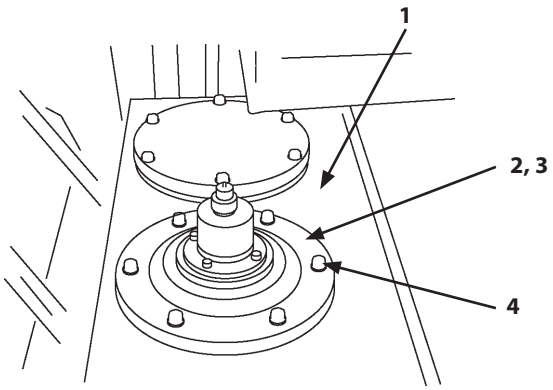
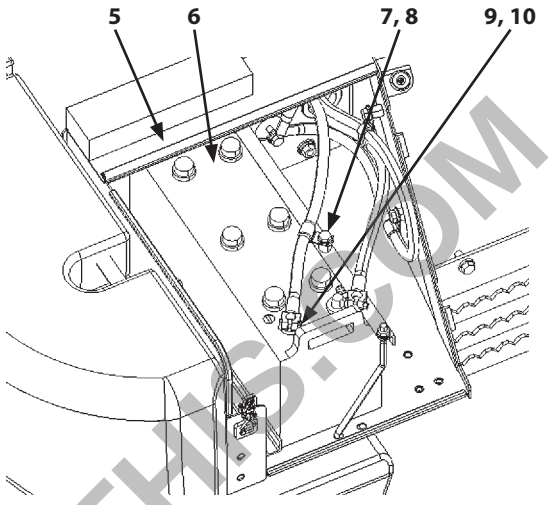
Removal and Installation of Cab



M4GB-07-044



WNEE-03-04-001

CAUTION: Escaping fluid under pressure may penetrate the skin and eyes, and cause serious injury. Release the pressure before disconnecting the hydraulic pipings or removing other equipment. Hot hydraulic oil just after operation may spout out and cause severe burns. Wait until oil cools before starting any work. Do not turn the cap of hydraulic oil tank (1) quickly. The cap may fly off by internal pressure. Release any remaining pressure and remove the cap.

IMPORTANT: Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach an identification tag onto the connectors, hoses, and pipes for assembling. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.

Removal

1. Set the machine for inspection and maintenance. (Refer to W1-6-1.)

CAUTION: Bleed air from hydraulic oil tank (1). (Refer to W1-4-1.)

2. Remove bolts, washers (4) (6 used). Remove the cover (2) assembly and O-ring (3).

   : 17 mm (0.67 in)

3. Place a container. Drain off hydraulic oil by using an oil feed pump.

NOTE: Specified oil amount of hydraulic oil tank (1): 115 L (30 US gal)

4. Open the cover of battery box (5).
5. Remove bolt, washer (7) and clamp (8).

   : 17 mm (0.67 in)

6. Loosen nut (9). Disconnect ground (10).

   : 10 mm (0.4 in)

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Tightening Bolts and Nuts

CAUTION: Use tools appropriate for the work to be done. Makeshift tools and procedures can create safety hazards. For loosening and tightening nuts and bolts, use correct size tools. Otherwise, tightening tools may slip, potentially causing personal injure.

NOTE:

- *Apply lubricant (e.g. white zinc B dissolved into spindle oil) to bolts and nuts to reduce friction coefficient of them.*
- *Make sure bolt and nut threads are clean before installing.*



WDAA-01-02-001

Bolt Types

Tighten the nuts or bolts correctly to the torque specifications.
As the different types and grades of bolt are used, use and tighten the correct bolts correctly when assembling the machine or components.

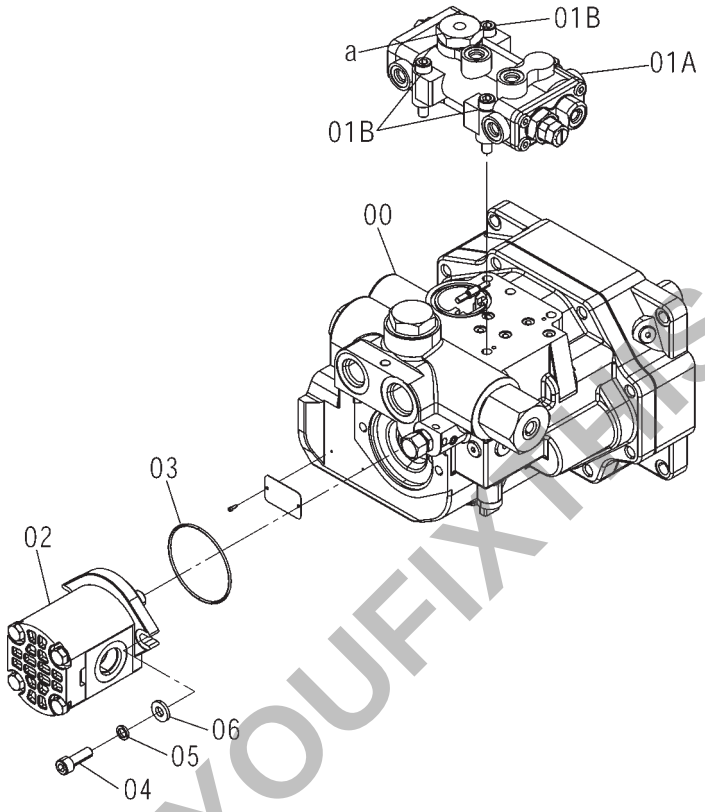
Specified Tightening Torque Chart

Bolt Dia.	Wrench Size	Hexagon Wrench Size	10.9 T T WDAA-01-02-002			8.8 H H WDAA-01-02-003 Socket Bolt			WDAA-01-02-004		
			N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)
M6	10	5							3 to 4	(0.3 to 0.4)	(2.2 to 3)
M8	13	6	30	(3)	(22)	20	(2)	(15)	10	(1)	(7.4)
M10	17	8	65	(6.5)	(48)	50	(5)	(37)	20	(2)	(15)
M12	19	10	110	(11)	(81)	90	(9)	(66)	35	(3.5)	(26)
M14	22	12	180	(18)	(133)	140	(14)	(103)	55	(5.5)	(41)
M16	24	14	270	(27)	(200)	210	(21)	(155)	80	(8)	(59)
M18	27	14	400	(40)	(300)	300	(30)	(220)	120	(12)	(89)
M20	30	17	550	(55)	(410)	400	(40)	(300)	170	(17)	(125)
M22	32		750	(75)	(550)	550	(55)	(410)	220	(22)	(162)
M24	36		950	(95)	(700)	700	(70)	(520)	280	(28)	(205)
M27	41		1400	(140)	(1030)	1050	(105)	(770)	400	(40)	(300)
M30	46		1950	(195)	(1440)	1450	(145)	(1070)	550	(55)	(410)
M33	50		2600	(260)	(1920)	1950	(195)	(1440)	750	(75)	(550)
M36	55		3200	(320)	(2360)	2450	(245)	(1810)	950	(95)	(700)

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Disassembly of Pump Device



WNEC-03-08-003

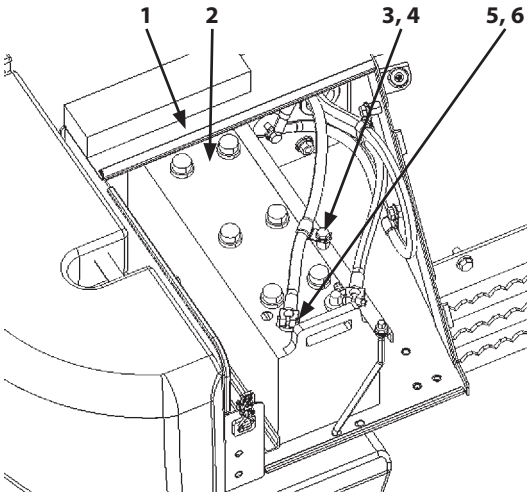
00- Main Pump
01A- Regulator
01B- Socket Bolt (4 Used)
02- Pilot Pump
03- O-Ring
04- Socket Bolt (2 Used)
05- Spring Washer (2 Used)
06- Washer (2 Used)

a- Reducer

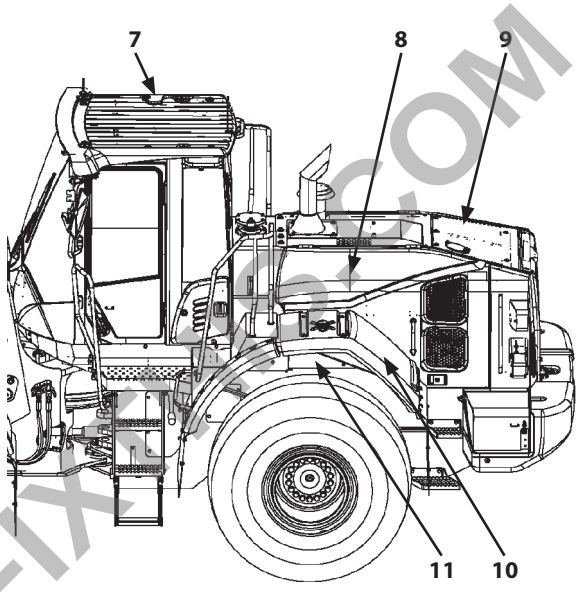
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Removal and Installation of Engine



WNEE-03-04-001



WNEE-03-04-040

IMPORTANT: The hose and pipe contain hydraulic oil. When removing the hose and pipe, receive oils with a container in order to avoid spilling oils.

IMPORTANT: Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach an identification tag onto the connectors, hoses, and pipes for assembling. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.

Removal

1. Set the machine for inspection and maintenance. (Refer to W1-6-1.)
2. Open the cover of battery box (1).
3. Remove bolt, washer (3) and clamp (4).

   : 17 mm (0.67 in)
4. Loosen nut (5). Disconnect the battery (2) side of ground (6).

   : 10 mm (0.4 in)
5. Remove cab assembly (7). (Refer to W3-1-1.)
6. Remove following parts. (Refer to W3-4-2.)

- Rear Fender (Rear) (10)
- Side Cover (8)
- Cover (Lower) (11)
- Rear Cover (9)

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Piping Joint

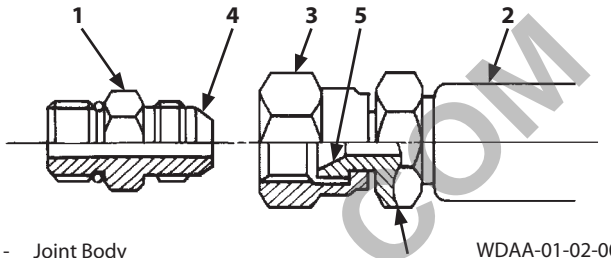
IMPORTANT: The torque given in table below are for general use only, however, a different torque is given for a specific application. Use the specified torque.

Union Joint

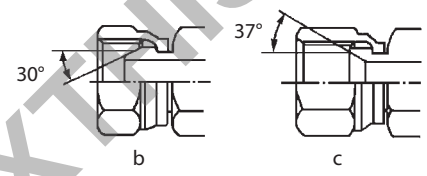
Metal sealing surfaces (4) and (5) of adapter (1) and hose (2) fit together to seal pressure oil. Union joints are used to join small-diameter lines.

IMPORTANT:

- **Do not over-tighten union nut (3). Excessive force will be applied to metal sealing surfaces (4) and (5), possibly cracking the adapter. Tighten union nut (3) to the specifications.**
- **Scratches or other damage to sealing surfaces (4) or (5) will cause oil leakage at the joint. Take care not to damage them when connecting / disconnecting.**



a - Joint Body WDAA-01-02-009



b - Male Union Joint c - Female Union Joint

WDAA-01-02-010

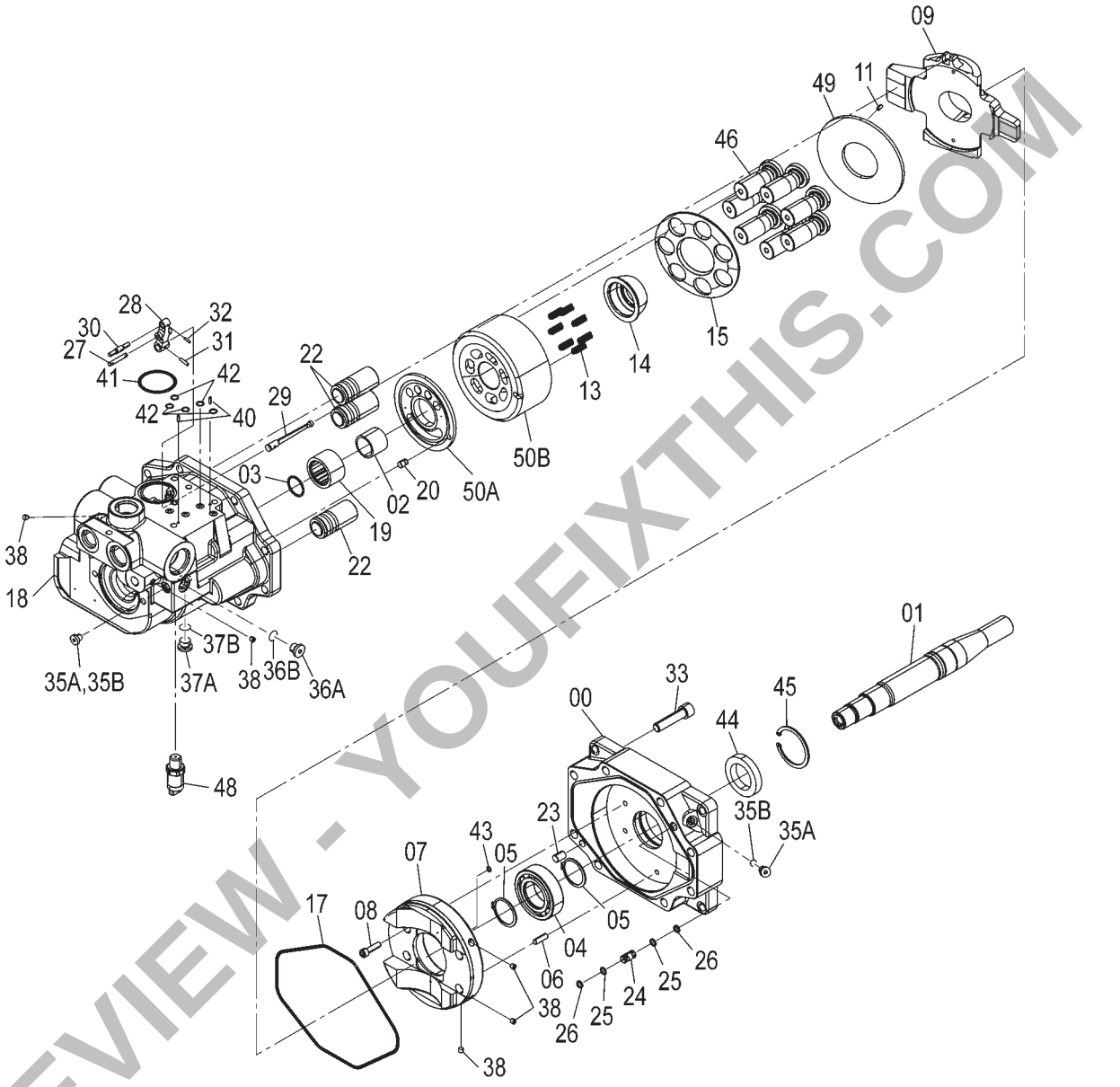
Description	Wrench Size mm	Tightening Torque		
	Union Nut	N·m	(kgf·m)	(lbf·ft)
30° male	17	25	(2.5)	(18)
	19	30	(3)	(22)
	22	40	(4)	(30)
	27	80	(8)	(59)
	32	140	(14)	(103)
	36	180	(18)	(133)
	41	200	(20)	(148)
	50	270	(27)	(200)
	55	380	(38)	(280)
	60	380	(38)	(280)
37° female	17	25	(2.5)	(18)
	19	30	(3)	(22)
	22	40	(4)	(30)
	27	80	(8)	(59)
	32	140	(14)	(103)
	36	180	(18)	(133)
	41	200	(20)	(148)

NOTE: Tightening torque of 37° male coupling without union is similar to tightening torque of 37° female.

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Disassembly of Main Pump



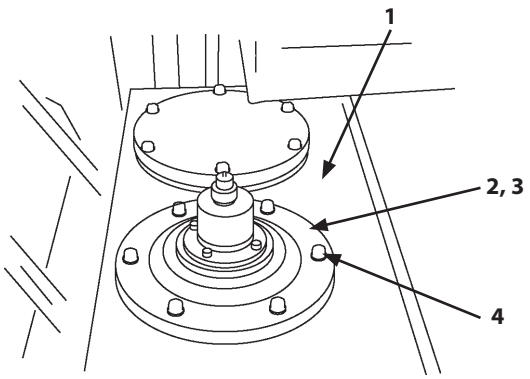
WNEC-03-08-001

00- Front Casing
01- Drive Shaft
02- Inner Race
03- Retaining Ring
04- Roller Bearing
05- Retaining Ring (2 Used)
06- Knock Pin
07- Cradle Plate
08- Socket Bolt (4 Used)
09- Swash Plate
11- Knock Pin
13- Spring (7 Used)
14- Bushing
15- Retainer
17- O-Ring
18- Pump Casing
19- Needle Bearing
20- Knock Pin
22- Servo Piston (3 Used)
23- Knock Pin
24- Restrictor Pin
25- Backup Ring (2 Used)
26- O-Ring (2 Used)
27- Pin
28- Feedback Link
29- Link Pin
30- Pin
31- Spring Pin
32- Spring Pin
33- Socket Bolt (8 Used)
35A- Plug
35B- O-Ring
36A- Plug
36B- O-Ring
37A- Plug
37B- O-Ring
38- Plug (5 Used)
40- Spring Pin (2 Used)
41- O-Ring
42- O-Ring (5 Used)
43- O-Ring
44- Oil Seal
45- Retaining Ring
46- Piston (7 Used)
48- Pressure Sensor
49- Cam Plate
50A- Valve Plate
50B- Rotor

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Removal and Installation of Pump Device



M4GB-07-044

CAUTION: Escaping fluid under pressure may penetrate the skin and eyes, and cause serious injury. Release the pressure before disconnecting the hydraulic pipings or removing other equipment. Hot hydraulic oil just after operation may spout out and cause severe burns. Wait until oil cools before starting any work. Do not turn the cap of hydraulic oil tank (1) quickly. The cap may fly off by internal pressure. Release any remaining pressure and remove the cap.

IMPORTANT: Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach an identification tag onto the connectors, hoses, and pipes for assembling. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.

Removal

1. Set the machine position for inspection and maintenance. (Refer to W1-6-1.)

CAUTION: Bleed air from hydraulic oil tank (1). (Refer to W1-4-1.)

2. Remove bolts, washers (4) (6 used). Remove the cover (2) assembly and O-ring (3) from the upper part of hydraulic oil tank (1).

   : 17 mm (0.67 in)

3. Place a container. Drain off hydraulic oil by using an oil feed pump.

NOTE: Specified oil amount of hydraulic oil tank (1): 115 L (45 US gal)

4. Remove the cab assembly. (Refer to W3-1-1.)

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Pipe Joint

Pipe connection (metal joint)
(Union Nut Wrench Size: 17, 19, 22, 27)

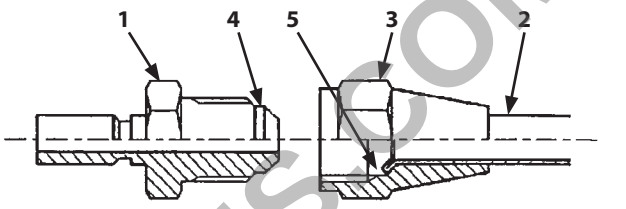
Metal (3) of adapter (1) and pipe (2) seals pressure oil.

- Precautions for use

Do not damage sealing surfaces (4) and (5) when disassembling and assembling.

Tightening Torque
Use the specified tightening torque in the table below.

Wrench Size (mm)		17	19	22	27
Tightening Torque	N·m	25	30	40	80
	(kgf·m)	(2.5)	(3)	(4)	(8)
	(lbf·ft)	(18)	(22)	(30)	(59)



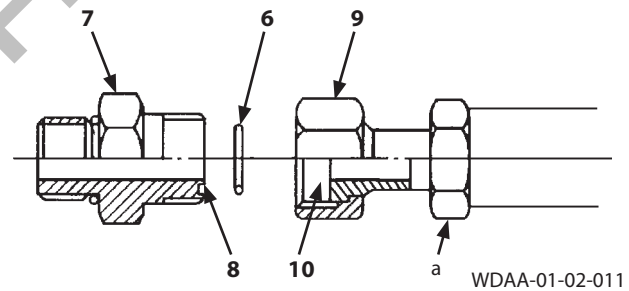
M1M7-07-005

O-ring Seal Joint

O-ring (6) is installed against the end surface of adapter (7) and seals pressure oil.

IMPORTANT:

- **Replace O-ring (6) with a new one when reinstalling.**
- **Before tightening union nut (9), confirm that O-ring (6) is seated correctly in O-ring groove (8). Tightening union nut (9) with O-ring (6) displaced will damage O-ring (6), resulting in oil leakage.**
- **Do not damage O-ring groove (8) of adapter (7) or sealing surface (10) on the hose side. Damage to O-ring (6) may cause oil leakage.**
- **If union nut (9) is found to be loose, causing oil leakage, do not tighten it to stop the leak. Instead, replace O-ring (6) with a new one, then tighten union nut (9) after confirming that O-ring (6) is securely seated in O-ring groove (8).**



WDAA-01-02-011

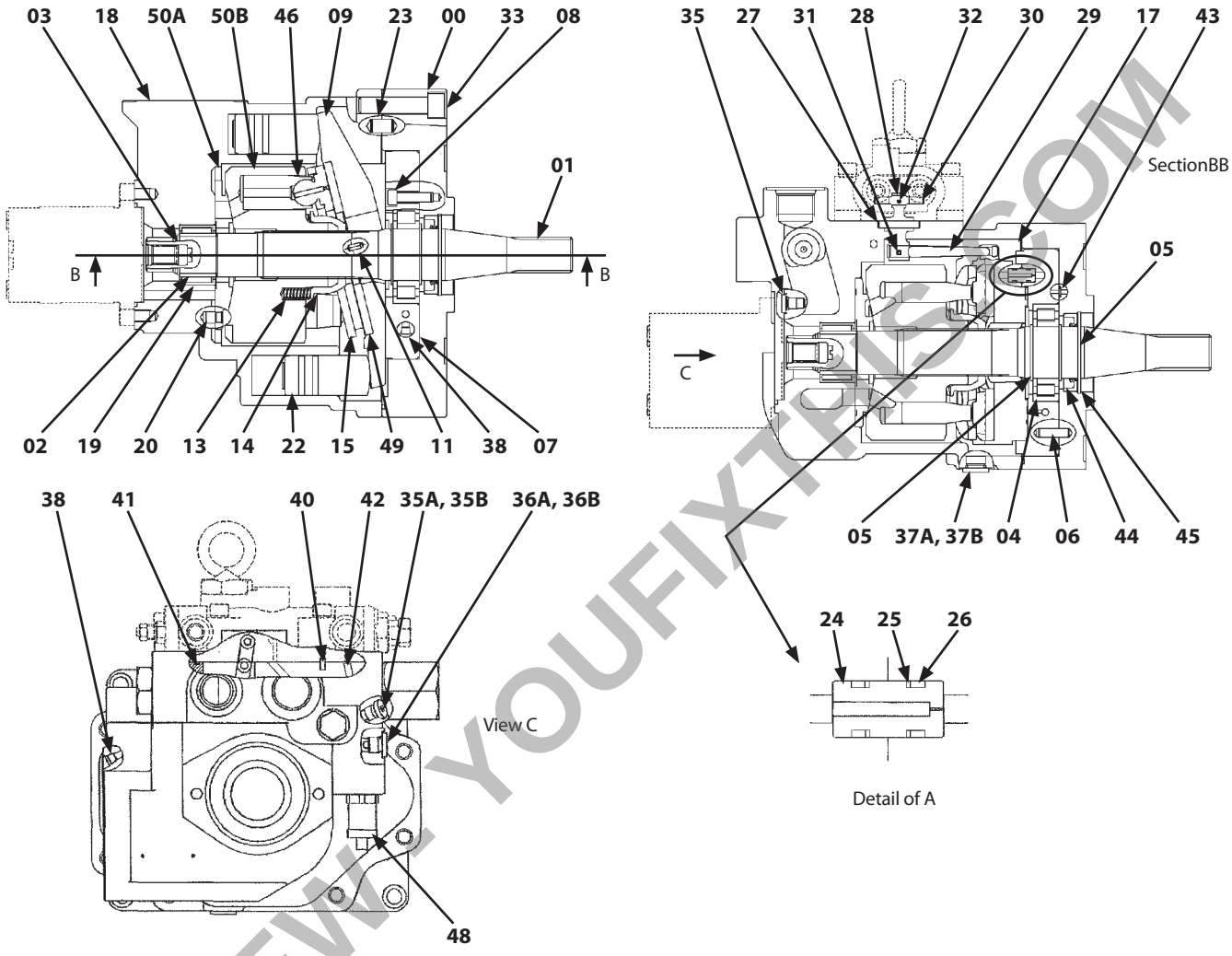
a - Joint Body

Wrench Size mm	Tightening Torque		
Union Nut	N·m	(kgf·m)	(lbf·ft)
19	30	(3)	(22)
22	70	(7)	(52)
27	95	(9.5)	(70)
32	140	(14)	(103)
36	180	(18)	(133)
41	200	(20)	(148)
50	350	(35)	(260)

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Assembly of Main Pump



W4GB-02-04-003

00- Front Casing
01- Drive Shaft
02- Inner Race
03- Retaining Ring
04- Roller Bearing
05- Retaining Ring (2 Used)
06- Knock Pin
07- Cradle Plate
08- Socket Bolt (4 Used)
09- Swash Plate
11- Knock Pin
13- Spring (7 Used)
14- Bushing
15- Retainer
17- O-Ring
18- Pump Casing
19- Needle Bearing
20- Knock Pin
22- Servo Piston (3 Used)
23- Knock Pin
24- Restrictor Pin
25- Backup Ring (2 Used)
26- O-Ring (2 Used)
27- Pin
28- Feedback Link
29- Link Pin
30- Pin
31- Spring Pin
32- Spring Pin
33- Socket Bolt (8 Used)
35A- Plug
35B- O-Ring
36A- Plug
36B- O-Ring
37A- Plug
37B- O-Ring
38- Plug (5 Used)
40- Spring Pin (2 Used)
41- O-Ring
42- O-Ring (5 Used)
43- O-Ring
44- Oil Seal
45- Retaining Ring
46- Piston (7 Used)
48- Pressure Sensor
49- Cam Plate
50A- Valve Plate
50B- Rotor

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Precautions for Disassembling and Assembling

Precautions for Disassembling

- Clean the Machine
  Thoroughly wash the machine before bringing it into the shop. Bringing a dirty machine into the shop may cause machine components to be contaminated during disassembling / assembling, resulting in damage to machine components, as well as decreased efficiency in service work.

- Inspect the Machine
  Be sure to thoroughly understand all disassembling / assembling procedures beforehand to help avoid incorrect disassembling of components as well as personal injury.
  Check and record the items listed below to prevent problems from occurring in the future.
  - The machine model, machine serial number, and hour meter reading.
  - Reason for disassembly (symptoms, failed parts, and causes).
  - Clogging of filters and oil, water or air leaks, if any. Capacities and condition of lubricants.
  - Loose or damaged parts.

- Prepare and Clean Tools and Disassembly Area
  Prepare the necessary tools to be used and the area for disassembling work.

Precautions for Disassembling and Assembling

- Precautions for Disassembling
  - Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach an identification tag onto the connectors, hoses, and pipes for assembling.
  - Before disassembling, clean the exterior of the components and place on a workbench.
  - Drain hydraulic oil and gear oil from the hydraulic components and reduction gear.
  - Be sure to provide appropriate containers for draining fluids.
  - Use matching marks for easier reassembling if necessary.
  - Be sure to use the specified special tools when instructed.
  - If a part or component cannot be removed after removing its securing nuts and bolts, do not attempt to remove it forcibly. Find the cause (s), then take the appropriate measures to remove it.
  - Orderly arrange disassembled parts. Mark and tag them if necessary.
  - Store common parts, such as bolts and nuts with reference to where they are to be used and in a manner that will prevent loss.
  - Inspect the contact or sliding surfaces of disassembled parts for abnormal wear, sticking, or other damage.
  - Measure and record the degree of wear and clearances.

- Precautions for Assembling
  - Be sure to clean all parts and inspect them for any damage. If any damage is found, repair or replace part.
  - Dirt or debris on the contact or sliding surfaces may shorten the service life of the machine. Take care not to contaminate any contact or sliding surfaces.
  - Apply appropriate lubricant oil onto parts in order to prevent them from seizing.
  - Be sure to replace O-rings, backup rings, oil seals, and floating seals with new ones once they have been disassembled. Apply grease before installing
  - Be sure that liquid-gasket-applied surfaces are clean and dry.
  - If an anti-corrosive agent has been used on a new part, be sure to thoroughly clean the part to remove the agent.
  - Fit the matching marks made when disassembling and assemble them.
  - Be sure to use the designated tools to assemble bearings, bushings, and oil seals.
  - Keep a record of the number of tools used for disassembly / assembly. After assembling is completed, count the number of tools so as to make sure that no forgotten tools remain in the assembled machine.

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SECTION 3

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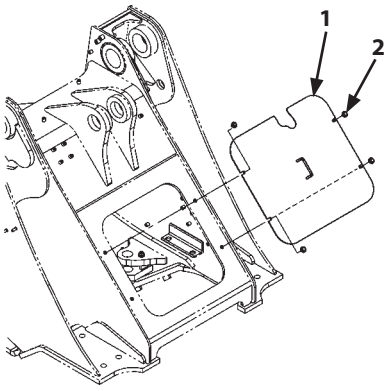
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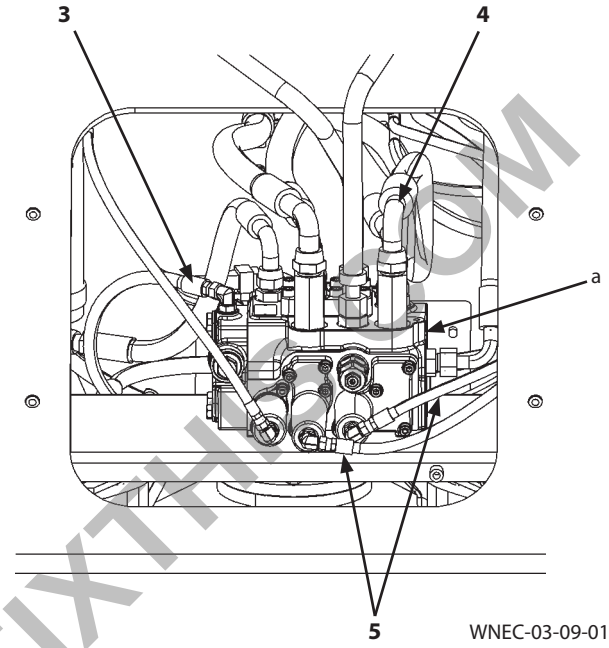
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Removal and Installation of the Hydraulic Hoses of Front Frame side.



WNEC-04-08-003



WNEC-03-09-011

a- Front Frame

IMPORTANT: Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach an identification tag onto the connectors, hoses, and pipes for assembling. Connect the hoses and install the clips in case the clips which secure the hoses have been removed.

Remove the hydraulic hoses of front frame side before removing the center hinge (Refer to W3-3-1.).

Removal

1. Set the machine position (lift arm raise) for inspection and maintenance. (Refer to W1-6-1.)

CAUTION: Bleed air from the hydraulic oil tank. (Refer to W1-4-1.)

2. Remove bolts, washers (2) (4 used). Remove cover (1).

: 17 mm (0.67 in)

3. Place a container under control valve (a). Disconnect hoses (5) (2 used).

: 19 mm (0.75 in)

4. Disconnect hose (3).

: 22 mm (0.87 in)

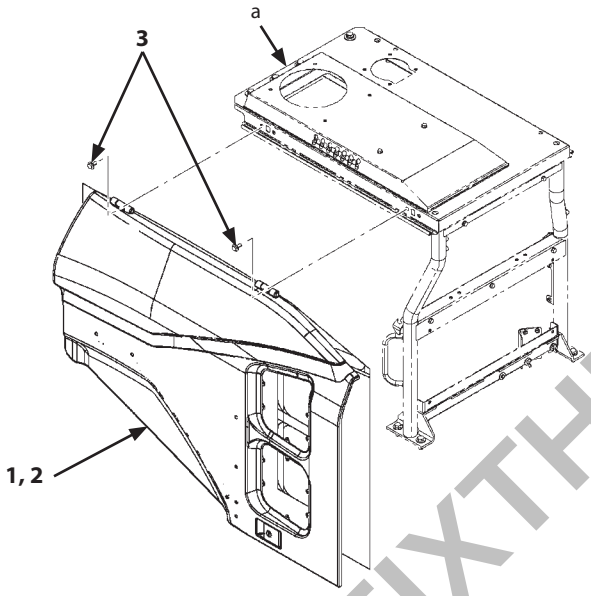
5. Disconnect hose (4).

: 41 mm (1.61 in)

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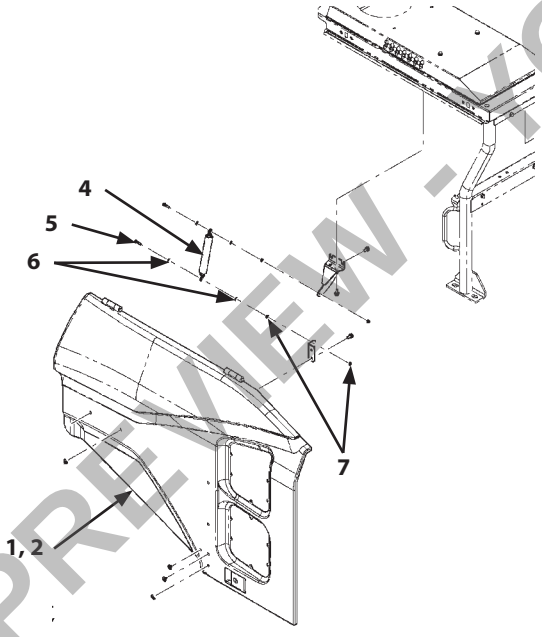
Removal and Installation of Side Cover



a- Engine Cover

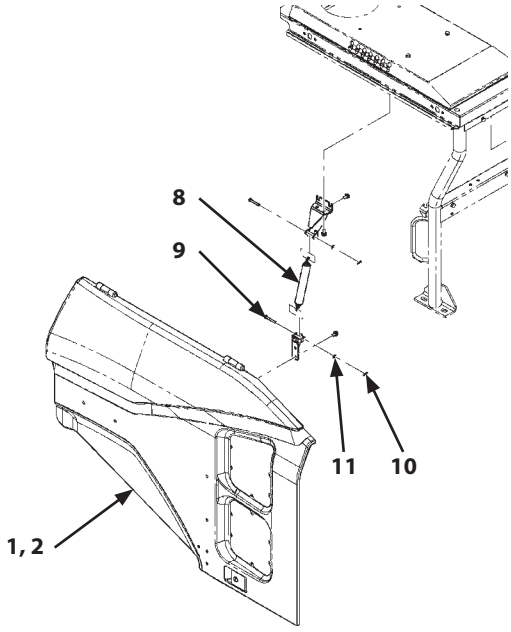
WNEE-03-04-045

Without rear fender (rear)



WNEE-03-04-046

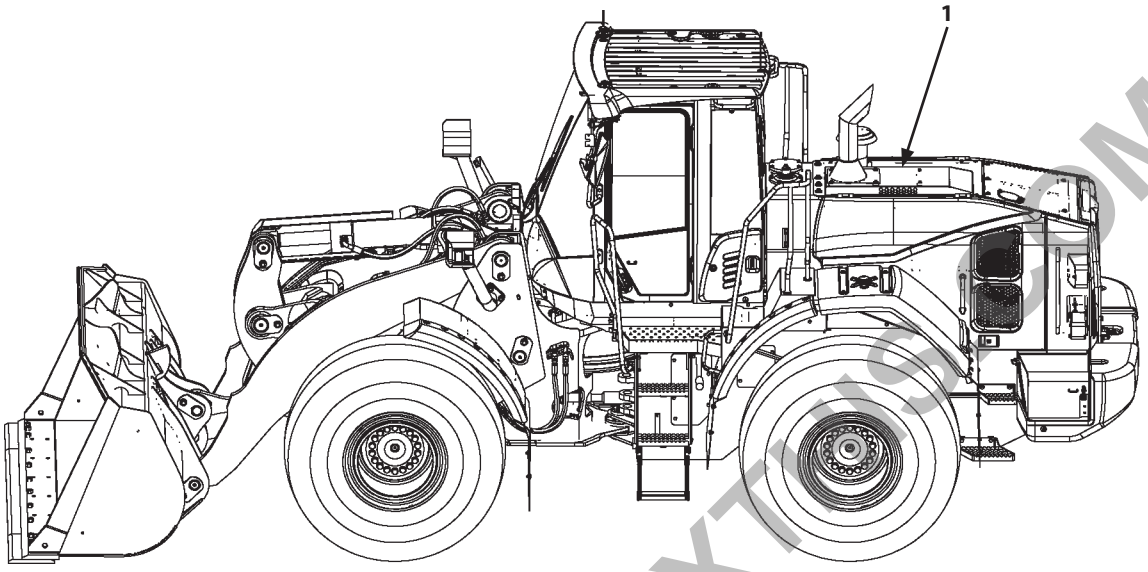
With rear fender (rear)



WNEE-03-04-047

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WNEC-01-03-001

20. Install engine cover (1). (Refer to W3-4-1.)

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IMPORTANT: The housing is made of aluminum. Do not damage the housing. Take extreme care in order to control the tightening torque.

No.	Part Name	Q'ty	Wrench Size (mm)	Tightening Torque			Remark
				N·m	kgf·m	lbf·ft	
2	Flange	1					
3	Oil Seal	1					Apply grease onto the lip when assembling.
5	Retaining Ring	1					
6	Seal	2					Apply grease onto the lip when assembling.
7	Cover	1					
9	Backup Ring	2					Apply grease onto the lip when assembling.
10	Key	2					
12	O-Ring	2					Apply grease onto the lip when assembling.
13	Gear	1					
14	Gear	1					
15	Washer	4					
26	Bushing	2					Apply hydraulic oil when assembling.
27	Bushing	2					Apply hydraulic oil when assembling.
28	Knock Pin	2					
29	Bolt	4	: 17	39 to 44	4 to 4.5	28.5 to 32.5	
41	Housing	1					

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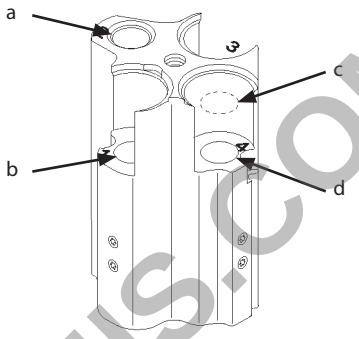
12. Remove universal joint (35I) from casing (80) by using a wrench.

    : 8 mm (0.3 in)

NOTE: LOCTITE #262 has been applied on universal joint (35I).

NOTE: Hold plate (51) against spring (65) when removing universal joint (35I).

13. Remove plate (51) from casing (80).
14. Remove plate (60C) and the guide (60A) assembly from casing (80) by using a screwdriver.
15. Remove the solenoid (53C) assemblies (3 used) from casing (80) by using a screwdriver.
16. Remove pusher (60B), retaining ring (60D), and O-ring (60E) from guide (60A).
17. Remove pushers (53B) (3 used) and O-rings (53D) (3 used) from solenoids (53C) (3 used).
18. Remove spool (62) and spring (65) from hole (a) on port 2 of casing (80) by using a pair of pliers.



WNEC-03-10-003

a- Hole on Port 2
b- Hole on Port 1
c- Hole on Port 3
d- Hole on Port 4

IMPORTANT: Keep the disassembled parts together by each port in order not to confuse.

19. Remove spools (63) (3 used), springs (65) (3 used), sockets (66A) (3 used), and springs (66B) (3 used) from hole (b) on port 1, hole (c) on port 3, and hole (d) on port 4 of casing (80) by using a pair of pliers.

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Disassembly of Manifold Valve

IMPORTANT: Keep the disassembled parts together by each port in order not to confuse.

IMPORTANT: The quantity and kind of shims (02, 05) have been determined for each manifold valve. Do not lose shims (02, 05).

1. Remove plug (01), O-ring (37), spring (04), shims (05, 02), and poppet (03) from body (22).

   : 36 mm (1.42 in)

2. Remove plug (09), O-ring (34), spring (07), and plunger (06) from body (22).

   : 6 mm (0.24 in)

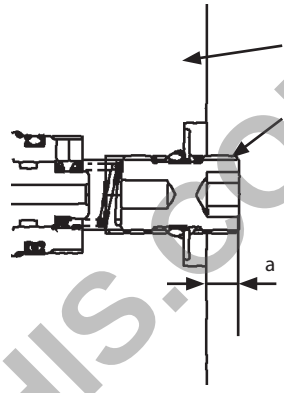
3. Remove socket bolts (28) (2 used) from solenoid (17). Remove solenoid (17), O-ring (41), sleeve (43A), O-rings (40, 39, 38), spool (43B), and spring (20) from body (22).

   : 4 mm (0.16 in)

4. Remove nut (30) from body (22).

   : 17 mm (0.67 in)

5. Measure and record mounting dimension (a) before removing screw (13).



WNEC-03-12-005

a- Mounting Dimension

6. Remove O-ring (34) and screw (13) from body (22).

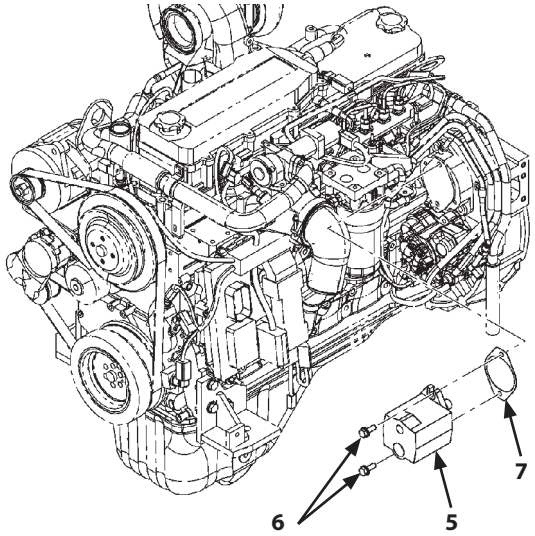
   : 6 mm (0.24 in)

7. Remove socket bolts (28) (2 used) from solenoid (21). Remove solenoid (21), O-ring (32), and the sleeve (10) assembly from body (22).

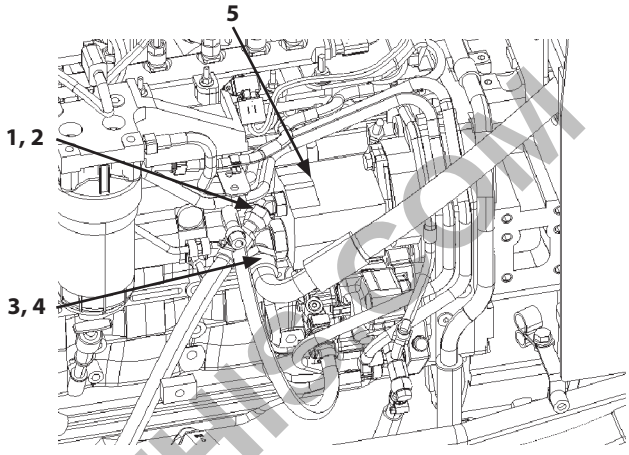
   : 4 mm (0.16 in)

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WNEE-03-15-040



WNEE-03-04-014

Installation

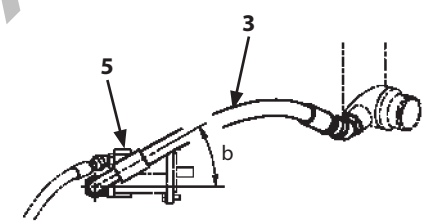
1. Install all removed adapters to fan pump (5).
2. Install gasket (7) and fan pump (5) with bolts, washers (6) (2 used).
3. Install O-ring (4). Connect hose (3) as shown in the illustration.

   : 41 mm (1.61 in)

   : 200 N·m (20 kgf·m, 148 lbf·ft)
4. Install O-ring (2). Connect hose (1).

   : 27 mm (1.06 in)

   : 95 N·m (9.5 kgf·m, 70 lbf·ft)



b- 30°

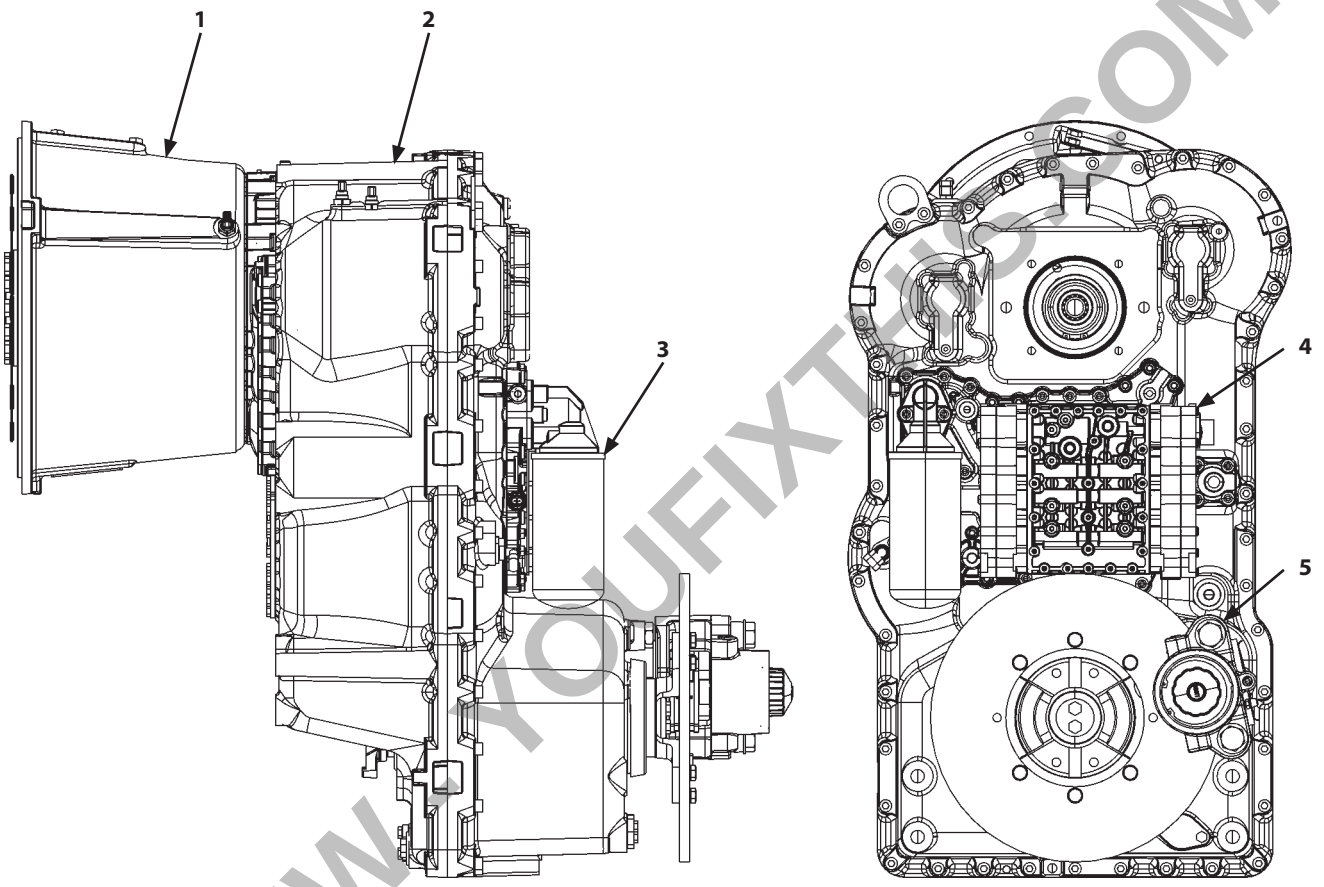
WNEE-03-04-034

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Disassembly and Assembly of Drive Unit

Drive Unit Assembly



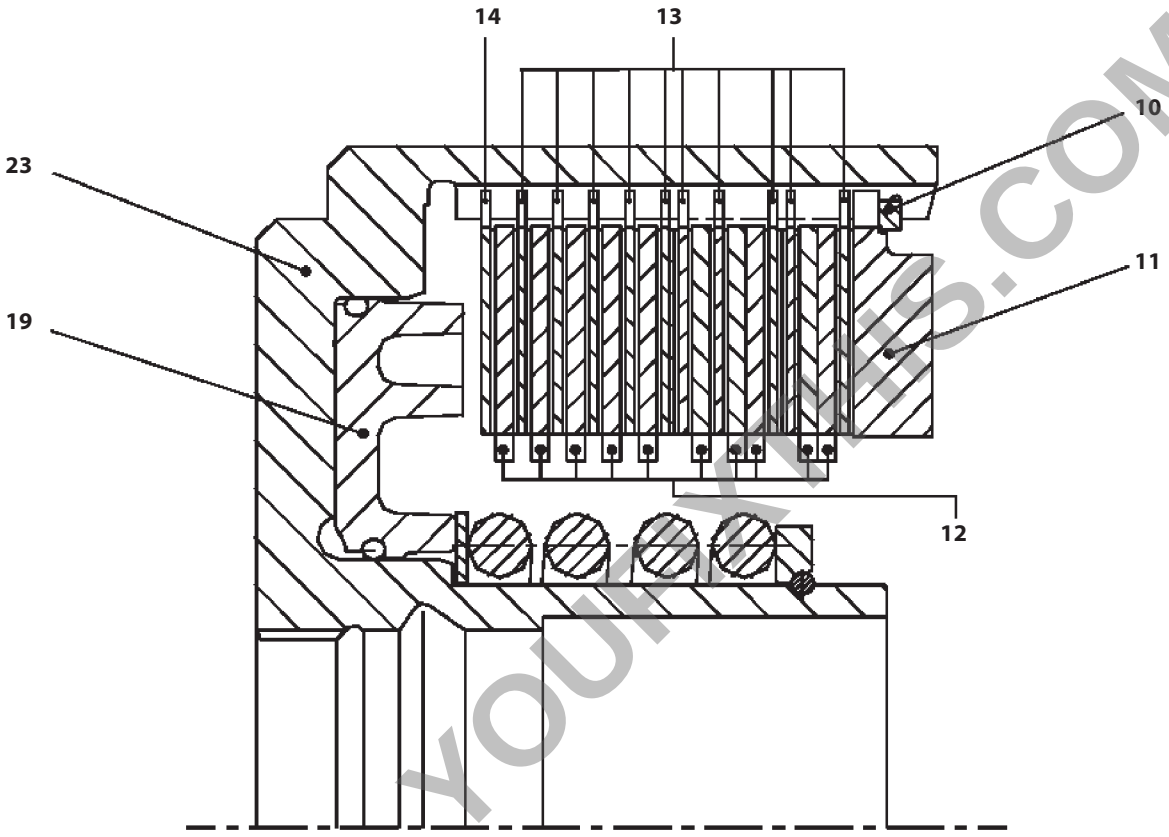
WNEC-04-02-008

1- Torque Converter
2- Transmission
3- Oil Filter
4- Transmission Control Valve
5- Parking Brake

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Slow-Speed Forward Clutch (KV) and Reverse Clutch (KR)



W4GB-03-02-147

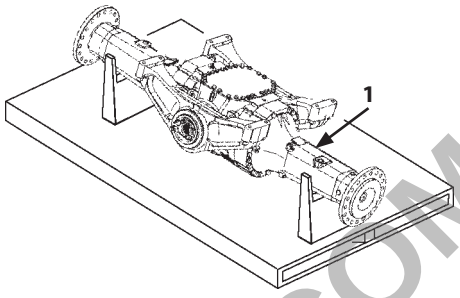
1- *Taper Roller Bearing
2- *Piston Ring
3- *Shaft
4- *Stud
5- *Piston Ring
6- *Needle Cage
7- *Idler
8- *Ball Bearing
9- *Snap Ring
10- Snap Ring
11- End Shim
12- Inner Clutch Disc (10 Used)
13- Outer Clutch Disc (10 Used)
14- Disc
15- *Snap Ring
16- *Guide Ring
17- *Coil Spring
18- *Washer
19- Piston
21- *O-Ring
22- *O-Ring
23- Disc Carrier
24- *Snap Ring
25- *Taper Roller Bearing

*NOTE: As for the item with mark *, refer to W4-2-4-36.*

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12. Lower and remove the rear axle (1) assembly.



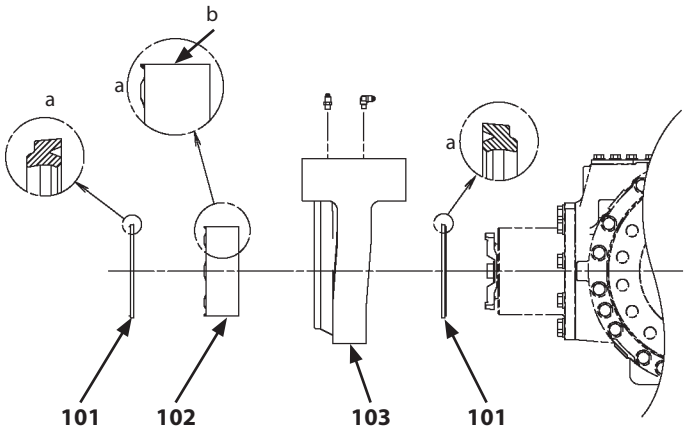
W4GB-03-03-113

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IMPORTANT: Check the direction to install dust seals (101) (2 used) and bushing (102).

98. Apply grease onto the inner surface of bushing (102). Install bushing (102) and dust seals (101) (2 used) to support (103).



WNEC-04-03-013

a- Direction to Install
b- Slit

CAUTION: Support (103) weight: 79 kg (175 lb)

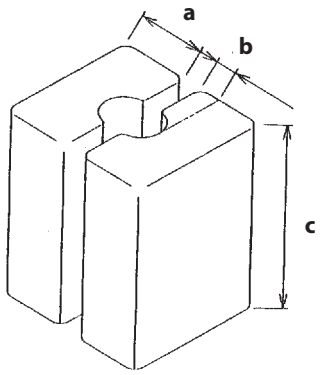
99. Attach nylon slings onto support (103). Hoist and hold support (103). Install support (103) to the rear axle.

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6. Secure the spool (02) assembly in a vise by using wooden pieces as illustrated. Remove cap screws (05) (2 used), springs (04) (2 used), and poppets (03) (2 used) from the spool (02) assembly.

   : 17 mm (0.67 in)



W4GB-03-08-002

a- 30 to 40 mm (1.18 to 1.57 in)
b- 10.5 to 12 mm (0.41 to 0.47 in)
c- 70 to 100 mm (2.76 to 3.94 in)

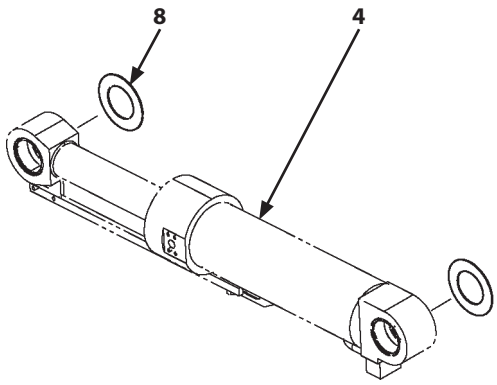
7. Remove O-rings (24) (2 used) and backup rings (23) (2 used) from cap screws (05) (2 used).
8. Remove plug (34A) and O-ring (34B) from valve housing (01).

   : 6 mm (0.24 in)

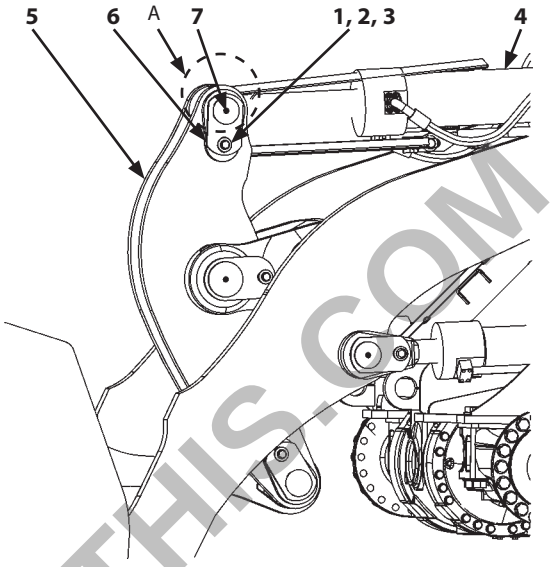
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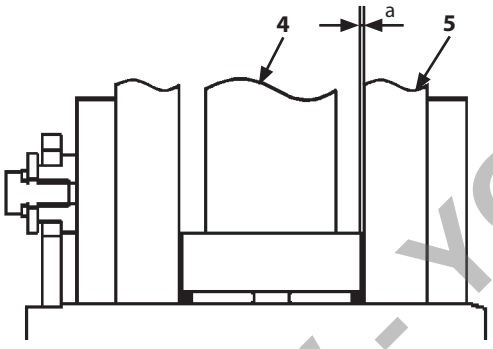
Detail A



WNEC-05-01-012



WNEC-05-01-016



WNEC-05-01-018

a- Clearance

CAUTION: Bucket cylinder (4) weight: 170 kg (375 lb)

16. Attach nylon slings onto bucket cylinder (4). Hoist and hold bucket cylinder (4).
17. Remove the wires from the rod holes of bucket cylinder (4). Start the engine. Extend the rod of bucket cylinder (4). Fit rhe rod to the mounting holes of bell crank (5). Stop the engine.

CAUTION: Pin (6) weight: 20 kg (45 lb)

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

18. Fit spacer (8) to the mounting holes of bucket cylinder (4) so that the clearance (a) is adjusted within 1.5 mm (0.059 in). Install pin (6) to bell crank (5) with using a hammer.

NOTE: Spacer (8) Thickness: 1.6 mm (0.063 in), 2.3 mm (0.091 in)

19. Install washers (2, 3) and bolt (1).

    : 24 mm (0.94 in)

    : 210 N·m (21 kgf·m, 155 lbf·ft)

20. Install grease fitting (7). Apply grease.

    : 10 mm (0.4 in)

    : 4 N·m (0.4 kgf·m, 3 lbf·ft)

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