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May 2017

Volume 2

SHOP MANUAL

WHEEL LOADER

70Z7B

Disassembly & Reassembly

Powered by CUMMINS QSB6.7 ENGINE

Serial No. 70C6-5001 and up

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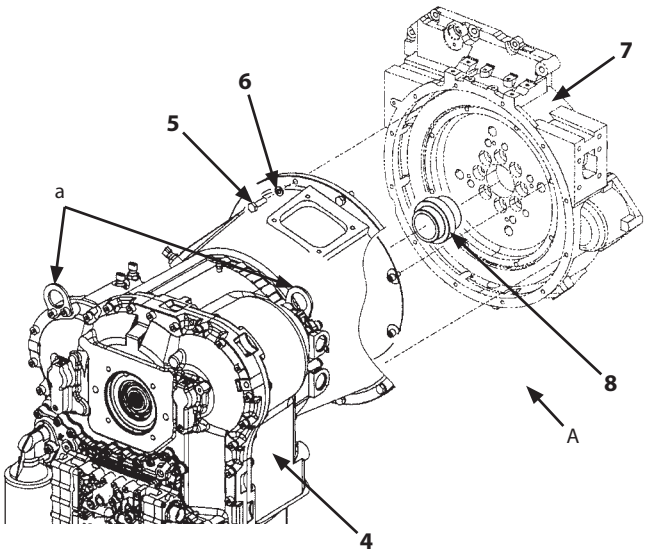
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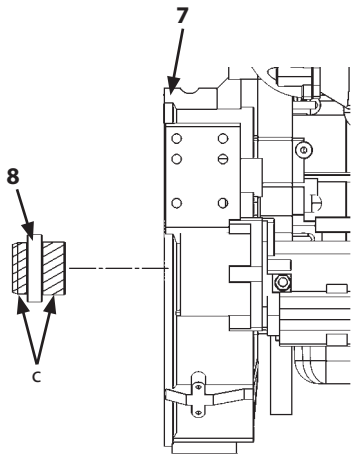
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WNEK50-04-02-005

View A



WNEK50-04-02-007

c- Contact surface

Installation

1. Install all removed adapters to drive unit (4).

IMPORTANT: Check the direction to install guide (8).

2. Apply molybdenum grease onto the contact surface (c) of guide (8). Install guide (8) to engine (7).

CAUTION: Drive unit (4) weight: 500 kg (1110 lb)

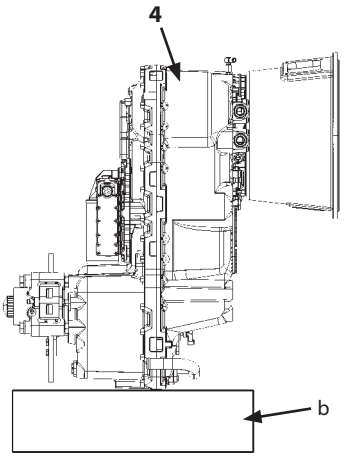
3. Install the shackles (2 used) to lifting brackets (a) (2 places). Attach the nylon slings onto the shackles (2 used). Hoist drive unit (4).

CAUTION: Place a stable stand (b) under drive unit (4) in order not to fall down the engine (7) assembly.

4. Install drive unit (4) to engine (7) with spring washers (6) (12 used) and bolts (5) (12 used) by fitting drive unit (4) to guide (8).

: 17 mm

: 36±3.6 N·m (26.5±2.7 lbf·ft)



WNEK50-04-02-008

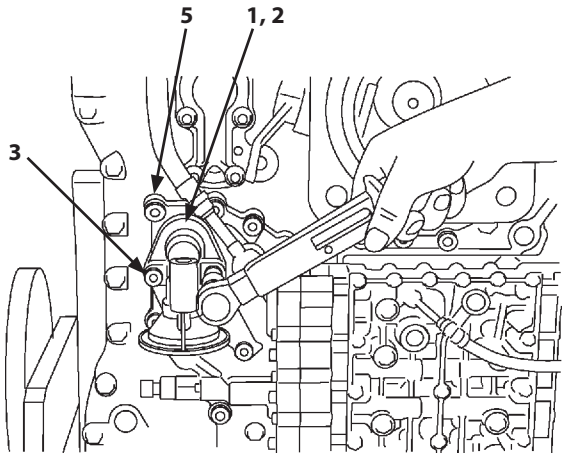
b- Stand

Installation of Oil Filter

1. Apply oil onto O-rings (1) (2 used). Install O-rings (1) (2 used) to filter head (2). Install filter head (2) to duct plate (5) with socket bolts (3) (2 used) by using a hexalobular internal wrench.

   : T40 (Hexalobular Internal Wrench)

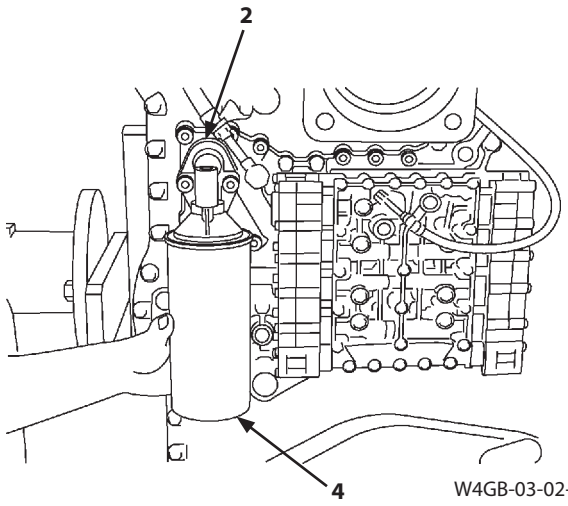
   : 34 N·m (25 lbf·ft)



W4GB-03-02-010

IMPORTANT: Take care not to tighten oil filter (4) too excessively in order not to deform.

2. Apply oil onto the seal surface of oil filter (4). Tighten oil filter (4) to filter head (2) until it comes into contact with seal surface. Tighten oil filter (4) by 1/3 to 1/2 turn by using a filter wrench after it has come into contact with seal surface.



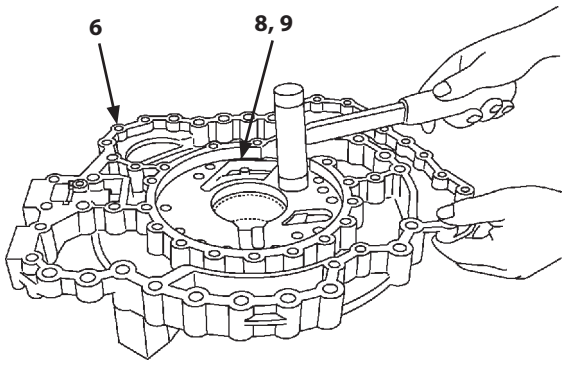
W4GB-03-02-011

5. Remove socket bolts (10) (10 used). Remove the oil feeder housing (6) assembly and gasket (7) from transmission case (13). Remove O-rings (11) (10 used) from socket bolts (10) (10 used).

: 8 mm

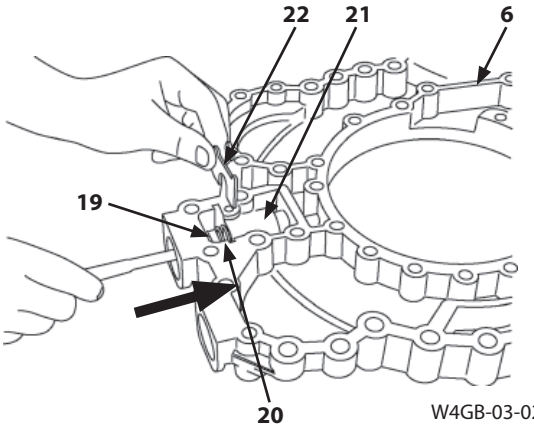
IMPORTANT: Do not disassemble hydraulic pump (9).

6. Remove hydraulic pump (9) from oil feeder housing (6) by using a plastic hammer. Remove O-ring (8) from hydraulic pump (9).



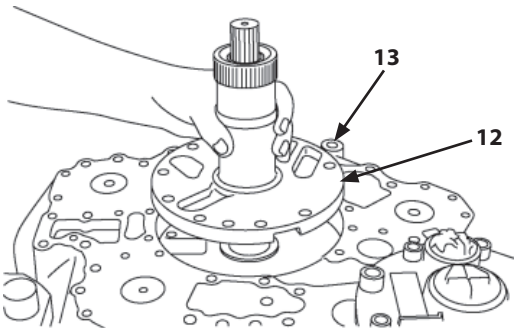
W4GB-03-02-040

7. Push pressure plate (19) with the bolt (M6). Remove tab washer (22). Remove pressure plate (19), spring (20), and piston (21) from oil feeder housing (6).



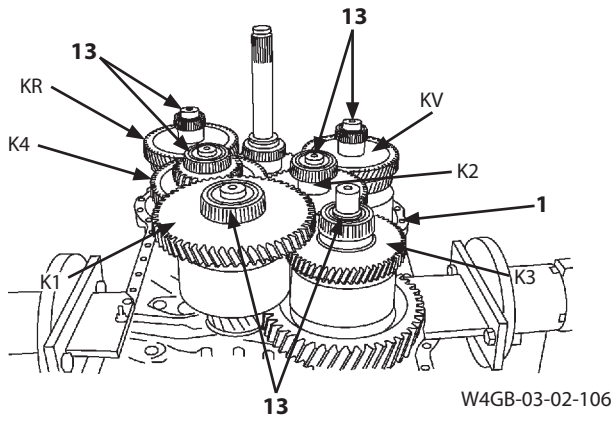
W4GB-03-02-043

8. Remove stator shaft (12) from transmission case (13).



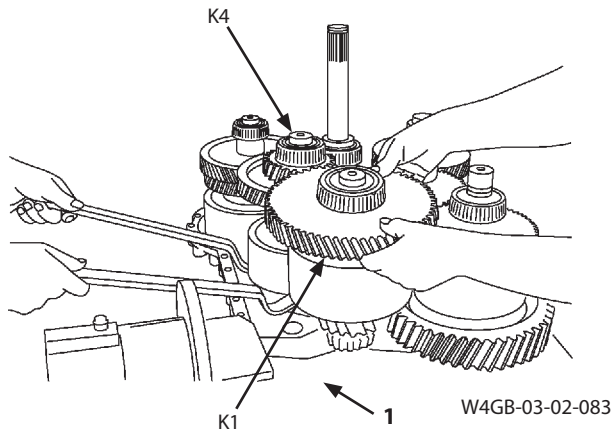
W4GB-03-02-044

12. Remove piston rings (13) (6 used) from the clutch shafts (6 used).



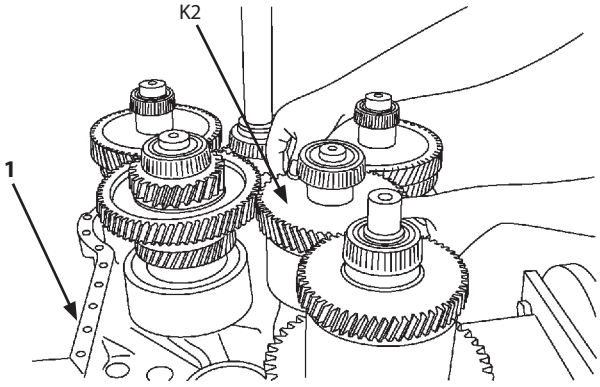
W4GB-03-02-106

13. Raise fast-speed forward clutch (K4) a little from transmission case cover (1) and hold it. Remove first speed clutch (K1) from transmission case cover (1). Return fast-speed forward clutch (K4).



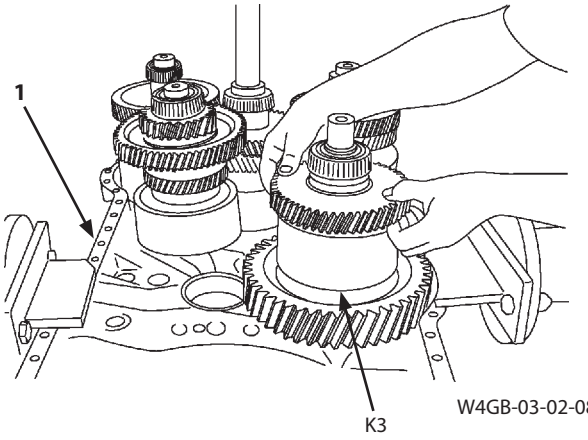
W4GB-03-02-083

14. Remove second speed clutch (K2) from transmission case cover (1).



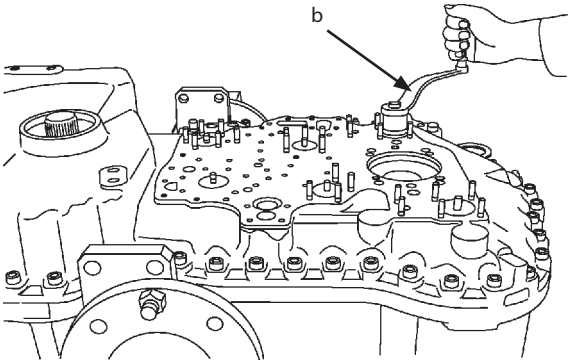
W4GB-03-02-084

15. Remove third speed clutch (K3) from transmission case cover (1).



W4GB-03-02-085

29. Install special tool (b) (ZF No.: 5870 280 007) to the shaft part of slow-speed forward clutch (KV) and check that it turns. Check it for all clutches. If any abnormality is found, disassemble it again, trace it, and correct the cause.



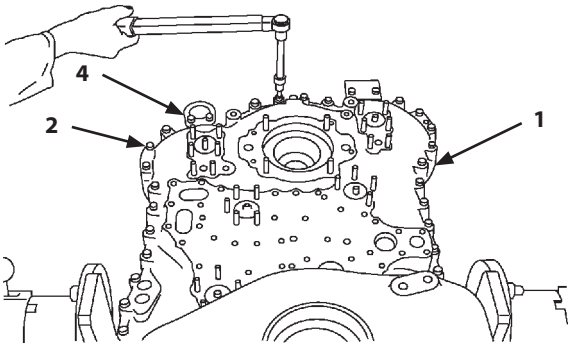
b- Special Tool

W4GB-03-02-119

30. Install plate (4) and socket bolts (2) (35 used) to transmission case cover (1).

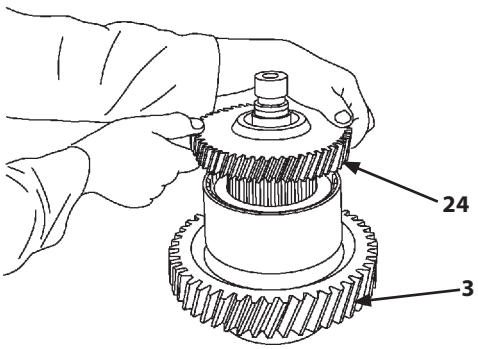
: 8 mm

: 46 N·m (34 lbf·ft)



W4GB-03-02-120

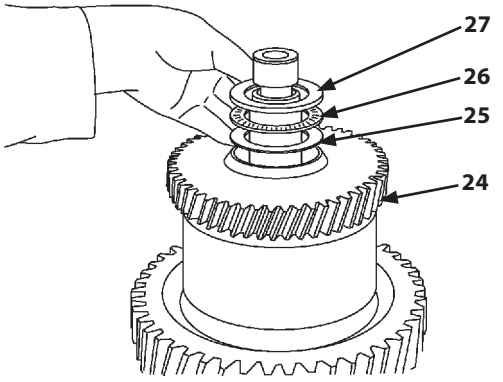
15. In order to engage the spline of idler (24) and the gear teeth of inner clutch disc (15) with shaft (3), install idler (24) to shaft (3) by turning it right and left.



W4GB-03-02-139

IMPORTANT: Install running disc (27) with the chamfered surface facing to the axial needle cage (26) side.

16. Install axial washer (25), axial needle cage (26), running disc (27), and retaining ring (28) (only K1 and K2) to idler (24).

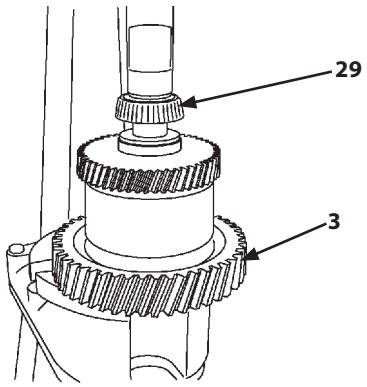


W4GB-03-02-141

NOTE: When the parts have been installed correctly in step 16, the level difference of upper surface of running disc (27) and shaft (3) are the same. If running disc (27) is higher, check the engagement of idler (24) and inner clutch disc (15).

CAUTION: Put heat-resisting gloves when installing the inner ring of taper roller bearing (29).

17. Heat the inner ring of taper roller bearing (29) to about +120 °C (248 °F). Install the inner ring of taper roller bearing (29) to shaft (3).

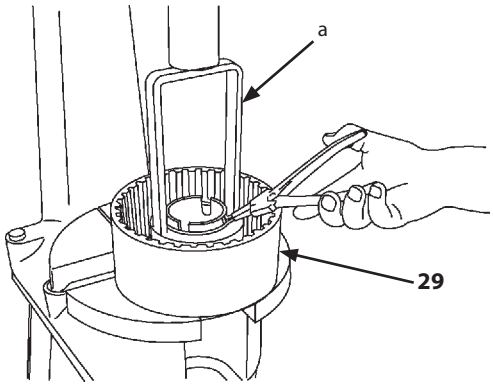


W4GB-03-02-142

Disassembly of Fast-Speed Forward Clutch (K4)

IMPORTANT: Do not disassemble snap ring (7) and gear (6).

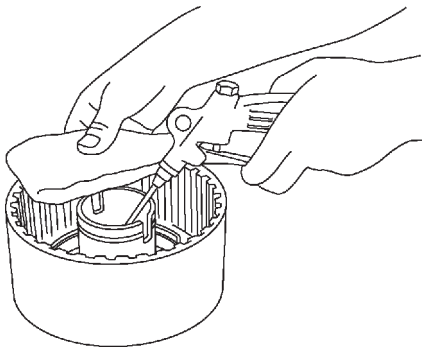
1. Remove piston rings (2, 5) from shaft (3).
2. Remove stud (4) from shaft (3). Remove taper roller bearings (1, 31) from shaft (3) by using the special tools (ZF No.: 5870 026 100 and 5873 001 057).
3. Remove snap ring (30) from shaft (3). Remove disc carrier (29) from shaft (6) by using a puller.
4. Remove running disc (15), axial needle cage (14), and axial washer (13) from idler (12).
5. Remove idler (12) from shaft (3).
6. Remove needle cages (11) (2 used), axial washer (10), axial needle cage (9), and axial washer (8) from shaft (3).
7. Remove snap ring (7) from shaft (3). Remove gear (6) from shaft (3).
8. Remove snap ring (16) from disc carrier (29). Remove end shim (17), outer clutch discs (20) (4 used), inner clutch discs (19) (5 used), and disc (20) from disc carrier (29).
9. Compress coil spring (24) by using special tool (a) (ZF No.: 5870 345 088). Remove snap ring (22) from disc carrier (29). Release coil spring (24). Remove coil spring (24) from disc carrier (29).



a- Special Tool

W4GB-03-02-124

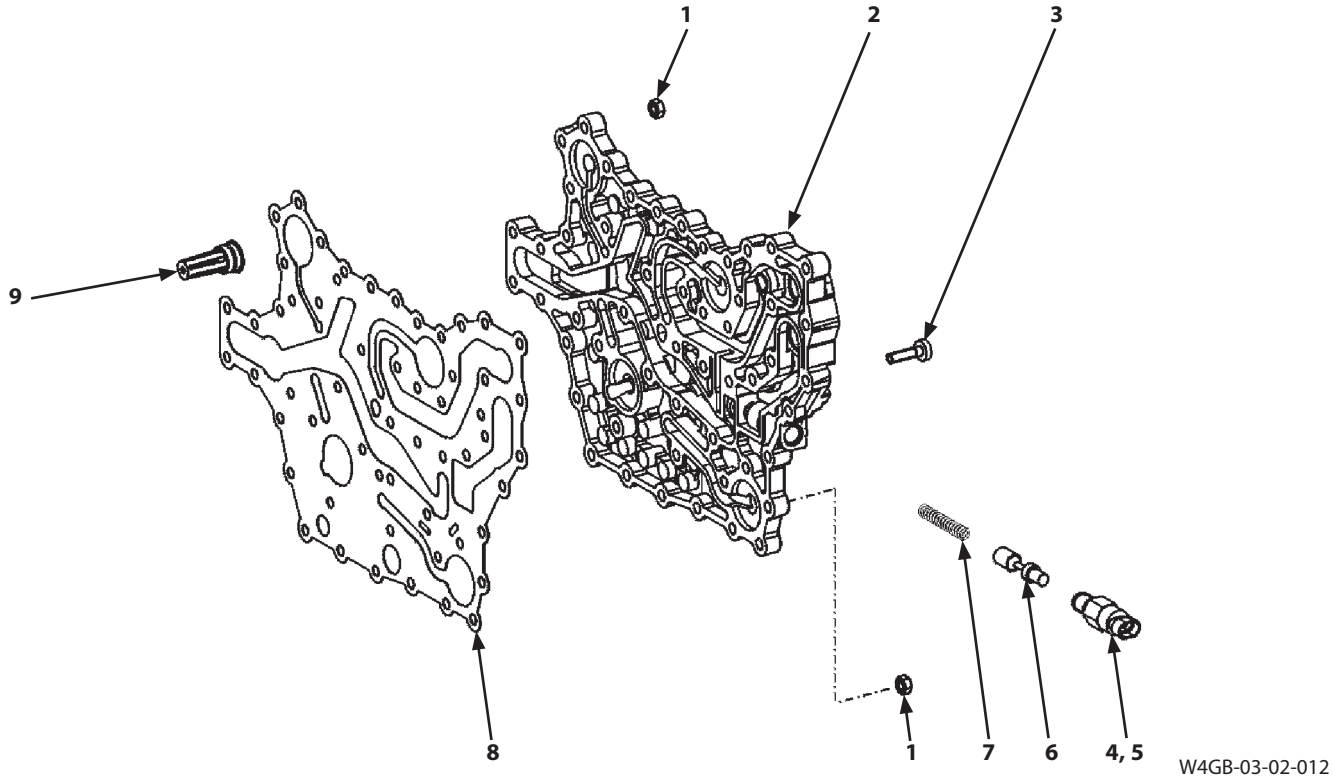
10. Supply low-pressure air through the oil hole of disc carrier (29) and remove piston (26) from disc carrier (29).



W4GB-03-02-125

11. Remove O-rings (27, 28) from piston (24).

Removal and Installation of Duct Plate

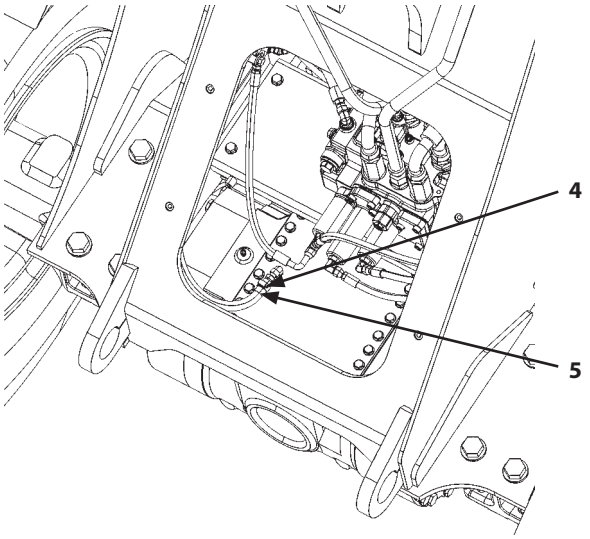


1- Nut (14 Used)
2- Duct Plate
3- Socket Bolt (36 Used)
4- Switch
5- O-Ring
6- Piston
7- Spring
8- Gasket
9- Safety Valve
10- *Transmission Case Cover

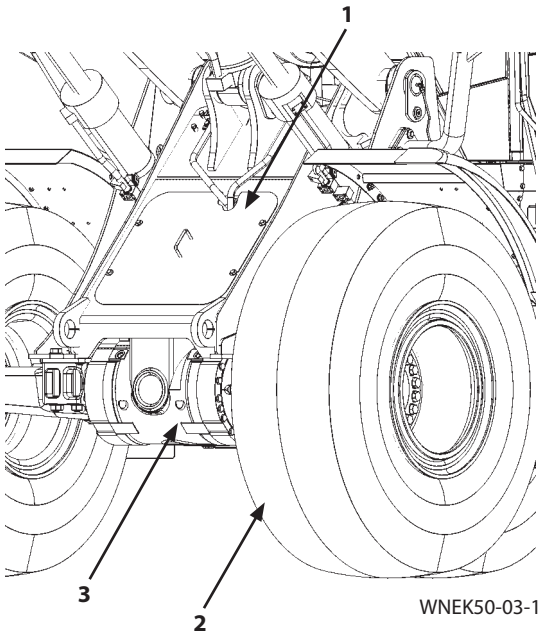
*NOTE: As for the item with mark *, refer to W4-2-4-1.*

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WNEK50-04-03-001



WNEK50-03-13-001

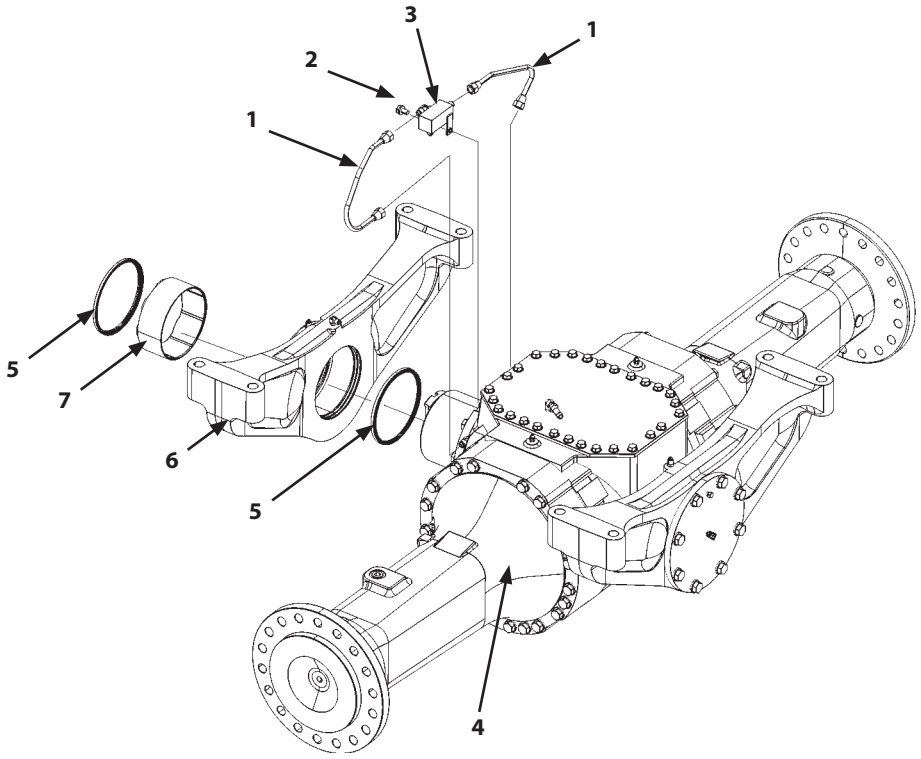
12. Set the machine position (lift arm raise) for inspection and maintenance. (Refer to W1-5-1.)
13. Connect hose (5) with clamp (4).

    : 7 mm

    : 3 N·m (2.2 lbf·ft)
14. Bleed air from the brake (axle). (Refer to W1-4-1.)
15. Set the machine position (lift arm lower) for inspection and maintenance. (Refer to W1-5-1.)
16. Install front tires (2) (2 used) to front axle (3). (Refer to W4-1-1.)

IMPORTANT: Check the hydraulic oil level. Start the engine and check for any oil leaks.

17. Set the machine position (lift arm raise) for inspection and maintenance. (Refer to W1-5-1.)
18. Install front cover (1). (Refer to W3-22-1.)



WNEK50-04-03-014

IMPORTANT: Check the direction to install dust seal (5) and bushing (7).

IMPORTANT: Install bushing (7) with slit (b) up.

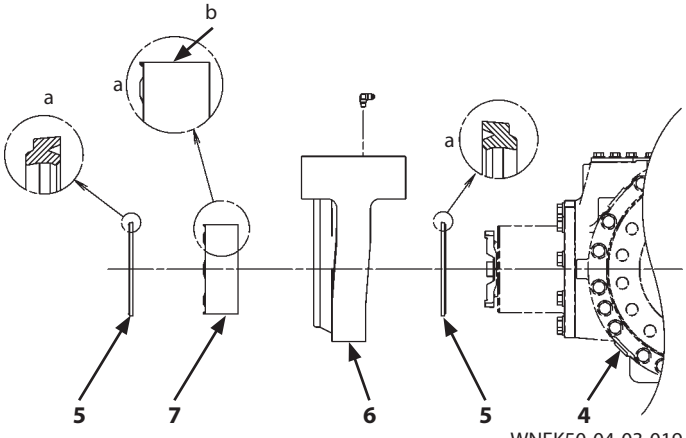
9. Install bushing (7) and dust seals (5) (2 used) to support (6).

CAUTION: Support (6) weight: 65 kg (145 lb)

10. Apply grease onto the inner circumference of bushing (7). Attach nylon slings onto support (6). Hoist steering support (6). Install support (6) to rear axle (4).
11. Secure support (6) to rear axle (4) by using wires.
12. Install block (3) to rear axle (4) with bolt, washer (2).

: 17 mm

: 50 N·m (37 lbf·ft)



WNEK50-04-03-019

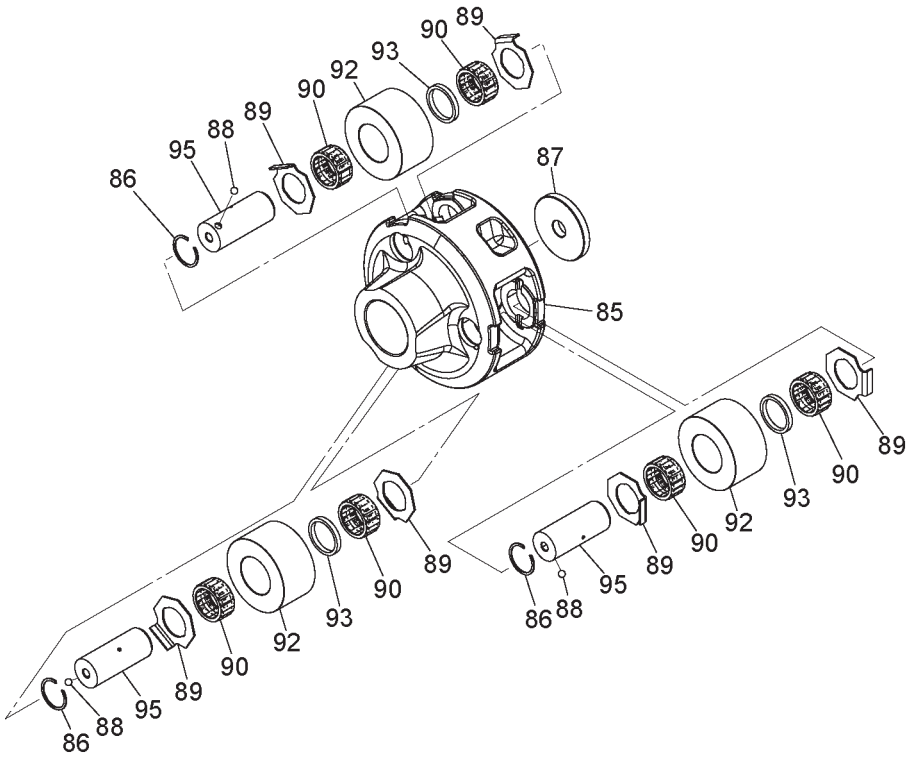
a- Direction to Install
b- Slit

13. Connect the both ends of pipes (1) (2 used).

: 22 mm

: 39 N·m (29 lbf·ft)

- Planetary Carrier Assembly (70)



WNDB-04-03-005

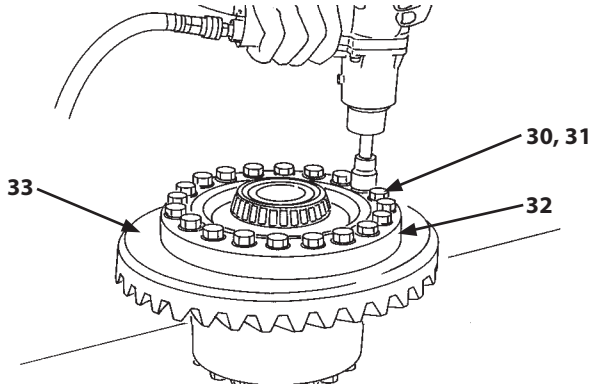
Disassembly of Differential Case (only Axle equipped with TPD)

CAUTION: Ring gear (33) weight: 24 kg (53 lb)

CAUTION: Do not drop ring gear (33).

48. Remove bolts (30) (16 used) and washers (31) (16 used) from differential case A (32). Remove ring gear (33) from differential case A (32).

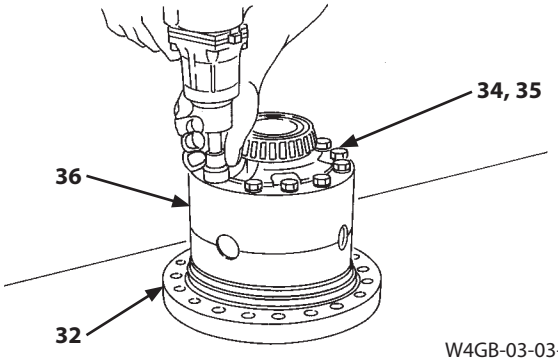
: 24 mm



W4GB-03-03-024

49. Put the matching marks at the jointed part between differential case B (36) and differential case A (32). Remove bolts (34) (12 used) and washers (35) (12 used) from differential case B (36).

: 17 mm

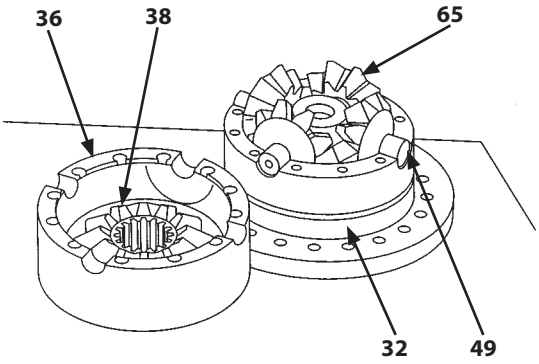


W4GB-03-03-025

CAUTION: Differential case A (32) weight: 26 kg (58 lb)

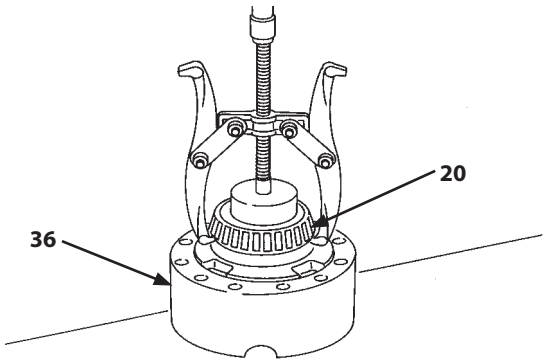
50. Tap the center of spider (49) and remove differential case A (32) from differential case B (36).

51. Remove side gears (38) (2 used), spider (49), pinions (65) (4 used), thrust washers (37) (2 used), and thrust washers (66) (4 used) from differential case B (36) and differential case A (32).



W4GB-03-03-026

52. Remove the inner races of bearings (20) (2 used) from differential case B (36) and differential case A (32) by using a bearing puller.



W4GB-03-03-027

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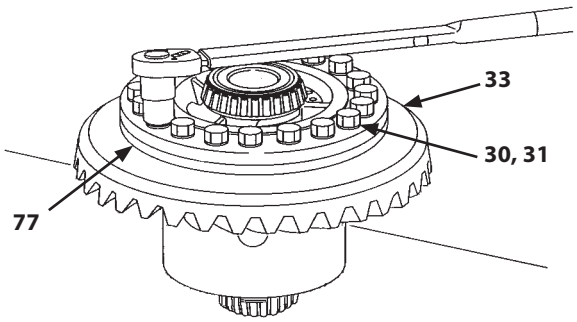
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19. Turn over the differential case assembly. Remove bolts (F) (M12, Pitch 1.25 mm) (2 used) which have been temporarily installed in step 17.
20. Apply LOCTITE #263 or equivalent to the thread part of bolts (30) (16 used). Install ring gear (33) with bolts (30) (16 used) and washers (31) (16 used).

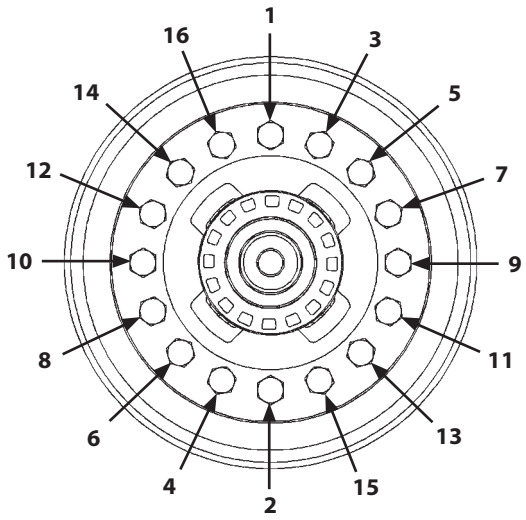
NOTE: Refer to the illustration for the order to tighten bolts (30).

: 24 mm

: 225 N·m (166 lbf·ft)



W4GB-03-03-042

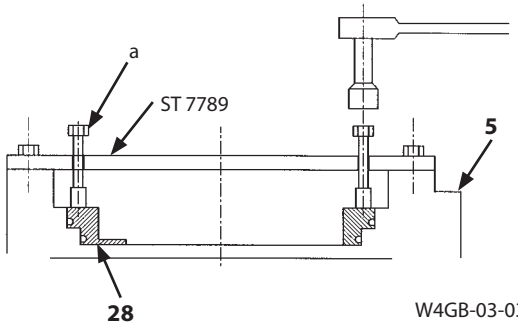


WNDB-04-03-012

Installation of Brake

CAUTION: Use the parts which are used for adjustment of brake disc clearance when installing the brake.

54. Install D-rings (27, 29) to the groove of the outer surface of brake piston (28). Apply grease onto D-rings (27, 29).
55. Install brake piston (28) to case (5) by using the special tool (ST 7789).



W4GB-03-03-061

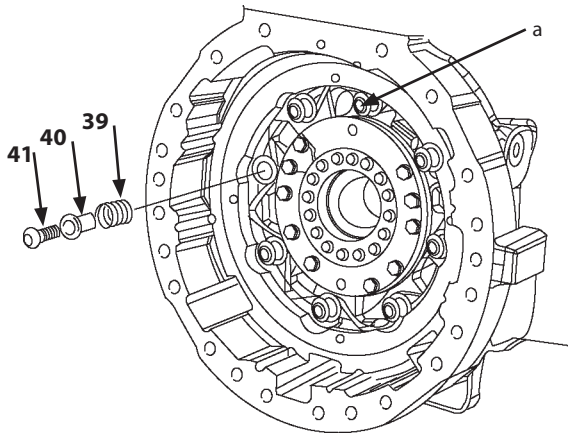
a- Thrust Bolt (M16, Pitch 2.0 mm, Thread part length: 50 mm or more)

56. Apply LOCTITE #263 or equivalent to button head bolt (41). Install springs (39) (8 used), adapters (40) (8 used), and button head bolts (41) (8 used) to case (5) through the piston hole of brake piston (28).

: 6 mm

: 49 N·m (36 lbf·ft)

: 41 N·m (30 lbf·ft) (a)

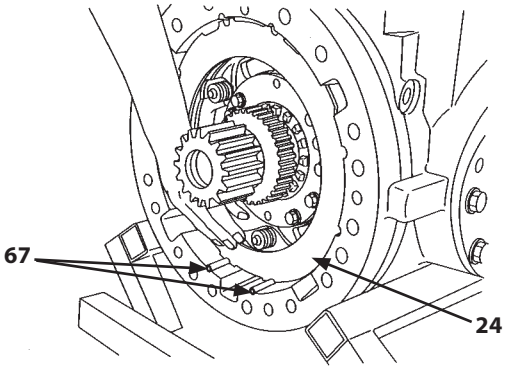


W4GB-03-03-016

57. Install shaft (42) to the spline of side gear (38) (in case of axle equipped with LSD: (79)) in case (5).
58. Install two pieces of pins (67) (8 used) to the bottom of case (5). Then, install brake ring (24).

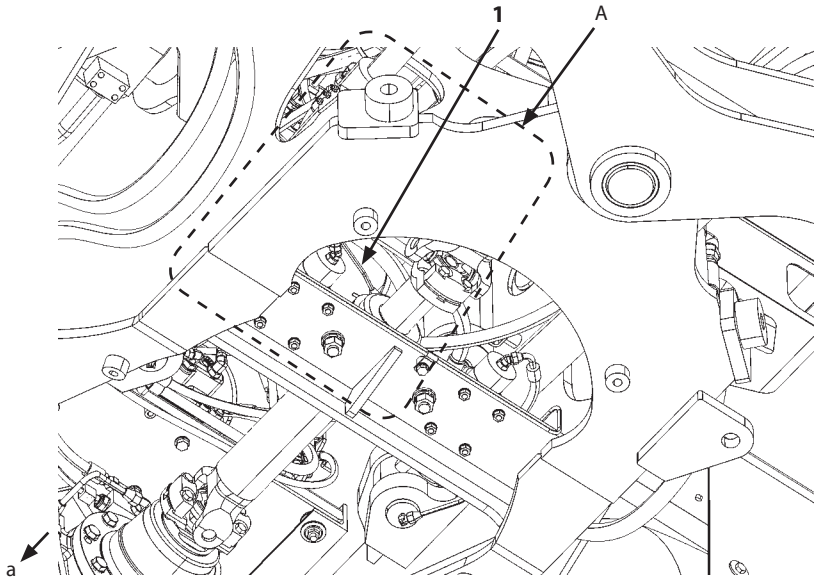
CAUTION: Select the thickness of brake ring (24) which has been selected for adjustment of brake disc clearance.

59. Install two pieces of pins (67) (8 used) to the bottom of case (5). Then, install brake ring (24).



W4GB-03-03-062

60. Install brake disc (21) to the spline of shaft (42). Install brake ring (22).
61. Install second brake disc (21) so that the open hole fits to that of first brake disc (21).



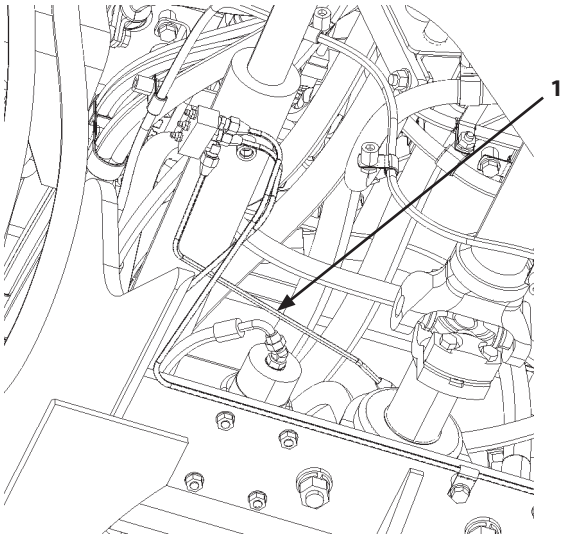
WNEK50-04-04-001

a- Vehicle Front Side

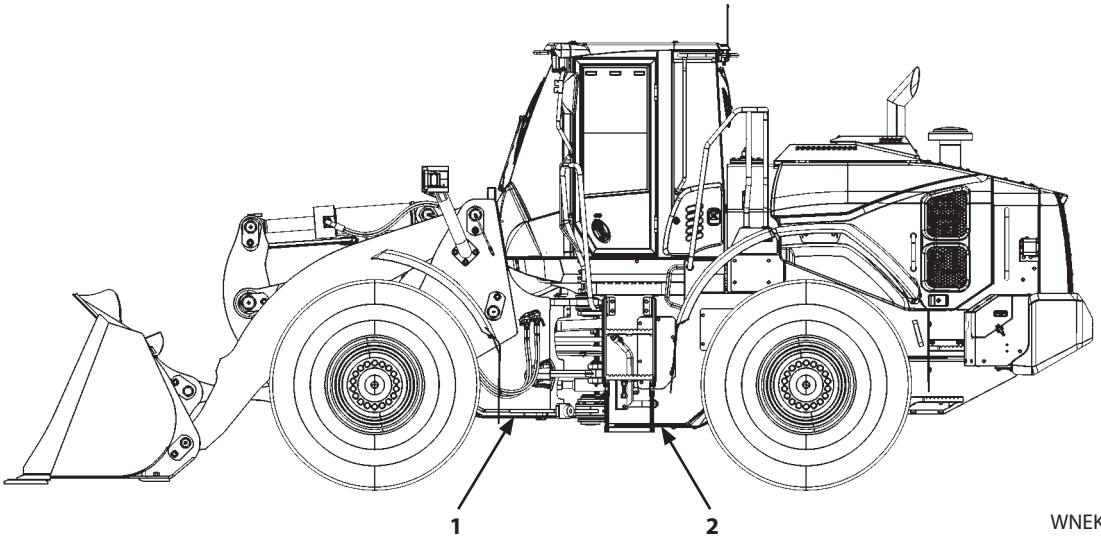
3. Disconnect the both ends of pipe (1).

: 17 mm

Detail A



WNEK50-04-04-004



WNEK50-03-22-002

13. Install under guard (front) (1) and under guard (rear) (2). (Refer to W3-22-1.)

NOTE: Only for the machine with under guard

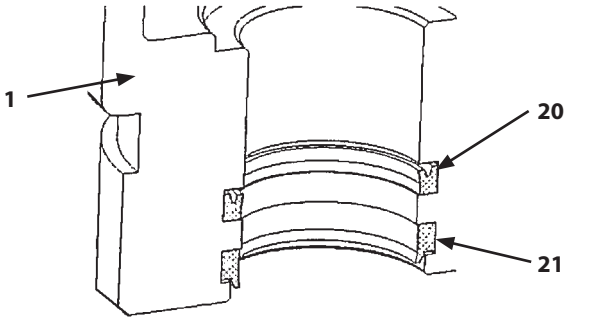
Assembly of Brake Valve

IMPORTANT: Before assembling, apply hydraulic oil onto parts in order to prevent them from seizing.

IMPORTANT: The brake valve is the susceptible hydraulic component to contamination. Keep the parts clean when assembling.

IMPORTANT: Check the direction to install packing (20) and scraper (21).

1. Apply hydraulic oil onto packing (20), scraper (21), and piston (14). Install packing (20), scraper (21), and piston (14) to flange (1).



WNEC-04-05-005

IMPORTANT: Replace retaining ring (24) with the new one.

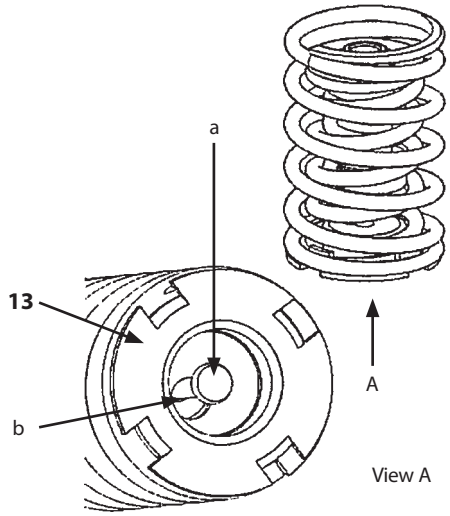
2. Install retaining ring (24) to piston (14).

IMPORTANT: Strong force deforms flange (1). Handle it with care.

3. Secure flange (1) in a vise with the piston (14) side down.
4. Apply grease onto O-ring (10). Install O-ring (10) to flange (1).

IMPORTANT: Install tip (a) of rod (12) to hole (b) of retainer (13) in order not to drop retainer (13) from rod (12).

5. Install springs (16, 17, 18), holder (11), and rod (12) to retainer (13). Install tip (a) of rod (12) to hole (b) of retainer (13).



WNEC-04-05-007

a- Tip of Rod (12)
b- Hole

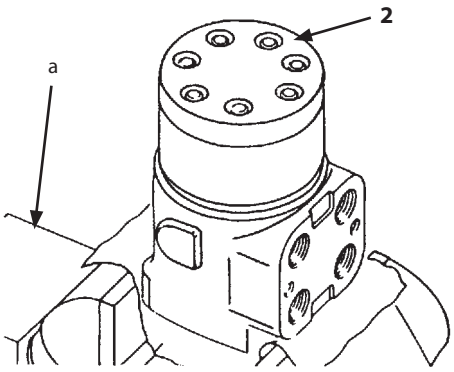
Disassembly of Steering Valve

IMPORTANT: As the setting changes, do not disassemble overload relief valves (23) (2 used).

IMPORTANT: Do not disassemble inserts (24) (2 used) and check valve (25).

IMPORTANT: Strong force deforms housing (18). Handle it with care.

1. Secure housing (8) in a vise (a) with the cap (21) side up.



a- Vise

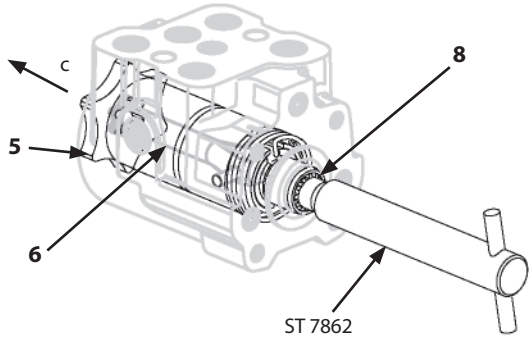
W202-02-14-002

2. Remove screws (1) (7 used) from cap (2). Remove cap (2) from housing (18). Remove O-ring (3) from cap (2).

: 13 mm

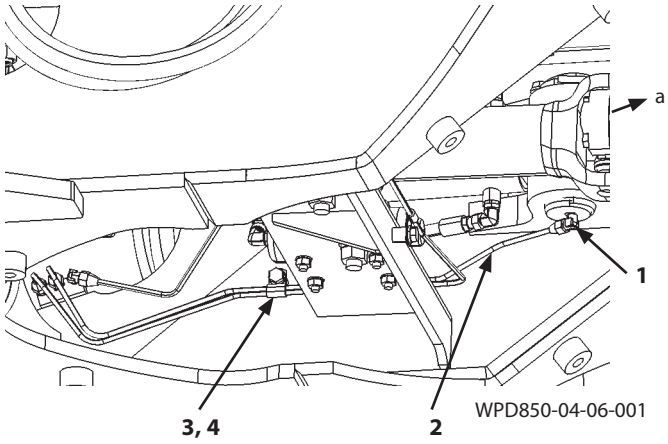
IMPORTANT: When removing rotor (4), do not drop star (5).

3. Remove rotor (4) and star (5) from housing (18).
4. Remove O-ring (3) from plate (7).
5. Remove plate (7) from housing (18).
6. Install the special tool (ST 7862) to the spline part of spool (8).
7. Install the cloth onto the teeth of star (5) which has been removed at step 4. Install star (5) to the gear part of drive (6).



WNDB-04-06-009

c- Up



a- Vehicle Front Side

Removal of Steering Cylinder (Left)

3. Remove bolt, washer (3) and clip (4).

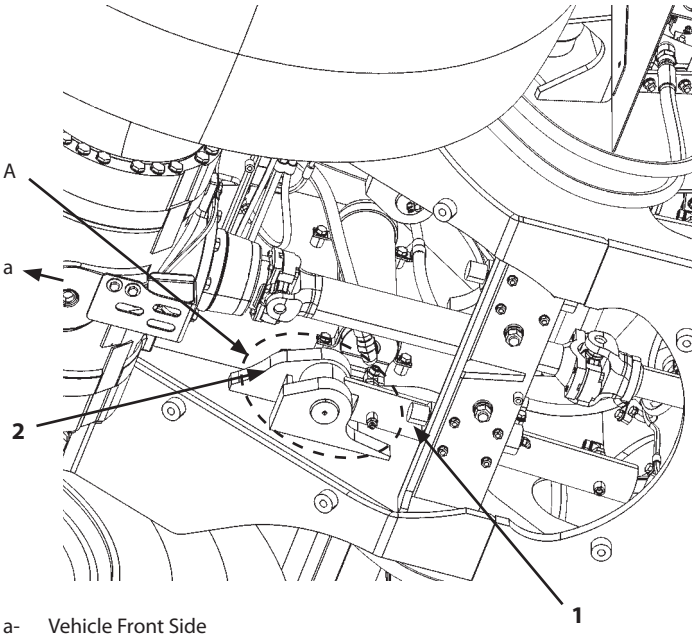
   : 17 mm

4. Disconnect the both ends of pipe (2).

   : 17 mm

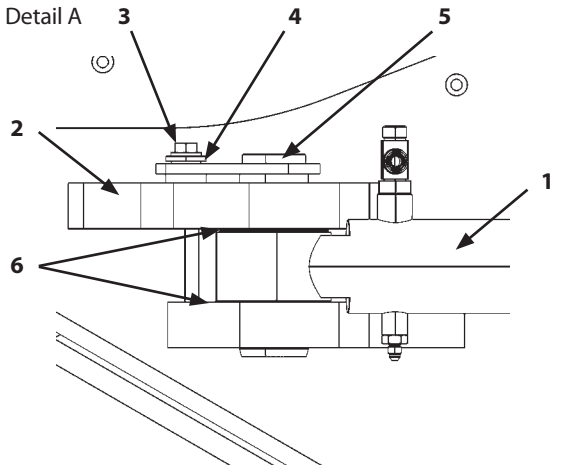
5. Remove elbow (1).

   : 14 mm



a- Vehicle Front Side

WNEK50-04-06-030



WNEK50-04-06-031

Installation

Installation of Steering Cylinder (Right)

1. Install all removed adapters to steering cylinder (1).

CAUTION: Steering cylinder (1) weight: 24 kg (53 lb)

2. Attach nylon slings onto steering cylinder (1). Hoist steering cylinder (1). Fit the hole at cylinder bottom side to the cylinder mounting hole of front frame (2).

IMPORTANT: Use one or more shims (6) respectively at the top and bottom sides.

3. Fit shims (6) to the top and bottom sides of the cylinder bottom hole. Adjust the total clearance at the top and bottom sides of steering cylinder (1) and front frame (2) within 1 mm (0.039 in.).

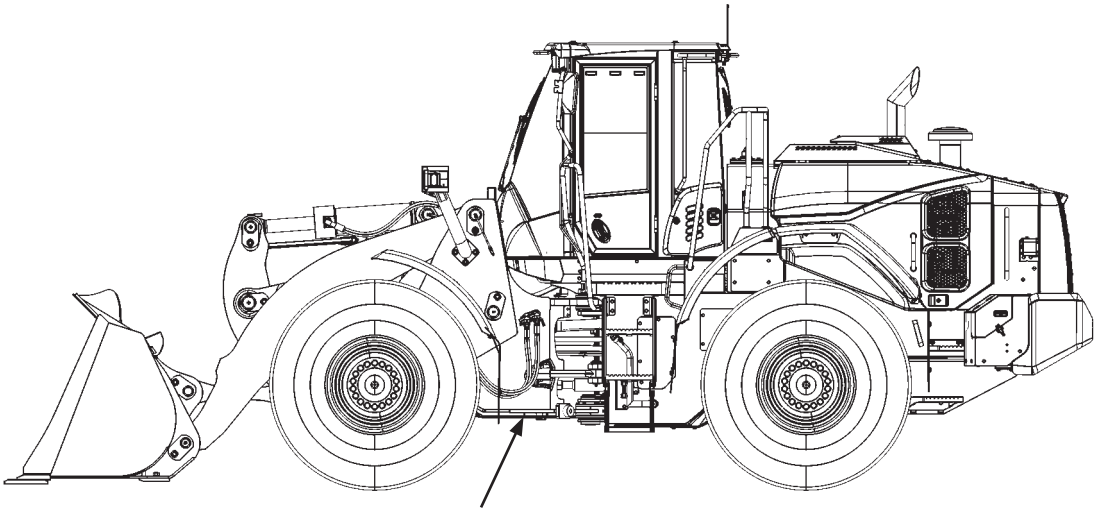
NOTE: Shim (6) thickness: 0.5 mm (0.02 in.), 1 mm (0.039 in.)

CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

4. Install pin (5) by using a hammer.
5. Install washer (4) and bolt, washer (3).

: 19 mm

: 90 N·m (66 lbf·ft)

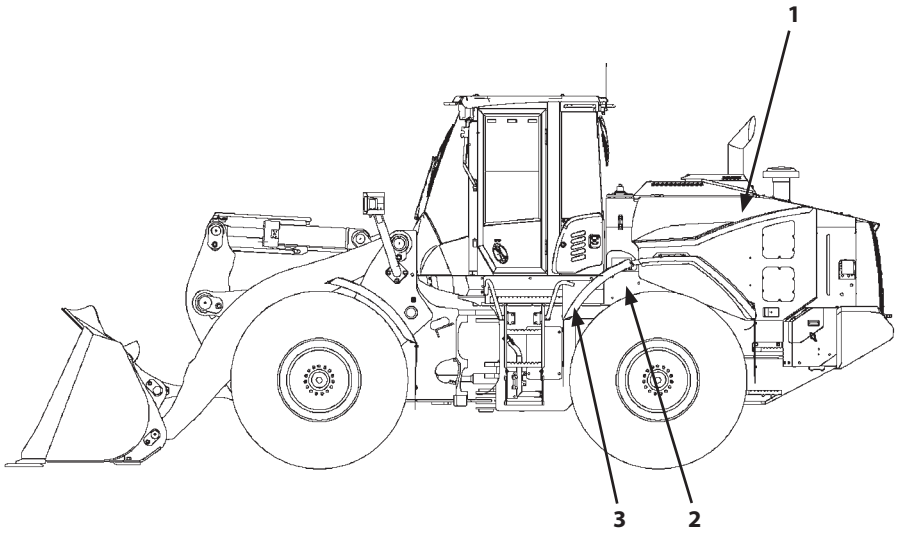


WNEK50-03-22-002

IMPORTANT: Check the hydraulic oil level. Start the engine. Operate the steering cylinder to the stroke end several times and check for any oil leaks.

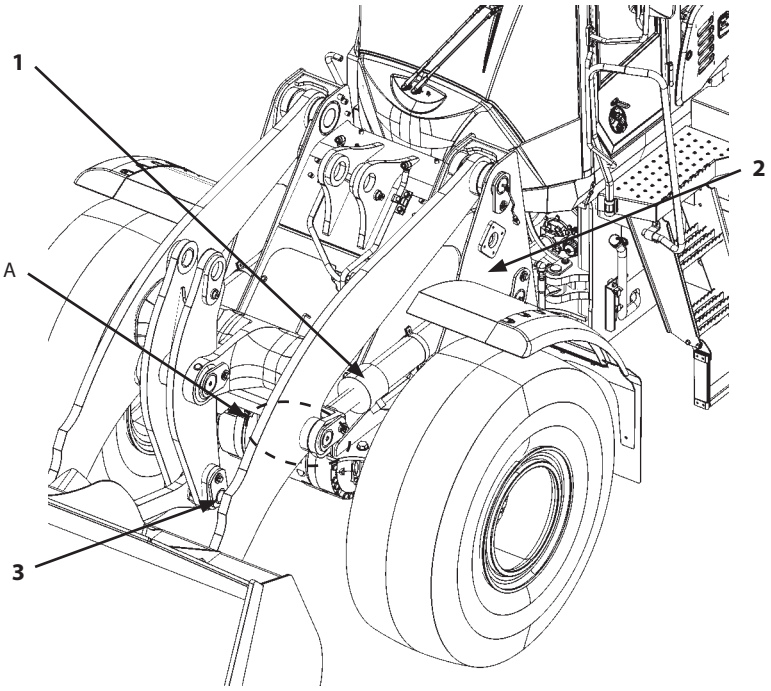
17. Install under guard (front) (1) (only for the machine with under guard). (Refer to W3-22-1.)

(Blank)



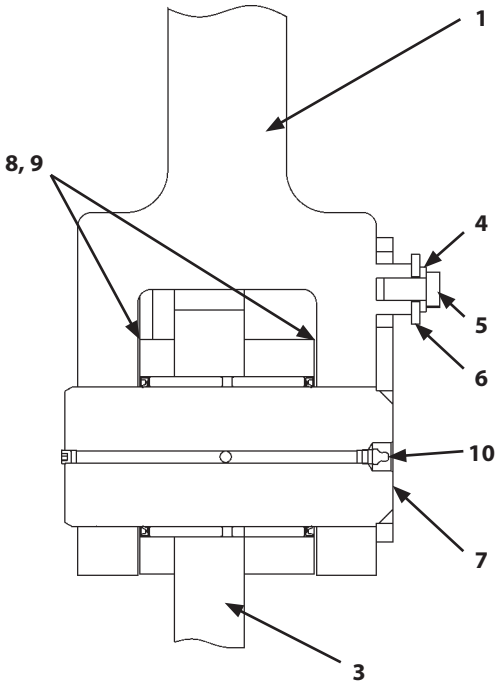
WPD850-03-01-003

15. Install the following parts. (Refer to W3-22-1.)
    - Lower Cover (2)
    - Rear Fender (Front) (3)
16. Close left and right side covers (front) (1).



WNEK50-05-01-025

Section A



WNEK50-05-02-003

9. Remove the wires from the rod holes of lift arm cylinder (1). Start the engine. Extend lift arm cylinder (1) and fit the cylinder rod side hole to the lift arm (3) mounting hole. Stop the engine.
10. Remove wooden blocks set in step 18.

IMPORTANT: Use one or more spacer (8) or shim (9) respectively at the right and left sides.

11. Install spacers (8) or shims (9) at the left and right side of the cylinder bottom side hole. Adjust total clearance of right and left between lift arm cylinder (1) and lift arm (3) within 1.5 mm (0.059 in.).

NOTE: Spacer (8) thickness: 2.3 mm (0.091 in.), Shim (9) thickness: 1.6 mm (0.063 in.)

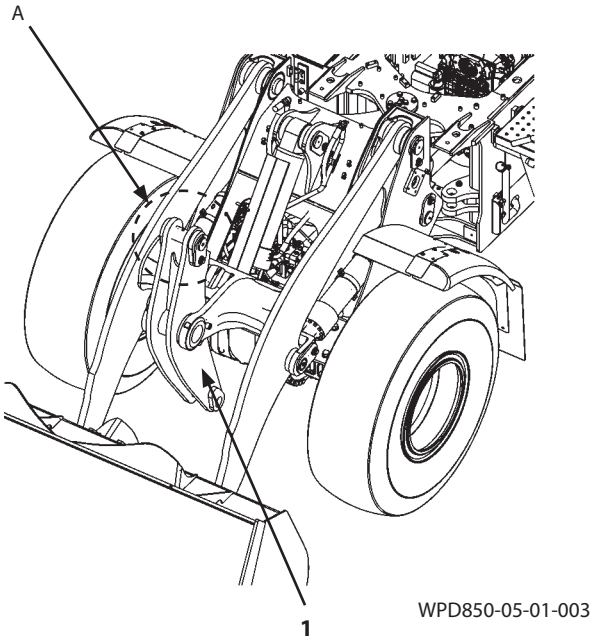
CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

12. Install pin (7) by using a hammer.
13. Install washers (4, 6) and bolt (5).

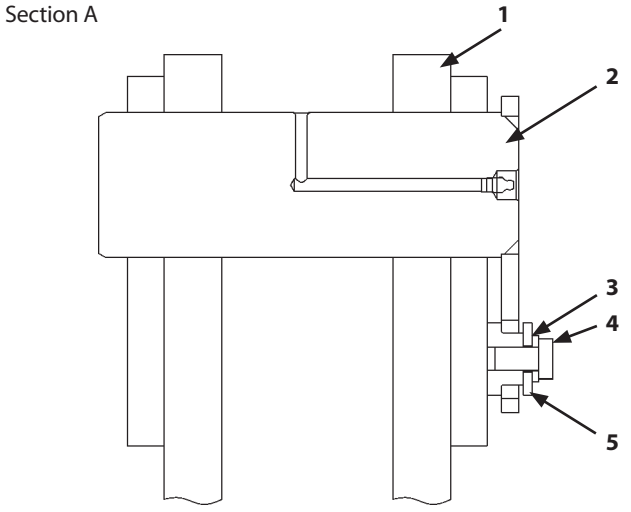
    : 24 mm

    : 210 N·m (155 lbf·ft)

14. Apply grease to grease fitting (10).
15. Install another lift arm cylinder (1) in the same way as step 9 to step 14.



WPD850-05-01-003



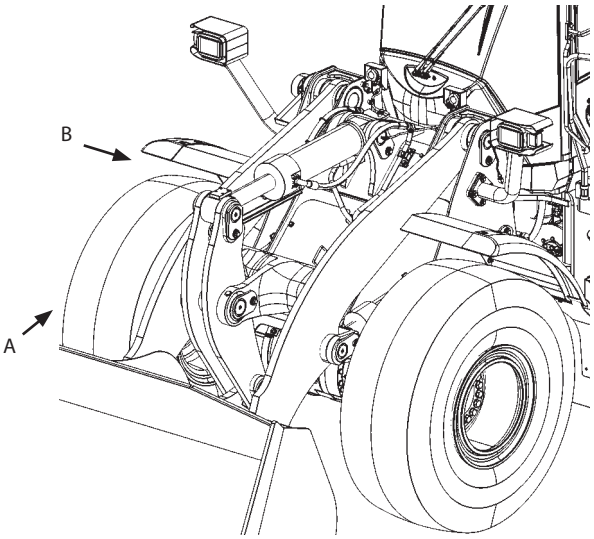
WNEK50-05-01-017

CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, hard hat, etc. in order to prevent personal injury.

7. Remove bolt (4) and washers (3, 5). Remove pin (2) from bell crank (1) by using a round bar and a hammer.

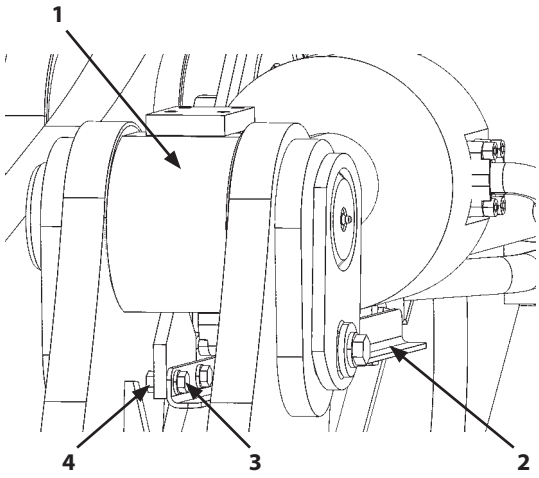
: 24 mm

(Blank)



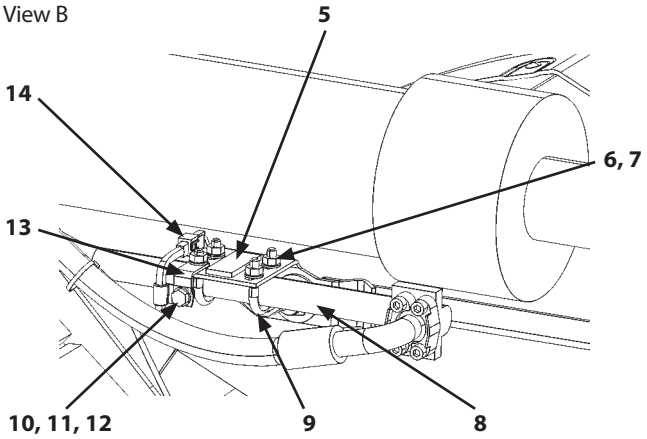
WNEK50-05-02-009

View A



WNEK50-05-02-010

View B



WNEK50-05-02-011

3. Remove bolts, washers (3) (2 used) and nuts (4) (2 used). Remove bracket (2) from bucket cylinder (1).

   : 17 mm

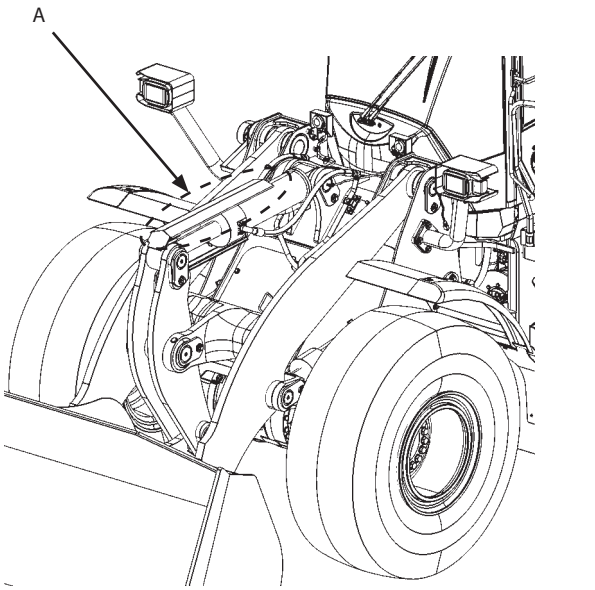
4. Remove bolt, washer (10), nut (11), and clip (12).

   : 17 mm

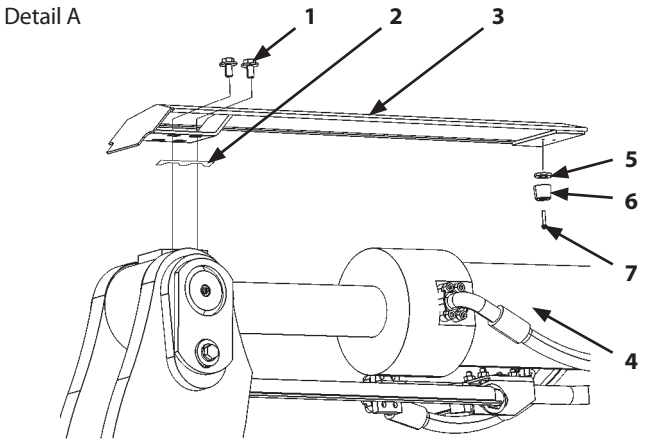
5. Disconnect connector (14).

6. Remove nuts (6) (4 used), washers (7) (4 used), bracket (13), connector (14) assembly and U-bolts (9) (2 used). Remove bracket (8) and the proximity switch (5) assembly.

   : 17 mm



WNEK50-05-02-007



WNEK50-05-02-008

22. Install shim (2) and guard (3) to bucket cylinder (4) with bolts, washers (1) (4 used).

    : 19 mm

    : 90 N·m (66 lbf·ft)

23. Ensure that the clearance between bucket cylinder (4) and cushion rubber (6) is 5 to 10 mm (0.2 to 0.4 in.). If clearance is not 5 to 10 mm (0.2 to 0.4 in.), adjust the clearance by following steps 24 to 28.

24. Remove bolts, washers (1) (4 used). Remove guard (3) and shim (2) from bucket cylinder (4).

    : 19 mm

25. Remove screw (7). Remove rubber cushion (6) and washer (5) from guard (3).

26. Adjust the number of shims (2) and washers (5) to be installed according to the clearance between bucket cylinder (4) and rubber cushion (6).

NOTE: Shim (2) thickness: 0.5 mm (0.02 in.), Washer (5) thickness: 2.3 mm (0.091 in.)

27. Install washer (5) and rubber cushion (6) to guard (3) with screw (7).

NOTE: There are two screw (7) mounting holes. Front side is used for this machine.

28. Install shim (2) and guard (3) to bucket cylinder (4) with bolts, washers (1) (4 used).

    : 19 mm

    : 90 N·m (66 lbf·ft)

29. Bleed air from the hydraulic system. (Refer to W1-4-1.)

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