

Maintenance Manual MM-1189

Off-Highway Axle Planetary Wheel Ends

Revised 08-20



Service Notes

About This Manual

This manual provides service and repair procedures for planetary wheel ends on off-highway 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

Contact Meritor's Commercial Vehicle Aftermarket at 888-725-9355.

Meritor Maintenance Manuals

Refer to the following Meritor maintenance manuals for additional service procedures. To obtain these publications, visit Literature on Demand at meritor.com.

- Maintenance Manual 4, Cam Brakes and Automatic Slack Adjusters
- Maintenance Manual MM-0467, EX+™ Air Disc Brake
- Maintenance Manual 5A, Single-Reduction Differential Carriers
- Maintenance Manual MM-0990, Amboid Rear Differential Carrier

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pg. i	Asbestos and Non-Asbestos Fibers	pg. 30	Disassembly Wheel End
1	Section 1: Exploded Views	31	Section 6: Non-Drive Axle Wheel End Removal and Disassembly
	Dual Tire H2 Planetary Wheel End		Removal Wheel End
2	Single Tire H2 Planetary Wheel End — Low Speed Applications	32	Section 7: Single Tire N5/P8 Wheel End Removal and Disassembly
4	Single Tire H2 Planetary Wheel End — High Speed Applications		Prior to Disassembly Drain the Oil Removal Planetary Carrier Assembly Disassembly Planetary Assembly
6	Non-Drive Wheel End, Ø335 Wheel BC	33	Removal Wheel End Disassembly Wheel End
7	Single Tire N5 Planetary Wheel End	35	Section 8: CTI Disassembly
9	Single Tire P8 Planetary Wheel End		Disassembly Central Tire Inflation
11	I2 5-Planet Wheel End	36	Section 9: Brake Removal
13	Single Tire H2 Optional S-Cam Drum Brake Assembly		Hazard Alert Messages Removal S-Cam Drum Brake Assembly
15	Hydraulic Disc Brake Option	38	Hydraulic Disc Brake Air Disc Brake
16	Central Tire Inflation (CTI) Option	39	Section 10: Prepare Parts for Assembly
17	Section 2: Introduction		Clean, Dry and Inspect Parts Clean Ground and Polished Parts Clean Rough Parts Drying Parts Immediately After Cleaning
	Description	40	Prevent Corrosion on Cleaned Parts Inspect Parts
18	Section 3: Dual Tire H2 Wheel End Removal and Disassembly	41	Repair or Replace Parts Removing Fasteners Secured with Adhesive New Fasteners with Pre-Applied Adhesive Hub Reduction Wheel Ends Wheel Studs
	Removal	43	Section 11: Dual Tire H2 Wheel End Assembly and Installation
	Axle Shafts on Non-Steer Drive Axles		Assembly Wheel Ends
	Disassembly	46	Installation Wheel Ends
	Wheel Ends		
20	Planet Gears		
	Hubs		
21	Removal		
	Removing Fasteners Secured with Adhesive		
22	Section 4: I2 5-Planet Wheel End Removal and Disassembly		
	Removal		
	Axle Shafts on Non-Steer Drive Axles		
	Disassembly		
	Wheel Ends		
24	Planetary Cover and Carrier		
26	Hubs		
	Removal		
	Removing Fasteners Secured with Adhesive		
27	Section 5: Single Tire H2 Wheel End Removal and Disassembly		
	Prior to Disassembly		
	Drain the Oil		
	Removal		
	Planetary Carrier Assembly		
28	Disassembly		
	Planetary Assembly		
29	Removal		
	Wheel End		

Contents

pg. 49	Section 12: I2 5-Planet Wheel End Assembly and Installation Assembly Wheel Ends, Planetary Carrier and Case	pg. 78	Section 20: Specifications Torque Specifications Dual Tire H2 Planetary Wheel End
53	Installation Wheel Ends	80	Single Tire H2 Planetary Wheel End
55	Section 13: Single Tire H2 Wheel End Assembly and Installation Assembly Wheel End Installation Wheel End	82	Single Tire N5/P8 Planetary Wheel End
57	Assembly Planetary Assembly	83	I2 5-Planet Wheel End
58	Installation Planetary Assembly	85	Non-Drive Wheel End
59	Section 14: Non-Drive Axle Wheel End Assembly and Installation Assembly and Installation Wheel End	86	Single Tire H2 Wheel End with S-Cam Drum Brake Assembly
61	Section 15: Single Tire N5/P8 Wheel End Assembly and Installation Assembly Wheel End	88	Hydraulic Disc Brake Option
62	Planetary Assembly Installation Wheel End	89	Section 21: Special Tools Tool Drawings
64	Section 16: CTI Assembly Assembly Central Tire Inflation (CTI)		
67	Section 17: Brake Installation Installation S-Cam Drum Brake Assembly		
68	Hydraulic Disc Brake Hydraulic Disc Brake Caliper		
69	Air Disc Brake		
70	Section 18: Troubleshooting Diagnostic Chart		
71	Section 19: Maintenance Inspection and Maintenance Wheel Bearing End Play Lubrication		
73	Lubricant Specifications and Maintenance Intervals		
74	Wheel Hub Central Tire Inflation Air Check		



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 (HEP A) 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

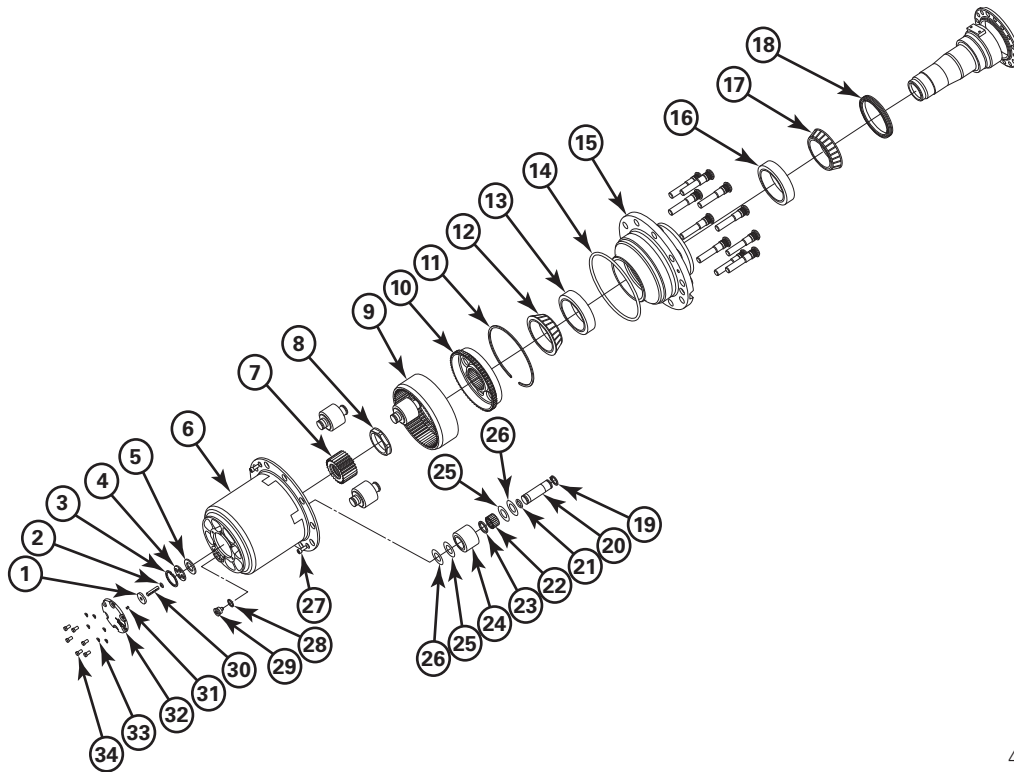
1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.
2. **Respiratory Protection.** OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m³ as an 8-hour time-weighted average. Some manufacturers 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.

Dual Tire H2 Planetary Wheel End

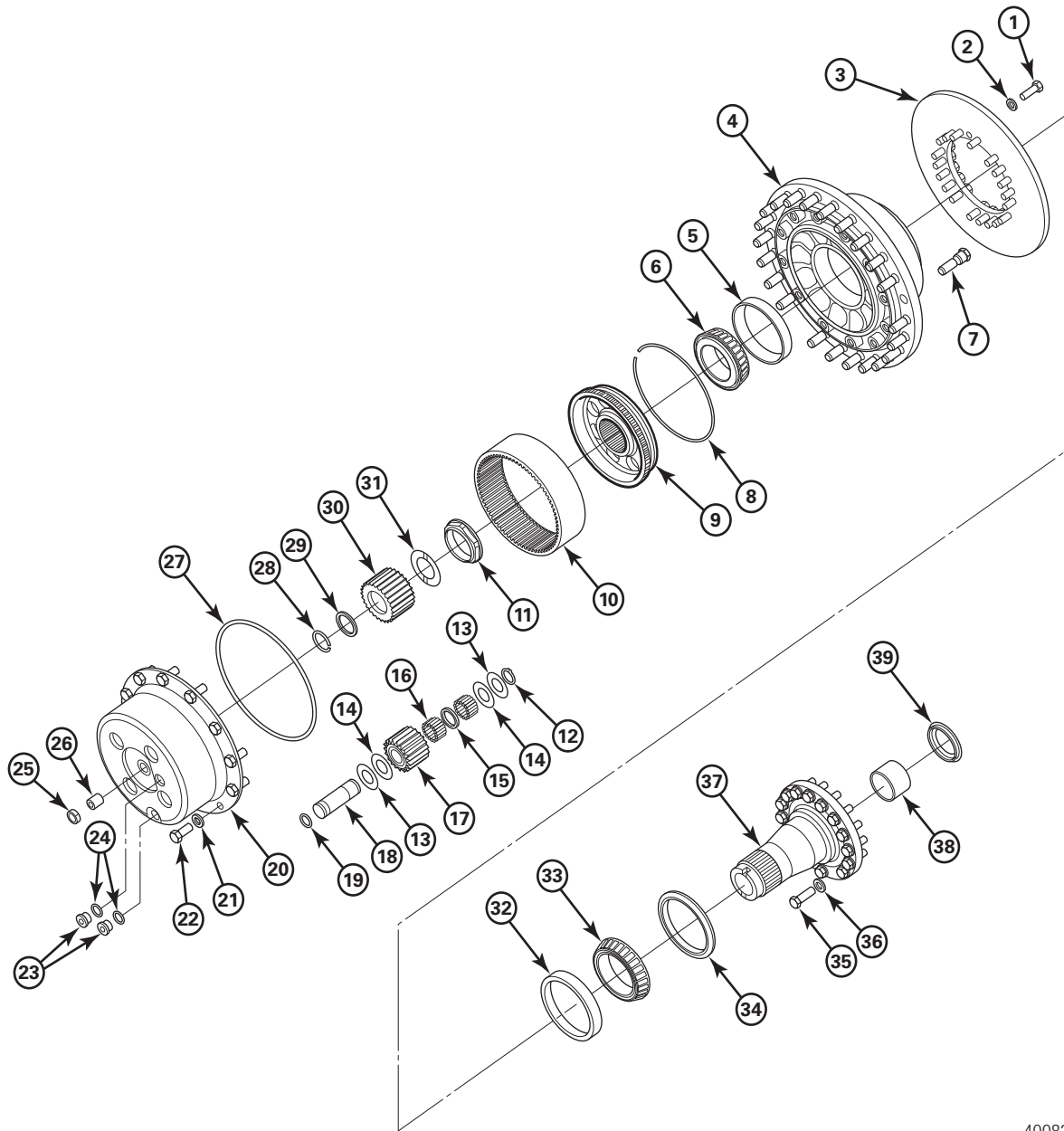


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Item	Description	Item	Description
1	Magnet	18	Oil Seal
2	Retaining Clip	19	Retaining Clip
3	Retaining Clip	20	Pinion Shaft
4	Thrust Washer	21	O-Ring
5	Spring Washer (2)	22	Needle
6	Planetary Carrier	23	Spacer Sleeve
7	Sun Gear	24	Planet Gear
8	Wheel Bearing Nut	25	Steel Washer
9	Ring Gear	26	Brass Washer
10	Ring Gear Carrier	27	Case-to-Hub Screw
11	Retaining Clip	28	Gasket
12	Outer Bearing Cone	29	Magnetic Plug
13	Outer Bearing Cup	30	Pin
14	O-Ring	31	Washer
15	Hub	32	Cover
16	Inner Bearing Cup	33	Washer
17	Inner Bearing Cone	34	Screw

1 Exploded Views

Single Tire H2 Planetary Wheel End — Low Speed Applications



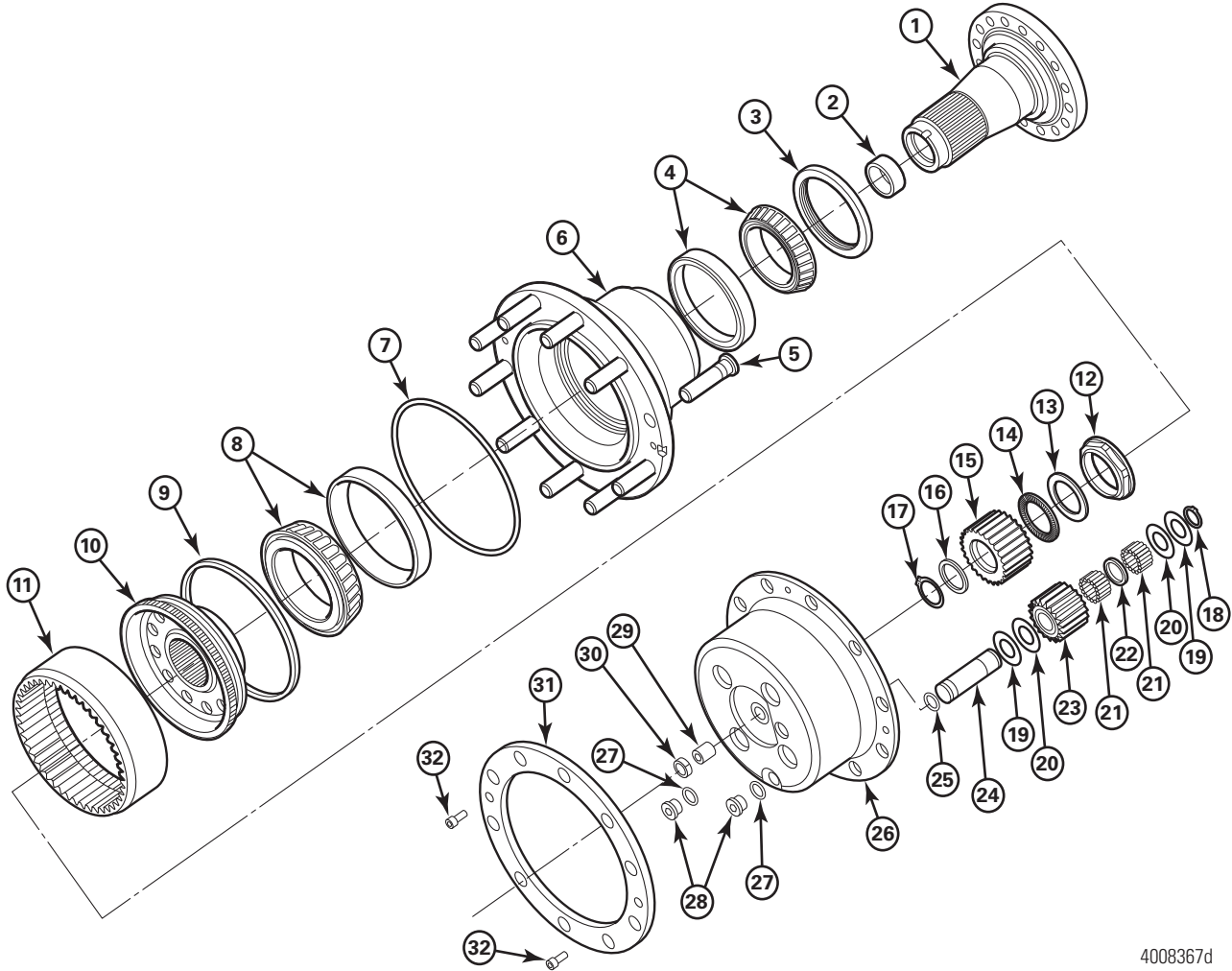
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Item	Description	Item	Description
1	Brake Rotor Bolt	7	Wheel Stud
2	Washer	8	Ring Gear Snap Ring
3	Brake Rotor	9	Ring Gear Hub
4	Wheel Hub	10	Ring Gear
5	Outer Bearing Cup	11	Wheel Bearing Nut
6	Outer Bearing Cone	12	Snap Ring

Item	Description
13	Thrust Washer, Brass
14	Thrust Washer, Steel
15	Roller Spacer
16	Bearing Rollers
17	Planet Gear
18	Pinion Shaft
19	O-Ring
20	Planetary Carrier
21	Washer
22	Planetary Carrier Bolt
23	Drain/Fill Plug
24	Seal Ring
25	Thrust Screw Jam Nut
26	Thrust Screw
27	O-Ring
28	Snap Ring
29	Retaining Washer (If Equipped)
30	Sun Gear
31	Thrust Washer
32	Inner Bearing Cup
33	Inner Bearing Cone
34	Oil Seal
35	Spindle Bolt
36	Washer
37	Spindle
38	Axle Shaft Bushing
39	Axle Shaft Seal

1 Exploded Views

Single Tire H2 Planetary Wheel End — High Speed Applications



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Item	Description
1	Spindle
2	Sleeve
3	Hub Oil Seal
4	Inner Bearing Cone and Cup
5	Wheel Stud
6	Wheel Hub
7	O-Ring
8	Outer Bearing Cone and Cup
9	Ring Gear Snap Ring
10	Ring Gear Hub
11	Ring Gear

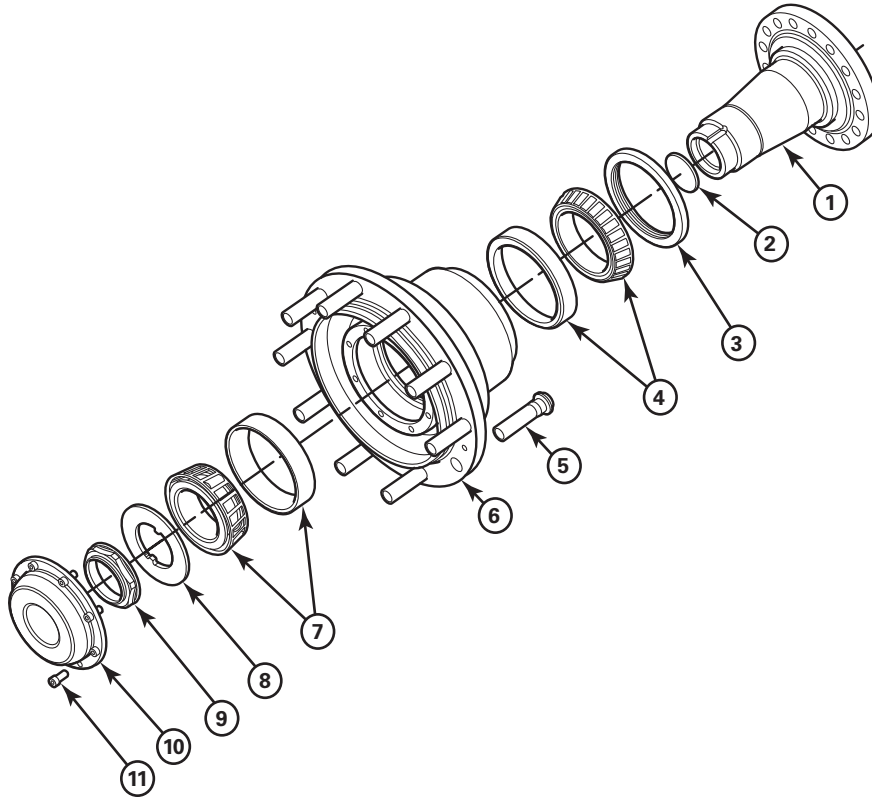
Item	Description
12	Wheel Bearing Nut
13	Thrust Washer
14	Thrust Needle Bearing
15	Sun Gear
16	Retaining Washer
17	Snap Ring
18	Snap Ring
19	Thrust Washer, Brass
20	Thrust Washer, Steel
21	Bearing Rollers
22	Roller Spacer

1 Exploded Views

Item	Description
23	Planet Gear
24	Pinion Shaft
25	O-Ring
26	Planetary Carrier
27	Seal Ring
28	Fill/Drain Plug
29	Thrust Screw
30	Jam Nut
31	Wheel Spacer (Disc Brake Only)
32	Planetary Carrier Bolt

1 Exploded Views

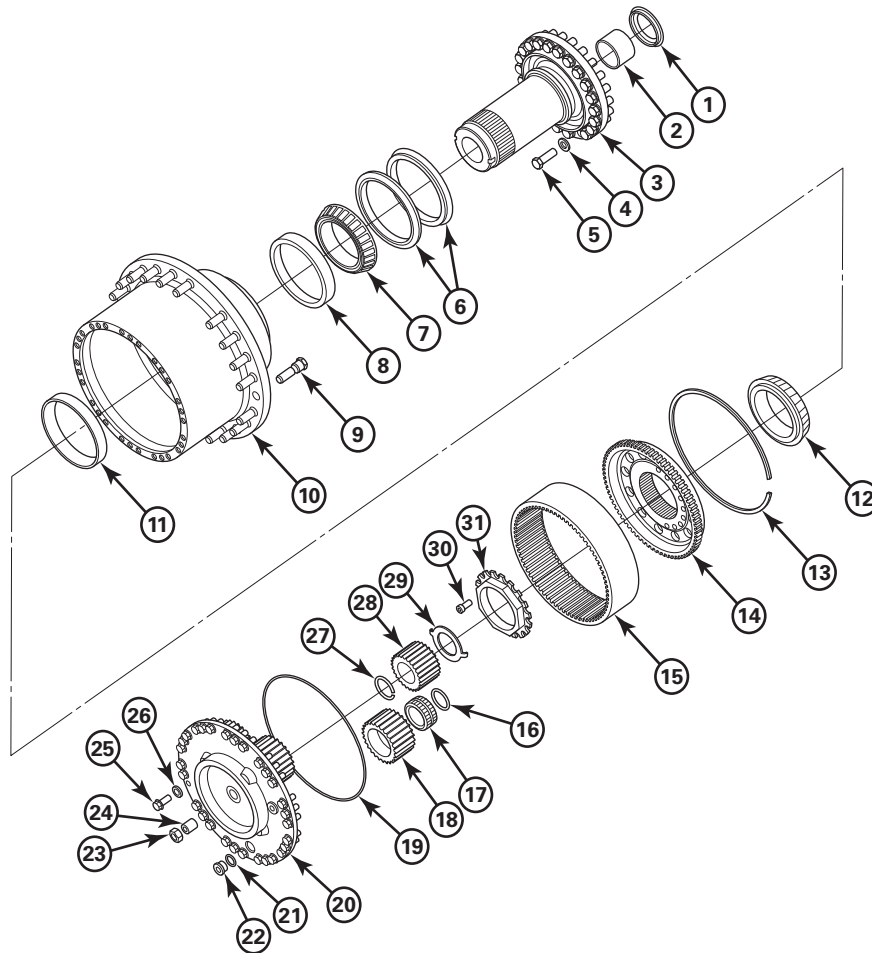
Non-Drive Wheel End, Ø335 Wheel BC



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Item	Description
1	Spindle
2	Retainer Plug
3	Hub Oil Seal
4	Inner Bearing Cone and Cup
5	Wheel Stud
6	Hub
7	Outer Bearing Cone and Cup
8	Thrust Washer
9	Wheel Bearing Nut
10	Hub Cover
11	Hub Cover Bolt

Single Tire N5 Planetary Wheel End



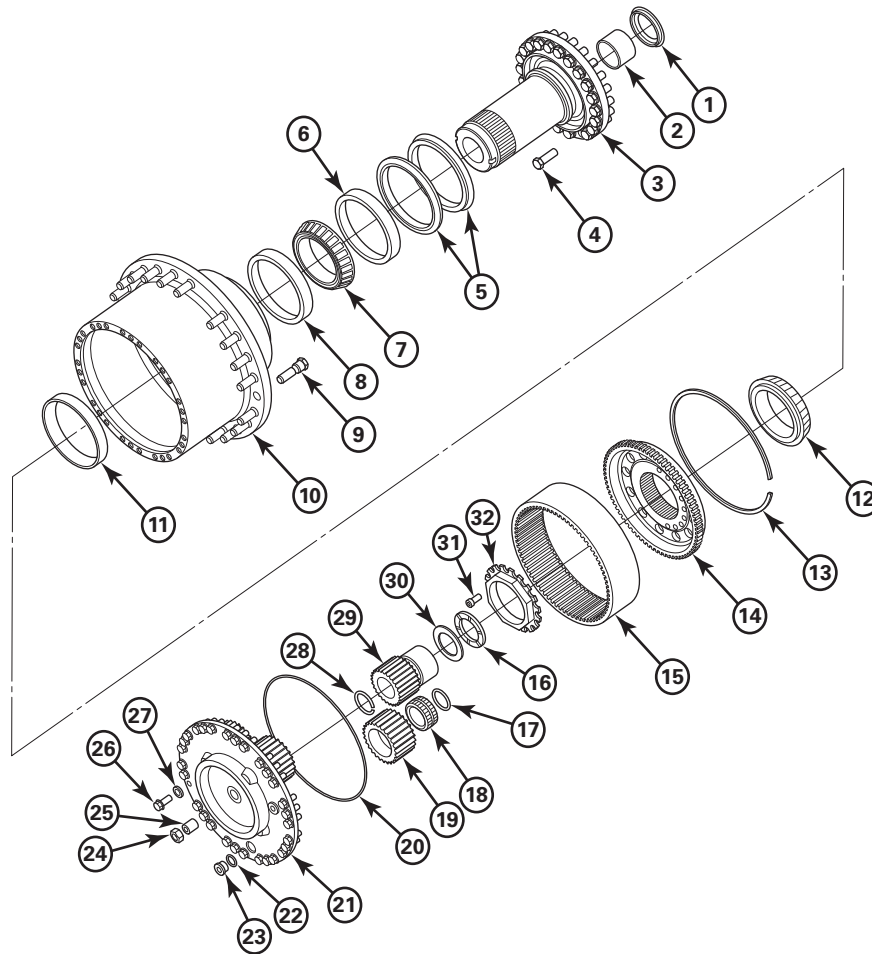
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Item	Description	Item	Description
1	Axle Shaft Seal	12	Outer Bearing Cone
2	Axle Shaft Bushing	13	Ring Gear Snap Ring
3	Spindle	14	Ring Gear Hub
4	Washer	15	Ring Gear
5	Spindle Bolt	16	Snap Ring
6	Metal Face Seal	17	Roller Bearing
7	Inner Bearing Cone	18	Planet Gear
8	Inner Bearing Cup	19	O-Ring
9	Wheel Stud	20	Planetary Carrier
10	Wheel Hub	21	Seal Ring
11	Outer Bearing Cup	22	Fill/Drain Plug

1 Exploded Views

Item	Description
23	Jam Nut
24	Thrust Screw
25	Planetary Carrier Bolt
26	Washer
27	Snap Ring
28	Sun Gear
29	Thrust Washer
30	Lock Bolt
31	Wheel Bearing Nut

Single Tire P8 Planetary Wheel End



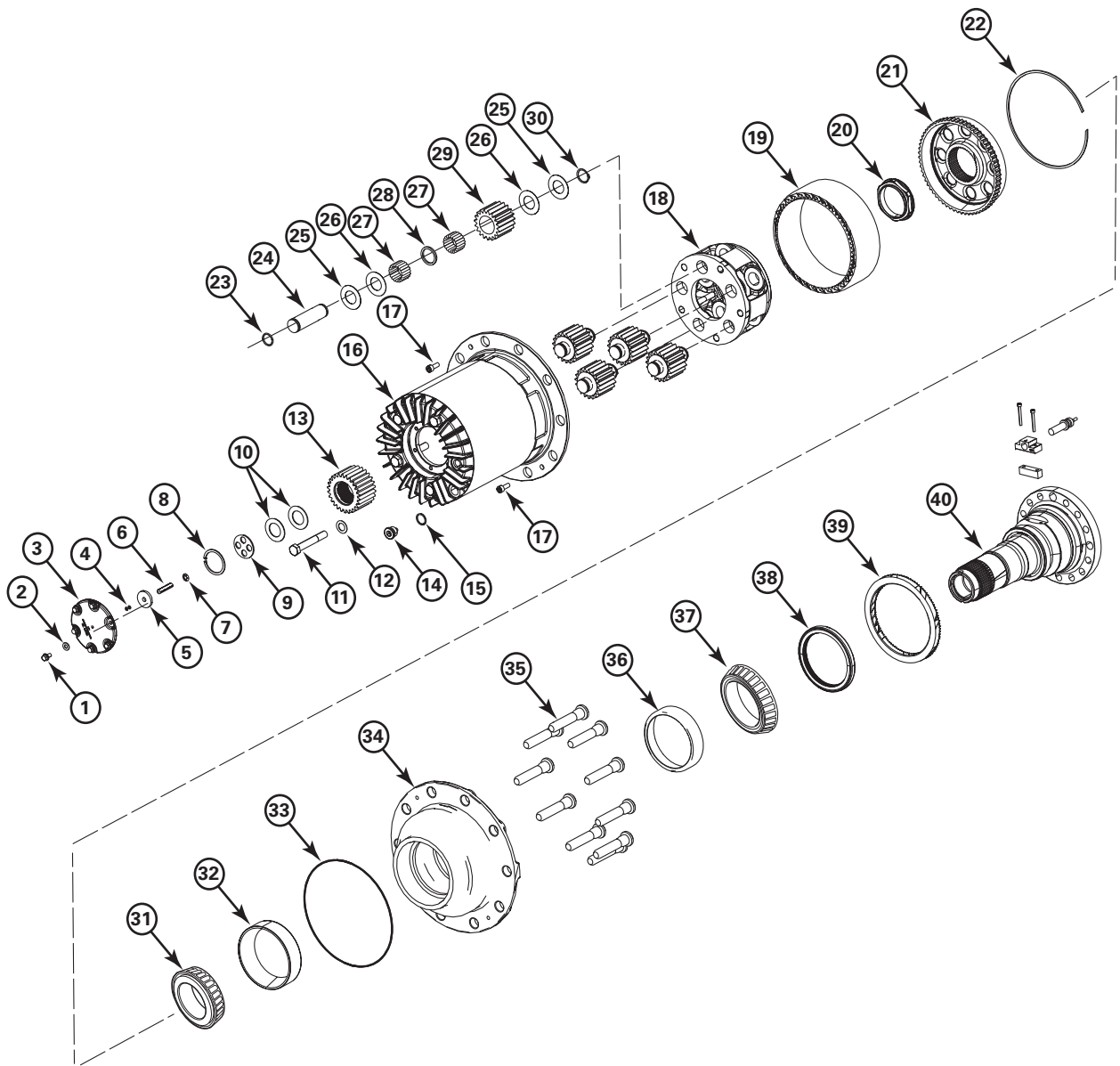
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Item	Description	Item	Description
1	Axle Shaft Seal	13	Ring Gear Snap Ring
2	Axle Shaft Bushing	14	Ring Gear Hub
3	Spindle	15	Ring Gear
4	Spindle Bolt	16	Thrust Washer
5	Metal Face Seal	17	Snap Ring
6	Oil Seal Sleeve	18	Roller Bearing
7	Inner Bearing Cone	19	Planet Gear
8	Inner Bearing Cup	20	O-Ring
9	Wheel Stud	21	Planetary Carrier
10	Wheel Hub	22	Seal Ring
11	Outer Bearing Cup	23	Fill/Drain Plug
12	Outer Bearing Cone	24	Jam Nut

1 Exploded Views

Item	Description
25	Thrust Screw
26	Planetary Carrier Bolt
27	Washer
28	Snap Ring
29	Sun Gear
30	Thrust Washer
31	Lock Bolt
32	Wheel Bearing Nut

I2 5-Planet Wheel End



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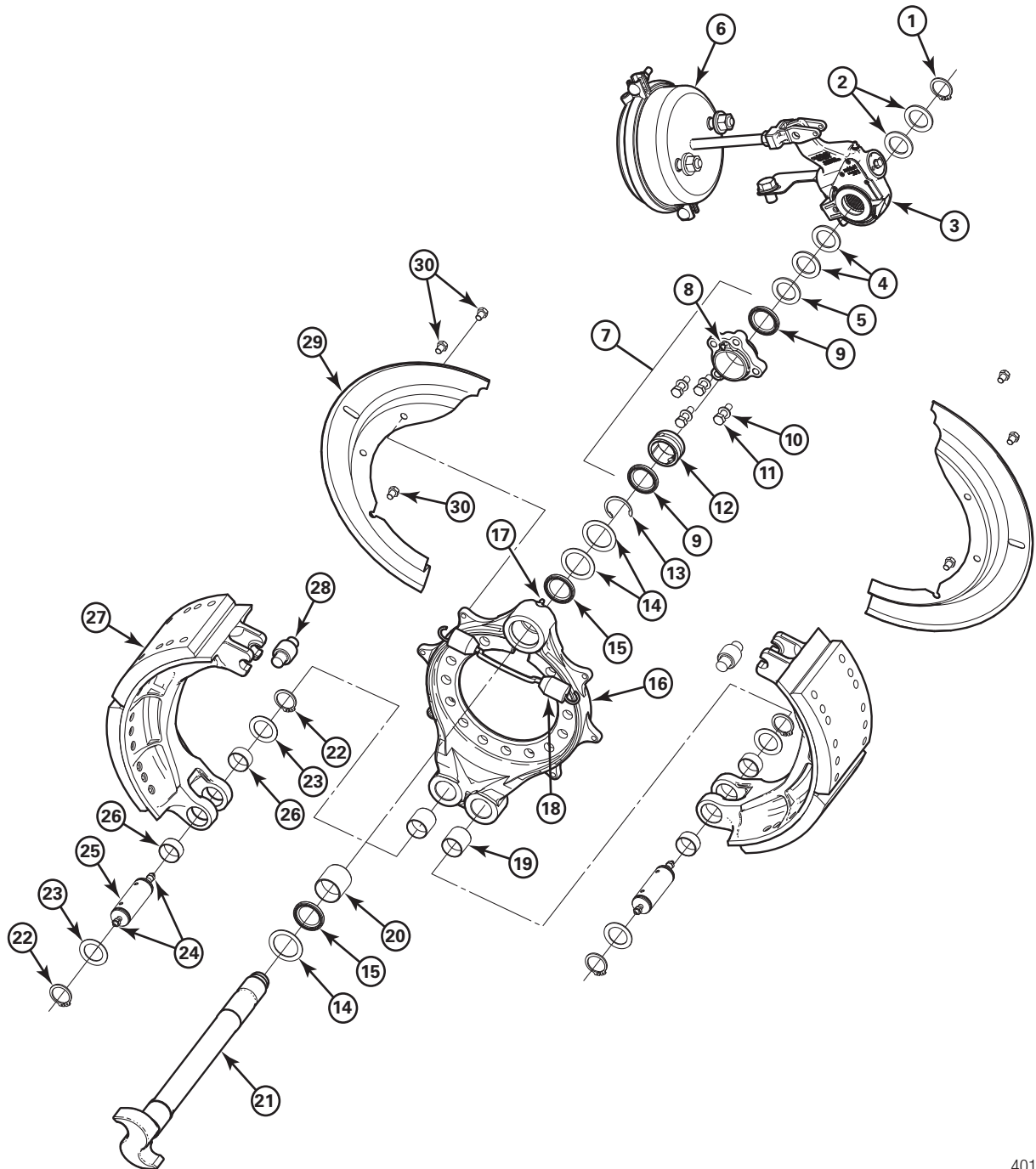
Item	Description
1	Screw
2	Washer
3	Cover
4	Spacer Washer
5	Magnet
6	Pin

Item	Description
7	Retainer Clip
8	Sun Gear Snap Ring
9	Thrust Washer
10	Spring Washer
11	Case-to-Carrier Capscrew
12	Washer

1 Exploded Views

Item	Description
13	Sun Gear
14	Magnetic Drain/Fill Plug
15	Plug O-Ring
16	Planetary Cover Case
17	Case-to-Hub Screw
18	Planetary Carrier
19	Ring Gear
20	Wheel Bearing Nut
21	Ring Gear Carrier
22	Carrier Snap Ring
23	O-Ring
24	Pinion Shaft
25	Brass Thrust Washer
26	Steel Thrust Washer
27	Needle Bearing
28	Spacer Ring
29	Planet Gear
30	Snap Ring
31	Outer Bearing Cone
32	Outer Bearing Cup
33	O-Ring
34	Hub
35	Wheel Stud
36	Inner Bearing Cup
37	Inner Bearing Cone
38	Oil Seal
39	Tone Ring
40	Spindle

Single Tire H2 Optional S-Cam Drum Brake Assembly



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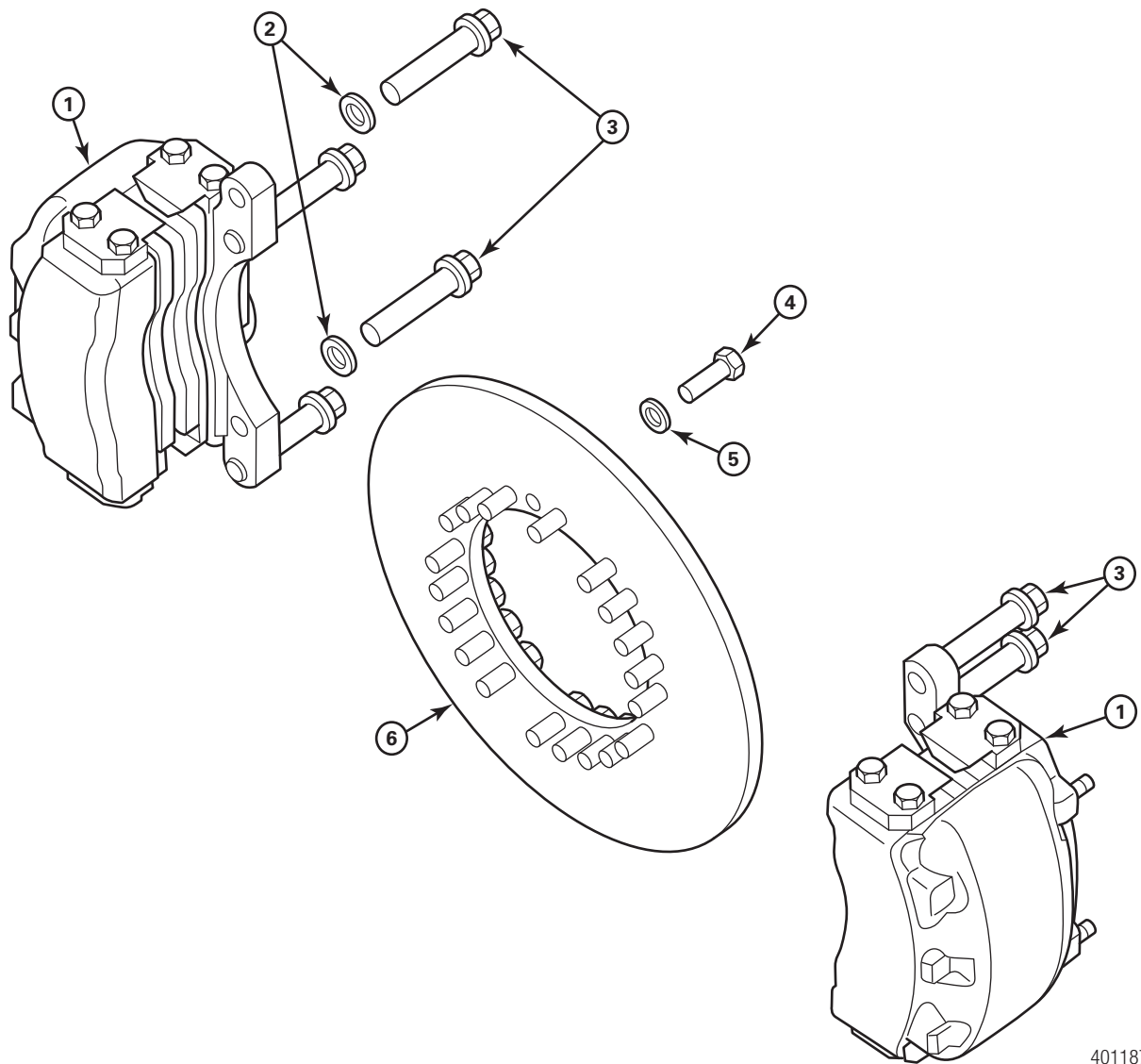
Item	Description
1	Snap Ring (Slack Retainer)
2	Washer (Slack, Outer)

Item	Description
3	Slack Adjuster
4	Washer (Slack, Inner)

1 Exploded Views

Item	Description
5	Washer (Slack, Inner)
6	Chamber Assembly
7	Bearing Block Assembly
8	Grease Fitting
9	Bearing Block Seal
10	Washer
11	Bearing Block Bolt Mounting
12	Bearing Block Bushing
13	Snap Ring (S-Cam Spider Washer)
14	Washer (S-Cam Head End)
15	Grease Seal (S-Cam in Spider)
16	Brake Spider Assembly
17	Grease Fitting
18	Shoe Return Spring
19	Bushing (Shoe Anchor Pin)
20	Bushing (S-Cam in Spider)
21	Brake Camshaft
22	Snap Ring (Shoe Anchor Pin)
23	Washer (Shoe Anchor Pin)
24	Grease Fitting
25	Shoe Anchor Pin
26	Bushing (Pin Anchor)
27	16.5 x 6 Shoe and Lining Assembly
28	Roller (Shoe Cam End)
29	Dust Shield
30	Shield Attachment Bolt

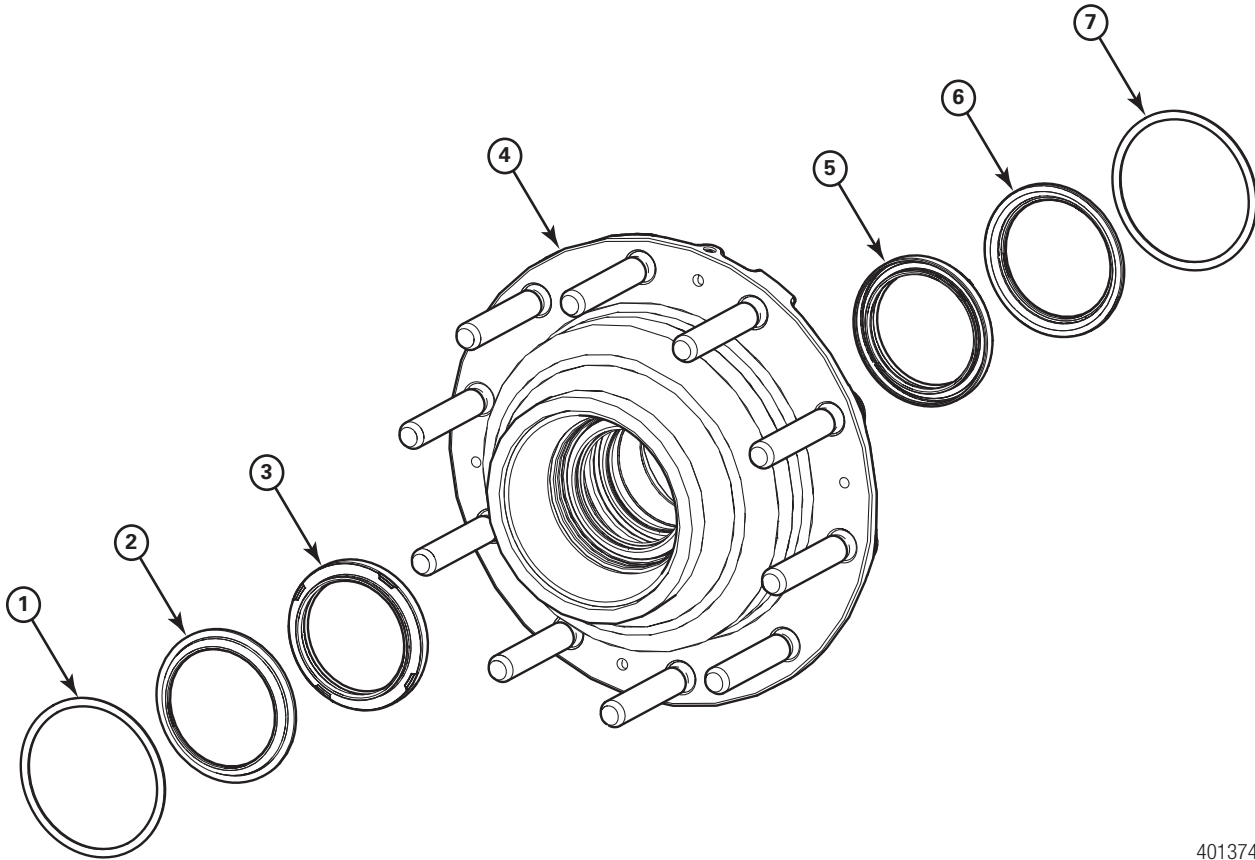
Hydraulic Disc Brake Option



Item	Description
1	Brake Caliper Assembly
2	Washer
3	Brake Caliper Bolt
4	Brake Rotor Bolt
5	Washer
6	Brake Rotor

1 Exploded Views

Central Tire Inflation (CTI) Option



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<u>Item</u>	<u>Description</u>
1	Spiral Snap Ring
2	Seal Retaining Ring
3	Outer CTI Seal
4	Hub Assembly
5	Inner CTI Seal
6	Seal Retaining Ring
7	Spiral Snap Ring

Description

Meritor P600 series heavy-duty drive axles and drive steer axles are equipped with planetary wheel ends. The planetary wheel end consists of a cylindrical planetary assembly in each hub. The assembly is made up of a sun gear assembly which is splined to the axle shaft, and several planet gears which rotate around the sun gear assembly within a ring gear.

Central Tire Inflation

Some vehicles may be equipped with a central tire inflation system to maintain correct air pressure in the tires. If equipped with this feature, the wheel end will have additional seals.

3 Dual Tire H2 Wheel End Removal and Disassembly

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.

Removal

Axle Shafts on Non-Steer Drive Axles

Due to their full floating design, the axle shafts on non-steer drive axles can easily be removed for field service or towing. Follow Steps 1-2 and Steps 6-10 of the wheel end removal procedure to gain access to the axle shaft, then grasp the end of the shaft and remove it from the axle housing.

Disassembly

Wheel Ends

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
3. Raise the vehicle so the wheels to be serviced are off the ground. Support the axle to be serviced with safety stands.
4. Remove the wheel nuts, wheels and brake drums. Most brake drums have two threaded holes to assist with brake drum removal. Install a M20x1.5 mm bolt to push the drum away from the hub.

5. Rotate the wheel ends so the drain plug is on the bottom. Remove the drain plug and drain the lubricant from the wheel ends.

NOTE: To remove the axle shaft for towing or service, follow Steps 6 through 10, then grasp the end of the shaft and remove it from the axle housing.

6. If the axle is equipped with a driver controlled differential lock (DCDL), it must be caged prior to axle shaft removal. To cage the DCDL, refer to MM5A or MM-0990 for procedures. To obtain these publications, refer to the Service Notes page on the front inside cover of this manual.
7. Use a wrench to remove the hub cover capscrews. Figure 3.1.

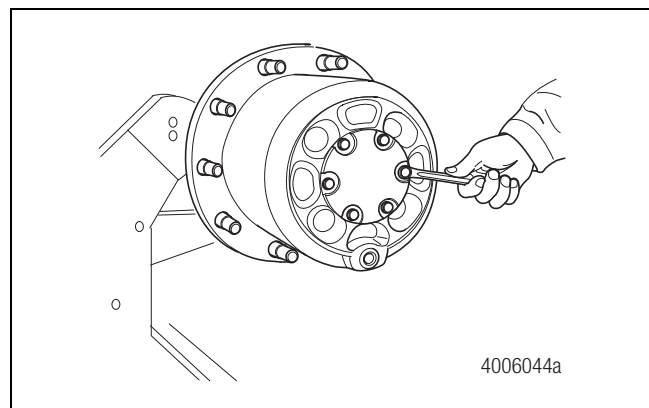


Figure 3.1

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

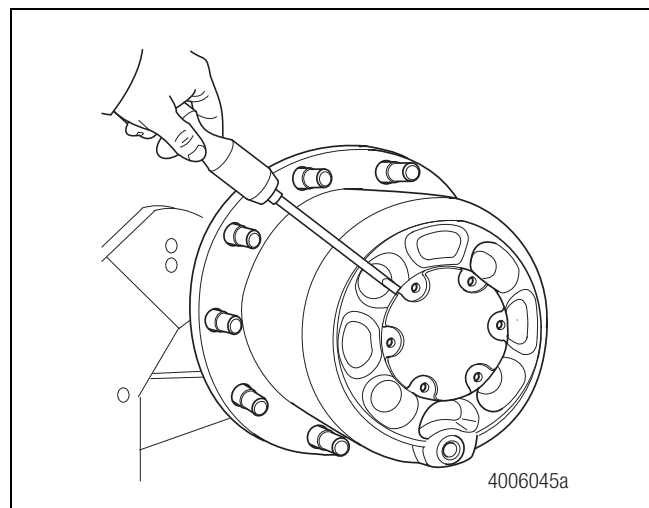


Figure 3.2

3 Dual Tire H2 Wheel End Removal and Disassembly

9. Use pliers to secure and remove the sun gear assembly from the hub housing. Figure 3.3.

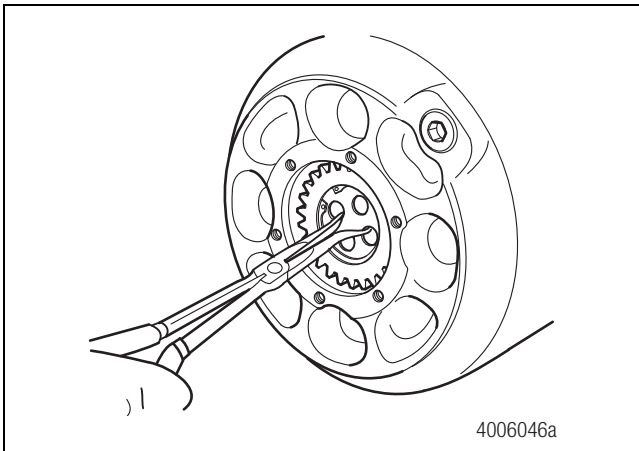


Figure 3.3

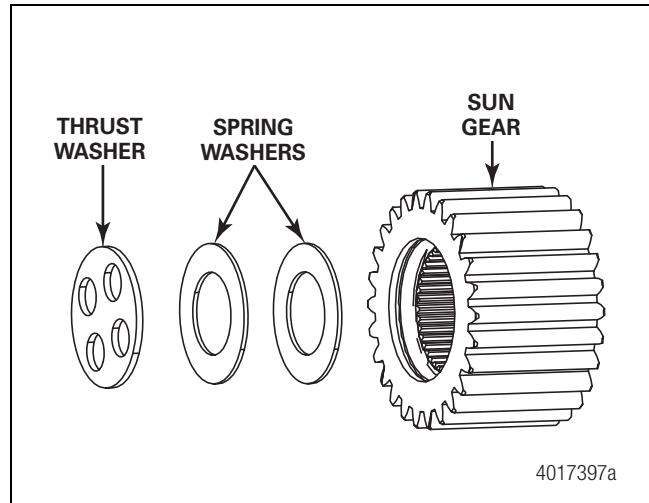


Figure 3.5

10. If it is necessary to disassemble the sun gear assembly to inspect or replace parts, use appropriate snap ring pliers to remove the snap ring then remove the thrust washer and two spring washers. Figure 3.4 and Figure 3.5.

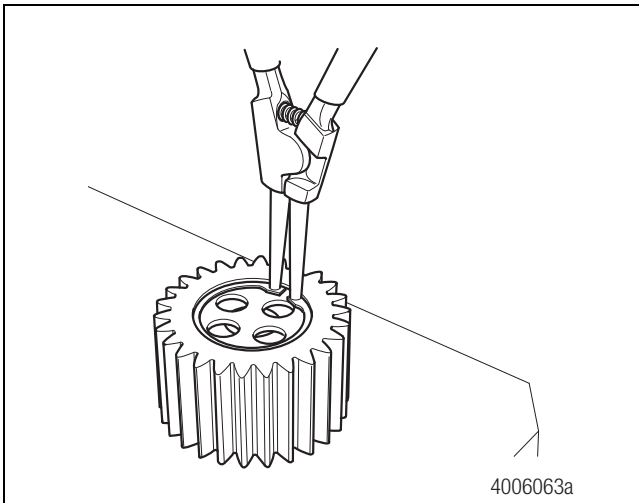


Figure 3.4

11. Pull to remove the axle shaft from the housing. If available, thread a 3/8" x 16 bolt into the end of the axle shaft to assist removal. Figure 3.6.

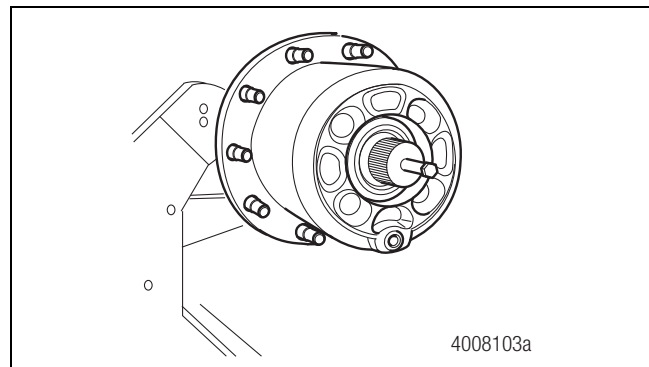


Figure 3.6

12. Block the rotation of the hub. Remove both planetary housing retaining screws. Remove the planetary housing. Figure 3.7.

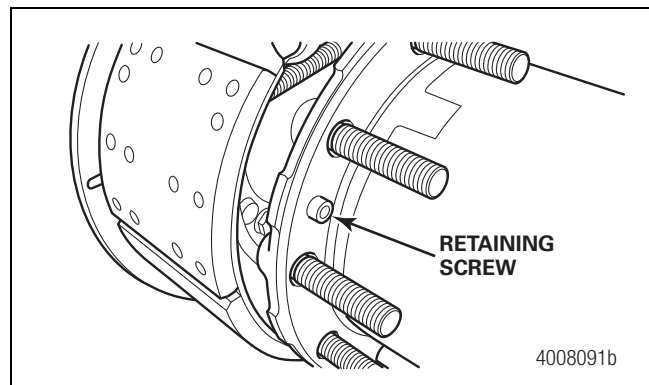


Figure 3.7

3 Dual Tire H2 Wheel End Removal and Disassembly

Planet Gears

1. Remove the snap rings from the planetary pinion shafts.
Figure 3.8.

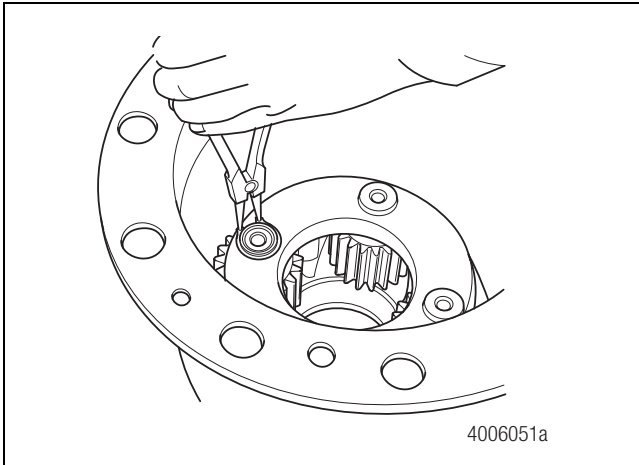


Figure 3.8

2. Use a drift to press out the pinion shafts. Figure 3.9.

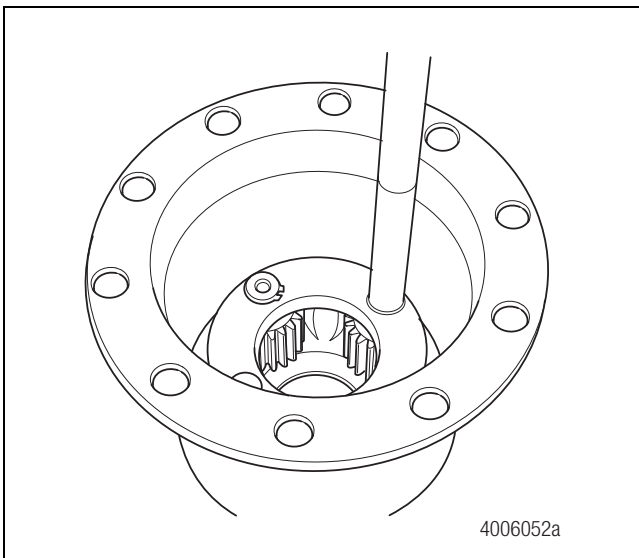


Figure 3.9

⚠ CAUTION

To ensure that the needle bearings do not become dislodged or lost, if necessary, install a dowel of an appropriate size into the planet gears to hold the needle bearings in place. Needle bearings that are dislodged or lost during operation can cause damage to components.

3. To inspect or replace damaged parts, remove the planet gears, washers and needle bearings. If necessary, install a dowel of an appropriate size into the planet gears to hold the needle bearings in place.
4. Remove the O-ring seals from the pinion shafts. Discard the O-ring seals. Figure 3.10.

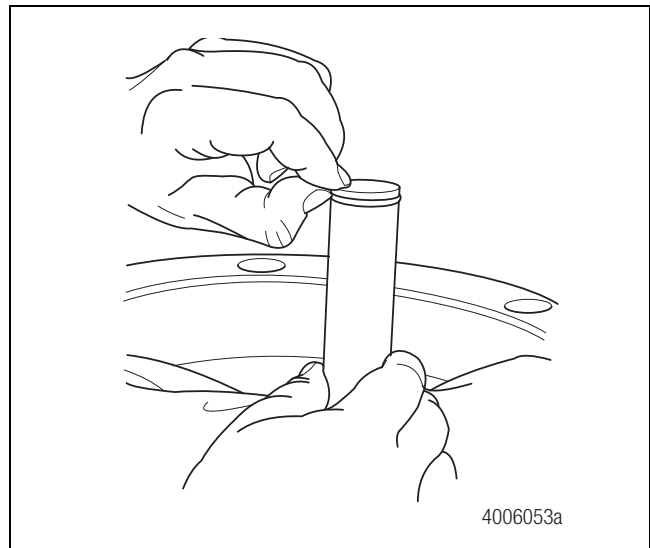


Figure 3.10

3 Dual Tire H2 Wheel End Removal and Disassembly

Hubs

WARNING

Discard the wheel bearing nut. Do not reuse the nut during reassembly. Damage to the nut could result in serious personal injury, damage to components, or both.

1. Use a blunt drift to remove the two stake points on the wheel bearing nut. Remove the wheel bearing nut. Use a drift to remove the staking points before removing the nut. Figure 3.11.

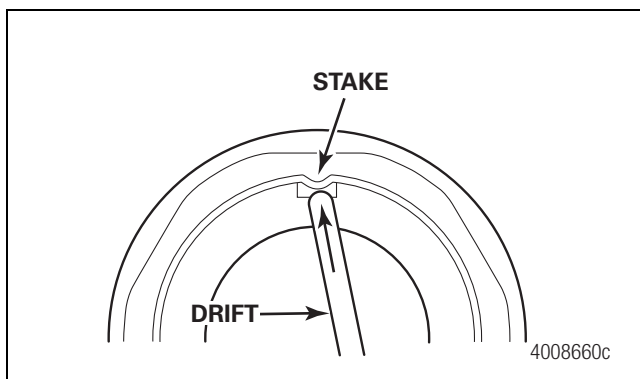


Figure 3.11

2. Remove the ring gear assembly.
3. If necessary, remove the snap ring from the ring gear assembly to separate the ring gear from the ring gear carrier. Figure 3.12.

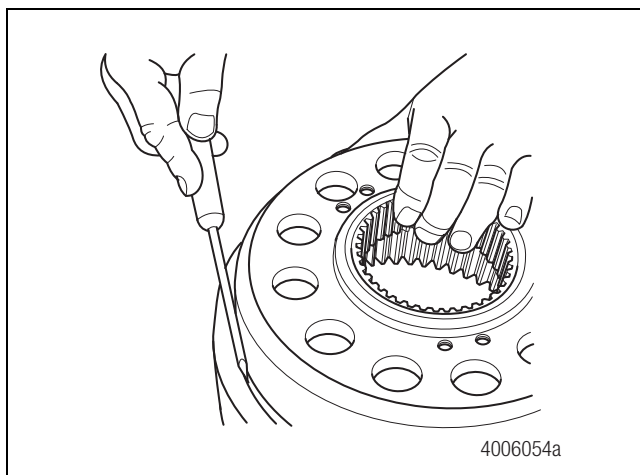


Figure 3.12

WARNING

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.

4. Use a strap and lifting device to support the hub assembly. Remove the hub assembly.
5. Remove the outer O-ring from the hub. Discard the O-ring.

Removal

Removing Fasteners Secured with Adhesive

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

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

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

4 12 5-Planet Wheel End Removal and Disassembly

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.

Removal

Axle Shafts on Non-Steer Drive Axles

Due to their full floating design, the axle shafts on non-steer drive axles can easily be removed for field service or towing. Follow Steps 1-2 and Steps 6-10 of the wheel end removal procedure to gain access to the axle shaft, then grasp the end of the shaft and remove it from the axle housing.

Disassembly

Wheel Ends

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
3. Raise the vehicle so the wheels to be serviced are off the ground. Support the axle to be serviced with safety stands.
4. Remove the wheel nuts, wheels and brake drums. Most brake drums have two threaded holes to assist with brake drum removal. Install a M20x1.5 mm bolt to push the drum away from the hub.

5. Rotate the wheel ends so the drain plug is on the bottom. Remove the drain plug and drain the lubricant from the wheel ends. Figure 4.1.

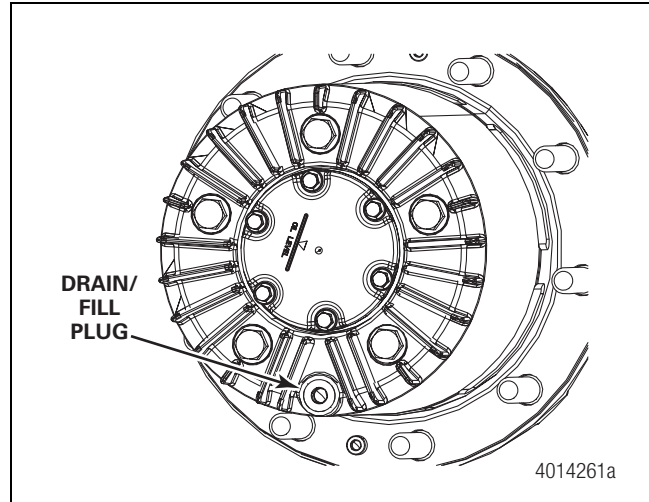


Figure 4.1

NOTE: To remove the axle shaft for towing or service, follow Steps 6 through 9 and Step 11, then grasp the end of the shaft and remove it from the axle housing.

6. If the axle is equipped with a driver controlled differential lock (DCDL), it must be caged prior to axle shaft removal. To cage the DCDL, refer to MM5A or MM-0990 for procedures. To obtain these publications, refer to the Service Notes page on the front inside cover of this manual.
7. Use a wrench to remove the hub cover capscrews. Figure 4.2.

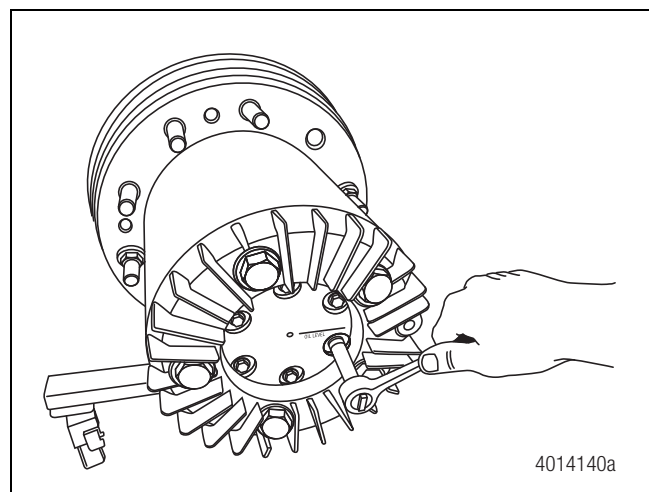


Figure 4.2

4 I2 5-Planet Wheel End Removal and Disassembly

- Use a screwdriver or pry bar to pry up and remove the hub cover. Figure 4.3.

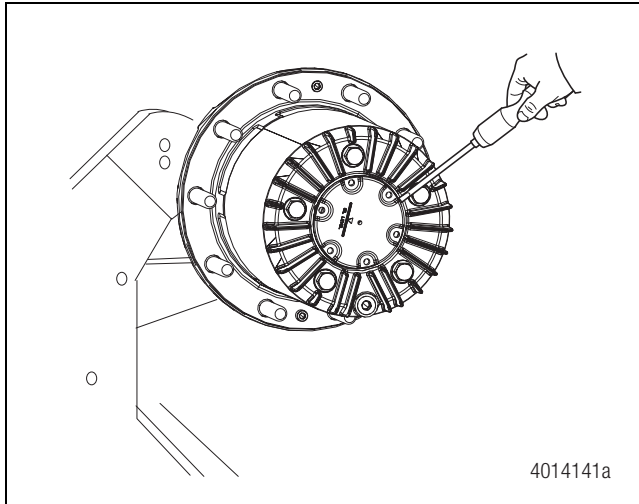


Figure 4.3

- Use pliers to secure and remove the sun gear assembly from the hub housing. Figure 4.4.

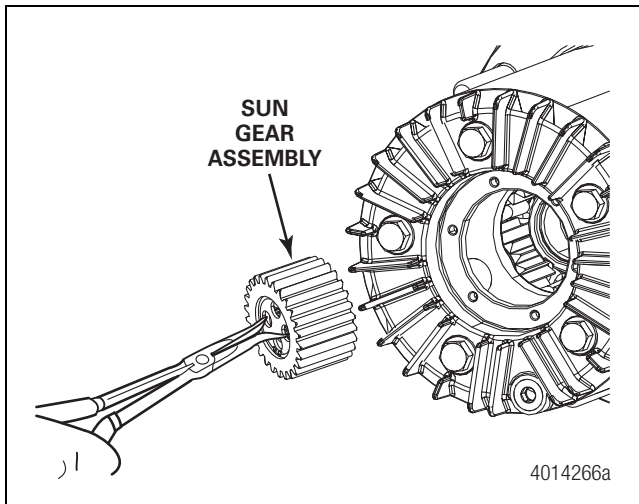


Figure 4.4

- If it is necessary to disassemble the sun gear assembly to inspect or replace parts, use appropriate snap ring pliers to remove the snap ring then remove the thrust washer and two spring washers. Figure 4.5 and Figure 4.6.

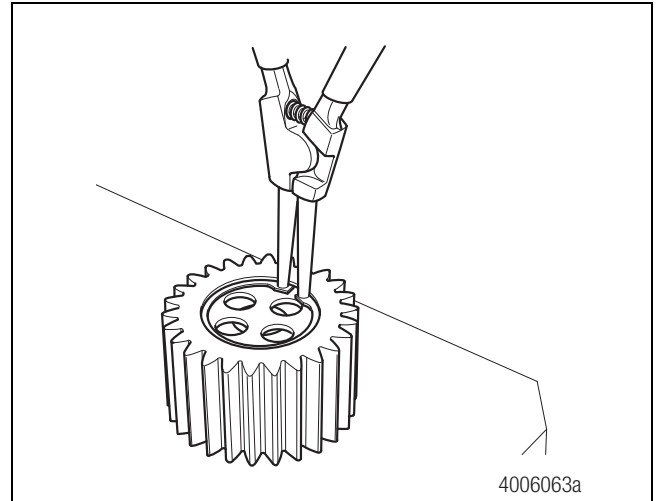


Figure 4.5

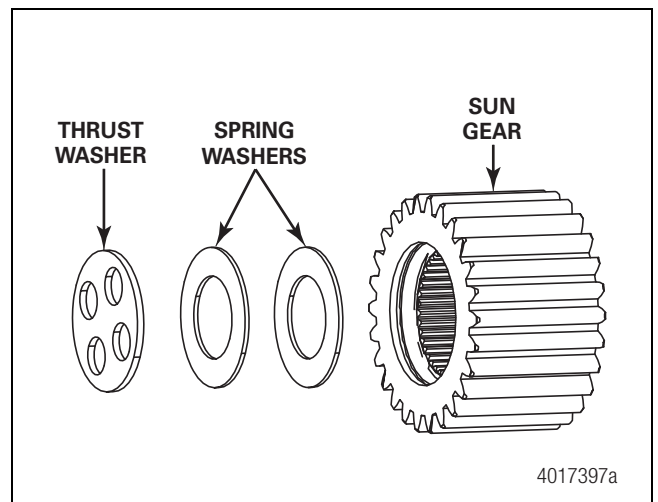


Figure 4.6

- Pull to remove the axle shaft from the housing. Figure 4.7.

4 12 5-Planet Wheel End Removal and Disassembly

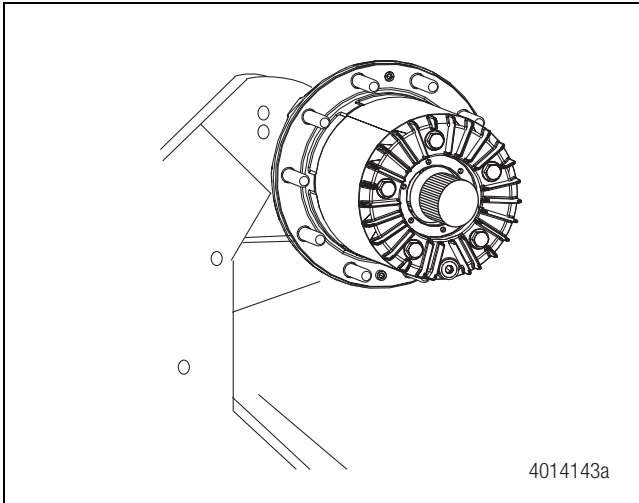


Figure 4.7

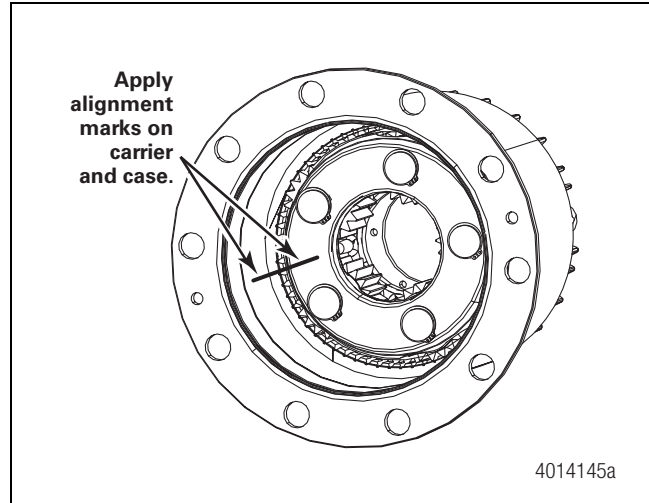


Figure 4.9

⚠ WARNING

Use a lifting strap to remove the planetary housing assembly. Failure to do so can result in damage to components and serious personal injury.

12. Block the rotation of the hub. Remove both planetary housing retaining screws. Remove the planetary housing from the hub. Figure 4.8.

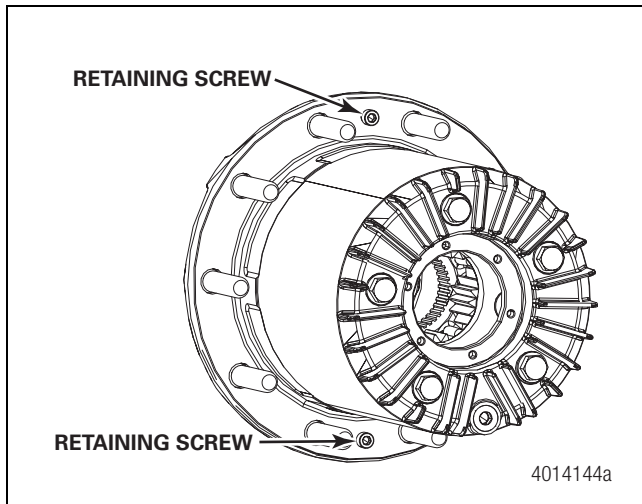


Figure 4.8

2. Remove the five bolts and remove the inner carrier assembly from the hub. Figure 4.10 and Figure 4.11.

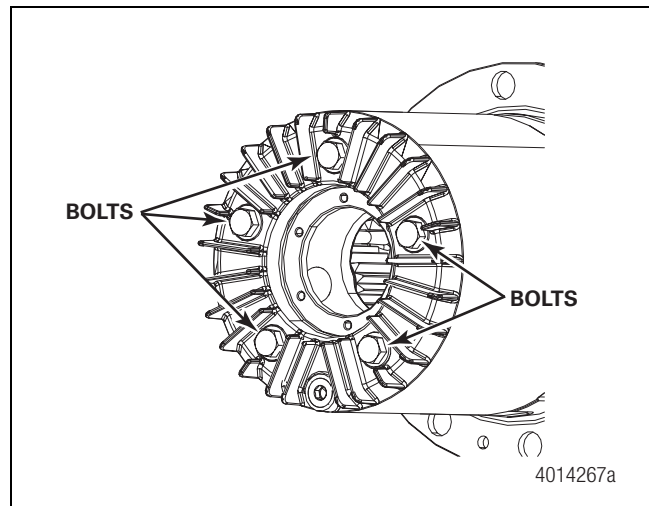


Figure 4.10

Planetary Cover and Carrier

1. Mark the alignment of the planetary carrier to the housing case inside the case. Figure 4.9.

4 I2 5-Planet Wheel End Removal and Disassembly

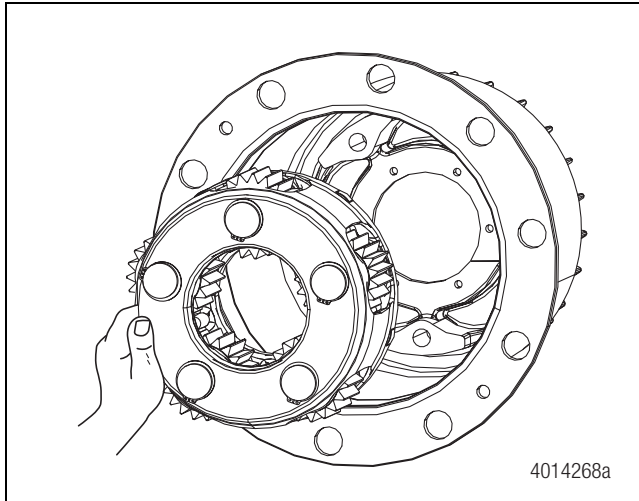


Figure 4.11

3. Remove the snap rings from the planetary pinion shafts. Figure 4.12.

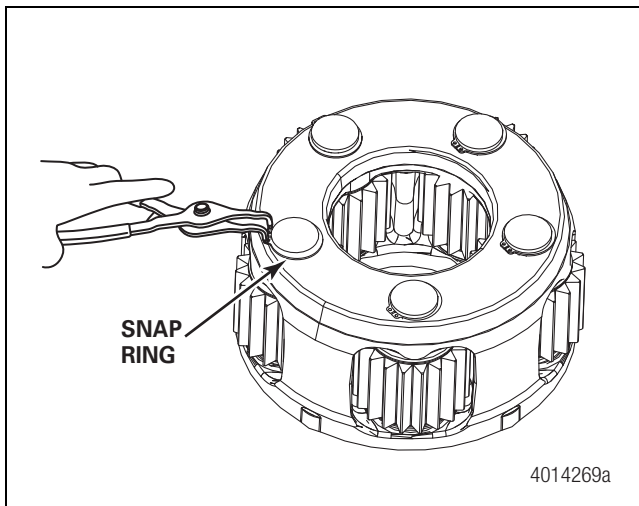


Figure 4.12

4. Use a drift to press out the pinion shafts. Figure 4.13.

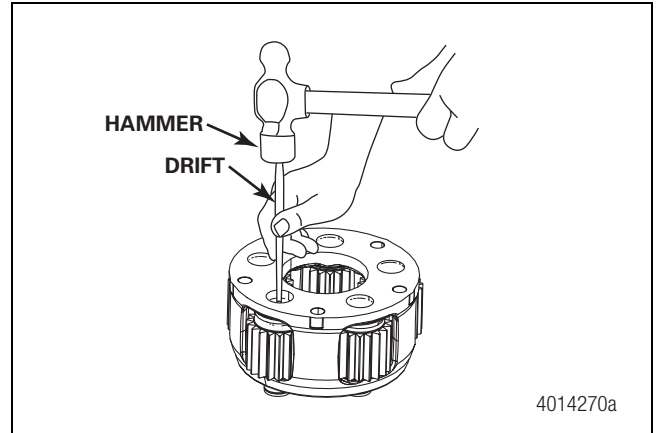


Figure 4.13

⚠ CAUTION

To ensure that the needle bearings do not become dislodged or lost, if necessary, install a dowel of an appropriate size into the planet gears to hold the needle bearings in place. Needle bearings that are dislodged or lost during operation can cause damage to components.

5. Remove the planet gears, washers and needle bearings. If necessary, install a dowel of an appropriate size into the planet gears to hold the needle bearings in place.
6. Remove the O-ring seals from the pinion shafts. Discard the O-ring seals. Figure 4.14.

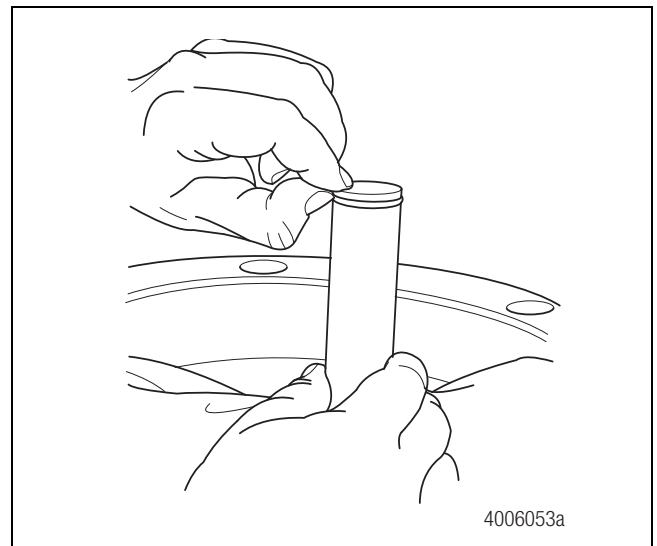


Figure 4.14

4 12 5-Planet Wheel End Removal and Disassembly

Hubs

WARNING

Discard the wheel bearing nut. Do not reuse the nut during reassembly. Damage to the nut could result in serious personal injury, damage to components, or both.

1. Use a blunt drift to remove the two stake points on the wheel bearing nut. Remove the wheel bearing nut. Figure 4.15.

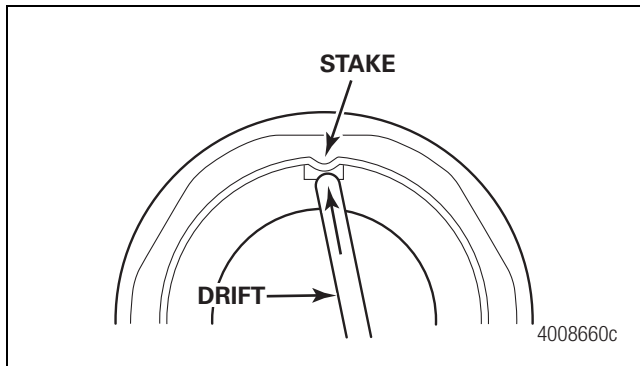


Figure 4.15

2. Remove the ring gear assembly.
3. If inspection or replacement of damaged parts is necessary, remove the snap ring from the ring gear assembly to separate the ring gear from the ring gear carrier. Figure 4.16.

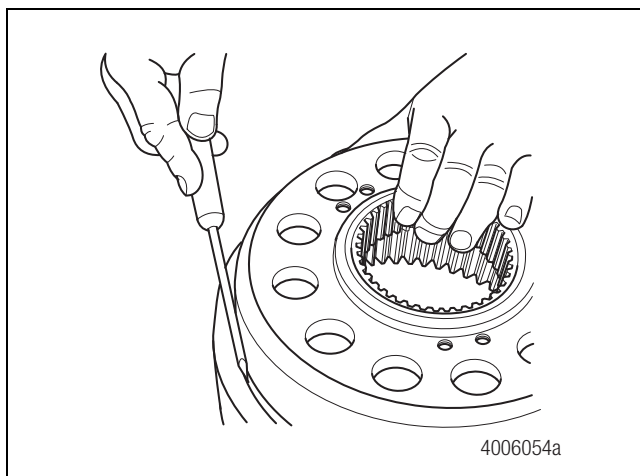


Figure 4.16

WARNING

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.

4. Use a strap and lifting device to support the hub assembly. Remove the hub assembly.
5. Remove the outer O-ring from the hub. Discard the O-ring.

Removal

Removing Fasteners Secured with Adhesive

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

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

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

5 Single Tire H2 Wheel End Removal and Disassembly

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. 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.

Prior to Disassembly

Drain the Oil

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
3. Raise the vehicle so the wheels to be serviced are off the ground. Support the axle to be serviced with safety stands.
4. Remove the wheel and tire assemblies from the wheel ends. Most brake drums have two threaded holes to assist with brake drum removal. Install a M20x1.5 mm bolt to push the drum away from the hub.

5. Place a drain pan under the hub drain plug. Rotate the wheel end so the drain plug is at its lowest position. Remove the drain plug and allow the hub oil to drain completely from the wheel end. Figure 5.1.

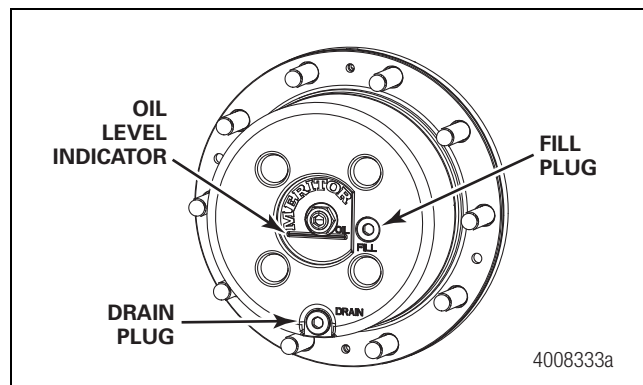


Figure 5.1

6. Place a drain pan under the housing drain plug. Remove the drain plug and allow the oil to drain completely from the axle housing.

Removal

Planetary Carrier Assembly

1. Use a suitable lifting device to support the planetary assembly. Remove the mounting bolts, and spacer (if equipped). Remove the planetary assembly from the hub. Figure 5.2.

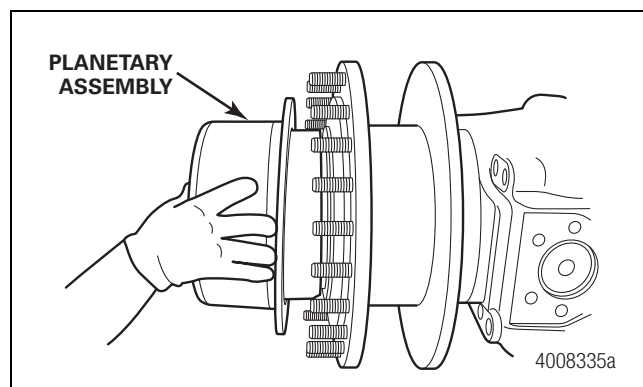


Figure 5.2

2. If necessary, remove the thrust screw from the planetary assembly. Figure 5.3.

5 Single Tire H2 Wheel End Removal and Disassembly

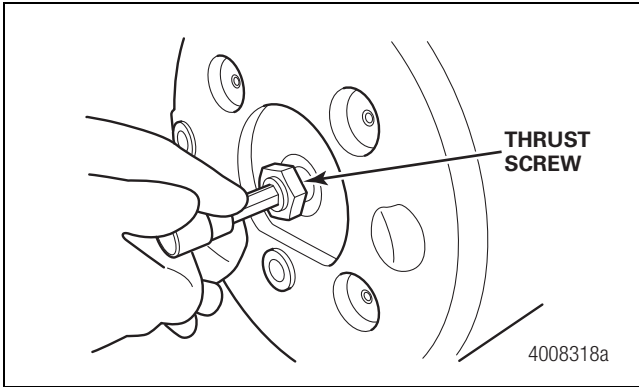


Figure 5.3

Disassembly

Planetary Assembly

1. Remove the snap rings from the end of the planetary pinion shaft. Figure 5.4.

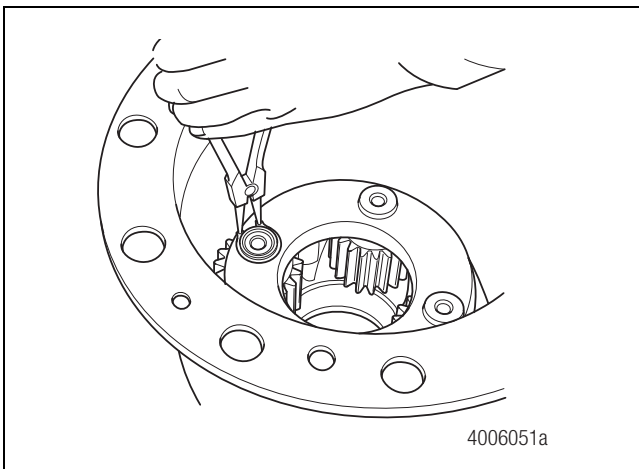


Figure 5.4

2. Use a hammer and drift to drive out the planetary pinion shaft from the planetary carrier. Figure 5.5.

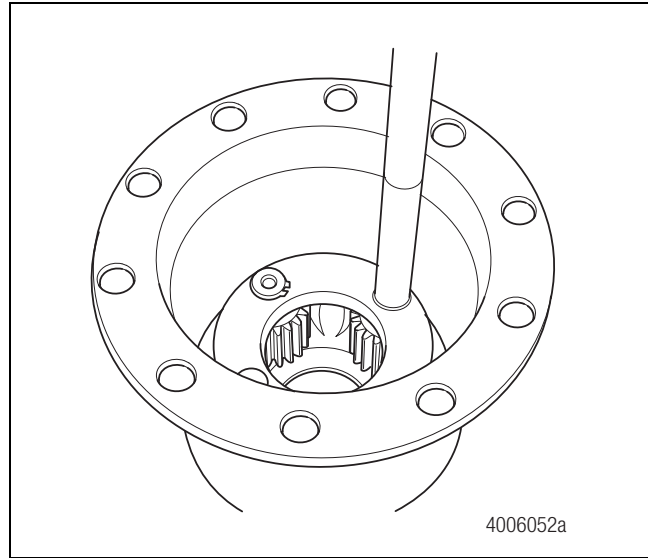


Figure 5.5

3. Remove the O-rings from the planetary pinion shaft. Figure 5.6.

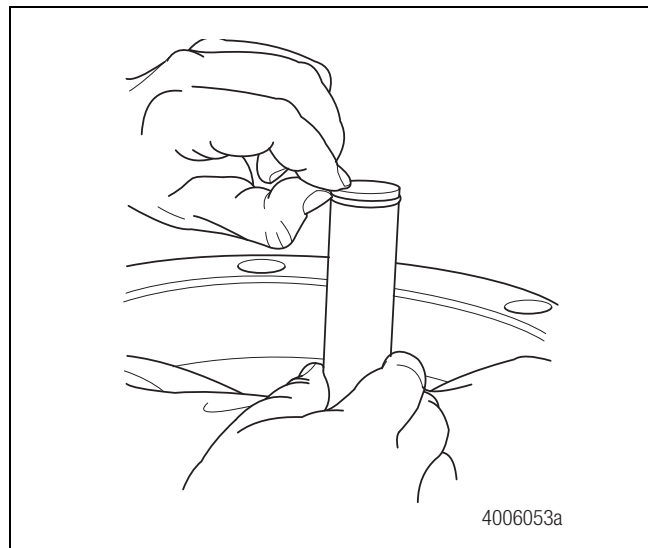


Figure 5.6

4. Remove the planet gears and thrust washers from the planetary carrier.

5 Single Tire H2 Wheel End Removal and Disassembly

⚠ CAUTION

To ensure that the needle bearings do not become dislodged or lost, if necessary, install a dowel of an appropriate size into the planet gears to hold the needle bearings in place. Needle bearings that are dislodged or lost during operation can cause damage to components.

5. Remove the bearing needles from the planet gears. If necessary, install a dowel of an appropriate size into the planet gears to help removal and keep the bearing needles together.

Removal

Wheel End

1. Remove the sun gear retaining snap ring and retaining washer (if equipped) from the end of the axle shaft. Figure 5.7.

NOTE: The retaining washer is used on front drive steer axles (MOX model) only; not used on rear drive axles (MOR model).

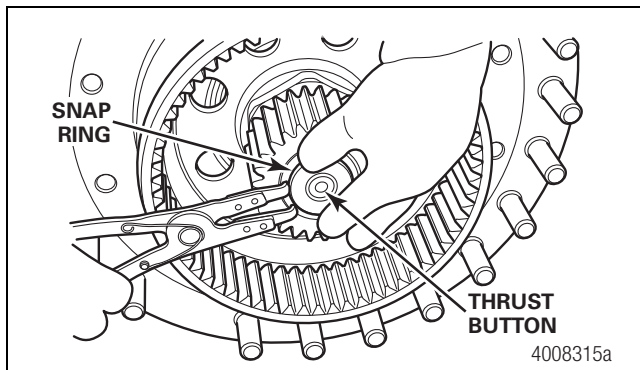


Figure 5.7

2. Remove the sun gear, needle thrust bearing (if equipped) and thrust washer from the axle shaft. Figure 5.8.

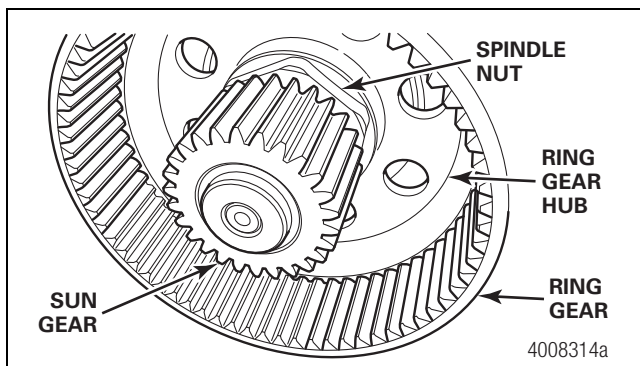


Figure 5.8

⚠ WARNING

The hub unit is heavy. Use a strap and lifting device to support the hub during removal to prevent serious personal injury and damage to components.

Discard the wheel bearing nut. Do not reuse the nut during reassembly. Damage to the nut could result in serious personal injury, damage to components, or both.

3. Remove the wheel bearing nut. Use a drift to remove the staking points before removing the nut. Figure 5.9.

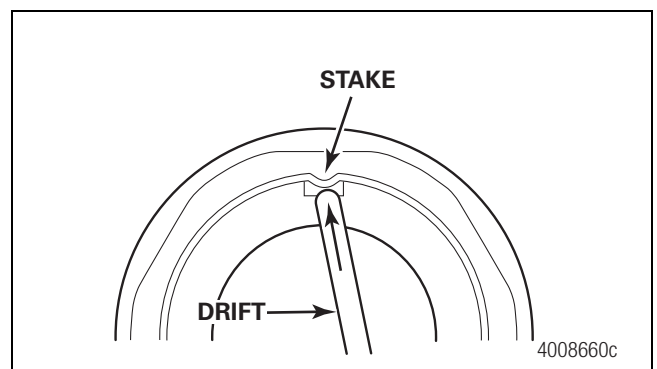


Figure 5.9

4. Remove the ring gear assembly from the spindle. Figure 5.10.
5. If necessary, remove the snap ring to separate the ring gear from the ring gear hub.

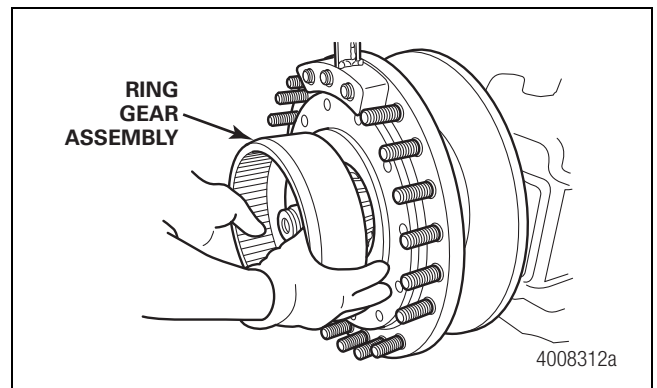


Figure 5.10

6. Remove the outer bearing cone from the spindle. Figure 5.11.

5 Single Tire H2 Wheel End Removal and Disassembly

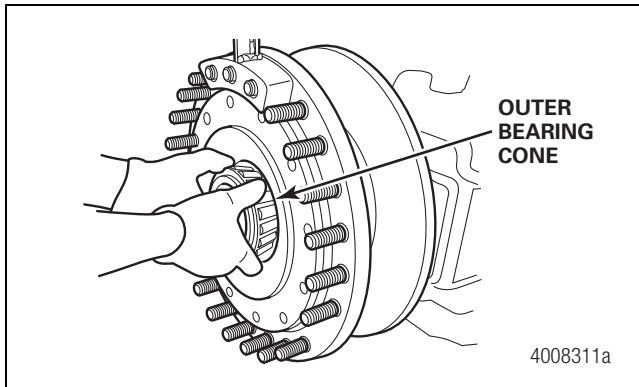


Figure 5.11

7. Use a suitable lifting device to remove the hub from the spindle.

Disassembly

Wheel End

1. If equipped, remove the rotor mounting bolts and remove the rotor from the hub. Figure 5.12.

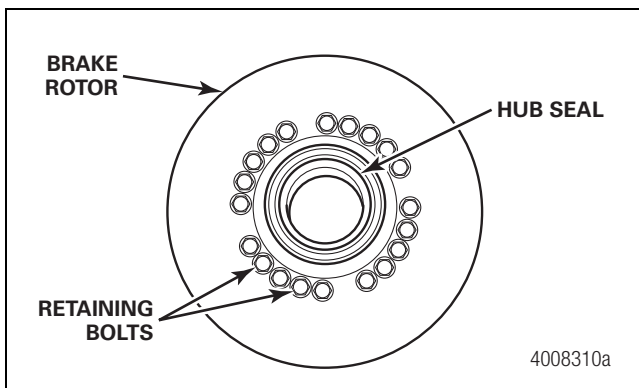


Figure 5.12

2. Remove the hub seal and inner bearing cone from the hub.
3. Remove the inner and outer bearing cups from the hub.

6 Non-Drive Axle Wheel End Removal and Disassembly

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. 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.

Removal

Wheel End

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
3. Remove the hub cover retaining bolts. Figure 6.1.

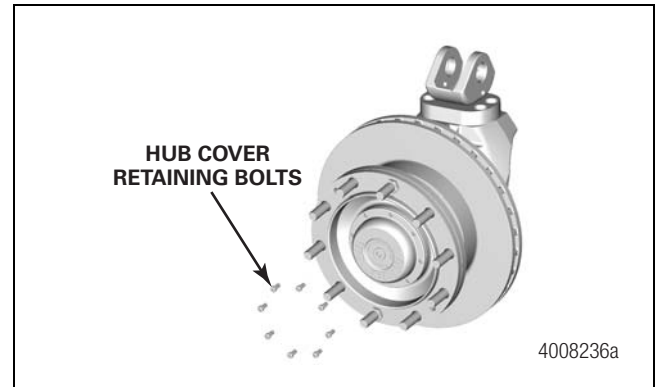


Figure 6.1

4. Use a suitable pry tool to loosen and remove the hub cover. Ensure that the cover's sealing surface is not marred or damaged during removal.
5. Use a suitable lifting device to support the hub assembly. Support the unit before nut removal.
6. Remove the wheel bearing nut and discard it.
7. Remove the tabbed thrust washer and outer bearing cone from the spindle. Figure 6.2.

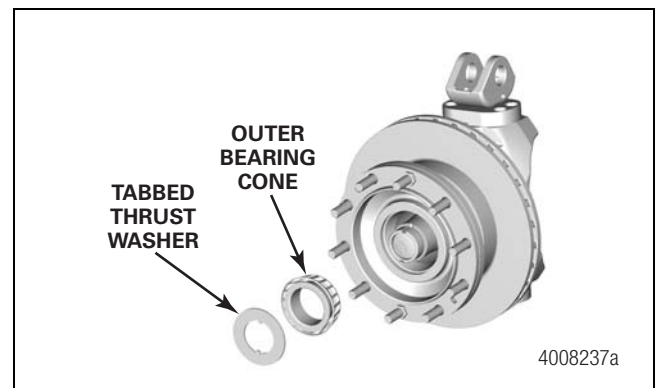


Figure 6.2

8. Remove the hub assembly from the spindle.
9. Remove the hub seal from the hub assembly. Discard the seal.

7 Single Tire N5/P8 Wheel End Removal and Disassembly

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. 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.

Prior to Disassembly

Drain the Oil

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
3. Raise the vehicle so the wheels to be serviced are off the ground. Support the axle to be serviced with safety stands.
4. Remove the wheel and tire assemblies from the wheel ends. Most brake drums have two threaded holes to assist with brake drum removal. Install a M20x1.5 mm bolt to push the drum away from the hub.

5. Place a drain pan under the hub drain plug. Rotate the wheel end so the drain plug is at its lowest position. Remove the drain plug and allow the hub oil to drain completely from the wheel end. Figure 7.1.

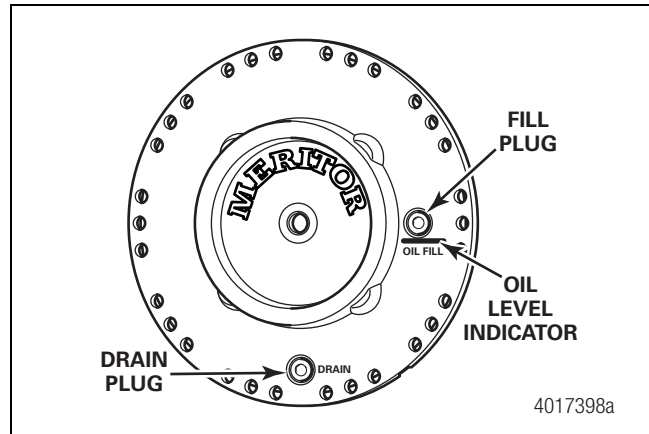


Figure 7.1

6. Place a drain pan under the housing drain plug. Remove the drain plug and allow the oil to drain completely from the axle housing.

Removal

Planetary Carrier Assembly

1. Remove the thrust screw from the planetary assembly.
2. Use a suitable lifting device to support the planetary assembly. Remove the mounting bolts. Remove the planetary assembly from the hub. Figure 7.2.

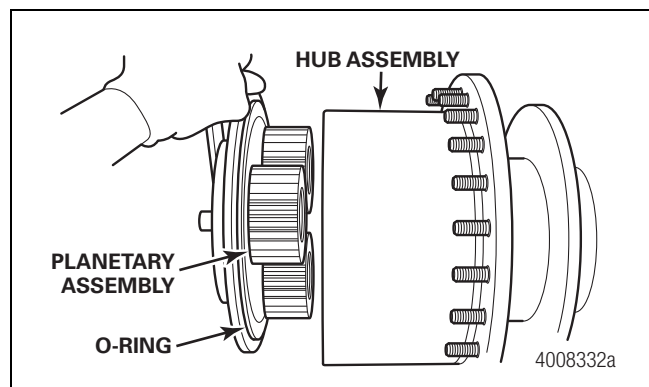


Figure 7.2

7 Single Tire N5/P8 Wheel End Removal and Disassembly

Disassembly

Planetary Assembly

1. Remove the snap rings from the end of the carrier stems.
2. Press the planet gears and bearing assemblies from the carrier stems.

CAUTION

Worn or damaged gear and bearing assemblies are non-serviceable. You must replace them as an entire assembly to prevent damage to components.

Removal

Wheel End

1. Remove the sun gear snap ring from the end of the axle shaft. Figure 7.3.

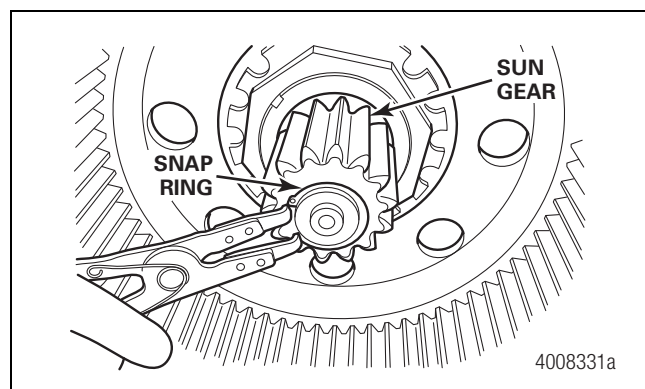


Figure 7.3

2. Remove the sun gear and thrust washer from the end of the axle shaft.
3. Remove the wheel bearing nut lock bolt.
4. Remove the wheel bearing nut.
5. Remove the ring gear assembly from the spindle. Figure 7.4.

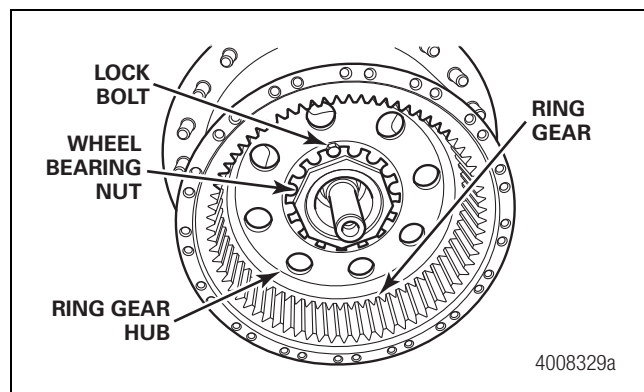


Figure 7.4

6. Remove the outer bearing cone from the spindle.
7. Remove the caliper. Refer to Section 9 for brake service procedures.

WARNING

The hub unit is heavy. Use a strap and lifting device to support the hub during removal to prevent serious personal injury and damage to components.

8. Use a suitable lifting device to remove the hub assembly from the spindle. Figure 7.5.

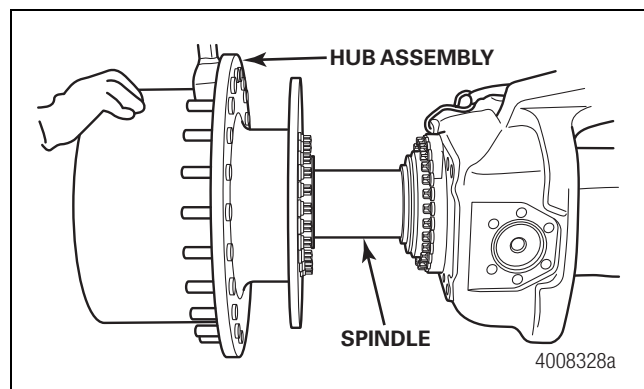


Figure 7.5

7 Single Tire N5/P8 Wheel End Removal and Disassembly

Disassembly

Wheel End

NOTE: If the hub is equipped with central tire inflation, refer to Section 8 for additional instructions.

1. Remove the rotor mounting bolts and remove the rotor from the hub. Figure 7.6.

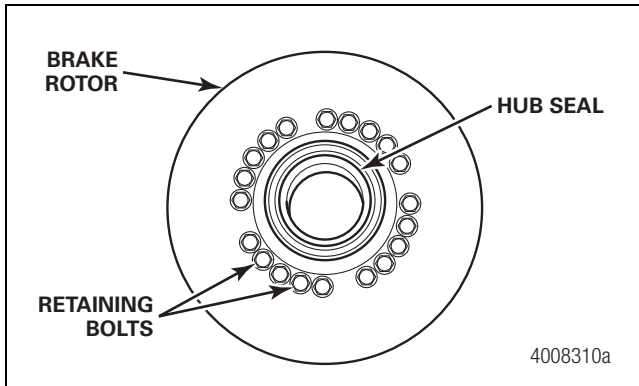


Figure 7.6

2. Remove the hub seal, sleeve (if equipped) and inner hub bearing cone from the hub.
3. Remove the inner and outer bearing cups from the hub.

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.

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.

⚠️ ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials. Refer to page i for asbestos and non-asbestos safety information and recommended work practices.

Disassembly

Central Tire Inflation

1. Install the CTI seal protection sleeve over the end of the spindle. Refer to the tool drawing in Section 21.
2. Install a lifting strap on the hub assembly to support the weight. Remove the outer bearing and hub assembly from the spindle.
3. Remove the hub inner grease seal and inner bearing cone.
4. Remove the CTI inner spiral snap ring, seal retaining ring and seal. Discard the seal. Figure 8.1.

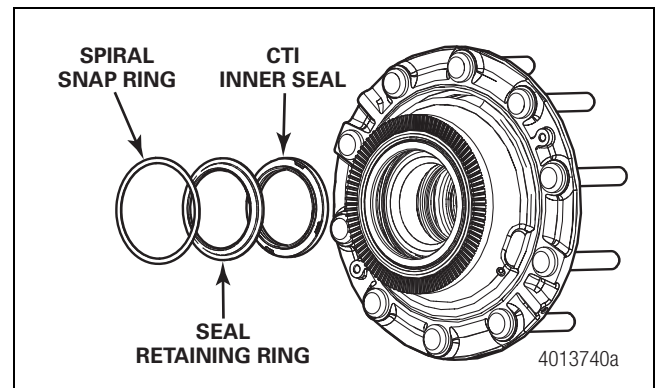


Figure 8.1

5. Remove the CTI outer spiral snap ring, seal retaining ring and seal. Figure 8.2.

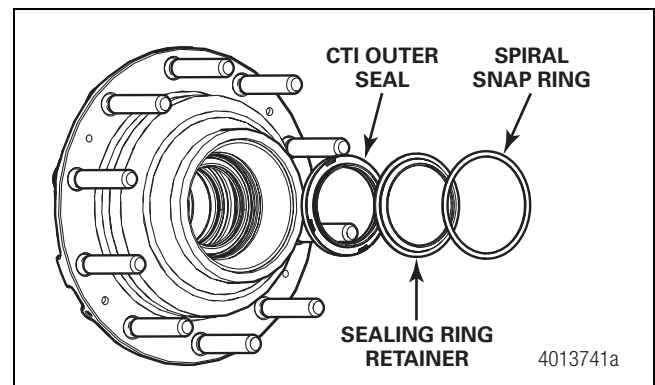


Figure 8.2

9 Brake Removal

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.

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.

⚠ ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials. Refer to page i for asbestos and non-asbestos safety information and recommended work practices.

Removal

S-Cam Drum Brake Assembly

NOTE: For complete Meritor S-cam drum brake service procedures, refer to the P Series and Cast+™ sections in Maintenance Manual 4.

⚠ 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 the brake cannot actuate during brake service. 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

For a Meritor slack adjuster, 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.

NOTE: Refer to Maintenance Manual MM 4 for additional description and service procedures. For non-Meritor slack adjusters, refer to the manufacturer's recommended instructions for removal and adjustment procedures.

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 on a Meritor slack adjuster, 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. Figure 9.1.

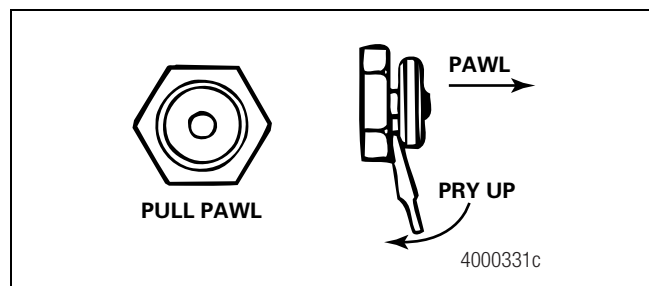
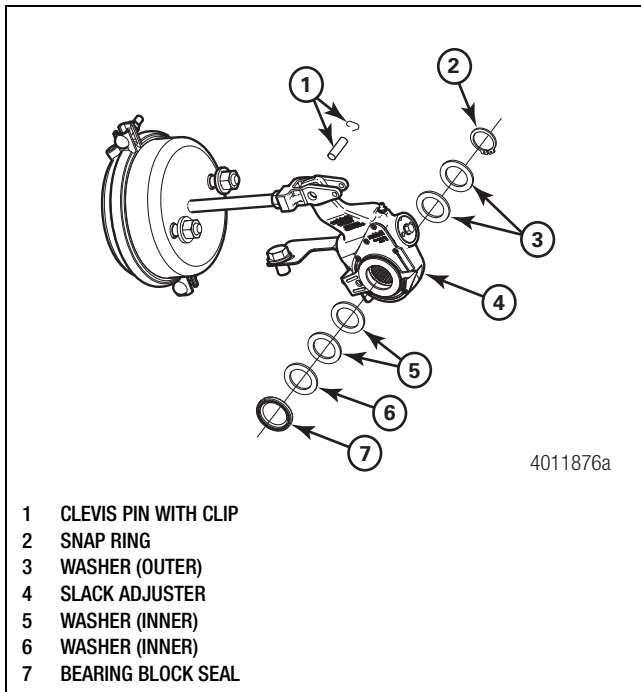


Figure 9.1

5. For single tire, H2 front drive steer axles with S-cam drum brakes, perform the following. Figure 9.2.
 - A. Remove the brake chamber rod clevis pin and clip, and release the clevis from the slack adjuster arm.
 - B. Remove the snap ring from the slack adjuster end of the S-cam.

- C. Note the position and number of washers under the snap ring and remove.
- D. Remove the slack adjuster. Refer to the slack adjuster manufacturer's instructions for correct procedures.
- E. Remove the snap ring from the outside of the S-cam support block assembly.
- F. Note the position and number of washers under the snap ring and remove the washers.



- 1 CLEVIS PIN WITH CLIP
- 2 SNAP RING
- 3 WASHER (OUTER)
- 4 SLACK ADJUSTER
- 5 WASHER (INNER)
- 6 WASHER (INNER)
- 7 BEARING BLOCK SEAL

Figure 9.2

- 6. Disconnect and remove the brake return spring and clips. Figure 9.3.

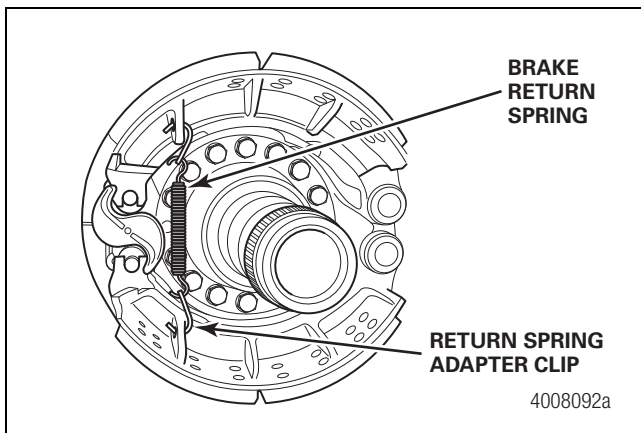


Figure 9.3

- 7. If you are servicing an axle equipped with an ABS sensor, remove the ABS sensor and mounting blocks as follows prior to brake assembly removal. Figure 9.4.
 - A. Pivot the top brake shoe up on the anchor pin and secure it in the elevated position to gain access to the sensor mount.
 - B. Remove the ABS sensor mount block capscrews, mount block and spacer block.
 - C. Remove the ABS sensor from the mount block.
 - D. Pull the ABS sensor and harness from the brake assembly as follows.
 - **Axles without CTIS:** Carefully pull the sensor and harness back through the hole in the brake spider and secure out of the way.
 - **Axles equipped with CTIS:** Remove the grommet where the sensor harness passes through the dust shield. Pull the sensor and harness through the dust shield and secure out of the way.

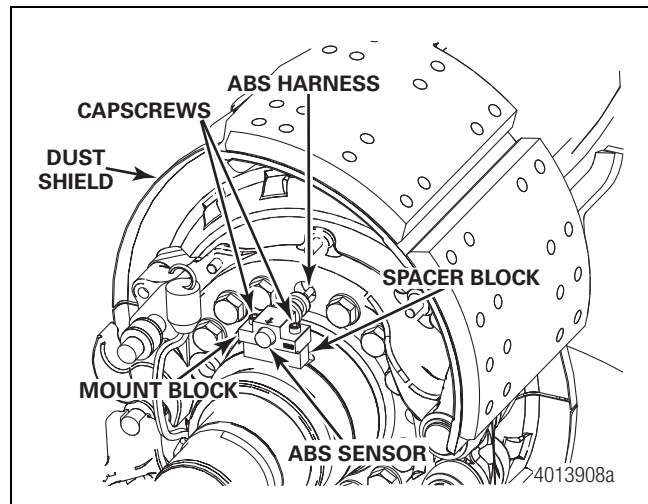


Figure 9.4

- 8. Support the brake assembly with a suitable lifting device. Figure 9.5.

9 Brake Removal

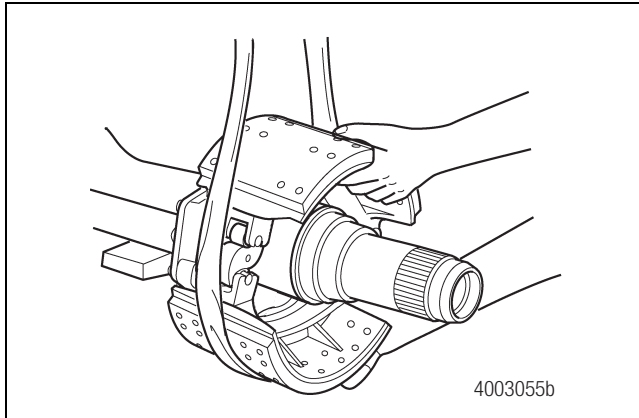


Figure 9.5

9. Remove the remaining 13 fasteners that hold the brake spider and spindle to the knuckle. Figure 9.6.

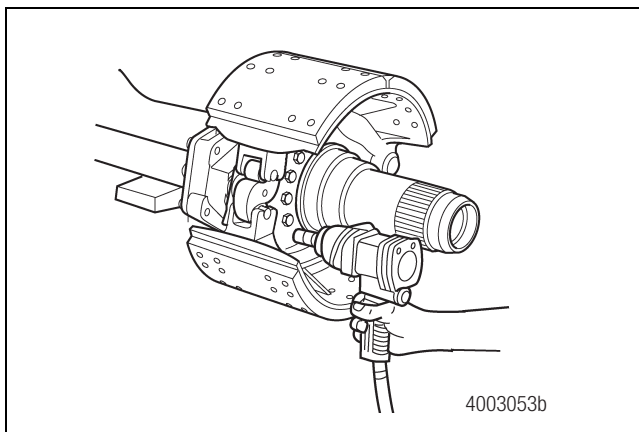


Figure 9.6

10. After removing the last brake spider bolt, carefully remove the complete brake assembly and set aside. For single tire H2 front drive steer axles, carefully remove the brake assembly while sliding the S-cam shaft through the knuckle.

Hydraulic Disc Brake

1. Use a 7/8" 12-point socket to remove three of the caliper mounting bolts. Figure 9.7.

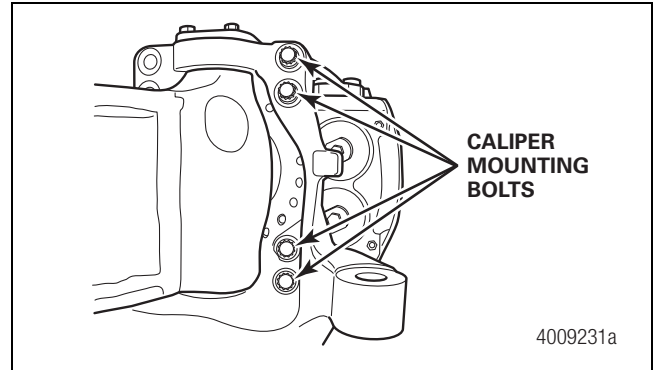


Figure 9.7

2. Use a suitable lifting device to support the caliper before removing the last bolt.
3. Remove the last caliper mounting bolt and remove the caliper from the wheel end. Figure 9.8.

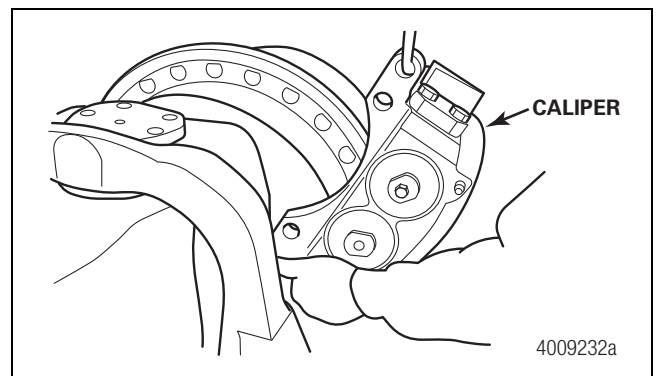


Figure 9.8

Air Disc Brake

1. Use a lifting device to support the brake caliper assembly.
2. Remove the four caliper mounting bolts. Lift the brake caliper assembly and remove it from the wheel end. Figure 9.9.

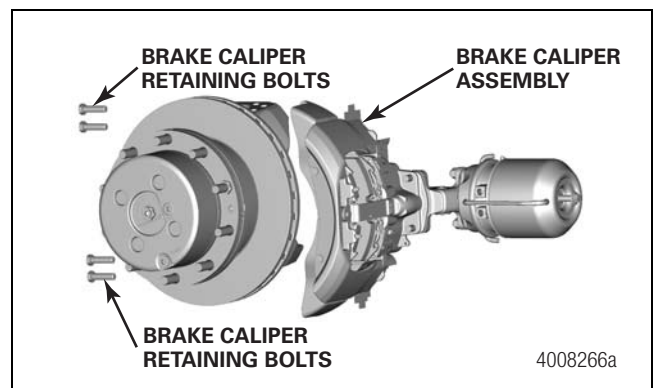


Figure 9.9

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 may be 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 and use appropriate safety equipment. 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.

Clean, Dry and Inspect Parts

Clean Ground and Polished Parts

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

CAUTION

Do not use hot solution tanks or water and alkaline solutions to clean ground or polished parts. Damage to parts can result.

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

Clean Rough Parts

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

Drying 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.

All Parts Except Bearings

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

10 Prepare Parts for Assembly

Prevent Corrosion on Cleaned Parts

1. Apply axle lubricant to cleaned and dried parts that are not damaged and are to be assembled.
2. For parts storage, wrap cleaned parts in anti-corrosive paper that will protect 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.

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 10.1.
- The radius at the large-diameter end of the rollers is worn to a sharp edge. Figure 10.1.
- 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 10.2.
- There are deep cracks or breaks in the cup, cone inner race or roller surfaces. Figure 10.2.
- There are bright wear marks on the outer surface of the roller cage. Figure 10.3.
- There is damage on the rollers and on the surfaces of the cup and cone inner race that touch the rollers. Figure 10.4.
- There is damage on the cup and cone inner race surfaces that touch the rollers. Figure 10.5.

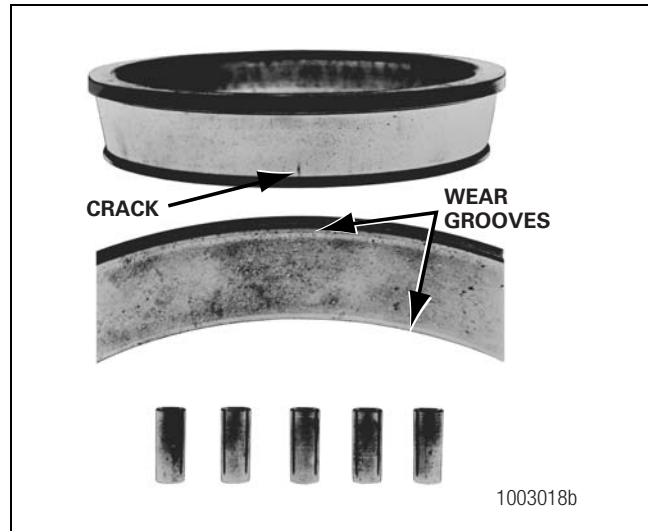


Figure 10.2

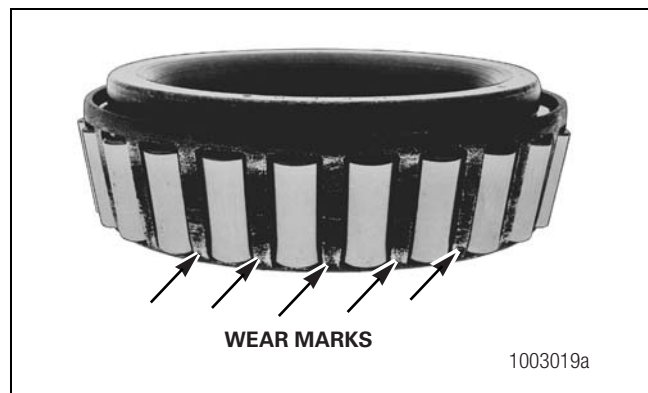


Figure 10.3

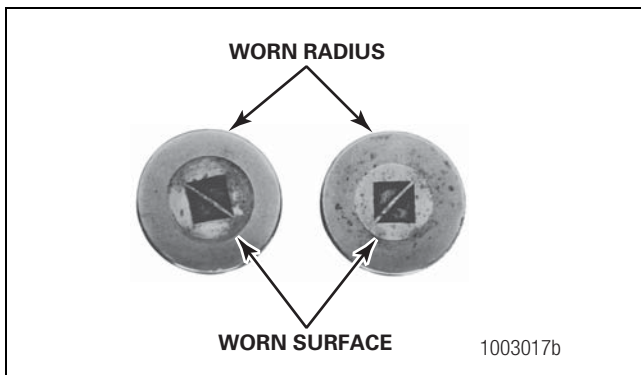


Figure 10.1

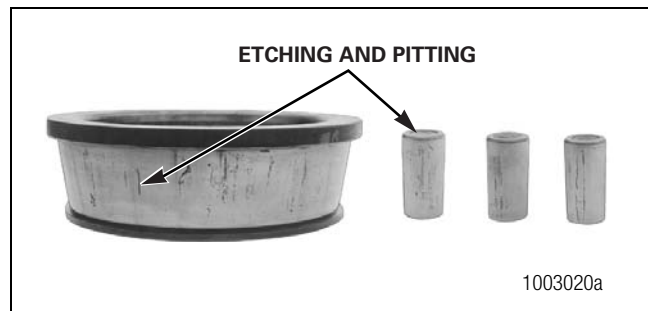


Figure 10.4

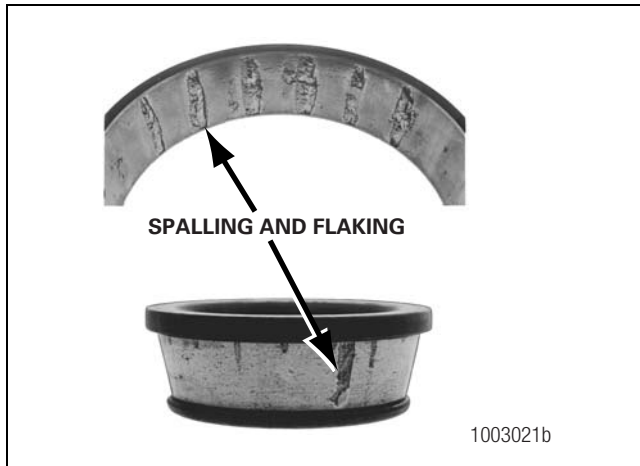


Figure 10.5

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.
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.

Removing Fasteners Secured with Adhesive

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

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

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

New Fasteners with Pre-Applied Adhesive

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.

Hub Reduction Wheel Ends

Thoroughly clean all hub parts. Check all of the parts for wear, deformities or damage.

Check the planet gears, pinion shaft and needle rollers surfaces for damage. If a planet gear, pinion shaft or roller bearings are damaged, all the components must be replaced at same time. Also check the planetary carrier pinion shaft contact surfaces to ensure proper sealing with the pinion shaft O-rings.

Wheel Studs

Replace all wheel studs that have damaged or distorted threads. Replace broken or bent studs, and studs that are badly corroded. Also replace the stud on each side of the damaged stud. If two or more studs in the hub are damaged, replace all the studs in the hub. Broken studs are usually an indication of either excessive or inadequate wheel nut torque.

⚠ 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.

When you remove or install a stud, you must support the inboard side of the flange adjacent to the stud head and perpendicular to the press cylinder. If you do not support the hub correctly, serious personal injury and damage to components can result.

10 Prepare Parts for Assembly

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

Hazard Alert Messages

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

⚠ WARNING

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

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

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.

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.

Assembly

Wheel Ends

1. Grease the needle bearings and the planet gears. Install the needle bearings and spacer sleeves into the planet gears. Each gear must have 38 needle rollers.

⚠ CAUTION

When you install the planet gears and thrust washers into the hub casing, install the steel washer against the planet gears and the brass washer against the hub housing. Otherwise, damage to the roller bearing and gears can occur during operation.

2. Install the planet gears and thrust washers into the hub casing. Align the gears with the pinion shaft bores and verify that the washers are positioned correctly against the hub housing. Figure 11.1.

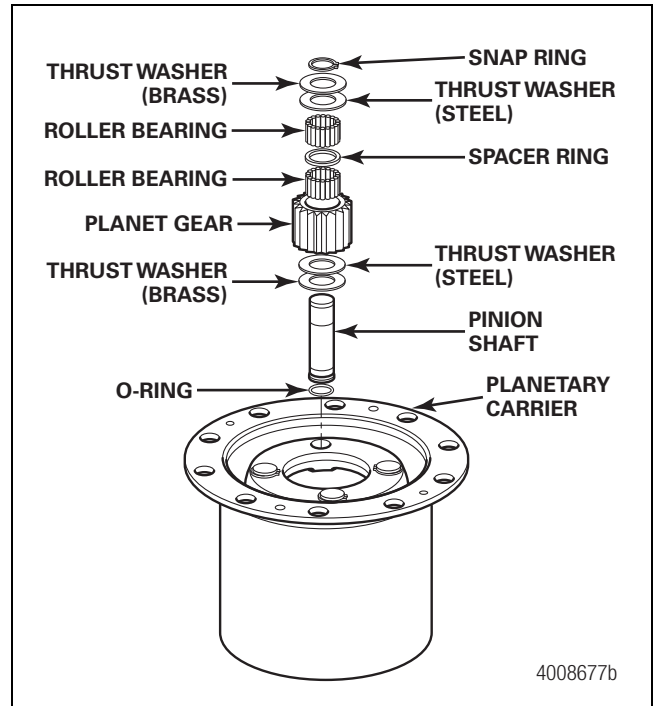


Figure 11.1

3. Grease the new pinion shaft O-rings with Meritor-approved white lithium grease and install them onto the pinion shafts. Figure 11.2.

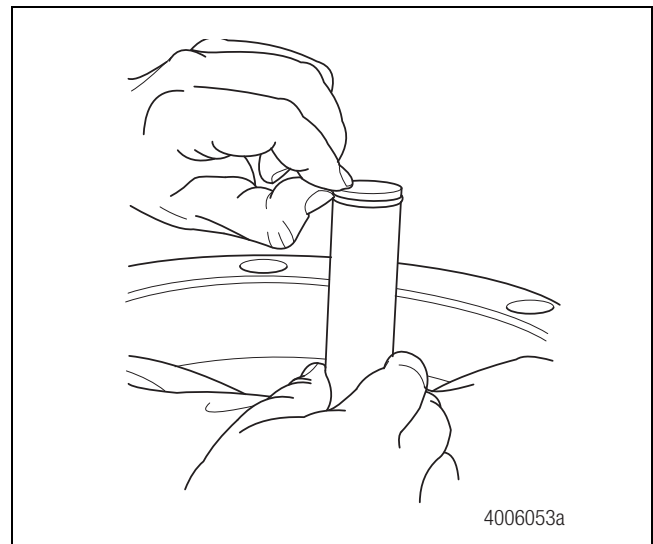


Figure 11.2

4. Use a drift to press the new pinion shafts into the planetary carrier hub housing. The pinion shafts should be seated with enough room to fit the snap rings. Figure 11.3.

11 Dual Tire H2 Wheel End Assembly and Installation

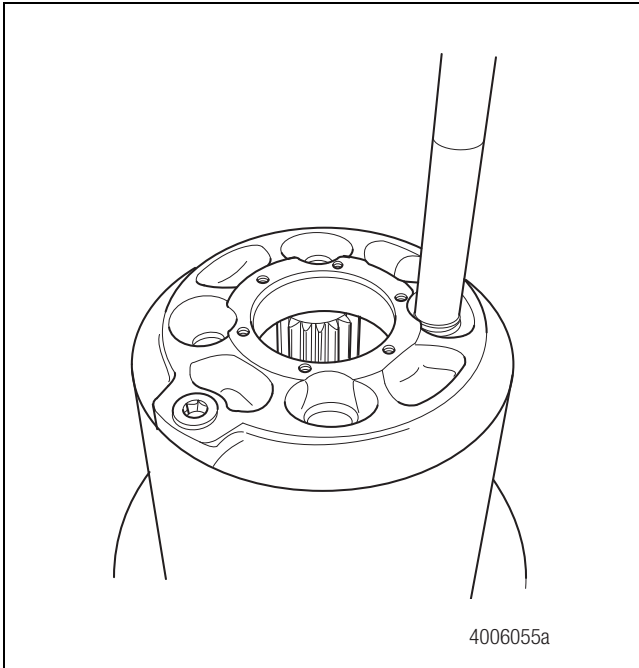


Figure 11.3

5. Install the snap rings onto the ends of the pinion shafts. Figure 11.4.

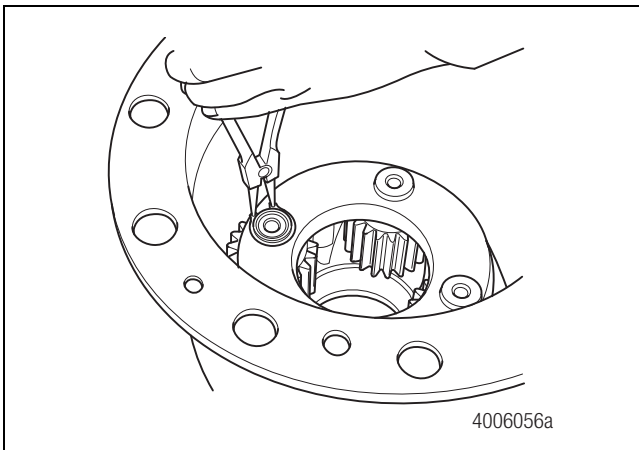


Figure 11.4

6. Install the inner bearing cone.
7. Prior to installing the new hub seal, apply a bead of Loctite® 638 adhesive sealant around the outside diameter of the seal as shown. Use Loctite® 680 adhesive sealant if Loctite® 638 is unavailable. Figure 11.5.

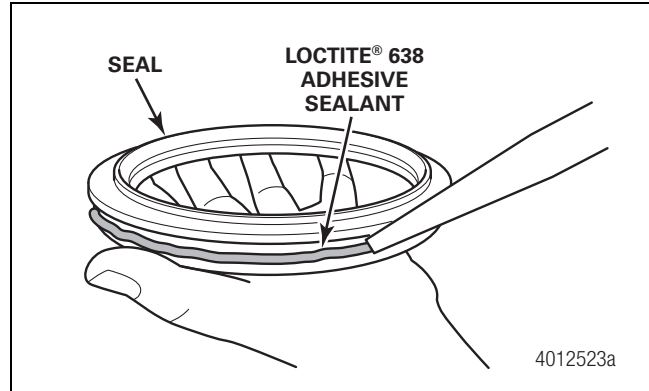


Figure 11.5

8. Use a seal driver to press the seal into the hub. Figure 11.6 and Figure 11.7.

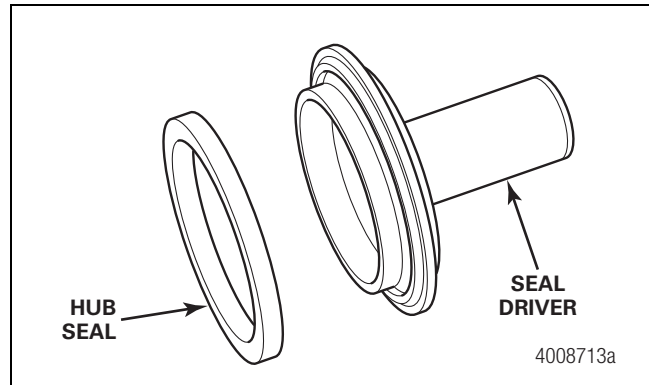


Figure 11.6

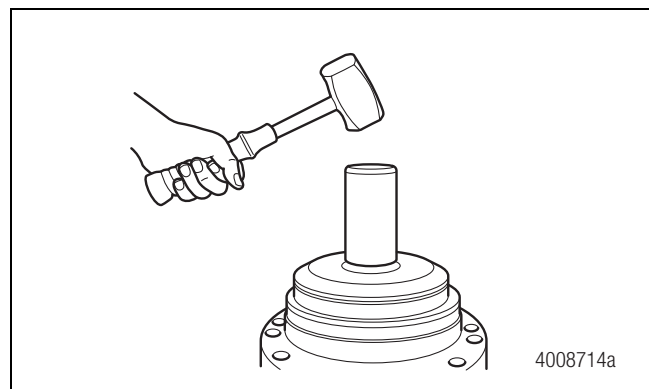


Figure 11.7

9. Lubricate a new outer planetary hub case O-ring with Meritor-approved white lithium grease and install it onto the hub.

11 Dual Tire H2 Wheel End Assembly and Installation

10. Lubricate the inner lip of the hub seal prior to installing the hub on the spindle.
11. Lubricate the spindle bearing journals with gear oil.
12. Install the outer bearing cone.
13. If the ring gear assembly was disassembled, reinstall the ring gear on the ring gear carrier and install the snap ring. Figure 11.8.

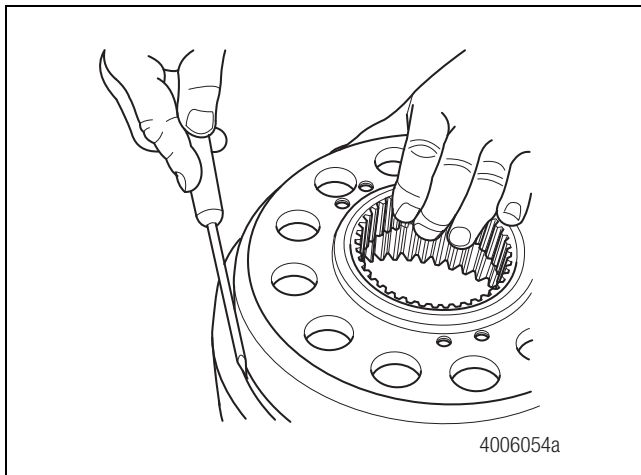


Figure 11.8

14. Install the ring gear assembly onto the spindle splines against the outer bearing cone.

⚠ WARNING

When you remove a wheel bearing nut, always replace the nut with a new one. Do not reuse a wheel bearing nut. Ensure that you correctly stake a wheel bearing nut. A reused or incorrectly staked wheel bearing 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.

15. Install the wheel bearing nut.
16. Tighten the wheel bearing nut using the appropriate procedure for the style of hub as follows.

Low-Speed Application Wheel Bearing Torque Procedure

- A. Tighten the wheel bearing nut to 300 lb-ft (407 N•m) while rotating the hub continuously back and forth. 🔧
- B. Loosen the wheel bearing nut.
- C. Retighten the wheel bearing nut to 75 lb-ft (102 N•m) while rotating the hub back and forth continuously. 🔧

- D. Mark the nut position and tighten an additional 21 degrees.
- E. Check the hub rolling resistance as follows and ensure it does not exceed 40 lb-ft (54 N•m).
 1. Attach a string to a lug stud and wrap it around the bolt circle several times.
 2. Attach a pull scale to the other end of the string.
 3. Pull the scale with an even motion until the hub is rotating at a constant speed.
 4. Record the average reading during the pull, disregarding any initial spike required to get the wheel moving.
- F. Tighten the wheel bearing nut to a final torque of 150 lb-ft (203 N•m). 🔧
- G. 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 11.9.

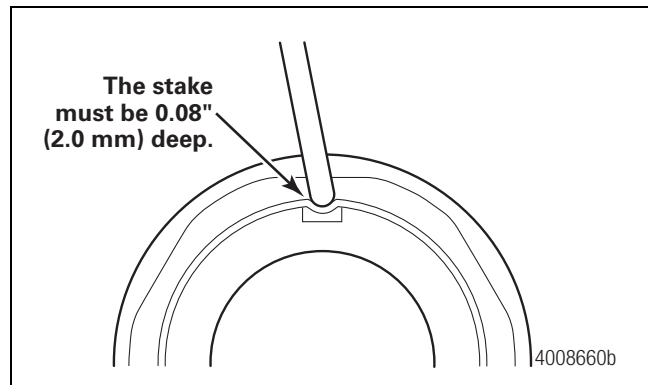


Figure 11.9

High-Speed Application Wheel Bearing Torque Procedure

- A. Tighten the wheel bearing nut to 45-58 lb-ft (61-79 N•m) while rotating the hub back and forth. 🔧
- B. Further rotate the hub three revolutions in each direction, alternating forward and backward.
- C. Mark the wheel bearing nut position and retighten the nut to 45-58 lb-ft (61-79 N•m). 🔧
- D. If the nut turns, repeat the previous step until the nut no longer turns when tightened.

11 Dual Tire H2 Wheel End Assembly and Installation

- E. 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 11.10.

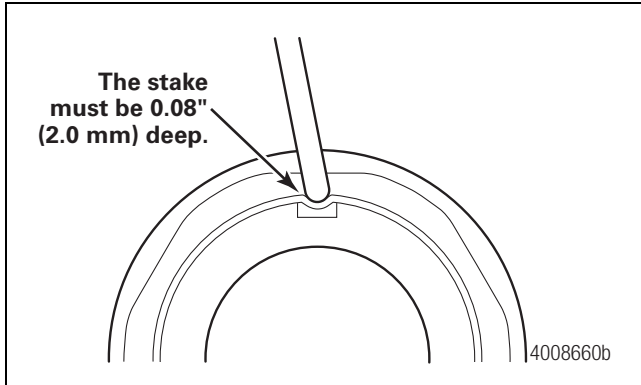


Figure 11.10

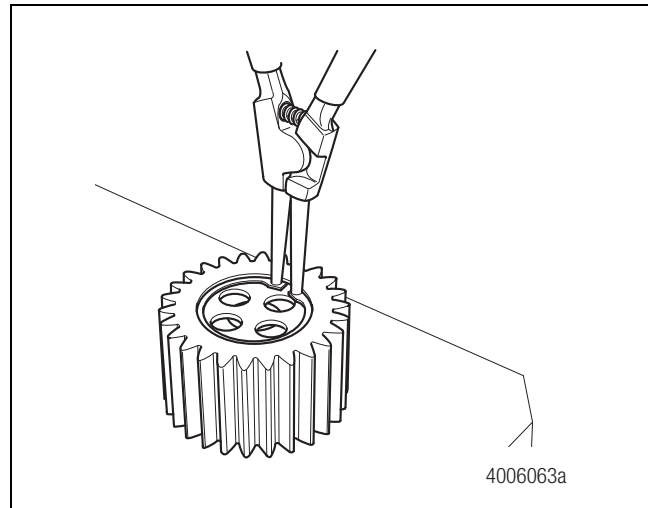


Figure 11.12

- 17. Install the axle shaft into the axle housing, making sure the splines fully engage within the carrier.

Installation

Wheel Ends

NOTE: For wheel ends with CTIS, refer to Section 16 for additional information regarding the planetary carrier hub installation.

- 1. If removed, install the spring washers and thrust washer into the sun gear. Install the snap ring. Figure 11.11 and Figure 11.12.

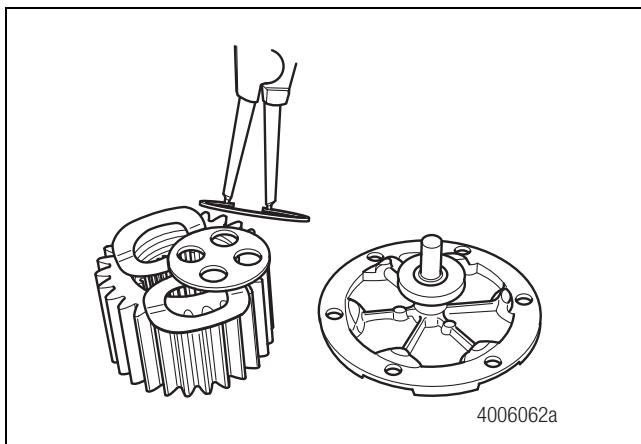


Figure 11.11

- 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. Apply Loctite® 243 threadlocker to two socket head bolts. Install the bolts and tighten them to the torque specified in Section 20.
- 3. Insert the sun gear assembly into the hub housing. Rotate the hub to engage the sun gear with the axle shaft splines and planet gears. Figure 11.13 and Figure 11.14.

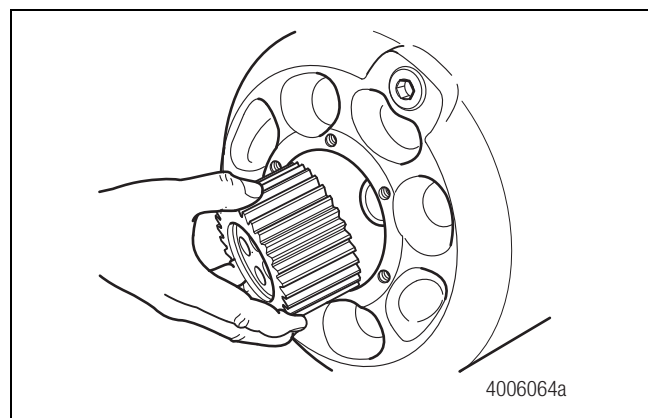


Figure 11.13

11 Dual Tire H2 Wheel End Assembly and Installation

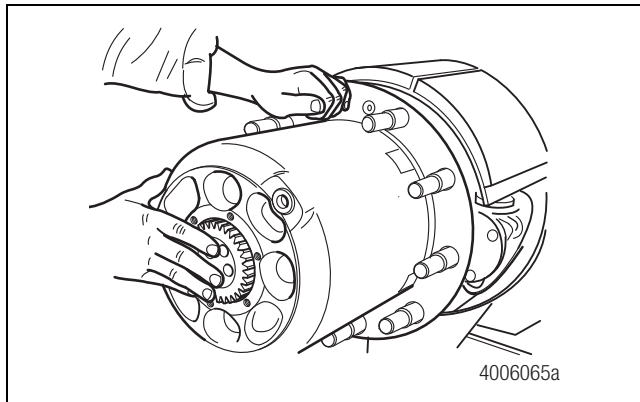


Figure 11.14

4. Push the sun gear assembly in as far as possible.
5. Clean the outer face of the hub housing and the inner mating surface of the cover plate. Remove any old sealant and debris.
6. Check the axle shaft end play.

- A. Measure the distance between the sun gear thrust washer and the face of the hub housing. This is dimension A. Figure 11.15.
- B. Pull out the sun gear assembly 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 10.

- C. If the end play is not with specifications, remove the thrust pin and change the number of washers under the pin.
- D. 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.
- E. 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.
- F. Install the magnetic washer over the thrust pin and secure it with a new star lock fastener.

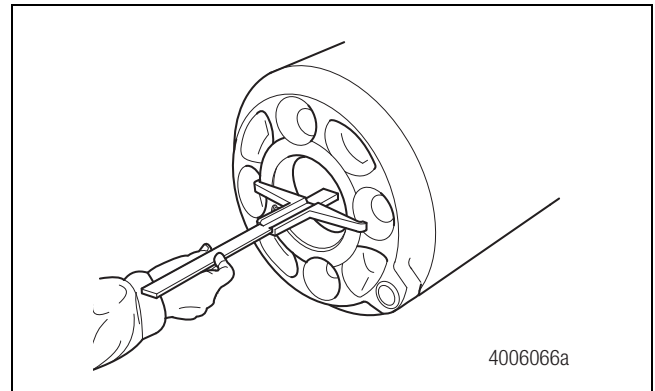


Figure 11.15

7. Apply a continuous 0.24-inch (6 mm) bead of Meritor specification 2297-H-7054, Loctite® 5699 RTV sealant to the inner face of the cover plate. Figure 11.16.

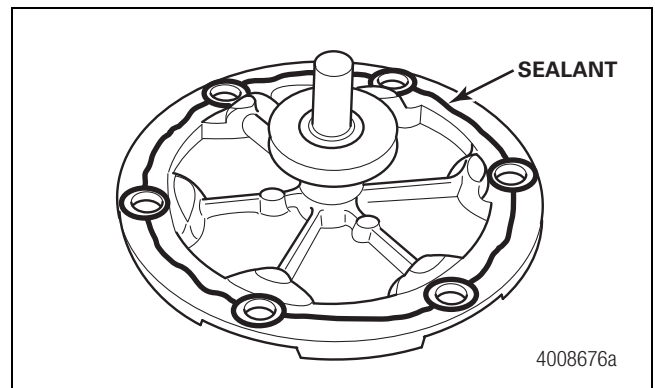


Figure 11.16

8. 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 11.17.

11 Dual Tire H2 Wheel End Assembly and Installation

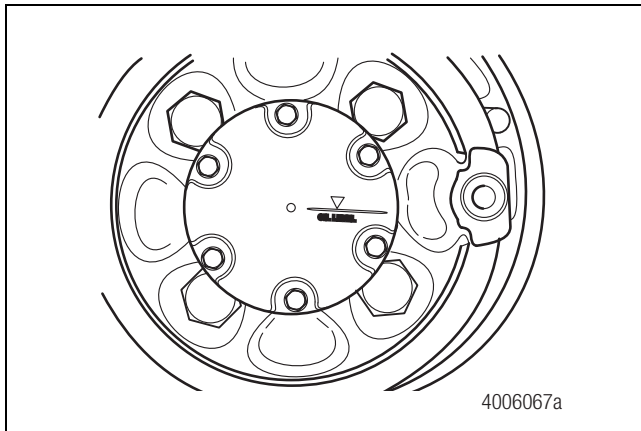


Figure 11.17

9. Install the cover plate capscrews and tighten them to the torque specified in Section 20.
10. Fill the hub with oil. Install and tighten the drain plug to the torque specified in Section 20. If the hubcaps have an oil level line, fill the hub until it reaches the correct level.

Hazard Alert Messages

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

⚠ WARNING

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

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

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.

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.

Assembly

Wheel Ends, Planetary Carrier and Case

1. Grease the needle bearings and the planet gears. Install the needle bearings and spacer rings into the planet gears. Each gear must have 38 needle rollers.

⚠ CAUTION

When you install the planet gears and thrust washers into the hub casing, install the steel washer against the planet gears and the brass washer against the hub housing. Otherwise, damage to the roller bearing and gears can occur during operation.

2. Install the planet gears and thrust washers into the planet carrier. Align the gears with the pinion shaft bores and verify that the washers are positioned correctly against the housing. Figure 12.1.

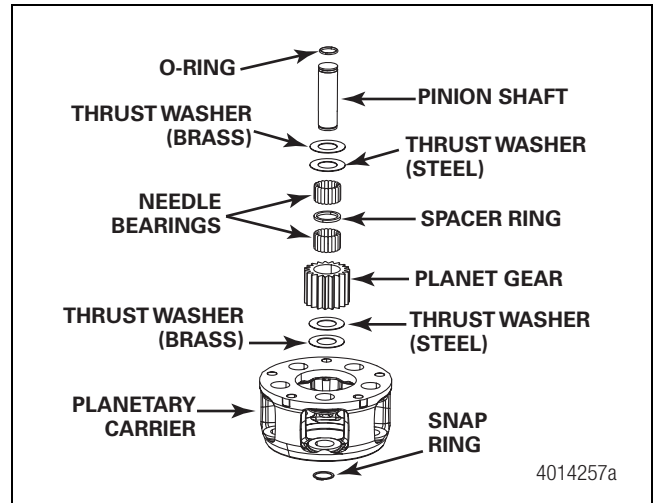


Figure 12.1

3. Grease the new pinion shaft O-rings with PolySi PST-841 lubricant and install them onto the pinion shafts. Figure 12.2.

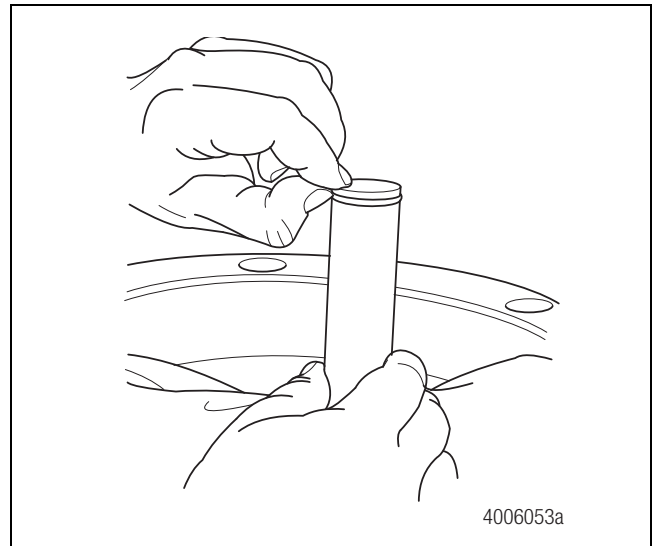


Figure 12.2

4. Use a drift to press the new pinion shafts into the planetary carrier housing. The pinion shafts should be seated with enough room to fit the snap rings. Figure 12.3.

12 12 5-Planet Wheel End Assembly and Installation

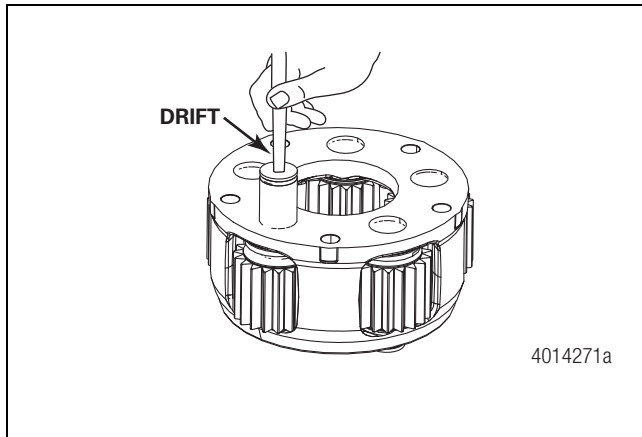


Figure 12.3

5. Turn the planetary carrier over. Install the snap rings onto the ends of the pinion shafts. Figure 12.4.

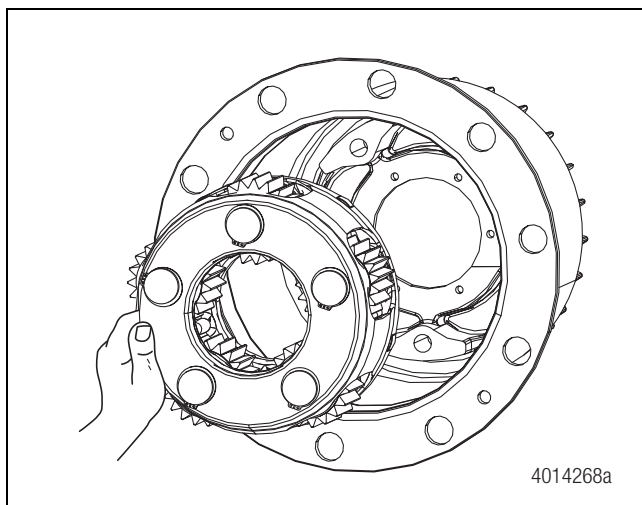


Figure 12.4

6. Install the carrier into the planetary case. Align the planetary carrier in the case using the alignment marks made during disassembly. Figure 12.5 and Figure 12.6.

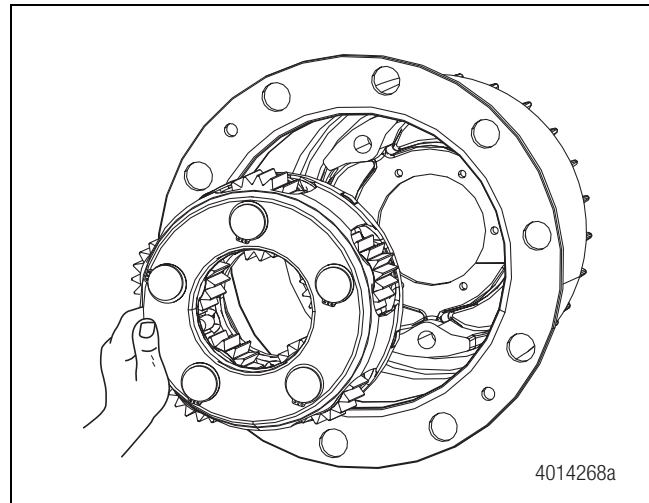


Figure 12.5

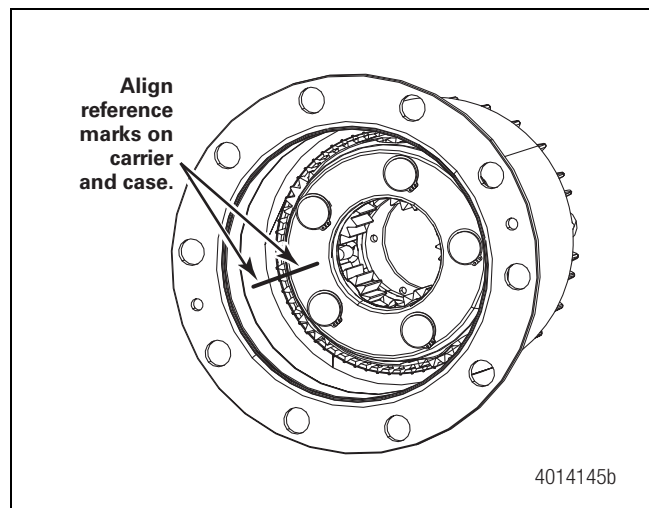


Figure 12.6

7. Install the five capscrews and washers through the case into the carrier. Tighten the capscrews to the torque specified in Section 20. Figure 12.7.

12 12 5-Planet Wheel End Assembly and Installation

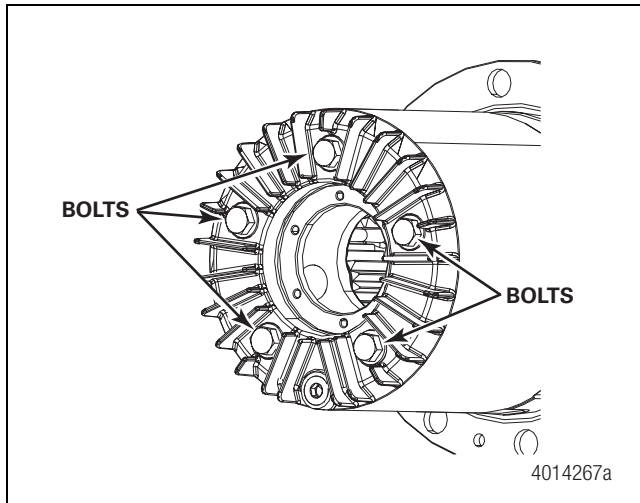


Figure 12.7

8. Install the inner bearing cone.

NOTE: For wheel ends with CTIS, refer to Section 16 for additional information regarding the planetary carrier hub installation.

9. Prior to installing the new hub seal, apply a bead of Loctite® 638 adhesive sealant around the outside diameter of the seal as shown. Use Loctite® 680 adhesive sealant if Loctite® 638 is unavailable. Figure 12.8.

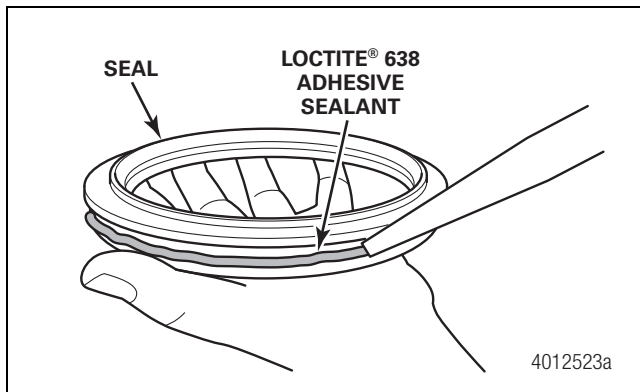


Figure 12.8

10. Use the appropriate seal driver to install seal into the hub. Refer to Section 21 for a tool drawing. Figure 12.9 and Figure 12.10.

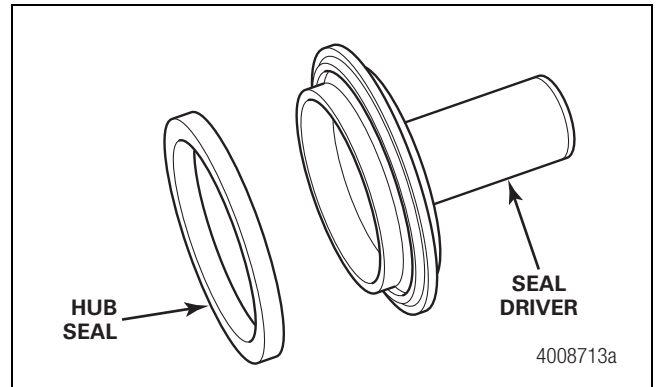


Figure 12.9

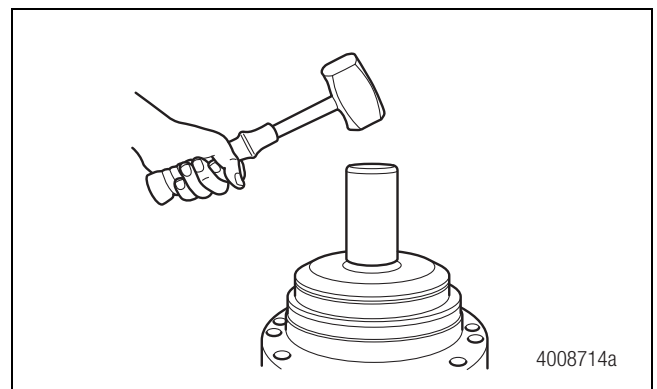


Figure 12.10

11. Lubricate a new outer planetary hub case O-ring with Meritor-approved white lithium grease and install it onto the hub.
12. Lubricate the inner lip of the hub seal prior to installing the hub on the spindle.
13. Lubricate the spindle bearing journals with gear oil.
14. Install the outer bearing cone.
15. If the the ring gear assembly was disassembled, reinstall the ring gear on the ring gear carrier and install the snap ring. Figure 12.11.

12 I2 5-Planet Wheel End Assembly and Installation

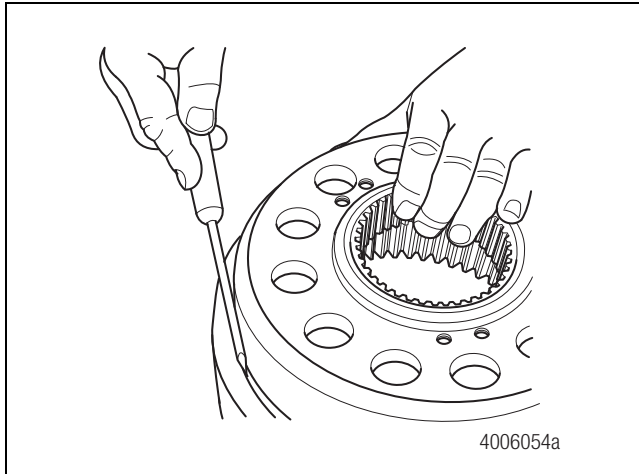


Figure 12.11

16. Install the ring gear assembly onto the spindle splines against the outer bearing cone.

⚠ WARNING

When you remove a wheel bearing nut, always replace the nut with a new one. Do not reuse a wheel bearing nut. Ensure that you correctly stake a wheel bearing nut. A reused or incorrectly staked wheel bearing 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.

17. Install the wheel bearing nut.
18. Tighten the wheel bearing nut using the appropriate procedure for the style of hub as follows.

Low-Speed Application Wheel Bearing Torque Procedure

- A. Tighten the wheel bearing nut to 300 lb-ft (407 N•m) while rotating the hub continuously back and forth. **ⓘ**
- B. Loosen the wheel bearing nut.
- C. Retighten the wheel bearing nut to 75 lb-ft (102 N•m) while rotating the hub back and forth continuously. **ⓘ**
- D. Mark the nut position and tighten an additional 21 degrees.
- E. Check the hub rolling resistance as follows and ensure it does not exceed 40 lb-ft (54 N•m).
 1. Attach a string to a lug stud and wrap it around the bolt circle several times.
 2. Attach a pull scale to the other end of the string.

3. Pull the scale with an even motion until the hub is rotating at a constant speed.
 4. Record the average reading during the pull, disregarding any initial spike required to get the wheel moving.
- F. Tighten the wheel bearing nut to a final torque of 150 lb-ft (203 N•m). **ⓘ**
 - G. 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 12.12.

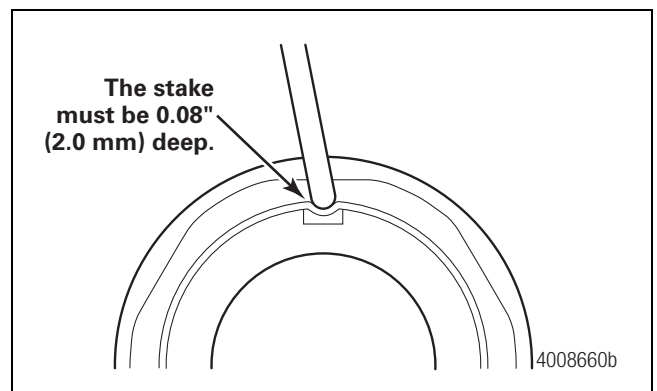


Figure 12.12

High-Speed Application Wheel Bearing Torque Procedure

- A. Tighten the wheel bearing nut to 45-58 lb-ft (61-79 N•m) while rotating the hub back and forth. **ⓘ**
- B. Further rotate the hub three revolutions in each direction, alternating forward and backward.
- C. Mark the wheel bearing nut position and retighten the nut to 45-58 lb-ft (61-79 N•m). **ⓘ**
- D. If the nut turns, repeat the previous step until the nut no longer turns when tightened.
- E. 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 12.13.

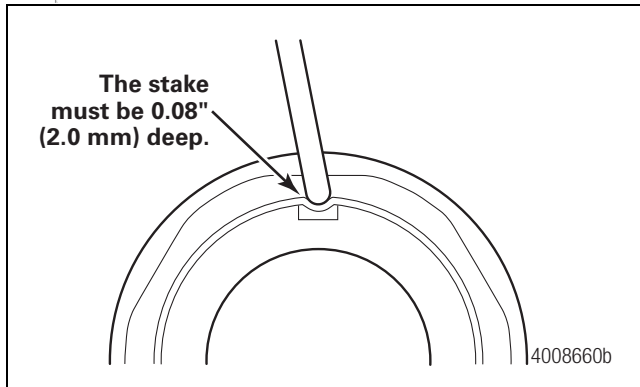


Figure 12.13

19. Install the axle shaft into the axle housing, making sure the splines fully engage within the carrier.

Installation

Wheel Ends

NOTE: For wheel ends with CTIS, refer to Section 16 for additional information regarding the planetary carrier hub installation.

1. Install the spring washers and thrust washer into the sun gear. Install the snap ring. Figure 12.14 and Figure 12.15.

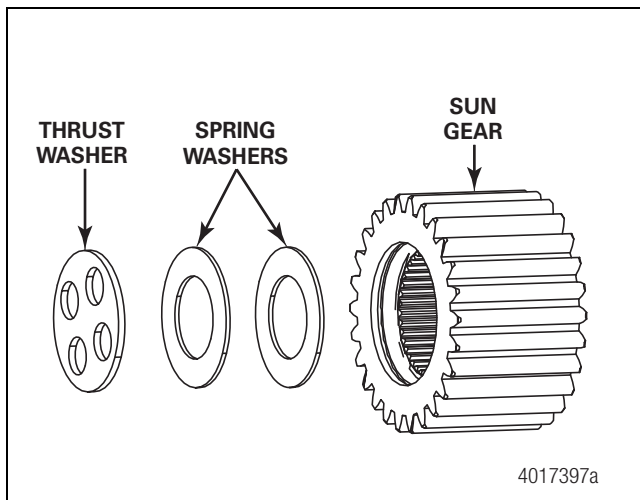


Figure 12.14

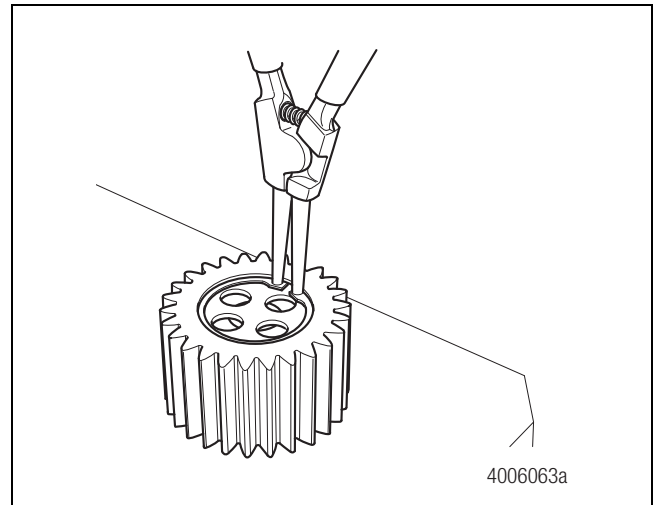


Figure 12.15

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. Apply Loctite® 243 threadlocker to two socket head bolts. Install the bolts and tighten them to the torque specified in Section 20.
3. Insert the sun gear assembly into the hub housing. Rotate the hub to engage the sun gear assembly with the axle shaft splines and planet gears. Figure 12.16.

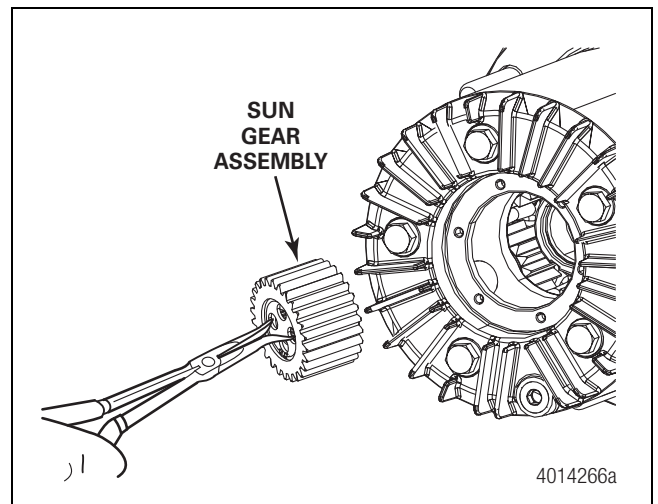


Figure 12.16

4. Push the sun gear assembly in as far as possible.
5. Clean the outer face of the hub housing and the inner mating surface of the cover plate. Remove any old sealant and debris.

12 12 5-Planet Wheel End Assembly and Installation

6. Check the axle shaft end play.
 - A. Measure the distance between the sun gear thrust washer and the face of the hub housing. This is dimension A. Figure 12.17.

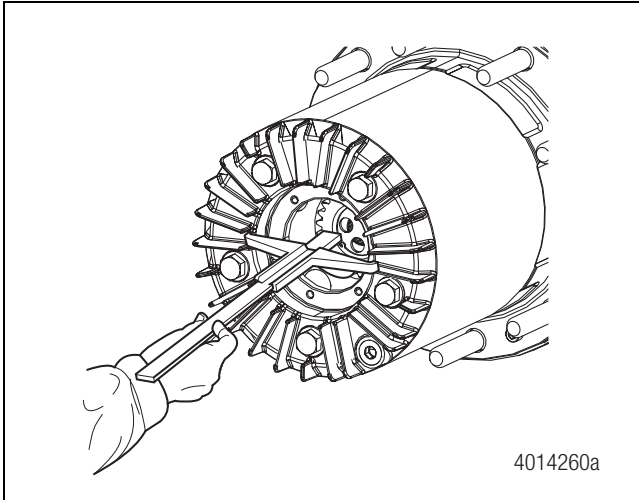


Figure 12.17

- B. Pull out the sun gear assembly 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 10.
 - C. If the end play is not with specifications, remove the thrust pin and change the number of washers under the pin.
 - D. 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.
 - E. 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.
 - F. Install the magnetic washer over the thrust pin and secure it with a new star lock fastener.

7. Apply a continuous 0.24-inch (6 mm) bead of Meritor specification 2297-H-7054, Loctite® 5699 RTV sealant to the inner face of the cover plate. Figure 12.18.

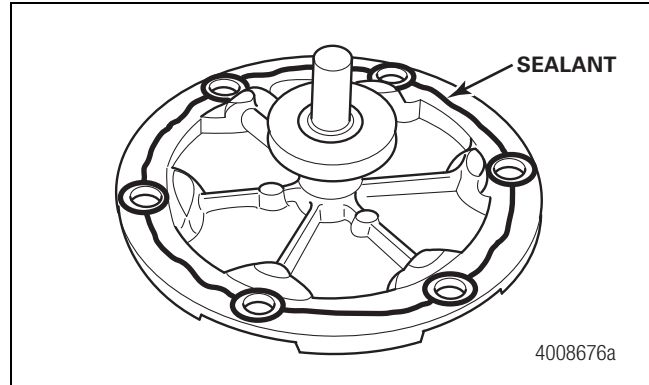


Figure 12.18

8. Align the "Oil Level" line on the cover plate with the drain/fill plug as shown in Figure 12.19. Install the cover plate onto the hub housing immediately to ensure the silicone gasket material compresses evenly between the sealing surfaces.

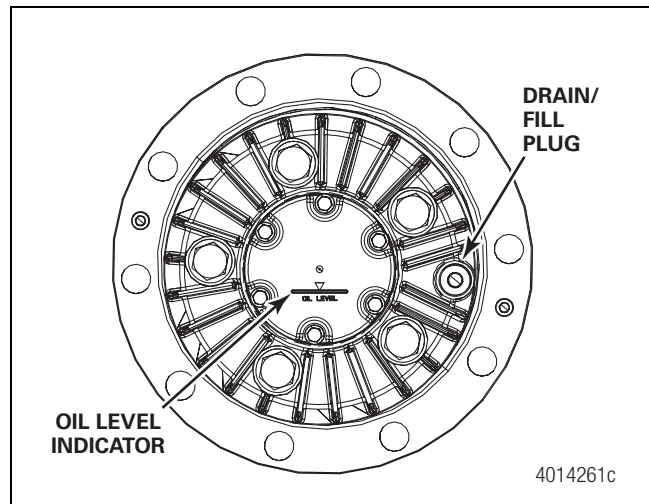


Figure 12.19

9. Install the cover plate capscrews and tighten them to the torque specified in Section 20.
10. Fill the hub with oil. Install and tighten the drain plug to the torque specified in Section 20. If the hubcaps have an oil level line, fill the hub until it reaches the correct level.

13 Single Tire H2 Wheel End Assembly and Installation

Hazard Alert Messages

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⚠ WARNING

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Assembly

Wheel End

1. If equipped with air S-cam brakes, install the air S-cam brake assembly according to the procedures in Section 17 prior to assembling the wheel end.
2. If removed, lubricate the hub bores and use a suitable press and driver to install the inner and outer bearing cups into the hub assembly.

⚠ CAUTION

For non-steer axles, do not apply grease to the bearings during installation, which can prevent correct oil flow. Damage to components can result.

3. For non-steer axles, install the inner bearing cone into the hub assembly.

4. For front drive steer axles, pack the inner hub bearing cone and the cavity of the hub with grease and install the inner bearing cone in the hub.
5. Prior to installing the new hub seal, apply a bead of Loctite® 638 adhesive sealant around the outside diameter of the seal as shown. Use Loctite® 680 adhesive sealant if Loctite® 638 is unavailable. Figure 13.1.

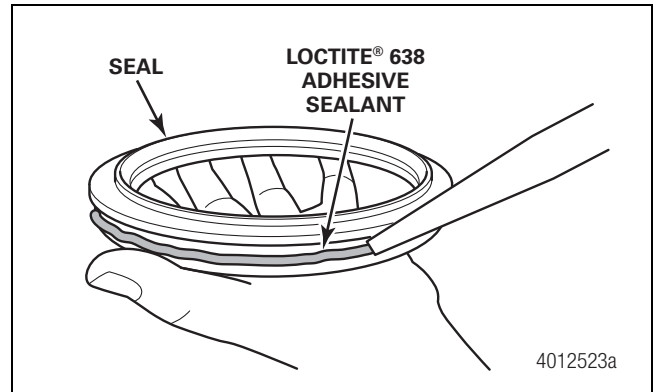


Figure 13.1

6. Use the appropriate seal driver to install the hub seal in the hub. Refer to Section 21 for tool drawings.
7. If equipped, install the rotor onto the hub. Install the rotor mounting bolts and tighten them to the torque specified in Section 20. Figure 13.2.

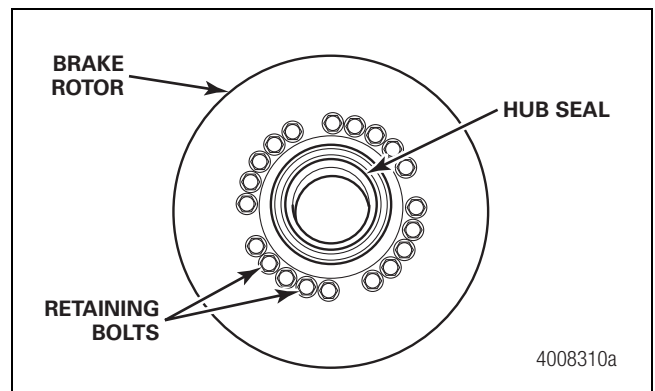


Figure 13.2

13 Single Tire H2 Wheel End Assembly and Installation

Installation

Wheel End

NOTE: A wheel end equipped with a thrust needle bearing under the sun gear is considered a “High Speed” application wheel end. A wheel end without a thrust needle bearing is considered a “Low Speed” application wheel end. You must follow the appropriate installation steps and torque procedures for the wheel end you are servicing. Refer to Section 20, Table E for the correct torque procedure.

1. Use a lifting device to guide the hub assembly onto the spindle until seated. Use care to avoid damaging the hub seal during installation.
2. Press the outer bearing cone onto the ring gear hub.
Figure 13.3.

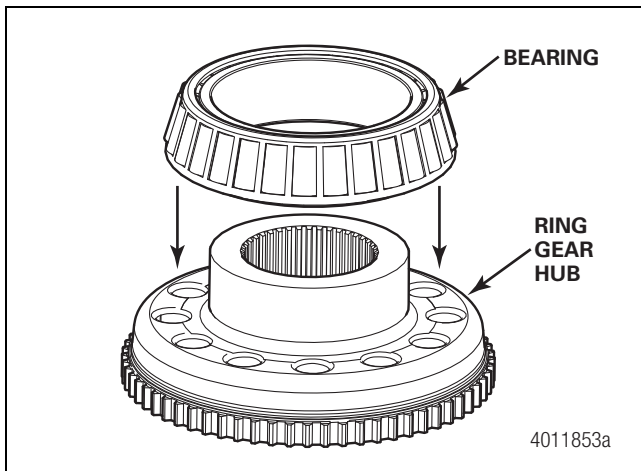


Figure 13.3

3. If disassembled, set the ring gear hub into the ring gear and secure the ring gear with the snap ring.
4. Install the ring gear assembly over the spindle splines until the bearings are seated in the cups. Figure 13.4.

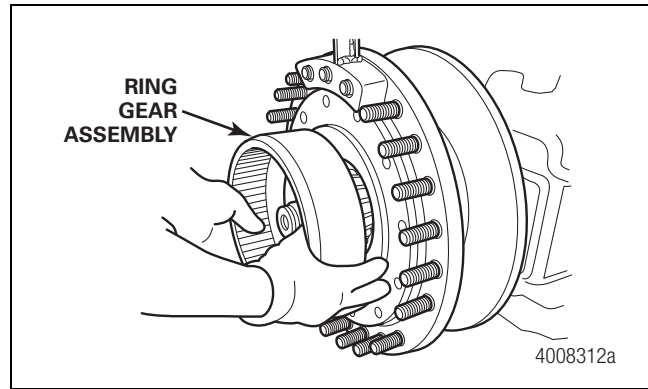


Figure 13.4

⚠ WARNING

When you remove a wheel bearing nut, always replace the nut with a new one. Do not reuse a wheel bearing nut. Ensure that you correctly stake a wheel bearing nut. A reused or incorrectly staked wheel bearing 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.

5. Lightly coat the wheel bearing nut threads with oil and install the wheel bearing nut.
6. While rotating the hub by hand, tighten the nut to the torque specified in Section 20.
7. Further rotate the hub three times in alternating directions, then mark the location of the nut.
8. Retighten the nut. If it moves, repeat the previous steps until the required torque is maintained.
9. Use a hammer and drift to stake the nut into the spindle slots in two places. Figure 13.5 and Figure 13.6.

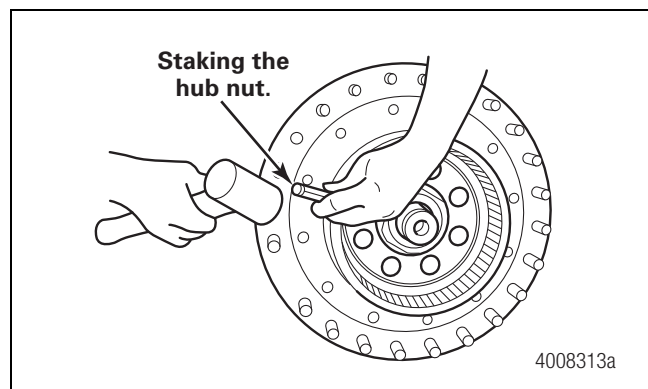


Figure 13.5

13 Single Tire H2 Wheel End Assembly and Installation

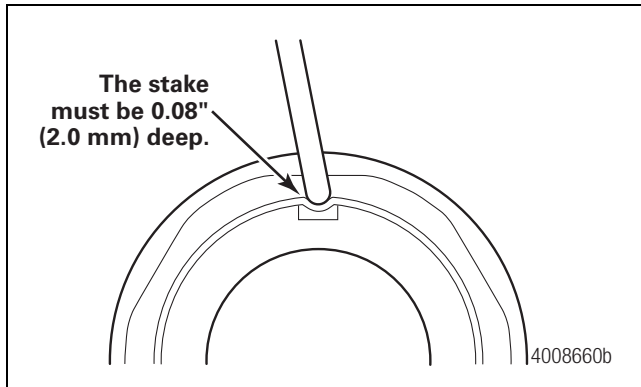


Figure 13.6

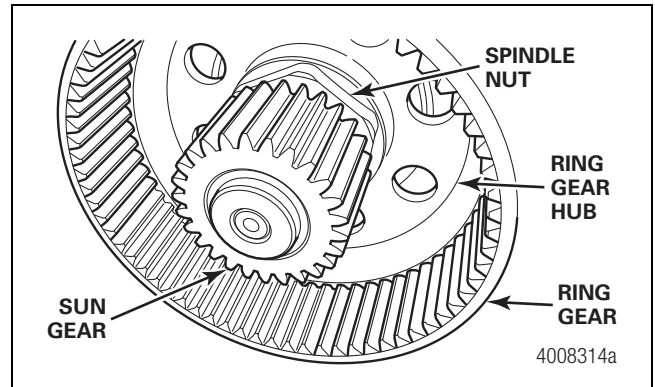


Figure 13.8

10. For Low Speed wheel ends, install the sun gear thrust washer against the spindle shoulder with the tabs facing inward. For High Speed wheel ends, install the thrust washer against the spindle shoulder. Lightly coat the thrust needle bearing with oil and install the thrust needle bearing on the spindle against the thrust washer. Figure 13.7.

12. Install the retaining washer (if equipped) and snap ring on the end of the axle shaft. Figure 13.9.

NOTE: The retaining washer is used on front drive steer axles (MOX model) only; not used on rear drive axles (MOR model).

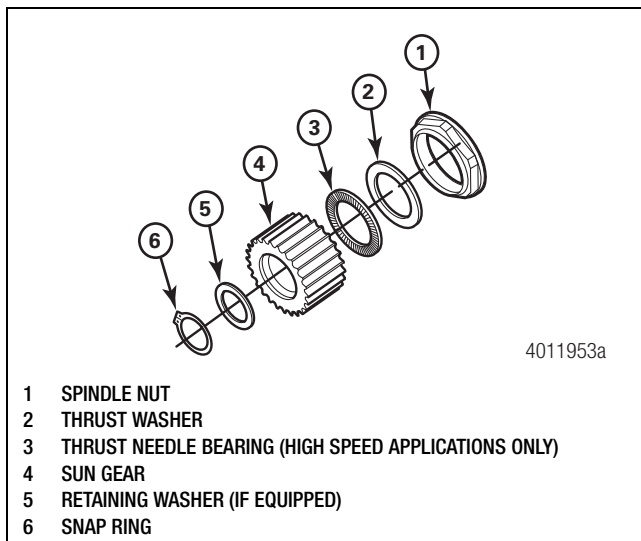


Figure 13.7

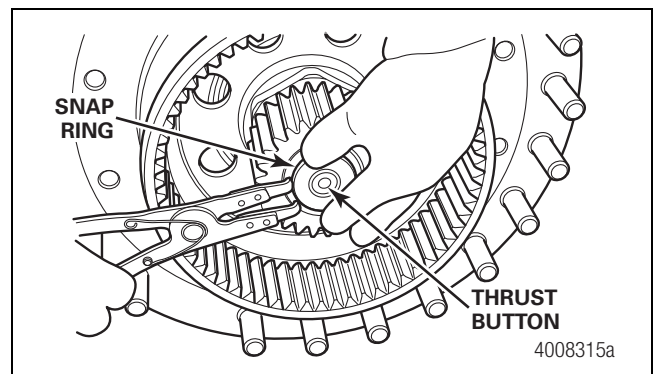


Figure 13.9

11. Install the sun gear onto the axle shaft. Figure 13.8.

13. Install the outer O-ring seal onto the hub face. Figure 13.10.

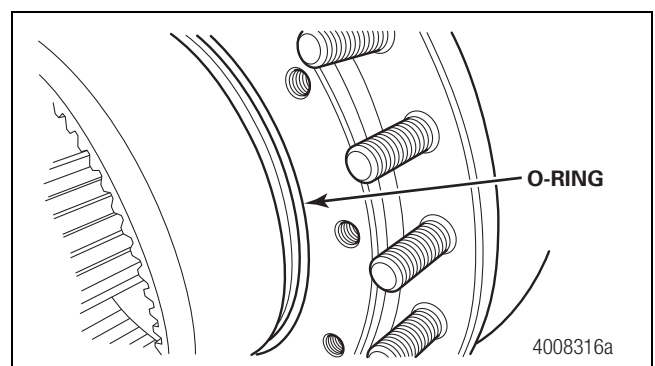


Figure 13.10

14. Install the thrust button into the end of the axle shaft. Figure 13.9.

13 Single Tire H2 Wheel End Assembly and Installation

Assembly

Planetary Assembly

1. Grease the bearing needles and the planet gears. Install the bearing needles and spacer sleeves into the planet gears. Wedge a pointed tool between two needles and check that the gap opened will not fit an additional needle.

CAUTION

When you install the planet gears and thrust washers into the planet carrier, install the steel washer against the planet gears and the brass washer against the planet carrier. Otherwise, damage to the roller bearing and gears can occur during operation.

2. Install the planet gears and thrust washers into the planetary carrier. Align the gears with the planetary pinion shaft bores and verify that the washers are positioned correctly against the planetary carrier. Figure 13.11.

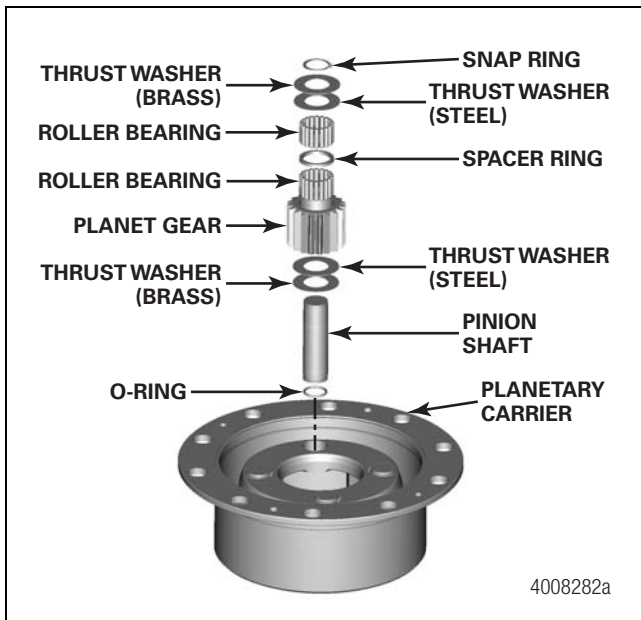


Figure 13.11

3. Grease the new O-rings with Meritor-approved white lithium grease and install them onto the planetary pinion shaft.
4. Clock the planetary carrier pinion shaft so that the cross lube hole points to the carrier center. Use a drift to press the new planetary pinion shaft into the planetary carrier. The shafts should be seated with enough room to fit the snap rings.

5. Install the snap rings onto the inner ends of the pinion shafts.

Installation

Planetary Assembly

1. Install the planetary assembly onto the hub. Install the retaining bolts and tighten them to the torque specified in Section 20. Figure 13.12.

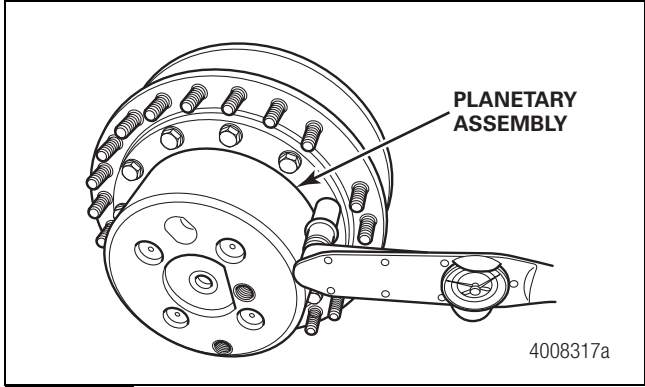


Figure 13.12

2. Apply Loctite® 30557 threadlocker to the threads of the thrust screw assembly.
3. Install the thrust screw assembly and tighten it to the torque specified in Section 20, then back it off 180 degrees (1/2 turn). Figure 13.13.

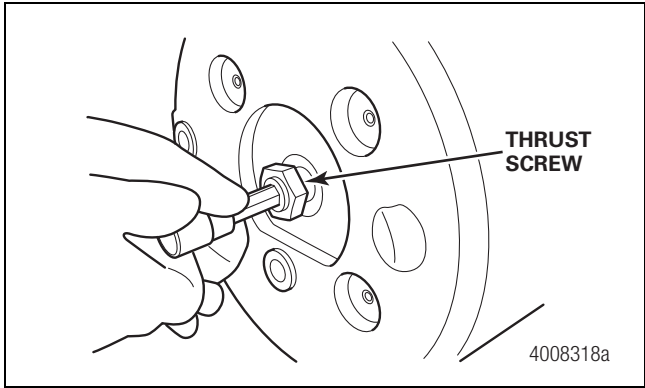


Figure 13.13

4. Tighten the thrust screw jam nut to the torque specified in Section 20 while holding the position of the thrust screw.

14 Non-Drive Axle Wheel End 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.

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.

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.

Assembly and Installation

Wheel End

1. Lubricate the inner and outer bearing cups with Meritor-approved wheel bearing grease. Use a suitable tool to install the inner and outer bearing cups into the hub.
2. If removed, install the rotor onto the hub. Install the hub-to-rotor bolts and tighten to the torque specified in Section 20.
3. Pack the bearing rollers with a Meritor-approved wheel bearing grease.
4. Place the inner bearing into the hub.

⚠ WARNING

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

5. Prior to installing the new hub seal, apply a bead of Loctite® 638 adhesive sealant around the outside diameter of the seal as shown. Use Loctite® 680 adhesive sealant if Loctite® 638 is unavailable. Figure 14.1.

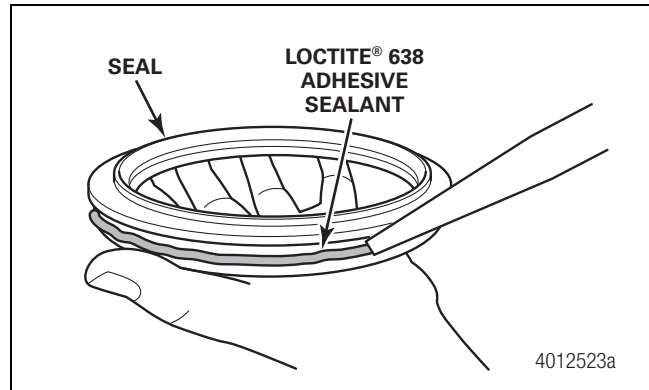


Figure 14.1

6. Use a seal driver to press the seal into the hub.
7. Install the hub assembly onto the spindle. Ensure that the seal lip is not damaged from contact with the spindle during installation. Figure 14.2.

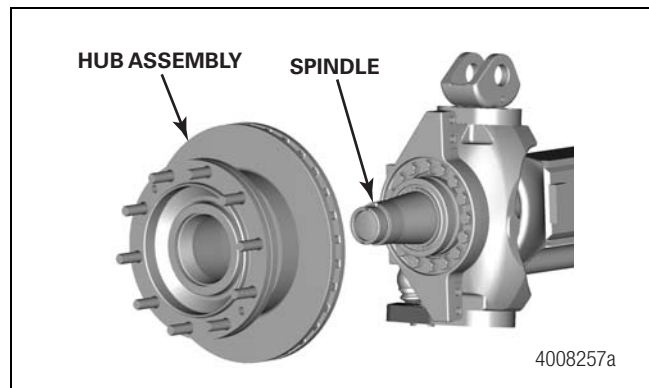


Figure 14.2

8. Install the outer wheel bearing into the hub bore.
9. Install the tabbed thrust washer onto the spindle. Figure 14.3.

14 Non-Drive Axle Wheel End Assembly and Installation

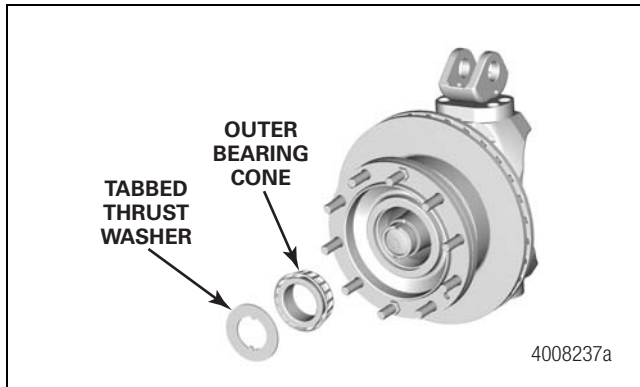


Figure 14.3

10. Install the wheel bearing nut and tighten it to the torque specified in Section 20 while rotating the hub back and forth. Further rotate the hub three full turns in each direction then retighten the nut.
11. 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 14.4.

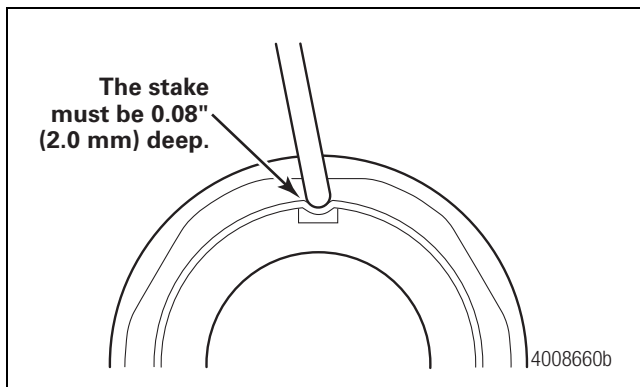


Figure 14.4

12. Apply a 1/8-inch bead of gray sealant to the hub cover and place it onto the hub. Figure 14.5.

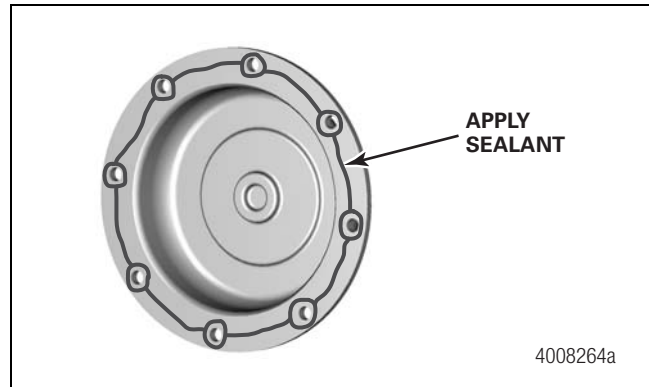


Figure 14.5

13. Install the hub cover bolts and tighten to the torque specified in Section 20.
14. Clean, install and tighten the drain plug and tighten to the torque specified in Section 20.
15. Rotate the hub so the fill hole is at the 3 o'clock position. Fill the hub with axle oil until the level reaches the bottom of the fill plug. Install and tighten the fill plug.
16. Use a lifting device to support the brake caliper assembly. Guide it into place on the wheel end. Install the four bolts and tighten to the torque specified in Section 20.

15 Single Tire N5/P8 Wheel End 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

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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.

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.

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.

Assembly

Wheel End

1. If removed, lubricate the hub bores and use a press and driver to install the inner and outer bearing cups into the hub assembly. Figure 15.1.

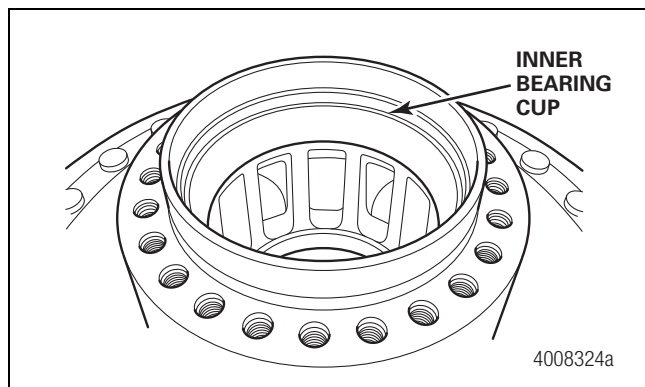


Figure 15.1

2. Install the rotor onto the hub. Install the rotor mounting bolts and tighten them to the torque specified in Section 20.
3. Use a suitable driver to install the inner bearing cone into the hub assembly.
4. If equipped, install the seal sleeve into the hub assembly until it bottoms out.
5. Dip the hub half of the face seal into isopropyl alcohol. While it is still wet, use the special driver to manually install the inner hub seal squarely into the hub assembly. Do not use a hammer or press. Figure 15.2 and Figure 15.3.

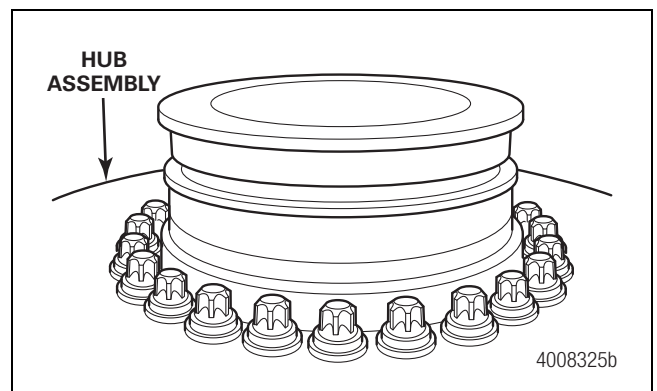


Figure 15.2

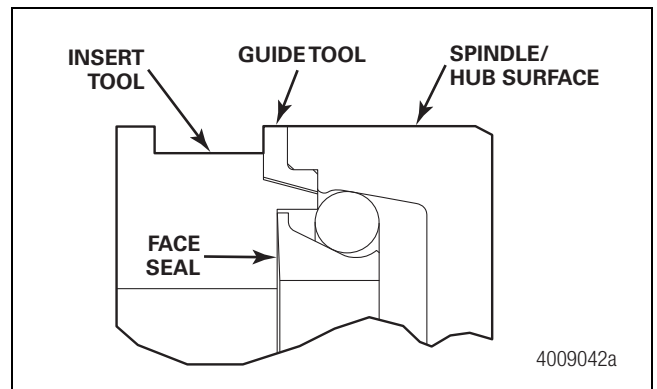


Figure 15.3

6. Check the seal's assembled height in at least four places 90 degrees apart. The variation must not exceed 0.394-inch (1.0 mm). Figure 15.4.

15 Single Tire N5/P8 Wheel End Assembly and Installation

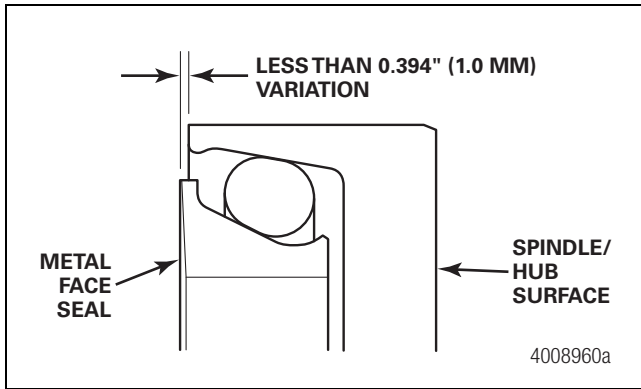


Figure 15.4

Planetary Assembly

The planet gear and bearing assemblies are non-serviceable. These must be replaced as an assembly if damaged or worn. If removed, press a new planet gear and bearing assembly onto the carrier stem.

Installation

Wheel End

1. Ensure there is no contamination present and lubricate both sealing surfaces of the face seal with a light coating of oil.
2. Use a lifting device to guide the hub assembly onto the spindle until seated. Use care to avoid damaging the hub seal during installation. Figure 15.5.

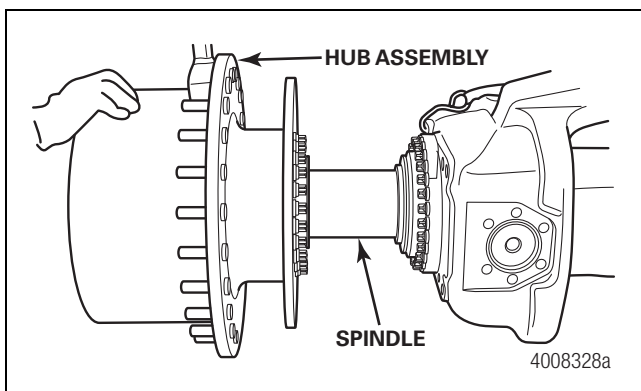


Figure 15.5

3. Install the outer bearing cone into the hub assembly.
4. If removed, assemble the ring gear to the ring gear hub and then install the snap ring to secure them.

5. Install the ring gear assembly onto the spindle. Figure 15.6.

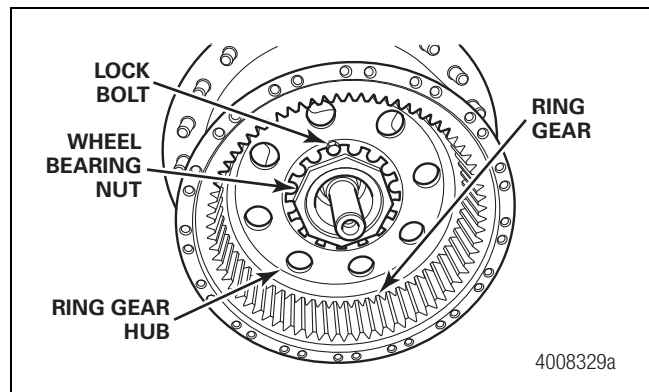


Figure 15.6

6. Lightly coat the wheel bearing nut threads with oil and install the nut.
7. While rotating the hub by hand, tighten the nut to the torque specified in Section 20.
8. Further rotate the hub three times in alternating directions, then mark the location of the nut.
9. Retighten the nut. If it moves, repeat the previous steps until the required torque is maintained.
10. Apply Loctite® 242 threadlocker to the lock bolt threads. Install the lock bolt through one of the nut slots and tighten to the torque specified in Section 20. Figure 15.7.

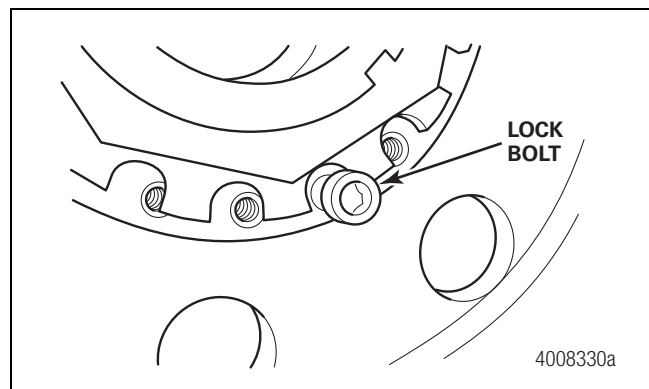


Figure 15.7

11. Apply grease to the thrust washers. If equipped, install the brass washer first with the oil grooves facing out, then the steel washer into the end of the spindle. Make sure to align the locking tangs correctly with the spindle during installation.
12. Install the sun gear onto the axle shaft.

15 Single Tire N5/P8 Wheel End Assembly and Installation

13. Install the retaining snap ring. If necessary, carefully push out the axle shaft assembly from the cardan joint. Figure 15.8.

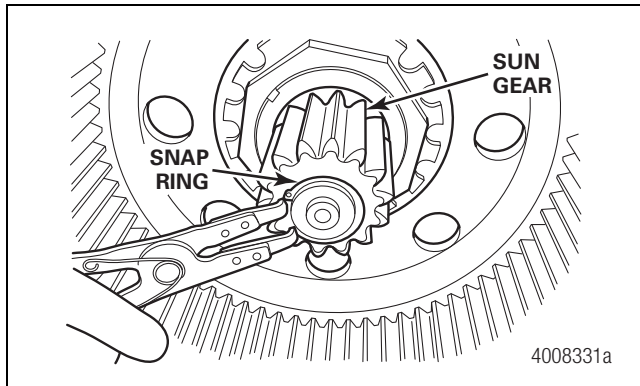


Figure 15.8

14. Install a new O-ring onto the planetary carrier.
15. Install the planetary assembly into the hub. Figure 15.9.

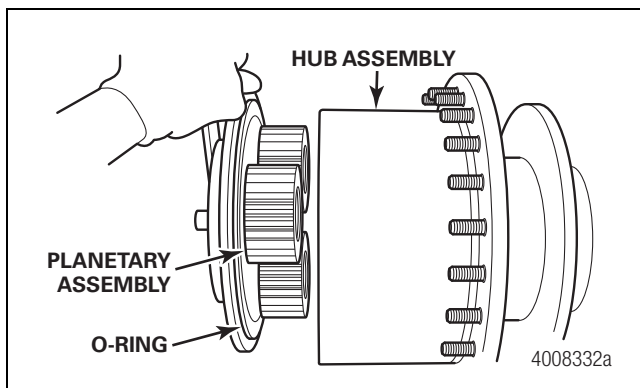


Figure 15.9

16. Install the bolts and tighten them to the torque specified in Section 20.
17. Apply Loctite® 30557 to the thrust screw threads.
18. Install the thrust screw and tighten to the torque specified in Section 20 then back it off 180 degrees (1/2 turn).
19. Tighten the jam nut to the torque specified in Section 20 while holding the adjustment of the thrust screw.

Hazard Alert Messages

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⚠ WARNING

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

⚠ ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials. Refer to page i for asbestos and non-asbestos safety information and recommended work practices.

Assembly

Central Tire Inflation (CTI)

1. Using a clean applicator tool, apply a thin film of hypoid gear oil to the inner CTI seal bore on the hub.
2. Place the inner CTI seal onto the CTI seal driver, tool 1199-F-4140 with handle 1199-G-4141. The seal must be positioned with the “non-pressure side” label against the face of the driver. Refer to the tool drawings in Section 21. Figure 16.1 and Figure 16.2.

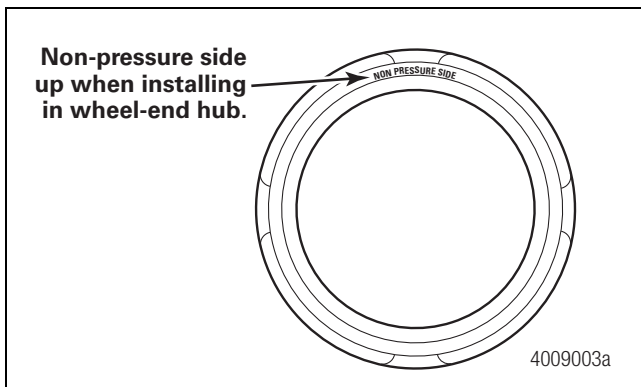


Figure 16.1

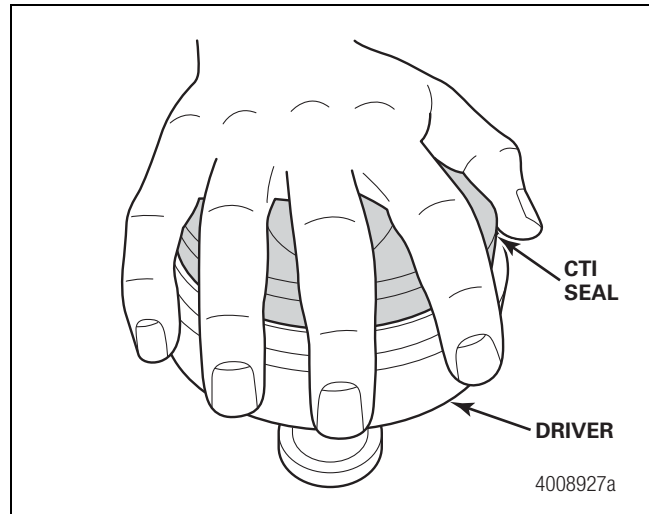


Figure 16.2

3. Place the inner CTI seal and driver squarely into the hub. The seal will stay fitted to the driver. Use a mallet to install the inner CTI seal. Figure 16.3 and Figure 16.4.

Inspect the seal after it has been installed to ensure it was not damaged and the springs were not dislodged during installation. If necessary, replace the seal.

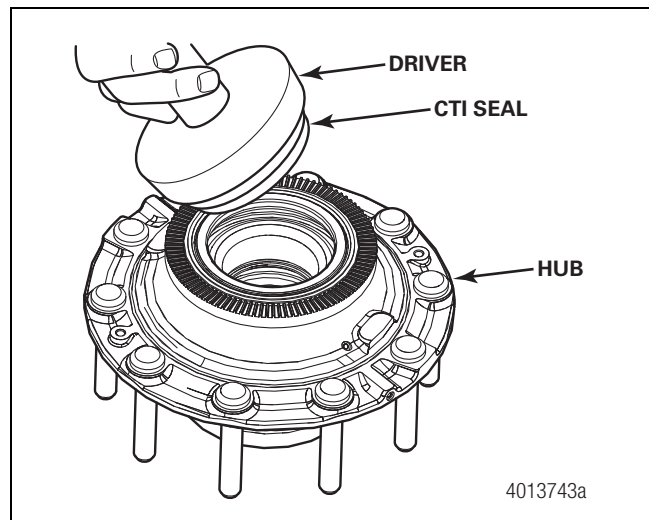


Figure 16.3

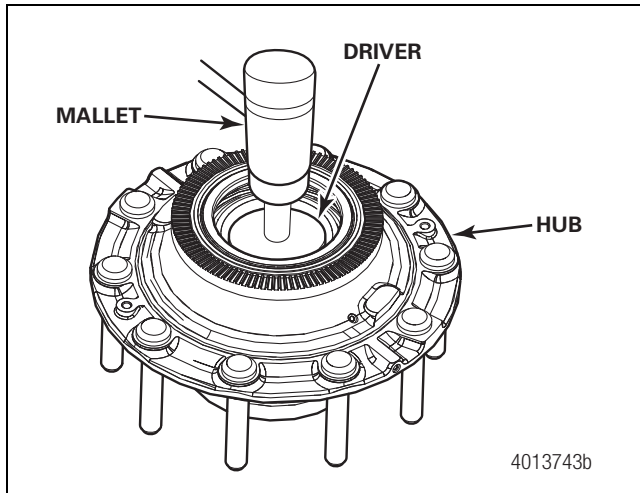


Figure 16.4

⚠ CAUTION

Do not use the CTI seal driver to install the inner and outer seal retaining rings. Damage to components can result.

4. Install the inner CTI seal retaining ring and spiral snap ring. Figure 16.5.

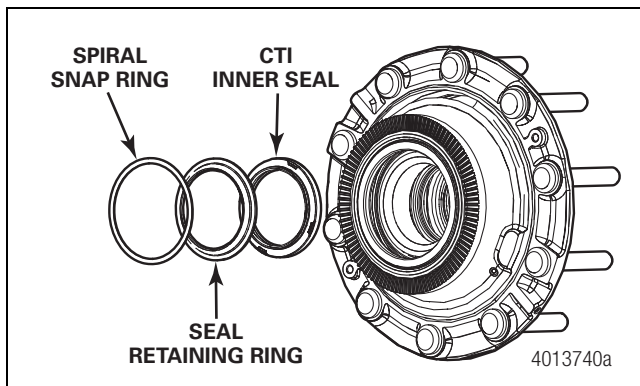


Figure 16.5

5. Place the outer CTI seal onto the CTI seal driver, tool 1199-F-4140 with handle 1199-G-4141. The seal must be positioned with the “non-pressure side” label against the face of the driver. Refer to the tool drawings in Section 21. Figure 16.1 and Figure 16.2.
6. Using a clean applicator tool, apply a thin film of hypoid gear oil to the outer CTI seal bore on the hub.
7. Place the outer CTI seal and driver squarely into the hub. The seal will stay fitted to the driver. Use a mallet to install the outer CTI seal. Figure 16.6 and Figure 16.7.

Inspect the seal after it has been installed to ensure it was not damaged and the springs were not dislodged during installation. If necessary, replace the seal.

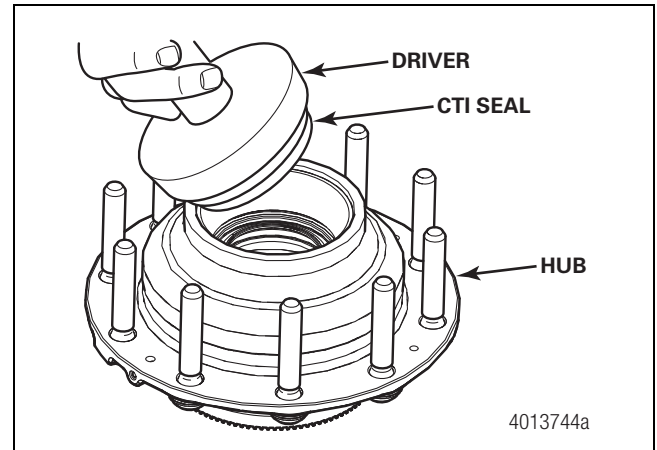


Figure 16.6

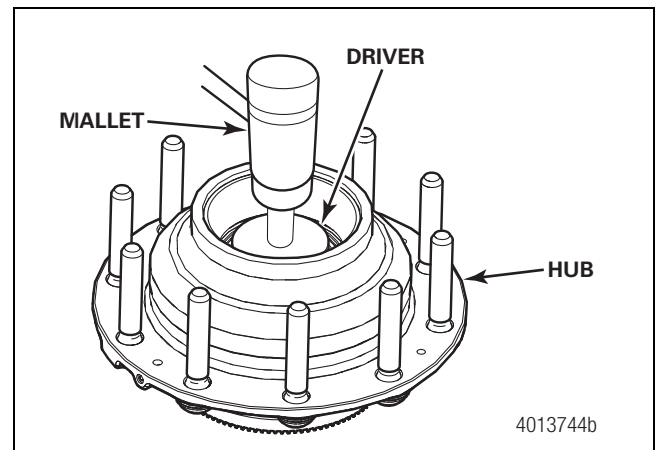


Figure 16.7

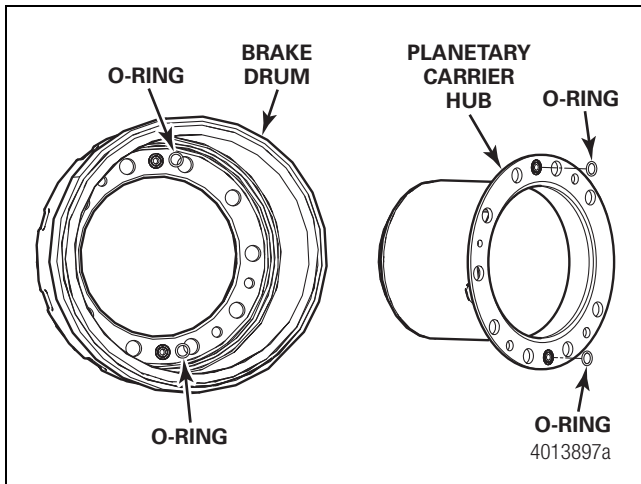
8. Install the outer CTI seal retaining ring and spiral snap ring.
9. Continue following the standard procedures for wheel end assembly and installation in Section 11 and perform the following steps, when required, to ensure correct operation of the CTI system.
10. Prior to installing the hub on the spindle, install the CTI seal protection sleeve on the spindle threads. Apply a light film of hypoid gear oil to the outside surface of the protection sleeve to facilitate the hub installation.
11. Remove the CTI seal protection sleeve after the hub is installed on the spindle.

16 CTI Assembly

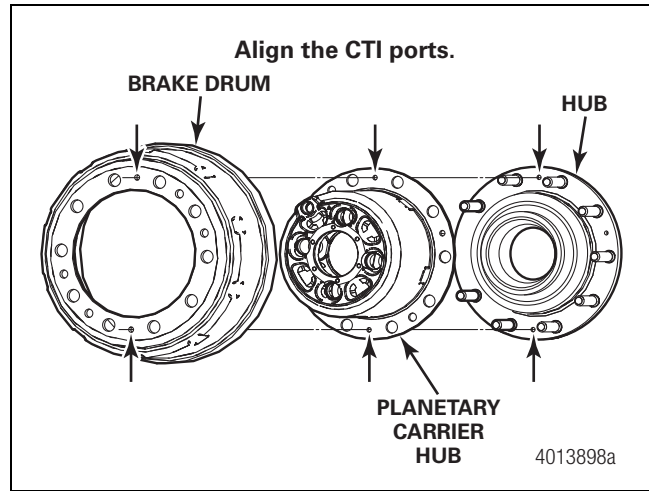
⚠ CAUTION

Anytime the tire and wheel is removed, the brake drum can move away from the planetary carrier hub cover and the CTIS O-rings in the back face of the brake drum become dislodged or fall out. Always inspect to ensure the O-rings are in the groove and not damaged.

12. Prior to installing the planetary carrier hub, inspect the four CTI sealing O-rings for damage such as nicks, cuts or pinched areas. Replace the O-rings if any damage is found.
13. Apply grease to the CTI port sealing O-rings. Install the O-rings into the grooved seats on the brake drum and planetary carrier hub. Figure 16.8.



14. When installing the planetary carrier hub onto the wheel hub, ensure the two CTI ports in the hub are aligned with the two ports in the planetary carrier hub. The two CTI ports are 180 degrees apart and must be aligned wheel hub-to-planetary carrier hub. Figure 16.9.



15. When the brake drum is installed, ensure the two CTI ports on the brake drum are aligned with the CTI ports on the planetary carrier hub. Figure 16.9.

Hazard Alert Messages

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⚠ WARNING

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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.

⚠ ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials. Refer to page i for asbestos and non-asbestos safety information and recommended work practices.

Installation

S-Cam Drum Brake Assembly

1. Use a lifting device to support the brake assembly.
2. Carefully rotate and install the complete brake assembly into position. Figure 17.1.

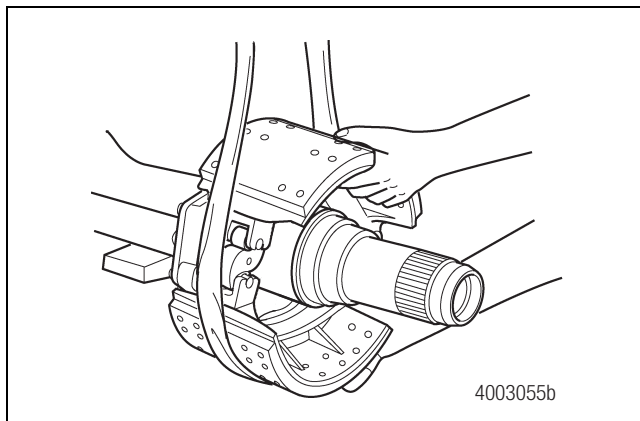


Figure 17.1

⚠ WARNING

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

3. Apply Loctite® 242, or 272 as an alternative, threadlocker to the brake spider-to-housing bolt threads.
4. Install and tighten the brake spider-to-housing bolts to the specified torque. Figure 17.2.

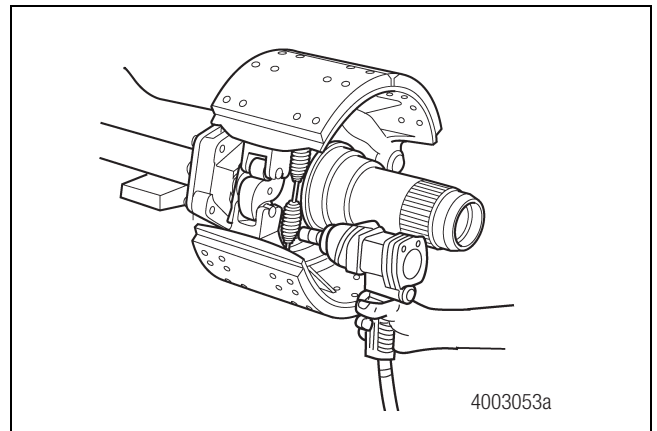



Figure 17.2

5. If removed, reinstall the ABS sensor and mounting blocks as follows. Figure 17.3.
 - A. Pivot the top brake shoe up on the anchor pin end and secure in the elevated position.
 - B. Route the ABS sensor and harness as follows.
 - **Axles without CTIS:** Carefully pull the sensor and harness through the hole in the brake spider.
 - **Axles with CTIS:** Carefully pull the sensor and harness through the hole in the dust shield.
 - C. Align the ABS sensor with the arrow marking on the top of the mount block and press the sensor into the mount block.
 - D. Mount the spacer block and sensor mount block on the spindle and align the capscrew holes.

17 Brake Installation

- E. Install the two capscrews through the mount block and spacer block into the spindle. Tighten to 7-11 lb-ft (10-15 N•m). 
- F. On axles with CTIS, install the ABS sensor harness grommet into the dust shield hole.
- G. Set the ABS sensor air gap by pressing the sensor up against the tone ring.

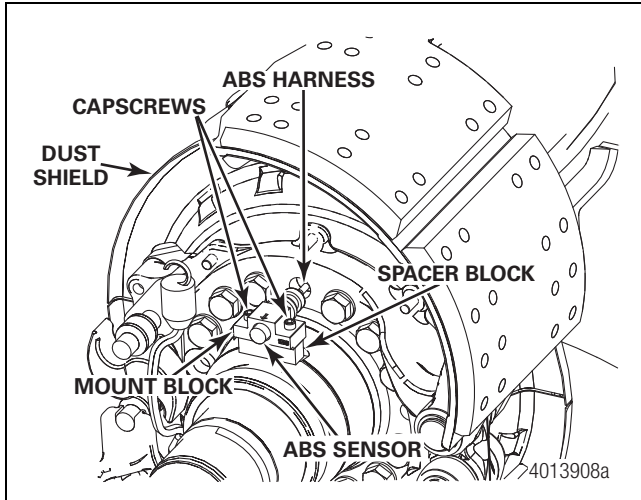


Figure 17.3

- 6. Install the brake return spring and clips. Figure 17.4.

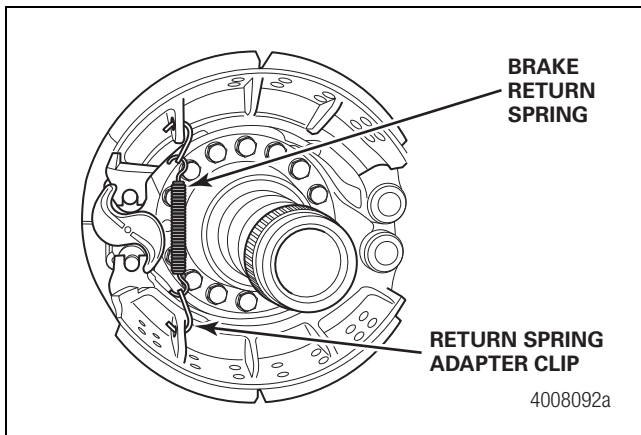


Figure 17.4

- 7. Connect the brake lines.
- 8. If the brake has spring chambers, carefully unlock the spring using the brake chamber manufacturer's instructions.

Hydraulic Disc Brake

- 1. Use a suitable lifting device to install the caliper on the wheel end. Figure 17.5.

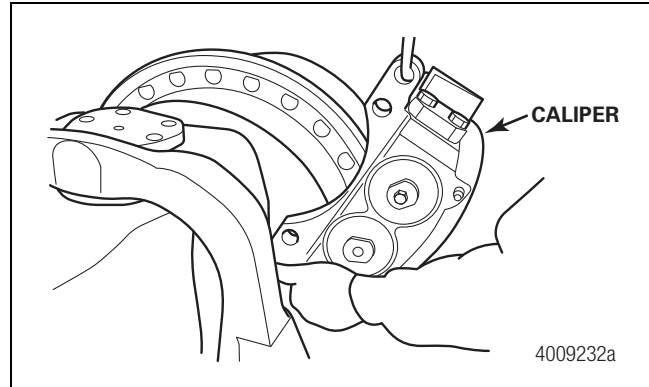


Figure 17.5

- 2. Install the four caliper mounting bolts. Use a 7/8" 12-point socket to tighten the bolts to 504-617 lb-ft (684-836 N•m). Figure 17.6. 

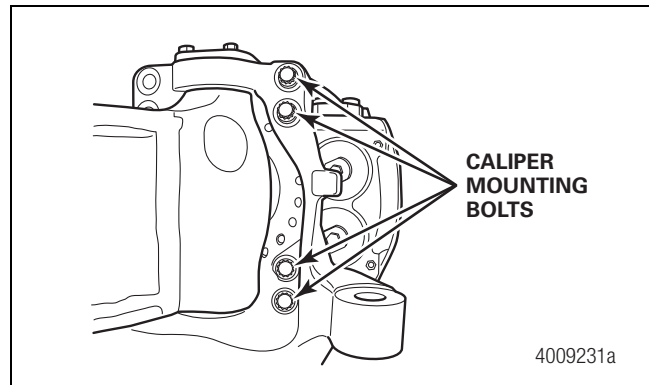


Figure 17.6

Hydraulic Disc Brake Caliper

NOTE: Refer to Parts Book PB-1106, Heavy-Duty Planetary Wheel End Drive Steer Axles, to determine the correct brake actuation fluid for the caliper. To obtain this publication, refer to the Service Note page on the front inside cover of this manual.

⚠ WARNING

Only use the brake actuation fluid specified by Meritor in the brake assembly. Do not use other types of brake actuation fluid or mix fluids to use in the assembly. Damage to the rubber parts of the caliper can occur, which can cause loss of braking. Do not reuse brake actuation fluid, which can be contaminated and adversely affect operation. Serious personal injury and damage to components can result.

1. Use a lifting device to install the brake caliper onto the knuckle.

⚠ WARNING

You must install the longer bolts in the upper mounting holes and the shorter bolts in the lower mounting holes. Do not install the bolts in the wrong positions. Serious personal injury and damage to components can result.

2. Install washers on the caliper mounting bolts. Install the two longer caliper mounting bolts into the upper holes and the two shorter caliper mounting bolts into the lower holes. Tighten the mounting bolts to the torque specified in Section 20. Figure 17.7 and Figure 17.8.

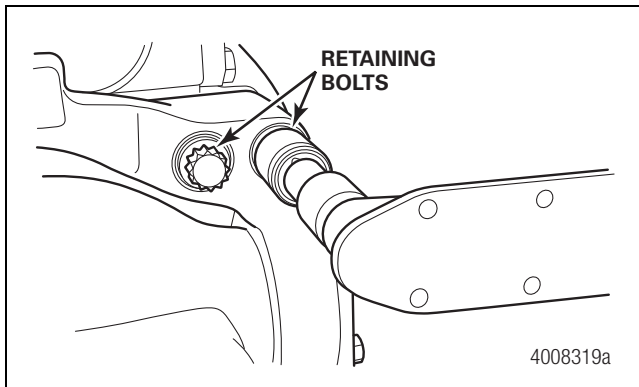


Figure 17.7

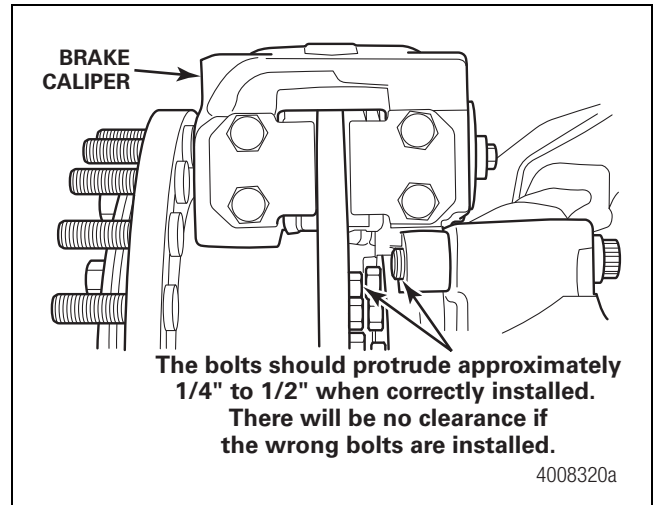


Figure 17.8

3. If removed, install the brake pads into the caliper.
4. Install the brake pad retainer plates onto the caliper. Install the retainer plate bolts and tighten them to the torque specified in Section 20.

Air Disc Brake

1. Use a lifting device to support the brake caliper assembly. Guide it into place on the wheel end.
2. Install the four brake caliper retaining bolts and tighten to the torque specified in Section 20. Refer to Maintenance Manual MM-0467 for complete installation procedures. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual. Figure 17.9.

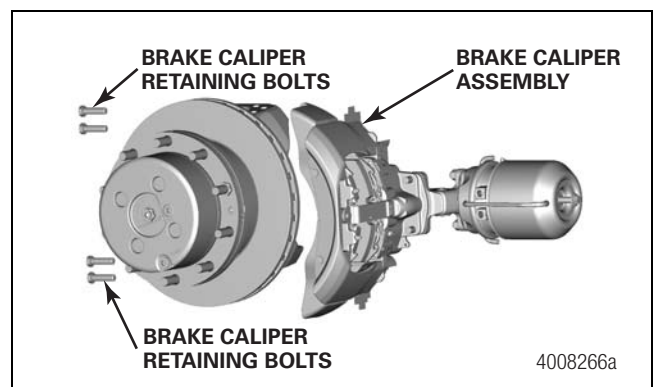


Figure 17.9

18 Troubleshooting

Diagnostic Chart

Refer to the following chart when troubleshooting planetary wheel end problems.

Table A: 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.

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.

Towing

Perform the following before towing the vehicle.

- Shift the DCDL, if equipped, to the unlocked or disengaged position using the switch inside the cab of the vehicle. The DCDL indicator light in the cab will go off. Refer to Maintenance Manual MM-5A, Section 11 for additional information. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.
- Remove the driveline of the axle with the wheels on the ground.

Inspection Tools

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

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 20.
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 tighten a new nut following the correct procedure for the wheel end.

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 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.

19 Maintenance

Planetary Wheel End Cover Type Identification

There are several different types of hub covers depending on the design of axle you are servicing. Refer to Figure 19.1, Figure 19.2, Figure 19.3, Figure 19.4 and Figure 19.5 for plug locations and fill lines.

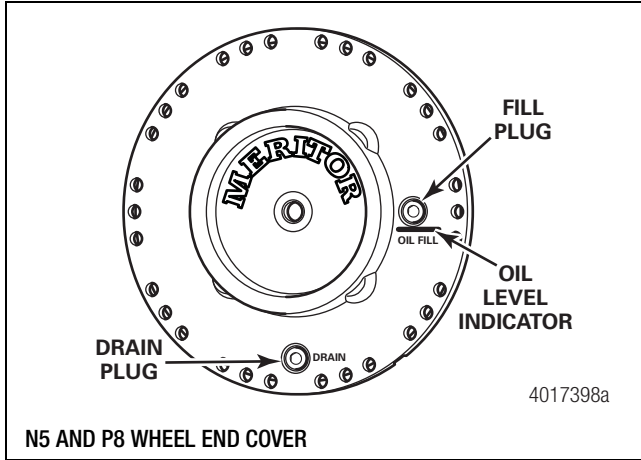


Figure 19.1

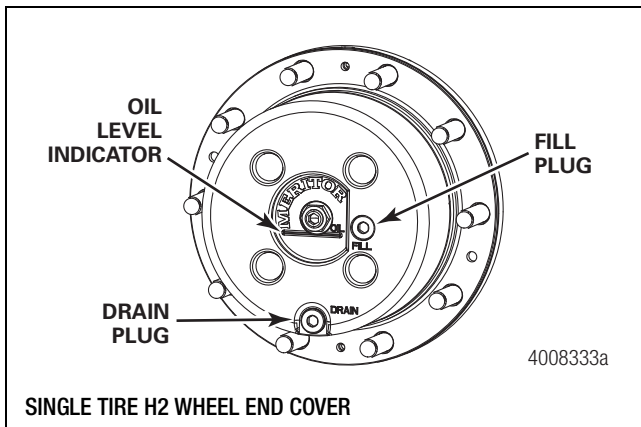


Figure 19.2

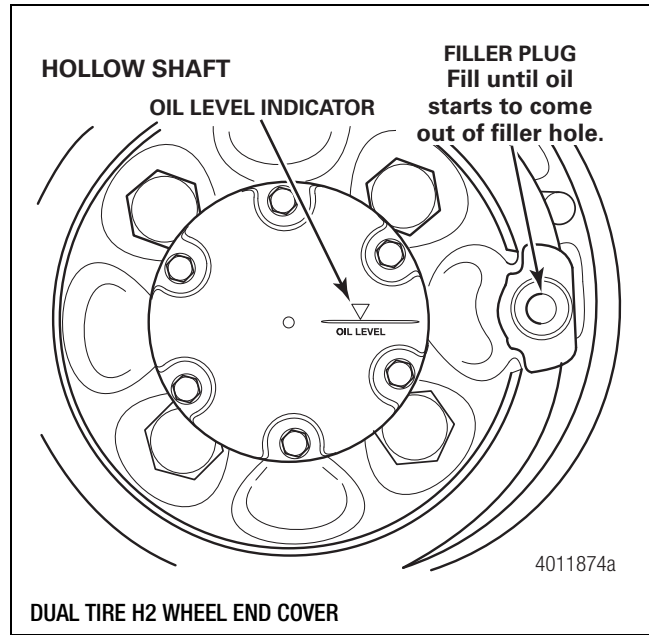


Figure 19.3

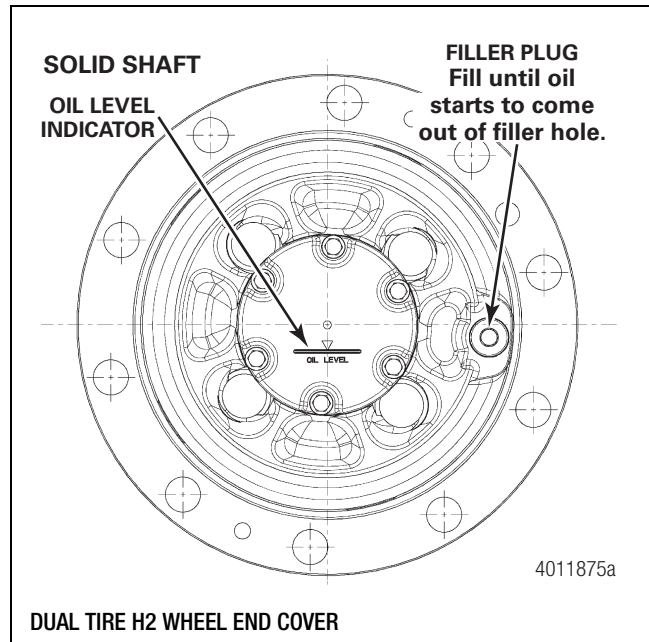
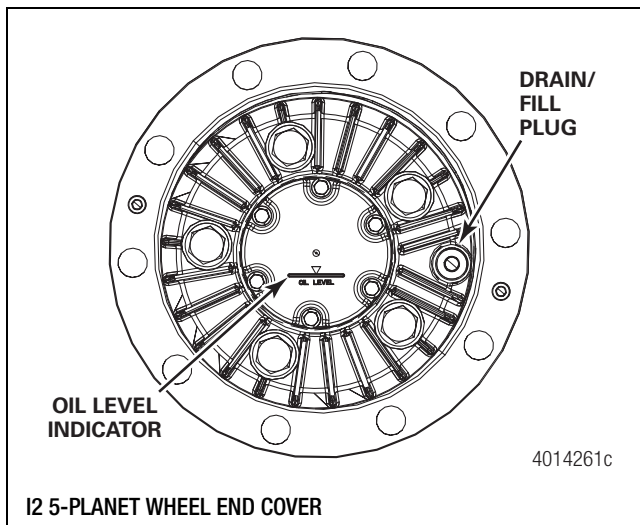


Figure 19.4



I2 5-PLANET WHEEL END COVER

Figure 19.5

NOTE: The dual tire H2 and the I2 5-planet wheel ends have a single fill and drain plug. When draining the oil, the wheel end should be rotated to place the plug at the bottom 6 o'clock position. To fill or check the oil level, the wheel end should be rotated to place the plug at the 3 o'clock position. Observe the oil level markings as shown in Figures 19.3, 19.4 and 19.5.

Drain the Oil from the Hub and Rear Drive Axle

1. Wear safe eye protection.
2. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
3. Raise the vehicle so the wheels to be serviced are off the ground. Support the axle to be serviced with safety stands.
4. Remove the wheel and tire assemblies from the wheel ends.
5. Place a drain pan under the hub drain plug. Rotate the wheel end so the drain plug is at its lowest position. Remove the drain plug and allow the hub oil to drain completely from the wheel end. Figure 19.6.

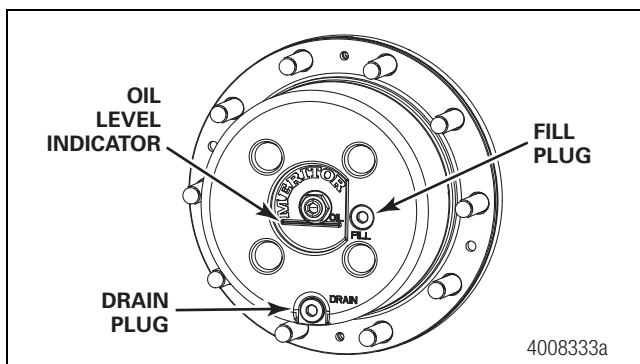


Figure 19.6

6. Place a drain pan under the housing drain plug. Remove the drain plug and allow the oil to drain completely from the axle housing.

Fill the Hub and Rear Drive Axle with Oil

1. Verify that the vehicle is parked on a level surface. Block the wheels to prevent the vehicle from moving.
2. Rotate the wheel-end fill plug to the 3 o'clock position (fill line will be horizontal) and remove the wheel-end fill plug and brass washer. Figure 19.7.

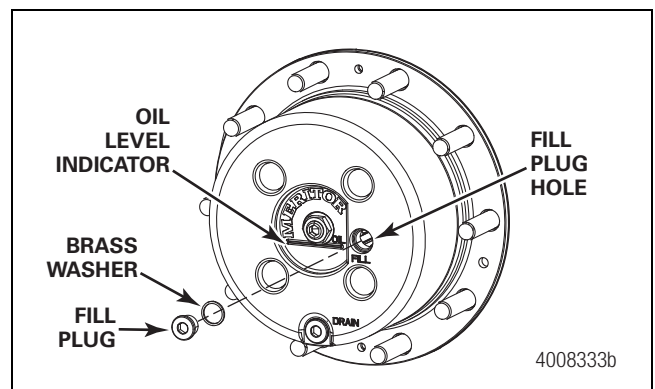


Figure 19.7

3. Fill the wheel end with specified oil until the level is even with the bottom of the fill plug hole.
4. Install the fill plug with the brass washer in the wheel end and tighten to 44-74 lb-ft (60-100 N•m).
5. Remove the fill plug and brass washer from the axle housing. Figure 19.8.

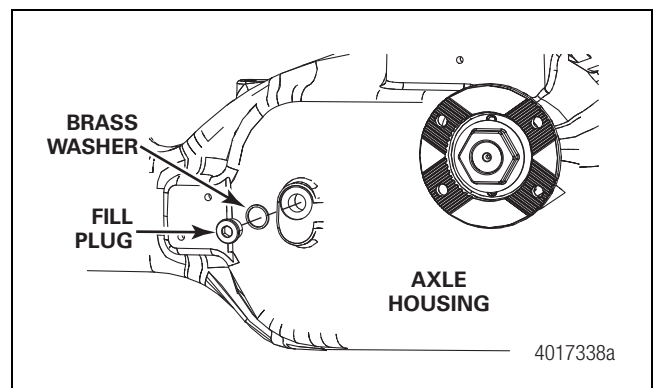



Figure 19.8

6. Fill the axle housing with specified oil until the level is even with the bottom of the fill plug hole. Allow enough time for the oil to flow through the axle assembly and reach an even level.

19 Maintenance

7. Clean the fill plug magnet of any debris.
8. Install the fill plug with the brass washer in the axle housing and tighten to 44-74 lb-ft (60-100 N•m). 

Check and Adjust the Oil in the Hub

NOTE: The vehicle must be stationary for at least 15 minutes prior to checking or adjusting levels.

1. Verify that the vehicle is parked on a level surface. Block the wheels to prevent the vehicle from moving.
2. Rotate the wheel-end fill plug to the 3 o'clock position (fill line will be horizontal) and remove the wheel-end fill plug and brass washer. Figure 19.7.

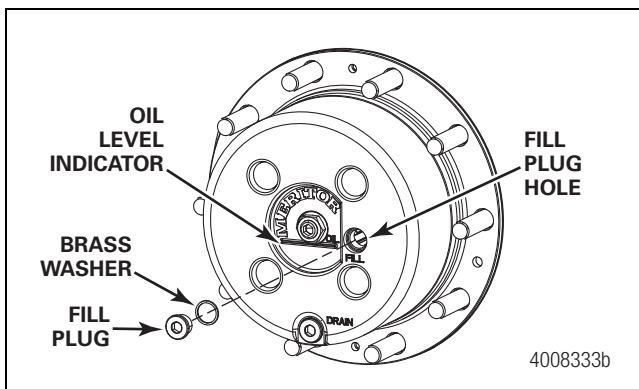



Figure 19.9

3. Check the oil level in the wheel end.
 - **If oil flows from the fill plug hole when the plug is loosened:** The oil level is acceptable; excess fluid does not need to be drained. Quickly proceed to Step 4 to minimize spillage.
 - **If the oil level is even with the bottom of the fill plug hole:** The oil level is acceptable.
 - **If the oil level is below the bottom of the fill plug hole:** Add specified oil until the oil level is even with the bottom of the fill plug hole.
4. Clean the fill plug magnet of any debris.
5. Install the fill plug with the brass washer in the wheel end and tighten to 44-74 lb-ft (60-100 N•m). 
6. Proceed to the rear drive axle check and adjust oil procedure.

Check and Adjust the Oil in the Rear Drive Axle

NOTE: The vehicle must be stationary for at least 15 minutes prior to checking or adjusting levels.

1. Verify that the vehicle is parked on a level surface. Block the wheels to prevent the vehicle from moving.
2. Remove the fill plug and brass washer from the axle housing. Figure 19.10.

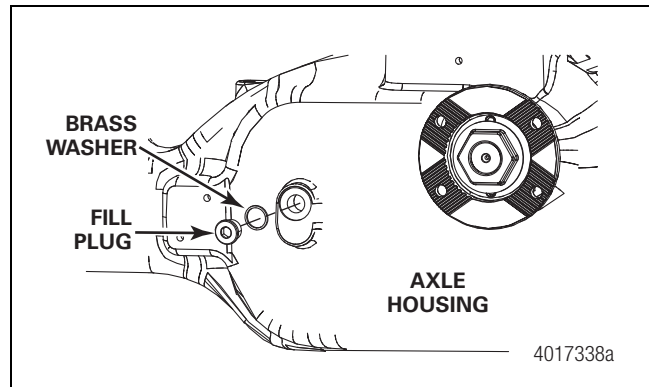



Figure 19.10

3. Check the oil level to ensure it is even with the bottom of the fill plug hole.
 - **If oil flows from the fill plug hole when the plug is loosened:** Let the excess fluid drain until it reaches the bottom of the fill plug hole.
 - **If the oil level is below the bottom of the fill plug hole:** Add specified oil until the oil level is even with the bottom of the fill plug hole.
4. Clean the fill plug magnet of any debris.
5. Install the fill plug with the brass washer in the axle housing and tighten to 44-74 lb-ft (60-100 N•m). 

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 B and Table C for standard information on lubricants, schedules and capacities.

Table B: 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
O-617-A	Multi-Purpose Grease (NLGI Grade 1)	Lithium 12-Hydroxy Stearate or Lithium Complex	Refer to the grease manufacturer's specifications for the temperature service limits.	
O-618	Multi-Purpose Grease	Lithium Complex, MIL-PRF-10924		

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

Table C: 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
Detailed Visual Inspection of the Entire Axle	10,000 (16 000)	6	1,500
Change Oil in Carrier and Wheel Ends (Petroleum Based)	25,000 (40 000)	12	1,500
Check Hub Endplay			
Change Oil in Carrier and Wheel Ends (Synthetic Based)	50,000 (80 000)		3,000

Wheel Hub Central Tire Inflation Air Check

Perform this procedure if you suspect the CTI seal is leaking air.

Refer to the Special Tools section for a drawing of the air test block.

1. Remove the air line from the 90-degree CTI air inlet fitting on the axle housing. Figure 19.8.

19 Maintenance

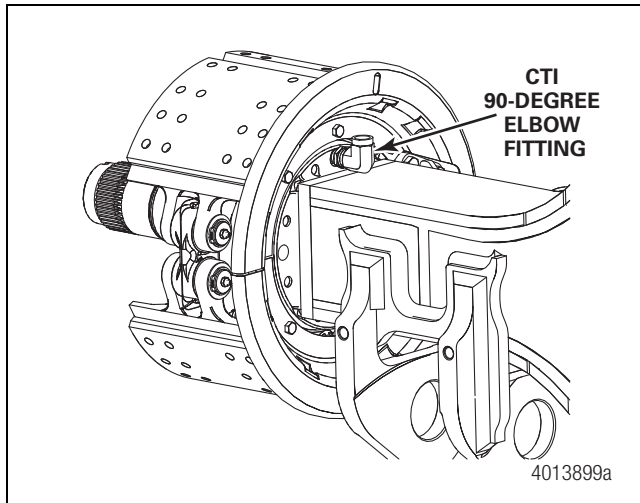


Figure 19.11

2. Install a 1/2-14 NPT threaded plug into the 90-degree air inlet fitting. Use pipe thread sealant on the fitting threads to prevent air leaks.
3. Install a 1/4-18 NPT threaded plug into one of the CTI ports of the brake drum. Use pipe sealant on the fitting threads to prevent air leaks.
4. Rotate the hub three or four times CLOCKWISE. Stop and rotate the hub three or four times COUNTERCLOCKWISE. This will help seat the seals.
5. Attach a pressure regulator with pressure gauge and air line to the threaded port (3/8-18 NPSF) on the air test block. Apply thread sealant to all threaded connections to prevent air leaks.
6. Inspect the O-ring in the recessed port of the air test block. Replace the O-ring if it is found to have cracks, cuts or other damage that prevents proper sealing.
7. Position the air test block with O-ring over the two wheel studs adjacent to the CTI port on the wheel hub flange. Position the clamp plate so that the O-ring is centered over the CTI port. Figure 19.12 and Figure 19.13.

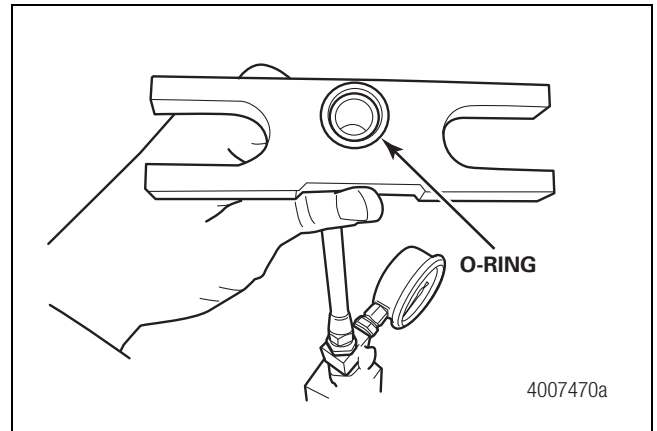


Figure 19.12

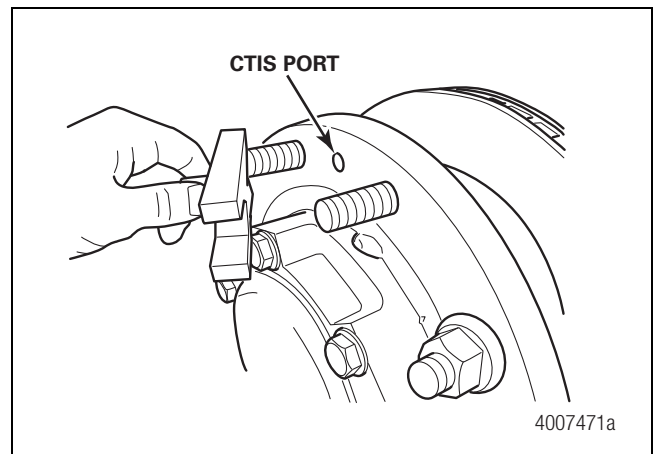


Figure 19.13

8. Install two wheel nuts to secure the air test block to the hub flange. Evenly tighten the wheel nuts by hand. Figure 19.14.

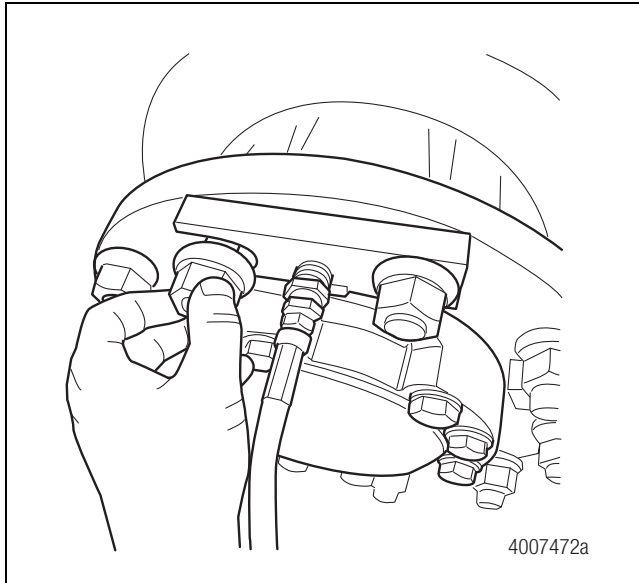


Figure 19.14

9. Attach a shop air source to the inlet coupler on the pressure regulator.
10. Rotate the knob of the pressure regulator until the gauge pressure reads 120 psi (8.27 bar).
11. Remove the shop air supply from the pressure regulator.
12. Note the pressure in the gauge. The pressure should not drop more than 10 psi (0.69 bar) in one minute. If the air pressure drops more than 10 psi (0.69 bar) in one minute, determine the source of the leak and repair or replace as necessary. Use a soapy water solution to inspect for leaks. Make sure the leaks are not coming from the test equipment. Figure 19.15.

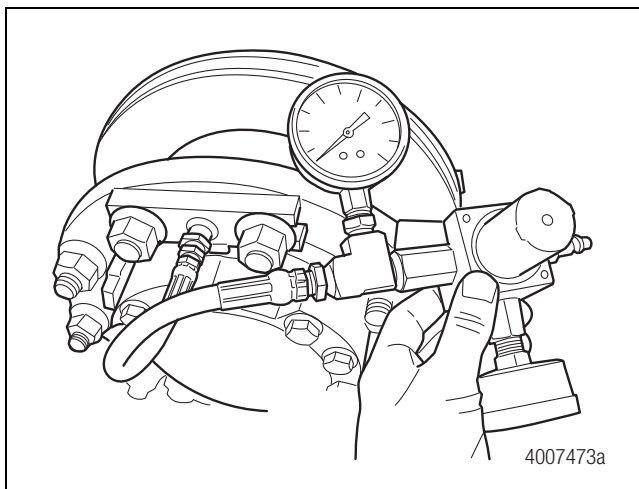


Figure 19.15

13. If the pressure continues to drop, rotate (by hand) the wheel end 30 full rotations in both the clockwise and counterclockwise direction. Repeat air check. If improvement is noted, but maximum pressure drop is not achieved, repeat process.
14. When the air check is complete, remove the air check test equipment.
15. Remove the NPT threaded plugs from the 90-degree CTI air inlet fitting on the axle housing and the CTI port on the brake drum.
16. Reinstall the air line fitting to the 90-degree CTI air inlet fitting.

Torque Specifications

Dual Tire H2 Planetary Wheel End

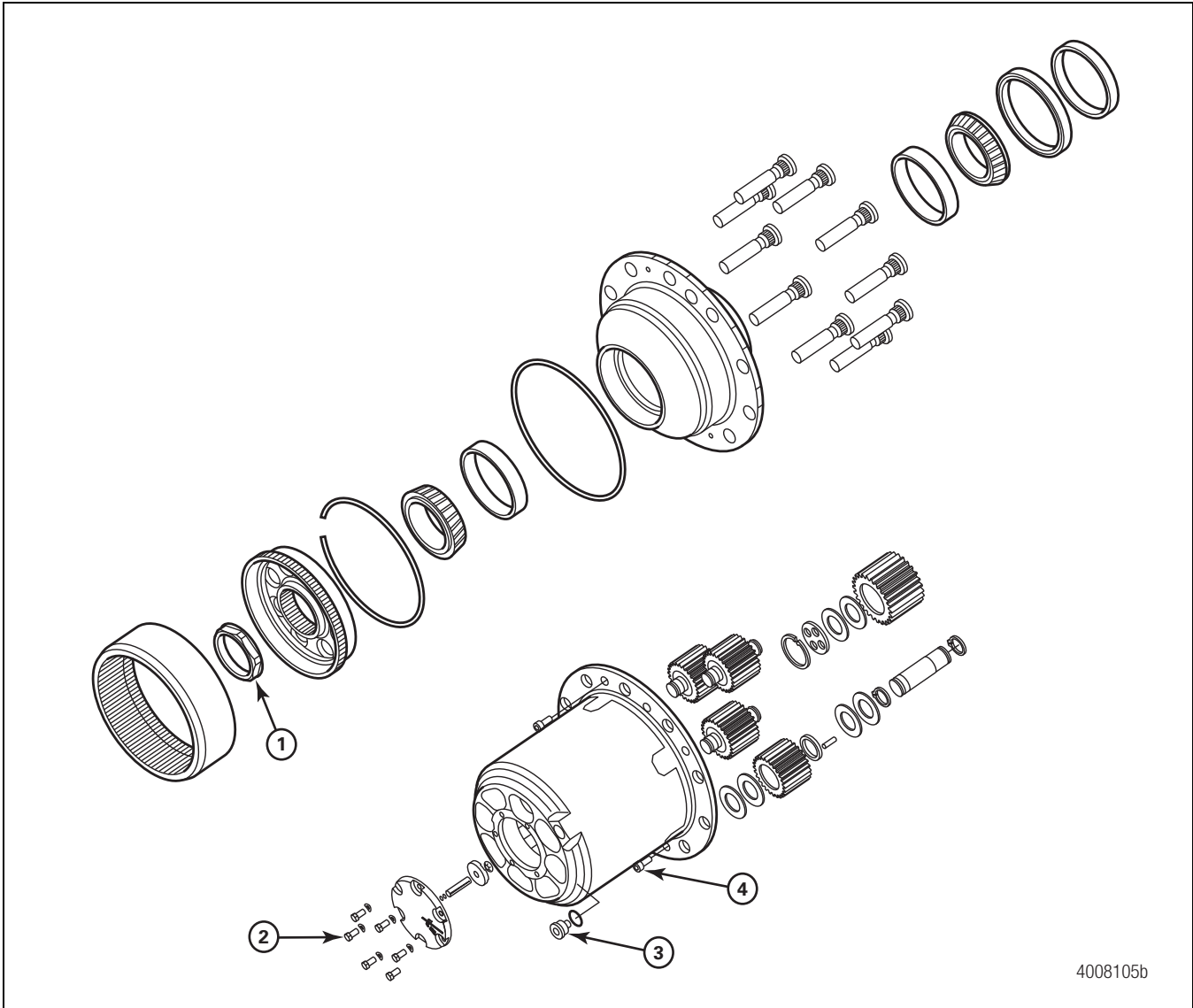


Figure 20.1

Table D: Torque Specifications

Item	Description	Thread Size	Step	Torque Range		Nominal Torque	
				Lb-Ft	N•m	Lb-Ft	N•m
1	Wheel Bearing Nut — Max. vehicle speed less than 25 mph (40 km/h) (Low Speed Application)	M80 x 2	Step 1	N/A	N/A	300	407
			Step 2	Release torque			
			Step 3	N/A	N/A	75	101
			Step 4	Mark the nut position and tighten an additional 21 degrees.			
			Step 5	N/A	N/A	150	203
	Wheel Bearing Nut — Max. vehicle speed greater than 25 mph (40 km/h) (High Speed Application)	M80 x 2		45-58	61-79	52	70
2	Hub Cover Bolts	M8 x 1.25		11-18	15-25	15	20
3	Fill/drain Plug (Hub)	M24 x 1.5		44-74	60-100	60	81
4	Hub Case-to-Hub Bolts ¹	M10 x 1.5		22-37	30-50	30	41
Not Shown	Brake Spider-to-Housing Bolts ²	M16 x 2		184-264	250-358	225	305
		M20 x 2.5		360-481	488-652	420	569

¹ Apply Loctite® 242, or 272 as an alternative, threadlocker to the bolt threads.

² Apply Loctite® 277 threadlocker to the bolt threads.

WARNING

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

Single Tire H2 Planetary Wheel End

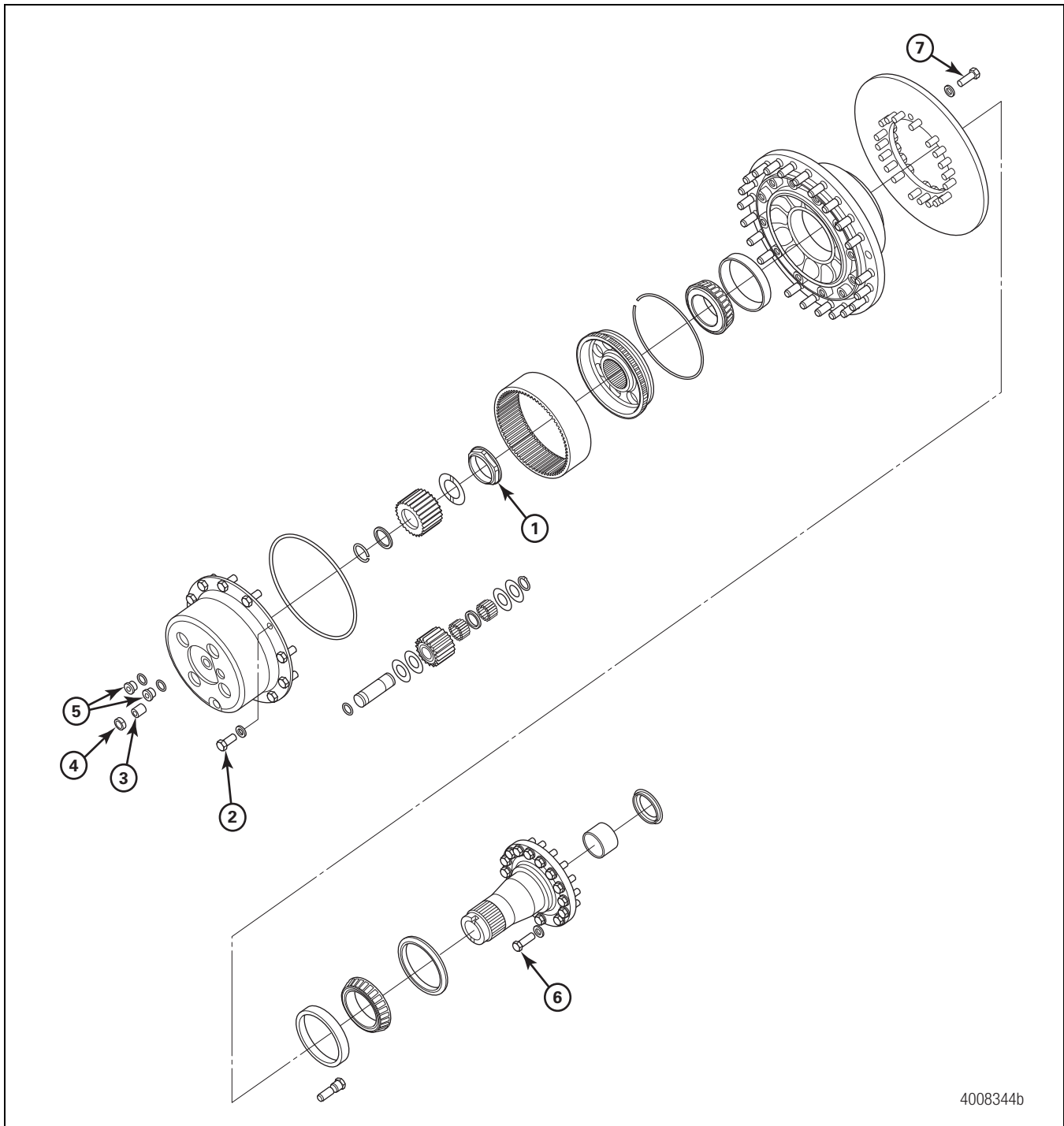
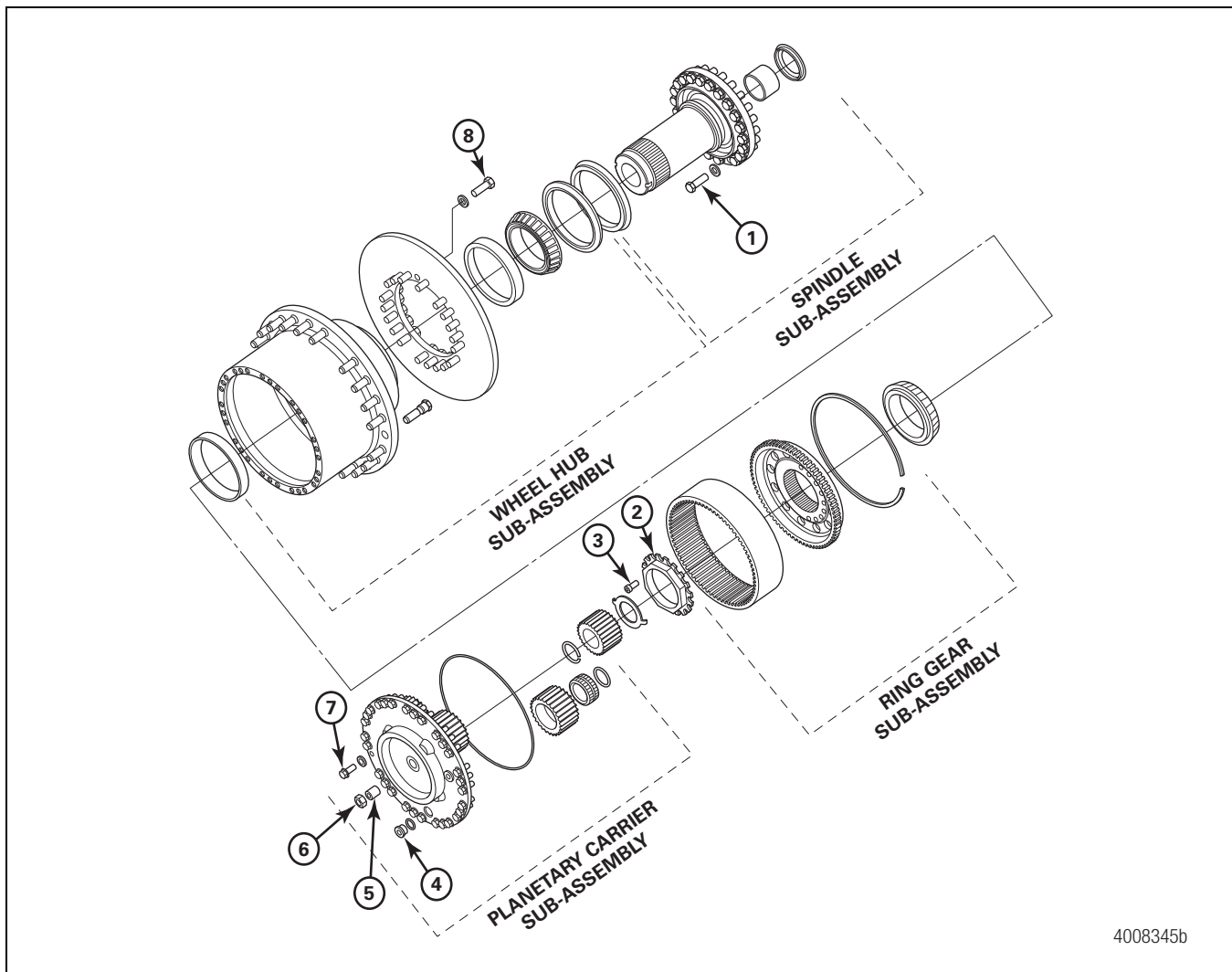


Figure 20.2

Table E: Torque Specifications

Item	Description	Thread Size	Step	Torque Range		Nominal Torque	
				Lb-Ft	N•m	Lb-Ft	N•m
1	Wheel Bearing Nut — Max. vehicle speed less than 25 mph (40 km/h) (Low Speed Application)	M80 x 2	Step 1	N/A	N/A	300	407
			Step 2	Release torque			
			Step 3	N/A	N/A	75	101
			Step 4	N/A	N/A	150	203
	Wheel Bearing Nut — Max. vehicle speed greater than 25 mph (40 km/h) (High Speed Application)	M80 x 2		45-58	61-79	52	70
2	Planetary Carrier-to-Hub Bolt	M16x2		229-254	311-344	241	327
		M10x1.5		44-54	60-73	50	67
3	Thrust Screw	M22x1.5		10 lb-ft (13 N•m) then back off 180 degrees (1/2 turn)			
4	Thrust Screw Jam Nut	M22x1.5		132-179	179-243	156	211
5	Oil Plugs, Planetary Carrier	M24x1.5		44-74	60-100	60	80
6	Spindle-to-Knuckle Bolt	M16x2		192-235	260-318	213	289
7	Rotor-to-Hub Bolt	M16x2		192-235	260-318	213	289
Not Shown	Caliper-to-Knuckle Bolt (Hydraulic)	7/8"-9 UNC		504-617	684-836	560	760
	Caliper-to-Knuckle Bolt (Air)	M16x2		192-235	260-318	213	289

Single Tire N5/P8 Planetary Wheel End



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Figure 20.3

Table F: Torque Specifications

Item	Description	Thread Size	Torque Range		Nominal Torque	
			Lb-Ft	N•m	Lb-Ft	N•m
1	Spindle-to-Knuckle Bolt	M16x2	192-235	260-318	213	289
2	Wheel Bearing Nut	M115x2	266-325	360-440	295	400
3	Wheel Bearing Nut Lock Bolt	M10x1.5	44-54	60-73	49	67
4	Oil Plugs, Planetary Carrier	M24x1.5	44-74	60-100	60	80
5	Thrust Screw	M22x1.5	10 lb-ft (13 N•m) then back off 180 degrees (1/2 turn)			
6	Thrust Screw Jam Nut	M22x1.5	132-179	179-243	156	211
7	Planetary Carrier-to-Hub Bolt	M12x1.75	92-103	125-139	97	132

Item	Description	Thread Size	Torque Range		Nominal Torque	
			Lb-Ft	N•m	Lb-Ft	N•m
8	Rotor-to-Hub Bolt	M16x2	192-235	260-318	213	289
Not Shown	Caliper-to-Knuckle Bolt (Hydraulic)	7/8"-9 UNC	504-617	684-836	560	760

I2 5-Planet Wheel End

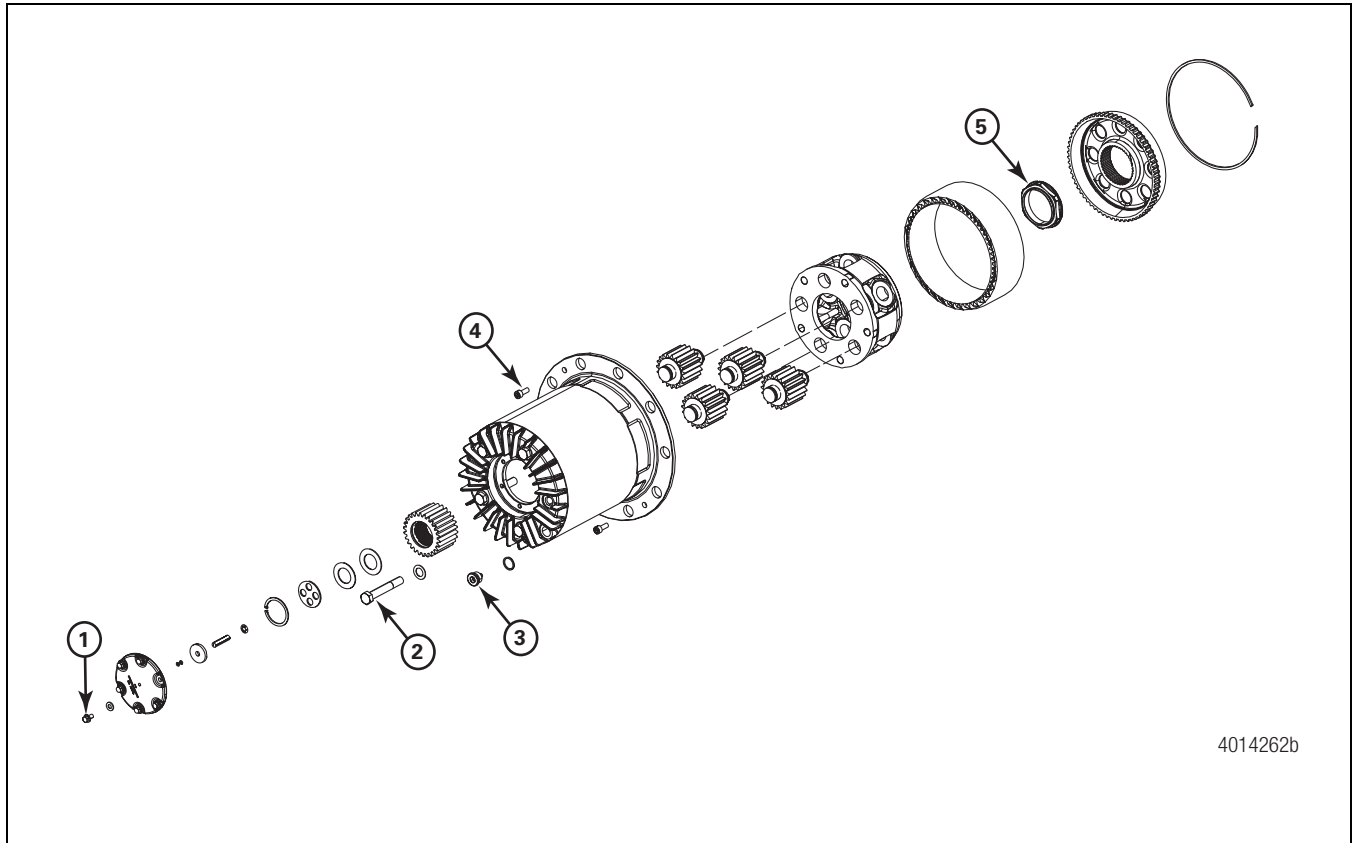


Figure 20.4

Table G: Torque Specifications

Item	Description	Thread Size	Step	Torque Range		Nominal Torque	
				Lb-Ft	N•m	Lb-Ft	N•m
1	Hub Cover Bolts	M8 x 1.25		N/A	31-39	26	35
2	Cover-to-Case Bolt	M18 x 2.0		320-350	435-475	335	455
3	Fill/drain Plug (Hub)	M24 x 1.5		44-74	60-100	60	81
4	Hub Case-to-Hub Bolts ¹	M10 x 1.5		22-37	30-50	30	41

20 Specifications

Item	Description	Thread Size	Step	Torque Range		Nominal Torque	
				Lb-Ft	N•m	Lb-Ft	N•m
5	Wheel Bearing Nut — Max. vehicle speed less than 25 mph (40 km/h) (Low Speed Application)	M80 x 2	Step 1	N/A	N/A	300	407
			Step 2	Release torque			
			Step 3	N/A	N/A	75	101
			Step 4	Mark the nut position and tighten an additional 21 degrees.			
			Step 5	N/A	N/A	150	203
	Wheel Bearing Nut — Max. vehicle speed greater than 25 mph (40 km/h) (High Speed Application)	M80 x 2	N/A	45-58	61-79	52	70
Not Shown	Brake Spider-to-Housing Bolts ²	M16 x 2		184-264	250-334	225	306
		M20 x 2.5		360-481	488-652	420	569

¹ Apply Loctite® 242, or 272 as an alternative, threadlocker to the bolt threads.

² Apply Loctite® 277 threadlocker to the bolt threads.

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Non-Drive Wheel End

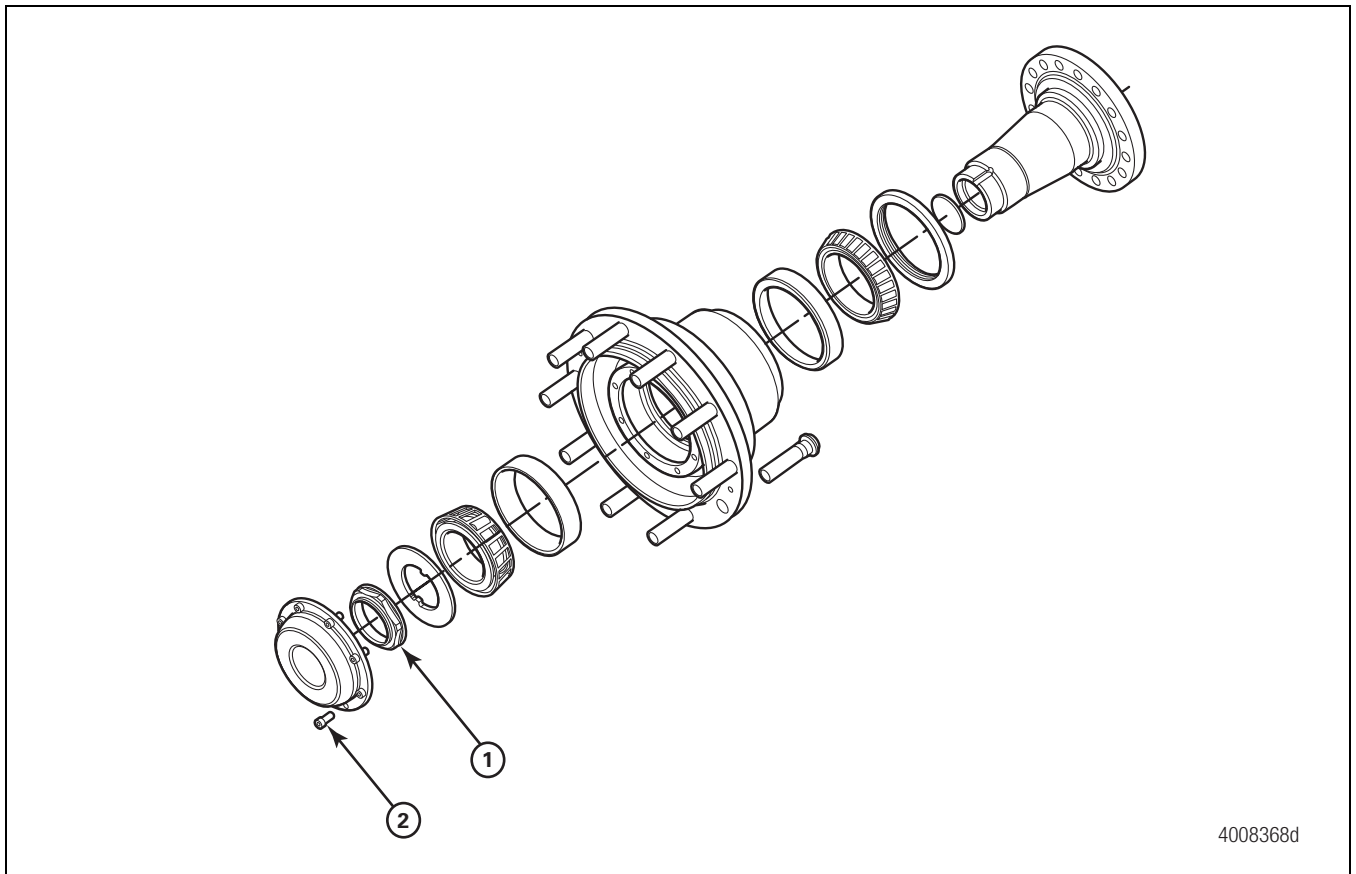
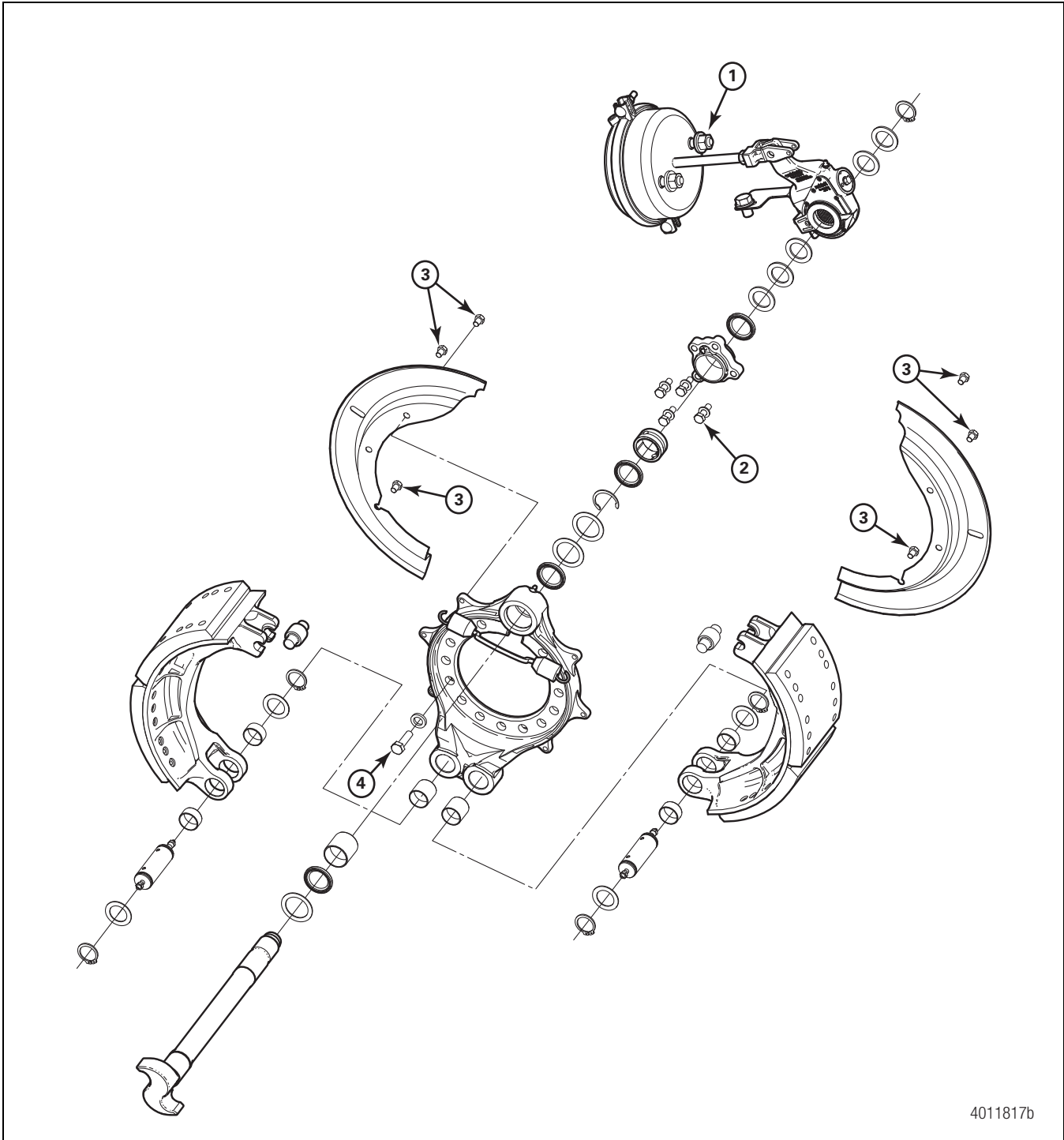


Figure 20.5

Table H: Torque Specifications

Item	Description	Thread Size	Torque Range		Nominal Torque	
			Lb-Ft	N•m	Lb-Ft	N•m
1	Wheel Bearing Nut	M80x2	45-58	61-79	52	70
2	Hub Cover Bolt	M8x1.25	22-27	30-37	24.9	33.7
Not Shown	Caliper-to-Knuckle Bolt (Air)	M16x2	192-235	260-318	213	289

Single Tire H2 Wheel End with S-Cam Drum Brake Assembly



4011817b

Figure 20.6

Table I: Torque Specifications

Item	Description	Thread Size	Torque Range		Nominal Torque	
			Lb-Ft	N•m	Lb-Ft	N•m
1	Brake Chamber-to-Bracket Nut	5/8-11 UNC	Initial torque to 25 lb-ft (34 N•m) Final torque to 133-155 lb-ft (180-210 N•m)			
2	Bearing Block Mounting Bolt	M10x1.5	44-54	60-73	50	67
3	Dust Shield Attaching Bolt	3/8-16 UNC	30-50	41-68	40	54
4	Spider-to-Knuckle Bolt	M16x2	Refer to Wheel End specification.			

Hydraulic Disc Brake Option

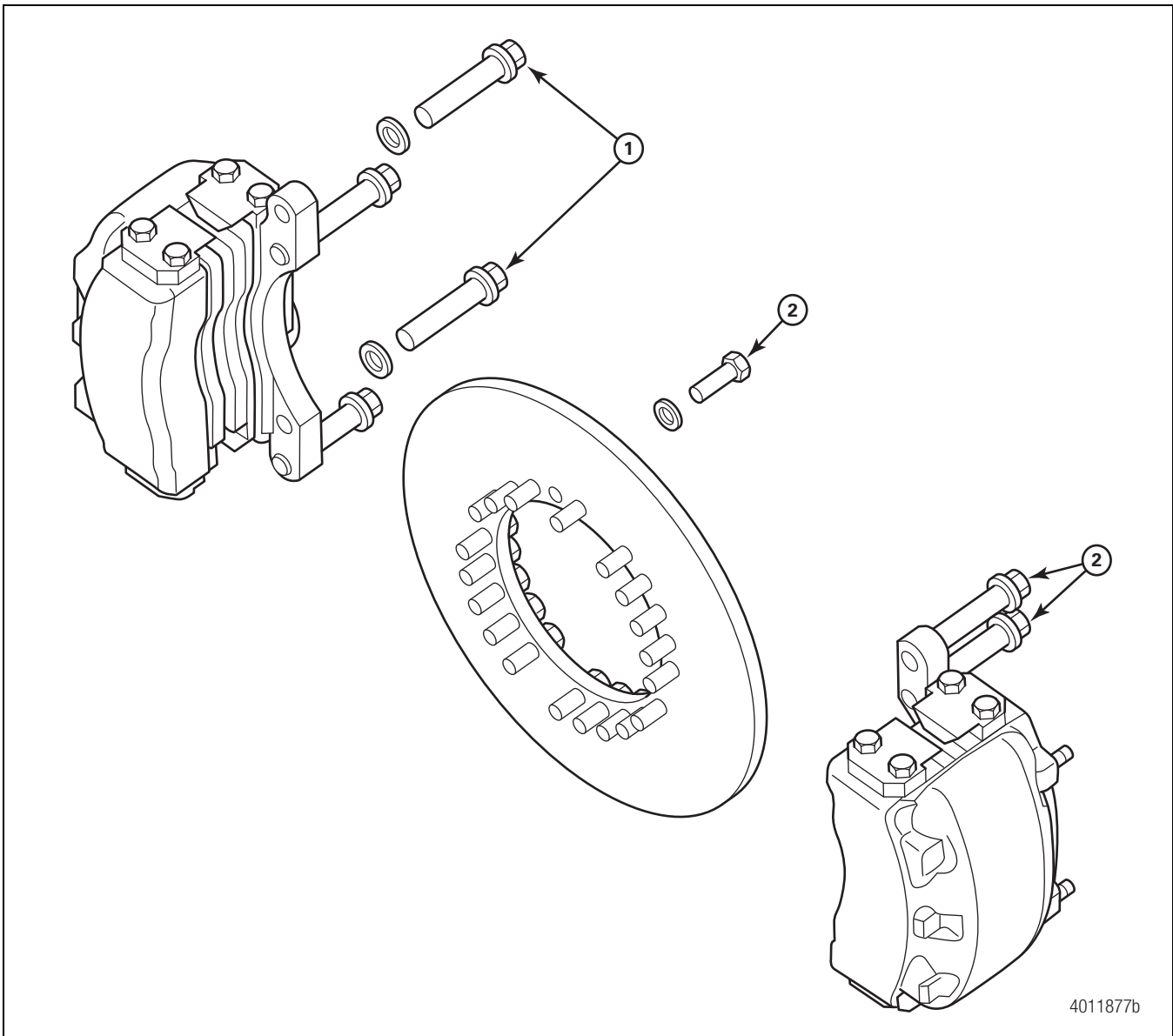


Figure 20.7

Table J: Torque Specifications

Item	Description	Thread Size	Torque Range		Nominal Torque	
			Lb-Ft	N•m	Lb-Ft	N•m
1	Caliper-to-Knuckle Bolt	7/8" UNC	504-617	684-836	560	760
2	Rotor-to-Hub Bolt	M16x2	192-235	260-318	213	289

Tool Drawings

Wheel Bearing Nut Socket

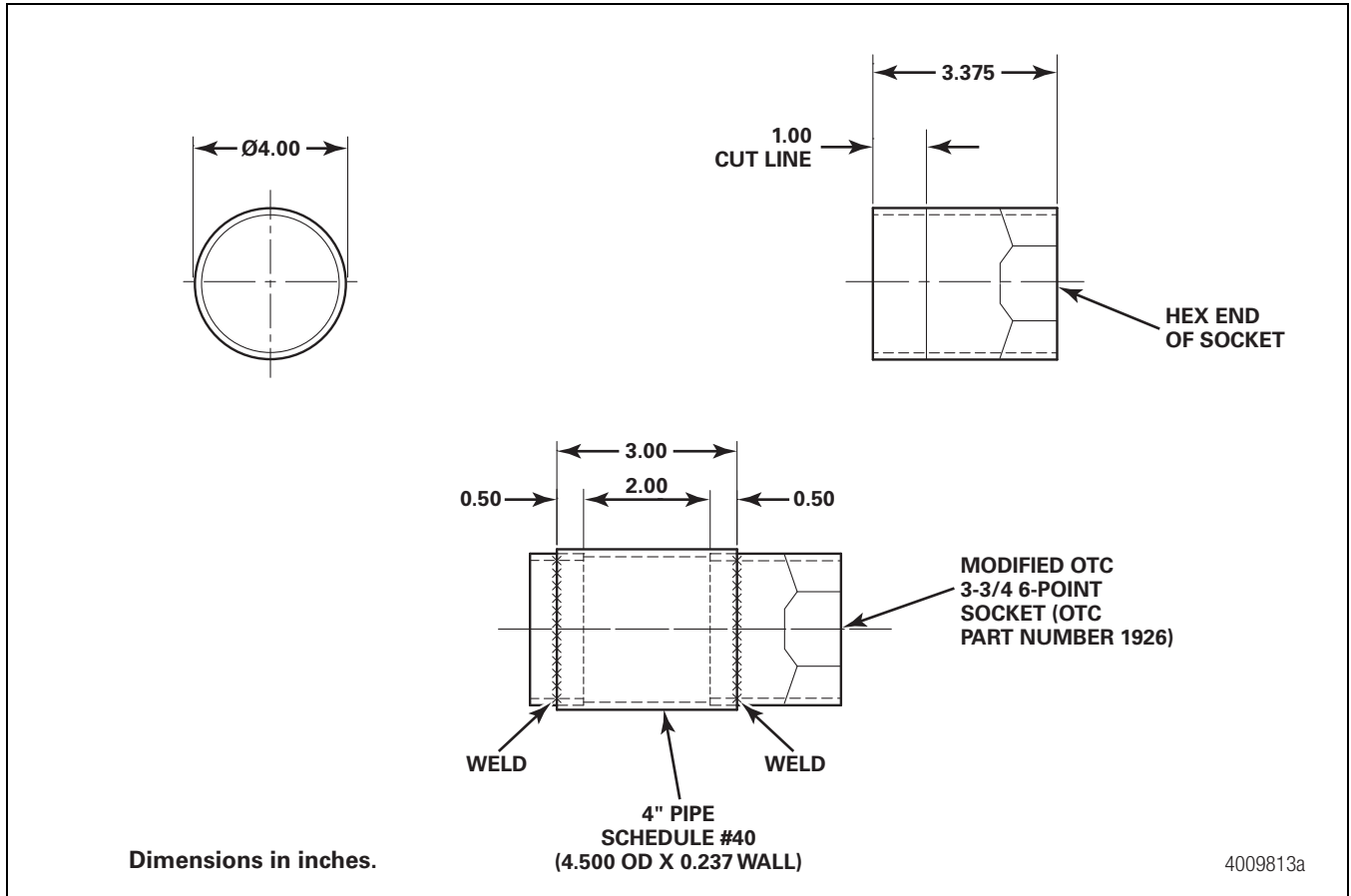


Figure 21.1

21 Special Tools

Hub Seal Driver 3256-G-1229

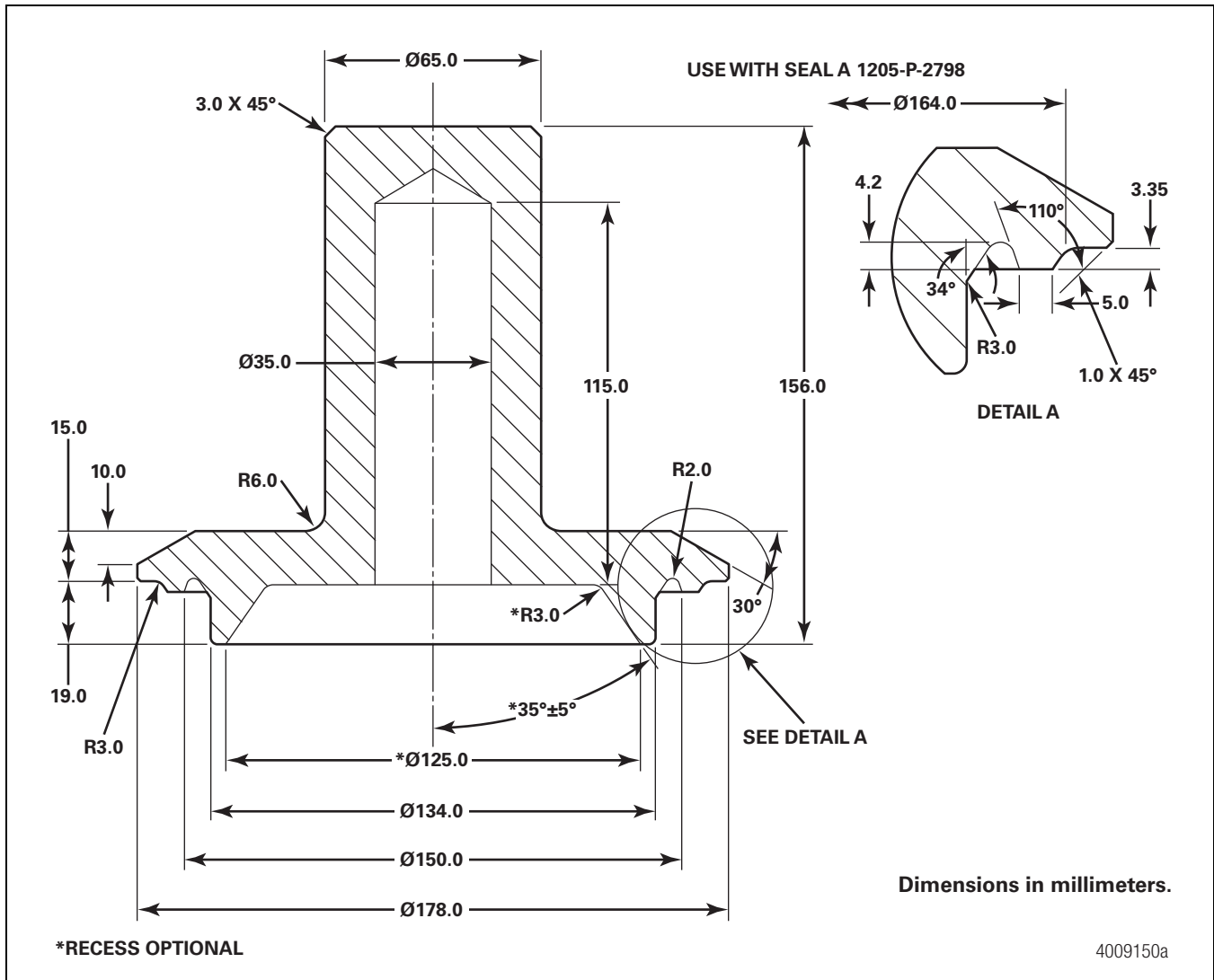


Figure 21.2

Hub Seal Driver 1TL50-27710 (Use with A 1205T2490 Hub Seal)

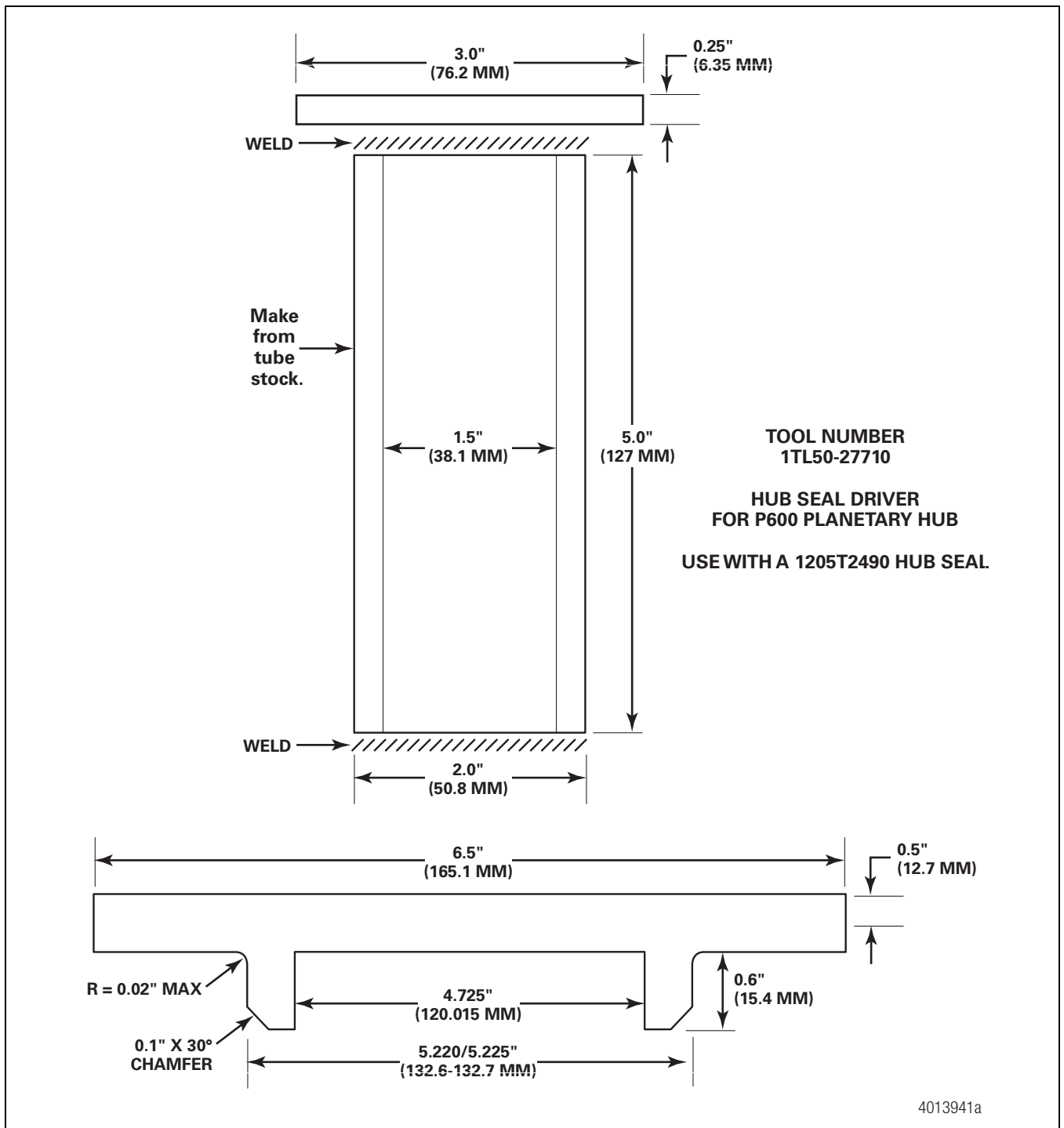


Figure 21.3

21 Special Tools

Hub Seal Driver (Use with A 1205C2837 Hub Seal)

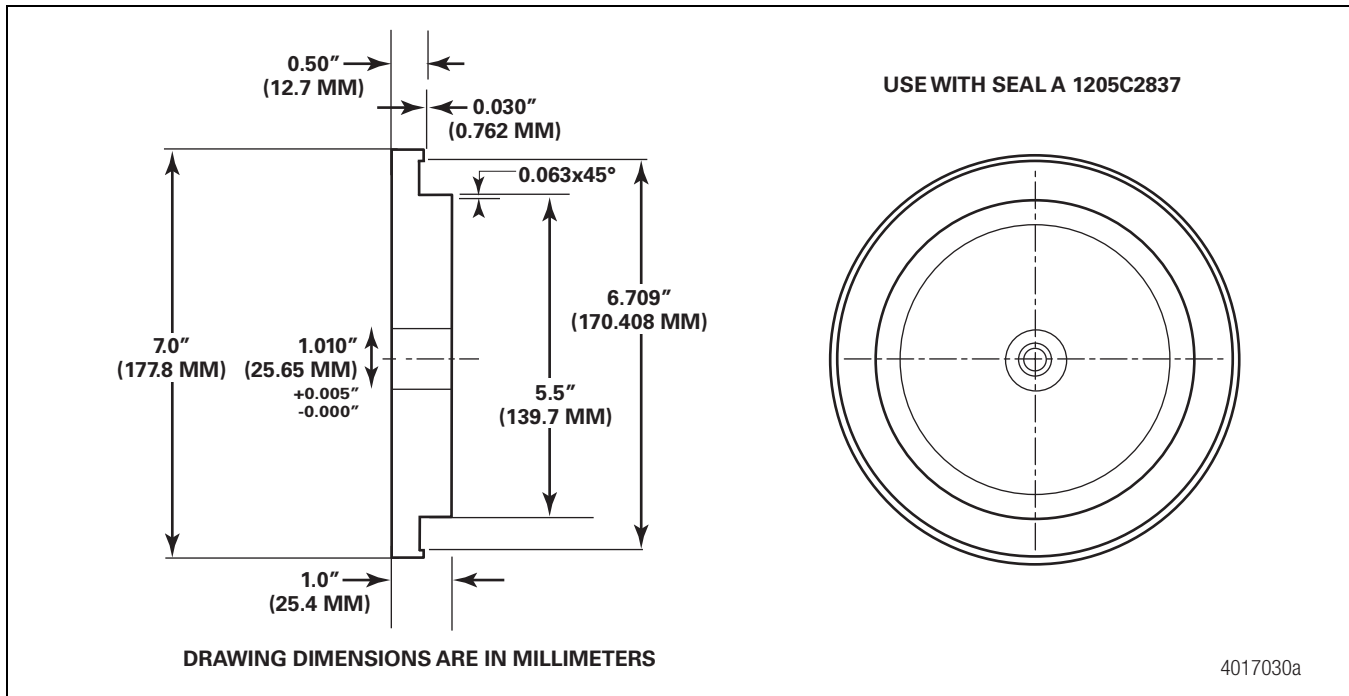


Figure 21.4

N5/P8 Wheel Bearing Nut Socket Wrench

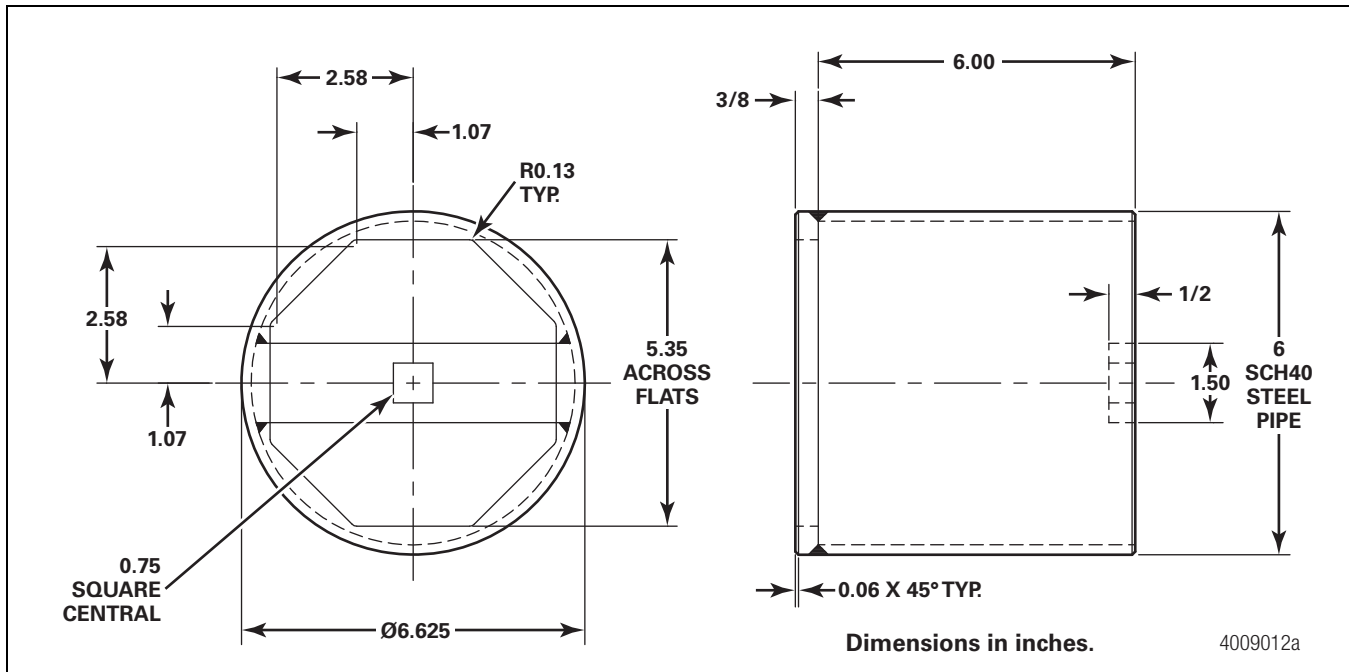


Figure 21.5

N5/P8 Metal Face Seal Insert Tool

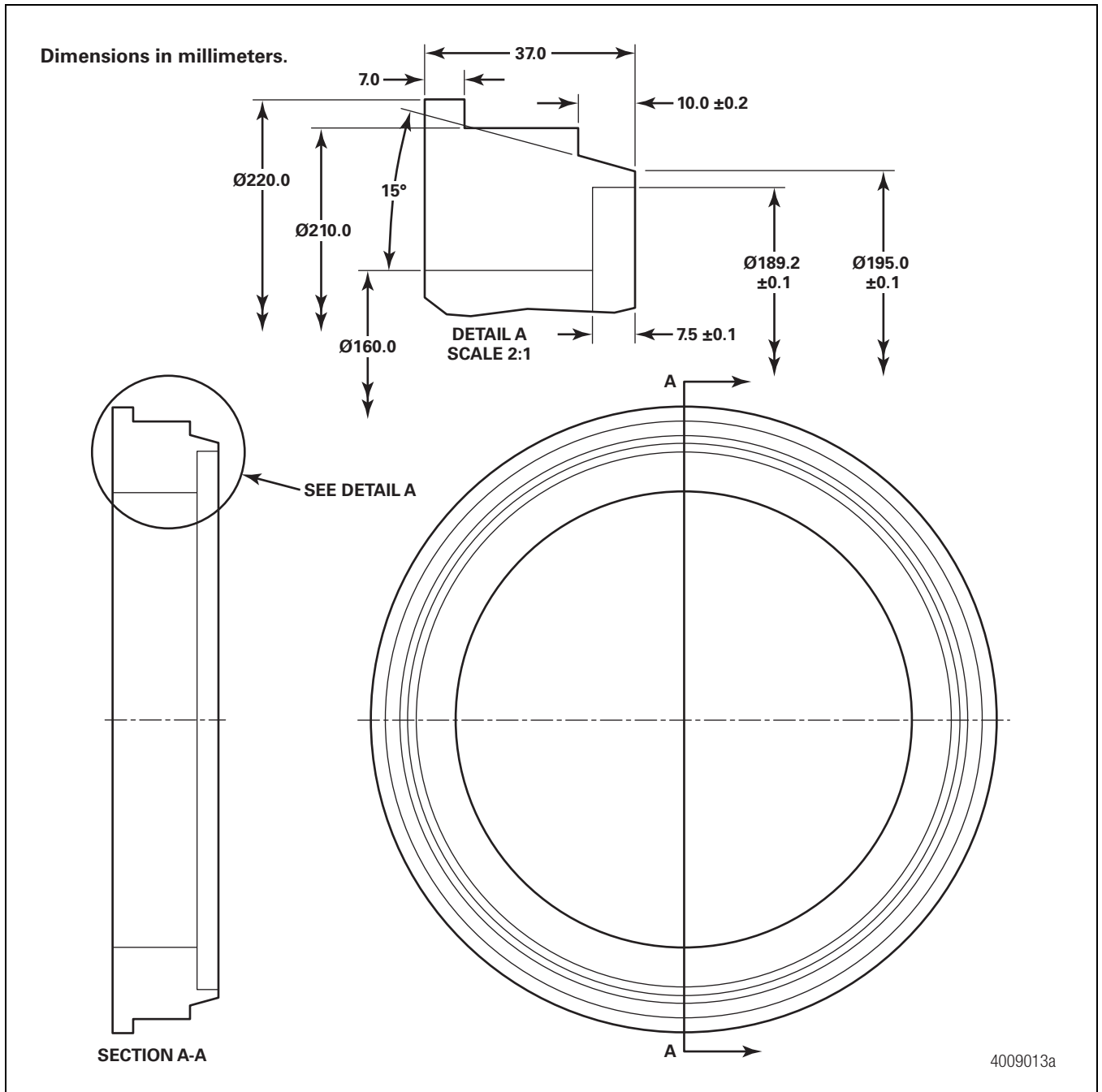


Figure 21.6

21 Special Tools

N5/P8 Metal Face Seal Outside Diameter Guide Tool

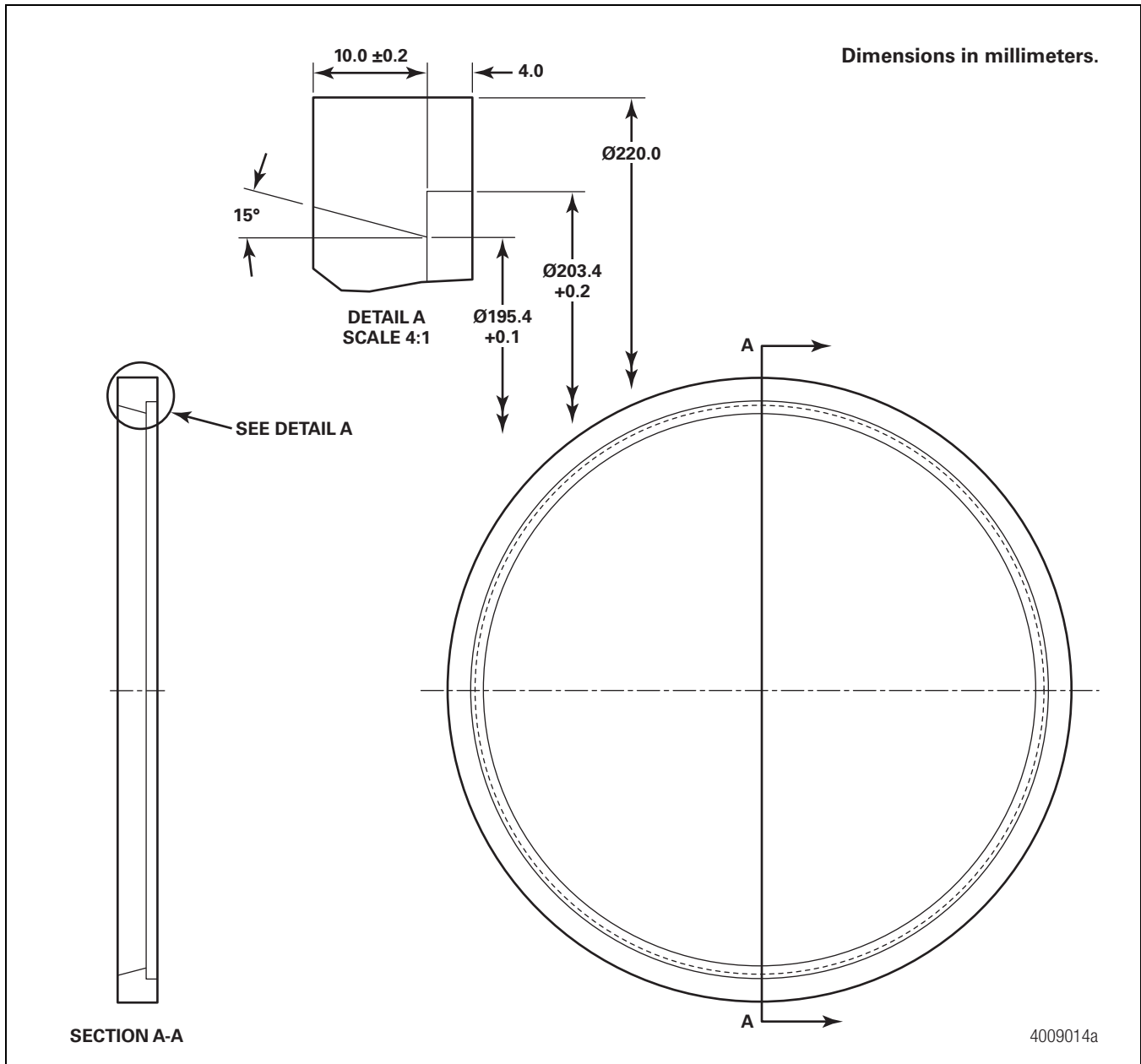


Figure 21.7

N5/P8 Metal Face Seal Inside Diameter Guide Tool

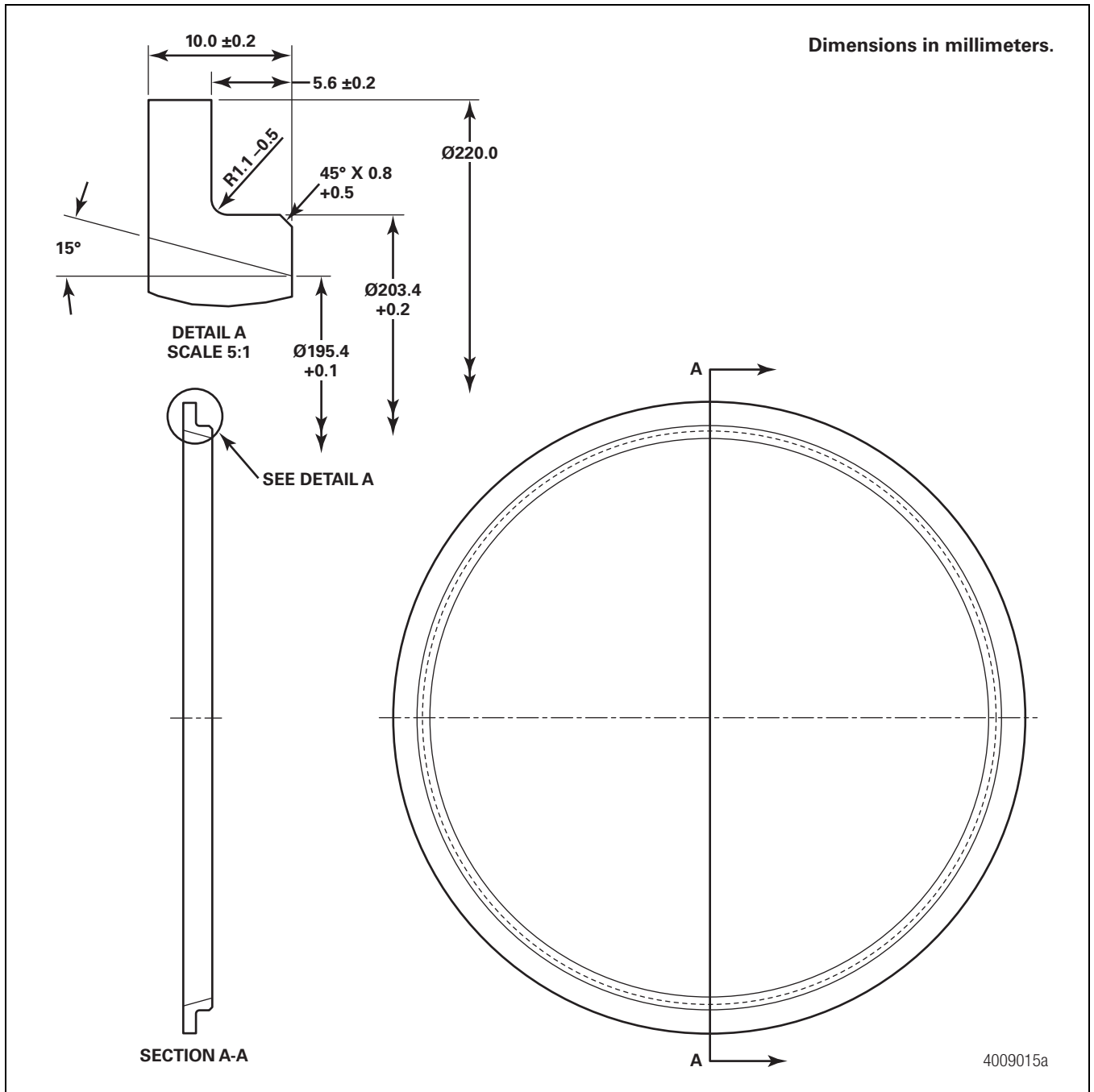


Figure 21.8

21 Special Tools

H2 Hub Seal Driver 911013 DET-111 (Use with Handle 911013 DET-110)

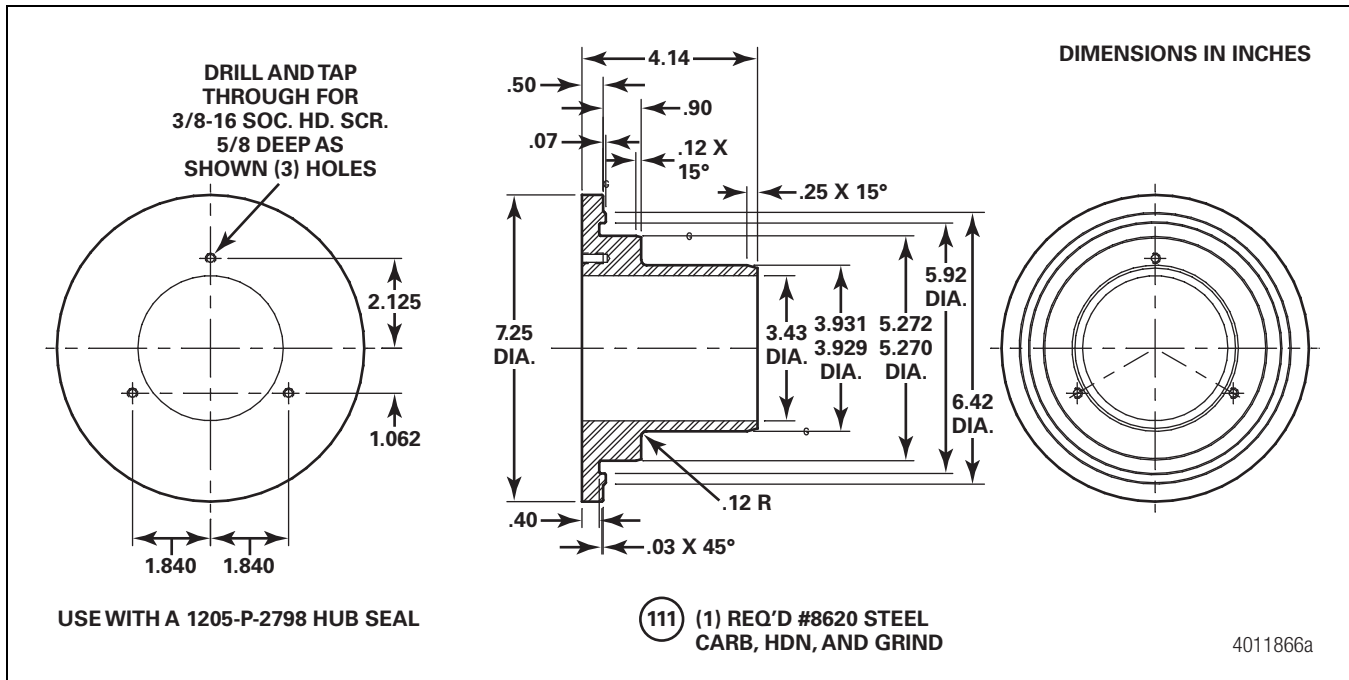


Figure 21.9

H2 Hub Seal Driver Handle 911013 DET-110 (Use with Driver 911013 DET-111)

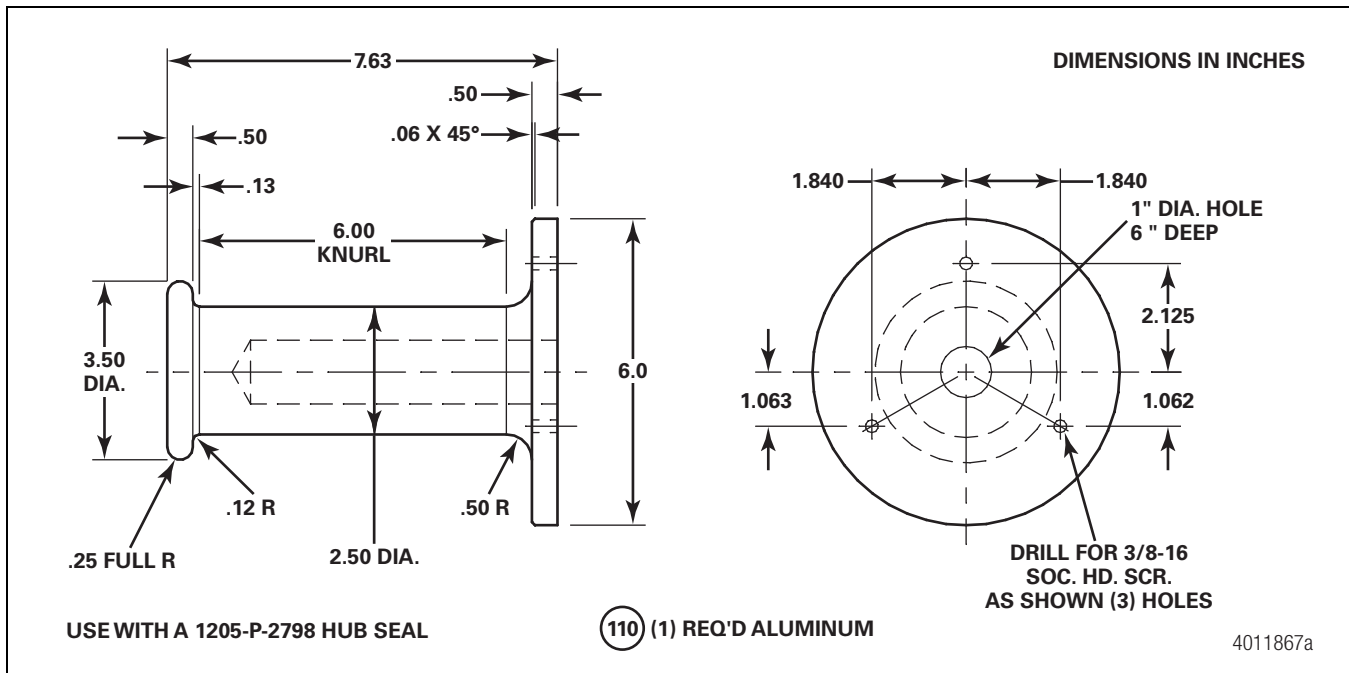


Figure 21.10

Central Tire Inflation Seal Driver (1199-F-4140) (Use with 1199-G-4141 Handle)

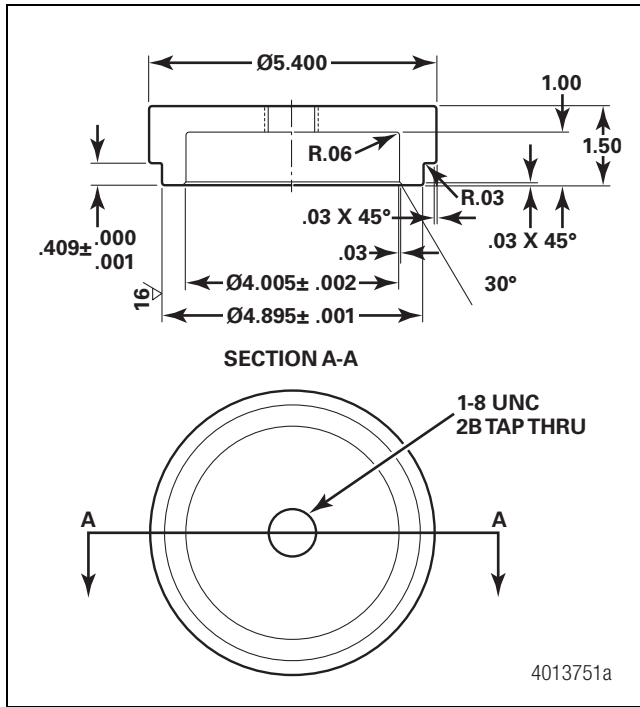


Figure 21.11

Central Tire Inflation Seal Handle (1199-G-4141)

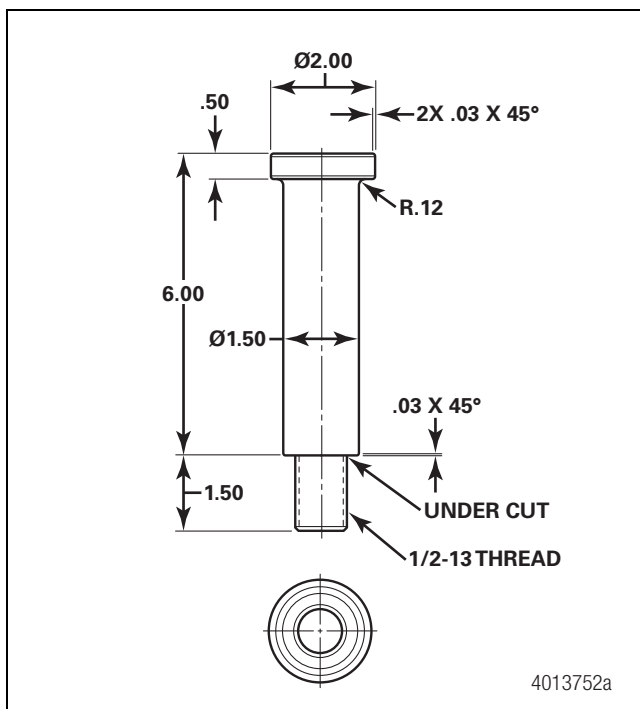


Figure 21.12

21 Special Tools

Central Tire Inflation Air Test Block

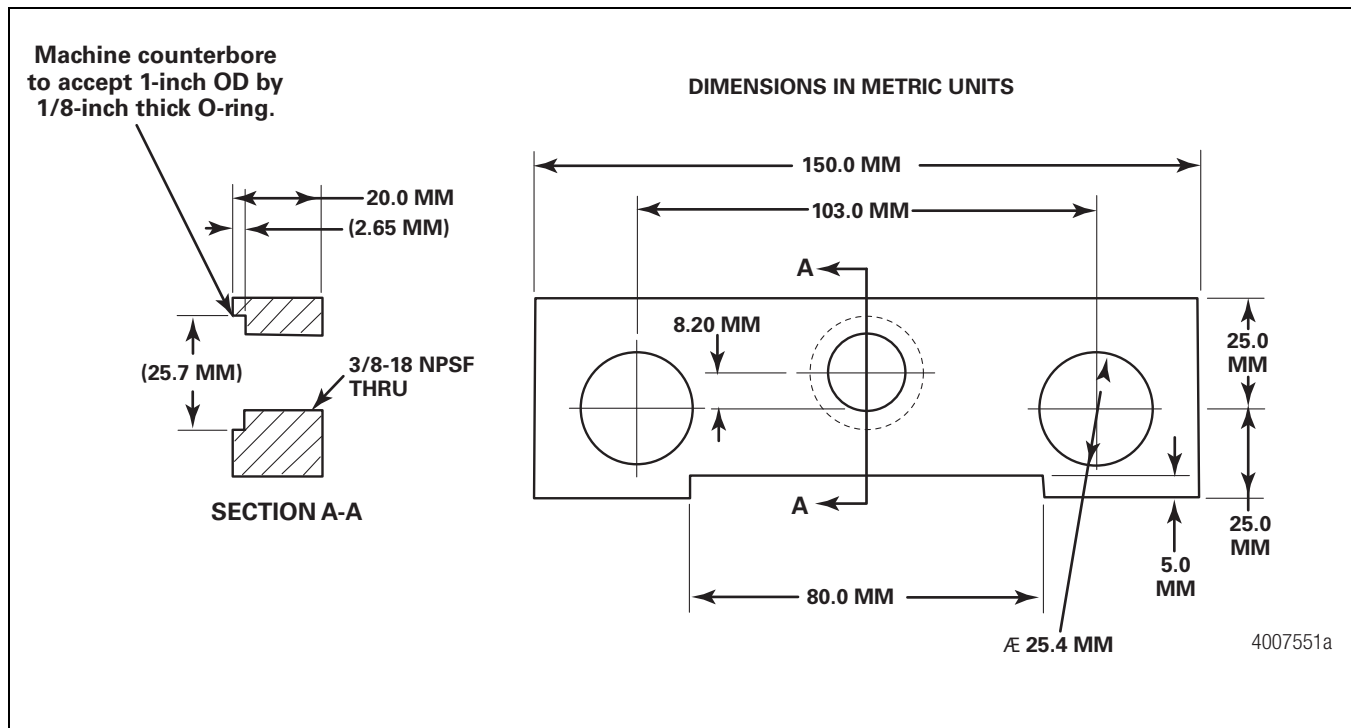


Figure 21.13

Central Tire Inflation Seal Protection Sleeve — Tandem Drive Axle

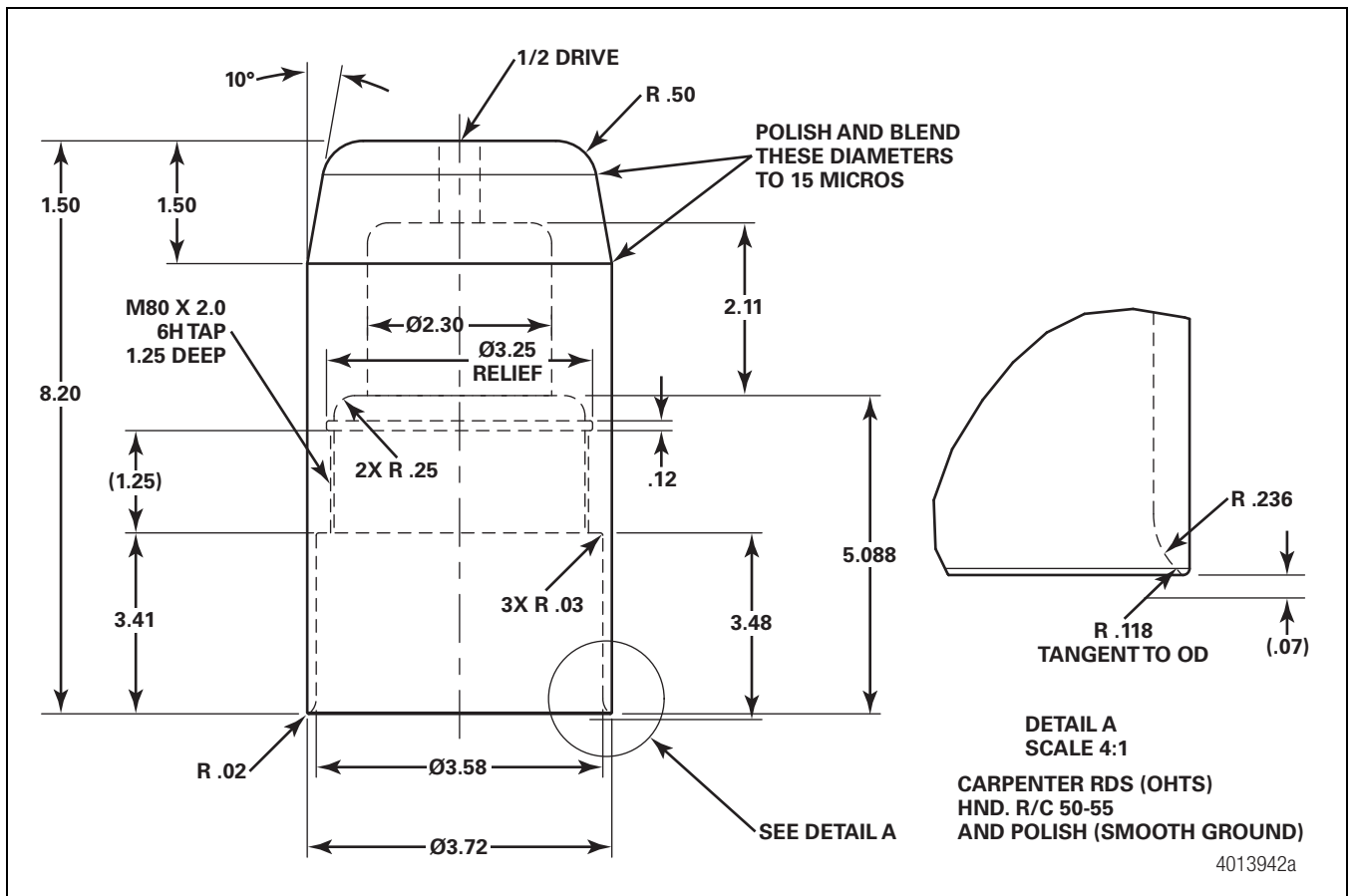


Figure 21.14

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