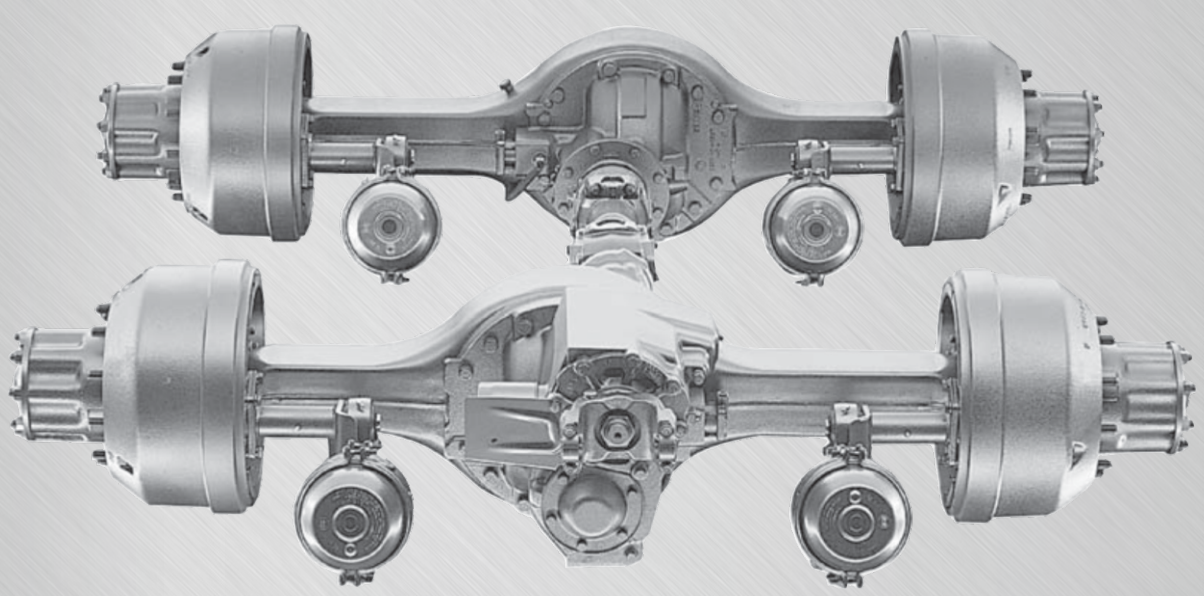
MAINTENANCE MANUAL



Differential axles Tandem

MT 46-145
MT 50-168

MERITOR®

Edition october/11

Index

Notes

About This Manual

This manual provides maintenance and service information for theMeritor forward tandem drive axles, including the RT-140; -144; -145; -149; -160; -169; RZ-166; -186 and -188 Series models.

Before You Begin

1. Read and understand all instructions and procedures before you begin to service components
2. 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.
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.

Hazard Alert Messages and Torque Symbols

WARNING

A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.

CAUTION

A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components.

@ This symbol alerts you to tighten fasteners to a specified torque value.

How to Obtain Additional Maintenance and Service Information

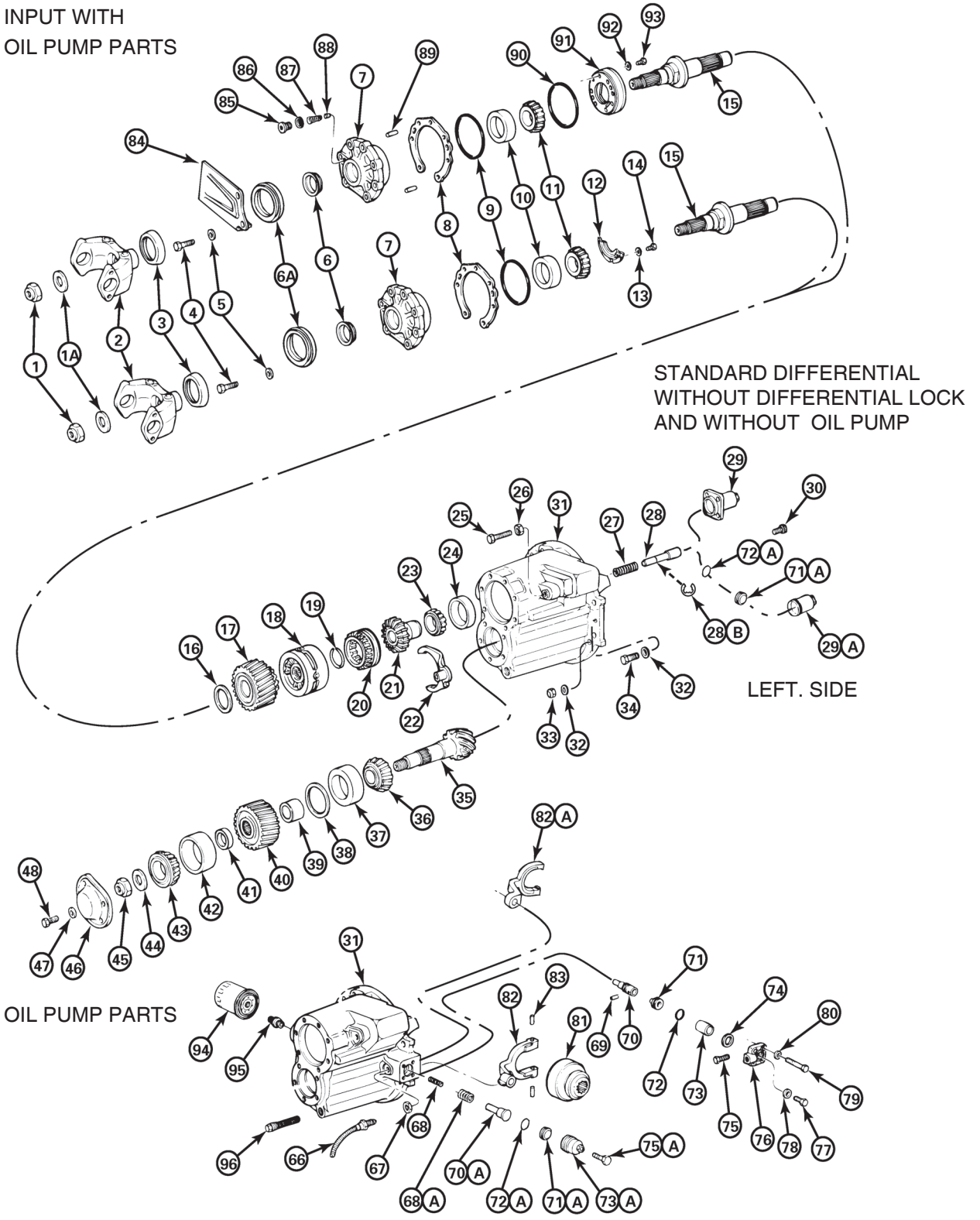
On the Web

Visit the DriveTrain Plus™ in the Technical Library Meritor in the site www.arvinmeritor.com to access and order product, service

The Library also offers a Request Form for Literature, interactive and printable.

Meritor Technical Support area

Call the Meritor Technical Support area
0800-55 55 30.

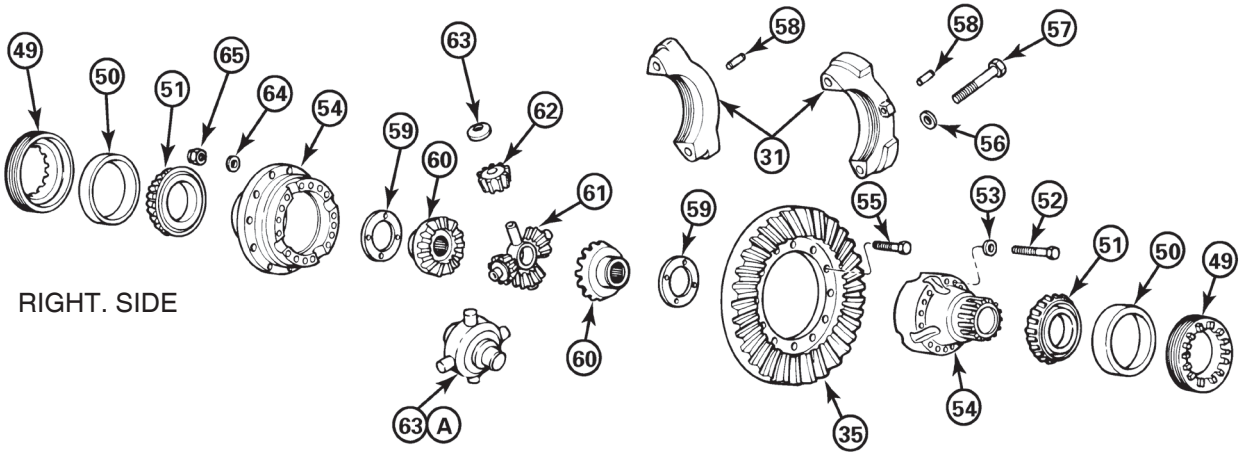

INPUT WITH
OIL PUMP PARTS
STANDARD DIFFERENTIAL
WITHOUT DIFFERENTIAL LOCK
AND WITHOUT OIL PUMP
LEFT. SIDE
OIL PUMP PARTS
DIFFERENTIAL
SYSTEM LOCK PARTS

Single Reduction Forward Differential Ensemble

ITEM	Description
01	Nut - Input Fork
01A	Washer - Input Fork
02	Input Fork
03	Deflector
04	Capscrew - Cage-to-Differential Input Shaft Bearings
05	Washer - Cage-to-Differential Input Shaft Bearings
06	Oil Seal - Triple-Lip (Main) Seal
06A	POSE™ Seal
07	Input Bearing Cage
08	Shims
09	O-Ring - Input Bearing Cage
10	Bearing Cup - Input Shaft
11	Bearing Cone - Input Shaft
12	Oil Baffle (Units Without Oil Pump)
13	Washer - Oil Baffle
14	Capscrew - Oil Baffle
15	Input Shaft
16	Thrust Washer - Helical Drive Gear
17	Helical Drive Gear
18	Inter-Axle Differential Case Assembly
19	Snap Ring-Inter-Axle Differential Case
20	Clutch Collar -Inter-Axle Differential Case
21	Rear Side Gear
22	Bearing Cone - Rear Side Gear
23	Rolamento Cone - Planetário
24	Bearing Cup - Rear Side Gear
25	Adjusting Screw - Shift Shaft
26	Jam Nut - Adjusting Screw
27	Spring - Shift Shaft
28	Shift Shaft and Piston
28A	“E” Clip (Reverse Shift IAD Only)
29	Air Shift Chamber Assembly - Bolt-On IAD
29A	Air Shift Chamber Assembly - Screw-In IAD
30	Capscrew - Air Shift Chamber Assembly
31	Differential and Caps
32	Washer - Differential-to-Axle Housing
33	Nut - Differential -to-Axle Housing
34	Capscrew - Differential to-Axle Housing
35	Ring Gear and Drive Pinion
36	Inner Bearing Cone - Drive Pinion
37	Inner Bearing Cup - Drive Pinion
38	Shims
39	Inner Spacer
40	Helical Driven Gear
41	Outer Spacer
42	Outer Bearing Cup - Drive Pinion
43	Outer Bearing Cone - Drive Pinion
44	Washer - Drive Pinion
45	Nut - Drive Pinion
46	Cover - Drive Pinion
47	Washer - Drive Pinion Cover
48	Capscrew - Drive Pinion Cover
49	Bearing Adjusting Ring
50	Cup — Main Differential Bearing
51	Cone — Main Differential Bearing
52	Capscrew — Main Differential Case Halves
53	Washer — Main Differential Case Halves
54	Main Differential Case Assembly
55	Bolt — Ring Gear (145 and 160 Series)
56	Washer — Differential Bearing Cap
57	Capscrew — Differential Bearing Cap
58	Roll Pin, Cotter Pin or Capscrew — Differential Bearing Cap
59	Thrust Washer — Main Differential Side Gear
60	Side Gear — Main Differential
61	Spider — Main Differential
62	Pinion Gear — Main Differential
63	Thrust Washer — Main Differential
63A	NoSPIN® Main Differential*
64	Washer — Ring Gear (145 and 160 Series)

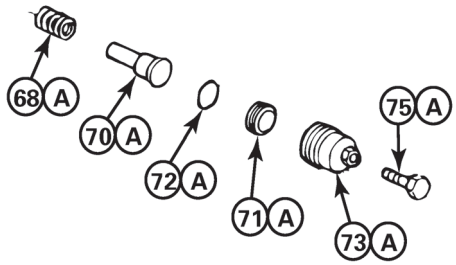
ITEM	Description
65	Nut — Ring Gear (145 and 160 Series)
66	Sensor Switch — Main Differential Lock
67	Locknut Main Differential Lock Sensor Switch (Old Design)
68	Spring — Main Differential Lock
68A	Spring — Main Differential Lock — Current Designl
69	Lock Pin — Spring Retaining (Old Design)
70	Shift Shaft — Main Differential Lock
70A	Shift Shaft — Main Differential Lock — Current Design
71	Piston — Main Differential Lock
71A	Piston — Main Differential Lock — Current Design
72	O-Ring — Piston
72A	O-Ring — Piston — Current Design
73	DCDL Cylinder — Shift Shaft Lock Mechanism Main differential
73A	DCDL Cylinder — Shift Shaft — Current Screw-In DCDL Design
74	Copper Gasket — Cover (160 Series)
75	Capscrew — Manual Engaging
75A	Capscrew — Manual Engaging — Current Design
76	Cover — Main Differential Lock (Old Design)
77	Plug — Manual Engaging (Old Design)
78	Washer — Manual Engaging Capscrew
79	Capscrew — Cover (Old Design)
80	Washer — Cover (Old Design)
81	Shift Collar — Main Differential Lock
82	Shift Fork — Main Differential Lock
82A	Shift Fork — Main Differential Lock — Current Design
83	Roll Pin — Shift Fork (Old Design)
84	Oil Filter Shield
85	Plug — Oil Pressure Relief Valve

ITEM	Description
86	Washer — Oil Pressure Relief Valve
87	Spring — Oil Pressure Relief Valve
88	Oil Pressure Relief Valve
89	Dowel — Input Cage to Oil Pump (Old Design)
90	O-Ring — Oil Pump
91	Oil Pump
92	Washer — Oil Pump
93	Capscrew — Oil Pump
94	Oil Filter
95	Adapter — Oil Filter
96	Oil Screen and Plug Assembly *

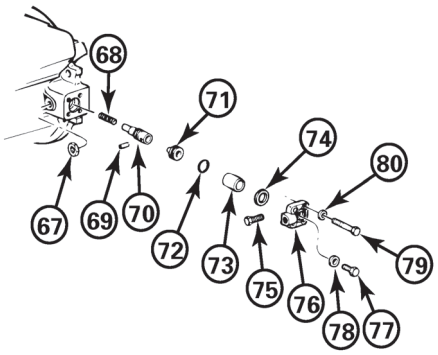


RIGHT. SIDE

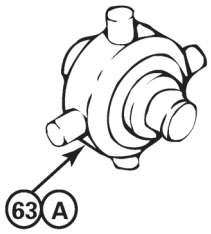
CURRENT DCDL



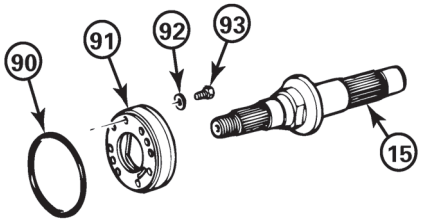
ANTERIOR DESIGN DCDL



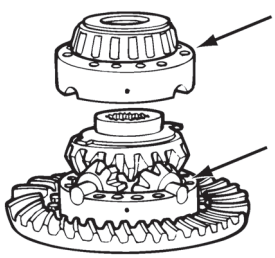
NO SPIN® ASSEMBLY



OIL PUMP



MAIN DIFFERENTIAL CASE



MLAIN DIFFFERENTIAL WITHOUT SIDE FLANGE

MLAIN DIFFFERENTIAL SIDE FLANGE

Introduction

Description

Forward Tandem Axle

The inter axle differential (IAD) is located behind the helical gear on the input shaft. The forward side gear of the inter axle differential is part of the upper helical gear hub. The thru shaft is splined to the rear side gear of the inter axle differential. Figure 2.1.

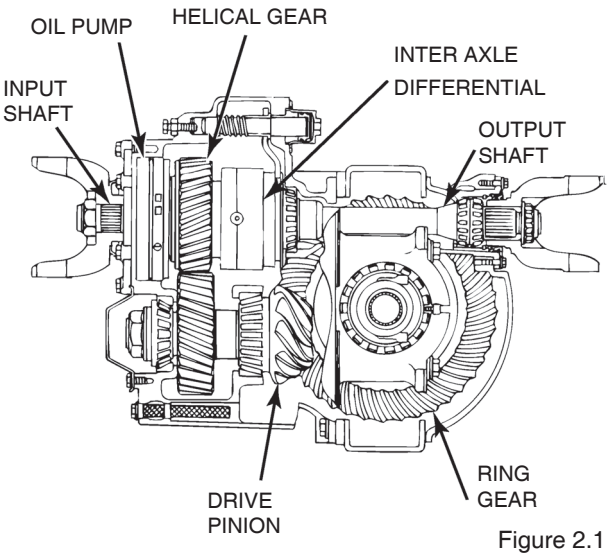


Figure 2.1

The forward tandem axles anterior models 140, 145 and 160 .

Use a single reduction, thru drive differential. The drive gearing is 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. Figure 2.1 and Figure 2.2.

RT-160 SERIES SHOWN

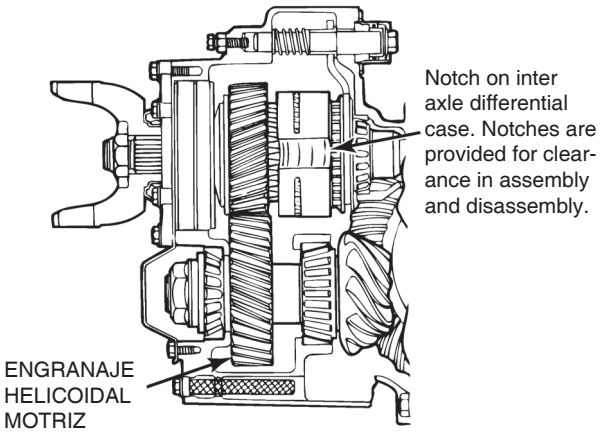


Figure 2.2

Axle Models Covered in This Manual

Tandem Models		
RT-34-140	RT-40-145P	RT-46-160
RT-34-144	RT-40-149	RT-46-160DEH
RT-34-145	RT-40-160	RT-46-160P
RT-34-145P	RT-40-169	RT-46-169
RT-40-140	RT-44-145	RT-50-160
RT-40-143	RT-44-145P	RT-50-160P
RT-40-145	RT-40-145P	RT-52-160P
RT-40-145A	MD/MR/MT 40-140	
Tridem Models		
RZ-166 RZ-186	RZ-188	

NOTE: For service procedures on rear differential, refer to Maintenance Manual 5, Singl Reduction Differential, for models preceding RS-, RT- and RF-Series, and Maintenance Manual 5A, SingleReduction Differential, for MX-, RS-, RT- and RF-Series
To obtain these publications, refer to the Service Notes page on beginning of this manual.

Optional Pressurized Lubrication System

The anterior axles can be equipped with an optional pressurized lubrication system. This filtered system has an oil pump driven by the input shaft. The pump forces the lubricant for roller bearings of the axes of input and output and directly to the inter axle differential (IAD)

Optional Driver-Controlled Main Differential Lock (DCDL)

Both the forward and rear axles can be equipped with an optional driver-controlled main differential lock (DCDL). The differential lock is operated by an air-actuated shift unit located on the anterior axle differentisal.

- When the differential lock is activated, the shift collar moves along the splines of the axle shaft toward the differential case.

- When the collar splines engage with the splines on the differential case, the axle shaft and the differential assembly lock together.
- When the differential operates with the DCDL in the locked position, there is no differential action between the wheels
- When the differential is operated in the unlocked position, there is normal differential action between the wheels at all times

Inter Axle Differential (IAD)

The Meritor inter-axle differential (IAD) is a driver controlled,

Air actuated traction device. The IAD allows for speed differences between the forward and rear axles in a tandem while also providing equal pulling power from each axle of the tandem. By activating the IAD switch located in the vehicle dash, improved traction is provided for each axle.

The inter axle differential is also known as a power divider or third differential.

Stall Testing Can Damage a Drive Axle

Stall testing is a procedure used to troubleshoot transmissions, evaluate vehicle performance, and test the service and park brakes.

During stall testing, or any similar procedure, the drive axle input receives multiplied torque, which can exceed the specified torque rating. Excessive torque can damage a drive axle, which will affect axle performance and component life. A drive axle damaged by

stall testing will void Meritor's warranty.

Call Meritor's Customer Service Center at 0800-55-5530 if you have questions regarding stall testing.

Use of Traction Chains

Meritor recommends that if you are using traction chains, you should install chains on both tires on each side of all drive axles on the vehicle.

Identification

Model

An identification tag is riveted on the axle housing or on the differential. Figure 2.3 and Figure 2.4. Use the model and the ratio number marked on the identification tag and the number on the differential to order replacement parts

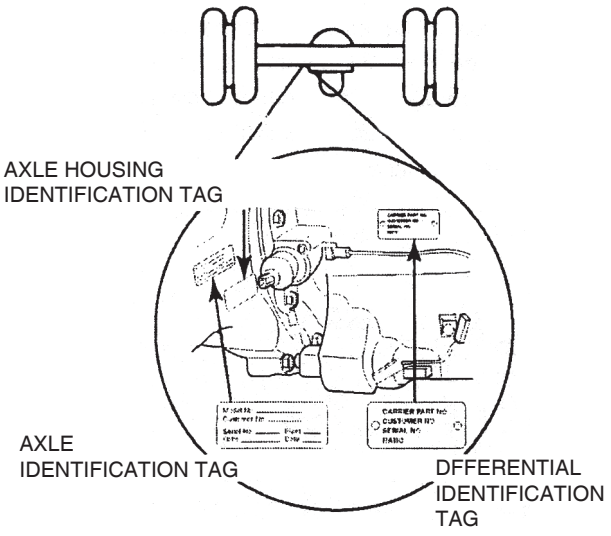


Figure 2.3

Refer to Figure 2.4 for an explanation of the model axle.

INFORMATION OF IDENTICATION THE MODEL AXLE AN THE IDENTIFICATION TAG

M D - 2 3 - 1 6 0

Meritor

Axle Type
D = Forward-Rear Axle of a Drive Tandem with Inter-Axle Differential
N = Forward-Rear Axle of a Drive Tandem without Inter-Axle Differential
P = Forward-Rear Axle of a Drive Tandem with Inter-Axle Differential and Pump
T = Tandem Drive Axle Set

Nominal Axle Load Rating (GAWR): In thousands of pounds. Individual forward and rear axles of a tandem set (D, N, P) are rated as single axles. A tandem set (T) is rated as the combination of the two axles.

Gearing Type:
1 = Single Speed

Differential Type: Differential size. Larger numbers indicate a higher GCW rated differential; this is, larger ring gear, etc

Axle Design Variation: Indicates axle design level or variation, (e.g., RS-23-161 has a thicker wall housing than RS-23-160).

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.

Use a brass or synthetic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off. Serious personal injury and damage to components can result.

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

Axle Shafts from the Axle Housing

WARNING

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip or fall over. Serious personal injury and damage to components can result.

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
2. Use a jack to raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
3. Remove the oil drain plug from the bottom of the axle housing. Drain the axle lubricant from the housing assembly.

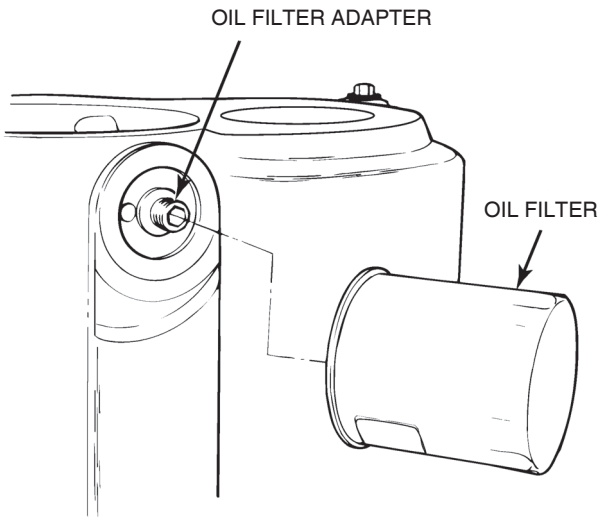


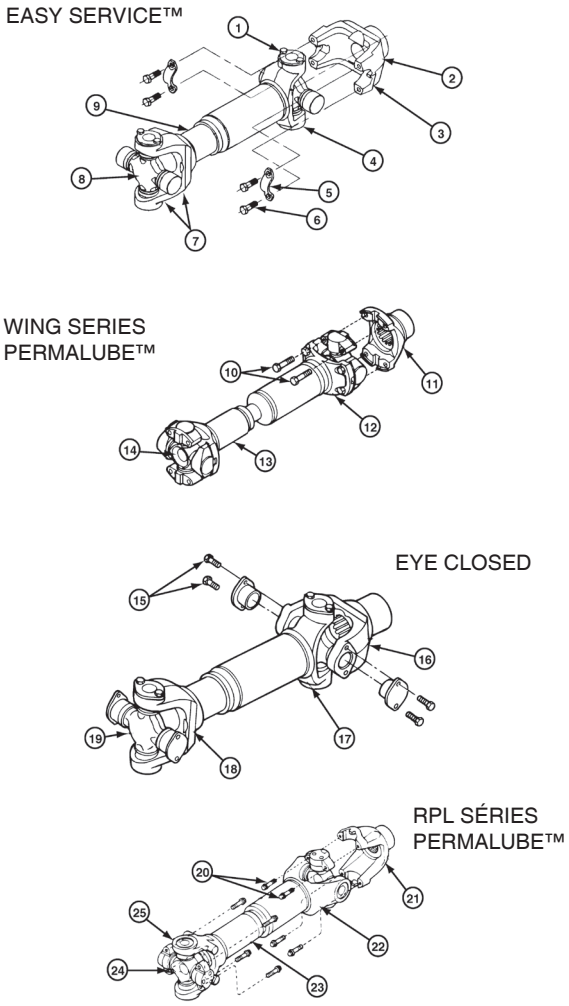
Figure 3.1

4. For axles with an oil pump, remove the oil filter shield from the input bearing cage.
5. Use a filter strap wrench to remove the oil filter. Be careful that the oil inside does not spill when removing the filter. Discard the filter. Figur 3.1.
6. Inspect the oil filter adapter threads. If the adapter threads are damaged: Remove and replace the oil filter adapter
7. On an axle with a driver-controlled main differential lock, shift the lock into and hold the lock in the locked or engaged position. The locked position provides enough clearance between the shift collar and the axle housing for differential removal. Refer to Section 6.

An alternate method to obtain clearance is to remove the cover of the air shift unit from the differential. Remove the piston. Remove the shift shaft and spring from the fork. The fork and the clutch collar will fall into the differential can be removed. Remove the fork and the clutch collar after the differential is removed.

8. Disconnect the driveline universal joint from the pinion input yoke or flange on the differential. Figure 3.2.

Figure 3.2



1 - FULL-ROUND BEARING CUPS
2 - END FORK
3 - FORK SADDLE
4 - WELD FORK
5 - BEARING STRAP
6 - CAPSCREWS
7 - EASY SERVICE™ BEARING CUPS
8 - U-JOINT CROSS
9 - SLIP FORK
10 - CAPSCREWS
11 - END FORK
12 - WELD FORK
13 - SLIP FORK
14 - U-JOINT CROSS
15 - CAPSCREWS
16 - END FORK
17 - WELD FORK
18 - SLIP FORK
19 - U-JOINT CROSS
20 - CAPSCREWS
21 - END FORK
22 - SLIP FORK
23 - TUBING
24 - U-JOINT CROSS
25 - WELD FORK

9. Remove the capscrews and washers or stud nuts and washers, if equipped, from the flanges of both axle shafts
10. Loosen the tapered dowels, if equipped, in the axle flanges of both axle shafts using one of the following methods:

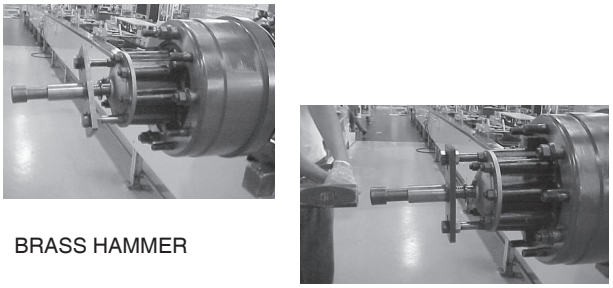
Brass Pin Method

WARNING

Do not strike the round driving lugs on the flange of an axle shaft. Pieces can break off and cause serious personal injury.

1. Hold a 1-1/2-inch diameter brass pin or brass hammer against the center of the axle shaft, inside the round driving lugs. Figure 3.3.

Figure 3.3



BRASS HAMMER

2. Strike the end of the drift with a large hammer 5 to 6 pounds, and the axle shaft and tapered dowels will loosen.
3. Mark each axle shaft before it is removed from the axle assembly.
4. Remove the tapered dowels and separate the axle shafts from the main axle hub assembly. Figure 3.4.

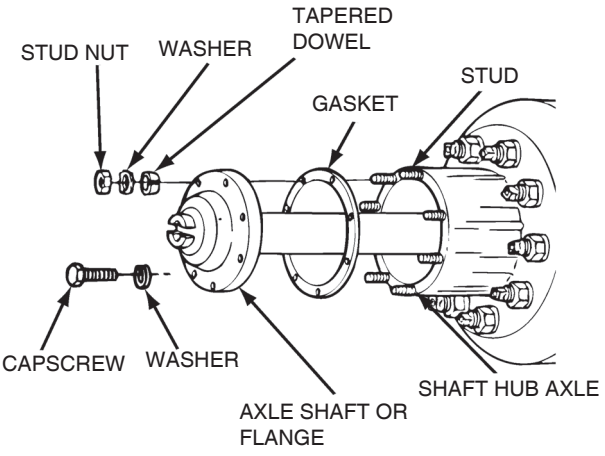


Figure 3.4

5. Install a cover over the open end of each axle assembly hub where an axle shaft was removed.

Air Hammer Vibration Method

WARNING

Wear safe eye protection when using an air hammer. When using power tools, axle components can loosen and break off causing serious personal injury.

CAUTION

DO NOT USE A CHISEL OR WEDGE TO LOOSEN THE AXLE SHAFT AND TAPERED DOWELS. USING A CHISEL OR WEDGE CAN RESULT IN DAMAGE TO THE AXLE SHAFT, THE GASKET AND SEAL, AND THE AXLE HUB.

1. Use a round hammer bit and an air hammer to loosen the tapered dowels and axle shaft.
2. Place the round hammer bit against the axle shaft or flange between the hub studs. Operate the air hammer at alternate locations between the studs to loosen the tapered dowels and axle shaft from the hub. Figure 3.5.

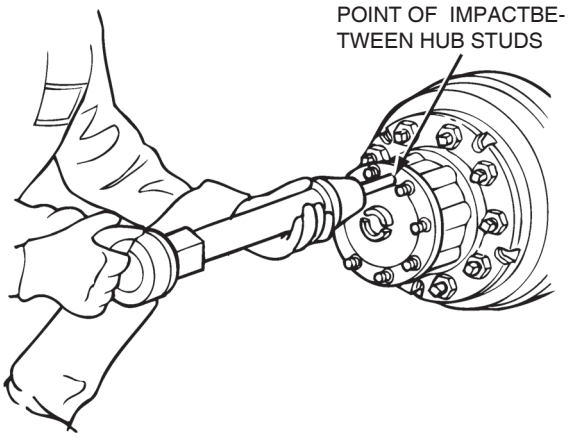


Figure 3.5

3. Mark each axle shaft before it is removed from the axle assembly.
4. Remove the tapered dowels and separate the axle shaft from the main axle hub assembly. Figure 3.4.

Output Shaft Removal

1. Disconnect the forward and rear drive shafts.

CAUTION

ALWAYS USE A FLANGE OR YOKE BAR DURING REMOVAL AND INSTALLATION OF THE FLANGE YOKE NUT TO PREVENT DAMAGE TO THE GEARING.

2. Attach a flange bar to the flange or place a yoke bar over the input or output yoke to hold the yoke or flange while you remove the locknut. Figure 3.6. See to Section 10 to make a yoke bar.

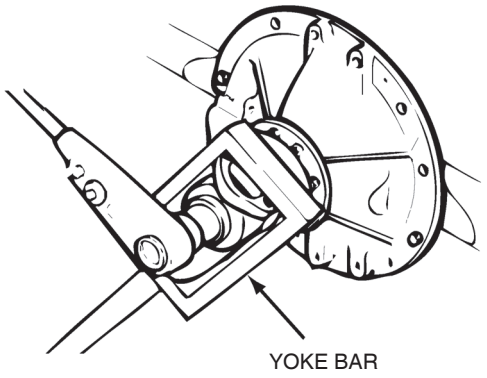
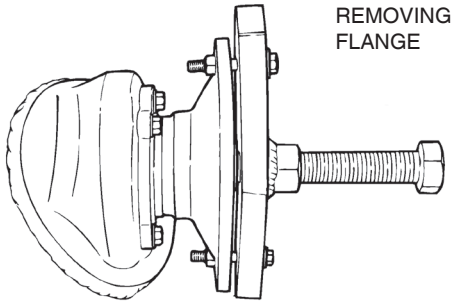


Figure 3.6

3. Disconnect the air lines at the inter axle differential shift unit (IAD).
4. Remove the output shaft nut, washer and yoke or flange. Use a puller tool to remove the yoke or flange from the output shaft.Figure 3.7



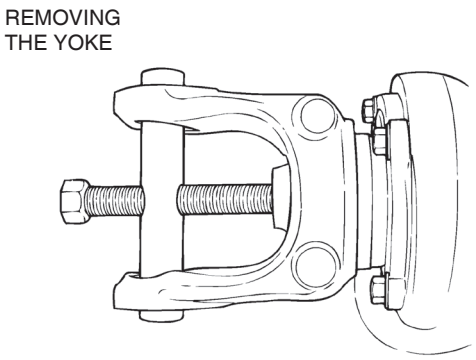


Figure 3.7

5. Remove the output shaft bearing cage capscrews and washers.
6. Pull the bearing cage, bearings and shaft assembly from the axle housing. If necessary, loosen the cage from the housing with a soft mallet. Figure 3.8

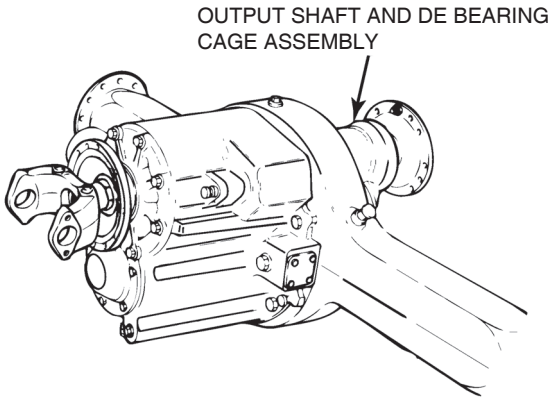


Figure 3.8

Removal differential assembly from the Axle Housing

1. Place a hydraulic jack under the differential assembly to support the assembly. Figure 3.9.

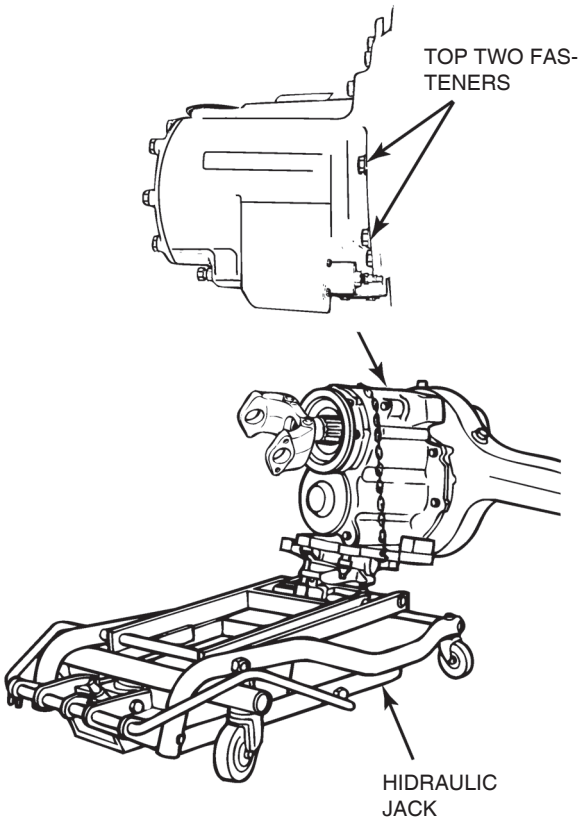


Figure 3.9

2. Remove all but the top two differential to housing capscrews or stud nuts and washers. Figure 3.9.
3. Loosen, but do not remove, the top two differential to housing fasteners. The fasteners will hold the diferrential in the axle housing.
4. Loosen the differential assembly in the axle housing. Use a plastic mallet to hit the differential mounting flange at several points.
5. After the differential is loosened, remove the top two stud nuts and washers that hold the assembly in the axle housing.

CAUTION

WHEN USING A PRY BAR, BE CAREFUL NOT TO DAMAGE THE DIFFERENTIAL OR HOUSING FLANGE. DAMAGE TO THESE SURFACES WILL CAUSE OIL LEAKS.

6. Use the hydraulic jack to remove the differential from the axle housing. Use lever that has a round end to help remove the differential from the housing.
7. On axles with a driver controlled main differential lock, if air pressure is used to shift the differential to the locked or engaged position, release the air pressure. Disconnect the air hose from the shift unit.

NOTE:

A model for differential is described in section 10 as a suggestion.

8. Use a lifting tool to lift the differential by the input folk or flange and place the assembly in a repair stand. Do not lift by hand. See the Section 10 to make a differential repair to differential. Figure 3.10.

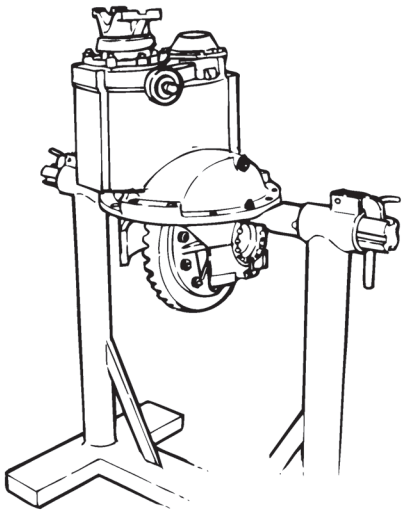


Figure 3.10

Disasssembly Output Shaft and Bearing Cage Assembly

1. Remove and discard the original oil seal. Use a new oil seal when the differential is assembled Figure 3.11

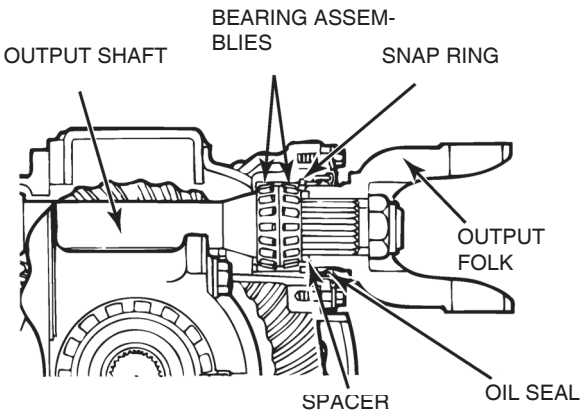


Figure 3.11

NOTE:

If you replace either the bearing cup or the cone, replace both parts in a fully matched set from the same manufacturer.

2. Remove the external snap ring or spacer betwen the folk or bearing cone fron the output shaft.
3. Remove the internal snap ring that holds the bearing cup in the output cage. Figure 3.12.

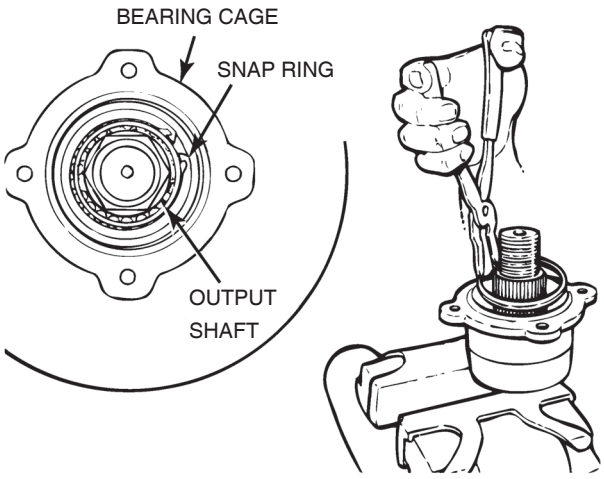


Figure 3.12

NOTE:

When you press the output shaft from the cage, the bearing cup remains in the cage. The outer cup is removed with the thru-shaft and the cones.

4. If necessary, remove the output shaft and the bearing cones as an assembly from the output bearing cage.

A. Place the output shaft and the output bearing cage in a press. Figure 3.13.

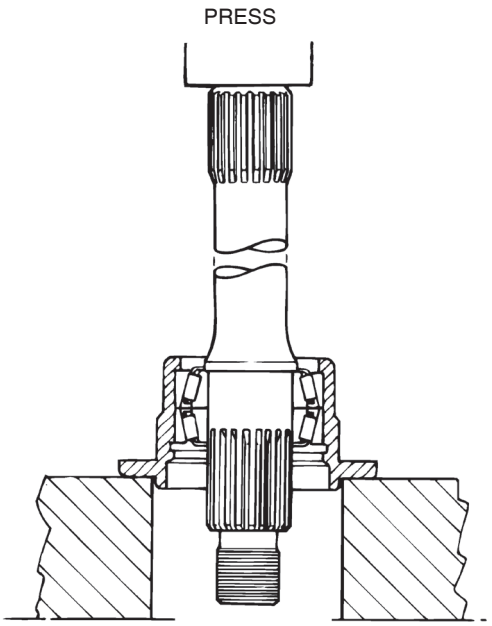


Figure 3.13

B. Press the output shaft and cones bearing cage.

C. Remove the outer cup from the output shaft.

5. Use a press or a bearing puller to remove the bearing cones from the output shaft. See the procedure in section 3.

Removal Bearing Cones the Output Shaft

Press Method

1. Place a used bearing cup on the inner bearing cone
2. Place the output shaft into a press. Figure 3.14. The used bearing cup supports the output shaft.

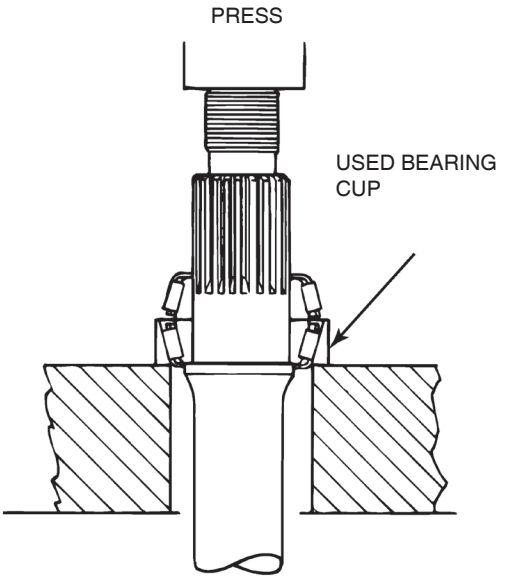


Figure 3.14

3. Press the output shaft through the bearing cones. Discard the used bearing cones.

Bearing Puller Method

1. Place a used bearing cup on the inner bearing cone.
2. Install a bearing puller tool over the output shaft. Figure 3.15. The bearing cup supports the output shaft

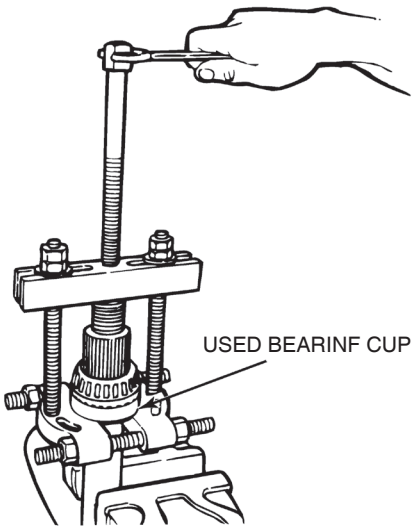


Figure 3.15

3. Remove the bearing cones from the output shaft. Discard the bearing cones.
4. If necessary, use a brass drift and hammer to carefully tap the inner cup from the cage. Discard the cup. Figure 3.16.

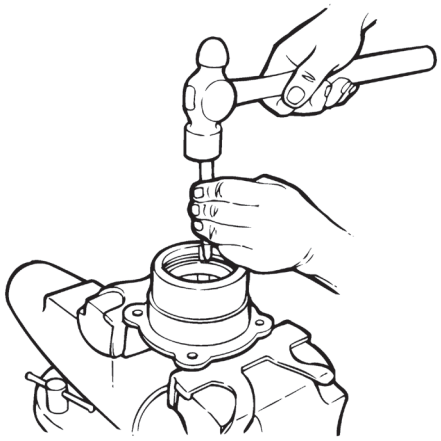


Figure 3.16

Measure Ring Gear Backlash

Before the differential be disassembled, use a dial indicator to measure and record ring gear backlash at three locations on the ring gear. This will help you to correctly reassemble the ring gear and drive pinion.

1. Rotate the differential in the stand to access the ring gear teeth
2. Install a dial indicator onto the flange of the differentialer. Place the tip of the indicator against the drive side of a ring gear tooth. Adjust the dial indicator to ZERO. Figure 3.17

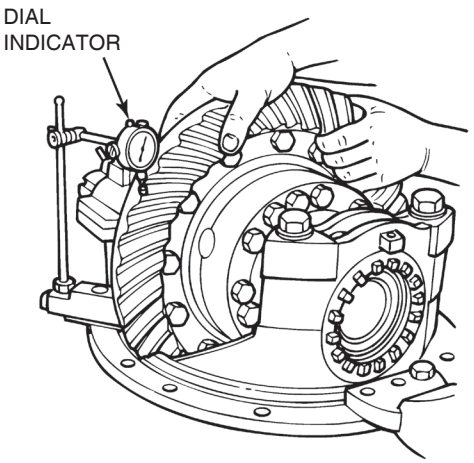


Figure 3.17

3. Read the dial indicator while you slightly rotate the ring gear in both directions. When you rotate the ring gear to measure the backlash, the drive pinion must not move. Record the reading on the dial indicator.
4. Repeat the procedure at two more locations on the ring gear.

- If the smallest of the three measurements is between 0.008” a 0.018” (0.20mm a 0.46mm) for Series 145 or up 0.010” a 0.020” (0.25mm a 0.51mm) for Series 160, replace the ring gear and drive pinion as a set

Removal the Input Shaft and Inter-Axle Differential Assembly

1. Rotate the differential in the support to access the input shaft.
2. Remove the capscrews and the washers that fasten the drive pinion cover to the differential. Remove the cover. Remove all gasket material from the cover and the differential. Figure 3.18.

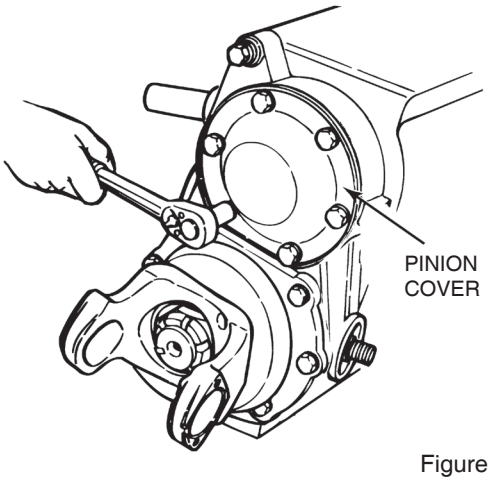


Figure 3.18

3. Use the correct tool to hold the fork or flange of the input shaft. Loosen, but do not remove, the drive pinion nut. Figure 3.19.

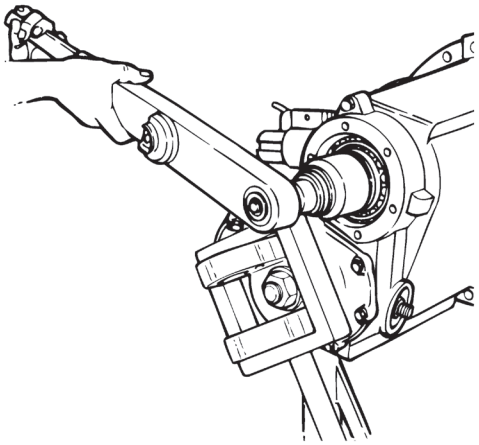


Figure 3.19

4. Use the correct tool to hold the fork or flange dof the input shaft. Loosen, but do not remove, the nut that fastens the yoke or flange to the input shaft. Figure 3.20.

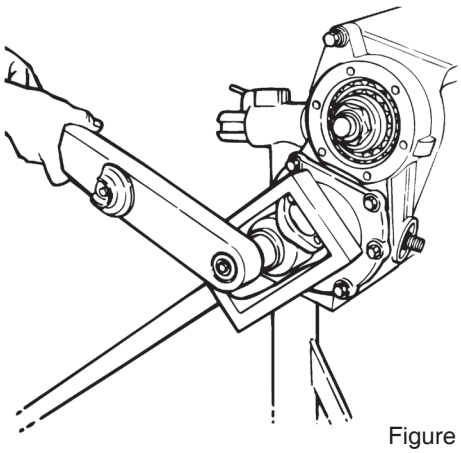


Figure 3.20

5. Remove the capscrews and washers that fasten the bearing cage to the input shaft to differential cage. Figure 3.21.

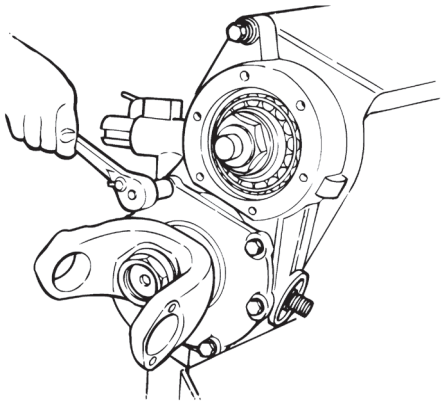


Figure 3.21

6. Rotate the differential in the support until the fork or flange get back to you.Connect a lifting device to the input fork.

NOTE:

Paint alignment marks on the helical drive gear and the helical driven gear before you remove the input shaft from the differential. This will ensure exact reassembly the gears owing mesh of the mated gears.

7. Paint alignment marks on the helical drive gear and the helical driven gear.

- For a driven gear: Paint the ends of two adjacent teeth.
- For a drive gear: Paint the top land of the matching tooth and guide it into the two painted teeth of the driven gear.

CAUTION

ON ALL 160 SERIES DIFFERENTIAL AND 145 SERIES MANUFACTURED BEFORE SEPTEMBER 1998, THERE ARE TWO NOTCHES ON THE SIDE OF THE INTER-AXLE DIFFERENTIAL CASE. ONE OF THE NOTCHES ON THE CASE MUST BE ALIGNED WITH THE HELICAL DRIVEN GEAR. IF THE NOTCH IS NOT ALIGNED OVER THE GEAR, THE GEAR WILL PREVENT THE REMOVAL OF THE INPUT SHAFT ASSEMBLY AND CAUSE DAMAGE TO THE ASSEMBLY.

8. Remove the input shaft, oil pump, if used, and inter-axle differential from the differential assembly.

A. Lift the input shaft assembly until the bearing cage is separated from the differential assembly. If necessary, tap on the bearing cage with a brass or plastic mallet to separate the cage of differential. Figure 3.22.

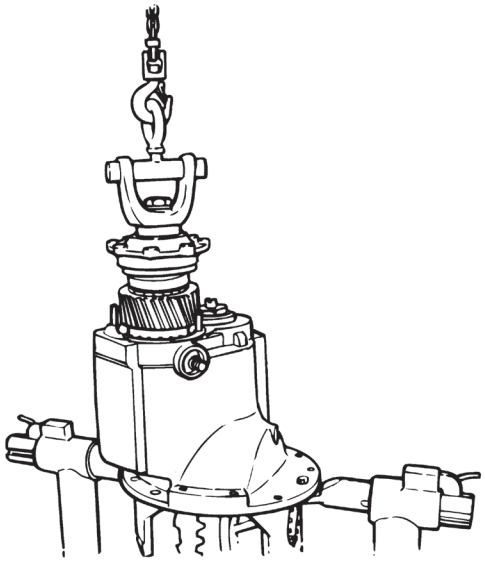


Figure 3.22

B. For 160 Series differential and 145 Series differential manufactured after September 1998, slowly lift the input shaft assembly.

- If the input shaft assembly comes out of the differential easily; remove the assembly.
- If the input shaft assembly cannot be removed easily: The inter-axle differential case must be rotated. Rotate the input shaft until one of the notches on the case is aligned over the helical driven gear. Remove the input shaft assembly from the differential. Figure 3.23 and Figure 3.24.

C. Place the input shaft assembly in a suitable location.

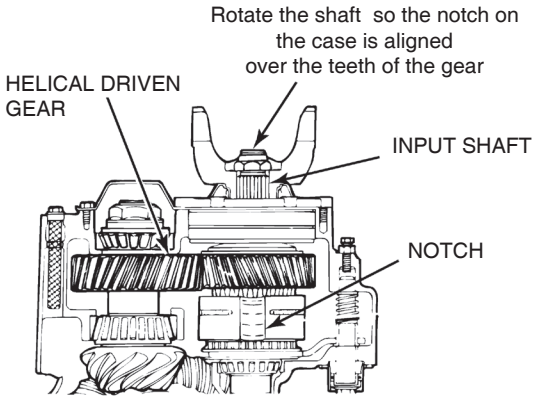


Figure 3.23

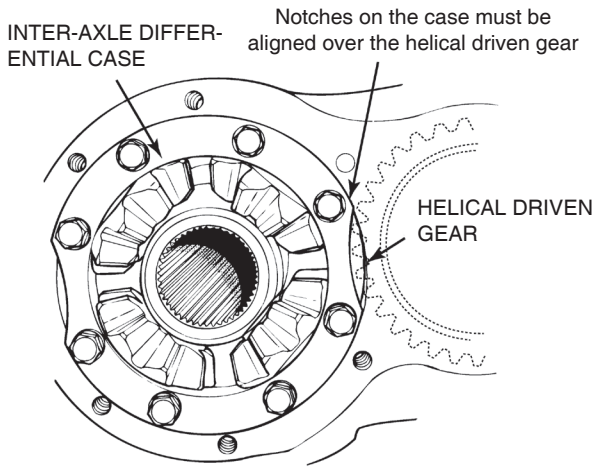


Figure 3.24

9. Remove the shims from between the bearing cage and the cage of differential.
10. Remove the rear side gear and the bearing cone from the differential. Remove the collar. Figure 3.25.

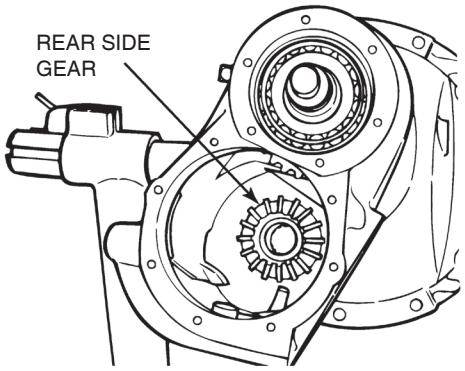


Figure 3.25

NOTE:

If you replace either the bearing cup or the cone, replace both parts in a fully-matched set from the same manufacturer.

11. Use a press, sleeve and bearing puller to remove the cone from the rear side gear. Figure 3.26.

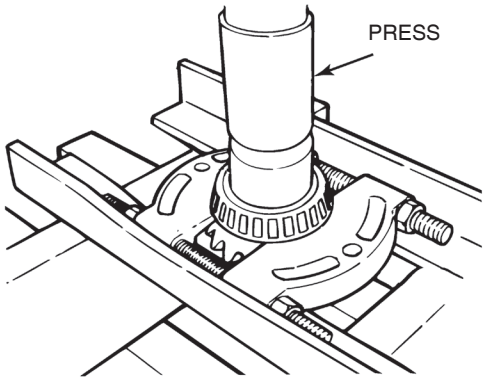


Figure 3.26

12. Use a brass drift and hammer to remove the cup of the rear side gear cone from the cage of differential.

Disassembly of Input Shaft, Bearing Cage, Oil Pump and Inter-Axle Differential

1. Use the correct tool to remove the fork or flange from the input shaft. Figure 3.27. If the differential assembly is not equipped with an oil pump, remove the bearing cage from the input shaft. Figure 3.28.

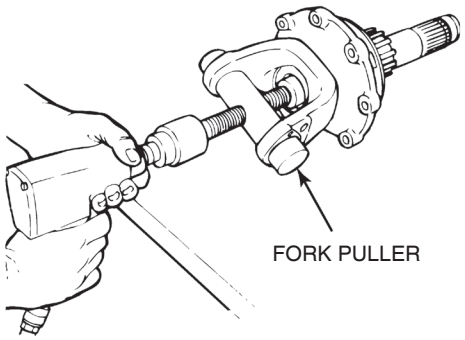


Figure 3.27

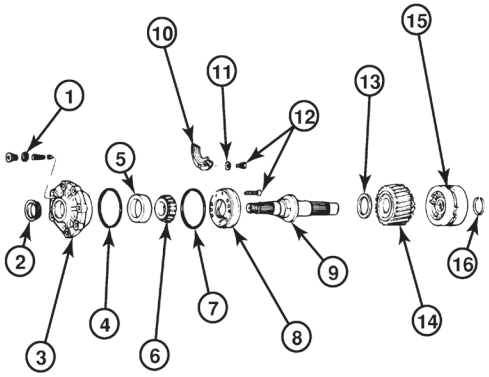


Figure 3.28

1 - PRESSURE RELIEF VALVE ASSEMBLY
2 - OIL SEAL
3 - BEARING CAGE
4 - O-RING
5 - BEARING CUP
6 - BEARING CONE
7 - O-RING
8 - OIL PUMP — UNITS WITH OIL PUMP
9 - INPUT SHAFT
10 - OIL BAFFLE — UNITS WITHOUT OIL PUMP
11 - WASHE
12 - CAPSCREWS
13 - THRUST WASHER
14 - HELICAL DRIVE GEAR
15 - INTER-AXLE DIFFERENTIAL
16 - SNAP RING

CAUTION

CAREFULLY REMOVE THE PINION SEAL FROM THE FORK OR DIFFERENTIAL. DO NOT DAMAGE THE SEAL BORE WHEN YOU REMOVE THE SEAL. DAMAGE TO COMPONENTS CAN RESULT.

NOTE:

Meritor recommends replacing all seals with the triple-lip or main oil seal. The addition or replacement of a POSE™ seal is also highly recommended.

2. Pry under the oil seal flange to remove the oil seal from the input bearing cage. Discard the oil seal. Figure 3.29.

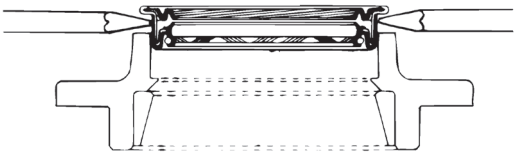


Figure 3.29

3. Remove the snap ring that fastens the inter-axle differential assembly to the input shaft. Remove the inter-axle differential assembly fron the input shaft. Figure 3.30.

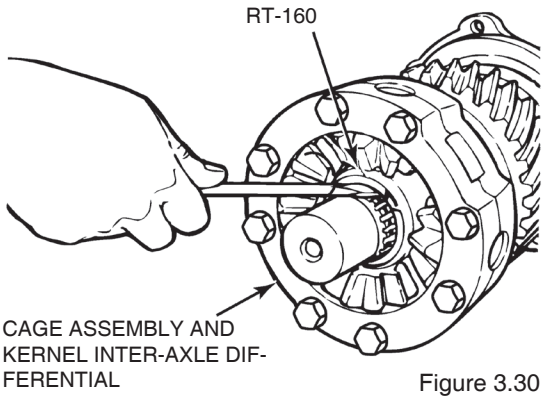


Figure 3.30

NOTE:

Disassemble the bolted inter-axle differential and inspect the components. The welded inter-axle differential is serviced as an assembly and cannot be disassembled.

4. Disassemble the bolted inter-axle differential. Inspect the components. Replace any damaged components

A. Use a punch and hammer to place an alignment mark on each half of the inter-axle differential case. The alignment marks will help you mate the case halves correctly during the reassembly. Figure 3.31.

B. Remove the capscrews that fasten the case halves of the inter-axle differential. Separate the case halves.

C. Remove the spider assembly from the case halves of the differential. Remove the four pinion gears and the four thrust washers from the u-joint cross.

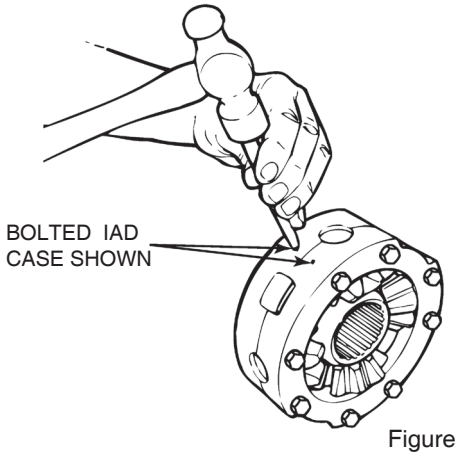


Figure 3.31

5. Remove the helical drive gear from the input shaft. Remove the thrust washer from the gear. Figure 3.32.

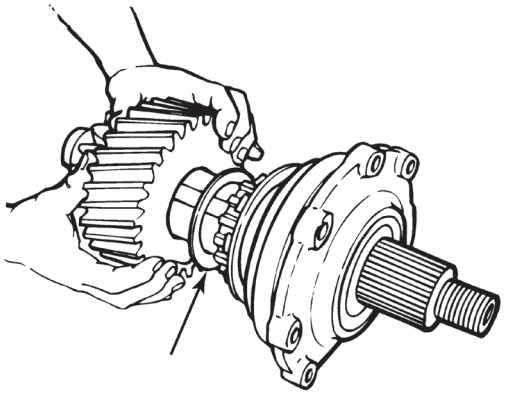


Figure 3.32

CAUTION

IF THE FOLLOWING PROCEDURE IS NOT FOLLOWED, THE OIL PUMP OR THE BEARING CAGE OF THE INPUT SHAFT WILL BE DAMAGED DURING REMOVAL. NEVER APPLY DIRECT PRESSURE TO THE SURFACE OF THE PUMP OR THE BEARING CAGE.

6. If an oil pump is used, remove the input bearing cage and the oil pump from the input shaft.

A. Place a extraction tool puller under the oil pump. The rivets on the back of the pump must not touch the bearing puller. The bearing puller provides a level surface so that the shaft can be pressed straight out of the assembly. Figure 3.33.

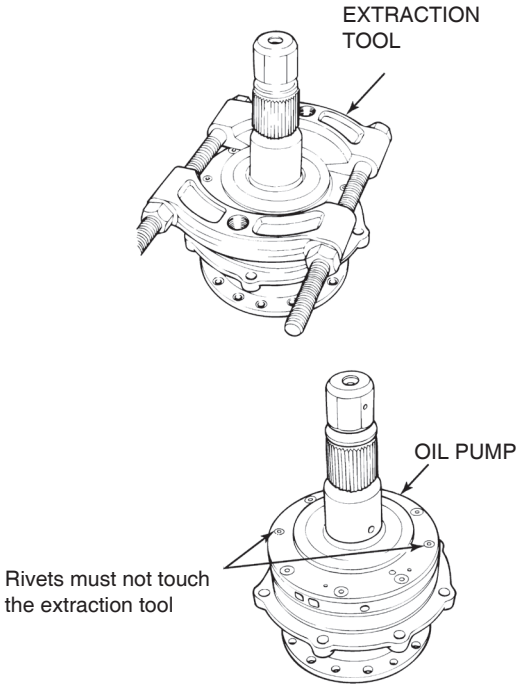


Figure 3.33

B. Place the assembly on a press so that extraction tool it rests on the differential. Figure 3.34.

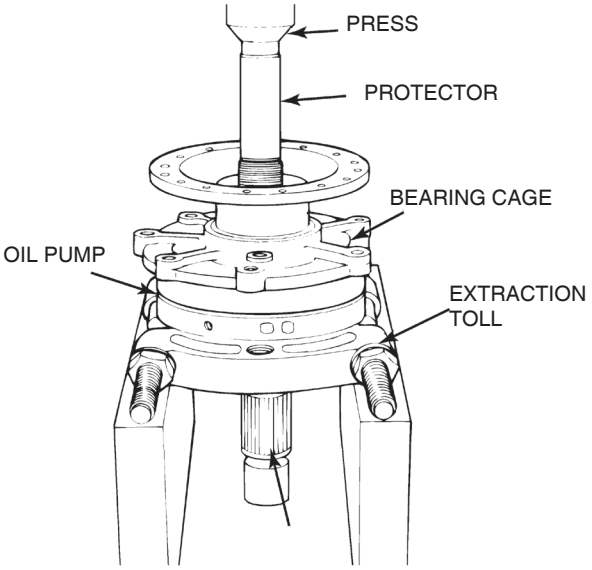


Figure 3.34

C. Place a protector on top of the input shaft. Remove the input shaft from the assembly. Remove the extraction tool. Figure 3.34.

D. Remove the capscrews that fasten the oil pump to bearing cage fron the input shaft. Separate the oil pump from the cage. Figure 3.35.

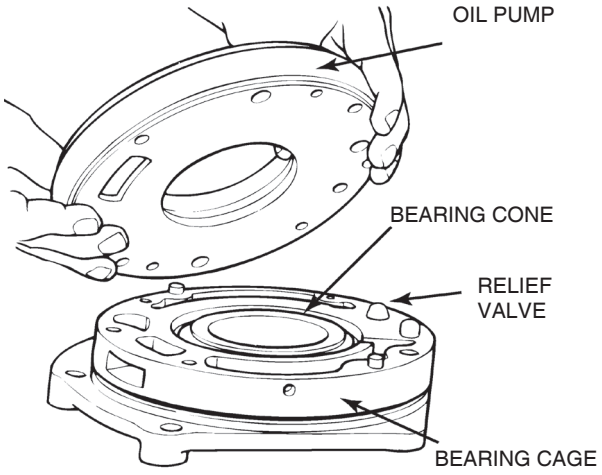


Figure 3.35

E. If the pump is worn or damaged, replace the pump. If the drive flats or the splines in the pump do not move, replace the pump.

7. Remove the O-rings from the bearing cage of the input shaft and, if used, the oil pump assembly
8. Remove the cone from the input bearing cage.

NOTE:

If you replace either the bearing cup or the cone, replace both parts in a fully-matched set from the same manufacturer.

9. If necessary, use a press and sleeve to remove the cup from the input bearing cage of the input shaft.
10. If necessary, remove the pressure relief valve assembly from the front of the bearing cage. Remove the plug, spring and relief valve from the bore. Figure 3.36.

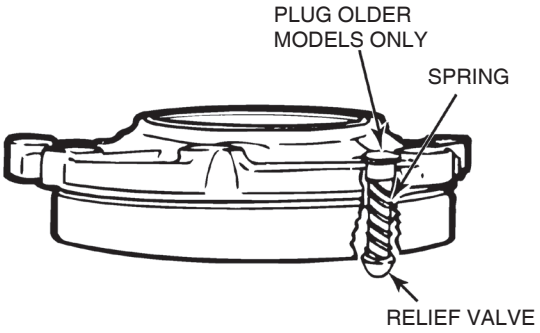


Figure 3.36

11. Remove the oil screen and plug assembly from the suction line at the front of the cage of differential assembly. Figure 3.37.

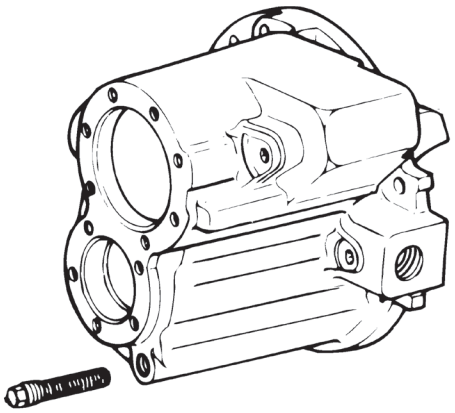


Figure 3.37

12. Clean the oil screen. See section 4.

Removal Inter-Axle Differential Lock IAD Shift Unit

Air Applied and Spring Release Models, Standard.

1. Remove the cylinder.

A. For flange-type cylinders, remove the capscrews that fasten the cylinder to the cage off differential . Remove the cylinder.

B. For threaded cylinders, remove the cylinder.

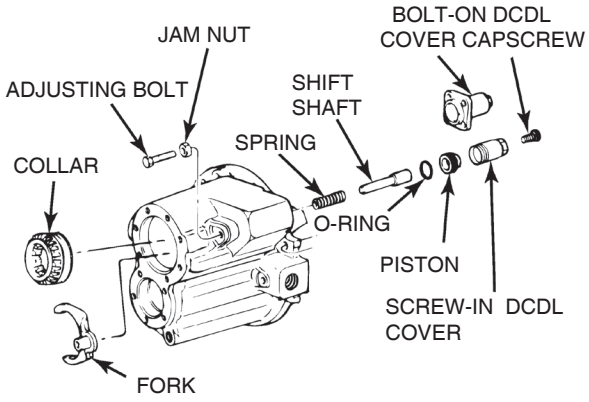


FigurE 3.38

2. Remove the piston from the shift shaft. Figure 3.38.
3. Remove the shift shaft from the cage of differential. When you remove the shift shaft, the fork and the spring may fall.

- If the shift shaft cannot be removed by hand: Remove the adjusting bolt and jam nut. Place a brass drift through the adjusting bolt hole against the rear of the shift shaft. Use a hammer on the brass drift to remove the shift shaft. Inspect the shift shaft for damage.

4. From the input shaft bore, remove the collar and fork.
5. If necessary, remove the jam nut and the adjusting bolt.

Spring Applied and Air Release Models, Reverse Shifter

1. Remove the four capscrews that fasten the shift cylinder cover to the cage of differential.
2. Remove the two capscrews and washers that fasten the cover to the shift cylinder. Remove the cover and spring. Figure 3.39.

BOLT-ON DCDL REVERSE SHIFTER

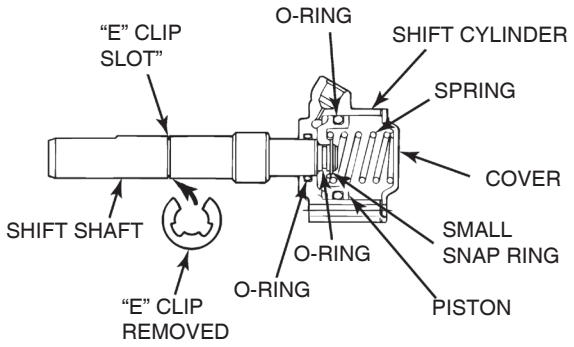


Figure 3.39

3. Remove the small snap ring from the cover end of the shift shaft.
4. Remove the cylinder assembly from the shaft
5. Rotate the shift shaft until the "E" clip ahead of the shift fork is at approximately the five o'clock position. Figure 3.40.

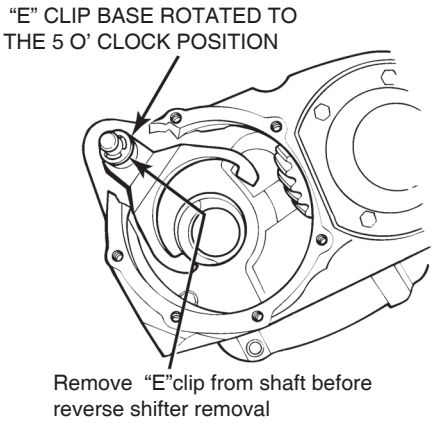


Figure 3.40

6. With the "E" clip base in the five o'clock position, use needlenose vise grips or equivalent to remove the "E" clip.
7. Remove the shift shaft from the differential. When you remove the shaft, the fork may fall.
8. Remove the piston from the shift cylinder. Inspect the O-rings for wear and damage. Replace the O-rings, if necessary.

Removal Driver-Controlled Main Differential Lock system (DCDL)

If the axle is equipped with a driver-controlled main differential lock, see to Section 6 for removal procedures.

Removal the Main Differential Case and Ring Gear Assembly

1. Rotate the differential until the ring gear is toward you.
2. Use a punch and hammer to mark the position of each bearing cap. The marks help you correctly match the bearing cap during reassembly. Figure 3.41.

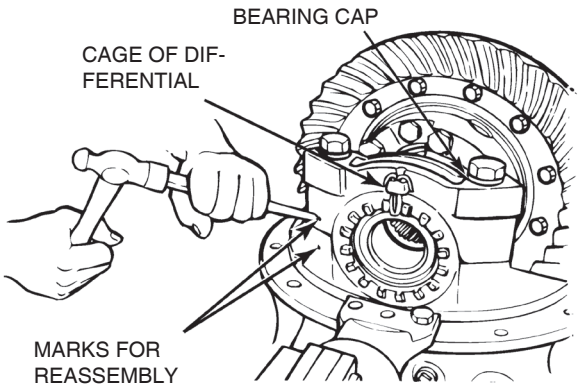


Figure 3.41

3. emove the capscrews, cotter pins, roll pins or lock plates, if equipped, that hold the bearing adjusting rings in position. Use a small drift and hammer to remove the pins. Each lock plate is held in position by two capscrews. Figure 3.42.

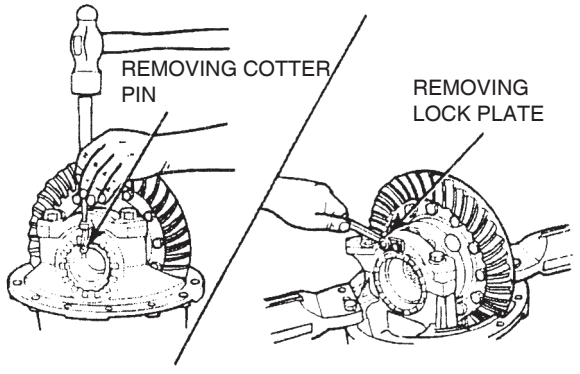


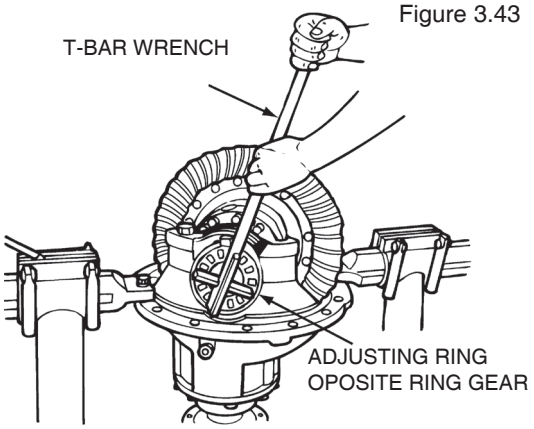
Figure 3.42

CAUTION

DO NOT HIT THE ADJUSTING RING WITH A HAMMER. DO NOT USE A HAMMER AND A DRIFT TO LOOSEN THE ADJUSTING RINGS. USING THESE METHODS WILL DAMAGE THE ADJUSTING RINGS.

4. Use a T-bar wrench or equivalent tool to loosen the adjusting rings. Do not remove the adjusting rings. If necessary, loosen, but do not remove, the capscrews on the bearing caps to move the adjusting rings. Figure 3.43.

Figure 3.43



5. Remove the capscrews and washers that fasten the bearing caps to the cage of differential. Mark the bearing caps and the differential to help you correctly reassemble.

NOTE:

Each bearing cap must be installed on the differencial leg from which it was removed. The caps are matched to the differencial legs. Do not mix bearing caps on differencial legs.

6. Remove the bearing caps, adjusting rings and bearing caps from the differential. Figure 3.44.

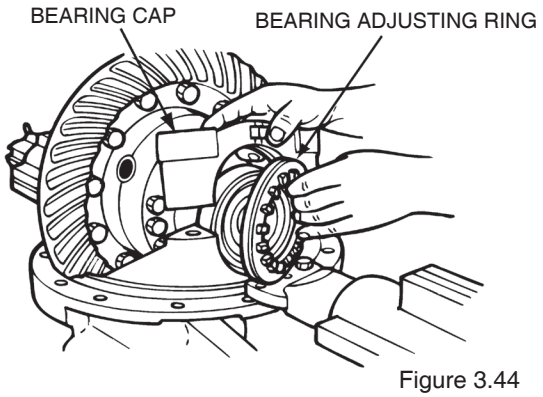


Figure 3.44

7. Use an appropriate lifting device to remove the main differential case and ring gear assembly from the cage of differential. Figure 3.45.

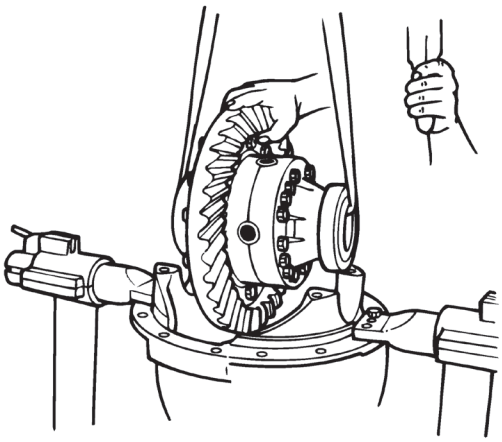


Figure 3.45

NOTE:

If you replace either the bearing cup or the cone, replace both parts in a fully-matched set from the same manufacturer. The bearing cones are not interchangeable.

8. If the bearing cones on the main differential case need to be replaced, use a bearing extractor to remove the cones. Figure 3.46.

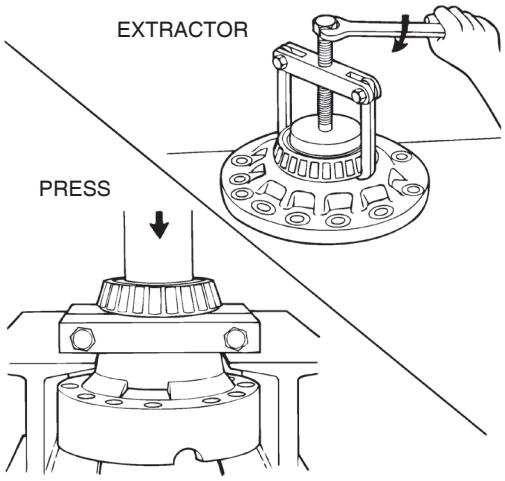


Figure 3.46

Disassembly Main Differential Case and Ring Gear

1. Use a punch and hammer to mark the case halves. The marks will help you correctly align the case halves during assembly. Figure 3.47.

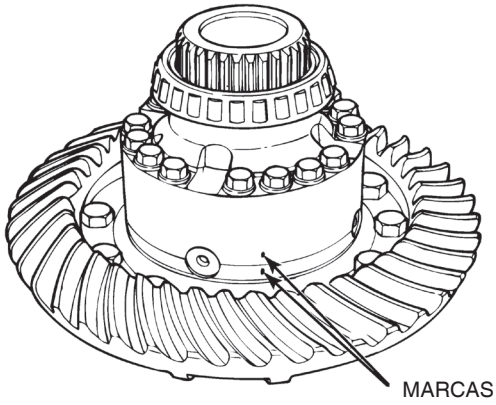


Figure 3.47

2. Remove the capscrews and washers that fasten the halves of the main differential together.
3. Remove the u-joint pinions, thrust washers and side gears from the separated case assembly. Figure 3.48.

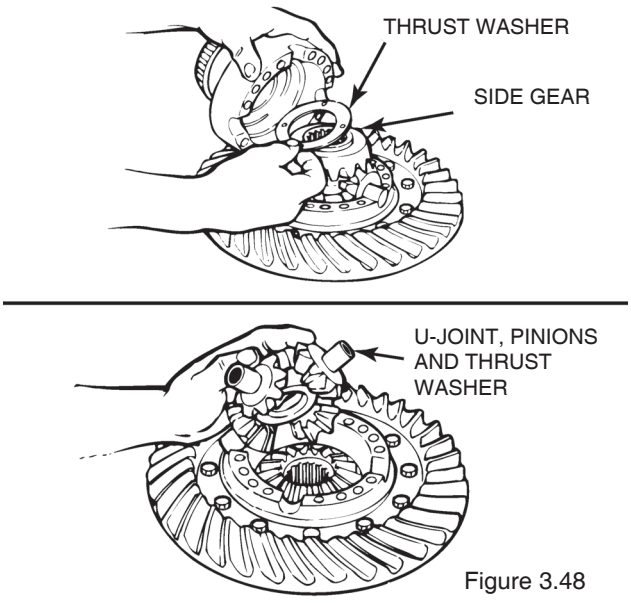


Figure 3.48

Removal Ring Gear from the Differential Case

NOTE:
If ring gear needs replaced use the following procedure:

1. For 145 and 160 Series axles, remove the capscrews, washers and nuts that fasten the ring gear from the differential case.

CAUTION

DO NOT REMOVE THE RIVETS OR THE RIVET HEADS WITH A CHISEL AND HAMMER. A CHISEL AND HAMMER CAN DAMAGE THE DIFFERENTIAL CASE.

2. For 140 Series axles, remove the rivets that fasten the ring gear to the differential case.

A. Carefully center-punch each rivet head in the center on the ring gear side of the assembly.

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 0.0312-inch (0.8000 mm) smaller than the body diameter of the rivets. Figure 3.49.

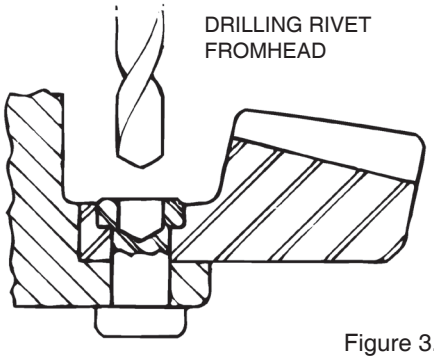


Figure 3.49

C. Press the rivets through the holes in the ring gear and the differential case. Press on the drilled rivet head.

3. Place the ring gear and case assembly on a press so that the teeth of the gear are toward you. Place supports under the gear.

4. Place a sleeve or a flat metal plate on top of the case. Press the main differential case from the ring gear. Figure 3.50.

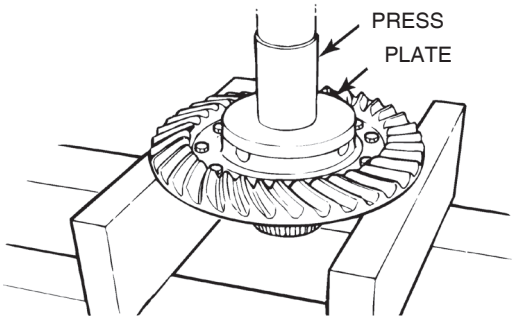


Figure 3.50

Removal Drive Pinion Assembly

NOTE:

Inspect the hypoid ring gear set for damage. If it is not damaged, you can reuse the ring gear set at reassembly. Measure and record the gear set backlash. Figure 3.17. See section 3.

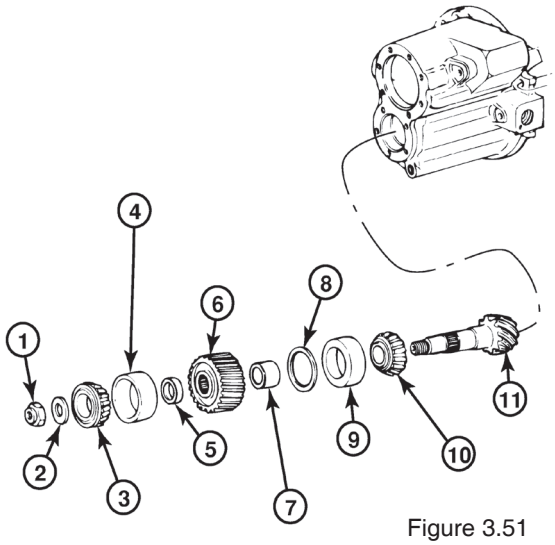


Figure 3.51

1 - NUT
2 - WASHER
3 - OUTER BEARING CONE
4 - OUTER BEARING CUP
5 - OUTER SPACER
6 - HELICAL DRIVEN GEAR
7 - INNER SPACER
8 - SHIMS
9 - INNER BEARING CUP
10 - INNER BEARING CONE
11 - DRIVE PINION

2. Remove the drive pinion from the Cage of differential.

A. Place the differential carrier into a press so that the threaded end of the drive pinion is facing UP. Place supports under the differential mounting flange.

B. Place a protector onto the top of the drive pinion shaft. Figure 3.52.

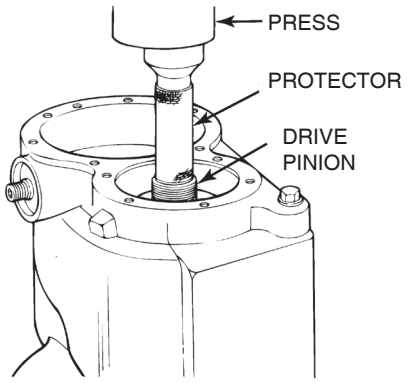


Figure 3.52

CAUTION

THE DRIVE PINION MUST NOT FALL ON THE FLOOR WHEN THE DRIVE PINION IS PRESSED FROM THE DIFFERENTIAL. IF THE DRIVE PINION FALLS TO THE FLOOR, THE GEAR TEETH MAY BE DAMAGED.

C. Press the pinion through the outer bearing cone and the helical driven gear. Remove the drive pinion from the bottom of the cage of differential.

D. Remove the outer spacer, outer bearing cone and helical driven gear from the differential. Remove the inner spacer from the drive pinion.

NOTE:

If you replace either the bearing cup or the cone, replace both parts in a fully-matched set from the same manufacturer.

NOTE:

If a new ring gear and drive pinion are being installed, the inner bearing cup must be removed to change the shim pack between the cup and the cage of differential.

3. If necessary, remove the inner and the outer bearing cups from the cage of differential. Use a hammer and drift to remove the cups from the Cage of differential. Replace any shims that are demaged. Measure and Record the thickness of the shim Pack for reassembly. Figure 3.53.

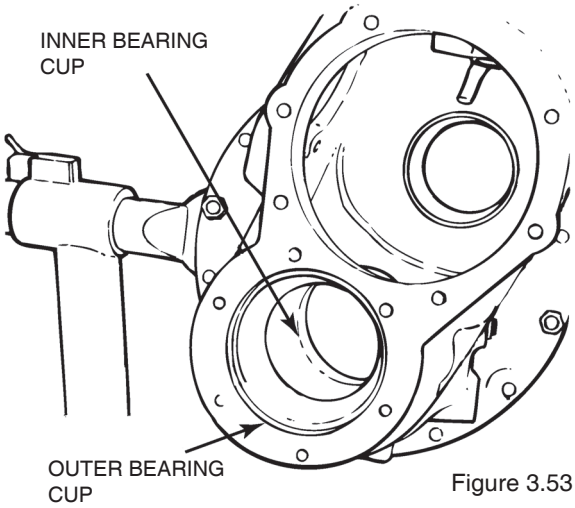


Figure 3.53

4. If necessary, remove the inner bearing cone from the drive pinion. Place a bearing extractor under the inner race to support the bearing. Place a protector on the top of the pinion shaft and press the drive pinion out of the bearing cone. Figure 3.54.

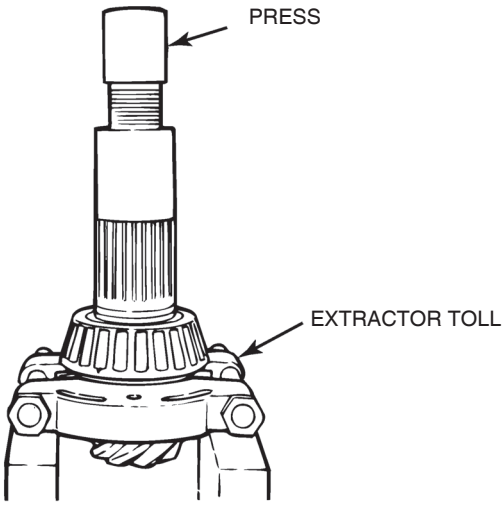


Figure 3.54

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.

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below.

- Wear safe eye protection.
- Wear clothing that protects your skin.
- Work in a well-ventilated area.
- Do not use gasoline, or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.

Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin.

Clean, Dry and Inspect PartsClean and Inspect the forks

CAUTION

DO NOT INSTALL A PRESS-ON SHAFT EXCLUDER OR POSE™ SEAL AFTER YOU INSTALL A UNITIZED PINION SEAL. THE USE OF A POSE™ SEAL WILL PREVENT CORRECT SEATING OF THE UNITIZED PINION SEAL ON THE FORK AND WILL RESULT IN LUBRICANT LEAKAGE AT THE SEAL.

The POSE™ seal installation is recommended only for triple lip and other previous design seals.

Do not use thin metal wear sleeves to refresh the yoke surface. Wear sleeves pressed onto the yoke will prevent correct seating of the pinion seal and damage the pinion seal assembly. Wear sleeve usage will cause the seal to leak

1. Clean the ground and polished surface of the fork of the universal joint using a clean shop towel and a safe cleaning solvent. Do not use abrasive cleaners, towels or scrubbers to clean the fork or flange surface. Do not use gasoline.

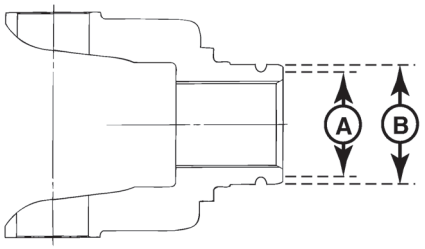
NOTE:

The unitized seal features a rubber inner sleeve that is designed to seal and rotate with the fork. This feature allows you to reuse a fork with minor grooves.

2. Inspect the fork seal surface for grooves.

- If you find grooves on fork hubs used with single or triple-lip seals: Replace the yokes
- If you find grooves on the fork hubs use calipers to measure the groove diameters. If any groove diameter measures less than the dimensions shown in Figure 4.1, replace the yoke.

UNITIZED PINION SEAL (UPS)



fork Seal Diameter	Minimum fork Diameter at Groove (Inches)
76,200 / 76,237 82,550 / 82,677	75,946 82,296

A - MINIMUM GROOVE DEPTH — DIAMETER
B - FORKE SEAL DIAMETER

Figure 4.1

Clean Ground and Polished Parts

1. Use a cleaning solvent, kerosene or diesel fuel to clean ground or polished parts or surfaces. Do not use gasoline.
2. Use a tool with a flat blade if required, to remove sealant material from parts. Be careful not to damage the polished or smooth surfaces.

CAUTION

DO NOT USE HOT SOLUTION TANKS OR WATER AND ALKALINE SOLUTIONS TO CLEAN GROUND OR POLISHED PARTS. DAMAGE TO PARTS CAN RESULT.

3. Do not clean ground or polished parts with water or steam.Do not immerse ground or polished parts in a hot solution tank or use strong alkaline solutions for cleaning, or the smooth sealing surface may be damaged.

Clean Rough Parts

1. Clean rough parts with the same method as cleaning ground and polished parts.
2. Rough parts can be cleaned in hot solution tanks with a weak or diluted alkaline solution.
3. Parts must remain in hot solution tanks until heated and completely cleaned
4. Parts must be washed with water until all traces of the alkaline solution are removed.

Clean Axle Assemblies

1. A complete axle assembly can be steam cleaned on the outside to remove dirt.
2. Before the axle is steam cleaned, close or place a cover over all openings in the axle assembly. Examples of openings are breathers or vents in air chambers.

Drying Parts After Cleaning

1. Parts must be dried immediately after cleaning and washing.
2. Dry the parts using soft, clean paper or cloth rags.

CAUTION

DAMAGE TO BEARINGS CAN RESULT WHEN THEY ARE ROTATED AND DRIED WITH COMPRESSED AIR.

3. Except for bearings, parts can be dried with compressed air.

Prevent Corrosion on Cleaned Parts

1. Apply axle lubricant to cleaned and dried parts that are not damaged and are to be assembled.
2. To store parts, apply a special material that prevents corrosion to all surfaces. Wrap cleaned parts in a special paper that will protect the parts from moisture and prevent corrosion.

Inspect Parts

It is very important to inspect all parts carefully and completely before the axle or differential is assembled. Check all parts for wear and replace damaged parts.

1. Inspect the cup, cone, rollers and cage of all tapered roller bearings in the assembly. If any of the following conditions exist, replace the bearing.

- The center of the large-diameter end of the rollers is worn level with or below the outer surface. Figure 4.2
- The radius at the large-diameter end of the rollers is worn to a sharp edge. Figure 4.2.
- There is 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 4.3.
- There are deep cracks or breaks in the cup, cone inner race or roller surfaces. Figure 4.3.
- There are bright wear marks on the outer surface of the roller cage. Figure 4.4.
- There is damage on the rollers and on the surfaces of the cup and cone inner race that touch the rollers. Figure 4.5.
- There is damage on the cup and cone inner race surfaces that touch the rollers. Figure 4.6.

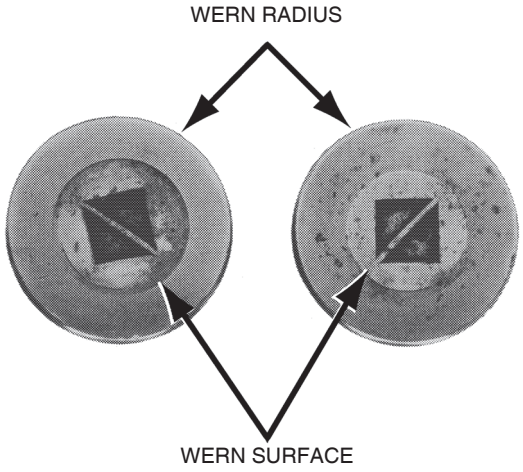


Figure 4.2

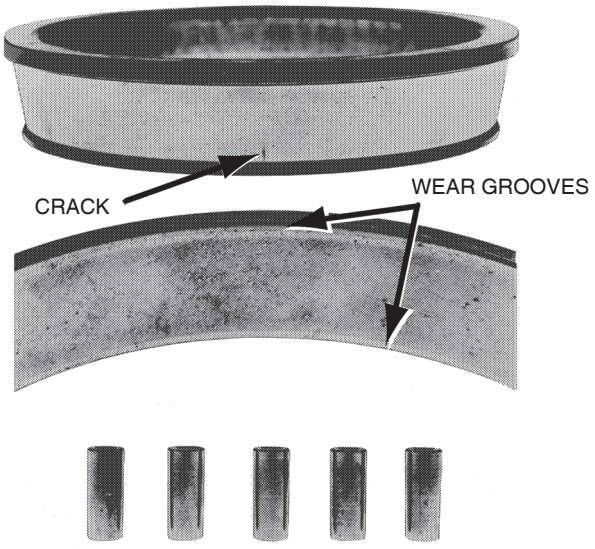


Figure 4.3

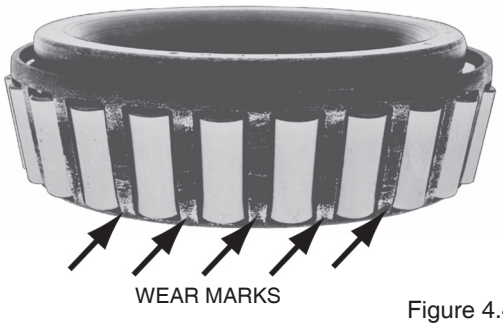


Figure 4.4

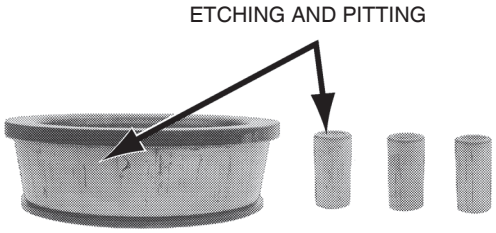


Figure 4.5

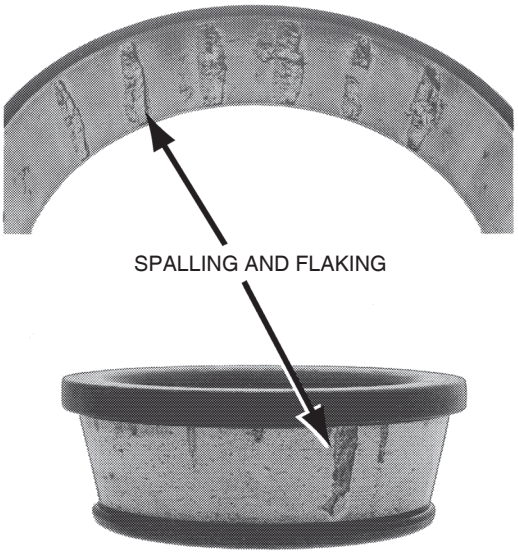


Figure 4.6

CAUTION

A DRIVE PINION AND RING GEAR ARE MACHINED AS A MATCHED SET. WHEN YOU REPLACE EITHER A DRIVE PINION OR A RING GEAR, YOU MUST REPLACE BOTH PARTS AS A MATCHED SET. DO NOT MIX OLD AND NEW PARTS. DAMAGE TO COMPONENTS CAN RESULT.

2. Inspect hypoid pinions and gears for wear and damage.Replace gears that are worn or damaged.

CAUTION

A THRUST WASHER, DIFFERENTIAL SIDE GEAR AND PINION GEAR ARE MACHINED AS A MATCHED SET. WHEN YOU REPLACE ANY OF THESE PARTS, YOU MUST INSTALL A NEW MATCHED SET. DO NOT MIX OLD AND NEW PARTS. DAMAGE TO COMPONENTS CAN RESULT.

3. Inspect the following main differential assembly parts for wear or stress. Replace parts that are damaged. Figure 4.7.
- Inside surfaces of both case halves
- Both surfaces of all thrust washers
- The four trunnion ends of the u-joint of differential
- Teeth and splines of both differential side gears
- Teeth and bore of all differential pinions

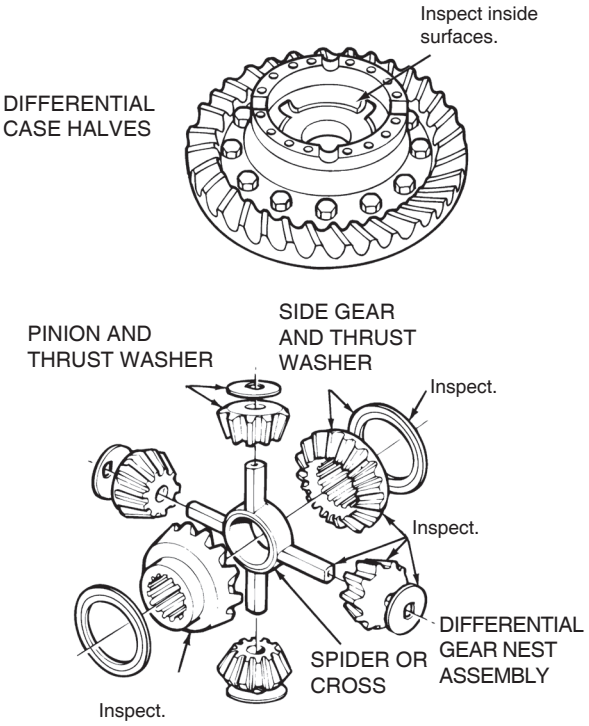


Figure 4.7

4. Inspect the axle shafts for wear and cracks at the flange, shaft and splines. Replace the axle shafts, if necessary.
5. Inspect the breather plug.

A. Remove the breather plug from the axle housing.

B. Clean the breather plug.
- If the breather plug remains dirty after cleaning:Replace the breathe plugr.

C. Apply compressed air to the breather.
- If compressed air does not pass through the breather plug: Replace the breather plug.

D. Install the breather plug in the axle housing.

Repair or Replace Parts

NOTE:

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

1. Replace any fastener if the corners of the head are worn.
2. Replace the washers if damaged.
3. Replace the gaskets, oil seals or grease seals at the time of axle or differential repair.
4. Clean the parts and apply new silicone gasket material where required when the axle or differential is assembled. Figure 4.8.

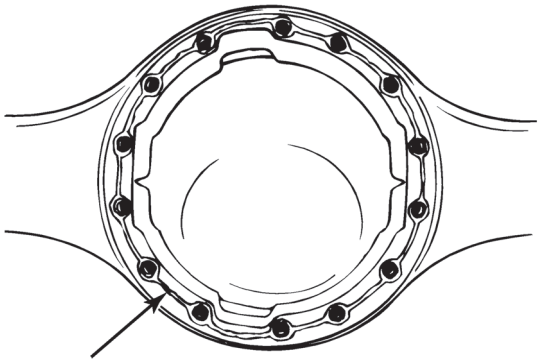


Figure 4.8

5. Remove nicks, mars and burrs from parts with machined or ground surfaces. Use a fine file, india stone, emery cloth or crocus cloth.
6. Clean and repair the threads of fasteners and holes.

Welding on Axle Housings

WARNING

Wear safe clothing and eye protection when you use welding equipment. Welding equipment can burn you and cause serious personal injury. Follow the operating instructions and safety procedures recommended by the welding equipment manufacturer.

Axle weld locations and welding procedures must adhere to Meritor standards. Welding at locations other than those authorized by Meritor will void the warranty and can reduce axle beam fatigue life. Serious personal injury and damage to components can result.

Seer to Maintenance Manual number 8, on the Drive Axle Housings. To obtain this publication, see to the Service Notes page on the begin of this manual.

Meritor permits drive axle housing assembly repair welding in the following locations only.

- Housing-to-cover weld joints;
- Snorkel welds;
- Housing seam welds between the suspension attaching brackets
- Bracket welding to the drive axle housing

Prepare the Axle

WARNING

The high temperature caused by the open flame from the cutting torch can ignite the oil in the axle housing and can cause serious personal injury.

1. Remove the oil drain plug from the bottom of the axle housing and drain the lubricant from the assembly.

CAUTION

REMOVE THE DIFFERENTIAL FROM THE AXLE HOUSING BEFORE YOU WELD ONTO AN AXLE. DO NOT WELD FOR AXLE WITH THE DIFFERENTIAL INSTALLED. ELECTRICAL ARC AND DAMAGE TO COMPONENTS CAN RESULT.

2. Remove the differential assembly from the axle housing. See the correct Meritor differential maintenance manual or the vehicle manufacturer's instructions.

CAUTION

REMOVE THE BRAKE AIR CHAMBERS BEFORE YOU WELD ONTO AN AXLE. DO NOT EXPOSE A BRAKE AIR CHAMBER TO MORE THAN 250°F (121°C). DAMAGE TO THE AIR CHAMBER CAN RESULT.

3. Remove the wheel-end components and brake air chambers from the axle. See to the correct Meritor brake maintenance manual or the vehicle manufacturer's instructions.
4. For housing to cover welds, clean the outside housing-to-cover weld area 2 at 3 -inches (50.8-76.2 mm) past each end or side of the crack. Clean the inside area where the cover mates with the housing. Clean the area completely around the cover. Use a wire brush and a cleaning solvent that will remove dirt and grease from these areas.
5. For suspension bracket welds, clean both lower and upper suspension brackets and the areas of the axle housing around each bracket. Use a wire brush and a cleaning solvent that will remove dirt and grease from these areas.

WARNING

The axle housing must be 70°F (21°C) or warmer before you weld onto the axle. Do not weld onto a cold axle or weld cold parts onto an axle. Cracks in the weld area, damage to components and serious personal injury can result.

6. Ensure that the axle housing temperature measures 70°F (21°C) or warmer.
   - If the axle housing temperature measures less than 70°F (21°C): Store the axle in a heated room until the housing reaches the correct temperature.
7. Heat the damaged area to approximately 300°F (149°C) before you begin welding.
8. Use suitable weld wire electrodes when you weld. Suitable weld wire electrodes include either BS EN 499 – E 42 2 B 32 H5 or BS EN 440 – G 42 2 M GSi (American Welding Society equivalents E7018 and ER70S3, respectively).

9. For complete welding instructions, refer to Maintenance Manual 8, Drive Axle Housings. To obtain this publication, see to the Service Notes page on the brgin this manual.

Do Not Bend or Straighten a Damaged Drive Axle Housing

WARNING

Replace damaged or out-of specification axle components. Do not bend, repair or recondition axle components by welding or heat-treating. A bent axle beam reduces axle strength, affects vehicle operation and voids Meritor's warranty. Serious personal injury and damage to components can result.

Always replace a damaged drive axle housing. Do not bend or straighten a damaged housing, which can misalign or weaken it,

and void warranty.

Removing Fasteners Secured with Adhesive

If it is difficult to remove fasteners secured with Dri-Loc, Meritor adhesive or Loctite 277 adhesive, use the following procedure.

When you remove fasteners secured with adhesive, slowly heat the fastener to 350°F (177°C). Do not exceed this temperature, or heat fasteners quickly. Damage to components can result.

1. Heat the fastener for three to five seconds. Try to loosen the fastener with a wrench. Do not use an impact wrench or hit the fastener with a hammer.
2. Repeat Step 1 until you can remove the fastener.

New Fasteners with Pre-Applied Adhesive

NOTE:

To remove fasteners secured with pr-applied adhesive no need to wait for drying

1. Use a wire brush to clean the oil and dirt from threaded holes.
2. Install new fasteners with pre-applied adhesive to assemble parts. Do not apply adhesives or sealants to fasteners with pre-applied adhesive, or to fastener holes.
3. Tighten the fasteners to the required torque value for that size fastener. See the warnings to the required torque

Original or Used Fasteners

1. Use a wire brush to clean the oil, dirt and old adhesive from all threads and threaded holes.

NOTE:

There is no drying time required for Meritor liquid adhesive 2297-C-7049, Loctite 638 or 680 liquid adhesive or equivalent.

2. Apply four or five drops of Meritor liquid adhesive Loctite 638 or 680 or equivalent inside each threaded hole or bore. Do not apply adhesive directly to the fastener threads. Figure 4.9.
3. Tighten the fasteners to the required torque value for that size fastener. See the warnings to the required torque.

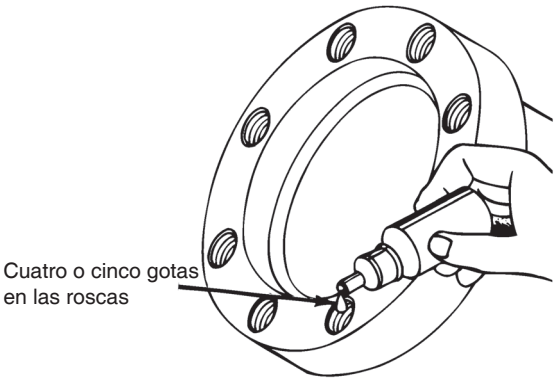


Figure 4.9

Meritor Aplication Adhesive 2297-T-4180 in the Differential Bearing Bores

NOTE:

Use Meritor specification 2297-T-4180 adhesive, for all axles.

1. Clean the oil and dirt from the outer diameters of the bearing cups and bearing bores in the differential and bearing caps. There is no special cleaning required.
2. Apply axle lubricant to the bearing cones and the inner diameters of the bearing cups of the main differential. Do not get oil on the outer diameter of the bearing cup and do not permit oil to drip for the bearing bores.

NOTE:

Meritor specification 2297-T-4180 adhesive, will dry in approximately two hours. You must complete the procedure within two hours from the time you apply the adhesive. If this period have passed since application, clean the adhesive from the parts and apply new adhesive.

3. Apply a single continuous bead of the adhesive to the bearing bores in the differential and bearing caps. Apply the adhesive around the circumference of the smooth, ground surfaces only. Do not place the adhesive on the threaded areas. Figure 4.10.

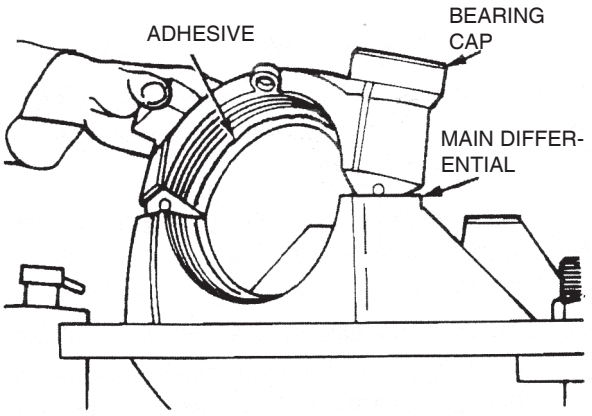


Figure 4.10

4. Install the main differential assembly, bearing cups and bearing caps. See Section 5.
5. Adjust the preload of the differential bearings, backlash and tooth contact patterns of the gear set as required. See Section 5.

Differential to Housing Joint Sealing Procedure Aplication

1. Remove the differential from the housing. See Section 3.
2. Remove all debris from inside the housing.
3. Use a rotary tool with a scour pad to clean all silicone residue from the housing and differential faces. Figure 4.11. Surfaces must be clean, dry and free of foreign matter. The surfaces must not be oily to the touch.

Cleaning the housing face with a rotary tool and a scour pad.

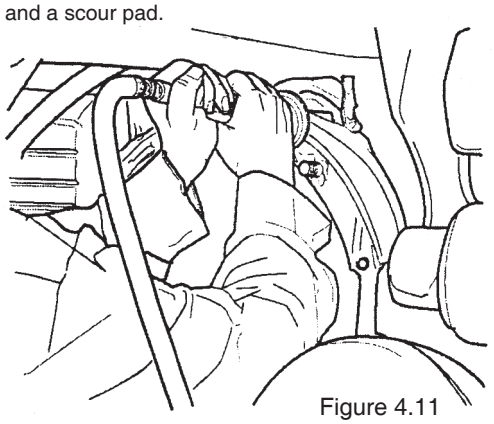


Figure 4.11

4. Remove metal filings from the magnets inside the housing.
5. Use solvent to clean the inside of the housing.
6. Use Loctite ODC Free cleaner or brake cleaner to clean the housing and differential faces.
7. Dry the housing and differential faces.
8. Use a rotary wire brush to remove any threadlocker material and clean the capscrew threads to differential. Use a clean cloth to wipe the threads.
9. Use a tap to clean the internal threads in the housing.

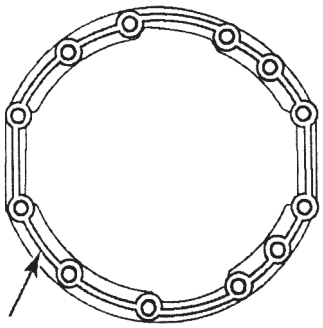
CAUTION

New capscrew kits have blue Dri-Loc® STS threadlocker, an equivalent to Loctite® 242 threadlocker, applied to the capscrews. Do not remove the blue Dri-Loc® STS threadlocker from the capscrews. Damage to components can result.

CAUTION

APPLY SILICONE GASKET MATERIAL IN A CONTINUOUS 0.25 INCH (6 MM) BEAD. IF YOU USE MORE THAN THIS AMOUNT, GASKET MATERIAL CAN BREAK OFF AND PLUG LUBRICATION PASSAGES. DAMAGE TO COMPONENTS CAN RESULT.

10. Apply a 0.25 inch (6 mm) bead of Loctite® 5699 silicone gasket material to the housing face. Do not use ThreeBond1216E silicone products. Figure 4.12.



DIAMETER SILICONE GASKET BEAD 0,25" (6MM

Figure 4.12

11. Install two long studs in the differential to guide the differential into the housing.
12. Immediately install the differential into the housing to compress the liquid gasket evenly between the differential faces and the housing.

CAUTION

APPLY SILICONE GASKET MATERIAL IN A CONTINUOUS 0.125 INCH (3 MM) BEAD. IF YOU USE MORE THAN THIS AMOUNT, GASKET MATERIAL CAN BREAK OFF AND PLUG LUBRICATION PASSAGES. DAMAGE TO COMPONENTS CAN RESULT.

13. Apply a 0.125-inch (3 mm) bead of Loctite® 242 threadlocker around the capscrew threads approximately 0.25-inch (6 mm) from the end. Apply a 0.125 inch (3 mm) bead of Loctite® 242threadlocker across the length of the threads. Figure 4.13.

LOCTITE® 242 THREADLOCKER APPLICATION

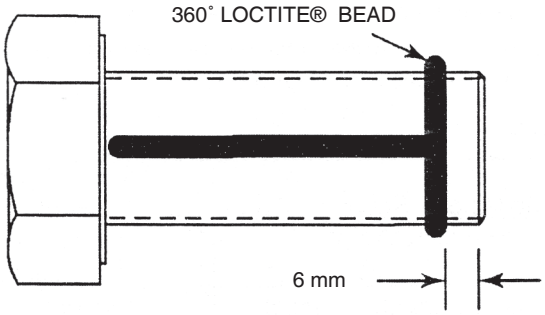


Figure 4.13

14. Install the capscrews. Use a crossing pattern to tighten the capscrews evenly. The capscrews must be tightened within10 minutes of initial application of Loctite® 242 threadlocker.
- Tighten the 1/2-inch capscrews to 140 lb-ft (190 N m). T
- Tighten the 5/8-inch capscrews to 225 lb-ft (306 N m). T

15. Wait a minimum of 60 minutes before filling the assembly with lubricant. See Section 7.

Fork and General U-Joint Reassembly

Install the fork general u-joint capscrews by hand after seating the U-joint. Tighten the capscrews according to the manufacturer's torque specifications.

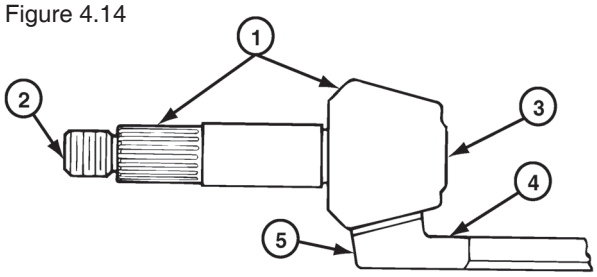
Identification

Gear Sets

See Table A, Table B, Table C and Table D for information on identifying gear sets with matched parts. Always check match numbers to verify that the gear set you will install has matched parts. Figure 4.14.

ALTERNATE LOCATIONS

Figure 4.14



1 - PART NUMBER, TOOTH COMBINATION NUMBER, GEAR SET MATCH NUMBER, PINION CONE VARIATION NUMBER

2 - PART NUMBER, TOOTH COMBINATION NUMBER

3 -GEAR SET MATCH NUMBER, PINION CONE VARIATION NUMBER

4 - PART NUMBER, TOOTH COMBINATION NUMBER, GEAR SET MATCH NUMBER

5 - PART NUMBER, TOOTH COMBINATION NUMBER, GEAR SET MATCH NUMBER

Examples

Table A: Gear Set Part Numbers

PART	NUMBER	LOCATION
Conventional ring gearl	36786	On the front face or outer diameter
Conventional drive pinion	36787	At the end at threads
Generoid ring gear	36786K o 36786K2	On the front face or outer diameter
Generoid drive pinion	36787	At the end at threads

Table B: Gear Set Tooth Combination Number

Qtd. Gear Set Teeth	Drive Pinion Location	Ring Gear Location
5-37 = gear set has a 5 -tooth drive pinion and a 37 tooth ring gear	At the end at threads	On the front face or outer diameter

NOTE:

Meritor drive pinions and ring gears are only available as matched sets. Each gear in a set has an alphanumeric match number.

Table C: Gear Set Match Number

Match Number	Drive Pinion Location	Ring Gear Location
M29	Pinion head	On the front face or outer diameter

NOTE:

Don't use the pinion cone variation number when you check for a matched gear set. Use this number when you adjust the pinion depth of the differential assembly. See Section 5.

Table D: Pinion assembly dimension Variation value

Pinion dimension (PC) Variation value	Drive Pinion Location	Ring Gear Location
PC+3	Pinion head	On the outer diameter
+2		
+0,01 mm		
PC-5		
-1		
-0,02 mm		

Check for Mismatched Ratios on Tandem Axles

For a tandem axle pair to function correctly, the forward and rear axles must operate with axle ratios within one percent. A mismatched tandem axle pair can cause differential overheating, hypoid gear set wear, metal debris to collect on the magnetic drain plug, differential lubricant additive depletion, excessive interaxle wear and noise.

To determine if the tandem axle ratios operate within allowable limits, refer to one of the following procedures, You perform the procedure that will work best for the vehicle you are servicing.

Hypoid Gear Set Ratios Listed on the Identification Tags

1. Locate the identification tags riveted to the forward and rear of differential. Figure 4.15.

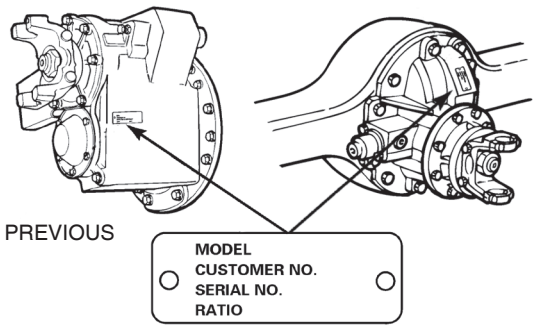


FigurE 4.15

2. Compare the axle ratios shown on both tags. To operate correctly, the axle ratios for both axles must be within one percent of each other. To calculate the percentage difference between the axle ratios, refer to the equation in Table E.

Table E:

Larger Ratio – Smaller Ratio	X 100 -	Percentage Difference Between Axle Ratios
Smaller Ratio		

- If the axle ratios shown on the identification tags are not within one percent of each other: See the vehicle manufacturer for further information

Rotate the Forward Driveshaft to Check the Hypoid Gear Set Ratio

WARNING

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

1. Park the vehicle on a level surface.
2. Engage the power divider and shift the transmission into NEUTRAL.
3. Block the wheels to prevent the vehicle from moving.
4. Use a jack to raise the vehicle until all the tandem drive axle wheels clear the ground. Support the vehicle with safety stands.
5. Mark the forward and rear tires at identical relative positions.Figure 4.16

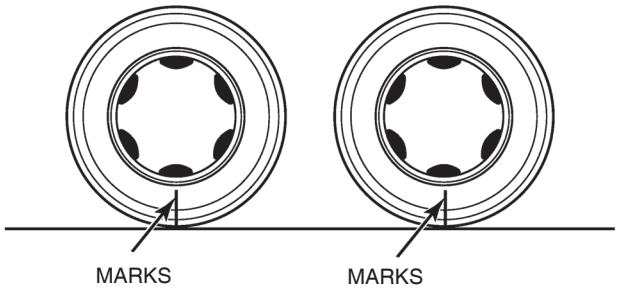


Figure 4.16

6. Turn the forward driveshaft in one direction by hand until the forward tire completes two rotations. Figure 4.17. The forward tire must rotate two times only. If the forward tire rotates more than or less than two rotations, the angle measurements you make in Step 7 will be inaccurate

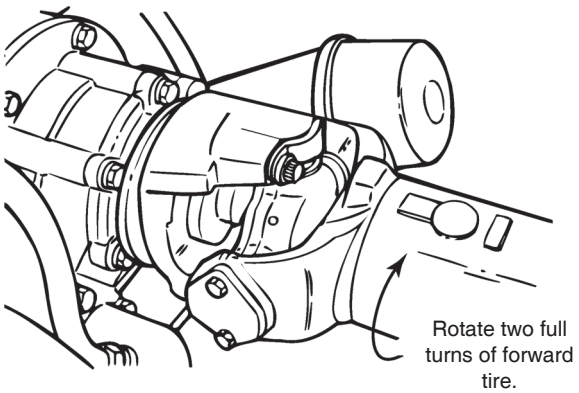


Figure 4.17

7. Note the positions of the tire marks you previously made. On a correctly matched tandem axle gear set, both tire marks will be within ± 3.6 degrees of each other. Figure 4.18.

- If the positions of the tire marks are more than3.6 degrees from each other: Check to the vehicle manufacturer for further information.

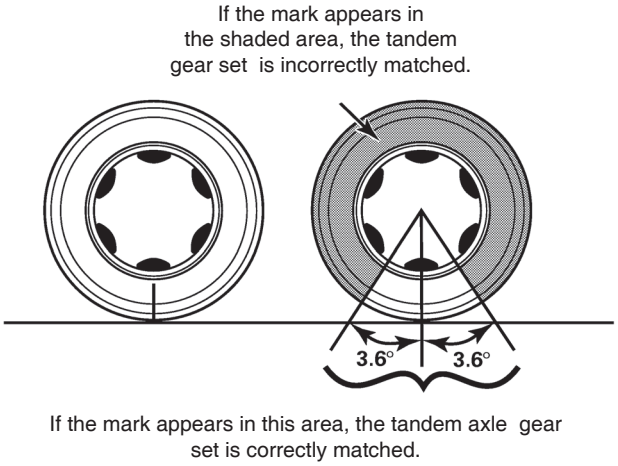


Figure 4.18

8. Remove the safety stands and lower the vehicle.

Hypoid Gear Set Teeth Numbers Stamped on the Forward and Rear Axle Drive Pinions

When the inter-axle driveline or differential are removed for maintenence, you can check the hypoid gear set teeth numbers stamped on the forward and rear axle drive pinions.

WARNING

1. Park the vehicle on a level surface.
2. Block the wheels to prevent the vehicle from moving.

To Identify the Gear Teeth Number on the Forward Axle Drive Pinion

1. Remove the forward pinion cover. See the vehicle manufacturer's procedures.
2. Look into the differential housing. Identify and record the gear set teeth numbers stamped on the drive pinion end. Figure 4.19.
3. Calculate the hypoid gear set ratio by dividing the larger number by the smaller number. Figure 4.19.

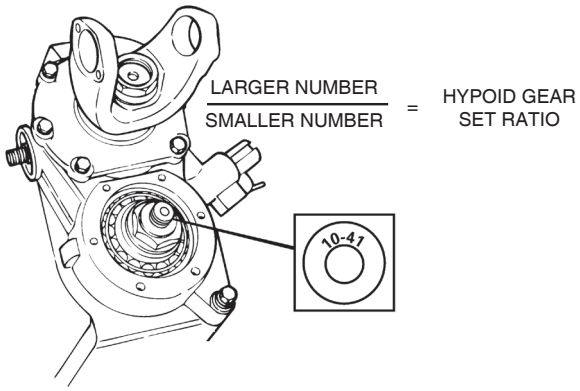


Figure 4.19

To Identify the Gear Teeth Number on the Rear Axle Drive Pinion

1. Remove the inter-axle driveshaft. Seethe vehicle manufacturer's procedures.
2. Identify and record the gear set teeth numbers stamped on the end of the rear axle drive pinion. Figure 4.20.
3. Calculate the hypoid gear set ratio by dividing the larger number by the smaller number. Figure 4.20.

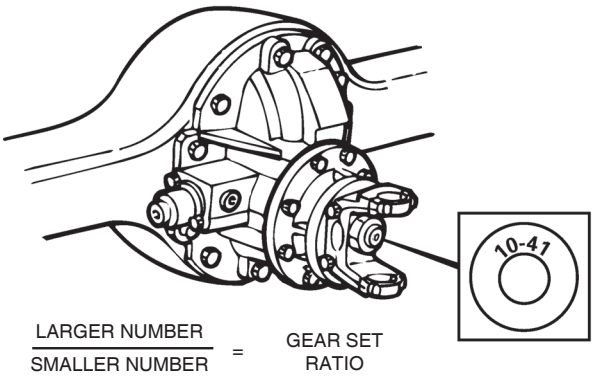


Figure 4.20

Compare Both Hypoid Gear Set Ratios

1. Both ratios must be within one percent of each other. To calculate the percentage difference between the axle ratios, refer to the equation in Table E.

- If the axle ratios shown on the identification tags are not within one percent of each other: See the vehiclemanufacturer for further information.

2. Install the inter-axle driveshaft. Refer to the vehicle manufacturer's procedures.
3. Install the pinion cover. See the vehicle manufacturer's procedures.
4. Remove the safety stands and lower the vehicle.

Verify the Actual Hypoid Gear Set Ratios

You can check the actual hypoid gear set ratios when you remove the differential assemcbly from the axle housings for maintenance or repair. See the following procedure to calculate the actual gear set ratios.

1. Count the number of ring gear teeth. Figure 4.21.
2. Count the number of pinion gear teeth. Figure 4.21.
3. Divide the number of ring gear teeth by the number of pinion gear teeth to determine the actual hypoid gear set ratio for each axle. Figure 4.21.

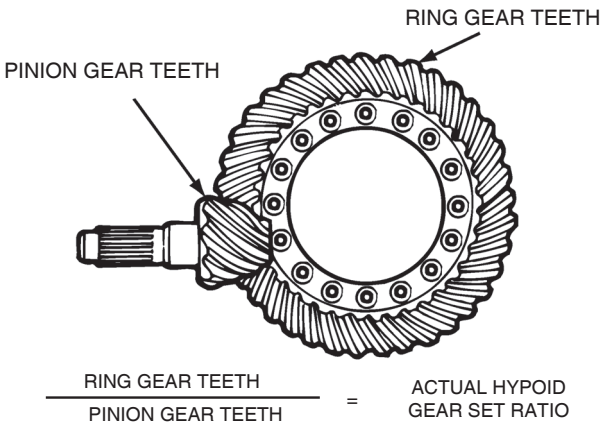


Figure 4.21

4. Calculate the percentage difference between the hypoid gear set ratios using the equation in Table E. All ratios must match within one percent.

- If the actual hypoid gear set ratios are not within one percent of each other: See the vehicle manufacture for further information.

Inspection Fork General U-Joint

All current Meritor axles feature helical splines at the fork interface. This feature provides a tight fit between the fork and input shaft, output shaft and pinion shaft. For the axle to operate correctly, the input shaft, output shaft and pinion shaft must fit tightly to the corresponding fork.

Check for Fork Wear

WARNING

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
2. Use a jack to raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
3. Remove the driveline.
4. Remove the input, output or pinion shaft nut.
5. Attempt to remove the fork by hand.

- If you can remove the fork by hand: The fork is worn.Replace the fork e

6. Use a correct fork puller tool to remove the fork.

Check for a adjustment Condition

NOTE:

You can check for a adjustment fit condition when you install any serviceable fork

1. Attempt to install the fork by hand.

- If the yoke bottoms out against the adjacent bearing:Replace the yoke.

2. Use a correct yoke installation tool to install the yoke.
3. As you install the fork, you should detect resistance between the fork and shaft.

- If you do not detect resistance between the fork and shaft: Replace the fork.

4. Install and tighten the input, output or pinion shaft nut to the correct torque. See Section 8.
5. Install the driveline.
6. Remove the safety stands.
7. Lower the vehicle.

Tire Matching for Tandem and Tridem Axles

CAUTION

UNMATCHED TIRES ON BOTH TANDEM DRIVE UNITS AND TRIDEM DRIVE UNITS WILL CAUSE TIRE WEAR AND SCUFFING AND POSSIBLE DAMAGE TO THE DRIVE UNITS. MERITOR RECOMMENDS THAT THE TIRES BE MATCHED TO WITHIN 0.125 INCH (3.18 MM) OF THE SAME ROLLING RADIUS, 0.75 INCH (19.05 MM) OF THE SAME ROLLING CIRCUMFERENCE

Tandem Axles

The four largest tires should never be installed on one driving axle or the four smallest tires on the other driving axle. Such tire mounting will cause an inter-axle fight, unusually high axle lubricant temperatures that result in premature lubricant breakdown and possible costly axle service.

In addition to matching individual tire rolling radius or rolling circumference, Meritor recommends matching, as nearly as possible, the total tire circumference of one driving axle to the total tire circumference of the other driving axle. This will usually result in satisfactory tandem axle lubricant temperatures that lengthen drive unit service with higher tire mileage.

Park the vehicle on a level surface. The vehicle must carry a correctly distributed rated capacity load. All the tires must be the same size. Measure new tires to verify that they will be correctly matched.

1. Inflate all tires to the same pressure.
2. Carefully measure the rolling circumference of each tire with a steel tape.
3. Mark the size on each tire with chalk and arrange the tires in order of size, largest to smallest.
4. Mount the two largest tires on one side of one axle and mount the two smallest on the opposite side of the same axle.
5. Mount the four other tires on the other axle in the same manner.
6. Test run the vehicle to gather accurate rear axle lubricant temperature readings on the two axle temperature gauges.
7 Vary tire air pressure within the tire manufacturer's recommended range so the lubricant temperature of both axles is within 30° F (14° C) of each other and not in excess of 200°F (93° C). This will usually result in uniform tire loading and good tire life.

Tridem Axles

When three driving axles are used together in a tridem series, unmatched tires will compound the problems described in the preceding paragraphs. Meritor recommends matching, as nearly as possible, the total tire circumference of each of the 3 driving axles.

To match tires on tridem units, follow the same procedure used for tandem units.

Arrange the tires in order of size.

- The two largest and two smallest go on one axle.
- The next two largest and smallest go on the second axle.
- The remaining four tires go on the third axle.

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.

Note all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

Installation

Installing the Drive Pinion, Adjusting Pinion Depth and Preload Bearings

There are two procedures for adjusting pinion depth. The procedure in this manual is to install the pinion, bearings and calculated shim pack into the case WITHOUT the helical gear and two spacers. After you check the tooth contact patterns to determine the correct pinion position, you must disassemble the differential to install the helical gear and two spacers.

An optional procedure is to install the pinion, bearings and calculated shim pack into the case WITH the helical gear and two spacers. After you check the tooth contact patterns to determine the correct pinion position, you only need to disassemble the differential if an adjustment is necessary. Both procedures are acceptable.

Adjustment

Shim Pack Thickness for a New Drive Pinion

NOTE:

Use this procedure if you'll install a new drive pinion and ring gear set or if you have to adjust the depth of the drive pinion. If the pinion depth shims are misplaced during differential repair, use 0.030 inch (0.76 mm) for 145 Series differential and 0.050 inch (1.27 mm) for 160 Series differential for the initial pinion position. Figure 5.1.

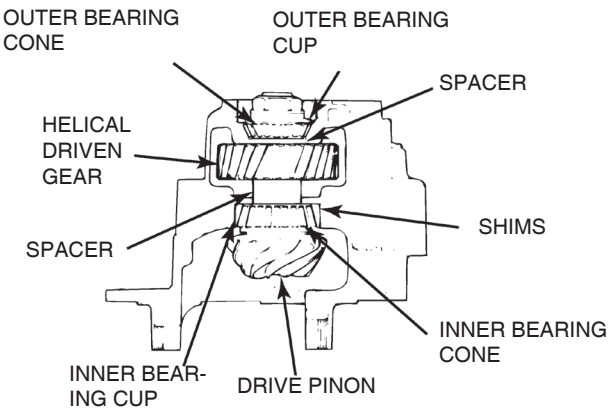


Figure 5.1

1. Use a micrometer to measure the thickness of the shim pack that was removed from the differential differential. Record the measurement. Figure 5.2

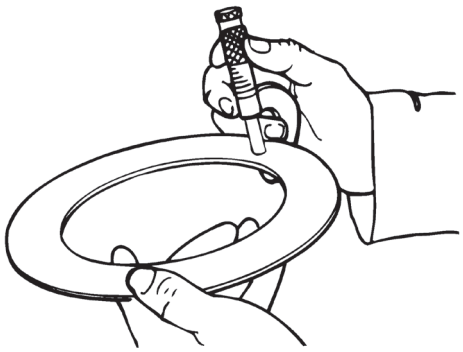


Figure 5.2

2. Find the pinion cone (PC) variation number on the drive pinion you'll replace. Record the number. Figure 5.3.

- PC+3, PC-3, +3 ou -3 = 0.003"
- PC +.03, PC 0.03 mm, +0.03 mm ou -0.03 = 0.03 mm.

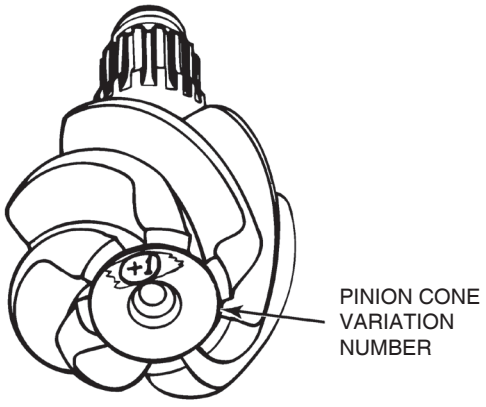


Figure 5.3

3. If you can't find the PC number or it's unreadable, install a new shim pack of the same thickness that you measured in Step 1.

NOTE:

The following calculation is the opposite for a rear differential, forward tandem or single.

4. If the old pinion cone variation number of a front tandem differential is a plus (+), ADD the cone variation number to the old shim pack thickness that was measured in Step 1.
5. If the old pinion cone variation number of a front tandem differential is a minus (–), SUBTRACT the cone variation number from the old shim pack thickness that was measured in Step 1.
6. Find the pinion cone variation number on the new drive pinion that will be installed. Record the number.
7. If the new pinion cone variation number of a front tandem differential is a plus (+), SUBTRACT the variation number from the standard shim pack thickness that was calculated in Step 4 or Step 5. Use new shims to make a shim pack to the determined thickness. See Table F.
8. If the new pinion cone number of a forward tandem differential is a minus (–), ADD the number to the standard shim pack thickness that was calculated in Step 4 or Step 5. Use new shims to make a shim pack to the determined thickness. See Table F.

TABLE F

Exemplos	mm	inches
1.Old Shim Pack Thickness	0,780	0,030
Old variation PC =PC+2	+0,050	+0,002
Standard Shim Pack Thickness	=0,810	=0,032
New variation PC=PC+5	-0,120	-0,005
New Shim Pack Thickness	=0,690	=0,027
1.Old Shim Pack Thickness	0,780	0,030
Old variation PC=PC-2	+0,050	+0,002
Standard Shim Pack Thickness	=0,710	=0,028
New variation PC=PC+5	-0,120	-0,005
New Shim Pack Thickness	=0,590	=0,023
1.Old Shim Pack Thickness	0,780	0,030
Old variation PC=PC+2	+0,050	+0,002
Standard Shim Pack Thickness	=0,810	=0,032
New variation PC =PC-5	-0,120	-0,005
New Shim Pack Thickness	=0,930	=0,037
1.Old Shim Pack Thickness	0,780	0,030
Old variation PC=PC-2	+0,050	+0,002
Standard Shim Pack Thickness	=0,710	=0,028
New variation PC=PC-5	-0,120	-0,005
New Shim Pack Thickness	=0,830	=0,033

Drive Pinion Assembly

The depth of the drive pinion and ring gear contact is controlled by the thickness of the shim pack. Figure 5.4.

- To increase the thickness of the drive pinion contact, increase the thickness of the shim pack.
- To decrease the depth of the drive pinion pattern, decrease the thickness of the shim pack.

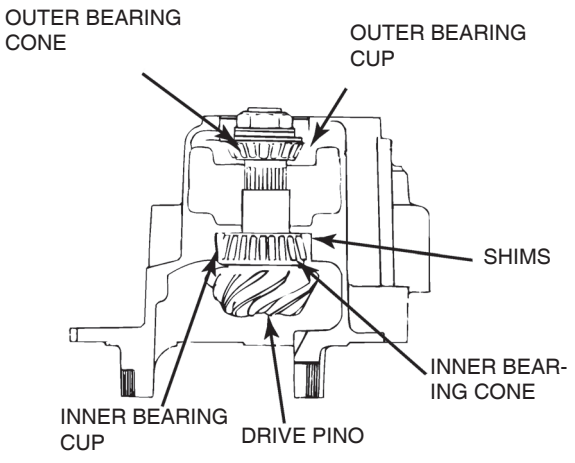


Figure 5.4

The preload of the bearings on the drive pinion is controlled by a spacer between the outer bearing cone and the helical driven gear.

Adjust the preload by changing the size of the spacer.

- To decrease the preload, use a thicker spacer.
- To increase the preload, use a thinner spacer.
- If the depth of the drive pinion is changed, the thickness of the spacer must also be changed the same amount. See the following examples.
- If a 0.003 inch (0.076 mm) shim is ADDED to the shim pack to INCREASE the depth of the drive pinion, a 0.003-inch (0.076 mm) larger spacer must be installed to keep the preload on the bearings.
- If a 0.003-inch (0.076-mm) shim is REMOVED from the shim pack to DECREASE the depth of the drive pinion, a 0.003-inch (0.076 mm) smaller spacer must be installed to keep the preload on the bearings.

NOTE:

The helical driven gear and the spacers are installed when the bearing preload on the drive pinion is inspected and adjusted.

1. If you are installing a new ring gear and drive pinion, the correct thickness of the shim pack between the pinion inner bearing cap and the differential must be determined. See the procedure in this section before temporarily assembling and installing the drive pinion assembly.
- If you are installing the original ring gear and drive pinion, temporarily install the drive pinion assembly.

2. If removed, use a press and a sleeve to install the inner bearing cone onto the drive pinion. Place the sleeve on the inner race of the bearing. Apply pressure until the bottom of the cone touches the shoulder on the pinion. Figure 5.5.

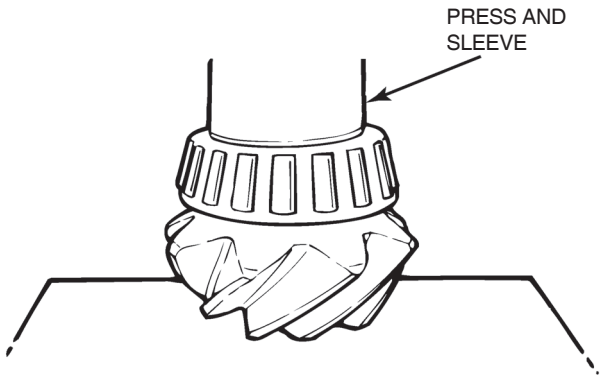


Figure 5.5

3. Apply axle lubricant to the bearing caps and cones.
4. If removed, install the shim pack and the inner bearing cap of the drive pinion.

A. Place the differential case into a press so that the bearings caps are toward the TOP of the press.

B. Install the correct amount of shims into the bore for the inner bearing cap of the drive pinion. Figure 5.6.

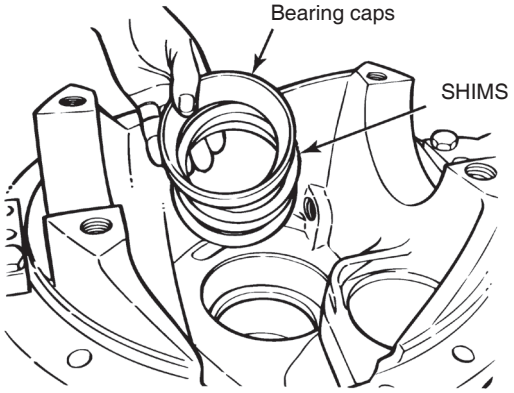


Figure 5.6

C. Place the cap into the bore. Figure 5.6.

D. Place supports under the differential case so that the case is level.

E. Place a sleeve or a installation tool into the caps and press the caps into the bore until the bottom of the cap touches the shims. If a press is not available, use a sleeve, a brass drift or a installation tool and a hammer to install the cap. Figure 5.7.

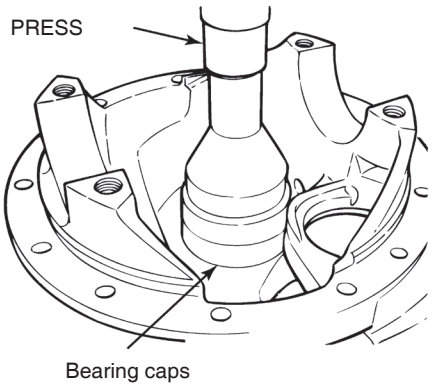


Figure 5.7

5. If removed, install the outer bearing cap for the drive pinion.

A. Place the differential caser in the press so that the bearing caps of the differential stay toward the bottom of the press. Place supports under the differential case, so that the differential is level.

B. Place the outer bearing cap for the drive pinion into the bore of the differential case.

C. Use a sleeve or a installation tool and a press to install the cap. Press the cap into the differential case until the bottom of the cap touches the bottom of the bore. If a press is not available, use a sleeve, a brass drift or a installation tool and a hammer to install the cap. Figure 5.8.

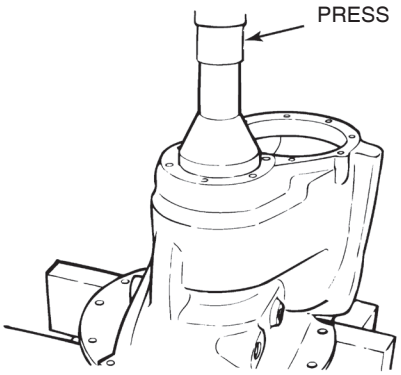


Figure 5.8

Installation Drive Pinion Assembly

1. Place the drive pinion into the differential case so that the pinion is through the inner and the outer bearing caps.
2. Place the differential case in the press so that the bearing caps of the differential stay toward the bottom of the press. Place supports under the differential case so that the case is level. Place a support under the head of the drive pinion so that the inner bearing cone on the pinion shaft touches the inner bearing cap in the differential case.
3. Place the outer bearing cone in the pinion shaft
4. Use a press and a sleeve to install the bearing cone in the pinion. Apply no more than two tons (1814 kg) of force to verify that the bearing cone is correctly installed. Figure 5.9.

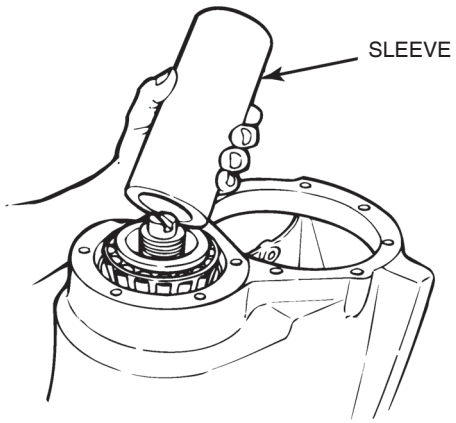


Figure 5.9

Adjustment Drive Pinion Bearing Preload

NOTE:

If the depth of the drive pinion was changed, then the amount of the change must be added or subtracted to the thickness of the spacer between the outer bearing cap and the helical driven gear.

After you obtain the correct gear tooth contact pattern and the correct shim pack thickness, you must adjust the bearing preload on the drive pinion. The preload is controlled by the thickness of the spacer between the helical driven gear and the outer bearing cone. Figure 5.10.

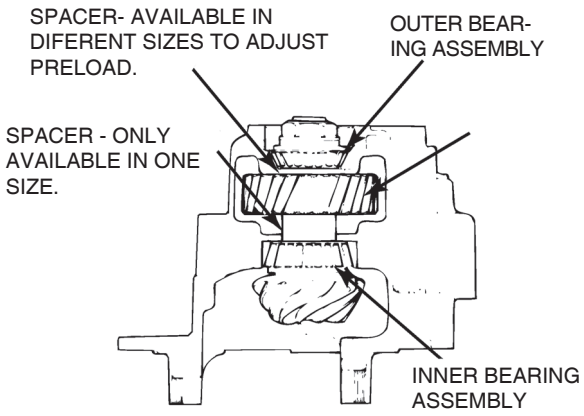


Figure 5.10

1. Place the differential case in the press so that the threaded end of the pinion is UP. Place supports under the flange of the differential case so that the case is level. Place a wood block under the head of the pinion. Figure 5.11.
2. Press the drive pinion out of the outer bearing cone. Remove the cone. Figure 5.11.

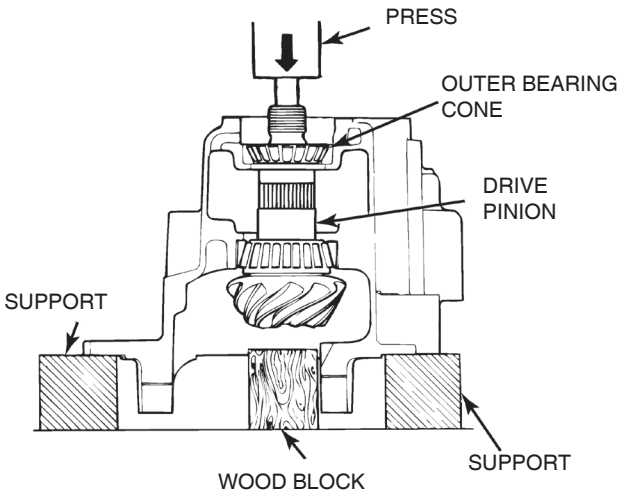


Figure 5.11

3. Turn the differential case so that the bearing caps of the differential case are UP. Place supports under the differential case so that the case is level.
4. Place the helical driven gear over the pinion bore in the differential case so that the splines inside the gear are toward the front of the differential case. Place the large spacer on top of the helical driven gear so that the spacer is toward the inner bearing cap. Figure 5.12.

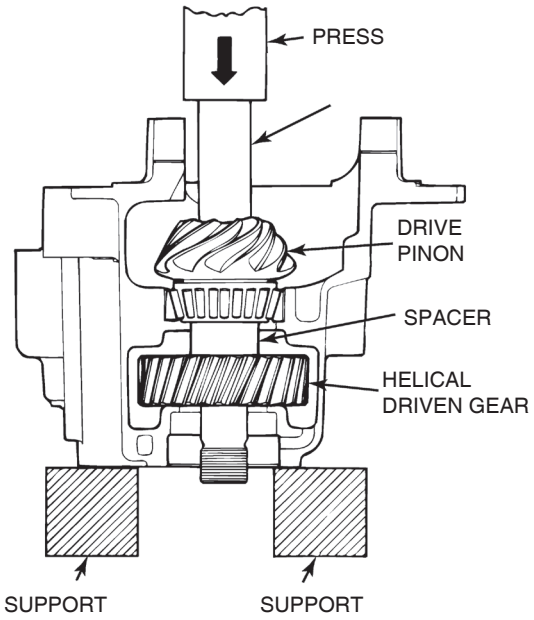


Figure 5.12

5. Install the drive pinion into the helical driven gear. Verify that the splines on the pinion engage the splines inside the gear. Figure 5.12.

CAUTION

DO NOT APPLY PRESSURE AFTER THE INNER BEARING CONE TOUCHES THE INNER BEARING CAP. IF MORE PRESSURE IS APPLIED, THE CAP, CONE AND DRIVE PINION WILL BE DAMAGED.

6. Place a protector in the head of the drive pinion. Use a press to install the pinion into the differential case so that the inner bearing cone touches the bearing cap. At this time, the helical driven gear will not be completely installed on the drive pinion. Figure 5.12.
7. Place the differential case in the press so that the threaded end of the pinion is toward the TOP. Place supports under the flange of the differential case so that the case is level. Place a wood block under the head of the drive pinion so the inner pinion bearing cone touches the inner bearing cap. Figure 5.13.

CAUTION

DO NOT APPLY PRESSURE AFTER THE HELICAL DRIVEN GEAR TOUCHES THE SPACER IN FRONT OF THE INNER BEARING ON THE DRIVE PINION. IF PRESSURE IS APPLIED AFTER THE PARTS TOUCH EACH OTHER, THE GEAR WILL DAMAGE THE SPACER.

8. Use a press and a sleeve to completely install the helical driven gear onto the drive pinion. Use a sleeve on the hub of the gear that fits inside the pinion bore. Press the gear into the drive pinion until the gear touches the spacer. Figure 5.13.

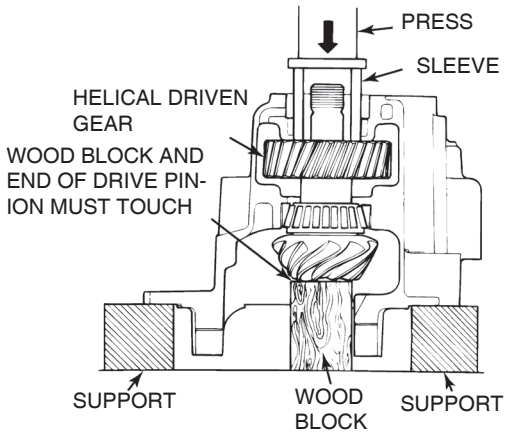


Figure 5.13

9. Cut two pieces of lead or solder approximately 0.5625-inch (14 mm) long and 0.625-inch (16 mm) wide. Use the two pieces of solder or lead as gauge blocks to determine the correct thickness of the spacer between the helical driven gear and the outer bearing.
10. Place the two pieces of lead or solder so that the pieces are opposite each other on top of the helical driven gear.
11. Place the outer bearing cone into the cap over the two pieces of lead or solder on top of the helical driven
12. Remove the support from the flange of the differential case. Place a sleeve on top of the outer bearing cone. Use a press to apply 2 tons (1814 kg) of force to the outer bearing cone. The force of the press compresses the lead or solder pieces to the correct size. Do not apply more than 2 tons (1814 kg) of force. Figure 5.14.

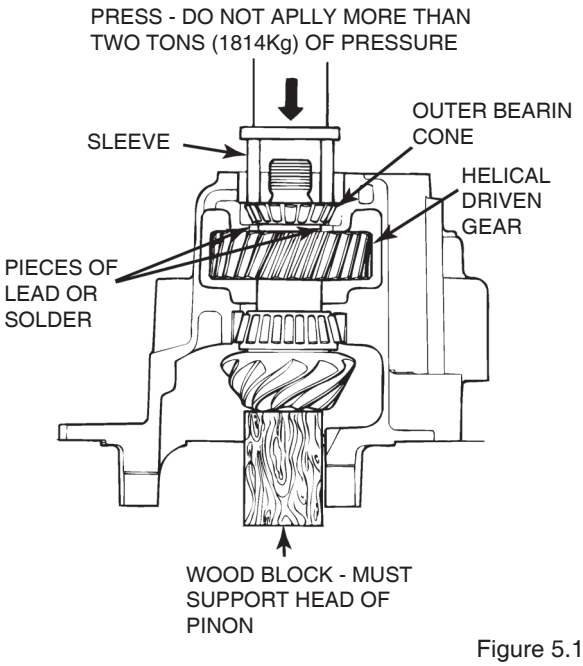


Figure 5.14

13. Release the pressure and remove the wood block from under the head of the drive pinion.

14. Use a press and a sleeve to press the shaft of the drive pinion out of the outer bearing cone. Do not press the shaft of the drive pinion out of the helical driven gear.
15. Remove the outer bearing cone and the two pieces of lead or solder from the outer bearing cone.
16. Use a micrometer to measure the thicknesses of the compressed pieces of lead or solder. Add the measurements of the two pieces and divide by two (2) to determine the average size of the pieces. Add 0.004-inch (0.100 mm) to the average size. Use this dimension to determine the size of the spacer to install between the helical driven gear and the outer bearing. See Table G.

TABLE G

Example	(mm)	Pol.
Thickness of piece number 1	(12.800)	0,504
Thickness of piece number 2	(12.852)	+0,506
Total thickness	(25.826)	1,010
Divide by two (2) to determine the average thickness	(12.826)	0,505
Add 0.004-inch (0.100 mm) to determine the thickness of the spacer	(12.9260)	0,509

17. Place a wood block under the head of the drive pinion so that the inner bearing cone on the pinion touches the inner bearing cap in the differential case. Remove the supports from the differential case. Figure 5.15.

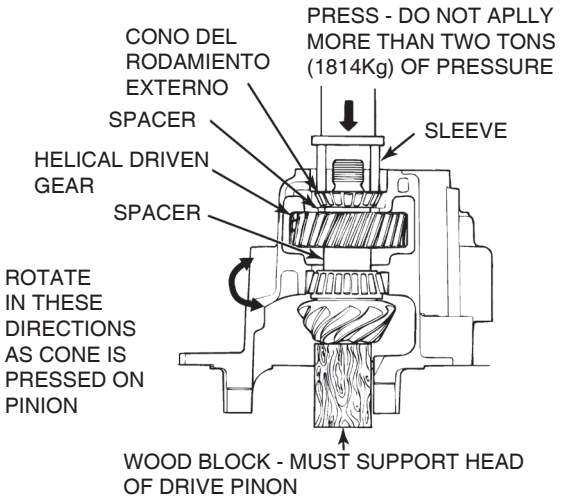


Figure 5.15

CAUTION

DO NOT APPLY PRESSURE AFTER THE HELICAL DRIVEN GEAR TOUCHES THE SPACER IN FRONT OF THE INNER BEARING ON THE DRIVE PINION. IF PRESSURE IS APPLIED AFTER THE PARTS TOUCH EACH OTHER, THE GEAR WILL DAMAGE THE SPACER.

NOTE:

The inner bearing cone on the drive pinion must touch the inner bearing cap in the differential case, when the helical driven gear is being installed.

18. Use a press and a sleeve to completely install the helical driven gear on the drive pinion. Use a sleeve on the hub of the gear that fits inside the pinion bore. Press the gear in the drive pinion until the gear touches the spacer. Do not remove the wood block at this time. Figure 5.14
19. Install the correct size spacer the shaft of the pinion in front of the helical driven gear.

NOTE:

Verify that the wood block is still under the head of the drive pinion. The inner bearing cone on the pinion must touch the cap in the differential case.

20. Install the outer bearing cone into the shaft of the drive pinion. Figure 5.15.

A. Place the outer bearing cone on the shaft of the drive pinion.

B. Place a sleeve in the top, inner race, of the outer bearing cone.

C. Use a press to apply 2 tons (1814 kg) of force on the bearing cone to install the cone into the shaft of the drive pinion. Rotate the differential case in both directions, while the cone is being installed to verify that the bearing cone is correctly installed.

21. Release the pressure and remove the differential case from the press. Place the differential case in a repair stand.

22. Install the washer and the nut the drive pinion. Prevent the drive pinion assembly from rotating by using of device or tool to hold the teeth of the helical driven gear or place wood blocks between the head of the pinion and the differential case wall. Tighten the nut to the specified torque. See Section 8. Remove the holding tool or the wood blocks.
23. Use an inch-pound torque wrench or a spring scale to inspect the preload of the bearings on the drive pinion.

Torque Wrench Method

1. Place an inch-pound (N.m) torque wrench and the correct socket in the drive pinion nut. Figure 5.16.

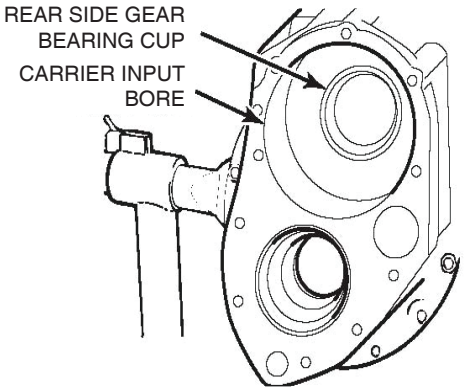


Figure 5.16

2. Use the torque wrench to rotate the drive pinion assembly. Inspect and record the torque level. Read while rotating the assembly. Record the dynamic or rotating torque not the starting torque.
3. The preload of the drive pinion bearings must be within the following limits.

- For new pinion bearings: 5-45 lb-in (0.56-5.08 N.m) rotational torque (T).
- For used pinion bearings: 10-30 lb-in (1.13-3.39 N.m) rotational torque (T).
- If the preload is not within the specified limits, remove and replace the spacer between the outer bearing cone and the helical driven gear. See the procedure below:
- To decrease the preload, install a thicker spacer.
- To increase the preload, install a thinner spacer.

Dinamometry Scale Method

1. Wind a cord around the washer under the nut of the drive pinion
2. Attach a dinamometry scale to the end of the cord
3. Pull the dynamometry scale and cord in a horizontal direction while looking at the reading on the spring scale. Figure 5.17.

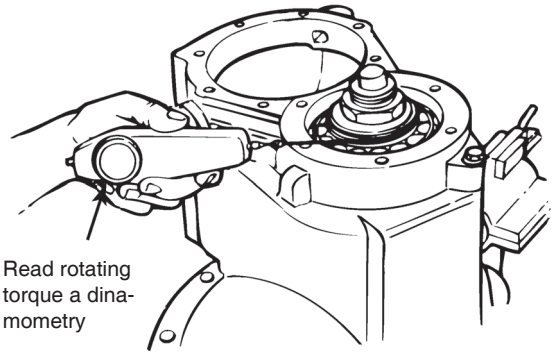


Figure 5.17

4. Measure the outer diameter of the washer under the drive pinion. Divide the outer 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 spring scale to get the preload on the pinion bearings

Example

Outer diameter of the washer = 3.00 inches (76.20 mm) scale reading = 9 lbs (4 kg)

	(mm)	Pol.
Outer diameter of the washer	(76,20)	3,00
Divide the outer diameter by two (2) to get the radius of the washer	(38.10)	1,50
Multiply the radius of the washer by the spring scale reading	1,49 N.m	13,50 lb-in

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

- For new pinion bearings:5-45 lb-in (0.56-5.08 N.m) rotational torque (T)
- For used pinion bearings:10-30 lb-in (1.13-3.39 Nm) rotational torque (T)
- If the preload is not within the specified limits, remove and replace the spacer between the outer bearing cone and the helical driven gear. See the procedure below.
- To decrease the preload, install a thicker spacer.
- To increase the preload, install a thinner spacer.

Spacer Replacement

NOTE:

Do not grind spacers by hand. The surfaces must be parallel within 0.0001-inch (0.0020 mm). You must use the correct spacers.

1. Prevent the drive pinion assembly from rotating by using a fixture to hold the teeth of the helical driven gear or place wood blocks between the head of the pinion and the differential wall. Remove the nut and the washer from the shaft of the drive pinion. Figure 5.18.

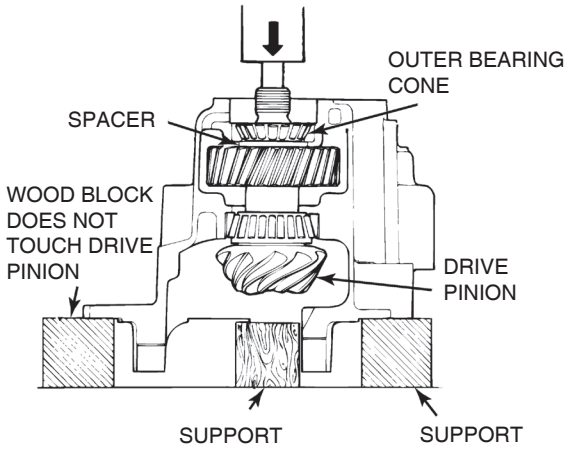


Figure 5.18

2.. Place the differential case into a press so that the threaded end of the pinion is toward the TOP of the press. Place supports under the flange of the differential case so that the differential is level. Place a wood block under the head of the pinion. Verify that the wood block does not touch the head of the drive pinion.

3. Press the drive pinion out of the bearing cone. Remove the outer bearing cone from the differential caser.

4. Install the correct size spacer in the shaft of the pinion over the helical driven gear.

5. Repeat Step 20 through Step 23 under Drive Pinion Bearing Preload in this section.

6. When the preload is within the specified range, install the main differential case and ring gear assembly into the differential case. See to procedure in this section.

Assembly Main Differential and Ring Gear

CAUTION

HEAT THE RING GEAR BEFORE SEATING IT IN THE DIFFERENTIAL CASE. DO NOT PRESS A COLD RING GEAR ON THE FLANGE CASE HALF. A COLD RING GEAR WILL DAMAGE THE CASE HALF BECAUSE OF THE TIGHT FIT.

1. Expand the ring gear by heating the gear in a tank of water to 160-180°F (71-82°C) for 10 to 15 minutes.

WARNING

Wear safe clothing and gloves for protection from injury when working with the hot ring gear.

2. Use a lifting tool to safely lift the ring gear from the tank of water.
3. Install the ring gear onto the flange case half immediately after the gear is heated.

- If the ring gear does not fit easily on the case half, heat the gear again.

4. Align the ring gear and flange case half fastener holes. Rotate the ring gear as necessary

NOTE:

If rivets were used to hold the ring gear to the flange case half, replace them with bolts, nuts and washers. For 140 Series differential with rivets are serviced with bolt kits for reassembly.

5. Install the bolts, nuts and washers, if equipped, that hold the ring gear to the flange case half. Install the bolts from the front side of the gear. The bolt threads must be installed from the inside face of the ring gear and the nuts tightened from the back of the ring gear. Figure 5.19.

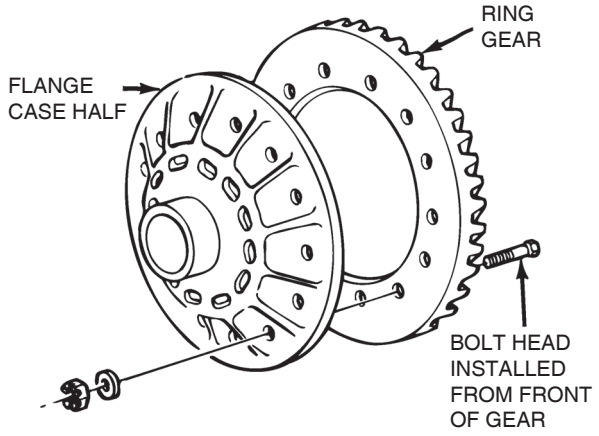


Figure 5.19

6. Tighten the bolts and nuts, if equipped, to the correct torque value. See to Section 8
7. Inspect for gaps between the back surface of the ring gear and the case flange. Use a 0.003-inch (0.080 mm) feeler gauge to inspect at four points around the assembly. Figure 5.20.

- If the gaps exceed specification, inspect the flange case half and ring gear for the problem that causes the gap. Repair or replace parts as necessary. Reassemble the ring gear on the flange case half. Reinspect for gaps.

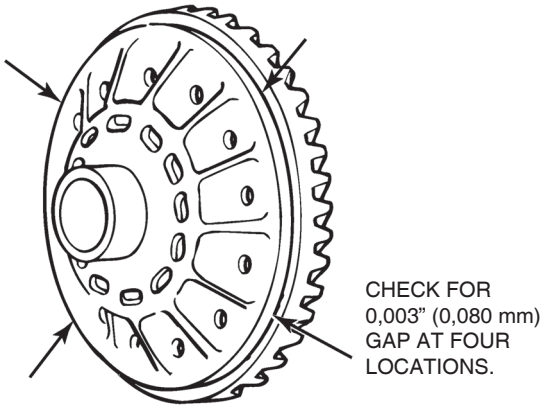


Figure 5.20

8. Use a press and the correct size sleeve to install the bearing cones in the both of the case halves. Figure 5.21.

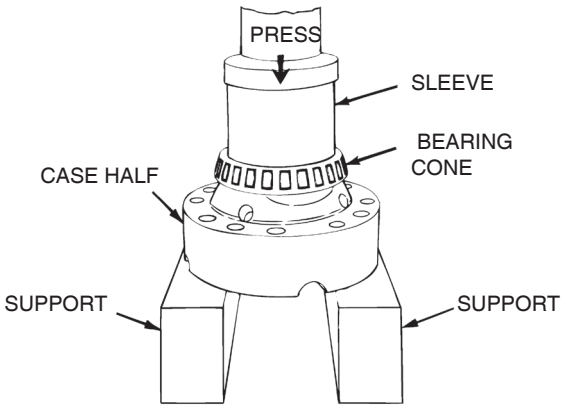


Figure 5.21

9. Apply axle oil lubricant on the inside surfaces of both case halves, spider or cross, thrust washers, side gears and differential pinions.
10. Place the flange case half in a bench with the ring gear teeth toward the TOP.

CAUTION

THE SIDE GEARS IN SOME DIFFERENTIAL MODELS HAVE HUBS OF DIFFERENT LENGTHS. INSTALL THE CORRECT LENGTH SIDE GEAR INTO THE FLANGE CASE HALF. DAMAGE TO COMPONENTS CAN RESULT.

11. Install one thrust washer and side gear into the flange case half. Figure 5.22.

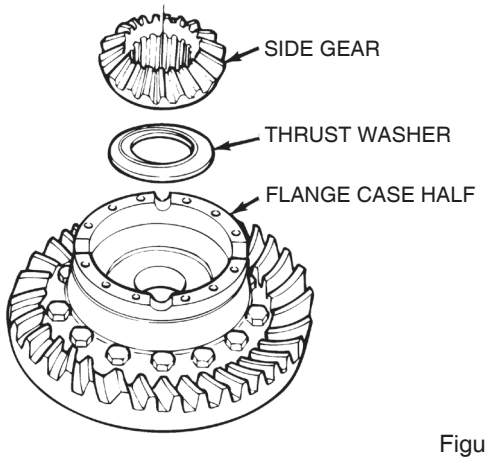


Figure 5.22

12. Install the spider or cross, differential pinions and thrust washers into the flange case half. Figure 5.23.

NOTE: is recommended that all parts are re-assembled in the same position they were prior to disassembly

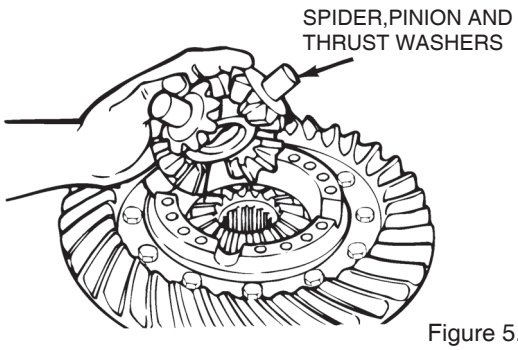


Figure 5.23

13. Install the second side gear and thrust washer over the spider and differential pinions. Figure 5.24.

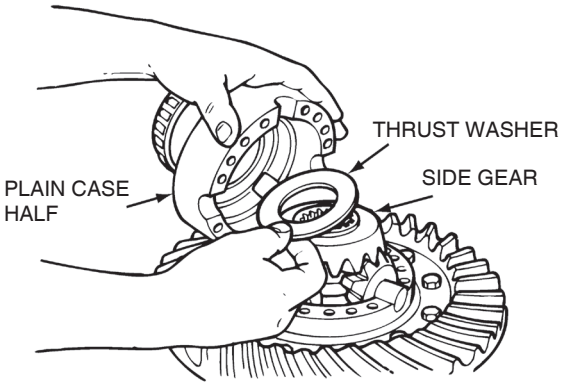


Figure 5.24

14. Place the plain half of the differential case over the flange half and gears. Rotate the plain half as needed to align the match marks. Figure 5.24 and Figure 5.25.

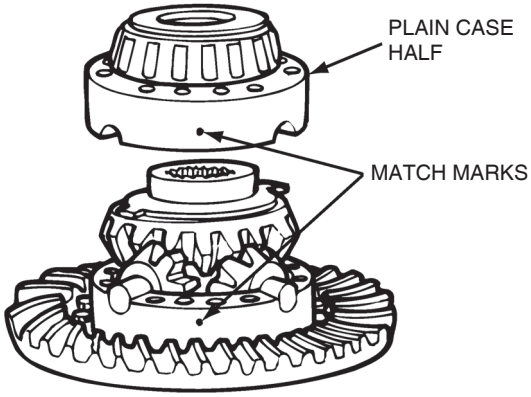


Figure 5.25

15. Install Dri-Loc® or equivalent fasteners into the case halves. See Section 4.

A. Install four capscrews and washers or bolts, nuts and washers into the case halves. The distance between the fasteners must be equal. Tighten the fasteners to the correct torque value in a crisscross pattern opposite each other. See the Section 8. Figure 5.26.

CRISSCROSS TIGHTENING PATTERN

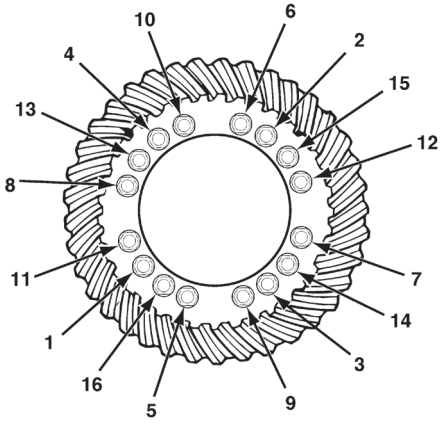


Figure 5.26

B. Install the other fasteners into the case halves. Tighten the fasteners to the correct torque value. See Section 8.

16. Check the rotating resistance of the differential gears. The differential assembly must rotate freely.

Check the Rotating Resistance of the Bearing of Case Halves Assembly

1. Make an inspection tool using an axle shaft that matches the spline size of the differential side gear. Cut the shaft to approximately 12-inches (304.8 mm). Weld a nut onto the end of the shaft. Figure 5.27.

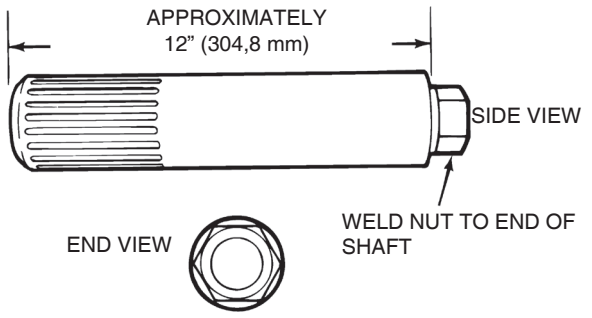


Figure 5.27

2. Place the case halves ensembly and ring gear into a vise. Install soft metal covers over the vise jaws to protect the ring gear. Figure 5.28.

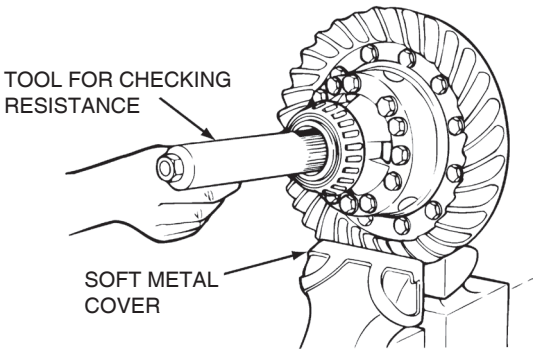


Figure 5.28

3. Install the tool into the differential until the splines of the tool are engaged with one side gear. Figure 5.28.
4. Place a torque wrench onto the nut of the tool and rotate the differential gears. As the differential gears rotate, read the value indicated on the torque wrench. Figure 5.29..

• If the torque value exceeds 50 lb-ft (67.8 N.m), disassemble the gears from the case halves. Inspect the case halves, spider, gears and thrust washers. Repair or replace parts. Assemble the parts and repeat Step 2 through Step 4. T

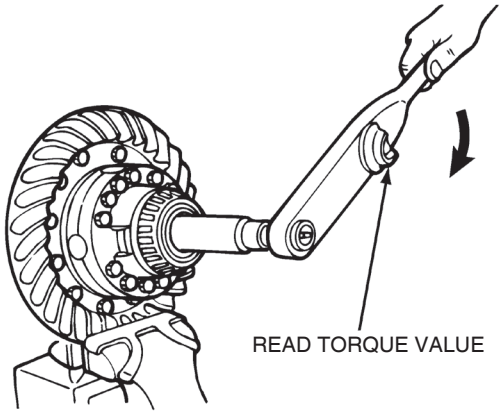


Figure 5.29

Installation Case Halves and Ring Gear In the Differential

1. If the bearing cones on the main differential case were removed, install a new cone and cap in a fully-matched set from the same manufacturer. The bearing cones are not interchangeable. Use a press and sleeve to install the cones in the case. Press only on the inner race of the bearing. Figure 5.30.

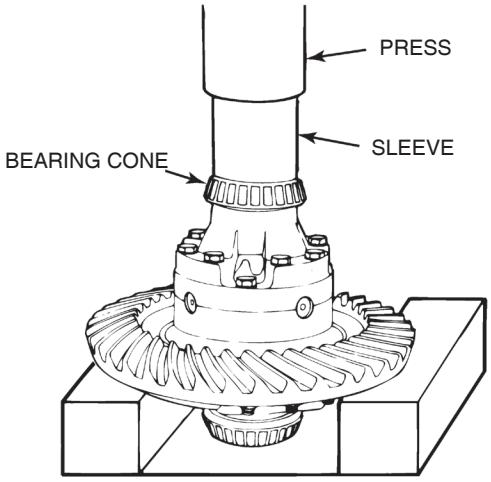


Figure 5.30

2. Clean and dry the bearing caps and bores of the differential legs and bearing caps.
3. Apply axle lubricant to the bearing caps and cones.
4. Apply adhesive 2297-T-418, evenly in the bearing bores and bearing caps of the legs the differential case. Cover the surfaces completely. The adhesive must not contact the adjusting ring threads. Figure 5.31. See the Section 4.
5. Install the bearing caps over the bearing cones in the case halves. Figure 5.32.
6. Safely lift the differential and ring gear assembly and install it inferential case. The bearing caps must be flat against the bores between the differential legs. Figure 5.32.

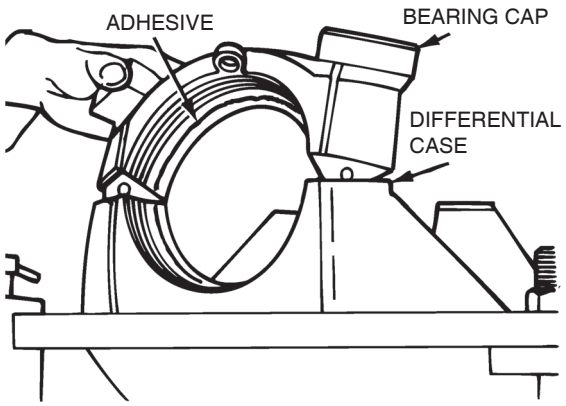


Figure 5.31

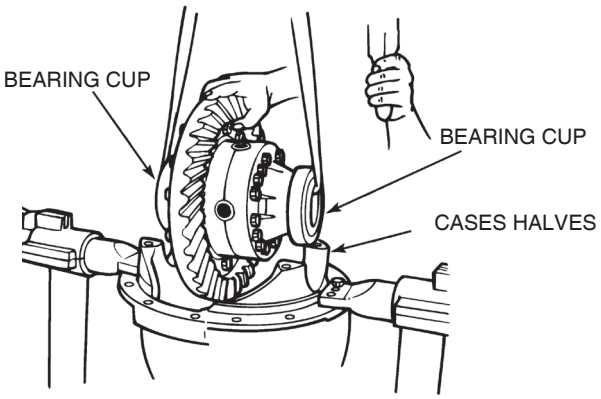


Figure 5.32

7. Install the bearing adjusting rings between the differential legs. Hand-tighten the adjusting rings against the bearing caps. Figure 5.33.

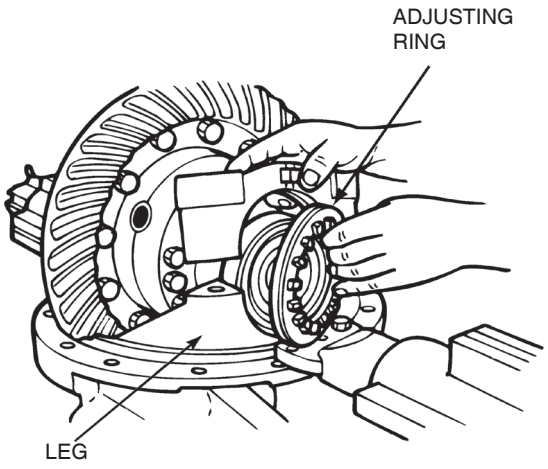


Figure 5.33

CAUTION

THE BEARING CAPS MUST BE CORRECTLY INSTALLED OR THE ADJUSTING RINGS WILL BE DAMAGED BY CROSS-THREADING. FORCING THE CAPS INTO POSITION CAN DAMAGE THE CAPS AND THE DIFFERENTIAL CASE.

8. Install the bearing caps over the bearings and adjusting rings in the correct location as marked before removal. Figure5.34

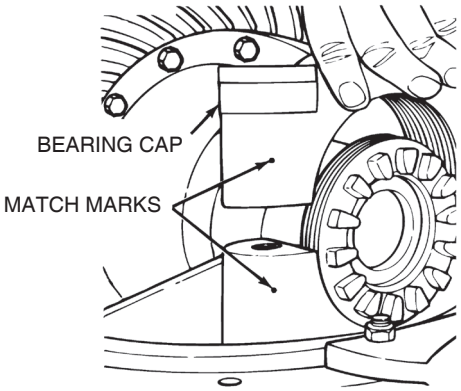


Figure 5.34

WARNING

Use a brass or plastic mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Serious personal injury and damage to components can result.

CAUTION

IF BEARING CAPS ARE NOT INSTALLED CORRECTLY IN THE ORIGINAL DIFFERENTIAL CASE LOCATIONS, THE BORES AND THREADS IN THE CAPS WILL NOT MATCH THE DIFFERENTIAL CASE. FORCING THE BEARING CAPS INTO THE INCORRECT POSITION WILL RESULT IN DAMAGE TO THE DIFFERENTIAL CASE.

9. Use a light leather plastic or rubber mallet to seat each bearing cap. The caps must fit easily against the bearings, adjusting rings and differential case. Do not force the bearing caps into position.

- If the bearing caps do not correctly fit in the position, check the alignment of the match marks between the caps and differential case. Remove the caps and repeat Step 7 through Step 9.

10. Install the capscrews and washers that secure the bearing caps to the differential case . Hand-tighten the capscrews 4 our to 6 turns. Then tighten the capscrews to the correct torque value. See the Section 8. Do not install the capscrews, cotter pins or roll pins, if equipped, that secure the bearing adjusting rings in position. Continue by adjusting the preload of the differential bearings, adjust the backlash of the hypoid gear and inspect the tooth contact patterns.

Adjustment Main Differential Case Bearings Preload

Use either the dial indicator or the large micrometer method to inspect and adjust the main differential side bearings preload.

NOTE:

The roll pins for the adjusting rings are installed after the tooth contact pattern is checked.

Dial Indicator Method

1. Attach a dial indicator in the differential case mounting flange so that the plunger or the pointer is against the back surface of the ring gear. Figure 5.35.

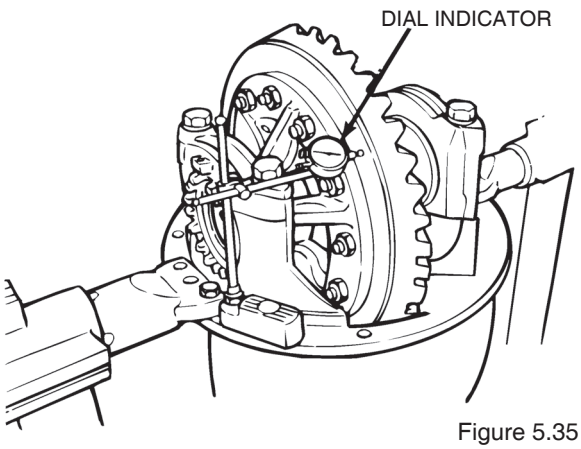


Figure 5.35

CAUTION

WHEN YOU TURN THE ADJUSTING RINGS, ALWAYS USE A TOOL THAT ENGAGES TWO OR MORE OPPOSITE NOTCHES IN THE 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.

NOTE:

On 160 Series differentials, half of the bearing assembly extends out of the bearing cap and differential case.

2. Use a T-bar wrench to loosen the adjusting ring that is opposite the ring gear. A small amount of clearancewill show on the dial indicator. Figure 5.36.

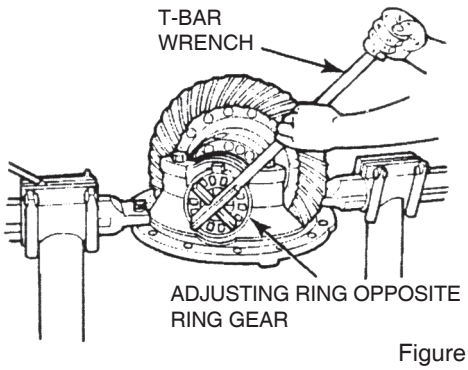


Figure 5.36

3. Use one of the following methods to move the main differential case and the ring gear carefully to the left and right while you read the dial indicator.

A. Insert two pry bars between the bearing adjusting rings and the ends of the main differential case. The pry bars must not touch the main differential case bearings. Figure 5.37.

B. Insert two pry bars between the main differential case and the ring gear at locations other than described in Step A. The pry bars must not touch the main differential bearings. Figure 5.38.

4. Tighten the bearing adjusting ring until the dial indicator reads ZERO end play. Move the main differential case and ring gear to the left and right as needed. If necessary, repeat Step A or Step B.

5. Tighten each bearing adjusting ring one notch from ZERO. The side bearings of the main differential case should have a preload of 15-35lb-in (1.7-3.9N m). Figure5.39. (T)

This procedure should expand the caps 0.008-0.010-inch (0.203-0.254 mm), and place the correct preload on the bearings when they are installed into the banjo housing.

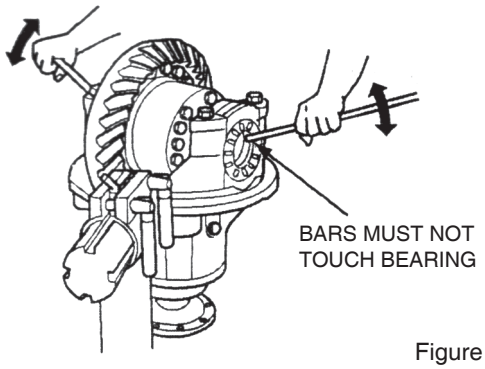


Figure 5.37

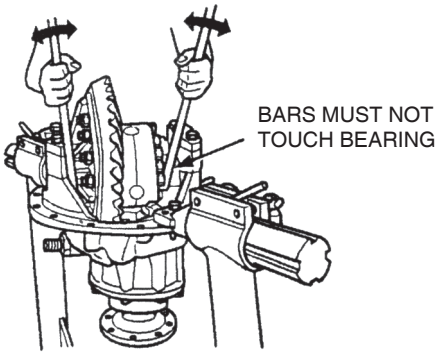


Figure 5.38

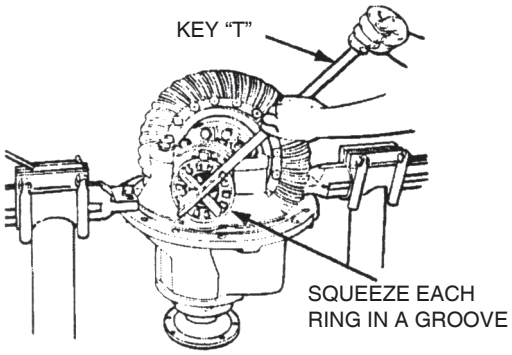


Figure 5.39

6. Proceed to check ring gear runout.

Large Micrometer Method

1. Hand-tighten the adjusting rings against the main differential bearings.
2. Use a large micrometer to measure distance X and Y between the opposite surfaces of the bearing caps. Record the measurement. Figure 5.40 and Figure 5.41.

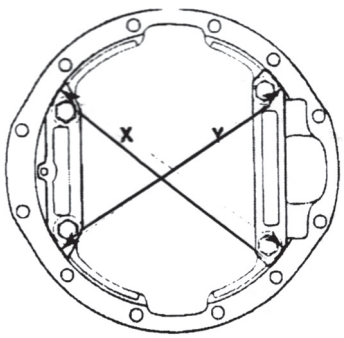


Figure 5.40

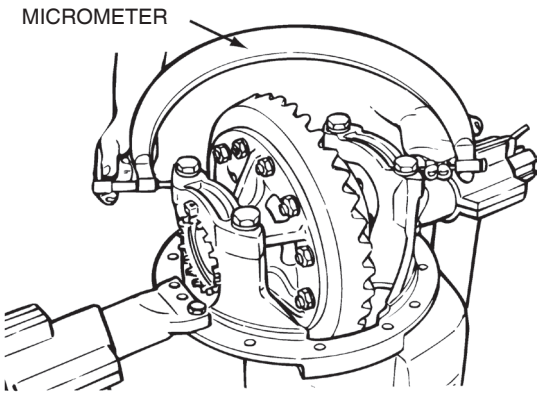


Figure 5.41

CAUTION

WHEN TURNING THE ADJUSTING RINGS, ALWAYS USE A TOOL THAT ENGAGES TWO OR MORE OPPOSITE NOTCHES IN THE 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.

3. Use a T-bar wrench to tighten each bearing adjusting ring one notch. Figure5.36.
4. Measure distance X and Y again. Compare the measurements with the distances X and Y measured in Step 2. The difference between the two distances is the amount the bearing caps have expanded. See the Table H.

Table H: Example

Distances X and Y BEFORE tightening the adjusting rings	= 389 mm (15.315")
Distances X and Y AFTER tightening the adjusting rings	= 389 mm (15.315")
15.324" – 15.315" = 0.009" difference	
389.230 mm – 389.000 mm = 0.230 mm difference	

5. If the difference is at or within the specification in Table I: Continue by checking the runout.
- If the difference is less than the specification: Repeat as needed.

Table I: Expansion Between Bearing Caps

Differential models RS-140, RS-145 e RS-160	0.050-0.229 mm (0,002-0,009”)
RS 120 and all other differential models	0.15-0.33 mm (0,006-0,013”)

Ring Gear Runout

1. Attach a dial indicator in the differential case mounting flange. Figure 5.42.

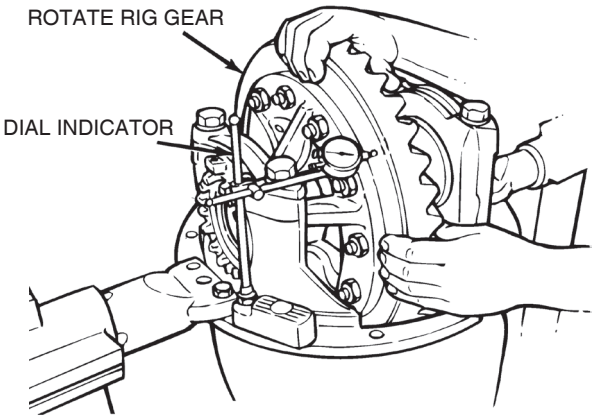


Figure 5.42

2. Adjust the dial indicator so that the plunger or pointer is against the back surface of the ring gear. Figure 5.42. Set the dial indicator to ZERO.
3. Rotate the main differential case and ring gear. Read the dial indicator. The ring gear runout must not exceed 0.008-inch (0.200 mm).
- If the ring gear runout is within the specification, proceed to Ring Gear Backlash.
- If the ring gear runout exceeds the specification, remove the main differential case and ring gear assembly from the differential case. See the Section 3.

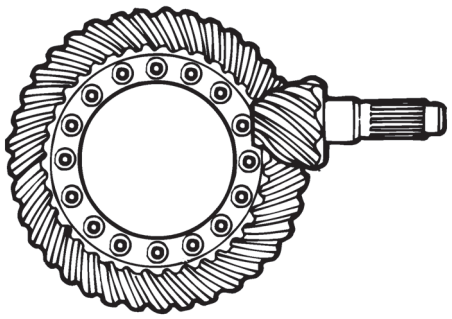
A. Inspect the main differential case parts, including the differential case, for wear and damage. Repair or replace parts as necessary.
B. Install the main differential case and ring gear assembly into the differential case. See the procedure in this section.
C. Repeat the procedure for preload adjustment of the main differential side bearings.

Check the Ring Gear Backlash

Table J: Specifications

Ring Gear Pitch Diameter	Range of Backlash Setting	Backlash Setting for New Gear Sets
Less than 17-inches (431.8mm)	0.20-0.46 mm (0,008 - 0,018”)	0,30 mm (0,012”)
Greater than 17-inches (431.8mm)	(0.25-0.51 mm 0,010 - 0,020”)	0,38 mm (0,015”)

Measure the outer diameter of the ring gear for the approximate pitch diameter. Figure 5.43.
- If the old gear set is installed, adjust the backlash to the setting that was measured before the differential was disassembled.
- If a new gear set is installed, adjust the backlash to the correct specification for new gear sets.



MEASURE OUTER DIAMETER FOR APPROXIMATE PITCH DIAMETER

Figure 5.43

After checking the tooth contact patterns, the backlash can be adjusted within the specification limits, if needed. To change the location of the pattern, use the following procedures.

1. Attach a dial indicator onto the differential mounting flange. Figure 5.44.

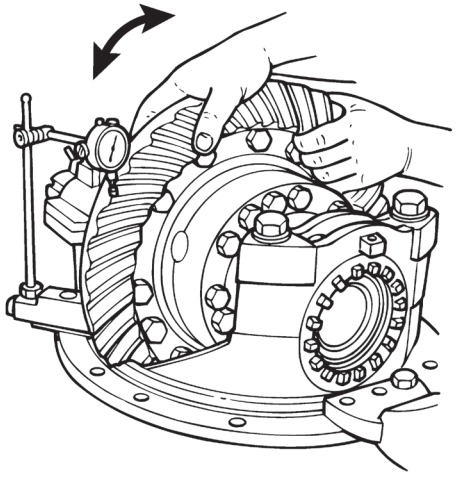


Figure 5.44

2. Adjust the dial indicator so that the plunger is against the tooth surface.
3. Adjust the dial indicator to ZERO. Hold the drive pinion in position.
4. After reading the dial indicator, rotate the differential case and ring gear a small amount in both directions against the drive pinion teeth.
- If the backlash reading is within the specification, check the tooth contact patterns.
- If the backlash reading is not within the specification, adjust the backlash as needed.

5. Loosen one bearing adjusting ring one notch. Tighten the opposite ring by the same amount..
- To increase the backlash, move the ring gear away from the drive pinion. Figure 5.45.
- To decrease the backlash, move the ring gear toward the drive pinion. Figure 5.46.

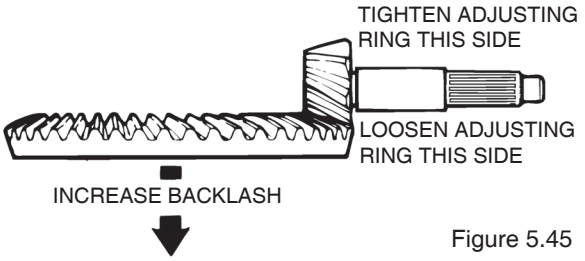


Figure 5.45

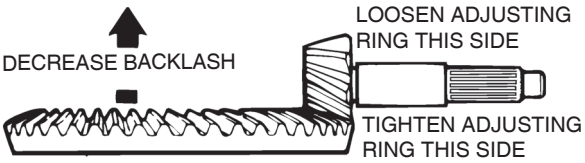


Figure 5.46

NOTE:

When you adjust the backlash, only move the ring gear. Do not move the drive pinion.

6. Repeat Step 2 through Step 5 until the backlash is within specification. Record the setting for use when you adjust the pinion bearing preload.

Gear Set Tooth Contact Patterns, Backlash

Meritor's differential can have a conventional or a generoid hypoid gear set. The tooth contact patterns for each type of gear set are different. Check the part numbers to determine what type of gear set is in the differential. See the Figure 5.47 for the location of part numbers. See the Section 4.

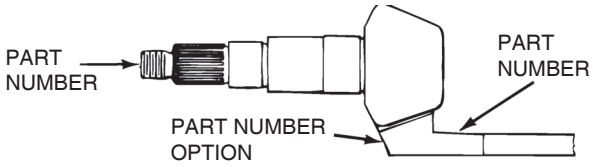


Figure 5.47

Examples

The following are part numbers for generoid gear sets.

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

In the following procedures, movement of the contact pattern along the length of the tooth is indicated as toward the heel or toe of the ring gear. Figure 5.48.

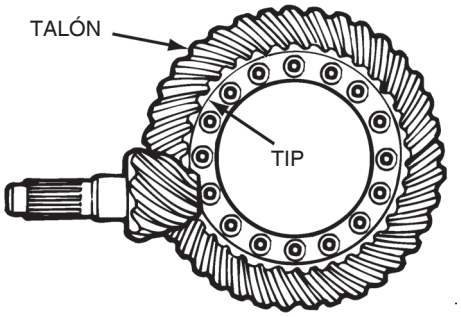


Figure 5.48

Always check the tooth contact patterns on the drive side of the gear teeth. Figure 5.49.

Figure 5.49

1. Adjust the backlash of a new gear set to either 0.012-inch (0.305 mm) or 0.015-inch (0.380 mm) depending on the size of the ring gear. Adjust the backlash of an old gear set to the setting that was measured before the differential was disassembled. See the procedure in this section.
2. Apply a marking compound in 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 5.50.

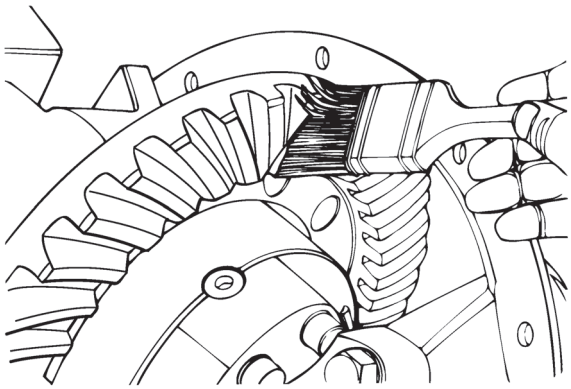


Figure 5.50

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 Figure 5.51, Figure 5.52 and Figure 5.53.

The location of a good hand-rolled contact pattern for a new gear set is toward the toe of the gear tooth and in the center between the top and bottom of the tooth

When the differential is operated, a good pattern will extend approximately the full length of the gear tooth. The top of the pattern will be near the top of the gear tooth. Figure5.54.

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

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

- 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 by following Step 6.

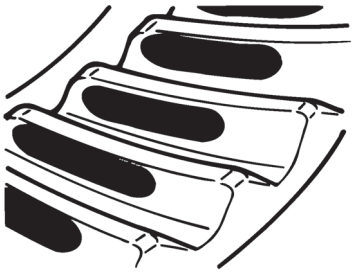


Figure 5.51

GOOD HAND-ROLLED POSITION

Figure 5.52

HIGH PATTERN

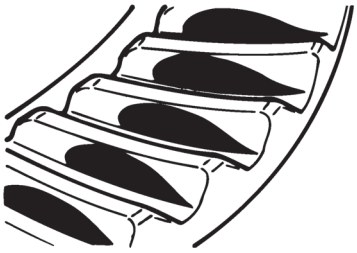
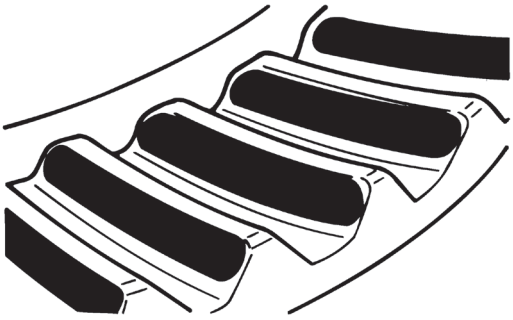


Figure 5.53

LOW PATTERN



GOOD PATTERN IN OPERATION

Figure5.54

5. Change the thickness of the shim pack between the pinion inner bearing cap and the differential case to move the contact patterns between the top and the bottom of the gear teeth.

A. Remove the drive pinion, inner bearing cap and shims from the differential case. See the Section 3.

- To correct a high-contact pattern: 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 5.55.
- To correct a low contact pattern: 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 5.56.

B. Install the inner bearing cap, the shims and the drive pinion in the differential case. See the procedure in this section.

C. Repeat Step 2 through Step 4 and Step 6 until the contact patterns are at the correct location along the length of the gear teeth.

6. Adjust the ring gear backlash within the specification range to move the contact patterns to the correct location along the length of the gear teeth. See the procedure in this section.

A. Decrease the backlash to move the contact patterns toward the toe of the ring gear teeth. Figure 5.57.

B. Increase the backlash to move the contact patterns toward the heel of the ring gear teeth. Figure 5.58.

C. Repeat Step 2 through Step 4 and Step 6 until the contact patterns are at the correct location along the length of the gear teeth.

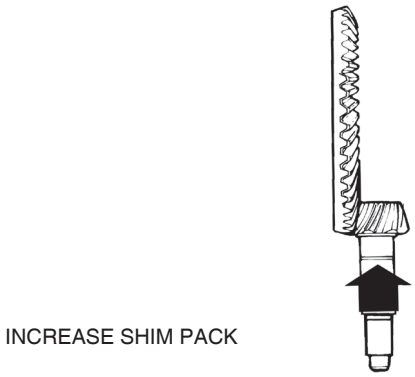


Figure 5.55

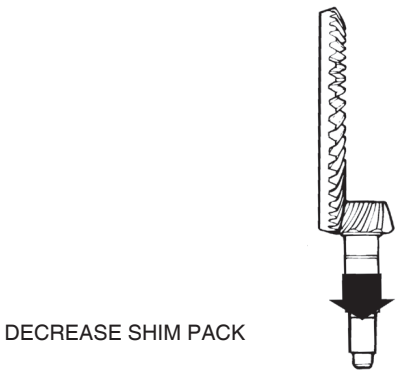


Figure 5.56

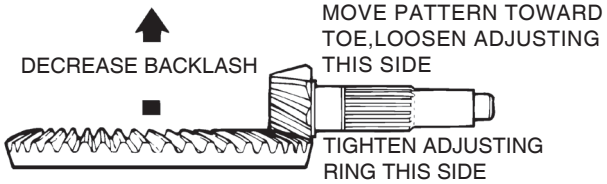


Figure 5.57

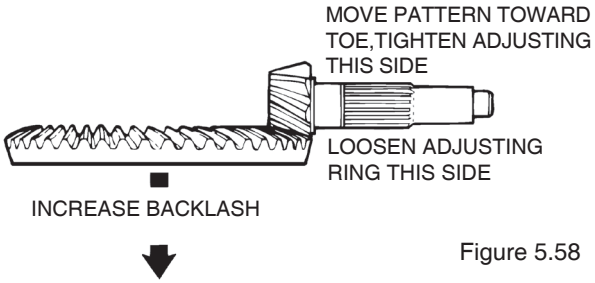


Figure 5.58

If the differential has cotter pins or capscrews, lock the adjusting rings only with cotter pins or capscrews. If the differential has roll pins, reuse the roll pins. Do not force a roll pin into a cotter pin hole. Damage to components can result.

7. Install the capscrews, cotter pins, roll pins or lock plates, if equipped, that hold the two bearing adjusting rings in position. Use the following procedures.

A. Install capscrews between the lugs of the adjusting ring and through the boss of the bearing cap. New capscrews include a locking patch, which can only be used once. If you are installing used capscrews, apply Loctite® threadlocker to the capscrew threads before install the capscrews. Figure 5.59.

B. Install cotter pins between the lugs of the adjusting ring and through the boss of the bearing cap. Bend the two ends of the cotter pin around the boss. Figure 5.59.

C. Use a drift and hammer to install the roll pin through the boss of the bearing cap until the roll pin is between the lugs of the adjusting ring. Figure 5.59.

D. Install the lock plate in the bearing cap so that the tab is between the lugs of the adjusting ring. Install the two capscrews and washers that hold the lock plate to the bearing cap. Tighten the capscrews to the correct torque value. See the Section 8. Figure 5.59.

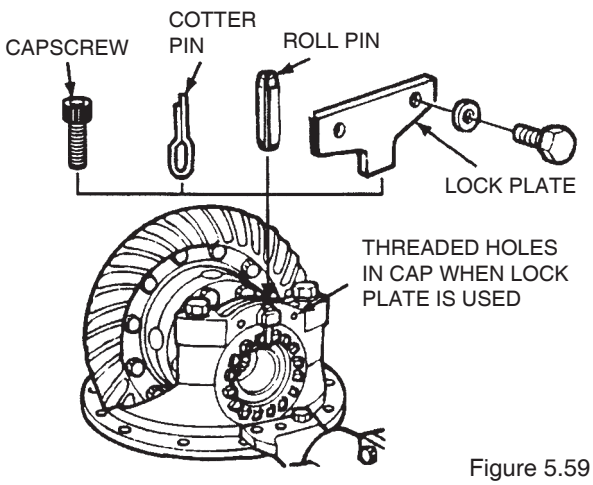


Figure 5.59

Adjusting Ring Gear Thrust Screw

1. Rotate the differential assembly in the repair stand until the back surface of the ring gear is toward the DOWN.
2. Install the jam nut in the thrust screw. Thread the jam nut to the middle of the thrust screw. Figure 5.60.

REAR DIFFERENTIAL EXAMPLE

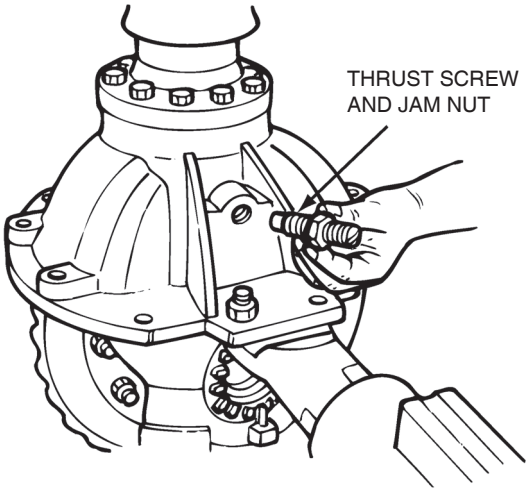


Figure 5.60

3. Install the thrust screw in the ring gear. Use a feeler gauge to verify that the clearance between the thrust screw and the ring gear is 0.025-0.045-inch (0.65-1.14 mm).
4. Loosen the thrust screw one-half turn or 180 degrees. Figure 5.61.

REAR DIFFERENTIAL EXAMPLE

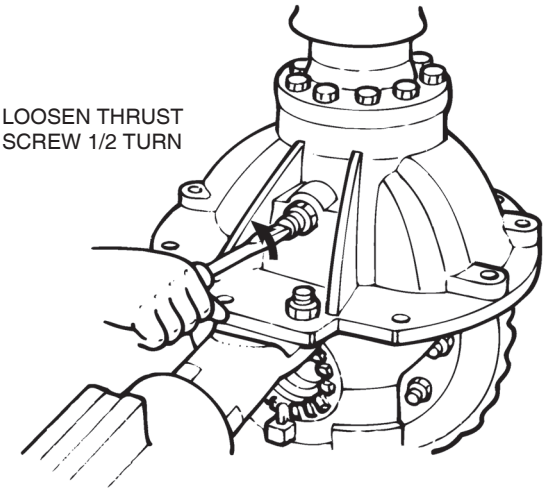


Figure 5.61

5. Tighten the jam nut, if equipped, to the correct torque value against the differential case. See the Section 8. Figure 5.62.

To complete the assembly of axles equipped with driver-controlled main differential locks, see the Section 6.

REAR DIFFERENTIAL EXAMPLE

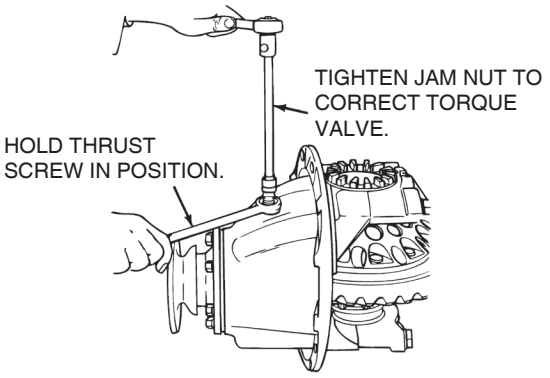


Figure 5.62

Air Shift Unit for the Inter-Axle Differential Lock (IAD)

Air Applied and Spring Release Models, Standard

1. Inspect the shift shaft for damage. Use an emery cloth to remove any small damage. If necessary, replace the shift shaft. Figure 5.63.

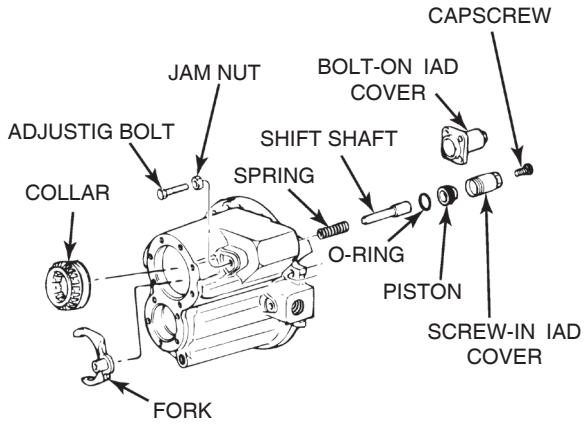


Figure 5.63

2 Place the spring and the shift fork into position in the differential. The spring must touch the screw side of the differential. The boss on the fork must be toward the adjusting bolt.

3. Install the shift shaft so the smaller part of the shaft goes through the fork and the spring.

4. If removed, install the O-ring onto the piston. Apply axle lubricant to the O-ring.

5. Install the piston in the shift shaft.

WARNING

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.

6. On flange-type cylinders, apply silicone gasket material onto the mounting surface of the cylinder.

On threaded cylinders, apply a continuous 0.06-inch (1.5 mm) diameter bead of a flange sealant, Meritor part number 2297-D-7076, around the cylinder thread circumference.

7. Install the cylinder. On flange-type cylinders, install and tighten the capscrews 7-12 lb-ft (10-16 N.m). T

NOTE:

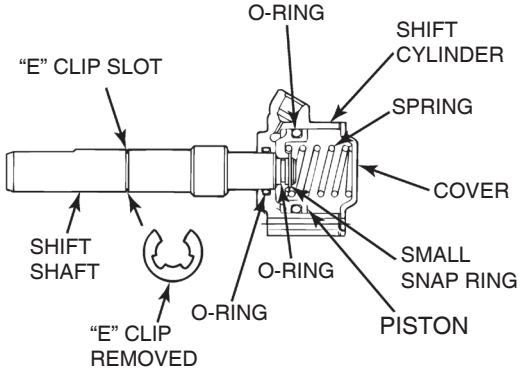
The adjusting screw is set to the specified distance after the input shaft assembly is installed. El tornillo de ajuste debe ser montado con la distancia especificada después del eje del mecanismo de bloqueo estar instalado.

8. Install the adjusting bolt and the jam nut.

Spring Applied and Air Release Models (Reverse Shift Systems)

1. Lubricate all the parts with axle lubricant. Figure 5.64.

BOLT-ON IAD REVERSE SHFTER



2. Inspect the shift shaft for damage. If necessary, replace the shift shaft.
3. If removed, install new O-rings in the groove in the shift shaft, into the groove in the shift cylinder and onto the piston.
4. Lubricate the bore of the shift cylinder with axle lubricant.
5. Install the piston in the shift cylinder.
6. Insert the shift shaft in the piston and shift cylinder assembly.
7. Install the small snap ring that fastens the piston in the shift shaft.
8. Install the spring in the piston bore.
9. Install the gasket so that the tab on the gasket is under the right capscrew bore.
10. Place the shift cover in the shift cylinder housing. Install two capscrews and washers to fasten the shift cover to the cylinder.
11. Install the assembly into the differential so that the shift shaft is in the bore of the shift fork.
12. Install the “E” clip onto the shift shaft slot in front of the shift fork.
13. Install the capscrews and washers that fasten the assembly to the differential case. Tighten the capscrews to 7-12 lb-ft (10-16 N.m).

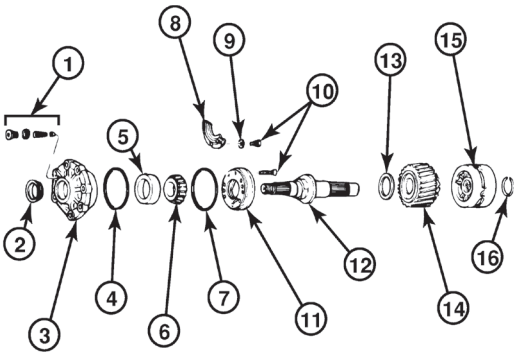
NOTE:

The adjusting screw is set to the specified distance after the input shaft assembly is installed.

14. Install the adjusting bolt and jam nut.

Assembly Input Shaft, Bearing Cage, Oil Pump and Inter-Axle Differential.

1. Apply axle lubricant to the parts as they are being assembled. Figure5.65.



1 - PRESSURE RELIEF VALVE ASSEMBLY
2 - OIL SEAL
3 - BEARING CAGE
4 - O-RING
5 - BEARING CP
6 - BEARING CONE
7 - O-RING
8 - OIL BAFFLE - UNITS WITHOUT OIL PUMP
9 - WASHER
10 - CAPSCREW
11 - OIL PUMP - UNITS WITH OIL PUMP
12 - INPUT SHAFT
13 - THRUST WASHER
14 - HELICAL DRIVE GEAR
15 - INTE-AXLE DIFFERENTIAL
16 - SNAP RING

Figure 5.65

2. If removed, install the bearing cap in the input bearing cage. Use a press and a sleeve to install the cap into the cage. The cap is correctly installed when the bottom of the cap is fully seated in the cage bore
3. If removed, install a new oil seal into the input bearing cage.

- For unitized pinion seals, look the unitized pinion seal installation procedure in this section and then proceed to Step 4. Figure5.66.
- For all other seals, look the following instructions.

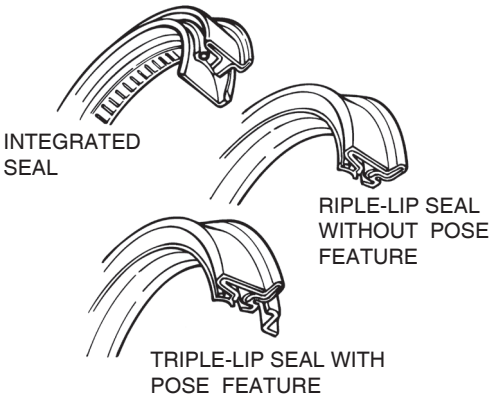


Figure 5.66

A. Apply axle lubricant to the inner bore of the bearing cage or the outer diameter of the new oil seal.

CAUTION

HOLD THE SEAL ONLY ON THE OUTER DIAMETER. DO NOT TOUCH THE LIPS IN THE INNER DIAMETER OF THE SEAL. IF YOU TOUCH THE LIPS ON THE INNER DIAMETER OF THE SEAL, YOU WILL CONTAMINATE THE LIPS AND COULD CAUSE A LEAK BETWEEN THE SHAFT AND THE SEAL.

B. Place the oil seal into the bearing cage so that the flange is parallel to the top of the cage.

C. Use a press and driver or flat metal plate to install the oil seal into the bearing cage. Figure 5.67.

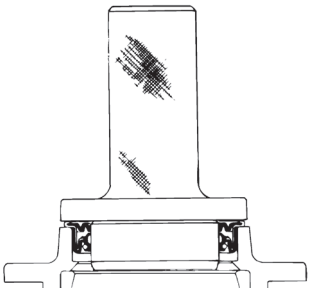


Figure 5.67

CAUTION

DO NOT APPLY PRESSURE AFTER THE SEAL FLANGE TOUCHES THE TOP OF THE CAGE OR YOU WILL DAMAGE THE CAGE.

D. Apply pressure until the metal flange of the seal is seated to the top of the cage.

E. After the seal is installed, a gap of 0.015-0.030-inch (0.381-0.762 mm) can exist between the flange and the cage. The gap is a normal condition because of the flexible coating on the flange of the seal. Use a feeler gauge to measure the gap between the complete flange-to-cage area.

- **If the gap varies more than 0.010-inch (0.254 mm) between the highest and lowest measurement, remove and reseat the seal. Figure 5.68.**

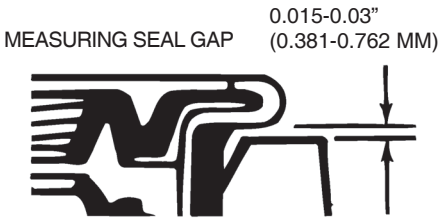


Figure 5.68

NOTE: If you replace either the bearing cap or cone, replace both parts in a fully-matched set from the same manufacturer.

4. On differential assembly that do not use an oil pump, install the input bearing cage.

A. If removed, install the bearing cone in the input shaft. Use a press and sleeve to install the cone in the input shaft until it bottoms on the shoulder of the shaft. Figure 5.69.

B. Install the O-ring onto the input bearing cage.

C. Place the cage over the input shaft so that the cap in the cage is against the bearing cone.

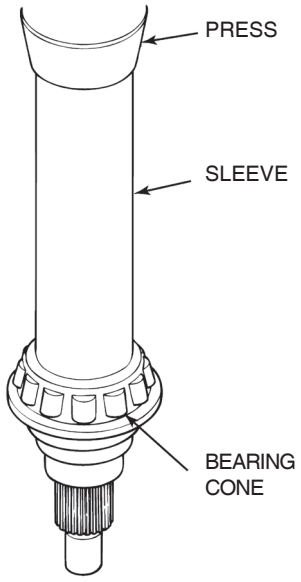


Figure 5.69

CAUTION

ON EARLY DESIGN FORWARD DIFFERENTIAL , VERIFY THAT THE DRIVE FLATS IN THE BORE OF THE PUMP ARE ALIGNED WITH THE FLATS ON THE INPUT SHAFT. IF THE FLATS ARE NOT ALIGNED, THE PUMP WILL BE DAMAGED.

NOTE: If you replace either the bearing cap or cone, replace both parts in a fully-matched set from the same manufacturer.

5. On differential that use an oil pump, install the input bearing cage and oil pump.

A. Position the input shaft so that the threads are toward you

- If dowel pins are used, install the oil pump onto the input shaft so that the dowel pin hole in the pump is toward the threads on the shaft.
- If a drive flat design pump is used, verify that the drive flats in the bore of the pump are aligned with the flats on the input shaft.
- If a spline design pump is used, verify that the splines in the pump are aligned with the splines on the shaft. Figure 5.70.

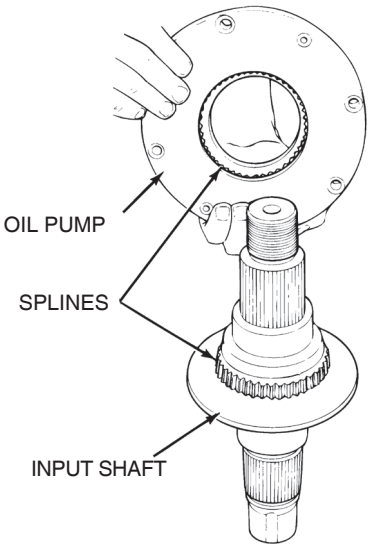


Figure 5.70

CAUTION

WHEN THE BEARING CONE AND THE OIL PUMPS ARE INSTALLED ON THE INPUT SHAFT, PLACE SUPPORTS UNDER THE INPUT SHAFT. DO NOT PLACE SUPPORTS UNDER THE OIL PUMP. THE OIL PUMP WILL BE DAMAGED IF PRESSURE IS APPLIED TO THE BODY OF THE PUMP.

B. Place supports under the input shaft.

C. Use a press and a sleeve to install the bearing cone onto the input shaft. The cone is correctly installed when the bottom of the cone touches the shoulder on the shaft. Figure 5.71.

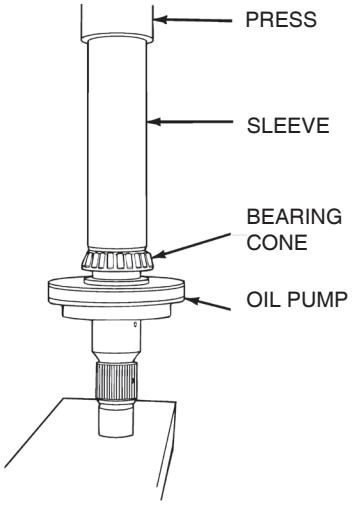


Figure 5.71

D. If removed, install the pressure relief valve assembly into the input bearing cage. Install the relief valve, spring and plug in the bore. Tighten the plug to 20-40 lb-ft (27-54 N.m). Figure 5.72. T

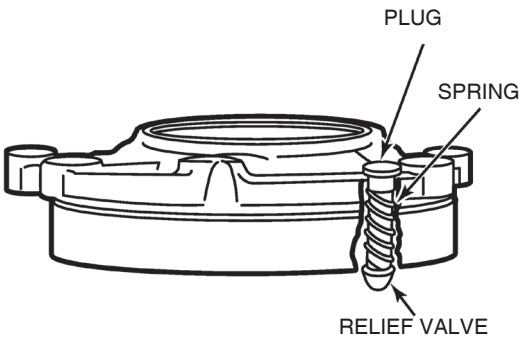


Figure 5.72

E. Install the input bearing cage over the input shaft on the oil pump.

- If dowel pins are used, verify that the dowel pins in the cage are aligned with the holes in the oil pump.

F. Install the capscrews that fasten the oil pump to the input bearing cage. Tighten the capscrews to 22-23 lb-ft (30-31 N.m). T.

G. Install the O-rings onto the oil pump and input bearing cage.

6. Inspect the fork surface

- If you installed a unitized seal on the outp ut bearing cage, look the procedure in this section, and then proceed to Step 7. Figure5.66.
- For all other seals, look the following instructions.

A. Inspect the fork for scratches, corrosion or a wear track from the previous oil seal. Replace the fork if any of these conditions exist.

B. Inspect the lead chamfer of the fork for nicks and burrs which may damage the sealing tip during installation.

C. Wipe clean the fork sealing surface and face.

- If a POSE™ seal is used, install the seal 1/2-inch (13 mm) in the fork hub. See to procedure in this section.

CAUTION

USE A PRESS AND A SLEEVE OR INSTALLATION TOOL TO INSTALL THE FORK. DO NOT USE A HAMMER OR MALLET. USING A HAMMER OR MALLET CAN DAMAGE THE BEARINGS, FORK OR FLANGE.

7. Use a press and sleeve or an installation tool to install the fork or the flange in the input shaft. If a press and sleeve are used, verify that the input shaft is well supported. Figure 5.73.

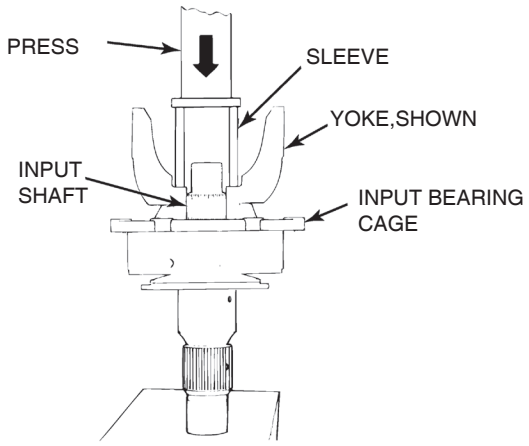


Figure 5.73

If a fork is removed after it has been partially or fully installed, the unitized pinion seal will be damaged. Remove and discard the original unitized pinion seal and replace it with a new one.

If a fork has been installed into the unitized pinion seal and then removed, the inner sleeve of the seal will be damaged. Install a new seal.

8. Install the nut that fastens the fork or the flange to the input shaft. Hand-tighten the nut. Do not tighten the nut to the specified torque until the bearing cage and pump assembly is installed in the housing.

9. Place the thrust washer into the pilot bore on the end of the helical drive gear. The oil groove in the thrust washer must face the input shaft flange. Install the helical drive gear and the thrust washer onto the input shaft so that the thrust washer is toward the input bearing cage. Figure5.74.

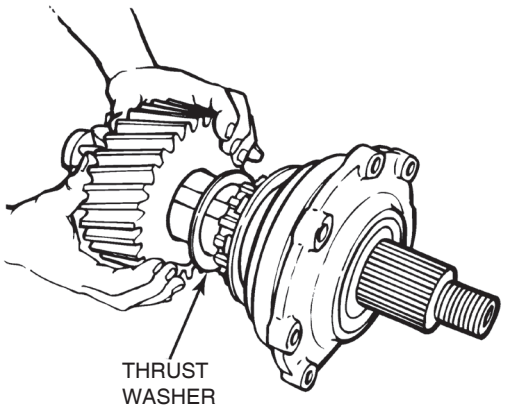


Figure 5.74

10. If disassembled, assemble the inter-axle differential.

A. Apply axle lubricant to all of the inter-axle differential parts.

B. Install the pinion gears and the thrust washers in the spider.

C. Place the spider and pinion assembly in one of the case halves of the inter-axle differential.

D. Install the remaining case half over the first case half. Verify that the marks on each case half are aligned.

E. Install four of the capscrews that fasten the case halves together. Install the capscrews so that the capscrews are the same distance away from each other. Equally tighten the capscrews to bring the case halves together.

F. Install the rest of the capscrews. Tighten the capscrews to 45-55 lb-ft (60-75 Nm). T

11. Install the inter-axle differential to the input shaft so that the teeth in the differential case are away from the helical drive gear. Install the snap ring that fastens the case to the shaft. Figure 5.75.

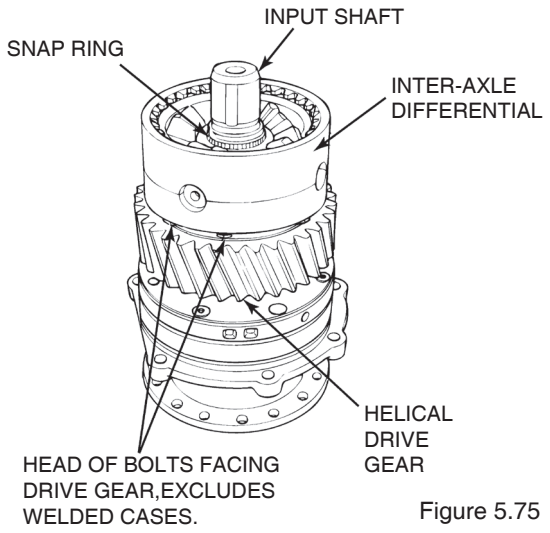


Figure 5.75

NOTE: If you replace either the bearing cap or the cone, replace both parts in a fully-matched set from the same manufacturer.

12. If removed, install the bearing cap for the rear side gear into the differential case. Use a press and a sleeve to install the cap into the differential case. If a press is not available, use a sleeve or a long, brass drift and a hammer to install the cap. The cap is correctly installed when the bottom of the cap is seated against the bottom of the bore. Figure 5.76.

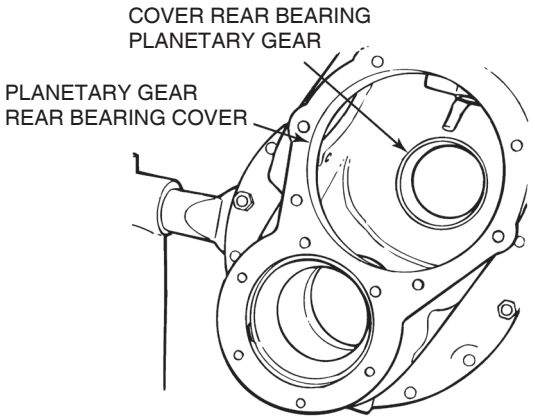


Figure 5.76

NOTE: If you replace either the bearing cap or the cone, replace both parts in a fully-matched set from the same manufacturer.

13. If removed, install the bearing cone onto the rear side gear. Use a press and sleeve to install the cone onto the gear. The cone is correctly installed when the bottom of the cone touches the shoulder on the side gear.

14. Install the oil filter assembly and plug in the suction line in front of the differential. Tighten the screen and plug assembly to 48 lb-ft (65 Nm). Figure 5.77. T

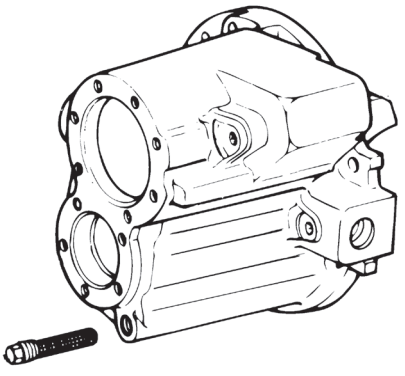


Figure 5.77

NOTE: The shim pack under the input bearing cage is installed after the clearanceof the input bearing is inspected and adjusted

1. Place the differential case in the repair stand so that the ring gear is facing DOWN.
2. If necessary, place the clutch collar into the differential case so that the teeth on the outside of the collar are toward the input fork. Install the clutch collar in the shift fork so the tabs of the fork fit in the slot of the clutch collar.
3. Install the rear side gear and bearing assembly through the clutch collar and into the differential case. Figure 5.78.

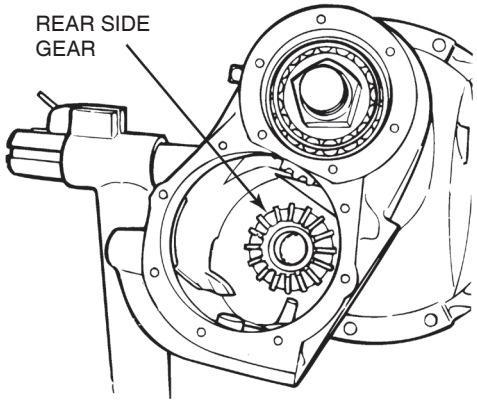


Figure 5.78

4. Verify that the painted alignment marks on the teeth of the helical gears are visible during the installation of the input shaft assembly. Figure 5.79.

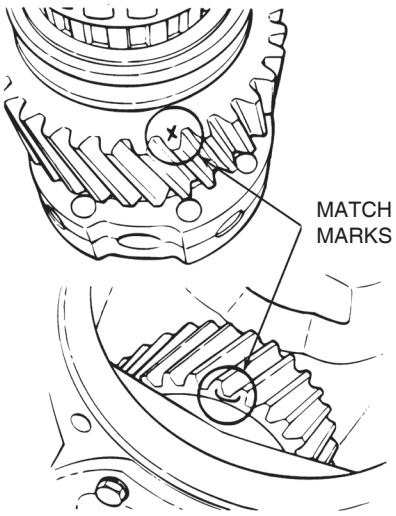


Figure 5.79

5. Install the input shaft assembly into the differential case.

A. Connect a lifting device to the input fork. Lift the input shaft assembly over the bore in the differential case.

B. Lubricate the O-rings with axle oil.

C. On 160 Series differentials, rotate the inter-axle differential case so that one of the notches on the case is aligned with the helical driven gear in the differential. Figure 5.80.

D. Lower the input shaft assembly into the differential case. Figure 5.81.

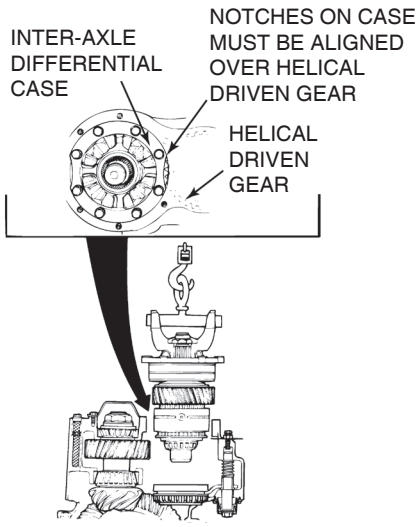


Figure 5.80

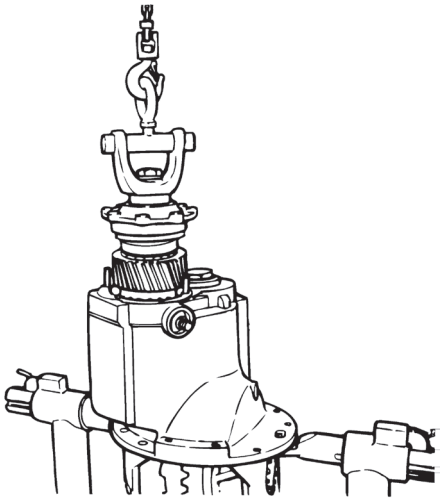


Figure 5.81

Inspection and Adjust the clearance of the bearing assembly input shaft

1. Install the capscrews, but not the washers, that fasten the input shaft bearing cage to the differential case. Rotate the input shaft in each direction to verify that the bearings are correctly installed while you hand-tighten the capscrews. Do not tighten the capscrews.
2. Use a feeler gauge to measure the gap between the input shaft bearing cage and the differential case. Inspect the gap at four equally-spaced places on the cage. Figure 5.82.

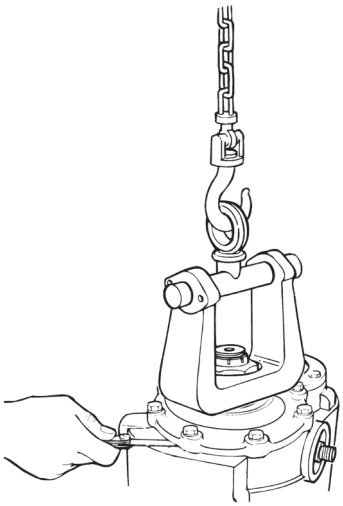
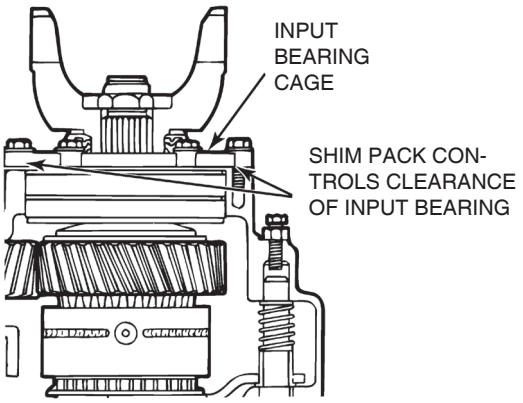


Figure 5.82

3. Add up the four measurements and determine the average gap between the bearing cage and the differential case. Add 0.005-inch (0.130 mm) to the average gap measurement to determine the size of the shim pack between the bearing cage and the differential case. Figure 5.83.



4. Build a shim pack. Use at least three shims when you build a shim pack. Always place the thickest shims in the middle of the shim pack.
5. Remove the capscrews that fasten the input bearing cage to the differential case.
6. Install the shim pack.

A. Connect a lifting device to the input fork. Lift the input shaft assembly until there is 0.25-0.50-inch (6-12 mm) between the bearing cage and the differential case.

B. Install the shim pack under the input shaft bearing cage. Verify that the hole pattern of the shim pack matches the hole pattern of the differential case. Figure 5.84.

C. Install the capscrews and washers that fasten the input shaft bearing cage to differential case. Verify that the capscrews are aligned with the holes in the shim pack. Tighten the capscrews so that the threads engage in the holes of the differential caser.

D. Lower the input shaft assembly so that the bearing cage and the shim pack are installed against the differential case. Remove the lifting device from the fork or flange.

E. Tighten the capscrews to 75-95 lb-ft (100-127 Nm) while rotating the input shaft in each direction to verify that the bearings are correctly installed. T

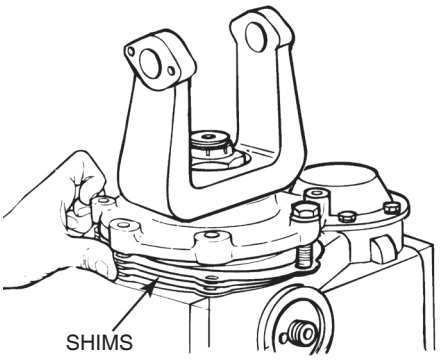


Figure 5.83

7. Place a holding tool in the input fork or flange and tighten the nut to the specified torque. See the Section 8.
8. Rotate the fork at least one full turn after you tighten the fork nut to the correct torque specification to ensure that the seal seats correctly.

9. Inspect the clearance operation of the input shaft assembly.

A. Rotate the input shaft in each direction and push the fork or flange toward the bearing cage. This ensures that the input shaft assembly in differential.

B. Use a dial indicator with a magnetic base or a clamp base to inspect the clearance of the input bearing. Verify that the pointer of the dial indicator is against the top of the input shaft. Set the dial indicator to ZERO. Figure 5.85.

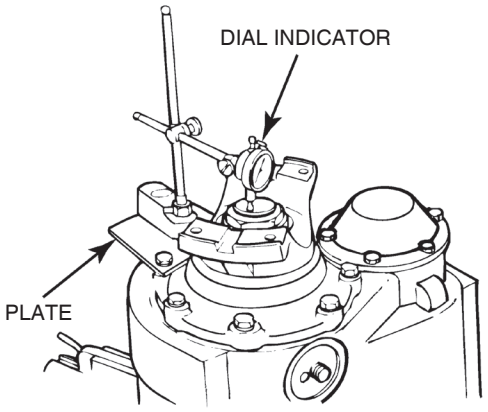


Figure 5.85

C. Use a pry bar and a support to push the fork or the flange. Read the dial indicator. The reading must be 0.002-0.008-inch (0.050-0.200 mm). Figure 5.86.

- If the clearance of the input bearing is not 0.002-0.008-inch (0.050-0.200 mm), add or remove shims from the shim pack. Repeat Step 5 through Step 9.

10. Place the shield for the oil filter onto the bearing cage.

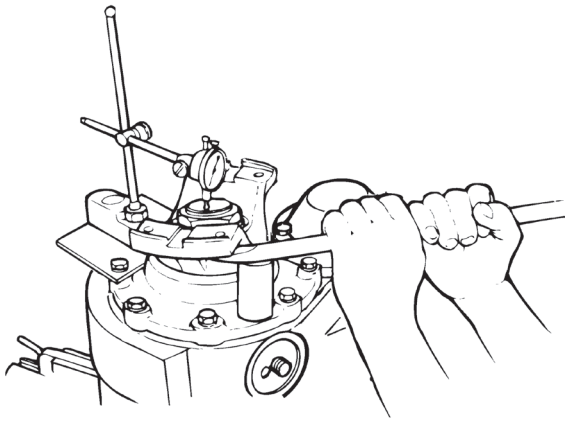


Figure 5.86

11. On RT-145 differential that do not use an oil pump, use the following procedure:

A. Remove the input shaft assembly from the differential.

WARNING

Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin.

B. Spray Loctite® Primer N sealant on the bearing cage and differential cage faces around the perimeter of the lube trough hole at the two o'clock position. Figure 5.87. Allow the primer to dry three to five minutes.

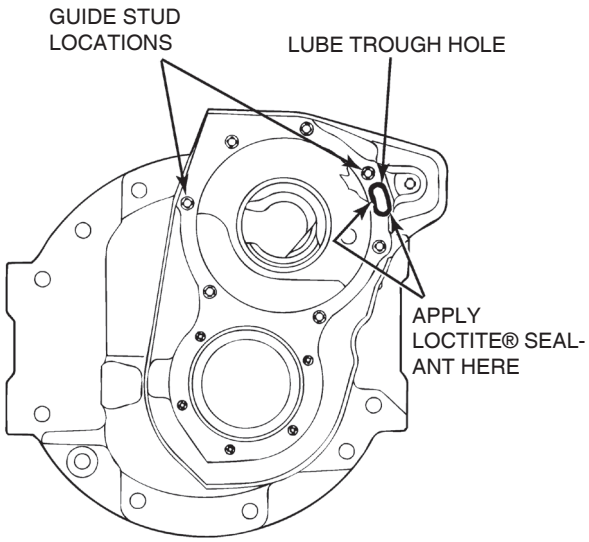


Figure 5.87

C. Carefully apply Loctite 518 sealant to the the bearing cage and differential cage faces around the lube trough hole. Avoid allowing any excess Loctite® sealant accumulation in the bearing cage bore. Figure 5.87.

D. Use guide studs to install the input shaft and bearing cage assembly with the appropriate shim pack. Tighten the capscrews to 95 lb-ft (128 N.m).T.

E. Allow four hours for the Loctite® sealant to cure before returning the vehicle to service.

Installation Driver-Controlled Main Differential Lock

See the Section 6 for installation procedures.

Installation of the output shaft and bearings.

1. Apply axle lubricant to bearing caps and cones. Figure 5.88.

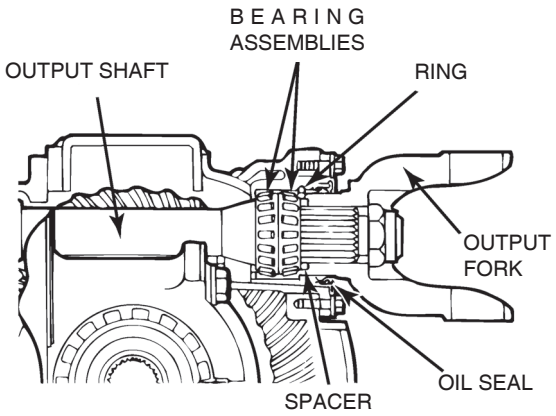


Figure 5.88

NOTE: If you replace either the bearing cap or the cone, replace both parts in a fully-matched set from the same manufacturer.

2. If the bearing cones were removed from the output shaft, install new bearing cones. Place both cones back-to-back onto the output shaft. Use a press and sleeve to install both cones. Apply pressure until the inner cone seats onto the shoulder of the output shaft. Figure 5.89.

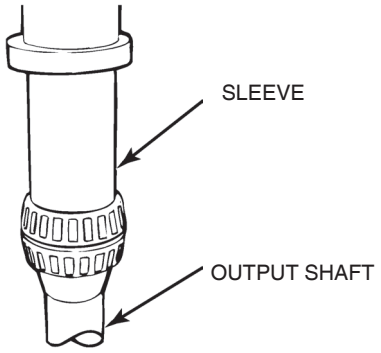


Figure 5.89

3. Use a press and sleeve to install the inner bearing cap into the bearing cage. Place the output shaft and bearing assembly into the cage.
4. Use a press and sleeve to install the outer bearing cap into the cage over the output shaft. Figure.

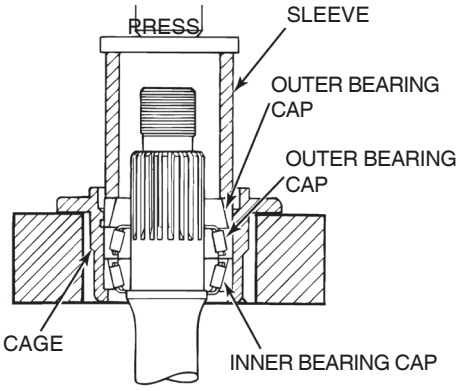


Figure 5.90

5. Install the snap ring that fastens the outer cap in the cage. The snap ring controls the clearance of the output shaft bearing. Figure 5.91.

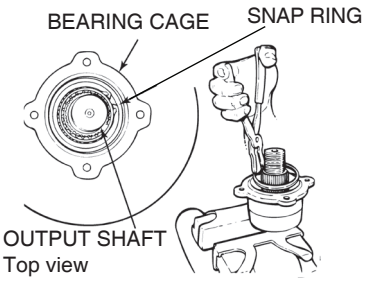


Figure 5.91

6. Install the snap ring or the fork and cone spacer into the output shaft until the snap ring touches the outer cone.
7. Inspect and adjust the clearance of the output shaft bearing.

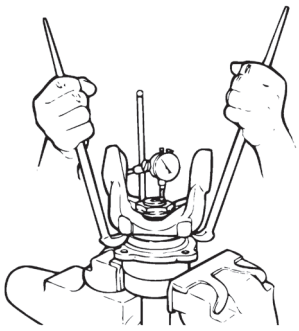


Figure 5.92

Inspection Adjust of the clearance of the Output shaft Bearings

The clearance the output shaft bearing is controlled by the size of the snap ring that holds the bearings in the bearing cage. The snap rings are available in increments of 0.003-inch (0.076 mm). Install the snap ring which results in an clearance of 0.001-0.004-inch (0.025-0.102 mm).

1. Place the output shaft and the bearing cage assembly into a vise with soft metal covers on the jaws of the vise.
2. Use an installation tool to install the fork or flange in the output shaft. Do not use the nut to draw the fork in the output shaft. Do not install the oil seal at this time.
3. Install the nut that fastens the fork or flange to the output shaft. Place a holding tool on the fork or flange and tighten the nut to the specified torque. See the Section 8.
4. Push the fork or flange toward the cage and rotate the shaft in each direction to verify that the bearings are correctly installed.
5. 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 fork or flange end of the output shaft. Set the dial indicator to ZERO. Figure 5.92.

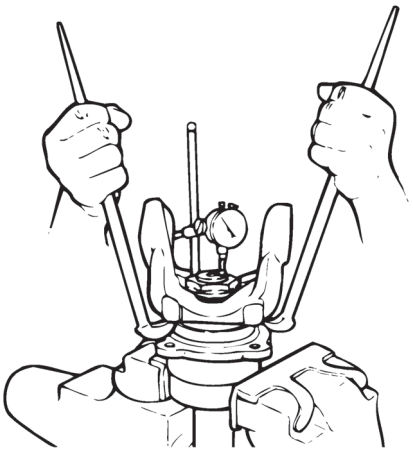
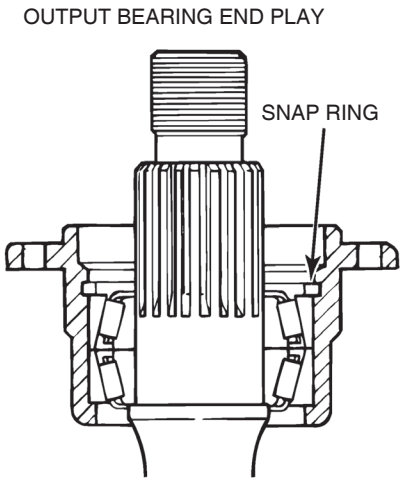


Figure 5.92

6. Place pry bars under the fork or flange and push the fork or flange away from the cage. Record the reading on the dial indicator. The reading must be 0.001-0.004-inch (0.025-0.102 mm). The reading is the measurement of the clearance on the output bearing.

- If the clearance reading is not 0.001-0.004-inch (0.025-0.102 mm), remove and replace the snap ring that fastens the bearings in the cage. Install a thinner snap ring to increase the clearance. Install a thicker snap ring to decrease the clearance. Figure 5.93.

7. Remove the nut that fastens the fork or flange to the output shaft. Use the correct puller tool to remove the fork.



To increase the clearance, install a thinner snap ring.
To decrease the clearance, install a thicker snap ring.

Figure 5.93

Installation Unitized Pinion Seal

1. Remove the old seal. Do not damage the bearing cage seal surface area. Do not touch or allow dirt or grease to contaminate the sealing surface areas or the adjacent bearings.
2. Inspect the bearing cage seal area for damage that could cause lubricant leaks after you install the seal. Use emery paper or an equivalent product to remove scratches, nicks or burrs.

CAUTION

INSPECT THE AXLE BREATHER FOR CONTAMINANTS, SUCH AS DIRT, LUBRICATION OR DEBRIS, WHICH CAN CAUSE PRESSURE TO BUILD INSIDE THE AXLE. DAMAGE TO THE SEAL AND PREMATURE SEAL LIP WEAR CAN RESULT. REMOVE THE AXLE BREATHER. USE A SAFE CLEANING SOLVENT TO CLEAN THE INSIDE AND OUTSIDE OF THE BREATHER.

3. Inspect the axle breather for contaminants, such as dirt, lubrication or debris.

- If you find contaminants in the axle breather, remove the axle breather. Use a safe cleaning solvent to clean the inside and outside of the breather.

4. Remove the replacement unitized seal from the package. Figure 5.94.

CAUTION

IF A FORK IS REMOVED AFTER IT HAS BEEN PARTIALLY OR FULLY INSTALLED, THE UNITIZED PINION SEAL WILL BE DAMAGED. REMOVE AND DISCARD THE ORIGINAL UNITIZED PINION SEAL AND REPLACE IT WITH A NEW ONE.

If a fork has been installed into the unitized pinion seal and then removed, the inner sleeve of the seal will be damaged. Install a new seal.

5. Select the correct seal driver from Table K. Each seal driver is designed to correctly install a specific diameter seal. To determine the fork seal diameter, measure the fork journal. To obtain the Meritor seal driver KIT 4454, See thethe Service Notes page on the front inside cover of this manual.

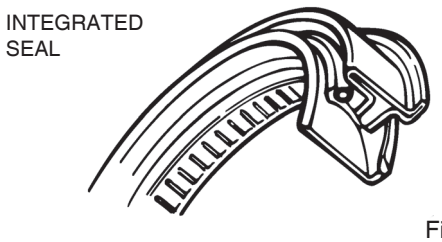


Figure 5.94

Simple Models	Tandem Models	Meritor´s Unitized seal	Local Installation Seal	Meritor´s Installation Tools	Diameter Seal - inch
MX-21-160	RT-34-144/P	A-1205-R-2592	Input of the previous differential. Tandem - 145 models - November 1993 to present.	R4422402	3.250 3.255
MX-23-160R	RT-34-145/P				
RF-16-145	MT-40-143				
RF-21-160	RT-40-145/A/P	A-1205-P-2590	Output of the previous differential Tandem - Input of the previous differential Tandem 145 models before November 1993 with seal A-1205-F-2424.	R4422401	3.000 3.005
RT-22-166	RT-40-149/A/P				
RF-23-185	RT-44-145/P				
RS-17-145	RT-40-160/A/P				
RS-19-145	RT-46-169/A/P				
RS-21-145	RT-46-160/A/P	A-1205-N-2588	Sigle axis input and previous Tandem – 145 models	R4422401	3.000 3.005
RS-21-160	RT-46-169/A/P				
RS-23-160/A	RT-46-16HEH/P	A-1205-Q-2591	Sigle axis input and previous Tandem – 160/164/185 models	R4422402	3.250 3.255
RS-23-161/A	RT-46-16HEH/P				
RS-25-160/A	RT-50-160/P				
RS-23-186	RT-52-160/P				
RS-26-185	RT-58-1851				
RS-30-185					

6. Position the installation tool and seal. Figure 5.95.
- If you use the R4422401 tool to install a forward tandem axle seal, the tool outer spokes or fins must fit between the bearing cage bolts. Ensure that the bolts on the bottom of the bearing cage are not in the path of the spokes.
- If the spokes contact the bearing cage bolts, the will incorrectly install the seal in the bearing cage seat and can also result in damage to the tool. The reference mark on the driver tool must be in the 12 o'clock or the 6 o'clock positions when you install the new seal.

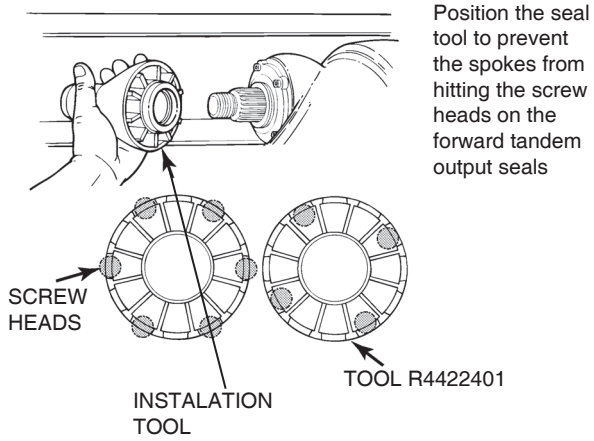


Figure 5.95

CAUTION

USE A RUBBER MALLET TO INSTALL THE SEAL. DO NOT USE A STEEL, BRASS OR PLASTIC HAMMER. USING A STEEL, BRASS OR PLASTIC HAMMER CAN DAMAGE THE SEAL AND TOOL.

7. Use a rubber mallet to mount the seal in the bearing cage. The seal must fully seat into or against the bearing cage. Figure 5.96.

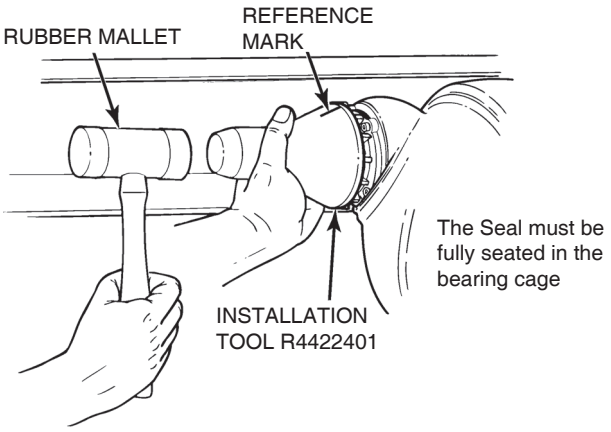


Figure 5.96

Cleaning and Inspection of the fork after the installation of a sealant

WARNING

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion type and petroleum base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below:

- Wear safe eye protection:
- Wear clothing that protects your skin.;
- Work in a well-ventilated area;
- Do not use gasoline, or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.

1. Use a clean shop towel and a safe cleaning solvent to clean the ground and polished surface of the fork journal. Do not use gasoline, abrasive cleaners, towels or scrubbers to clean the fork. Do not attempt to polish the fork.

NOTE: The unitized seal features a rubber inner sleeve that is designed to seal and rotate with the fork. This feature allows you to reuse a fork with minor grooves.

2. Inspect the fork seal surface for grooves

- If you find grooves on the fork, use calibrators to measure the groove diameters. If any groove diameter measures less than the dimensions shown in Figure 5.97, replace the fork.

SELLADOR DE PIÑÓN UNITIZADO

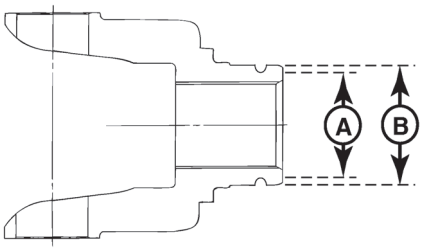


Figure 5.97

FORK SEAL DIAMNETER	MINIMUN FORK DIAMETER AT GROOVE
76,200 / 76,327 82,550 / 82,677	75,946 82,296

A - MINIMUN GROOVE DEPTH DIAMETER
B - FORK SEAL DIAMETER

CAUTION

DO NOT INSTALL A POSE™ SEAL AFTER YOU INSTALL A UNITIZED PINION SEAL. THE USE OF A POSE™ SEAL WILL PREVENT CORRECT SEATING OF THE UNITIZED PINION SEAL ON THE FORK AND CAN RESULT IN LUBRICANT LEAKAGE AT THE SEAL. POSE™ SEAL INSTALLATION IS RECOMMENDED ONLY FOR TRIPLE-LIP AND OTHER PREVIOUS DESIGN SEALS.

Do not use thin metal wear sleeves to refresh the fork surface. Wear sleeves pressed in the fork can prevent correct seating of the pinion seal, damage the pinion seal assembly and can cause the seal to leak.

3. Before install the fork, lightly lubricate the seal track in the fork of the joint with axle oil.
4. Align the fork splines with the shaft splines. Slide the fork over the shaft spline.

Tight Fit Forks and POSE™ Seal .

1. Apply axle lubricant to the hub of the fork or flange. Figure 5.98.

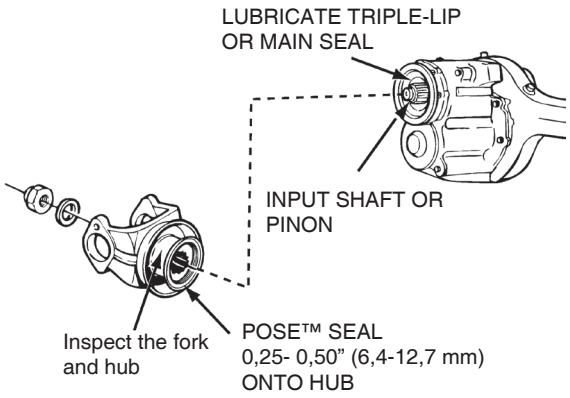


Figure 5.98

2. Verify that the lips of the POSE™ seal and the outer retainer of the triple-lip seal or main seal are clean and free from dirt and particles that may cause lubricant leakage between the seals.
3. Install the POSE™ seal onto the hub of the fork or flange by hand. The lips of the seal must face toward the end of the hub, opposite shoulder. Slide the POSE™ seal onto the hub until the lips are 0.25-0.50-inch (6.4-12.7 mm) from the end of the hub. Do not install the POSE™ seal against the shoulder. Figure 5.99.

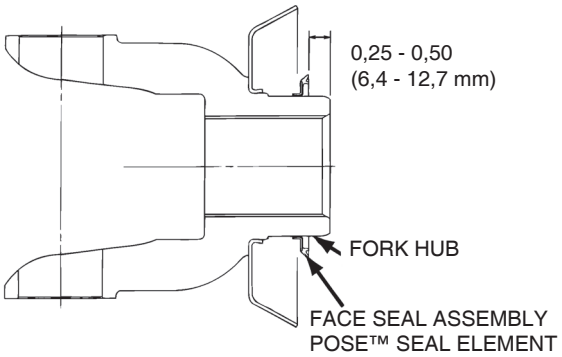


Figure 5.99

4. Before install the fork or flange in the shaft, apply axle lubricant to the hub.

NOTE: The POSE™ seal will position itself correctly as the fork or flange is pressed on the shaft.

5. nstall the fork or flange using the correct procedure. The fork must be completely seated before you tighten the pinion nut to the input shaft.

Output Flange fork or Oil Sealer Box Output Shaft Bearings.

CAUTION

HOLD THE SEAL ONLY ON THE OUTER DIAMETER. DO NOT TOUCH THE LIPS IN THE INNER DIAMETER OF THE SEAL. IF YOU TOUCH THE LIPS ON THE INNER DIAMETER OF THE SEAL, YOU WILL CONTAMINATE THE LIPS AND CAUSE A LEAK BETWEEN THE SHAFT AND THE SEAL.

Do not apply pressure after the flange of the seal touches the top of the cage or you will damage the seal.

1. Prepare the seal for installation.

A. Apply axle lubricant to the inner bore of the output bearing cage or the outer diameter of the new oil seal.

B. Place the oil seal into the cage so that the flange is parallel to the top of the cage.

C. Use a press and sleeve, or a mallet and sleeve, to install the seal into the cage. The seal is correctly installed when the metal flange of the seal seats on the top of the cage. Figure 5.100.

NOTE: The gap cannot be measured in the RT-40-145. The seal seats below the lip.

D. After the seal is installed, a gap of 0.015-0.030-inch (0.381-0.762 mm) can exist between the flange and the cage. The gap is a normal condition because of the flexible coating on the flange of the seal. Use a feeler gauge to measure the gap around the complete flange-to-cage area.

• If the gap varies more than 0.010-inch (0.254 mm) between the highest and lowest measurement, remove and reseat the seal. Figure 5.101.

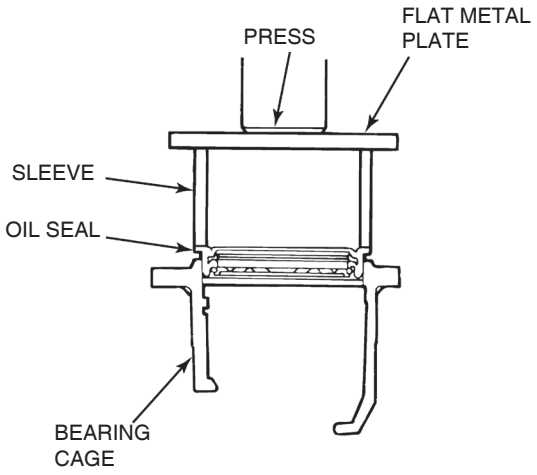


Figure 5.100

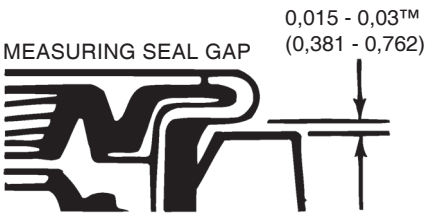


Figure 5.101

2. Inspect the fork surface.

• If you installed a unitized pinion seal on the output bearing cage, see the section 5 and then proceed to Step 3.

• For all other seals, see to the instructions below.

A. Inspect the fork surface for scratches, corrosion or a wear track from the previous oil seal. Replace the fork if any of these conditions exist

B. Inspect the lead chamfer of the fork for nicks and burrs which may damage the sealing lip during installation. Use an emery cloth to repair nicks and burrs.

C. Wipe clean the fork sealing surface and face.

D. Clean the splines in the fork or flange and on the thru-shaft.

E. Apply axle lubricant to the splines in the fork or flange and the thru-shaft.

• If a POSE™ seal is used, see the procedure in this section.

CAUTION

USE A PRESS AND A SLEEVE OR FORK INSTALLATION TOOL TO INSTALL THE FORK. DO NOT USE A HAMMER OR MALLET. USING A HAMMER OR MALLET CAN DAMAGE THE BEARINGS, FORK OR FLANGE.

If a fork is removed after it has been partially or fully installed, the unitized pinion seal will be damaged. Remove and discard the original unitized pinion seal and replace it with a new one.

If a fork has been installed into the unitized pinion seal and then removed, the inner sleeve of the seal will be damaged. Install a new seal.

3. Use a press and sleeve or an installation tool to install the fork or flange in the output shaft. Verify that the splines inside the fork or flange are aligned with the splines on the toutput shaft. If a press and sleeve are used, verify that the output shaft is supported.
4. Install the nut that fastens the output fork or flange to the output shaft. Place a holding tool on the fork or flange and tighten the nut to the specified torque. See the Section 8.
5. Rotate the fork at least one full turn after the fork nut is tightened to the correct torque specification. This ensures correct seating of the seal.

Differential Assembly of the Axle Housing

WARNING

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion type and petroleum base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below:

- Wear safe eye protection.
- Wear clothing that protects your skin.
- Work in a well ventilated area.
- Do not use gasoline, or solvents that contain gasoline. Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions

1. Use a cleaning solvent and rags to clean the inside of the axle housing and the differential mounting surface. See the Section 4.
2. Inspect the axle housing for damage. Repair or replace the axle housing. See the Section 4.
3. Check for loose studs, if equipped, in the mounting surface of the housing where the differential fastens. Remove and clean the studs that are loose.
4. Install the studs in the axle housing. See the procedure in this section. Tighten the studs to 150-230 lb-ft (203-312 Nem). T.

WARNING

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.

CAUTION

APPLY SILICONE GASKET MATERIAL IN A CONTINUOUS 0.25-INCH (6 MM) BEAD. IF YOU USE MORE THAN THIS AMOUNT, GASKET MATERIAL CAN BREAK OFF AND PLUG LUBRICATION PASSAGES. DAMAGE TO COMPONENTS CAN RESULT.

5. Apply a 0.25-inch (6 mm) continuous bead of silicone gasket material to the mounting surface of the housing where the differential fastens. Figure 5.102.

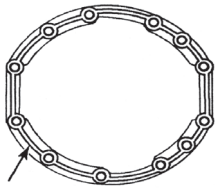


Figure 5.102

6. On an axle with a driver-controlled main differential lock, shift the lock into and hold the lock in the locked or engaged position. The locked position provides enough clearance between the shift collar and the axle housing for differential installation. See to Section 6.
7. Use a hydraulic roller jack or a lifting tool to install the differential in the axle housing. Figure 5.103.

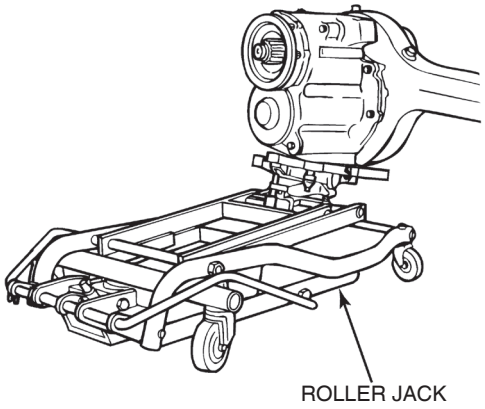


Figure 5.103

WARNING

Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin.

8. Spray the capscrew threads with Loctite® sealant. Allow the primer to dry for three to five minutes.

CAUTION

DO NOT USE A HAMMER OR MALLET TO INSTALL THE DIFFERENTIAL. A HAMMER OR MALLET WILL DAMAGE THE MOUNTING FLANGE OF THE DIFFERENTIAL AND CAUSE OIL LEAKS.

NOTE: Nord-Lock washers are reusable, but replace them if they are leaking

9. Install the nuts and washers or the capscrews and washers in the four corner locations around the differential and the axle housing. Hand tighten the fasteners. Do not tighten to the specified torque
- For fasteners with Nord-Lock washers, install the washers with the radial teeth side facing the differential. Figure 5.104.
10. Carefully push the differential in the position. Alternately tighten the four fasteners two or three turns. Figure 5.105.

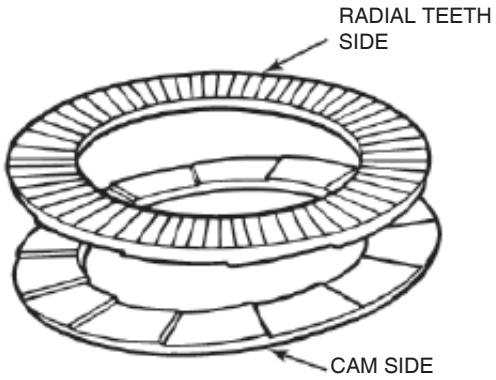


Figure 5.104

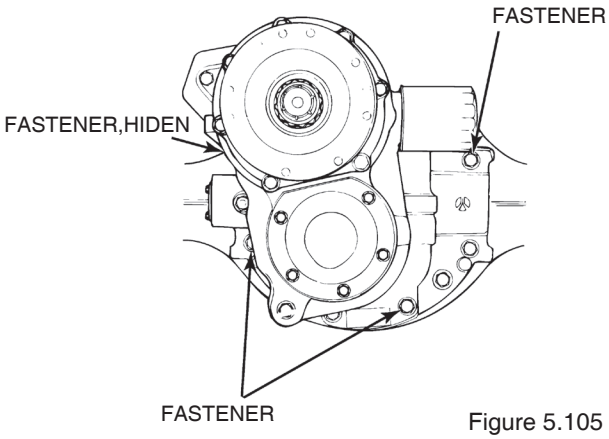


Figure 5.105

11. Repeat Step 10 until the four fasteners are tightened to the correct torque value.
- For fasteners with standard flat washers, tighten the fasteners to 150-230 lb-ft (204-312 Nm). T.
- For fasteners with Nord-Lock washers, tighten the fasteners to 210 lb-ft (287 Nm). T.
12. Install the remaining fasteners and the washers that hold the differential in the axle housing. Tighten the fasteners to the correct torque value. See the Section 8.
13. Install the washers and tighten the capscrews that fasten the output bearing cage to the axle housing. Tighten the capscrews to 35-50 lb-ft (48-67 Nm). T.

14. Adjust the shift fork for the inter-axle differential lock. The movement of the shift fork is controlled by the adjusting screw of the locking mechanism.

A. Loosen the jam nut on the adjusting screw. Loosen the adjusting screw so that the screw does not touch the shift of the drive mechanism. Figure 5.106.

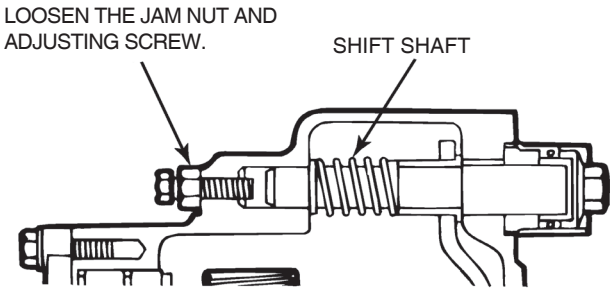


Figure 5.106

B. Apply and hold 60 psi (413 kPa) of air pressure to the shift cylinder so that the shift collar engages the splines in the inter-axle differential case.

C. Verify that the adjusting screw does not touch the shift shaft when the shift collar engages the inter-axle differential case.

D. Tighten the adjusting screw until the tip of the screw touches the end of the shift shaft. Release the air pressure

D. When the screw touches the shaft, tighten the adjusting screw an additional one turn. Apply air pressure, then tighten the jam nut. Figure 5.107.

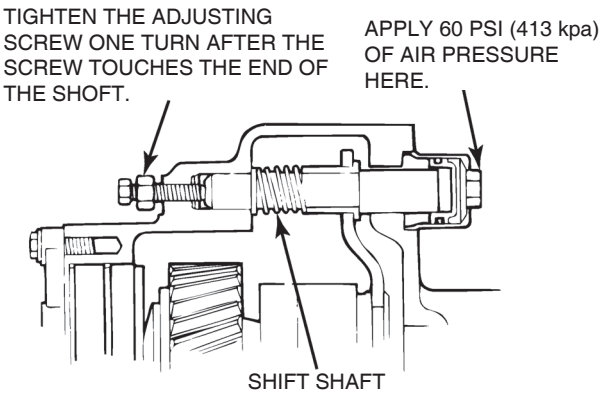


Figure 5.107

F. Disengage the inter-axle differential lock by holding the input fork or flange and rotating the output fork or flange. The output fork or flange should rotate with less than 50 lb-ft (67 Nm) of torque applied. T.

G. Apply and hold 60 psi (413 kPa) of air pressure to the shift cylinder mechanism to verify that the shift collar engages the splines in the inter-axle differential case. When the input fork or flange is rotated, the output fork or flange must rotate. Release the air pressure.

H. Apply a rust prevention oil, for example, as Meritor part number 1199-U-1113 or equivalent to the inlet of the air cylinder.

15. Connect the vehicle driveshafts to the input and the thru forks or flanges.

16. Connect the air lines to the inter-axle differential air cylinder and, if used the main differential lock cylinder.

17. On axles with a main differential lock, connect the electrical connector of the sensor unit. Verify that the main differential lock is disengaged.

18. If removed, install the oil filter adapter of the differential housing. Use Meritor adhesive number 2297-T-4180, or equivalent. See the Section 4. Tighten the adapter to 40-60 lb-ft (55-80 Nm). Figure 5.108. (T).

CAUTION

IF THE OIL FILTER IS TIGHTENED MORE THAN 3/4 OF A TURN AFTER IT CONTACTS THE DIFFERENTIAL, THE OIL FILTER WILL BE DAMAGED AND LEAK FLUID. DAMAGE TO COMPONENTS CAN RESULT.

19. Apply axle lubricant to the gasket of the new oil filter. Install the oil filter onto the adapter. When the gasket on the filter contacts the differential, tighten the oil filter an additional 3/4 of a turn. If necessary, use an oil filter wrench to tighten the filter. Figure 5.108.

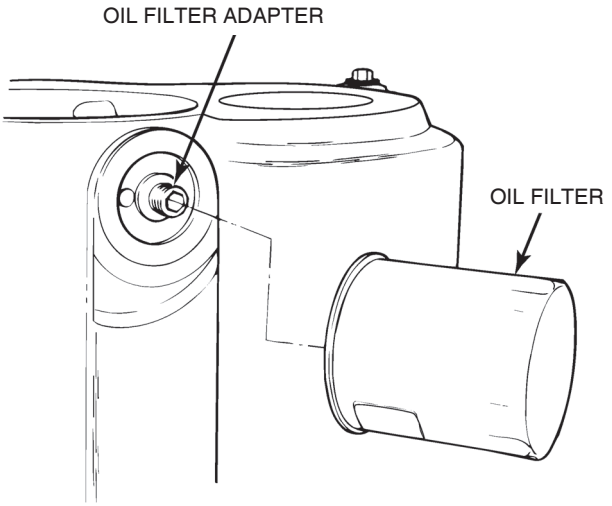


Figure 5.108

CAUTION

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.

Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin.

Conical Washer, Flat Washer and Nut

1. Clean the mating surfaces of the axle shaft and wheel hub.
2. If silicone gasket material is used, apply a 0.125-inch (3 mm) diameter bead of the gasket material around the mating surface of the hub and around the edge of each fastener hole.
3. Install the gaskets and axle shafts in the axle housing in the differential. The gasket and flange of the axle shafts must fit flat against the wheel hub. Figure 5.109.
4. If the axle shaft hubs have conical hole studs, install conical washer in the each stud and the flange of the axle shaft. Figure 5.109.

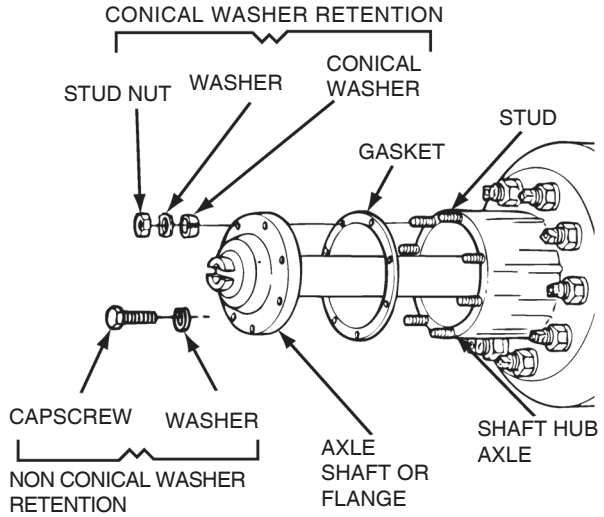


Figure 5.109

5. If the axle shaft flange have cylindrical hole for screw mounting, install the screws and washers in the holes. Figure 5.109. Tighten the screws to the correct torque value. See the Section 8.
6. Position the gasket between the output shaft bearing cage and the axle housing.
7. Install the output shaft and bearing cage assembly in the axle housing. Rotate the output shaft to align the splines with the splines of the rear side gear.
8. Clean the cage to housing bearing screws. Remove RTV residue from the thru-drilled tapped holes.
9. Apply a 0.25-inch (6 mm) length bead of Loctite 518 sealant in the thru-drilled tapped holes located at the two, five and eight o'clock positions. Figure 5.110.
10. Install the gasket and axle shaft in the housing. The gasket and flange of the axle shaft must fit flat against the wheel hub. Figure 5.109.
11. Install conical washer and nut over each stud and the flange of the axle shaft. Use a punch or a drift and hammer, if necessary.
12. Install the grade 8 nuts and washers in the stud. Lock washers are an acceptable alternative. Tighten the stud nuts to the torque specified in Table L.
13. Fill the axle with the specified lubricant. See the procedure in this section.

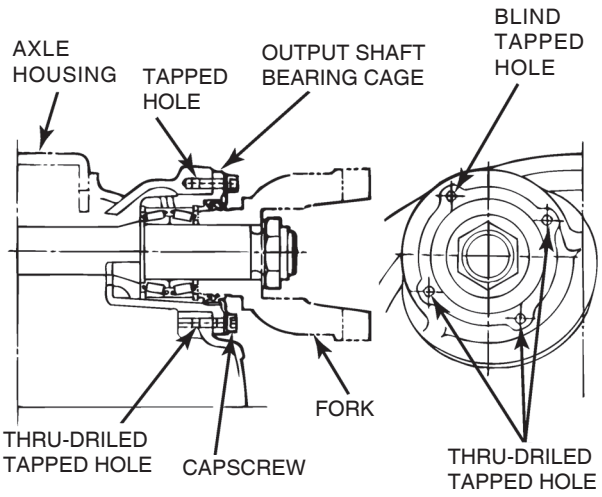


Figure 5.110

Table L: Shaft-to-Hub Torque Fastener Chart — Conical washers Applications

		Torque Value - Grade 8 Nuts lb-ft (Nm)	
Fastner	Thread Size	Plain Nut	LOCKNUT
Porca do Prisioneiro ou Semi-Eixo	0,44 - 20 0,50 - 20 0,56 - 18 0,62 - 18	68-102 (50-75) 102-156 (75-115) 150-224 (110-145) 204-312 (150-230)	54-88 (40-65) 88-136 (65-100) 136-197 (100-145) 176-258 (130-190)
Studs	ALL	Install the coarse thread end of the stud in the hub and tighten to the last thread.	

Cylindrical Holes, Nuts and Washers

1. Clean the mounting surfaces of the axle shaft and wheel hub.
2. If silicone gasket material is used, apply a 0.125-inch (3 mm) diameter bead of the gasket material around the mounting surface of the hub and around the edge of each fastener hole.
3. Install the gaskets and axle shafts in the axle housing and differential. The gasket and flange of the axle shafts must fit flat against the wheel hub. Figure 5.109.
4. If the wheel hubs have tapered hole studs, install solid tapered washers in each stud and in the flange of the axle shaft. Figure 5.109.
5. If the wheel hubs have cylindrical holes capscrew, install the capscrews washers. Tighten the correct torque value. See the Section 8.
6. Position the gasket between the bearing cage of the output axle and housing axle.
7. Install the output axle and bearing cage assembly in the axle housing. Rotate the output axle to align the splines of the output axle splines of the rear side gear.
8. Clean the bearing cage to housing capscrews. Remove RTV residue from the thru-drilled tapped holes.
9. Apply a 0.25-inch (6 mm) length bead of Loctite 518 sealant in the thru-drilled tapped holes located at the two, five and eight o'clock positions. Figure 5.111.

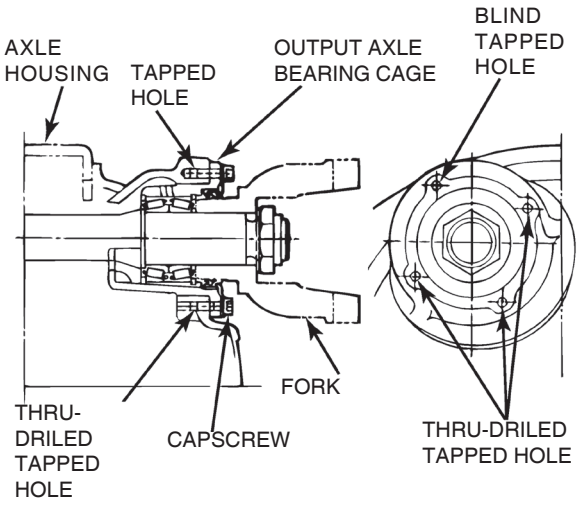


Figure 5.111

10. Install the gasket and axle shaft in the housing. The gasket and flange of the axle shaft must fit flat against the wheel hub. Figure 5.109.
11. Install the Grade 8 nuts and washers on the stud. Lock washers are an acceptable alternative. Tighten the stud nuts to the torque specified in Table M.
12. Fill the axle with the specified lubricant. See the procedure in this section.

Table M: Shaft-to-Hub Torque Fastener Chart — Tapered Washer Applications

		Torque Value - Grade 8 Nuts lb-ft (Nm)	
Fastener	Thread Size	Plain Nut	LOCKNUT
Tuerca del Espárrago o Semieje	0,62 - 18 0,75 - 16	203-312 (150-230) 420-542 (310-400)	176-258 (130-190) 366-475 (270-350)
STUDS	ALL	Install the coarse thread end of the stud He hub and thighten to the last thread	

Fill the Axle with Lubricant

NOTE: For additional lubrication information, See the Maintenance Manual 1, Lubrication. To obtain this publication, See the Service Notes page on the front inside cover of this manual.

1. Park the vehicle on a level surface. When the angle of the drive pinion changes, the lubricant capacity of the axle will change.
2. Remove the fill plug from the side of the bowl cover of the axle housing. Figure 5.112.
3. Fill the axle with lubricant until the lubricant level is to the bottom of the fill plug hole. See the Section 7.
4. Install the fill plug. Tighten the fill plug to 35 lb-ft (47 Nm). When correctly installed, one complete thread of the fill plug is visible between the housing and plug head.
5. Road test the vehicle in an unloaded condition for one to two miles (1.6-3.2 km) at speeds not more than 25 mph (40 kmh). Recheck the lubricant levels and all the fasteners.
6. If used, inspect the operation of the driver-controlled main differential lock. See the Section 6.

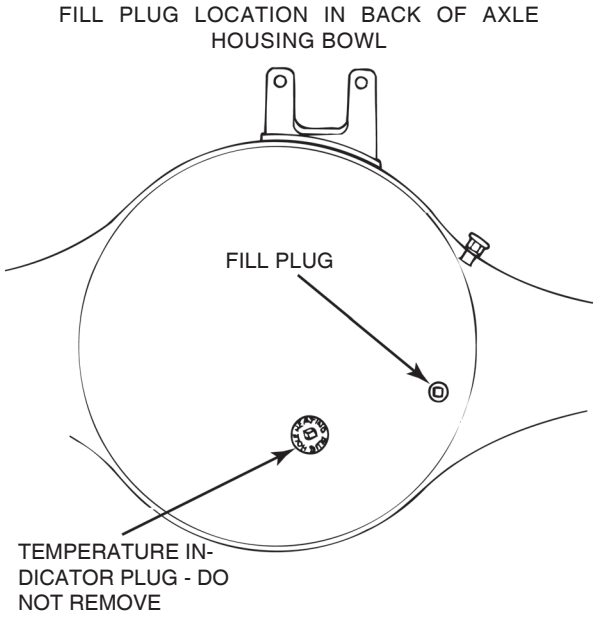


Figure 5.112

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.

Description

Some Meritor drive axle models have a driver-controlled main differential lock (DCDL). This differential lock is operated by a differential mounted, air actuated shift unit. When activated, the shift unit moves a sliding collar which is installed on the splines of the axle shaft. When engaged, the collar locks the axle shaft to a second set of splines on the differential case. Both driven wheels are then simultaneously engaged. Figure 6.1.

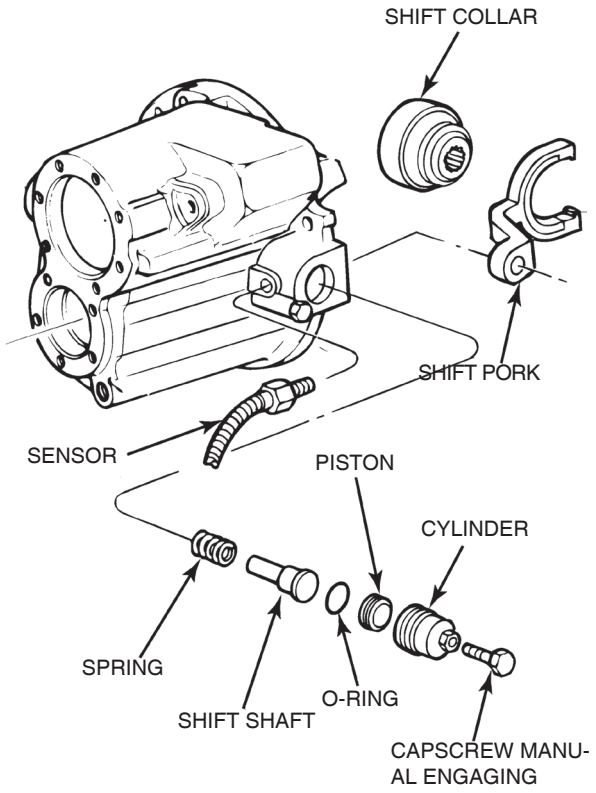


Figure 6.1

NOTE:

Meritor differential models with driver-controlled differential lock equipment are manufactured in metric dimensions and sizes. When these differential are serviced, it is important to use the correct metric size tools on the fasteners. See the Section 8.

Removal Differential Differential from the Axle Housing

Before the differential can be removed or installed, the differential lock must be shifted into and held in the locked or engaged position. The locked position gives enough clearance between the shift collar and the axle housing to permit the removal or installation of the differential.

NOTE:

If the axle shafts were removed for or towing with the differential in the unlocked or disengaged position, Install the left hand axle shaft into the housing before continuing. Perform the following steps for reinstalling the axle shafts into the axle housing.

1. Remove the protective covers, if used, from the wheel hubs.
2. If the drive axles are equipped with a main differential lock, shift the differential to the unlocked or disengaged position. Install the axle shafts with two sets of splines and new gaskets in the correct location as follows. Figure 5.109.

A. Push the axle shaft and gasket into the hub and housing until the shaft stops against the differential lock collar.

B. Push down and in on the axle shaft flange and rotate the shaft until the splines of the shaft and the shift collar are engaged.

C. Push the axle shaft further into the housing until the shaft stops against the differential side gear.

D. Push down on the axle shaft flange and rotate the shaft until the splines of the shaft and the side gear are engaged.

E. Push the axle shaft completely into the housing until the axle shaft flange and gasket are flush against the wheel hub.

Engagement or Lockout of the DCDL

WARNING

During DCDL disassembly or differential removal, when the DCDL is in the locked or engaged position and one of the vehicle's wheels is raised from the floor, do not start the engine and engage the transmission. The vehicle can move and cause serious personal injury. Damage to components can result.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Manual Method

Use the following manual engaging method to shift the DCDL into the locked position:

If an auxiliary air supply is not available or if the differential differential is to be stored for later use, use this manual engaging method for the DCDL. Figure 6.2 and Figure 6.3.

Threaded DCDL

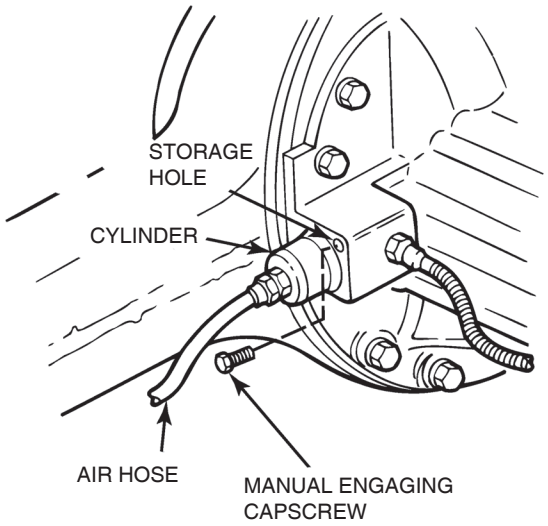


Figure 6.2

FIXED CAPSCREW DCDL

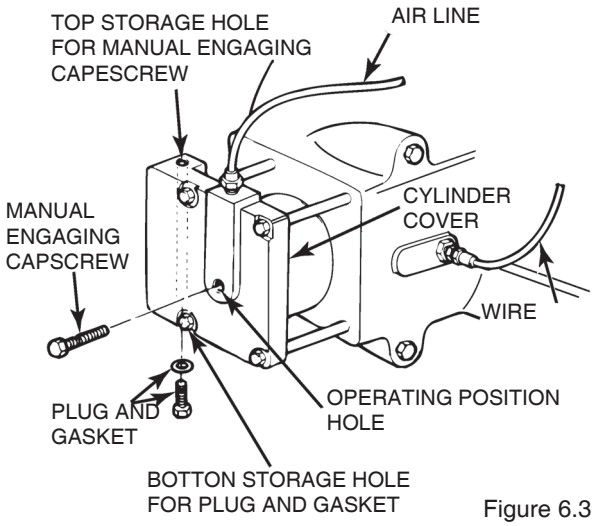


Figure 6.3

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
2. Remove the drain plug from the bottom of the housing and drain the lubricant.
3. Use a jack to raise the left-hand wheel of the drive axle.
4. Place a jackstand under the left-hand spring seat to hold the vehicle in the raised position.
5. Disconnect the driveline from the input fork of the differential.
6. Disconnect the vehicle air line from the inter-axle differential and main differential lock actuator assemblies.
7. Remove the plug and gasket from the hole in the center of the Threaded DCDL cylinder or flanged fixed capscrew DCDL.
8. Remove the manual engaging capscrew from the top storage hole in the cylinder cover or the shift tower with the threaded type shift assembly. Figure 6.2 and Figure 6.3.

NOTE:

For a fixed capscrew DCDL shift assembly, the storage hole for the plug and gasket is the opposite end of the storage hole for the manual engaging capscrew. Figure 6.3.

9. Install the plug and gasket into the bottom storage hole in the cylinder cover or in the shift tower.

10. Install the manual engaging capscrew into the threaded hole in the center of the cylinder cover or cylinder.

WARNING

THERE WILL BE A SMALL AMOUNT OF SPRING RESISTANCE FELT WHEN YOU TURN IN THE MANUAL ENGAGING CAPSCREW. IF A HIGH RESISTANCE IS FELT BEFORE REACHING THE LOCKED OR ENGAGED POSITION, STOP TURNING THE CAPSCREW, OR THE COVER, FORK AND CAPSCREW THREADS WILL BE DAMAGED.

11. Turn the manual adjusting capscrew to the right until the head is approximately 0.25-inch (6 mm) from the cylinder cover. Do not turn the capscrew beyond its normal stop.

A high resistance on the capscrew indicates that the splines of the shift collar and the differential case half are not aligned or engaged. To align the splines, use the following procedure.

A. Rotate the left-hand wheel to align the splines of the shift collar and case half while you turn in the manual engaging capscrews.

B. When the normal amount of spring resistance is again felt on the capscrew, the splines are engaged. Continue to turn in the manual engaging capscrew until the head is approximately 0.25-inch (6 mm) from the cylinder cover. The capscrew is now in the service position and the main differential lock is completely engaged.

12. Remove the differential from the axle housing. See the Section 3.

13. Release the differential lock by removing the manual engaging capscrew and seal from the cylinder cover or cylinder.

Auxiliary Air Supply Method

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.

2. Use a jack to raise the left-hand wheel of the drive axle. Place a safety stand under the left-hand axle housing leg to support the vehicle in the raised position.

3. Remove the drain plug from the bottom of the housing and drain the lubricant.

4. Disconnect the driveline from the input fork.

5. Disconnect the vehicle air line from the inter-axle differential and main differential lock actuator assemblies.

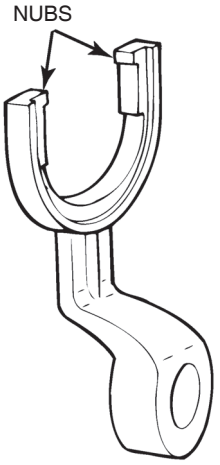


Figure 6.4

6. Install a suitable air line coupling into the main differential actuator assembly.

7. Install the air line into the coupling.

WARNING

WHEN YOU USE AN AUXILIARY AIR SUPPLY TO ENGAGE THE DCDL, YOU MUST SUPPLY AIR TO THE DCDL UNTIL YOU REMOVE THE DIFFERENTIAL. DO NOT DISCONNECT THE AIR LINE OR REDUCE AIR PRESSURE TO THE DCDL BEFORE YOU REMOVE THE DIFFERENTIAL FROM THE HOUSING.

DAMAGE TO COMPONENTS CAN RESULT.

8. Supply 120 psi (827 kPa) regulated air pressure through the air line.

9. Verify that the DCDL is engaged.

10. Remove the differential from the axle housing. See the Section 3.

11. Shut-off the air supply to the DCDL..

12. Disconnect the air line from the main differential actuator assembly coupling.

Differential and Gear Assembly and Main Differential Lock

Threaded DCDL Shift Assembly

The current design shift fork does not employ roll pins. Nubs on the inner face of the fork hold the shift collar in place. Figure 6.4.

1. Verify that the differential lock is released and the engaging capscrew and seal are removed from the shift cylinder.
2. Tap the shift collar with a rubber mallet to loosen and remove the collar from the shift fork. Figure 6.5.

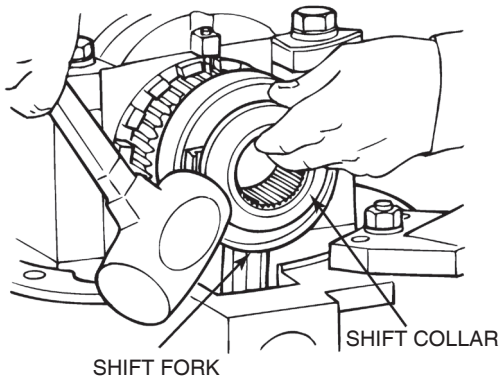


Figure 6.5

3. Remove the differential lock sensor switch, if used, and jam nut from the differential. Figure 6.6.

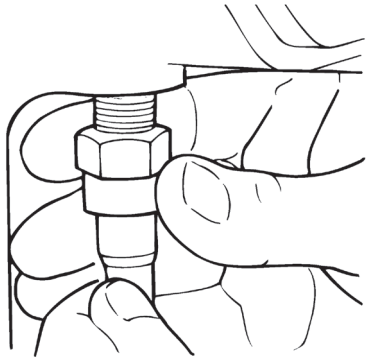


Figure 6.6

4. Remove the shift cylinder and piston assembly from the differential by turning it to the left. Figure 6.7.

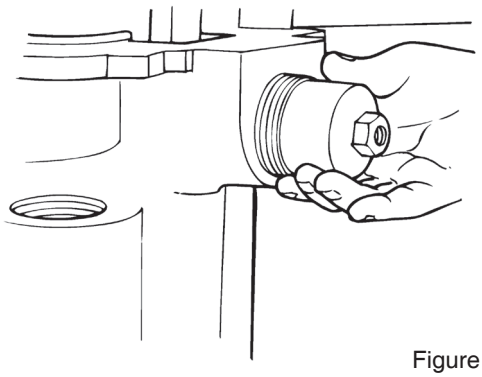


Figure 6.7

5. Place the shift cylinder and piston assembly in a vise that has brass covers over the jaws. Remove the piston and O-ring from inside the cylinder. Use a narrow drift through the hole in the top of the cylinder to push out the piston. It may be necessary to use a mallet to tap out the piston. Figure 6.8.

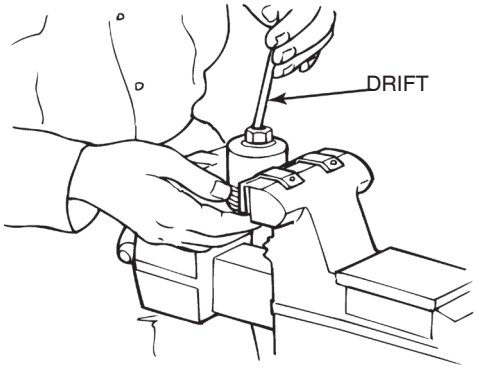


Figure 6.8

6. Carefully remove the O-ring from the piston. Use a thin pointed tool to remove the O-ring. Do not damage the piston. Figure 6.9.

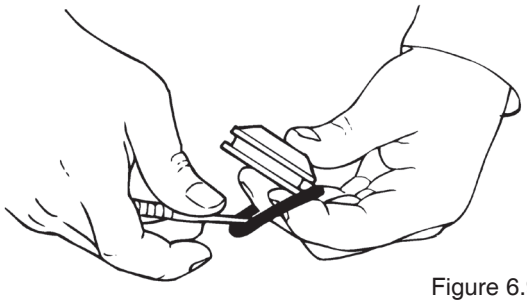


Figure 6.9

7. Inspect the O-ring for any damage such as cracks, cuts or breaks.
   - If the O-ring is damaged, replace it with a new O-ring when you assemble the components.
8. Clean and inspect all shift assembly parts. See the Section 4.

9. Pull the shift shaft from the fork and out of the differential. Figure 6.10.

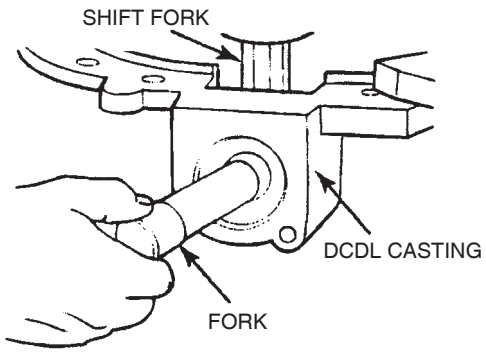


Figure 6.10

10. Remove the shift shaft spring and fork from the differential. Figure 6.11.

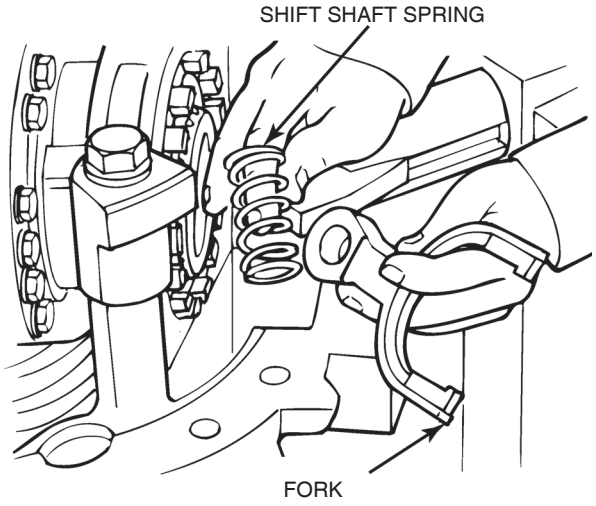


Figure 6.11

11. If roll pins are used, use a hammer and brass drift to remove the roll pins for the adjusting rings on the bearing caps. If capscrews or cotter pins are used, remove the capscrews or cotter pins.
12. Remove the bearing cap capscrews and washers, the bearing caps and adjusting rings. Match mark one bearing cap and one differential leg so that these parts will be assembled in the correct positions..
13. Lift the differential and gear assembly from the differential. Figure 6.12.

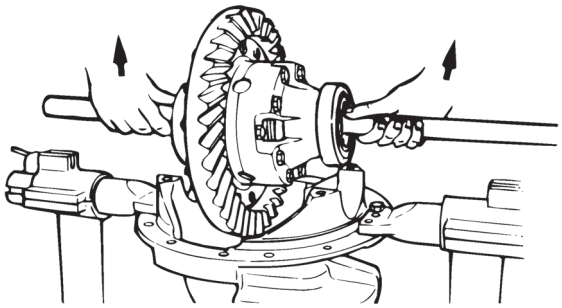


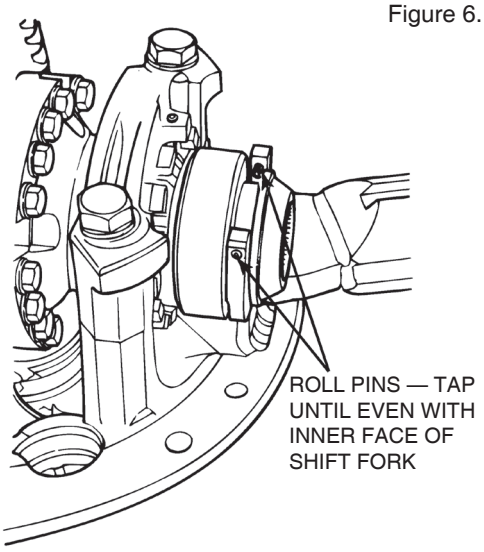
Figure 6.12

Further disassembly of these differentials is the same as axles without the driver-controlled main differential lock. To continue disassembly, follow the procedures in Section 3.

Fixed capscrew DCDL Shift Assembly

1. To remove the differential lock sliding shift collar, tap out the two retainer roll pins until they are level with the inner face of the shift fork. Figure 6.13.

Figure 6.13



2. If required, remove the differential lock shift unit.

A. Remove the sensor switch and jam nut.
B. Remove the four capscrews and washers that hold the cylinder cover. Remove the cover. On the 160 Series differentials, remove the copper gasket. Figure 6.14.
C. Remove the shift cylinder and piston.
D. Remove the shift shaft from the shift fork. It may be necessary to use heat to separate the shaft from the fork to loosen it.

NOTE:

Some models use silastic seal instead of the flat washer in Step E. Also, a roll pin is installed in the shift shaft and is used as a stop for the shift shaft spring. It is not necessary to remove this roll pin during a normal disassembly.

E. Remove the shift shaft spring and flat washer.

F. Remove the shift fork and continue with Step 11 in the previous procedure.

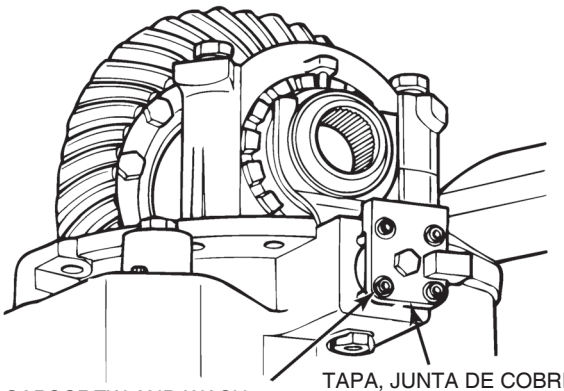


Figure 6.14

DCDL Installation

Differential Shift Assembly

WARNING

When you apply some silicone gasket materials, a small a mount 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.

Take care when you use Loctite® adhesive to avoid serious personal injury. Read the manufacturer's instructions before using this product. Follow the instructions carefully to prevent irritation to the eyes and skin.

Threaded DCDL Shift Assembly.

Install the differential shift assembly after the differential is assembled and the gear and bearing adjustments are made. The Threaded DCDL shift assembly is shown in Figure 6.15

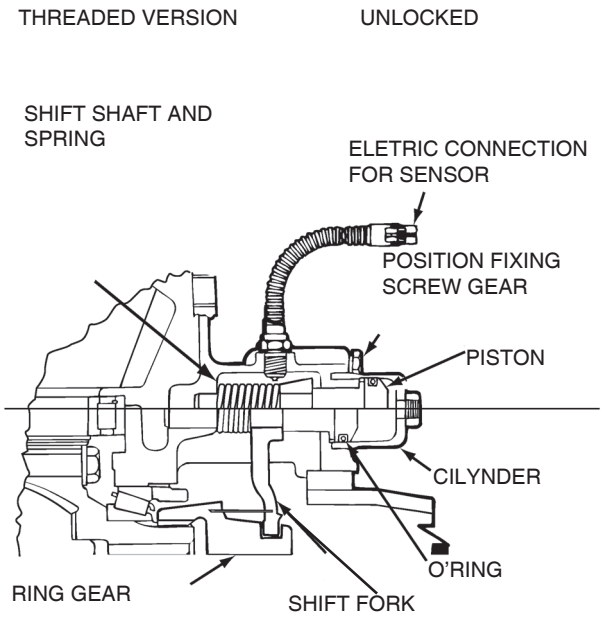


Figure 6.15

LOCKED

1.Install the shift fork into the shift of the differential. The "L" shape of the fork and the bore for the shift shaft must face out toward the cylinder bore in the side of the differential. Figure 6.16.

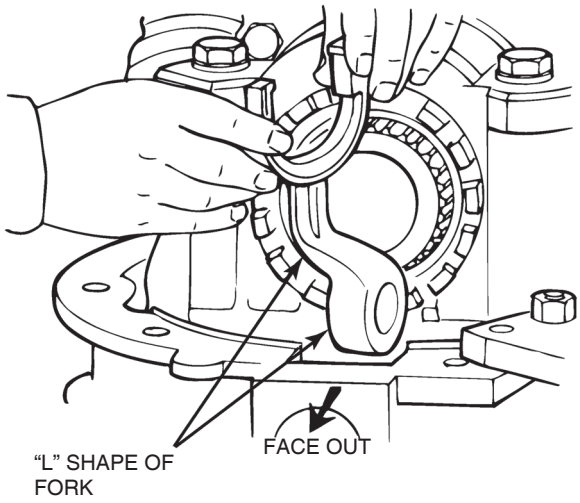


Figure 6.16

2. Compress the shift shaft spring as required and install it between the back of the fork and differential wall inside the differential. Figure 6.17.

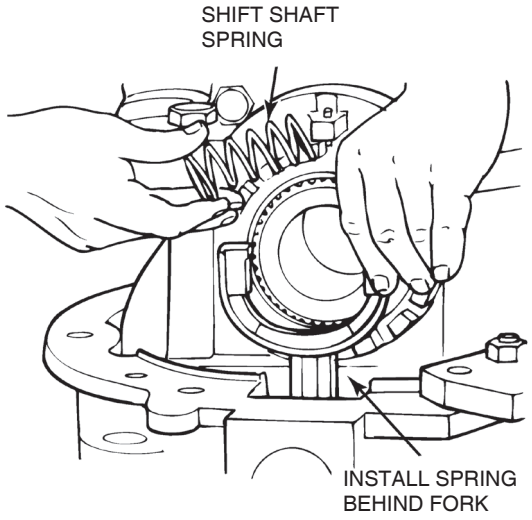


Figure 6.17

3. Align the spring and bore in the shift fork with the shift shaft bore in the differential.
4. Install the shift shaft through the bore in the differential, fork and spring until it is against the shift fork. Figure 6.18.

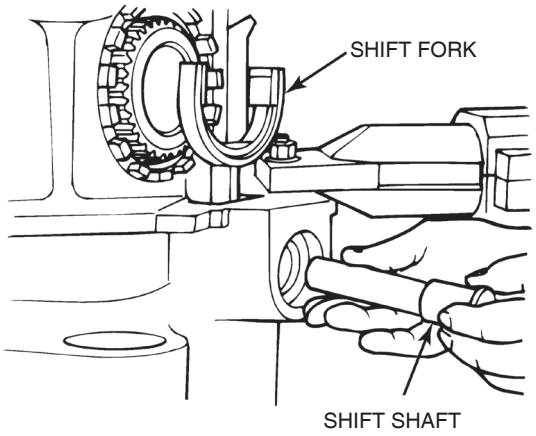


Figure 6.18

5. If required, lubricate a new O-ring with axle lubricant. Install the O-ring into the piston groove.
6. Install the piston and O-ring assembly into the shift cylinder, bevel end first. Push on the piston until it is against the bottom of the cylinder. Figure 6.19.

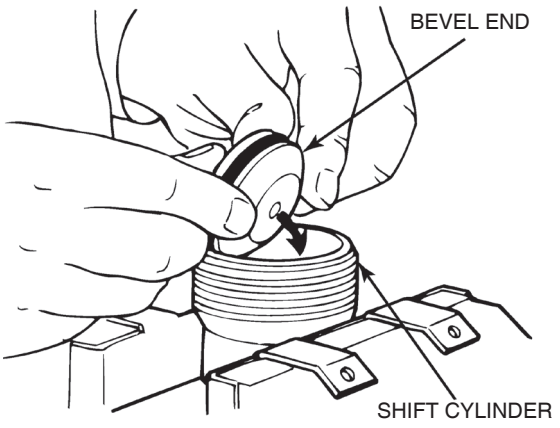


Figure 6.19

7. Apply a continuous 0.06-inch (1.5 mm) diameter bead of Loctite® flange sealant, Meritor part number 2297-D-7076, around the DCDL cylinder threads..
8. Turn the shift cylinder and piston assembly to the right until it bottoms in the differential casting bore. Figure 6.20.

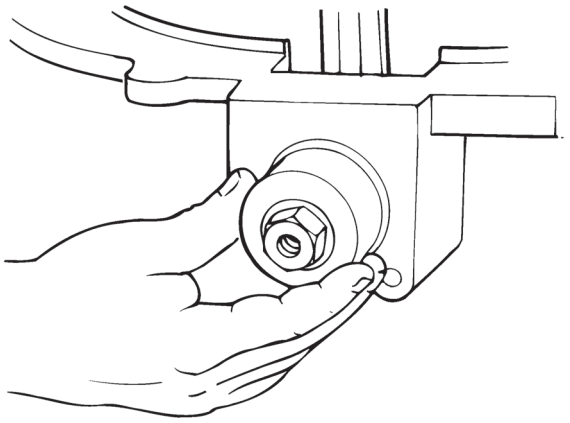


Figure 6.20

9. Position the shift collar over the fork. The large splines of the collar must face toward the main differential. Use a rubber mallet to tap the shift collar through the nubs of the shift fork. Figure 6.21.

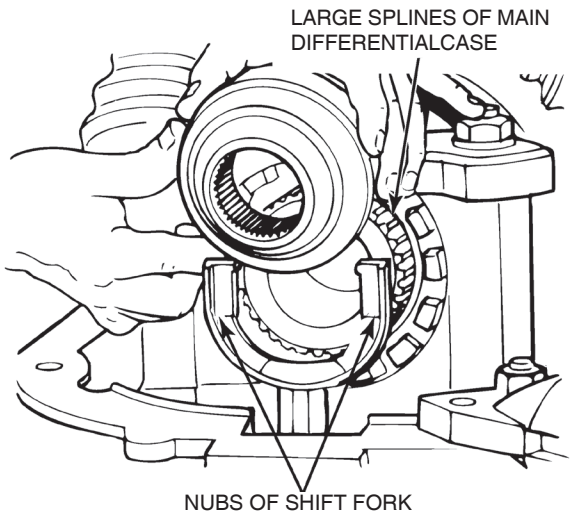


Figure 6.21

10. Engage the splines of the collar with the splines of the main differential case. Insert the manual engaging capscrew through the top of the shift cylinder to move the shift collar toward the differential case. Rotate the collar as necessary to align the splines. Figure 6.22.

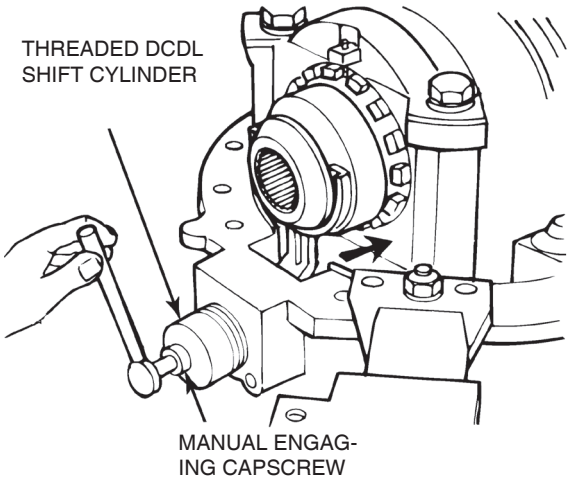


Figure 6.22

11. Turn the manual adjusting capscrew to the right until the head is approximately 0.25-inch (6 mm) from the cylinder cover. Do not turn the capscrew beyond its normal stop. The capscrew is now in the service position and the main differential lock is completely engaged.

NOTE:

The differential must be in the locked position to install the axle shaft into the axle housing.

12. With the shift collar in the locked position, install the sensor switch into the threaded hole in the front of the differential. Figure 6.23.

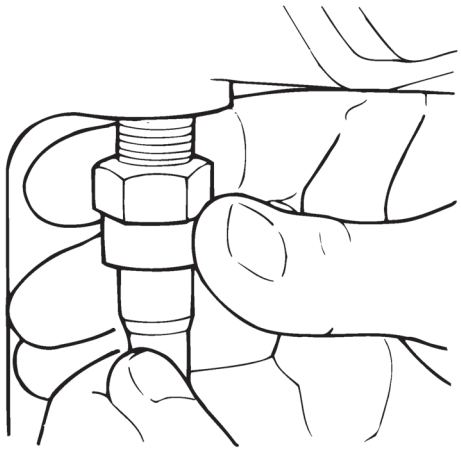


Figure 6.23

13. Connect a volt-ohm meter to the sensor switch. Select ohms on the meter. With the DCDL engaged, the circuit should be closed, showing less than one ohm resistance. If the resistance is over one ohm, check the sensor.

A. Verify that the fork is aligned with the sensor switch when it is in the engaged position.

B. Check for a loose wiring connection. The connector must be tightly seated.

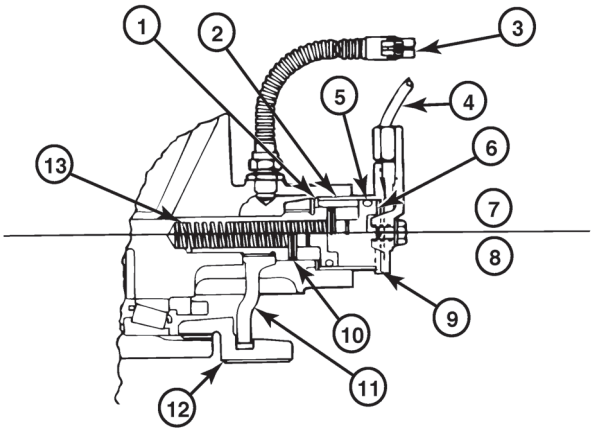
C. Verify that the sensor switch is fully seated against the differential.

- If the resistance is greater than one ohm afterthese checks, replace the sensor switch.

Fixed capscrew DCDL Shift Assembly

Install the differential shift assembly after the differential differential is assembled and the gear and bearing adjustments are made. The fixed capscrew type shift assembly is shown in Figure 6.24.

DCDL FIJADO POR TORNILLOS



1 - FLAT WASHER OR SILASTIC AS REQUIRED
2 - CYLINDER
3 - ELECTRIC CONNECTION FOR SENSOR
4 - AIR LINE
5 - O-RING
6 - DISENGAGED
7 - ENGAGED
8 - COPPER GASKET
9 - PIN
10 - PERNO
11 - SHIFT FORK
12 - COLLAR
13 - SHIFT SHAFT AND SPRING

Figure 6.24

1. On differential models with shift fork roll pins, install the two roll pins into the ends of the shift fork. Tap the pins into position until they are level with the inner fork face. Figure 6.25. Do not install completely at this time.

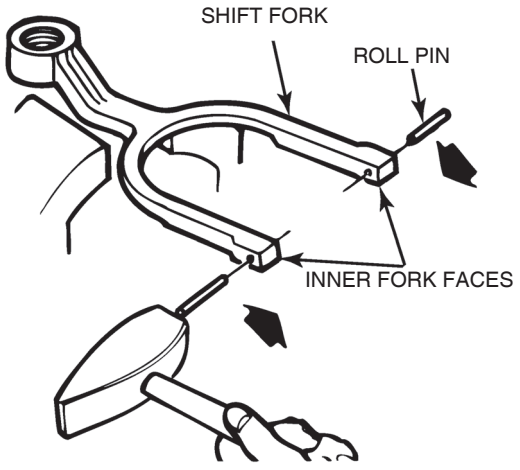


Figure 6.25

2. If the spring stop roll pin was removed from the head of the shift shaft, reinstall the pin at this time.
3. On models without roll pins, snap the fork into position.
4. Apply Loctite 222 threadlocker, to the threads of the shift shaft.
5. Install the shift fork into its correct position in the differential case. Figure 6.26.

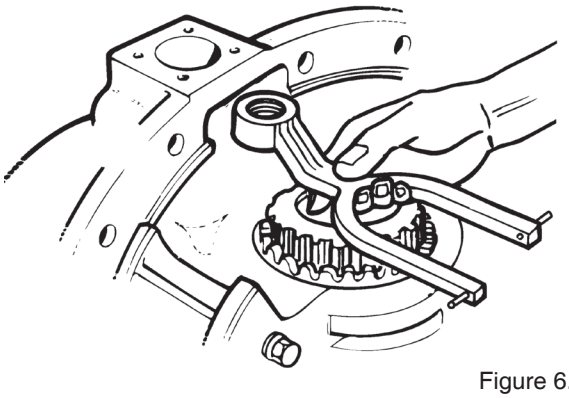


Figure 6.26

6. Hold the shift fork in position. Install the shift shaft spring into the shift shaft opening in the differential, through the shift fork bore and into the bore for the shift shaft spring. Figure 6.27.

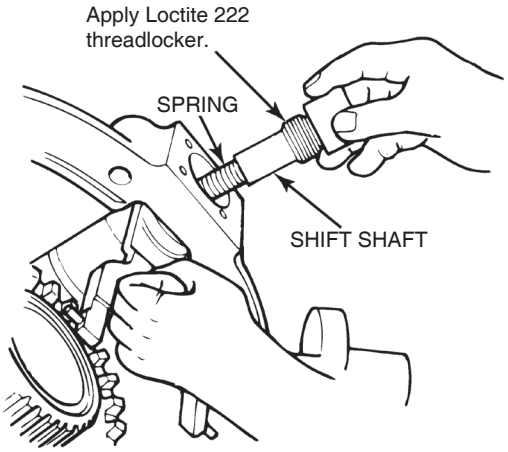


Figure 6.27

7. Slide the shift shaft over the spring. Install the shaft into the shift fork. Tighten it to 20-25 lb-ft (27-34 Nm).T
8. Install the copper gasket or apply silastic sealant, Meritor part number 1199-Q-2981, to the bottom of the cylinder bore. Figure 6.28.

VERSIÓN FIJADA POR TORNILLOS

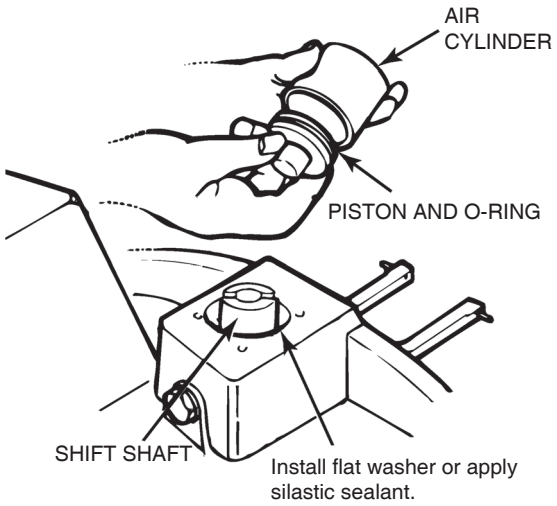


Figure 6.28

9. Lubricate the O-ring with axle lubricant. Install the O-ring into its groove on the piston. Carefully install the piston into the air cylinder. Figure 6.28. Do not damage the O-ring.
10. Install the cylinder into the housing bore. Verify that the pilot journal on the piston is against its bore on the shift shaft. Figure 6.29.

FIXED CAPSCREW VERSION

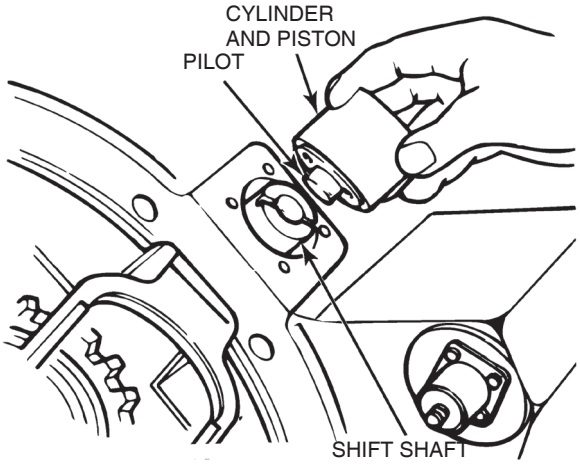


Figure 6.29

11. Install the copper gasket, if used, into its bore on the inside of the cylinder cover. Place the cover into position over the cylinder so that the air intake port will point up when the differential is installed into the housing. Install the cover with the four attaching capscrews and washers. Tighten the capscrews to 4-6 lb-ft (5.5-8.5 N m). Figure 6.30. T.

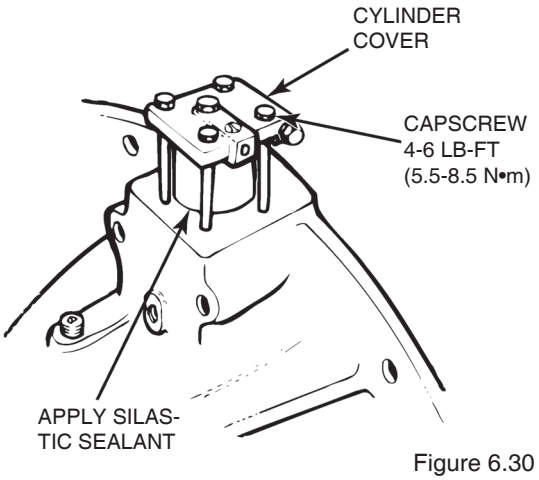


Figure 6.30

12. Apply a bead of silastic sealant, Meritor part number 1199-Q-2981, to the cylinder and differential house.
13. Slide the shift collar into the fork and engage the shift collar splines with the splines of the differential case. Use the manual actuation capscrew to move the shift collar splines onto the differential case splines. See Section 6.
14. Hold the shift collar in the locked or engaged position and tap in the two roll pins in the shift fork ends until they are even with the outer fork faces. Figure 6.31.

FIXED CAPSCREW VERSION

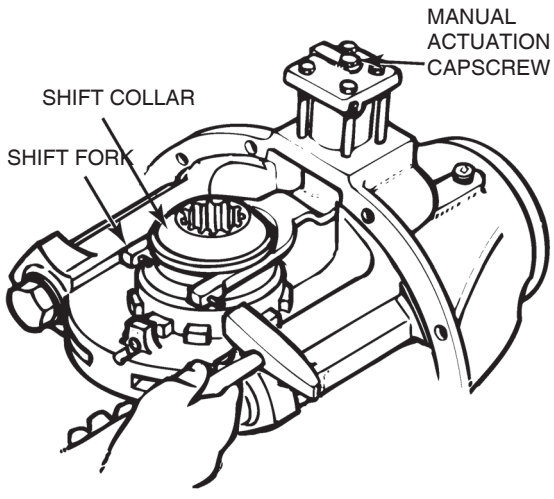


Figure 6.31

15. While the shift collar is still in the locked position, place the sensor switch, with the locknut loosely attached, into its hole.

16. Connect a volt-ohm meter to the sensor switch. Select ohms on the meter. Rotate the switch CLOCKWISE until the meter reading changes from infinity to less than one ohm. Turn the switch one additional turn and tighten the locknut to 25-35 lb-ft (35-45 Nm). T

Differential Lock Assembly Cover Plates

For differentials without the differential lock or air shift, assemble the sensor switch plug and cover plate as follows.

Fixed capscrew DCDL Cover Plate Assemblies

1. Install the washer and plug into the hole for the sensor switch. Tighten the plug from 45-55 lb-ft (60-74 N m). Figure 6.32. T.

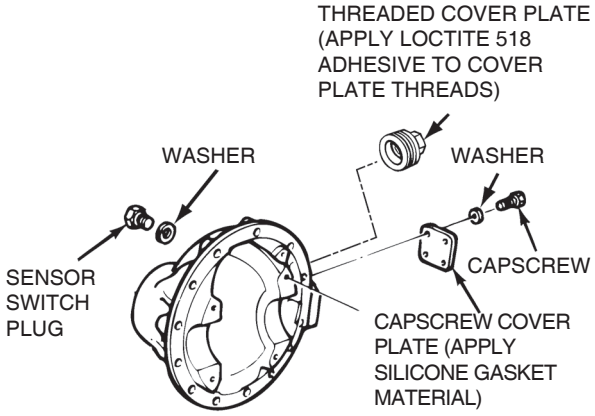


Figure 6.32

2. Apply silicone gasket material to the cover plate mounting surface on the differential. See the Section 4.
3. Install the four washers and capscrews. Tighten the capscrews to 7.4-8.9 lb-ft (10-12 N m). Figure 6.32.

Threaded DCDL Cover Plate Assemblies

1. Apply Loctite 518 liquid adhesive to the plate threads.
2. Install the bolts and washers and tighten the plate into the differential opening to 7.5-9.0 lb-ft (10-12 N m).

Differential Assembly Into the Forward AxleHousing

WARNING

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below.

- Wear safe eye protection.
- Wear clothing that protects your skin.
- Work in a well-ventilated area.;
- Do not use gasoline, or solvents that contain gasoline.

  Gasoline can explode.
- You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.

NOTE:

When you install the differential into the axle housing, the shift collar must be held in the engaged position. This can be done by keeping the air pressure applied to the shift cylinder by using the manual engaging capscrew. See the the procedure in this section. The differential must be in the locked or engaged position to install the differential assembly into the axle housing. After you install the differential into the axle housing, shift the differential into the unlocked or disengaged position to permit the installation of the left-hand axle shaft.

Manual Method

1. Use a cleaning solvent and rags to clean the inside of the axle housing and the differential mounting surface. See the Section 4.
2. Check the axle housing for damage. If necessary, repair or replace the housing. See the Section 4.
3. Check for loose studs in the differential mounting surface. Remove and replace the studs where required. Apply liquid adhesive to the holes. Install and tighten the stud to 150-230 lb-ft (204-312 N m). T
4. The differential lock must be manually engaged before installing the differential into the housing. See the the procedure in this section.

5. Install the differential into the housing. See the Section 5.
6. Install and tighten the differential-to-housing capscrews to the specified torque.
7. Install the right- and left-hand axle shafts. See the Section 5.

NOTE:

When the manual engaging capscrew is removed from the service position in the center of the DCDL actuator, the main differential lock is disengaged.

8. Remove the long manual engaging capscrew from the center of either the fixed capscrew or Threaded DCDL..
9. Clean the plug, gasket, cylinder cover and threaded service position hole in the center of the fixed capscrew DCDL cylinder cover, or in the center of the Threaded DCDL.
10. Verify that the sealing gasket is under the head of the capscrew.
11. Install the manual engaging capscrew into the DCDL storage hole in the fixed capscrew or the Threaded DCDL assembly. Figure 6.33 and Figure 6.34.

A. On a fixed capscrew DCDL shift assembly, remove the short plug and gasket from the storage hole of the DCDL.

   Install the short plug and gasket into the service position hole in the center of the DCDL. Figure 6.33..

B. On a Threaded DCDL shift assembly, install the short screw or plug into the storage hole located in the top of the Threaded DCDL shift assembly. Figure 6.34.

BOLT ON DCDL SHIFT ASSEMBLY

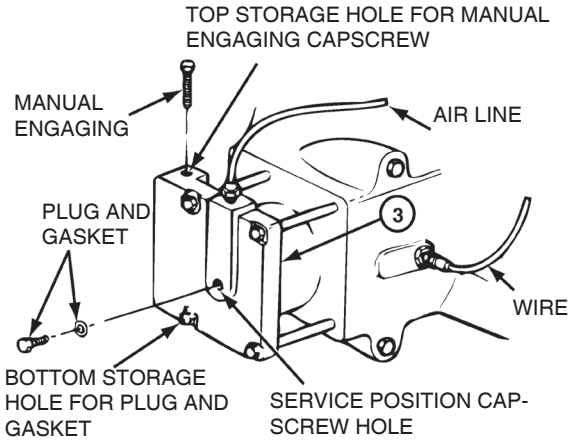


Figure 6.33

THREADED DCDL SHIFT ASSEMBLY

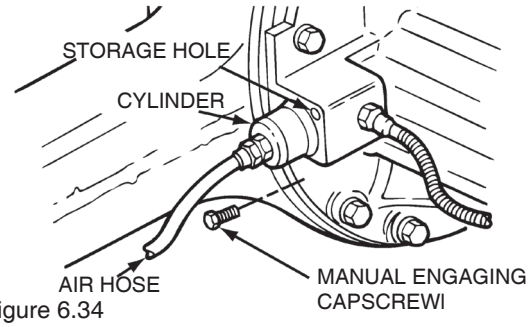


Figure 6.34

12. Tighten the plug to 44-55 lb-ft (60-75 N m). Tighten the manual engaging capscrew to 22-28 lb-ft (30-38 N m) for fixed capscrew DCDL style cylinders and to 7-11 lb-ft (10-15 N m) for Threaded DCDL type reverse shifters. T
13. Connect the vehicle air line to the differential lock actuator assembly.
14. Install the electrical connection on the sensor switch located in the differential, below the actuator assembly.
15. Remove the security support from under the drive axle.Lower the vehicle to the floor.
16. Fill the axle with lubricant. See the Section 7.
17. Proceed to Check the Differential Lock in this section.

Auxiliary Air Supply Method

1. Use a cleaning solvent and rags to clean the inside of the axle housing and the differential mounting surface. See the Section 4.
2. Check the axle housing for damage. If necessary, repair or replace the housing. See the Section 4.
3. Check for loose studs in the differential mounting surface. Remove and replace the studs where required. Apply liquid adhesive to the holes. Install and tighten the stud to 150-230 lb-ft (204-312 N m). T
4. Connect an air line to the main differential lock actuator Figure 6.33 assembly coupling.
5. Supply 120 psi (827 kPa) regulated air pressure through the air line.
6. Verify that the DCDL engaged.

7. Install the differential as s embl y into the housing. See the Section 5.
8. Install and tighten the differential-to-housing capscrews to the specified torque.
9. Install the right- and left-hand axle shafts See the Section 5.
10. Remove the air line coupling from the main differential actuator assembly.
11. Clean the plug, gasket, cylinder cover and threaded service position hole in the center of the fixed capscrew DCDL cylinder cover, or in the center of the Threaded DCDL.
12. Tighten the plug to 44-55 lb-ft (60-75 N m). Tighten the manual engaging capscrew to 22-28 lb-ft (30-38 N m) for fixed capscrew DCDL style cylinders and to 7-11 lb-ft (10-15 N m) for Threaded DCDL type reverse shifters.
13. Connect the vehicle air line to the differential lock actuator assembly.
14. Install the electrical connection onto the sensor switch located in the differential, below the actuator assembly.
15. Remove the jackstand from under the drive axle. Lower the vehicle to the floor.
16. Fill the axle with lubricant. See the Section 7.
17. Proceed to Check the Differential Lock which follows.

Check the Differential Lock

1. Shift the vehicle transmission into neutral. Start the engine to get the system air pressure to the normal level.

WARNING

During DCDL disassembly, when the DCDL is in the locked or engaged position and one of the vehicle's wheels is raised from the floor, do not start the engine and engage the transmission. The vehicle can move and cause serious personal injury and damage to components.

2. Place the differential lock switch in the cab of the vehicle in the unlocked or disengaged position.
3. Drive the vehicle at 5-10 mph (8-16 km/h) and check the differential lock indicator light. The light must be off when the switch is in the unlocked or disengaged position.
4. Continue to drive the vehicle and place the differential lock switch in the locked or engaged position. Let up on the accelerator to remove the driveline torque and permit the shift. The light must be on when the switch is in the locked position.

- If the indicator light remains ON with the switch in the unlocked position: The differential is still in the locked position. Verify that the manual engaging capscrew was removed from the cylinder cover of the DCDL shift assembly. See the the procedure in this section.

DCDL Driver Caution Alert Label

Verify that the driver caution label is installed in the vehicle cab. Figure 6.35. The caution label must be placed in a location that is easily visible to the driver. The recommended location is on the instrument panel, next to the differential lock switch and lock indicator light.

⚠ CUIDADO

For more information on using the lock, see the the vehicle manufacturer's manual

- Engage DCDL only under poor road conditions.
- Do not engage DCDL during downhill operation.
- Do not engage DCDL or operate the vehicle at speeds above 25 mph.

When DCDL is engaged, an "understeer" condition can occur when making turns, so operate the vehicle carefully. When you disengage DCDL, normal steering resumes.

For more information on using the lock, see the the vehicle manufacturer's manual.

Driver Instruction Information Available to Orde

See the the Service Notes page on the front inside cover of this manual to obtain the following publications.

- DCDL Caution Alert Label TP-86101;.
- DCDL Driver Instruction Kit (Contains DCDL labeland technical bulletin) TP-9579;nico), TP-9579;
- Traction Controls for Drive Axles DVD T95125V.

Specifications

For complete information on lubricating drive axles and differentials, refer to Maintenance Manual 1, Lubrication. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

See the Table N, Table O and Table P for information on lubricants, schedules and capacities.

Table N: Lubricant Cross Reference (Viscosity) and Temperature Chart

Meritor Lubrificant Specificacion	Descrption	Cross Reference	Minimum Outside Temperature	Maximum Outside Temperature
O-76-A	Hypoid Gear Oil	GL -5, S.A.E. 85W/140	-10°F (-12,2°C)	1
O-76-B	Hypoid Gear Oil	GL -5, S.A.E. 80W/140	-15°F (-26,1°C)	1
O-76-D	Hypoid Gear Oil	GL -5, S.A.E. 80W/90	-15°F (-26,1°C)	1
O-76-E	Hypoid Gear Oil	GL -5, S.A.E. 75W/90	-40°F (-40°C)	1
O-76-J	Hypoid Gear Oil	GL -5, S.A.E. 75W	-40°F (-40°C)	+35°F(+1,6°C)
O-76-L	Hypoid Gear Oil	GL -5, S.A.E. 75W/140	-40°F (-40°C)	

1 There is no upper limit on these outside temperatures, but the axle sump temperature must never exceed 250°F (+121°C).

Table O: Oil Change Intervals and Specifications for All Rear Drive Axles.1

nitial Oil Change	Not required from january 1993		Construction Transit Bus Refuse Yard Tractor Logging Heavy Haul Mining Oil Field Rescue
Check Oil Level	Every 25,000 miles (40 000 km), or the fleet maintenance interval, whichever comes first.	Every 10,000 miles (16 000 km), once a month, or the fleet maintenance interval, whichever comes first.	Every 5,000 miles (8000 km), once a month, or the fleet maintenance interval, whichever comes first. 2
Petroleum-Based Oil Change on axles with or without a pump and filter system	Every 100,000 miles (160 000 km) or annually, whichever comes first	Every 50,000 miles (80 000 km) or annually, whichever comes first	Every 25,000 miles (40 000 km) or annually, whichever comes first
Syntetic Oil change on axle WITHOUT pump and filter system 3	Every 250,000 miles (400.000 km) or every 3 years, anos, whichever comes first.	Every 100.000 miles (160.000 km) or annually, whichever comes first	Every 50.000 miles (80.000 km) or annually, whichever comes first
Syntetic Oil change on axle WITH pump and filter system 3	Every 500.000 miles (800.000 km)	Every 250,000 miles (400 000 km)	Every 100.000 miles (160.000 km)
Change filter on axle with pump and filter system	Every 100.000 miles (160.000 km)	Every 100.000 miles (160.000 km)	Every 100.000 miles (160.000 km)

1. If NoSPIN® installed differential, check the petroleun based oil or syntetic oil, in the minimum interval of the 40.000 miles (64.000 km) or maximum interval of the 50.000 miles (80.000 km).
2. For continuous cycle operations, check the oil level every 1.000 miles (1.600 km). Add the type and amount of suitable oil to it.
3. This interval applies to approved semi-synthetic and synthetic oils only. For a list of approved extended-drain axle oils, see the TP-9539, Approved Rear Drive Axle Lubricants. To obtain this publication, see the Service Notes page on the front inside cover of this manual.

Tabela P: Tandem and Tridem Rear Drive Axle Oil Capacities

Axle Model Axle Model Differential		Oil Capacity	
		Pints	Liters
RT-34-140	Forward	26,0	12,3
	Rear	35,0	16,6
RT-34-145	Forward	29,6	14,0
	Rear	25,4	12,0
RT-34-145P	Forward	29,6	14,0
	Rear	25,4	12,0
RT-40-140	Forward	30,2	14,3
	Rear	22,8	10,8
RT-40-145	Forward	30,2	14,3
	Rear	25,8	12,2
RT-40-145A	Forward	30,2	14,3
	Rear	25,8	12,2
RT-40-145P	Forward	30,2	14,3
	Rear	25,8	12,2
RT-40-149	Forward	30,2	14,3
	Rear	25,8	12,2
RT-40-149A	Forward	30,2	14,3
	Rear	25,8	12,2
RT-40-149P	Anterior	30,2	14,3
	Rear	25,8	12,2
RT-40-160	Forward	39,1	18,5
	Rear	34,4	16,3
RT-40-160A	Forward	39,1	18,5
	Rear	34,4	16,3
RT-40-160P	Forward	39,1	18,5
	Rear	34,4	16,3
RT-40-169	Forward	39,1	18,5
	Rear	34,4	16,3
RT-40-169A	Forward	39,1	18,5
	Rear	34,4	16,3
RT-40-106P	Forward	39,1	18,5
	Rear	34,4	16,3
RT-44-145	Forward	29,3	13,9
	Rear	25,1	11,9
RT-46-160	Forward	39,1	18,5
	Rear	34,4	16,3
RT-46-160A	Forward	39,1	18,5
	Rear	34,4	16,3
RT-46-106P	Forward	39,1	18,5
	Rear	34,4	16,3
RT-46-169	Forward	39,1	18,5
	Rear	34,4	16,3
RT-46-169A	Forward	39,1	16,3
	Rear	34,4	18,5
RT-46-169P	Forward	39,1	18,5
	Rear	34,4	16,3
RT-46-164-EH	Forward	38,1	18,0
	Rear	33,2	15,7
RT-46-164P	Forward	38,1	18,0
	Rear	33,2	15,7
RT-46-16H EH	Forward	38,1	18,0
	Rear	33,2	15,7
RT-46-16 HP	Forward	38,1	18,0
	Rear	32,2	15,7
RT-48-180[2]	Forward	61,1	28,9
	Rear	36,8	17,4
RT-48-380[2]	Forward	61,1	28,9
	Rear	63,6	30,1
RT-50-160	Forward	38,1	18,0
	Rear	33,2	15,7
RT-50-160P	Forward	38,1	18,0
	Rear	33,2	15,7
RT-52-160	Forward	44,1	20,9
	Rear	41,2	19,5
RT-52-160P	Forward	44,1	20,9
	Rear	41,2	19,5
RT-52-180[2]	Forward	56,1	26,5
	Rear	36,1	17,1
RT-52-185	Forward	56,1	26,5
	Rear	36,1	17,1
RT-52-380[2]	Forward	56,1	26,5
	Rear	58,2	27,5
RT-58-180[2]	Forward	56,1	26,5
	Rear	36,1	17,1
RT-58-185	Forward	56,1	26,5
	Rear	36,1	17,1
RT-58-380[2]	Forward	56,1	26,5
	Rear	58,2	27,5
RT-70-380[2]	Forward	54,4	25,7
	Rear	53,1	25,1
RZ-166	Axle 1	39,1	18,5
	Axle 2	39,1	18,5
	Axle 3	34,4	16,3
RZ-186	Axle1	56,1	56,5
	Axle 2	39,1	18,5
	Axle 3	34,4	16,3
RZ-188	Axle 1	56,1	56,5
	Axle 2	56,1	26,5
	Axle 3	36,1	17,1

[1] Oil capacities are for standard sizes and shafts that have been measured at various angles of inclination of the pinion. The amounts listed include oil to both ends. Oil capacities will be altered if the measure or the pinion angle are different.
[2] Forward differential with oil pump system.

Torque Specifications

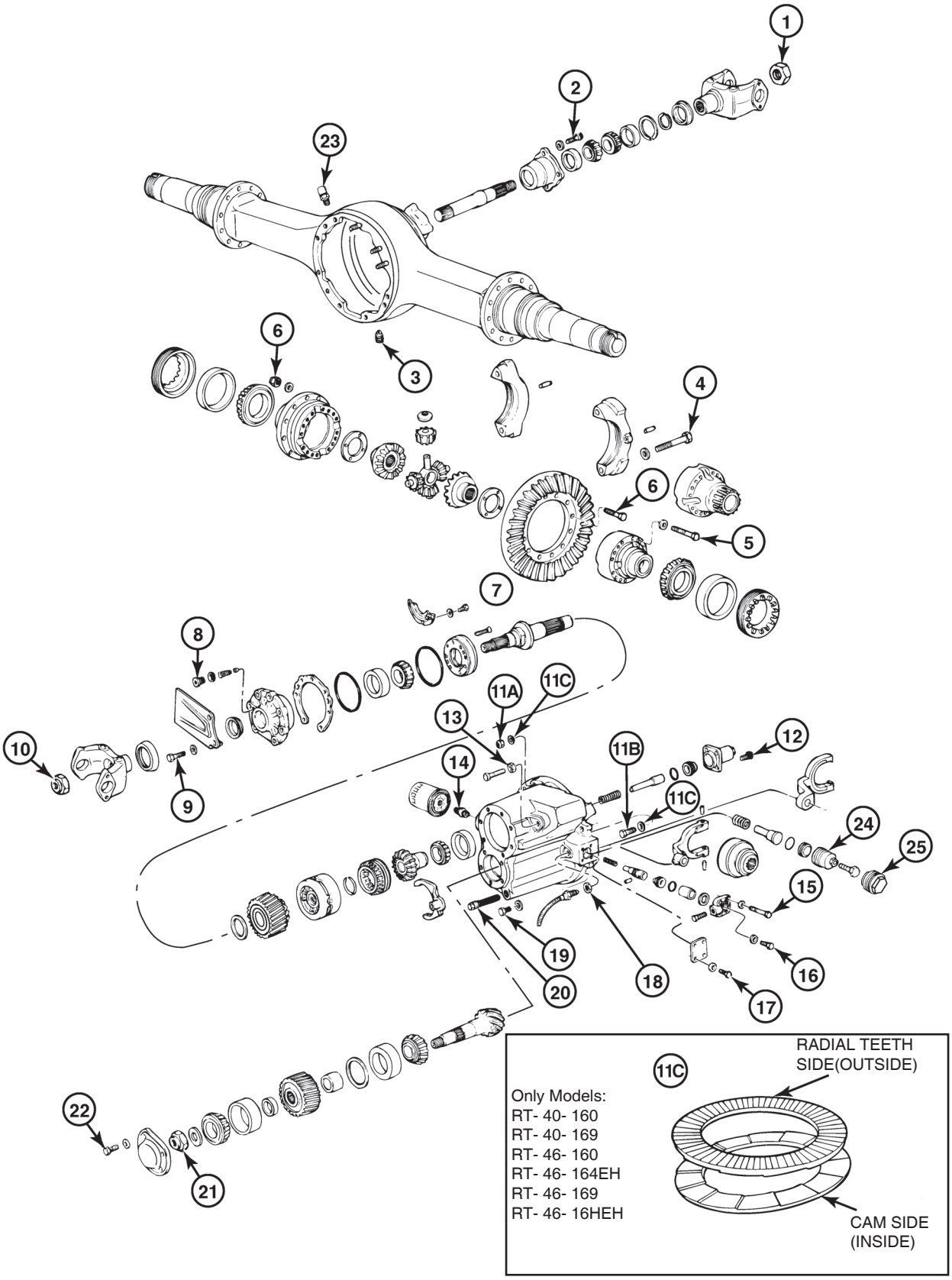


Table Q: General Torques Specifications

Ítem	Description	Axle Application	Size	Torque Value	
				Lb-Ft	N.m
1	Output Fork Nut	See the Table R, Table S or Table T			
2	Output Bearing Cage to differential Capscrew	ALL	0,38”-16	35-50	47-68
3	Drain and Fill Plugs 1	ALL	0,75”-14	35 Min	47,5 MIn
4	Bearing Caps Capscrew	140 e 145	M30 x 2,5	320-400	430-540
		160	M22 x 2,5	480-600	650-810
5	Main Differential Case Halves Capscrew	140 e 145	M12 x 1,75 Class 12,9 Std. Cab. Hecag	105-125	143-168
		140 e 145,	M12 x 1,75 Class 10,9	75-95	100-127
		160	M16 x 2,0 Class 12 Std. Cab. Hecag	220-310	300-420
6	Ring Gear-to-Case Nut and Bolt	145	M16 x 1,5 Class 10 Std. Cab. Hecag	160-210	220-290
		160	M16 x 1,5 Class 10 Std. Cab. Hecag	196-262	265-355
7	Oil Pump-to-Input Bearing Cage Capscrew	145 e 160	MB x 1,25	22-33	30-45
8	Pressure Relief Valve Plug	145-160	M12 x 1,75	75-95	100-129
9	Input Bearing Cage to differential Capscrew	ALL	M12 x 1,75	75-95	100-129
10	Input Fork Nut	See Table R, Table S and Table T			
11A	Differential -to-Axle Housing Nut	ALL	5/8”-18	150-230	203-312
11B	Differential -to-Axle Housing Capscrew	All — Standard or Nylon Fasteners	5/8”-11	150-230	203-312
11C	Nord-Lock Washer	RT-40-160 RT-40-169 RT-46-160 RT-46-164EH RT-46-169 RT-46-16HEH	–	210	285
12	Air Shift Cylinder-to-Differential Capscrew — Inter-Axle Differential	ALL	M6 x 10	7-12	10-18
13	Air Shift Adjusting Screw Jam Nut — Inter-Axle Differential	ALL	M6 x 1,5	40-55	55-75
14	Oil Filter Adapter-to-Differential House	145 e 160	M22 x 2,5	40-60	55-80
15	Main Differential Lock Cover Capscrew	ALL	M x 1,0	7-12	10-16
16	Manual Actuation Plug — Main Differential Lock	ALL	M10 x 1,5	15-25	20-35
17	Cover Capscrew — Axles without Main Differential Lock	ALL	M6 x 1,0	7-12	10-16

1 – Torque minimum. Tighten until only a trickle of thread is visible.

Tabela Q: General Torques Specifications (Continuation)

Ítem	Description	Axle Application	Size	Value Torque	
				Lb-Ft	N.m
_	Air Line-to-Main Differential Lock Cover Adapter	ALL	M12 x 1,5	30-40	22-30
18	Main Differential Lock Sensor Jam Nut	ALL	M16 x 1,0	35-45	25-35
19	Plug — Axles without Main Differential Lock Sensor	ALL	M16 x 1,0	60-75	45-55
20	Oil Screen and Plug differential Assembly	ALL	M26 x 1,5	65 Min	48 Min
21	Drive Pinion Nut	ALL	M50 x 2,0	1625 x 2035	1200 x 1500
22	Drive Pinion Cover-to-Differential cage Capscrew	145-160	M12 x 1,75	75-95	100-129
23	Breather Vent	ALL	3/18”-18	27 Min	20 Min
_	Heat Indicator Plug	ALL	1/2”-14	34 Min	25 Min
_	Axle Shaft-to-Wheel Hub Capscrew	ALL	1/2”-13	115-156	85-115
_	Axle Shaft Stud Nut	ALL	Plain Nut 3/4”-16	420-542	420-542
			Locknut 3/4”-16	366-475	270-350
24	Screw-In DCDL Assembly Housing	Current DCDL Option	M60-2,0	109-136	80-100
25	Screw-In DCDL Plug or Cap	Non-DCDL Options	M60-2,0	109-136	80-100
26	Adjusting Rings Capscrews	145 e 160	_	28-30	21-28

1 - Torque minimum. Tighten until only a trickle of thread is visible

Input and Output Fork Pinion Nut Fastener Torque Specifications

Tabela R: Single Axles

Axle Models	RS-120 RS-125 RS-140	RS-145	RS-160 RS-161 RS-185 RS-186	RS-210 RS-220 RS-230	RS-240	RS-380
Differential input Fork	1000 - 1245N.m (740-920 lb-ft)	1250 - 1535 N.m (920 -1130 lb-ft)	1350 - 1670 Nm (1000 - 1230 lb-ft)	1250 - 1535 N.m (740-920 lb-ft)	1250 - 1535 N.m (920-1130 lb-ft)	1085 - 1496 N.m (800 - 1100 lb-ft)
Fastener Size	M32 x 1,5	M39 x 1,5	M45 x 1,5	M32 x 1,5	M39 x 1,5	1-1/2- 12 UNF

Tabela S: Mounted on Tandem Axles (Track)

Axle Models	RT - 140	RT - 145 RT - 149	RT - 160 RT - 164 RT - 169	RT - 185	RT - 380 Com IAD	RT - 380 Sem IAD
1º Differential Input Fork	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)	1224 - 16332 N.m (900-1200 lb-ft)
Fastener Size	M45 x 1,5	M45 x 1,5	M45 x 1,5	1 - 3/4 - 12 UN	1 - 3/4 - 12 UN	1 - 3/4 - 12 UN
1º Differential Output Fork	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)
Fastener Size	M32 x 1,5	M39 x 1,5	M39 x 1,5	1-1/2-12 UNF	1-1/2-12 UNF	1-1/2-12 UNF
2º Differential Input Fork	1000 - 1245 Nm (740-920 lb-ft)	1250 - 1535 N.m (920-1130 lb-ft)	1350 - 1670 N.m (1000-1230 lb-ft)	1350 - 1670 N.m (1000-1230 lb-ft)	1085 - 1496 N.m (800-1100 lb-ft)	1085 - 1496 N.m (800-1100 lb-ft)
Fastener Size	M32 x 1,5	M39 x 1,5	M45 x 1,5	M45 x 1,5	M39 x 1,5	1-1/2-12 UNF

Tabela T: Axles Tridem

Axle Models	RZ - 164	RZ - 166	RZ - 198	RZ - 198
1º Differential Input Fork	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)
Fastener Size	M45 x 1,5	M45 x 1,5	1 - 3/4 - 12 UN	1 - 3/4 - 12 UN
1º Diffrential Output Fork	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)
Fastener Size	M39 x 1,5	M39 x 1,5	1-1/2-12 UNF	1-1/2-12 UNF
2º Differential input fork	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)	815 - 1085 N.m (600-800 lb-ft)
Fastener Size	M45 x 1,5	M45 x 1,5	M45 x 1,5	1 - 3/4 - 12 UN
2º Differential Output Fork	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)	610 - 880 N.m (450-650 lb-ft)
Fastener Size	M39 x 1,5	M39 x 1,5	M39 x 1,5	1-1/2-12 UNF
3º Differential Input fork	1250 - 1535 N.m (920-1130 lb-ft)	1350 - 1670 N.m (1000-1230 lb-ft)	1350 - 1670 N.m (1000-1230 lb-ft)	1350 - 1670 N.m (1000-1230 lb-ft)
Fastener Size	M39 x 1,5	M45 x 1,5	M45 x 1,5	M45 x 1,5

Table U: Drive Pinion Bearings — Preload (See to Section 5)

Specification	New bearings 5-45 lb-in (0.56-5.08 N.m) Used bearings in good condition 10-30 lb-in (1.13-3.39 N.m)
Adjustment	Preload is controlled by the thickness of the spacer between bearing cones. To increase preload, install a thinner spacer. To decrease preload, install a thicker spacer

Tabela V: Drive Pinion — Depth in Differentia (See to Section 5)

Specification	Install the correct amount of shims between the inner bearing cap of the drive pinion and the differential. To calculate, use the old shim pack thickness and the new and old pinion cone numbers.
Adjustment	Change the thickness of the shim pack to get a good gear tooth contact pattern

Table W: Hypoid Gear Set — Tooth Contact Patterns (Hand Rolled) (See to Section 5)

Specification	Toward the toe of the gear 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 cone of the drive pinion and the differential and by ring gear backlash. To move the contact pattern lower, increase the thickness of the shim pack between the inner bearing cup of the drive pinion and the differential. To move the contact pattern higher, decrease the thickness of the shim pack between the inner bearing cup of the drive pinion and the differential. To move the contact pattern toward the toe of the tooth, decrease backlash of the ring gear. To move the contact pattern toward the heel of the tooth, increase backlash of the ring gear.

Table X: Main Differential Bearings — Preload (See to Section 5)

Specification	15-35lb-in (1.7-3.9N m) orExpansion between bearing caps 140 and 145 Series — 0.003-0.009-inch (0.08-0.22mm) 160 Series — 0.006-0.013-inch (0.15-0.33mm)
Adjustment	Preload is controlled by tightening both adjusting rings after zero end play is reached.

Table Y: Main Differential Gears — Rotating Resistance (See to Section 5)

Specification	68 N.m (50 lb-ft) Torque máximo verificado para girar un planetario

Table Z: utput Bearing — Clearance and Preload (See to Section 5)

Clearance input axle	0.050-0.200 mm (0.002-0.008”)

Tabela AA: Output Bearing — Clearance and Preload (See to Section 5)

Specification	0.025-0.102 mm (0.001-0.004”) Holgura en el Rodamiento.
Adjustment	Clearance is controlled by the size of the snap ring in the output bearing cage. Increase end play by installing a thinner snap ring. Decrease end play by installing a thicker snap ring. NOTE: If the end play on the output bearing measures ZERO, a thinner snap ring is required.

Tabela AB: Ring Gear — Backlash (See the Section 5)

Specification	145 Series: Range: 0.008-0.018-inch (0.20-0.460mm)Backlash setting for new gear sets: 0.012-inch (0.300mm) 160 Series: Range: 0.010-0.020-inch (0.25-0.510mm)Backlash setting for new gear sets: 0.012-inch (0.300mm)
Adjustment	Backlash is controlled by the position of the ring gear. Change backlash within specifications to get a good tooth contact pattern. To increase backlash, move the ring gear away from the drive pinion To decrease backlash, move the ring gear toward the drive pinion.

Tabela AC: Ring Gear — Runout (See the Section 5)

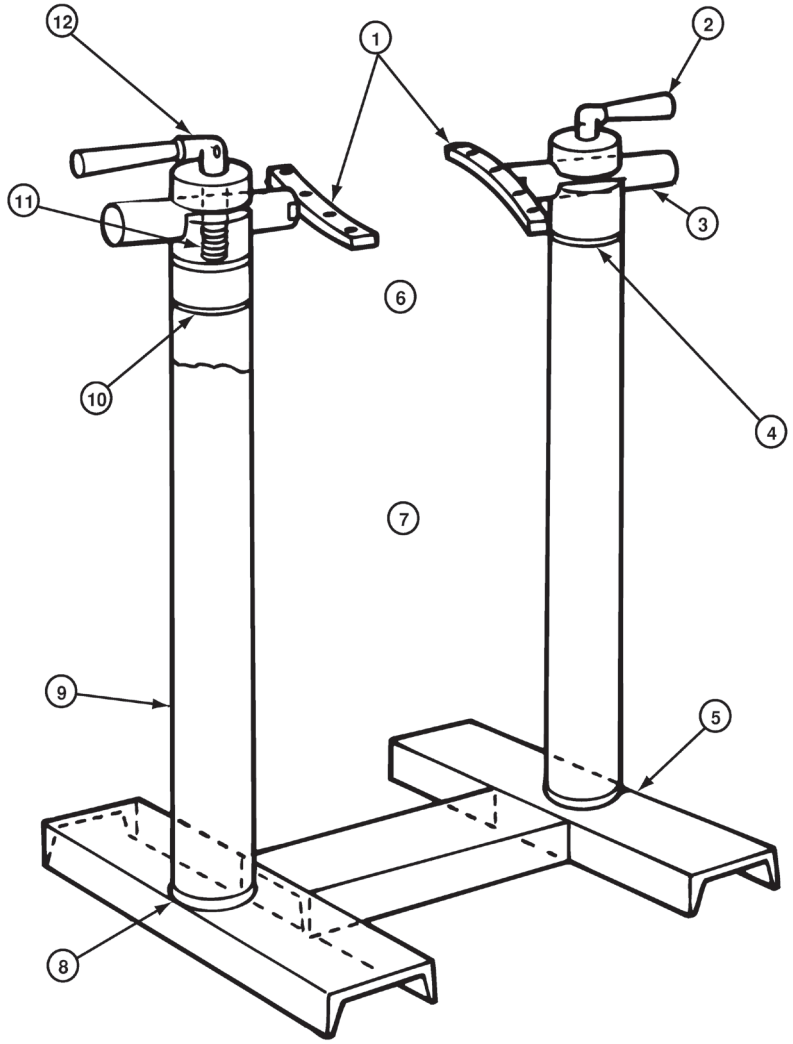
Specification	0.008-inch (0.200mm) Ring gear maximum observed with main differential case in the difcoroa montada na caixa dos satélites e na caixa do differential.

Tabela AD: Sensor Switch — Installation (With Differential Lock Only) (See the Section 6)

Adjustment	Shift the differential to the locked position. Tighten the sensor switch in the differential until the test light illuminates. Tighten the sensor switch one additional turn. Tighten the jam nut to the specified torque.

Specifcations

Mounting Bracket to Differential Repairs



1 - PLATES 8” (203,2 mm) Long X 3/4”(19,05 mm) THICK X 1-1/4” 931,75 mm) Wide With A Tongue To Fit Slot In Bar Weld Plates To Bar

2 - -Handle 7”(177,8 mm) Long With Slot In One End To Fit Clamp Screw

3 - Bar 2”(50,8 mm) Diameter X 9” (228,6 mL) ong With One End Slotted To Fit Plate

4 - Weld All Around After Pressing Plug In Pipe

5 - Weld

6 - Shape And Size Of Holes To Fit Differential

7 - 23-1/2” (596,9 mm) Center To Center Of Pipe

8 - Chamfer End Of Pipe For Welding

9 - 4”(101.6) Diameter Pipe

10 - Plug 4” Diameter X 7” (177,8 mm) Long With One End Turned 3” (76,2 mm) Long To Fit Pipe. Drill 2” (50,8 mm) Hole And Mill 3/16” Wide Slot 2” (50,8mm) From Top

11 - Screw 3” (88,9 mm) Long X 5/8” (15,96 mm) Diameter With Flats On End To Fit Handle And 2-1/2” (63,5 mm) Length Of Thread On Other End

12 - Drill 3/8” (9,5 mm) Hole Through Handle And Screw

To obtain a repair stand, see to the Service Notes page on the front of this manual.

How to Make a Fork Tool to Detencion

1. Measure dimensions A and B of the fork you are servicing. Figure 10.1.

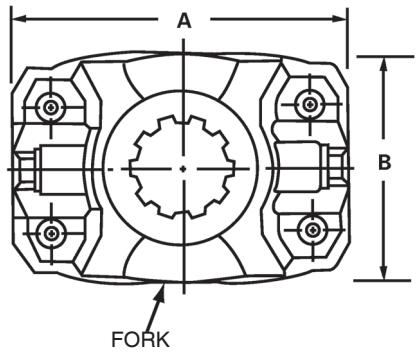


Figure 10.1

2. Calculate dimensions C and D of the fork bar by adding 0.125-0.250-inch to dimensions A and B of the fork. Figure 10.2.

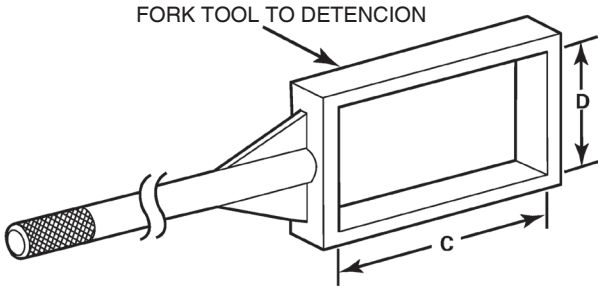


Figure 10.2

WARNING

Wear safe clothing and eye protection when you use welding equipment. Welding equipment can burn you and cause serious personal injury. Follow the operating instructions and safety procedures recommended by the welding equipment manufacturer

3. To make the box section, cut and weld 1-inch x 2-inch mild steel square stock according to dimensions C and D. Figure 10.2.
4. Cut a 1,20 mt x 1.25-inch piece of mild steel round stock to make the fork bar handle. Center weld this piece to the box section. Figure 10.2.

- To increase fork bar rigidity: Weld two angle pieces onto the handle. Figure 10.2.

Unitized Pinion Seals and Seal Tools

See the Table AE and Figure 10.3 for information on unitized pinion seals and seal tollss. To obtain Meritor seal tools KIT 4454, see to the Service Notes page on the front of this manual.

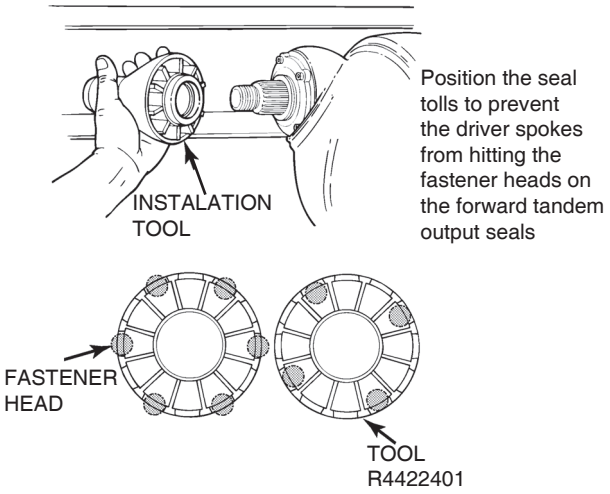


Figure 10.3

Table AE: Unitized Pinion Seals and Seal Tools

Single Models	Tandem Models	Unitilized Pinion Seal	Seal position	Seal Tools	Diameter Seat Sealer in the Fork
MX-21-160	RT-34-144 /P	A-1205-R-2592	Shaft iinput entry -Model 145 fron November 1993 to present	R4422402	3.250 / 3.255
MX-23-160R	RT-34-145 /P				
RF-16-145	MT-40-143				
RF-21-160	RT-40-145 /A /P	A-1205-P-2590	Shaft output previous – shaft input previous models 145 before November 1993 with Seal A- 1205-F-2424	R4422401	3.000 / 3.005
RF-22-166	RT-40-149 /A /P				
RF-23-185	RT-44-145 /P				
RS-17-145	RT-40-160 /A /P				
RS-19-145	RT-40-169 /A /P	A-1205-N-2588	Input Tandem Rear Axle and Rear Axles Single — Models 145	R4422401	3.000 / 3.005
RS-21-145	RT-46-160 /A /P				
RS-21-160	RT-46-169 /A /P	A-1205-Q-2591	Input Tandem Rear Axle and Rear Axles Single — Models 160/164/185	R4422402	3.250 / 3.255
RS-23-160 /A	RT-46-164EH /P				
RS-23-161 /A	RT-46-16HEH /P				
RS-25-160 /A	RT-50-160 /P				
RS-23-186	RT-52-185[1]				
RS-26-185	RT-58-185[1]				
RS-30-185					

1 INPUT AN PREVIOUS SHAFT ONLY.

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.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result. Before you service a spring chamber, carefully follow the manufacturer's instructions to compress and lock the spring to completely release the brake. Verify that no air pressure remains in the service chamber before you proceed. Sudden release of compressed air can cause serious personal injury and damage to components.

Engage the parking brake to prevent the vehicle from moving before you begin maintenance or service procedures that require you to be under the vehicle. Serious personal injury can result.

CUIDADO

IF THE VEHICLE IS EQUIPPED WITH A FRONT DRIVE AXLE, TOW THE VEHICLE FROM THE FRONT, WITH THE FRONT WHEELS OFF THE GROUND. IF THIS IS NOT POSSIBLE, YOU MUST REMOVE THE FRONT DRIVE SHAFT BEFORE TOWING. DAMAGE TO COMPONENTS CAN RESULT

Do not use a chisel or wedge to loosen the axle shaft and tapered dowels. A chisel or wedge can result in damage to the axle shaft, the gasket and seal, and the axle hub.

NOTE:

For complete towing information, refer to Technical Bulletin TP-9579, Driver Instruction Kit. To obtain this publication, see the Service Notes page on the front this manual.

These instructions supersede all other instructions for the purpose of transporting vehicles for service or new vehicle, including those contained in Meritor maintenance manuals..

When transporting a vehicle with the wheels of one or both drive axles on the road, it is possible to damage the axles if the wrong procedure is used before transporting begins. Meritor recommends that you use the following procedure:

Type of Axle

Forward Tandem Axle, with Driver- Controlled Main Differential Lock (DCDL — Screw-In DCDL Shift Assembly) and with Inter-Axle Differential (IAD) Before Towing or Drive-Away

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from rolling.
2. Apply the vehicle parking brakes using the switch inside the cab of the vehicle.
3. Shift the transmission into neutral and start the vehicle's engine.
4. Shift the DCDL to the unlocked or disengaged position using the switch inside the cab of the vehicle. The indication light in the cab will go off. in the cab will go off.
5. Stop the engine.
6. Remove the stud nuts or capscrews and the washers from the flange of the axle shaf. Figure 11.1.

Tabela AF

Single Axle	Remove the left side axle shaft, inner side of the road	
Tandem Axles	Front Axle	Remove the right side axle shaft, outer side of the road
	Rear axle	Remove the left side axle shaft inner of the road

7. Release conical washers, if used, of the flange of the axle shaf. Figure. FIGURE 11.1.

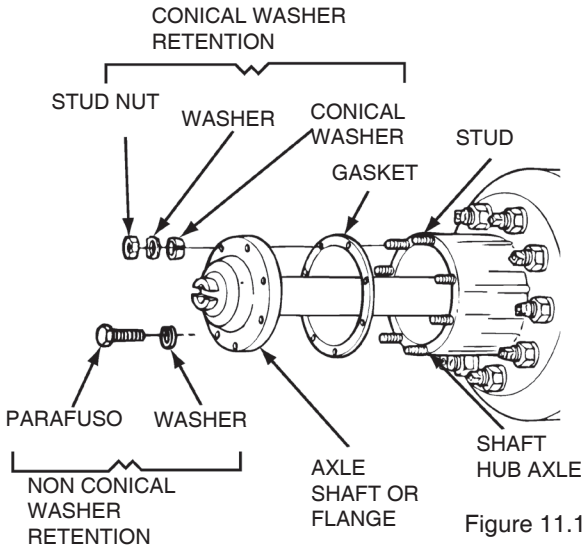


Figure 11.1

8. Identify each axle shaft to be removed from the axle assembly so they can be installed in the same location after transporting or repair is completed.
9. Remove the conical washers, the axle shafts and gaskets, if used. Figure 11.1.
10. Desconecte a mangueira de ar do cilindro de acionamento do mecanismo de bloqueio. FIGURE 11.2

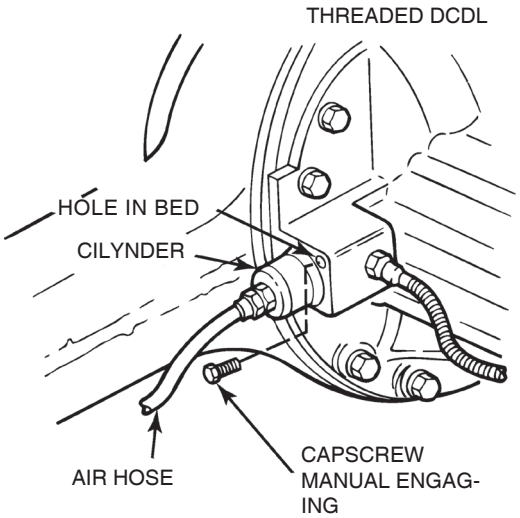


Figure 11.2

11. Remove the manual engaging capscrew from the storage hole. The storage hole of threaded shift assemblies is located in the shift tower of the differential, next to the cylinder. FIgure 11.2.
12. Lock or gear the main differential using the manual engaging capscrew. See the Section 6.
13. Remove the remaining axle shaft(s) as necessary from the axle(s) that will remain on the road when the vehicle is transported
14. Install a cover over the open end of each hub where an axle shaft was removed. This will prevent dirt from entering the bearing cavity and minimize loss of lubricant

NOTE:

If an air supply will be used for the brake system of the transported vehicle, continue with Steps 15 and 16, otherwise continue with Step 17.

15. Connect an auxiliary air supply to the brake system of the vehicle that is being transported. Before moving the vehicle, charge the brake system with the correct amount of air pressure to operate the brakes. Refer to the instructions supplied by the manufacturer of the vehicle for procedures and specifications. If an auxiliary air supply is not used, continue with Step 17.
16. When the correct amount of air pressure is in the brake system, release the parking brakes of the vehicle that is being transported. Step 17 is not required.
17. If there are spring or parking brakes on the axle(s) that will remain on the road when the vehicle is transported, and they cannot be released by air pressure, manually compress and lock each spring so that the brakes are released. See the manufacturer's instructions.

Towing or Drive-Away

1. If an auxiliary air supply was used, apply the vehicle parking brakes using the switch inside the cab of the vehicle. If an auxiliary air supply was not used, begin with Step 2.

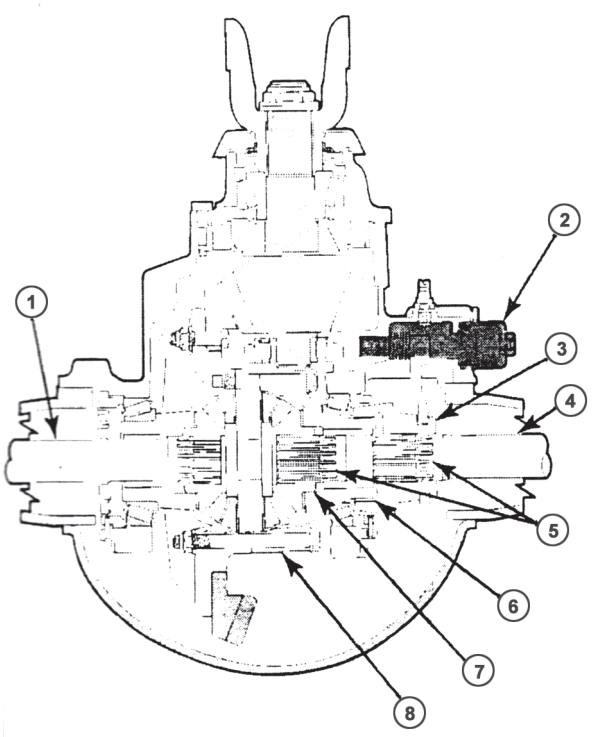
2. Apply the vehicle spring or parking brakes by manually releasing each spring that was compressed before begin to transport. See the vehicle manufacturer's instructions.
3. Disconnect the auxiliary air supply, if used, from the brake system of the vehicle that was transported. Connect the vehicle's air supply to the brake system.
4. Remove the covers from the hubs.

NOTE:

Install the axle shaft(s) indicated in Table AG. These Axle shafts have a double row of splines that engage with the splines of the side gear and shift collar in the differential case. FIGURE 11.3.

5. Install the gasket, if used, and axle shaft into the axle housing and differential in the same location. The gasket and flange of the axle shaft must be flat against the hub. Rotate the axle shaft or the driveline as necessary to align the splines and the holes in the flange with the studs in the hub. Figure 11.1.

SINGLE AXLE OR REAR AXLE OF TANDEM SHOWN WITH SCREW-IN DCDL SHIFT ASSEMBLY AND SHOWN IN THE LOCKED OR ENGAGED POSITION



1 - LEFT-HAND, ROADSIDE, AXLE SHAFT
2 - SHIFT ASSEMBLY
3 - SHIFT COLLAR
4 - RIGHT-HAND, CURBSIDE, AXLE SHAFT
5 - DOUBLE ROW OF SPLINES
6 - SHIFT COLLAR AND DIFFERENTIAL CASE SPLINES ENGAGED OR LOCKED
7 - SIDE GEAR
8 - DIFFERENTIAL CASE

Table AG

Single Axle	Remove the left side axle shaft inner side of the road	
Tandem Axle	Front Axle	Remove the right side axle shaft, outer side of the road
	Rear Axle	Remove the left side axle shaft, inner inside of the road

6. Install the conical washers, if used, over each stud and into the tapered holes of the flange.
7. Install the washers and capscrews or stud nuts. Determine the size of the fasteners and tighten the capscrews or nuts to the corresponding torque value shown in Table AH.

Table AH

Type of Fastener	Thread Size	Tandem Axle
Capscrew	0,31"-24 0,50"-13	0,24-33 (18-24) 115-156 (85-115)
Stud Nuts/Plain Nut	0,44"-20 0,50"-20 0,56"-18 0,62"-18 0,75"-16	68-102 (50-75) 102-156 (75-115) 149-224 (110-165) 203-312 (150-230) 420-542 (310-400)
Locknut	0,44"-20 0,50"-20 0,56"-18 0,62"-18 0,75"-16	54-88 (40-65) 65-100 (88-136) 136-197 (100-145) 176-258 (130-190) 366-475 (270-350)

8. Unlock or disengage the DCDL by removing the manual engaging capscrew from the shift assembly.
9. Install the manual engaging capscrew into the storage hole. The storage hole of threaded shift assemblies is located in the shift tower of the differential next to the cylinder. Tighten the capscrew to 15-25 lb-ft (20-35 N m). Figure11.2. T
10. Connect the air hose to the shift cylinder. Tighten the air hose to 22-30 lb-ft (30-40 Nm). T
11. Install the remaining axle shaft into the axle housing and differential
12. Check the lubricant level in the axles and hubs where the axle shafts were removed. Add the correct type and amount of lubricant if necessary. See the Section 7.

Previous Tandem Axle, with Driver-Controlled Main Differential Lock (DCDL — Bolt-On DCDL Shift Assembly) and with Inter-Axle Differential (IAD)

Before Towing or Drive-Away

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from rolling.
2. Apply the parking brake using the switch inside the cab of the vehicle.
3. Shift the transmission into neutral and start the vehicle's engine.
4. Shift the DCDL to the unlocked or disengaged position using the switch inside the cab of the vehicle. The indicator light in the cab will go off.
5. Stop the engine.

NOTE:

Remove in this point, only axle shaft (s) show (s) in table AI, that will remain on the road when the vehicle is transported.

6. Remove the stud nuts or capscrews and the washers from the flange of the axle shaf. FIGURE 11.4.

Table AI

Single Axles	Remove de left side axle shaft inner side of the road	
Tandem Axles	Front Axle	Remove the right side axle shaft, outer side of the road
	Rear Axle	Remove the left side axle shaft, inner inside of the road

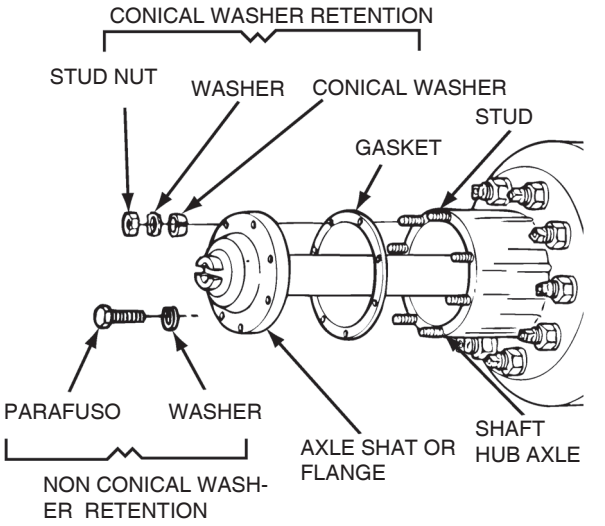


Figure 11.4

7. Loosen conical washers , from the flange of the axle shaf,if used. Figure 11.4. See the Section 3.
8. Identify each axle shaft to be removed from the axle assembly so they can be installed in the same location after transporting or repair is completed.
9. Remove the conical washer, gasket, IF used, and axle shaft Figure 11.4.
10. Remove the manual engaging capscrew from the storage hole. The storage hole of threaded shift assemblies is located in the shift tower of the differential, next to the cylinder. Figure 11.5.

BOLT ON SHIFT ASSEMBLY

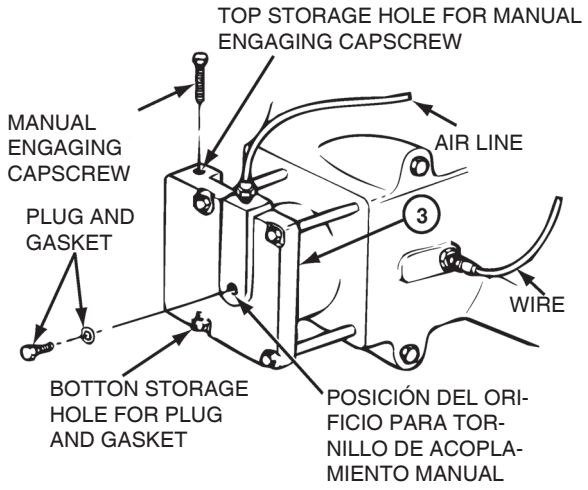


Figure 11.5

11. Remove the plug and gasket from the storage hole. Install the plug and gasket into the threaded hole in the center of the shift cylinder cover. Tighten to 15-25 lb-ft (20-35 Nm). Figure 11.5. T
12. Lock or engage the main differential Cage using using one of the following methods: pressurized air method or manual engaging method
13. Lock or engage the main diferential cage using the pressurized air method.

A. Install the manual engaging capscrew into the threaded hole in the center of the cylinder. Turn the capscrew to the right 3 or 5 laps. FIGURE 11.6.
B. Shift the transmission into neutral and start the vehicle's engine. Keep the engine idling to increase the air pressure in the system. Does not release the parking brake.
C. Shift the main differential Cage to lock or engaged using the switch inside the cab the vheicle. When differential is locked, the indicator light in the cab will go on.

- If the indicator light will go off a, turn manually the driveline or IAD until main differential Cage be locked and the indicator light will go on.

NOTE:

When the locking ring is completely engaged with the main differential Cage splines, the differential is locked and the driveline do not be rotate. Figure 11.7.

D. While the differential is held locked position by air pressure, rotate the manual engaging capscrew to right until you feel resistance against the piston Stop to rotate the capscrew.
E. Place the system switch lock of the main differential cage in the position unlocked or disengagedo.
F. Stop the engine. Continue from step 15.

BOLT-ON SHIFT ASSEMBLY

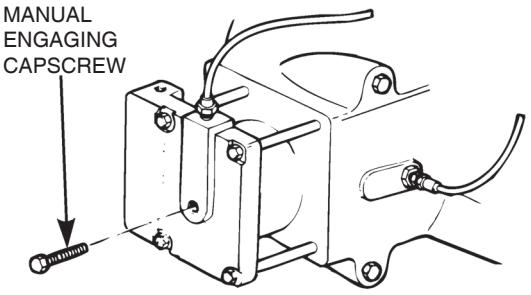
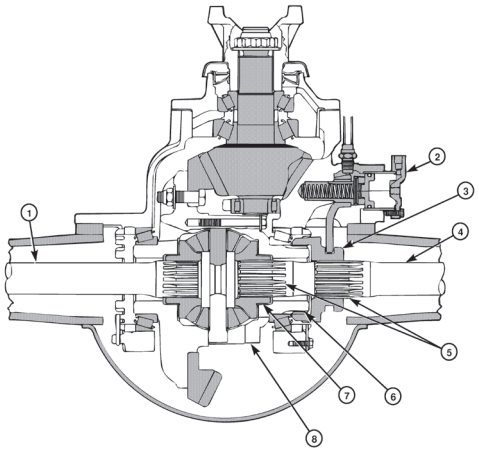


Figure 11.6

SINGLE AXLE OR REAR AXLE OF TANDEM SHOWN WITH BOLT-ON DCDL SHIFT ASSEMBLY AND SHOWN IN THE LOCKED, ENGAGED POSITION



1 - LEFT-HAND, ROADSIDE, AXLE SHAFT
2 - SHIFT ASSEMBLY
3 - SHIFT COLLAR
4 - RIGHT-HAND, CURBSIDE, AXLE SHAFT
5 - DOUBLE ROW OF SPLINES
6 - SHIFT COLLAR AND DIFFERENTIAL CASE SPLINES ENGAGED OR LOCKED SIDE GEAR
7 - SIDE GEAR
8 - DIFFERENTAIL CASE

14. Lock or engaged the main differential Cage using the manual engaging methoid.

A. Install the manual engaging capscrew into the threaded hole in the center of the cylinder. FIGURE 11.6.

CAUTION

WHEN YOU TURN THE CAPSCREW IN STEP D AND YOU FEEL A HIGH RESISTANCE, STOP TURNING THE CAPSCREW. A HIGH RESISTANCE AGAINST THE CAPSCREW INDICATES THAT THE SPLINES OF THE SHIFT COLLAR AND DIFFERENTIAL CASE ARE NOT ALIGNED. DAMAGE TO THE THREADS OF THE CYLINDER AND CAPSCREW WILL RESULT.

B. Turn the capscrew to the right until the head is approximately 0.25- to 0.50-inch (6.4 to 12.7 mm) from the cylinder. The capscrew is now in the service position and the shift collar is locked or engaged. Figure 11.8. When turning the capscrew you will feel a small amount of resistance. This is normal.

- If you feel a high resistance before achieving the 0.25- to 0.50-inch distance between the capscrew head and cylinder, stop turning the capscrew and continue with Step C, step D and step E.

C. Rotate de driveline or IAD only a small portion of rotation.

D. Tighten the manual engaging capscrew to right. if you feel a high resistance,stop turning the capscrew.

E. Repeat the step C and step D until you feel a small resistance in the capscrew. Continue with step B. Continue from step 15.

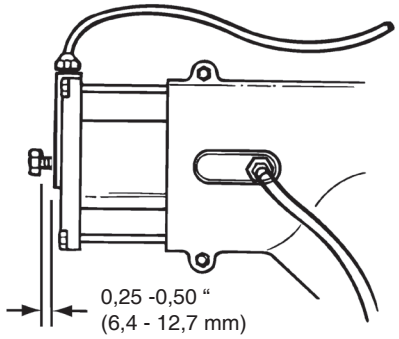


Figure 11.8

15. Remove the remaining axle shaft(s) as necessary from the axle(s) that will remain on the road when the vehicle is transported.

16. Install a cover over the open end of each hub where an axle shaft was removed. This will prevent dirt from entering the bearing cavity and minimize loss of lubricant.

NOTE:

If an air supply will be used for the brake system of the transported vehicle, continue with Steps 17 and 18. Otherwise continue with Step 19.

17. Connect an auxiliary air supply to the brake system of the vehicle that is being transported. Before moving the vehicle, charge the brake system with the correct amount of air pressure to operate the brakes. Refer to the instructions supplied by the manufacturer of the vehicle for procedures and specifications. If an auxiliary air supply is not used, continue with Ste19.

18. When the correct amount of air pressure is in the brake system, release the parking brakes of the vehicle that is being transported. The step 19 is not required.

19. If there are spring or parking brakes on the axle that will remain on the road when the vehicle is transported, and they cannot be released by air pressure, manually compress and lock each spring so that the brakes are released. See the manufacturer’s instructions.

After Towing or Drive-Away

1. If an auxiliary air supply was used, apply the vehicle parking brakes using the switch inside the cab of the vehicle. If an auxiliary air supply was not used, begin with Step 2.
2. Apply the vehicle spring or parking brakes by manually releasing each spring that was compressed before transporting started. See the manufacturer’s instructions.
3. Disconnect the auxiliary air supply, if used, from the brake system of the vehicle that was transported. Connect the vehicle’s air supply to the brake system.
4. Remove the covers from the hubs.

Note:

Install the axle shaft(s) indicated in Table AJ. Axle shafts with a DCDL have a double row of splines that engage with the splines of the side gear and shift collar in the differential case. FIGURE 11.7.

5. Install the gasket, if used, and axle shaft into the axle housing and differential in the same location. The gasket and flange of the axle shaft must be flat against the hub. Rotate the axle shaft or the driveline as necessary to align the splines and the holes in the flange with the studs in the hub. Figure 11.4.

Table AJ

Single Axles	Remove the left side axle shaft inner side of the Road	
Tandem Axles	Front Axle	Remove the right side axle shaft, outer side of the road
	Rear Axle	Remove the left side axle shaft, inner inside the road

6. Install the conical washerss, if used, over each stud and into the tapered holes of the flange..
7. Install the washers and capscrews or stud nuts. Determine the size of the fasteners and tighten the capscrews or nuts to the corresponding torque value shown in Table AK.

Tabela AK

Fastener	Thread Size	Torque Value Nm (lb-ft)
Capscrews	0,31”-24	24-33 (18-24)
	0,50”-13	115-156 (85-115)
Stud Nuts/ Plain Nut	0,44”-20	68-102 (50-75)
	0,50”-20	102-156 (75-115)
	0,56”-18	149-224 (110-165)
	0,62”-18	203-312 (150-230)
	0,75”-16	420-542 (310-400)
Locknut	0,44”-20	54-88 (40-65)
	0,50”-20	88-136 (65-100)
	0,56”-18	136-197 (110-145)
	0,62”-18	176-258 (130-190)
	0,75”-16	366-475 (270-350)

8. Unlock or disengage the DCDL by removing the manual engaging capscrew from the shift assembly.
9. Install the manual engaging capscrew into the storage hole. The storage hole of bolted on shift assemblies is located in the top side of the shift cylinder cover. Tighten the capscrew to 15-25 lb-ft (20-35 N m). Figure 11.5.
10. Remove the plug and gasket from the storage hole. Install the plug and gasket into the threaded hole in the center of the shift. cylinder cover. Tighten to 15-25 lb-ft (20-35 N m).
11. Install the remaining axle shaft(s) into the axle housing and diffrential.
12. Check the lubricant level in the axles and hubs where the axle shafts were removed. Add the correct type and amount of lubricant if necessary. See the Section 7.

Forward Tandem Axle, without Driver--Controlled Main Differential Lock (DCDL), with Inter-Axle Differential (IAD)

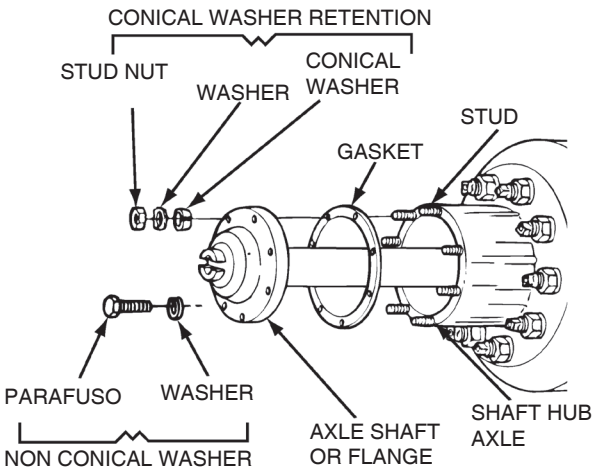
Before Towing or Drive-Away

1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
2. Apply the vehicle parking brakes using the switch inside the cab of the vehicle
3. Shift the transmission into neutral and start the vehicle’s engine.
4. Shift the IAD to the unlocked or disengaged position using the switch inside the cab of the vehicle. The indicator light in the cab will go off.
5. Stop the engine.

Note:

Remove both axle shafts from the axle(s) that will remain on the road when the vehicle is transported.

6. Remove the stud nuts or capscrews and washers from the flange of the axle shaft. Figure 11.9.
7. Loosen the conical washers, if used, in the flange of the axle shaft. Figure 11.11. See the Section 3.



8. Identify each axle shaft that is removed from the axle assembly so they can be installed in the same location after transporting or repair is completed.
9. Remove the conical washers, gasket, if used, and the axle shaft from the axle assembly. Figure 11.9.
10. Install a cover over the open end of each hub where an axle shaft was removed. This will prevent dirt from entering the bearing cavity and loss of lubricant

NOTE:

If an air supply will be used for the brake system of the transported vehicle, continue with Step 11 and Step 12, otherwise continue with Step 13.

11. Connect an auxiliary air supply to the brake system of the vehicle that is being transported. Before moving the vehicle, charge the brake system with the correct amount of air pressure to operate the brakes. Refer to the instructions supplied by the manufacturer of the vehicle for procedures and specifications. If an auxiliary air supply is not used, continue with Step 13.
12. When the correct amount of air pressure is in the brake system, release the parking brakes of the vehicle that is being transported. Step 13 is not required.
13. If there are spring or parking brakes on the axle(s) that will remain on the road when the vehicle is transported, and they cannot be released by air pressure, manually compress and lock each spring so that the brakes are released. See the manufacturer's instructions.

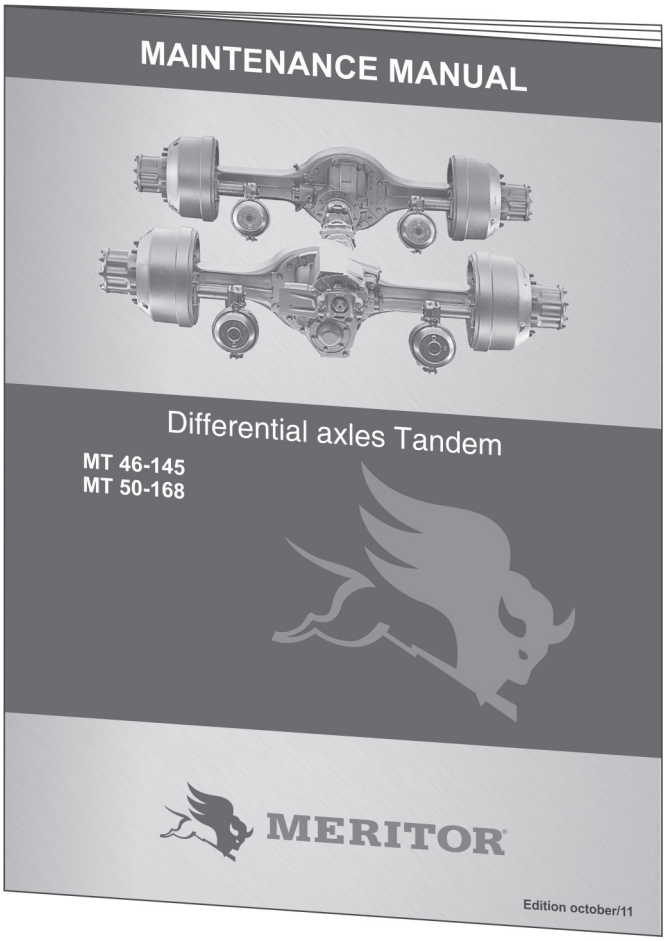
After Towing or Drive-Away:

1. If an auxiliary air supply was used, apply the vehicle parking brakes using the switch inside the cab of the vehicle. If an auxiliary air supply was not used, begin with Step 2.
2. Apply the vehicle spring or parking brakes by manually releasing each spring that was compressed before transporting started. See the manufacturer's instructions.
3. Disconnect the auxiliary air supply, if used, from the brake system of the vehicle that was transported

   Connect the vehicle's air supply to the brake system.
4. Remove the covers from the hubs.
5. Install the gasket, if used, and axle shaft into the axle housing and differential in the same location. The gasket and flange of the axle shaft must be flat against the hub. Rotate the axle shaft or the driveline as necessary to align the splines and the holes in the flange with the studs in the hub. Figure 11.9.
6. Install the conical washers, se usadas, if used, over each stud and into the tapered holes of the flange.
7. Install the washers and capscrews or stud nuts. Determine the size of the fasteners and tighten the capscrews or nuts to the torque value shown in Table AL.

Tabla AL

Fastener	Thread Size	Torque Value Nm (lb-ft)
Capscrews	0,31"-24 0,50"-13	24-33 (18-24) 115-156 (85-115)
Stud Nuts/ Plain Nuts	0,44"-20 0,50"-20 0,56"-18 0,62"-18 0,75"-16	68-102 (50-75) 102-156 (75-115) 149-224 (110-165) 203-312 (150-230) 420-542 (310-400)
Locknut	0,44"-20 0,50"-20 0,56"-18 0,62"-18 0,75"-16	54-88 (40-65) 88-136 (65-100) 136-197 (110-145) 176-258 (130-190) 366-475 (270-350)



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