



Disassembly and Assembly

950F SERIES II WHEEL LOADER POWER TRAIN

S/N: 8TK1-UP



Disassembly and Assembly 950F SERIES II WHEEL LOADER POWER TRAIN

Media Number -SENR5918-01

Publication Date -01/12/1997

Date Updated -25/01/2010

SENR59180011

Axle Shaft Assemblies

SMCS - 3260-017

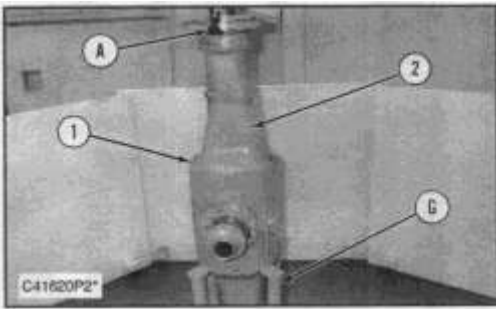
Disassemble & Assemble Axle Shaft Assemblies

Tools Needed		A	B	C	D	E	F	G
6V2157	Link Bracket	2						
1P1863	Pliers		1					
6V2156	Link Bracket			3				
6V7820	Torque Multiplier				1			
4C8501	Spanner Wrench Assembly				1			
FT1183	Plate					1		
1U6436	Installer						1	
1P2420	Transmission Repair Stand							1

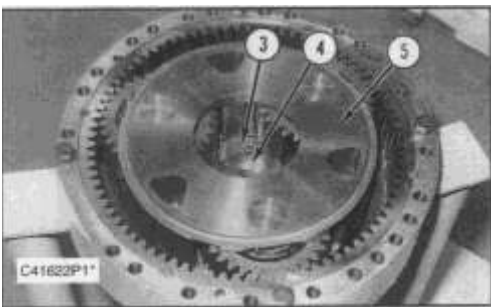
Start By:

- a. remove front axle housing group (fixed)
- b. remove rear axle housing group (oscillating)

NOTE: The axle shaft assemblies used in the front and rear axle housing groups are similar. The removal, disassembly, assembly and installation procedures are the same for both axle groups.



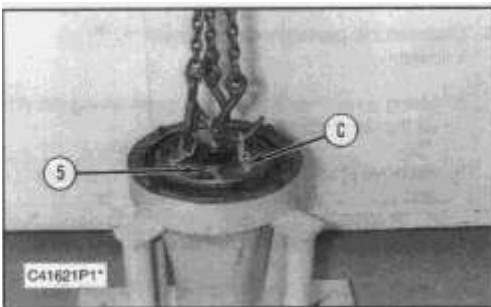
1. Install the axle housing group on Tool (G) in a vertical position as shown.
2. Fasten Tool (A) and a hoist to the rim flange of the axle shaft as shown. Remove twenty four bolts (1) and the washers that hold axle shaft assembly (2) to the differential housing. Carefully remove the axle shaft assembly. The weight of the axle shaft assembly is approximately 295 kg (650 lb).



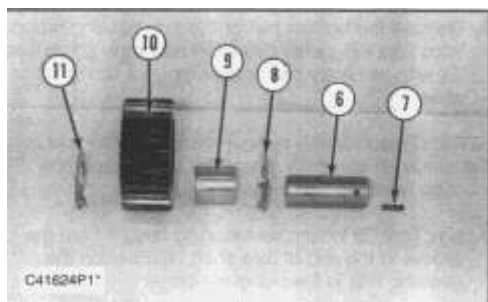
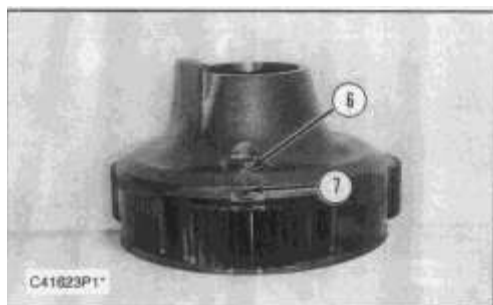
3. Remove the bottom half of the axle housing group from Tool (G). Install axle shaft assembly (2) on Tool (G) with planetary carrier assembly (5) facing up as shown.

NOTE: To completely remove retaining ring (3) from the axle shaft assembly, planetary carrier assembly (5) must be removed and disassembled.

4. Use Tool (B) to remove retaining ring (3) from the groove in the end of axle shaft (4). Position the retaining ring in the planetary carrier.

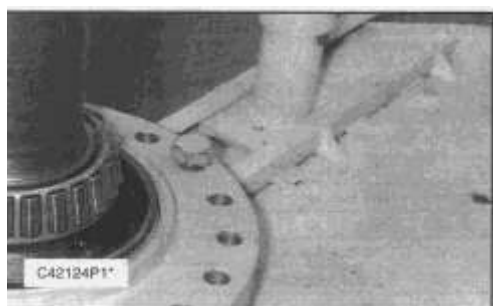


5. Fasten Tool (C) and a hoist to planetary carrier assembly (5) as shown. Remove the planetary carrier assembly from the axle shaft housing. The weight of the planetary carrier assembly is approximately 80 kg (175 lb).



6. Disassemble planetary carrier assembly (5) as follows:

- a.** Using a hammer and punch, push spring pin (7) all the way into shaft (6).
- b.** Remove shaft (6), thrust washers (11) and (8) and planetary gear (10) from the carrier.
- c.** Remove bearing (9) from planetary gear (10).
- d.** Remove spring pin (7) from shaft (6) with a hammer and punch.
- e.** Remove the other two planetary gears (10) from the carrier as in Steps 6a through 6d.
- f.** Remove retaining ring (3) from the carrier.



The axle shaft housing has been removed from the axle shaft for better photo illustration of mounting the axle shaft to Tool (G).

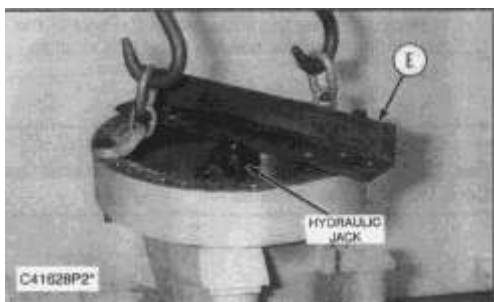




7. Fasten the rim flange of the axle shaft to Tool (G) with suitable size bolts as shown in Photo C42124P1. Installation of the bolt will prevent the axle shaft from turning when bearing nut (12) is removed. Use Tooling (D) to remove bearing nut (12) from the axle shaft.



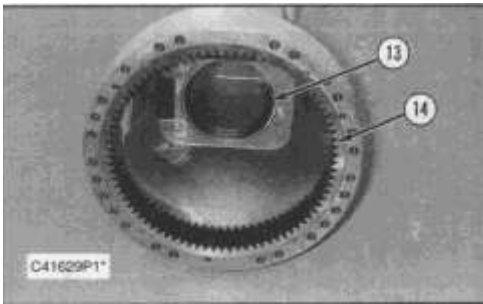
8. Fasten Tooling (A) and a hoist to the axle shaft housing as shown. Put slight lifting tension on the axle shaft housing.



NOTE: The bearing cone which is located under bearing nut (12) will be removed at the same time that the axle shaft housing is being removed from the axle shaft.

9. Fasten Tool (E) to the axle shaft housing as shown. Put a hand operated hydraulic jack between Tool (E) and the end of the axle shaft as shown. Operate the hydraulic jack to push the axle shaft housing and inner bearing cone off of the axle shaft. Remove the axle shaft housing and inner bearing cone from the axle shaft. The weight of the axle shaft housing is approximately 105 kg (231 lb).

10. Remove the inner bearing cone from the axle shaft housing.

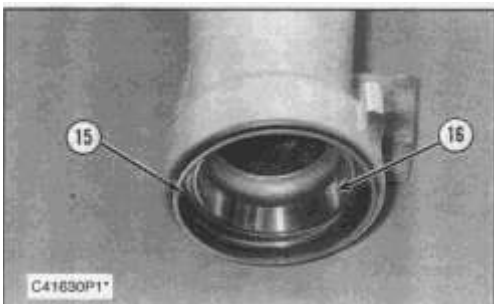


11. Remove inner bearing cup (13) from the axle shaft housing.

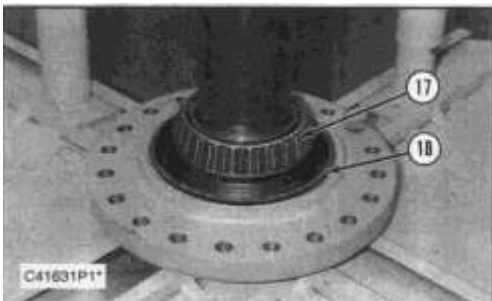
NOTICE

Ring gear (14) will be destroyed when it is removed from the axle shaft housing.

12. Remove ring gear (14) from the axle shaft housing. Using a torch, cut the ring gear in three places. Cut the ring gear at the position of the three locating dowels in the axle shaft housing. An alternate method is to make three welds equally spaced around the circumference of the ring gear to cause it to shrink. Remove the three locating dowels for ring gear (14).

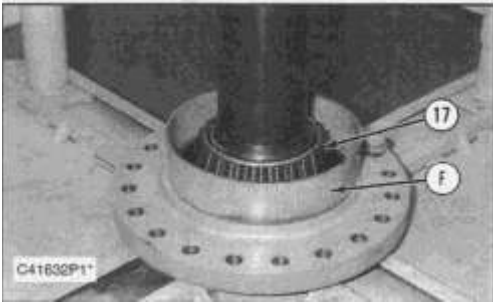


13. Remove Duo-Cone seal (15) and outer bearing cup (16) from the opposite end of the axle shaft housing.



14. Remove Duo-Cone seal (18) and outer bearing cone (17) from the axle shaft.

NOTE: The following steps are for the assembly of the axle shaft assemblies.



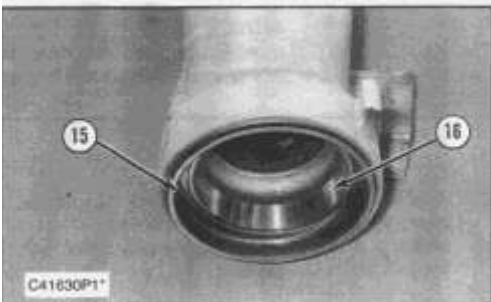
15. Fasten the rim flange of the axle shaft to Tool (G) with suitable size bolts as shown. Heat outer bearing cone (17) to a maximum temperature of 135° C (275° F), and install the bearing cone on the axle shaft as shown. Be sure the bearing cone is seated against the shoulder on the end of the axle shaft. Allow the bearing cone and shaft to cool.

NOTICE

See, "Assembly And Installation Of Conventional Duo-Cone Seals" in this module.

NOTE: The rubber seals and all surfaces that make contact with the seals must be clean and dry. After installation of the seals, put clean SAE 30 oil on the contact surfaces of the metal seals.

16. Use Tool (F) to install the Duo-Cone seal in the end of the axle shaft.



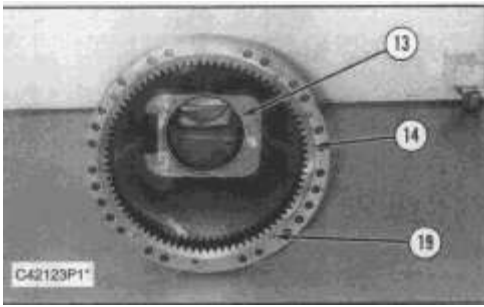
17. Lower the temperature of outer bearing cup (16), and install it in the end of the axle shaft housing as shown. Be sure the bearing cup is seated all the way down in the axle shaft housing.

NOTICE

See, "Assembly And Installation Of Conventional Duo-Cone Seals" in this module.

NOTE: The rubber seals and all surfaces that make contact with the seals must be clean and dry. After installation of the seals, put clean SAE 30 oil on the contact surfaces of the metal seals.

18. Use Tool (F) to install the Duo-Cone seal in the end of the axle shaft housing.



19. Lower the temperature of inner bearing cup (13), and install it in the opposite end of axle shaft housing as shown. Be sure the bearing cup is seated all the way down against the shoulder in the axle shaft housing.

NOTE: Three dowels (19) are used to locate and hold ring gear (14) in position in the axle shaft housing.

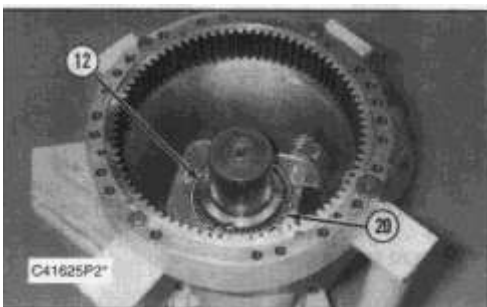
20. Locate the position of the ring gear in relation to the axle shaft housing by aligning the half holes for the three dowel. Put alignment marks on the ring gear and axle shaft housing to ensure correct installation.

21. Lower the temperature of ring gear (14) to a temperature of -38°C (-36°F). Install three dowels (19) in the half holes on the outside diameter of the ring gear. Use an O-ring seal or rubber band to hold the three dowels in position.

22. Using a press, install ring gear (14) in the axle shaft housing. Install the ring gear with the chamfered side down. As the ring gear is being pressed into the axle shaft housing, it will be necessary to tap three dowels (19) down along with the ring gear. After installation, the ring gear should be even or slightly below the machined surface of the axle shaft housing. The three dowels must be flush with the ring gear.



23. Put a thin coat of clean SAE 30 oil on the outer bearing cone on the end of the axle shaft and on the contact surfaces of the Duo-Cone seal on the end of the axle shaft and in the axle shaft housing. Fasten Tool (A) and a hoist to the axle shaft housing as shown. Lower the axle shaft housing on to the axle shaft.



24. Heat inner bearing cone (20) to a maximum temperature of 135° C (275° F). Install the inner bearing cone on the axle shaft with slight end play remaining. After the inner bearing cone cools, lubricate it with clean SAE 30 oil.

NOTICE

The adjusting nut (12) must be installed with side that has the part number facing away from inner bearing cone (20).

25. Put clean SAE 30 oil on bearing nut (12). Install bearing nut (12) on the axle shaft. Tighten the nut until only a small amount of end play remains in the axle shaft assembly.

26. Measure the torque required (also called "Seal Drag Torque" or SDT) to rotate the axle housing as follows:

- a. Install a nut and bolt through one of the outer mounting bolt holes in the axle housing.
- b. Install a 203 mm (8 in) torque wrench on the bolt installed in Step 26a so that it is in line with the center of the axle shaft.
- c. While turning the axle housing with the torque wrench, note the reading on the torque wrench, and calculate the actual seal drag torque with the following formula:

$$SDT = \frac{C \times (B + A)}{B}$$

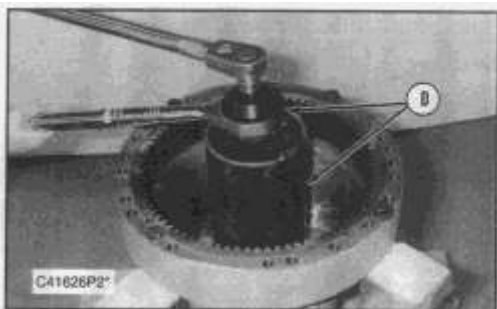
Where:

"SDT" is the actual seal drag torque (in N·m)

"C" is the reading on the torque wrench (in N·m).

"B" is the length of the torque wrench (in meters).

"A" is the bolt circle radius of the axle housing in meters and is equal to .229 m (9.0157 in).



27. While turning the axle housing with the torque wrench, tighten bearing nut (12) until the torque wrench reading calculated with the following formula is reached:

$$C = \frac{(T + SDT) \times B}{(B+A)}$$

Where:

"C" is the reading on the torque wrench (in N·m).

"B" is the length of the torque wrench (in meters).

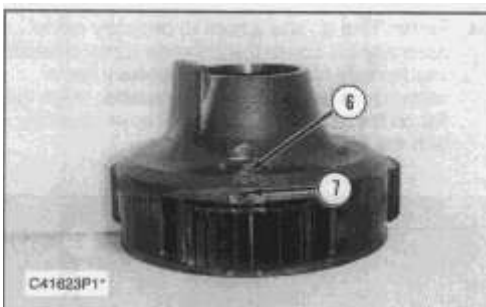
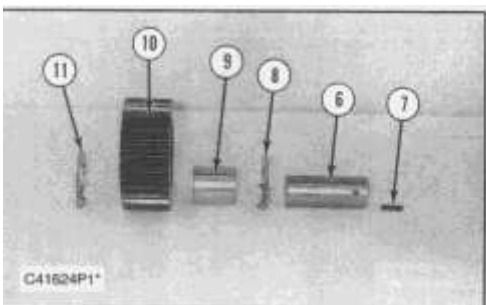
"A" is the bolt circle radius of the axle housing in meters and is equal to .229 m (9.0157 in).

"T" is the rolling torque specification for axle bearing preload which is 10.4 to 11.6 N·m (92 to 103 lb in).

"SDT" is the actual seal drag torque (in N·m) from Step 26.

28. Check to be sure there is zero end play in the axle shaft.

29. If the axle bearing preload rolling torque exceeds the specification, back off bearing nut (12) by 1/8turn, and reseal the bearing against the bearing nut. Perform Step 27 again.



30. Assemble planetary carrier assembly (5) as follows:

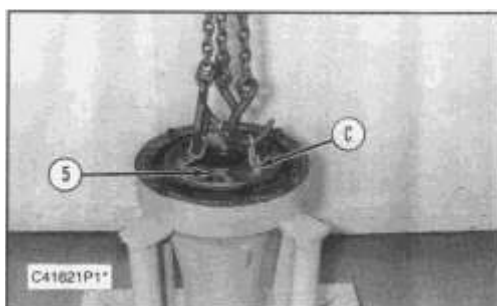
a. Install retaining ring (3) in the carrier.

b. Put clean SAE 30 oil on all parts of planetary carrier assembly (5).

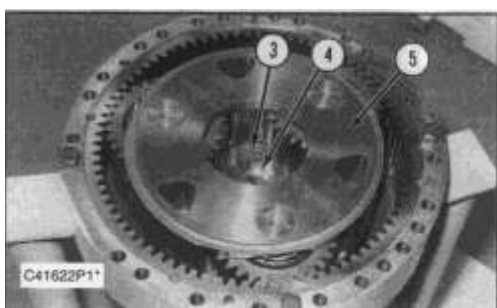
c. Install bearing (9) in planetary gear (10).

d. Put thrust washers (11) and (8) on each side of planetary gear (10), and install the planetary gear in the carrier.

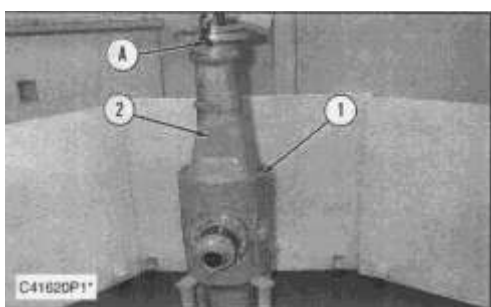
- e. Install shaft (6) in the carrier. Be sure the spring pin hole in the shaft is in alignment with the spring pin hole in the carrier. Install a new spring pin in the carrier and shaft. Install the spring pin slightly below the outside surface of the carrier.
- f. Install the other two planetary gears in the carrier as in Steps 30a through 30e.



31. Fasten Tool (C) and a hoist to planetary carrier assembly (5). Lower the planetary carrier assembly into the axle housing. As the planetary carrier assembly is being lowered into position, align the flat on the hub of the planetary carrier assembly with the flat on bearing nut (12).



32. Use Tool (B) to install retaining ring (3). Check to be sure that the retaining ring is fully seated in the groove in the axle shaft.



33. Remove axle shaft assembly (2) from Tool (G). Reinstall the bottom half of the axle housing group on Tool (G).
34. Put 6V-6640 Sealant on the machined surface of the axle shaft housing and on the intermediate housing assembly. Fasten Tool (A) and a hoist to the rim flange on the axle shaft. Put axle shaft assembly (2) in position on the differential housing. Install twenty four washers and bolts (1) that hold it. Tighten the bolts to a torque of $300 \pm 40 \text{ N}\cdot\text{m}$ ($220 \pm 30 \text{ lb ft}$).

End By:

- a. install rear axle housing group (oscillating)
- b. install front axle housing group (fixed)



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SENR59180012

Brake Groups

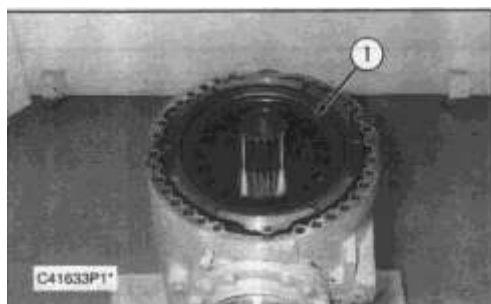
SMCS - 4250-010

Remove & Install Brake Groups

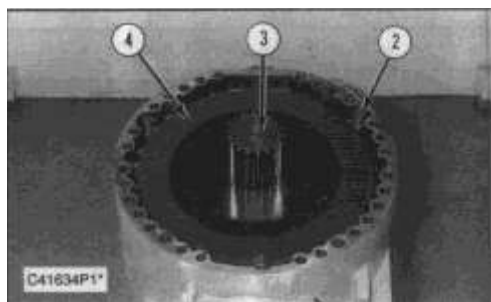
Start By:

- a. remove axle shaft assemblies

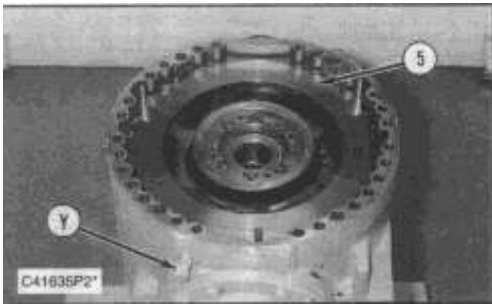
NOTE: The brake group used in the front and rear axle housing groups is the same.



1. Remove reaction plate (1).



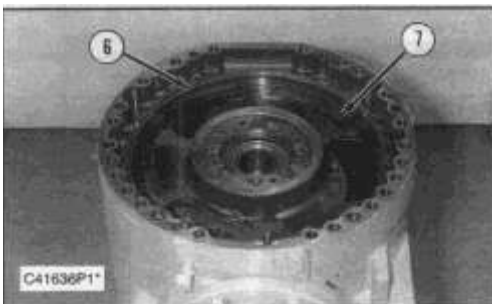
2. Remove three springs (2), sun gear (3) and friction disc (4).



WARNING

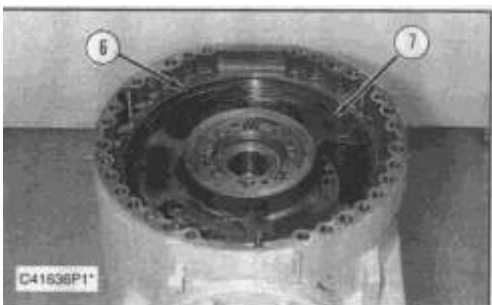
Brake piston (5) must be removed from the intermediate housing assembly with shop air pressure. The brake piston can come out of the intermediate housing assembly with force during the removal procedure. To prevent possible personal injury, the brake piston must be retained in the intermediate housing assembly when applying shop air pressure.

3. While retaining the brake piston, apply shop air pressure (free of water) of approximately 525 kPa (75 psi) to fitting (Y). Brake piston (5) will move up and out of the intermediate housing assembly.



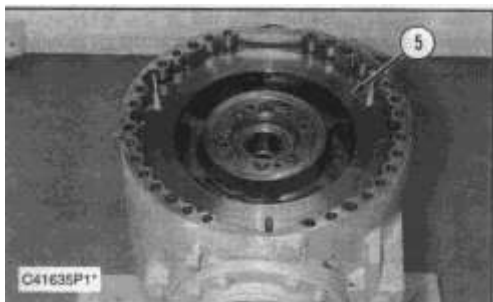
4. Remove seal (6) and seal assembly (7) with the back-up ring.

NOTE: The following steps are for the installation of the brake group.

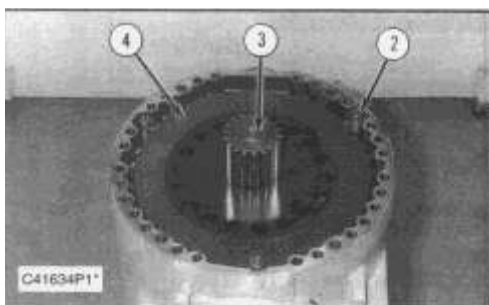


NOTE: Lubricate all seals with SAE 30 oil.

5. Install seal (6) and seal assembly (7) with the back-up ring. Seal assembly (7) consists of an L-shaped seal and a back-up ring. Put the L-shaped seal with the flat side towards the differential. Put the back-up ring in position away from the differential.



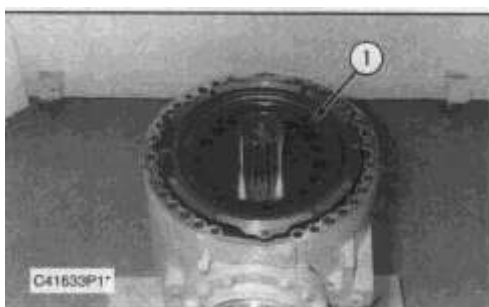
6. Install piston (5) in the intermediate housing assembly.



NOTICE

The continued use of the friction disc with 7.65 mm (.301 in) or less of friction material (depth of oil groove) will result in accelerated wear. Do not use the disc color as an indication for wear. The overall thickness and groove depth are more important.

7. Inspect friction disc (4) for wear. Replace the friction disc if the friction material thickness is 7.65 mm (.301 in) or less. Immerse the friction disc in clean SAE 30 oil. Install friction disc (4), sun gear (3) and three springs (2).



8. Install reaction plate (1).

End By:

a. install axle shaft assemblies



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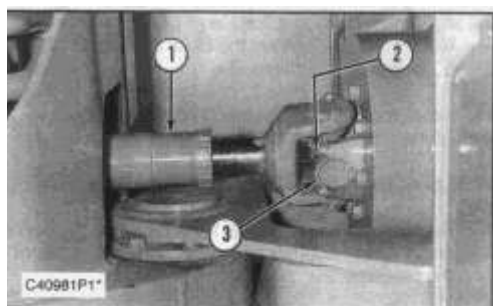
SENR59180004

Center Drive Shaft

SMCS - 3253-010

Remove & Install Center Drive Shaft

1. Connect the steering frame lock link. See the topic, "Separate & Connect Steering Frame Lock Link" in this module.
2. Be sure the parking brake is released so the drive shaft can be turned.



3. Remove four bolts (2) and two straps (3) from both ends of center drive shaft (1). Remove the center drive shaft.

NOTE: The following steps are for the installation of the center drive shaft.

NOTICE

NOTE: Be sure the drive shaft yokes are positioned on the same center line with the center drive shaft.

4. Put center drive shaft (1) in position. Install straps (3) and bolts (2).

5. Tighten bolts (2) to a torque of 60 ± 7 N·m (44 ± 5 lb ft).
 6. Separate the steering frame lock link. See the topic, "Separate & Connect Steering Frame Lock Link" in this module.
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Disassembly and Assembly 950F SERIES II WHEEL LOADER POWER TRAIN

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SENR59180016

Differential (Limited Slip)

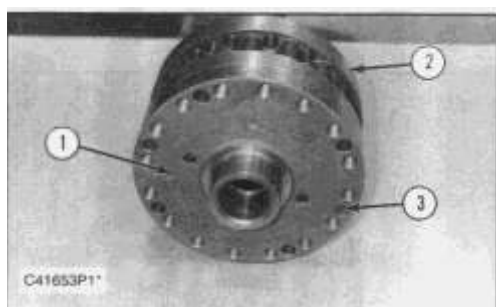
SMCS - 3263-015; 3263-016

Disassemble Differential (Limited Slip)

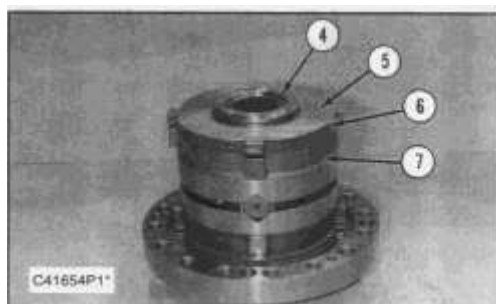
Start By:

- a. remove differentials and pinion assemblies

NOTE: DO NOT use this procedure with limited slip differential Part Nos. **103-2007** and **144-4465**. Refer to "Disassemble & Assemble Differential (Limited Slip) (Part Nos. **103-2007** & **144-4465**)", in this module.



1. Remove two socket head bolts (3). Turn the differential up on differential housing cover (1), and remove differential housing (2).



Diesel Engines

ABS	Agco-Sisu
Akasaka	Baudouin
BMW	Bukh
Caterpillar	CHN 25/34
Cummins	Daihatsu
Detroit	Deutz
Doosan-Daewoo	Fiat
Ford	GE
Grenaa	Guascor
Hanshin	Hatz
Hino	Honda
Hyundai	Isotta
Isuzu	Iveco
John-Deere	Kelvin
Kioti	Komatsu
Kubota	Liebherr
Lister	Lombardini
MAK	MAN B&W
Mercedes	Mercruiser
Mirrlees BS	Mitsubishi
MTU	MWM
Niigata	Paxman
Perkins	Pielstick
Rolls / Bergen	Ruggerini
Ruston	Scania
Shibaura	Sisu-Valmet
SKL	Smit-Bolnes
Sole	Stork
VM-Motori	Volvo
Volvo Penta	Westerbeke
Wichmann	Yanmar

Machinery

ABG	Airman
Akerman	Ammann
Astra	Atlas Copco
Atlas Weyha.	Atlet
Bell	Bendi
Bigjoe	Bobcat
Bomag	BT
Carelift	Case
Caterpillar	Cesab
Challenger	Champion
Claas	Clark
Combilift	Crown
Daewoo-Doosan	Demag
Deutz-Fahr	Dressta

Machinery

Drott	Dynapack
Extec	Faun
Fendt	Fiat
Fiatallis	Flexicoil
Furukawa	Gehl
Genie	Grove-gmk
Halla	Hamm
Hangcha	Hanix
Hanomag	Hartl
Haulpack	Hiab
Hidromek	Hino truck
Hitachi	Hyster
Hyundai	IHI
Ingersoll-rand	JCB
JLG	John-Deere
Jungheinrich	Kalmar
Kato	Kioti
Kleeman	Kobelco
Komatsu	Kramer
Kubota	Lamborghini
Landini	Liebherr
Linde	Link-belt
Manitou	Massey-Ferg.
Mccormick	MDI-Yutani
Mitsubishi	Moxy
Mustang	Neusson
New-Holland	Nichiyu
Nissan	OK
OM-Pimespo	others-tech
Pel-Job	PH-mining
Poclain	Powerscreen
Same	Samsung
Sandvik	Scania
Schaefer	Schramm
Sennebogen	Shangli
Shibaura	Steiger
Steinbock	Steyr
Still	Sumitomo
Super-pac	Tadano
Takeuchi	TCM
Terex	Toyota
Valpadana	Venieri
Versatile	Vogele
Volvo	Weidemann
Wirtgen	Yale
YAM	Yanmar