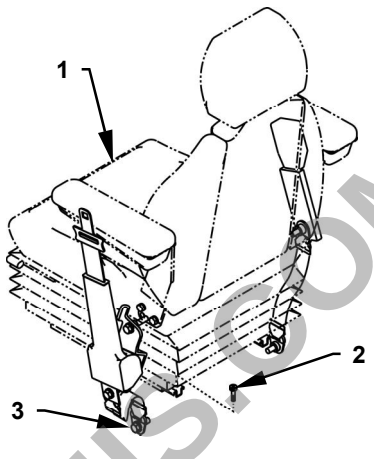
REMOVE AND INSTALL CAB

Removal

CAUTION: Seat weight: 45 kg (99 lb)

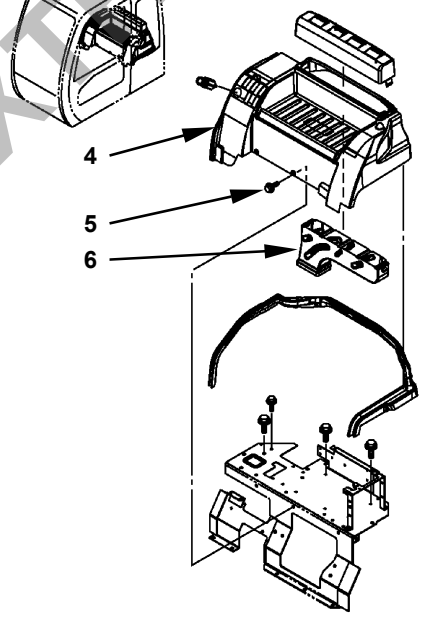
1. Remove bolts (3) (2 used) and socket bolts (2) (4 used). Put the plate on the floor plate. Move seat (1) to remove it.
   : 16 mm
   : 6 mm



W16J-02-01-003

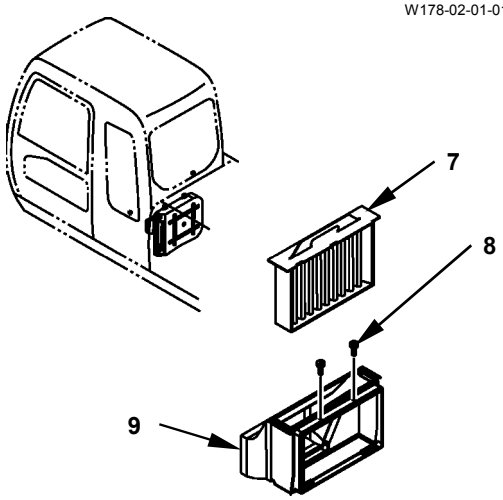
2. Remove bolts (5) (2 used) behind the cab to remove rear box (4).
   : 17 mm

3. Raise duct (6) to remove it.



W178-02-01-012

4. Remove air filter (7). Remove clips (8) (2 used) with a plier, then remove duct (9) from the cab.



W1F3-02-01-002

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TIGHTENING TORQUE SPECIFICATION

No.	Descriptions			Bolt Dia mm	Q'ty	Wrench Size (mm)	Torque N·m	Torque (kgf·m)	Torque (lbf·ft)
1	Engine cushion rubber mount-ing bolt	Front		22	2	32	750	(76.5)	(550)
		Rear	Engine cushion rubber	22	2	32	750	(76.5)	(550)
			Cushion rubber-machine	18	4	27	400	(41.0)	(295)
2	Engine bracket mounting bolt			14	8	22	180	(18.5)	(135)
3	Radiator mounting bolt			16	4	24	210	(21.5)	(155)
4	Hydraulic oil tank mounting bolt			16	8	24	210	(21.5)	(155)
5	Fuel tank mounting bolt			16	8	24	210	(21.5)	(155)
6	ORS fittings for hydraulic hoses and piping			$1-\frac{3}{16}$–12UNF		36	180	(18.0)	(135)
				$1-\frac{7}{16}$–12UNF		41	210	(21.5)	(155)
7	Pump device mounting bolt			12	12	19	90	(9.2)	(66)
8	Control valve mounting bolt (hexagonal wrench)			20	4	17	400	(41.0)	(295)
9	Swing device mounting bolt			22	26	32	750	(76.5)	(550)
10	Swing motor mounting bolt (hexagonal wrench)			18	24	14	300	(30.5)	(220)
11	Battery mounting nut (except ZAXIS460LCH)			8	3	13	20	(2.0)	(15.0)
	Battery mounting nut (ZAXIS460LCH)			12	2	19	35	(3.5)	(26)
12	Cab mounting nut			16	6	24	210	(21.5)	(155)
13	Swing bearing mounting bolt to upperstructure			27	36	41	1400	(143)	(1030)
	Swing bearing mounting bolt to undercarriage			27	36	41	1400	(143)	(1030)
14	Travel device mounting bolt			22	40	32	750	(76.5)	(550)
	Travel motor mounting bolt			18	8	27	300	(30.5)	(220)
	Sprocket mounting bolt			22	48	32	750	(76.5)	(550)
15	Upper roller mounting		STD, H	18	16	27	400	(41.0)	(295)
			LC, LCH	18	24	27	400	(41.0)	(295)
16	Lower roller mounting bolt		STD, H	22	64	32	750	(76.5)	(550)
			LC, LCH	22	72	32	750	(76.5)	(1030)
17	Track shoe bolt		STD, H	24	392	32	1400	(143)	(1030)
			LC, LCH	24	424	32	1400	(143)	(550)
18	Track guard mounting bolt		STD	22	28	32	750	(76.5)	(550)
			LC	22	36	32	750	(76.5)	(550)
			H	22	40	32	750	(76.5)	(550)
			LCH	22	40	32	750	(76.5)	(550)
19	Track mounting bolt		LC, LCH	33	36	50	1750	(178)	(1290)

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PERIODIC REPLACEMENT OF PARTS

To ensure safe operation, be sure to conduct periodic inspection of the machine. In addition, the parts listed below, if defective, may pose serious safety/fire hazards. It is very difficult to gauge the extent of deterioration, fatigue, or weakening of the parts listed below simply by visual inspection alone. For this reason, replace these parts at the intervals shown in the table below. However, if any of these parts are found to be defective, replace before starting operation, regardless of the interval.
Also, when replacing hoses, check the clamps for deformation, cracks, or other deterioration, and replace as necessary.
Be sure to perform periodic inspection of all hoses, as shown below, and replace or retighten any defective parts found, as necessary.
Consult your authorized dealer for correct replacement.

Periodic Replacement Parts			Replacement Intervals
Engine		Fuel hose (Fuel tank to filter)	Every 2 years or 6000 hours
		Fuel hose (Fuel tank to injection pump)	Every 2 years or 6000 hours
		Heater hose (Heater to engine)	Every 2 years or 6000 hours
Hydraulic System	Basic Machine	Pump suction hose	Every 2 years or 6000 hours
		Pump delivery hose	Every 2 years or 6000 hours
		Swing hose	Every 2 years or 6000 hours
		Travel hose	Every 2 years or 6000 hours
	Front-End Attachment	Boom cylinder line hose	Every 2 years or 6000 hours
		Arm cylinder line hose	Every 2 years or 6000 hours
		Bucket cylinder line hose	Every 2 years or 6000 hours
		Pilot hose	Every 2 years or 6000 hours

NOTE: Be sure to replace seals, such as O-rings and gaskets, when replacing hoses.

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Workshop Manual

ZAXIS450 class

450/450H/450LC/450LCH/460LCH

Vol No.: W16J-E-01

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RECOGNIZE SAFETY INFORMATION

- This is the **SAFETY ALERT SYMBOL**.
  - When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.
  - Follow recommended precautions and safe operating practices.



001-E01A-0688

SA-688

UNDERSTAND SIGNAL WORDS



SA-1223

- On machine safety signs, signal words designating the degree or level of hazard - DANGER, WARNING, or CAUTION - are used with the safety alert symbol.
  - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
  - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
  - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
    DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on **CAUTION safety signs**.
  - Some safety signs don't use any of the designated signal words above after the safety alert symbol are occasionally used on this machine.
- **CAUTION** also calls attention to safety messages in this manual.
- To avoid confusing machine protection with personal safety messages, a signal word **IMPORTANT** indicates a situation which, if not avoided, could result in damage to the machine.
- ***NOTE*** indicates an additional explanation for an element of information.

002-E01C-1223

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SECTION 1
GENERAL



— CONTENTS —

Group 1 Precautions for Disassembling and Assembling

Precautions for Disassembling and Assembling.....T1-1-1
Maintenance Standard Terminology.....T1-1-7

Group 2 Tightening Torque

Tightening Torque Specification..... W1-2-1
Torque Chart..... W1-2-3
Piping Joint..... W1-2-6
Periodic Replacement of Parts..... W1-2-10

Group 3 Painting

Painting..... W1-3-1

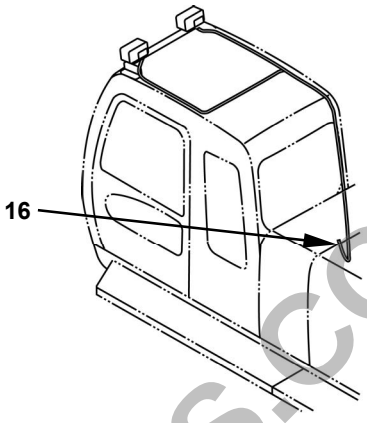
Group 4 Bleeding Air from Hydraulic Oil Tank

Bleeding Air from Hydraulic Oil Tank..... W1-4-1

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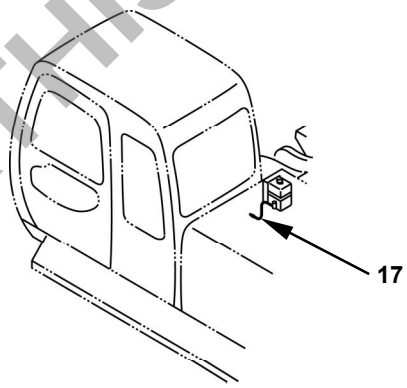
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5. Connect connector (16) of the work light on the right rear side in the cab.



W16J-02-01-002

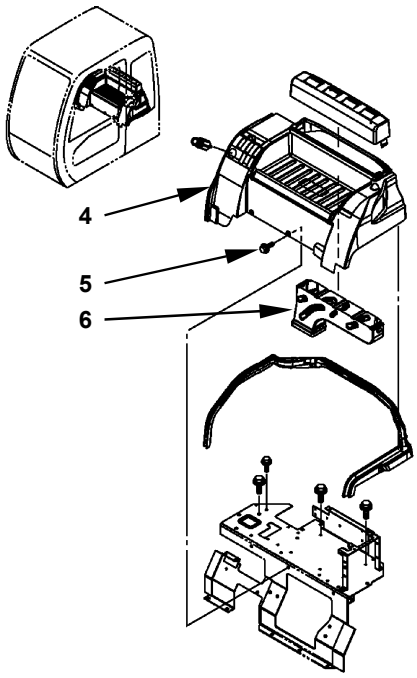
6. Connect washer vinyl hose (17) behind the cab.



W16J-02-01-001

7. Align the mounting hole for duct (6). While pressing duct downward, install it.

8. Install rear box (4) with bolts (5) (2 used).
   : 17 mm
   : 50 N·m (5.1 kgf·m, 37 lbf·ft)



W178-02-01-012

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CAUTION: Front casing weight: 35 kg (77 lb)

IMPORTANT: When removing front casing (80), take care not to damage the following items:
- **Slide surface of oil seal for drive shaft (47)**
- **Seat packing (18)**
- **Mating face of front casing (80) and pump casing (58)**

14. Attach sling to the bolt hole in the engine mounting section of front casing (80) and lift it by crane. Remove socket bolts (85) (11 used) to lift and remove front casing (80) from pump casing (58).
    : 10 mm

NOTE: There are two spring assembling pins (19) meshed tightly between front casing (80) and pump casing (58). Tap and remove front casing (80) straightly at right angle in the direction of drive shaft (47).

15. Remove retaining rings (74, 79) from drive shaft (47) and driven shaft (48) to remove bearing spacers (75, 78), drive gear (76) and driven gear (77).

16. Remove retaining ring (50) and bearing spacer (49) from pump casing (58).

17. Tap the rear ends of drive shaft (47) and driven shaft (48) with plastic hammer to remove drive shaft (47) and driven shaft (48) from pump casing (58).

18. Remove retaining ring (44), bearing spacer (45), roller bearing (46) from drive shaft (47) and driven shaft (48) only when necessary. Do not remove the roller bearing (46) unless its service life is over. When removing, put a metal plate on the outer race of roller bearing (46) and remove the roller bearing by pressing out with a press. Roller bearing (46) being pressed out can not be reused.

IMPORTANT: Since THREEBOND#1305N was applied to socket bolt (69), heat it before removing.

19. Remove socket bolt (69) which is used to secure swash plate support (42) to remove swash plate support (42) from pump casing (58).
    : 6 mm

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Assemble Control Valve (5-Spool Section)

- Be sure to read “Precautions for Disassembly and Assembly Work” thoroughly on page W1-1-1 before starting the assembly work.

Assemble Spool

1. Install O-rings (34) (5 used) into housing (1). Install covers (35 and 37) into the housing with socket bolts (36) (10 used).
   : 10 mm
   : 98 N·m (10 kgf·m, 72 lbf·ft)

2. Clamp spool (24) into a vise with wooden spatulas inserted at both sides.
   Install backup ring (19), O-ring (20) into cap (18).
   Install check valve (23), spring (22), spacer (21) into spool (24).
   Install the cap into the spool.
   : 8 mm
   : 78.5 N·m (8 kgf·m, 58 lbf·ft)

IMPORTANT: Apply LOCTITE to the bolt (12) hole of each spool (7 and 24 to 27).

3. Clamp each spool (7 and 24 to 27) into a vise with wooden spatulas inserted at both sides.
   Install O-rings (13) (5 used) into housing (1).
   Install spring guide (8), sleeve (9), spring (10), spring guide (11) into spools (7 and 24 to 27). Install bolts (12) to each spool.
   : 10 mm
   : 98 N·m (10 kgf·m, 72 lbf·ft)

IMPORTANT: Apply hydraulic oil on the surface of spools (7 and 24 to 27).

4. Install spool (7 and 24 to 27) assemblies into housing (1) while rotating them slowly.

5. Install cover (15) onto housing (1) with socket bolts (14) (10 used).
   : 10 mm
   : 98 N·m (10 kgf·m, 72 lbf·ft)

Assemble Check Valve

IMPORTANT: Chip (32) prevents cap (33) from being pulled and loosening.
The chip will be damaged when cap is removed because it is made of nylon. Be sure to replace the chip with a new one and install the cap.

6. Install backup ring (31), O-ring (30), chip (32) into cap (33).
   Insert spring (29) into check valve (28).
   Install the check valve and cap into housing (1).
   : 14 mm
   : 343 N·m (35 kgf·m, 255 lbf·ft)

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4. Install boot (30). Install nut (5) and grip (4) to lever (31) and secure it with the nut.
   : 19 mm
   : 20 N·m (2 kgf·m, 14.5 lbf·m)

IMPORTANT: If the harness is arranged to the inside of spring pin (8), it may make contact with the moving part of the pilot valve damaging it. Be sure to arrange the harness to the outside of spring pin (8).

5. Pass the harness of grip (4) through the hole on the top of boot (30). Secure the harness to lever (31) with grips (6 and 28).
   Arrange the harness to the outside of spring pin (8) over bolt (9) head.
   Connect connector (7).

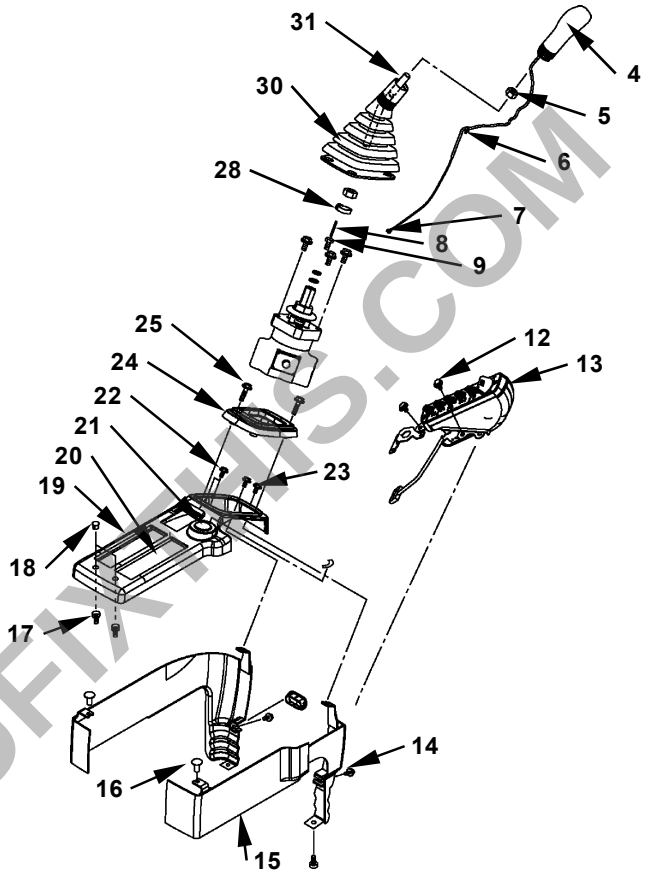
6. Install switch box (13) with bolts (12) (3 used), then connect connector.
   : 13 mm
   : 10 N·m (1.0 kgf·m, 7.2 lbf·m)

7. Connect each harness of key switch (21) and air conditioner controller (20).

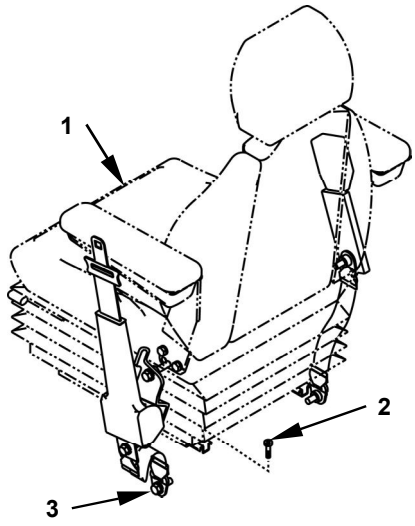
8. Install cover (15) with screws (23, 16 and 14). Install cover (19) with screws (22) (4 used), and (17) (2 used). Install caps (18) (2 used) to the cover. Install cover (24) with screw (25).

9. Install seat (1) with socket bolts (2) (4 used). Install the seat belt with bolts (3) (2 used).
   : 6 mm
   : 8 N·m (0.8 kgf·m, 5.8 lbf·ft)
   : 16 mm
   : 70 N·m (7.1 kgf·m, 51 lbf·ft)

IMPORTANT: After installation, check the oil level, start the engine and check for oil leaks.



W178-02-07-001



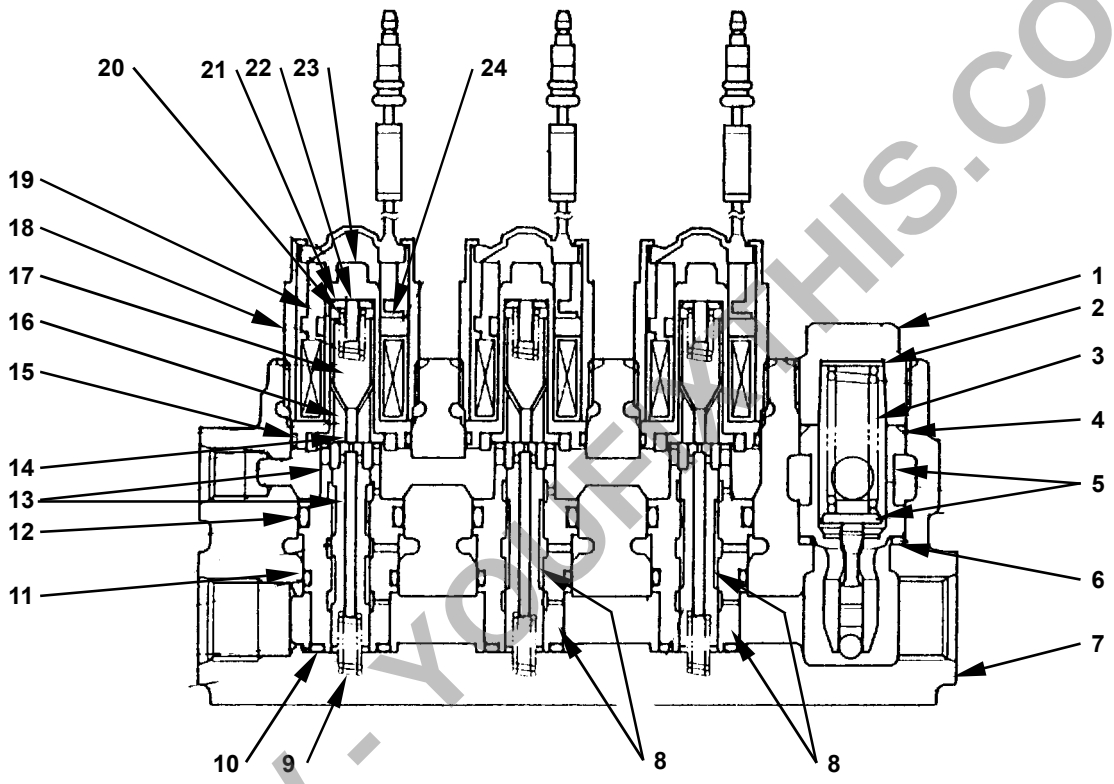
W16J-02-01-003

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DISASSEMBLE AND ASSEMBLE THREE-SPOOL SOLENOID VALVE

IMPORTANT: One of solenoid valves (3 used) is normal closed type and different from others. When assembling, be sure to install them correctly.



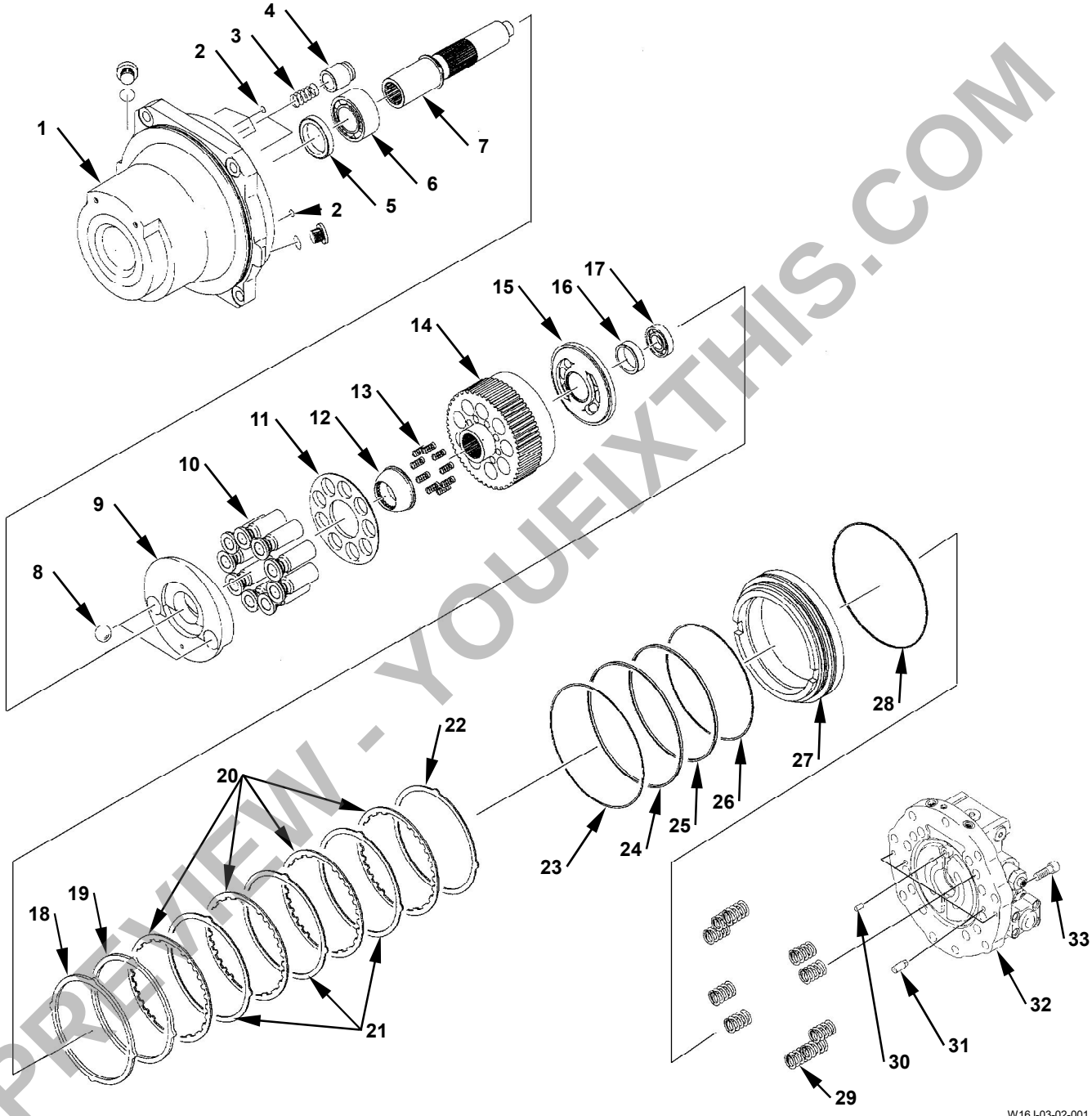
T111-02-07-002

NOTE: 1 kgf·m=7.233 lbf·ft

Item No.	Part Name	Quantity	Wrench Size (mm)	Tightening Torque			Item No.	Part Name	Quantity	Wrench Size (mm)	Tightening Torque		
				N·m	(kgf·m)	(lbf·ft)					N·m	(kgf·m)	(lbf·ft)
1	Plug	1	22	49	(5)	(36)	13	Spool Assembly	1				
2	Shim	1					14	Rod	3				
3	Spring	1					15	O-Ring	3				
4	O-Ring	1					16	Stopper	3				
5	Valve Assembly	1					17	Plunger	3				
6	Gasket	1					18	Screw	3	32	29.5	(3)	(22)
7	Casing	1					19	Coil Assembly	3				
8	Spool Assembly	2					20	Spring	3				
9	Spring	3					21	Spring Seat	3				
10	O-Ring	3					22	Pipe	3				
11	O-Ring	3					23	Housing	3				
12	O-Ring	3					24	Spacer	3				

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DISASSEMBLE TRAVEL MOTOR



W16J-03-02-001

1 - Casing
2 - O-Ring (4 Used)
3 - Spring (2 Used)
4 - Piston (2 Used)
5 - Oil Seal
6 - Roller Bearing
7 - Shaft
8 - Steel Ball (2 Used)
9 - Swash Plate
10 - Piston (9 Used)
11 - Retainer
12 - Holder
13 - Spring (9 Used)
14 - Cylinder Block
15 - Valve Plate
16 - Collar
17 - Roller Bearing
18 - Friction Plate
19 - Friction Plate
20 - Disc Plate (4 Used)
21 - Friction Plate (3 Used)
22 - Friction Plate
23 - Backup Ring
24 - O-Ring
25 - O-Ring
26 - Backup Ring
27 - Brake Piston
28 - O-Ring
29 - Spring (10 Used)
30 - Pin
31 - Pin (4 Used)
32 - Valve Housing
33 - Socket Bolt (9 Used)

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10. Remove socket bolts (1) (4 used) to remove guide (3) from piston rod (4).
    : 12 mm

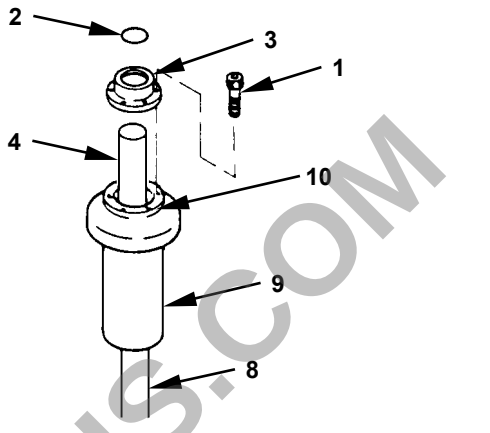
11. Pull out piston rod (4) from cylinder (9).

12. Remove O-ring (2) from guide (3).

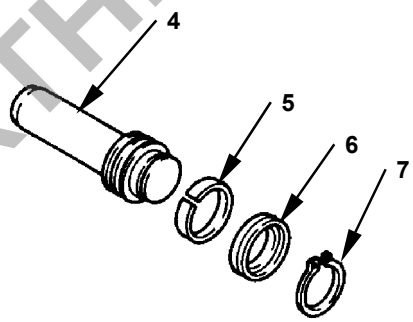
CAUTION: Cylinder (9) weight: 40 kg (88 lb)
Rod (8) weight: 21 kg (50 lb)

13. Install eyebolt (M16, Pitch 2.0) into rod (8).
    Lift and remove the rod from cylinder (9) by crane.
    Remove O-ring (10) from inside of the cylinder.

14. Remove retaining ring (7), U-ring (6) and wear ring (5) from piston rod (4).



W142-03-04-010



W166-03-04-001

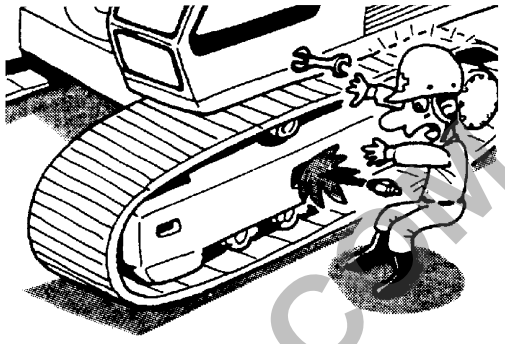
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REMOVE AND INSTALL TRACKS

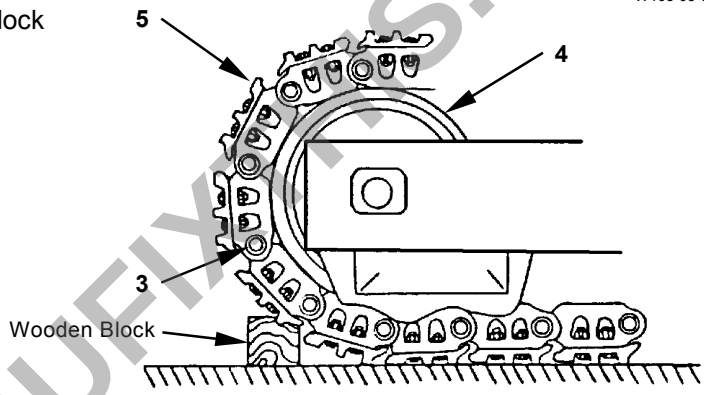
Removal

CAUTION: Do not loosen valve (1) quickly or loosen it too much as high-pressure grease in the adjusting cylinder may gush out.
Loosen carefully, keeping body parts and face away from the valve.
Never loosen grease fitting (2).



W105-03-07-001

1. Rotate the tracks so that master pin (3) is positioned over front idler (4). Put a wooden block under track shoes (5), as shown.

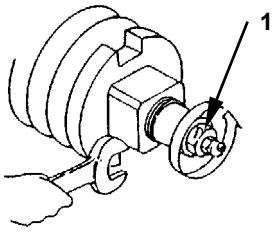


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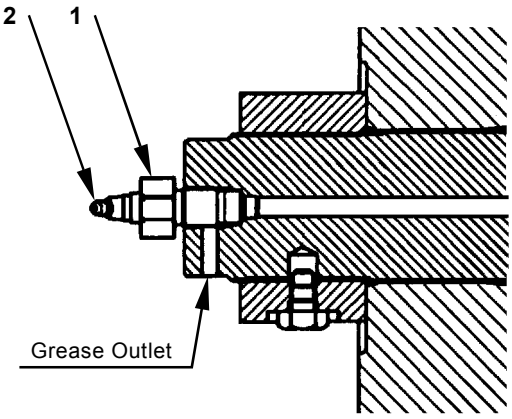
IMPORTANT: It is enough to loosen the valve by 1 to 1.5 turns.
Do not loosen it over that degree.

2. Loosen valve (1) for track adjuster to drain grease out.

: 24 mm



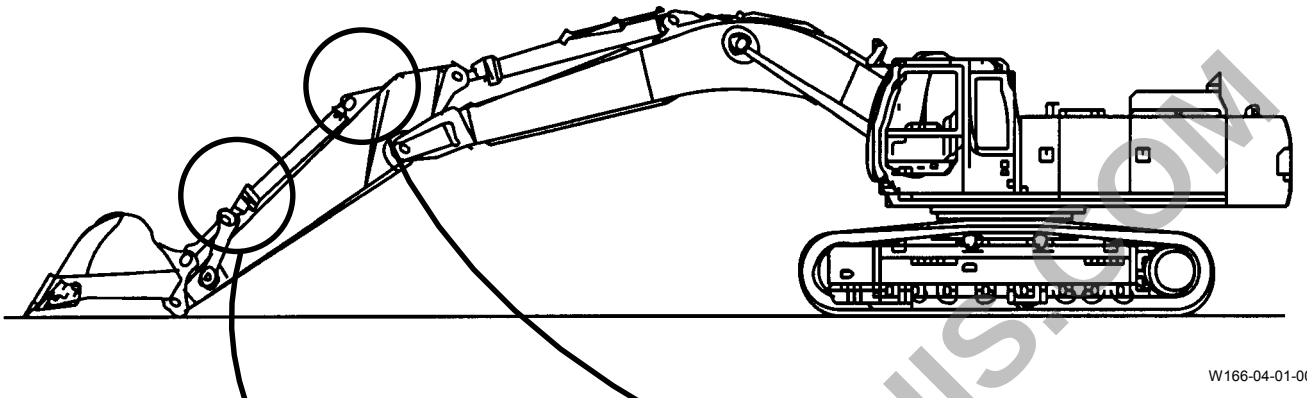
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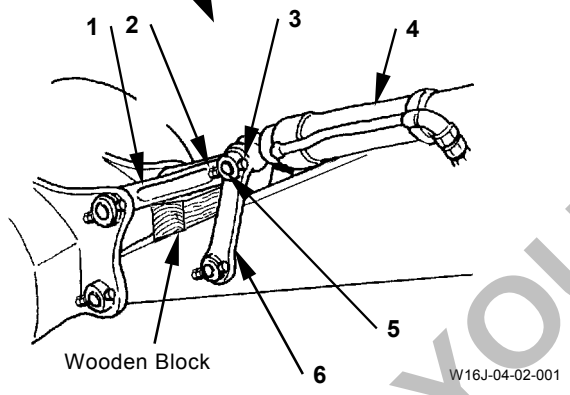


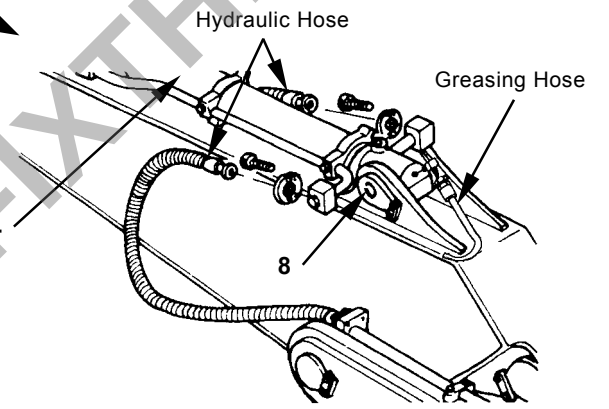
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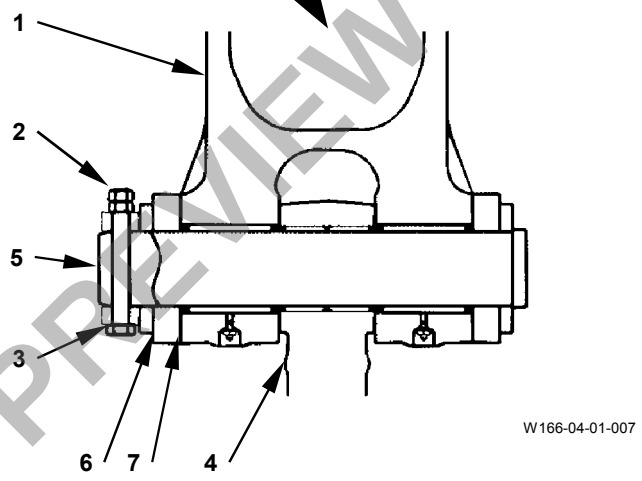
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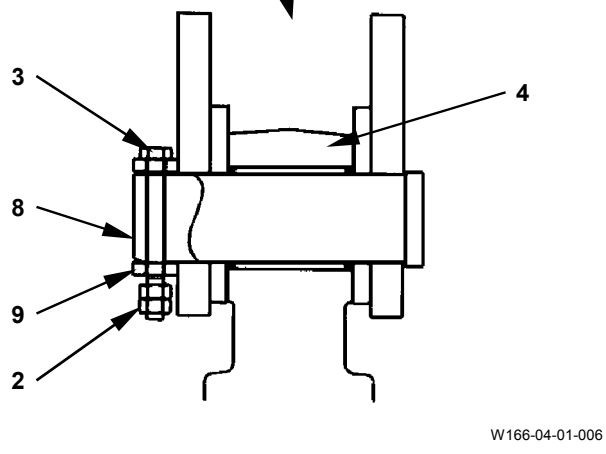
Remove and Install Bucket Cylinder











1 - Link A
2 - Lock Nut (4 Used)
3 - Bolt (2 Used)
4 - Bucket Cylinder
5 - Pin
6 - Link B (2 Used)
7 - Shim (2 Used)
8 - Pin
9 - Stopper

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