

SMCS - 3020

i08107617

Telehandler

TH3510D (S/N: TH2153,155-158,160-163,166-168,170-171,173,176-177,179-200,248,251;
TH3150,152)TH357D (S/N: TD6151-153,155-158,161-165,167-178,180-182,184-185,187-188,191-193,195-
198,204-213,216-220,222-283,285-308,313-315,318,328,334,393,396,411-412,414,434;
TD7153)TH408D (S/N: TH4151-152; TH9150,152-167,169-171,174-179,182-186,188,191-194,196-
198,204-206,231-238,241-279,281-303,305-306,308-322,326,328-329,332,335-
336,338,347,349,355-356,359,386,473,478,487,498-499,507,514,542)

Introduction

Revision History	
Revision	Summary of Changes
02	Update to technical detail of gear selection.
01	Updated force on lever to eliminate idle stroke.

Table 1

This Special Instruction contains the inspection and repair procedure for the front axle parking brake on the machines listed above. It has been found that the parking brake lever is insufficiently greased leading to seizure of the lever. This instruction outlines the check and greasing preventative measure and also the after failure repair procedure.

Do not perform any procedure in this Special Instruction until you have read the information and you understand the information.

Reference

Reference: Service Magazine, M0090819, "Updated Front Axle Group Oil Specifications for Differentials and Wheel Ends are Now Available for Certain Telehandlers"

Reference: General Service Information, UENR6271, "Models TL642, TL642C, TL642D, TH357D, TH408D, TH3510D, TH514D, TH414C GC, TH414C GC, TH417C GC, TH314D, TH417D - Axle Service Manual"

Reference: Service Magazine, M0085373, "Best Practices for Reassembly of the Limited Slip Differential in the Front Axle are Now Available on Certain Telehandlers"

Reference: Torque Specifications, SENR3130

Safety

WARNING

Do not operate or work on this product unless you have read and understood the instruction and warnings in the relevant Operation and Maintenance Manuals and relevant service literature. Failure to follow the instructions or heed the warnings could result in injury or death. Proper care is your responsibility.

WARNING

Failure to follow all safety guidelines prescribed in this document and by governing authorities and regulatory agencies may result in severe injury or death of personnel or machine damage.

WARNING

When removing a major component or attachment, ensure that it is properly blocked or secured before removing mounting hardware. An assembly that is disconnected without proper blocking may shift or fall, resulting in serious injury or death of personnel or machine damage.

WARNING

Personal injury or death can result from improper maintenance procedures. To avoid injury or death, follow the procedures exactly as stated below.

Additional Safety Information

- During all operations described in this procedure, the axle should be fastened onto a trestle while the other parts mentioned should rest on supporting benches.
- When removing one of the arms, an anti-tilting safety trestle should be placed under the other arm.
- When working on an arm that is fitted on the machine, make sure that the supporting trestles are correctly positioned and that the machine is locked lengthways.
- Do not admit any other person inside the work area. Mark off the area, hang warning signs and remove the ignition key from the machine.
- Use only clean quality tools. Discard all worn, damaged, low quality, or improvised wrenches and tools. Ensure that all torque wrenches have been checked and calibrated.
- During maintenance operation, always wear protective glasses, safety footwear, protective gloves, and all Personal Protective Equipment (PPE) in function of the risks which the workers may be exposed to.
- Should you stain a surface with oil, remove marks straight away.
- Dispose of all lubricants, seals, rags, and solvents once work has been completed. Treat them as special waste and dispose of them according to the relative law provisions obtaining in the country where the axles are being overhauled.
- Make sure that only weak solvents are used for cleaning purposes. Avoid using turpentine, dilutants and toluol, xylolbased, or similar solvents. Use light solvents such as Kerosene, mineral spirits, or water-based environment friendly solvents.
- For the sake of clarity, the parts that do not normally need to be removed have not been reproduced on some of the illustrations.
- For construction axles, the terms "RIGHT" and "LEFT" refer to the position outside facing the machine with the input drive facing forward.
- Follow all safety instructions in the Operation and Maintenance Manual that came with the machine.
- Before draining oil, release the internal pressure.

Oil Draining Mandatory Procedure

Do not attempt any maintenance if the axle is hot (40° to 50° C (104° to 122° F)). Hot oil and components can cause personal injury.

Avoid skin contact. Wear protective gloves and glasses. Make sure that all fluids are contained during inspection, maintenance, tests, adjustment, and repair of the machine. Prepare a suitable container to collect the fluid before removing any component containing fluids. Dispose of all fluids following legal and local regulations.

Planetary Gear Reduction

Before draining oil, it is mandatory to rotate the planetary gear reduction to move the oil plug to the fill position. Loosen the oil plug and wait until the internal pressure is released. Remove the oil plug and drain oil only when the pressure released.

Axle Central Housing

Before draining oil, it is mandatory to loosen the oil filling plug and wait until the internal pressure is released. Remove the oil plug and drain oil only when the pressure is released.

Definition of Viewpoints

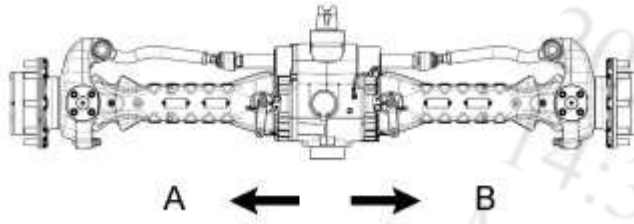


Illustration 1
(A) Left side
(B) Right side

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The terms "Left" and "Right" refer to the position outside facing the machine with the input drive facing forward.

Inspection Procedure



Personal injury or death can result from sudden machine movement.

Before working on the brakes, when the axle is installed on the machine, ensure that the machine is chocked to prevent movement.

Record the axle serial number from the axle serial number plate in the service report. It will be required for any communications or claims to Caterpillar.

The following must be performed on both mechanical parking brakes.



Illustration 2

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1. Disconnect the mechanical parking brake cable. Apply a suitable wrench on the brake lever.



Illustration 3

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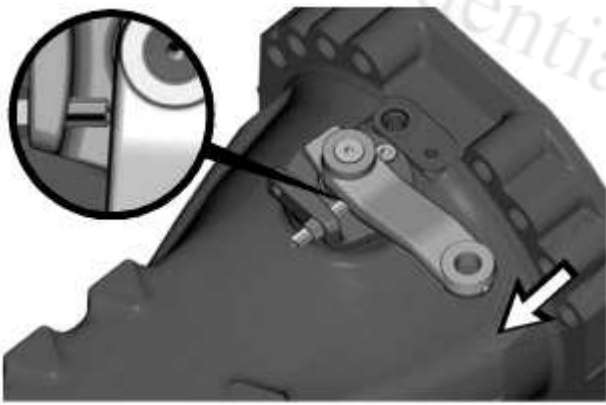


Illustration 4

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3. Remove the force and carefully check that the brake lever returns to its starting position.



Illustration 5

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4. If the brake lever returns to its starting position, proceed to Section "Preventative Action - Repair Before Failure".
If the brake lever does **NOT** return to its starting position, proceed to Section "Repair - After Failure".

Preventative Action - Repair Before Failure

Required Parts

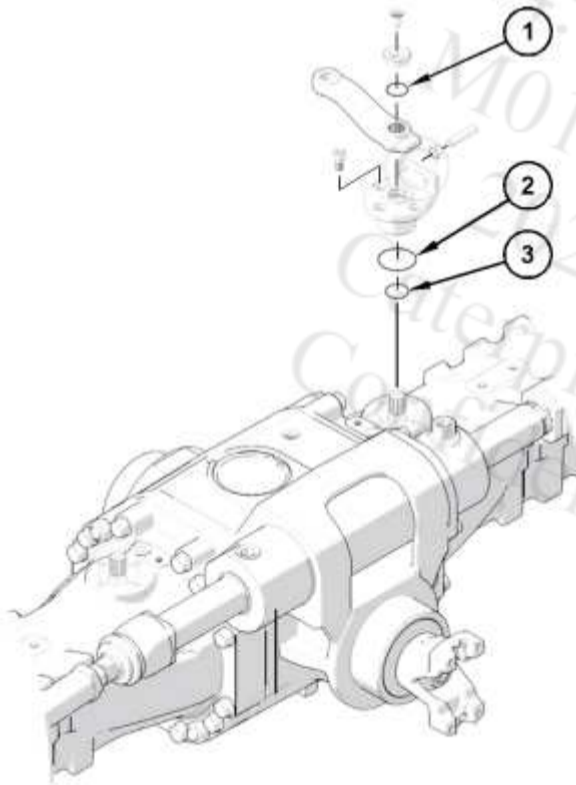


Illustration 6

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Exploded View

Required Parts				
Item	Qty	Part Number	Part Name	Reference Part Number ⁽¹⁾
1	2	458-6100	O-Ring Seal	001.05.1358
2	2	458-6096	O-Ring Seal	001.05.1494
3	2	458-6141	O-Ring Seal	001.05.1588

Table 2

(1)

Required Tools

Required Tools			
Item	Qty	Part Number	Part Name
T1	As Needed	N/A	Castrol Molub-Alloy Paste TA OR Castrol Optimizing Paste TA
T2a ⁽¹⁾	1	330-5251	Controller Kit
T2b	1	N/A	Laptop equipped with Caterpillar [®] Electronic Technician (Cat ET)
	1	421-5320	Cable Kit
	1	517-9882	Software ⁽²⁾

Table 3

⁽¹⁾

⁽²⁾ Use either (T2a) **OR** (T2b), both are not required

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Disassembly

WARNING

Personal injury or death can result from sudden machine movement.

Before working on the brakes, when the axle is installed on the machine, ensure that the machine is chocked to prevent movement.

The following must be performed on both mechanical parking brakes.

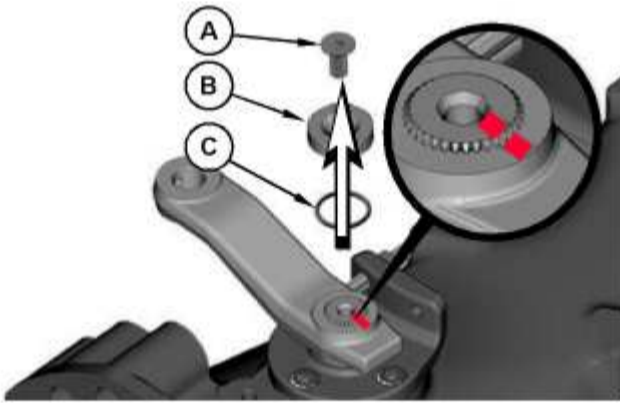


Illustration 7

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- (A) Bolt
- (B) Washer
- (C) O-ring

1. Loosen and remove bolt (A), washer (B), and O-ring (C).

Note: Discard used O-ring (C), do not reuse.

Note: Mark the position of the lever in relation to the thrust lever.

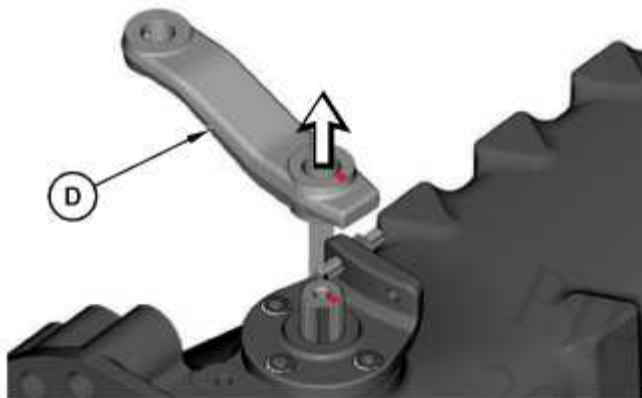


Illustration 8

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- (D) Lever

2. Remove lever (D).

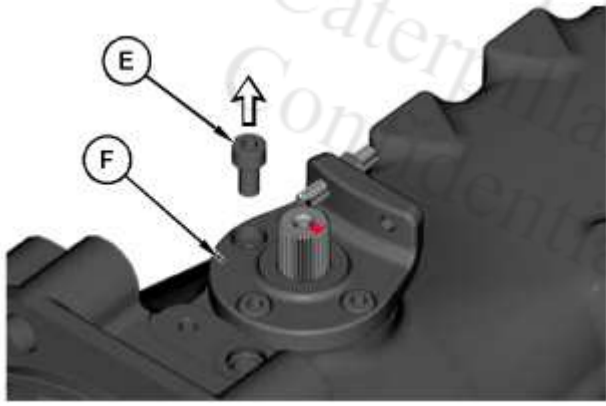


Illustration 9
 (E) Bolt
 (F) Bushing

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3. Loosen and remove bolt (E) and bushing (F).

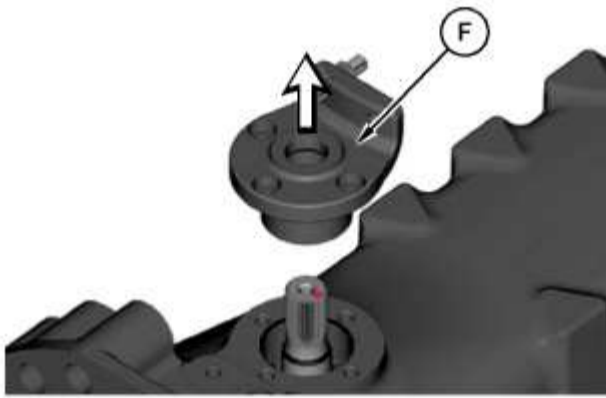


Illustration 10
 (F) Bushing

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4. Remove bushing (F) with the O-rings.



Illustration 11
 (F) Bushing
 (G) O-ring
 (H) O-ring

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5. Remove O-rings (G) and (H) from bushing (F).

Note: Discard used O-rings (G) and (H), do not reuse.

Cleaning

Clean all parts thoroughly using solvent type cleaning fluid. It is recommended that parts be immersed in cleaning fluid and agitated slowly until parts are thoroughly cleaned of all old lubricants and foreign materials.

Thoroughly dry all cleaned parts immediately by using moisture free compressed air or soft lint free absorbent wiping cloth free of abrasive materials such as metal filings, contaminated oil, or lapping compound.



1. Using a lint free cloth, carefully clean outer surface (J) of bushing (F).

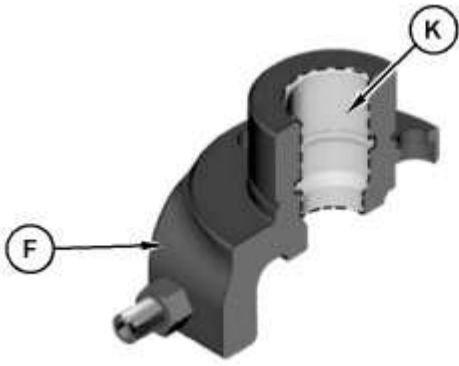


Illustration 13
(F) Bushing
(K) Inner surface

2. Carefully clean inner surface (K) of bushing (F).

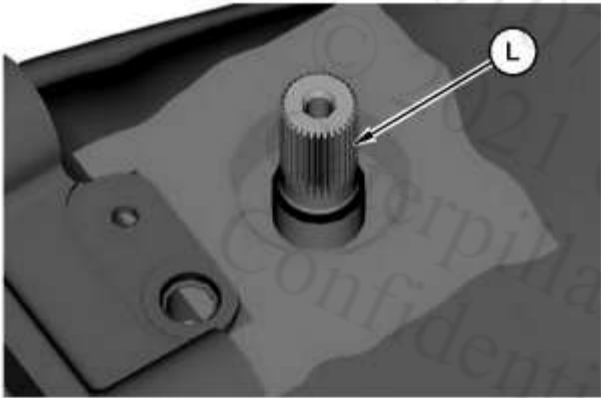


Illustration 14
(L) Thrust lever spline

3. Place a lint free cloth to prevent oil contamination. Using another lint free cloth, carefully clean thrust lever spline (L) and the contact surfaces. Remove and dispose of the lint free cloth.

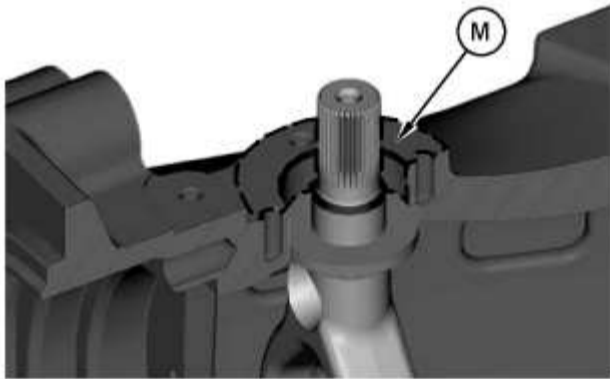
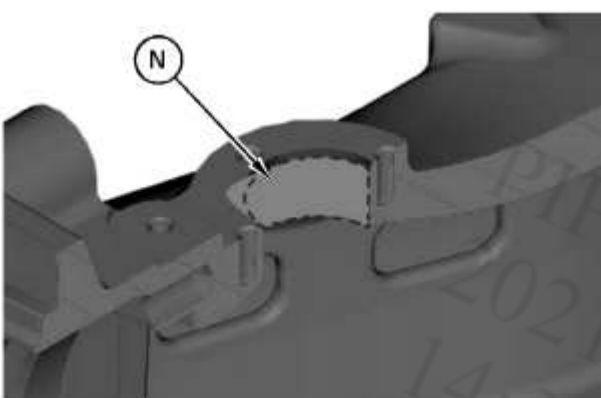


Illustration 15
(M) Contact surface

4. Place a lint free cloth to prevent oil contamination. Using another lint free cloth, carefully clean contact surfaces (M) on the arm. Remove and dispose of the lint free cloth.

Assembly



1. Thoroughly lubricate surface area (N) with Castrol Molub-Alloy Paste TA (T1).

Note: Do not lubricate the threads. The surface area must be fully covered with paste (T1).

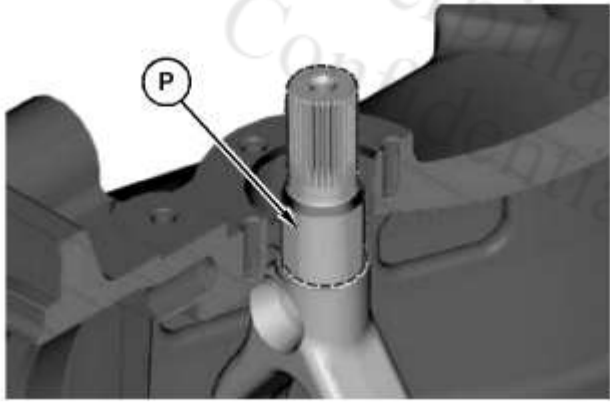


Illustration 17
(P) Surface area

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2. Thoroughly lubricate surface area (P) and thrust lever spline with Castrol Molub-Alloy Paste TA (T1).

Note: Do not lubricate the threads. The surface area must be fully covered with paste (T1).



Illustration 18
(F) Bushing
(R) Surface area

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3. Thoroughly lubricate surface area (R), of bushing (F), with Castrol Molub-Alloy Paste TA (T1).

Note: The surface area must be fully covered with paste (T1).

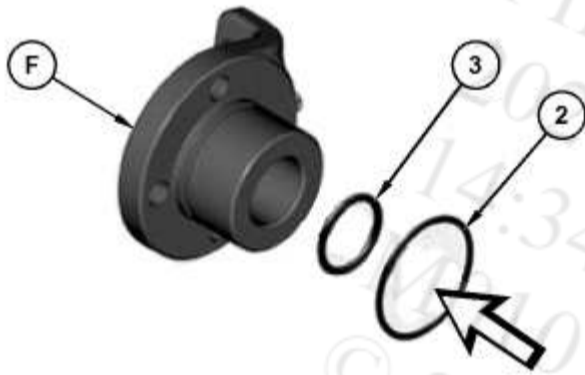


Illustration 19
(2) 458-6096 O-Ring Seal
(3) 458-6141 O-Ring Seal
(F) Bushing

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4. Assemble new O-rings (2) and (3) onto bushing (F).

Note: Do not roll the O-rings.



Illustration 20

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5. Thoroughly lubricate outer surface (J), of bushing (F), and new O-rings (2) and (3) with Castrol Molub-Alloy Paste TA (T1).

Note: The surface area must be fully covered with paste (T1).

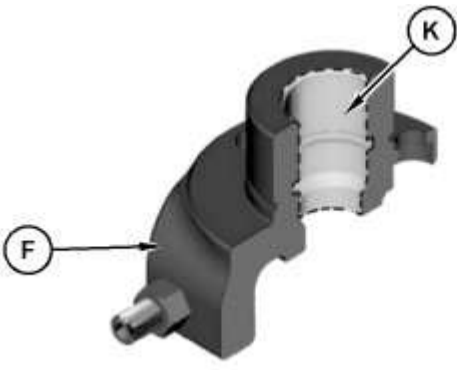


Illustration 21
(F) Bushing
(K) Inner surface

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6. Thoroughly lubricate outer surface (K), of bushing (F), with Castrol Molub-Alloy Paste TA (T1).

Note: The surface area must be fully covered with paste (T1).

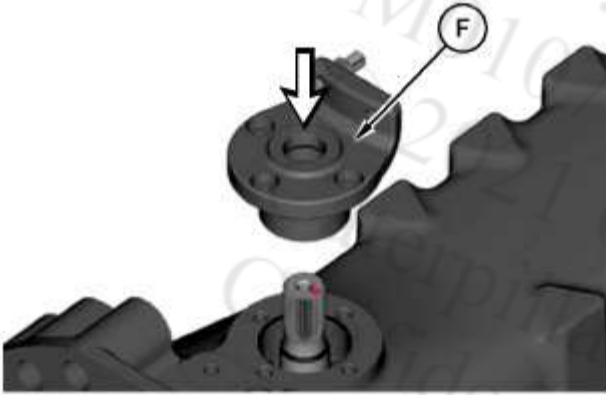


Illustration 22
(F) Bushing

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7. Reinstall bushing (F) into the front axle.

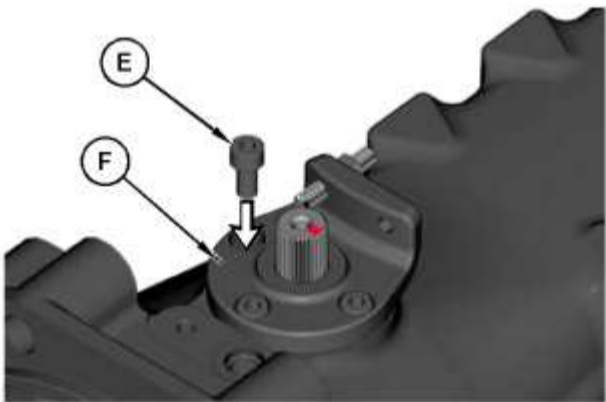


Illustration 23
(E) Bolt
(F) Bushing

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8. Secure bushing (F) with bolt (E) and tighten to a torque of 25 ± 1.2 N·m (18.4 ± 0.89 lb ft).

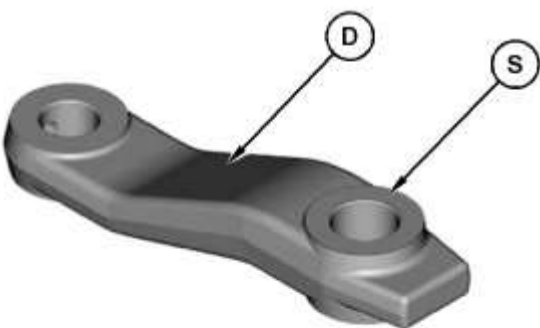


Illustration 24
(D) Lever
(S) Surface

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9. Thoroughly lubricate surface (S) of lever (D) with Castrol Molub-Alloy Paste TA (T1).

Note: The surface area must be fully covered with paste (T1).

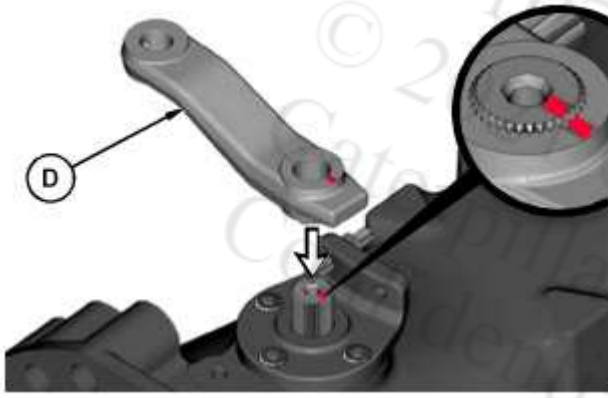


Illustration 25

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10. Reinstall lever (D) on the thrust lever, aligning the previously marked assembly position.

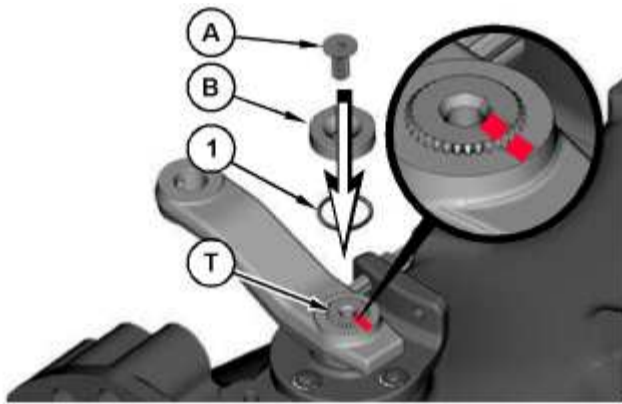


Illustration 26

g06437870

- (1) 458-6100 O-Ring Seal
- (A) Bolt
- (B) Washer
- (T) Surface

11. Thoroughly lubricate surface (T) of lever (D) with Castrol Molub-Alloy Paste TA (T1). Lubricate new O-ring (1) with paste (T1).
Note: The surface area must be fully covered with paste (T1).
12. Install O-ring (1) in washer (B) and install on lever (D).
13. Secure washer (B) to lever (D) using bolt (A) and tighten to a torque of 25 ± 1.2 N·m (18.4 ± 0.89 lb ft).

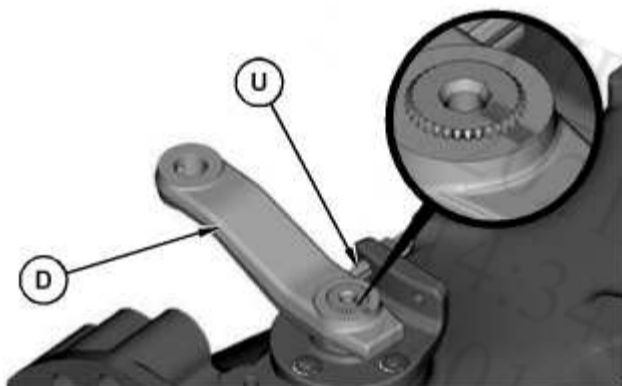


Illustration 27

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- (D) Lever
- (U) Bolt

14. After connecting the control cable, check that when the brakes are released both bolts (U) lean against lever (D).
15. Perform the procedure outlined in Section "Reconnect and Adjust the Parking Brake Cable".
16. Perform the procedure outlined in Section "Confirm the Parking Brake is Functioning Correctly".

Repair - After Failure

Required Parts

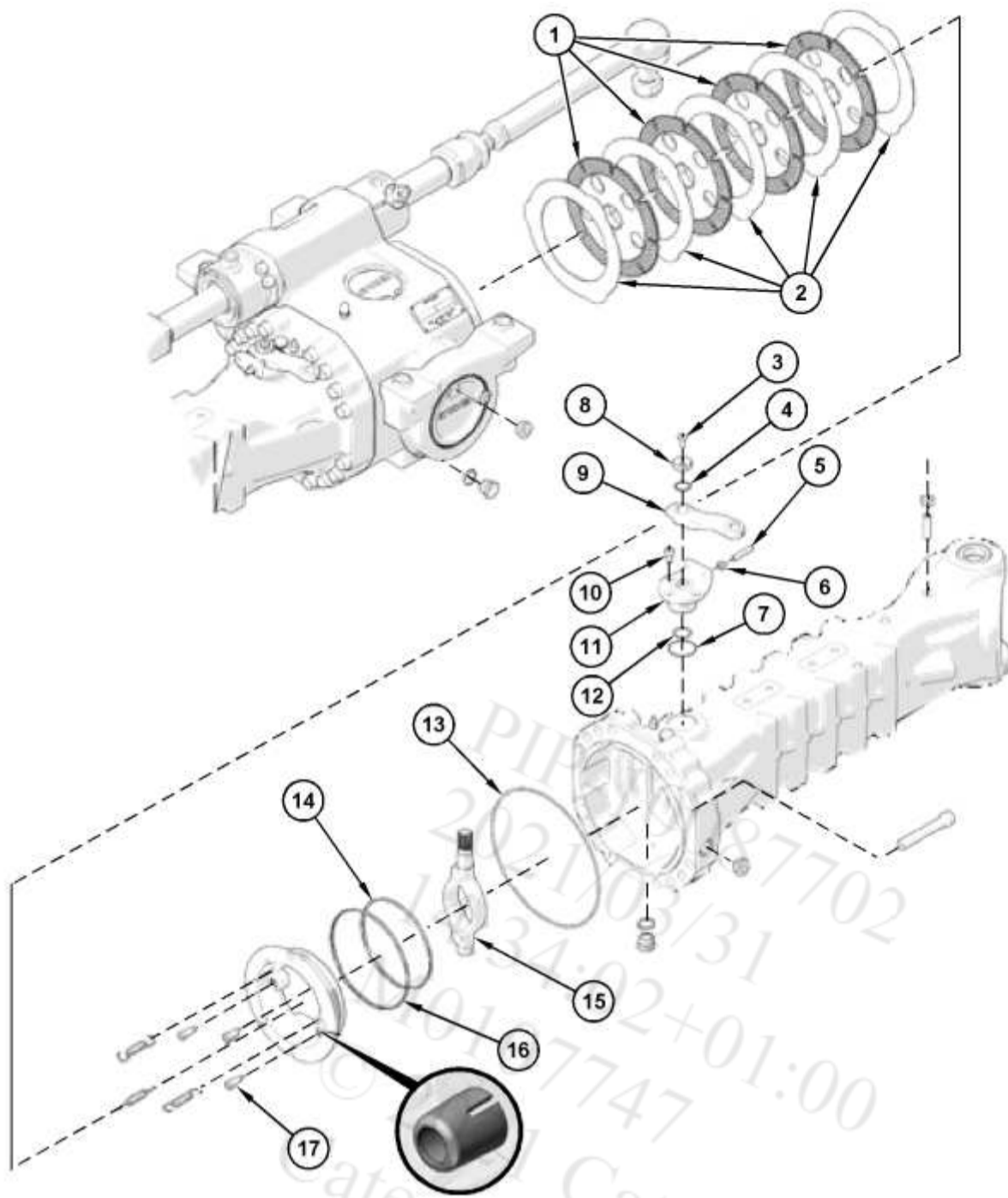


Illustration 28
Exploded View

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Illustration 29
Exploded View

g06438127

Required Parts				
Item	Qty	Part Number	Part Name	Reference Part Number ⁽¹⁾
1	8	385-3637	Disc	112.07.610.04
2	10	459-3348	Brake Disc	112.07.006.06
3	2	097-5154	Bolt	016.06.0439
4	2	458-6100	O-Ring Seal	001.05.1358
5	2	458-6098	Bolt	016.08.2083
6	2	458-6099	Nut	006.03.0195
7	2	458-6096	O-Ring Seal	001.05.1494
8	2	171-07.007.01	Washer	171.07.007.01

9	2	8Q-2143	Lever	734.07.025.05
10	6	458-6095	Bolt	016.04.0705
11	2	507-0387	Bushing	112.07.080.01
12	2	458-6141	O-Ring Seal	001.05.1588
13	4	298-1799	O-Ring Seal	001.05.1178
14	2	459-3347	O-Ring Seal	112.07.075.01
15	1	458-6136	Lever ⁽²⁾	112.07.702.01
16	2	459-3346	O-Ring Seal	112.07.076.01
17	6	350-8573	Bolt	112.07.037.10
18	2	298-1877	O-Ring Seal	001.05.1389
19	1	459-0424	Lever ⁽³⁾	112.07.701.01

Table 4

- (1)
(2) May be stamped on part.
(3) Left side
Right side

Required Tools

Required Tools			
Item	Qty	Part Number	Part Name
T1	As Needed	N/A	Castrol Molub-Alloy Paste TA OR Castrol Optimizing Paste TA
T2a ⁽¹⁾	1	330-5251	Controller Kit
T2b	1	N/A	Laptop equipped with Caterpillar [®] Electronic Technician (Cat ET)
	1	421-5320	Cable Kit
	1	517-9882	Software ⁽²⁾
T3	As Needed	N/A	Loctite 242
T4	As Needed	N/A	NLGI 3 EP Grease

Table 5

- (1)
(2) Use either (T2a) **OR** (T2b), both are not required
Check SIS Web to ensure latest version of this software

Disassembly

WARNING

Personal injury or death can result from sudden machine movement.

Before working on the brakes, when the axle is installed on the machine, ensure that the machine is chocked to prevent movement.

The following must be performed on both mechanical parking brakes.

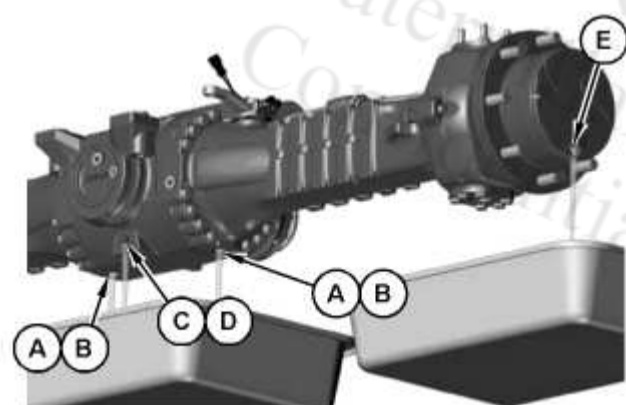


Illustration 30

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- (A) Plug
- (B) Washer
- (C) Plug
- (D) Washer
- (E) Plug

1. Remove oil drain plugs (A), (C), and (E) with washers (B) and (D). Drain the oil from the planetary reduction gear and from the central housing.

Note: Ensure that all the oil has been drained before performing the repair procedure on the axle.

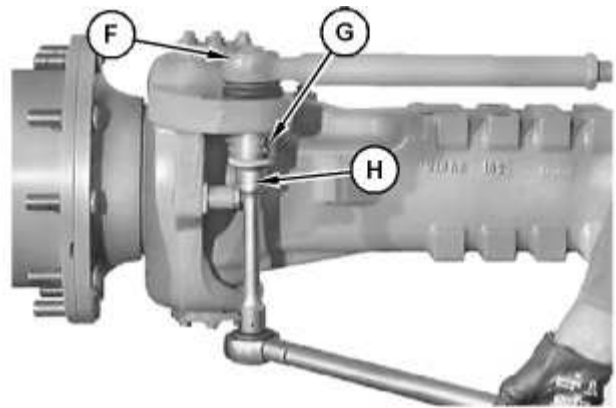


Illustration 31

g06438222

- (F) Tie rods
- (G) Articulation pins
- (H) Castellated nuts

2. Remove castellated nuts (H) that lock articulation pins (G). Remove the safety cotter pins from articulation pins (G) of tie rods (F).

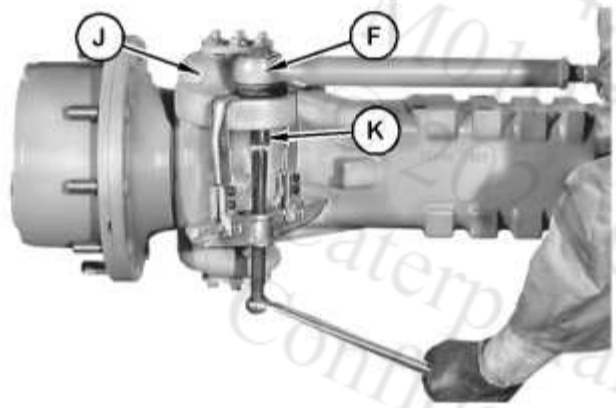


Illustration 32

g06438435

- (F) Tie rods
- (J) Steering knuckle
- (K) Tapered pins

3. Disconnect tapered pins (K) of tie rods (F) from steering knuckle (J) using an extractor.

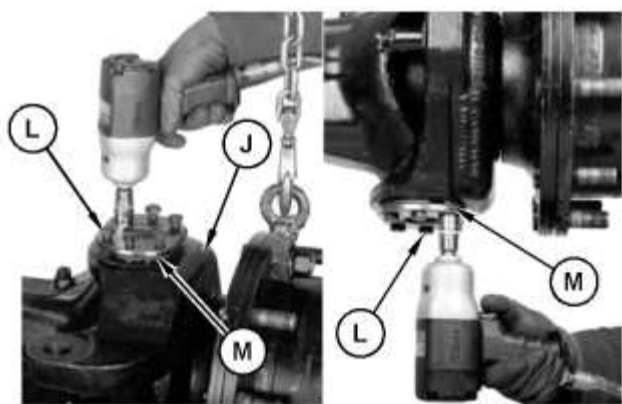


Illustration 33

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- (J) Steering knuckle
- (L) Bolt
- (M) Steering knuckle post

4. Apply a suitable eye hook on the wheel stud and secure using a suitable nut. Safely connect the complete steering knuckle (J) to suitable lifting device using lifting brackets. Loosen and remove bolts (L) from steering knuckle posts (M).

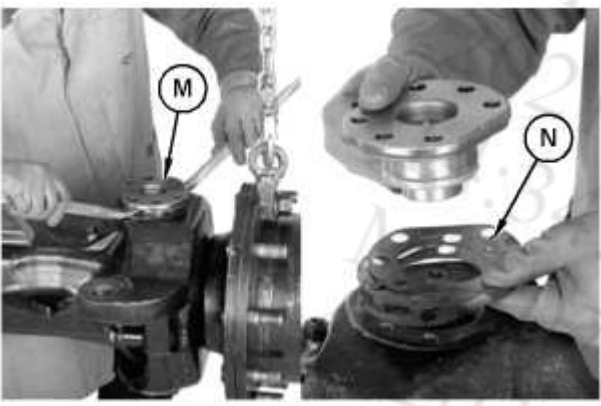


Illustration 34
(M) Steering knuckle post
(N) Shims

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5. Remove upper steering knuckle post (M) complete with front seal ring and shims (N).

Note: Measure the thickness of shims (N), ensure that the shims from each upper steering knuckle post do not get switched.

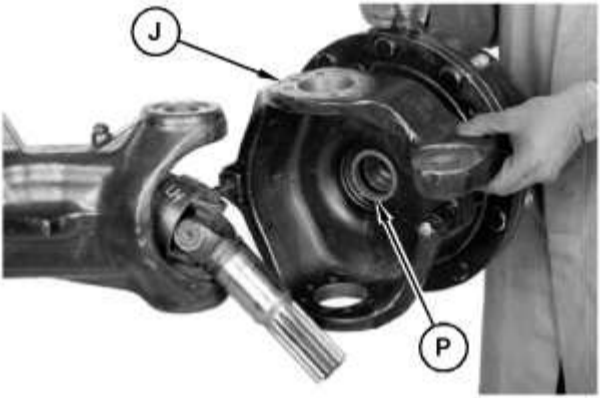


Illustration 35
(J) Steering knuckle
(P) Sun gear seal ring

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6. Remove complete steering knuckle (J) making sure not to damage sun gear seal ring (P).

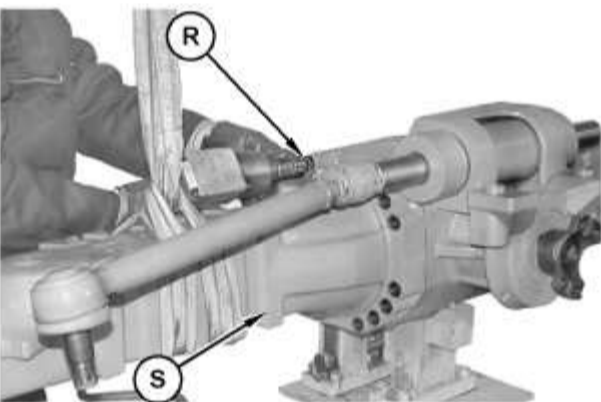


Illustration 36
(R) Bolt
(S) Arm

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7. Using lifting brackets, safely sling arm (S) to be removed and the rod under slight tension. Loosen and remove bolts (R) from arm (S).

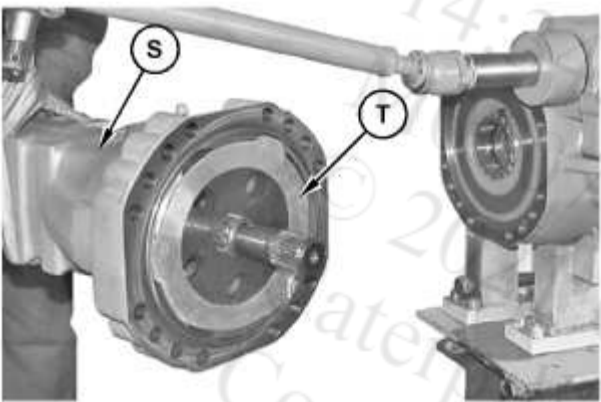


Illustration 37
(S) Arm
(T) Braking discs pack

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8. Remove arm (S) with braking discs pack (T). Place arm (S) on a bench.

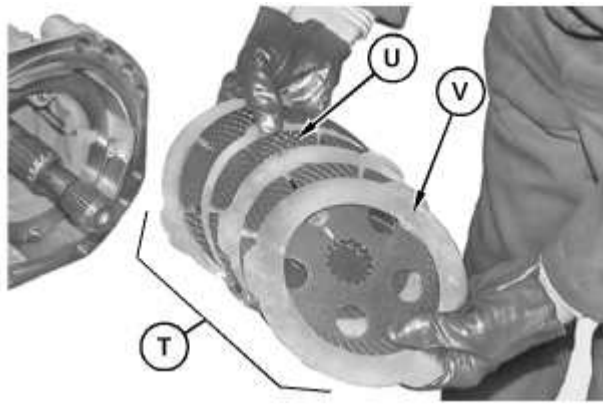


Illustration 38 g06438550
 (T) Braking discs pack
 (U) Braking disc
 (V) Braking disc

9. Remove braking discs pack (T) and write down the order of assembly of the individual braking discs (U) and (V).

Note: After removal and recording placement order, discard braking discs pack (T). New braking discs will be installed during reassembly.

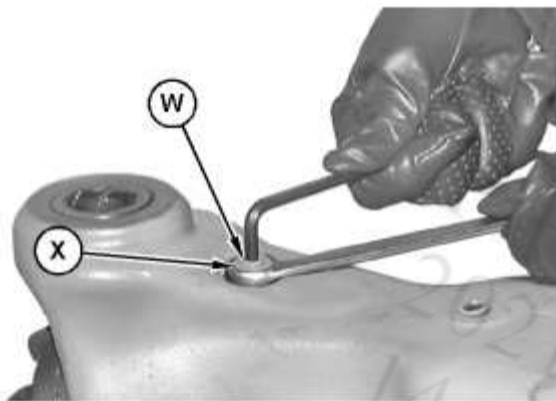


Illustration 39 g06438563
 (W) Counter nuts
 (X) Studs

10. Loosen and remove counter nuts (W) from studs (X).

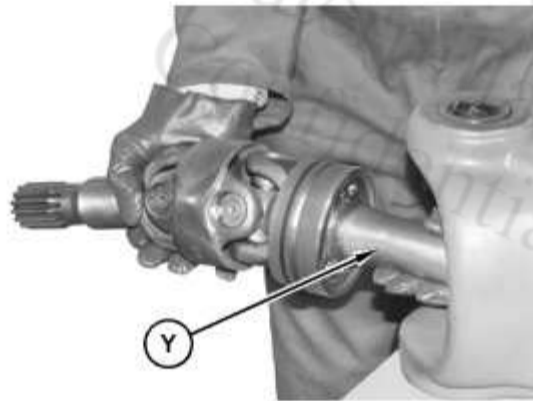


Illustration 40 g06438585
 (Y) U-joint

11. Remove U-joint (Y).

Note: If necessary for the extraction of U-joint (Y), use a plastic mallet or a lever.

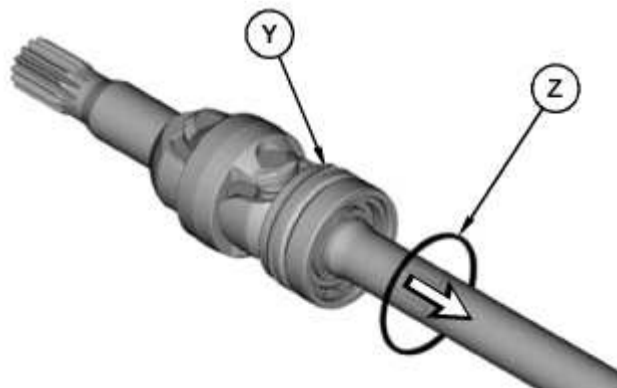


Illustration 41 g06438591
 (Y) U-joint
 (Z) O-ring

12. Remove O-ring (Z) from the bushing on U-joint (Y).

Note: Discard O-ring (Z), do not reuse.

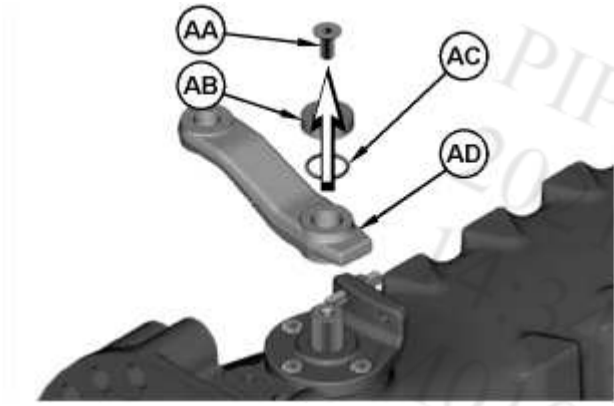


Illustration 42

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- (AA) Bolt
- (AB) Washer
- (AC) O-ring
- (AD) Lever

13. Loosen and remove bolt (AA), washer (AB), O-ring (AC), and lever (AD).

Note: Discard removed parts, do not reuse.

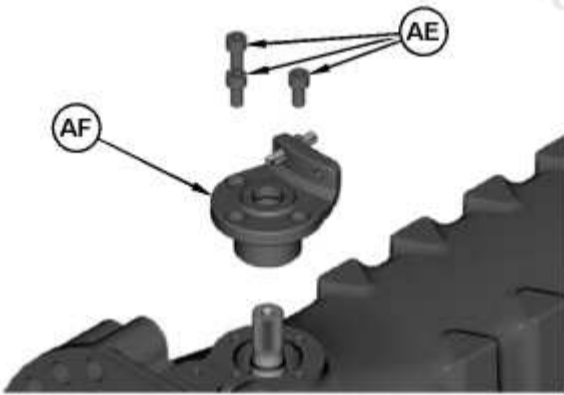


Illustration 43

g06438607

- (AE) Bolt
- (AF) Bushing

14. Remove bolts (AE) and bushing (AF) with the O-rings.

Note: Discard removed parts, do not reuse.

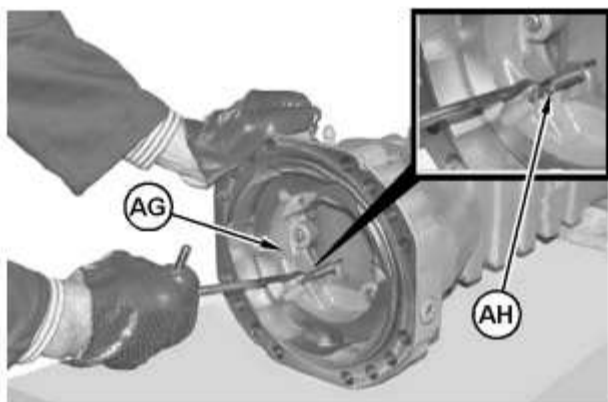


Illustration 44

g06438616

- (AG) Piston
- (AH) Return spring

15. Remove return springs (AH) from piston (AG).

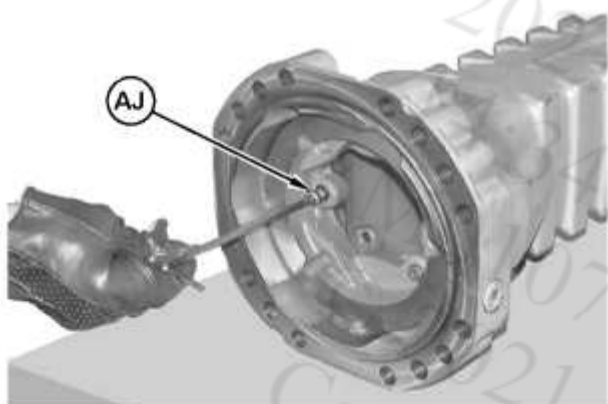


Illustration 45

g06438619

- (AJ) Self adjusting screw

16. Remove self adjusting screws (AJ).

Note: Discard removed parts, do not reuse.

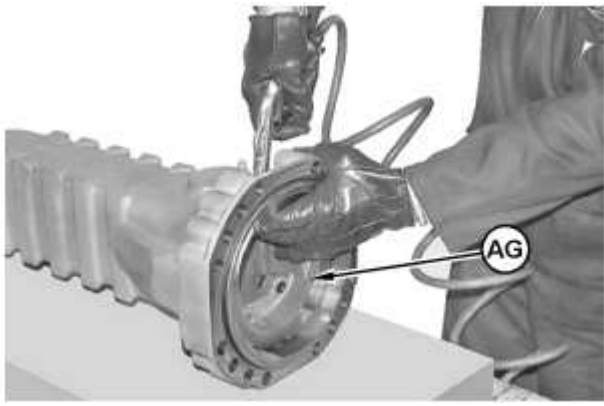


Illustration 46
(AG) Piston

g06438623

17. Slowly introduce compressed air through the connection of the braking circuit to extract piston (AG).



Illustration 47
(AK) Thrust lever

g06438627

18. Lift and slightly rotate thrust lever (AK).

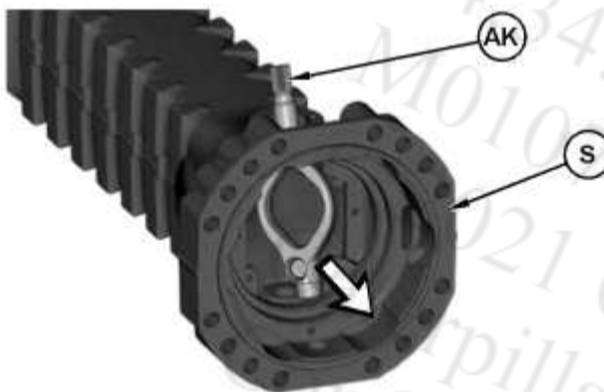


Illustration 48
(S) Arm
(AK) Thrust lever

g06438638

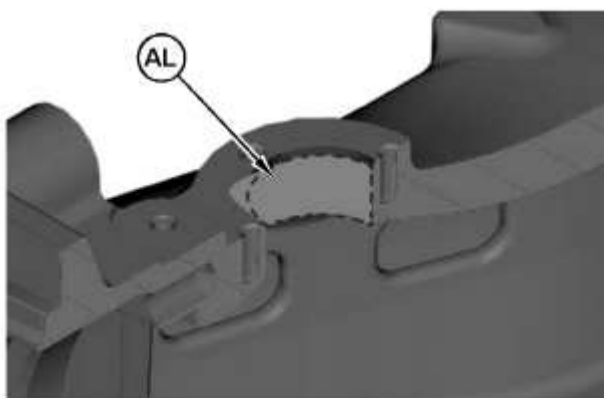
19. Tilt and remove thrust lever (AK) from each side of arm (S).

Note: Discard removed parts, do not reuse. Clean the lower thrust washer seat.

Cleaning

Clean all parts thoroughly using solvent type cleaning fluid. It is recommended that parts be immersed in cleaning fluid and agitated slowly until parts are thoroughly cleaned of all old lubricants and foreign materials.

Thoroughly dry all cleaned parts immediately by using moisture free compressed air or soft lint free absorbent wiping cloth free of abrasive materials such as metal filings, contaminated oil, or lapping compound.



1. Using a lint free cloth, carefully clean surface (AL) on arm (S).

Assembly

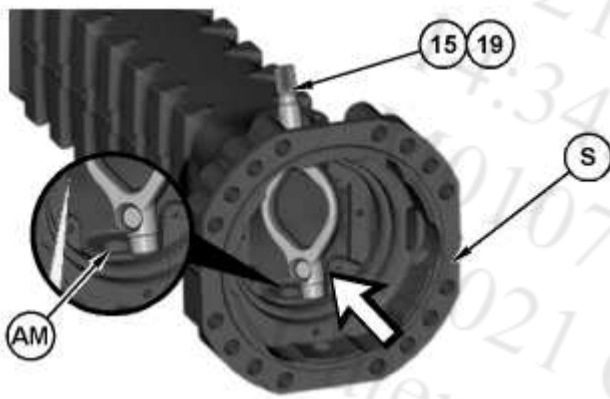


Illustration 50

g06438691

- (15) 458-6136 Lever (left side)
- (19) 459-0424 Lever (right side)
- (S) Arm
- (AM) Thrust lever seat

1. Lubricate thrust lever (15) seat (AM). Assemble thrust lever (15) into arm (S).

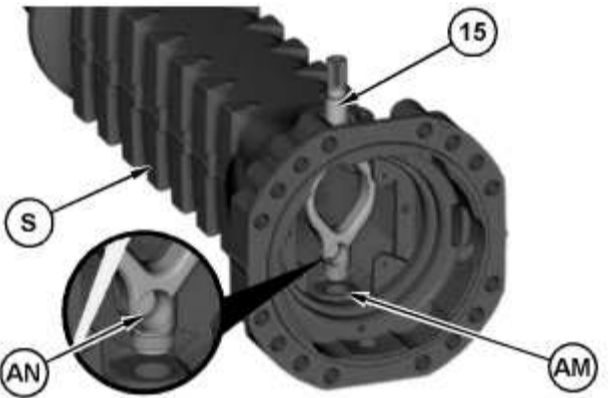


Illustration 51

g06438708

- (15) 458-6136 Lever (left side)
- (19) 459-0424 Lever (right side)
- (S) Arm
- (AM) Thrust lever seat
- (AN) Pusher slot

2. Assemble thrust lever (15) into seat (AM). Ensure that pusher slot (AN) is facing towards the piston side.

Note: Pay attention to assemble the right-hand side thrust lever (19) in the right-hand side arm and left-hand side thrust lever (15) in the left-hand side arm.

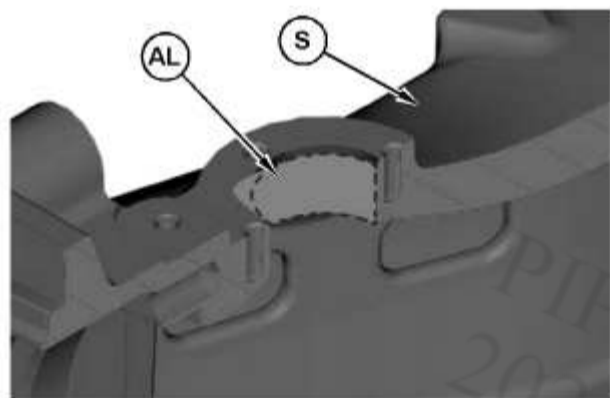


Illustration 52

g06438710

- (S) Arm
- (AL) Surface

3. Thoroughly lubricate surface area (AL) with Castrol Molub-Alloy Paste TA (T1).

Note: Do not lubricate the threads. The surface area must be fully covered with paste (T1).

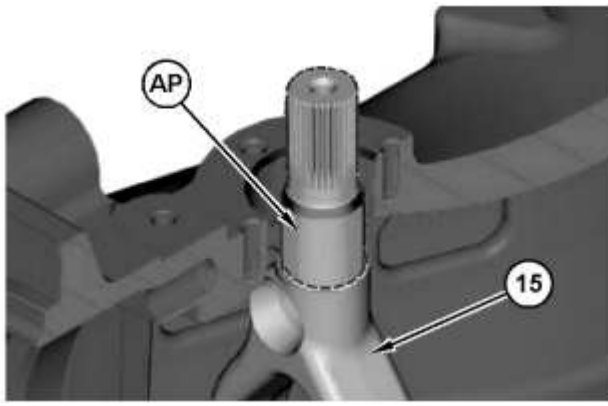


Illustration 53
 (15) 458-6136 Lever
 (AP) Surface area

g06438711

4. Thoroughly lubricate surface area (AP) and thrust lever spline with Castrol Molub-Alloy Paste TA (T1).

Note: Do not lubricate the threads. The surface area must be fully covered with paste (T1).



Illustration 54
 (5) 458-6098 Bolt
 (6) 458-6099 Nut
 (11) 507-0387 Bushing

g06438713

5. Assemble bolt (5) and nut (6) in the correct threaded hole of bushing (11).



Illustration 55
 (11) 507-0387 Bushing
 (AR) Surface area

g06438716

6. Thoroughly lubricate surface area (AR), of bushing (11), with Castrol Molub-Alloy Paste TA (T1).

Note: The surface area must be fully covered with paste (T1).

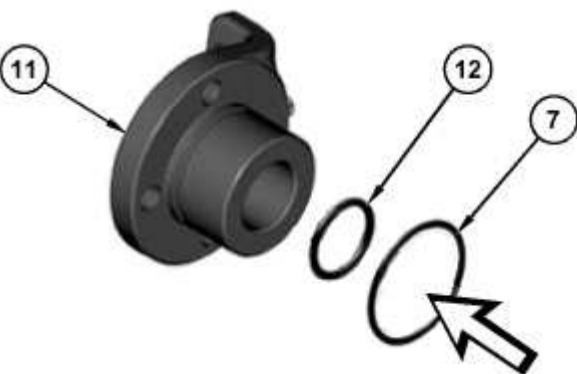


Illustration 56
 (7) 458-6096 O-Ring Seal
 (11) 507-0387 Bushing
 (12) 458-6141 O-Ring Seal

g06438722

7. Assemble new O-rings (7) and (12) onto bushing (11).

Note: Do not roll the O-rings.



Illustration 57
 (11) 507-0387 Bushing
 (AS) Surface

g06438730

8. Thoroughly lubricate outer surface (AS), of bushing (11), and new O-rings (7) and (12) with Castrol Molub-Alloy Paste TA (T1).

Note: The surface area must be fully covered with paste (T1).

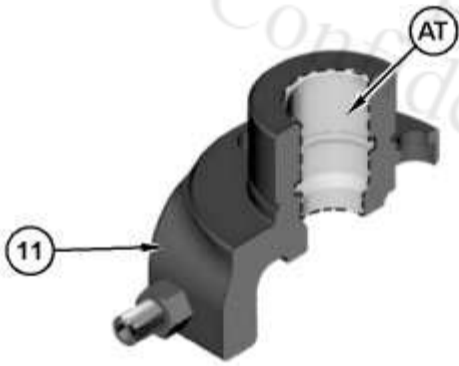


Illustration 58
 (11) 507-0387 Bushing
 (AT) Inner surface

g06438732

9. Thoroughly lubricate inner surface (AT), of bushing (11), with Castrol Molub-Alloy Paste TA (T1).

Note: The surface area must be fully covered with paste (T1).

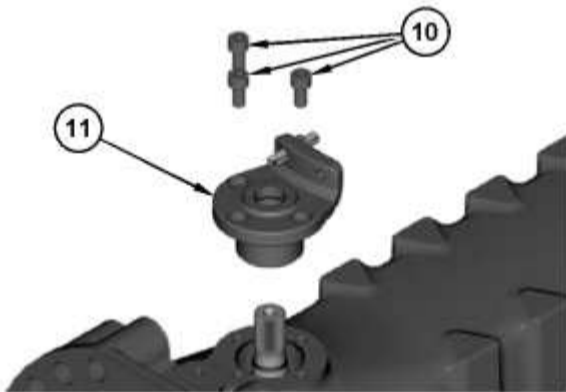


Illustration 59
 (10) 458-6095 Bolt
 (11) 507-0387 Bushing

g06438741

10. Install bushing (11), complete with O-rings (7) and (12), and secure with bolts (10). Tighten bolts (10) to a torque of 25 ± 1.2 N·m (18.4 ± 0.89 lb ft).



Illustration 60
 (9) 8Q-2143 Lever
 (AU) Surface

g06438763

Note: The surface area must be fully covered with paste (T1).

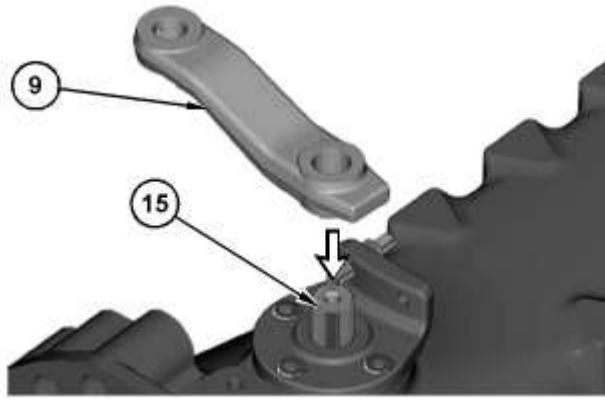


Illustration 61
(9) 8Q-2143 Lever
(15) 458-6136 Lever

g06438769

12. Assemble lever (9) onto thrust lever (15).

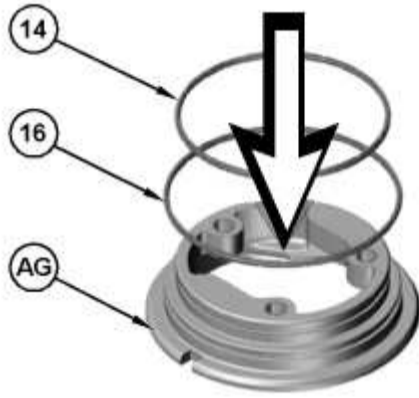


Illustration 62
(14) 459-3347 O-Ring Seal
(16) 459-3346 O-Ring Seal
(AG) Piston

g06438775

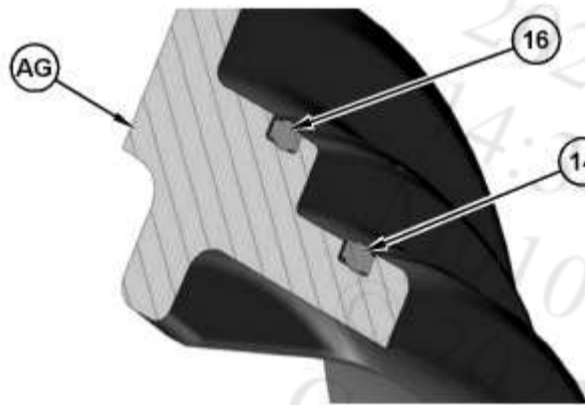


Illustration 63
Piston Assembly Detail Cutaway
(14) 459-3347 O-Ring Seal
(16) 459-3346 O-Ring Seal
(AG) Piston

g06438779

13. Thoroughly clean piston (AG). Lubricate and assemble O-rings (14) and (16) in the slots of piston (AG).

Note: The surface area and O-rings must be fully covered with paste (T1).

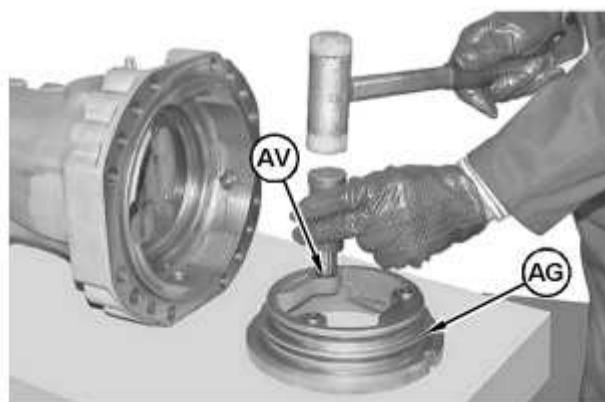


Illustration 64
(AG) Piston
(AV) Self adjusting spring

g06438964

14. Using a suitable driver, move self adjusting springs (AV) in line with the surface of piston (AG).



Illustration 65
(S) Arm
(AG) Piston

g06438974

15. Assemble piston (AG) into arm (S).

Note: Ensure that the piston seat fits in the stop pin inside arm (S).

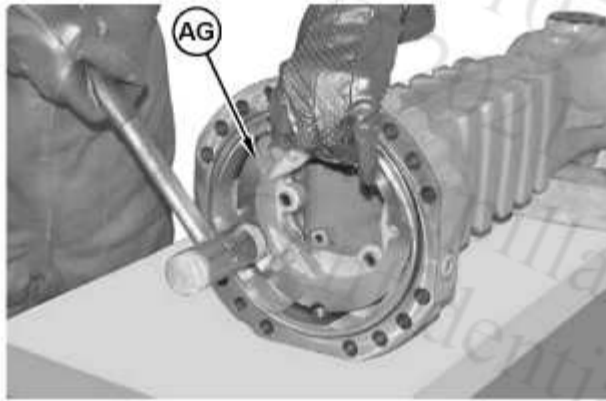


Illustration 66
(AG) Piston

g06438978

16. Install piston (AG) by lightly hammering around the edge with a plastic hammer.

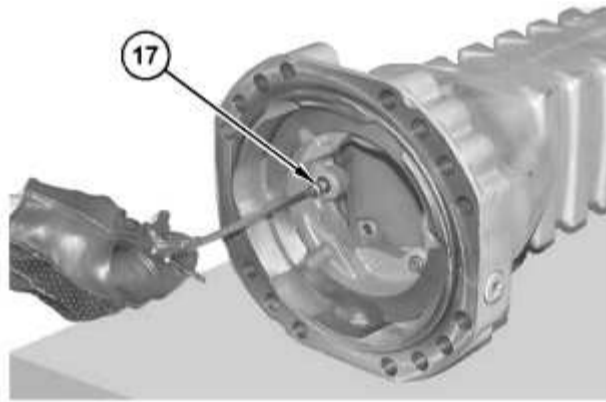


Illustration 67
(17) 350-8573 Bolt

g06438979

17. Assemble bolts (17) and tighten to a torque of 6 ± 1 N·m (53 ± 9 lb in).

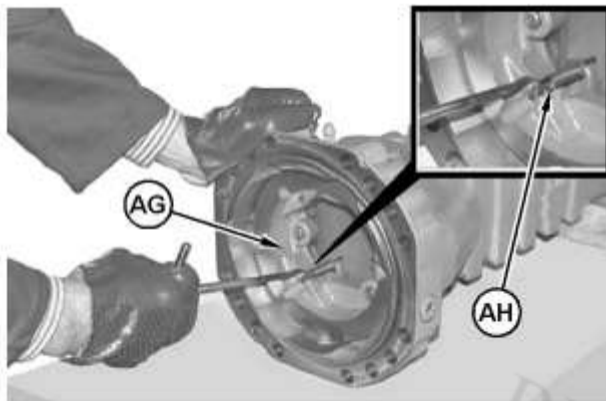


Illustration 68
(AG) Piston
(AH) Return spring

g06438616

18. Assemble return springs (AH) in piston (AG).

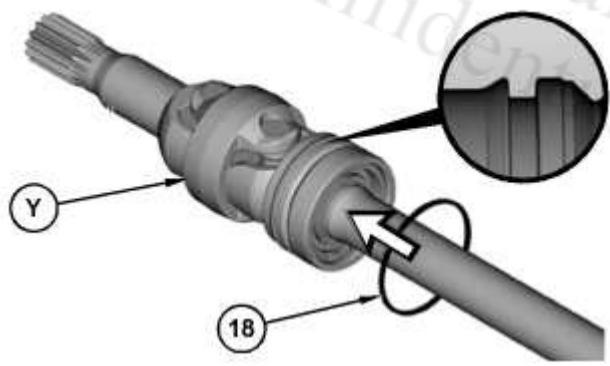


Illustration 69
 (18) 298-1877 O-Ring Seal
 (Y) U-joint

g06439016

19. Lubricate O-ring (18) with the proper axle lubricant type and assemble into the slot on U-joint (Y).

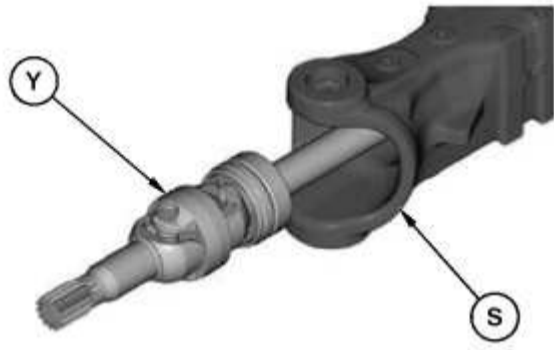


Illustration 70
 (S) Arm
 (Y) U-joint

g06439020

20. Assemble U-joint (Y) in the seat in arm (S).

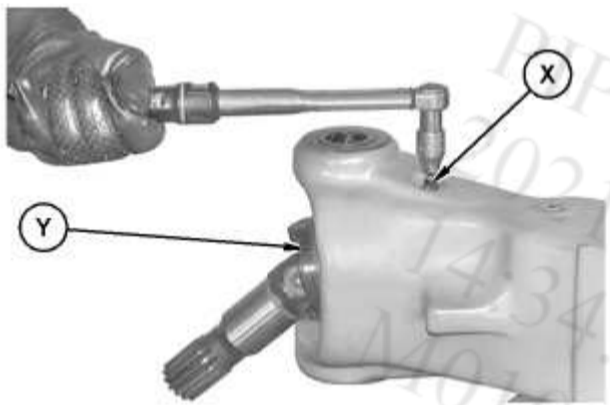


Illustration 71
 (X) Studs
 (Y) U-joint

g06439055

21. Install U-joint (Y) and tighten studs (X) to a maximum torque of 15 N·m (133 lb in).

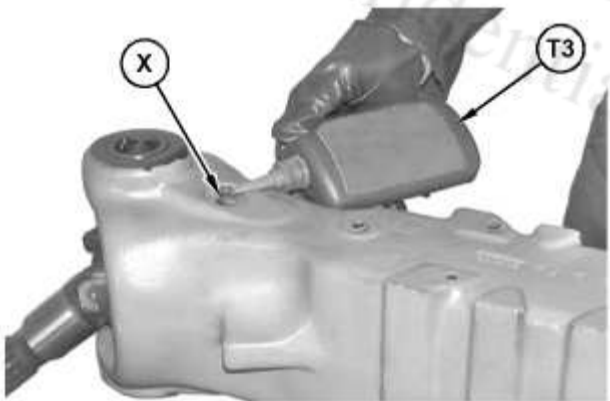


Illustration 72
 (X) Studs
 (T3) Loctite 242

g06439060

22. Apply Loctite 242 (T3) to studs (X).

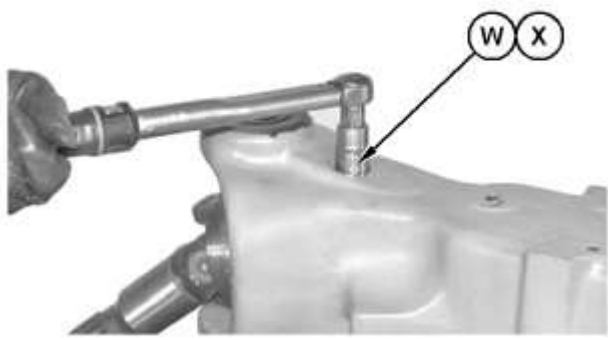


Illustration 73
 (W) Counter nuts
 (X) Studs

g06439063

23. Install counter nuts (W) on studs (X) and tighten to a torque of 122 N·m (90 lb ft).

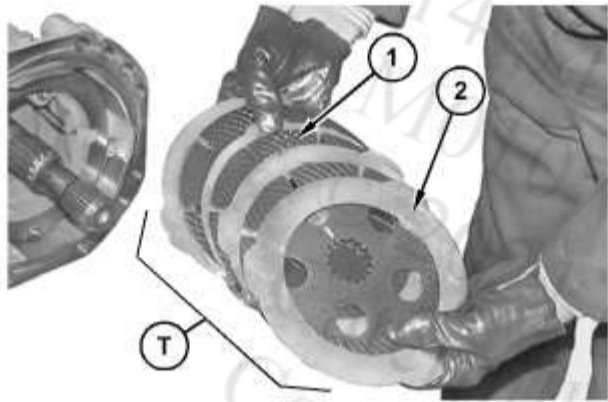


Illustration 74
 (1) 385-3637 Disc
 (2) 459-3348 Brake Disc
 (T) Braking discs pack

g06439078

24. Lubricate disc pack (T) consisting of new brake discs (1) and (2) using the proper type of axle lubricant. Check that the brake discs are in alternating sequence. Assemble disc (2) first, disc (1) second, and disc (2) is assembled last.

Note: Refer to Service Magazine, M0090819, "Updated Front Axle Group Oil Specifications for Differentials and Wheel Ends are Now Available for Certain Telehandlers" for proper axle lubrication.

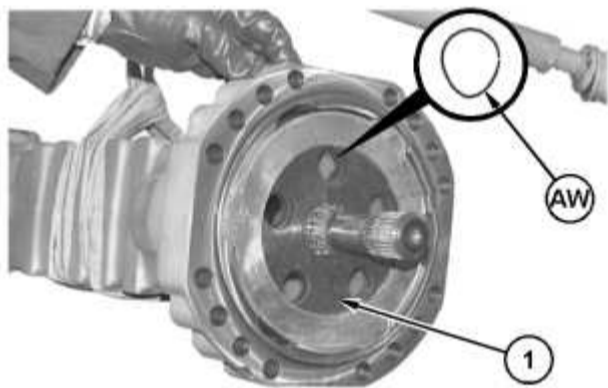


Illustration 75
 (1) 385-3637 Disc
 (AW) Oval marked holes

g06439085

25. Assemble brake discs (1) with the oil circulation holes and oval marked holes (AW) perfectly aligned.

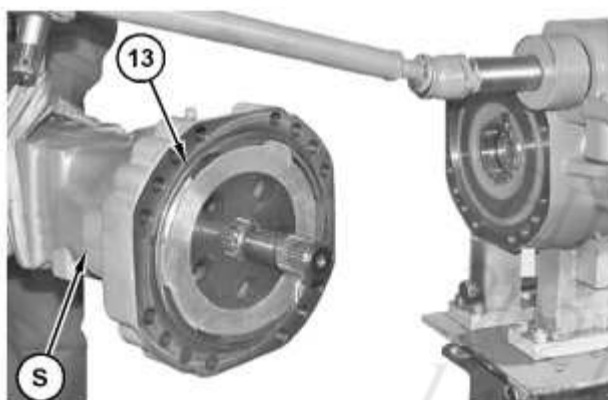


Illustration 76
 (13) 298-1799 O-Ring Seal
 (S) Arm

g06439095

26. Lubricate O-ring (13) using the same axle lubricant and assemble on the centering diameter on arm (S).
27. Assemble the first arm (S) on the central housing. Secure arm (S) into position using two bolts (R). Assemble the second arm.
- Note:** Position an anti-tilt suitable support under the first arm after assembling the arm onto the central housing.

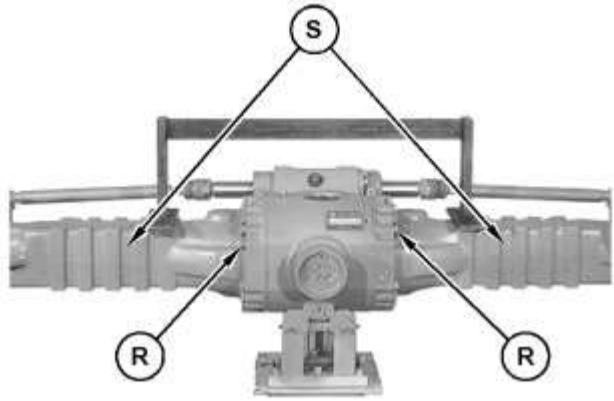


Illustration 77

g06439107

(R) Bolt
(S) Arm

28. Check the alignment of arms (S) and secure into place by assembling remaining bolts (R) using the criss-cross method. Tighten all bolts to a torque of 298 N·m (220 lb ft).

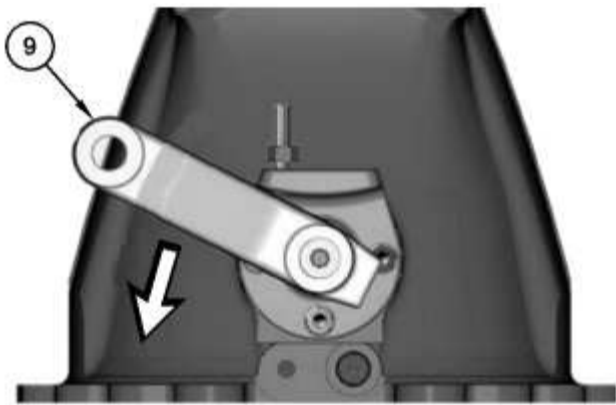


Illustration 78

g06439186

(9) 8Q-2143 Lever

29. Connect the braking circuit and apply the maximum working pressure to set braking discs pack (T).

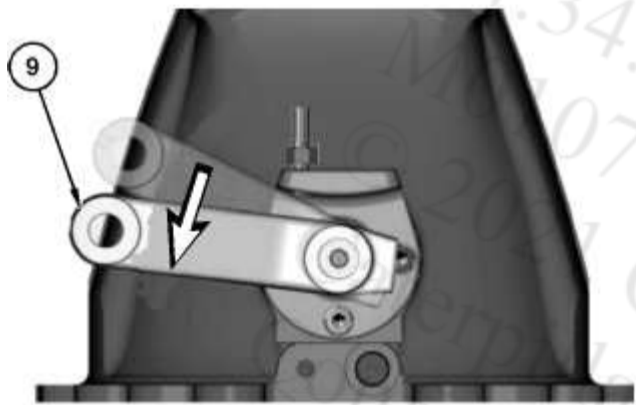


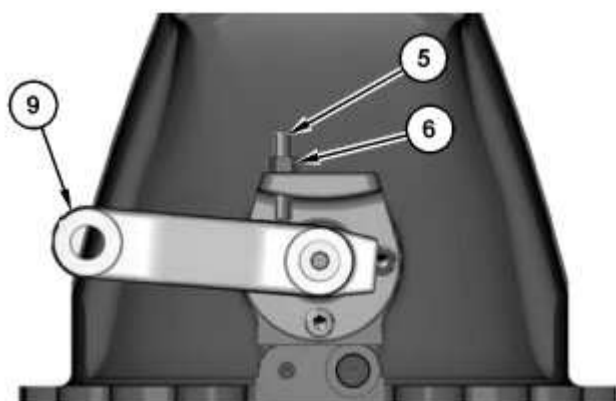
Illustration 79

g06439190

(9) 8Q-2143 Lever

30. Apply a force of 9 ± 1 N (2.0 ± 0.2 lb) to lever (9). Direct the force towards the braking direction to eliminate the idle stroke.

Note: The idle stroke should be eliminated without preloading the thrust levers.



31. While the force is being applied, tighten bolt (5) until touching lever (9). Lock bolt (5) in position with nut (6) tightening to a torque of 22.5 ± 2.5 N·m (199 ± 22 lb in).

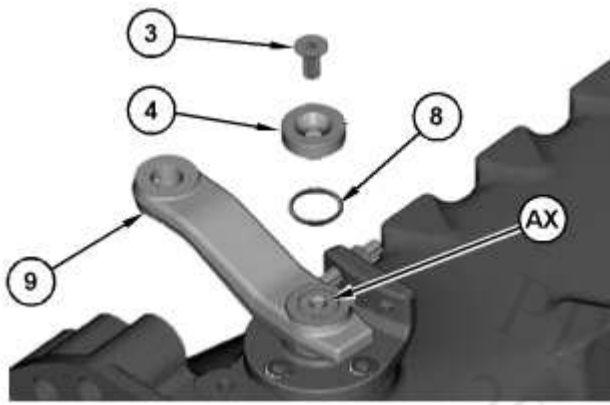


Illustration 81

g06439203

- (3) 097-5154 Bolt
(4) 458-6100 O-Ring Seal
(8) 458-6132 Washer
(9) 8Q-2143 Lever
(AX) Surface

32. Thoroughly lubricate surface (AX) and O-ring (4) with Castrol Molub-Alloy Paste TA (T1). Assemble O-ring (4) into washer (8) and secure to lever (9) with bolt (3). Tighten bolt (3) to a torque of 25 ± 1.2 N·m (18.4 ± 0.89 lb ft).

Note: After connecting the parking brake control cable, check that when brakes are released both bolts (5) rest against levers (9).

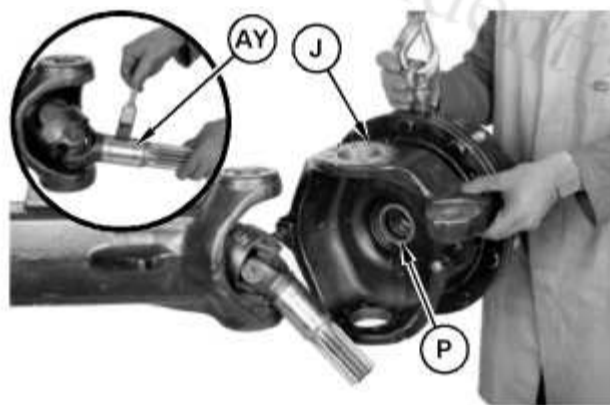


Illustration 82

g06439219

- (J) Steering knuckle
(P) Sun gear seal ring
(AY) Sun gear

33. Lubricate sun gear (AY) before assembly. Connect steering knuckle (J) to suitable lifting device. Assemble sun gear (AY) into steering knuckle (J), paying attention not to damage sun gear seal ring (P). Seat steering knuckle (J) paying attention to engage sun gear (AY) in the planetary gears.

Note: Rotate the pinion to facilitate the sun gear engagement.

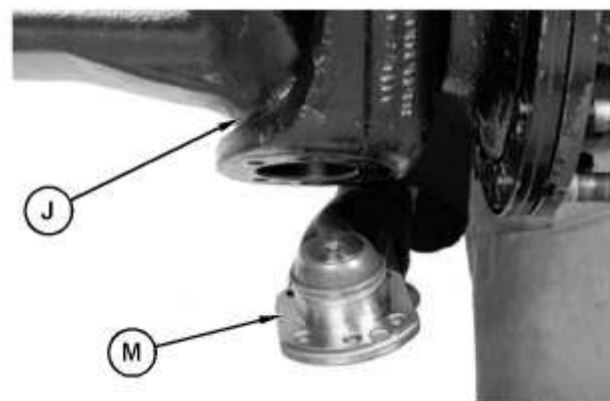


Illustration 83

g06439225

- (J) Steering knuckle
(M) Steering knuckle post

34. Using NLGI 3 EP grease (T4), thoroughly lubricate bottom steering knuckle post (M), the contact surfaces of steering knuckle post (M), and steering knuckle (J). Install steering knuckle post (M).

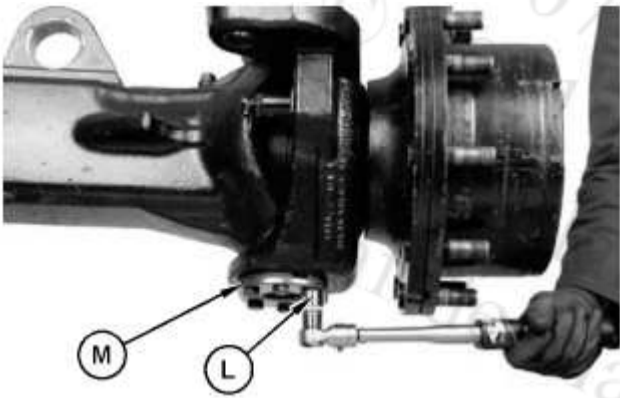


Illustration 84 g06439227
 (L) Bolt
 (M) Steering knuckle post

35. Secure steering knuckle post (M) using bolts (L). Tighten bolts (L), using the criss-cross method, to a torque of 140 N·m (103 lb ft).

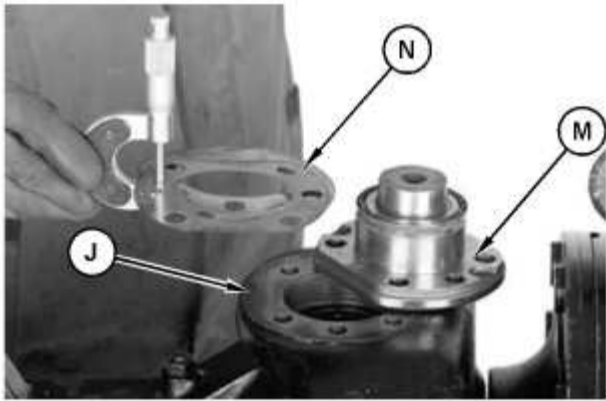


Illustration 85 g06439229
 (J) Steering knuckle
 (M) Steering knuckle post
 (N) Shims

36. Using NLGI 3 EP grease (T4), thoroughly lubricate top steering knuckle post (M), the contact surfaces of steering knuckle post (M), and steering knuckle (J). Assemble shims (N) of the same thickness measured during disassembly.

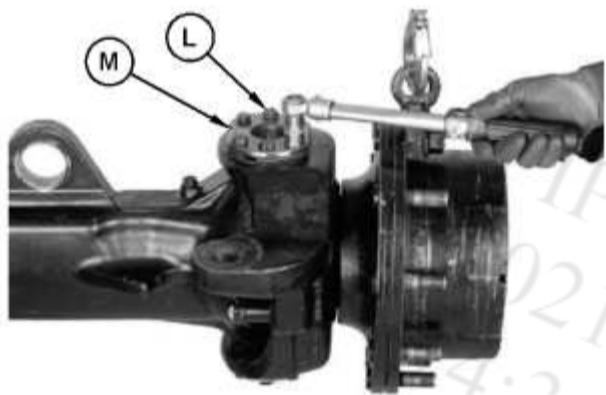


Illustration 86 g06439230
 (L) Bolt
 (M) Steering knuckle post

37. Secure top steering knuckle post (M) using bolts (L). Tighten bolts (L), using the criss-cross method, to a torque of 140 N·m (103 lb ft).



Illustration 87 g06439618
 (H) Castellated nuts
 (J) Steering knuckle

38. Insert the pins into steering knuckle (J) and tighten castellated nuts (H) to a torque of 275 ± 15 N·m (203 ± 11 lb ft). Find the position of the notching in relation to the hole of the

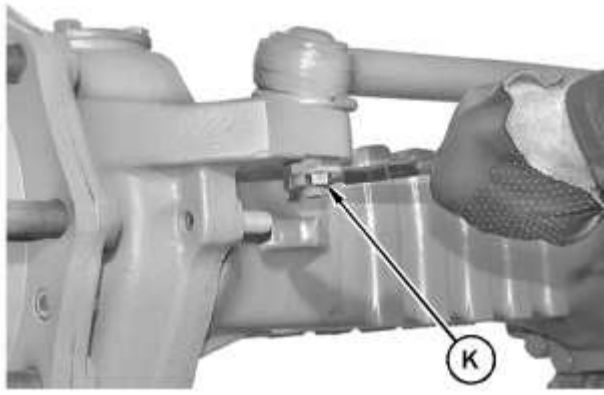


Illustration 88
(K) Tapered pins

g06439628

39. Insert tapered pins (K) and bend the safety stems.

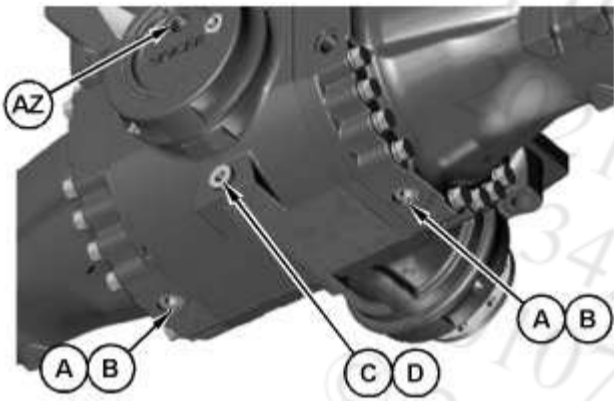


Illustration 89
(A) Plug
(B) Washer
(C) Plug
(D) Washer
(AZ) Plug

g06439636

40. Assemble the central housing oil drain plugs (C) and (AZ) and arm drain plugs (A) with washers (B) and (D). Tighten the plugs to a torque of 42.5 ± 7.5 N·m (31.3 ± 5.5 lb ft).

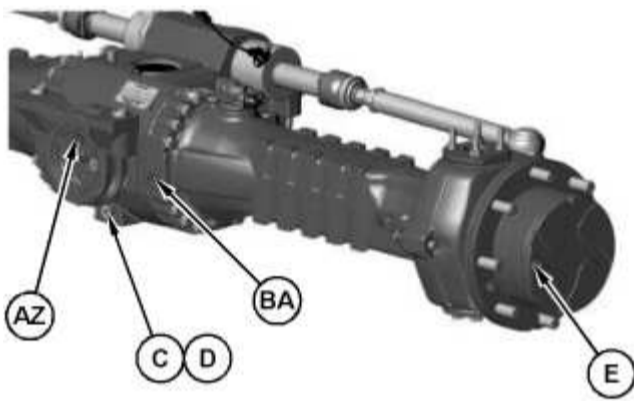


Illustration 90
(E) Plug
(AZ) Plug
(BA) Plug

g06439641

41. Rotate the planetary carrier cover until the oil filling hole is in the horizontal position. Fill the planetary carrier cover and central housing with appropriate type and quantity of oil. Install oil fill plugs (E) and (AZ) and oil level plug (BA). Tighten the plugs to a torque of 42.5 ± 7.5 N·m (31.3 ± 5.5 lb ft).

42. Install the axle into the machine.

Reconnect and Adjust the Parking Brake Cable

1. Turn the hand grip on the parking brake lever to the minimum position, therefore giving minimal displacement of cable when parking brake is applied.
2. With the hand lever in the OFF position, connect both clevis to the lever arms on the axle.
3. Ensure that the lever arms on the axle are resting on the end stops with the parking brake in the OFF position. Make any necessary adjustments by setting the positional lock nuts mounted on the threaded barrels of the cable assembly ensuring any cable slack is eliminated.

4. To set the parking brake holding force, rotate the hand grip on the parking brake lever to achieve a greater cable displacement.
5. Ensure that the parking brake system meets the holding criteria by performing the procedure outlined in Section "Confirm the Parking Brake is Functioning Correctly".

Confirm the Parking Brake is Functioning Correctly

Confirm that the parking brake is functioning correctly using the following procedure:

Note: The following procedure is used to determine if the parking brake is functional. This procedure is not intended to measure the maximum brake performance.

Note: Install either tooling (T2a) **OR** (T2b) to perform this procedure.

1. Verify that the machine is on a dry, level surface and the test area is clear of personnel and obstacles.

2. Engage the park brake and start the machine.

3. Select "PARK BRAKE TEST" from the Calibrations Menu. The operator will be asked: "PERFORM PARK BRAKE TEST?". To begin the test, press "ENTER".

Note: Pressing the "ESC" button will return the operator back to the Calibrations Menu.

Note: If there is an active fault pertaining to a drive direction or gear selection inputs, the analyzer will not permit the test to be run and show "PARK BRAKE TEST FAILED".

4. With the park brake test now running, the analyzer will prompt the operator to "SET PARK BRAKE".

Note: If the park brake is NOT set (or no input received from the park brake micro switch) when the operator presses the "OK" button, the control system will respond with a "PARK BRAKE TEST FAILED" message. Any following button press will return the analyzer back to "CALIBRATION: PARK BRAKE TEST" menu screen.

5. If the park brake is set when the operator presses "ENTER", the analyzer will prompt the operator to shift to a specified gear. Usually fourth gear.

Note: If any other gear is selected than the specified gear when the operator presses the "ENTER" button, the control system will respond with a "PARK BRAKE TEST FAILED" message. Any following button press will return the analyzer back to "CALIBRATION: PARK BRAKE TEST" menu screen.

6. If the correct, specified gear is selected when the operator presses "ENTER", the analyzer will provide the following information: "WARNING: DRIVE WILL BE ENGAGED" for 2 seconds. The following information will then be displayed: "FORWARD TO START" (first line) "NEUTRAL TO PAUSE" (second line).

7. Push the transmission in FORWARD.

8. If the control system receives a valid drive FORWARD signal in this test mode, the transmission neutralize state will be overridden. It will act as if the park brake is not set and drive will be engaged. If the control system receives a valid drive NEUTRAL signal in this test mode, the transmission neutralize state will be engaged (normal operation).

9. Gradually increase the engine speed to high idle. The machine should not move.

10. Reduce engine speed to low idle. Move transmission control lever to the NEUTRAL position.

Note: If the machine moved during the "PARK BRAKE TEST", repeat this procedure and retest.

Note: If there is no input received from the park brake micro switch, the wrong gear is selected, or an active fault pertaining to the drive direction or other gear selection inputs become active in this test mode. The test will be stopped and the control system will respond with a "PARK BRAKE TEST FAILED" message. Any following button press will return the analyzer back to "CALIBRATION: PARK BRAKE TEST" menu screen. If the "ESC" or "ENTER" button is pressed at this stage, the control system will stop the test and respond with a "PARK BRAKE TEST COMPLETE" message. Any following button press will return the analyzer back to "CALIBRATION: PARK BRAKE TEST" menu screen.

11. With the "PARK BRAKE TEST" complete, engage the park brake, and shut engine OFF.

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