ZX210LCN-G HYDRAULIC EXCAVATOR WORKSHOP MANUAL

PART NO. WDC390-EN-00

HITACHI

Reliable solutions

Workshop Manual

ZX210LCN-G

Hydraulic Excavator

Hitachi Construction Machinery Co., Ltd.
URL:http://www.hitachi-c-m.com

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WDC390-EN-00

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TODC390-EN
Technical Manual (Troubleshooting)	: Vol. No.TTDC390-EN
Workshop Manual	: Vol. No.WDC390-EN
Engine Manual	: Vol. No.EDCD-EN

General Precautions for Cab

- Before entering the cab, thoroughly remove all dirt and/or oil 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 leave parts and/or tools lying around the operator's seat. Store them in their specified locations.
- 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.

- Avoid swinging the upperstructure on slopes. Never attempt to swing the upperstructure downhill. The machine may tip over. If swinging uphill is unavoidable, carefully operate the upperstructure and boom at slow speed.
- If the engine stalls on a slope, immediately lower the bucket to the ground. Return the control levers to neutral. Then, restart the engine.
- 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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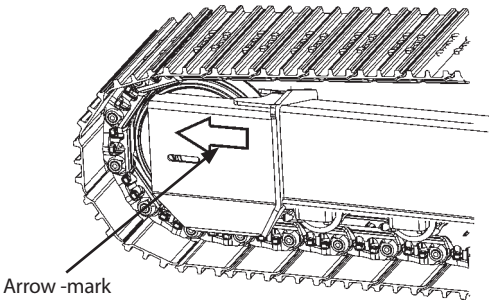

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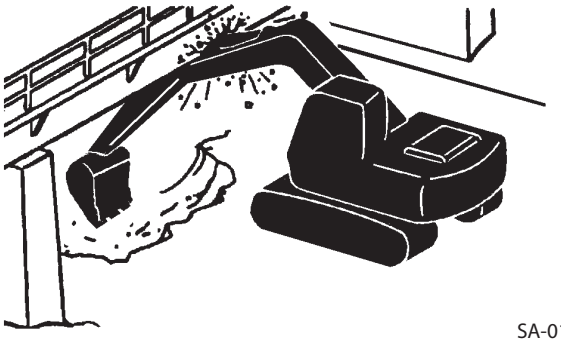


SA-011

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.

SA-527

- 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 in the 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.

Remove Paint Before Welding or Heating

SA-029

- Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch. If inhaled, these fumes may cause sickness.
  - Avoid potentially toxic fumes and dust.
  - Do all such work outside or in a well-ventilated area. Dispose of paint and solvent properly.
  - Remove paint before welding or heating:

1. If you sand or grind paint, avoid breathing the dust.

   Wear an approved respirator.

2. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

Beware of Asbestos and Silicon Dust and Other Contamination

SA-029

- Take care not to inhale dust produced in the work site. Inhalation of asbestos fibers may be the cause of lung cancer. Inhalation of silicon dust or other contamination may cause sickness.
  - Depending on the work site conditions, the risk of inhaling asbestos fiber, silicon dust or other contamination may exist. Spray water to prevent asbestos fibers, silicon dust or other contamination from becoming airborne. Do not use compressed air.
  - When operating the machine in a work site where asbestos fibers, silicon dust or other contamination might be present, be sure to operate the machine from the upwind side and wear a mask rated to prevent the inhalation of asbestos, silicon dust or other contamination.
  - Keep bystanders out of the work site during operation.
  - Asbestos fibers might be present in imitation parts. Use only genuine Hitachi Parts.

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.

Pipe Joint

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

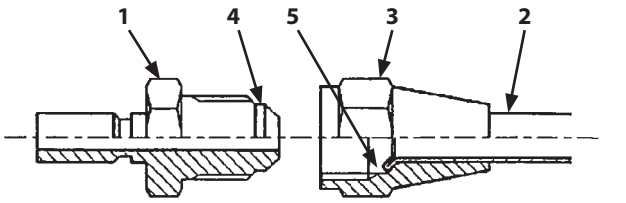
Metal (3) of adapter (1) and pipe (2) seals pressure oil.

- 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)



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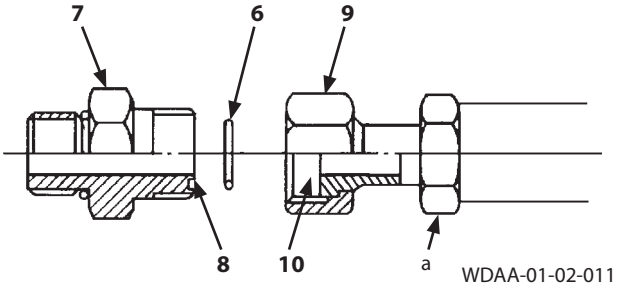
O-ring Seal Joint

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)

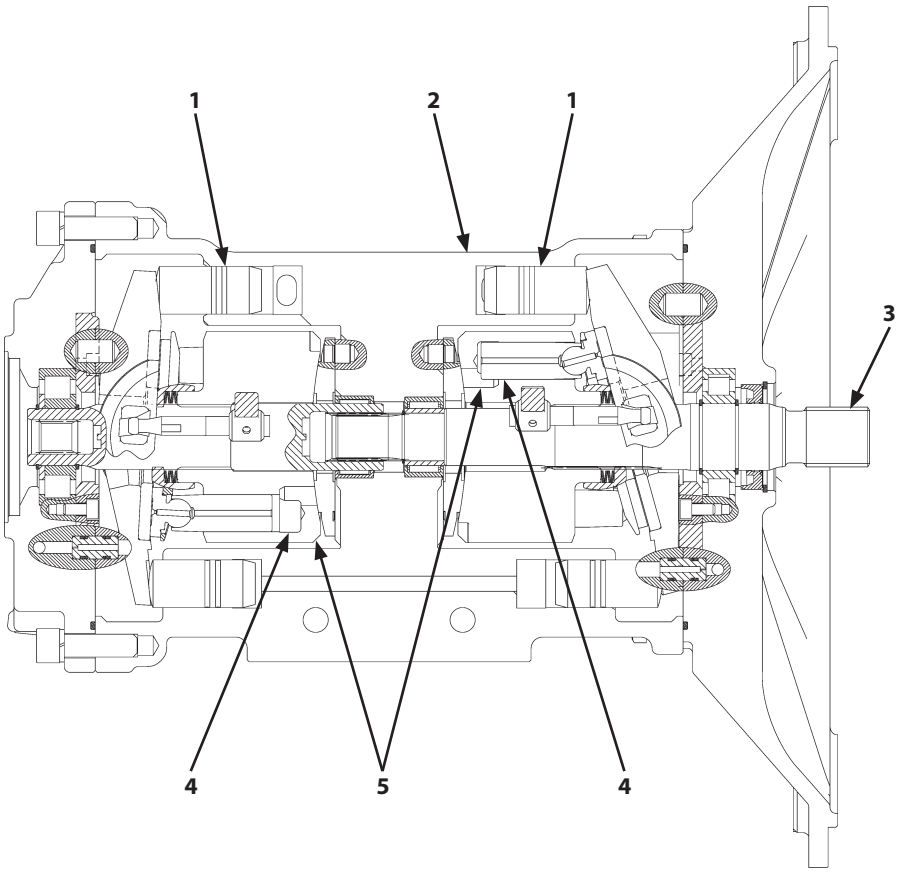
Bleeding Air from Radiator

CAUTION: Do not loosen the radiator cap until the system has cooled. Hot steam may spout out and cause severe burns. Wait until coolant cools and loosen the cap slowly. Release all pressure and remove the cap.

Preparation

1. Park the machine on a solid and level surface. Set the front attachment in position for checking hydraulic oil level.
2. Stop the engine. Remove the radiator cap.

Pump Device



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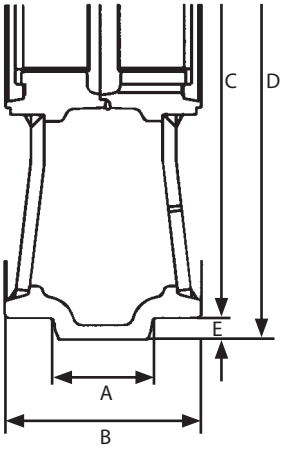
1- Servo Piston (6 Used)
2- Pump Casing
3- Shaft
4- Plunger (18 Used)
5- Rotor (2 Used)

Front Idler



W166-03-05-001

Unit: mm (in)

	Standard	Allowable Limit	Remedy
A	84 (3.31)	[68 (2.67)]	Build up welding and hand finishing
B	159 (6.26)	-	
C	500 (19.7)	[488 (19.2)]	
D	538 (21.2)	-	
E	19 (0.75)	25 (0.98)	

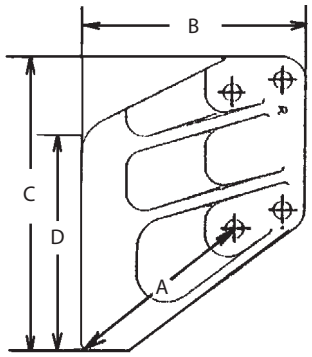
Axle and Bushing

Unit: mm (in)

		Standard	Allowable Limit	Remedy
Axle	Outer Diameter	75.0 (2.95)	[74.2 (2.93)]	Replace
Bushing	Inner Diameter	75.0 (2.95)	[76 (2.99)]	
	Flange Thickness	2 (0.08)	[1.2 (0.05)]	

NOTE: Values in [ ] are just for reference.

Side Cutter (2014503, 2014504)

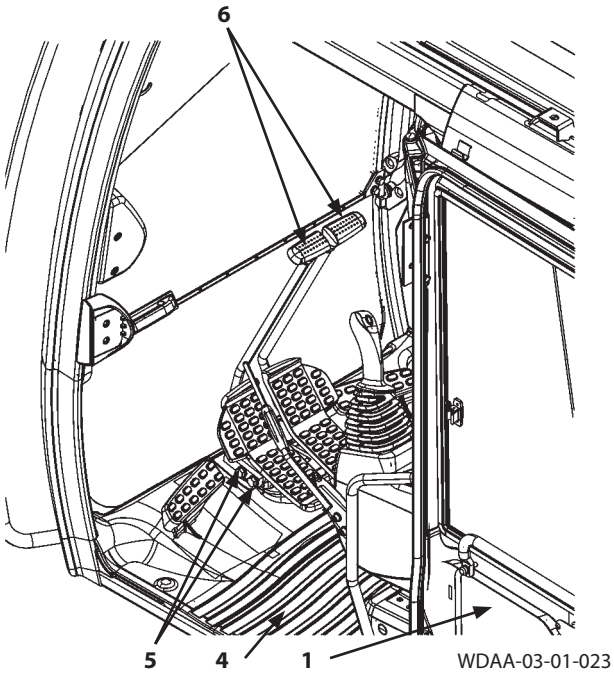


W155-04-01-002

Unit: mm (in)

	Standard	Allowable Limit	Remedy
A	278 (10.9)	181 (7.1)	Replace
B	295 (11.6)	-	
C	433 (17.0)	-	
D	135 (5.3)	-	

Removal and Installation of Cab



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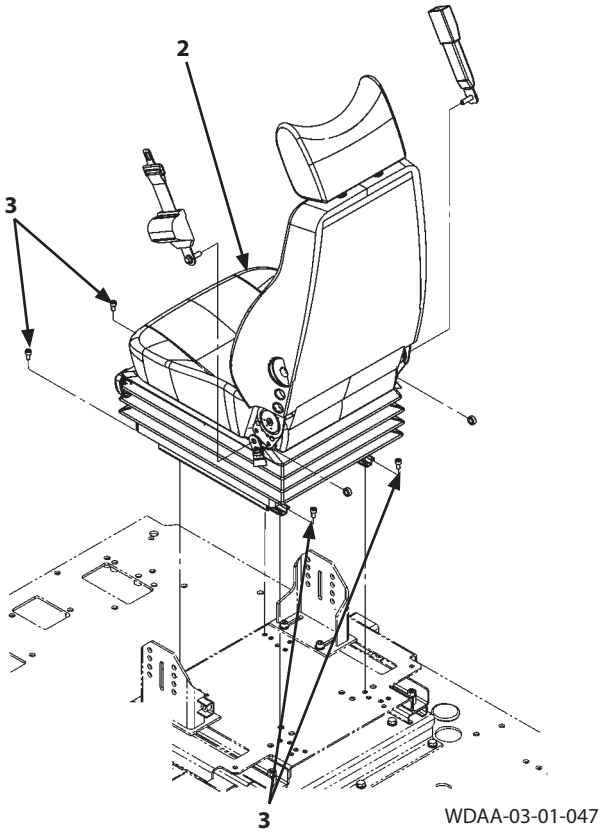


WDAA-03-01-047

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.)
2. Open door (1).

CAUTION: Seat (2) weight: 21 kg (47 lb)

3. Remove bolts, washers (3) (4 used). Remove seat (2).

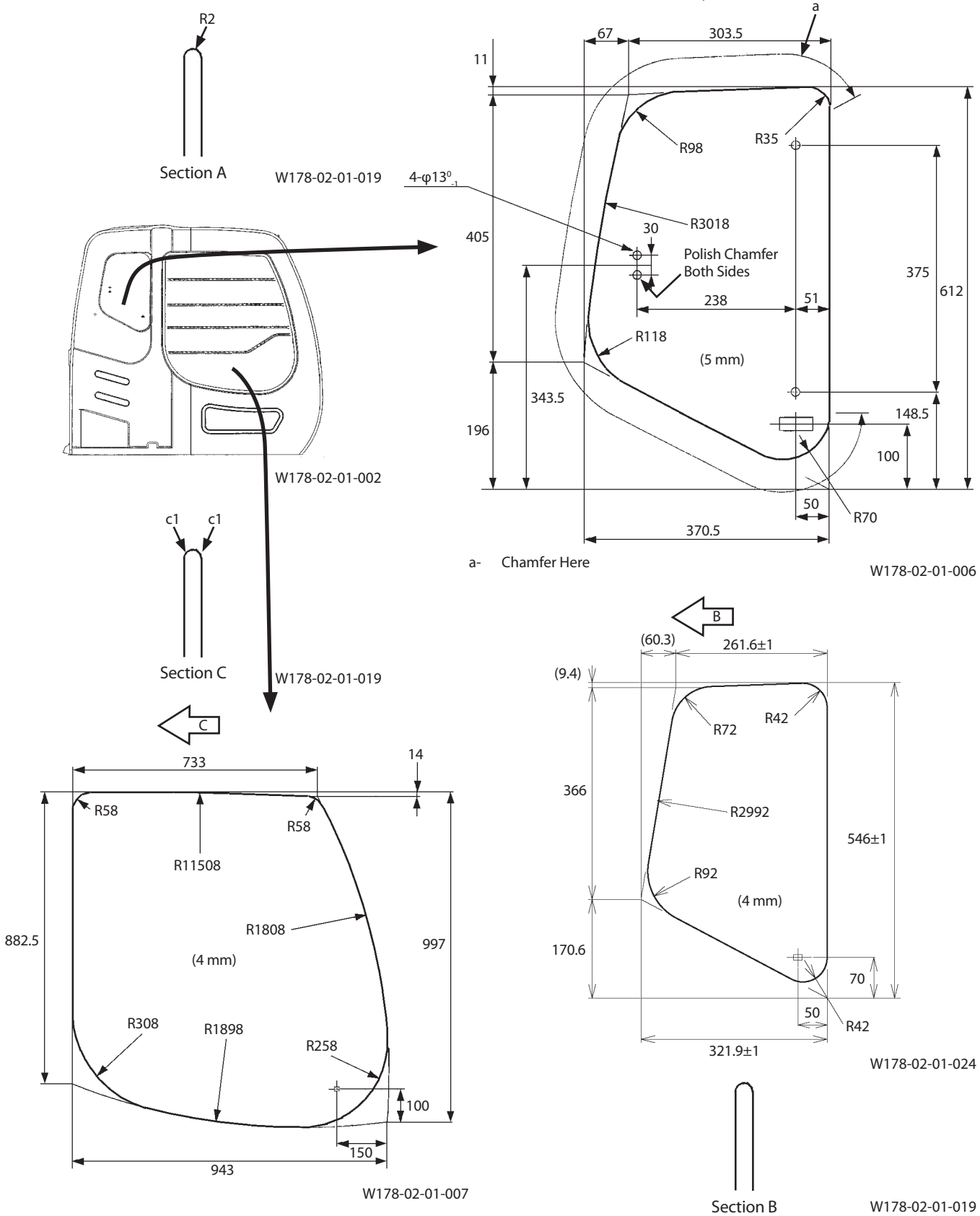
: 17 mm

4. Remove floor mat (4).
5. Remove bolts, washers (5) (4 used). Remove travel control levers (6) (2 used).

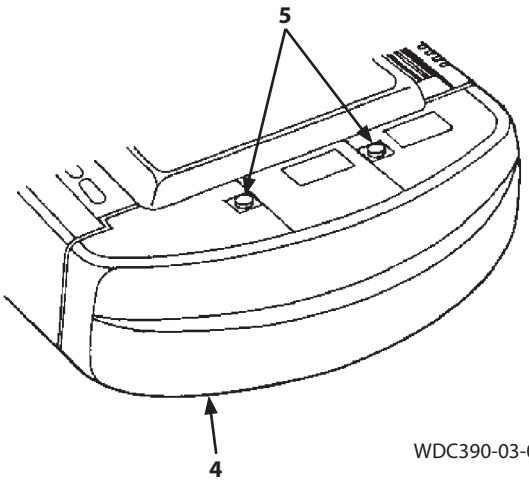
: 17 mm

Dimensions of The Cab Glass

Unit: mm



Removal and Installation of Counterweight



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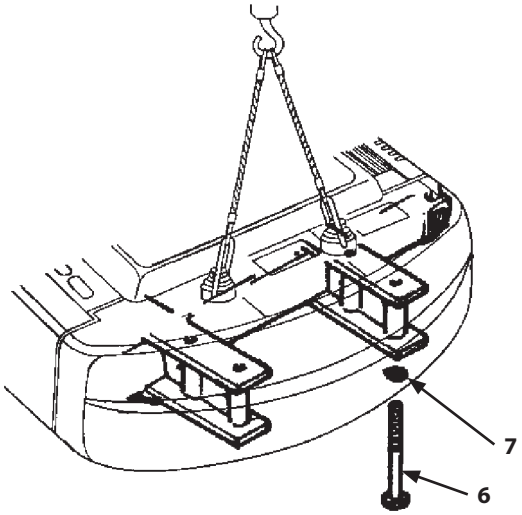

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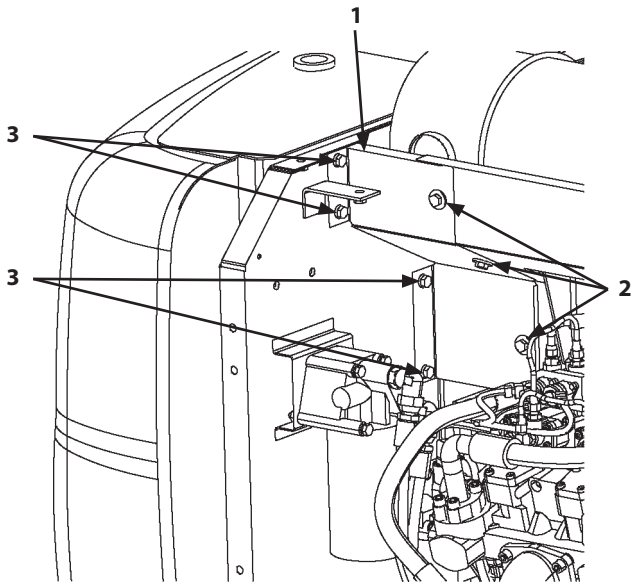
Removal

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

CAUTION: Counterweight (4) weight: 5310kg (11800 lb)

3. Remove caps (5) (2 used). Install the Freno-Linkbolts (A-42, M42, Pitch 4.5 mm) (2 used) to the cap (5) mounting holes (2 places). Attach wire ropes onto the Freno-Linkbolts. Hoist and hold counterweight (4).
4. Remove bolts (6) (4 used) and washers (7) (4 used). Remove counterweight (4).

: 55 mm



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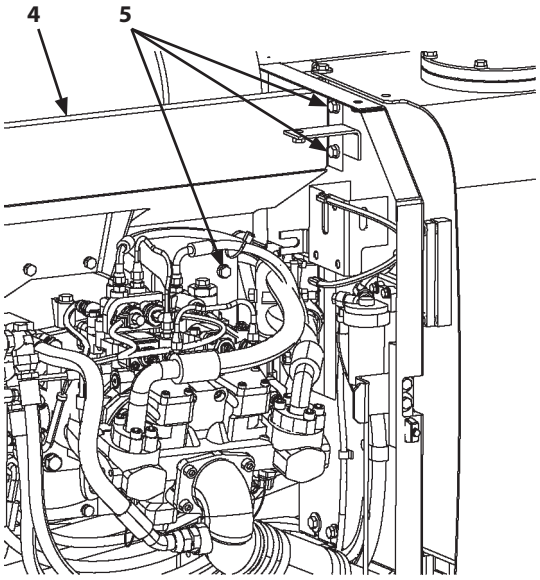
8. Remove bolts, washers (2) (3 used) and bolts, washers (3) (4 used). Remove cover (1).

: 17 mm



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9. Remove bolts, washers (5) (3 used). Remove cover (4).

: 17 mm

Disassembly of Pump Device

1. Disconnect the both ends of pipe (79) from regulators (2, 6).

   : 17 mm

2. Remove pump 1 delivery pressure sensor (80) and pump 2 delivery pressure sensor (81) from selector head (66).

   : 27 mm

3. Remove socket bolts (87, 90), washer (86), and spring washer (89). Remove N sensor (85), O-ring (84), and bracket (88) from pump casing (51).

   : 5 mm

4. Remove plug (25) from gear casing (47).

   : 17 mm

5. Remove plug (30) from gear casing (47). Drain off engine oil.

   : 22 mm

NOTE: Amount of oil: 1 L (1.06 US qt)

6. Remove socket bolts (1) (4 used). Raise regulator (2) to the direction of selector head (66). Remove regulator (2) from pump casing (51).

   : 8 mm

7. Remove socket bolts (3, 5) (2 used for each). Raise regulator (6) to the direction of selector head (66). Remove regulator (6) from pump casing (51). Do not remove socket bolt (4).

   : 8 mm

8. Remove O-rings (56) (2 used), O-rings (55) (10 used), O-rings (7) (4 used), and spring pins (54) (4 used) from pump casing (51).

CAUTION: Pump device weight: 160 kg (355 lb)

CAUTION: When hoisting the pump device, do not take pump casing (51) off the ground but turn to the gear casing (47) side.

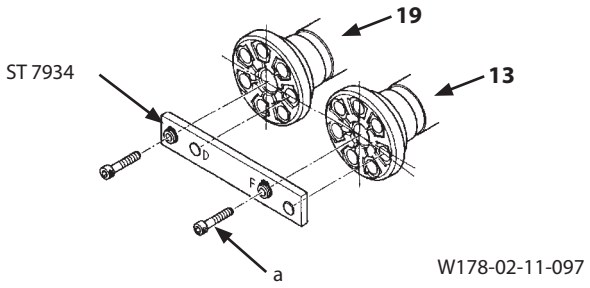
9. Install eyebolts (M10, Pitch 1.5 mm) (2 used) to the socket bolt (1, 3) holes of pump casing (51). Hoist the pump device. Place the pump device with gear casing (47) down. Place a wooden block (80 mm or more square) under gear casing (47).

10. Remove socket bolts (33) (2 used) from gear casing (47). Remove level gauge (35), pipe (34), and gasket (32).

    : 6 mm

23. Fit the matching marks on shafts (13, 19) and gears (27, 29). Install retaining rings (26) (2 used) to shafts (13, 19). When replacing the shaft and the gear, install the gear according to the following procedures.

- Secure the special tool (ST 7934) to the plunger (17) mounting side of shafts (13, 19) with the socket bolt (M8, Pitch 1.25 mm).



a- M8, Pitch 1.25 mm

- Turn shafts (13, 19) clockwise, viewed from the gear (27, 29) mounting side, until shafts (13, 19) come in contact with the special tool. (Remove a play in periphery direction.)
- Install gear (27) and retaining ring (26) to the spline of shaft (13).
- Install gear (29) to the spline of shaft (19) and engage it with gear (27). If gear (29) does not engage, adjust shaft (19) within a play of the special tool by turning.
- Install retaining ring (26) to the spline of shaft (19).
- Remove the special tool (ST 7934).

24. Install spring pins (48) (2 used) to gear casing (47). Install gasket (28).

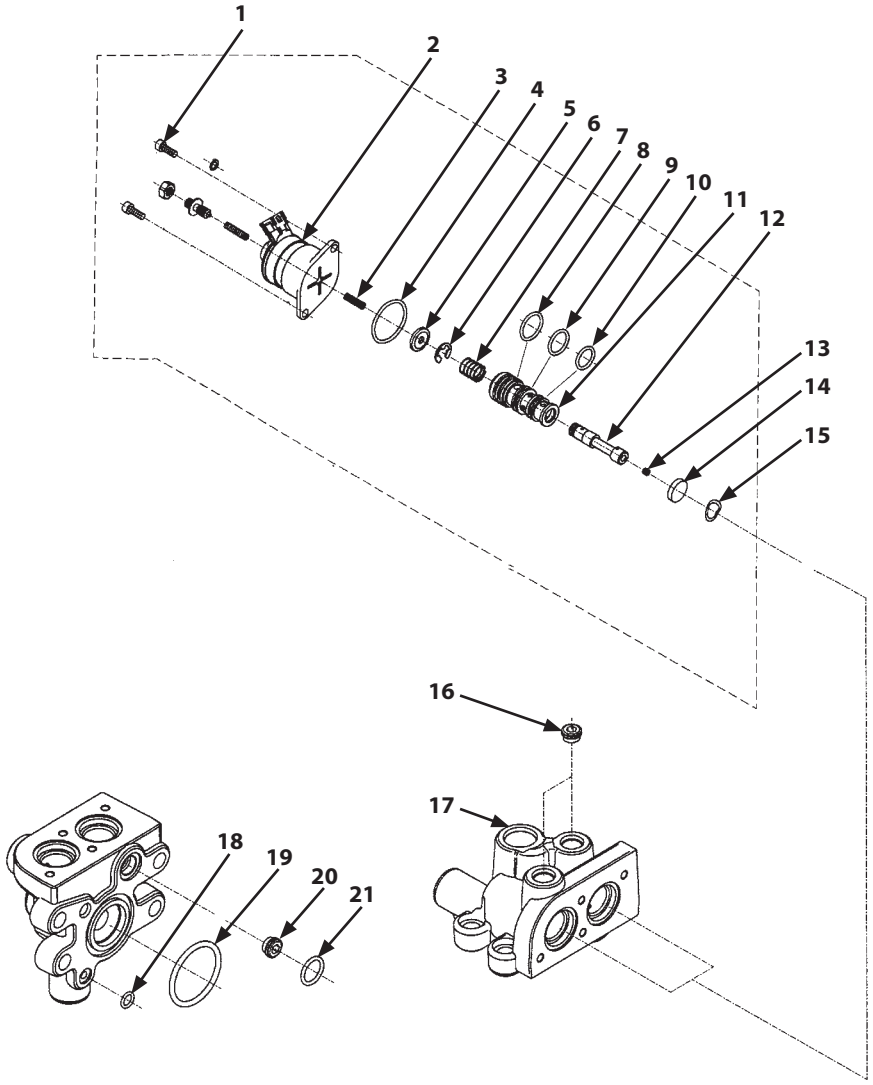
CAUTION: The pump casing (51) assembly weight: 72 kg (160 lb)

25. Install eyebolts (M12, Pitch 1.75 mm) (2 used) to the socket bolt (71) holes (2 places) of pump casing (51). Hoist the pump casing (51) assembly. While engaging gear (43) with gear (29), install the pump casing (51) assembly to gear casing (47) with bolts (53) (6 used) and spring washers (52) (6 used).

: 24 mm

: 150 N·m (15 kgf·m, 111 lbf·ft)

Disassembly of Solenoid Valve



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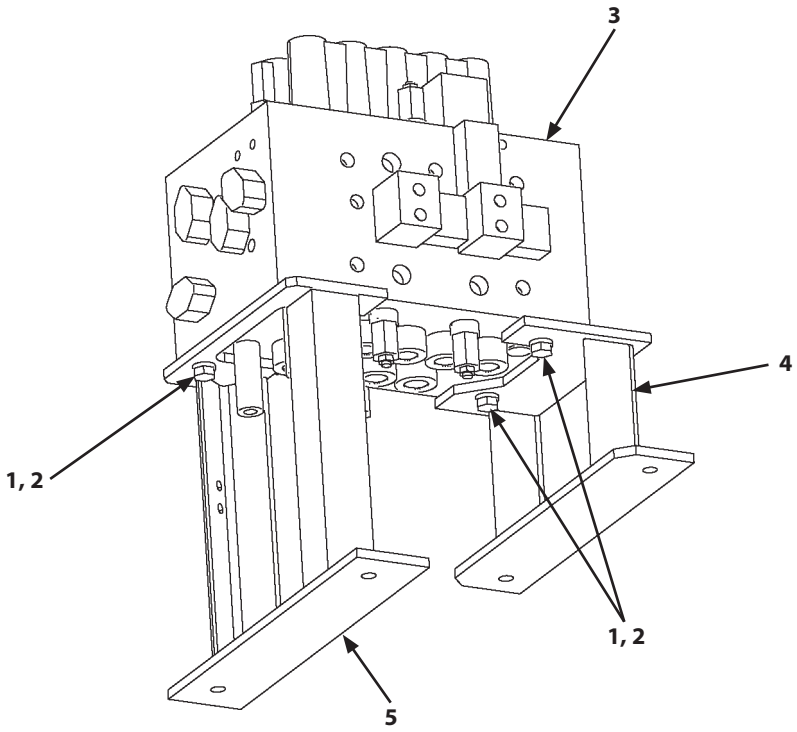
1- Socket Bolt
2- Solenoid
3- Spring
4- O-Ring
5- Diaphragm
6- Retaining Ring
7- Spring
8- O-Ring
9- O-Ring
10- O-Ring
11- Sleeve
12- Spool
13- Orifice
14- Plate
15- Wave Washer
16- Filter
17- Body
18- O-Ring
19- O-Ring
20- Filter
21- O-Ring



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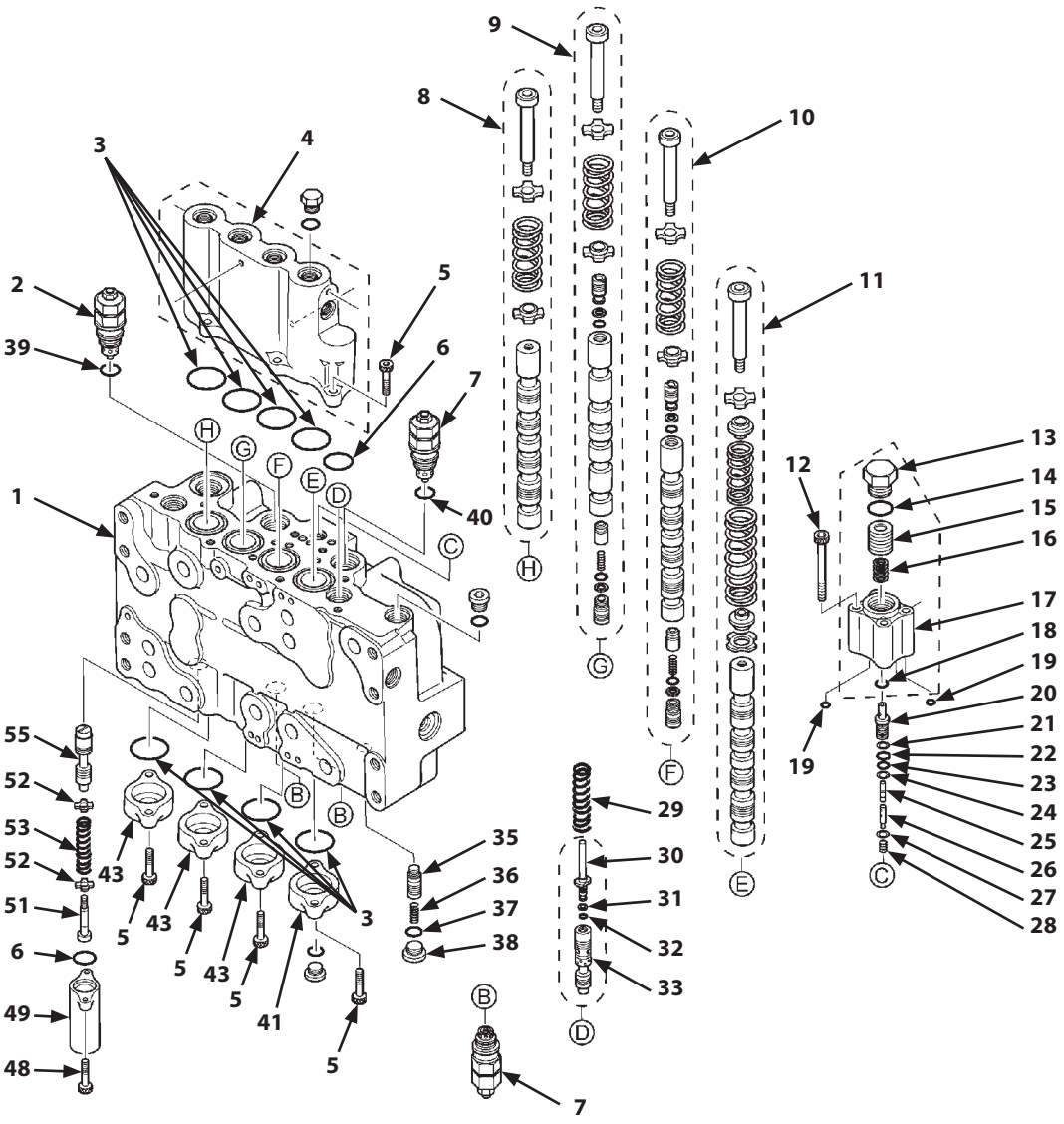
CAUTION: Control valve (3) weight: 190 kg (420 lb)

21. Install eyebolts (M10, Pitch 1.75 mm) (2 used) to eyebolt mounting holes (2 places) of control valve (3). Attach nylon slings onto the eyebolts. Hoist and hold control valve (3).
22. Remove bolts (1) (4 used) and spring washers (2) (4 used). Remove control valve (3) from brackets (4, 5).

    : 24 mm
23. Remove the adapter with control valve (3) attached if necessary.

Disassembly of Control Valve (4-Spool Side)



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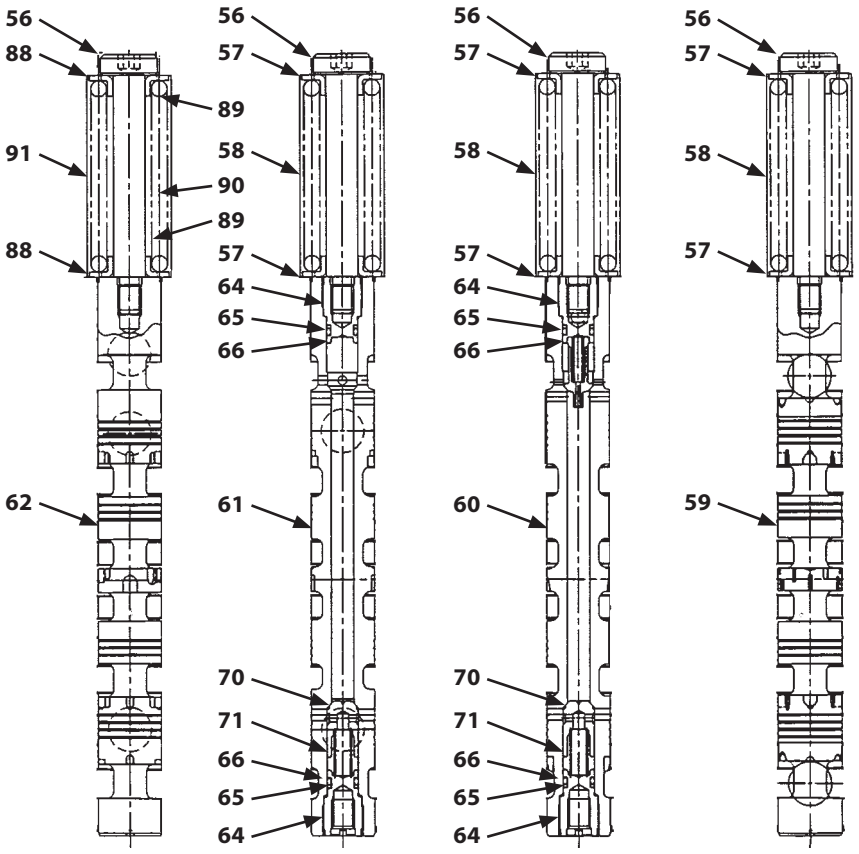

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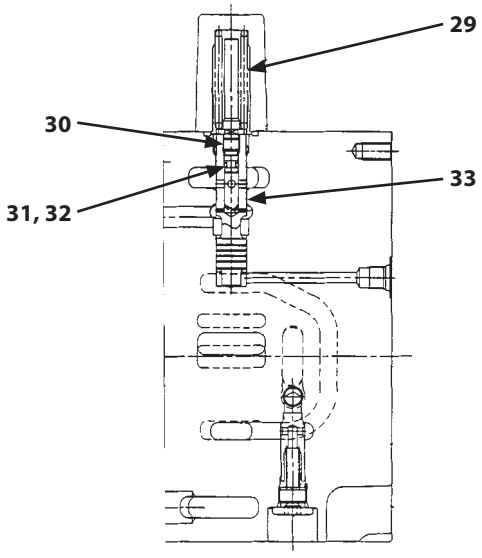

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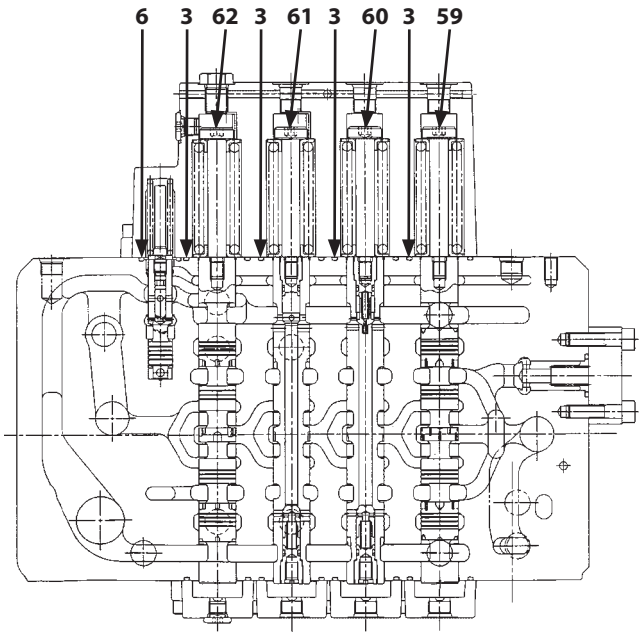

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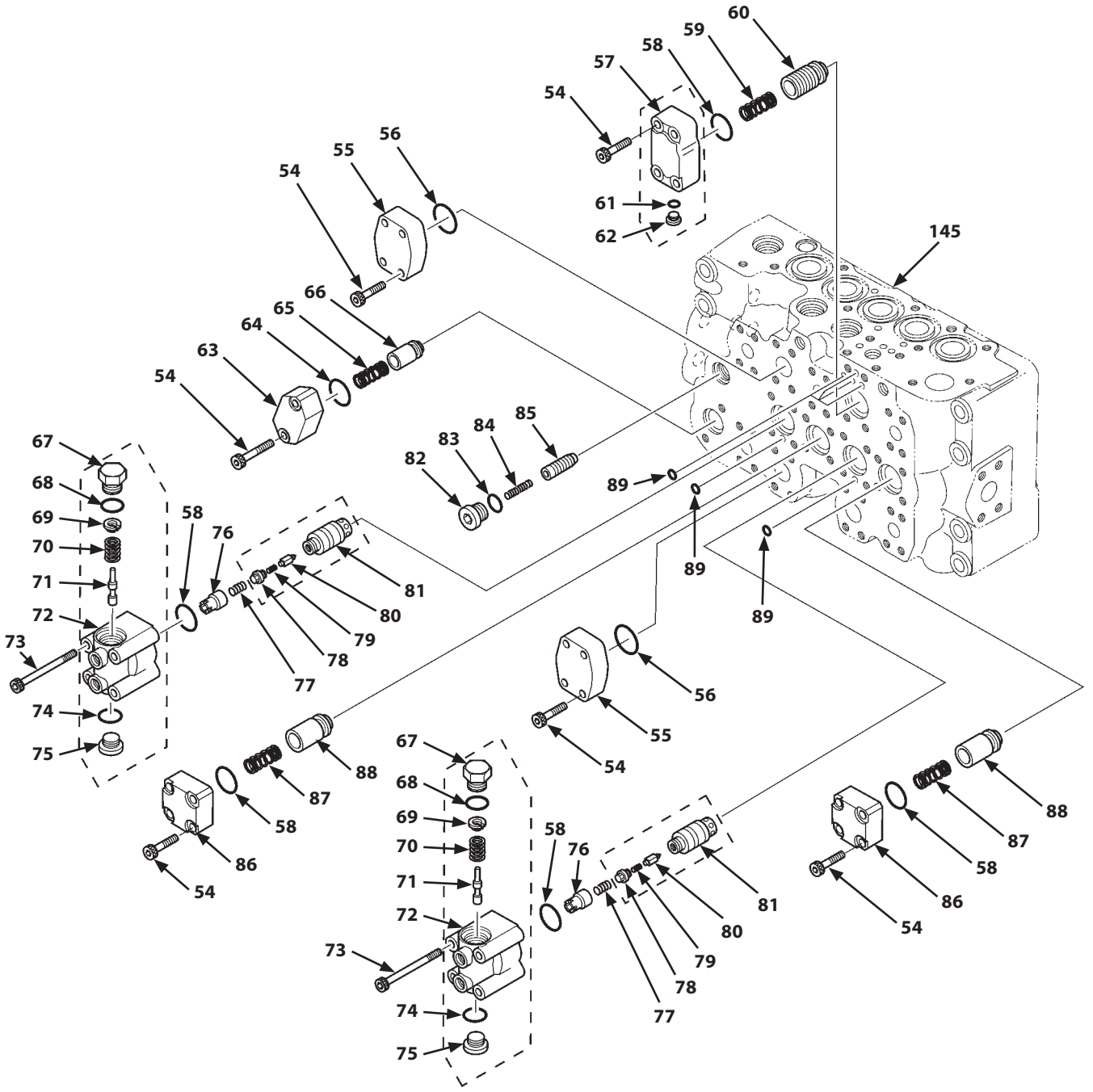
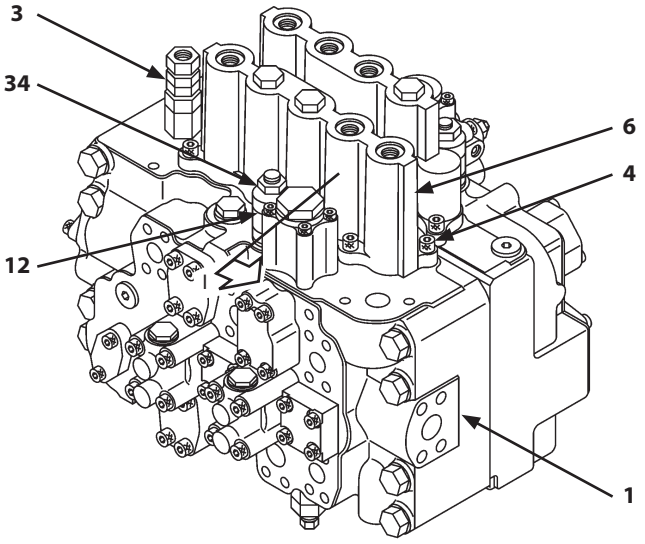
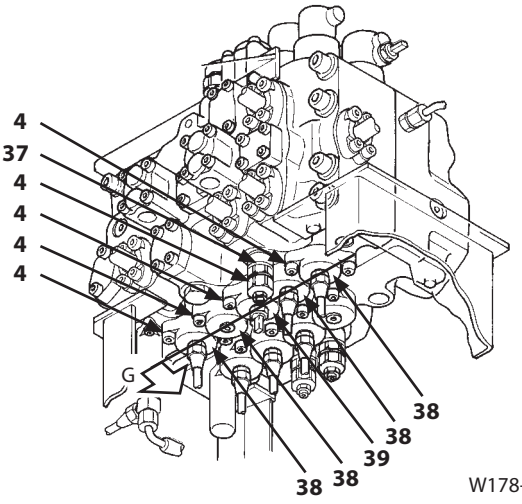


W178-02-05-010

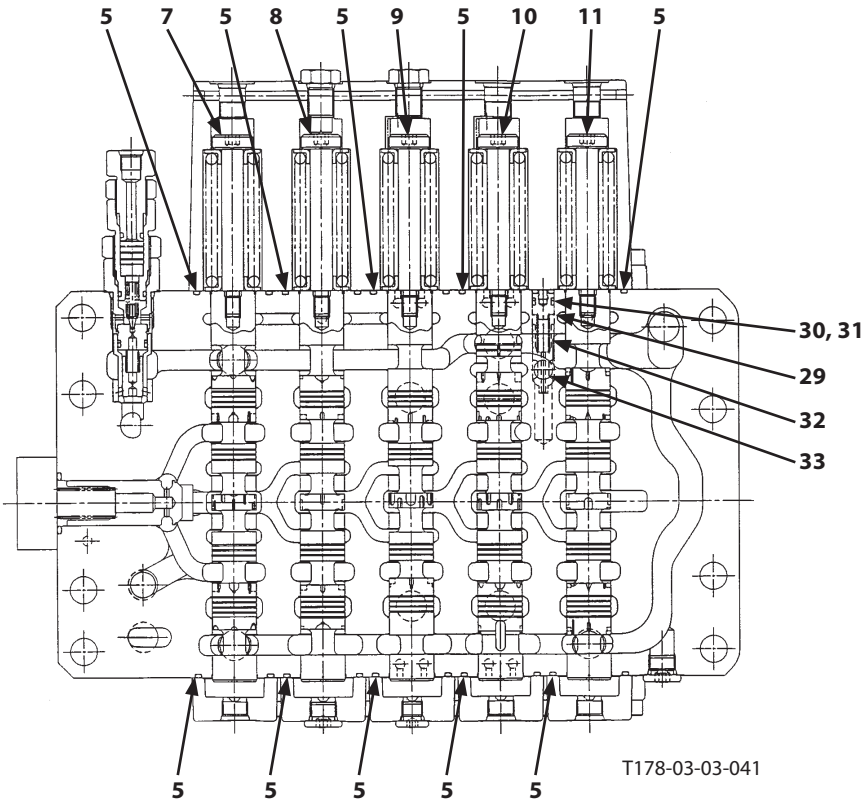


M178-05-003



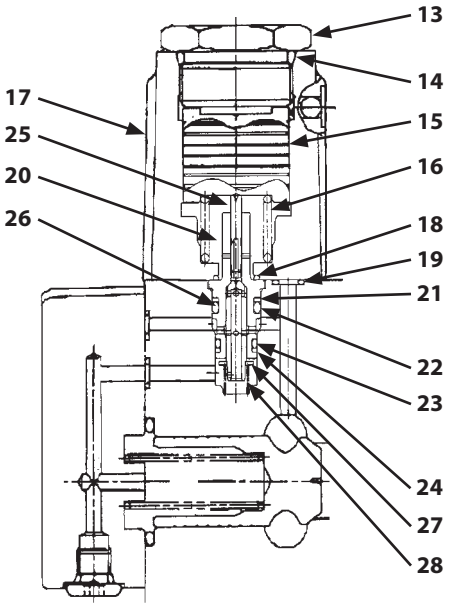
W178-02-05-018

G Section



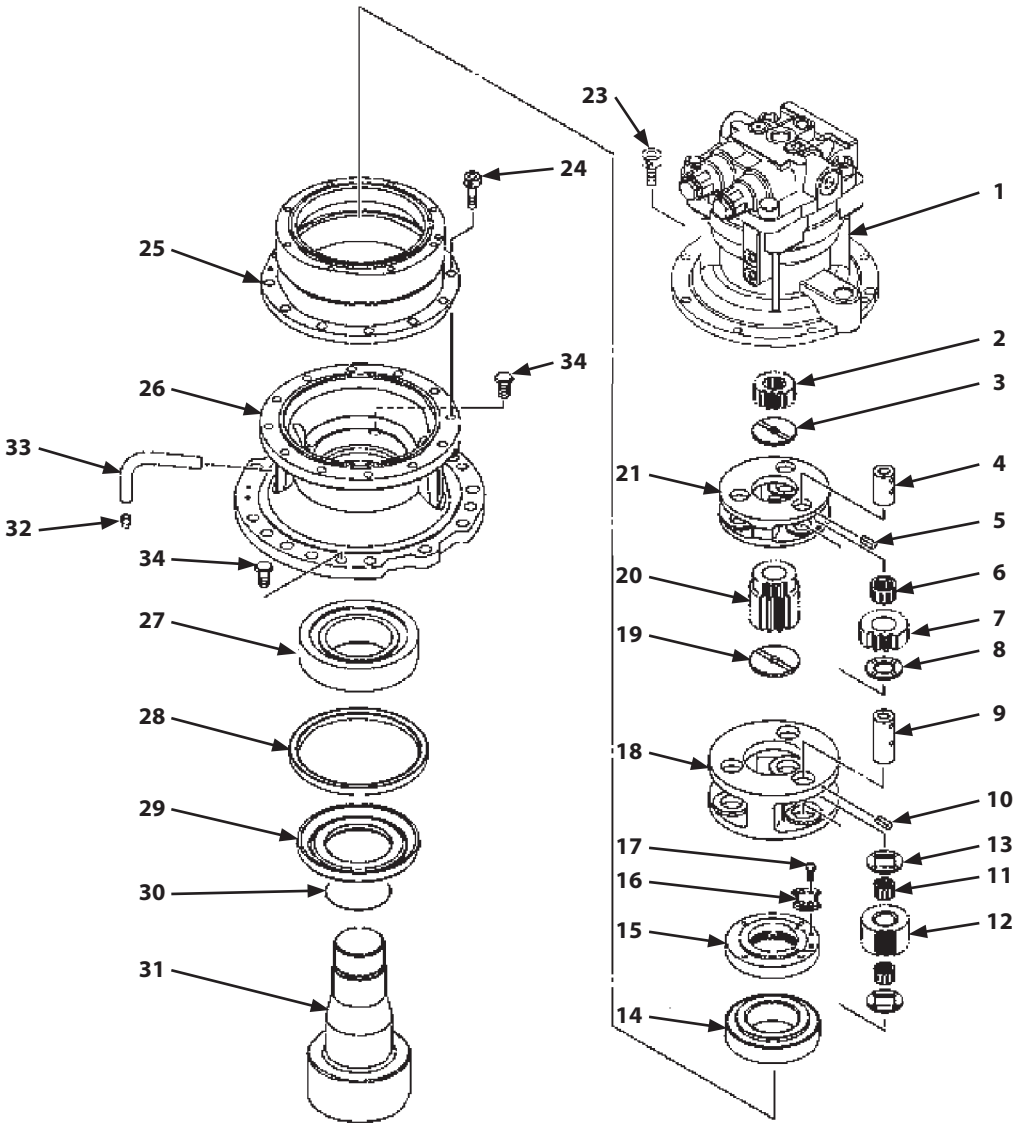
T178-03-03-041

H Section



W178-02-05-029

Disassembly of Swing Device



WDC390-03-10-001

1- Motor
2- First Stage Sun Gear
3- Thrust Plate
4- Pin (3 Used)
5- Spring Pin (3 Used)
6- Needle Bearing (3 Used)
7- Planetary Gear (3 Used)
8- Thrust Plate (3 Used)
9- Pin (3 Used)
10- Spring Pin (3 Used)
11- Needle Bearing (6 Used)
12- Planetary Gear (3 Used)
13- Thrust Plate (6 Used)
14- Roller Bearing
15- Bearing Nut
16- Lock Plate
17- Bolt (2 Used)
18- Second Stage Carrier
19- Thrust Plate
20- Second Stage Sun Gear
21- First Stage Carrier
23- Socket Bolt (8 Used)
24- Socket Bolt (12 Used)
25- Ring Gear
26- Housing
27- Roller Bearing
28- Oil Seal
29- Sleeve
30- O-Ring
31- Shaft
32- Drain Plug
33- Pipe
34- Plug (2 Used)

IMPORTANT: Check the mounting position of thrust plate (8).

38. Install planetary gears (7) (2 used), needle bearings (6) (2 used), thrust plates (8) (2 used), pins (4) (2 used), spring pins (5) (2 used), and thrust plate (3) to first stage carrier (21) in the same way as step 35 to step 37.
39. Fit the spline and install the second stage carrier (18) assembly to shaft (31).
40. Install second stage sun gear (20) to the second stage carrier (18) assembly with the small diameter part up.
41. Apply THREEBOND #1215 (or LOCTITE #5020) onto the ring gear (25) mounting surface of housing (26).

CAUTION: Ring gear (25) weight: 23 kg (51 lb)

42. Install eyebolts (M12, Pitch 1.75 mm) (2 used) to the motor (1) mounting screw part of ring gear (25). Hoist ring gear (25). Fit the matching marks. Install ring gear (25) to housing (26) with socket bolts (24) (12 used).

    : 14 mm

    : 210 N·m (21 kgf·m, 155 lbf·ft)

43. Fit the spline and install the first stage carrier (21) assembly to second stage sun gear (20).

IMPORTANT: Check the direction to install first stage sun gear (2).

44. Install first stage sun gear (2) to the first stage carrier (21) assembly with the stepped part down.
45. Install a seal tape onto the thread part of pipe (33). Install pipe (33) to housing (26). Face pipe (33) down.

    : 18 mm

46. Install a seal tape onto drain plug (32). Install drain plug (32) to pipe (33).

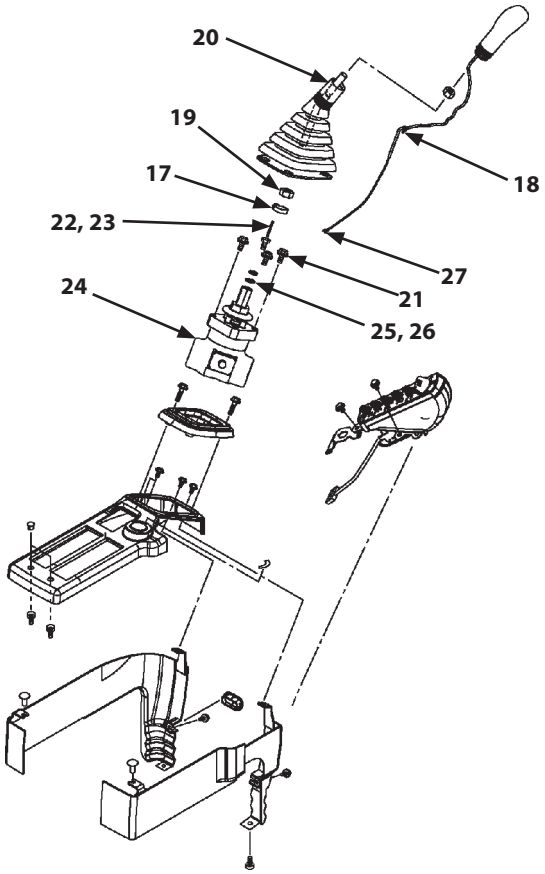
    : 8 mm

    : 35 N·m (3.5 kgf·m, 26 lbf·ft)

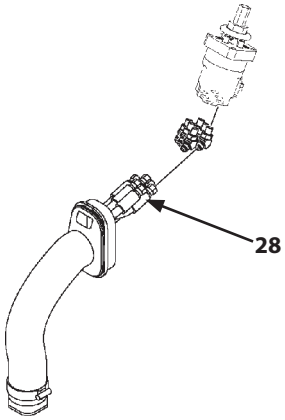
47. Add gear oil to ring gear (25) until gear oil reaches the middle part of first stage sun gear (2).

    Oil amount: 6.7 L (1.82 US gal)

48. Apply THREEBOND #1212 (or LOCTITE #5020) onto the motor (1) mounting surface of ring gear (25).



W178-02-11-159



W178-02-11-160

9. Remove clip bands (17, 18). Disconnect connector (27).
10. Loosen lock nut (19). Remove the lever (20) assembly.

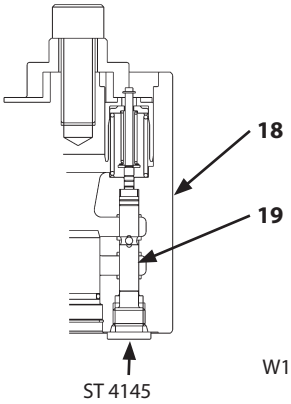
    : 19 mm, 22 mm
11. Disconnect hoses (28) (6 used).

    : 19 mm
12. Remove bolts, washers (21) (3 used), spring pin (22), bolt (23), spring washer (25), and washer (26). Remove pilot valve (24).

    : 13 mm
13. Remove the adapter with pilot valve (24) attached if necessary.

7. When compressing the spring, do not lower spool (19). Install the special tool (ST 4145) to the port hole on casing (18) as illustrated.

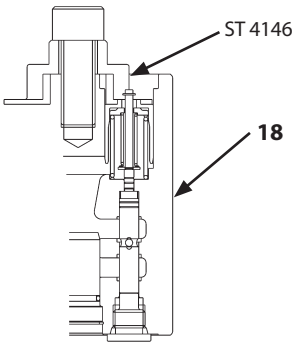
: 6 mm



W178-02-07-048

8. Install the special tool (ST 4146) to the pusher hole on casing (18). Push the special tool (ST 4146) and compress the spring. Tighten the special tool (ST 4146) by using the socket bolt (M14, Pitch 2.0 mm). Remove retaining rings (8) (4 used) from spools (19) (4 used) by using a screwdriver.

: 12 mm



W178-02-07-048

IMPORTANT: The quantity of shims (2) has been determined for each port during the performance testing. Do not lose shim (2). Keep shim (2) carefully in order to install shim (2) to the original port when assembling.

9. Remove the special tool (ST 4146). Remove spring guides (7) (4 used), return springs (5, 6) (2 used for each), and balance springs (3, 4) (2 used for each) from spools (19) (4 used).
10. Remove shim (2) and spacers (1) (4 used) from spools (19) (4 used).

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

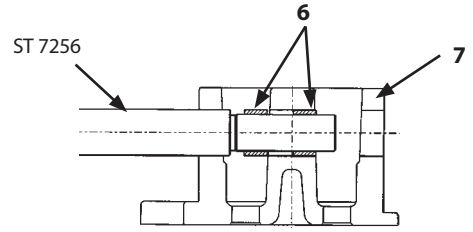
11. Remove the special tool (ST 4145) from casing (18). Slowly turn and remove spool (19) from casing (18).

IMPORTANT: Retaining ring (22) may come off while disassembling. Do not drop retaining ring (22) inside casing (18). If retaining ring (22) falls inside casing (18), remove retaining ring (22) completely. Retaining ring (22) cannot be reused.

12. Remove retaining ring (22) from casing (18) by using a screwdriver. Install a bolt (M8, Pitch 1.25 mm) to plug (21). Remove plug (21) from casing (18). Remove O-ring (20) from plug (21).

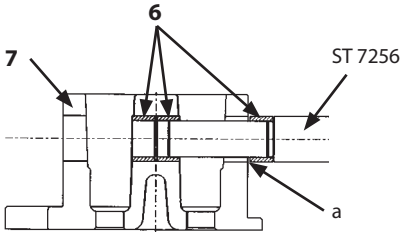
: 13 mm

- Install bushing (6) on the opposite side in the same way.



W178-02-11-311

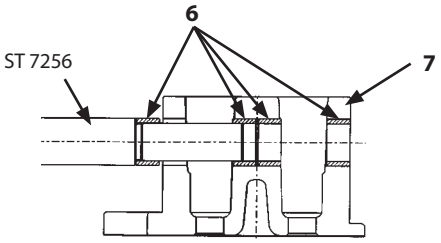
- Install bushing (6) in the near side as illustrated. Stop tapping when the bushing (6) end is flush with the outside of holder (7).



a- Outside of Holder

W178-02-11-312

- Install bushing (6) in the near and opposite side as illustrated.



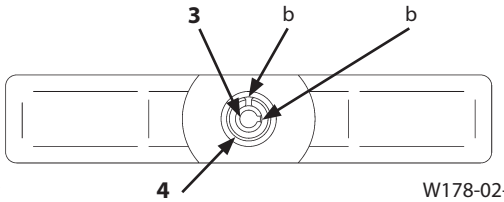
W178-02-11-313

12. Install O-ring (33) to pin (35). Apply grease onto O-ring (33). Install pin (35) and cam (5) to holder (7).

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

IMPORTANT: Check the direction to install spring pins (3, 4).

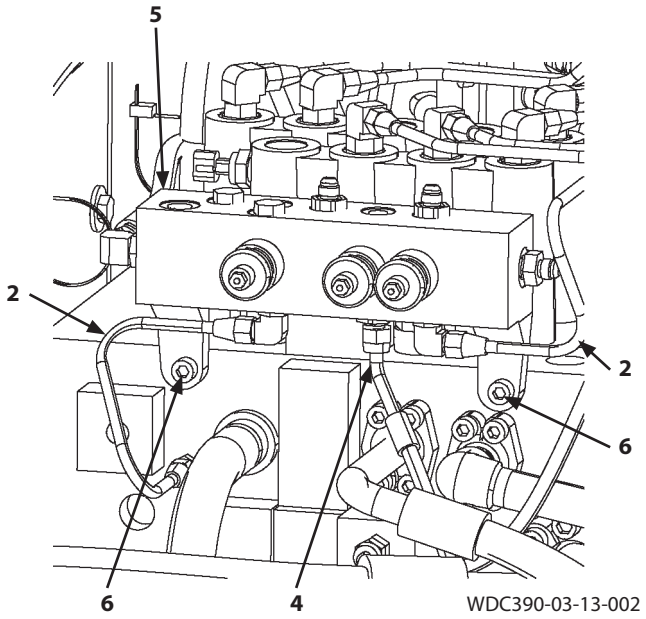
13. Install spring pins (3, 4) to cam (5) by using the special tool (ST 1237). Secure cam (5) and pin (35). At this time, the slits (a) of spring pins (3, 4) should be positioned 90SDgr away each other. Tap and install spring pins (3, 4) until spring pins (3, 4) come in contact with the stepped part in the hole.



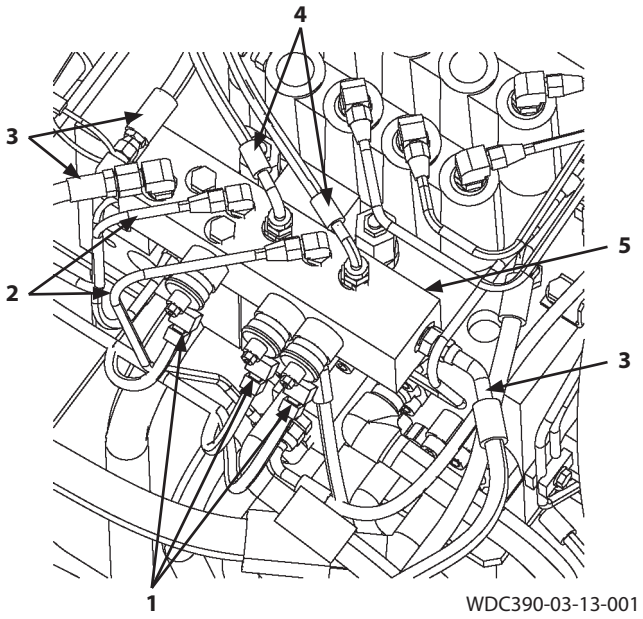
b- Slit

W178-02-07-050

14. Crimp the hole end (2 places) of cam (5) where spring pins (3, 4) are inserted by using a punch.
15. Install other cam (5) in the same way as step 12 to step 14.



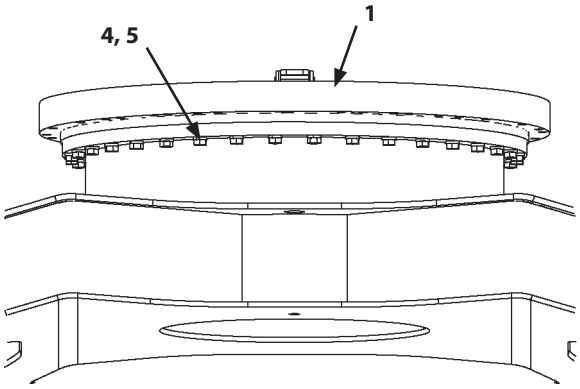
WDC390-03-13-002



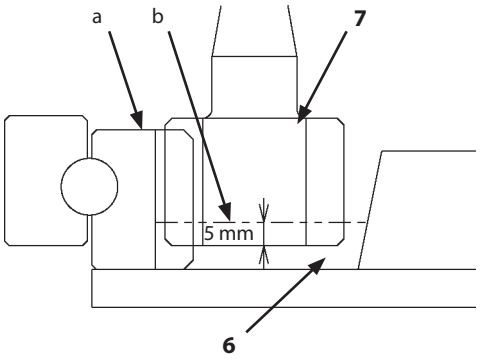
WDC390-03-13-001

Installation

1. Install all removed adapters to 3-spool solenoid valve unit (5).
2. Install 3-spool solenoid valve unit (5) with socket bolts (6) (2 used).
   : 8 mm
   : 50 N·m (5 kgf·m, 37 lbf·ft)
3. Connect hoses (3) (3 used).
   : 19 mm
   : 30 N·m (3 kgf·m, 22 lbf·ft)
4. Connect hoses (4) (3 used).
   : 17 mm
   : 25 N·m (2.5 kgf·m, 18.5 lbf·ft)
5. Connect pipes (2) (4 used).
   : 17 mm
   : 25 N·m (2.5 kgf·m, 18.5 lbf·ft)
6. Connect connectors (1) (3 used).



WDAA-04-01-001



W175-03-01-002

a- Gera Part of Swing Bearing
b- Grease Level

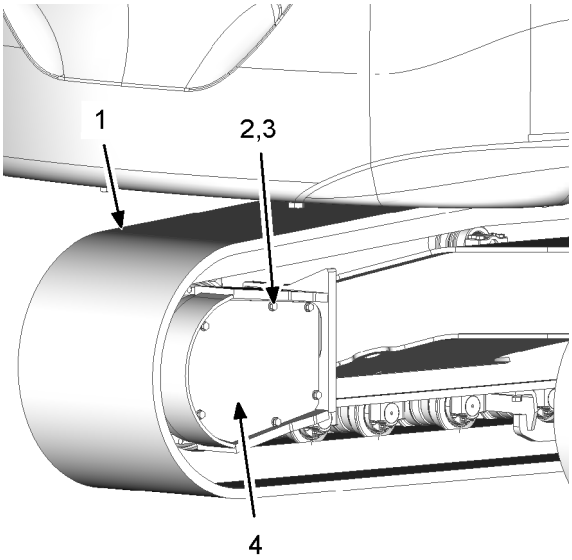
5. Install swing bearing (1) with spring washers (5) (36 used) and bolts (4) (36 used).

   : 30 mm

   : 500 N·m (50 kgf·m, 370 lbf·ft)

6. After installing swing bearing (1), add grease (Alvania EP2 or equivalent) to gear part (a) of the swing bearing. Add grease (Alvania EP2 or equivalent) to grease bath (6) until pinion (7) of the swing device is 5 mm (0.2 in) under grease.

NOTE: Amount of grease: 14±1 L (3.7±0.3 US gal)



WDAA-04-02-001

6. Connect track (1). (Refer to 4-6-1.)
7. Install other travel device in the same way as step 1 to step 6.
8. Bleed air from the hydraulic system. (Refer to W1-4-1.)

IMPORTANT: Check the hydraulic oil level. Start the engine and check for any oil leaks. In order to prevent the travel motor from seizing, perform the break-in operation after installing.

Condition:

1. Engine speed: Slow idle speed

2. Travel mode switch: Slow speed

3. Operation duration: Over 2 minutes

9. Install cover (4) with washers (3) (6 used) and bolts (2) (6 used).

: 22 mm

: 180 N·m (18 kgf·m, 133 lbf·ft)

10. Install other cover in the same way as step 9.

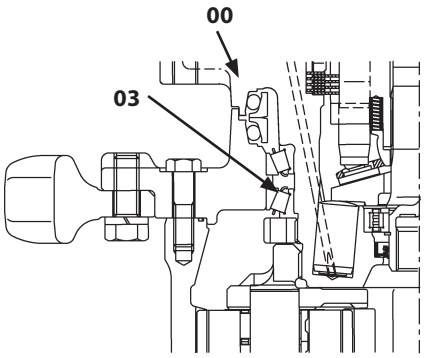
CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, helmets, etc in order to prevent personal injury.

CAUTION: Be careful as roller bearing (03) is too hot.

17. Warm up the inner race of roller bearing (03) of the cover (41) side to 50 to 70 °C (122 to 158 °F) by using a heater. Install the inner race of roller bearing (03) of the cover (41) side to travel motor (00). After roller bearing (03) of the cover (00) side cools, install roller bearing (03) of the cover (00) side to travel motor (00) by using a bar and a hammer.

NOTE: Install roller bearing (03) until the inner race side of roller bearing (03) reaches three threads for bearing nut (09).

NOTE: Check that the inner race of roller bearing (03) on the cover (41) side is installed completely.



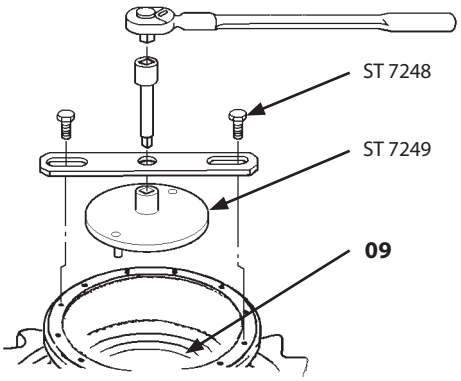
WDBE-04-02-003

IMPORTANT: Check the direction to install bearing nut (09).

18. Apply grease onto the thread part of bearing nut (09). Install bearing nut (09) to travel motor (00) with the machining surface facing to roller bearing (03) on the cover (41) side. Tighten bearing nut (09) by hand.

19. Install bearing nut (09) by using special tools (ST 7248, ST 7249) and a torque wrench.

: 500 N·m (50 kgf·m, 370 lbf·ft)



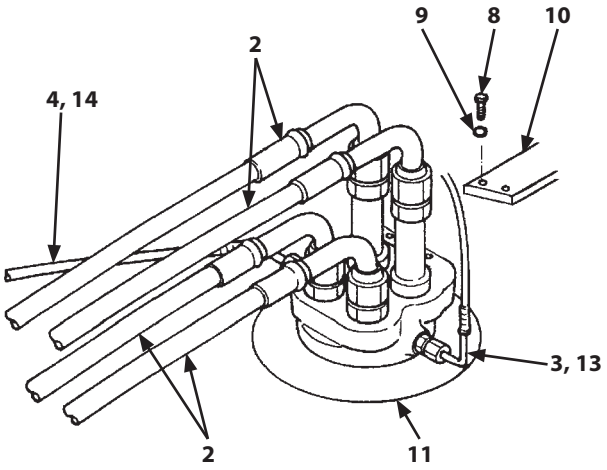
W178-03-02-013

20. After installing bearing nut (09), tap the sprocket (05) end by using a plastic hammer and reduce a play. Rotate sprocket (05) both clockwise and counterclockwise 4 to 5 turns.

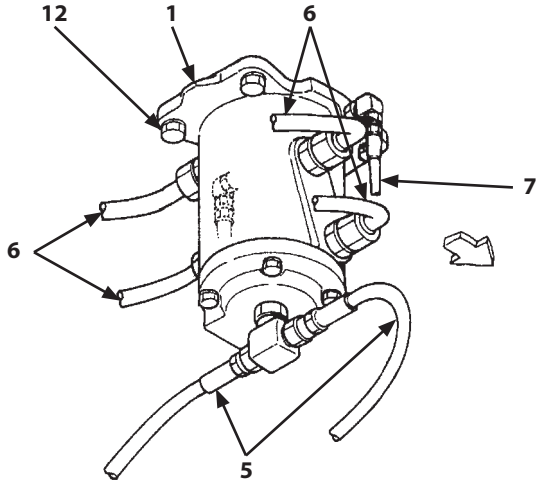
21. Repeat steps 19, 20.

22. Tighten bearing nut in the same way as step 19.

: 500 N·m (50 kgf·m, 370 lbf·ft)



W178-02-11-237



W178-02-11-238

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 identification tags 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. Disconnect hoses (2) (4 used).

   : 36 mm

3. Disconnect hose (3).

   : 27 mm

4. Remove adapter (13).

   : 22 mm

5. Disconnect hose (4).

   : 17 mm

6. Remove adapter (14).

   : 19 mm

7. Disconnect hoses (5) (2 used).

   : 27 mm

8. Disconnect hoses (6) (4 used).

   : 36 mm

9. Disconnect hoses (7) (2 used).

   : 17 mm

10. Remove bolts (8) (2 used) and spring washers (9) (2 used). Remove stopper (10).

    : 22 mm

11. Remove rubber (11).

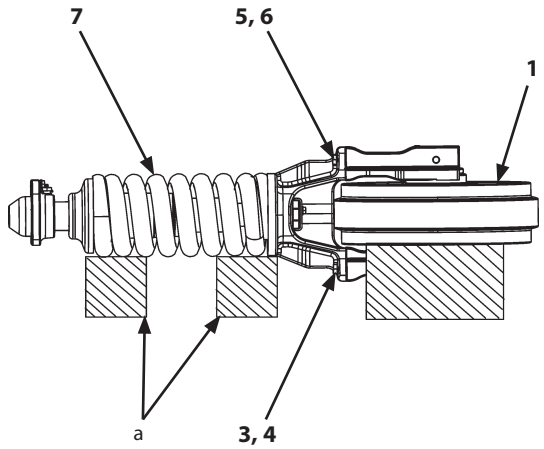
CAUTION: Center joint (1) weight: 27 kg (60 lb)

12. Install eyebolts (M14, Pitch 2.0 mm) to the bolt (8) holes (2 places) of center joint (1). Attach nylon slings onto eyebolts. Hoist and hold center joint (1).

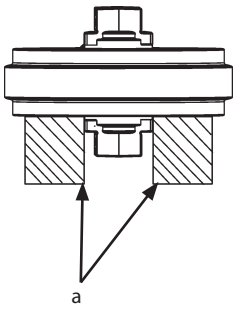
13. Remove bolts, washers (12) (4 used). Remove center joint (1).

    : 19 mm

14. Remove the adapters with center joint (1) attached if necessary.



WDCD-04-04-004



WDCD-04-04-003

a - Block

Installation

CAUTION: Take care not to turn over track adjuster (7).

CAUTION: Front idler (1) weight: 110 kg (245 lb)

Track adjuster (7) weight: 140 kg (310 lb)

1. Place track adjuster (7) and front idler (1) onto blocks (a) (4 used) with the bolt (5) hole side up.
2. Install front idler (1) with washers (6) (2 used) and bolts (5) (2 used).

   : 24 mm

   : 270 N·m (27 kgf·m, 200 lbf·ft)

CAUTION: The track adjuster (7) assembly weight: 250 kg (555 lb)

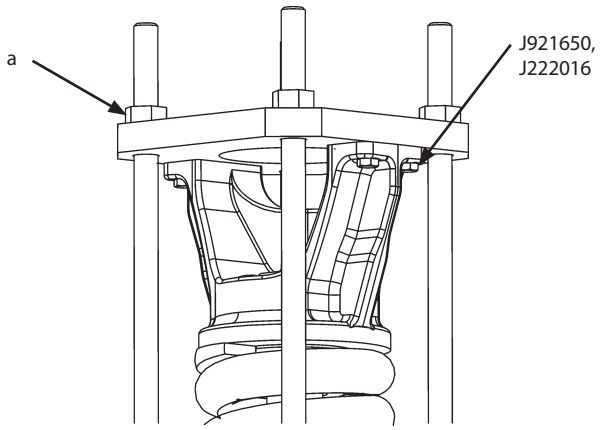
3. Turn over the track adjuster (7) assembly.
4. Install washers (4) (2 used) and bolts (3) (2 used).

   : 24 mm

   : 270 N·m (27 kgf·m, 200 lbf·ft)

8. Install the special tool (ST 4052) in order to cover the spring (02) assembly. Install washers (J222016) (4 used) and bolts (J921650) (4 used) to the bolt holes (4 places) of yoke (03). Secure the special tool (ST 4052) and the spring (02) assembly with them.

   : 24 mm



WDCD-04-04-013

a- Nut

CAUTION: As spring (02) is compressed, a strong force is applied. Check if the spring (02) assembly is installed correctly with compressing spring (02) by using the oil jack.

9. Tighten nuts (a) (4 used) of the special tool (ST 4950) and secure the spring (02) assembly. Operate the oil jack. Compress spring (02) to the position where nut (07) is loose.

NOTE: Spring (02) compressed length:

Spring free length (560 mm (22 in)) - Spring set length (460 mm (18.1 in)) = Spring compressed length (100 mm (3.94 in))

10. Remove bolt (09) and washer (10) from bracket (08). Remove bracket (08) from nut (07).

    : 17 mm

11. Remove nut (07) from rod (00B).

    : 75 mm

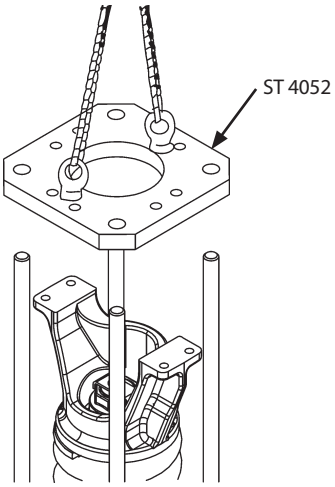
12. Lower the oil jack slowly.

13. Remove nuts (a) (4 used) of the special tool (ST 4950).

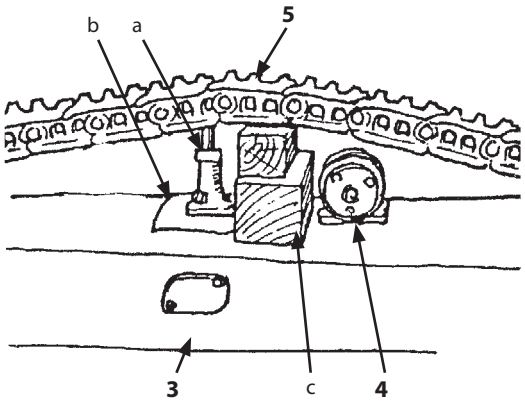
    : 46 mm

CAUTION: Special tool (ST 4052) weight: 32 kg (71 lb)

14. Attach nylon slings onto the eyebolts (2 used) of the special tool (ST 4052). Hoist and hold the special tool (ST4052). Remove bolts (J921650) (4 used) and washers (J222016) (4 used). Remove the special tool (ST4052).

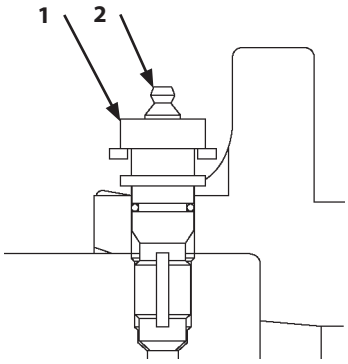


WDCD-04-04-012

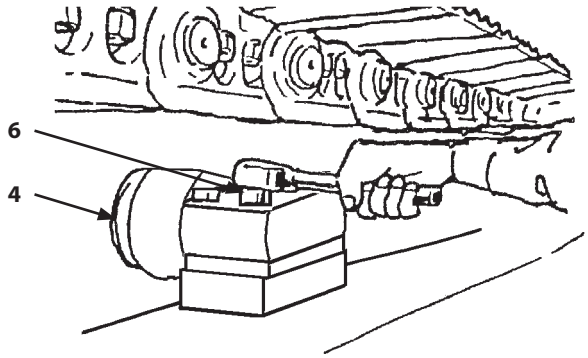


W105-03-06-003

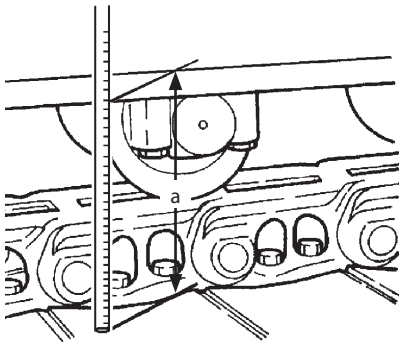
a- Oil Jack
b- Nonskid Cloth
c- Wooden Block



TDAA-03-08-002



W1V7-03-06-001



WXXX-03-07-001

a - Track sag specification

Installation

1. Install upper roller (4) with bolts (6) (4 used).

   : 24 mm

   : 270 N·m (27 kgf·m, 200 lbf·ft)

2. Remove wooden block (c), oil jack (a), and nonskid cloth (b) between track (5) and track frame (3).
3. Tighten valve (1) in the track adjuster.

   : 24 mm

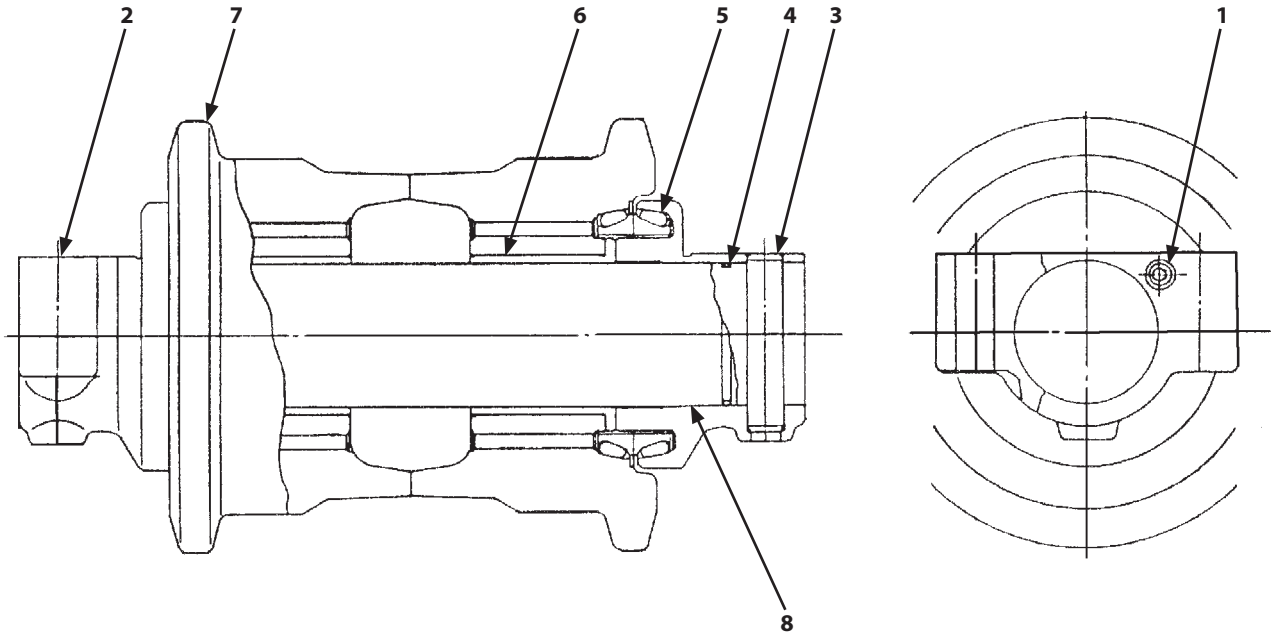
   : 90 N·m (9 kgf·m, 66 lbf·ft)

CAUTION: Securely support the raised machine by using blocks.

4. Raise the track to be adjusted. Rotate the track in the reverse direction a little.
5. Apply grease through grease fitting (2) and adjust the track tension.

NOTE: Track sag specification (a): 300 to 335 mm (11.8 to 13.2 in)

Assembly of Lower Roller



W105-03-06-023

1- Plug (2 Used)
2- Collar (2 Used)
3- Pin (2 Used)
4- O-Ring (2 Used)
5- Floating Seal (2 Used)
6- Bushing (2 Used)
7- Roller
8- Axle

MEMO

Removal and Installation of Boom Cylinder

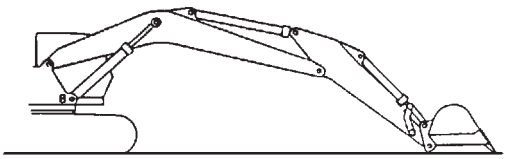
IMPORTANT: The hose and pipe contain hydraulic oil. When removing the hose and pipe, receive oil with a container in order to avoid spilling oil.

IMPORTANT: Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach identification tags 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 arm top onto the ground.
2. Stop the engine. Disconnect hoses (1) (2 used) from boom cylinder (2).

: 17 mm



W105-04-02-001

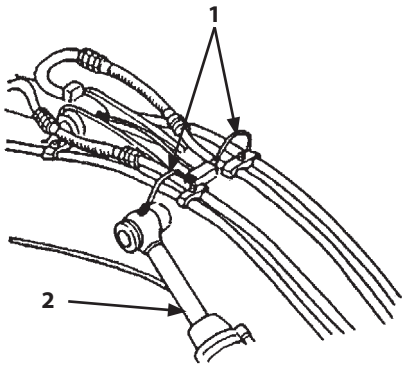
CAUTION: Boom cylinder (2) weight: 170 kg (375 lb)

3. Attach the nylon sling onto boom cylinder (2). Hoist and hold boom cylinder (2).

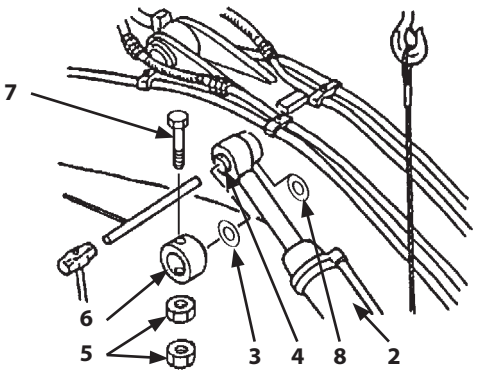
CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, helmets, etc in order to prevent personal injury.

4. Remove nuts (5) (2 used), bolt (7), and stopper (6) from the boom cylinder (2) rod side. Push pin (4) into the boom by using a bar and a hammer. Remove thrust plates (3), and thrust plates (8).

: 30 mm



W105-04-02-032



W158-04-02-013

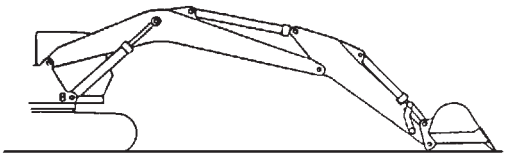
Removal and Installation of Bucket Cylinder

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

IMPORTANT: Cap the open ends in case the hoses and pipes have been disconnected. In addition, attach identification tags 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 arm top onto the ground.
2. Place wooden blocks (3) (2 used) under the arm (2) top and between bucket cylinder (1) and arm (2). Stop the engine.



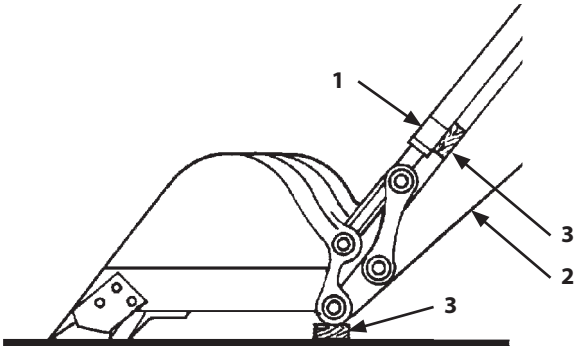
W105-04-02-001

CAUTION: Before removing pin (7), secure the link by using wires in order not to fall off.

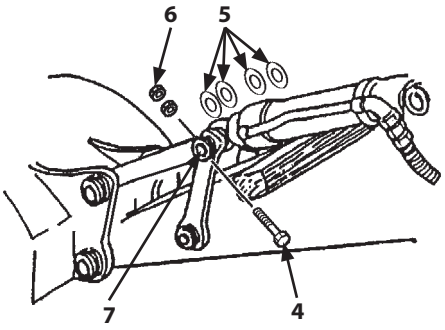
CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, helmets, etc in order to prevent personal injury.

3. Remove nuts (6) (2 used) and bolt (4). Remove pin (7) by using a bar and a hammer. Remove thrust plates (5) (4 used).

: 30 mm



W178-02-11-287



WLAA-05-02-002

Assembly of Boom, Arm Cylinder

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

1. Install bushing (5) to cylinder head (7).

   Special tool when installing bushing (rod outer diameter):

   ST 8020: 85 mm (Boom Cylinder)

   ST 8021: 95 mm (Arm Cylinder)

IMPORTANT: Check the direction to install.

2. Install U-ring (3), backup ring (2), buffer ring (4), and snap ring (6) to cylinder head (7).
3. Install wiper ring (1) to cylinder head (7) by using a plastic hammer.

   Special tool when installing wiper ring (rod outer diameter):

   ST 8020: 85 mm (Boom Cylinder)

   ST 8021: 95 mm (Arm Cylinder)

4. Install O-ring (10) and backup ring (9) to cylinder head (7).
5. Install O-ring (18) and seal ring (17) to piston (15) by using the special tool A. After installing seal ring (17), adjust seal ring (17) by using the special tool B.

   Special tool A, Special tool B (tube inner diameter):

   ST 2964, ST 2208: 120 mm (Boom Cylinder)

   ST 2978, ST 2535: 135 mm (Arm Cylinder)

6. Install backup rings (16) (2 used), slide rings (19) (2 used), and slide rings (20) (2 used) to piston (15).
7. Install the cylinder head (7) assembly to cylinder rod (11).

   Special tool when installing cylinder head (rod outer diameter):

   ST 8020: 85 mm (Boom Cylinder)

   ST 8021: 95 mm (Arm Cylinder)

IMPORTANT: Face the slit in cushion seal (26) to the piston side. Check the direction of oil groove in cushion bearing (27).

8. (Arm cylinder only)

   Install snap ring (25) and cushion seal (26) to cylinder rod (11). Install cushion bearing (27) and stoppers (28) (2 used).