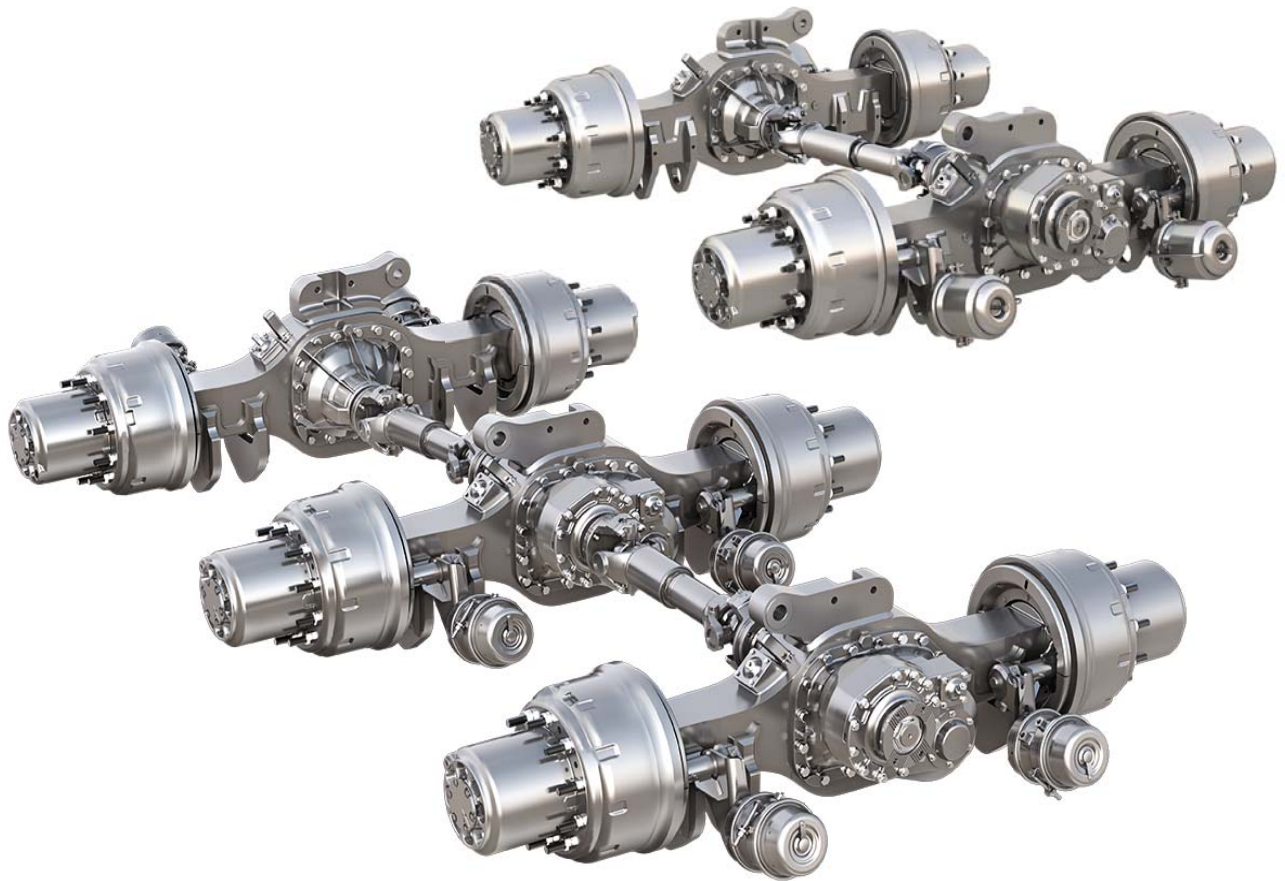


Maintenance Manual MM-11118

Hub-Reduction Heavy-Haul Tandem Axles Equipped with Square-Flange DT-100/DS-70 Differential Carriers

Revised 02-20



Service Notes

About This Manual

This manual provides service and repair procedures for Meritor hub-reduction heavy-haul tandem axles.

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, Service and Product Information

Visit Literature on Demand at meritor.com to access and order additional information.

Contact the Meritor OnTrac™ Customer Call Center at 866-668-7221 (United States and Canada); 001-800-889-1834 (Mexico); or email OnTrac@meritor.com.

If Tools and Supplies are Specified in This Manual

Call Meritor's Commercial Vehicle Aftermarket at 888-725-9355 to obtain Meritor tools and supplies.

SPX Kent-Moore, 28635 Mound Road, Warren, Michigan, 48092. Call the company's customer service center at 800-345-2233, or visit their website at spxkentmoore.com.

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

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ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

Hazard Summary

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

**DANGER: ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA.**

2. **Respiratory Protection.** Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.
3. **Procedures for Servicing Brakes.**
 - a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
 - b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - c. If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
 - d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
 - e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

NON-ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from Meritor.

Hazard Summary

Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some scientists believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.
2. **Respiratory Protection.** OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m³ as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.

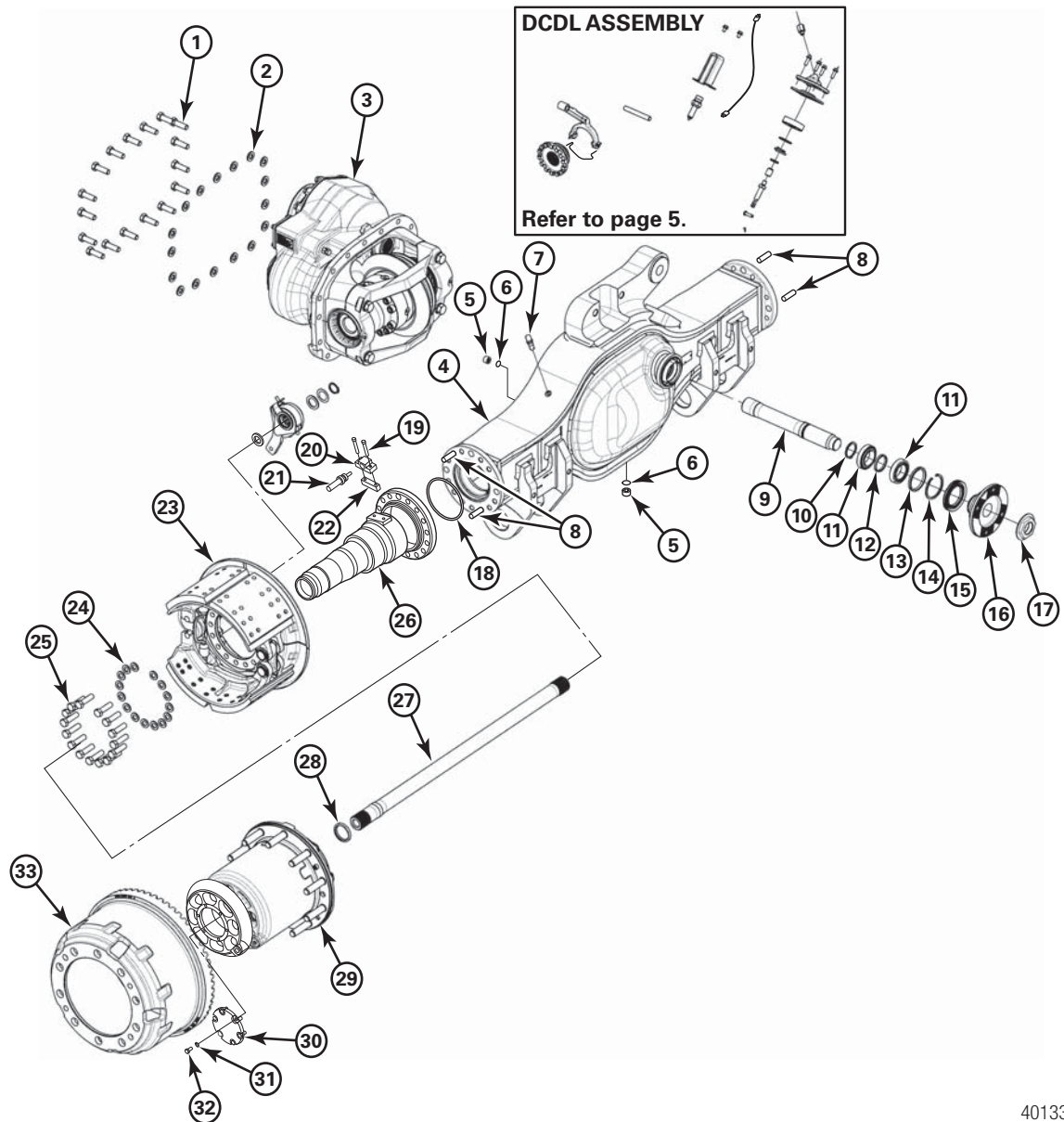
Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.

3. **Procedures for Servicing Brakes.**
 - a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
 - b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - c. If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
 - e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA, to minimize exposure. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

Hub Reduction Heavy Haul Forward-Rear Axle Assembly



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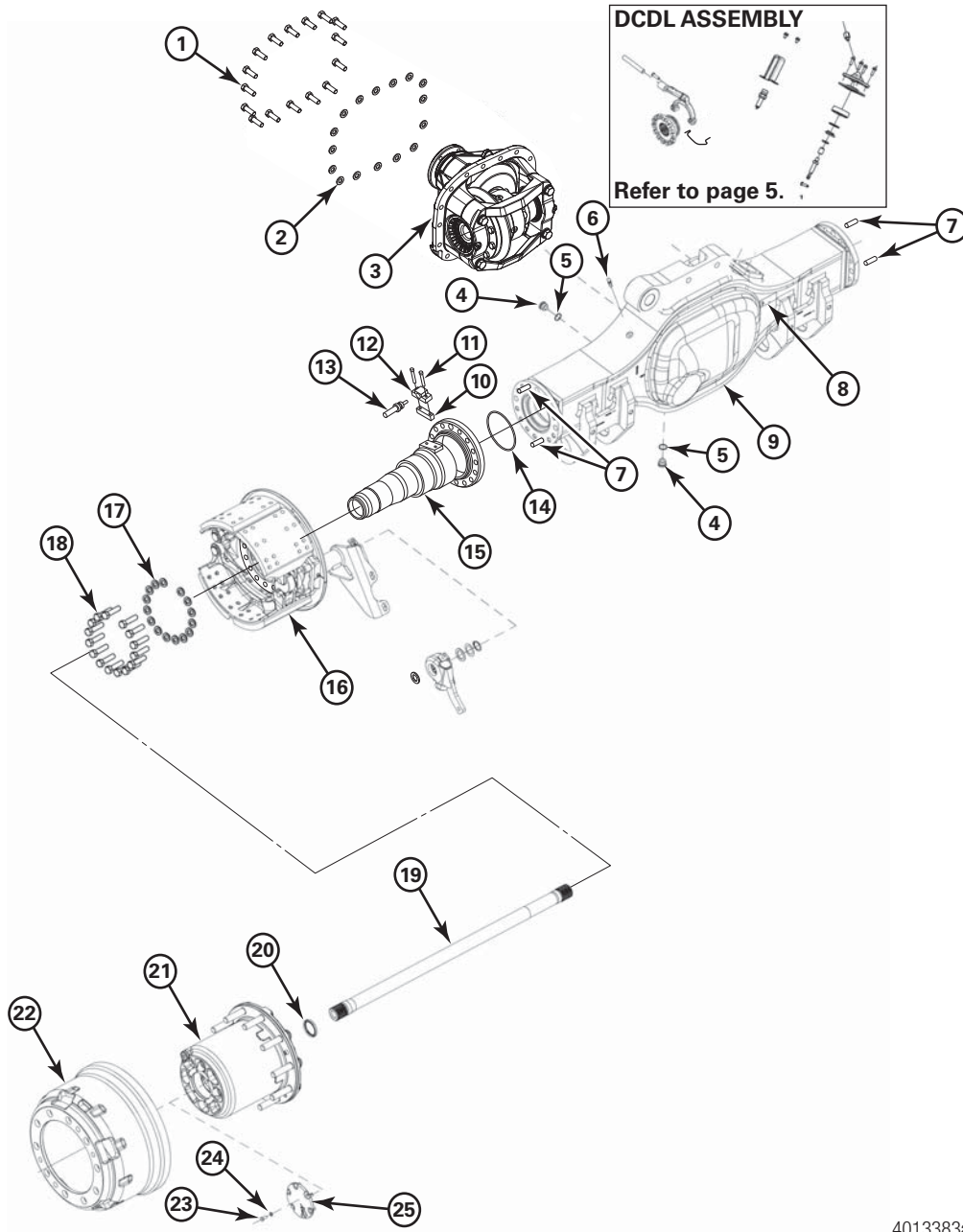
Item	Description
1	Cover-to-Housing Capscrew
2	Hardened Washer
3	Differential Carrier Assembly
4	Axle Housing
5	Oil Fill/Drain Plug
6	Oil Fill/Drain Plug Gasket

Item	Description
7	Breather Assembly
8	Dowels
9	Output Shaft
10	Retaining Ring
11	Bearing Assembly
12	Spacer Ring

1 Exploded Views

Item	Description
13	Spacer
14	Snap Ring
15	Seal
16	Drive Yoke
17	Lock Nut
18	O-Ring
19	ABS Sensor Block Retaining Bolt
20	ABS Sensor Block
21	ABS Sensor
22	ABS Spacer Block
23	LH Brake Assembly
24	Hardened Washer
25	Capscrew
26	Spindle
27	Axle Shaft
28	Sealing Ring
29	Hub Reduction Wheel End
30	Cover
31	Washer
32	Bolt
33	Brake Drum

Hub Reduction Heavy Haul Rear-Rear Axle Assembly



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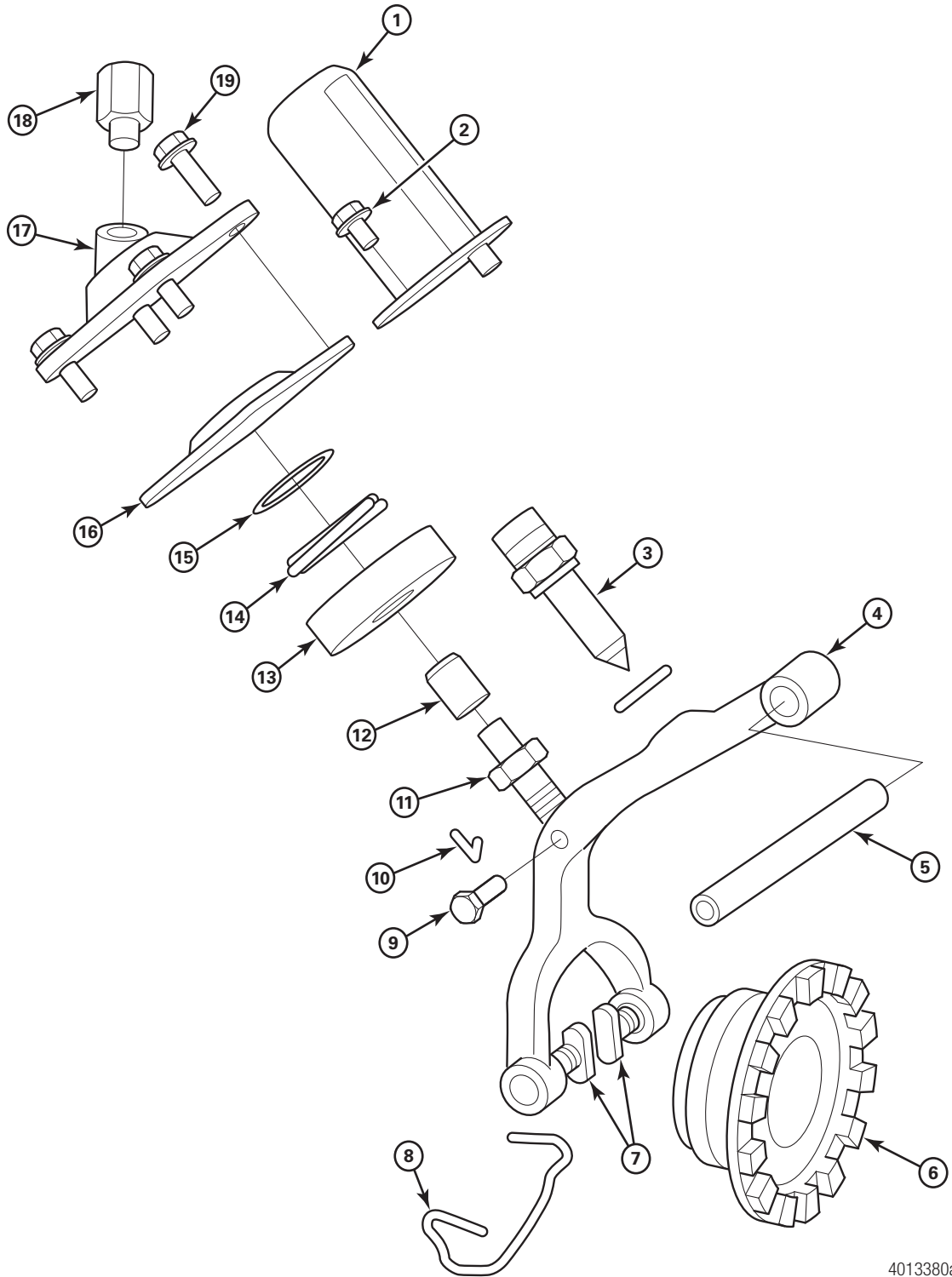
Item	Description
1	Cover-to-Housing Capscrew
2	Hardened Washer
3	Differential Carrier Assembly
4	Oil Fill/Drain Plug

Item	Description
5	Oil Fill/Drain Plug Gasket
6	Breather Assembly
7	Dowels
8	Axle Nameplate

1 Exploded Views

Item	Description
9	Axle Housing
10	ABS Spacer
11	ABS Block Bolt
12	ABS Sensor Block
13	ABS Sensor
14	O-Ring
15	Spindle
16	LH Brake Assembly
17	Hardened Washer
18	Capscrew
19	Axle Shaft
20	Sealing Ring
21	Hub Reduction Wheel End
22	Brake Drum
23	Bolt
24	Washer
25	Cover

Driver-Controlled Main Differential Lock (DCDL) Assembly



4013380a

1 Exploded Views

Item	Description
1	Sensor Protector Bracket
2	Bracket Capscrew
3	DCDL Lock Switch
4	DCDL Shift Fork
5	Fork Shaft
6	DCDL Clutch Collar
7	DCDL Fork Pin
8	Pin Retainer Wire
9	Clevis Pin
10	Clevis Clip
11	Fork Pushrod
12	Pushrod Sleeve
13	Diaphragm Seat
14	Spring
15	Diaphragm Sleeve
16	Diaphragm
17	Cover
18	Air Fitting
19	Cover Capscrew

Components

Driver-Controlled Differential Lock

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

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

Inter-Axle Differential (IAD) Lock

The Meritor inter-axle differential (IAD) lock is a driver-controlled, air-actuated traction device. The IAD allows for speed differences between the forward and rear axles in a tandem or tridem while also providing equal pulling power from each axle of the tandem or tridem. 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.

Rear Axle Carrier

The axle is equipped with a square-flange single-reduction differential carrier with an optional DCDL feature. Refer to Maintenance Manual MM-0194, Single-Reduction Leading Axle Carrier for Tandem Axle Series MD16-MN16; and Maintenance Manual MM-0763, DS70H Single-Reduction Differential Carrier, for more information. To obtain these publications, refer to the Service Notes page on the front inside cover of this manual. Figure 2.1.

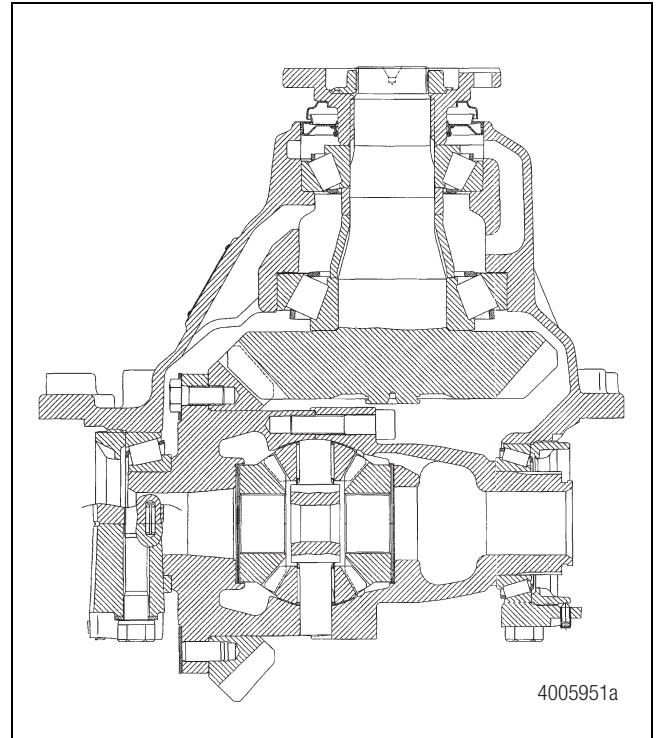


Figure 2.1

Hub Reduction Wheel Ends

The hub reduction wheel end consists of a cylindrical planetary assembly in each hub. The assembly is made up of a sun gear which is splined to the axle shaft, and four planetary gears which rotate around the sun gear within a ring gear. Refer to Maintenance Manual MM-1189, Off-Highway Axle Wheel Ends, for more information. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual. Figure 2.2.

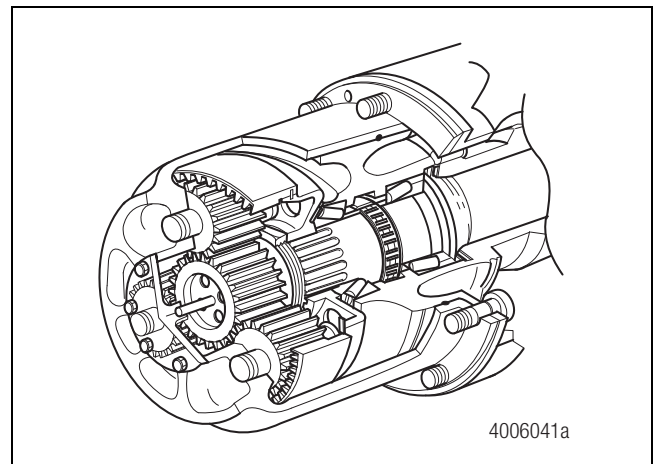


Figure 2.2

2 Introduction

Identification

Model Number

An identification tag is riveted or tack welded on the axle housing and on the differential carrier. Figure 2.3. Use the model number and the ratio number marked on the identification tag and the number on the carrier to obtain replacement parts.

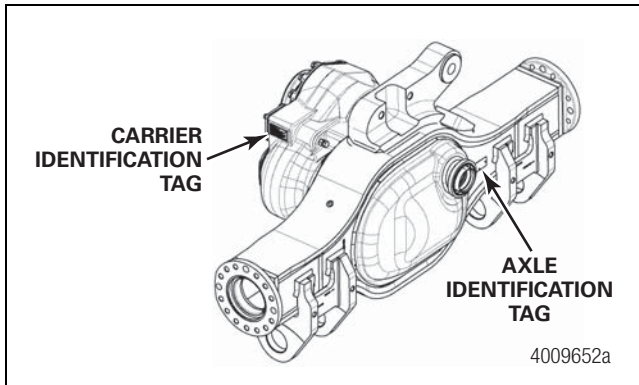


Figure 2.3

Refer to Figure 2.4 and Figure 2.5 for an explanation of the model number.

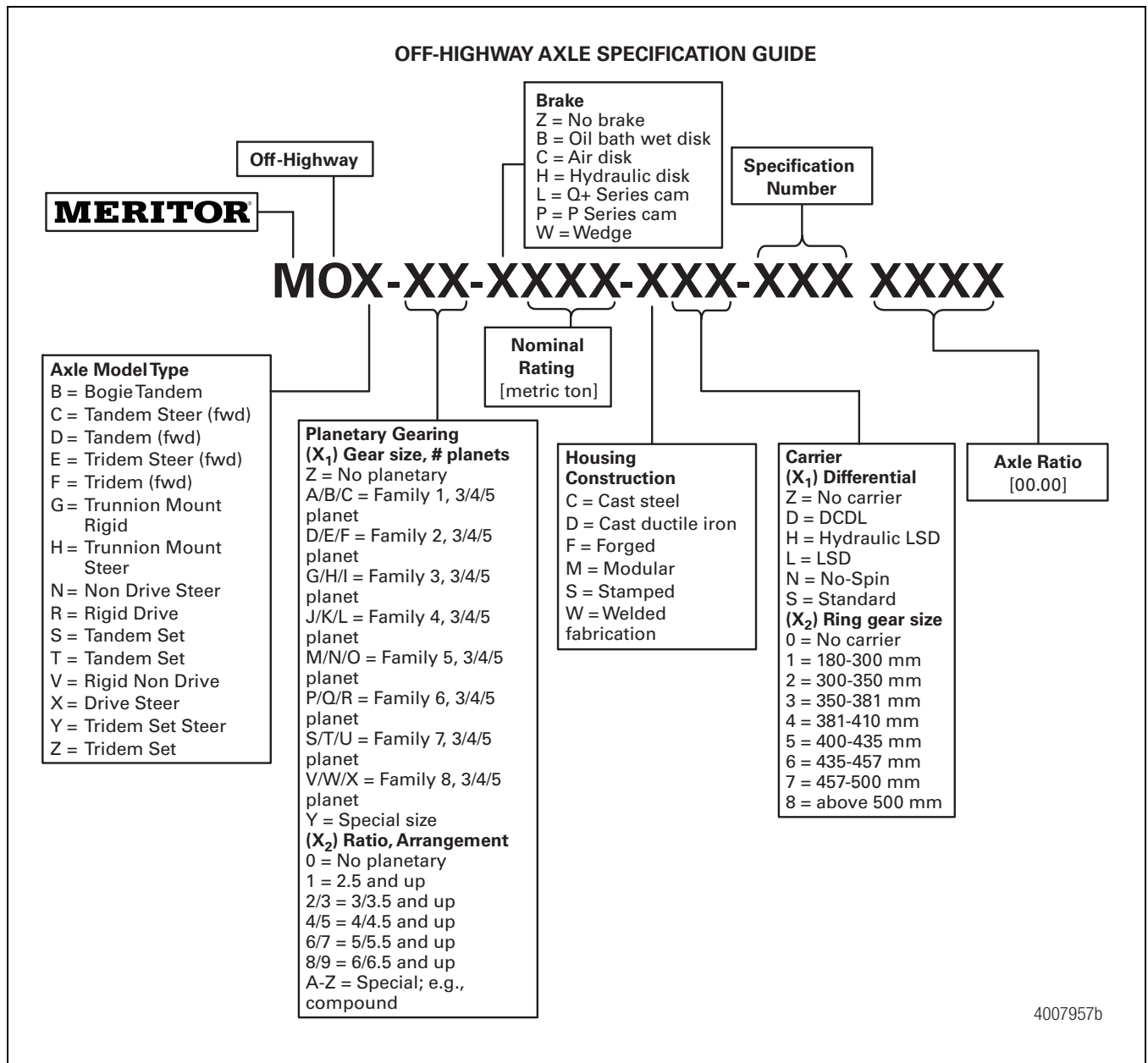


Figure 2.4

2 Introduction

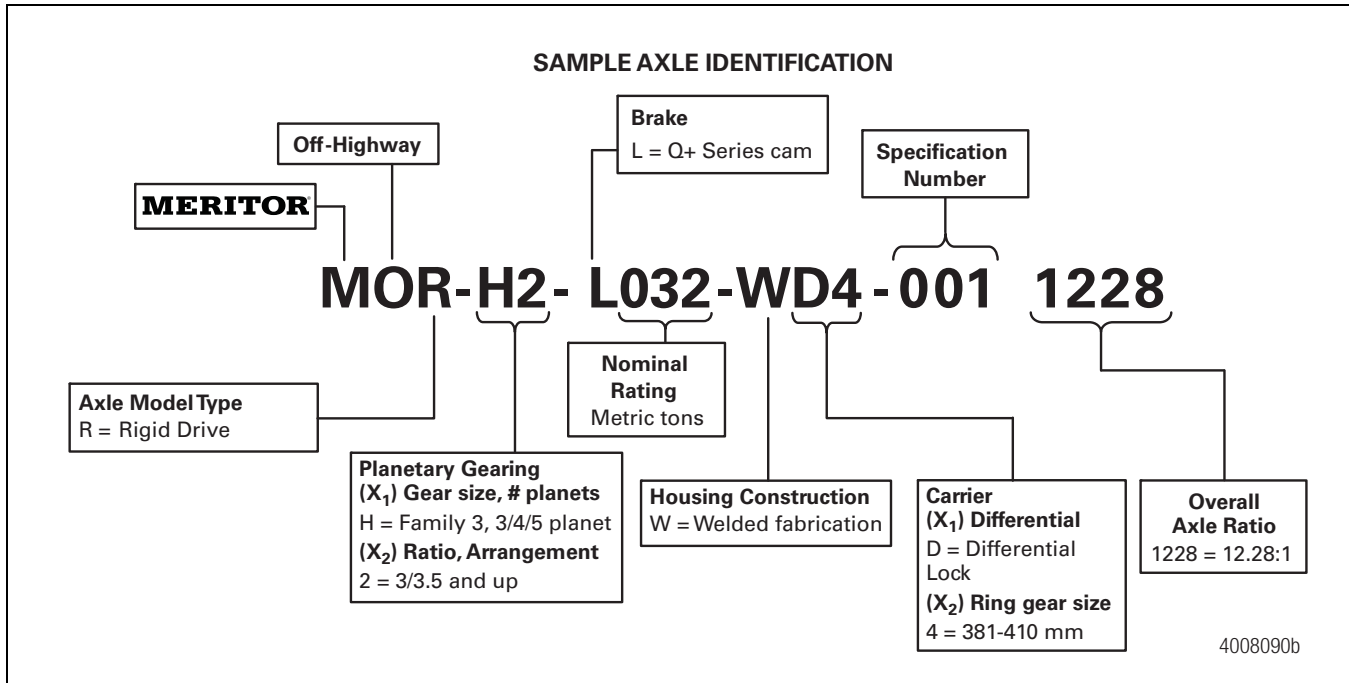


Figure 2.5

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

1. Remove the drive shaft. Refer to the vehicle manufacturer's procedures.
2. Identify and record the gear set teeth numbers stamped on the end of the rear axle drive pinion. Figure 2.6.

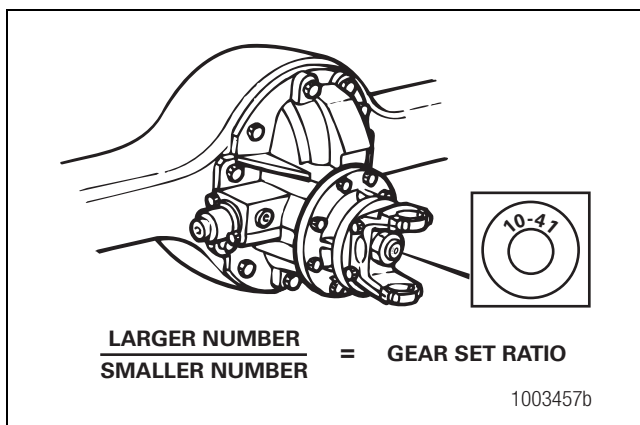


Figure 2.6

3. Calculate the gear set ratio by dividing the larger number by the smaller number. Figure 2.6.

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.

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 and cause serious personal injury.

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

To avoid serious personal injury and damage to components, take care when using lifting devices during service and maintenance procedures. Inspect a lifting strap to ensure that it is not damaged. Do not subject the lifting straps to shocks or drop-loading.

Removal

Axle Shafts

1. Wear safe eye protection. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
2. Use a wrench to remove the hub cover capscrews. Figure 3.1.

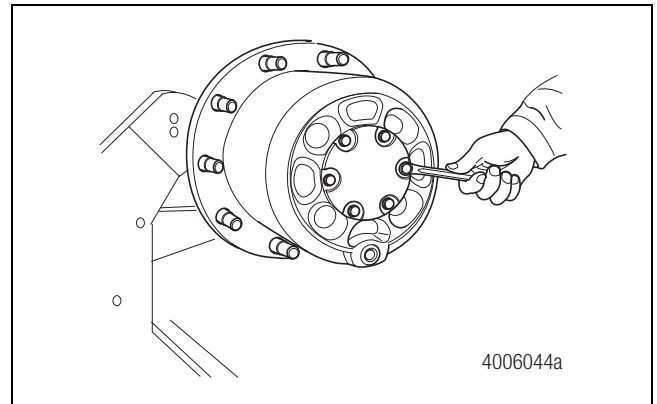


Figure 3.1

3. Use a screwdriver or pry bar to pry up and remove the hub cover. Figure 3.2.

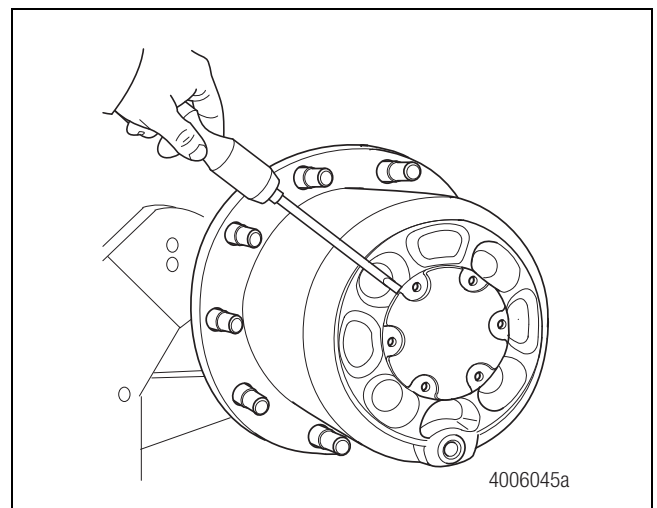


Figure 3.2

4. Use pliers or other suitable tool to secure and remove the sun gear from the hub housing. Figure 3.3.

3 Removal and Disassembly

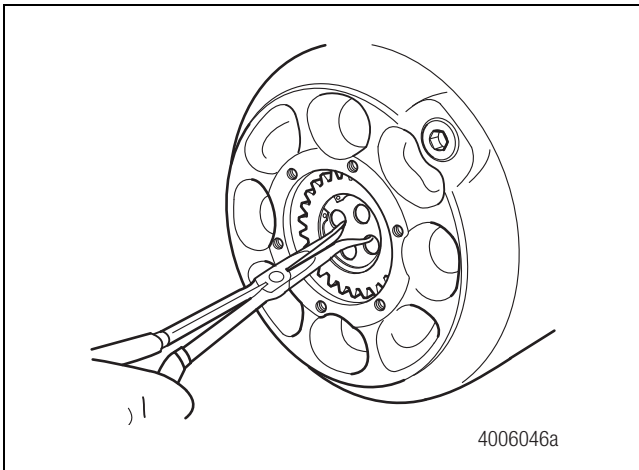


Figure 3.3

5. Pull to remove the axle shaft from the housing. Figure 3.4.

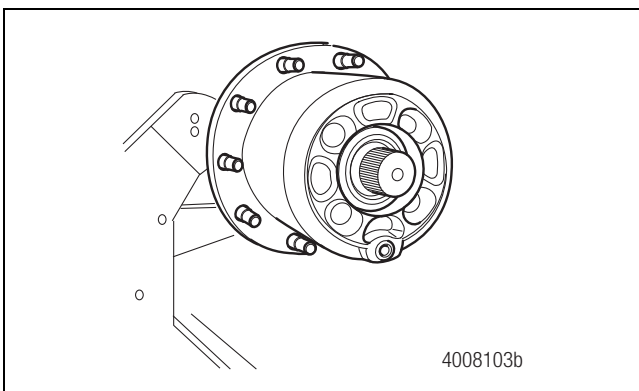


Figure 3.4

6. For towing, replace the hub cover and bolts to prevent further fluid loss.

Wheel End

Refer to Maintenance Manual MM-1189, Off-Highway Wheel Ends, for all wheel end removal and disassembly procedures, and information. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

Removing Fasteners Secured with Adhesive

⚠ CAUTION

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

1. If necessary, use the following procedure to remove fasteners secured with Dri-Loc®, Meritor adhesive or Loctite® 277 adhesive.
 - A. Use a heat gun to slowly heat the fastener for about three to five seconds to a temperature of 350°F (177°C).
 - B. Use a wrench to try to loosen the fastener. Do not use an impact wrench or a hammer.
2. Repeat Step 1 until you can remove the fastener.

Brake and Spindle

⚠ WARNING

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.

1. If the brake has spring chambers, carefully cage and lock the spring, so that it cannot actuate during assembly. Follow the chamber manufacturer's instructions to completely release the brake.
2. Verify that no air pressure remains in the service chamber. Sudden release of pressurized air can cause serious personal injury and damage to components.
3. Disconnect the brake lines.

⚠ CAUTION

You must disengage a pull pawl before rotating the manual adjusting nut, or you will damage the pawl teeth. A damaged pawl will not allow the slack adjuster to automatically adjust brake clearance. Replace damaged pawls before putting the vehicle in service.

3 Removal and Disassembly

4. Ensure the brake rollers are fully seating into the S-cam pockets by backing off the slack adjuster as needed. Before you rotate the manual adjusting nut, disengage the pull pawl. Use a screwdriver or equivalent tool to pry the pull pawl at least 1/32-inch (0.8 mm) to disengage the teeth from the actuator.
5. Disconnect the brake return spring and clips. Figure 3.5.

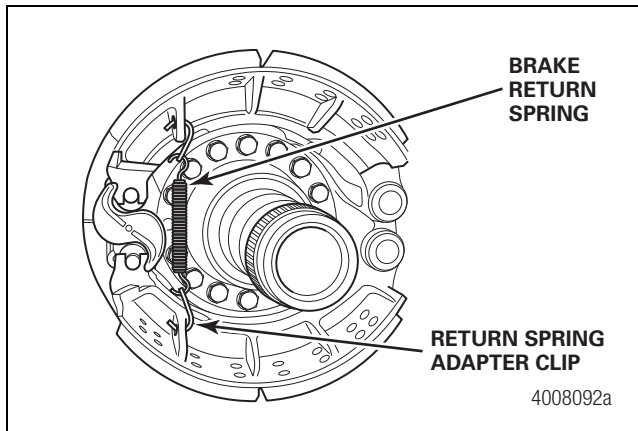


Figure 3.5

6. Remove the bolts and washers from the ABS sensor mounting block to remove the sensor from the axle. Refer to the ABS manufacturer's service instructions for more information.
7. Use a lifting device to support the brake assembly. Figure 3.6.

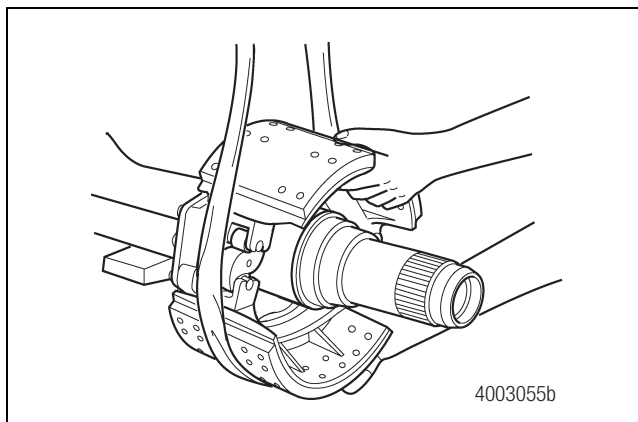


Figure 3.6

8. Use a socket and wrench to remove the brake spider/spindle-to-housing bolts. Figure 3.7.

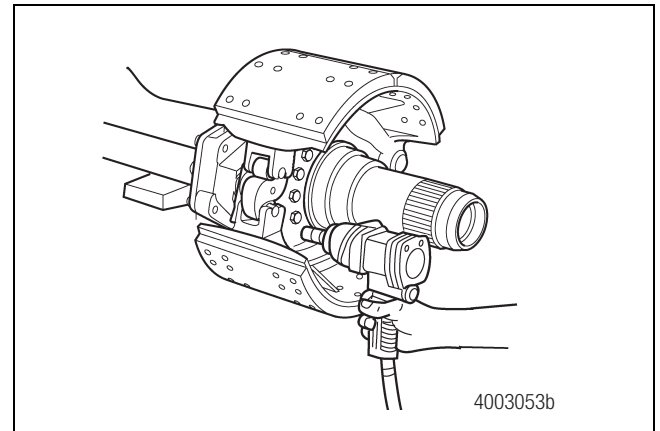


Figure 3.7

9. After removing the last brake spider bolt, carefully remove the complete brake assembly and set aside.
10. Use a lifting device to support the spindle. Pull to remove the spindle from the two spindle dowels and set aside. Figure 3.8.

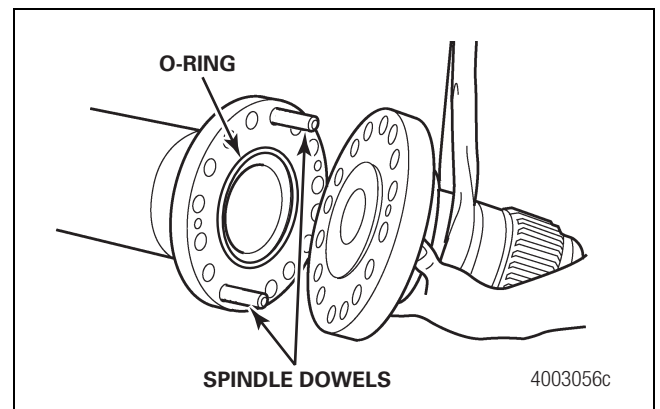


Figure 3.8

11. Remove the O-ring from the axle housing and discard it. Figure 3.8.

Output Shaft

NOTE: The DT100 family of axles use two different output shaft designs. The output shafts on tridem forward axles are designed with a spacer as shown in Figure 3.9. The output shafts on tridem middle and tandem forward axles are designed without a spacer as shown in Figure 3.10. When removing the output shaft, note the design style and position of components for proper reassembly.

3 Removal and Disassembly

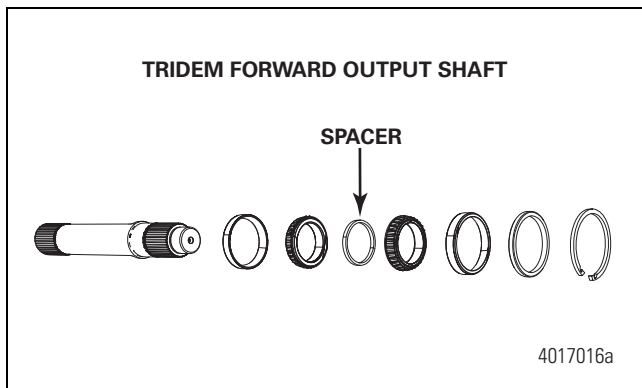


Figure 3.9

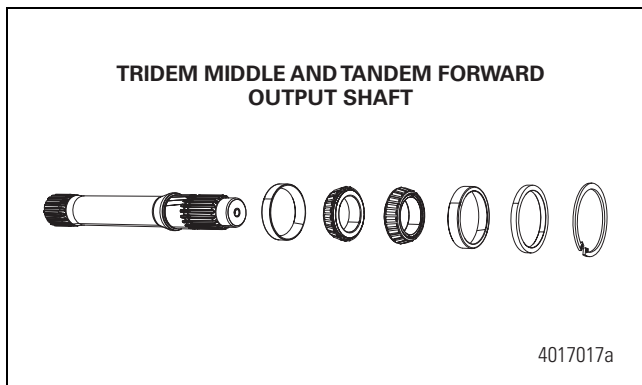


Figure 3.10

1. Disconnect the drive shaft from the output shaft flange.
2. Use a companion flange retainer tool to hold the output shaft flange in place. Figure 3.11.

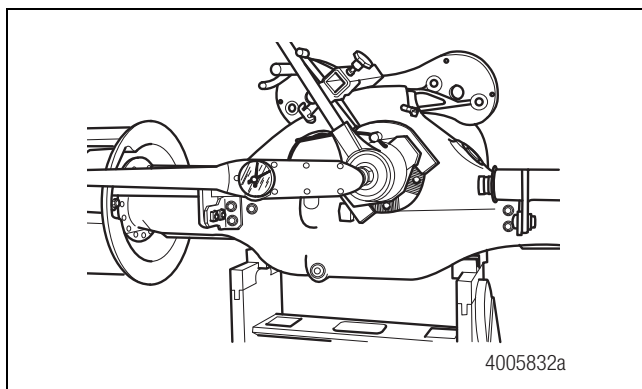


Figure 3.11

3. Use a 65 mm, 6-point socket to remove the retaining nut from the companion flange. Retain the nut for reuse during reassembly.
4. Use a suitable puller to remove the output shaft companion flange. Figure 3.12.

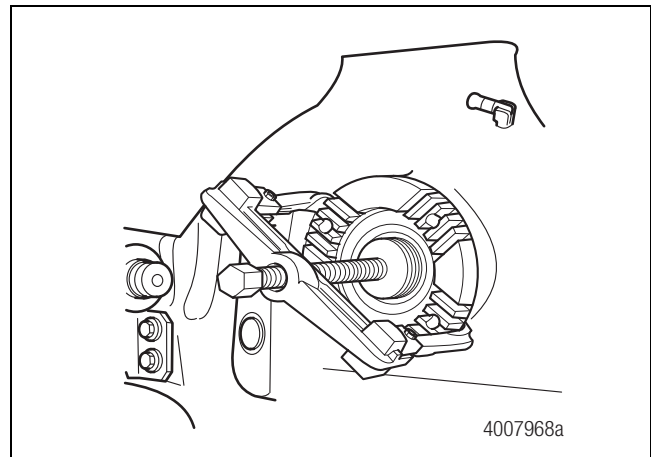


Figure 3.12

5. Use a seal puller or suitable tool to remove the output shaft seal. Discard the seal. Figure 3.13.

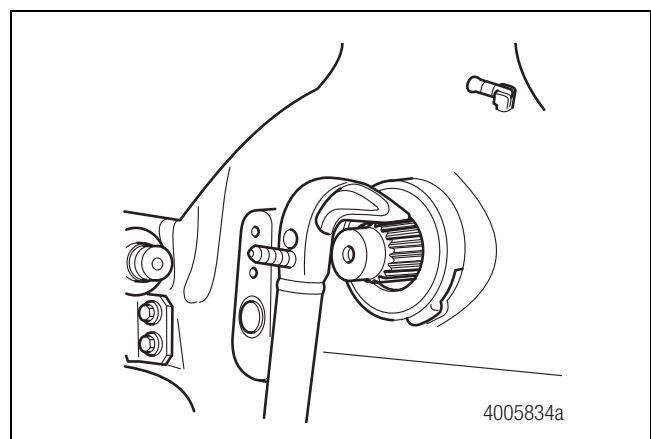


Figure 3.13

6. Use snap ring pliers to remove the snap ring. Figure 3.14.

3 Removal and Disassembly

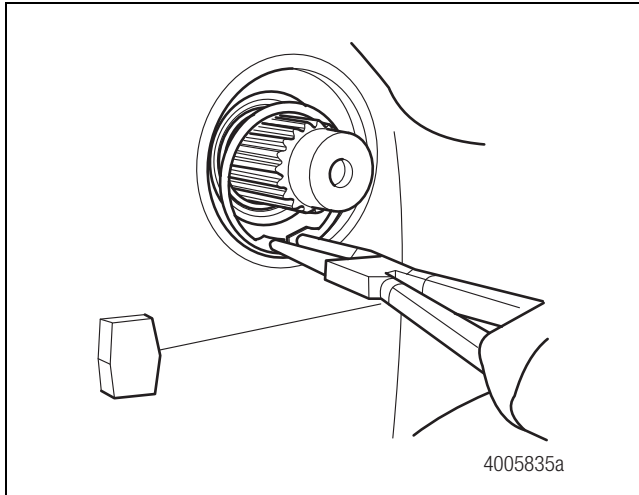


Figure 3.14

7. Pull out the output shaft from the housing. If necessary, turn around the yoke nut and thread it partially onto the output shaft, then use a pry bar to pull the shaft from the bearing cage. Figure 3.15.

The bearings, outer bearing cup and spacer will come out with the output shaft. Note there are different design output shafts depending on the configuration of the axle. When you remove the output shaft, note the design style, quantity and combination of components to ensure the proper parts are reinstalled.

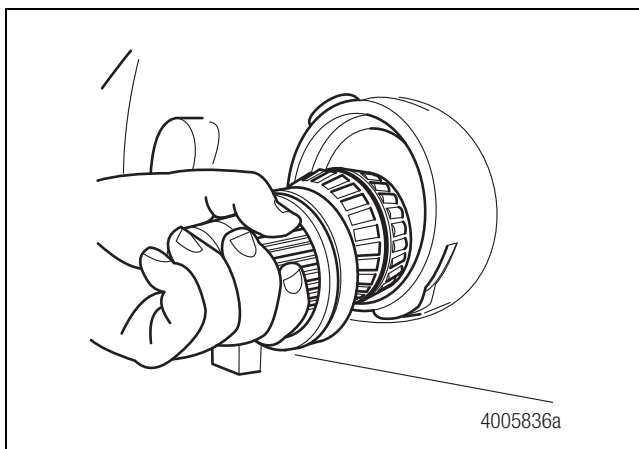


Figure 3.15

8. Use a puller to remove the inner bearing cup from the output shaft bearing cage. Figure 3.16.

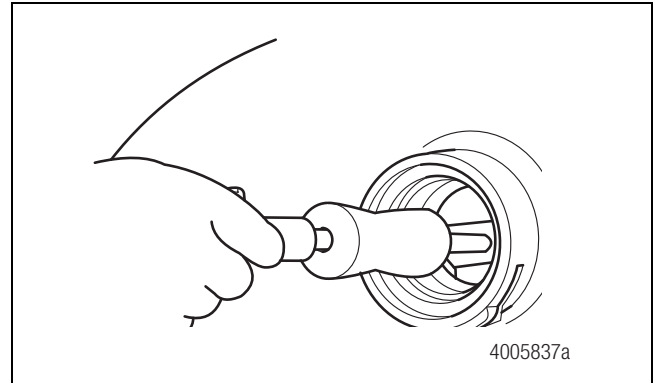


Figure 3.16

⚠ WARNING

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

9. If necessary, remove the bearings from the output shaft. Use a press to push on the inner race of the bearing. Note that if the output shaft bearings are removed for any reason, you must replace them with new cones and cups. Figure 3.17.

Depending on the design style, the output shaft may have a spacer between the inner and outer bearings. If equipped, retain the spacer for reassembly.

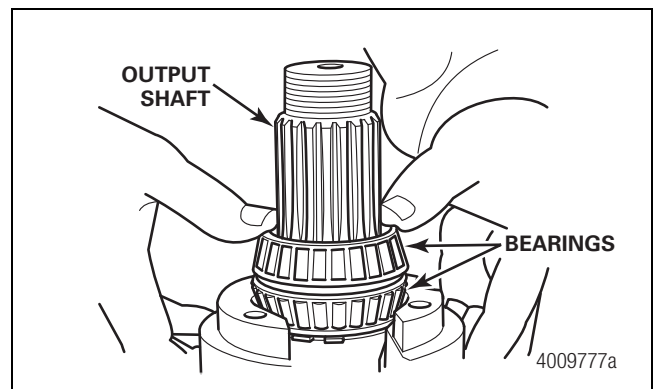


Figure 3.17

Differential Carrier from the Axle Housing

⚠ CAUTION

Disengage the driver-controlled main differential lock (DCDL) before carrier removal or installation to prevent damage to components.

3 Removal and Disassembly

1. Wear safe eye protection. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
2. Raise the vehicle so the wheels to be serviced are off the ground. Support the axle to be serviced with safety stands.
3. Rotate the wheel ends so the drain plug is at the bottom. Remove the drain plug and drain the lubricant from the wheel ends.
4. Use a wrench to remove the hub cover capscrews. Figure 3.18.

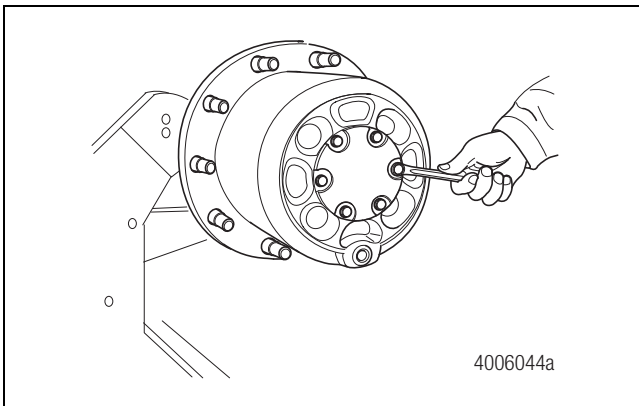


Figure 3.18

5. Use a screwdriver or pry bar to pry up and remove the hub cover. Figure 3.19.

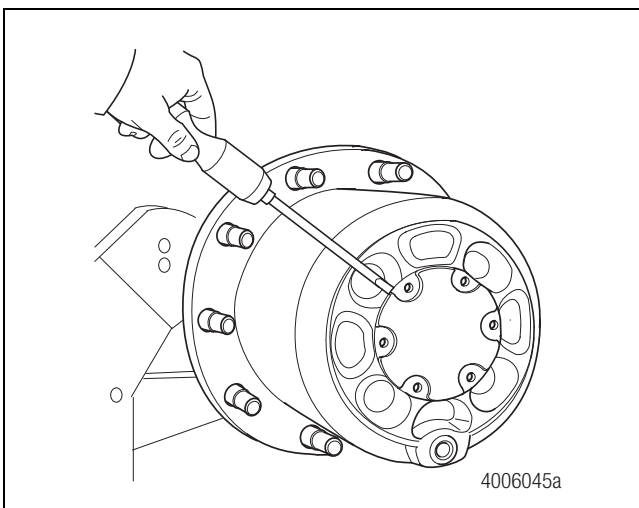


Figure 3.19

6. Use a suitable tool to secure and remove the sun gear from the hub housing. Figure 3.20.

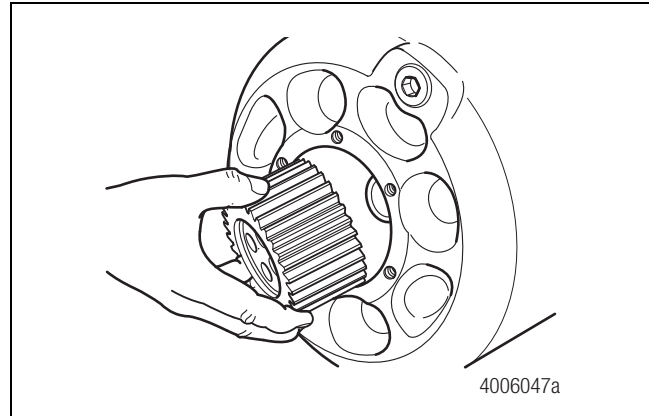


Figure 3.20

⚠ CAUTION

Use care when you remove the axle shaft to avoid damaging the axle shaft seal.

7. Pull the axle shaft from the housing only far enough to disengage it from the carrier, approximately six inches (152.4 mm). Use care to avoid damaging the axle shaft seal. Figure 3.21.

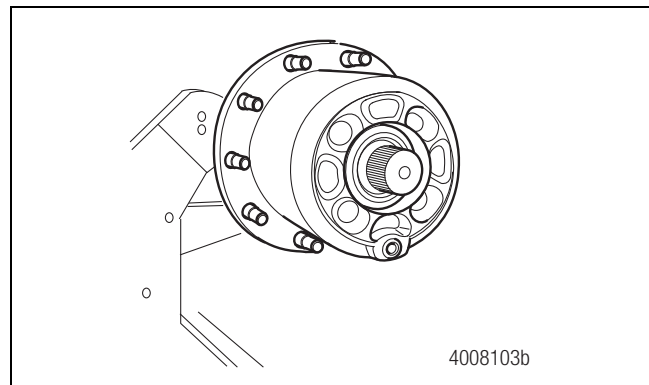


Figure 3.21

8. Remove the safety stands and lower the axle. Block the wheels to prevent the vehicle from moving.
9. Disconnect the drive shaft from the companion flange. If necessary, disconnect the inter-axle drive shaft between the forward and rear carriers.
10. Position a hydraulic roller jack or suitable lifting device under the carrier. Figure 3.22.

3 Removal and Disassembly

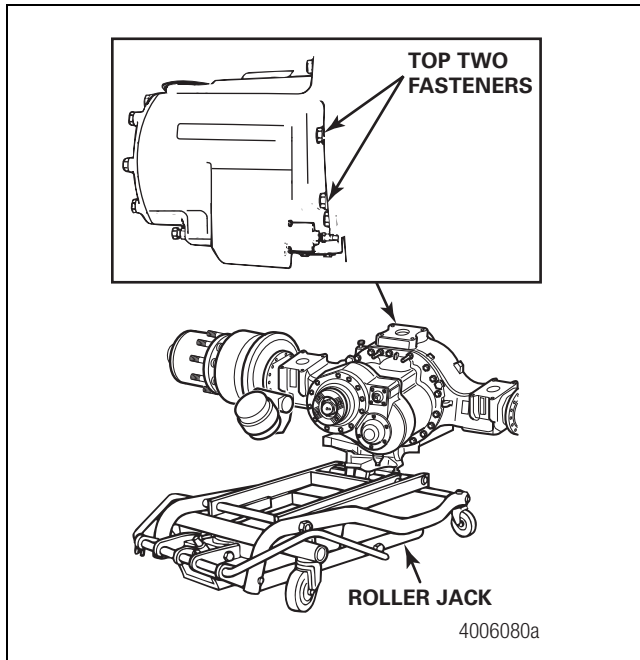


Figure 3.22

11. Remove all but two of the capscrews that secure the carrier to the axle housing. Loosen the remaining capscrews but do not remove them at this time. They help secure the carrier.
12. Use a pry bar in the access points to break the seal between the carrier and axle housing. Figure 3.23.

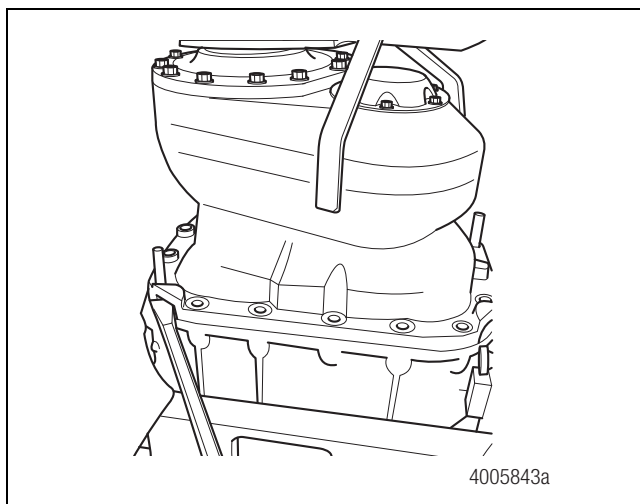


Figure 3.23

13. Verify that the carrier is supported correctly and will not fall during removal.

14. Remove the final two capscrews and pull the carrier out of the axle housing.
15. Install the carrier into a suitable carrier repair stand. Figure 3.24.

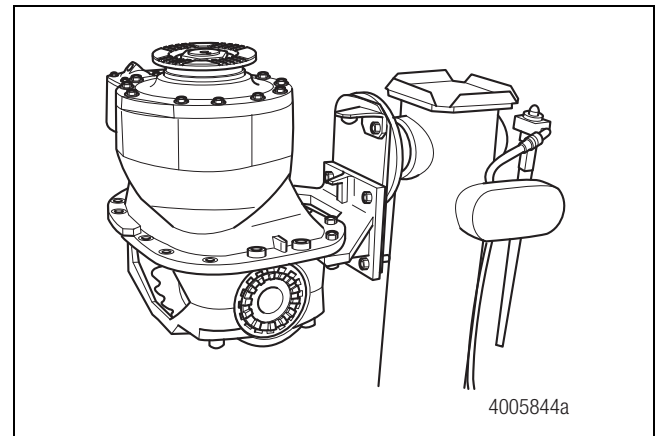


Figure 3.24

4 Prepare Parts for Assembly

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. If Loctite® adhesive material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

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.

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

Clean, Dry and Inspect Parts

Clean and Inspect the Companion Flange

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 onto the companion flange and will 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 companion flange surface. Wear sleeves pressed onto the companion flange will prevent correct seating of the pinion seal and will damage the pinion seal assembly. Wear sleeve usage will cause the seal to leak.

1. Clean the ground and polished surface of the companion flange journal using a clean shop towel and a safe cleaning solvent. Do not use abrasive cleaners, towels or scrubbers to clean the companion flange or flange surface. Do not use gasoline.
2. Inspect the companion flange seal surface for grooves. The unitized seal features a rubber inner sleeve that is designed to seal and rotate with the companion flange. This feature allows you to reuse a companion flange with minor grooves.
 - **If you find grooves on companion flange hubs used with single or triple-lip seals:** Replace the companion flanges.
 - **If you find grooves on the companion flange:** Use calipers to measure the groove diameters. If any groove diameter measures less than the correct specification, replace the companion flange.

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.

4 Prepare Parts for Assembly

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.

Dry Parts Immediately After Cleaning

All Parts Except Bearings

Use soft, clean paper, cloth rags or compressed air to dry parts immediately after cleaning.

Bearings

CAUTION

Use soft, clean paper or cloth rags to dry bearings immediately after cleaning. Do not use compressed air, which can damage the bearings when they are rotated and dried.

Use soft, clean paper or cloth rags to dry bearings immediately after cleaning. Do not use 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 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 4.1.
 - The radius at the large-diameter end of the rollers is worn to a sharp edge. Figure 4.1.
 - 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 4.2.
 - There are deep cracks or breaks in the cup, cone inner race or roller surfaces. Figure 4.2.
 - There are bright wear marks on the outer surface of the roller cage. Figure 4.3.
 - There is damage on the rollers and on the surfaces of the cup and cone inner race that touch the rollers. Figure 4.4.
 - There is damage on the cup and cone inner race surfaces that touch the rollers. Figure 4.5.

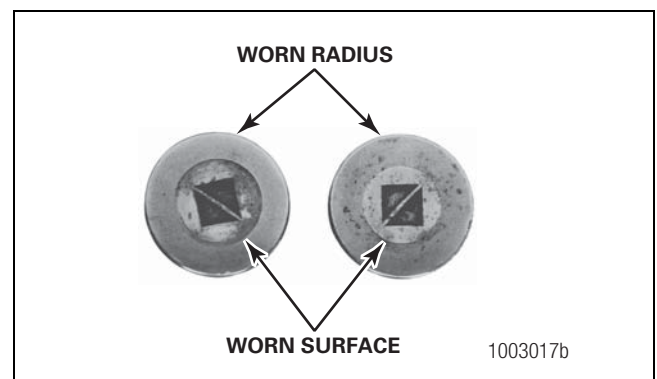


Figure 4.1

4 Prepare Parts for Assembly

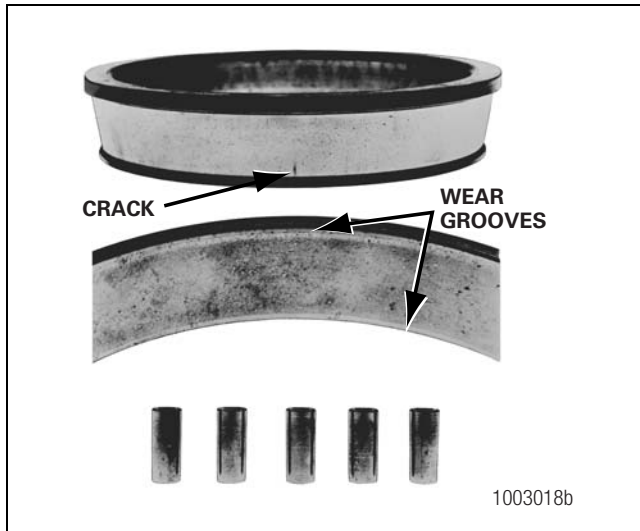


Figure 4.2

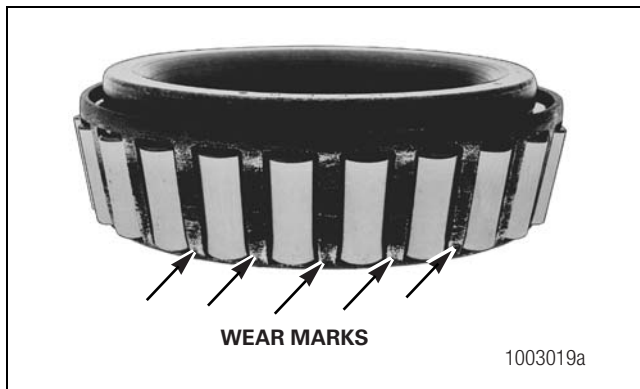


Figure 4.3

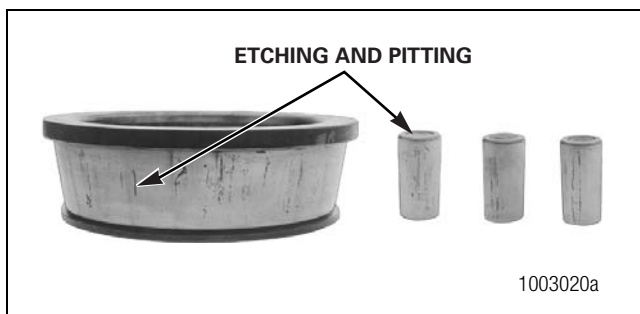


Figure 4.4

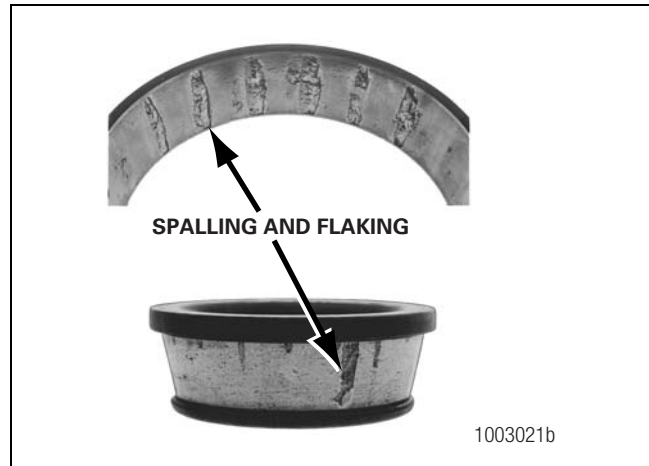


Figure 4.5

2. Inspect the axle shafts for wear and cracks at the flange, shaft and splines. Replace the axle shafts, if required.
3. Inspect the breather.
 - A. Remove the breather from the axle housing.
 - B. Clean the breather.
 - **If the breather remains dirty after cleaning:** Replace the breather.
 - C. Apply compressed air to the breather.
 - **If compressed air does not pass through the breather:** Replace the breather.
 - D. Install the breather into the axle housing.

Repair or Replace Parts

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 repair.
4. Clean the parts and apply new silicone gasket material where required when the axle is assembled. Figure 4.6.

4 Prepare Parts for Assembly

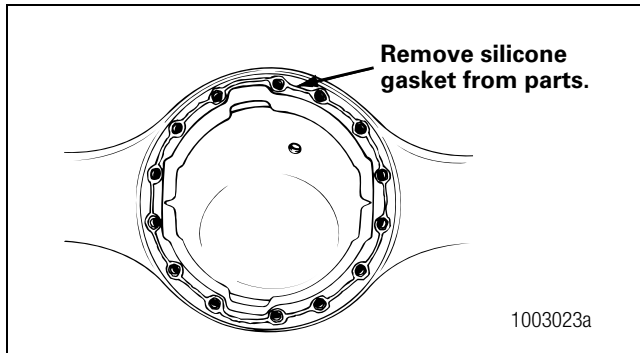


Figure 4.6

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. Use a die or tap of the correct size or a fine file.

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 Meritor's warranty.

Do Not Repair Weld the Axle Housings

⚠ WARNING

Do not repair weld the axle housings, which can reduce axle beam fatigue life and void the warranty. Serious personal injury and damage to components can result.

Meritor does not permit repair welding on the axle housings, which can reduce axle beam fatigue life and void the warranty.

New Fasteners with Pre-Applied Adhesive

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. No drying time is required for fasteners with pre-applied adhesive.

Original or Used Fasteners

1. Use a wire brush to clean the oil, dirt and old adhesive from all threads and threaded holes.
2. Apply four or five drops of Meritor liquid adhesive 2297-C-7049, Loctite® 638 or 680 liquid adhesive or equivalent inside each threaded hole or bore. Do not apply adhesive directly to the fastener threads. Figure 4.7.

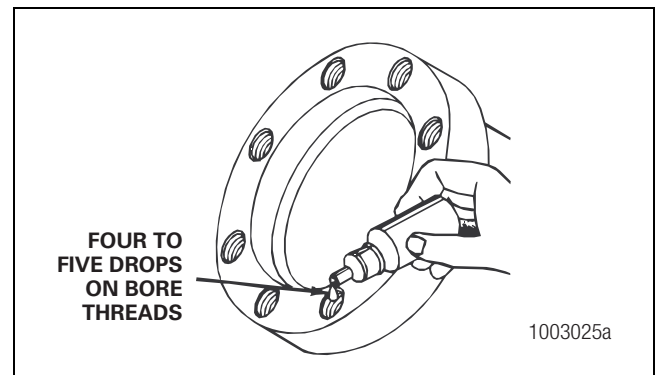


Figure 4.7

3. Tighten the fasteners to the required torque value for that size fastener. There is no drying time required for Meritor liquid adhesive 2297-C-7049, Loctite® 638 or 680 liquid adhesive or equivalent.

Carrier-to-Housing Joint Sealing Procedure

1. Remove the carrier from the housing.
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 carrier faces. Figure 4.8. Surfaces must be clean, dry and free of foreign matter. The surfaces must not be oily to the touch.

4 Prepare Parts for Assembly



Figure 4.8

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 carrier faces.
7. Dry the housing and carrier faces.

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.

8. If you reuse the carrier-to-housing capscrews, use a rotary wire brush to remove any threadlocker material and clean the capscrew threads. Use a clean cloth to wipe the threads.
9. Use a tap to clean the internal threads in the housing.

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 ThreeBond 1216E silicone products. Figure 4.9.

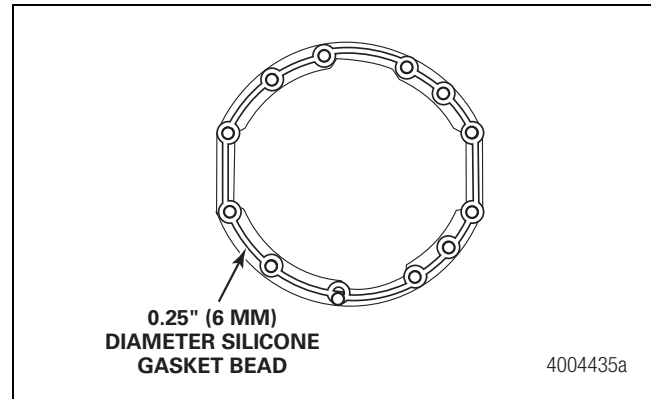


Figure 4.9

11. Install two long studs in the carrier to guide the carrier into the housing.
12. Immediately install the carrier into the housing to permit the silicone gasket material to compress evenly between the faces. If using a new capscrew kit with blue Dri-Loc® STS pre-applied threadlocker, skip the next step.

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® 242 threadlocker across the length of the threads. Figure 4.10.

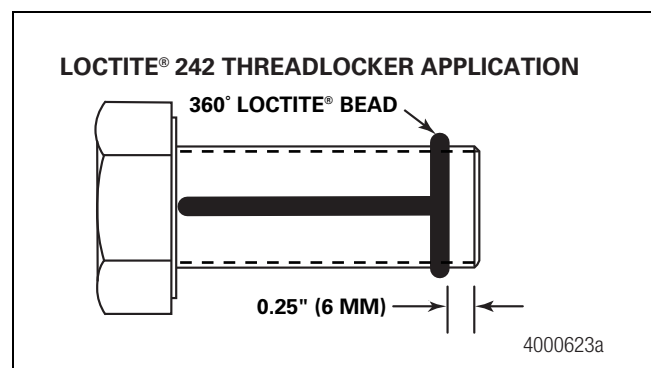



Figure 4.10

14. Install the capscrews. Use a crossing pattern to tighten the capscrews evenly to 175-225 lb-ft (237-305 N•m). The capscrews must be tightened within 10 minutes of initial application of Loctite® 242 threadlocker. 
15. Wait a minimum of 60 minutes before filling the assembly with lubricant.

Inspection

Hub Reduction Wheel Ends

1. Thoroughly clean all hub parts. Check all of the parts for wear, deformities or damage.
2. Check the needle roller bearing assemblies, gears and all bearing surfaces. If a planetary gear is damaged, all of the planetary gear pinion shafts and rollers must be replaced at the same time. Replace any damaged parts.

Wheel Studs

WARNING

Take care that you do not damage stud threads. Studs with damaged threads can strip or cross-thread, which will reduce clamp load, loosen studs and cause a wheel to separate from the vehicle. Serious personal injury and damage to components can result.

Replace bent, loose, broken or stripped studs. When you replace a stripped stud, always replace the stud on each side of the stripped stud as well. Even if the adjoining studs are not cracked, they have sustained fatigue damage, which can cause the wheels to loosen and separate from the vehicle. Serious personal injury and damage to components can result.

You must correctly support the hub when you remove or install a stud. If you do not support the hub correctly, serious personal injury and damage to components can result.

Do not use a hammer to remove or install studs while the hub is on bearings. A hammer can cause impact damage to the bearing raceway, which will reduce bearing life. Serious personal injury and damage to components can result.

Ensure that you do not damage stud threads during installation procedures. Damaged threads will not allow the stud to provide the required clamp to support the wheel retention system. The wheels can loosen and separate from the vehicle. Serious personal injury and damage to components can result.

Stud Removal

1. Wear safe eye protection.
2. Place the clean hub in a shop press.
3. Support the inboard side of the flange adjacent to the stud head and perpendicular to the press cylinder.
4. Use a press on the threaded end of the stud to force the stud out of the flange.

Stud Installation

1. Wear safe eye protection.
2. Support the outboard side of the flange close to the stud hole and perpendicular to the press cylinder.

CAUTION

Always replace the studs with the same part number as those removed. Damage to components can result.

3. Press the new stud all the way into the hub. Verify that the stud is fully seated and that the stud head is not embedded into the hub.
 - **If the stud head is embedded into the hub:** Replace the hub.
4. Examine the hub flange to verify the studs are not damaged, and make sure the flange was not damaged during the stud installation process.
 - **If the flange is damaged:** Replace the hub.

5 Assembly and Installation

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.

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. If Loctite[®] adhesive material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

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.

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.

To avoid serious personal injury and damage to components, take care when using lifting devices during service and maintenance procedures. Inspect a lifting strap to ensure that it is not damaged. Do not subject the lifting straps to shocks or drop-loading.

Installation

Differential Carrier into the Axle Housing

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.

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 carrier mounting surface.
 2. Inspect the axle housing for damage. Repair or replace the axle housing.
 3. Check for loose studs in the mounting surface of the housing where the carrier fastens. Remove and clean the studs that are loose.
 4. Install the studs into the axle housing with a small amount of thread locking compound.

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 Loctite® 5101 adhesive sealant or other silicone gasket material to the mounting surface of the housing. Figure 5.1.

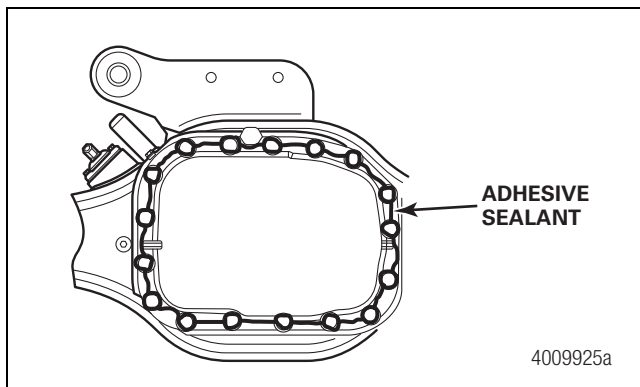



Figure 5.1

6. Ensure that the driver-controlled main differential lock (DCDL) is in the unlocked or disengaged position. The unlocked position provides enough clearance between the shift collar and the axle housing for carrier installation.
7. Use a hydraulic roller jack or a lifting tool to install the carrier into the axle housing. Align the carrier with the axle housing studs. Rotate the input shaft as necessary to engage the output shaft splines.
8. Apply thread locking compound to the mounting capscrews. Tighten the capscrews in a cross pattern to 175-225 lb-ft (237-305 N•m). 

CAUTION

Do not use a hammer or mallet to install the carrier. A hammer or mallet will damage the mounting flange of the carrier and cause oil leaks. Damage to components can result.

Output Shaft

NOTE: The DT100 family of axles use two different output shaft designs. The output shafts on tridem forward axles are designed with a spacer as shown in Figure 5.2. The output shafts on tridem middle and tandem forward axles are designed without a spacer as shown in Figure 5.3. When installing the output shaft, be sure to install the correct design shaft and related components in the proper position.

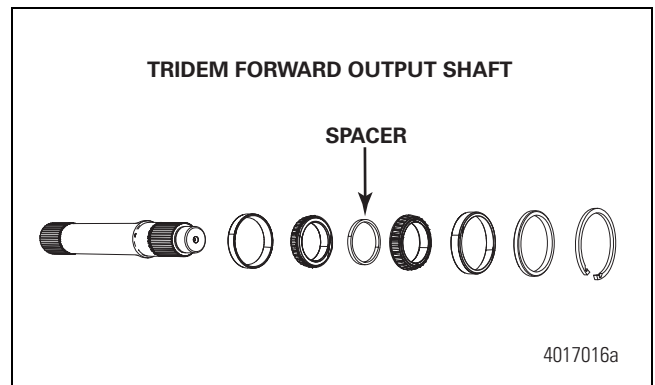


Figure 5.2

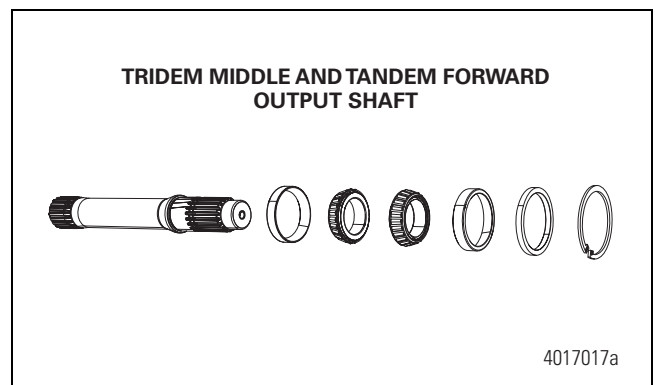


Figure 5.3

NOTE: If you have a “snap-ring stop” version output shaft that you need to replace, you must replace it with a “shoulder stop” version output shaft.

1. If you are servicing a “snap-ring stop” version output shaft, install the retaining ring onto the shaft.

5 Assembly and Installation

2. If the output shaft bearings were removed, you must replace them with new cones and cups. Install the new bearings onto the output shaft, then use a press and sleeve to push on the bearing's inner race until fully seated. For tridem forward output shafts, press the inner cone onto the output shaft then install the spacer before you press the outer cone onto the shaft. Figure 5.4.

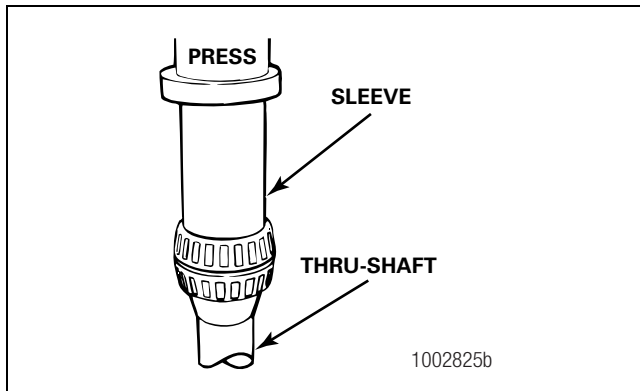


Figure 5.4

3. Lubricate the bearings with gear lube.
4. Use an appropriate driver and mallet to install the inner bearing cup. Figure 5.5.

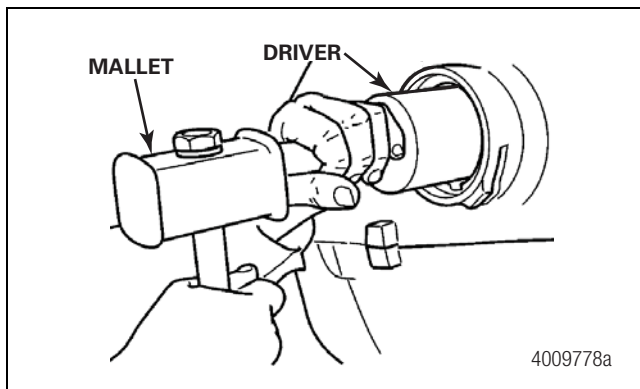


Figure 5.5

5. Install the output shaft and spacer ring. Figure 5.6.

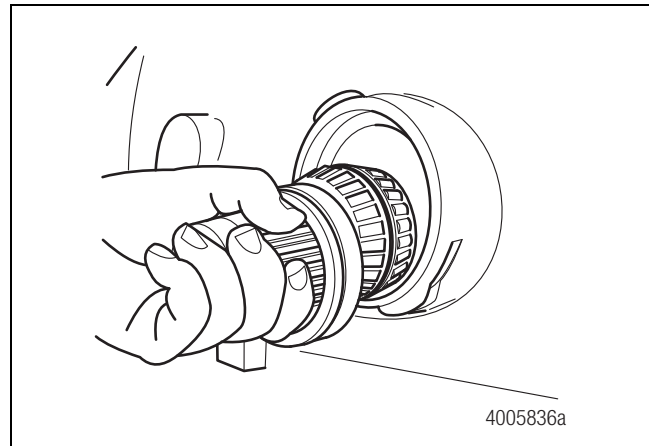


Figure 5.6

6. Use an appropriate cup driver to install the outer bearing cup into the axle housing. Ensure that the cup is seated far enough to allow for installation of the spacer and snap ring. Figure 5.7.

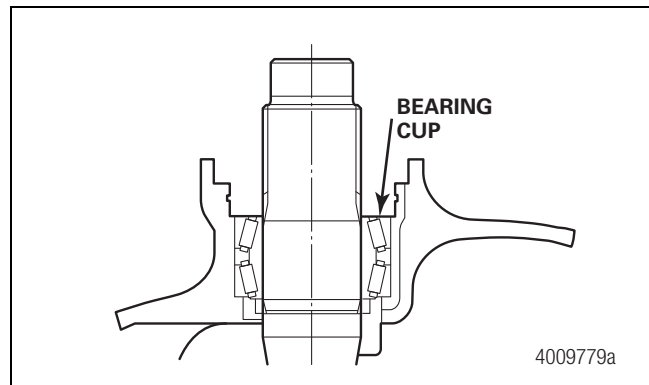


Figure 5.7

7. Install the spacer and snap ring onto the shaft. Figure 5.8.

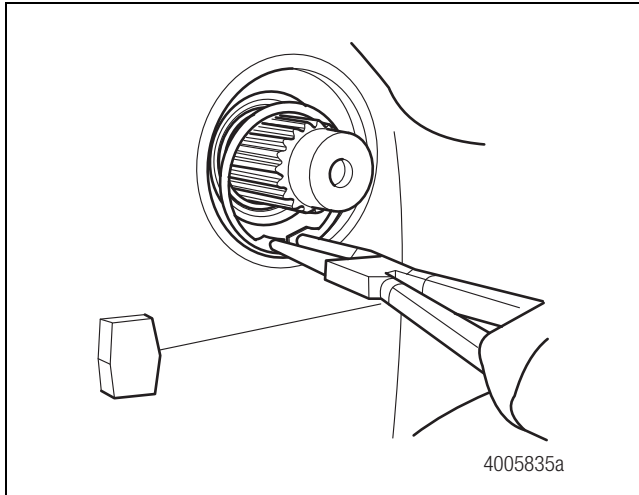



Figure 5.8

8. Install the companion flange on the output shaft.
9. Oil the threads and nut. Install the old nut and tighten to 465-565 lb-ft (630-766 N•m). Rotate the shaft 10 turns in both directions during tightening. Figure 5.9. 

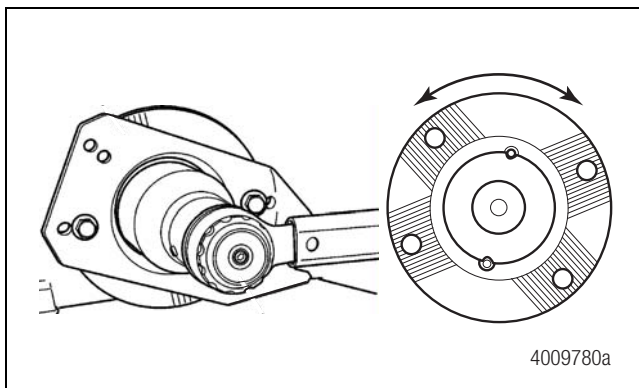


Figure 5.9

10. Mount a dial indicator onto the axle shaft housing with the indicator tip resting on the end of the output shaft.
11. Gently tap the output shaft while turning until the reading does not change.
12. Use a pry bar to pull outward on the companion flange and record the shaft movement. End play must be 0.001-0.004-inch (0.025-0.102 mm). Figure 5.10.
 - **If end play is not within specification:** Adjust the end play by installing a thinner spacer to increase the end play or a thicker one to reduce the end play.

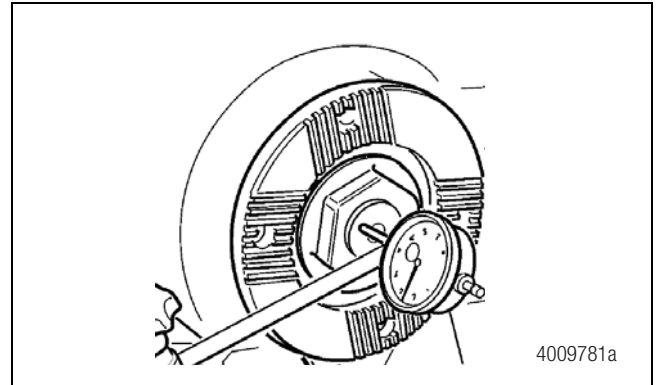


Figure 5.10

13. Remove the old companion flange and nut.
14. Clean and inspect the oil seal journal and companion flange seal surface for damage.
15. Lubricate a new oil seal.

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 driver tool.

16. Use the appropriate seal driver or suitable tool and a rubber mallet to install the new oil seal. Figure 5.11.

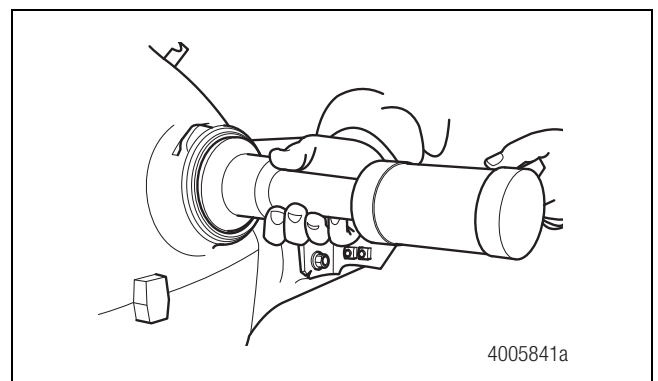


Figure 5.11

17. Inspect the companion flange face for damage caused when the nut was removed. Grind away any protruding metal to ensure a flat surface for full contact of the new nut. Replace the flange if excess wear or damage is found. Figure 5.12.

5 Assembly and Installation

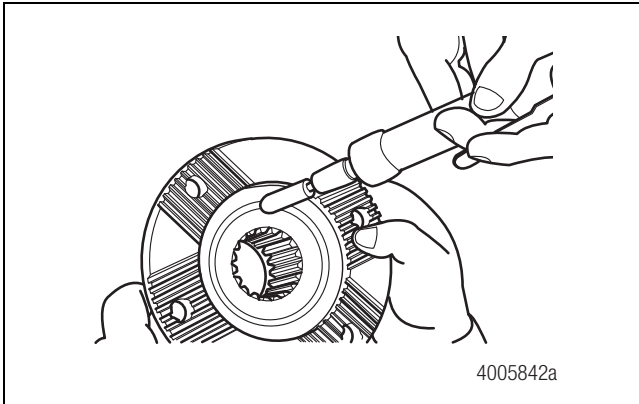



Figure 5.12

18. Lubricate the seal journal with oil.
19. Install the companion flange onto the output shaft.
20. Install a companion flange retainer tool to hold the flange in place.
21. Install a new companion flange retaining nut and tighten to 465-565 lb-ft (630-766 N•m). Figure 5.13. 

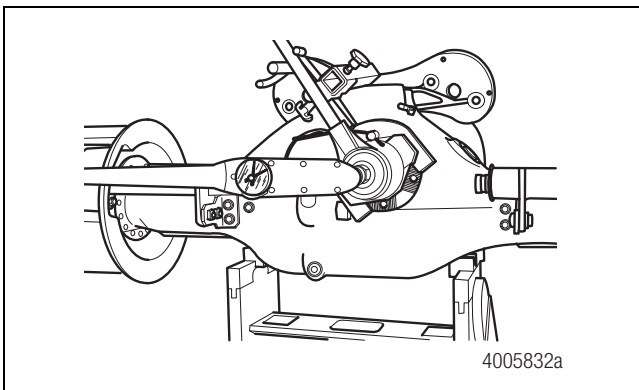


Figure 5.13

22. Stake the nut on both side using a rounded tip tool to achieve approximately 0.11 inch (3 mm) in depth. Figure 5.14.

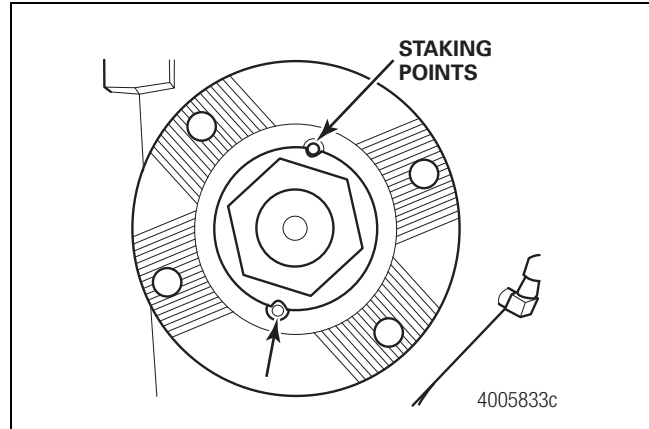


Figure 5.14

Assembly

Brake and Spindle

1. Lubricate and install a new housing O-ring.
2. Use a lifting device to support the spindle as it is installed onto the two spindle dowels. Figure 5.15.

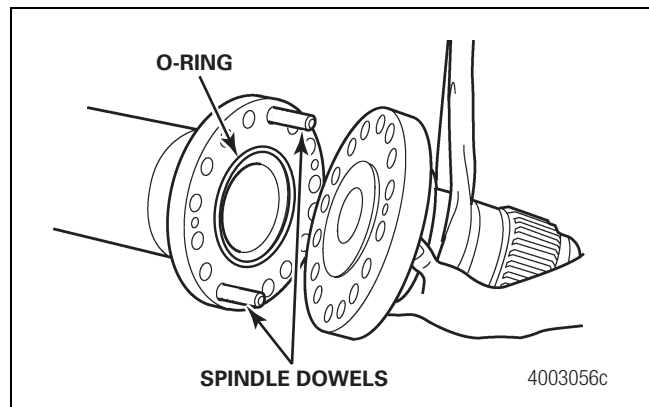


Figure 5.15

3. Use a lifting device to support the brake assembly.
4. Carefully rotate and install the complete brake assembly into position. Figure 5.16.

5 Assembly and Installation

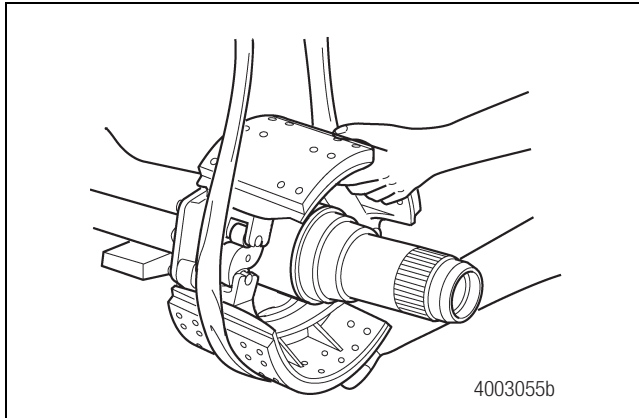


Figure 5.16

5. Apply Loctite® 277 threadlocker to the brake spider-to-housing bolt threads.

⚠ WARNING

You must tighten all brake spider-to-housing bolts to the correct specification. If the bolts are not tightened to the correct specification, the wheel ends can separate from the vehicle during operation. Serious personal injury and damage to components can result.

6. Install and tighten the brake spider-to-housing bolts according to their length. You must tighten all brake spider-to-housing bolts to the correct specification. Figure 5.17.
 - A. Tighten the M16 x 2 bolts to 180-230 lb-ft (224-310 N•m). **ⓘ**
 - B. Tighten the M20 x 2.5 bolts to 360-481 lb-ft (488-652 N•m). **ⓘ**

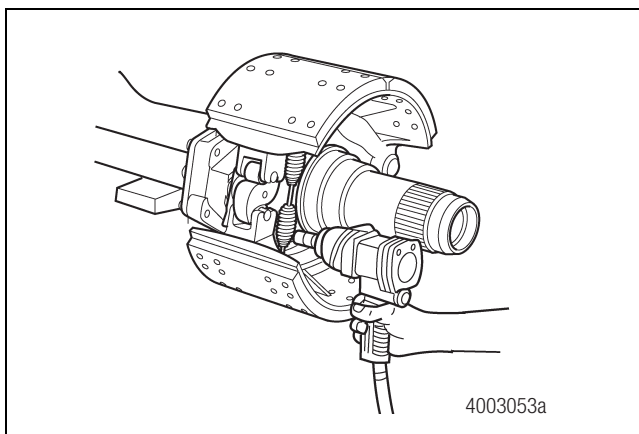


Figure 5.17

7. Install the brake return spring and clips. Figure 5.18.

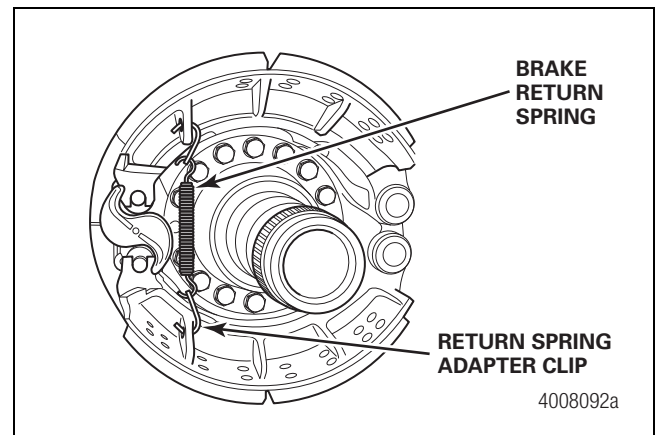


Figure 5.18

8. Place the sensor block onto the axle and install the bolts and washers. Apply Loctite® 242 threadlocker and tighten the bolts to 7-11 lb-ft (10-15 N•m). **ⓘ**
9. Grease the ABS sensor, spring clip and bore. Install the ABS sensor onto the axle and wipe away the excess grease. Refer to the ABS manufacturer's service instructions for more information.
10. Connect the brake lines.

⚠ WARNING

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.

11. If the brake has spring chambers, carefully unlock the spring using the brake chamber manufacturer's instructions.

Wheel Ends

1. If removed, press the ABS tooth wheel into place until it is fully seated against the shoulder of the hub.
2. If necessary, lubricate a new inner hub seal. Use a seal driver to press it into the hub. Figure 5.19 and Figure 5.20.

5 Assembly and Installation

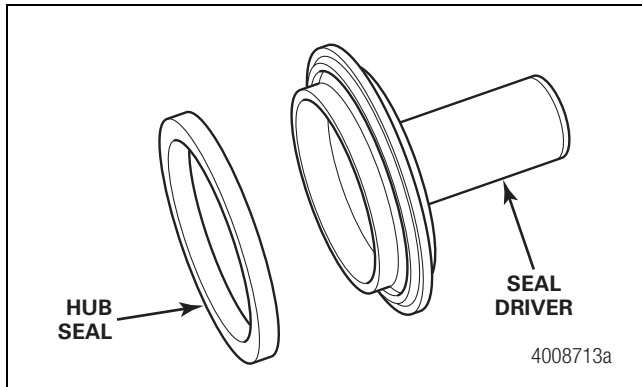


Figure 5.19

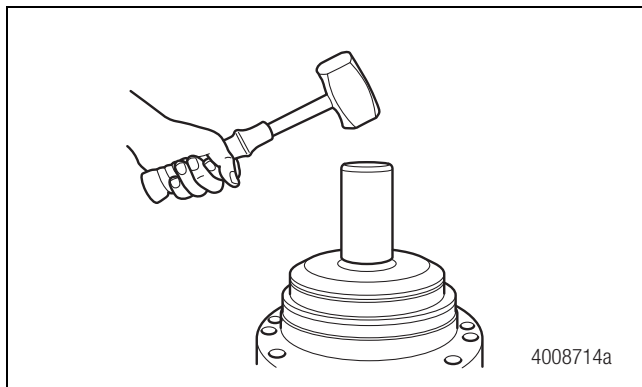



Figure 5.20

3. Lubricate a new outer O-ring with Meritor-approved white lithium grease and install it onto the hub.
4. Grease the spindle bearing journals and place the hub into position on the spindle.
5. If removed, install the snap ring onto the ring gear assembly.
6. Place the ring gear carrier into position on the ring gear.
7. Install a new nut onto the spindle. While rotating the hub by hand, tighten the nut to 45-58 lb-ft (61-79 N•m). 
8. Further rotate the hub three times in alternating directions. Then mark the location of the nut.
9. Retighten the nut.
 - **If the nut moves:** Repeat the previous steps until the required torque is maintained.

WARNING

When you remove a spindle nut, always replace the nut with a new one. Do not reuse a spindle nut. Ensure that you correctly stake a spindle nut. A reused or incorrectly staked spindle nut will not tighten correctly and can cause the wheels to loosen and separate from the vehicle during operation. Serious personal injury and damage to components can result.

10. Stake the nut by deforming the flange into the channel on the spindle at two locations 180 degrees apart. The stake must be 0.08-inch (2.0 mm) deep. Figure 5.21.

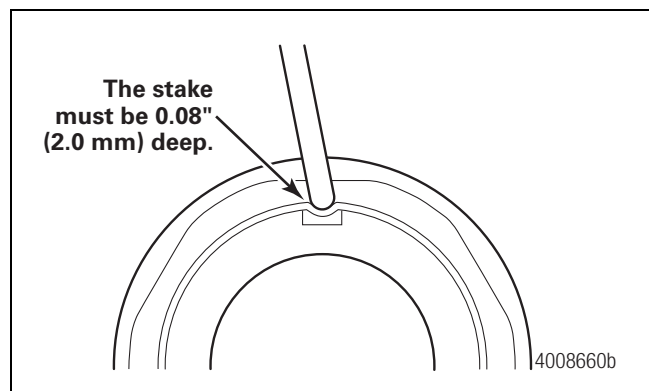


Figure 5.21

11. Install the axle shaft sealing ring into the spindle.
12. Install the axle shaft into the axle housing. Ensure the splines fully engage within the carrier.

Installation

Wheel Ends

1. If removed, install the spring washers and thrust washer into the sun gear. Install the snap ring. Figure 5.22 and Figure 5.23.

5 Assembly and Installation

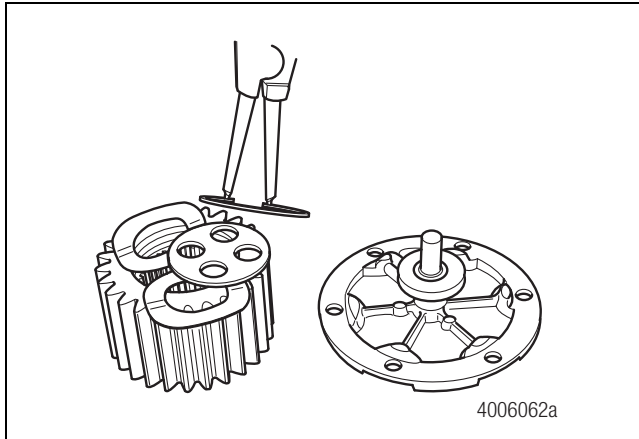


Figure 5.22

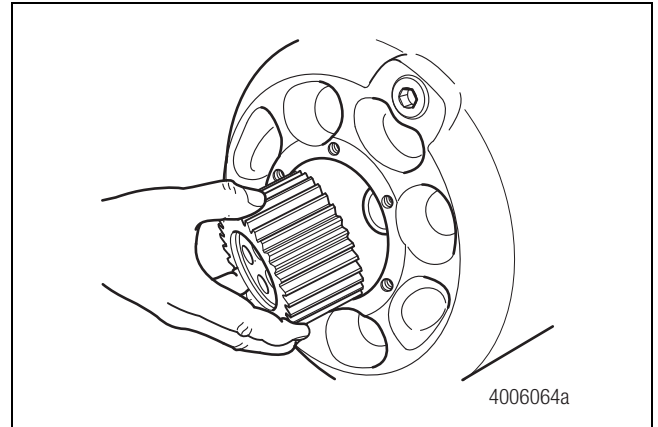


Figure 5.24

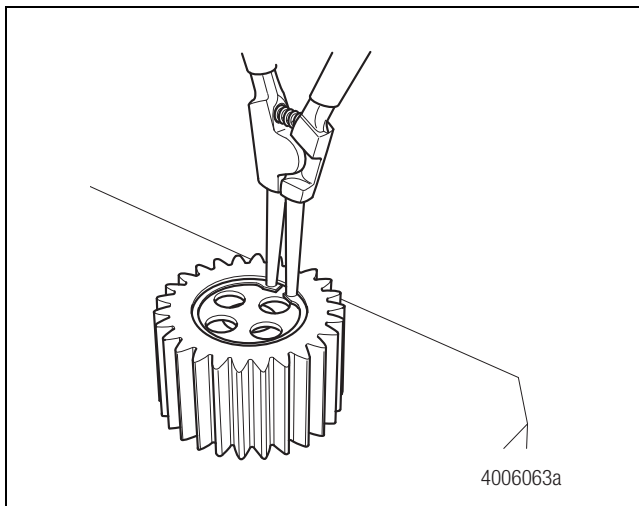


Figure 5.23

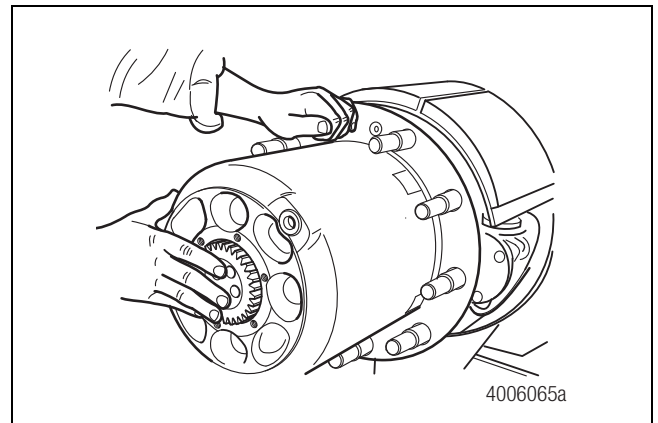



Figure 5.25

2. Use a strap with a hoist or other suitable lifting device to install the planetary housing onto the hub. Make sure to align the holes for the mounting bolts. Install two socket head bolts to hold the planetary housing in position.
3. Apply Loctite® 243 threadlocker to two socket head bolts. Install the bolts and tighten them to 22-37 lb-ft (30-50 N•m). 
4. Insert the sun gear into the hub housing. Rotate the hub to engage the sun gear with the axle shaft splines and planetary gears. Figure 5.24 and Figure 5.25.

5. Push the sun gear in as far as possible.
6. Clean the outer face of the hub housing and the inner mating surface of the cover plate. Remove any old sealant and debris.
7. Check the hub end play.
 - A. Measure the distance between the sun gear thrust washer and the face of the hub housing. This is dimension A. Figure 5.26.
 - B. Pull out the sun gear approximately 1/2-inch (10 mm). Place the cover plate assembly into position on the hub housing. Remove the cover plate and measure the depth of the sun gear thrust washer. This is dimension B. Dimension B must be 0.040-0.080-inch (1-2 mm) less than dimension A.
 - **If end play is within specification:** Continue to Step 11.

5 Assembly and Installation

- **If the end play is not with specifications:** Remove the thrust pin and change the number of washers under the pin.
- C. Remove the serrated thrust pin from the cover plate. Select the appropriate number of washers and a serrated thrust pin to obtain a total length that is 0.16-0.24-inch (0.4-0.6 mm) less than dimension A.
- D. Place the washers into the pin bore and install the pin into the cover plate. Measure to obtain a new end play dimension A and dimension B.
- **If the measurement is not within specifications:** Install a different number of washers and check the end play until it is correct.
- E. Install the magnetic washer over the thrust pin and secure it with a new star lock fastener.

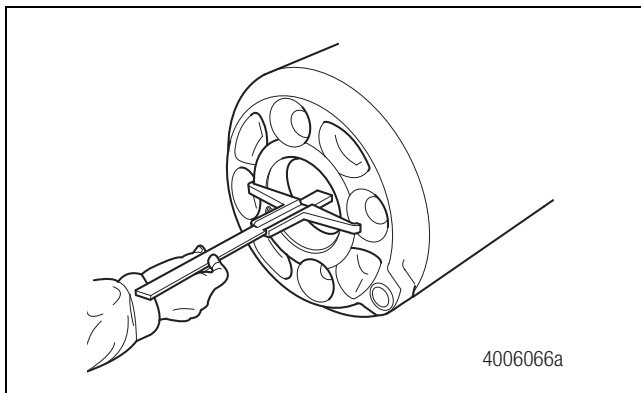


Figure 5.26

8. Apply a continuous 0.24-inch (6 mm) bead of Dow Corning 7091 sealing compound to the inner face of the cover plate. Figure 5.27.

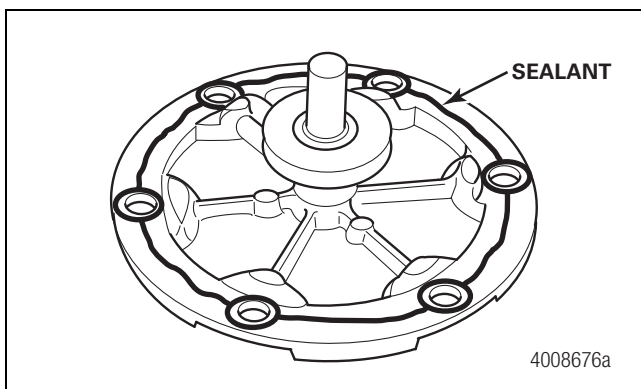


Figure 5.27

9. Align the "Oil Level" line on the cover plate with the drain/fill plug. Install the cover plate onto the hub housing immediately to ensure the silicone gasket material compresses evenly between the sealing surfaces. Figure 5.28.

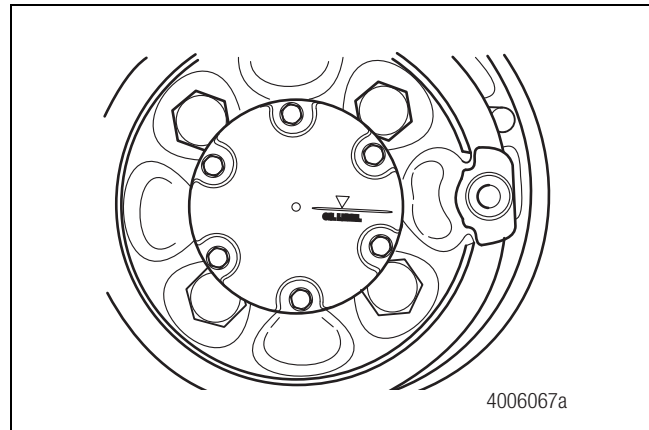




Figure 5.28

10. Install the cover plate capscrews and tighten them to 11-18 lb-in (15-25 N•m). 
11. Fill the hub with oil until it reaches the correct level. Install and tighten the drain plug to 44-74 lb-ft (60-100 N•m). 

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

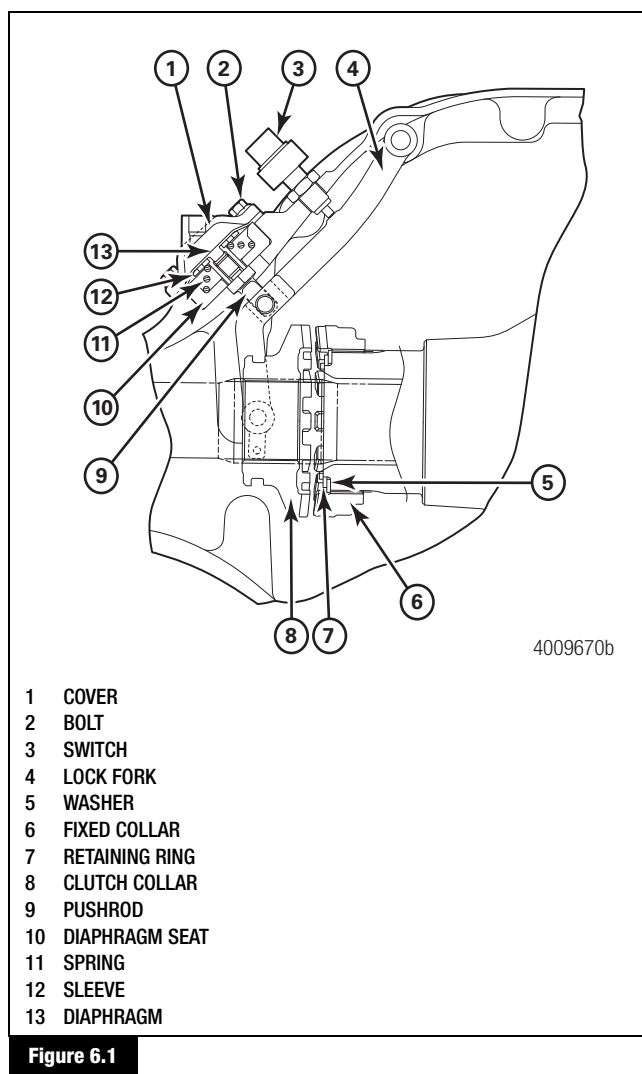
To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

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.

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. If Loctite® adhesive material gets into your eyes, follow the manufacturer's emergency procedures. Have your eyes checked by a physician as soon as possible.

Description

The driver-controlled main differential lock (DCDL) is operated by a axle housing 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 and Figure 6.2.



6 Driver-Controlled Main Differential Lock (DCDL)

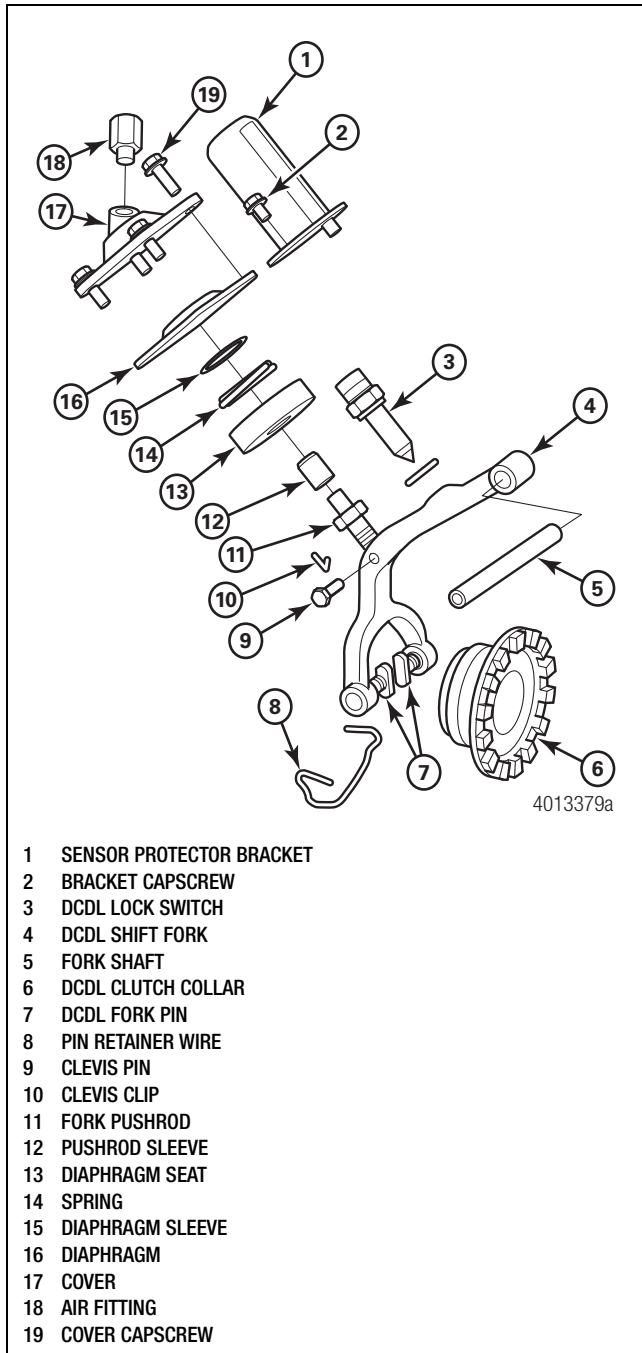


Figure 6.2

Removal

DCDL Shift Assembly

1. Remove the cotter pin from the clevis pin. Remove the clevis pin from the shift fork. Figure 6.3.

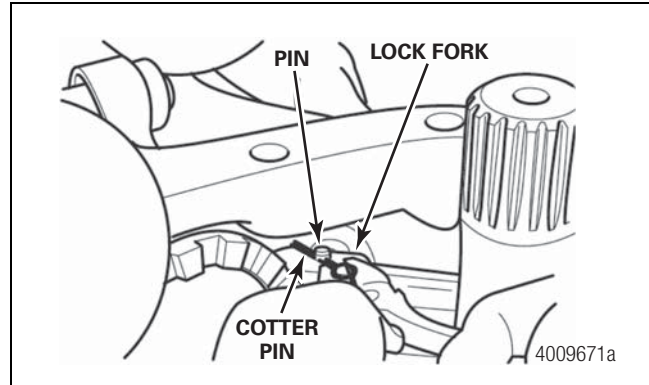


Figure 6.3

2. Thread an extractor bolt (M6 x 1.0) into the pivot pin and withdraw it from the carrier. Figure 6.4.

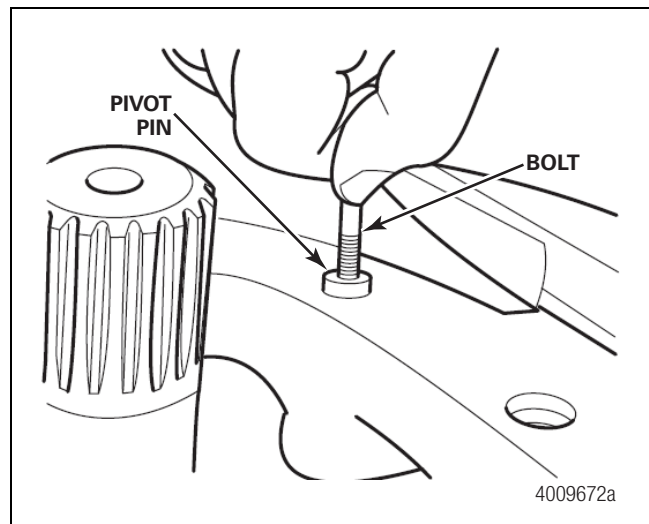


Figure 6.4

3. Remove the shift fork and clutch collar from the axle housing. Figure 6.5.

6 Driver-Controlled Main Differential Lock (DCDL)

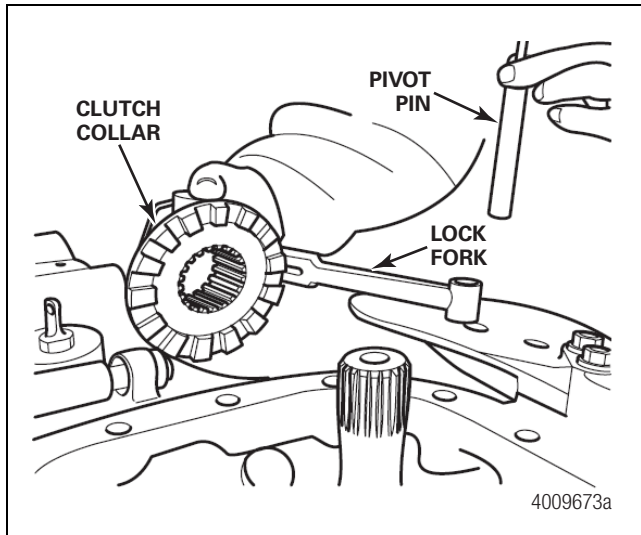


Figure 6.5

4. Mark the orientation of the cover relative to the axle housing.
5. Remove the bolts from the DCDL cover and remove the cover from the axle housing. Figure 6.6.

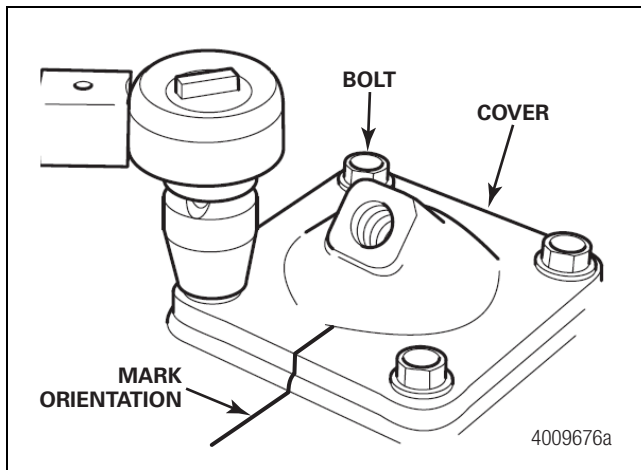


Figure 6.6

6. Remove the diaphragm. Figure 6.7.

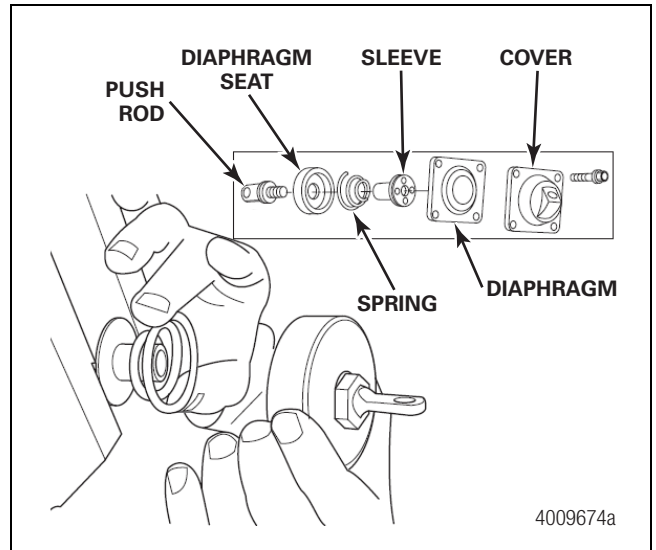


Figure 6.7

7. Remove the diaphragm pushrod assembly.
8. If necessary, unscrew the pushrod from the sleeve and remove the spring.
9. Remove the screws from the switch protector and remove the switch protector from the housing.
10. Loosen the switch lock nut. Unscrew the switch and remove it from the housing. Figure 6.8.

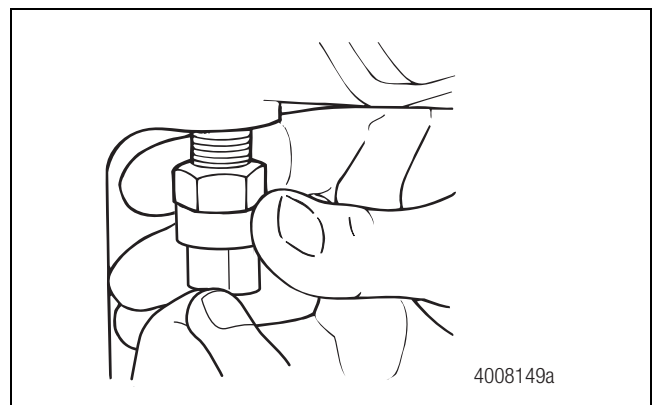


Figure 6.8

Installation

DCDL Shift Assembly

1. Install the spring and diaphragm seat onto the diaphragm sleeve. Figure 6.9.

6 Driver-Controlled Main Differential Lock (DCDL)

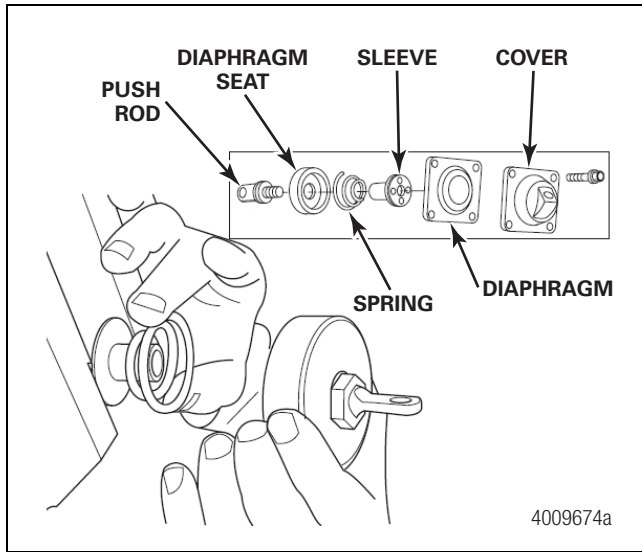




Figure 6.9

2. Screw the pushrod into the diaphragm sleeve and tighten it to 18-26 lb-ft (24-35 N•m). 
3. Install the assembly into the housing. Install the cover and diaphragm over the assembly. Ensure the cover is oriented correctly.
4. Apply Loctite® 242 threadlocker to the cover bolt threads. Install the cover bolts and tighten to 15-20 lb-ft (20-27 N•m). Figure 6.10. 

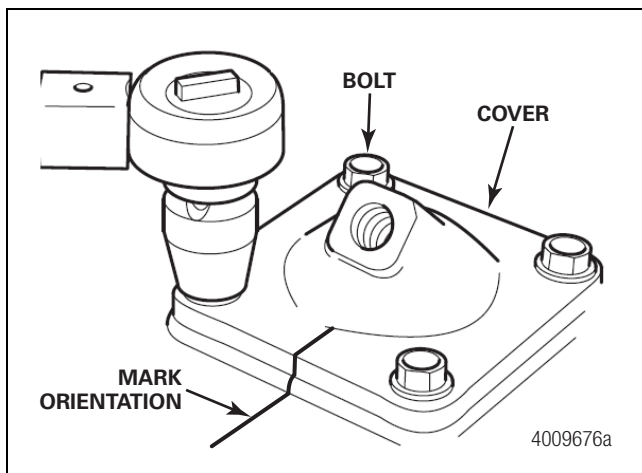


Figure 6.10

5. Install the clutch collar guide pins into the fork.
6. Install the clutch collar into the fork and retain it with the lock brace.

7. Apply axle lubricant to the clutch collar splines and fork groove, in the shift fork pushrod (selector bar) hole and pivot pin hole.
8. Assemble an axle shaft part way into the axle housing. Install the clutch collar with the fork onto the axle shaft and push the axle shaft through into the carrier. The axle shaft will be used as a guide for aligning the DCDL parts. Figure 6.11.

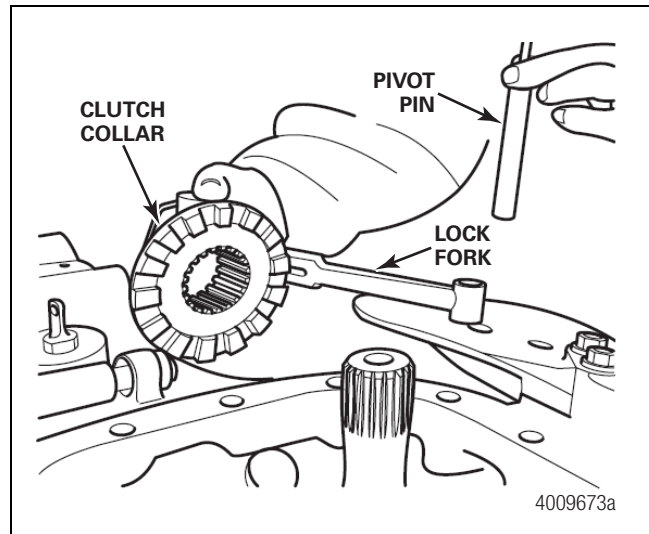


Figure 6.11

9. Rotate the shift fork and align the hole on the fork with the hole in the housing. Install the pivot pin through the housing and fork. Figure 6.12.

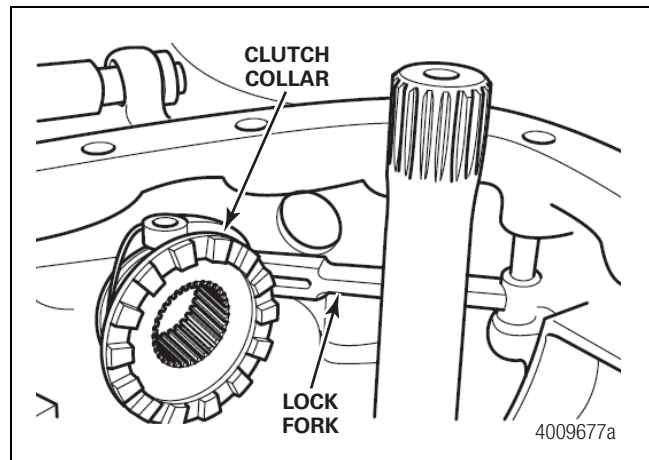


Figure 6.12

10. Align the shift fork with the pushrod (selector bar) holes and install the clevis pin through the fork. Install the cotter pin through the clevis pin. Figure 6.13.

6 Driver-Controlled Main Differential Lock (DCDL)

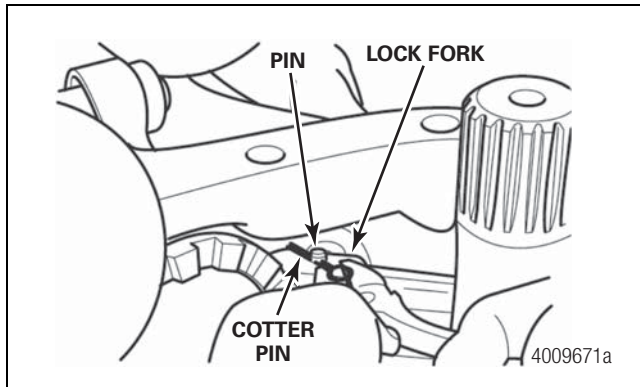


Figure 6.13

- Slide the axle shaft end back out so it is flush with the clutch collar.
- Connect the air line to the DCDL cover and apply 80 ± 3 psi (5.5 ± 0.2 bar) of air. Check for a leak rate of 1 psi (0.068 bar) maximum in one minute.
 - If the leak rate exceeds this limit:** Disassemble the DCDL and correct the issue.
- Apply Loctite® 5127 threadlocker to the switch threads. Figure 6.14.

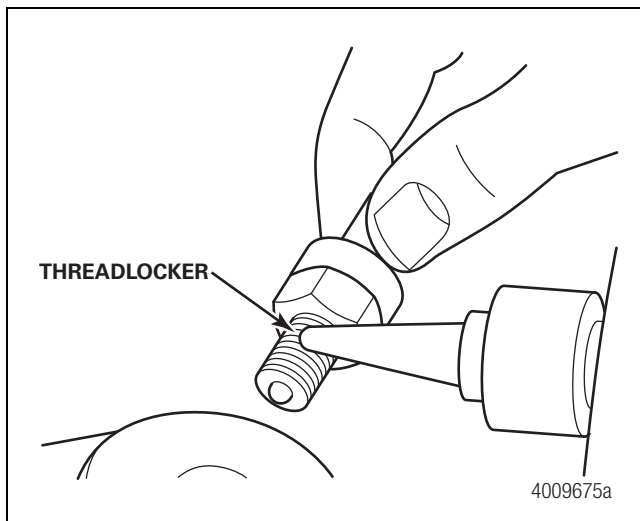



Figure 6.14

- With the differential lock disengaged, connect the volt-ohm meter to the sensor switch. Screw the switch into the housing until the contact is broken and the reading switches to infinity. Figure 6.15. 

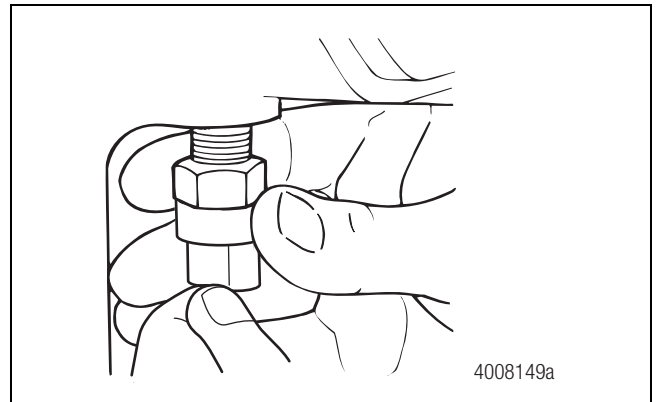




Figure 6.15

- Continue tightening the switch another 3/4 turn clockwise. Tighten the lock nut against the housing to 26-34 lb-ft (35-45 N•m). 
- Connect the wiring harness to the DCDL switch.
- Place the switch protector over the switch and align the holes. Apply Loctite® 242 threadlocker to the switch protector screws. Install the screws and tighten to 15-20 lb-ft (20-27 N•m). 

Check the Differential Lock

- Install the carrier into the axle housing. Refer to Section 5.
- Shift the vehicle transmission into neutral. Start the engine to get the system air pressure to the normal level.

WARNING

Do not start the engine and engage the transmission during disassembly of the driver-controlled main differential lock (DCDL), or when the DCDL is in the locked or engaged position, and the vehicle's wheels are raised from the floor. The vehicle can move and cause serious personal injury and damage to components.

- Place the differential lock switch in the cab of the vehicle in the unlocked or disengaged position.
- 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.

6 Driver-Controlled Main Differential Lock (DCDL)

- Continue to drive the vehicle and place the differential lock switch in the locked or engaged position. A slight left or right turn may be required to lock the DCDL. Let up on the accelerator to remove the driveline torque and permit the shift. The indicator 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. A slight left or right turn may be required to unlock the DCDL. If the indicator light remains on after completing a slight left or right turn, check the piston and shift shaft for binding. If necessary, take them apart and check both for burrs, scratches and damage. Replace the parts if necessary. Refer to the procedure in this section.

DCDL Driver Caution Alert Label

Verify that the driver caution label is installed in the vehicle cab. Figure 6.16. 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.

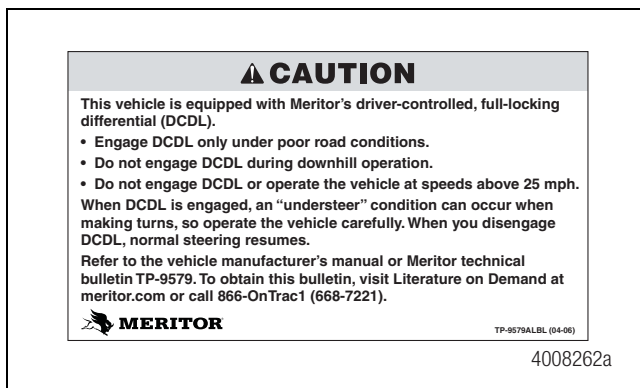


Figure 6.16

Driver Instruction Information Available

Refer to the Service Notes page on the front inside cover of this manual to obtain the following items from meritor.com.

- A technical bulletin compilation is available to download that covers DCDL, inter-axle differential (IAD), axle preparation instructions for towing or new-vehicle drive-away, and DCDL installation instructions. Enter TP9579 in the Search by Publication # box.
- Traction Control for Drive Axles (DVD). Enter SP03105 in the Search by Publication # box to order.

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.

Input and Pinion Seal Removal

1. Disconnect the driveshaft from the input flange.
2. Use a die grinder to remove the two staking points on the retaining nut. Figure 7.1.

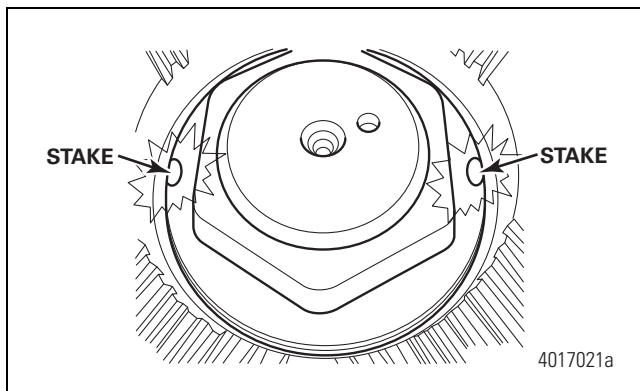


Figure 7.1

3. Use a companion flange retainer tool or other suitable tool to hold the companion flange in place. Figure 7.2.

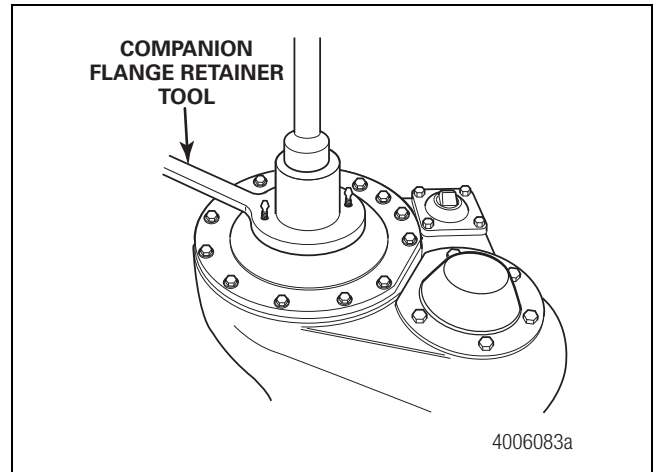


Figure 7.2

4. Use an appropriate torque multiplier to remove the flange nut. Discard the nut. Figure 7.3.

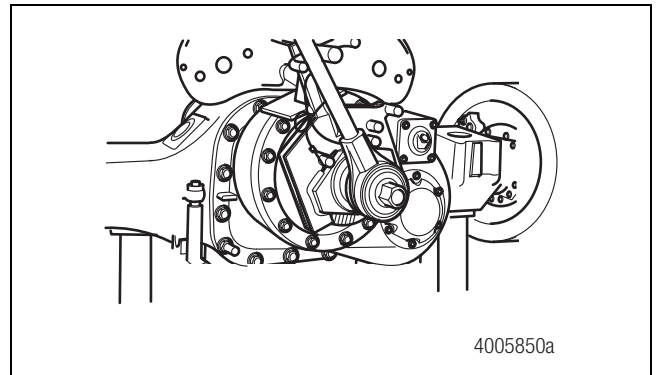


Figure 7.3

5. Use a puller to remove the companion flange. Figure 7.4.

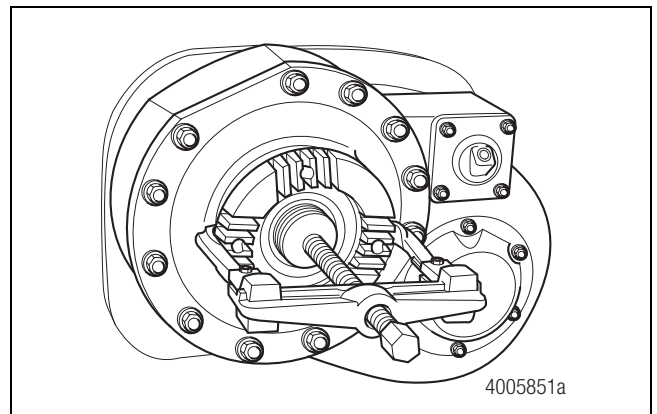


Figure 7.4

7 Input and Pinion Seal Service

6. Inspect the deflector for damage. If damage is found, replace the deflector. Figure 7.5.

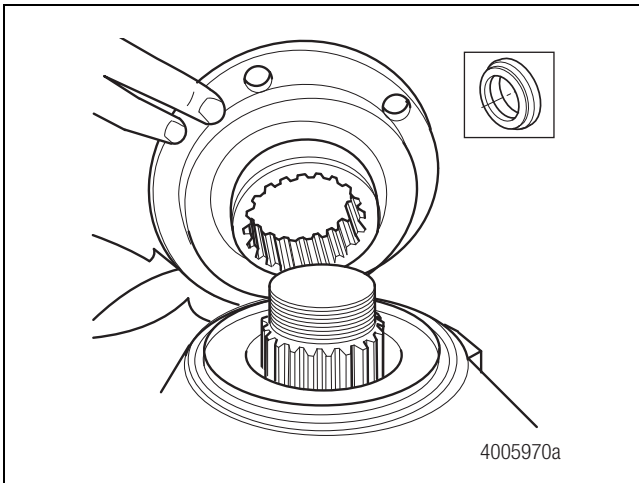


Figure 7.5

7. Use a seal puller or other suitable tool to remove the seal. Discard the seal. Figure 7.6.

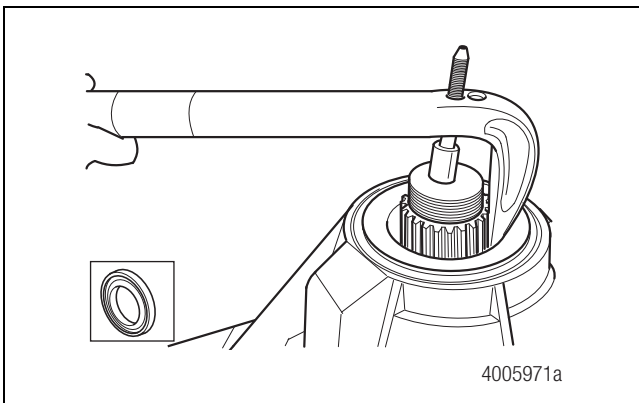


Figure 7.6

8. Remove the seal sleeve from the companion flange and replace it with a new seal sleeve.

Input and Pinion Seal Installation

1. Use a seal driver and a mallet to install the seal into the bore in the carrier. Ensure the seal is fully seated in the bore. Figure 7.7.

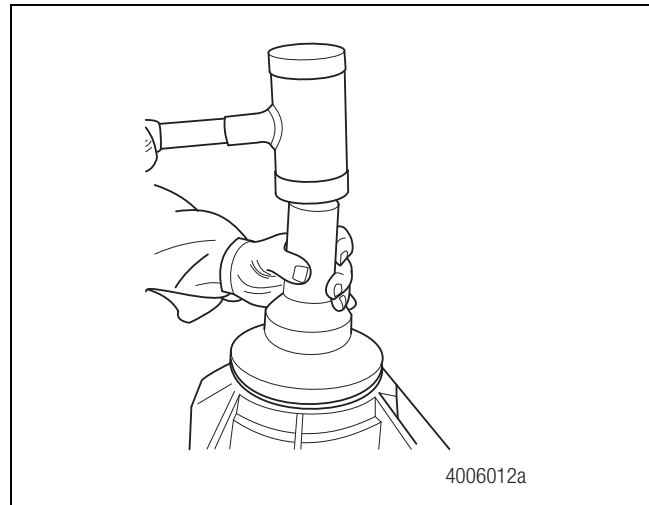


Figure 7.7

2. Verify that the seal spring has remained in the correct position. Figure 7.8.

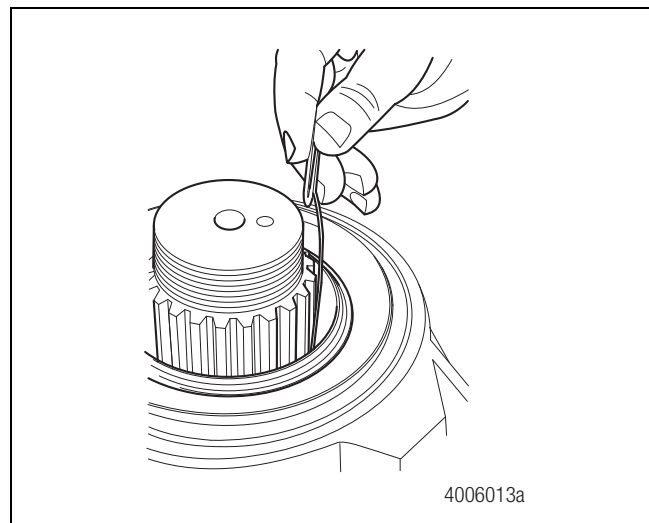


Figure 7.8

3. If the deflector requires replacement, apply a film of oil on the companion flange journal and use driver tool 3256L1286 to install the deflector.
4. Lubricate the companion flange sleeve journal with a film of oil and use driver tool 3256K1285 to install the seal sleeve.
5. Apply a film of oil to the sleeve. Figure 7.9.

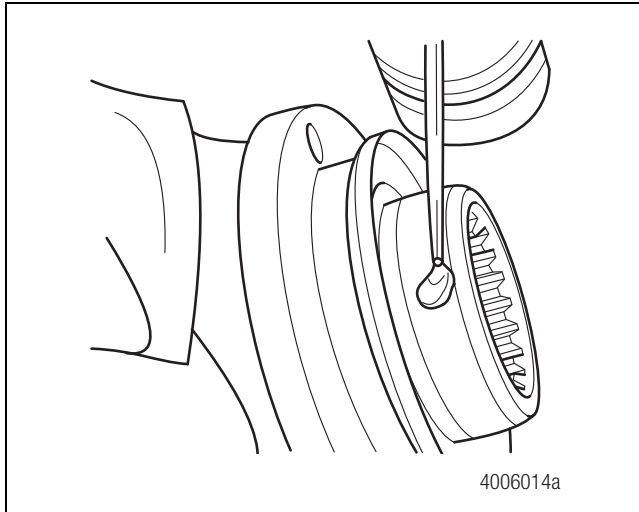


Figure 7.9

6. Install the companion flange onto the shaft.
7. Install a companion flange retaining tool to hold the flange in place.
8. Install the companion flange retaining nut and tighten to the torque specified in Section 10.
9. Use a suitable staking tool to stake the nut in two places directly above the slots in the companion flange. Figure 7.10.

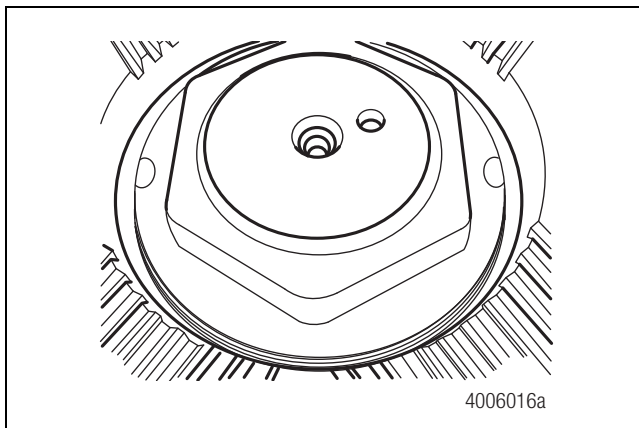


Figure 7.10

8 Troubleshooting

Diagnostic Charts

Refer to the following charts when troubleshooting axle problems.

Table A: Carriers

Condition	Possible Causes	Actions Required
Noise, Possibly Followed by High Temperature	The oil is incorrect.	Drain the oil. Fill the axle with the correct oil according to the specifications.
	The oil level is too low.	Check the oil level.
	The backlash is incorrect.	Adjust the backlash.
	The tooth contact is incorrect.	Adjust the tooth contact.
	The gears are damaged.	Remove the final drive. Inspect the gears for damage. Replace any damaged parts. Perform the necessary adjustments.
Thump in the Forward Axle Carrier When Applying the Accelerator Pedal (Noise due to U-joint wear ruled out)	The bearings are worn or incorrectly adjusted.	Check and adjust the bearings. Replace worn or damaged bearings.
	The thrust washers for the differential gears are worn.	Replace all thrust washers.
	The differential gears or spider are worn.	Replace the worn parts.
	The driving wheel is loose on the hub.	Tighten the wheel nuts.
	The splines are worn on the drive shafts or final drive.	Replace the worn parts.
Oil Leakage	The oil level is too high.	Check the oil level.
	The breather valve is clogged.	Check the breather valve.
	The oil seals are damaged.	Replace the oil seals.
	The wheel bearings are incorrectly adjusted or damaged.	Adjust or replace the wheel bearings.
	Damage is found on the pinion seal or the flange/yoke.	Replace the damaged parts.
	The pinion bearings are incorrectly adjusted or damaged.	Adjust or replace the bearings.
	The differential lock piston seal leaks so compressed air enters the final drive when the differential lock is engaged.	Replace the piston seal.
	The air lines are leaking.	Check the air lines and connections.
Differential Lock Does Not Engage	The differential lock teeth are damaged or deformed.	Replace the differential lock.
	The shift fork guide pin holes are bent or damaged.	Replace the guide pins.

Condition	Possible Causes	Actions Required
	There is an electrical fault in the switch or solenoid valve.	<ol style="list-style-type: none"> 1. Check the cables and connections. 2. Check the solenoid valve. 3. Check the switch.
	The push rod is incorrectly adjusted.	Adjust the push rod according to the recommended procedure.
Differential Lock Does Not Disengage	The return spring is broken.	Replace the spring.
	The shift fork holes are bent or damaged.	Replace the guide pins.
Differential Lock Indicator Lamp Does Not Illuminate	The differential lock does not engage or engages only partially.	Refer to the “Differential Lock Does Not Disengage” condition.
	There is an electrical fault in the lines or connections.	Check the lines and connections.
	A bulb is blown.	Replace the bulb.
	The indicator contact is incorrectly adjusted.	Replace the indicator according to the recommended instructions.
Differential Lock Indicator Lamp Illuminates Continuously	The differential lock does not disengage or disengages only partially.	Refer to the “Differential Lock Does Not Disengage” condition.
	The electrical cable between the indicator lamp and the control cylinder has contact with the chassis.	Insulate or replace the cable.
	The indicator is incorrectly adjusted.	Adjust the indicator.

Table B: Hub Reduction Wheel Ends

Condition	Possible Causes	Checks	Actions Required
Loss of Oil from the Hub	The wheel bearing is damaged.	The oil loss is coming from the hub outwards.	Remove the wheel-end assembly. Replace the bearing and any other damaged parts.
Loss of Oil between the Hub Cover and the Hub	The sealant was not distributed correctly during service.		Remove the hub cover. Apply sealant correctly. Check the drive shaft and hub for correct installation.
Excessive Hub Clearance	There is too much slack, looseness on the hub.	Check the hub nut. Check for correct staking or signs of rotation.	Check the condition of the bearings. Ensure the hub nut is correctly tightened. Ensure correct staking of the nut.

9 Maintenance

Inspection and Maintenance

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 performing an inspection of axle components, verify that the correct tools are available. Using the correct tools will ensure safety and provide the most accurate results. Check for the following tools.

- Dial indicator
- Tire blocks
- Jack
- Safety stands
- Pry bar
- Torque wrench

Components

Axle

Visually inspect for signs of oil or grease leaking as well debris in or around the breather. Repair as necessary.

Verify that all fasteners are tightened to the specified torque. Use a torque wrench to check the torque in a tightening direction. As soon as the fastener starts to move, record the torque. Correct if necessary. Replace any worn or damaged fasteners.

Inspect the parts of the axle for wear and damage. Look for bent or cracked parts. Replace all worn or damaged parts.

Verify that looseness does not exist at the pivot points. Verify that the pivot points are lubricated.

Verify that all the parts move freely through the complete turning radius.

Inspect the tires for wear patterns that indicate suspension damage or misalignment.

Brakes

Inspect the brakes at least every six months when you replace the seals and reline the brakes.

Inspect the brakes every two weeks during the first four-month period for hardened or contaminated grease and for the absence of grease to help determine lubrication intervals.

Lubricate more often for severe-duty applications. Refer to Maintenance Manual 4, Cam Brakes and Slack Adjusters, for more information. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

Carrier

Replace the carrier seal as required or whenever the carrier is repaired. Refer to Maintenance Manual MM-1190, DS70 and DT100 Single-Reduction Differential Carriers. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

Wheel Bearing End Play

Wheel bearings should be checked periodically according to the inspection intervals in this section. End play should be less than 0.001-inch (0.0254 mm). If end play is detected, perform an internal inspection using the following procedure.

1. Mark the location of the spindle nut in relation to the planetary ring gear hub.
2. Un-stake the spindle nut from the spindle.
3. Tighten the spindle nut to the torque specified in Section 10.
4. If the nut advances more than 30 degrees from its original marked position, disassemble the wheel hub assembly and inspect for bearing damage.
5. If the nut does not advance more than 30 degrees, a bearing inspection is not required.

WARNING

When you remove a spindle nut, always replace the nut with a new one. Do not reuse a spindle nut. Ensure that you correctly stake a spindle nut. A reused or incorrectly staked spindle nut will not tighten correctly and can cause the wheels to loosen and separate from the vehicle during operation. Serious personal injury and damage to components can result.

6. Remove the used nut. Install and torque a new nut following the procedure listed in Section 5.

Breather

CAUTION

Cover the breather when steam cleaning the housing to prevent water from entering the housing and contaminating the oil. Damage to components can result.

During operation, an oil mist may be noticeable at the breather and its surrounding area. This occurrence is normal and may be exaggerated by a build-up of dust and other airborne contaminants. Perform a weekly inspection and clean the breather as necessary. If a leak is found, repair as required.

Lubrication

Drive axles generate small metal wear particles at a fairly steady rate, especially during the break-in period. If these fine, but hard particles are allowed to circulate in the lubricant, along with external moisture and dirt, internal components will wear at a much faster rate than normal.

Magnets and Magnetic Drain Plugs

Meritor front driving axles are equipped with magnetic drain plugs. Inspect the magnetic drain plug each time the oil is changed. Use the correct part. Pipe plugs may leak if used as a drain plug.

Seals

CAUTION

Always use the correct tools and procedures when replacing seals to prevent incorrect installation and help prevent seals from leaking.

Always use the correct tools and procedures when replacing seals to prevent incorrect installation and help prevent seals from leaking. Seals keep lubricant in and dirt out of a component. When they are worn or damaged, seals leak and produce low lubricant levels which may damage components. Durable triple-lip seals, standard in Meritor axles, protect the quality and levels of the lubricant and provide superior performance.


Temperature Indicators

CAUTION



If the oil temperature reaches 250°F (121°C), stop the vehicle immediately and check for the cause of overheating. Damage to components can result.

Meritor axles can operate above 190°F (88°C) without damage. However, if the oil temperature reaches 250°F (121°C), stop the vehicle immediately and check for the cause of overheating. Damage to components can result. Many Meritor axles have a tapped hole in the housing for the installation of a lubricant temperature indicator that will help reduce the failure of axle parts from overheated oil.

Check and Adjust the Oil Level

1. Verify that the vehicle is parked on a level surface.
2. Remove the fill plug from the axle.
3. Look at the oil level to ensure it is even with the bottom of the fill plug hole.
 - **If oil flows from the hole when the plug is loosened:**
The oil level is high. Let the oil drain to the correct level.
 - **If the oil level is below the bottom of the fill plug hole:**
Add the specified oil.
4. Install and tighten the fill plug to 44-74 lb-ft (60-100 N•m). 

Drain and Replace the Oil

1. Verify that the vehicle is parked on a level surface.
2. Place a large container under the axle.
3. Remove the drain plug from the bottom of the axle housing and/or hub. To completely drain the oil from the wheel ends, the hubs must be orientated with the drain/fill plug to the 6 o'clock position. Drain and discard the oil correctly.
4. Clean, install and tighten the axle housing drain plug to 44-74 lb-ft (60-100 N•m). 
5. Remove the fill plug from the axle.
6. Rotate the wheel ends to orientate the hub drain/fill plug to the 3 o'clock position for filling.
7. Fill the axle to the bottom of the fill plug hole with the specified oil. Allow enough time for oil to circulate through the axle assembly.
8. Install and tighten the fill plug to 44-74 lb-ft (60-100 N•m). 

9 Maintenance

Lubricant Specifications and Maintenance Intervals

Meritor recommends using a lubricant analysis program. The schedules listed below should be used in combination with lubricant analysis as a foundation for establishing a maintenance schedule that provides the optimum equipment performance with minimal down time for any particular fleet. Perform lubricant analysis at regularly-scheduled preventive maintenance intervals.

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

Refer to Table C and Table D for standard information on lubricants, schedules and capacities.

Table C: Lubricant Cross Reference, Viscosity and Temperature Chart

Meritor Lubricant Specification	Description	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
MSO-705	Multi-Purpose Grease (NLGI Grade 2)	Lithium 12-Hydroxy Stearate or Lithium Complex	Refer to the grease manufacturer's specifications for the temperature service limits.	

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

Table D: Maintenance Intervals

Component/Operation	Maintenance Interval (Whichever Comes First)		
	Miles (km) Driven or	Months or	Hours of Operation
Check Wheel End Oil Level	1,000 (1600)	1	250
Check Axle Oil Level	5,000 (8000)		
Detailed Visual Inspection of the Entire Axle	10,000 (16 000)	6	1,500
Inspect the Carrier Thrust Screw			
Change Oil in Carrier (Petroleum Based)	50,000 (80 000)	24	3,000
Change Oil in Carrier (Synthetic Based)	200,000 (320 000)		6,000
Change Oil in Wheel Ends (Petroleum Based)	25,000 (40 000)	12	1,500
Change Oil in Wheel Ends (Synthetic Based)	50,000 (80 000)	24	3,000
Check Hub Endplay	25,000 (40 000)	12	1,500
Grease The S-cam and Slack Adjusters	10,000 (16 000)	6	1,000

Component/Operation	Maintenance Interval (Whichever Comes First)		
	Miles (km) Driven or	Months or	Hours of Operation
Inspect Brake Lining Thickness	As Necessary — 0.25-inch (6.4 mm) Minimum Thickness		
Grease the Brake Pins and Rollers	As Necessary		
Inspect the Slack Adjuster	At Each Brake Reline		

10 Specifications

Torque Specifications

Forward-Rear Hub Reduction Heavy Haul Tandem Axle

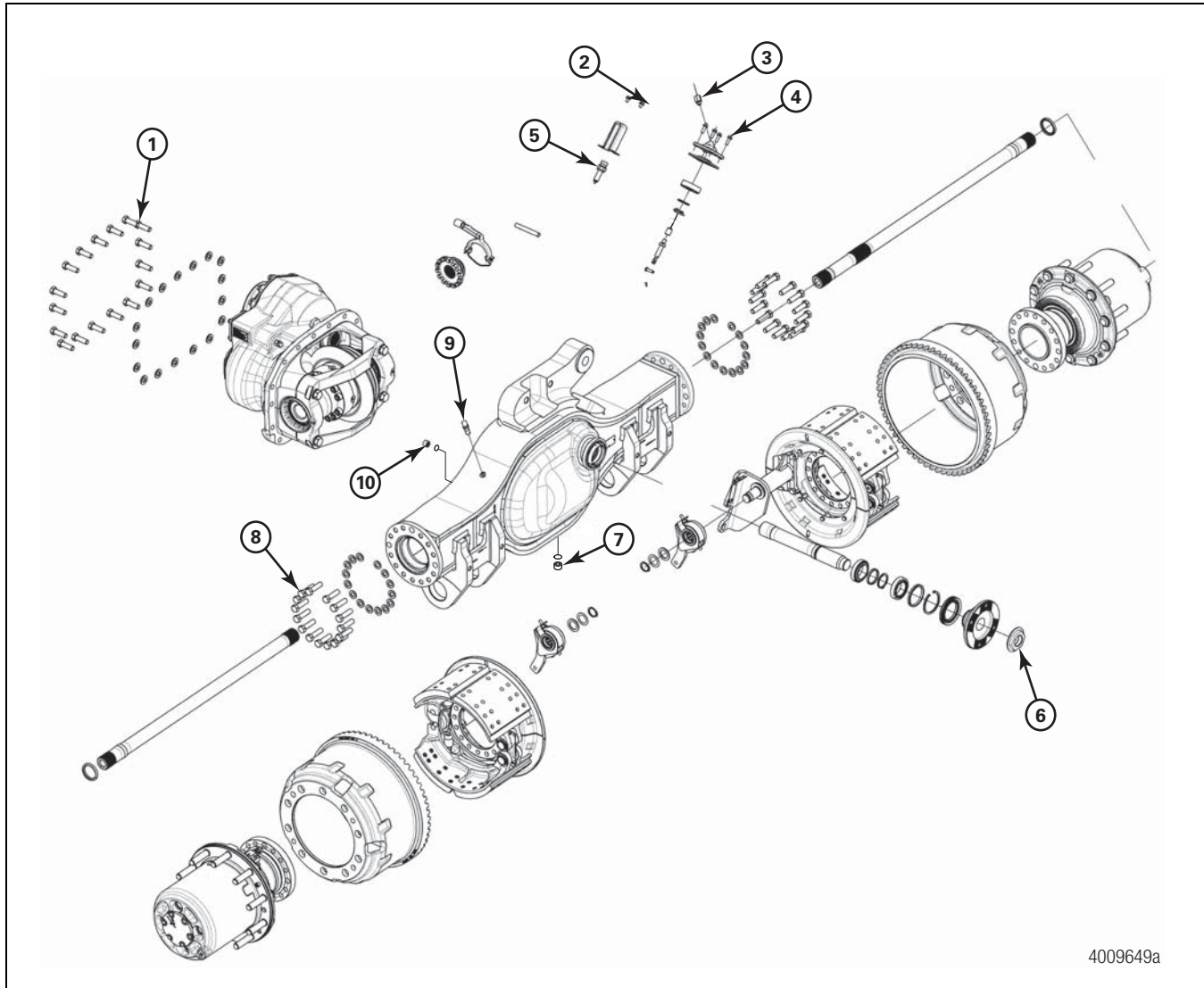


Figure 10.1

Table E: Torque Specifications

Item	Description	Thread Size	Torque	
			Lb-Ft	N•m
1	Carrier-to-Housing Bolts ¹	M16 x 2.0 x 50	175-225	237-305
		M16 x 2.0 x 70		
2	Screw	M8 x 1.25	15-20	20-27
3	Adapter (Fitting)	M12 x 1.5	18-26	24-35

Item	Description	Thread Size	Torque	
			Lb-Ft	N•m
4	Flange Screw	M8 x 1.25	15-20	20-27
5	DCDL Switch with Lock Nut	M18 x 1.25	26-34	35-45
6	Thru-Shaft Companion Flange Lock Nut	M42 x 1.5	465-565	630-766
7	Drain Plug (Axle Housing) with Gasket	M24 x 1.5	37 min.	50 min.
8	Brake Spider-to-Housing Bolts ¹	M16 x 2.0 x 60	180-230	244-312
		M20 x 2.5 x 60	360-481	488-652
9	Breather Assembly	3/8 x 18 NPT	7-12	9-16
10	Fill Plug with Gasket	M24 x 1.5	37 min.	50 min.
—	Spindle Nut	M80 x 2	Refer to the procedure in Section 5.	
—	Hub Cover Bolts	M8 x 1.25	11-19	15-25
—	Fill/drain Plug (Hub)	M24 x 1.5	44-74	60-100
—	Hub Case-to-Hub Bolts ²	M10 x 1.5	22-37	30-50
—	Input Shaft Nut	M60 x 2.0	885-1033	1200-1400
—	Torque Rod Bracket-to-Housing Bolts	M20 x 2.5	357-423	484-573

¹ Apply Loctite® 277 threadlocker to the bolt threads.

² Apply Loctite® 242 threadlocker to the bolt threads.

10 Specifications

Rear-Rear Hub Reduction Heavy Haul Tandem Axle

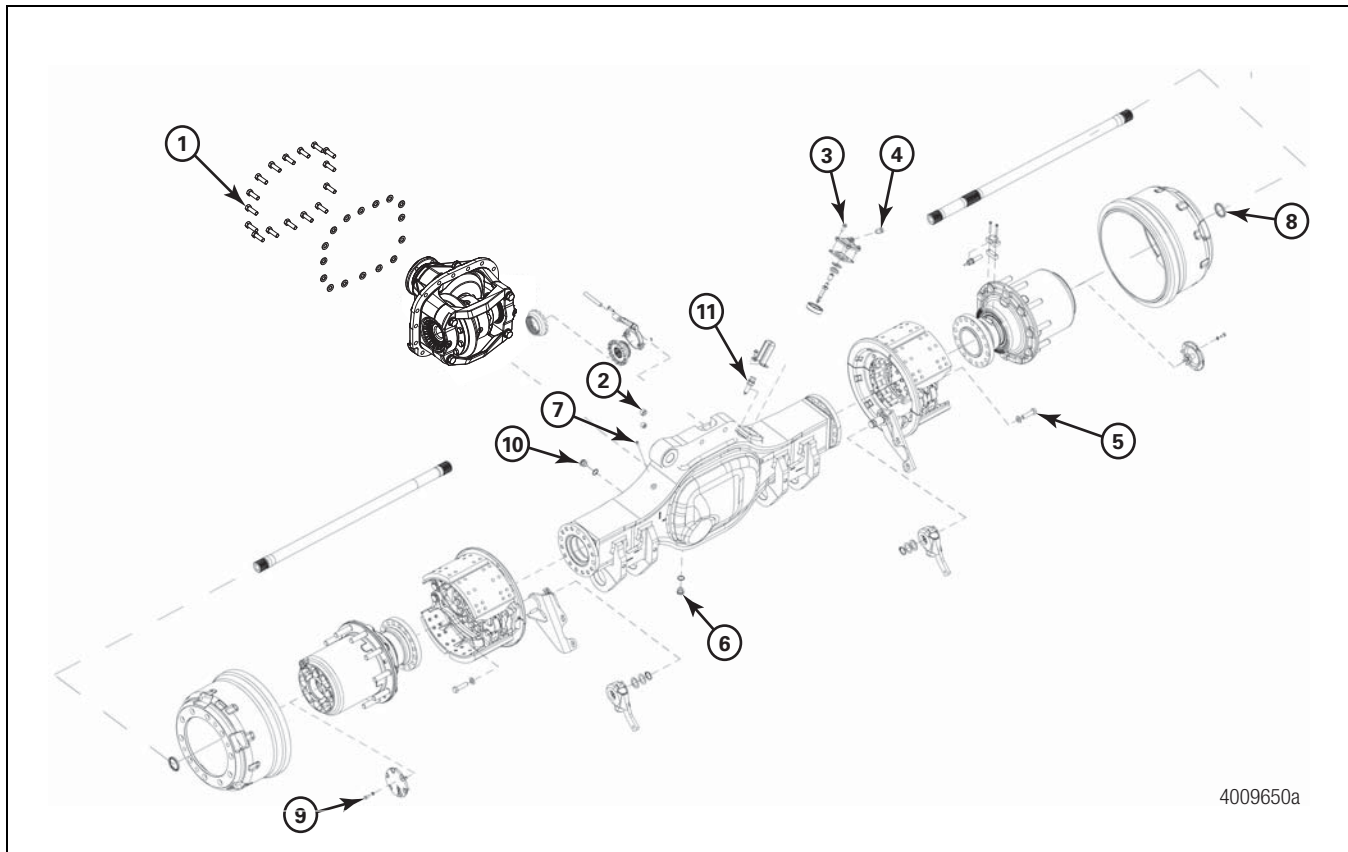


Figure 10.2

Table F: Torque Specifications

Item	Description	Thread Size	Torque	
			Lb-Ft	N•m
1	Carrier-to-Housing Bolts ¹	M16 x 2.0 x 50 M16 x 2.0 x 70	175-225	237-305
2	Screw	M8 x 1.25	15-20	20-27
3	Flange Screw	M8 x 1.25	15-20	20-27
4	Adapter (Fitting)	M12 x 1.5	18-26	24-35
5	Brake Spider-to-Housing Bolts ¹	M16 x 2.0 x 60 M20 x 2.5 x 60	180-230 360-481	244-312 488-652
6	Drain Plug (Axle Housing) with Gasket	M24 x 1.5	25 min.	34 min.
7	Breather Assembly	3/8 x 18 NPT	7-12	9-16
8	Spindle Nut	M80 x 2	Refer to the procedure in Section 5.	
9	Hub Cover Bolts	M8 x 1.25	11-19	15-25
10	Fill Plug with Gasket	M24 x 1.5	25 min.	34 min.

Item	Description	Thread Size	Torque	
			Lb-Ft	N•m
11	DCDL Switch with Lock Nut	M18 x 1.25	26-34	35-45
—	Fill/drain Plug (Hub)	M24 x 1.5	44-74	60-100
—	Hub Case-to-Hub Bolts ²	M10 x 1.5	22-37	30-50
—	Pinion Shaft Nut	M60 x 2.0	1475-1623	2000-2200
—	Torque Rod Bracket-to-Housing Bolts	M20 x 2.5	357-423	484-573

¹ Apply Loctite® 277 threadlocker to the bolt threads.

² Apply Loctite® 242 threadlocker to the bolt threads.

Carrier Input Seal Driver, All Models

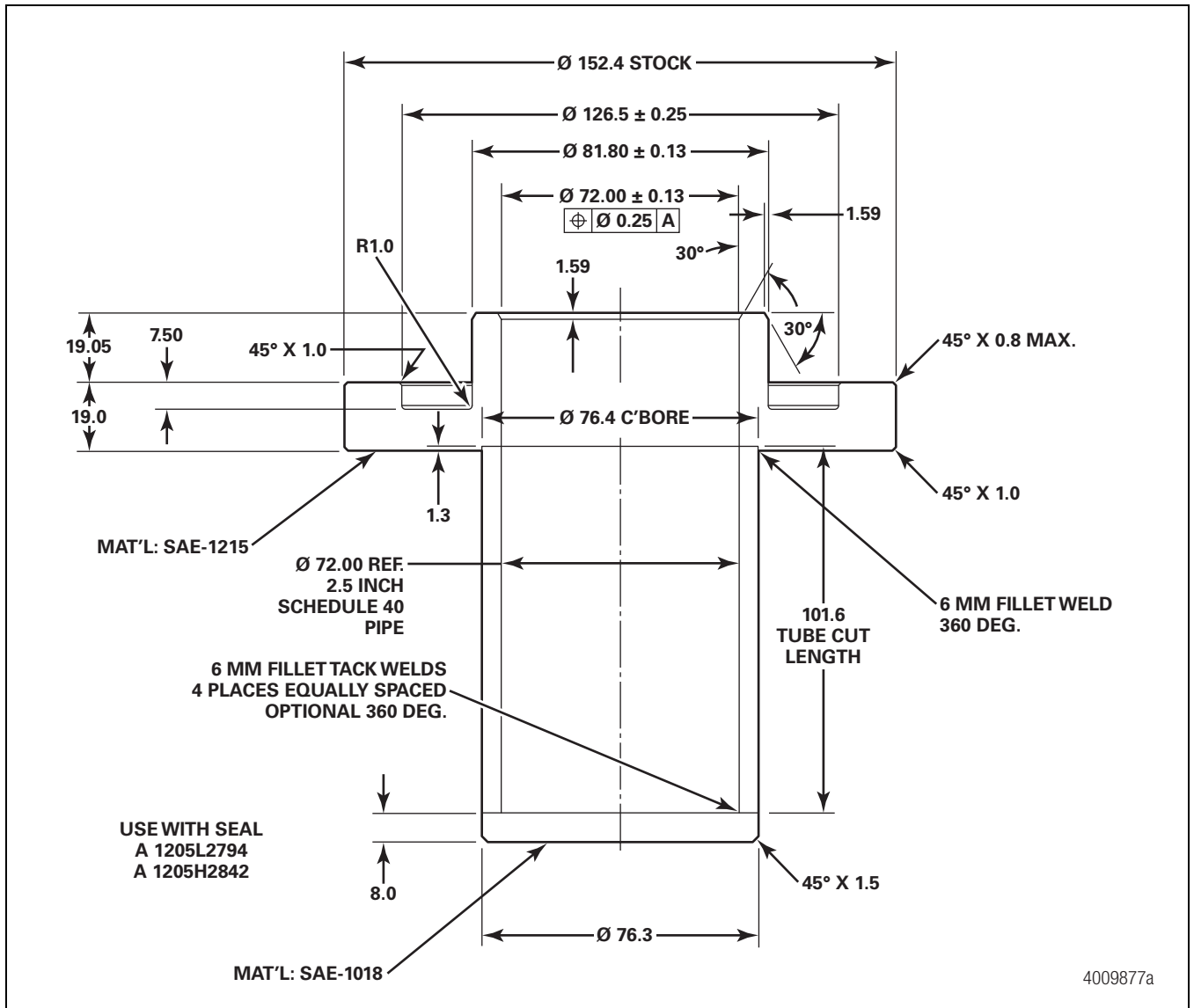


Figure 11.2

11 Special Tools

Carrier Output Seal Driver, Tandem Forward and Tridem Middle Carrier

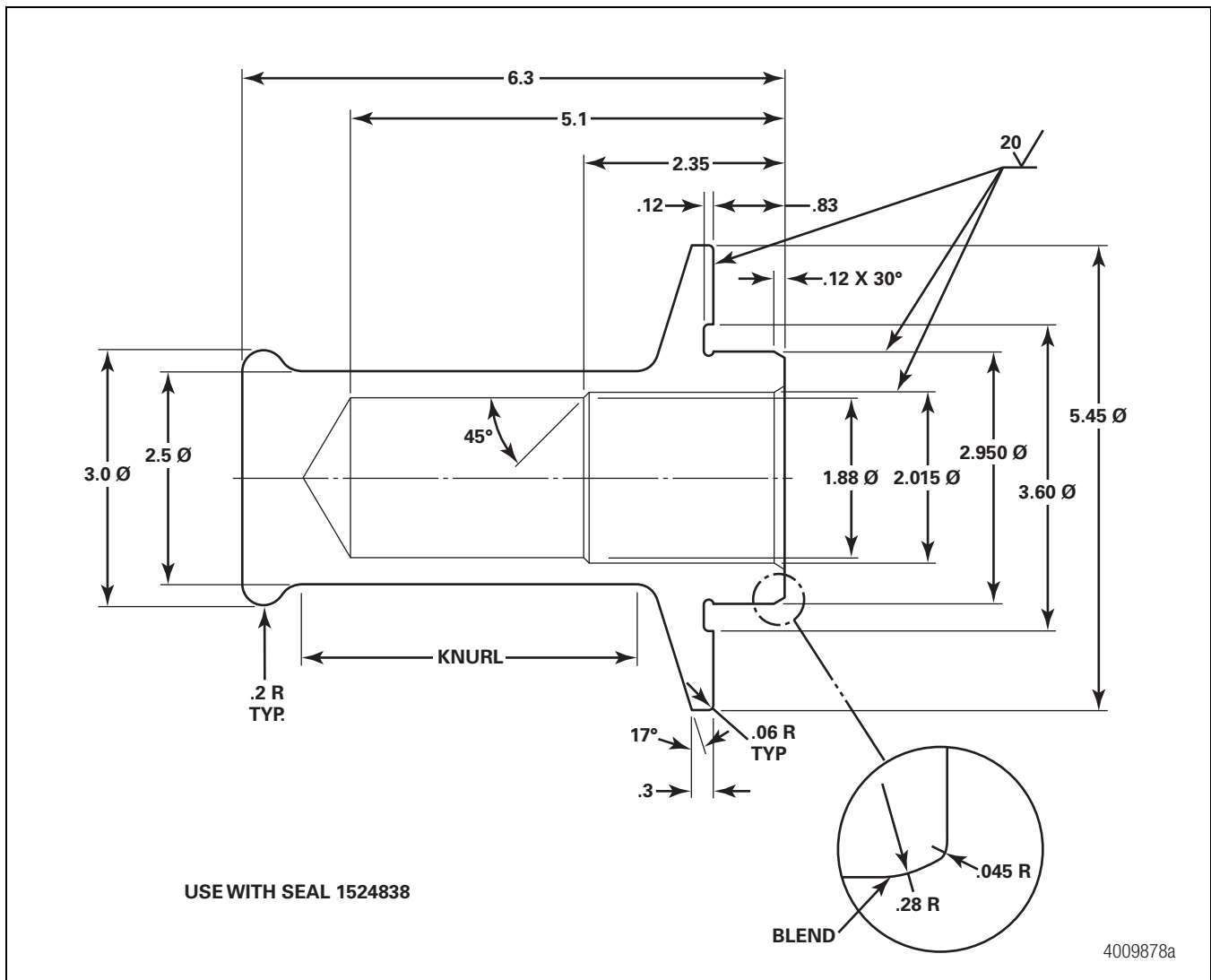


Figure 11.3

Carrier Output Seal Driver, Tridem Forward Carrier

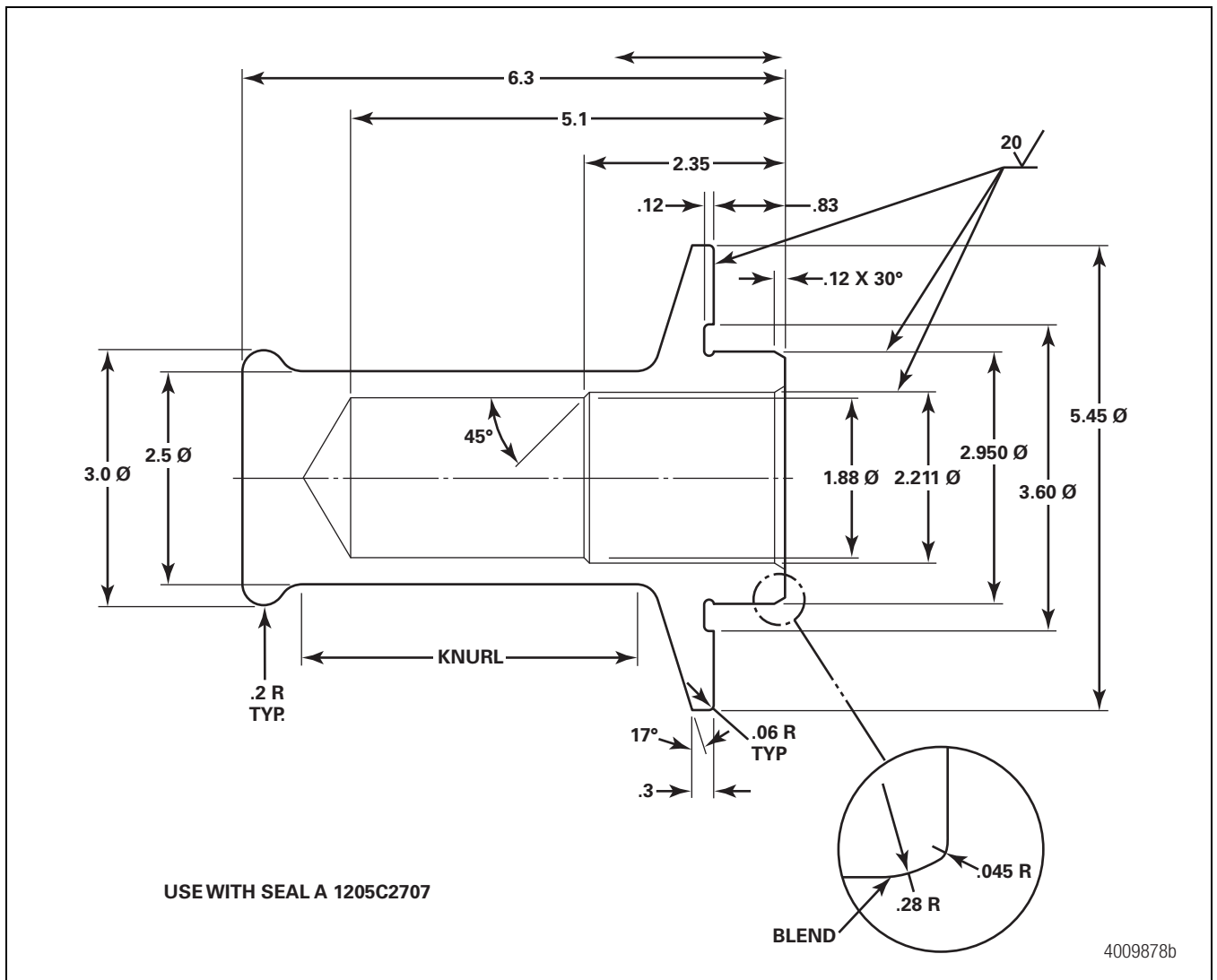


Figure 11.4

11 Special Tools

Hub Seal Driver

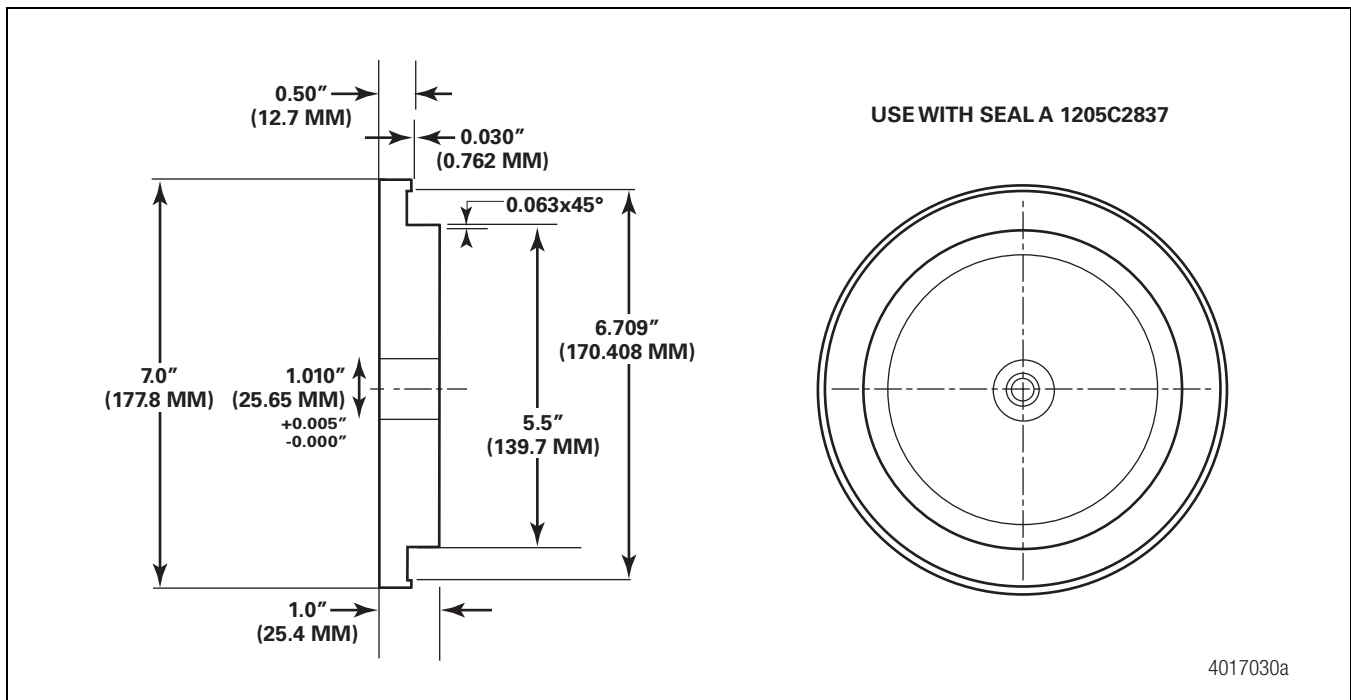


Figure 11.5

11 Special Tools

Inner Ring Driver

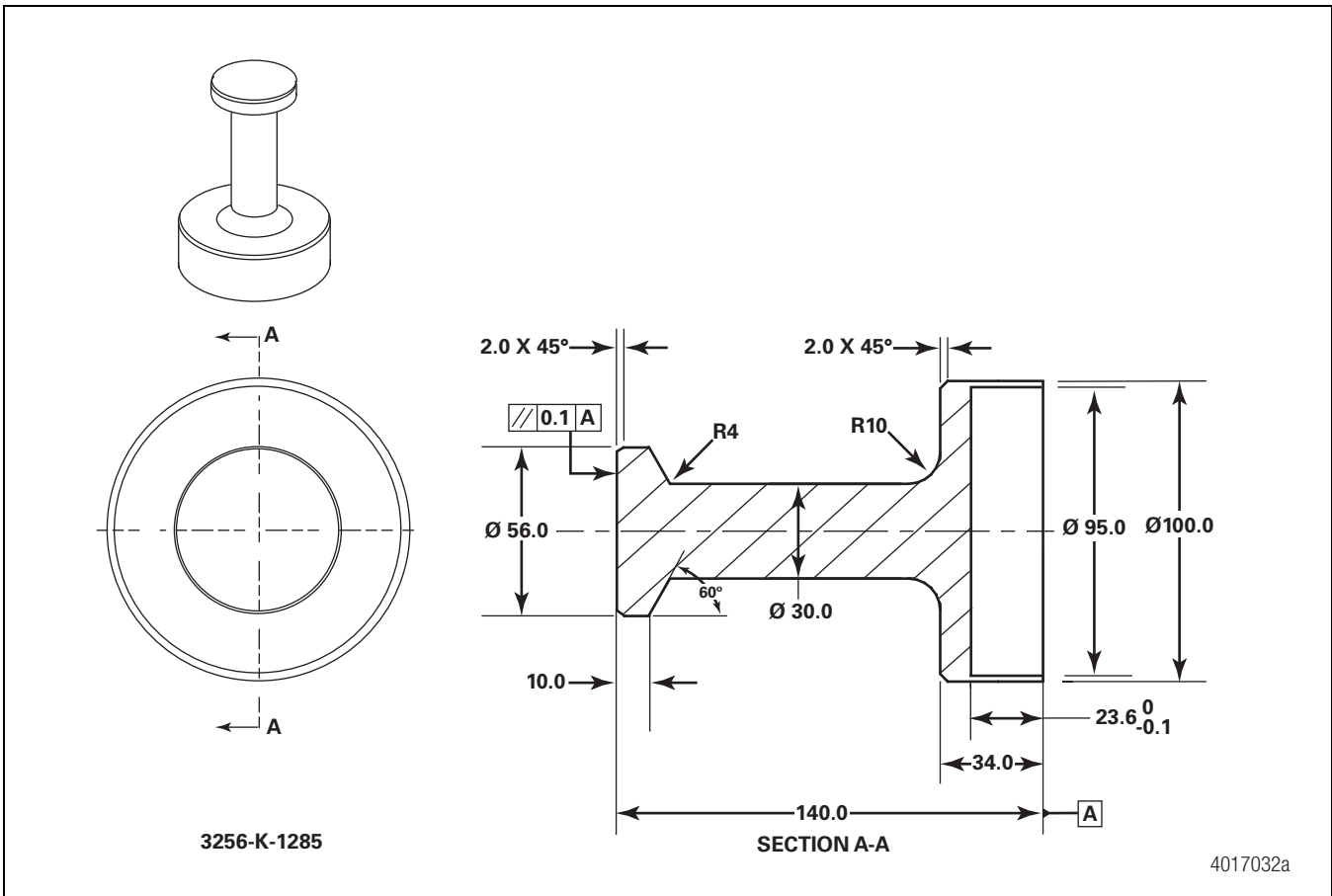


Figure 11.7

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