Planetary Axle Wheel Ends
Extrémités de pont à
double réduction

Maintenance Manual 9B
Manuel de maintenance 9B

Models 202-N and 203-W2M Series
Modèles 202-N et 203-W2M Series
WARNING
A warning indicates procedures that must be followed exactly. Serious personal injury can occur if the procedure is not followed.

CAUTION
A caution indicates procedures that must be followed exactly. If the procedure is not followed, damage to equipment or components can occur. Serious personal injury can also occur in addition to damaged or malfunctioning equipment or components.

TORQUE
The torque symbol is used to indicate fasteners that must be tightened to a specific torque value.

NOTE:
A note indicates an operation, procedure or instruction that is important for correct service. A note can also give information that will make service quicker and easier.
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Wheel End Assembly: 202N/203-W2M Series
WET DISC PARKING BRAKE ASSEMBLY: AXLE SHAFT SPEED

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**Section 1
Introduction**

**Description: Planetary Axles**

AxleTech 202-N and 203-W2M Series Planetary Axles incorporate a single reduction carrier with hypoid gearing mounted in the axle center. The final reduction is of planetary design spur gearing built into the wheel hubs.

There are four basic types of housings: modular cast, integral cast, stamped and pot or split carrier.

AxleTech Planetary Axles permit the hypoid gearing of the carrier and the axle shafts to carry only a nominal torsional load while, at the same time, providing the highest practical numerical gear reduction at the wheels.

- The Hypoid Pinion and Differential assembly of the first reduction are supported by tapered roller bearings.
- The pinion bearing preload is adjusted and maintained by a hardened precision spacer between the inner and outer bearings.

- The differential tapered bearing preload is adjusted and maintained by the positioning of the threaded adjusting rings in the carrier leg and cap bores.
- The teeth of the floating sun gear mesh with teeth of the planetary spur gears.
- The planetary gears rotate on planetary shafts which are mounted on a spider. The planetary gear teeth in turn mesh with teeth of the floating ring gear.
- Power is transmitted by the hypoid gear set in the carrier to the axle shafts and the sun gear of the final reduction, through the revolving planetary gears, and into the planetary spider which drives the wheel hub.

**Description: W2M Parking Brake**

AxleTech W2M wet disc brakes described in this maintenance manual are mechanically actuated and hydraulically released. The W2M Wet Disc Brake is designed to function as a parking brake.
Section 1
Introduction

Identification

The exact axle model specification is shown on the identification tag located on the axle. Figure 2.

Figure 2
Example:

\[
\begin{array}{c|c|c}
\text{PRTC} & 203 & \text{W2M 208} \\
\hline
\text{Last Digit - Carrier} & \text{Brake Designations:} \\
\text{Designation for Base} & \text{N = None} \\
\text{Model Number} & \text{W2M = 9 In. Shaft Speed Wet Disc Brake} \\
\text{First Two Digits Wheel} & \text{Spring Actuation} \\
\text{End Designation (Basic} & \text{Model Number)} \\
\text{Housing Type Designation} \\
\text{M = Modular Cast} \\
\text{C = Integral Cast} \\
\text{S = Stamped} \\
\text{A = Pot or Split Carrier} \\
\text{Only If Applicable:} \\
\text{T = Transmission on Carrier} \\
\text{O = Oscillating or Pin Mount} \\
\text{L = Mounting Other Than Pad with Drilling} \\
\text{R = Rigid} \\
\text{S = Steering} \\
\end{array}
\]

Identification

The exact axle model specification is shown on the identification tag located on the axle. Figure 2.
Section 2
Disassembly

Disassemble Planetary Wheel End

**WARNING**
To prevent serious eye injury, always wear safe eye protection when doing maintenance or service.

**NOTE:**
• Numbers in parenthesis ( ) with letter “A” refer to exploded view A, Wheel End 202/203 Series.
• Numbers in parenthesis ( ) with letter “B” refer to exploded view B, Wet Disc Parking Brake Assembly, Axle Shaft Speed.

**NOTE:**
Unless service is planned for the brake, it will not be necessary to remove the tire and rim from the planetary wheel end to service the planetary gearing.

**WARNING**
Support the vehicle with safety stands. Do not work under a vehicle only supported by jacks. Jacks can slip or fall over and cause serious personal injury.

1. Make sure the vehicle is on level surface.
2. Put blocks under the wheels not being serviced to keep the vehicle from moving.
3. Raise the vehicle so that the wheels to be serviced are off the ground. Support the vehicle with safety stands.
4. Remove the wheel nuts or rim lug nuts. Remove the tire and rim.
5. Position the hub assembly so that the magnetic oil drain plug (1A) in the planetary spider (2A) is at the bottom.
6. Apply 250 psi (17.24 bar) minimum hydraulic pressure into brake inlet port to disengage brake.
7. Remove the magnetic drain plugs (1A, 14B) from the planetary spider and brake housing. Drain the lubricant.
8. Match mark both the spider and wheel hub for identification of correct alignment during reassembly. Figure 3.
9. Insert mounting bolts into three tap puller holes.
10. Remove the planetary spider mounting capscrews (4A) and washers (5A).
11. Remove the planetary spider assembly.
12. Remove the snap ring (10A) and thrust washer (9A) from the ends of the planetary shafts (7A). Remove the planetary pinion (8A).
13. Remove the planetary setscrew (6A) from each shaft. Press each planetary shaft out of the spider toward the inner face.
14. Remove the outer axle shaft (25A), snap ring (15A), planetary sun gear (11A) and sun gear thrust washer (12A). Remove the snap ring from the axle shaft to remove the sun gear from the shaft.
Section 2
Disassembly

15. Remove the wheel bearing adjusting nut lock plate screws (13aA) and lock plate (13bA). Remove the adjusting nut (13A). Figure 4.

CAUTION
Support the wheel hub while removing the planetary ring gear and hub assembly. If the hub is allowed to tilt, the wheel hub seal may be damaged.

16. Support the wheel hub (18A) and remove the planetary ring gear assembly (14A).

17. Remove the outer wheel bearing cone (16A) from the ring gear hub.

18. Remove the wheel hub, wheel hub oil seal (21A) and the inner (20A) and outer (16A) bearing cones.

19. If worn or damaged, remove and discard the wheel bearing cups (17A, 19A).

Remove Spindle and Parking Brake Assembly

NOTE:
- Axles built BEFORE August 1989 have only ten equally spaced cap screws at the spindle flange. All ten cap screws pass through the brake housing to engage the axle housing.
- Axles built AFTER August 1989 have 12 cap screws at the spindle flange. Ten of these cap screws are equally spaced and pass through the brake housing to engage the axle housing. Two of the cap screws are not equally spaced and engage the brake housing.
- The W2M parking brake housing and spindle are disassembled together.
- The parking brake does not use a forced cooling system.

Axle with 10 Capscrews at Spindle Flange

1. Remove the spindle and brake housing mounting cap screws (27A) and washers (28A).

2. Remove the spindle.

3. Remove the friction (2B) and stationary (3B) brake discs.

4. Release the pressure in the brake.

5. Remove the axle shaft coupling (1B).

6. Remove the brake housing and piston assembly from the axle housing.

7. PROCEED TO “DISASSEMBLE PARKING BRAKE HOUSING AND PISTON” INSTRUCTIONS ON PAGE 6.
Section 2
Disassembly

Axle with 12 Capscrews at Spindle Flange

**WARNING**
When all 12 capscrews are removed, the spindle and brake assembly can separate and fall from the planetary axle housing. Use the following procedure to support the brake housing assembly and to avoid damage components and serious personal injury.

1. Remove two capscrews opposite each other. Insert 2 studs approximately 6 inches (152.4 mm) in length with 0.56-12 threads on one end through the spindle and brake housing. The studs engage with the axle housing to provide support for the brake housing assembly after the spindle is removed.

**WARNING**
Removal of the ten (10) capscrews allow the spindle and brake assembly to separate. It can fall from the planetary axle housing and cause damage to components and serious personal injury.

2. Remove the 10 equally spaced spindle mounting capscrews (27A) and washers (28A).

3. Remove the spindle (22A) and brake housing assembly (7B) from the axle housing. Set the spindle and brake housing assembly on bench with spindle facing up.

**WARNING**
Cage or compress the internal brake springs. Failure to cage or compress the internal brake springs can cause sudden separation of the spindle and brake housing. Follow the proper removal and disassembly procedures to avoid serious personal injury.

4. Cage or compress the internal springs. Apply 250 psi (17.24 bar) hydraulic pressure to the brake inlet to compress the springs.

5. Remove the 2 studs that hold the spindle to the brake housing; then remove the spindle.

6. Remove the friction (2B) and stationary (3B) discs. Release the pressure on the brake piston.

7. If the axle shaft coupling (1B) came off with the brake and spindle assembly, remove it. If the axle shaft coupling is still attached to the inner axle shaft, remove it.

8. PROCEED TO “DISASSEMBLE PARKING BRAKE HOUSING AND PISTON” INSTRUCTIONS.

Disassemble Parking Brake Housing and Piston

**WARNING**
Observe all WARNINGS and CAUTIONS provided by the press manufacturer concerning press operation to avoid serious personal injury and possible damage to components.

1. Position the brake housing and piston assembly in a press with the internal splined end facing up. With a pair of blocks, press the spring retainer (5B) downward to compress the springs to release force on the lock ring (4B).

2. Remove the lock ring (4B). Release the pressure. Remove the brake housing and piston from the press. Figure 5.

3. Remove the spring retainer (5B).

4. Remove springs. Figure 6.
Section 2
Disassembly

5. Turn the brake housing over with the internal splined end downward. Remove the piston (13B).

6. Remove the inner and outer piston quad rings (10B and 11B) from the backup rings (9B and 12B) from the piston and brake housing.

Remove Inner Shaft, Seal and Bushing

1. Remove the inner axle shaft (26A).

2. Remove the axle shaft oil seal from the end of the axle housing.

3. If worn or damaged, remove and discard the axle shaft support bushing from the axle housing.
Section 3
Prepare Parts for Assembly

Clean Ground and Polished Parts

WARNING
To prevent serious eye injury, always wear safe eye protection when doing maintenance or service.

WARNING
If you use cleaning solvents, hot solution tanks or alkaline solutions incorrectly, serious personal injury can occur. To prevent serious personal injury, follow the instructions supplied by the manufacturer of these products. Do NOT use gasoline to clean parts. Gasoline can explode and cause serious personal injury.

CAUTION
Use only solvent cleaners to clean ground or polished metal parts. Hot solution tanks or water and alkaline solutions will damage these parts. Isopropyl alcohol, kerosene or diesel fuel can be used for this purpose.

If required, use a sharp knife to remove gasket material from parts. Be careful not to damage the ground or polished surfaces.

Clean Parts with Rough Finish

NOTE:
Do not clean friction discs. Wipe off each disc with a clean rag before applying brake cooling fluid to their surfaces during assembly.

• Parts with a rough finish can be cleaned with cleaning solvent or in a hot solution tank with a weak alkaline solution. DO NOT USE GASOLINE.

• Parts must remain in hot solution tanks until completely cleaned and heated.

• Remove parts from the hot solution and wash them with water until the hot solution is removed.

Clean Wet Disc Brake and Axle Assembly

• Use steam to clean the wet disc brake and axle assembly on the outside to remove dirt.

• Before the assembly is cleaned, close or put a cover over all openings. Breathers or vents in the axle assembly are some examples of openings.

Dry Cleaned Parts

• Dry the parts immediately after the parts are cleaned and washed.

• Dry the parts with soft, clean paper or rags.

CAUTION
The bearing cones can be damaged if the cones are dried by rotating with compressed air.

• The parts, except the bearing cones, can be dried with compressed air.

Prevent Corrosion and Rust on Cleaned Parts

• Apply the fluid used in the brake housing to the cleaned and dried parts that are not damaged and are to be assembled. See Section 6, Specifications.

• Apply a special material that prevents corrosion and rust to all surfaces. Put the parts in a special paper that prevents corrosion and rust.

Inspect Parts

It is very important to inspect all parts carefully and completely before the axle and brake are assembled. Check all parts for wear and stress. Replace all damaged parts. Replacement of the damaged parts before assembly can prevent complete failure of the assembly later.

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

A. The center of the large diameter end of the rollers is worn level with or below the outer surface.
Section 3
Prepare Parts for Assembly

B. The radius at the large diameter end of the rollers is worn to a sharp edge. Figure 7.

C. A visible roller groove is worn in the inner race surfaces of the cup or cone. The groove can be seen at the small or large diameter end of both parts. Figure 8.

D. Deep cracks or breaks appear in the surfaces of the cup, cone inner race or rollers. Figure 8.

E. Bright wear marks appear on the outer surface of the roller cage. Figure 9.

F. The rollers and surfaces of the cup and cone inner race that touch the rollers are damaged. Figure 10.
Section 3
Prepare Parts For Assembly

G. The cup and cone inner race surfaces that touch the roller are damaged. Figure 11.

Figure 11

2. Inspect the gears for wear or damage. Replace worn or damaged gears.

3. Inspect the housing:
   A. Remove all dirt from the housing and oil lubrication passages, troughs, slots and holes.
   B. Inspect machined surfaces for cracks and damage. Repair or replace damaged parts.

4. Inspect all shafts and flange/yokes for wear, stress and cracks at the splines, shaft and yoke ears. Replace shafts and flange/yokes that are worn or cracked.
   A. Make sure oil passages in the output shaft are clean and free of debris.

5. Inspect Brake Discs
   A. Inspect each disc for wear beyond wear limits.

Disc Wear Limits:

9 inch (229 mm) Friction Disc (Part number 3281-M-1001): Replace friction disc if overall thickness is less than 0.1225 inch (3.11 mm) or there is a noticeable decrease in brake performance.

9 inch (229 mm) Stationary Disc (Part number 3281-N-1002): Replace stationary disc if overall thickness is less than 0.098 inch (2.48 mm) or there is a noticeable decrease in brake performance.

6. Inspect Seals
   A. Inspect the rubber elements and metal rings for wear, damage or distortion.
   B. If there is a problem with either ring, replace both rings with a matched pair of rings. A matched pair is either two new rings or two used rings that have been run together. Do NOT use one new ring and one used ring or two used rings that were not run together. Leaks can occur.

Repair or Replace Parts

1. Replace worn or damaged parts of the wet disc brake assembly.

2. Replace discs that are worn beyond wear limits.

3. Replace any fasteners if the corners of the head are worn.

4. Replace washers if damaged.

5. Replace oil seals, face seals and gaskets when components are separated from each other. Clean parts before applying silicone gasket material.

6. Remove small damage from parts that have machined or ground surfaces. Use a fine-tooth file, India stone, emery cloth or crocus cloth for this purpose.

7. Clean and repair the threads of fasteners and the holes they use with a tap or a die of the correct size or a fine-tooth file.

CAUTION
The threads must be clean and not damaged so that accurate adjustments and correct torque values can be applied to fasteners and parts.

8. Tighten all fasteners to the correct torque value. See Section 6, Torque Chart.
Section 3
Prepare Parts For Assembly

Silicone (RTV) Gasket Material Application

**WARNING**
Some acid vapor is present when silicone gasket material is applied. To prevent serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

Silicone (RTV) gasket material is used between the following mounting surfaces:

- Axle housing and cover
- Spindle and cover
- Brake housing and cover
- Wheel hub and planetary spider assembly
- Planetary spider assembly and cover

**NOTE:**
The following silicone gasket products or their equivalent can be used on AxleTech components:

A. Dow Corning Silicone Rubber Sealant, No. 732 Black.
B. General Electric, No. RTV-1473 Black.
C. AxleTech:
   - Part No. 1199-Q-2981, 40 lb. containers
   - Part No. 1250-X-388, 10 oz. tubes
   - Part No. 1199-T-3842, 3 oz. tubes

1. Remove all old gasket material from both surfaces.
2. Clean the surfaces where the silicone gasket material will be applied. Remove all oil, grease, dirt and moisture.
3. Dry both surfaces.

4. Apply a 0.125 inch (3.18 mm) diameter continuous bead of silicone gasket material around one surface. Also apply the gasket material around the edge of all the fastener holes on that surface. **Figure 12.**

5. Assemble the components immediately to permit the gasket material to compress evenly between the parts. Tighten the fasteners to the required torque value for that size fastener. See the Torque Chart on page 18. There is no special procedure or additional torque required.
6. Wait 20 minutes before filling the assembly with lubricant.
Section 4
Assembly

**WARNING**
To prevent serious eye injury, always wear safe eye protection when doing maintenance or service.

Assemble Axle Housing and Shaft

1. Press in the new axle shaft support bushing if the original was removed.

2. Carefully press in the axle shaft oil seal until it bottoms completely in the seal bore. DO NOT CRUSH THE OIL SEAL.

**NOTE:**
The seal spring should face the axle differential carrier assembly.

3. Apply a light film of multi-purpose grease to the seal lips and to the inner axle shaft seal journal. Install the axle shaft to engage the carrier side gear.

Assemble Parking Brake Housing and Piston

1. Install the inner piston quad ring (10B) and backup ring (9B) in the piston groove. Install the backup ring on the side of the quad ring furthest away from the pressure side. Apply a light film of multi-purpose grease to hold the backup ring in the groove. Make sure the quad ring is not twisted in the groove.

2. Install the outer piston quad ring (11B) and backup ring (12B) into the groove in the brake housing (7B). Make sure the quad ring is not twisted and the backup ring is away from the pressure side.

3. Position the brake housing on the bench with the piston cavity facing upward. Apply a coating of brake actuation hydraulic fluid to both quad rings and the seal journal and bore mating surfaces.

4. Install the piston into the brake housing. Do not damage the seal.

5. Position the brake housing and piston on the bench with the piston facing down. Install the springs (6B) in the brake housing pockets.

6. Install the spring retainer (5B) over the springs and piston nose.

**WARNING**
Observe all WARNINGS and CAUTIONS provided by the press manufacturer concerning press operation to avoid serious personal injury and possible damage to components.

7. Place the brake assembly on a press. Use two (wooden) blocks to press the spring retainer down far enough to expose the lock ring groove in the piston nose.

8. Install the lock ring (4B) and remove the assembly from the press.

Assemble Parking Brake Discs and Spindle

**NOTE:**
If you have the axle with 12 spindle mounting capscrews, proceed to Page 13.

Axle with 10 Capscrews at Spindle Flange

1. Install 2 “temporary” studs approximately 6 inches (152.4 mm) long with 0.56 - 12 threads in the opposing holes in the axle housing flange. This will mount the brake housing temporarily.

**WARNING**
Small amounts of acid vapor are present when applying silicone gasket material. To prevent possible serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

2. Apply a 0.125 inch (3.18 mm) diameter bead of liquid gasket material to the brake housing face which mates with the axle housing. Refer to page 11, “Silicone Gasket Material Application.”

3. Slide the brake piston and housing assembly onto the two temporary studs and mate the assembly with the axle housing flange.
Section 4
Assembly

4. Install the axle shaft coupling (1B) onto the inner axle shaft until the internal snap ring (1aB) bottoms on the inner shaft end face.
5. Apply 250 psi (17.25 bar) hydraulic pressure to the brake inlet port to compress the springs.
6. Apply brake cooling fluid to each surface of the discs.
7. Install a stationary disc (3B) first, then a friction disc (2B). Continue installing alternate discs until six of each have been installed. The outermost disc must be a friction disc.
8. Apply a 0.125 inch (3.18 mm) diameter bead of liquid gasket material to the spindle mounting face. 
9. Mount the spindle (22A) to the brake housing. Install capscrews (27A) and washers (28A). Remove the two temporary studs and tighten the ten capscrews to 130-165 ft-lb (176-224 Nm).
10. Release the brake inlet pressure. Springs will apply the brake.
11. GO TO “ASSEMBLE WHEEL END” PAGE 14.

Axle with 12 Capscrews at Spindle Flange

1. Position the brake housing (7B) on the bench with the internal splined end facing upward.

**WARNING**
Do not draw the spindle and brake housing together with capscrews. Cage or compress the springs with brake apply pressure. Failure to do this can cause serious personal injury.

2. Apply 250 psi (17.25 bar) hydraulic pressure to the brake inlet port to compress the springs until completely installed in housing.
3. Apply brake cooling fluid to each surface of the discs.
4. Install a stationary disc (3B) first, then a friction disc (2B). Continue installing alternate discs until six of each have been installed. The outermost disc must be a friction disc.
5. Install the axle shaft coupling with the internal snap ring (1aB) in place through the friction disc teeth. The nose end of the coupling must enter the piston bore first. Place a temporary support block under the coupling to properly position the coupling.

**WARNING**
Small amounts of acid vapor are present when applying silicone gasket material. To prevent possible serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

6. Apply a 0.125 inch (3.18 mm) diameter bead of liquid gasket material to the brake mounting flange of the brake housing.
7. Install the spindle (22A) onto the brake housing with the hole pattern aligned. Install two 2.0 inch (50.8 mm) long capscrews and washers. Tighten to 130-165 lb-ft (176-224 Nm).
8. Release the brake inlet pressure.
9. Apply a 0.125 inch (3.18 mm) diameter bead of liquid gasket material to the brake mounting flange of the axle housing.
10. Install 2 “temporary” studs approximately 6 inches (152.4 mm) long with 0.56-12 threads on the flange. This will aid in the installation of the brake and spindle assembly.
11. Make sure the axle shaft coupling (1B) is still engaged in the brake friction discs. Apply 250 psi (17.25 bar) hydraulic pressure to brake inlet port to align the brake discs. Install the spindle and brake sub-assembly onto the axle housing.
12. Insert the outer shaft through the spindle and brake sub-assembly for proper alignment.
13. Install the long spindle mounting capscrews (27A) and washers (28A). Remove outer shaft. Tighten to 130/165 lb-ft (176-224 Nm).
14. Release the brake inlet pressure. Springs will apply the brake.
15. Remove the temporary studs.
Section 4
Assembly

Assemble Wheel End

1. Install the inner and outer bearing cups (19A, 17A) and inner bearing cone (20A) in the wheel hub (18A).

2. Install the wheel hub oil seal (21A). Press the seal flush with the hub face.

3. Install the outer bearing cone (16A) on the planetary ring gear (14A).

4. Apply a light film of multi-purpose grease to the spindle seal journal and the seal I.D. Install the wheel hub onto the spindle with adequate support to prevent the hub from cocking.

5. Install the planetary ring gear and bearing assembly.

6. Install the wheel bearing adjusting nut (13A).
   a. Tighten the wheel bearing adjusting nut to 100 lb-ft (136 N•m)
   b. Rotate the wheel hub forward and backward.
   c. Rap the hub several times with a brass or plastic hammer.
   d. Re-torque the wheel bearing adjusting nut to 100 lb-ft (136 N•m).
   e. Install the lock plate (13bA) either to flat of nut or over a corner of the nut. If the nut must be moved to allow the lock plate positioning, advance the nut. Do not loosen the nut. Figure 6.

f. Install the two lock plate screws (13aA) and tighten to 35-50 lb-ft (47-68 N•m)

WARNING
Do not hit steel parts with a steel hammer. Parts can break and cause serious personal injury.

To avoid serious personal injury, be careful when using Loctite. Follow the manufacturer’s instructions for safe use to prevent irritation to eyes and skin. Wash after skin contact. If the Loctite gets in the eyes, flush the eyes with water for 15 minutes. Have eyes checked by a doctor.

NOTE:
If original lock plate screws are reused, apply several drops of Loctite #277 to the internal threads in the planetary ring gear. New lock plate screws have a pre-applied lock patch.

7. Install the outer axle shaft (25A) through the spindle bore to engage the internal spline of the shaft coupling.

8. Install the sun gear thrust washer (12A) with the tangs engaging the holes in the wheel bearing adjusting nut. Apply multi-purpose grease to the inner face of the sun gear thrust washer to help hold it in position.

9. Install the planetary sun gear (11A) onto the end of the axle shaft. Install the snap ring (15A).
17. Install the planetary spider assembly into the wheel hub. Install the planetary spider mounting cap screws (4A) and washers (5A). Tighten to 85-115 lb-ft (115-156 N·m).

18. Release the brake inlet pressure. Springs will apply the brake.

**WARNING**

Use only the type of lubricant specified by the equipment manufacturer. The wrong lubricant will damage the rubber parts of the assembly and can cause incorrect operation, damage and serious personal injury.

19. Put the specified lubrication into the brake cavity and the planetary wheel end cavity.

**NOTE:**

Although lubrication is common in the brake cavity and the planetary wheel end cavity, add more lube until it runs out of both lube level holes.

20. Install the oil level/fill plugs (15B) in the brake (15B) and planetary spider (1A). Tighten to 35 lb-ft (47 N·m) minimum.

**Section 4 Assembly**

**NOTE:**

- Current axle models incorporate nylon coated steel planetary pinion shafts.
- Debris from wear or component damage must be thoroughly flushed from the wheel end, or from the entire axle if a common lube system is used.

10. Install the planetary pinion shafts (7A) into the planetary spider (2A) from the inside face of the spider. Press the uncoated end of each planetary pinion shaft into the spider until the standoff of each planetary pinion shaft from machined spider face to the far end of the planetary pinion shaft is 1.650-1.645 inches (41.9-41.7 mm).

11. If a new planetary pinion shaft is installed, carefully drill a 3.125 inch (7.93 mm) diameter hole 0.25 inch (6.35 mm) into the planetary pinion shaft. The drill must pass through the 3/8-16 tapped hole in the spider boss.

12. Install a planetary pinion shaft setscrew (6A) into each planetary pinion shaft. Tighten to 35 lb-ft (47 N·m).

13. Apply specified lubricant to the bore of the planetary pinions (8A) and the planetary shaft journals. Install the planetary pinions on the planetary pinion shafts.

**NOTE:**

If the original planetary gears are reused, make sure the gear bore is smooth and free of any surface damage.

14. Install the planetary pinion thrust washer (9A). Install a snap ring (10A) on each planetary shaft.

15. Apply 250 psi (17.25 bar) hydraulic pressure to the brake inlet port to compress the springs.

**WARNING**

Small amounts of acid vapor are present when applying silicone gasket material. To prevent possible serious personal injury, make sure there is good ventilation in the work area. If the silicone gasket material gets in your eyes, flush your eyes with water for 15 minutes. Have your eyes checked by a doctor.

16. Apply a 0.125 inch (3.18 mm) diameter bead of liquid gasket material to the mounting face of the planetary spider.
Section 4
Assembly

Bleed Brakes

⚠️ WARNING
When you loosen any brake system hydraulic connection, you must bleed the brakes to remove all air from the system. Failure to bleed the brakes will allow air to remain in the brake system. This can prevent the hydraulic pressure in the brake system from rising enough to release the brakes properly. This can cause the brakes to drag resulting in premature wear and overheating of the brake cooling oil. Excessive wear and overheating can cause a decrease in brake performance and serious personal injury.

NOTE:
Always start at the point in the system that is furthest from the master cylinder and work back toward the master cylinder.

1. Make sure that the master cylinder is filled to the specified level with the type of hydraulic fluid specified by the equipment manufacturer. Keep the master cylinder filled during bleeding so that you do not pull air into the system through the master cylinder. Make sure the master cylinder is filled when you are done bleeding the system.

2. Put a clear tube on the bleeder screw. Submerge the other end of the tube in a clear container of the specified fluid.

3. To Release Brake:
   (a). For full hydraulic systems:
   Slowly apply low hydraulic pressure to the brake. Loosen the bleeder screw. Continue to apply pressure until no air bubbles appear in the container of fluid. Tighten the bleeder screw 15-20 lb-ft (20-27 Nm), then release the pressure to the brake.

   (b). For air/hydraulic or mechanical actuator systems:
   Apply the brake pedal, then loosen the bleeder screw. Tighten the bleeder screw 15-20 lb-ft (20-27 Nm) before you release the brake pedal so that air is not pulled back into the system. Repeat this procedure until no air bubbles appear in the container of fluid when you apply the brake pedal.

4. Check for fluid leaks.
Parking Brake Release Procedure for Towing

When the vehicle hydraulic system cannot release the parking brakes, the following procedure can be used to release the brakes to allow the vehicle to be towed to a service area.

**WARNING**

- The following procedure is used only to release the brakes so the vehicle can be towed to a service area. Do not operate the vehicle after the brakes have been disconnected. This can cause serious personal injury.
- Block the wheels of the vehicle to be towed and connect and apply the brakes of the towing vehicle. Failure to do so can cause the disabled vehicle to roll and cause serious personal injury.

1. Connect the towing vehicle to the disabled vehicle. Apply the brakes of the towing vehicle. Block the wheels of the disabled vehicle.

2. Connect a portable pressure unit and apply 250-300 psi (17.24-20.7 bar) of hydraulic pressure to release the parking brakes of the disabled vehicle.

**WARNING**

Before the towing vehicle is disconnected from the disabled vehicle, block the wheels of the disabled vehicle. Failure to do so can cause the disabled vehicle to roll and cause serious personal injury.

3. After the disabled vehicle has been towed to the service area, block the wheels of the disabled vehicle. Apply the brakes of the towing vehicle.

4. Release the hydraulic pressure provided by the portable pressure unit to apply the parking brakes of the disabled vehicle. Disconnect the portable pressure unit.

5. Disconnect the towing vehicle from the disabled vehicle.
Section 6
Specifications

Torque Chart

<table>
<thead>
<tr>
<th>Component</th>
<th>Torque Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusting nut lock plate screws</td>
<td>35-50 lb-ft (47-68 N•m)</td>
</tr>
<tr>
<td>Bleeder screws</td>
<td>15-20 lb-ft (20-27 N•m)</td>
</tr>
<tr>
<td>Oil level/fill/drain plugs</td>
<td>35 lb-ft (47 N•m)</td>
</tr>
<tr>
<td>Planetary shaft setscrew</td>
<td>35 lb-ft (47 N•m)</td>
</tr>
<tr>
<td>Planetary spider mounting capscrews</td>
<td>85-115 lb-ft (115-156 N•m)</td>
</tr>
<tr>
<td>Spindle capscrews</td>
<td>130-165 lb-ft (176-224 N•m)</td>
</tr>
<tr>
<td>Wheel bearing adjusting nut</td>
<td>100 lb-ft (136 N•m)</td>
</tr>
</tbody>
</table>

Oil Capacities

- Planetary wheel end: 3.5 pints (1.65 liters)
- W2M parking brake: 1.5 pints (0.71 liters)
- Differential carrier & gear box assembly: 23.0 pints* (10.81 liters*)

* Approximately. Depends on axle housing length. Fill until lubricant runs out of fill hole

Wheel End and Parking Brake (W2M) Oil Change Intervals and Specifications

<table>
<thead>
<tr>
<th>High-Horsepower Operation Intervals</th>
<th>AxleTech Specification</th>
<th>Outside Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Level</td>
<td>Oil Change Specification</td>
<td>F°</td>
</tr>
<tr>
<td>Initial</td>
<td>A.P.I. -CD, -CE, -CF</td>
<td>10</td>
</tr>
<tr>
<td>500 hrs or once a year</td>
<td>SAE 30 or Equivalent</td>
<td>15</td>
</tr>
</tbody>
</table>

NOTES:
1. Multi-Weight engine oils are acceptable if the SAE rating ends in a 40.
2. Multi-Weight engine oils are acceptable if the SAE rating ends in a 30.