

Removal and installation of electric motor

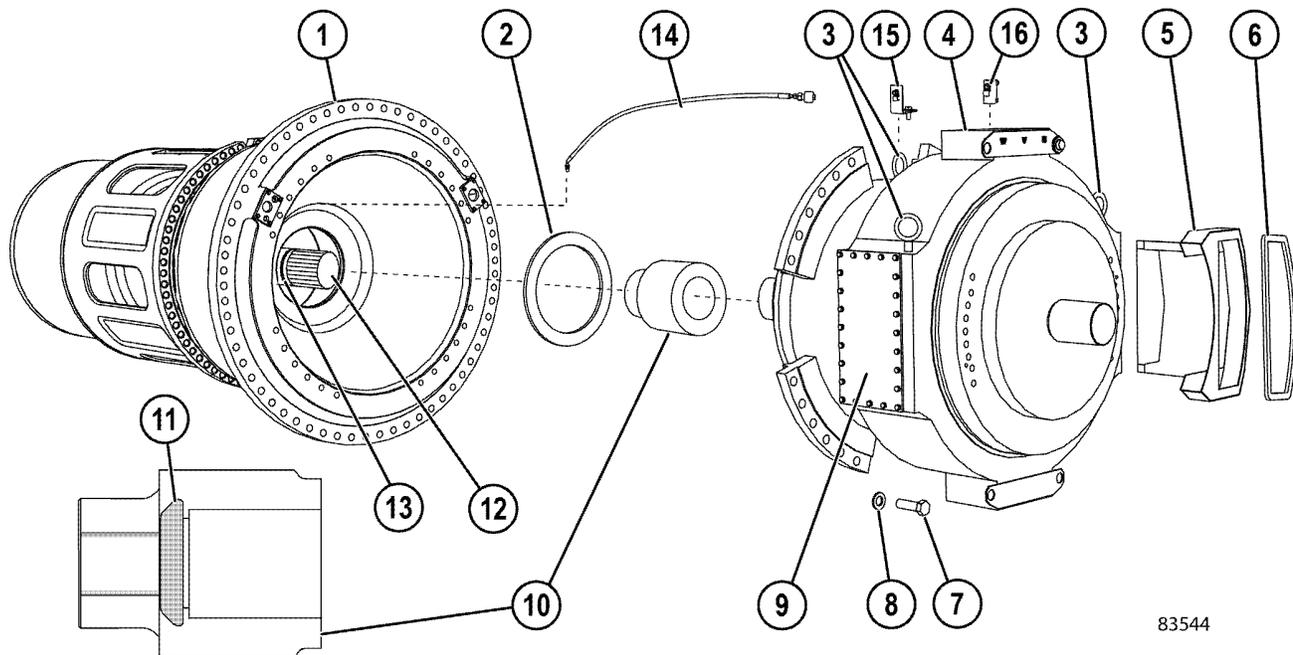
Removal

1. Attach three appropriate lifting device to the three lifting eyes (3, Figure 50-29) on the electric motor. The weight of the electric motor is approximately 4 356 kg (9,603 lb). Attach the lifting slings to a hoist. Lift the hoist enough to put tension on the lifting slings.
2. Remove 24 cap screws (7) and flat washers (8) that secure electric motor (4) to the wheel motor transmission.
3. Lift the motor from the transmission and set aside.
4. Remove seal (2) from the electric motor.

Installation

1. Install new seal (2, Figure 50-29) and install onto transmission (1).
2. Apply a thin layer of ENS grease (4271211871) to the mating splines on the electric motor shaft, the transmission shaft splines (12) and the grease seal (13) on the transmission shaft.

3. Add 620 ml (2 oz) of ENS grease to grease cavity (11) inside adapter (10).
4. Install brackets (15) and (16) to the motor. Install hose (14) with fittings and filter to transmission.
5. Transmission (1) must be positioned so the top of the unit is on top. Attach appropriate lifting device to three lifting eyes (3) on the electric motor. The weight of the electric motor is approximately 4 356 kg (9,603 lb). Attach the lifting slings to a hoist. Lift the motor into position on the wheel motor transmission. The electric motor shaft may have to be turned slightly to line up the drive splines.
6. Install 24 cap screws (7) and the flat washers that secure electric motor (4) to the transmission. Tighten the cap screws to **1 600 ± 160 N·m (1,180 ± 118 ft lb)**. Attach hose (14) to brackets (15) & (16).
7. Ductwork (5) must be installed so it will line up with the ductwork inside the axle housing. Cover (9) and ductwork (5) are interchangeable, so ductwork can be installed on either side of the electric motor. Use sealant (VS7492) when installing the ductwork to the motor. Install gasket (6) to ductwork (5).



83544

FIGURE 50-29. WHEEL MOTOR ASSEMBLY

- | | | | |
|-------------------|----------------|------------------------|-------------|
| 1. Transmission | 5. Ductwork | 9. Cover | 13. Seal |
| 2. Seal | 6. Gasket | 10. Adapter | 14. Hose |
| 3. Lifting Eyes | 7. Cap Screw | 11. Grease Cavity | 15. Bracket |
| 4. Electric Motor | 8. Flat Washer | 12. Transmission Shaft | 16. Bracket |

Disassembly and assembly of wheel motor transmission



Wheel motor component weights are listed throughout this instruction. Verify that all lifting apparatus such as lift eyes and lifting straps are properly rated for the component weight. Using lifting components that are not rated for the intended load may result in serious personal injury and component damage.



Use caution when lifting components. DO NOT damage the machined surfaces of the wheel motor during handling.

Disassembly

1. Remove the electric motor from the wheel motor assembly. Refer to CEN50011, Removal And Installation of Electric Motor, for instructions.

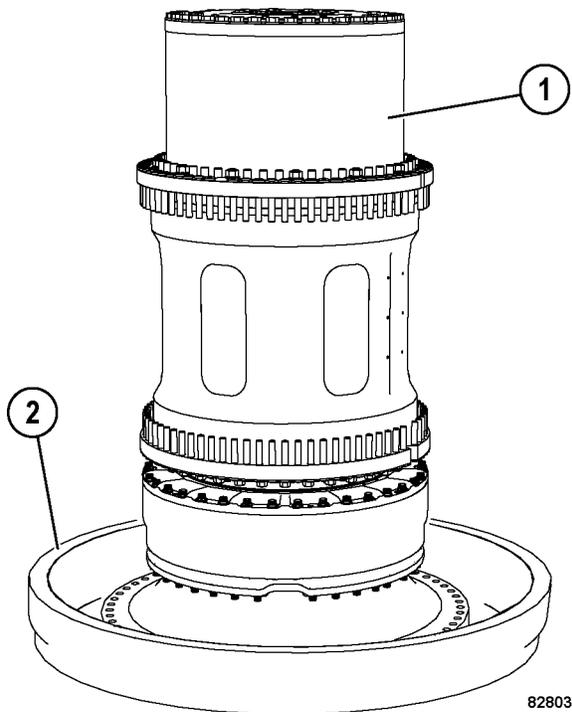


FIGURE 50-30.

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|-----------------------------|------------|
| 1. Wheel Motor Transmission | 2. Oil Pan |
|-----------------------------|------------|

2. Lift the wheel motor transmission and stand the assembly vertically in an oil pan as shown in Figure 50-30. The weight of the assembly is approximately 13 000 kg (28,660 lb).
3. If the wheel motor is being disassembled for a transmission problem, remove cap screws (4, Figure 50-31) and the washers that secure inspection cover (5). Inspect the magnets from below the cover, remove and clean.

Remove the O-ring for the cover.

4. Remove 20 cap screws (2) and the washers that secure cover (1) to the assembly.
5. Install three pusher screws (M16 x 2.00) into the tapped holes in the cover. Tighten the screws to separate the cover from the assembly.

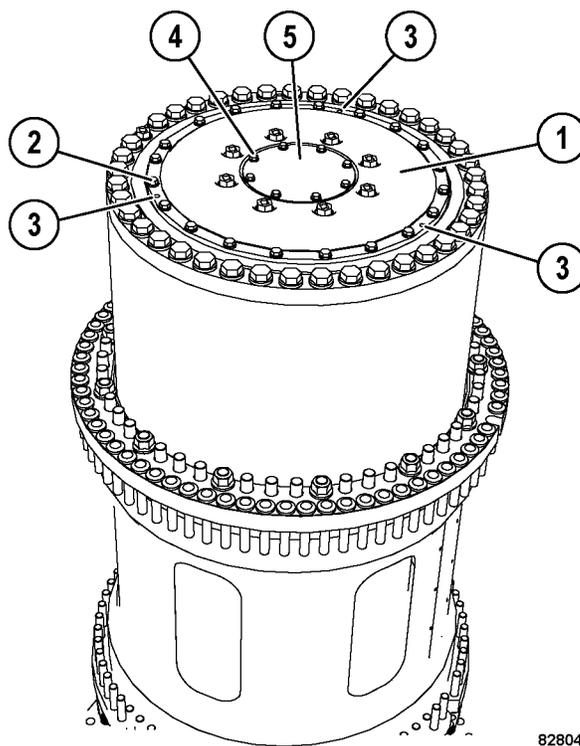
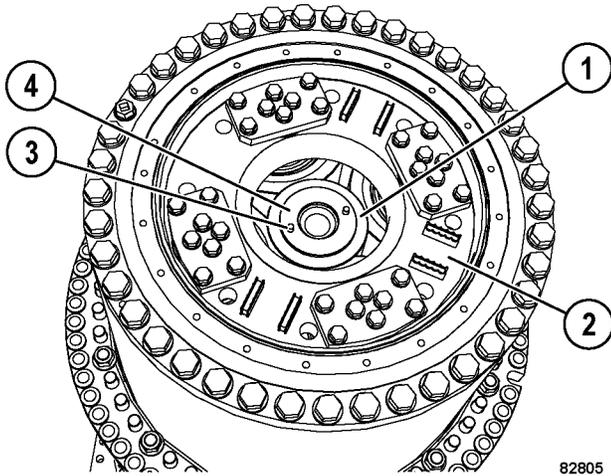


FIGURE 50-31.

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|-----------------|---------------------|
| 1. Cover | 4. Cap Screw |
| 2. Cap Screws | 5. Inspection Cover |
| 3. Tapped Holes | |

6. Remove the pusher screws and install three lift eye into the cover. Attach lifting chains and a hoist to the lift eyes. Lift the cover from the assembly. The weight of the cover is approximately 123 kg (271 lb).
7. Remove the O-ring seal that seals the cover to the assembly.

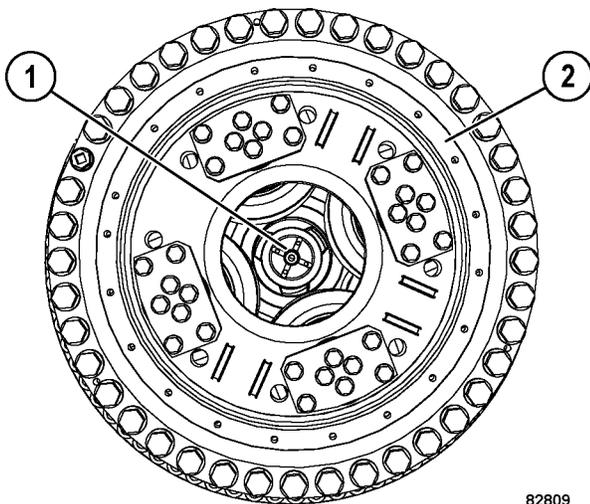


82805

FIGURE 50-32.

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|-----------------------|--------------|
| 1. Low Speed Sun Gear | 3. Dowel Pin |
| 2. Low Speed Carrier | 4. Spacer |

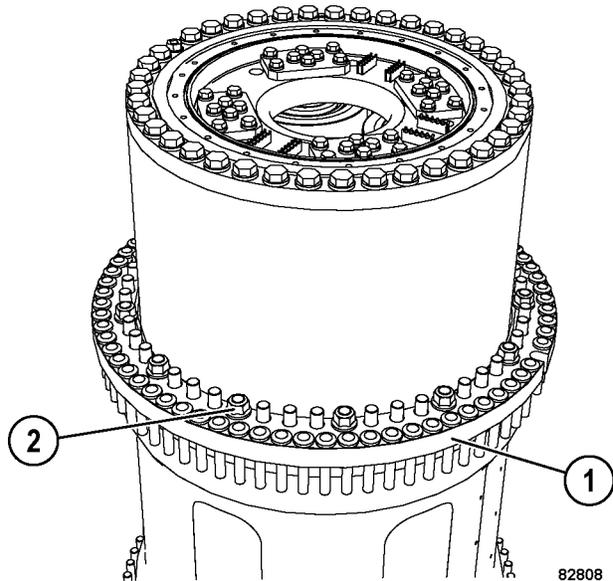
8. Remove spacer (4, Figure 50-32) and two dowel pins (3) from the cover.
9. Attach two lift eyes (M12 x 1.75) to low speed sun gear (1). Attach lifting straps and a hoist to the lift eyes. Lift the sun gear from the assembly. The weight of the sun gear is approximately 100 kg (221 lb).
10. Remove button (1, Figure 50-33).
11. Remove 13 nuts (2, Figure 50-34) that secure adapter ring (1), if installed. Attach lifting brackets to the adapter ring studs at three evenly spaced locations. Attach lifting chains and a hoist to the lifting brackets. Lift the adapter ring from the assembly. The adapter ring weighs approximately 318 kg (701 lb).



82809

FIGURE 50-33.

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|-----------|----------------------|
| 1. Button | 2. Low Speed Carrier |
|-----------|----------------------|



82808

FIGURE 50-34.

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|-----------------|--------|
| 1. Adapter Ring | 2. Nut |
|-----------------|--------|

12. Remove 40 cap screws (3, Figure 50-35) and the washers that secure low speed carrier (4) to torque tube (1).
13. Install three lift eyes (M16 x 2.00) in the tapped holes in the low speed carrier. Attach lifting chains and a hoist to the lift eyes. Lift the carrier from the assembly. The weight of the low speed carrier is approximately 1400 kg (3086 lb).
14. Remove 12 countersunk cap screws (2) that secure torque tube (1) to the hub.
15. Attach three lift eyes (M30 x 3.00), lifting chains and a hoist to the carrier. Lift the torque tube from the assembly. The torque tube weighs approximately 490 kg (1080 lb).
16. Remove the O-ring from the bottom of the torque tube.
17. Attach three lifting straps to high speed carrier (2). Loop the straps through the holes in the carrier as shown in Figure 50-36. Attach a hoist to the lifting straps. Lift the carrier from the assembly. The weight of the high speed carrier is approximately 535 kg (1179 lb).
18. Install an eye bolt (M20 x 2.50) into sun gear shaft (4, Figure 50-37). Attach a lifting chain and a hoist to the eye bolt. Lift the shaft from the assembly. The weight of the shaft is approximately 170 kg (375 lb).

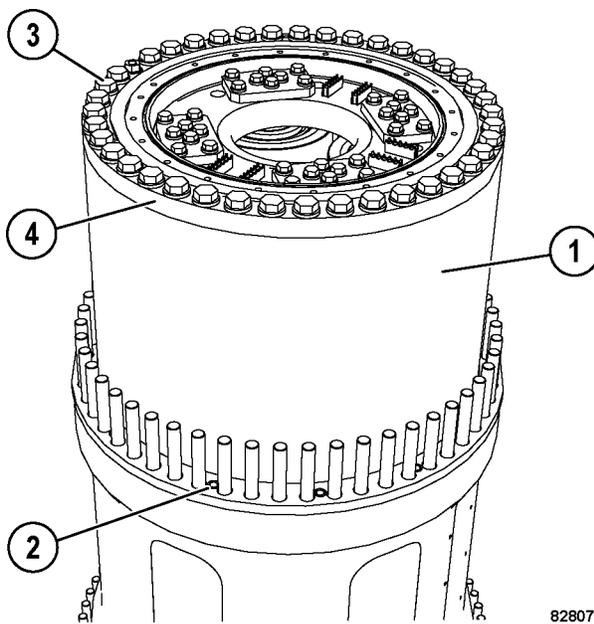
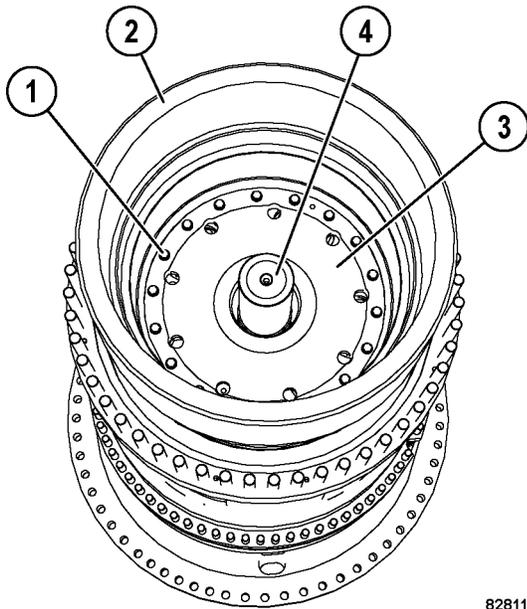


FIGURE 50-35.

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|----------------|----------------------|
| 1. Torque Tube | 3. Cap Screw |
| 2. Cap Screw | 4. Low Speed Carrier |



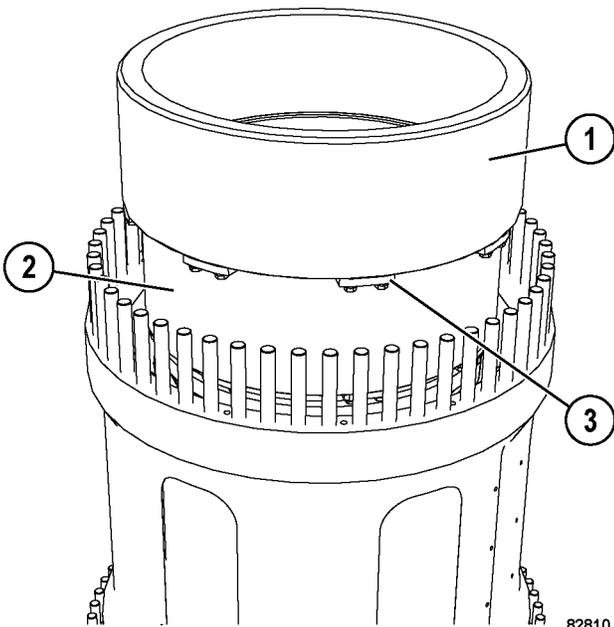
FIGURE 50-36.



82811

FIGURE 50-37.

- 1. Cap Screw
- 2. Low Speed Ring Gear
- 3. Hub
- 4. Sun Gear Shaft

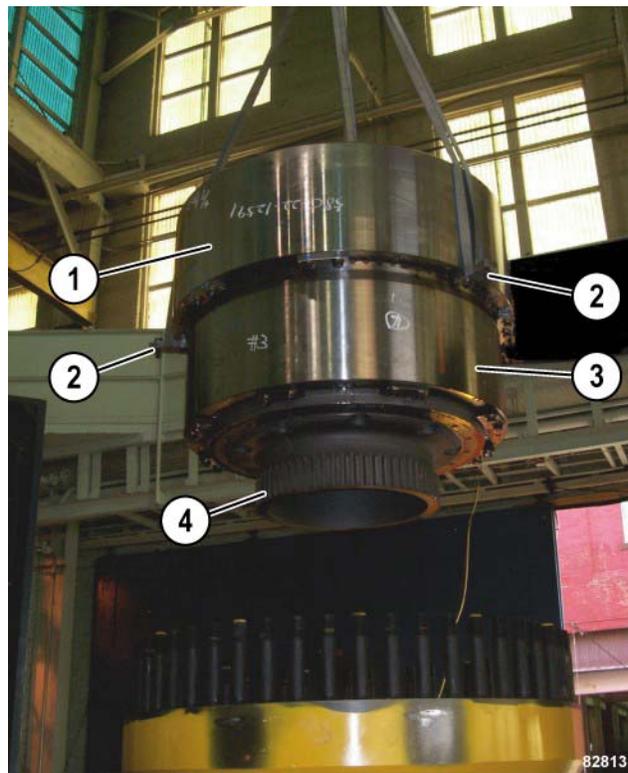


82810

FIGURE 50-38.

- 1. Low Speed Ring Gear
- 2. High Speed Ring Gear
- 3. Keeper Plate

19. Remove eighteen cap screws (1) and the washers that secure hub (3) to the assembly.
20. Remove three evenly spaced keeper plates (3, Figure 50-38) from the bottom face of low speed ring gear (1) and attach lifting brackets. Attach lifting chains and a hoist to the lifting brackets. Lift both ring gears and the hub from the spindle as an assembly. The weight of the ring gears and hub is approximately 895 kg (1973 lb).



82813

FIGURE 50-39.

- 1. Low Speed Ring Gear
- 2. Lifting Bracket
- 3. High Speed Ring Gear
- 4. Hub

21. Attach an eye bolt (M16 x 2.00) to each spacer (1, Figure 50-40). Attach lifting chains and a hoist to the lift eyes and individually lift each spacer from the assembly. Each spacer weighs approximately 26 kg (57 lb).
22. Remove 14 cap screws (3) that secure retainer (2). Attach two lift eyes (M16 x 2.00) to the retainer. Attach lifting chains and a hoist to the lift eyes and lift the retainer from the assembly. The retainer weighs approximately 95 kg (209 lb).
23. Collect the shims from below the retainer and keep in a secure place for use during assembly.

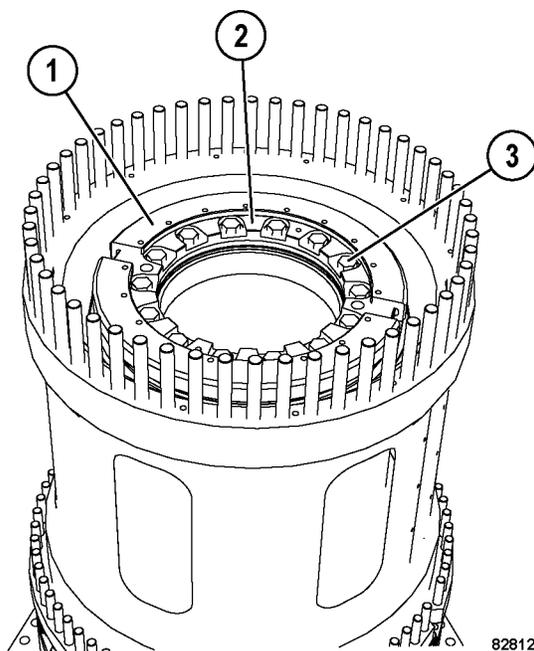


FIGURE 50-40.

1. Spacer
2. Retainer
3. Cap Screw

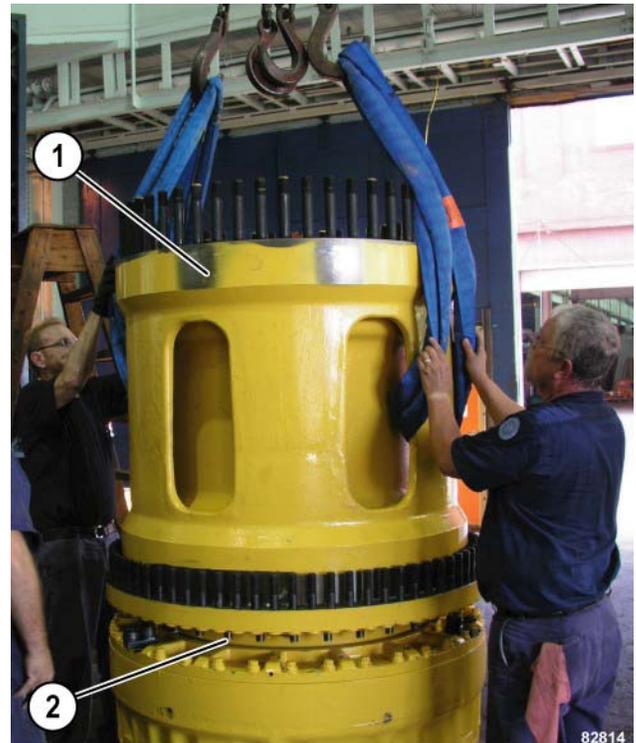


FIGURE 50-41.

1. Hub
2. Nut

24. Remove 36 nuts (2, Figure 50-41) that secure hub (1) to the assembly.
25. Loop two lifting straps through the access slots in hub (1) 180° apart. Attach a hoist to the lifting straps and lift the hub from the assembly. The outer bearing will be removed with the hub. The weight of the hub and bearing is approximately 2350 kg (5180 lb).

26. Install three brake tools onto the brake as shown in Figure 50-42. The brake tools provide support to keep the inner face seals from being damaged.
- Locate the three open threaded holes on the top plate of brake assembly (3, Figure 50-42). The three holes are 120° apart.
 - Position brake tool (2) onto the brake and secure with a cap screw.
 - Slide spacer (1) between the brake tool and hub adapter (4). It may be necessary to pry up on the hub adapter to provide adequate clearance. Install a cap screw through the hub adapter and brake tool. It may be necessary to rotate the wheel. If this is necessary, the parking brake will need to be released by using a port-a-power. Parking brake release pressure is 8 653 kPa (1,255 psi). Do not exceed 12 755 kPa (1,850 psi).
 - Install the remaining two brake tools.

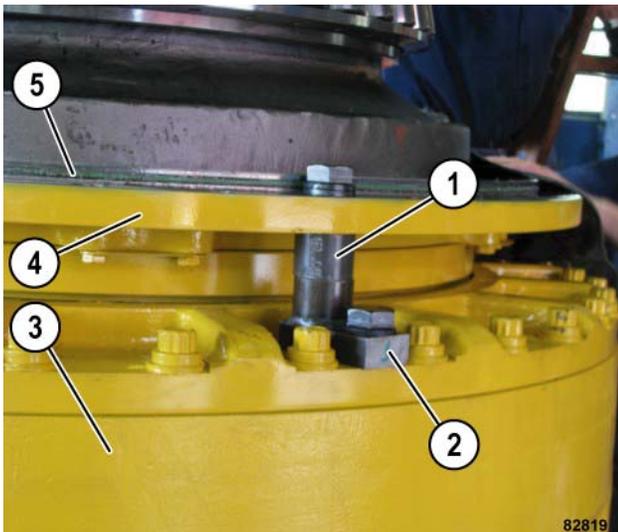


FIGURE 50-42.

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|-------------------|----------------|
| 1. Spacer | 4. Hub Adapter |
| 2. Brake Tool | 5. O-ring |
| 3. Brake Assembly | |

27. Remove O-ring (5) from hub adapter (4).

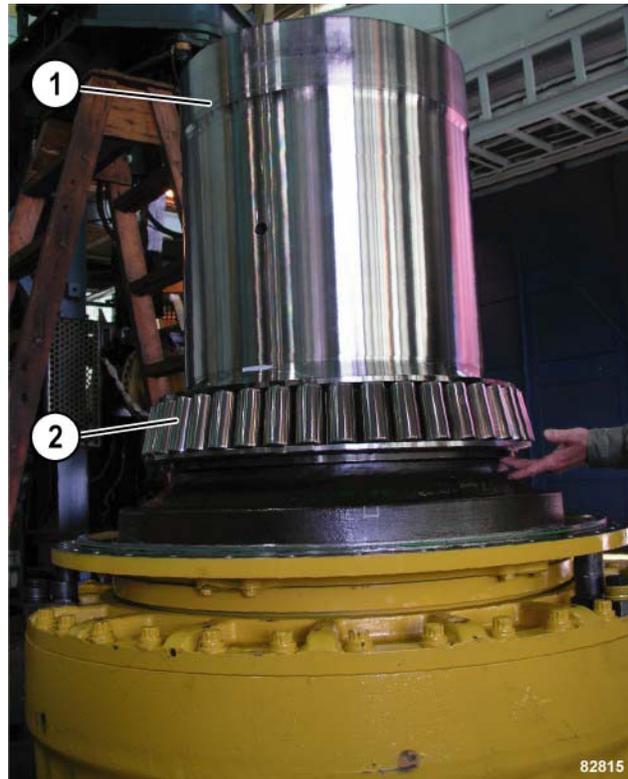


FIGURE 50-43.

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|------------|------------------|
| 1. Spindle | 2. Inner Bearing |
|------------|------------------|

28. Using an appropriate bearing puller, loosen inner bearing (2, Figure 50-43).

CAUTION

The tapped holes on the inner wheel bearing are to be used for lifting purposes only. DO NOT attempt to separate the bearing from the spindle using these holes. Damage to the bearing will occur.

29. Attach lift eyes to the inner bearing. Attach lifting chains and a hoist to the lift eyes. The inner bearing weighs approximately 140 kg (309 lb).

NOTE: The inner and outer bearings are different sizes. If the bearings are to be re-used, mark the location from where they were removed. The inside diameter of the inner bearing cone (2, Figure 50-44) is 2 mm (0.079 in.) larger in diameter than the outer bearing cone.



FIGURE 50-44.

1. Spindle 2. Inner Bearing

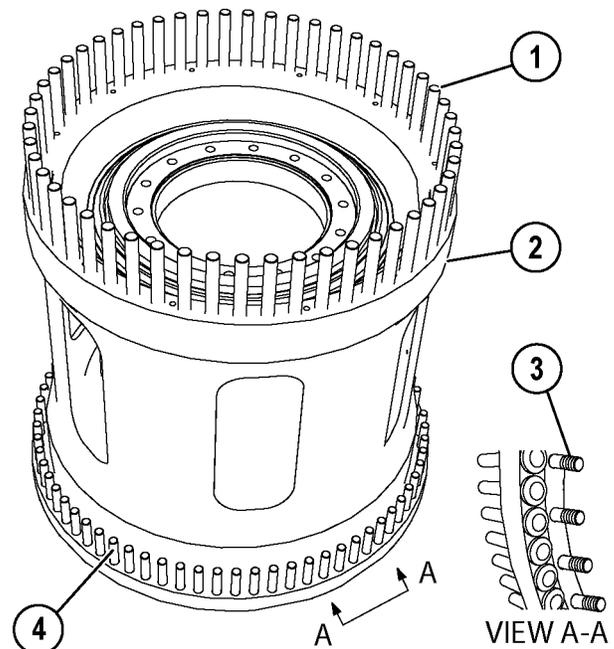
30. If removal of the brake is necessary, refer to CEN50012, Removal And Installation of Rear Brake Assembly, for instructions.

Cleaning and inspection

1. Inspect all magnets for excessive metal particulates. Note the location of each magnet for assembly.
2. Clean all parts in solvent and inspect for excessive wear and damage. Replace worn parts.
3. Inspect wheel studs (4, Figure 50-45) for wear or damage. Replace as necessary. For stud (4) replacement instructions, refer to "Wheel stud maintenance" in this section.

NOTE: Any damaged wheel stud(s) (4) should be replaced at this time. After wheel hub (2) is assembled to the wheel motor, these studs are very difficult to replace.

4. Inspect studs (1, Figure 50-45) for wear or damage. Replace as necessary. When installing new studs (1), apply Three Bond (TB1374) to the threads and tighten to $727 \pm 123 \text{ N}\cdot\text{m}$ ($536 \pm 91 \text{ ft lb}$).
5. Inspect studs (3) for wear or damage. Replace as necessary. When installing new studs (3), apply Three Bond (TB1374) to the threads and tighten to $329 \pm 51 \text{ N}\cdot\text{m}$ ($243 \pm 38 \text{ ft lb}$).



83651

FIGURE 50-45. HUB INSPECTION

- | | |
|---------------------|-----------------|
| 1. Stud (Planetary) | 3. Stud (Brake) |
| 2. Wheel Hub | 4. Stud (Wheel) |

Assembly

1. Clean the tapped holes on the end of the spindle with a tap. Remove any oil film from the tapped holes. Thoroughly clean the spindle.
2. Install the rear brake assembly. Refer to CEN50012, Removal And Installation of Rear Brake Assembly, for installation instructions. Seal carrier will also be installed during the brake installation procedure.
3. Install a new O-ring (1, Figure 50-46) onto hub adapter (2). Lubricate the O-ring with clean wheel motor oil.
4. Install O-ring around outside of hub.
5. If removed, install the outer bearing races of the spindle bearings into the hub. Freeze the bearing races before installation. Do not chill below -40°C (-40°F).

NOTE: The inner and outer bearings are different sizes. If the bearings are to be re-used, ensure the bearings are installed from where they were removed. The inside diameter of inner bearing cone (2, Figure 50-47) is 2 mm (0.079 in.) larger in diameter than outer bearing cone (1, Figure 50-49).

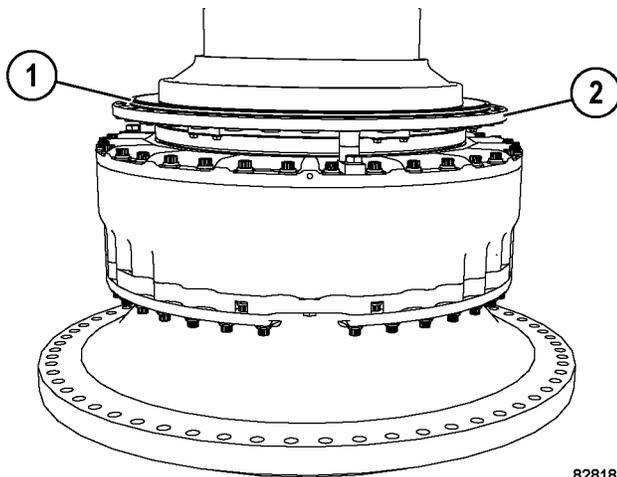


FIGURE 50-46.

1. O-ring

2. Hub Adapter

6. Heat inner bearing (2, Figure 50-47) to $90 \pm 10^{\circ}\text{C}$ ($194 \pm 50^{\circ}\text{F}$).
7. Attach lift eyes to the inner bearing. Attach lifting chains and a hoist to the lift eyes and lift the bearing onto the spindle. The inner bearing weighs approximately 140 kg (309 lb).
8. Use a mallet and a clean piece of wood to tap the inner race of the bearing down until it is evenly seated on the spindle.

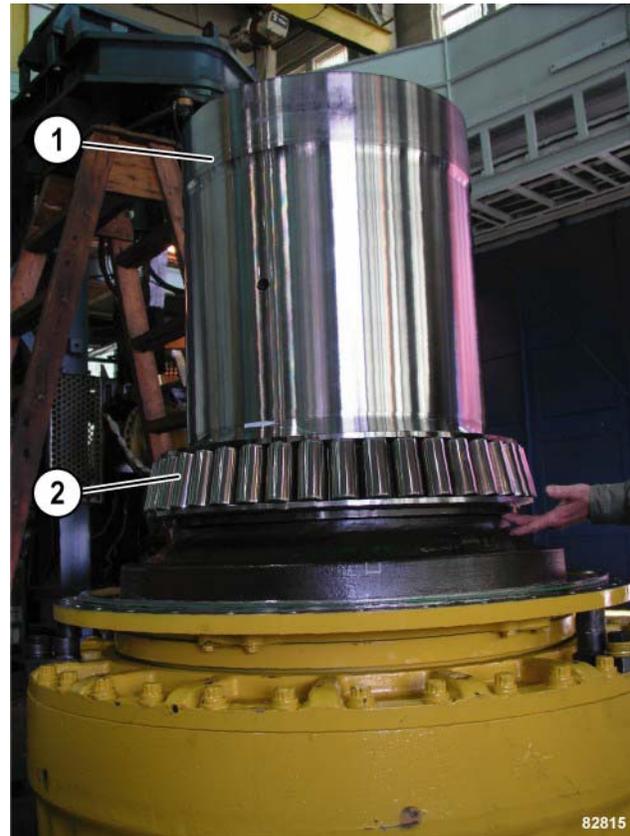


FIGURE 50-47.

1. Spindle

2. Inner Bearing