PART NO. WAEBJ0-EN-00

HITACHI

Reliable solutions

Workshop Manual

ZX55USR-5A

Hydraulic Excavator

ZX55USR-5A HYDRAULIC EXCAVATOR WORKSHOP MANUAL

Hitachi Construction Machinery Co., Ltd.

URL:http://www.hitachi-c-m.com

PRINTED IN JAPAN (K) 2013, 12

WAEBJ0-EN-00

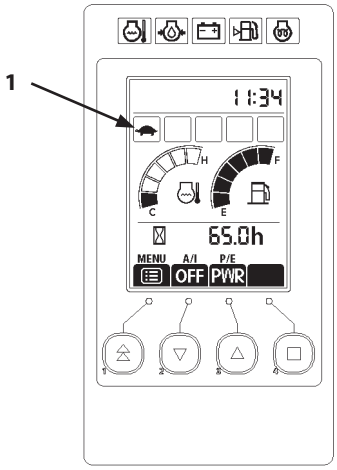
Service Manual consists of the following separate Part No.

Technical Manual	: Vol. No.TAEBJ0-EN
Workshop Manual	: Vol. No.WAEBJ0-EN
Engine Manual	: Vol. No.ETADB-EN, EWADB-EN

General Precautions for Cab

- Before entering the cab, thoroughly remove all dirt and/or oil such as mud, grease, soil or stones that may mess up the cab from the soles of your work boots. If any controls such as a pedal is operated while with dirt and/or oil on the soles of the operator's work boots, the operator's foot may slip off the pedal, possibly resulting in a personal accident.
- Do not mess up around the operator's seat with parts, tools, soil, stones, obstacles that may fold up or turn over, cans or lunch box. The levers or pedals become inoperable if obstacle jams in operation stroke of the travel levers/pedals, pilot control shut-off lever or control levers, which may result in serious injury or death.
- Avoid storing transparent bottles in the cab. Do not attach any transparent type window decorations on the windowpanes as they may focus sunlight, possibly starting a fire.
- Refrain from listening to the radio, or using music headphones or mobile telephones in the cab while operating the machine.
- Keep all flammable objects and/or explosives away from the machine.
- After using the ashtray, always cover it to extinguish the match and/or tobacco.
- Do not leave cigarette lighters in the cab. When the temperature in the cab increases, the lighter may explode.
- Use proper floor mat dedicated to the machine. If another floor mat is used, it may be displaced and contact with the travel pedals during operation, resulting in serious injury or death.

- When the machine descends a slope at high speed, machine weight accelerates descending speed. It may cause collision accident due to misjudging of braking distance or machine turnover due to running on an unexpected obstacle.
  Always ensure that travel mode display (1) on the monitor is , and then reduce the engine speed before descending a slope.
- Be sure to thoroughly warm up the machine before ascending steep slopes. If hydraulic oil has not warmed up sufficiently, sufficient performance may not be obtained.
- Use a signal person when moving, swinging or operating the machine in congested areas. Coordinate hand signals before starting the machine.
- Before moving machine, determine which way to move travel pedals/levers for the direction you want to go. When the travel motors are in the rear, pushing down on the front of the travel pedals or pushing the levers forward moves the machine forward, towards the idlers. An arrow-mark seal is stuck on the inside surface of the side frame to indicate the machine front direction.
- Select a travel route that is as flat as possible. Steer the machine as straight as possible, making small gradual changes in direction.
- Before traveling on them, check the strengths of bridges and road shoulders, and reinforce if necessary.
- Use wood plates in order not to damage the road surface. Be careful of steering when operating on asphalt roads in summer.
- When crossing train tracks, use wood plates in order not to damage them.
- Do not make contact with electric wires or bridges.
- When crossing a river, measure the depth of the river using the bucket, and cross slowly. Do not cross the river when the depth of the river is deeper than the upper edge of the upper roller.
- When traveling on rough terrain, reduce engine speed. Select slow travel speed. Slower speed will reduce possible damage to the machine.
- Avoid operations that may damage the track and undercarriage components.
- During freezing weather, always clean snow and ice from track shoes before loading and unloading machine, to prevent the machine from slipping.



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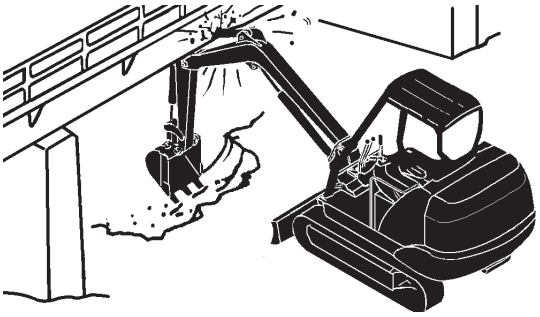
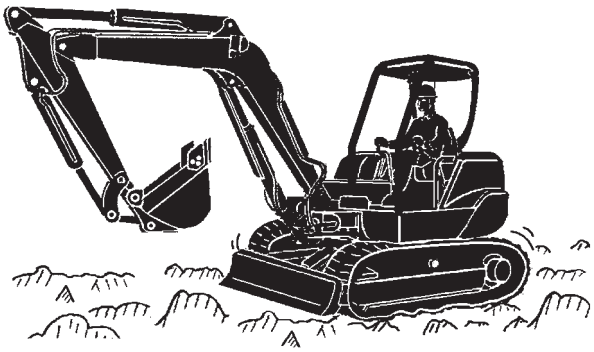


SA-673



M586-05-002

Practice Safe Maintenance

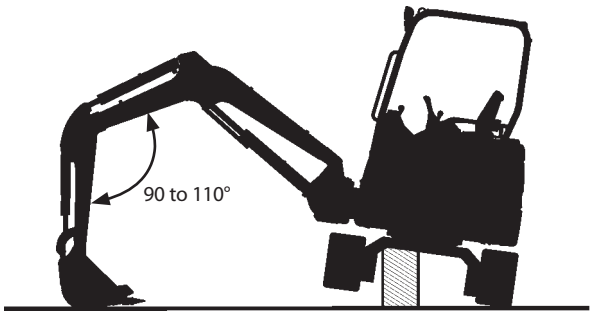
To avoid accidents:

- Understand service procedures before starting work.
- Keep the work area clean and dry.
- Do not spray water or steam inside cab.
- Never lubricate or service the machine while it is moving.
- Keep hands, feet and clothing away from power-driven parts.

SA-028

Before servicing the machine:

1. Park the machine on a level surface.
2. Lower the bucket to the ground.
3. Turn the auto-idle switch off.
4. Run the engine at slow idle speed without load for 5 minutes.
5. Turn the key switch to OFF to stop engine.
6. Relieve the pressure in the hydraulic system by moving the control levers several times.
7. Remove the key from the key switch.
8. Attach a "Do Not Operate" tag on the control lever.
9. Pull the pilot control shut-off lever to the LOCK position.
10. Allow the engine to cool.



M1M7-04-006

- If a maintenance procedure must be performed with the engine running, do not leave the machine unattended.
- If the machine must be raised, maintain a 90 to 110˚ angle between the boom and arm. Securely support any machine elements that must be raised for service work.
- Inspect certain parts periodically and repair or replace as necessary. Refer to the section discussing that part in the "MAINTENANCE" chapter of operator's manual.
- Keep all parts in good condition and properly installed.
- Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.
- When cleaning parts, always use nonflammable detergent oil. Never use highly flammable oil such as fuel oil and gasoline to clean parts or surfaces.
- Disconnect battery ground cable (–) before making adjustments to electrical systems or before performing welding on the machine.

SA-527

Avoid Heating Near Pressurized Fluid Lines

- Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders.
  - Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.
  - Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install temporary fire-resistant guards to protect hoses or other materials before engaging in welding, soldering, etc..

SA-030

Avoid Applying Heat to Lines Containing Flammable Fluids

- Do not weld or flame cut pipes or tubes that contain flammable fluids.
- Clean them thoroughly with nonflammable solvent before welding or flame cutting them.

Precautions for Handling Accumulator and Gas Damper

High-pressure nitrogen gas is sealed in the accumulator and the gas damper. Inappropriate handling may cause explosion, possibly resulting in serious injury or death.

Strictly comply with the following items:

- Do not disassemble the unit.
- Keep the units away from open flames and fire.
- Do not attempt to bore a hole or cut by torch.
- Avoid giving shocks by hitting or rolling the unit.
- Before disposing the unit, sealed gas must be released. Consult your nearest Hitachi dealer.

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.

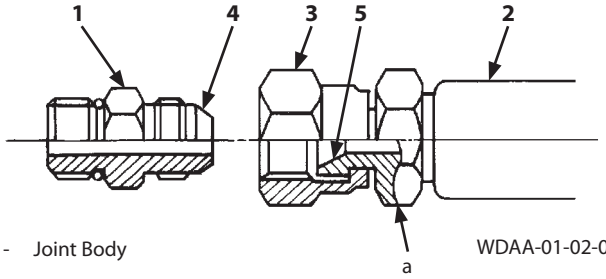
- Precautions for Assembling
  - Be sure to clean all parts and inspect them for any damage. If any damage is found, repair or replace part.
  - Dirt or debris on the contact or sliding surfaces may shorten the service life of the machine. Take care not to contaminate any contact or sliding surfaces.
  - 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.

Union Joint

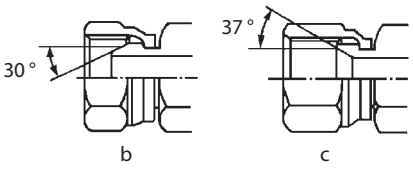
Metal sealing surfaces (4) and (5) of adapter (1) and hose (2) fit together to seal pressure oil. Union joints are used to join small-diameter lines.

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

2013/09

Description	Wrench Size mm	Tightening Torque	
	Union Nut	N·m	(lbf·ft)
30 ° male	17	25	(18.5)
	19	30	(22)
	22	40	(29.5)
	27	80	(59)
	32	140	(103)
	36	180	(133)
	41	210	(155)
	50	350	(260)
	55	380	(280)
	60	380	(280)
37 ° female	17	25	(18.5)
	19	30	(22)
	22	40	(29.5)
	27	80	(59)
	32	140	(103)
	36	180	(133)
	41	210	(155)
	50	350	(260)

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

Bleeding Air from Fuel System

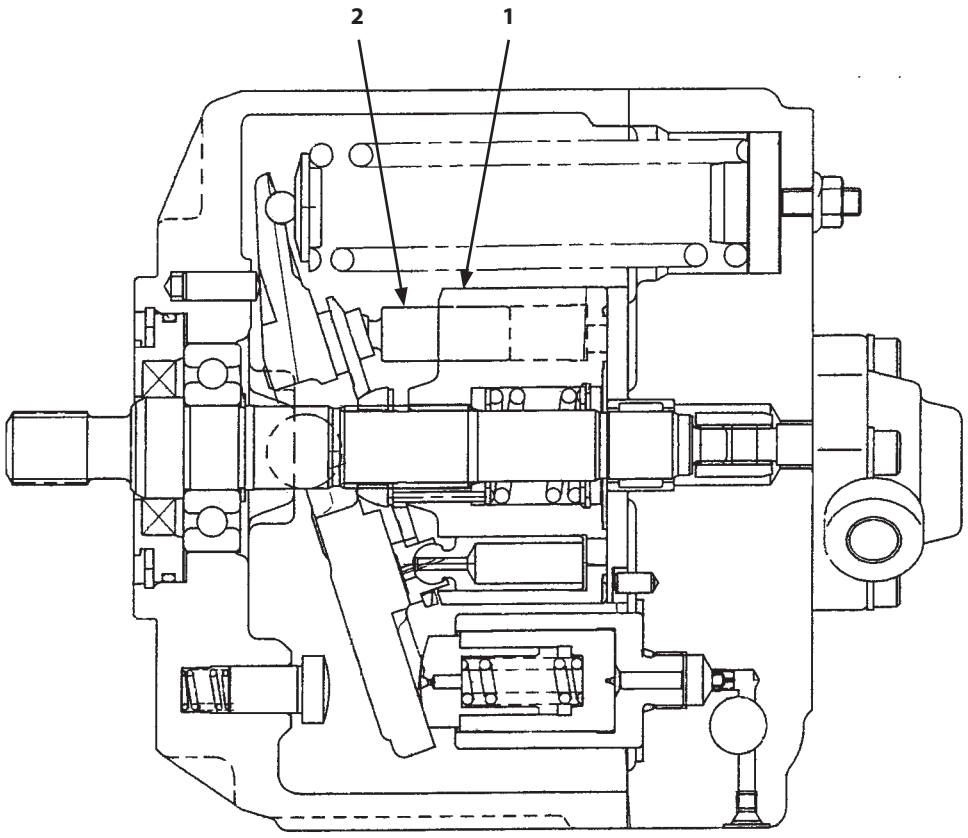
Air in the fuel system may make the engine hard to start or make it run irregularly. After draining water and sediment from the fuel filter, replacing the fuel filter, or running the fuel tank dry, be sure to bleed the air from the fuel system.

Air Bleeding Procedures

Automatic bleeding deveice is provided on this machine.

1. Confirm that the fuel level is more than one-half of the fuel tank capacity. If the fuel is lower, add fuel.
2. Set the key switch to the ON position and hold it for 10 to 15 seconds.
3. Start the engine and check the fuel system for fuel leaks.

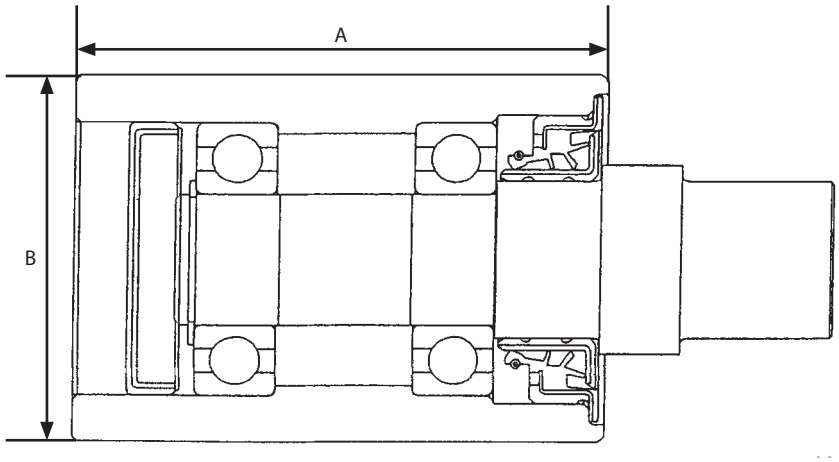
Pump Device



W1M9-02-03-001

1- Cylinder Block
2- Plunger (11 Used)

Upper Roller



WADB-02-02-001

Unit: mm (in)

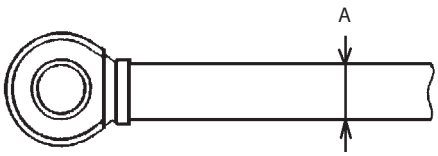
	Standard	Allowable Limit	Remedy
A	100 (3.94)	-	Replace
B	70 (2.76)	64 (2.52)	

Lubrication Oil

Engine Oil (API CD class, SAE #30)
Amount of engine oil: 40 to 50 ml (40 to 50 cm^3)

Cylinder

Rod

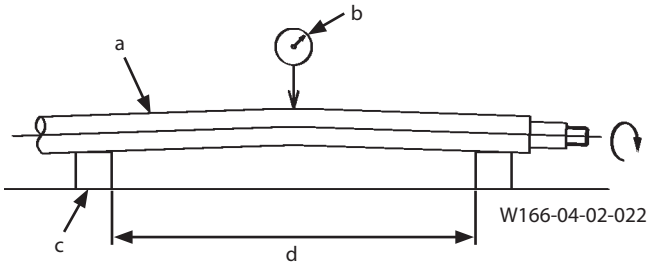


W105-04-02-094

Unit: mm (in)

Cylinder Name	Recommended Size After Re-manufacturing (A)
Boom	$55^{-0.010}_{-0.023}$ ($2.17^{-0.0004}_{-0.0009}$)
Arm	$50^{-0.009}_{-0.020}$ ($1.97^{-0.0004}_{-0.0008}$)
Bucket	$45^{-0.009}_{-0.020}$ ($1.77^{-0.0004}_{-0.0008}$)
Blade	$50^{-0.009}_{-0.020}$ ($1.97^{-0.0004}_{-0.0008}$)

Rod Bend and Run Out



W166-04-02-022

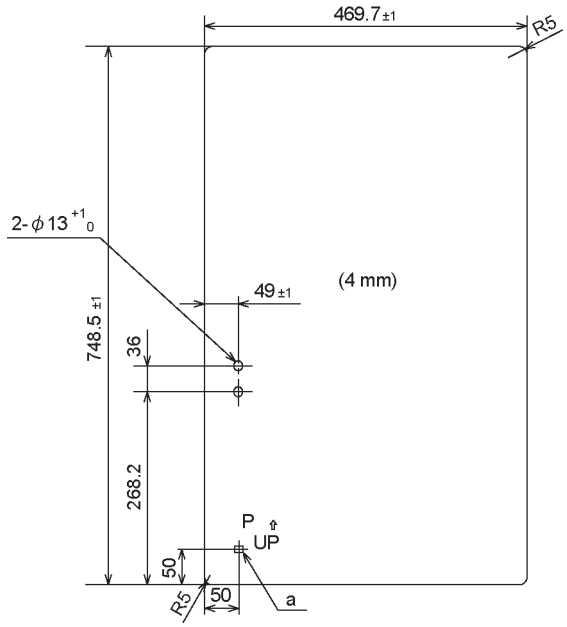
a- Cylinder Rod
b- Dial Gauge
c- V Block
d- 1 m (39.4 in)

Unit: mm (in)

Bend	Run Out	Remedy
0.5 (0.02)	1.0 (0.04)	Repair
1.0 (0.04)	2.0 (0.08)	Replace

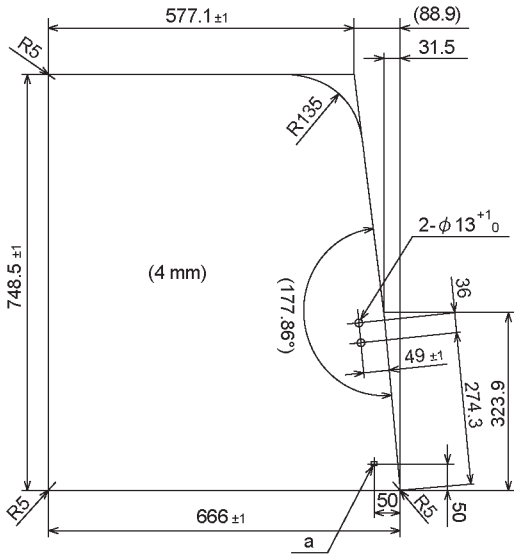
Dimensions of Cab Glass

Unit: mm



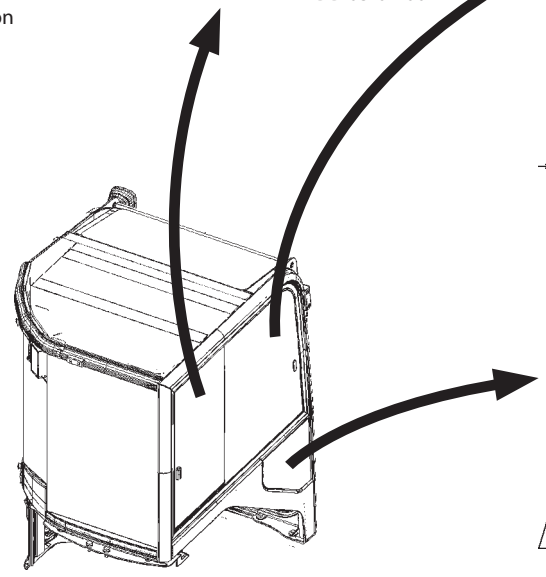
WADB-03-01-001

a - Mark Position



WADB-03-01-002

a - Mark Position



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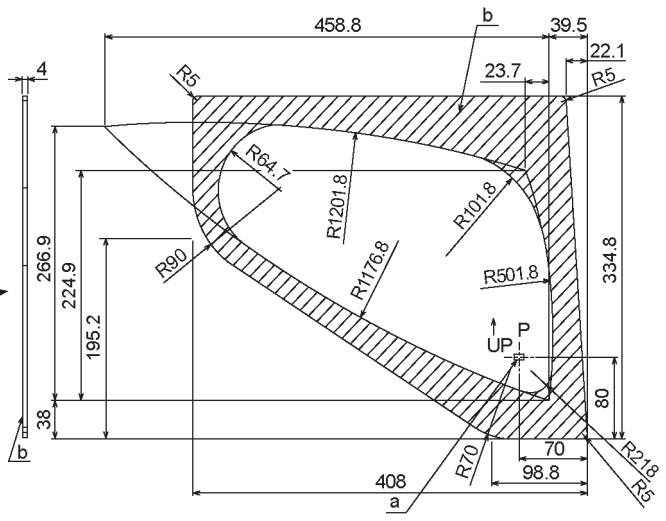
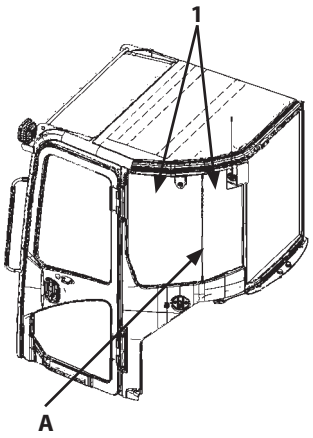


WADB-03-01-004

a - Mark Position

b - Black Ceramic Coating Surface

13. Evenly apply adhesive (SUNSTAR Penguin Seal #2505) to part A of rear left-hand glass (1).



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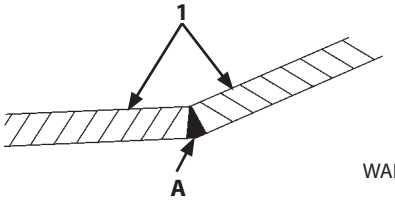

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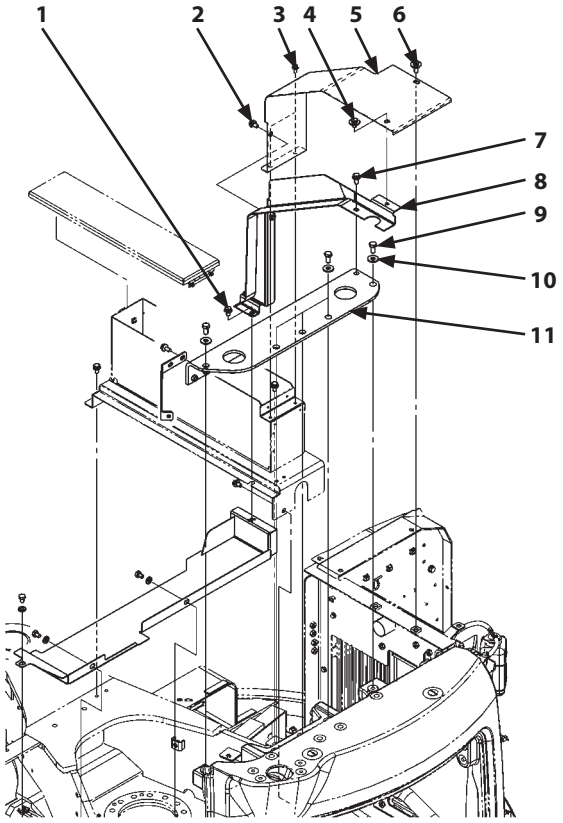


WAEA-03-02-002

4. Install cover (11) with washers (10) (5 used) and bolts (9) (5 used).
   - : 19 mm
   - : 110 N·m (11 kgf·m, 81 lbf·ft)
5. Install cover (8) with bolts, washers (1, 7).
   - : 17 mm
   - : 50 N·m (5 kgf·m, 37 lbf·ft)
6. Install cover (5) with bolts, washers (2, 4, 6).
   - : 17 mm
   - : 50 N·m (5 kgf·m, 37 lbf·ft)
7. Install bolts, washers (3) (2 used).
   - : 13 mm
   - : 10 N·m (1 kgf·m, 7.4 lbf·ft)

Assembly of Pump Device

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

IMPORTANT: When replacing ball bearing (6), install ball bearing (6) to shaft (5), and then install retaining ring (7).

IMPORTANT: Replace needle bearing (29) and orifice (36) as an assembly.

1. Apply grease onto O-ring (2) of the seal holder (3) outer surface and the lip part of oil seal (4).
2. Install oil seal (4) and O-ring (2) to seal holder (3). Install seal holder (3) to body S (10) by using the special tool (ST 7274). Install retaining ring (1) to body S (10).

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.

3. Evenly tap and install ball bearing (6) to shaft (5) by using a bar and a hammer.
4. Install retaining ring (7) to shaft (5).

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.

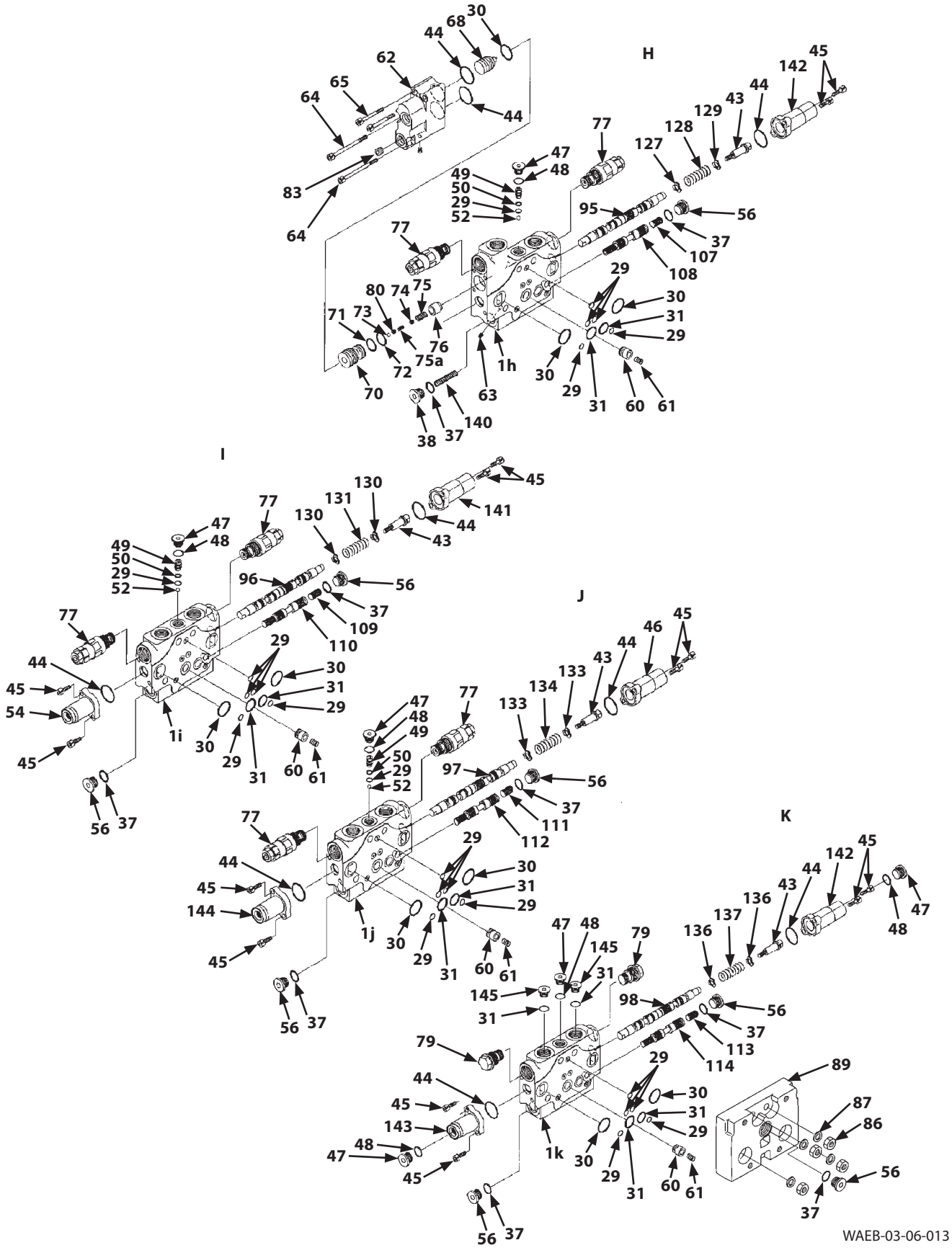
5. Place body S (10) with the gear pump (44) mounting side up onto wooden blocks. Evenly tap ball bearing (6) and install the shaft (5) assembly to body S (10) by using a bar and a hammer.
6. Install spring (13), stopper pin (14), and control pistons (15) (2 used) to body S (10).
7. Apply grease onto ceramic balls (16) (2 used) and the sliding surface of swash plate (17). Install ceramic balls (16) (2 used) to the spherical part of body S (10). Install swash plate (17) to body S (10).

IMPORTANT: When replacing component parts (18 to 23, 25) of the cylinder block (23) assembly and valve plate (28), replace them as an assembly.

8. Install washers (21) (2 used) and spring (25) to cylinder block (23).

CAUTION: Push spring (25) by using a press in order not to fly out and install retaining ring (27).

9. Install retaining ring (27) to cylinder block (23).
10. Turn over cylinder block (23). Install needles (22) (3 used). Place washer (21) and holder (20).


H
I
J
K
1h
1i
1j
1k
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Assembly of Body

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

1. Install check valves (61) (6 used) and springs (60) (6 used) to sections (C, D, H, I, J, K).
2. Install O-ring (20), O-rings (29) (49 used), O-rings (29b) (2 used), O-rings (30) (19 used), and O-rings (31) (19 used) to each section.
3. Place bodies (1a to 1f, 1h to 1k) of each section in the original sequence before disassembling. Tighten bodies (1a to 1f, 1h to 1k) with tie rods (88) (4 used), block (89), washers (87) (8 used), and nuts (86) (8 used).

   : 17 mm

   : 67 to 72 N·m (6.7 to 7.2 kgf·m)
4. Install plugs (79) (2 used) to section (K).

   : 21 mm

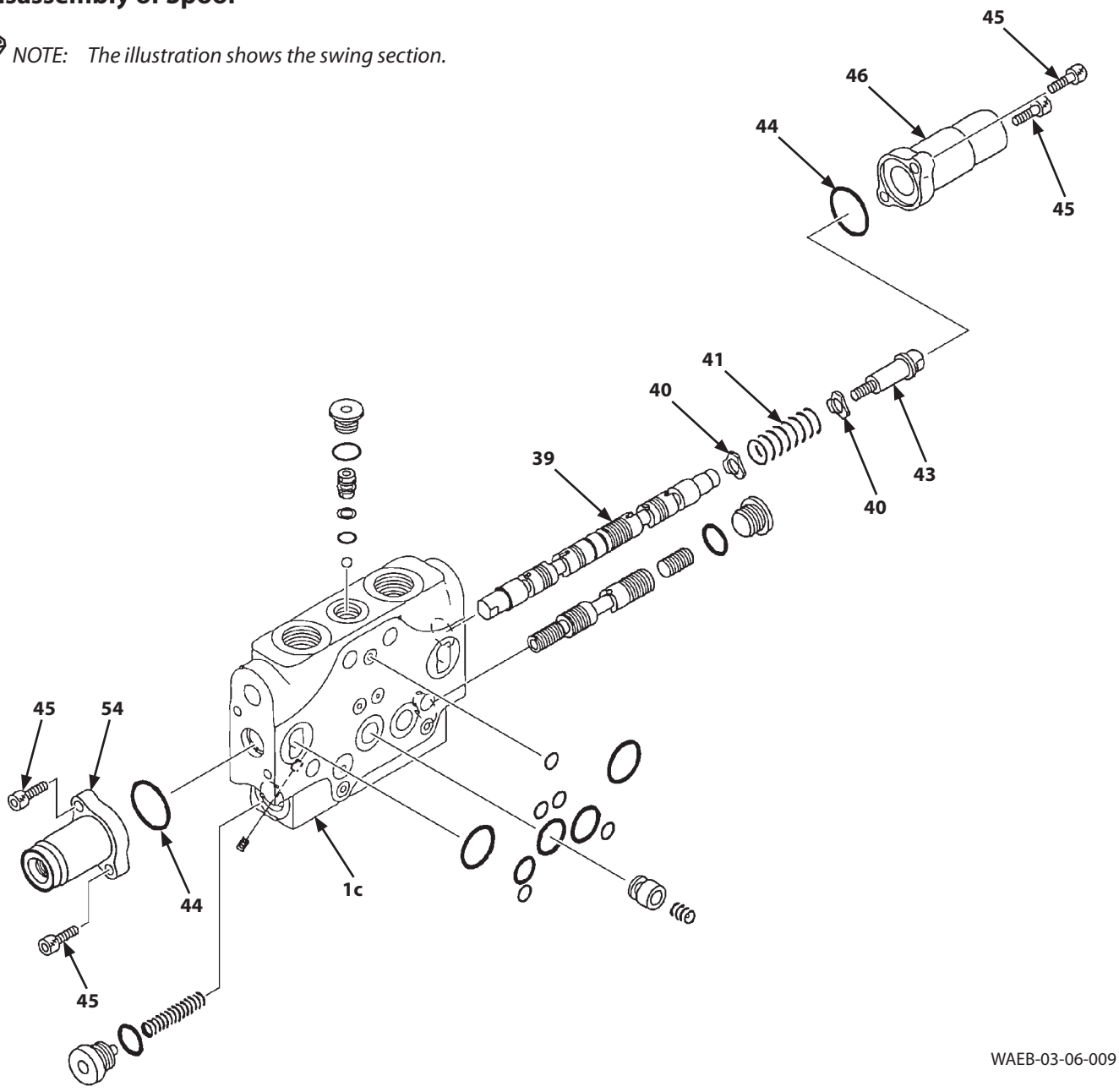
   : 65 to 69 N·m (6.5 to 6.9 kgf·m)
5. Install overload relief valves (77) (6 used) to sections (H, I, J).

   : 26 mm

   : 60 to 64 N·m (6 to 6.4 kgf·m)

Disassembly of Spool

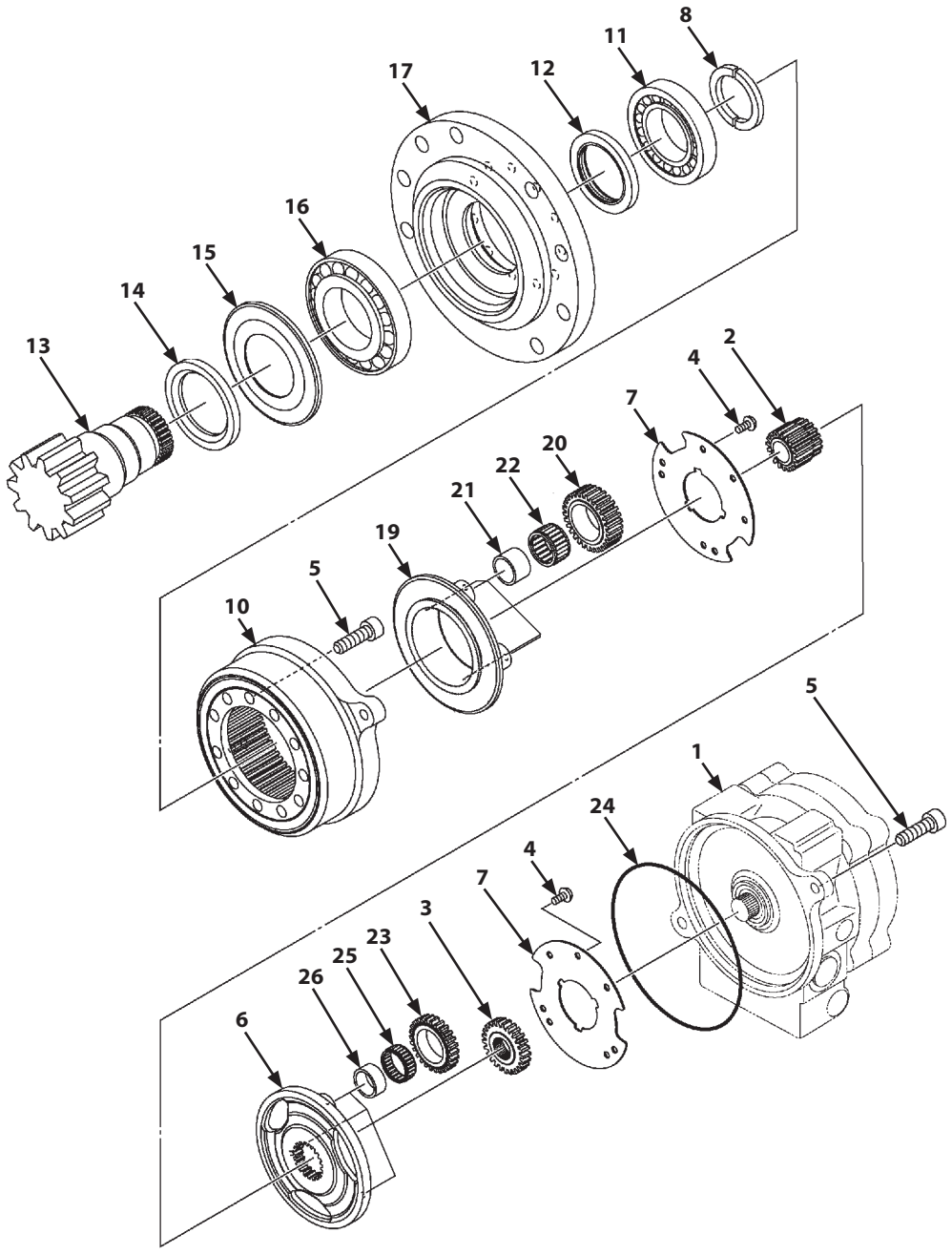
NOTE: The illustration shows the swing section.



WAEB-03-06-009

1c- Body (Swing)
39- Spool
40- Retainer (2 Used)
41- Spring
43- Bolt
44- O-Ring (2 Used)
45- Socket Bolt (4 Used)
46- Cover
54- Cover

Disassembly of Swing Device



WAEA-03-07-001

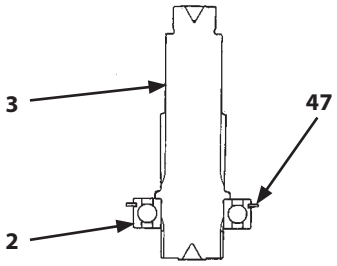
1- Swing Motor
2- Second Stage Sun Gear
3- First Stage Sun Gear
4- Bolt (7 Used)
5- Socket Bolt (13 Used)
6- First Stage Carrier
7- Plate (2 Used)
8- Washer
10- Ring Gear
11- Roller Bearing
12- Oil Seal
13- Shaft
14- Spacer
15- Spring Plate
16- Roller Bearing
17- Housing
19- Second Stage Carrier
20- Second Stage Planetary Gear (4 Used)
21- Inner Race (4 Used)
22- Needle Bearing (4 Used)
23- First Stage Planetary Gear (3 Used)
24- O-Ring
25- Needle Bearing (3 Used)
26- Inner Race (3 Used)

Assembly of Swing Motor

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

IMPORTANT: Install bearing (2) with its retaining ring (47) up as illustrated.

1. Install ball bearing (2) to shaft (3) by using a press.



W1M9-02-05-007

2. Install retaining ring (47) to ball bearing (2).

IMPORTANT: Install shaft (3) until retaining ring (47) of ball bearing (2) comes in contact with casing (1). If pushing shaft (3) further, retaining ring (47) may be deformed.

3. Tap the cover (21) mounting side by using a plastic hammer and install the shaft (3) assembly to casing (1).

IMPORTANT: Install swash plate (4) with the chamfered surface facing to the casing (1) side.

4. Apply grease onto the chamfered surface of swash plate (4). Install swash plate (4) to casing (1).

IMPORTANT: Install collar (6) with the chamfered surface facing to the casing (1) side.

5. Install collar (6), spring (7), and washer (8) to rotor (5).

CAUTION: When installing retaining ring (9) to rotor (5), push washer (8) and spring (7) by using a press in order not to fly out.

6. Push washer (8) and spring (7) by using a press. Install retaining ring (9) to rotor (5). Turn over rotor (5).
7. Apply grease onto pins (10) (3 used). Install pins (10) (3 used) to rotor (5). Install holder (11) to pin (10).
8. Install retainer (12) and plungers (13) (9 used) to rotor (5).
9. Place the casing (1) assembly horizontally with the orifice (28) mounting surface side down. Install the rotor (5) assembly to casing (1) by turning shaft (3). Place casing (1) with the cover (21) mounting side up.
10. Install disc plate (14) to casing (1).
11. Install O-rings (16, 17) to brake piston (15). Fit the matching marks made when disassembling and install brake piston (15) to casing (1).

NOTE: If it is not easy to install brake piston (15) to casing (1) due to the friction from O-rings (16, 17), evenly tap brake piston (15) by using a plastic hammer.

Removal and Installation of Travel Pilot Valve

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.

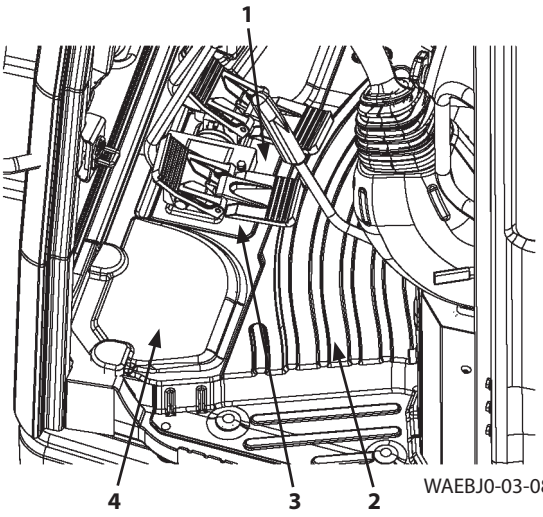
1. Set the machine position for inspection and maintenance. (Refer to W1-6-1.)

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

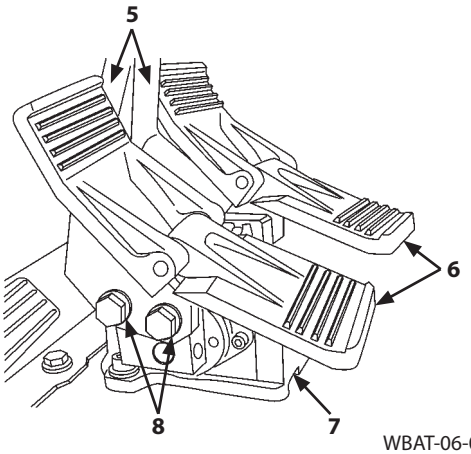
Removal

2. Remove floor mats (1, 2, 3, 4).
3. Remove bolts, washers (8) (4 used). Remove the pedal (6) assemblies (2 used) and the lever (5) assemblies (2 used) from pilot valve (7).

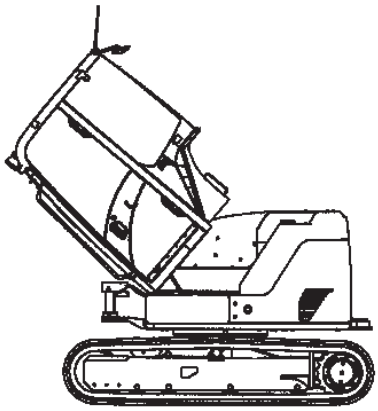
   : 17 mm
4. Tilt up the floor. (Refer to the operator's manual.)



WAEBJ0-03-08-003



WBAT-06-01-038


M1M0-07-032

Assembly of Pilot Valves (Right and Left)

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

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

NOTE: The table below shows the relations between each port and the parts. Do not confuse them when assembling.

Port No.	Spool (19)	Shim (2)	Pushers (9, 10)
1	Same to the former one	Same to the former one	One outer groove
2			Two outer grooves
3			One outer groove
4			Two outer grooves

Port No.	Return Springs (5, 6)	Balance Springs (3, 4)
1	Short	Short
2	Long	Long
3	Short	Short
4	Long	Long

1. Check the port hole number and insert same spool (19) before disassembling. Install the thinner end of spool (19) into the port hole on casing (18) by turning slowly.

NOTE: Spool (19) has been selected to match the port hole. Spool (19) and casing (18) should be replaced as an assembly.

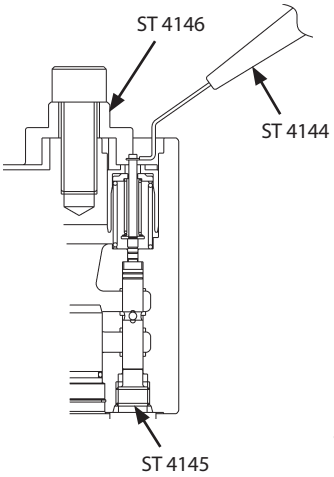
2. Install the special tool (ST 4145) to the port hole on casing (18) in order not to lower spool (19) when the spring is compressed.

: 6 mm

IMPORTANT: Refer to the table in the left in order to assemble the parts correctly.

3. Install spacer (1), shim (2), and balance spring (3) to spool (19). Install return spring (5) to casing (18).
4. Install spring guide (7) to return spring (5) with the protrusion up.
5. Install other spools (19) (3 used) in the same way as step 1 to step 4.
6. Install the special tool (ST 4146) to the pusher (9, 10) holes on casing (18). Push the special tool (ST 4146) and compress the spring. Tighten the special tool (ST 4146) by using the bolt (M14, Pitch 2.0 mm).

: 12 mm



W178-02-07-049

7. Install retaining ring (8) to the ring holder (ST 4144).

23. Crimp the hole edge of bracket (11) where spring pins (12, 13) are inserted by using a punch.
24. Install other bracket (11) in the same way as step 22 to step 23.
25. Install cover (2) to holder (7) with bolts, washers (1) (2 used).

    : 10 mm

    : 5 N·m (0.5 kgf·m, 3.5 lbf·ft)
26. Apply grease onto the spring pin (10) contact part of dampers (32) (2 used).
27. Install O-rings (19) (2 used) to plugs (20) (2 used). Install plugs (20) (2 used) to casing (23).

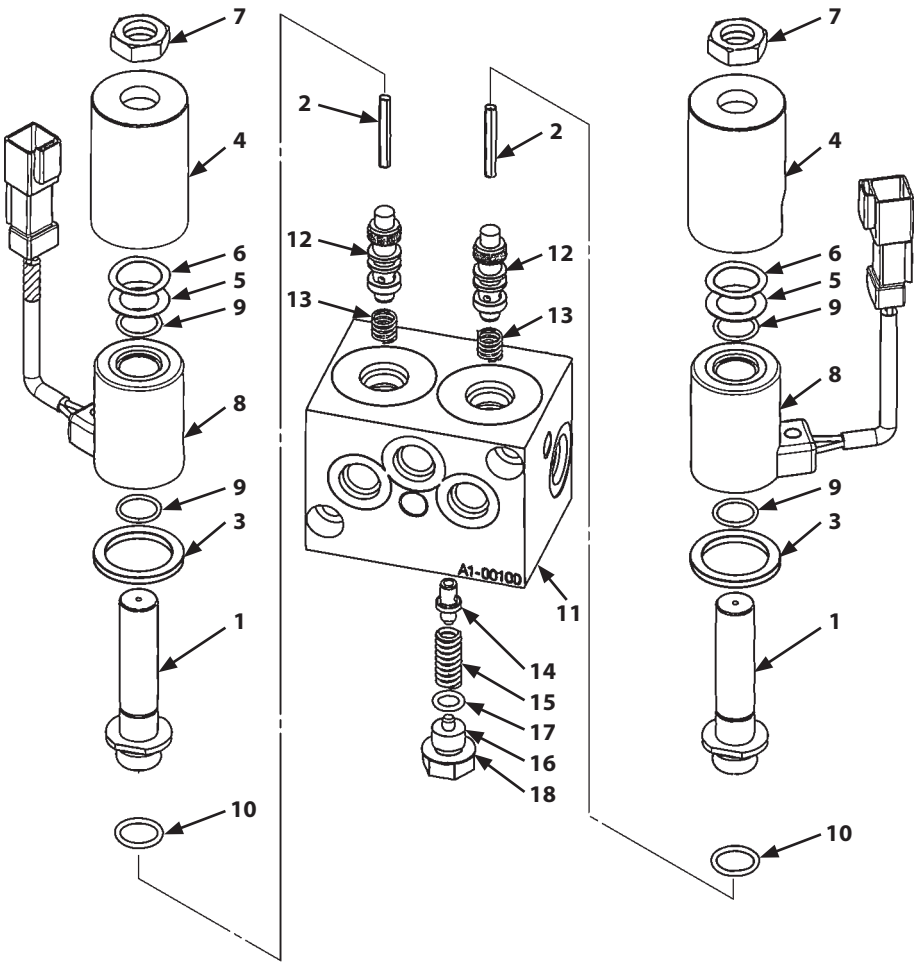
    : 5 mm

    : 10 N·m (1 kgf·m, 7.5 lbf·ft)
28. Install O-rings (22) (2 used) to plugs (21) (2 used). Install plugs (21) (2 used) to casing (23).

    : 6 mm

    : 20 N·m (2 kgf·m, 15 lbf·ft)

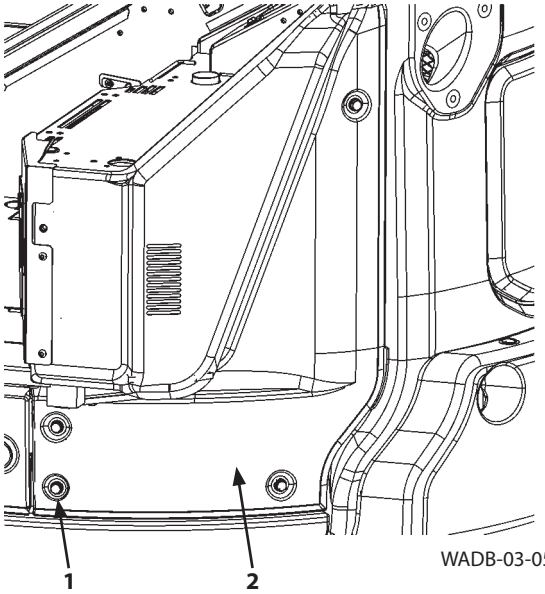
Disassembly of 2-Spool Solenoid Valve



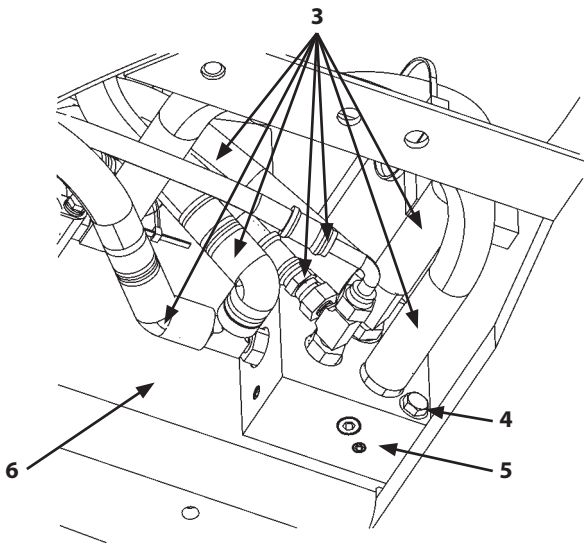
WADB-03-09-001

1- Piston (2 Used)
2- Pin (2 Used)
3- Plate (2 Used)
4- Casing (2 Used)
5- Plate (2 Used)
6- Wave Washer (2 Used)
7- Lock Nut (2 Used)
8- Solenoid (2 Used)
9- O-Ring (4 Used)
10- O-Ring (2 Used)
11- Body
12- Spool (2 Used)
13- Spring (2 Used)
14- Check Valve
15- Spring
16- Adjuster
17- O-Ring
18- Lock Nut

Removal and Installation of Revolution Sensing Valve



WADB-03-05-005



WAEB-03-10-002

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 position 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 (1) (4 used). Remove cover (2).

   : 17 mm

3. Disconnect hoses (3) (7 used) from revolution sensing valve (5).

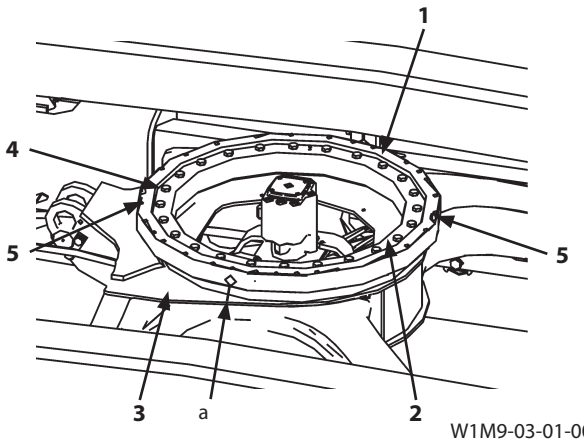
   : 17 mm, 19 mm

4. Remove bolts, washers (4) (2 used). Remove revolution sensing valve (5) from frame (6).

   : 13 mm

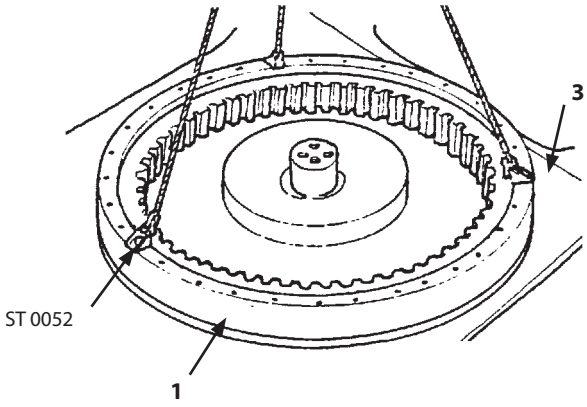
5. Remove the adapters with revolution sensing valve (5) attached if necessary.

Removal and Installation of Swing Bearing



W1M9-03-01-002

a- Matching Mark



W110-03-01-004

Before removing and installing the swing bearing, the upperstructure must be removed first.
Therefore, the procedure starts on the premise that the upperstructure has already been removed here.

Removal

1. Put matching marks (a) on inner race (2) of swing bearing (1) and track frame (3).
2. Remove knock pins (5) (2 used).
3. Remove bolts (4) (24 used).

: 19 mm

CAUTION: Swing bearing (1) weight: 59 kg (135 lb)

4. Install the special tools (ST 0052) (3 used) to swing bearing (1). Attach the nylon slings onto the special tools (ST 0052) (3 used). Hoist swing bearing (1). Remove swing bearing (1).

1- Plug (3 Used)
2- O-Ring (3 Used)
3- Cover
4- O-Ring
5- Wire
6- Thrust Plate
7- First Stage Planetary Gear (3 Used)
8- Needle Bearing (3 Used)
9- Inner Race (3 Used)
10- Thrust Washer (3 Used)
11- First Stage Carrier
12- Drive Gear
13- Sun Gear
14- Screw (4 Used)
15- Thrust Plate
16- Second Stage Planetary Gear (4 Used)
17- Needle Bearing (4 Used)
18- Inner Race (4 Used)
19- Thrust Washer (4 Used)
20- Ring Gear
21- Plug (2 Used)
22- Plug (2 Used)
23- Bearing Nut
24- Bearing
25- Steel Ball (99 Used)
26- Floating Seal
27- Body
28- Oil Seal
29- Ball Bearing
30- Shaft
31- *Steel Ball (2 Used)
32- Swash Plate
33- Plunger (9 Used)
34- Retainer Plate
35- Holder
36- Pin (3 Used)
37- Rotor
38- Collar
39- Spring
40- Washer
41- Retaining Ring
42- Piston (2 Used)
43- Spring (2 Used)
44- Valve Plate
45- Ball Bearing
46- O-Ring
47- Disc Plate
48- O-Ring
49- O-Ring
50- Brake Piston
51- Spring (4 Used)
52- Spring (8 Used)
53- Brake Valve
54- Socket Bolt (6 Used)
63- O-Ring (4 Used)
64- Pin (4 Used)
65- Pin

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

Removal and Installation of Center Joint

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. Attach an identification tag onto the hoses and the pipe 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 the hydraulic oil tank. (Refer to W1-4-1.)

2. Tilt up the floor. (Refer to the operator's manual.)
3. Disconnect hoses (1) (8 used) from center joint (2).

   : 17 mm, 19 mm, 22 mm, 27 mm

4. Remove bolts, washers (4) (2 used) from frame (5). Remove stopper (3) from frame (5).

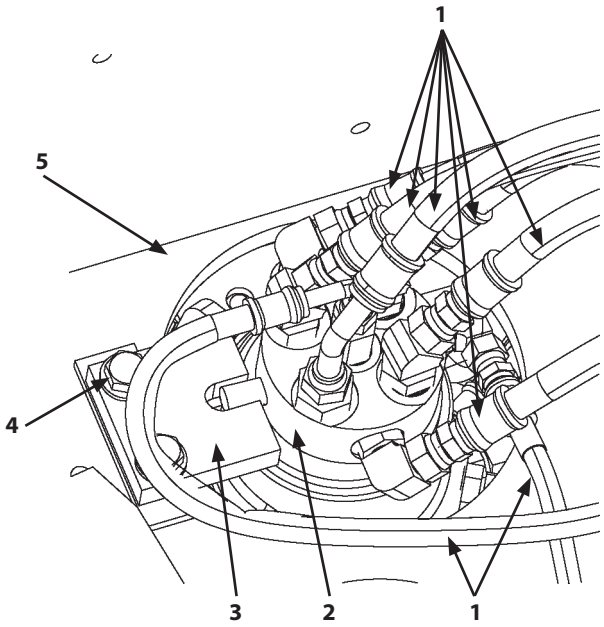
   : 19 mm

NOTE: LOCTITE #262 has been applied on bolt (4).

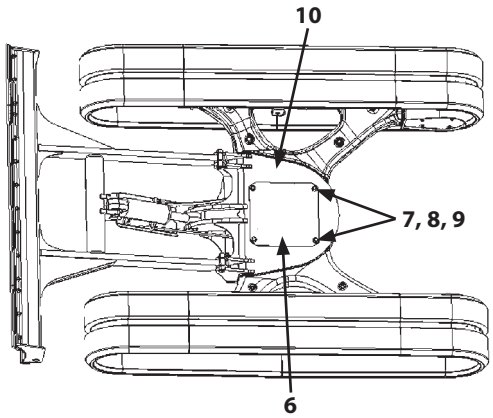
CAUTION: Remove cover (6) while holding it. Do not drop cover (6).

5. Remove bolts (7) (4 used), collars (8) (4 used), and washers (9) (4 used) from track frame (10). Remove cover (6) from track frame (10).

   : 17 mm

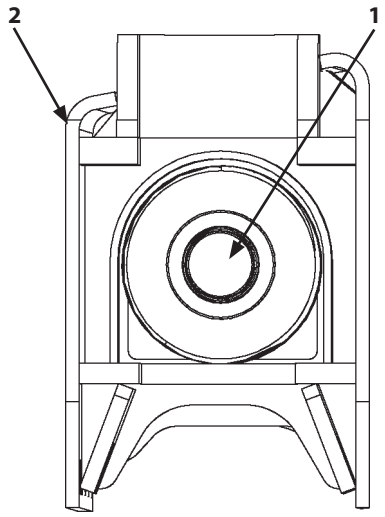


WAFA-04-03-001



W1M9-03-03-003

Removal and Installation of Track Adjuster



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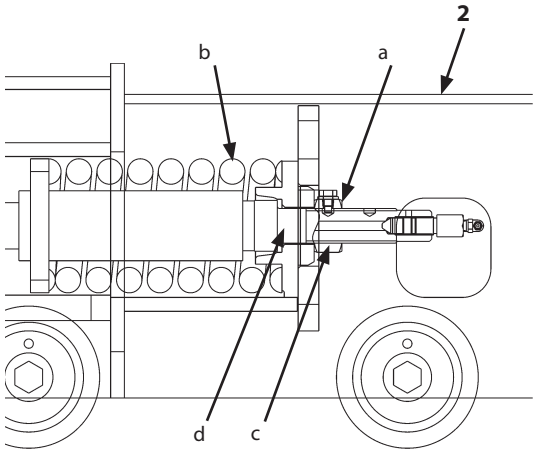


W1M9-03-04-001

a- Nut
b- Spring
c- Thread Part
d- Rod

Before removing and installing the track adjuster, the tracks and front idler must be removed first. (Refer to W4-5-1 and W4-7-1.) Therefore, the procedure starts on the premise that the tracks and front idler have already been removed here.

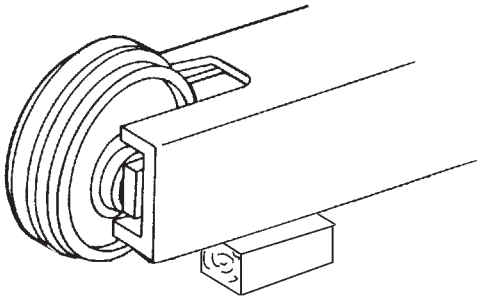
Removal

CAUTION: Track adjuster (1) may fly out due to the spring (b) force when removing track adjuster (1). Do not stand in the same direction to remove track adjuster (1) or where it may fly out. Particularly, the spring (b) load is always applied to thread part (c) of the rod. If the rod and/or thread part (c) are damaged, metal fragments may fly out due to the spring (b) force.

1. Pry and remove track adjuster (1) from track frame (2) by using a pry bar.

Removal and Installation of Front Idler

Before removing the front idler, the tracks should be removed first. (Refer to W4-7-1.)
Therefore, the procedure starts on the premise that the tracks have already been removed here.



W1M3-03-05-001

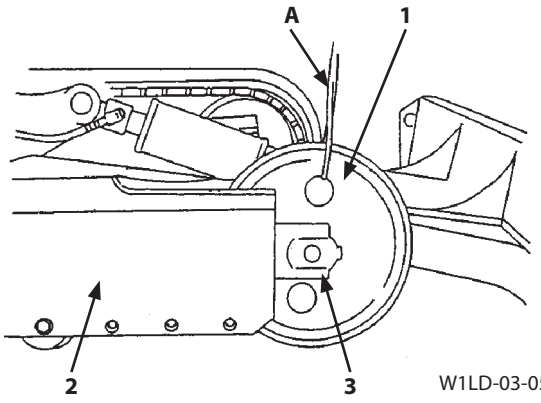
Removal

CAUTION: Front idler (1) weight: 35 kg (78 lb)

CAUTION: Front idler (1) may fly out due to the spring force of the track adjuster when removing front idler (1). Do not stand in the same direction to remove front idler (1) or where it may fly out.

1. Attach nylon slings (A) onto front idler (1). Hoist and hold front idler (1).
2. Insert a pry bar between front idler (1) and track frame (2). Hoist and remove front idler (1) with yoke (3) together by using a pry bar.

CAUTION: When keeping front idler (1), place it on the wooden blocks.

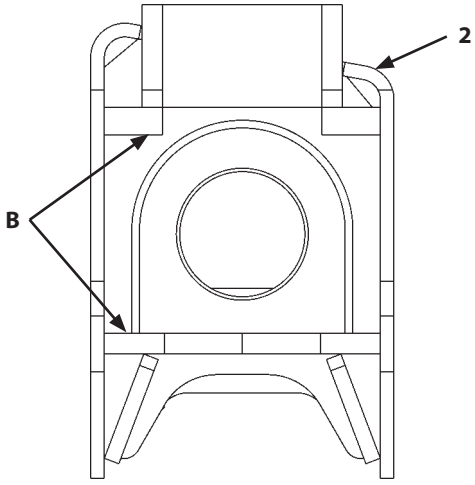


W1LD-03-05-003

Installation

1. Install it in the reverse way of removal. Check the followings.

- Clean sliding surfaces (B) of track frame (2) and yoke (3). Apply grease.



WAEA-04-05-001

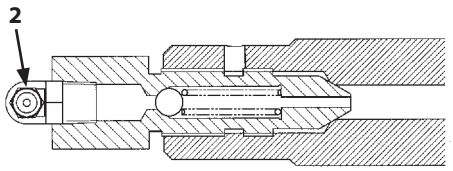
6. Apply grease through grease fitting (2) and adjust the track tension.

NOTE: At this time, turn the track in reverse direction so that the track sag should be located down.

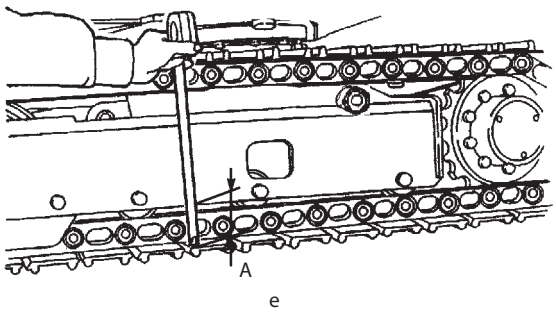
Track Sag Specification (A):

Steel Crawler (e): 140 to 160 mm

7. Lower the track.

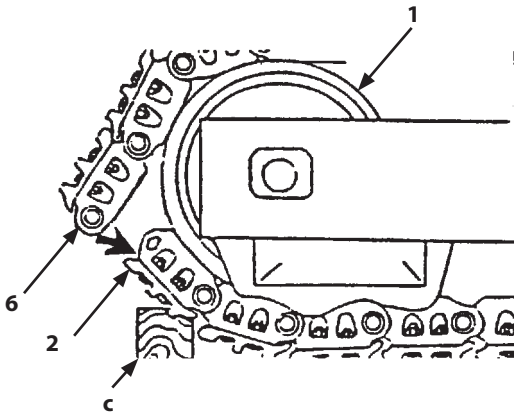


W1NC-03-06-001



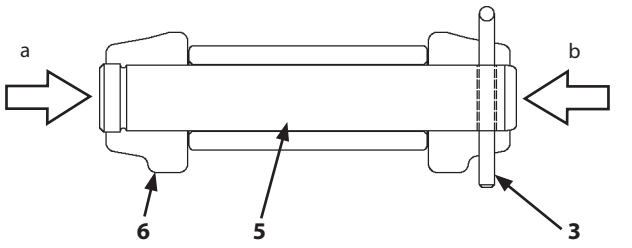
WAEBJ0-04-06-002

e- Steel Crawler



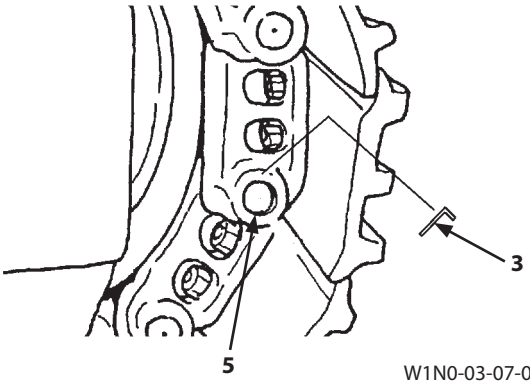
W105-03-07-016

c- Wooden Block



WAFA-04-07-003

a- Direction to Install b- Direction to Remove



W1N0-03-07-001

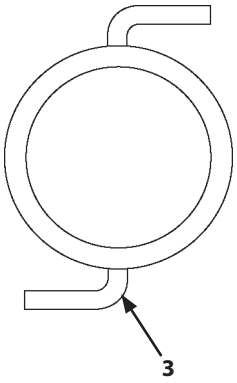
4. Wind the track link until connection part (6) of the track link reaches front idler (1). Lower the machine. Place wooden blocks (c) under shoe (2) and support shoe (2).

IMPORTANT: Master pin (5) can be installed to only one direction. Check direction (a) to install master pin (5).

5. Fit the matching marks made when removing. Install master pin (5) to the track.

IMPORTANT: Replace pin (3) with the new one.

6. Install pin (3) to master pin (5). Bend the end of pin (3) in order not to come off.



WAFA-04-07-004

Assembly of Blade Cylinder

1. Install bushing (6) to cylinder head (5).

   Special Tool for Bushing (Rod Outer Diameter): ST 8040: 50 mm

IMPORTANT: Check the direction to install the U-packing (7).

2. Install U-packing (7) and backup ring (8) to cylinder head (5).
3. Install dust wiper (9) to cylinder head (5) by using a plastic hammer.

   Special Tool for Dust Wiper (Rod Outer Diameter):

   ST 8047: 50 mm
4. Install O-rings (10, 12) and backup ring (11) to cylinder head (5).
5. Install seal (14) to piston (13) by using the special tool (ST 2977). After installing seal (14), adjust seal (14) by using the special tool (ST 2332).

   Special Tool for Seal (Tube Inner Diameter): ST 2977: 105 mm
6. Install wear ring (15), O-ring (16), and backup rings (17) (2 used) to piston (13).
7. Install the cylinder head (5) assembly to cylinder rod (3).

   Special Tool for Cylinder Head (Rod Outer Diameter):

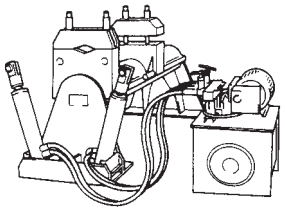
   ST 8076: 50 mm
8. Install the piston (13) assembly to cylinder rod (3).

   Special Tool for Piston: ST 3440: 75 mm

   : 491±49 N·m (50±5.0 kgf·m, 362±36 lbf·ft)
9. Fit the matching marks before disassembling and tighten piston nut (18) by using the special tool (ST 5908) for cylinder and the special tool for nut.

   Special Tool for Nut: ST 3239: 60 mm

   : 736±74 N·m (75±7.5 kgf·m, 543±55 lbf·ft)



Special Tool for Cylinder: ST 5908

W158-04-02-022

Removal and Installation of Boom Cylinder

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. Park the machine on a solid and level surface. Fully retract the arm cylinder and bucket cylinder and lower the boom. Place the arm end onto the ground.

CAUTION: Boom cylinder (5) weight: 55 kg (122 lb)

2. Remove bolts (7) (2 used), spring washers (8) (2 used), and washers (9) (2 used). Remove cover (6) from boom cylinder (5).

: 17 mm

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.

3. Attach the nylon slings onto boom cylinder (5). Hoist and hold boom cylinder (5). Remove bolt (1), spring washer (2), and bushing (3). Remove pin (4) by using a bar and a hammer.

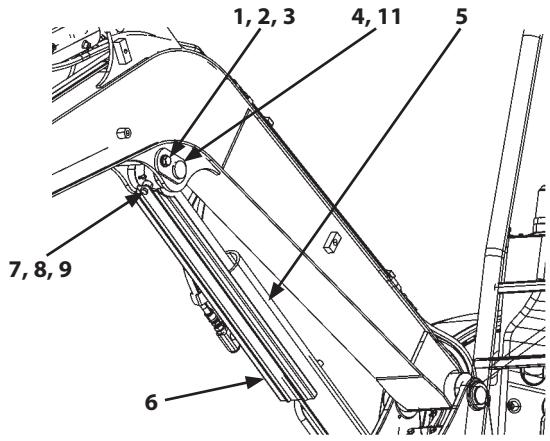
: 22 mm

NOTE: LOCTITE #262 has been applied on bolt (1).

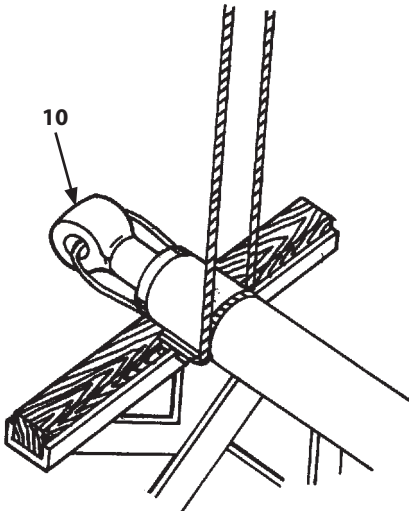
4. Remove shims (11) from on both sides of the cylinder rod (10) boss. Start the engine. Retract cylinder rod (10) to the stroke end. Pass the wires through the cylinder rod (10) boss and secure cylinder rod (10) in order not to extend.
5. Place boom cylinder (5) on the stands.

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

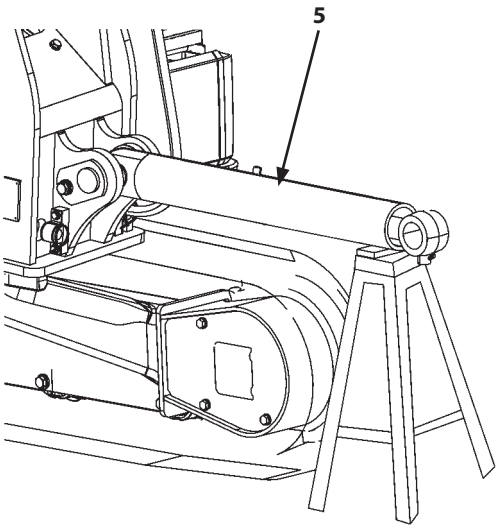
CAUTION: Release any pressure in the hydraulic circuit. (Refer to W1-5-1.)



W1MJ-04-02-007



W554-02-03-007



WAEBJ0-05-02-001

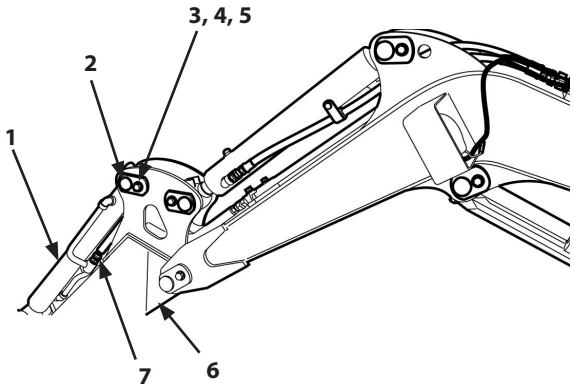
Installation

CAUTION: Bucket cylinder (1) weight: : 28 kg (62 lb)

IMPORTANT: Insert at least one shim to both left and right sides of all pins respectively. When the shims should be used in order to adjust the clearance, the shims should be inserted at both sides respectively. (Clearance: 0.5 mm or less)

IMPORTANT: Apply grease onto the lip part of the dust seal for bucket cylinder (1), the boss side, and the bushing inside (both bottom and rod sides).

1. Attach the nylon sling onto bucket cylinder (1). Hoist bucket cylinder (1). Fit the pin (2) holes of bucket cylinder (1) and arm (6). Insert the shims to both sides of the cylinder tube boss.



W1L7-04-02-005

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.

2. Apply LOCTITE #262 onto bolt (3). Install pin (2) by using a hammer. Secure pin (2) with bolt (3), spring washer (4), and bushing (5).

   : 22 mm

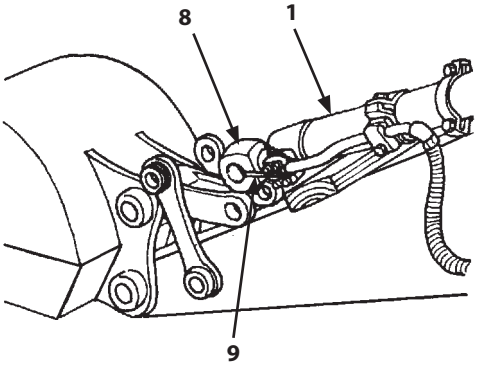
   : 140 N·m (14 kgf·m, 103 lbf·ft)

3. Connect hoses (7) (2 used) to bucket cylinder (1).

   : 27 mm

   : 80 N·m (8 kgf·m, 59 lbf·ft)

4. Remove wires (9) from rod (8) of bucket cylinder (1).



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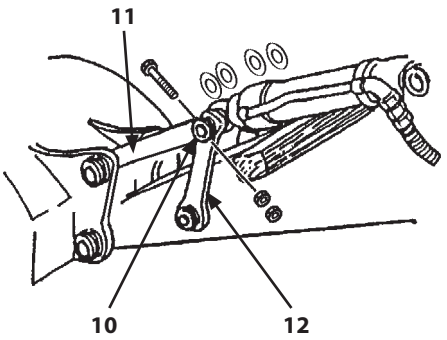
5. Start the engine with the cylinder rod retracted to the stroke end. Slowly extend the cylinder rod. Fit the pin (10) holes of bucket cylinder (1), link A (11), and link B (12) (2 used).

NOTE: When the work in step 5 is finished, air in the cylinder has been released.



W158-04-02-006

14. Tighten cylinder head (5) to cylinder tube (1) by using hook wrench (a). Bend the lock washer in order not to loosen.

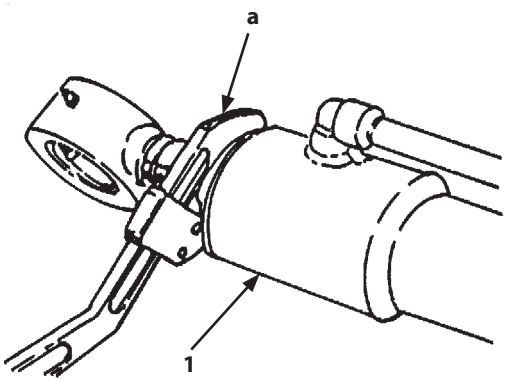
    Diameter of cylinder head (5):

    (Boom Cylinder): 112 mm

    : 700±70 N·m (70±7 kgf·m, 520±52 lbf·ft)

    (Bucket Cylinder): 88 mm

    : 700±70 N·m (70±7 kgf·m, 520±52 lbf·ft)



W506-04-02-019

a- Hook Wrench