next to the cage. **Figure 137.**

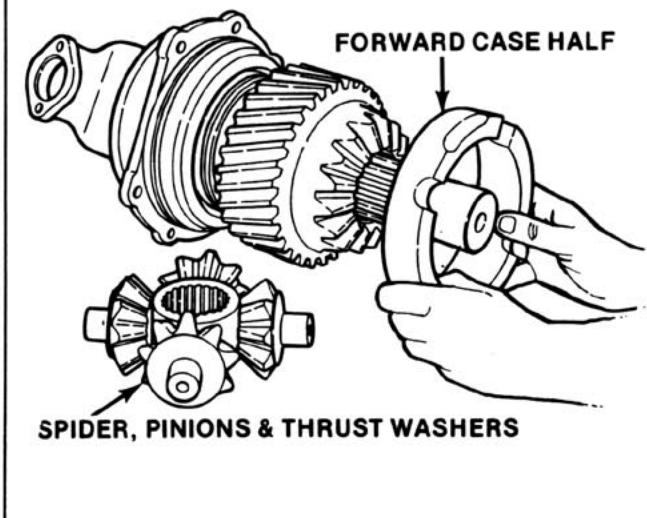
Section 5 Assembly

Figure 138



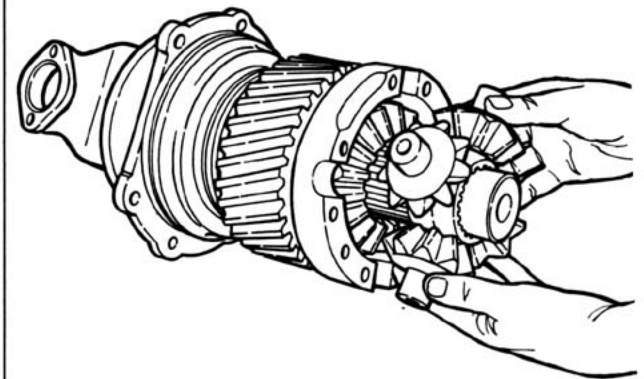
10. Install the thrust washer and helical gear on to the input shaft against the shoulder. The side gear part of the helical gear must face out. **Figure 138.**
11. If disassembled, assemble the inter-axle differential.
 - A. Lubricate the inside of the case halves, spider, pinions and thrust washers with axle lubricant.

Figure 139



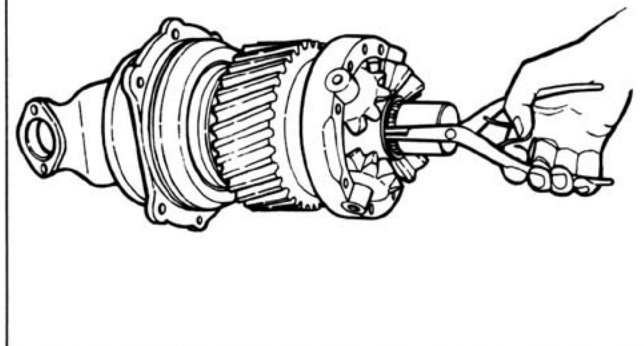
- B. Install the forward case half of the inter-axle differential over the side gear part of the helical gear. **Figure 139.**

Figure 140



- C. Install the spider, pinions and thrust washers over the splines of the input shaft and into the forward case half. **Figure 140.**

Figure 141

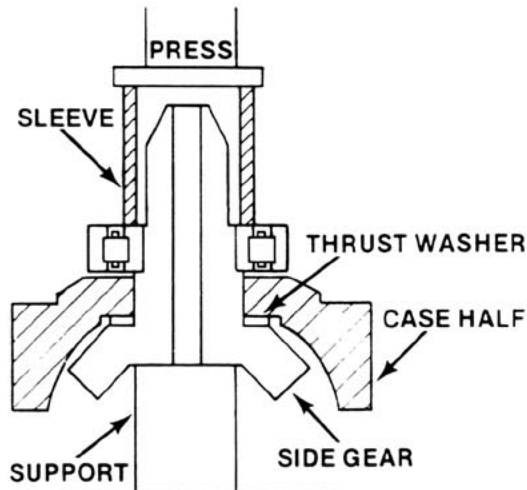


- D. Install the retainer on to the input shaft against the spider. Install the snap ring in the groove on the input shaft. **Figure 141.**

Section 5

Assembly

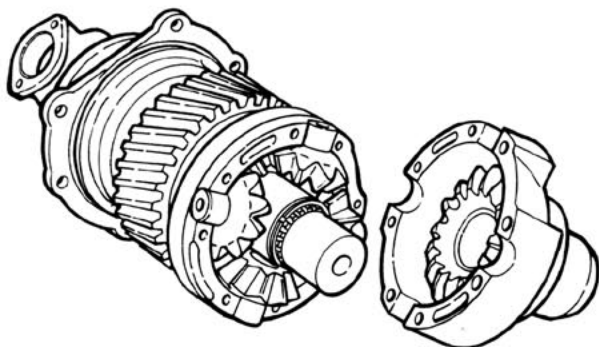
Figure 142



E. Assemble the rear side gear, thrust washer and case half together and put the assembly in a press with the gear teeth at the bottom. Support the side gear with a round steel bar at the gear hub inner shoulder. The support must be high enough to permit the case half to rest on the thrust washer at the back of the side gear. **Figure 142.**

F. Press the inner race of the roller bearing on to the side gear hub so that the bearing is flat against the shoulder of the case half.

Figure 143



G. Install the rear side gear and case half assembly on to the input shaft. Make sure that the match marks of both case halves are aligned. **Figure 143.**

H. Use four equally spaced capscrews to pull the case halves together.

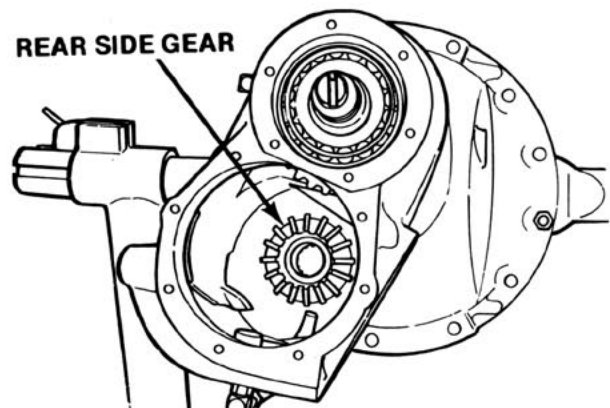
I. Apply four or five drops of Meritor Liquid Adhesive 2297-C-3747 or Loctite 277 to the threaded capscrew holes and install the remaining capscrews. Tighten all of the fasteners to the torque specified in the Torque Chart on page 72. Install the lockwire, if used, through the capscrew heads. **T**

9. Press the outer race (with rollers) of the bearing into the bore of the carrier. Use a sleeve that presses only against the outer race.

Install Input Shaft Assembly Into Carrier

1. Put the differential carrier in a repair stand so that the the ring gear is toward the floor.

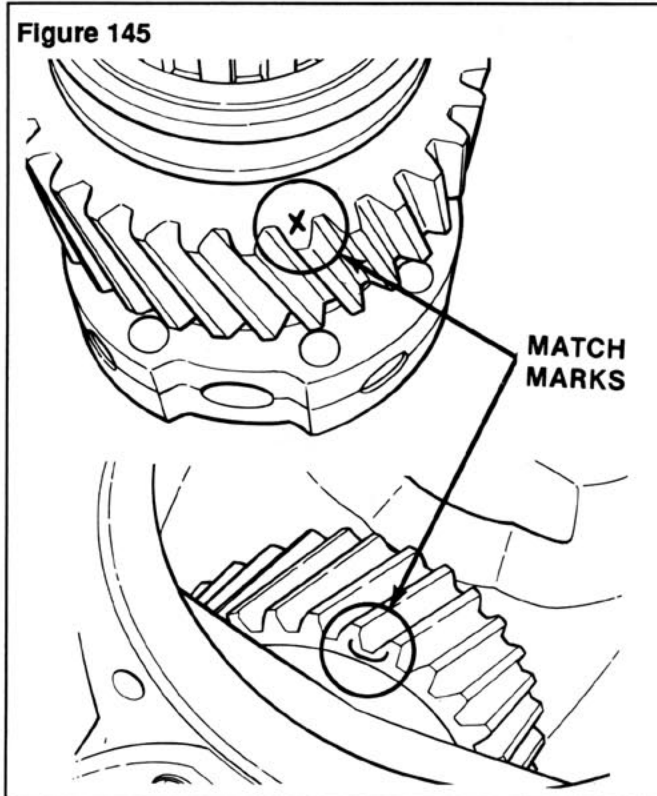
Figure 144



2. Install the rear side gear and bearing cone assembly into the bearing cup installed into the carrier. **Figure 144.**

Section 5 Assembly

Figure 145

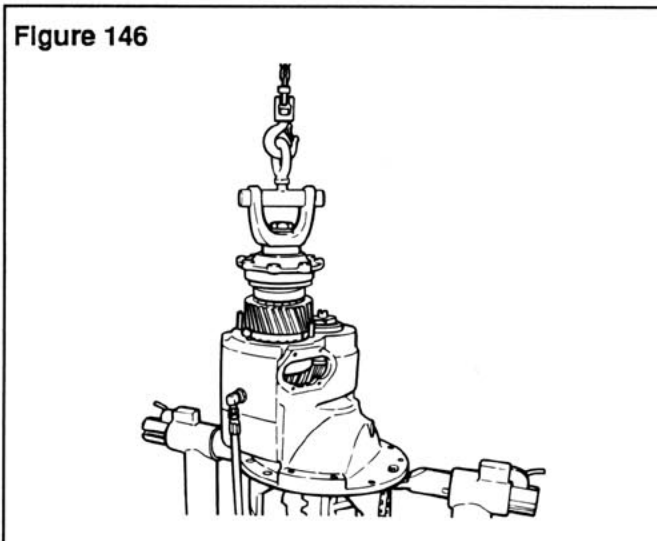


NOTE:

The production drive and driven helical gears are match marked. One gear tooth is marked with an "X" and one gear tooth space is marked with a "U". These marks **MUST** be aligned for correct gear contact. Figure 145.

3. Connect a lifting device or chain fall to the input yoke or flange. Lift the input shaft assembly over the bore in the differential carrier.

Figure 146



4. Carefully lower the assembly into the carrier making sure that the match marks on two helical gears are aligned. This can be done by viewing and rotating the gears through the shift unit opening at the side of the carrier. Figure 146.

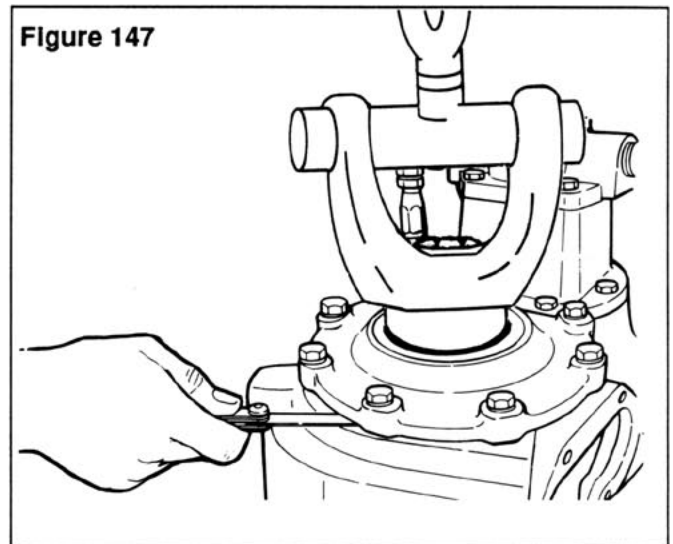
Adjust Input Shaft End Play

Specification:

End Play of the Input Shaft: 0.002-0.008 Inch (0.05-0.20 mm)

1. Put a wood block between the ring gear and the differential case to keep the ring gear from rotating.
2. Install the capscrews but not the washers that fasten the input bearing cage to the carrier. Rotate the input shaft several revolutions in each direction to seat the bearings while tightening the capscrews by hand. **DO NOT TIGHTEN THE CAPSCREWS TO THE SPECIFIED TORQUE.**

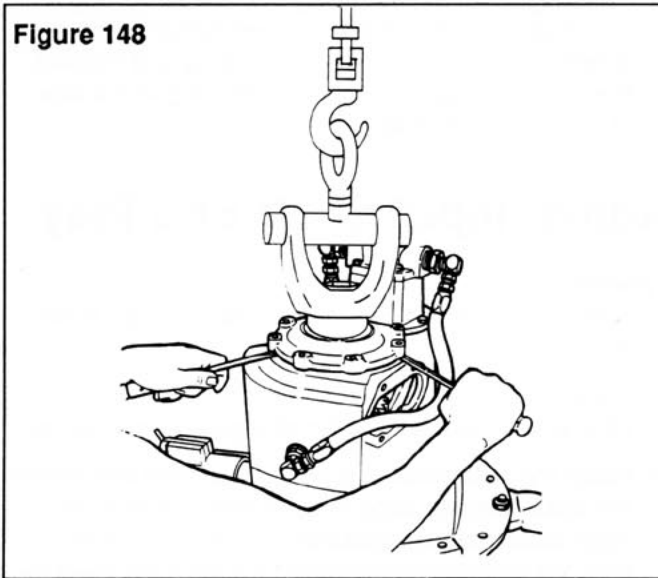
Figure 147



3. Use a feeler gauge to measure the gap between the input bearing cage and the differential carrier. Check the gap at four equally spaced places on the cage. Figure 147.
4. Add up the four measurements and determine the average gap between the cage and the carrier. Add .003 inch (0.76 mm) to the average gap measurement to determine the size of the shim pack between the cage and the carrier.
5. Use at least three shims to build a shim pack. Put the thickest shims in the middle of the shim pack.

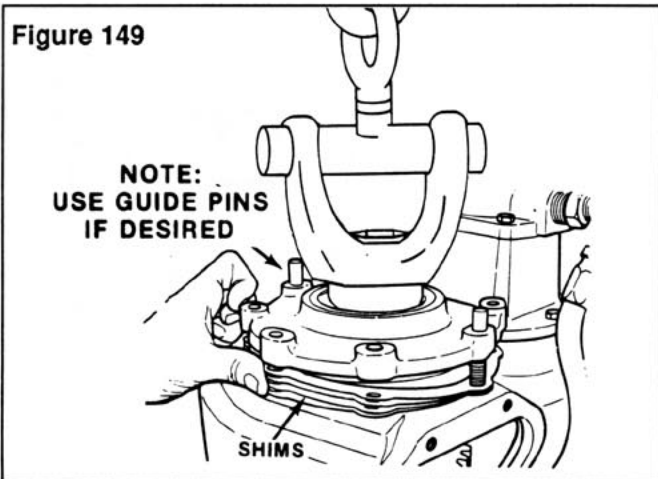
Section 5 Assembly

Figure 148



6. Remove the capscrews from the carrier and lift the input shaft approximately two inches (50 mm).
Figure 148.

Figure 149



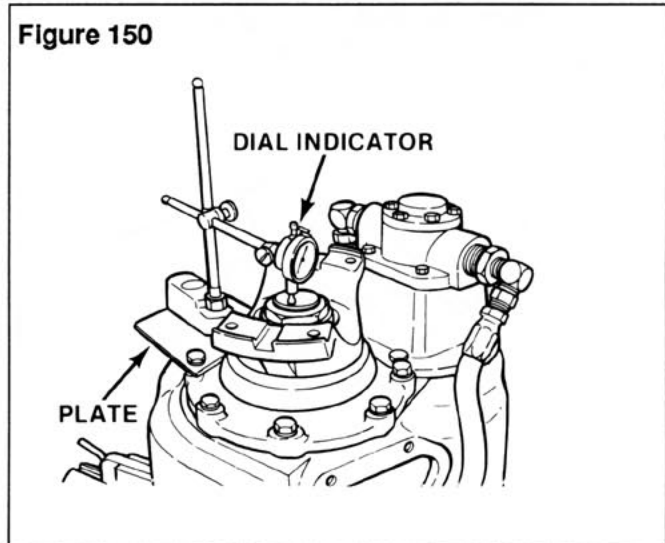
7. Install the shim pack under the bearing cage. Make sure that the holes of the shim pack match the holes in the cage. Use guide pins if desired. **Figure 149.**
8. Lower the input shaft assembly into the carrier being careful that you do not damage the oil seal. Install the cage to carrier capscrews and washers. Tighten the capscrews to 60-75 lb-ft while rotating the input shaft in both directions to seat the **T** bearings.
9. Remove the block of wood from between the ring gear and the differential carrier.
10. Put a holding tool on the input yoke or flange and install the nut and washer on the input shaft.

Tighten the nut to the specified torque. See the Torque Chart on page 72. **T**

11. Check the end play of the input shaft according to the following procedure:

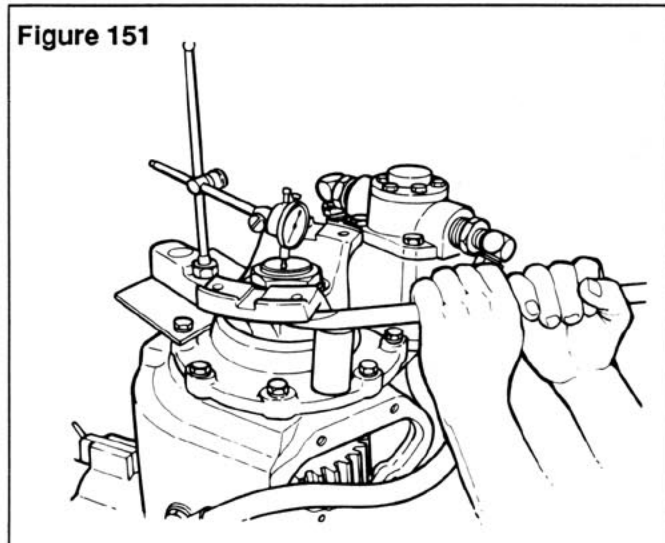
- A. Rotate the input shaft in each direction and push the yoke or flange toward the bearing cage. This makes sure that the input shaft assembly is at the bottom of its travel.

Figure 150



- B. Fasten a plate to the bearing cage using one of the attaching capscrews. Mount a dial indicator on the plate with the pointer of the dial indicator against the top of the input shaft. Set the dial indicator to zero (0). **Figure 150.**

Figure 151

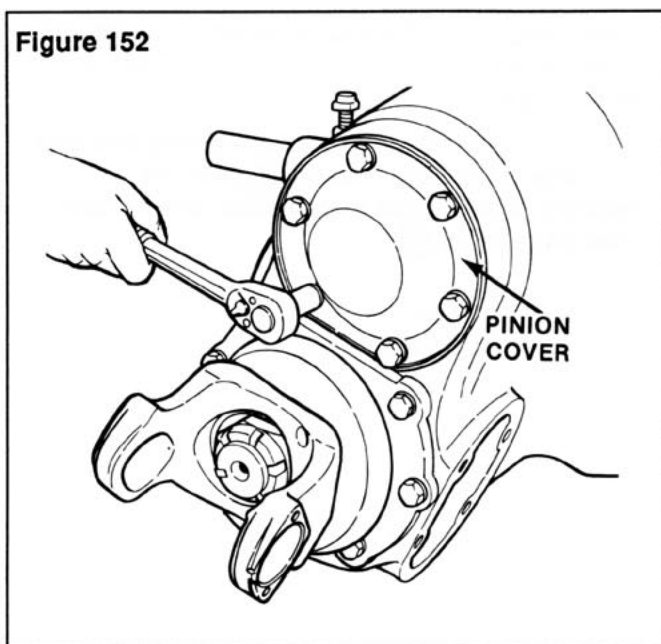


- C. Use a pry bar and a support to push the yoke or the flange away from the carrier. Read the dial

indicator. The reading must be 0.002-0.008 inch (0.05-0.20 mm). **Figure 151.**

12. If the end play of the input bearing is not within the correct range, add or remove shims from the shim pack. Add shims to increase end play and remove shims to decrease end play. See Steps 7 through 11 of this section.

Figure 152



13. If the axle does not have an external oil pump, install the drive pinion cover and gasket or silicone gasket material. (See "Application of Silicone Gasket Material" on page 31). **Figure 152.**

Install Ring Gear Thrust Screw

NOTE:

Early models of these axles used an adjusting screw and thrust block combination instead of only a thrust screw. Correct clearance adjustment for both types is the same. If the carrier does not have a thrust block, start at Step 3.

Specification:

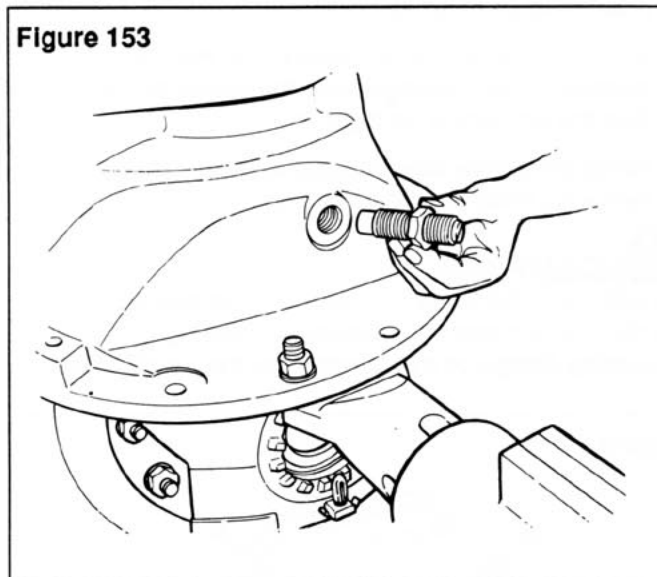
Clearance between thrust screw or (thrust block) and ring gear: .025-.035 inch (.635-.889 mm).

1. If a thrust block is used, put the carrier in the repair stand with the back face of the ring gear on top.
2. Apply grease to the face of the thrust block and put it on the back face of the ring gear. Rotate the ring

gear until the hole in the thrust block is aligned with the adjusting screw hole in the carrier.

3. Install the jam nut on the thrust screw approximately one half the distance between both ends.

Figure 153



4. Install the thrust screw into the carrier until the screw stops against the ring gear (or bottom of the hole in the thrust block). **Figure 153.**
5. To get the correct clearance adjustment of .025-.035 inch (.635-.889 mm) loosen the thrust screw 1/2 turn (180°).
6. Hold the thrust screw in position and tighten the jam nut against the carrier to 150-190 lb-ft (203-258 N.m). **T**

Install Differential Carrier Into Axle Housing



WARNING:

Be careful when you use cleaning solvents. Follow the instructions supplied by the solvent manufacturer for safe use.

1. Clean the inside of the axle housing and the mounting surface where the carrier fastens. Use a cleaning solvent and rags to remove dirt. Blow dry the cleaned areas with air. See the procedure on page 26.
2. Inspect the axle housing for damage. Repair or replace the axle housing. See the procedure on page 28.

Section 5

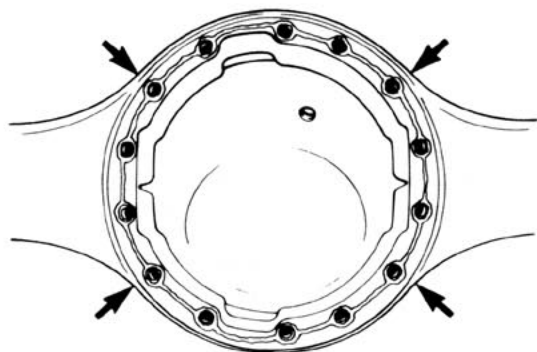
Assembly

3. Check for loose studs in the mounting surface of the housing where the carrier fastens. Remove and clean the studs that are loose. Apply liquid adhesive to the stud holes and install the clean studs tightened to the last thread. See the procedure on page 30.
4. Apply silicone gasket material to the mounting surface of the housing where the carrier fastens. See the procedure on page 31.
5. Install the carrier into the axle housing. Use a hydraulic roller jack or a lifting tool.

CAUTION:
Do not use a hammer or a mallet to install the carrier. A hammer or a mallet will damage the mounting flange of the carrier and cause oil leaks.

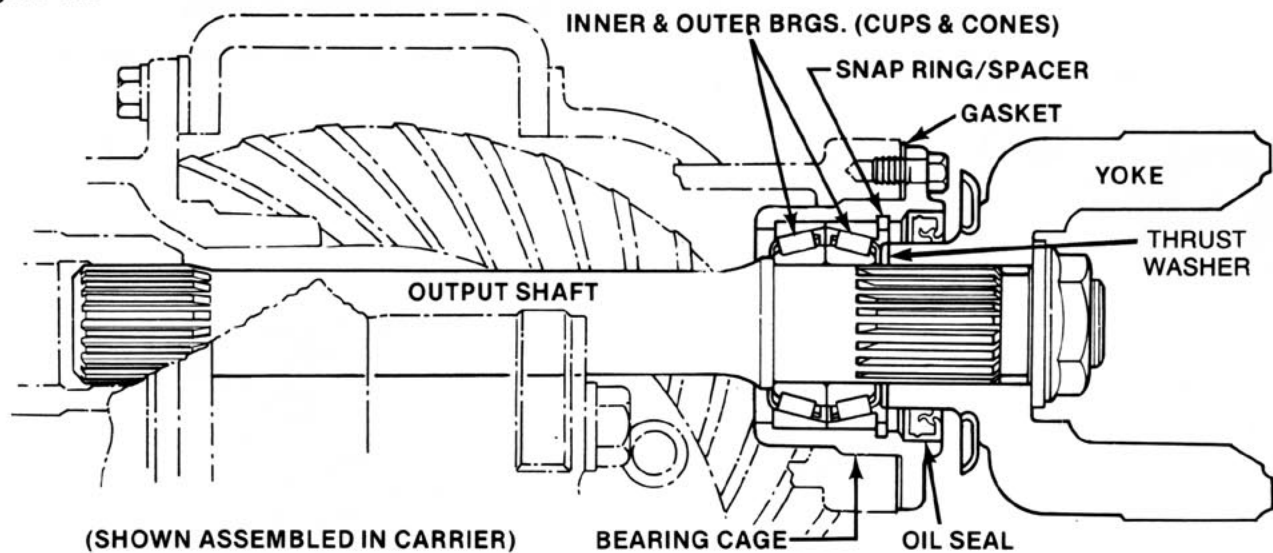
6. Install the nuts and washers in the four corner locations around the carrier and the axle housing. **Figure 154.** Tighten the fasteners by hand. **DO NOT TIGHTEN TO THE SPECIFIED TORQUE.**
7. Carefully push the carrier into position. Tighten the four fasteners two or three turns each in a pattern opposite each other.
8. Repeat Step 6 until the four fasteners are tightened to the correct torque value. See Torque Chart on page 72. **T**
9. Install the other fasteners and the washers that hold the carrier in the axle housing. Tighten the fasteners to the correct torque value. See Torque Chart on page 72. **T**

Figure 154



Section 5 Assembly

Figure 155



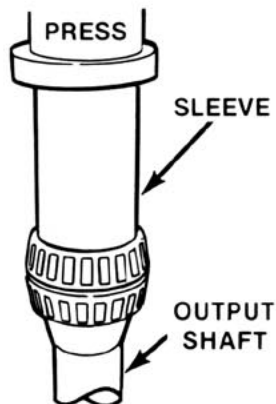
Assemble Output Shaft, Bearings and Seal

Current Models (Tapered Bearings)

NOTE:

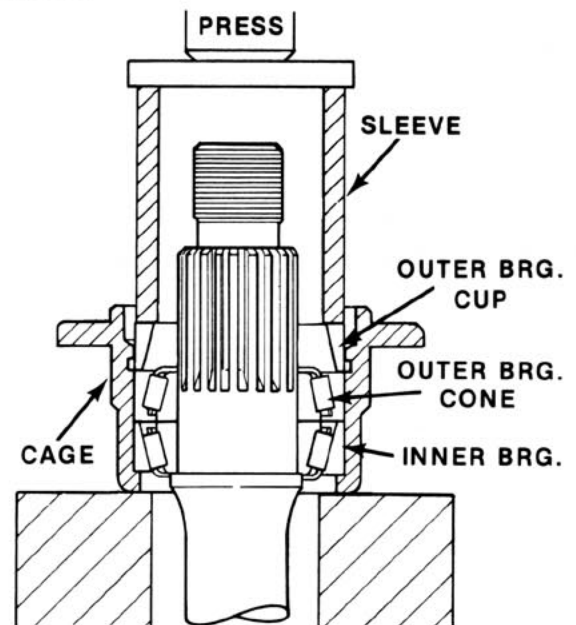
Apply axle lubricant to the parts as they are being assembled.

Figure 156



1. If removed, press both the inner and outer bearing cones, back to back, on the output shaft. Use a press and a sleeve to install both cones. Apply pressure until the inner cone touches the shoulder of the output shaft. **Figure 156.**
2. Use a press and sleeve to install the inner bearing cup in the bearing cage.

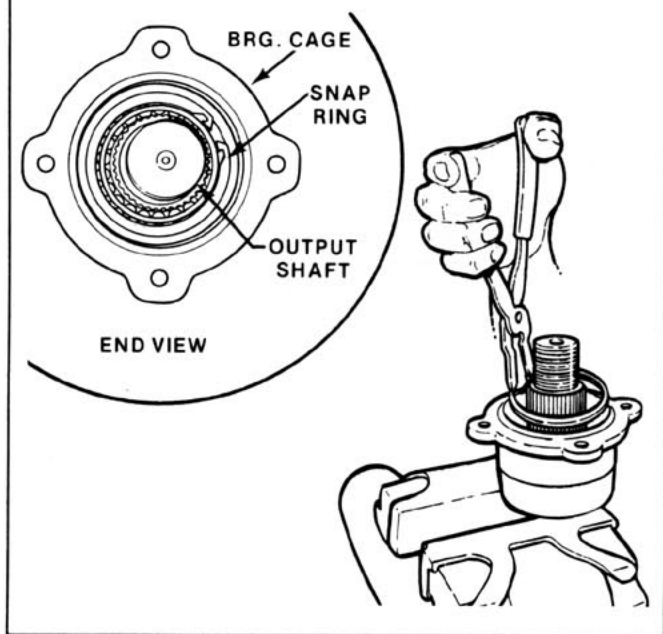
Figure 157



3. Put the output shaft in the bearing cage so that the inner bearing cone on the shaft is in position in the bearing cup in the cage. **Figure 157.**
4. Use a press and a sleeve to install the outer bearing cup into the cage against the outer bearing cone.

Section 5 Assembly

Figure 158



6. Install the retainer snap ring in the groove of the bearing cage I. D. **Figure 158**. Install the yoke to cone thrust washer on the output shaft.

Adjust Output Bearings (Tapered bearings only)

Specification:

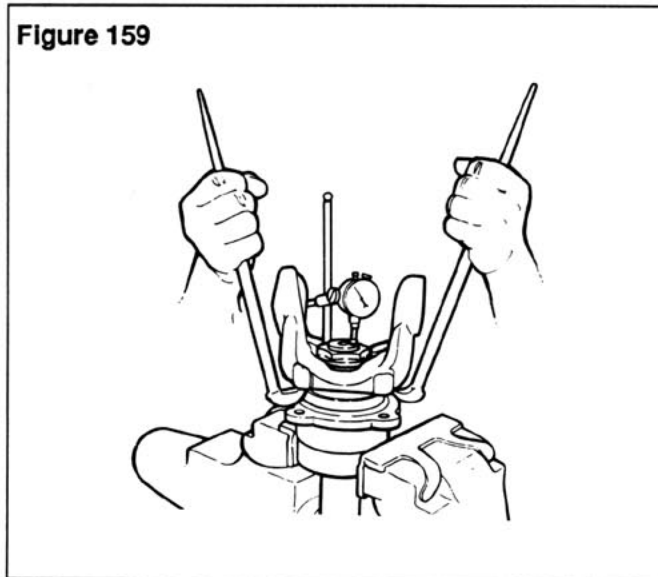
.001-.004 Inch (.025-.10 mm) end play

The bearing end play of the output shaft is controlled by the size of the snap ring that holds the bearings in the output cage. The snap rings are available in several different sizes.

1. Put the output shaft and cage assembly in a vise with soft metal covers on the jaws of the vise. Clamp the assembly at the shaft.
2. Use an installation tool to install the yoke or flange on the output shaft. **DO NOT INSTALL THE OIL SEAL AT THIS TIME.**
3. Install the nut that fastens the yoke or flange to the output shaft. Put a holding tool on the yoke or flange and tighten the nut to the torque specified in the Torque Chart on page 72. **T**
4. Move the shaft and cage assembly in the vise so that the assembly is clamped at the bearing cage.

5. Push the yoke or flange hard toward the cage and rotate the shaft in each direction to make sure that the bearings are correctly installed.

Figure 159



6. Install a dial indicator so that the base of the indicator is on the mounting flange of the cage. The pointer of the indicator must touch the yoke or flange end of the shaft. Adjust the dial indicator to the zero (0) setting. **Figure 159**.
7. Put pry bars under the yoke or flange and pull the yoke or flange away from the cage. The reading on the dial indicator is the measurement of the end play on the output bearing.
8. If the end play exceeds the .004 inch (.10 mm) limit, remove and replace the snap ring that fastens the bearings in the cage. A thicker snap ring will decrease end play and a thinner snap ring will increase end play.
9. After correct adjustment is made, remove the yoke or flange from the shaft with a yoke or flange puller.
10. Install a new oil seal into the bearing cage as required.

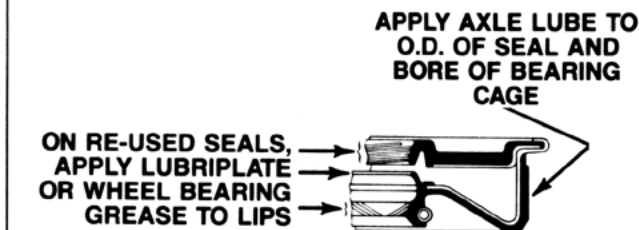
Single-Lip Oil Seals:

- A. Apply Lubriplate or wheel bearing grease to the lip of the seal.
- B. Apply a sealing compound on the outer surface of the seal.
- C. Install the oil seal into the bore of the bearing cage with a press and sleeve or seal driver and mallet. Press or tap the seal until it is even with the face of the cage.

Triple-Lip Oil Seals:

- A. The old triple-lip seal can be installed back into the bearing cage if the seal and yoke are not worn or damaged.

Figure 160



- B. Apply the same lubricant used in the axle housing to the outer surface of the seal and the seal bore in the bearing cage. **Figure 160.**

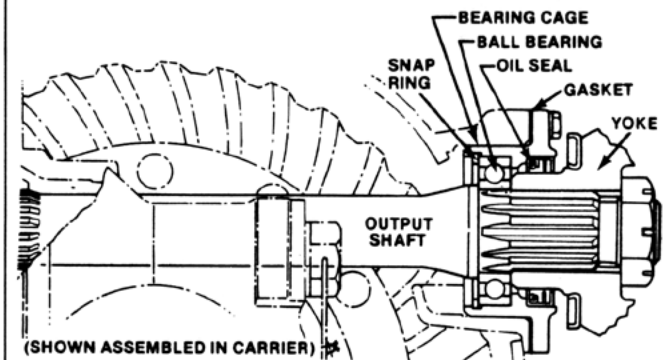


CAUTION:

Make sure that the seal lips are clean and free from dirt and particles that will cause a leak between the yoke and seal.

- C. On re-used seals, apply Lubriplate or wheel bearing grease to the seal lips.
- D. Install the seal into the bearing cage until the flange of the seal is flat against the face of the bearing cage.
- E. After the seal is installed, a gap of .015-.030 inch (.38-.76 mm) between the flange and bearing cage is acceptable. Check the gap with a feeler gauge at several points around the seal. The difference between the largest and smallest gap measurement must not be more than .010 inch (.25 mm).
13. Squirt axle lubricant through the inner and outer openings of the bearing cage while rotating the bearings.
14. After the bearings are oiled, pack them with Meritor Specification 0-622 grease. Use a grease gun with a flexible nozzle to pack the bearing cavities.

Figure 161

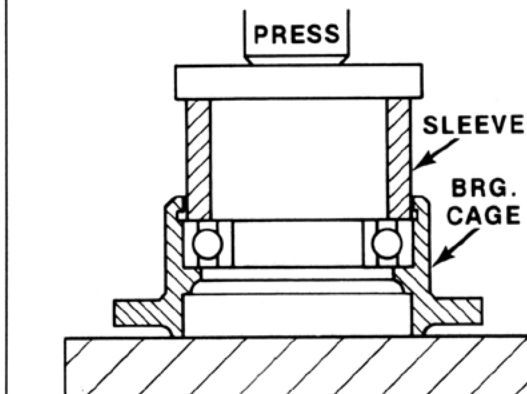


Early Models (Ball Bearings)

NOTE:

Apply axle lubricant to the parts as they are being assembled.

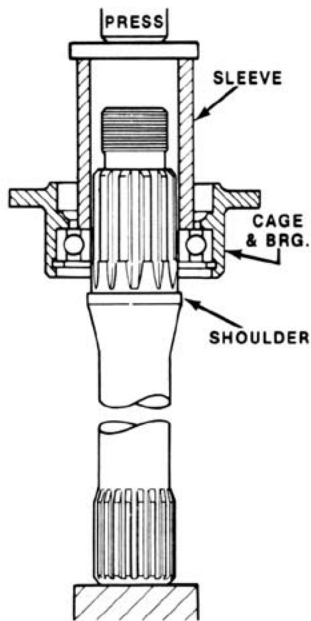
Figure 162



1. Press the output bearing into the bearing cage until it is flat against the bottom of the bore. Use a sleeve that presses against the outer race only. **Figure 162.**
2. Install the snap ring into the groove in the I.D. of the bearing cage.

Section 5 Assembly

Figure 163



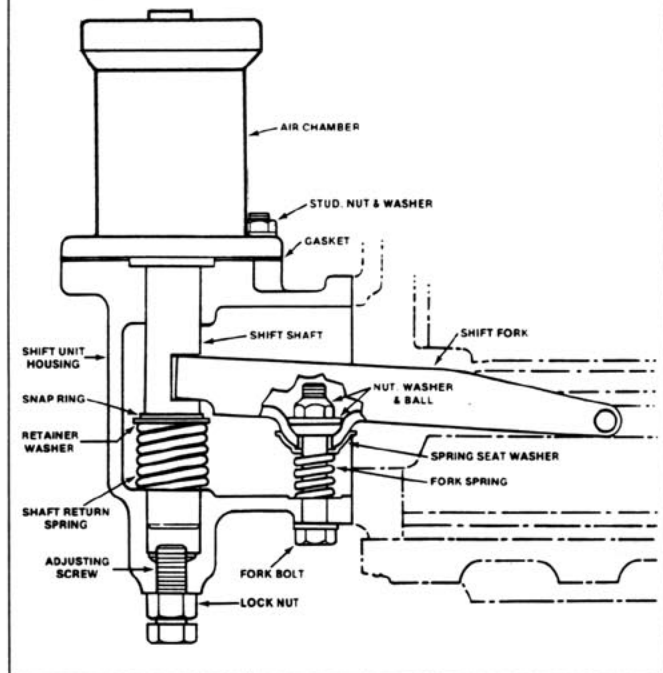
3. Press the cage and bearing assembly over the splines of the threaded end of the output shaft until it is flat against the shoulder on the shaft. Use a sleeve that presses against the inner race of the bearing only. **Figure 163.**
4. Apply Lubriplate or wheel bearing grease to the lips of a new oil seal.
5. Apply a sealing compound on the outer surface of the seal.
6. Install the seal into the bearing cage with a mallet and sleeve. Tap the sleeve until the seal is flat against the bottom of the bore.

Install Output Shaft Assembly Into Housing

1. Install the output shaft assembly and gasket into the rear of the axle housing. If necessary, rotate the shaft to align the splines of the shaft with the splines of the inter-axle differential rear side gear.
2. Assemble the bearing cage to the housing with the capscrews and washers tightened to the correct torque. See Torque Chart on page 72. **T**
3. Install the yoke or flange on to the output shaft. Use a press and sleeve or a three-piece pilot tool. (See page 32 for installation).

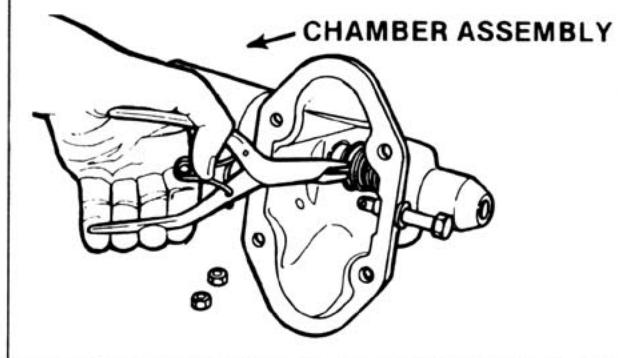
Assemble Inter-Axle Differential Shift Unit

Figure 164



1. Put a new air chamber gasket over the the studs on the chamber mounting surface of the shift unit housing.

Figure 165

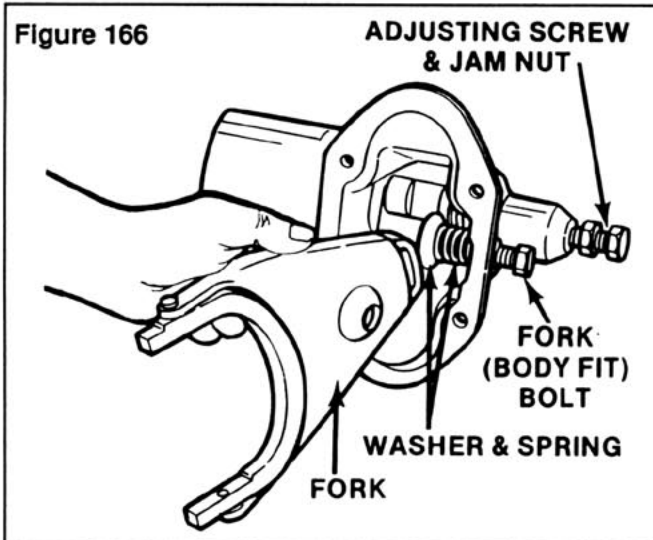


2. Push the chamber and shaft part way into the shift unit housing. When the shaft enters the housing, slide the snap ring over shaft and into its groove. **Figure 165.**
3. Slide the spring retainer washer and the spring on to the shaft against the snap ring.

Section 5 Assembly

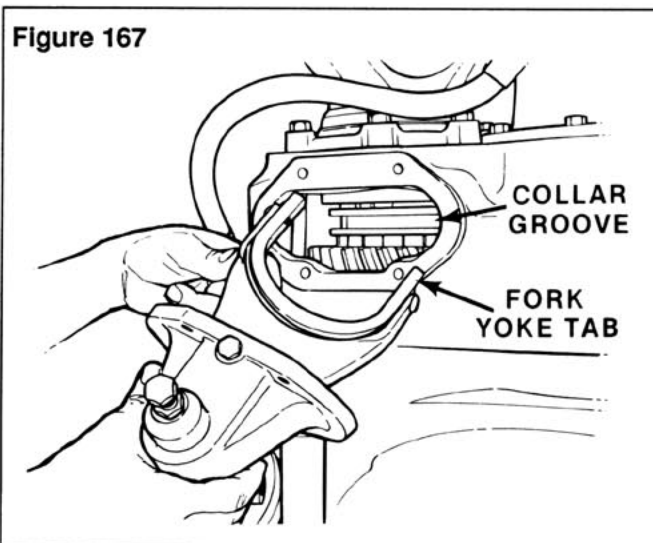
4. Install the shaft completely into the shift housing until it mates with the studs and gasket. Fasten the chamber to the housing with the nuts and washers. Tighten the stud nuts to the specified torque. See the Torque Chart on page 72. **T**

Figure 166



5. Install the shift shaft adjusting screw and jam nut into the end of the shift unit housing. **Figure 166.**
6. Install the fork bolt part way into the housing. From inside of the housing, slide the spring, spring seat washer, shift fork and fork ball on to the bolt. Engage the end of the shift fork with the slot in the shift shaft.
7. Hold the components in position and tap the bolt completely into the housing. Fasten all parts with the nut and cotter key, if used. Tighten the nut to the specified torque. See Torque Chart on page 72.

Figure 167

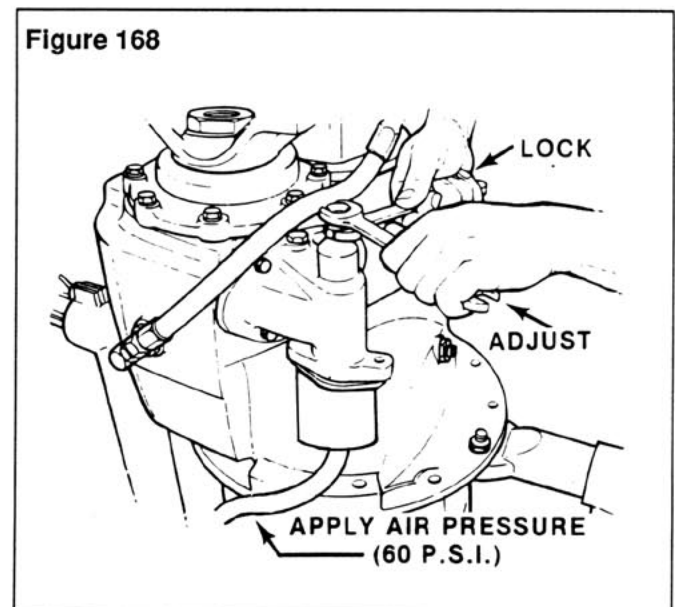


8. Install the shift unit assembly and a new gasket on to the carrier. When the shift fork enters the carrier, make sure that the yoke tabs engage with the clutch (shift) collar. **Figure 167.**
9. Fasten the shift unit assembly to the carrier with the capscrews and washers. Tighten the capscrews to the specified torque. See the Torque Chart on page 72. **T**

Adjust Shift Shaft

1. Attach a 60 P.S.I. auxiliary air supply to the shift unit chamber.
2. Loosen the shift shaft adjusting screw enough to permit the shaft to move back to its maximum stroke when the air pressure is applied.
3. Apply and hold the air pressure to the air chamber to engage the clutch collar with the helical drive gear.
To make sure of complete engagement between the clutch collar and gear, rotate either the input or output shafts as the air is applied. A clap sound and a resistance to the shaft rotation will indicate engagement.

Figure 168



4. While the air pressure is still being held, tighten the adjusting screw until it touches the end of the shift shaft. After contact with the shaft is made, tighten the screw an additional 3/4 to 1 1/4 revolutions. This will move the tabs on the shift fork to the center of the groove on the clutch collar. **Figure 168.**
5. Tighten the lock nut to 150-190 lb-ft. **T**

Section 5

Assembly

6. Release the air pressure and check for correct disengagement of the clutch collar. Hold the input shaft stationary while rotating the output shaft. If the shift unit is correctly adjusted, the output shaft will turn freely.
7. Check the complete shift by repeating Steps 12 and 15. If any problems occur, check for the cause and repeat Steps 10 through 15. When shift is correct, remove the auxiliary air supply.
8. Connect the driveline universal joints to the yokes or flanges on the axle.
9. Install the gaskets and axle shafts into the axle. The gasket and flange of the axle shaft **MUST** fit flat against the wheel hub.
10. Install the tapered dowels over each stud and into the flange of the axle shaft. Use a punch or drift and hammer if necessary.
11. Install Grade 8 nuts and lockwashers on the studs. Tighten the stud nuts to the correct torque. See Torque Chart on page 72. 

Lubricants

1. Drive Units:

The lubricants used for differentials in all Meritor drive axles must be SAE designation API-GL-5 that are approved under military specification MIL-L-2105C. Choose any one of the lubricants as required by outside temperature. (See chart below.)

2. Output bearings:

All of the Hypoid Gear oils listed below plus 0-622 bearing grease.

2. Heavy-duty on-highway, on/off highway and off-highway service:

Check lubrication levels every 1000 miles (1600 km). Drain and refill to bottom of filler hole every 25,000 to 30,000 miles (40,000 to 48,000 km) when yearly mileage is more than 60,000 miles (96,000 km). If yearly mileage is less than 60,000 miles (96,000 km), change the lubricant twice a year (spring and fall).

3. Regular on-highway common carrier service:

Change lubricant every 100,000 miles (160,000 km) or once a year if mileage is less than 100,000 miles (160,000 km).

4. Output bearings:

At overhaul time only, coat the bearings with axle lubricant and then pack the bearings with 0-622 bearing grease. (See page 67).

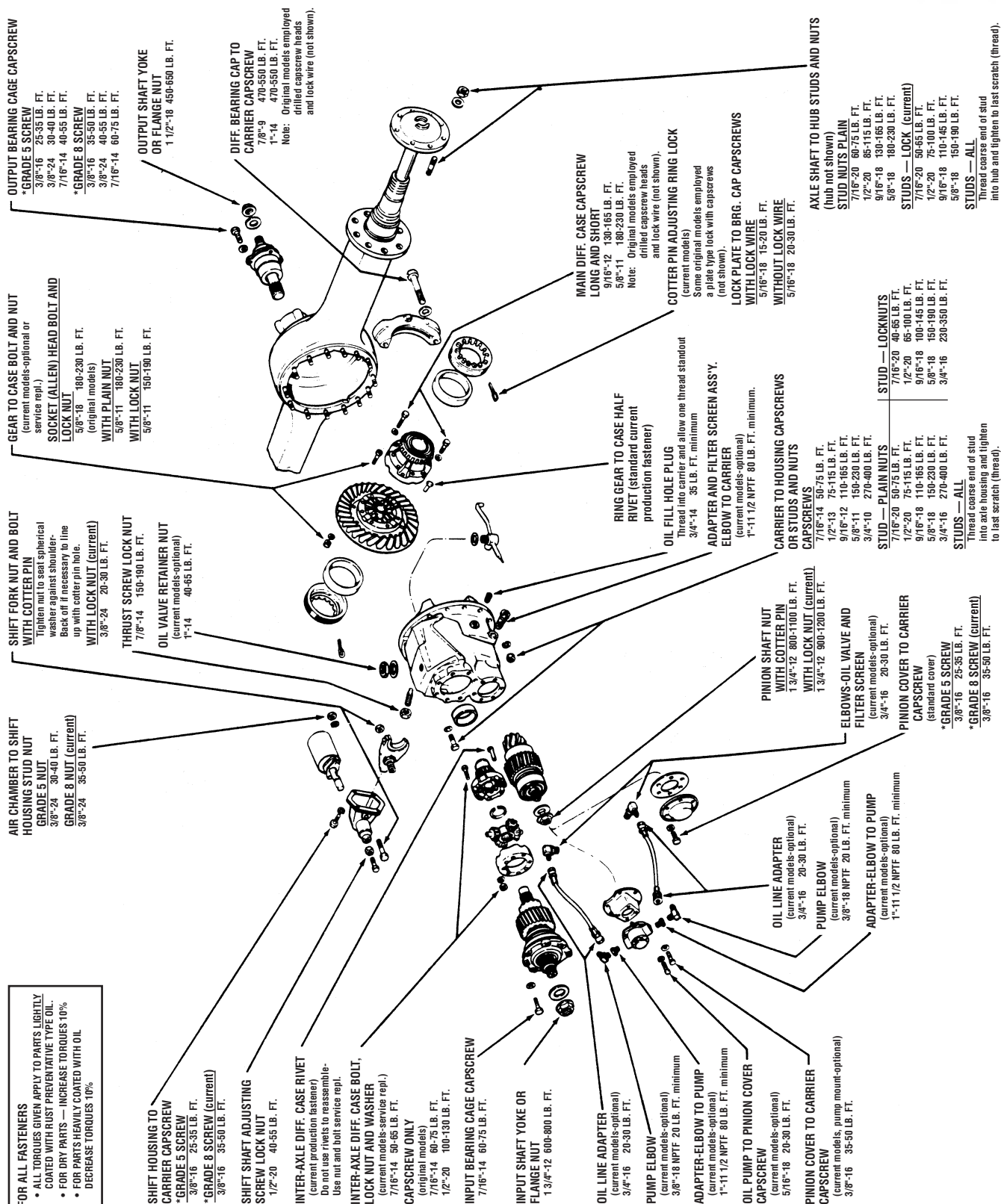
Lubrication Frequencies

1. All new and reconditioned units:

Drain and refill the initial lubricant after the first 1000 miles (1600 km) but never later than 3000 miles (4800 km). Drain the lubricant while the unit is still warm.

Meritor Lubricant Specification	Description	Cross Reference	Minimum Outside Temperature	Maximum Outside Temperature
0-76-A	Hypoid Gear Oil	GL-5, S.A.E. 85W/140	+ 10°F (- 12.2°C)	- - -**
0-76-B	Hypoid Gear Oil	GL-5, S.A.E. 80W/140	- 15°F (- 26.1°C)	- - -**
0-76-D	Hypoid Gear Oil	GL-5, S.A.E. 80W/90	- 15°F (- 26.1°C)	- - -**
0-76-E	Hypoid Gear Oil	GL-5, S.A.E. 75W/90	- 40°F (- 40°C)	- - -**
0-76-J	Hypoid Gear Oil	GL-5, S.A.E. 75W	- 40°F (- 40°C)	+ 35°F (+ 1.6°C)
0-76-L	Hypoid Gear Oil	GL-5, S.A.E. 75W/140	- 40°F (- 40°C)	- - -**
**There is no upper limit on these outside temperatures, but the axle sump temperature MUST NEVER EXCEED + 121°C (250°F)				

Section 7 Fastener Torque Chart



Section 8

Adjustments and Specifications

Drive Pinion Bearings - Preload

Specification:

New bearings - 5-25 lb-in torque.

Used bearings in good condition - 5-15 lb-in torque.

Page
47

Adjustment: Preload is controlled by the thickness of the spacer between the helical gear and the outer bearing.

Drive Pinion - Depth in Carrier

Specification:

Install correct amount of shims between the pinion inner bearing cup and the carrier.

Page
34

Adjustment: Change the thickness of the shim pack to get a good gear tooth contact pattern.

Hypoid Gear Set - Tooth Contact Patterns

Specification:

Conventional Gear Set - Toward the toe of the gear tooth and in the center between the top and bottom of the tooth.

Page
43

Generoid Gear Set - Between the center and toe of the tooth and in the center between the top and bottom of the tooth.

Adjustment: Tooth contact patterns are controlled by the thickness of the shim pack between the inner bearing cup and the and the carrier, and by the ring gear backlash.

Ring Gear - Backlash

Specification: 0.005 to 0.015 inch (.127 to .381 mm.).

Page
42

Adjustment: Backlash is controlled by the position of the ring gear. Change the backlash within specifications to get a good tooth contact pattern.

Ring Gear - Runout

Specification: 0.008 inch (.20 mm) maximum.

Page
42

Ring Gear - Thrust Screw or Thrust Block Clearance

Specification: 0.025 to 0.035 inch (.635 to .889 mm).

Page
63

Adjustment: Turn in thrust screw against back of ring gear. Loosen the screw one-half turn and lock into position.

Section 8

Adjustments and Specifications

Main Differential - Bearing Preload

Specification:

15-35 lb-in (1.7-3.9 N.m) torque

OR

0.006 to 0.010 inch (.152 to .254 mm) expansion between bearing caps.

Page**40**

Adjustment: Preload is controlled by tightening both adjusting rings one or two notches after zero end play is reached.

Main Differential - Rotating Resistance

Specification: 50 lb-ft (68 N.m) torque applied to one side gear.

Page**38**

Input Shaft - Bearing Adjustment

Specification:

Current Models (Tapered Bearings) - 0.002 to 0.008 inch (.05 to .20 mm) end play.

Early Models (Ball Bearings) - 0.003 to 0.006 inch (.076 to .152 mm) tight.

Page**61**

Adjustment: Shim as required at input bearings.

Output Shaft - Bearing Adjustment

Specification:

Current Models (Tapered Bearings) ONLY - .001 to .004 inch (.025 to .10 mm) end play.

Page**66**

Adjustment: Use variable thickness snap ring/spacer as required.

ArvinMeritorTM
Commercial Vehicle Systems

Meritor Heavy Vehicle Systems, LLC
2135 West Maple Road
Troy, MI 48084 USA
800-535-5560
arvinmeritor.com

Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability. ArvinMeritor Commercial Vehicle Systems reserves the right to revise the information presented or discontinue the production of parts described at any time.

Copyright 1988
ArvinMeritor, Inc.
All Rights Reserved

Printed in the USA

Maintenance Manual 5B
Issued 09-88
16579/Meritor





Technical Bulletin

Maintenance Manual Update*

Installing Fasteners with Pre-applied Adhesive, Meritor Liquid Adhesive 2297-C-7049, Loctite® 680 Liquid Adhesive or Equivalent

* The information in this Technical Bulletin updates the following Maintenance Manuals:

MM #	Title	Date
5B	Tandem Axle Forward Rear Drive Units	9-88
5L	Tandem Axle Forward Rear Drive Units	8-91
5J	Single Reduction Hypoid Unit	8-79
5P	Tandem Axle Forward Rear Drive Units	3-91
6B	Tandem Axle Forward Rear Drive Units	5-75
6C	Double Reduction Differential Carriers	8-84
7A	Two-Speed Differential Carriers	8-90

Installing New Fasteners with Pre-applied Adhesive Patches

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

1. Clean oil and dirt from the threaded holes. There is no special cleaning required.

CAUTION

Do not apply adhesives or sealants on new fasteners with pre-applied adhesive patches or in the threaded holes. If other adhesives or sealants are used, the new adhesive will not function correctly.

2. Assemble parts using the new pre-applied adhesive fasteners.

NOTE: There is no drying time required for fasteners with pre-applied adhesive.

3. Tighten the fasteners to the required torque value for that size fastener.

Installing Original or Used Fasteners Using Meritor Liquid Adhesive 2297-C-7049 or Loctite® 680 or Equivalent

1. Clean oil, dirt and old adhesive from all threads and threaded holes.
2. Apply four or five drops of Meritor Liquid Adhesive, Loctite® 680 or equivalent to each threaded hole or bore ONLY. Make sure the adhesive is not applied to the threads. **Figure 1.**

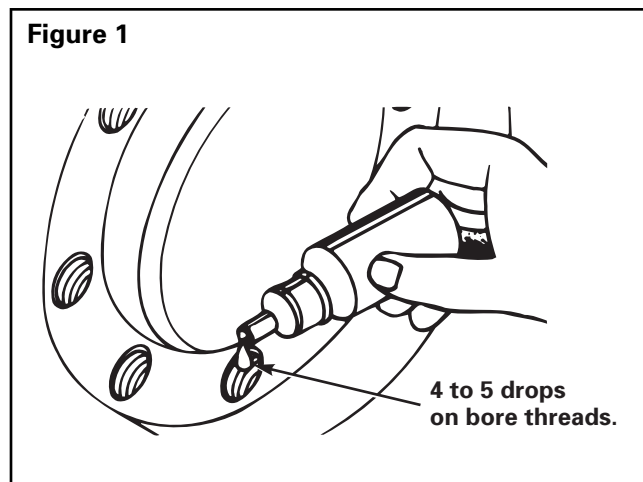
CAUTION

Do not apply adhesive to the fastener threads. Air pressure in the hole will push the adhesive out as the fastener is installed.

NOTE: There is no drying time required for Meritor Liquid Adhesive 2297-C-7049, Loctite® 680 or equivalent.

3. Tighten fasteners to the required torque value for that size fastener.

Figure 1



ArvinMeritorTM
Commercial Vehicle Systems

Meritor Heavy Vehicle Systems, LLC
2135 West Maple Road
Troy, MI 48084 USA
800-535-5560
arvinmeritor.com



Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability. ArvinMeritor Commercial Vehicle Systems reserves the right to revise the information presented or discontinue the production of parts described at any time.

Copyright 1997
ArvinMeritor, Inc.
All Rights Reserved

Printed in the USA

TP-96104
Revised 02-97
16579/Meritor



Maintenance Manual Update

Applying Loctite® Ultra Grey Flange Sealant 5699/Meritor Part Number 2297-Z-7098

Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

When you apply some silicone gasket materials, a small amount of acid vapor is present. To prevent serious personal injury, ensure that the work area is well-ventilated. Read the manufacturer's instructions before using a silicone gasket material, then carefully follow the instructions. If a silicone gasket material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

Procedures

1. Remove all old gasket material from both the axle and the carrier surfaces. Figure 1.

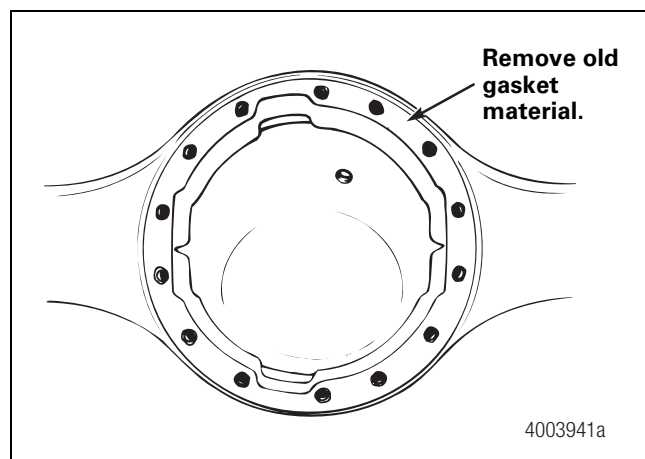


Figure 1

2. Clean the surfaces where you will apply the silicone gasket material. Remove all oil, grease, dirt and moisture. Figure 1.
3. Dry both surfaces.

CAUTION

The amount of silicone gasket material applied must not exceed a 0.125-inch (3 mm) diameter bead. Too much gasket material can block lubrication passages and result in damage to the carrier or axle components.

4. Apply a 0.125-inch (3 mm) diameter continuous bead of Loctite® Ultra Grey Flange Sealant 5699, Meritor part number 2297-Z-7098, around one surface. Also apply the gasket material around the edge of all fastener holes on that surface. Figure 2.

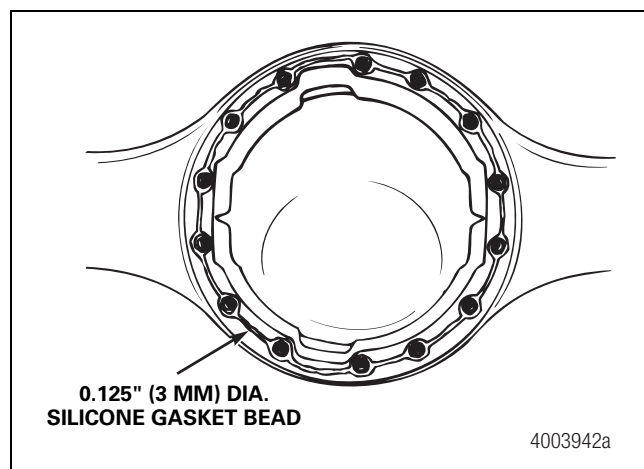


Figure 2

5. Assemble the components immediately to permit the silicone gasket material to compress evenly between the parts. Tighten the fasteners to the required torque value for that size fastener.
6. Wait 20 minutes before filling the assembly with lubricant.

Maintenance Manuals

The information in this Technical Bulletin updates the following Maintenance Manuals.

MM	Title	Date
5B	Tandem Axle Forward Rear Drive Units	09-88
5J	Single-Reduction Hypoid Drive Unit	08-79
5P	Tandem Axle Forward Rear Drive Units	03-91
6C	Double-Reduction Differential Carriers	08-84
7A	Hypoid Planetary Two-Speed Differential Carriers	08-90
12	Heavy-Duty Front Drive Steer Axles	11-98

ArvinMeritor™

Meritor Heavy Vehicle Systems, LLC
2135 West Maple Road
Troy, MI 48084 USA
800-535-5560
arvinmeritor.com



Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability. Meritor Heavy Vehicle Systems, LLC, reserves the right to revise the information presented or discontinue the production of parts described at any time.

Copyright 2003
ArvinMeritor, Inc.
All Rights Reserved

Printed in the USA

TP-96105
Revised 07-03
(16579/24240)