

Demonstrate Inspecting and Servicing Various Bearing, Seal and Gasket Used In Heavy Equipment

Skill Number CO-OP15GN106

Full Name: Niko Andron P

No ID: _____
School: SMKNI 1 SINGASARI

Validation Date: 24-12-2025

PERFORMANCE TASK:

Given assorted bearings, seals and gaskets, the student is requested to perform the following tasks on the components:

- Removing
- Inspection
- Installing

The student must be able to perform the following task:

- Demonstrate removing, inspection and installing Bearing, Seals and Gasket.

It is recommended that assessor put questions to student regarding the findings of their inspections and subsequent report. Literature and measuring tools will be made available but will not be provided directly to the student. Safety and Contamination Control must be always applied to this process.

Prerequisite	Yes	No	N/A	Hints
The student must complete the knowledge assessment. Minimum passing grade 80%.	✓			Score seal, bearing, gasket course or subject.

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Preparation	✓			Observe if the candidate is referring to the Manufacturer's Literature
Prepare related literature	✓			Observe if the candidate is preparing bearings, seals, and gaskets
Prepare required equipment	✓			Observe if the candidate is preparing related tools (e.g.: Hand tools, bearing puller, Bearing heater, Infrared Thermometer, etc.)
Prepare related tools	✓			
Prepare Safety & Contamination Control equipment	✓			Observe if the candidate is preparing related Safety & CC Equipment (e.g.: PPE, Blue Towel, Plastic Wrap, etc.)

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform etiquette/manner when starting the job	✓			
Meet the customer / assessor	✓			
Perform etiquette/manner when opening the interaction.	✓			• Perform smile & greet • Introduce Student's name
Explain the purpose of Student's activity.	✓			
Ask permission to perform the job.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Remove, Inspect and Install Bearings, Seals and Gaskets	✓			Observe if the candidate is accessing information relating task from manufacturer's literature
1. Accessing Information	✓			Observe if the candidate is removing seals and gasket following instructor manufacturer's literature
2. Bearing, Seals & Gasket Removal	✓			Observe if the candidate is inspecting seals and gasket following instructor manufacturer's literature
3. Determine bearing reusability of bearings, seals, and gasket	✓			Observe if the candidate is installing seals and gasket following instructor manufacturer's literature
4. Bearing, Seals & Gasket Installation	✓			
5. Equipment and tooling are used in the correct way	✓			
6. Equipment and tooling are cleaned and returned to its correct location	✓			
Documentation:				
Take picture if needed				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform close the job by ensuring all systems or conditions is in the standard condition	<input checked="" type="checkbox"/>			<ul style="list-style-type: none"> Find the improper condition. Communicate the finding to the customer/assessor.
Ensure all systems or conditions are in standard condition.	<input checked="" type="checkbox"/>			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Reporting All relevant documentation completed correctly and approved by customer (if required).	<input checked="" type="checkbox"/>			<ul style="list-style-type: none"> Completing the Task List Completing Measurement Form/Related Check Sheet, if required Create Service Report (SIMS), if required Create SPR, if required Documenting the failed or damaged parts, if required Provide Technical Analysis Report/Failure Analysis Report, if required.

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Safety Using APD related to the job	<input checked="" type="checkbox"/>			
Follows relevant Workplace Safety Guidelines (LOTO, Safety Equipment)	<input checked="" type="checkbox"/>			<ul style="list-style-type: none"> Comply with safety regulation that applied on the workplace
State and follow Safety Precautions	<input checked="" type="checkbox"/>			<ul style="list-style-type: none"> Create Job Safety Analysis Student must follow safety procedure refer to service manual or SIS related to job
Service man completes job without accident due to incorrect procedure using hand tools.	<input checked="" type="checkbox"/>			<ul style="list-style-type: none"> Correct working position Correct hand tool related to the job
Tasks completed without damage equipment and tools	<input checked="" type="checkbox"/>			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Contamination Control Environmental Practices & Housekeeping	<input checked="" type="checkbox"/>			<ol style="list-style-type: none"> Waste is minimized, waste including sludge, solids and wastes are sorted and store recycling or disposal Packaging of goods receive and reused or disposed of in Materials that can be reuse cleaned and stored Waste and scrap are remove All fluids are disposed of in following workplace proceed with enterprise policies and

Tasks	Completed			Observation
	Yes	No	N/A	
Perform etiquette/manner after completing the job Perform etiquette/manner when closing the communication.	<input checked="" type="checkbox"/>			<ul style="list-style-type: none"> Perform smile & greet Ask permission to the interation.

Demonstrate Inspecting and Servicing Various Bearing, Seal and Gasket Used in Heavy Equipment

Skill Number CO-OP15GN106

Full Name: Nilko Ashton P

No ID: _____

Validation Date: 28/12/2025

School: SOAKN Singosari

PERFORMANCE TASK:

Given assorted bearings, seals and gaskets, the student is requested to perform the following tasks on the components:

- Removing
- Inspection
- Installing

The student must be able to perform the following task:

- Demonstrate removing, inspection and installing Bearing, Seals and Gasket.

It is recommended that assessor put questions to student regarding the findings of their inspections and subsequent report. Literature and measuring tools will be made available but will not be provided directly to the student. Safety and Contamination Control must be always applied to this process.

Prerequisite	Yes	No	N/A	Hints
The student must complete the knowledge assessment. Minimum passing grade 80%.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Preparation	✓			
Prepare related literature	✓			
Prepare required equipment	✓			
Prepare related tools	✓			
Prepare Safety & Contamination Control equipment	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform etiquette/manner when starting the job	✓			
Meet the customer / assessor	✓			
Perform etiquette/manner when opening the interaction.	✓			
Explain the purpose of Student's activity.	✓			
Ask permission to perform the job.	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Remove, Inspect and Install Bearings, Seals and Gaskets	✓			
1. Accessing Information	✓			
2. Bearing, Seals & Gasket Removal	✓			
3. Determine bearing reusability of bearings, seals, and gasket	✓			
4. Bearing, Seals & Gasket Installation	✓			
5. Equipment and tooling are used in the correct way	✓			
6. Equipment and tooling are cleaned and returned to its correct location	✓			
Documentation:				
Take picture if needed				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform close the job by ensuring all systems or conditions is in the standard condition				
Ensure all systems or conditions are in standard condition.				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Reporting All relevant documentation completed correctly and approved by customer (if required).	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Safety				
Using APD related to the job	✓			
Follows relevant Workplace Safety Guidelines (LOTO, Safety Equipment)	✓			
State and follow Safety Precautions	✓			
Serviceperson completes job without accident due to incorrect procedure using hand tools.	✓			
Tasks completed without damage equipment and tools	✓			

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Contamination Control				
Environmental Practices & Housekeeping				

Tasks	Completed			Observation / Hints
	Yes	No	N/A	
Perform etiquette/manner after completing the job				
Perform etiquette/manner when closing the communication.				

General Comments

RESULT: **COMPETENT** **NOT YET COMPETENT** (please check 'X')

Student: Niko Anderson Date: 29/02/2025

Assessor: Schriever Date: 29/02/2025

Supervisor: _____ Date: _____

Data Recorded: _____ Date: _____

SMCS - 3256, 3258

110135287

Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7502	Repair Stand	1
B	439-3938	Link Bracket As	2
C	456-4371	Lever Hoist	1
D	1P-5546	Crossblock	1
E	6V-3160	Double Acting Cylinder	1
F	1P-0520	Driver Group	1
H	6V-4070	Spanner Wrench	1
J	8B-7651	Bearing Puller	1
K	5F-7343	Bearing Puller Gp	1

Start By:

- Remove the front or rear differential assembly. Refer to Differential and Bevel Gear (Front and Rear) - Remove and Install.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

- Apply location marks on all housings and case assemblies for assembly purposes.

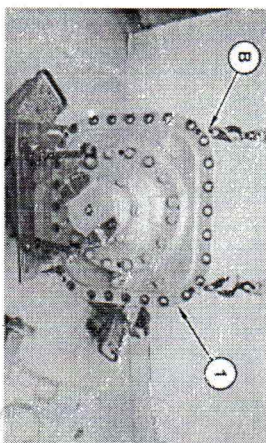


Illustration 1

903865438

- Attach Tooling (B) and a suitable lifting device to differential and bevel gear assembly. The weight of differential and bevel gear assembly (1) is approximately 322 kg (710 lb).

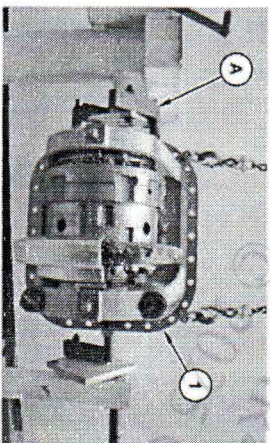


Illustration 2

903865440

- Position and place differential and bevel gear assembly (1) onto Tooling (A). Remove Tooling (B) and the suitable lifting device.

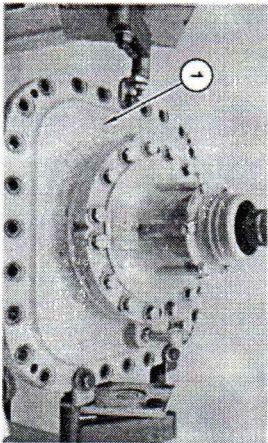


Illustration 3

903865449

- Rotate differential and bevel gear assembly (1) by 90 degrees.

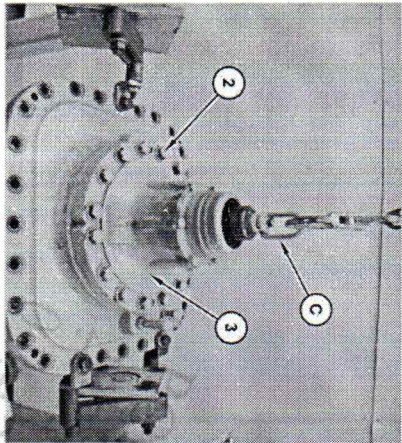


Illustration 4

g03865468

5. Attach Tooling (C) and a suitable lifting device to the yoke. The weight of pinion housing (3) is approximately 75 kg (165 lb). Remove bolts (2).

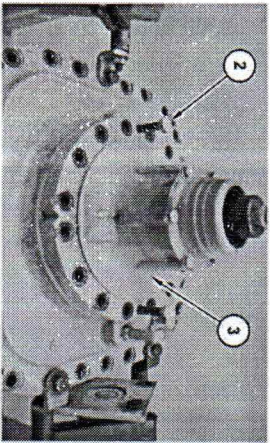


Illustration 5

g03865471

6. Install two bolts (2) in the threaded holes of pinion housing (forcing bolt holes). Tighten two bolts (2) evenly to separate pinion housing (3). Remove pinion housing (3).

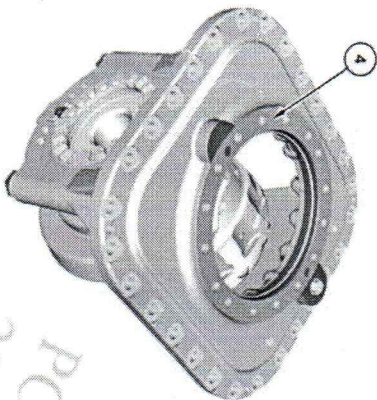


Illustration 6

g03865526

7. Remove shims (4).

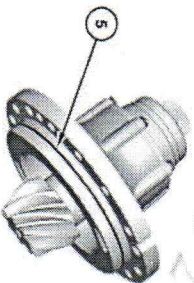
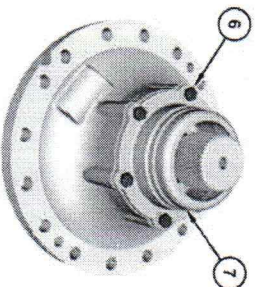


Illustration 7

g03865544

8. Remove O-ring seal (5).



- 9. Position the pinion housing onto suitable cribbing.
- 10. Remove bolts (6) and retainer (7).

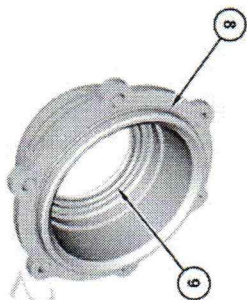


Illustration 9

g03865904

- 11. Remove O-ring seal (8) and lip seal (9).

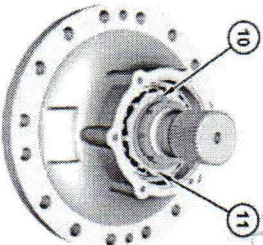


Illustration 10

g03865905

- 12. Remove retaining ring (10) and locking washer (11).

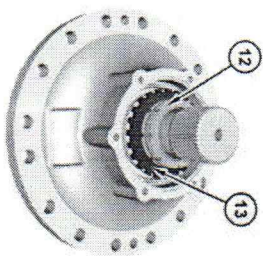


Illustration 11

g03865906

- 13. Use Tooling (H) (not shown) to remove locknut (12). Remove locknut (12) and washer (13).

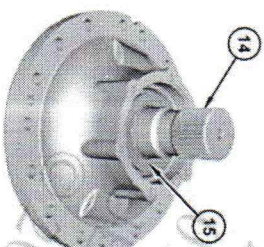


Illustration 12

g03865972

- 14. Use a suitable press to remove pinion shaft (14) from bearing cone (15).

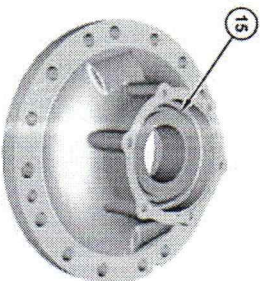


Illustration 13

g03865973

- 15. Remove bearing cone (15).

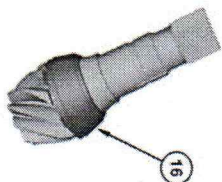


Illustration 14

g03865974

Typical Example

16. Use a suitable press and Tooling (J) (not shown) to remove bearing cup (16).

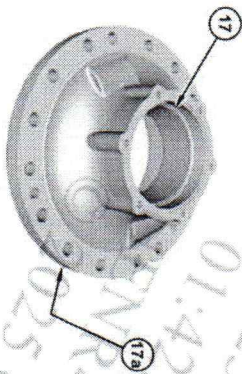


Illustration 15

g03865975

17. Remove bearing cup (17) and bearing cup (17a).

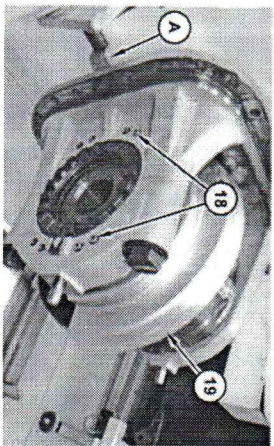


Illustration 16

g03865976

- 18. Rotate the carrier and differential assembly by 90 degrees on Tooling (A).
- 19. Remove four bolts (18) and guard (19).

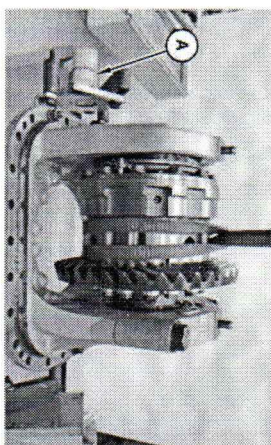


Illustration 17

g03865999

20. Use a suitable lifting device to position the carrier and differential assembly on T. The weight of the carrier and differential assembly is approximately 234 kg (516

21. Rotate the carrier and differential assembly an additional 90 degrees on Tooling

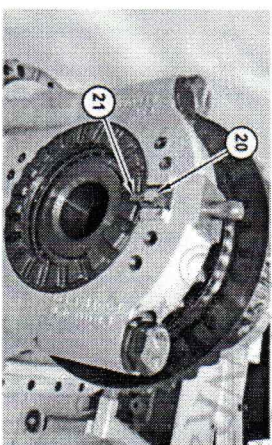


Illustration 18

g03866003

22. Remove bolt (20) and lock (21). Repeat for the opposite side.

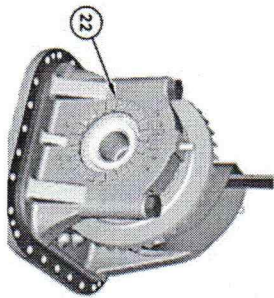


Illustration 19

g03866009

Do not remove suitable lifting device from the carrier and differential assembly.

23. Remove adjusting ring (22). Repeat for the opposite side.

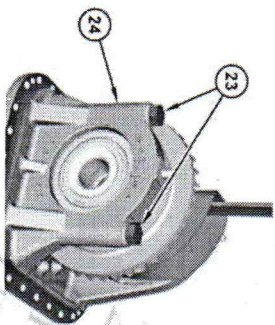


Illustration 20

g03866014

24. Remove bolts (23) and bearing cap (24).

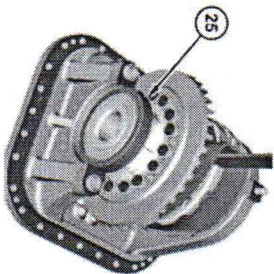


Illustration 21

g03866037

25. Remove bearing cup (25).

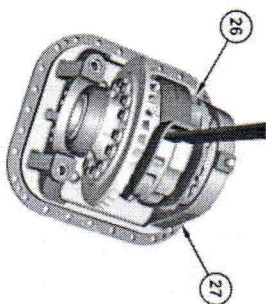


Illustration 22

g03866038

26. Use the suitable lifting device to remove differential assembly and bevel gear (26) carrier assembly (27). The weight of differential assembly and bevel gear (26) is approximately 115 kg (254 lb).

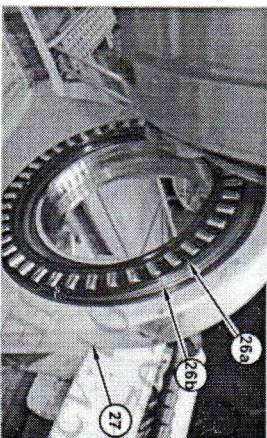


Illustration 23

g03866235

27. Remove bearing (26a) from carrier assembly (27). Remove bearing race (26b).

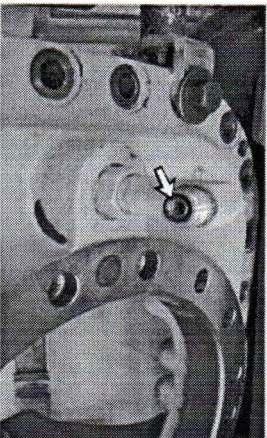


Illustration 24

g03866236

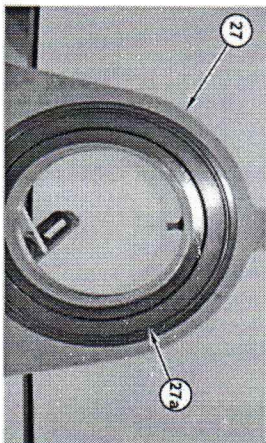


Illustration 25

g03866237

⚠ WARNING

Personal injury can result from air pressure against the piston.

The piston can come out of the housing assembly with force when air pressure is applied.

To prevent possible personal injury, the piston must be retained in the housing assembly when applying air pressure.

28. Apply air pressure to remove clutch piston (27a) from carrier assembly (27). Remove clutch piston (27a).

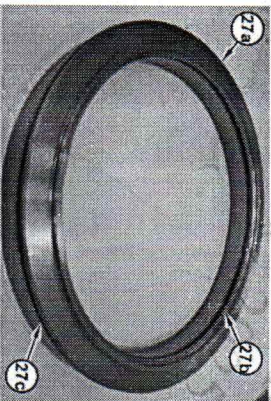


Illustration 26

g03868985

29. Remove D-ring seal (27b) and D-ring seal (27c) from clutch piston (27a).

Illustration 27

g06636611

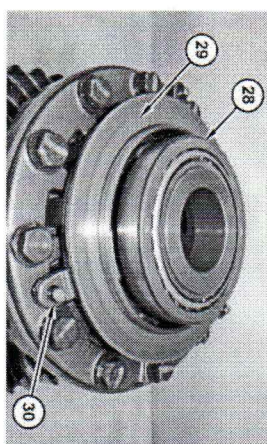


Illustration 27

g06636611

30. Position the differential assembly and bevel gear on suitable cribbing (not shown).

31. Remove bearing cup (28) and O-ring seals (30).

32. Remove thrust ring (29).

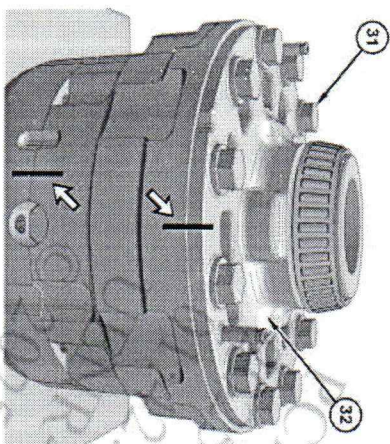


Illustration 28

g06637042

Typical Example

Note: Mark the orientation of the housing joints prior to disassembly for the assembly purposes.

33. Remove bolts (31) and top clutch housing (32).

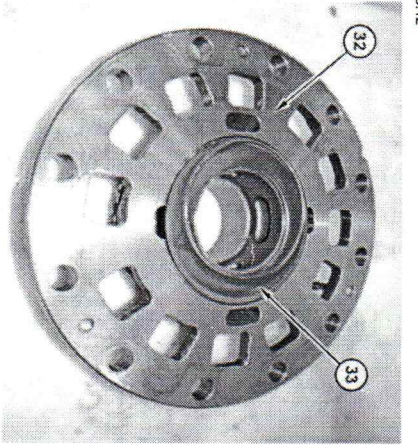


Illustration 29

g038637152

34. Remove thrust washer (33) from back side of top clutch housing (32).

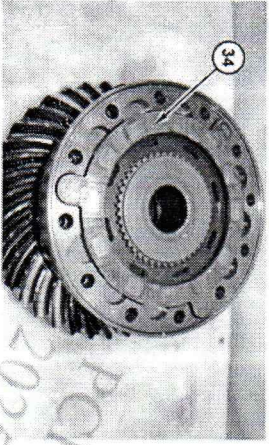


Illustration 30

g03866103

35. Remove thrust plate (34).

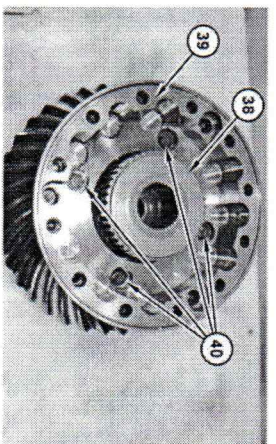
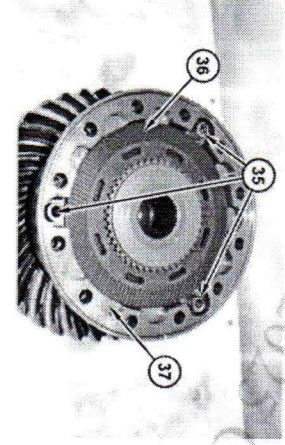


Illustration 32

g038665119

36. Remove springs (35), eight friction discs (36), and eight separator plates (37).

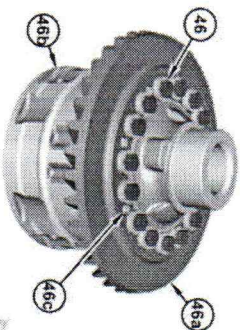


Illustration 33

g03870565

37. Remove gear (38) and bolts (40).

38. Remove spring pins (46c). Remove bolts (46). Remove bevel gear (46a) from disc housing (46b) and separate housing (39).

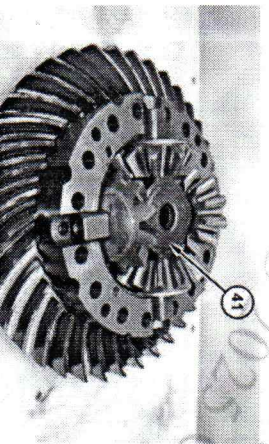


Illustration 34

g03866124

39. Remove spider gear assembly (41).

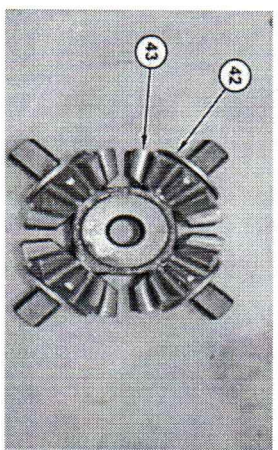


Illustration 35

g03866131

40. Remove thrust washers (42) and gears (43).

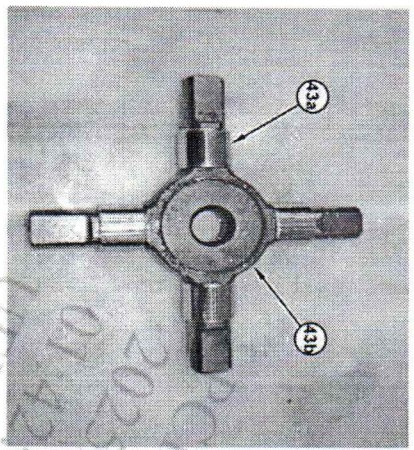


Illustration 36

g03870010

41. Remove gear sleeves (43a) from spider (43b).

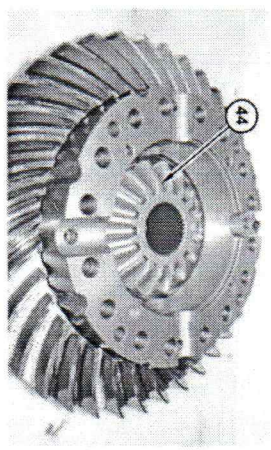


Illustration 37

g03866169

42. Remove gear (44).

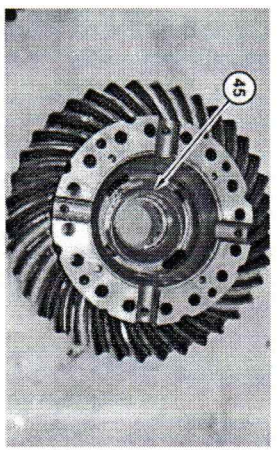


Illustration 38

g03866175

43. Remove thrust washer (45).

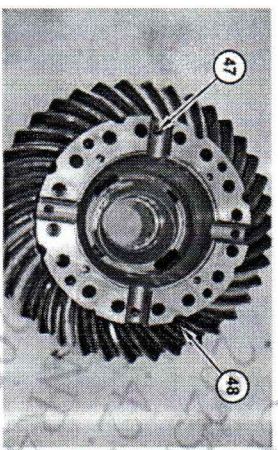


Illustration 39

g03866231

44. Remove roll pins (47) and bevel gear (48).

PCP-00022950
 2025/12/24 01:42:16+07:00
 DEVP/1227
 2025-12-27
 Caterpillar Inc.

PCP-00022950

2025/12/24

01:42:13+07:00

106233843

© 2025 Caterpillar Inc.

Illustration 27

28. Install bearing cone (15). Install pinion shaft (14).
29. Perform the following Steps for setting backlash:

- a. Secure the pinion housing in a suitable holding fixture.

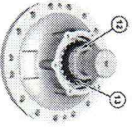


Illustration 28

903865956

- b. Install notched washer (13) and locknut (12). Tighten locknut (12) until you attain a rolling torque of 0.67 to 1.35 N·m (6 to 12 lb·in).

Note: Rotation of the pinion is critical to achieve a proper seating of all the components.

- c. Rotate the pinion several times to ensure that the bearings are fully seated.

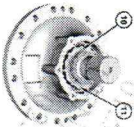


Illustration 29

903865955

- d. Install locking washer (11) so the slots line up with the notches on the notched washer. Locking washer (11) has eight different positions to align the tabs with the notches in the notched washer. If locking washer (11) does not fully align with the notched washer, position locking washer (11) so that locking washer (11) is very close to fitting into the

Illustration 34

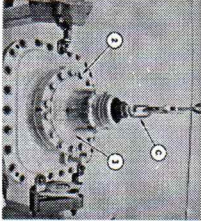


Illustration 34

903865958

35. Attach suitable Tooling (2) and a suitable lifting device to the yoke. The weight of pinion housing (3) is approximately 75 kg (165 lb).

36. Install pinion housing (3) and bolts (2). Tighten bolts (2) to a torque of 270 ± 40 N·m (199 ± 30 lb·ft).

37. Perform the following procedure to set bearing end play and to set backlash of the bevel gear.

- notches of the notched washer. Tighten the locknut until locking washer (11) fits into the notches of the notched washer.

- e. Measure the rolling torque again to confirm that the rolling torque is still 0.67 to 1.35 N·m (6 to 12 lb·in).

- f. If the rolling torque is still 0.67 to 1.35 N·m (6 to 12 lb·in), then install retaining ring (10) into the groove of the locknut that is closer to the locking washer. Make sure that retaining ring (10) is fully seated in the groove.

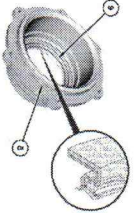


Illustration 30

903865937

30. Install lip seal (8) with the spring being up. Lubricate lip seal (8) with the lubricant that is being sealed. Install O-ring seal (6).

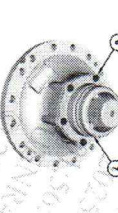


Illustration 31

903865954

31. Install retainer (7) and bolts (8).

Illustration 36

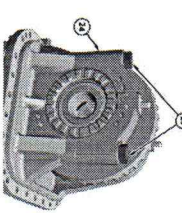


Illustration 36

903865932

- b. Ensure that bolts (23) for bearing cups (24) are tightened to a torque of 70 N·m (50 lb·ft).

- c. Move both adjusting rings to a position that maintains gear backlash, but not a tight gear mesh. Make sure to maintain a slight bearing end play.

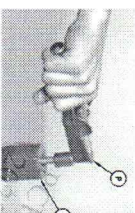


Illustration 37

903865932

- d. Position the differential and bevel gear so that pinion shaft (14) is in a vertical position. Install a suitable bolt in pinion shaft (14). Use Tooling (9) to tighten the bolt until pinion shaft (13) turns.

- e. Measure the overall rolling torque of the differential and the pinion shaft. Record that number.



Illustration 32

903865544

32. Install O-ring seal (5).



Illustration 33

903865929

33. Scrape and reposition differential and bevel gear assembly (1) by 90 degrees.

- Note:** Use the original shims (4) or provide new shims (4) that are the same thickness as the original shims that were removed.

- Note:** If original shims (4) are not available, then install 80 percent of the new shims in this case, you will be required to adjust the thickness of shims (4) after you detect tooth contact pattern.

34. Install shims (4) in the differential and bevel gear assembly (1).

Illustration 38

1. Advance the adjusting ring that is next to the bevel gear while you observe the gear to a zero backlash position. Then, back off this adjusting ring to that position (a maximum of one lug on the adjusting ring).
2. Advance the adjusting ring that is opposite the bevel gear while you rotate gear set. Monitor the torque that is required to rotate the pinion shaft until registered over the torque measured in Step 22c.
3. This position is the seated position. Advance the adjusting ring and rotate gear until the overall rolling torque is 1.20 to 2.48 N·m (11 to 22 lb·in) about torque achieved in Step 22b.



Illustration 38

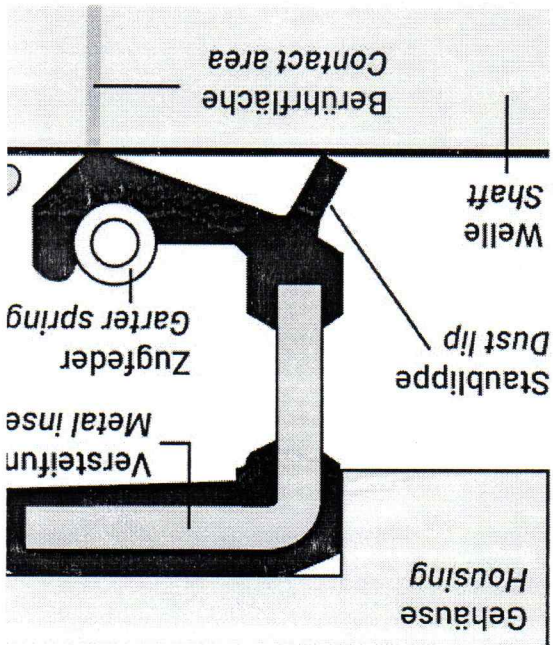
903871700

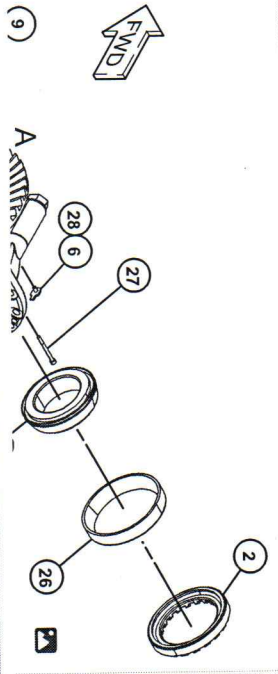
Illustration 39

1. Measure the backlash in three equally spaced positions around bevel gear (1) of the three measurements are not equal to the specified backlash of 0.36 (0.014 ± 0.005 inch). Then rotate the adjusting ring or advance the adjust equally to previous the product. Repeat this Step until the backlash at all three locations is 0.36 ± 0.12 mm (0.014 ± 0.005 inch).

2. Check the tooth contact between the pinion shaft and the bevel gear.

- Note:** Tip for checking backlash is to hold pinion still while moving gear.





Entire Group

365-3456 DIFFERENTIAL & BEVEL GEAR GP

S/N LFJ1-UP

PART OF 370-9013 AXLE GP-FRONT

SINCS Case 3256 - Bevel Gear/shaft

0 + -

Individual Parts Service Articles Where Used

Price And Availability

Hydraulic Information

+ Add All RRP

+ All

Part Number

Part Name

Quantity Req'd

1 6V-0852

RRP

Cap-Dust

1

+ -



2 8R-2861

Ring-Adjustment

1

+ -



3 108-8369

Ring-Adjustment

1

+ -



4 293-4503

Seal-Lip Type

1

+ -



5 296-9950

RRP

Locknut AS

1

+ -

Part Number

Part Name

Quantity Req'd

5L-4753

RRP

Ring-Retaining

1

+ -



6 297-3211

Lock-Bearing

2

+ -



7 359-6216

Set-Bevel Gear

1

+ -



8 365-2063

Differential GP

1

+ -

9 365-3451

Carrier AS

1

+ -



TV-9514

RRP

Sleeve

2

+ -



TX-2586

Bolt (M30X3.5x180-MM)

2

+ -



9X-8399

Washer (33X56X6-MM Thk)

2

+ -



157-7240

Dowel

2

+ -



365-3453

Housing-Pinion

1

+ -

367-5433

Shroud

1

+ -