ZX670-5G HYDRAULIC EXCAVATOR WORKSHOP MANUAL

PART NO. WJBF90-EN-00

HITACHI

Reliable solutions

Workshop Manual

ZX670LC-5G

Hydraulic Excavator

Hitachi Construction Machinery Co., Ltd.

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

PRINTED IN JAPAN (K) 2013, 04

WJBF90-EN-00

Service Manual consists of the following separate Part No.

Technical Manual (Operational Principle)	: Vol. No.TOJBF90-EN
Technical Manual (Troubleshooting)	: Vol. No.TTJBF90-EN
Workshop Manual	: Vol. No.WJBF90-EN

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

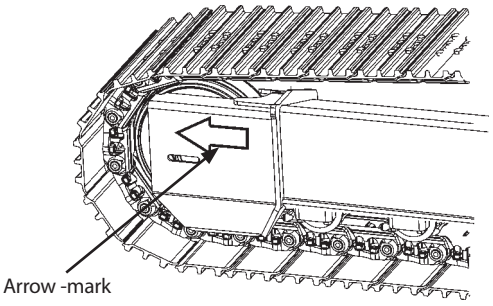
General Precautions for Cab

- 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.

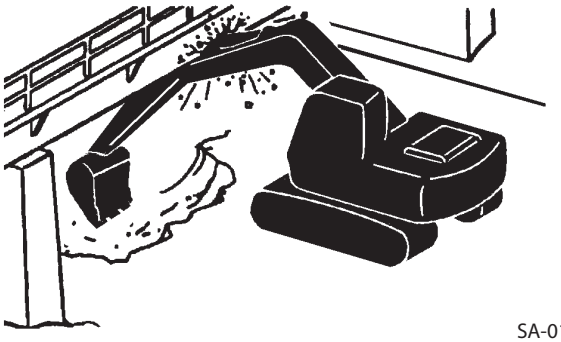
- Avoid swinging the upperstructure on slopes. Never attempt to swing the upperstructure downhill. The machine may tip over. If swinging uphill is unavoidable, carefully operate the upperstructure and boom at slow speed.
- If the engine stalls on a slope, immediately lower the bucket to the ground. Return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



M104-05-008



M178-03-001



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.

SECTION 1

GENERAL

CONTENTS

Group 1 Precautions for Disassembling and Assembling
Precautions for Disassembling and Assembling W1-1-1-1

Group 2 Tightening
Tightening Bolts and Nuts W1-2-1-1
Piping Joint W1-2-1-4

Group 3 Painting
Painting specification W1-3-1-1
Final painted color W1-3-1-1

Group 4 Bleeding Air
Bleeding Air from Hydraulic Oil Tank W1-4-1-1
Bleeding Air from Hydraulic System W1-4-1-2
Bleeding Air from Fuel System W1-4-1-3
Bleeding Air from Radiator W1-4-1-4

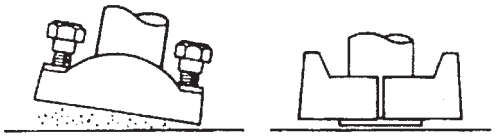
Group 5 Pressure Release Procedure
Hydraulic Circuit Pressure Release Procedure W1-5-1-1

Group 6 Preparation
Preparation before Inspection and Maintenance W1-6-1-1

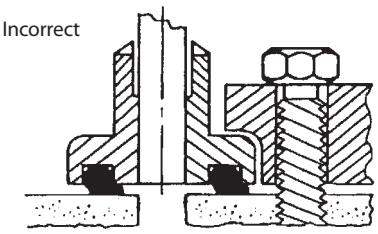
Precautions for Spilt Flange

IMPORTANT:

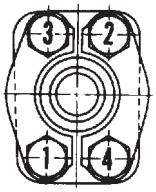
- **Clean the sealing surfaces. Check if there are any scratches and roughness on the surface of the seal that cause oil leaks and damage to the O-ring.**
- **Use only specified O-rings. Inspect O-rings for any damage. Do not file the O-ring surfaces. When installing O-ring into a groove, use grease in order to hold O-ring in place.**
- **While tightening the bolt by hand, check that flange is installed to the port correctly. Do not pinch the O-ring.**
- **Tighten the bolts up and down, left and right alternately, in order to ensure even tightening to the specified torque.**
- **Do not use air wrenches. Using an impact wrench often causes tightening of one bolt fully before tighten the others, resulting in damage to O-rings or uneven tightening of bolts.**



WDAA-01-02-005



WDAA-01-02-006



W105-01-01-008

Nut and Bolt Locking

・ Lock Plate

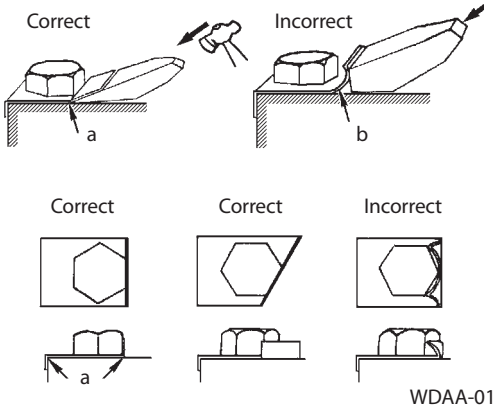
IMPORTANT: Do not reuse the lock plates. Do not try to bend the same point twice.

・ Split Pin

IMPORTANT: Do not turn in the loosening direction in order to align the grooves and holes on the nut. Always turn in the tightening direction. Do not reuse the split pins.

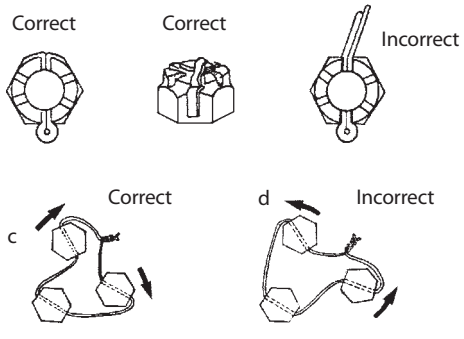
・ Wire

IMPORTANT: Attach wire to bolts in the bolt-tightening direction. Do not reuse the wire.



WDAA-01-02-007

a- Bend along edge sharply b- Do not bend it round



WDAA-01-02-008

c- Tighten d- Loosen

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, cleaning the fuel solenoid pump strainer or running the fuel tank dry, be sure to bleed the air from the fuel system.

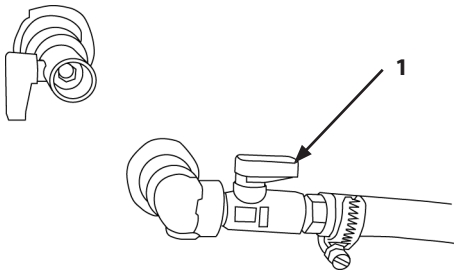
Air Bleeding Procedures

CAUTION: Fuel leaks may lead to fires.

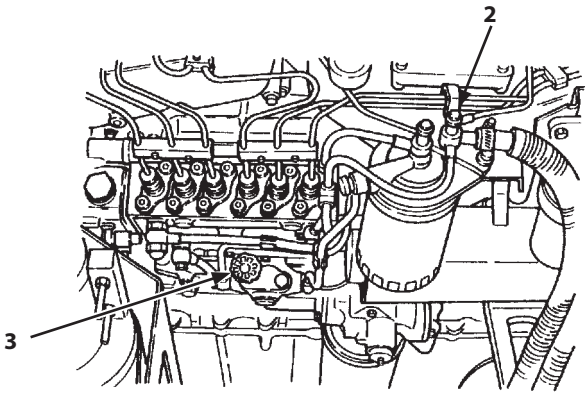
1. Check that fuel cock (1) on bottom of the fuel tank is opened.
2. Loosen priming pump (3).
3. Loosen joint bolt (2) on the fuel main filter.

   : 12 mm
4. Supply fuel by reciprocating priming pump (3). After no air bubbles are spouted through joint bolt (2), tighten joint bolt (2).

   : 12 mm
5. After tightening joint bolt (2), reciprocate priming pump (3) until its movement becomes slow.
6. Tighten priming pump (3).
7. Wipe off any spilled fuel.
8. Start the engine. Check that no fuel leaks are present. If the engine does not start, repeat the above procedures from step 1.



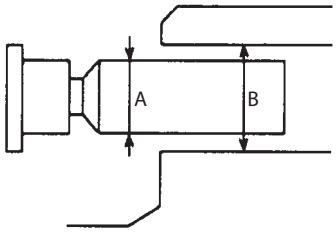
M1U1-07-015



M111-07-046

Main Pump

1. Clearance between plunger outer diameter (A) and cylinder block bore diameter (B).

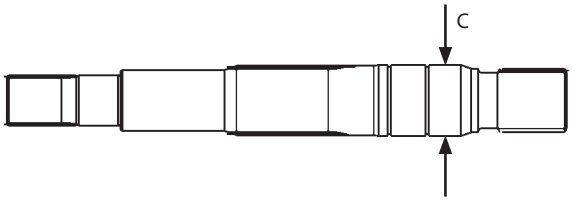


W117-02-02-009

B-A — Unit: mm (in)

Standard	Allowable Limit
0.05 (0.002)	0.095 (0.004)

2. Outer diameter (C) of shaft.

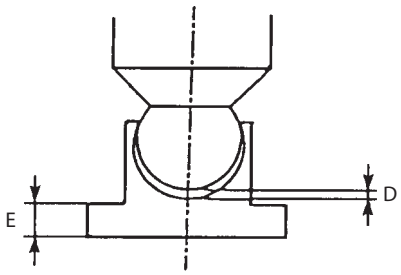


W176-02-04-019

C — Unit: mm (in)

Standard	Allowable Limit
65 (2.56)	64.8 (2.55)

3. Clearance (D) between plunger and shoe bottom and shoe thickness (E)



W117-02-02-011

D — Unit: mm (in)

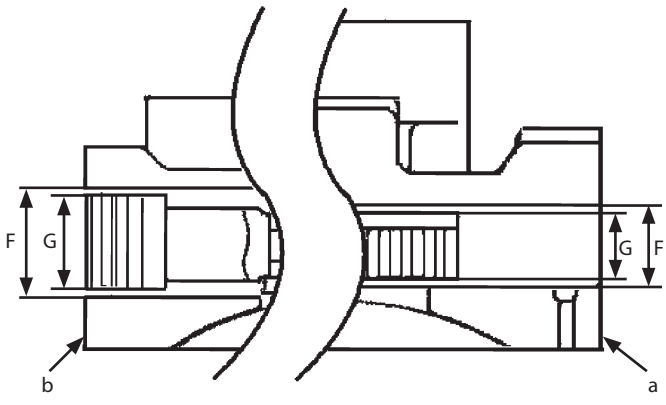
Standard	Allowable Limit
0.2 (0.008)	0.45 (0.018)

E — Unit: mm (in)

Standard	Allowable Limit
8.5 (0.335)	8.3 (0.327)

4. Clearance between small chamber inner diameter and servo piston

5. Clearance between large chamber inner diameter and servo piston



WDCD-02-01-001

a- Small Chamber Diameter
b- Large Chamber Diameter

F-G — Unit: mm (in)

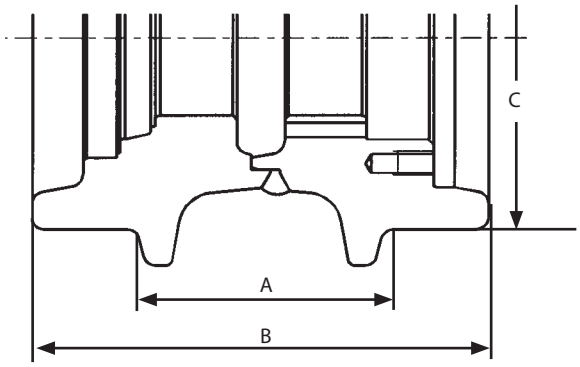
Standard	Allowable Limit
0.065 (0.0026)	0.085 (0.0033)

F-G — Unit: mm (in)

Standard	Allowable Limit
0.07 (0.0028)	0.09 (0.0035)

Upper Roller

Roller



W166-03-06-007

Unit: mm (in)

	Standard	Allowable Limit	Remedy
A	118 (4.65)	-	Cladding by welding and finish or replace.
B	240 (9.45)	-	
C	200 (7.87)	[190 (7.48)]	

NOTE: Values in [ ] are just for reference.

Axle and Bushing

Unit: mm (in)

		Standard	Allowable Limit	Remedy
Axle	Outside Dia.	75 (2.95)	[74.2 (2.92)]	Replace
Bushing	Inside Dia.	75 (2.95)	[76 (2.99)]	
	Flange Thickness	4.5 (0.18)	[3.7 (0.15)]	

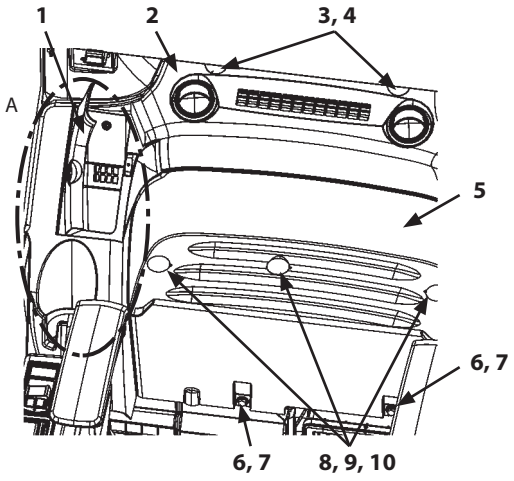
NOTE: Values in [ ] are just for reference.

ZX670LC-5 Class

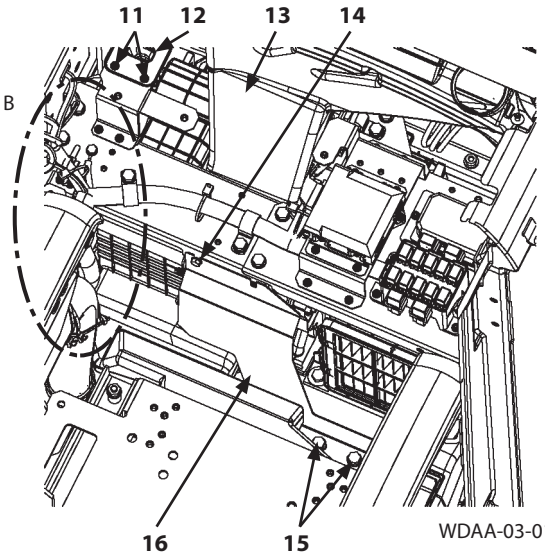
Unit: mm (in)

Front	STD., H	BE
A	600 (23.6)	610 (24.0)
B	20 (0.79)	←
C	890 (35.0)	←
D	820 (32.3)	←
E	2164 (85.2)	2187 (86.1)
F	662 (26.1)	693 (27.3)
G	77 (3.03)	100 (3.94)
H	10 ˚	←
I	0 ˚	←
J	150 (5.91)	←
K	525 (20.7)	←
L	597 (23.5)	←
M	160 (6.30)	←
N	525 (20.7)	←
O	597 (23.5)	←

NOTE:
1. *Dimension A is different according to the arm type.*
2. *Dimension K and N: 525 mm (20.7 in) includes the clearance for shims in order to adjust the bucket clearance.*
3. *Dimensions H: 10 ˚, I: 0 ˚ indicate the angle of stopper.*
4. *Dimensions E, F and G are different according to the bucket type.*

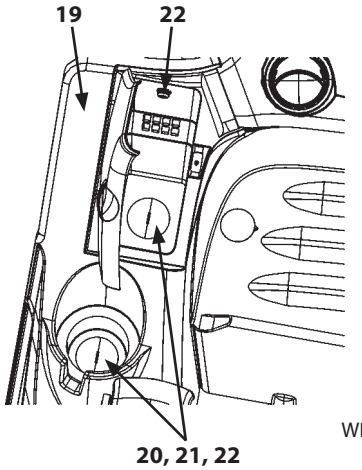


WDAA-03-01-052



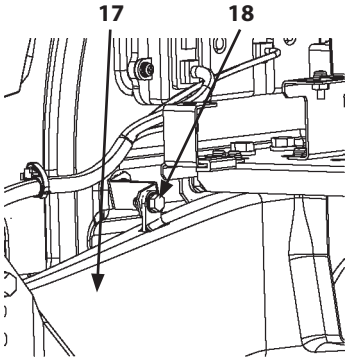
WDAA-03-01-053

Detail A



WDAA-03-01-062

Detail B



WDAA-03-01-065

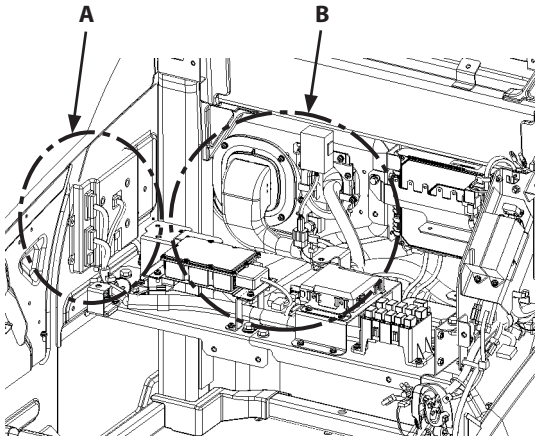
9. Open cover (1).
10. Remove caps (20) (2 used). Remove seals (21) (2 used) and screws (22) (3 used). Remove cover (19).
11. Remove bolts, washers (6) (2 used) and washers (7) (2 used).

    : 13 mm
12. Remove caps (8) (3 used). Remove rubbers (9) (3 used) and screws (10) (3 used). Remove cover (5).
13. Remove caps (3) (2 used). Remove screws (4) (2 used). Remove cover (2) and duct (13).
14. Remove bolts, washers (15) (2 used).

    : 17 mm
15. Remove bolt, washer (14). Remove cover (16).

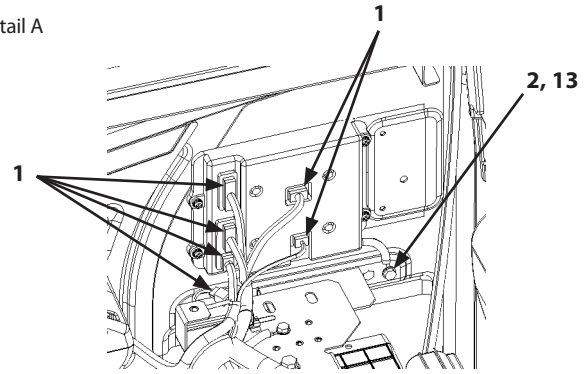
    : 13 mm
16. Remove screws (11) (2 used). Remove duct (12).
17. Remove bolt, washer (18). Remove duct (17).

    : 13 mm



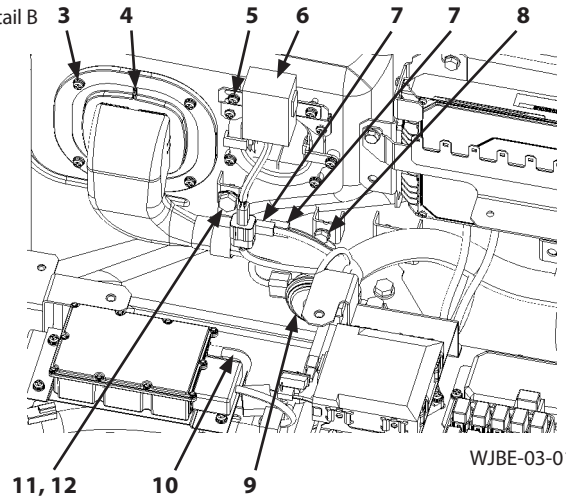
WJBE-03-01-008

Detail A



WJBE-03-01-009

Detail B



WJBE-03-01-010

5. Connect cable (10).
6. Install horn (9) with bolt, washer (8).

   : 13 mm

   : 10 N·m (1 kgf·m, 7.4 lbf·ft)
7. Install clip (12) and bolt, washer (11).

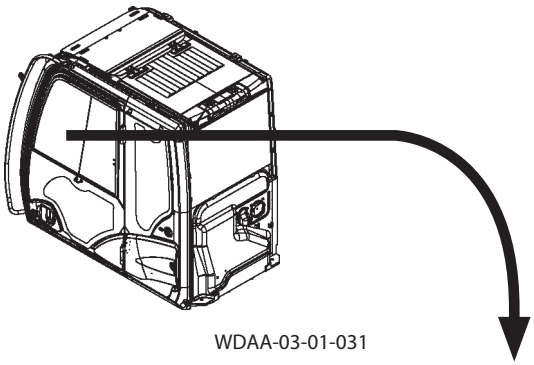
   : 17 mm

   : 50 N·m (5 kgf·m, 37 lbf·ft)
8. Connect connectors (7) (2 used).
9. Install controller (6) with screws (5) (2 used).
10. Install connector (4) with screws (3) (4 used).
11. Install ground (13) with bolt, washer (2).

    : 13 mm

    : 10 N·m (1 kgf·m, 7.4 lbf·ft)
12. Connect connectors (1) (6 used).

Unit: mm

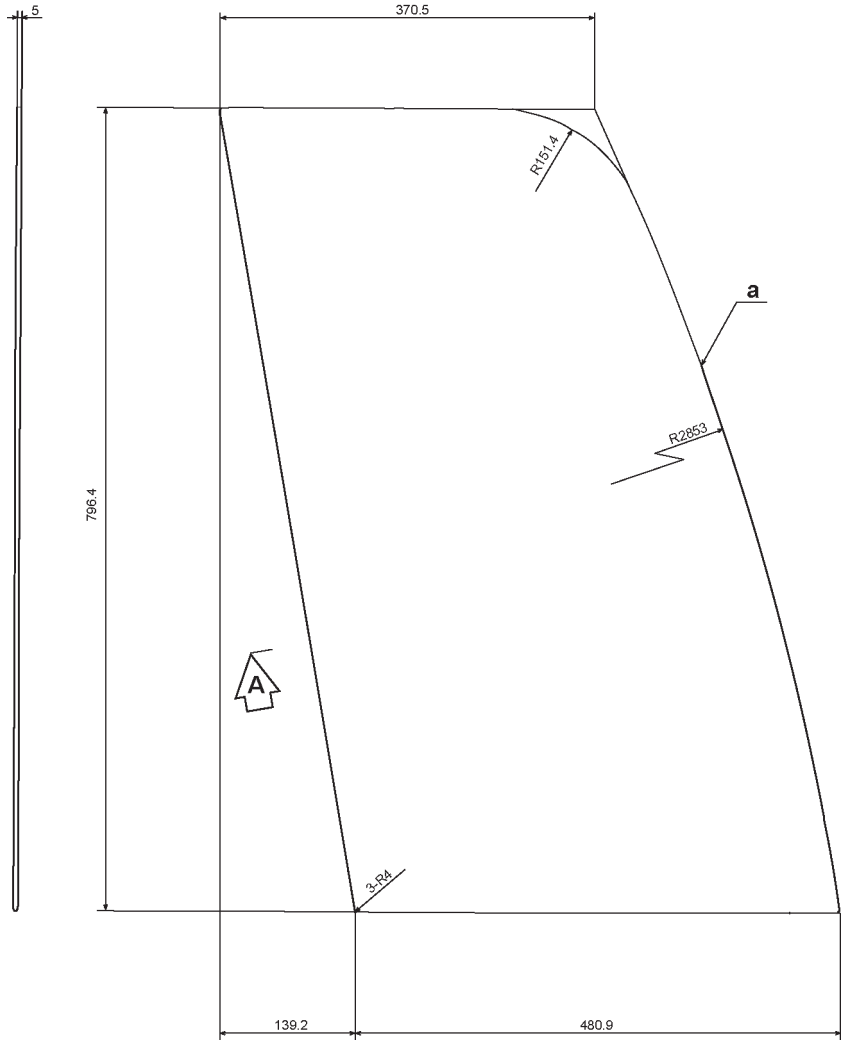


WDAA-03-01-031

Section A



WDAA-03-01-004

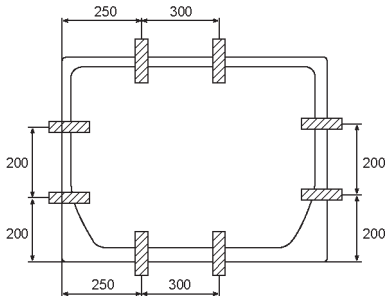


a - Chamfer along the Periphery

WDAA-03-01-003

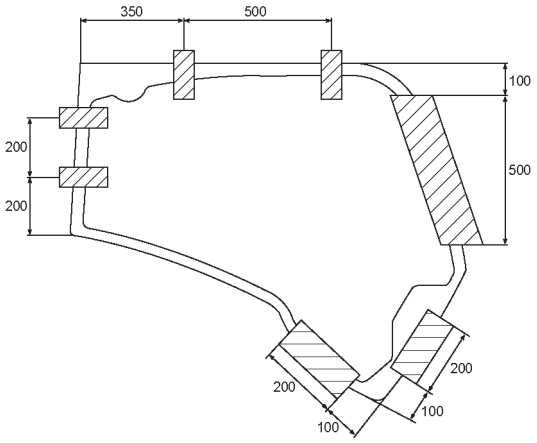
Unit: mm

Rear Glass



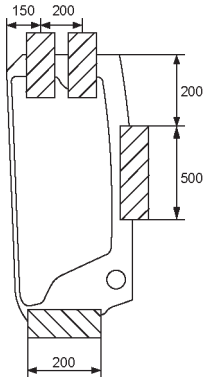
WDAA-03-01-039

Right-Hand Glass



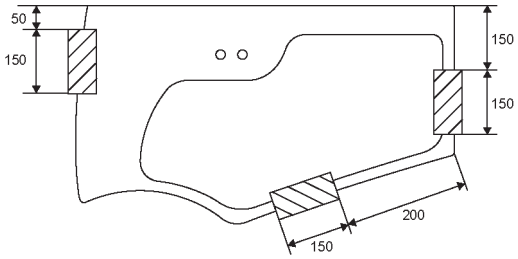
WDAA-03-01-040

Rear Left-Hand Glass



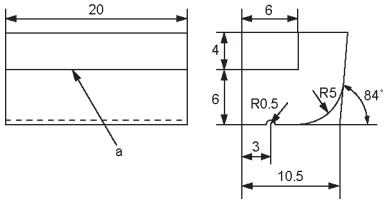
WDAA-03-01-041

Lower Door Glass



WDAA-03-01-042

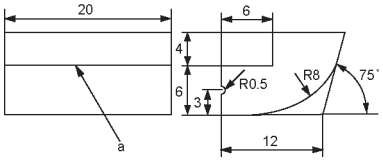
Spacer A



WDAA-03-01-043

a - Two-Side Adhesive Tape

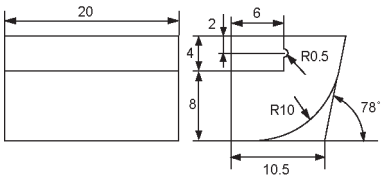
Spacer B



WDAA-03-01-044

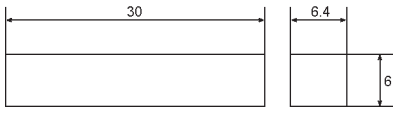
a - Two-Side Adhesive Tape

Spacer C



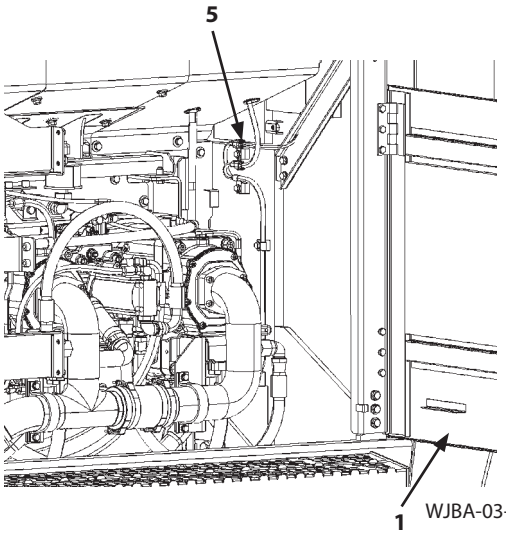
WDAA-03-01-045

Dam Rubber



WDAA-03-01-046

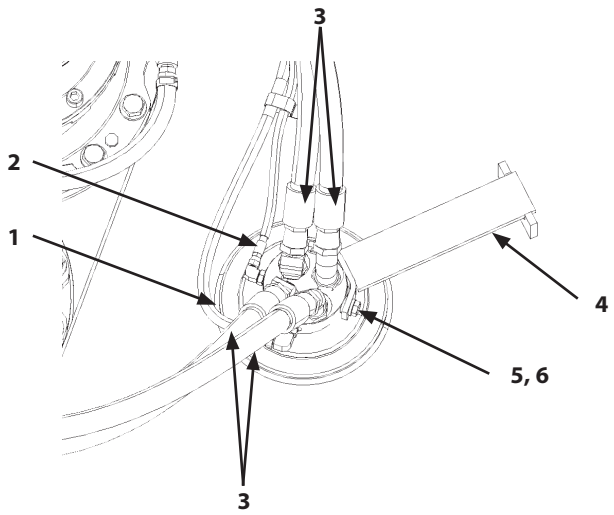
Removal and Installation of Counterweight



WJBA-03-02-001

Removal

1. Set the machine position for inspection and maintenance. (Refer to W1-6-1.)
2. Open door (1).
3. Disconnect connector (5).



WJBA-03-03-002

5. Install stopper (4) with washers (6) (4 used) and bolts (5) (2 used).

   : 22 mm

   : 140 N·m (14 kgf·m, 103 lbf·ft)

6. Connect hose (2).

   : 17 mm

   : 25 N·m (2.5 kgf·m, 18.5 lbf·ft)

7. Connect hose (1).

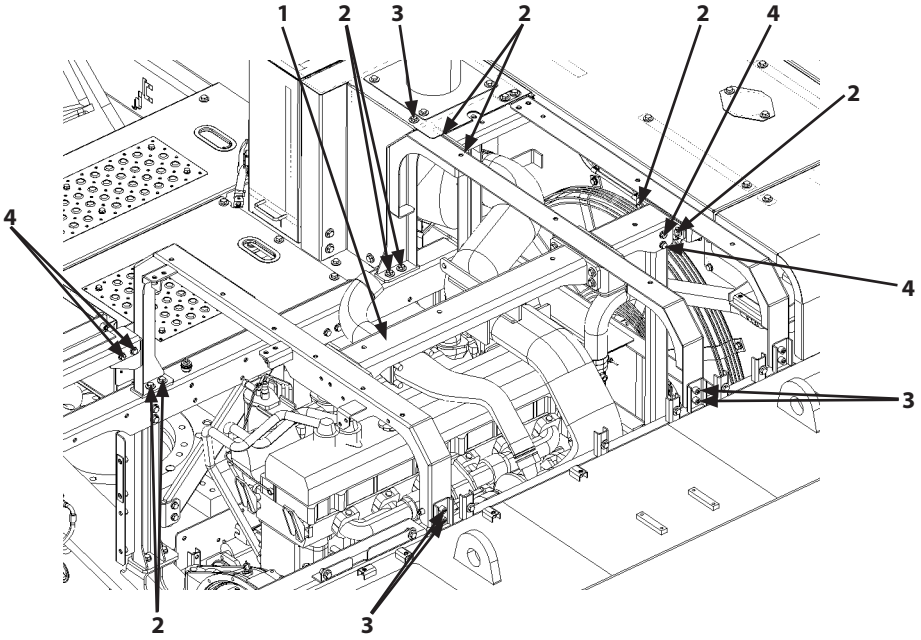
   : 27 mm

   : 80 N·m (8 kgf·m, 59 lbf·ft)

8. Connect hoses (3) (4 used).

   : 41 mm

   : 200 N·m (20 kgf·m, 148 lbf·ft)



WJBF-03-04-004

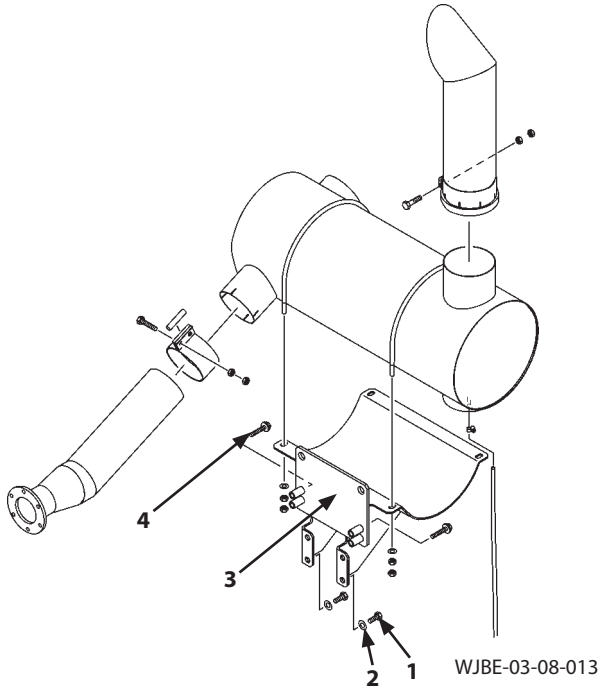
CAUTION: The beam (1) assembly weight: 70 kg (155 lb)

26. Attach the nylon slings onto the beam (1) assembly. Hoist and hold the beam (1) assembly.
27. Remove bolts, washers (2) (8 used).

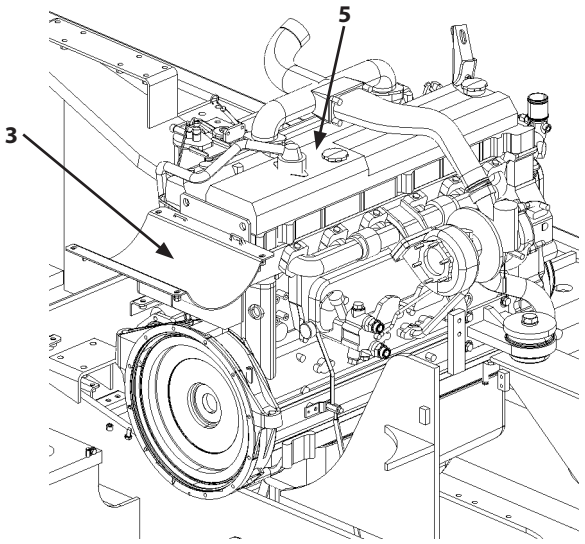
    : 19 mm
28. Remove bolts, washers (3) (5 used).

    : 19 mm
29. Remove bolts, washers (4) (4 used). Remove the beam (1) assembly.

    : 19 mm



WJBE-03-08-013



WJBE-03-04-009

72. Remove bolts (1) (4 used) and washers (2) (4 used).

    : 22 mm

73. Remove bolts, washers (4) (4 used). Remove bracket (3).

    : 19 mm

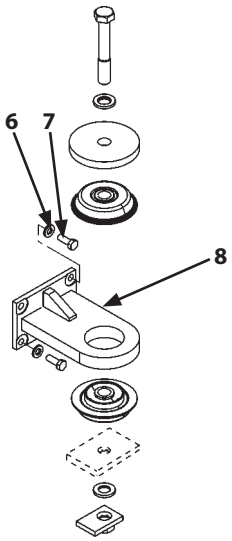
74. Remove bolts (7) (4 used) and washers (6) (4 used) at the counterweight side. Remove bracket (8).

NOTE: LOCTITE # 262 has been applied onto bolts (7) (4 used).

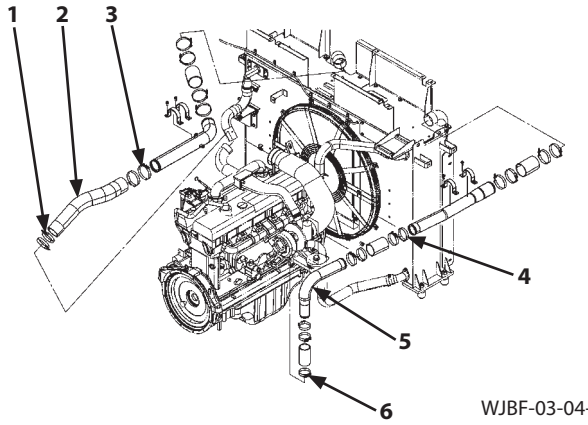
    : 22 mm

75. Remove bracket (8) at the front attachment side in the same way as step 74.

76. Remove the adapter with engine (5) attached if necessary.



WJBE-03-04-010



WJBF-03-04-005

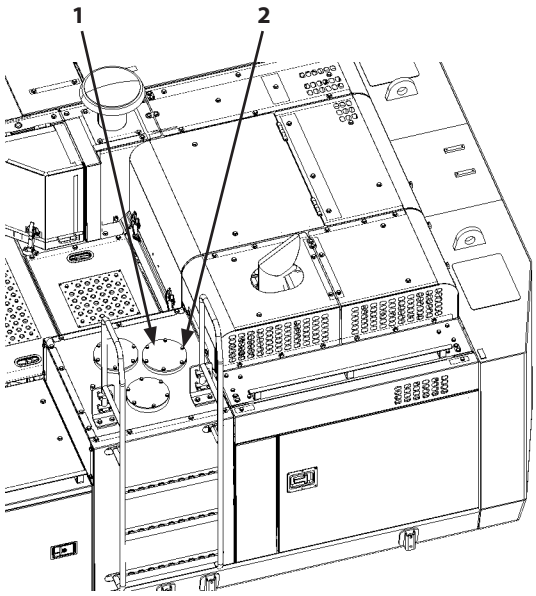
44. Connect pipe (2) with clamps (1, 3) (2 used for each).

    : 10 N·m (1 kgf·m, 7.4 lbf·ft)

45. Connect the pipe (5) assembly with clamps (4) (2 used) and clamp (6).

    : 10 N·m (1 kgf·m, 7.4 lbf·ft)

Replacement of Radiator and Oil Cooler



WJBF-03-08-001

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.)

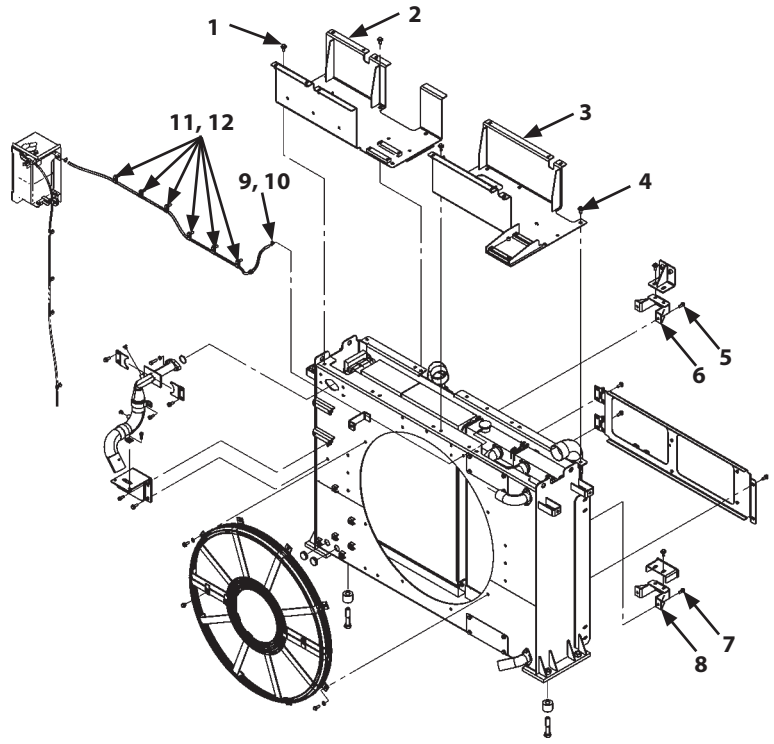
CAUTION: Bleed air from the hydraulic oil tank. (Refer to W1-4-1.)

2. Remove bolts, washers (2) (6 used). Remove cover (1).

: 17 mm

3. Drain off hydraulic oil by using an oil feed pump.

NOTE: Total oil amount: 750 L (198 US gal)



WJBF-03-05-012

35. Remove bolts, washers (11) (6 used) and clips (12) (6 used).

    : 19 mm

CAUTION: Cover (2) weight: 35 kg (78 lb)

36. Remove bolts, washers (1) (6 used). Remove cover (2).

    : 19 mm

CAUTION: Cover (3) weight: 34 kg (75 lb)

37. Remove bolts, washers (4) (6 used). Remove cover (3).

    : 19 mm

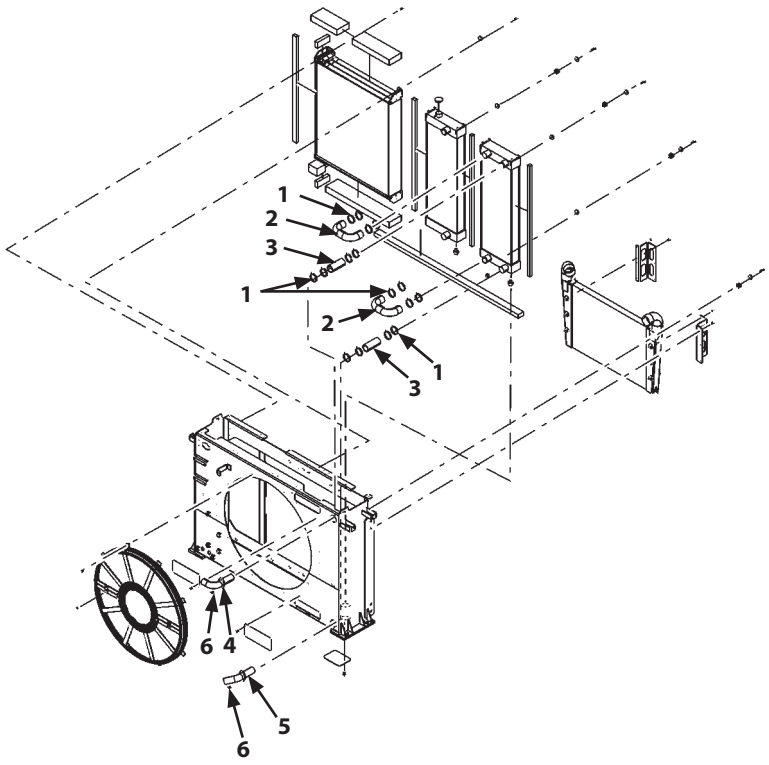
38. Remove clamp (9). Disconnect hose (10).

39. Remove bolts, washers (5) (2 used). Remove the bracket (6) assembly.

    : 19 mm

40. Remove bolts, washers (7) (2 used). Remove the bracket (8) assembly.

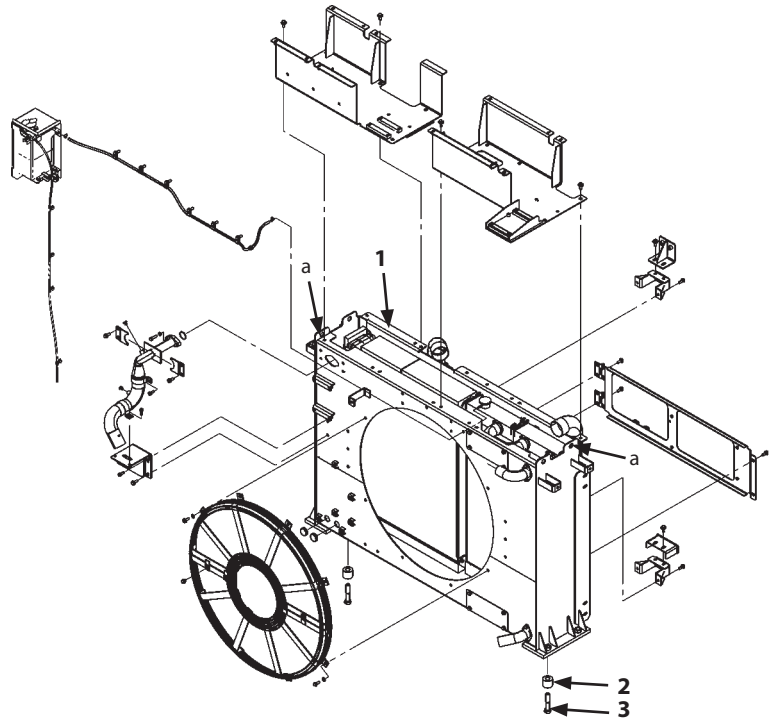
    : 19 mm



WJBF-03-05-002

64. Remove clamps (1) (16 used). Disconnect hoses (2, 3) (2 used for each).
65. Remove bolts (6) (4 used). Disconnect pipes (4, 5).

: 19 mm



a- Lifting Hole

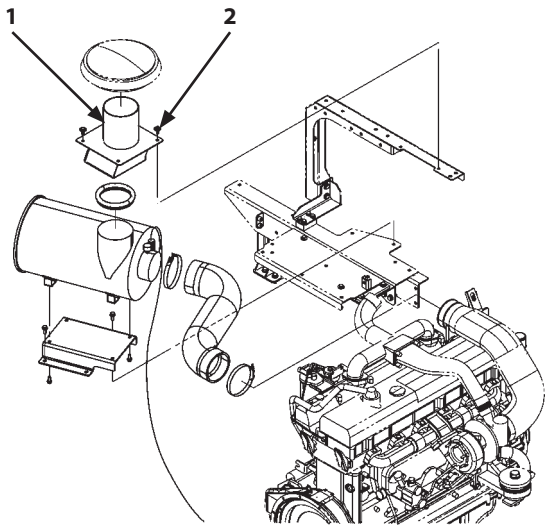
WJBF-03-05-012

CAUTION: The radiator (1) assembly weight: 600 kg (1330 lb)

31. Install shackles (2 used) to lifting holes (a) (2 places) of the radiator (1) assembly. Attach the nylon slings onto the shackles. Hoist the radiator (1) assembly.
32. Install the radiator (1) assembly with spacers (2) (4 used) and bolts (3) (4 used).

: 36 mm

: 950 N·m (95 kgf·m, 700 lbf·ft)

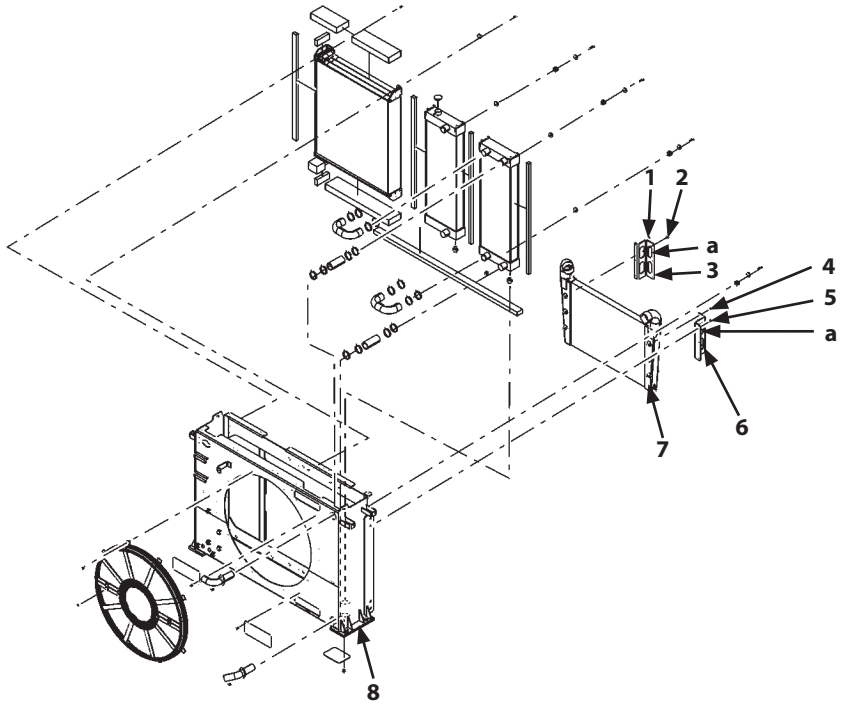


WJBF-03-05-011

61. Install the duct (1) assembly with bolts, washers (2) (4 used).

: 17 mm

: 50 N·m (5 kgf·m, 37 lbf·ft)



a- Lifting Hole

WJBF-03-05-002

Installation

1. Install plates (3, 6) with bolts, washers (2, 4) (3 used for each).

   : 19 mm

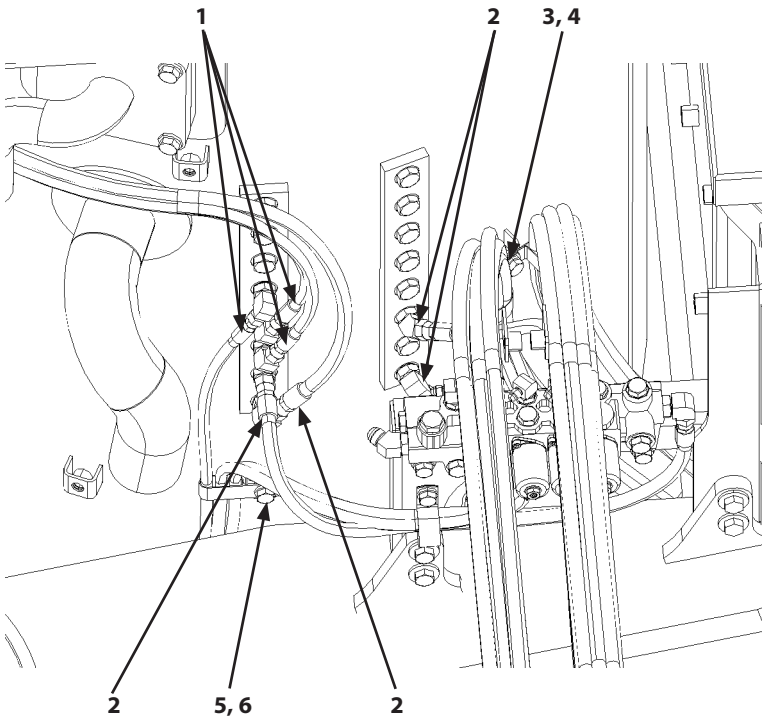
   : 73±10 N·m (7.3±1 kgf·m, 54±7.4 lbf·ft)

CAUTION: Intercooler (7) weight: 40 kg (89 lb)

2. Install shackles (2 used) to lifting holes (a) (2 places) of plates (3, 6). Attach the nylon slings onto shackles. Hoist intercooler (7). Hoist and install intercooler (7) while avoiding touch with radiator (8).
3. Install bolts, washers (1, 5) (3 used for each).

   : 19 mm

   : 89±34 N·m (8.9±3.4 kgf·m, 66±25 lbf·ft)



WJBF-03-06-008

34. Remove bolt, washer (5). Remove clip (6).

    : 17 mm

35. Remove bolt, washer (3). Remove clips (4) (2 used).

    : 17 mm

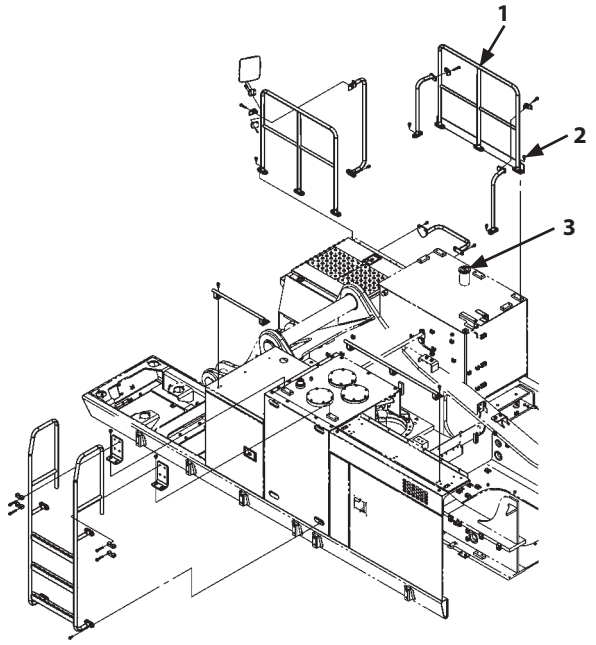
36. Disconnect hoses (1) (3 used).

    : 17 mm

37. Disconnect hoses (2) (4 used).

    : 19 mm

Removal and Installation of Fuel Tank



WJBF-03-06-003

CAUTION: Fuel is highly flammable. Never bring a fire close to fuel.

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

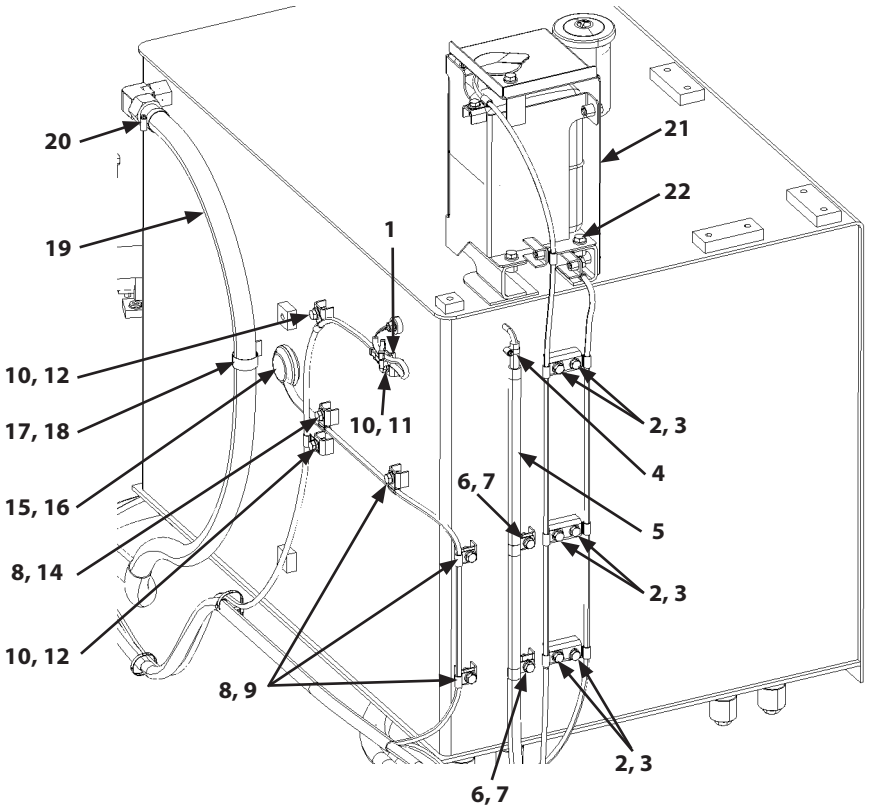
1. Set the machine position for inspection and maintenance. (Refer to W1-6-1.)
2. Remove cap (3).
3. Place a container. Drain off fuel by using an oil feed pump.

NOTE: Oil amount: 920 L (243 US gal)

CAUTION: The handrail (1) assembly weight: 24 kg (53 lb)

4. Attach the nylon slings onto the handrail (1) assembly. Hoist and hold the handrail (1) assembly.
5. Remove bolts, washers (2) (10 used). Remove the handrail (1) assembly.

: 19 mm



WJBF-03-07-002

4. Connect hose (19) with clamp (20).
5. Install clip (18) and bolt, washer (17).

   : 17 mm

   : 50 N·m (5 kgf·m, 37 lbf·ft)
6. Connect connectors (16) (2 used).
7. Install cap (15).
8. Install clip (14), clips (9) (3 used), and bolts, washers (8) (4 used).

   : 17 mm

   : 50 N·m (5 kgf·m, 37 lbf·ft)
9. Connect connector (1).
10. Install clip (11), clips (12) (2 used), and bolts, washers (10) (3 used).

    : 17 mm

    : 50 N·m (5 kgf·m, 37 lbf·ft)
11. Connect hose (5) with clamp (4).
12. Install clips (7) (2 used) and bolts, washers (6) (2 used).

    : 17 mm

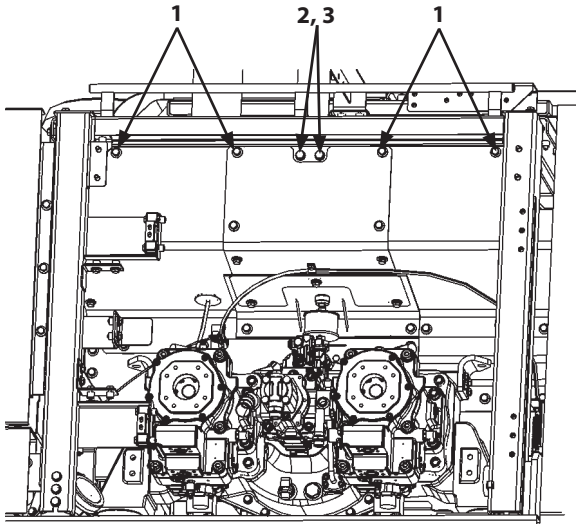
    : 50 N·m (5 kgf·m, 37 lbf·ft)
13. Install the coolant reservoir (21) assembly with bolts, washers (22) (2 used).

    : 19 mm

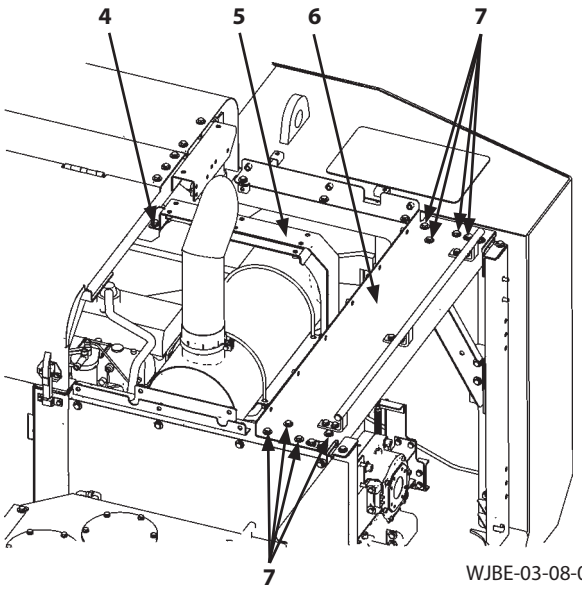
    : 90 N·m (9 kgf·m, 66 lbf·ft)
14. Install clips (3) (6 used) and bolts, washers (2) (6 used).

    : 17 mm

    : 50 N·m (5 kgf·m, 37 lbf·ft)



WJBE-03-08-010



WJBE-03-08-009

13. Remove bolts (2) (2 used) and washers (3) (2 used).

    : 22 mm

14. Remove bolts, washers (4) (2 used). Remove support (5).

    : 19 mm

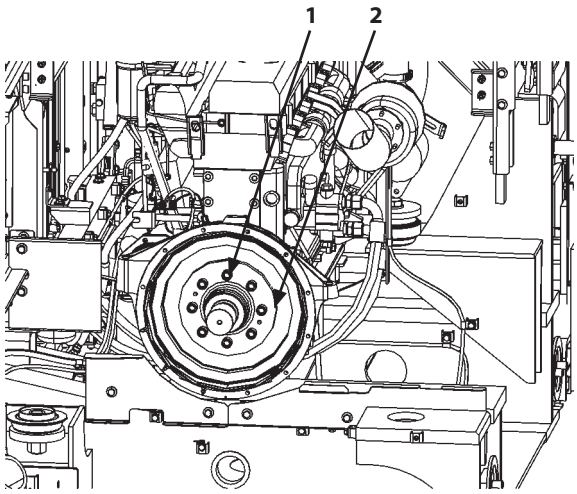
CAUTION: The cover (6) assembly weight: 28 kg (62 lb)

15. Remove bolts, washers (1) (4 used).

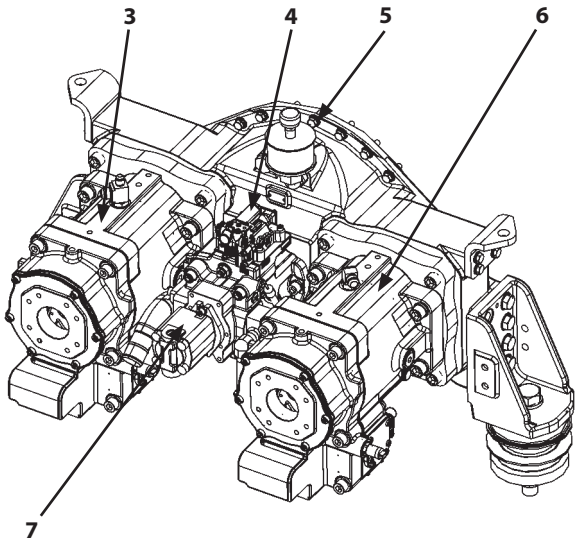
    : 19 mm

16. Remove bolts, washers (7) (8 used). Remove the cover (6) assembly.

    : 19 mm



WJBE-03-08-019

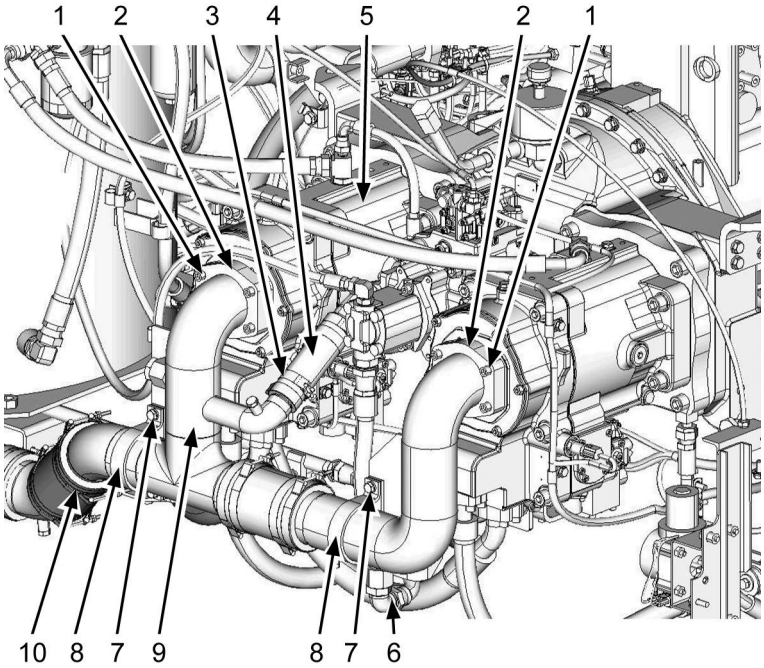


WJBE-03-08-017

80. Remove the adapters with main pumps (3, 6), pilot pump (7), fan pump (4), and pump transmission (5) attached if necessary.
81. Remove socket bolts (1) (8 used). Remove coupling (2).

NOTE: LOCTITE #262 has been applied onto socket bolts (1) (8 used).

: 17 mm



WJBF-03-08-005

CAUTION: The pipe (9) assembly weight: 22 kg (49 lb)

57. Attach the nylon slings onto the pipe (9) assembly. Hoist the pipe (9) assembly.
58. Install O-rings (2) (2 used) to the pipe (9) assembly. Install socket bolts (1) (8 used).

    : 10 mm

    : 90 N·m (9 kgf·m, 66 lbf·ft)
59. Install the pipe (9) assembly with clamps (8) (2 used) and bolts, washers (7) (4 used).

    : 17 mm

    : 50 N·m (5 kgf·m, 37 lbf·ft)
60. Install clamps (10) (2 used).

    : 10 N·m (1 kgf·m, 7.4 lbf·ft)
61. Connect hose (4) with clamps (3) (2 used).
62. Connect the both ends of hose (6).

    : 41 mm

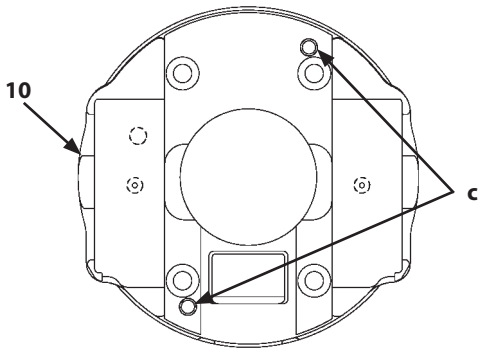
    : 200 N·m (20 kgf·m, 148 lbf·ft)

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.

15. Remove retaining ring (07) from gear (02). Remove coupling (06) from gear (02) by using a bar and a hammer. Remove retaining ring (07) from gear (02).
16. Remove ball bearings (04, 43) from gear (02) by using a puller.

26. Remove socket bolts (14) (4 used). Evenly install the bolts (M8, Pitch 1.25 mm) (2 used) to screw holes (c) (2 places) on plate (10). Float plate (10).
27. Remove plate (10) from casing (01).

    : 8 mm



WJBA-03-09-009

c- Screw Hole

28. Remove socket bolts (59) (6 used). Remove stopper (54) from casing (01).

    : 6 mm

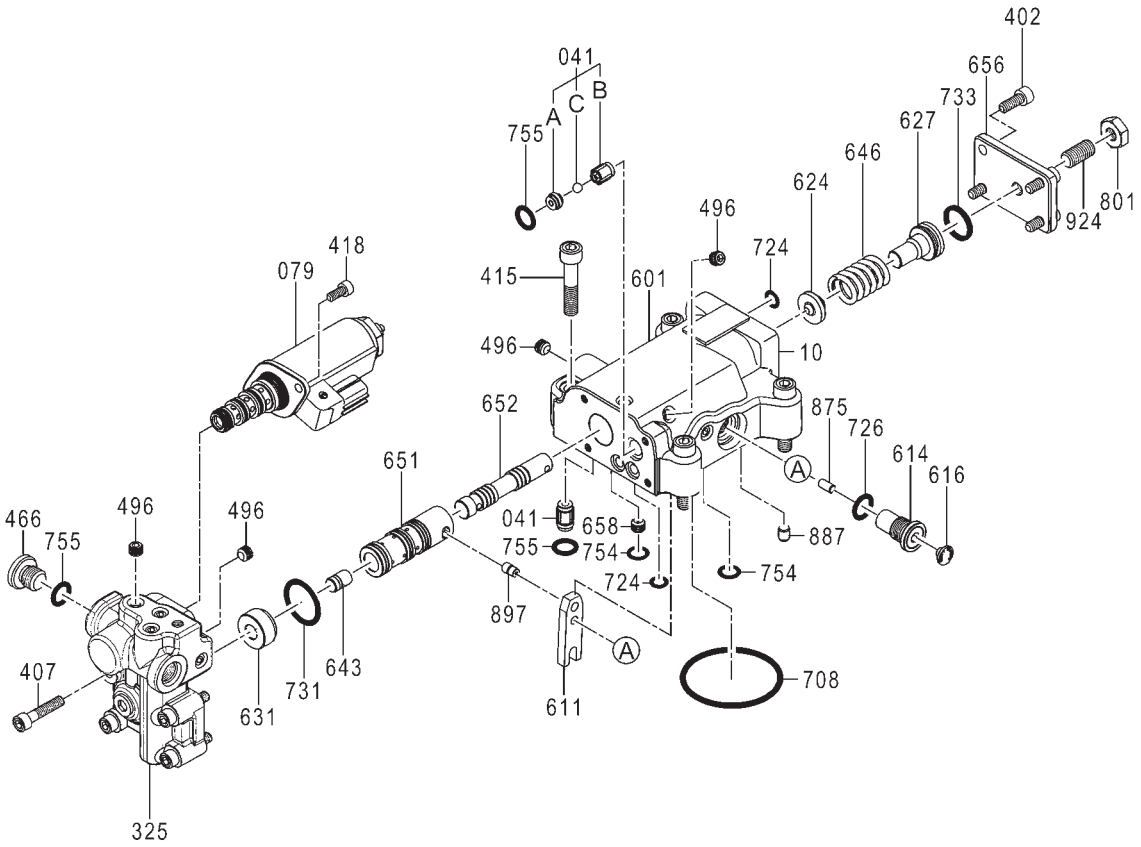
29. Remove O-ring (55) from stopper (54).
30. Remove socket bolts (59) (6 used). Remove stopper (56) from casing (01).

    : 6 mm

31. Remove O-ring (57) from stopper (56).
32. Remove servo piston (16) from casing (01).

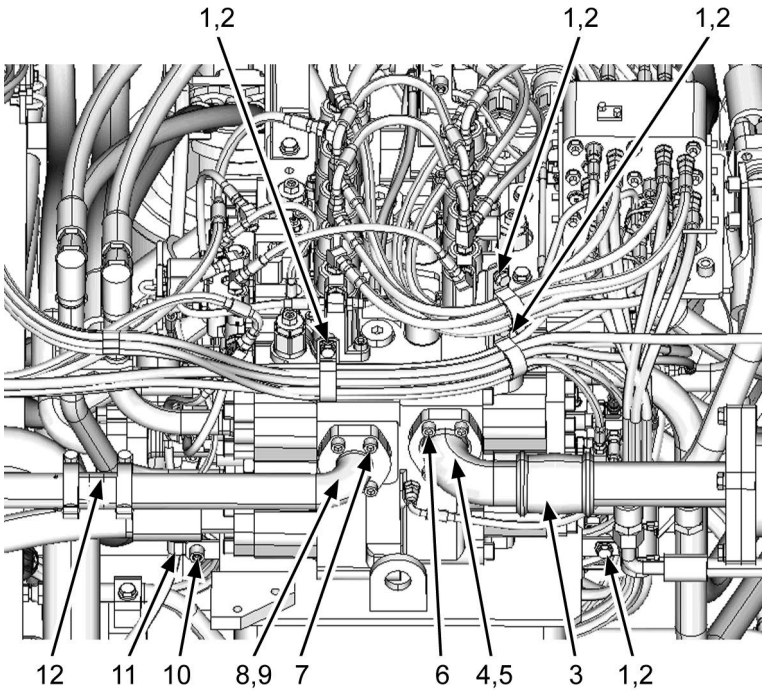
00- Casing
02- Sleeve
03- Spool
05- Piston
06- Cylinder
07- O-Ring (2 Used)
09- Front Cover
10- Adjusting Screw
11- Nut
13- Stopper
14- Inner Stopper
15- O-Ring
16- Rear Cover
17- Nut
18- Nut
20- Spring
22- Socket Bolt (8 Used)
24- Plug (2 Used)
26- Plug (4 Used)
27- O-Ring (4 Used)
39- Solenoid Valve Block
40- O-Ring
41- O-Ring (2 Used)
42- O-Ring
43- Socket Bolt (4 Used)
46- Plug
47- O-Ring
50- Socket Bolt (4 Used)
52- Pressure Sensor

Disassembly of Regulator for Fan Pump



WJBC-03-09-011

041A- Seat (2 Used)
041B- Stopper (2 Used)
041C- Steel Ball (2 Used)
079- Pump Control Solenoid Valve
325- Casing
402- Socket Bolt (4 Used)
407- Socket Bolt (4 Used)
415- Socket Bolt (4 Used)
418- Socket Bolt (2 Used)
466- Plug
496- Plug (9 Used)
601- Casing
611- Feedback Lever
614- Support Plug
616- Plug
624- Spring Seat
627- Rod
631- Sleeve
643- Piston
646- Spring
651- Sleeve
652- Spool
656- Cover
658- Plug
708- O-Ring
724- O-Ring (5 Used)
726- O-Ring
731- O-Ring
733- O-Ring
754- O-Ring (2 Used)
755- O-Ring (3 Used)
801- Nut
875- Pin
887- Pin
897- Pin
924- Adjusting Screw



WJBF-03-09-002

9. Remove bolts, washers (1) (4 used) and clips (2) (4 used).

   : 17 mm

10. Remove bolt, washer (10) and clip (11).

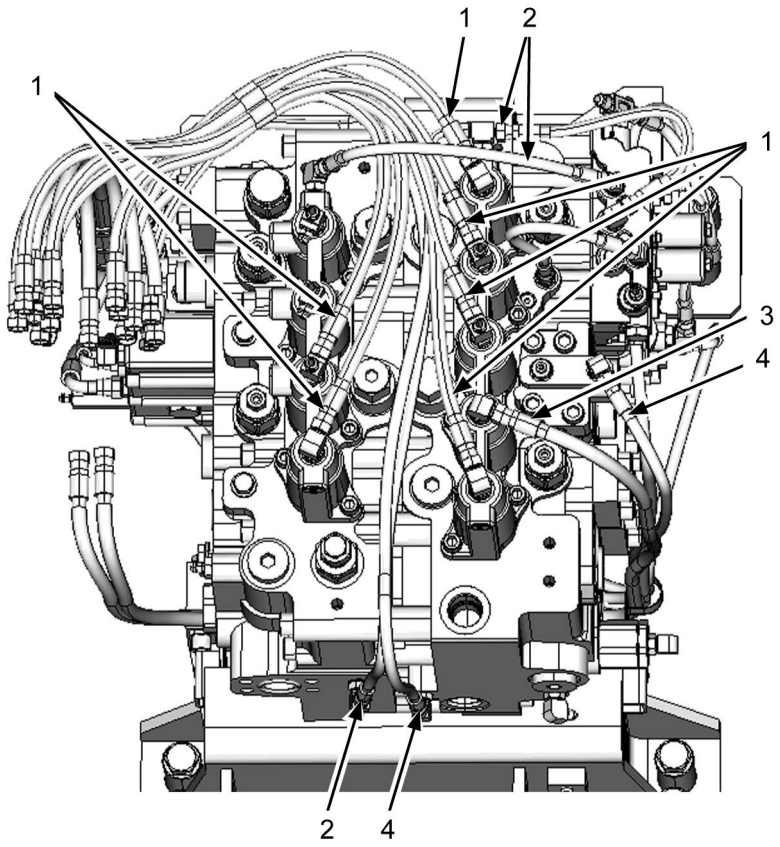
    : 17 mm

11. Place a container under the control valve.
12. Remove coupling (3).
13. Remove socket bolts (6) (4 used). Disconnect pipe (4). Remove O-ring (5).

    : 10 mm

14. Remove coupling (12).
15. Remove socket bolts (7) (4 used). Disconnect pipe (8). Remove O-ring (9).

    : 10 mm



WJBF-03-09-012

56. Disconnect hoses (2) (3 used).

    : 17 mm

57. Disconnect hoses (1) (6 used).

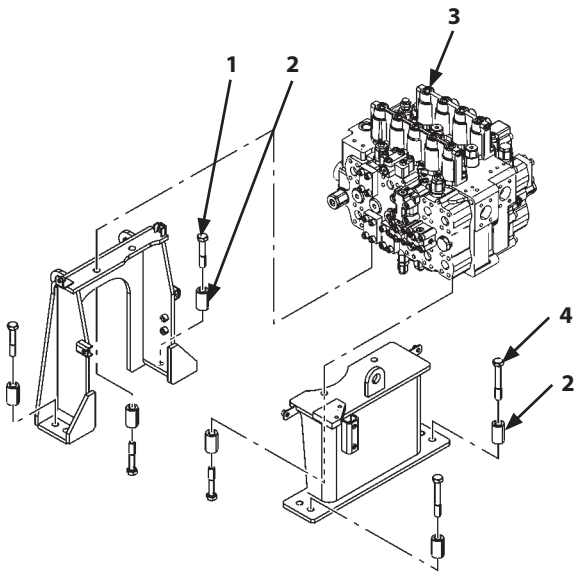
    : 19 mm

58. Disconnect the both ends of hoses (4) (2 used).

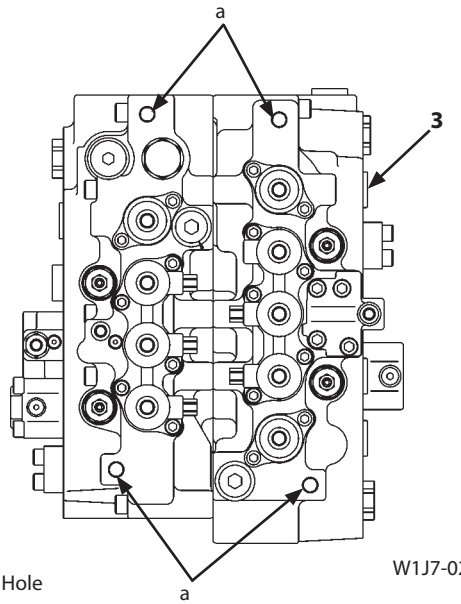
    : 17 mm

59. Disconnect the both ends of hose (3).

    : 19 mm



WJBE-03-09-019



a- Lifting Hole

W1J7-02-05-017

CAUTION: The control valve (3) assembly weight: 500 kg (1110 lb)

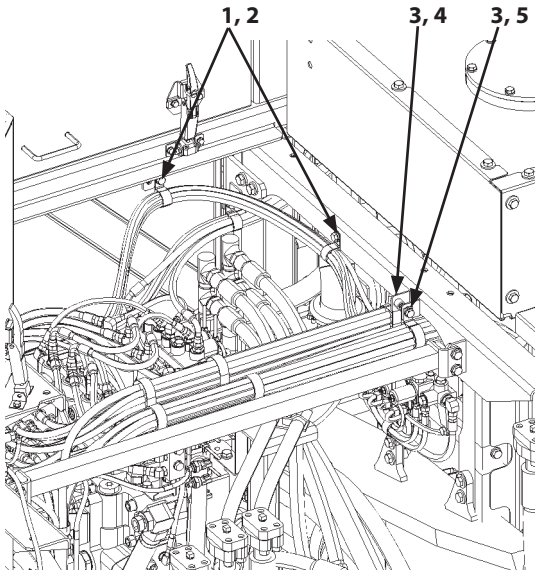
16. Install eyebolts (M12, Pitch 1.75 mm) (4 used) to lifting holes (a) (4 places) of control valve (3). Attach the nylon slings onto the eyebolts (4 used). Hoist the control valve (3) assembly.
17. Apply LOCTITE #262 onto bolts (4) (4 used). Install the control valve (3) assembly with spacers (2) (4 used) and bolts (4) (4 used).

    : 30 mm

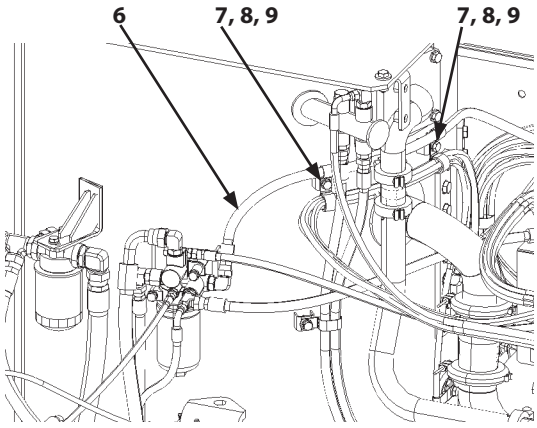
    : 400 N·m (40 kgf·m, 300 lbf·ft)
18. Apply LOCTITE #262 onto bolts (1) (4 used). Install spacers (2) (4 used) and bolts (1) (4 used).

    : 30 mm

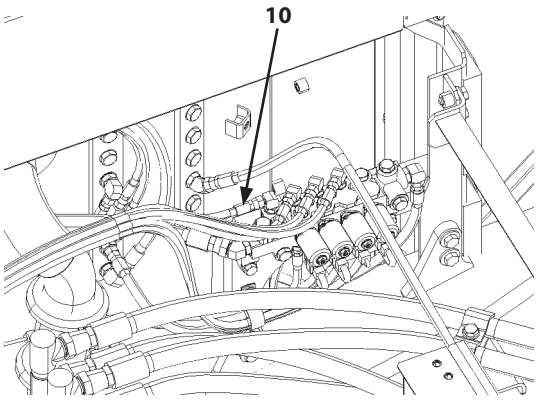
    : 400 N·m (40 kgf·m, 300 lbf·ft)



WJBF-03-09-008



WJBF-03-09-009



WJBF-03-09-010

61. Connect hose (6).

    : 27 mm

    : 80 N·m (8 kgf·m, 59 lbf·ft)

62. Install clips (8, 9) (2 used for each) and bolts, washers (7) (2 used).

    : 17 mm

    : 50 N·m (5 kgf·m, 37 lbf·ft)

63. Install clips (4, 5) and bolts, washers (3) (2 used).

    : 17 mm

    : 50 N·m (5 kgf·m, 37 lbf·ft)

64. Connect hose (10).

    : 17 mm

    : 25 N·m (2.5 kgf·m, 18.5 lbf·ft)

65. Install clips (2) (2 used) and bolts, washers (1) (2 used).

    : 17 mm

    : 50 N·m (5 kgf·m, 37 lbf·ft)

1- Housing
2- Spool
3- Spool
4- Spool
5- Spool
6- Spool (2 Used)
7- Cap (2 Used)
8- Backup Ring (2 Used)
9- O-Ring (2 Used)
10- Spacer (2 Used)
11- Spring (2 Used)
12- Check Valve (2 Used)
13- Housing
14- Spool
15- Spool
16- Spool
17- Cap
18- Spring
19- O-Ring (13 Used)
20- Spacer
21- Spool
22- Main Relief Valve
23- Cover
24- O-Ring (18 Used)
25- Spring Guide (18 Used)
26- Spring (9 Used)
27- Cap (9 Used)
28- Cover
29- Cover
30- Cap (8 Used)
31- O-Ring (11 Used)
32- Socket Bolt (26 Used)
33- Plug (4 Used)
34- Cover (2 Used)
35- Socket Bolt (4 Used)
36- Flange (4 Used)
37- O-Ring (4 Used)
38- Socket Bolt (16 Used)
39- Check Valve
40- Overload Relief Valve (6 Used)
41- O-Ring (14 Used)
42- Backup Ring (10 Used)
43- O-Ring (10 Used)
44- Cap (2 Used)
45- O-Ring (4 Used)
46- Cap (2 Used)
47- Backup Ring (7 Used)
48- Spring (10 Used)
49- Check Valve (7 Used)
50- Socket Bolt (8 Used)
51- Washer (14 Used)
52- Socket Bolt (6 Used)
53- O-Ring
54- O-Ring (2 Used)
55- O-Ring (5 Used)
56- O-Ring (6 Used)
57- Boom Overload Relief Valve
58- Cap (2 Used)
59- Cap (2 Used)
60- O-Ring (12 Used)
61- O-Ring (4 Used)
62- Backup Ring (5 Used)
63- Cap
64- Piston (2 Used)
65- Cap (2 Used)
66- Cap (2 Used)
67- O-Ring (5 Used)
68- Spring (2 Used)
69- Spool (2 Used)
70- Cap
71- Cap
72- Check Valve (2 Used)
73- Cap (2 Used)
74- Check Valve (2 Used)
75- Cap
76- Sleeve (2 Used)
77- Piston (2 Used)
78- O-Ring (2 Used)
79- Backup Ring (2 Used)
80- Spool (2 Used)
81- Spring
82- O-Ring (3 Used)
83- Spring Guide (2 Used)
84- Sleeve
85- O-Ring (2 Used)
86- Cap (2 Used)
87- Boom 2 Anti-Drift Valve
88- Socket Bolt (5 Used)
89- Spring (3 Used)
90- Poppet (3 Used)
91- O-Ring (2 Used)
92- Spring
93- Sleeve
94- O-Ring (3 Used)
95- Flow Rate Control Valve
96- Flow Rate Control Valve (2 Used)
97- Socket Bolt (12 Used)
98- Spring (3 Used)
99- Piston (3 Used)
100- Check Valve (3 Used)
101- Poppet
102- Poppet
103- Check Valve
104- Piston
105- Cap
106- Backup Ring
107- O-Ring
108- Check Valve
109- Spring
110- Check Valve
111- Arm Rod Anti-Drift Valve
112- Flow Rate Control Valve Assembly
113- Socket Bolt (6 Used)
114- Piston
115- Cap
116- Backup Ring
117- O-Ring (2 Used)
118- Spring (2 Used)
119- Check Valve
120- Poppet
121- Spring
122- Cap
123- Cap
124- Spool
125- Auxiliary Flow Combiner Valve
126- O-Ring
127- Cap
128- Backup Ring
129- Spacer
130- Check Valve

a- Load Check Valve
b- Arm Regeneration Cut Valve
c- Bucket Regeneration Cut Valve
d- Check Valve
e- Flow Combiner Valve
f- Check Valve
g- Bypass Shut-Out Valve
h- Load Check Valve
i- Load Check Valve
j- Boost Check Valve
k- Load Check Valve
l- Check Valve
m- Check Valve
n- Check Valve
o- Load Check Valve
p- Load Check Valve
q- Bypass Shut-Out Valve

Assembly of Flow Rate Control Valve (95)

17. Install O-rings (60, 94) to flow rate control valve (95).
18. Install poppet (101), check valve (100), spring (98), and piston (99) to housing (13).
19. Install flow rate control valve (95) to housing (13) with socket bolts (97) (4 used).

    : 12 mm

    : 140 N·m (14 kgf·m, 103 lbf·ft)
20. Install O-ring (45) to cap (58).
21. Install cap (58) to housing (13).

    : 17 mm

    : 400 N·m (40 kgf·m, 300 lbf·ft)

Assembly of Check Valve (f)

22. Install backup ring (47) and O-ring (19) to cap (46).
23. Install check valve (49) and spring (48) to housing (13).
24. Install cap (46) to housing (13).

    : 14 mm

    : 350 N·m (35 kgf·m, 260 lbf·ft)

Assembly of Flow Combiner Valve (e)

25. Install O-ring (19) to cap (17).
26. Install spool (21), spacer (20), and spring (18) to housing (13).
27. Install cap (17) to housing (13).

    : 46 mm

    : 250 N·m (25 kgf·m, 185 lbf·ft)

Assembly of Check Valve (d)

28. Install backup ring (62) and O-rings (61, 19) to cap (63).
29. Install spring (48) and check valve (49) to housing (13).
30. Install cap (63) to housing (13).

    : 14 mm

    : 350 N·m (35 kgf·m, 260 lbf·ft)

Assembly of Bucket Regeneration Cut Valve (c)

31. Install O-ring (85) to cap (86).
32. Install cap (86) and O-ring (82) to sleeve (84).

    : 12 mm

    : 180 N·m (18 kgf·m, 133 lbf·ft)
33. Install O-ring (78), backup ring (79), and piston (77) to sleeve (76).
34. Install spring guide (83), spring (81), spool (80), and sleeve (76) to sleeve (84).
35. Install sleeve (84) to housing (13).

    : 36 mm

    : 180 N·m (18 kgf·m, 133 lbf·ft)

Disassembly of Load Check Valve (p)

45. Remove cap (71) from housing (1).

    : 14 mm

46. Remove check valve (72), spring (48), and check valve (49) from housing (1).

47. Remove O-ring (19) and backup ring (47) from cap (71).

Disassembly of Bypass Shut-Out Valve (q)

48. Remove cap (65) from housing (1).

    : 46 mm

49. Remove spool (69) and spring (68) from housing (1).

50. Remove piston (64), cap (66), and O-ring (67) from cap (65).

    : 46 mm

51. Remove O-ring (67) from cap (66).

52. Remove cap (44) from housing (1).

    : 46 mm

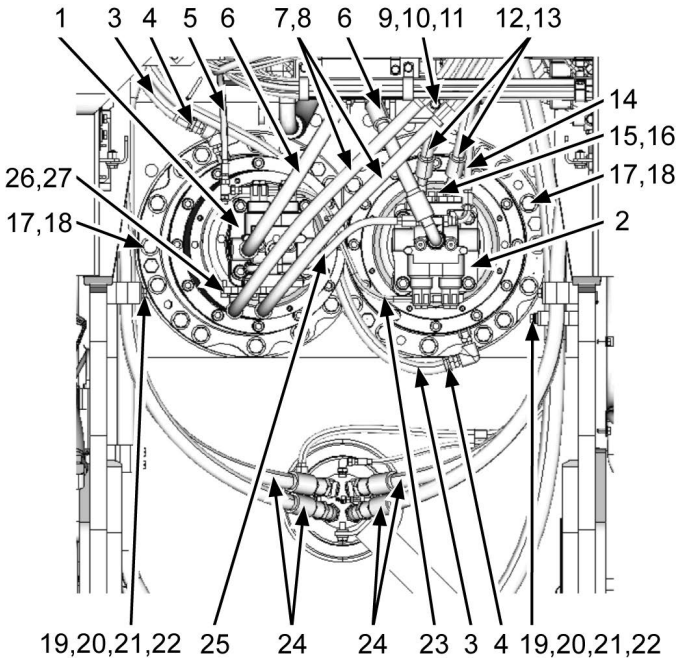
53. Remove O-ring (45) from cap (44).

54. Remove socket bolts (38) (12 used).

    : 12 mm

55. Remove flanges (36) (3 used) from housing (1).

    Remove O-rings (37) (3 used) from flanges (36) (3 used).



WJBF-03-10-001

Installation

1. Install all removed adapters to swing devices (1, 2).

CAUTION: Swing devices (1, 2) weight: 300 kg for each (665 lb)

2. Apply THREEBOND #1102 onto the main frame mounting surface of swing device (1). Attach the nylon slings onto the body of swing motor. Hoist swing device (1).
3. Install swing device (1) with washers (18) (13 used) and bolts (17) (13 used).

   : 32 mm

   : 750 N·m (75 kgf·m, 550 lbf·ft)
4. Install swing device (2) in the same way as step 2 to step 3.
5. Connect hoses (3) (2 used) with clamps (4) (2 used).
6. Connect hose (5).

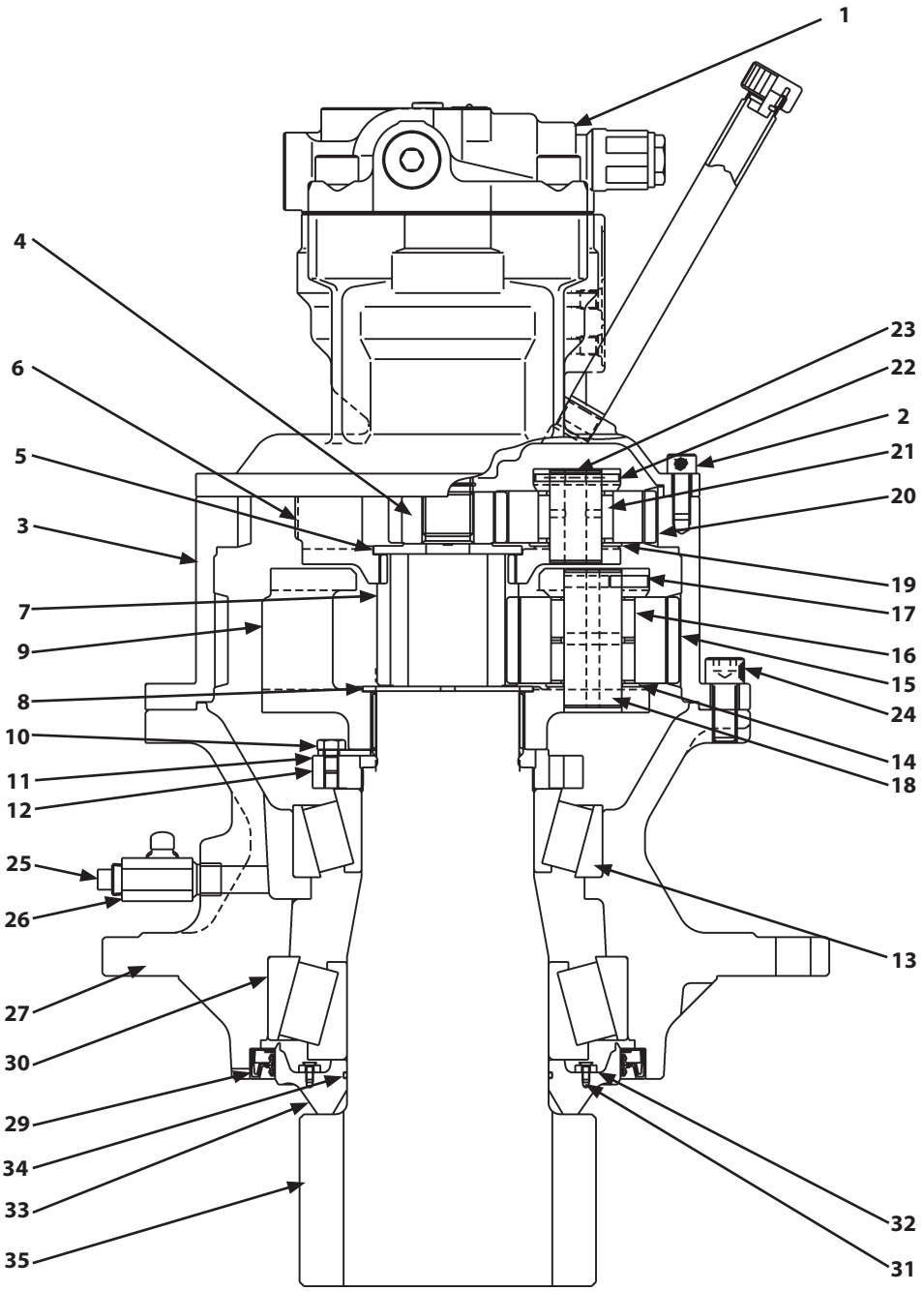
   : 19 mm

   : 30 N·m (3 kgf·m, 22 lbf·ft)
7. Connect the both ends of hose (23).

   : 19 mm

   : 30 N·m (3 kgf·m, 22 lbf·ft)

Assembly of Swing Device

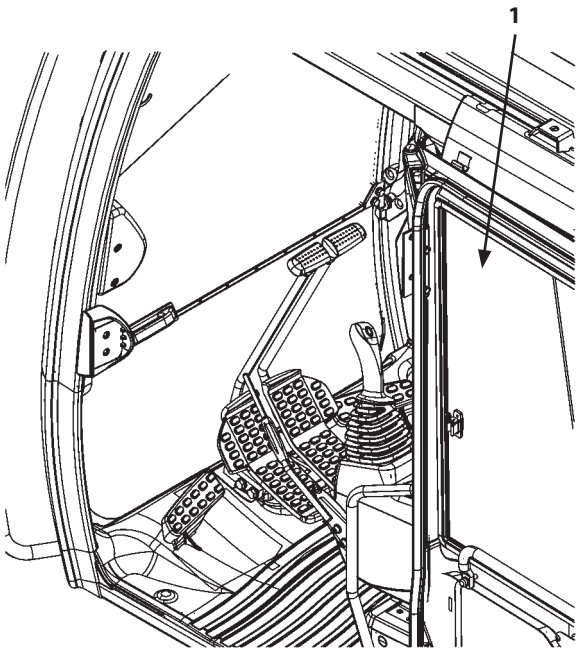


T17P-03-02-002

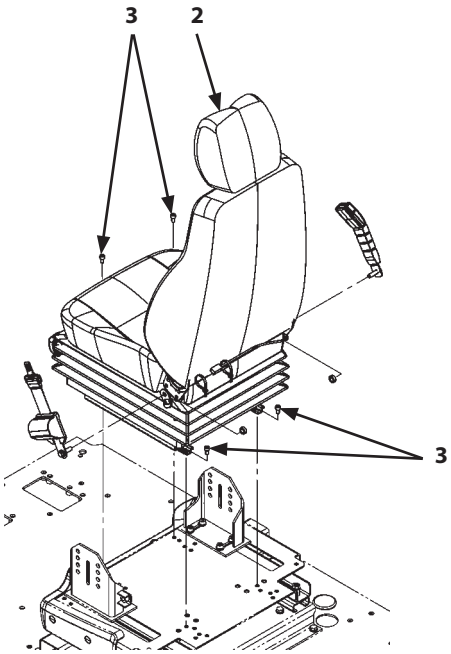
1- Motor
2- Socket Bolt (8 Used)
3- Ring Gear
4- First Stage Sun Gear
5- Thrust Plate
6- First Stage Carrier
7- Second Stage Sun Gear
8- Thrust Plate
9- Second Stage Carrier
10- Bolt (2 Used)
11- Lock Plate
12- Bearing Nut
13- Roller Bearing
14- Thrust Plate (3 Used)
15- Planetary Gear (3 Used)
16- Needle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

1- Casing
2- Oil Seal
3- Bearing
4- Shaft
5- Shoe Plate
6- Plunger (9 Used)
7- Plate
8- Retainer
9- Rotor
10- Plate (4 Used)
11- Friction Plate (3 Used)
12- O-Ring
13- Piston
14- Spring
15- Ball
16- Plug (2 Used)
17- O-Ring
18- O-Ring
19- Brake Piston
20- Spring (24 Used)
21- Valve Plate
22- Bearing
23- O-Ring
24- Plug (2 Used)
25- O-Ring (2 Used)
26- Spring (2 Used)
27- Poppet (2 Used)
28- Valve Casing
29- Socket Bolt (4 Used)
30- Plug (2 Used)
31- Relief Valve (2 Used)

Removal and Installation of Pilot Valve (Right)



WDAA-03-01-023



WJAA-03-01-013

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.)

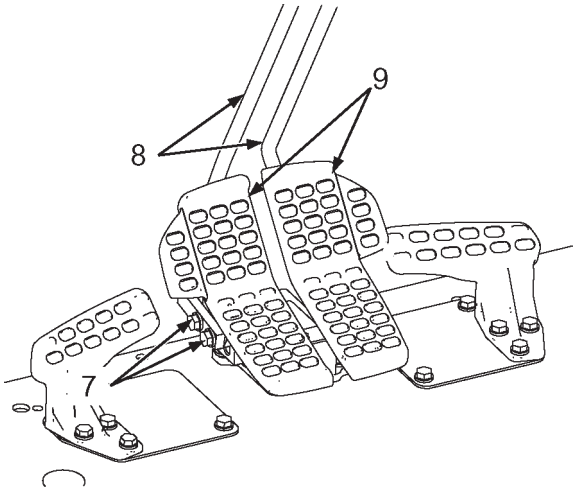
CAUTION: Bleed air from the hydraulic oil tank. (Refer to W1-4-1.)

2. Open door (1).

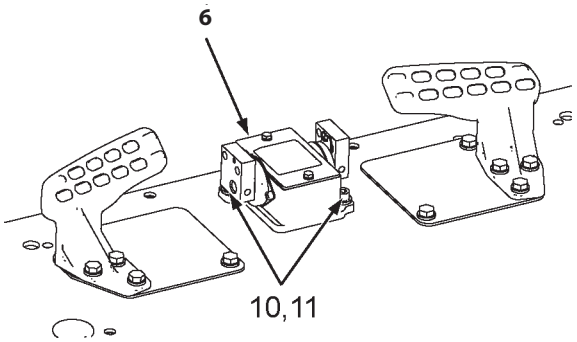
CAUTION: Seat (2) weight: 41 kg (91 lb)

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

: 13 mm



WDAA-03-12-017



WDAA-03-12-018

Installation

1. Install all removed adapters to pilot valve (6).
2. Install pilot valve (6) with washers (11) (2 used) and socket bolts (10) (2 used).

   : 8 mm

   : 50 N·m (5 kgf·m, 37 lbf·ft)
3. Install pedals (9) (2 used) and levers (8) (2 used) with bolts, washers (7) (4 used).

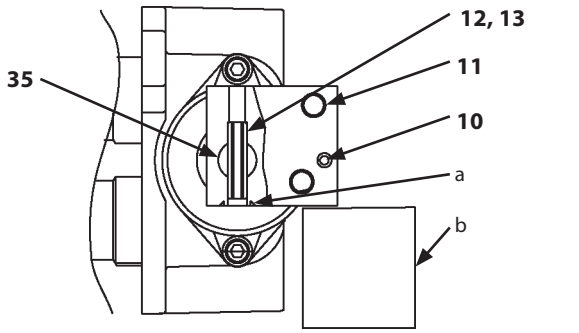
   : 17 mm

   : 50 N·m (5 kgf·m, 37 lbf·ft)

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.

IMPORTANT: Place a stand under bracket (11) and receive a reaction force. If holder (7) bears the reaction force, strong force acts on pin (35). Therefore, pin (35) may be deformed.

9. Place a stand under bracket (11).
   The inner surfaces of the spring pins (12, 13) holes on bracket (11) are stepped-shape. The spring pin can only be removed in one direction.
   Tap and remove spring pins (12, 13) from bracket (11) at the same time by using the special tool (ST 1237). Remove bracket (11) from pin (35).
   Do not remove spring pin (10) with bracket (11) attached unless necessary.
   The hole end of spring pin (10) has been crimped.



W176-02-07-019

a - Crimped Position
b - Stand

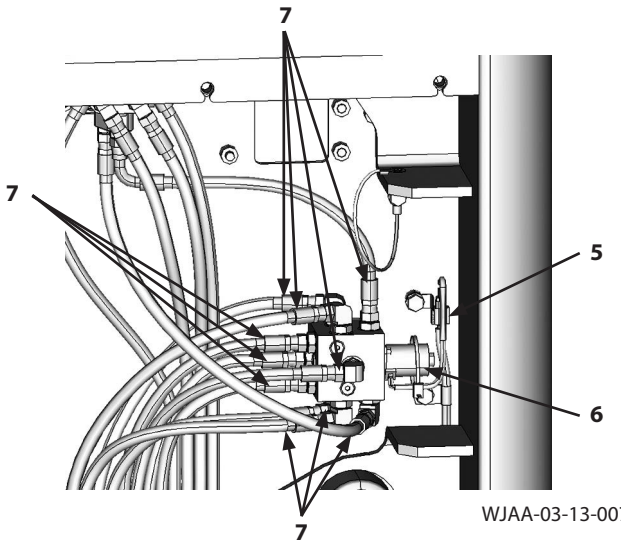
10. Remove socket bolts (9) (2 used) and spring washers (8) (2 used). Remove damper (32) and rubber seat (31) from pin (35). O-ring (34) is removed together.

    : 5 mm

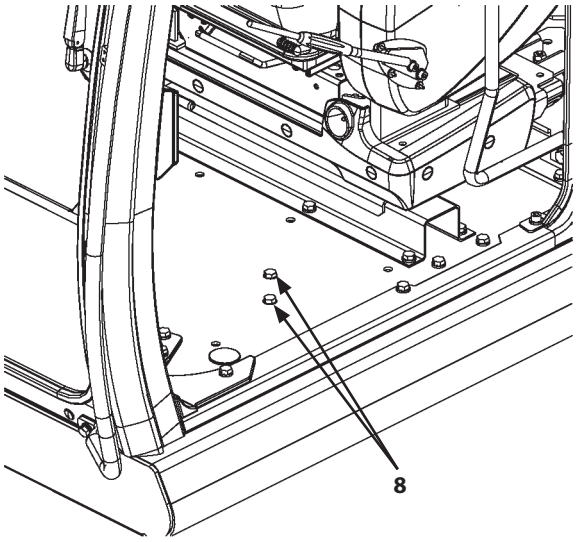
11. Remove O-ring (33) from pin (35).
12. Remove other bracket (11) in the same way as step 9 to step 11.
13. Place holder (7) with the casing (23) mounting surface up.

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.

14. The holes of spring pins (3, 4) (2 used for each) in cam (5) are stepped-shape. Tap the bottom of cam (5) and remove spring pins (3, 4) (2 used for each) from cams (5) (2 used) at the same time by using the special tool (ST 1237).
    As the holes of spring pins (3, 4) (2 used for each) are crimped, spring pins (3, 4) may feel tight when removing.



WJAA-03-13-007



WDAA-03-13-007

Installation

1. Install all removed adapters to pilot shut-off solenoid valve (6).
2. Install pilot shut-off solenoid valve (6) with bolts, washers (8) (2 used).

   : 17 mm

   : 50 N·m (5 kgf·m, 37 lbf·ft)
3. Connect hoses (7) (10 used).

   : 19 mm

   : 30 N·m (3 kgf·m, 22 lbf·ft)
4. Connect connector (5).

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

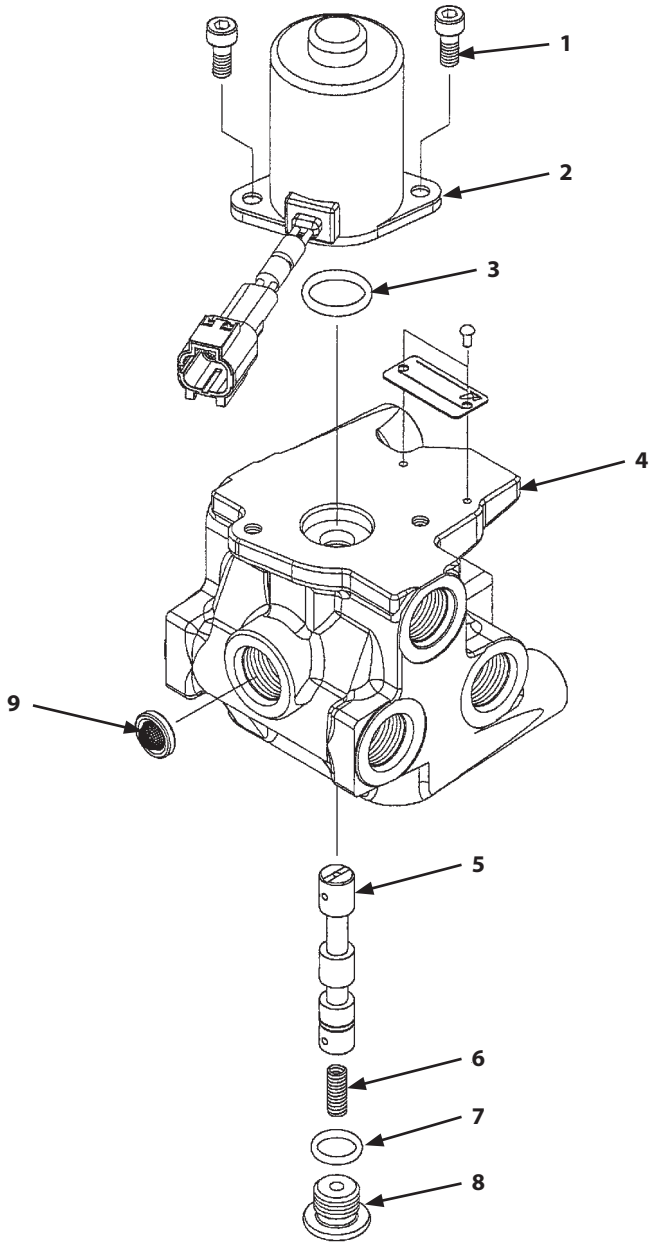
- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

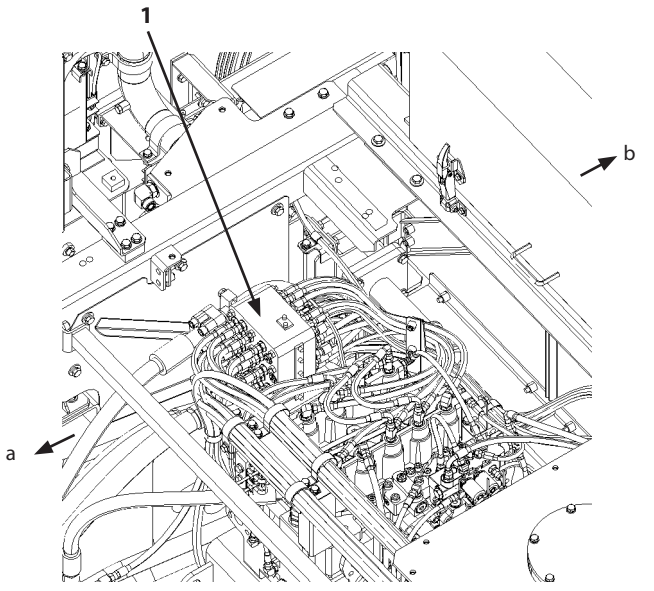
CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

Disassembly of Pilot Shut-Off Solenoid Valve



WDAA-03-13-014

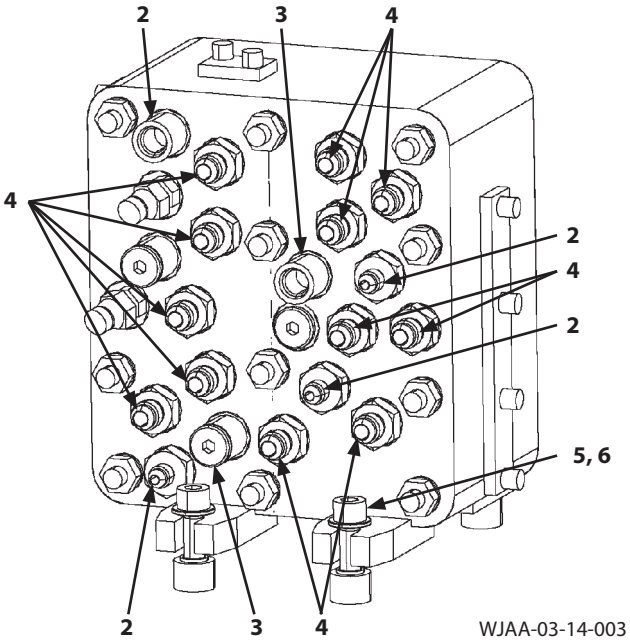
1- Socket Bolt (2 Used)
2- Solenoid
3- O-Ring
4- Body
5- Spool
6- Spring
7- O-Ring
8- Plug
9- Filter



WJBF-03-13-002

a- Pilot Valve Side b- Control Valve Side

Control Valve Side



WJAA-03-14-003

5. Disconnect hoses (4) (12 used).

   : 19 mm

6. Disconnect hoses (2) (4 used).

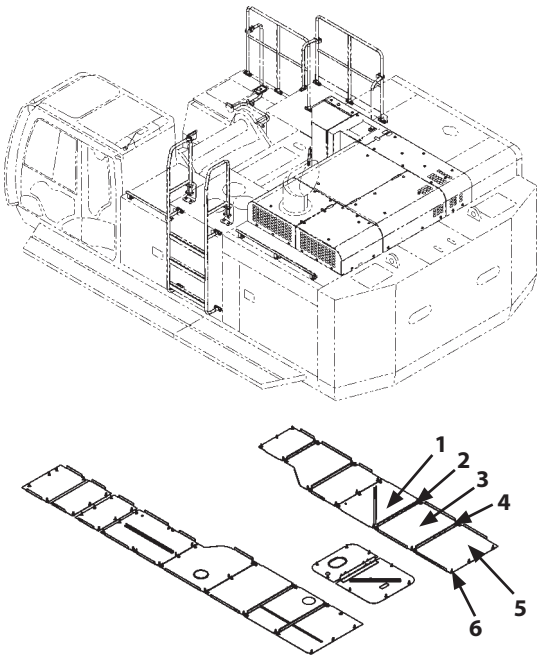
   : 17 mm

7. Disconnect connectors (3) (2 used).
8. Remove socket bolts (5) (4 used) and washers (6) (4 used). Remove signal control valve (1).

   : 8 mm

9. Remove the adapter with signal control valve (1) attached if necessary.

Removal and Installation of Fan Valve



WJBF-03-08-003

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.)

CAUTION: Remove cover (1) while holding it. Do not drop cover (1).

2. Remove bolts, washers (2) (5 used). Remove cover (1).

: 19 mm

CAUTION: Remove cover (3) while holding it. Do not drop cover (3).

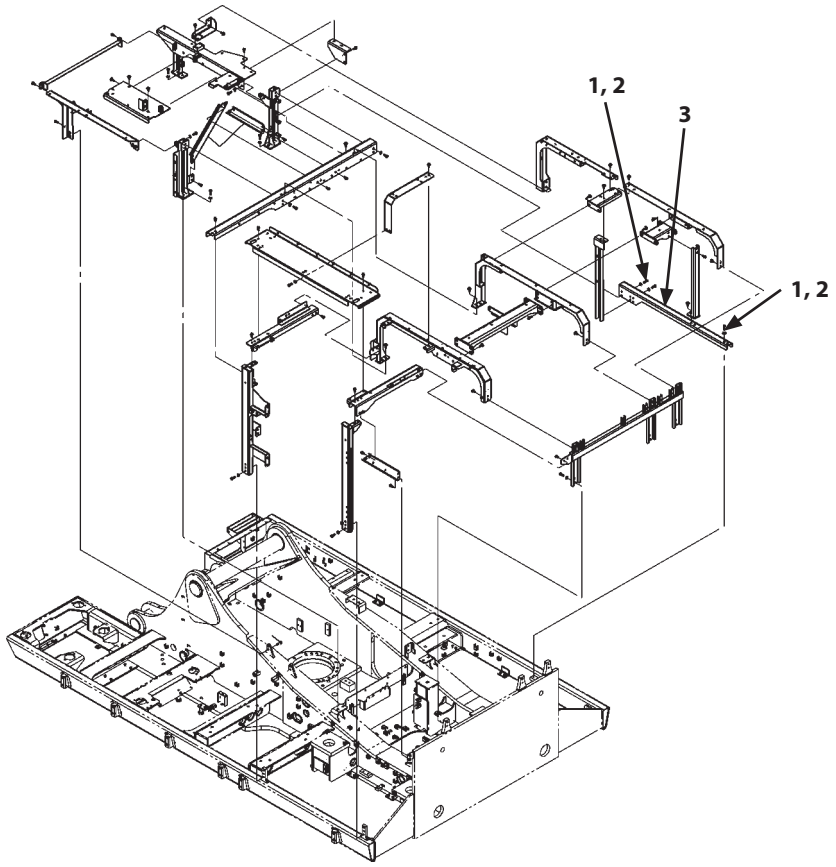
3. Remove bolts, washers (4) (4 used). Remove cover (3).

: 19 mm

CAUTION: Remove cover (5) while holding it. Do not drop cover (5).

4. Remove bolts, washers (6) (5 used). Remove cover (5).

: 19 mm

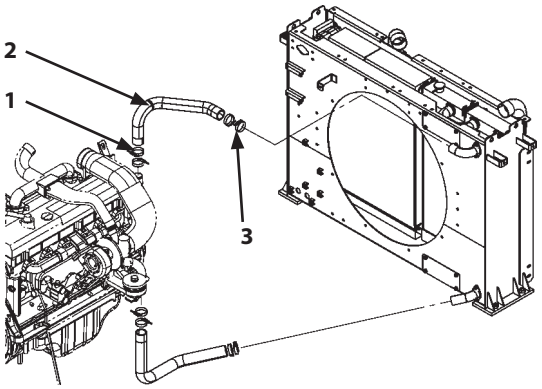


WJBF-03-05-013

CAUTION: The support (3) assembly weight: 27 kg (60 lb)

31. Attach the nylon slings onto the support (3) assembly. Hoist and hold the support (3) assembly.
32. Remove bolts (1) (4 used) and washers (2) (4 used). Remove the support (3) assembly.

: 22 mm

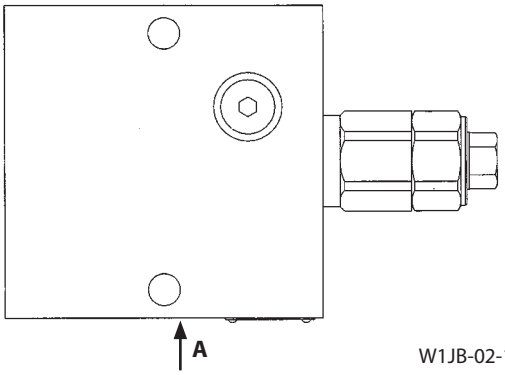


WJBF-03-04-006

11. Install hose (2) with clamps (1, 3) (2 used for each).

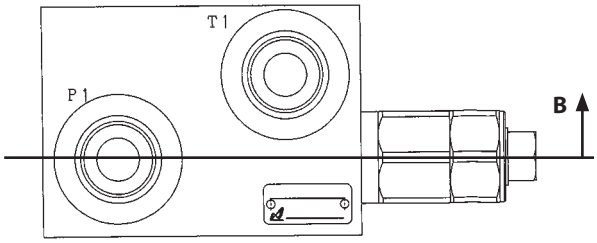
    : 10 N·m (1 kgf·m, 7.4 lbf·ft)

Structure of Fan Valve



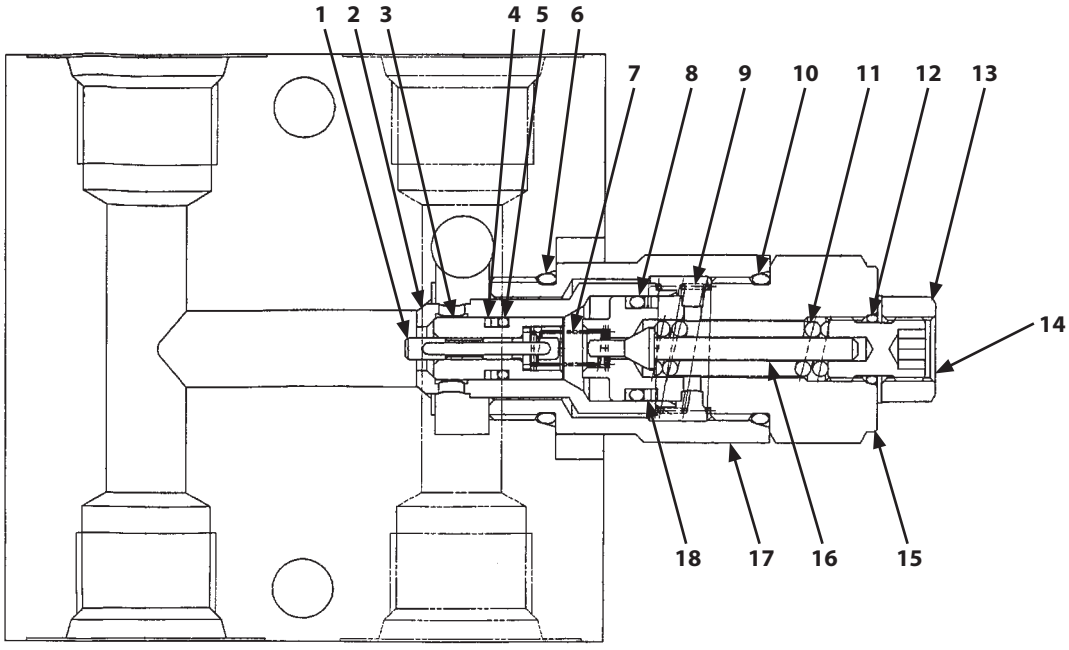
W1JB-02-13-002

View A

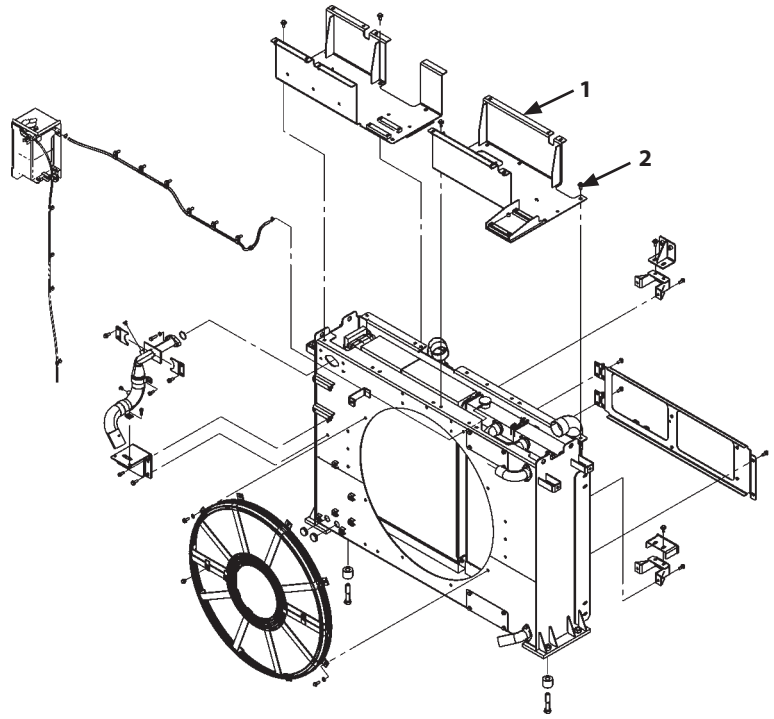


W1JB-02-13-003

Section B



W1JB-02-13-001

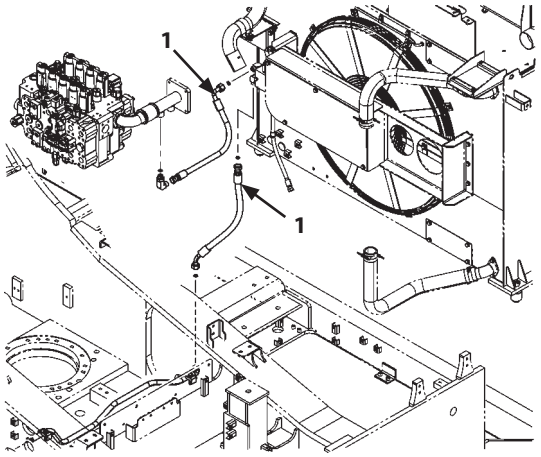


WJBF-03-05-012

CAUTION: Cover (1) weight: 34 kg (75 lb)

29. Remove bolts, washers (2) (6 used). Remove cover (1).

: 19 mm

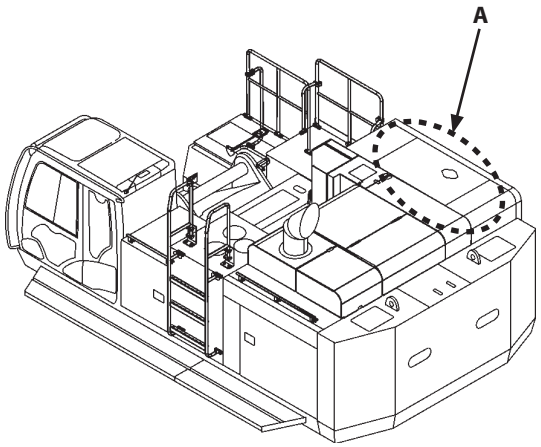


WJBF-03-05-015

11. Connect hoses (1) (2 used).

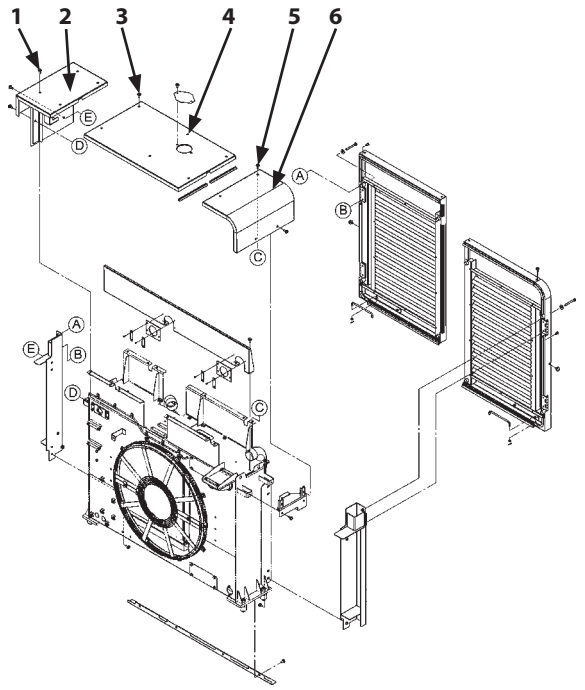
: 36 mm

: 180 N·m (18 kgf·m, 133 lbf·ft)



WJBF-03-04-001

Detail A



WJBF-03-05-001

36. Install cover (6) with bolts, washers (5) (4 used).

    : 19 mm

    : 90 N·m (9 kgf·m, 66 lbf·ft)

CAUTION: Cover (4) weight: 21 kg (47 lb)

37. Install cover (4) with bolts, washers (3) (6 used).

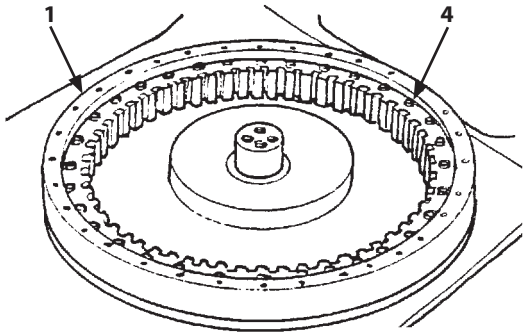
    : 19 mm

    : 90 N·m (9 kgf·m, 66 lbf·ft)

38. Install cover (2) with bolts, washers (1) (7 used).

    : 19 mm

    : 90 N·m (9 kgf·m, 66 lbf·ft)



W105-03-01-002

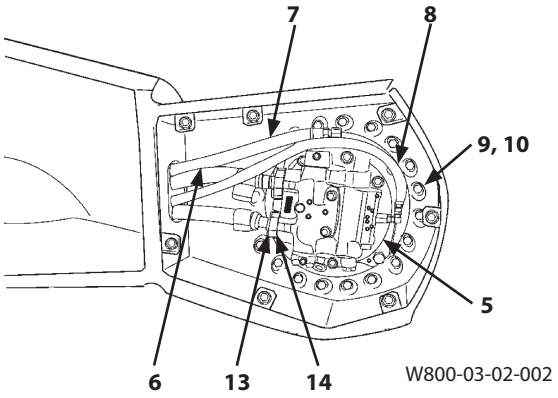
5. Install swing bearing (1) with bolts (4) (40 used).

   : 46 mm

   : 1750 N·m (175 kgf·m, 1290 lbf·ft)

6. After installing swing bearing (1), add grease (Alvania EP2 or equivalent) to grease bath.

NOTE: Grease amount: 20 L (5.3 US gal)



Installation

1. Install all removed adapters to travel device (5).

CAUTION: Travel device (5) weight: 980 kg (2170 lb)

2. Attach nylon slings onto travel device (5). Hoist travel device (5). Install travel device (5) with washers (10) (24 used) and bolts (9) (24 used).

   : 41 mm

   : 1400 N·m (140 kgf·m, 1030 lbf·ft)

3. Connect hose (8).

   : 19 mm

   : 30 N·m (3 kgf·m, 22 lbf·ft)

4. Connect hose (7).

   : 27 mm

   : 80 N·m (8 kgf·m, 59 lbf·ft)

5. Connect hoses (6) (2 used) with split flanges (14) (4 used) and socket bolts (13) (8 used).

   : 10 mm

   : 90 N·m (9 kgf·m, 66 lbf·ft)

Assembly of Travel Device

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

CAUTION: Housing (5) weight: 112 kg (250 lb)

1. Attach nylon sling onto the body of housing (5). Hoist housing (5). Place housing (5) with the motor (3) side down.

IMPORTANT: Handle floating seal (6) with care. (Refer to W4-2-5.)

2. Apply grease onto O-ring of one side of floating seal (6). Install one side of floating seal (6) to housing (5). Apply gear oil onto the whole sliding surface on floating seal (6).

NOTE: If it is difficult to install O-ring of floating seal (6), push O-ring to the periphery direction by using a bamboo spatula.

3. Evenly tap and install the inner race of roller bearing (7) to housing (5).

NOTE: Check that the inner race of roller bearing (7) is installed completely.

CAUTION: Drum (8) weight: 248 kg (550 lb)

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

IMPORTANT: Do not tap except for the outer race of roller bearing (7).

4. Install eyebolts (M27, Pitch 3.0 mm) to the bolt (16) holes (2 places) of drum (8) of on the motor (3) side. Attach nylon slings onto the eyebolts. Hoist drum (8). Place drum (8) with cover (41) side down. Evenly tap and install the outer race of roller bearing (7) to drum (8) by using a bar and a hammer.

NOTE: Check that the outer race of roller bearing (7) is installed completely.

Disassembly of Travel Motor

CAUTION: Travel motor weight: 134 kg (300 lb)

1. Attach a nylon sling onto the travel motor. Hoist the travel motor. Place the travel motor with the brake valve (29) side up.

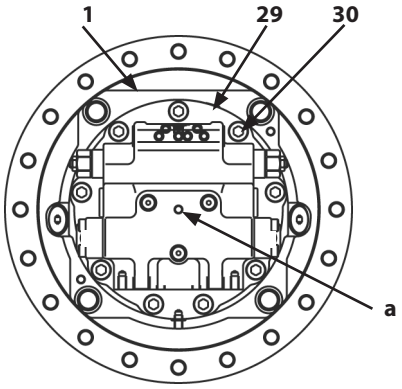
CAUTION: Brake valve (29) weight: 39 kg (86 lb)

IMPORTANT: Evenly loosen socket bolts (30) (9 used). When loosening socket bolt (30), valve housing (29) is floated from case (1) by the reaction force of springs (13, 26). At this time, record the clearance between case (1) and valve housing (29).

IMPORTANT: When removing the brake valve (29) assembly, do not drop valve plate (15).

2. Remove socket bolts (30) (9 used). Install an eyebolt (M12, Pitch 1.75 mm) to the lifting hole (a) of brake valve (29). Attach a nylon sling onto the eyebolt. Hoist brake valve (29). Remove brake valve (29) from housing (1).

: 14 mm



W16J-03-02-002

a - Lifting Hole

IMPORTANT: Do not remove roller bearing (17) unless necessary. Remove roller bearing (17) by using a small puller if necessary. As the outer race is deformed, roller bearing (17) cannot be reused.

IMPORTANT: Do not damage valve plate (15).

3. Remove valve plate (15), pin (27), and pins (28) (4 used) from brake valve (29).
4. Wrap the tape on the thrust surface of shaft (7) for roller bearing (17) in order to protect.
5. Remove springs (26) (10 used) from housing (1).
6. Remove O-ring (25) and O-rings (2) (4 used) from housing (1).

CAUTION: When removing brake piston (24), cover with a cloth in order not to fly out brake piston (24).

7. Apply air 100 to 300 kPa (1.0 to 3.0 kgf/cm^2, 15 to 44 psi) to the brake releasing oil passage in housing (1). Float and remove brake piston (24).

8. Remove socket bolts (35) (4 used) from another cap (36). Remove cap (36) from valve housing (46).

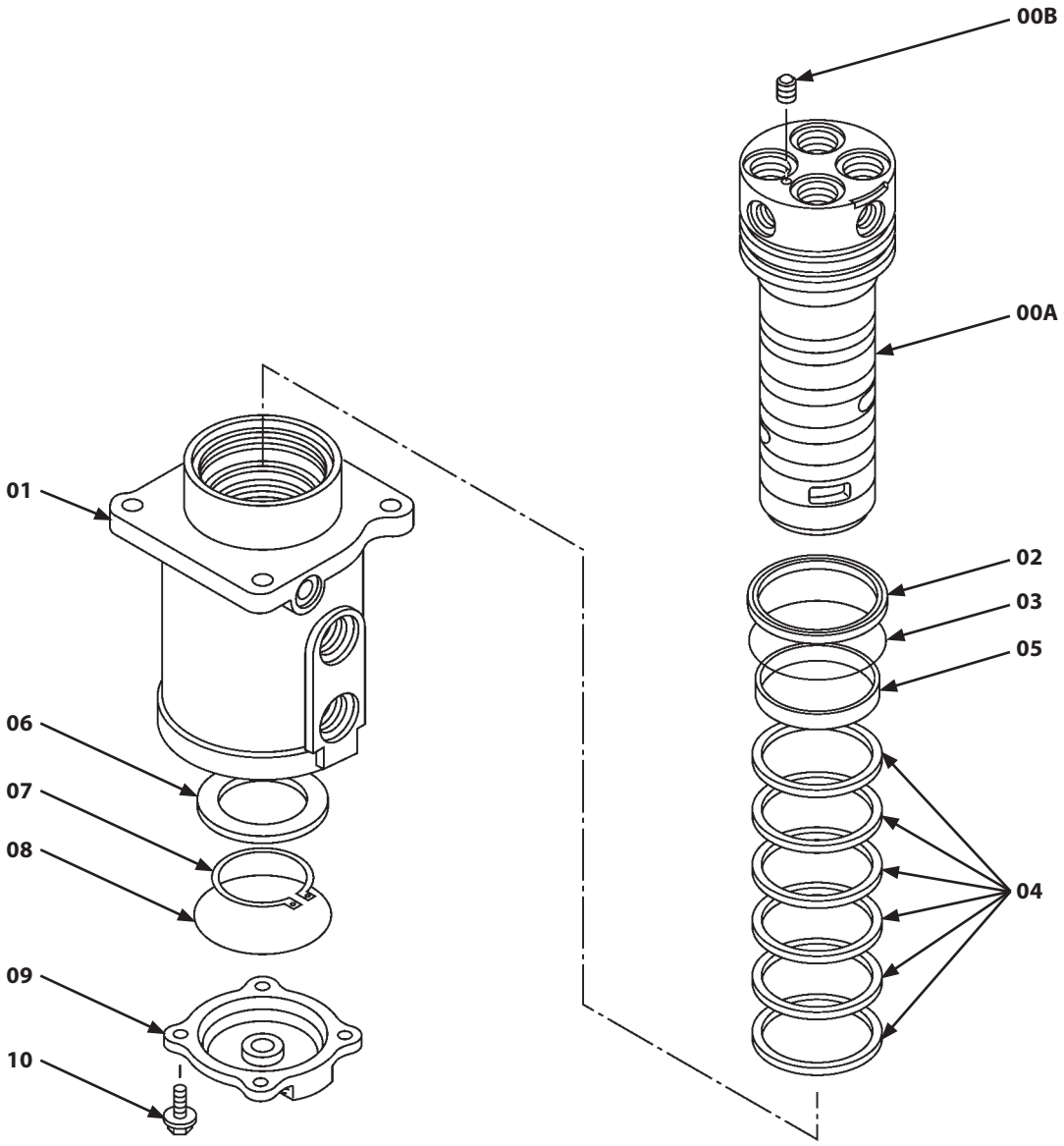
   : 10 mm

9. Remove spring seats (38) (2 used), springs (39) (2 used), and spring seats (40) (2 used) from valve housing (46).

IMPORTANT: Remove spool assembly (50) by rotating. If they stick even a little, try again instead of pulling them roughly.

10. Remove spool assembly (50) from valve housing (46).
11. Secure spool assembly (50) by using wooden pieces in a vise.
12. Remove plugs (41) (2 used) from spool (45). Remove O-rings (42) (2 used) from plugs (41) (2 used). Remove springs (43) (2 used) and check valves (44) (2 used) from spool (45).

Disassembly of Center Joint



W16J-03-03-001

00A- Spindle
00B- Plug (With Ball)
01- Body
02- Dust Seal
03- O-Ring
04- Oil Seal (6 Used)
05- Bushing
06- Ring
07- Retaining Ring
08- O-Ring
09- Cover
10- Bolt, Washer (4 Used)

3. Put the matching marks on rod (15) and nut (13).
4. Remove valve (16) from rod (15).

   : 24 mm
5. Remove bolt (14) from nut (13).

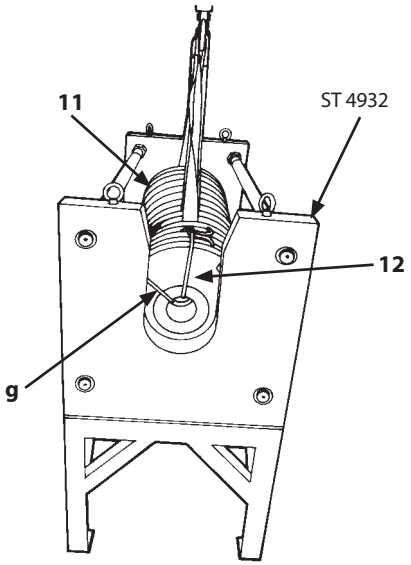
   : 19 mm
6. Remove nut (13) from rod (15).

   : 125 mm
7. Retract the cylinder of the special tool (ST 4932) slowly and extend spring (11) to the free length.

NOTE: Spring (11) free length: 930 mm (36.6 in)

CAUTION: The spring (11) assembly weight: 400 kg (885 lb)

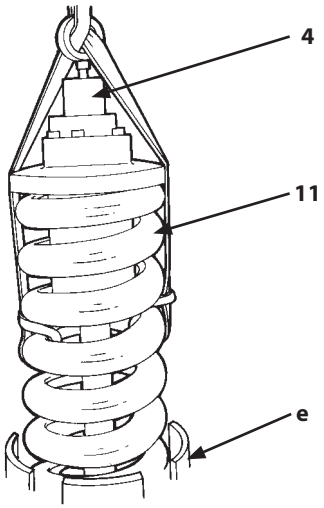
8. Secure bracket (12) and spring (11) by using wire (g). Attach a nylon sling onto spring (11). Hoist the spring (11) assembly. Remove the spring (11) assembly from the special tool (ST 4932).



W142-03-04-005

g - Wire

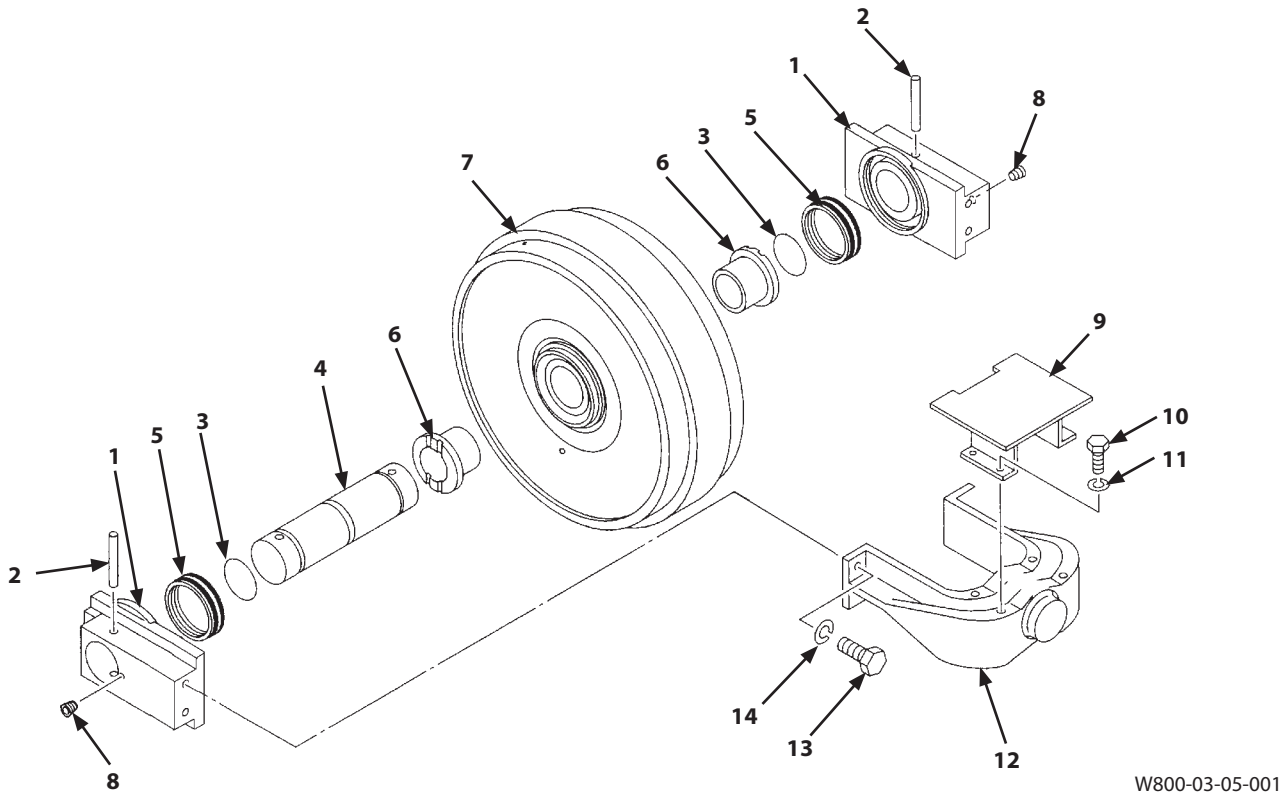
9. Install an eyebolt (M16, Pitch 2.0 mm) to piston rod (4). Attach a nylon sling onto spring (11). Pass a nylon sling through the eyebolt on piston rod (4). Hoist and place the spring (11) assembly on holder (e).



W142-03-04-006

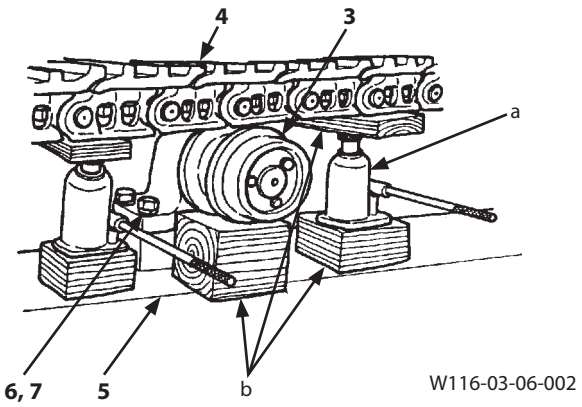
e - Holder

Disassembly of Front Idler

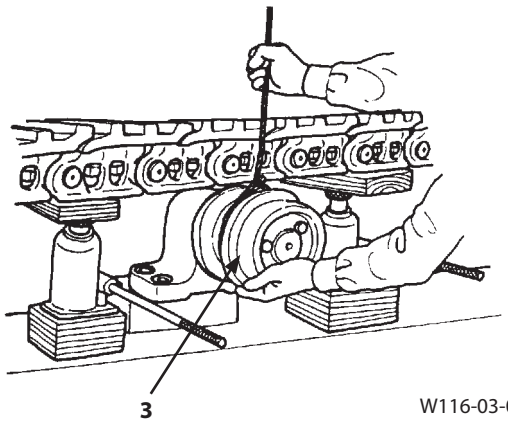


W800-03-05-001

1- Bearing (2 Used)
2- Pin (2 Used)
3- O-Ring (2 Used)
4- Axle
5- Floating Seal (2 Used)
6- Bushing (2 Used)
7- Idler
8- Plug (2 Used)
9- Guard
10- Bolt (4 Used)
11- Spring Washer (4 Used)
12- Yoke
13- Bolt (4 Used)
14- Spring Washer (4 Used)

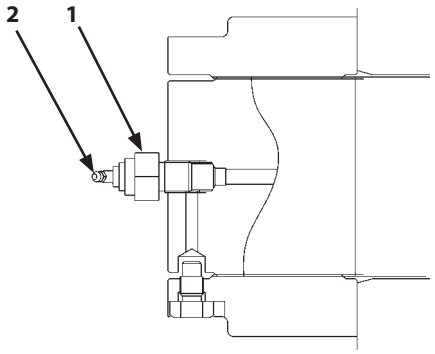


W116-03-06-002

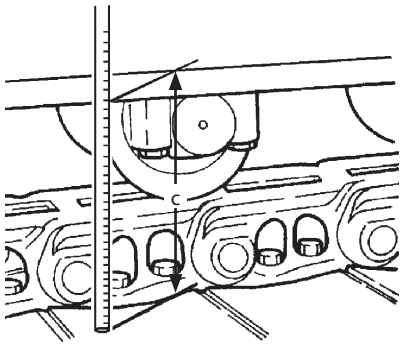


W116-03-06-003

a- Oil Jack
b- Wooden Block



W800-03-07-002



Wxxx-03-07-001

c - Track Sag Specification

Installation

CAUTION: Upper roller (3) weight: 60 kg (135 lb)

1. Attach nylon slings onto the body of upper roller (3). Hoist upper roller (3).
2. Apply LOCTITE #262 onto bolts (6) (4 used)
3. Install upper roller (3) with washers (7) (4 used) and bolts (6) (4 used).

   : 30 mm

   : 550 N·m (55 kgf·m, 410 lbf·ft)
4. Remove wooden blocks (b) and oil jack (a) between track (4) and track frame (5).
5. Tighten valve (1) of the track adjuster.

   : 24 mm

   : 150 N·m (15 kgf·m, 111 lbf·ft)

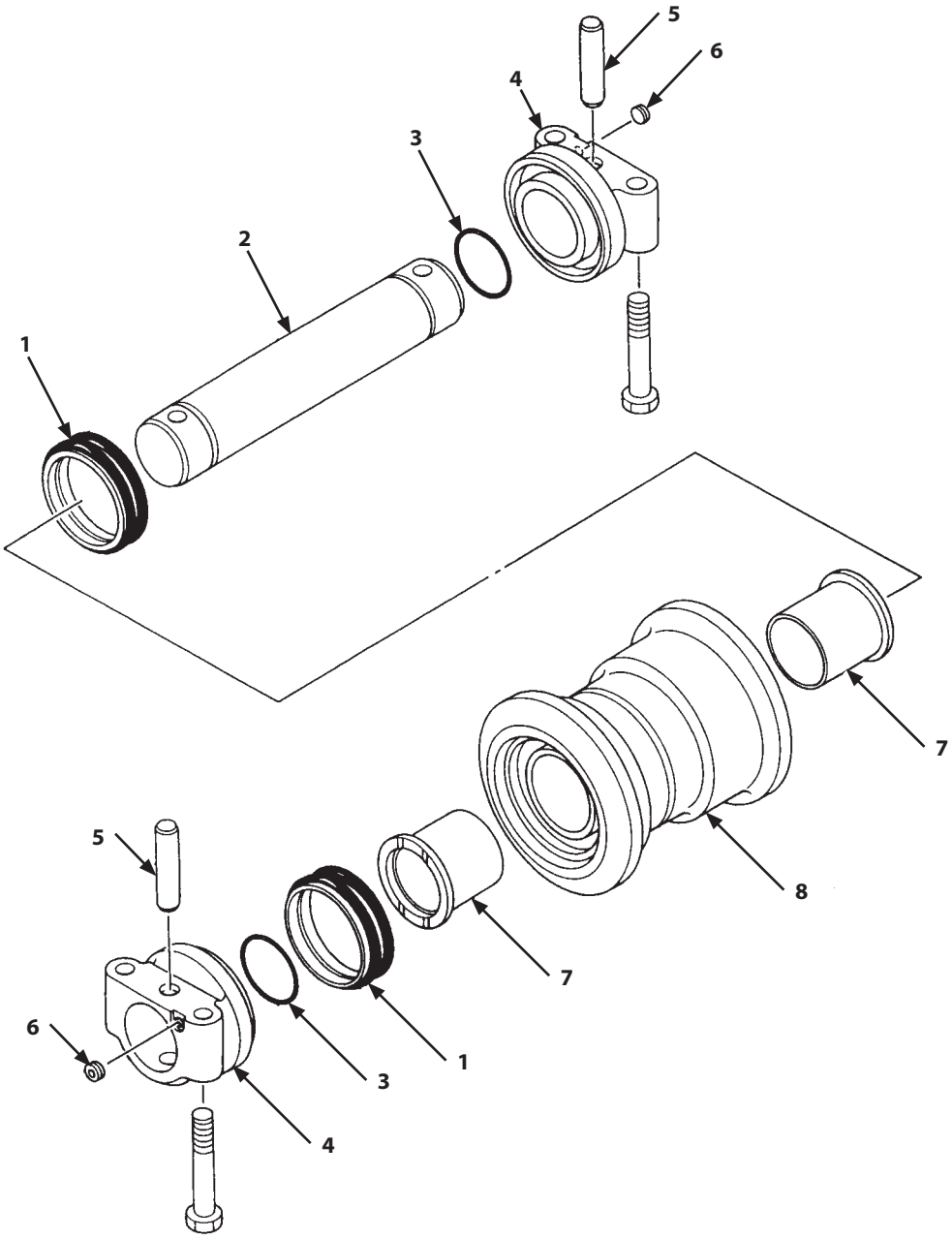
CAUTION: Securely support the raised machine by using the blocks.

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

NOTE: Track sag specification (c): 450 to 500 mm (17.7 to 19.7 in)

8. Lower the track.

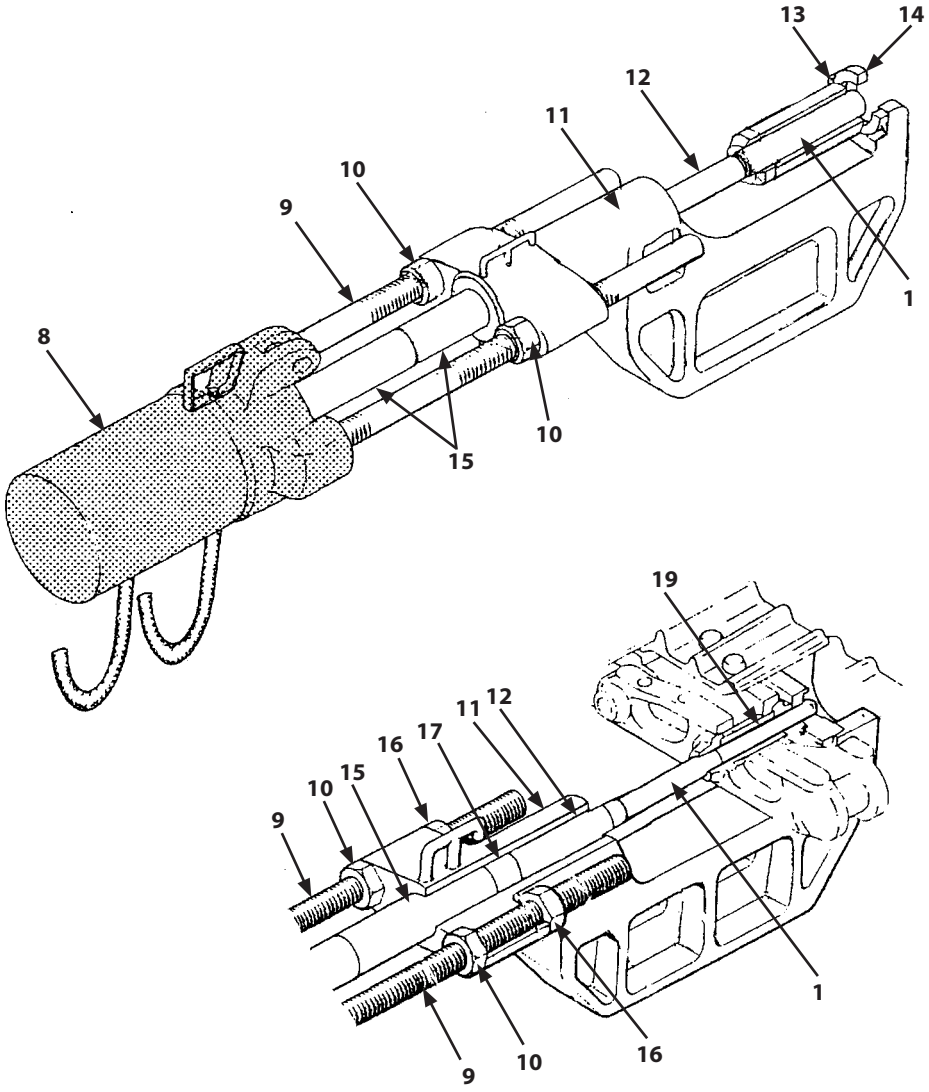
Disassembly of Lower Roller



W166-03-06-006

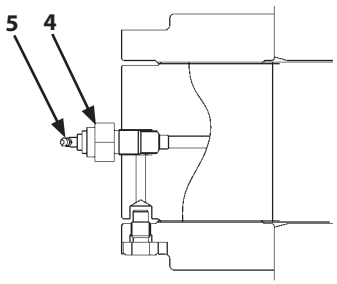
1- Floating Seal (2 Used)
2- Axle
3- O-Ring (2 Used)
4- Collar (2 Used)
5- Pin (2 Used)
6- Plug (2 Used)
7- Bushing (2 Used)
8- Roller

Assembly of Special Tool (ST 1532) for Removal / Installation of Master Pin

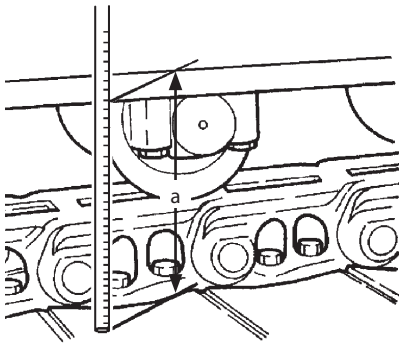


WJBE-04-07-001

8 - Hydraulic Cylinder (ST 1512)
9 - Screw (2 Used) (ST 1516)
10 - Nut (2 Used) (ST 1515)
11 - Frame (ST 1513)
12 - Pusher (ST 1521)
13 - Handling Screw (ST 1530)
14 - Adapter (ST 1518)
15 - Extension (3 Kinds) (ST 1514)
16 - Nut (2 Used) (ST 1515)
17 - Pilot (ST 1517)
19 - Guide Pin (ST 1529)



W800-03-07-027



WXXX-03-07-001

a - Track Sag Specification

12. Tighten valve (4). Apply grease through grease fitting (5) and adjust the track tension.

    : 24 mm

    : 150 N·m (15 kgf·m, 111 lbf·ft)

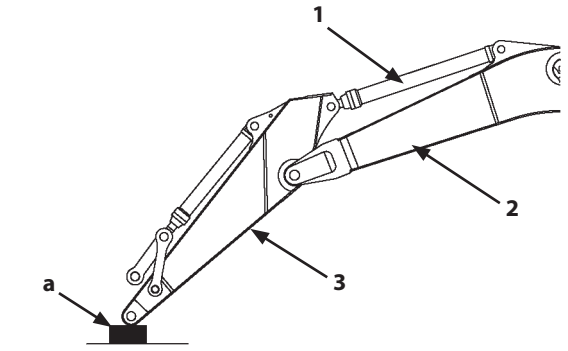
NOTE: Track sag specification (a): 450 to 500 mm (17.7 to 19.7 in)

Removal and Installation of Arm

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. Remove the bucket. (Refer to W5-1-1.)
2. Fully retract arm cylinder (1) and lower boom (2). Place the end of arm (3) onto wooden block (a).



a- Wooden Block

W1J7-04-01-010

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

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

3. Remove socket bolts (6) (8 used) and flanges (7) (4 used). Disconnect hoses (5) (2 used). Remove O-rings (8) (2 used).

: 12 mm

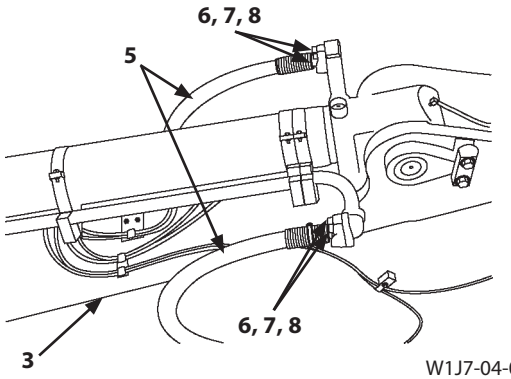
4. Disconnect lubrication hose (9).

: 19 mm

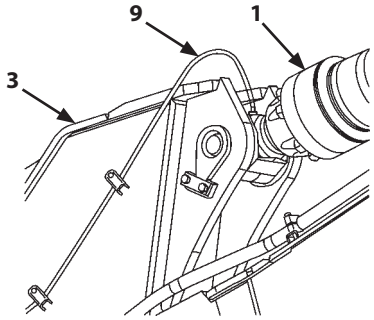
NOTE: Step (5) is for the machine equipped with the auto lubrication device (optional).

5. Disconnect lubrication hose (10).

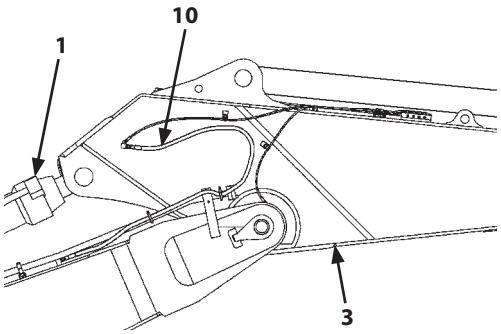
: 22 mm



W1J7-04-01-011



W1JB-04-02-010



W1J7-04-01-012

NOTE: Step 4 and step 5 are for the machine equipped with the auto lubrication device (optional).

4. Connect lubrication hoses (9) (2 used).

   : 22 mm

   : 40 N·m (4 kgf·m, 29.5 lbf·ft)

5. Install clip (11) to lubrication hoses (9) (2 used) and secure them with bolt, washer (10).

   : 19 mm

   : 90 N·m (9 kgf·m, 66 lbf·ft)

IMPORTANT: Add hydraulic oil to the specified level. Start the engine and check the hose connections for any oil leaks.

CAUTION: Boom cylinder (2) weight: 590 kg (1310 lb)

6. Remove the wires which secure the boom cylinder (2) rod hole and tube. (2 places on both right and left sides).
7. Hoist the boom cylinder (2) rod side. Start the engine. Extend boom cylinder (2) and fit the pin (4) holes on 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.

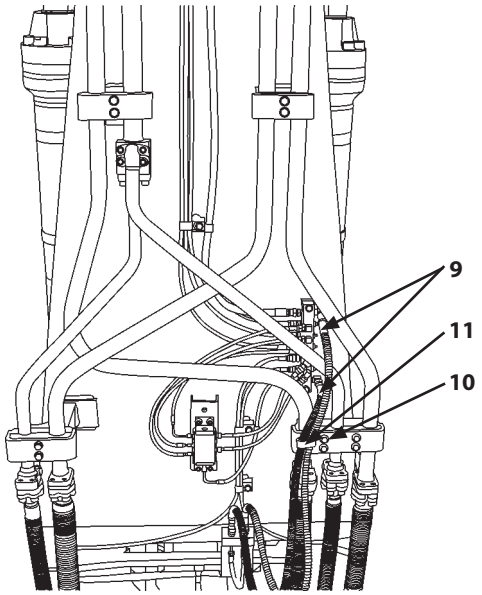
CAUTION: Pin (4) weight: 33 kg (73 lb)

8. Attach the nylon slings onto pin (4). Hoist pin (4). Insert plate (8) between boom (3) and boom cylinder (2). Install pin (4). Install boom cylinder (2) to boom (3).
9. Install pin (4) to boom (3) with plate (7), washers (5) (2 used), and bolts (6) (2 used).

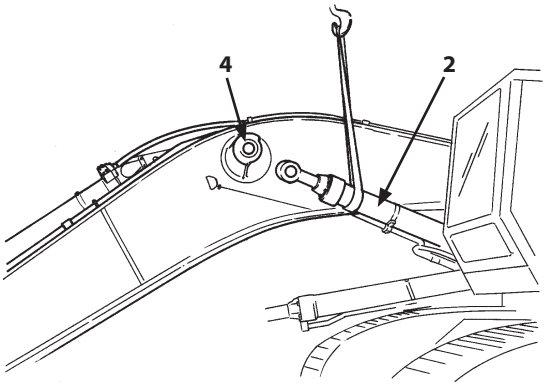
   : 30 mm

   : 400 N·m (40 kgf·m, 300 lbf·ft)

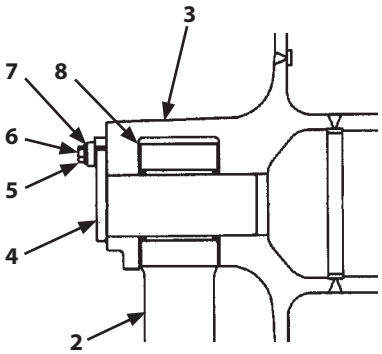
10. Install other boom cylinder (2) in the same way as step 7 to step 9.



WJBF-05-01-001



W1J7-04-01-016



W1JB-04-02-008

Removal and Installation of Arm Cylinder

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. Disconnect hose (1) from the rod side of arm cylinder (2).

   : 19 mm

2. Place wooden block (a) between arm cylinder (2) and boom (8).

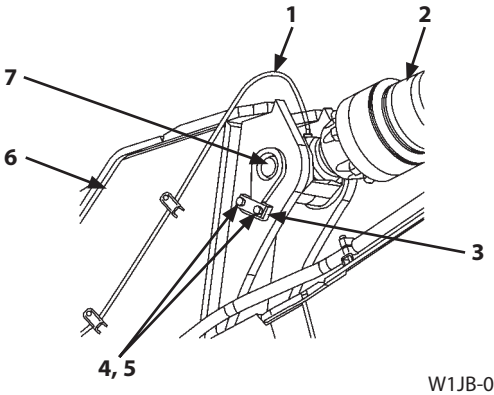
CAUTION: Metal fragments may fly off when a hammer is used. Wear necessary protection, such as goggles, helmets, etc in order to prevent personal injury.

CAUTION: Pin (7) weight: 36 kg (80 lb)

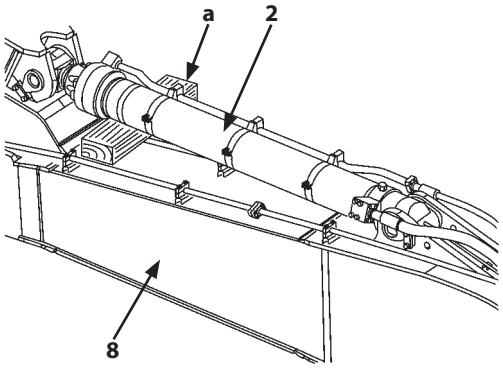
3. Remove bolts (4) (2 used), washers (5) (2 used), and plate (3) from the arm cylinder (2) rod side. Attach the nylon slings onto the body of pin (7). Hoist pin (7). Remove pin (7) from arm (6).

   : 30 mm

4. Start the engine. Operate the arm control lever and retract arm cylinder (2). In order not to extend the rod, pass the wires through the rod hole and secure the rod to the cylinder tube.

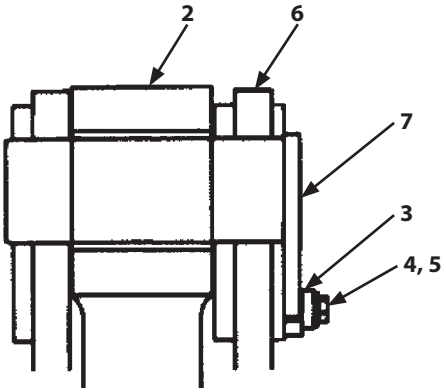


W1JB-04-02-010



a- Wooden Block

W1JB-04-02-012

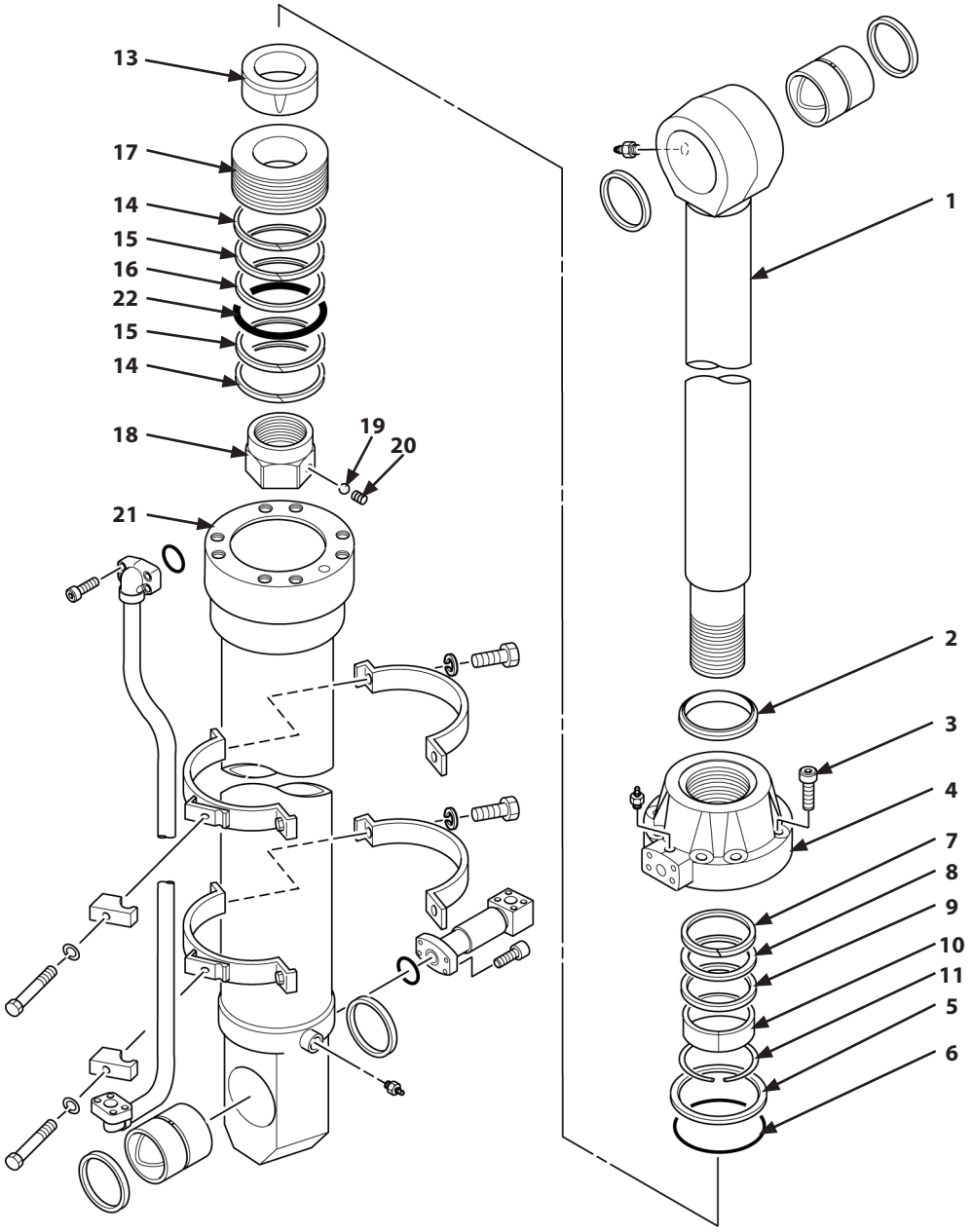


W1JB-04-02-011

8. Remove cushion bearing (13), cushion seal (12), and cylinder head (4) from cylinder rod (1).
9. Remove O-ring (6), backup ring (5), wiper ring (2), retaining ring (11), ring (9), U-ring (8), and backup ring (7) from cylinder head (4).
10. Remove bushing (10) from cylinder head (4) by using the special tool (ST 8023).

NOTE: Cylinder rod (1) outer diameter: 130 mm (5.1 in)

Disassembly of Bucket Cylinder



W1J7-04-02-003

1- Cylinder Rod
2- Wiper Ring
3- Socket Bolt (8 Used)
4- Cylinder Head
5- Backup Ring
6- O-Ring
7- Backup Ring
8- U-Ring
9- Ring
10- Bushing
11- Retaining Ring
13- Cushion Bearing
14- Slide Ring (2 Used)
15- Slide Ring (2 Used)
16- Seal Ring
17- Piston
18- Nut
19- Steel Ball
20- Set Screw
21- Cylinder Tube
22- O-Ring

Abbreviations Charts

List of industrial abbreviations which may be used in this manual

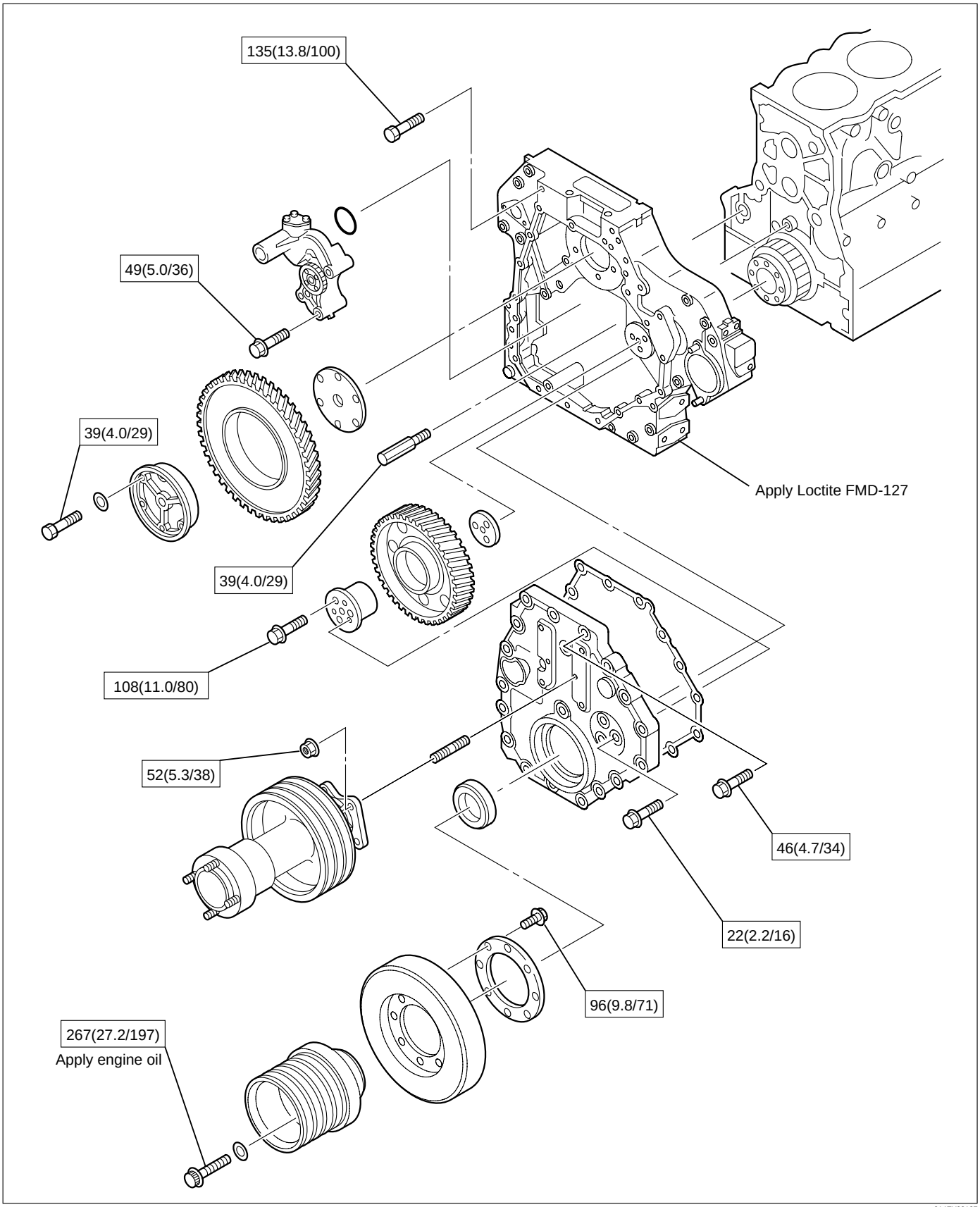
A – Ampere(s)
AC – Alternating Current
ACL – Air Cleaner
Adj – Adjust
AMP – Ampere(s)
ASM –Assembly
ATDC – After Top Dead Center
Auto – Automatic
Bat – Battery
B+ – Battery Positive Voltage
BHP – Brake Horsepower
BTDC – Before Top Dead Center
°C – Degrees Celsius
cc – Cubic Centimeter
CID – Cubic Inch Displacement
CO – Carbon Monoxide
Conn – Connector
Crank – Crankshaft
Cu. In. – Cubic Inch
Cyl – Cylinder(s)
DOHC – Double Overhead Camshaft
DTC – Diagnostic Trouble Code
DTM – Diagnostic Test Mode
DTT – Diagnostic Test Terminal
ECM – Engine Control Module
ECT – Engine Coolant Temperature
EGR – Exhaust Gas Recirculation
Exh – Exhaust
°F – Degrees Fahrenheit
FL – Fusible Link
FLW – Fusible Link Wire
FP – Fuel Pump
FRT – Front
ft – Foot
Gal – Gallon
GND – Ground
Gov – Governor
g – Gram
Harn – Harness
HC – Hydrocarbons
HD – Heavy Duty
Hg – Hydrargyrum (Mercury)
IC – Integrated Circuit / Ignition Control
ID – Identification / Inside Diameter
IGN – Ignition
INJ – Injection
Int – Intake
kg – Kilograms
km – Kilometers
km/h – Kilometer per Hour
kPa – Kilopascals
kV – Kilovolts (thousands of volts)
kW – Kilowatts
L – Liter
lb ft – Foot Pounds
lb in – Inch Pounds
LF – Left Front
LH – Left Hand
LR – Left Rear
LS – Left Side
L-4 – In-Line Four Cylinder Engine
Max – Maximum
Min – Minimum
mm – Millimeter
N – Newtons
NA – Naturally Aspirated
NC – Normally Closed
N·m – Newton Meters
NO – Normally Open
NOX – Nitrogen, Oxides of
OD – Outside Diameter
OHC – Overhead Camshaft
PCV – Positive Crankcase Ventilation
PRESS – Pressure
PROM – Programmable Read Only Memory
PSI – Pounds per Square Inch
PSP – Power Steering Pressure
Pt. – Pint
PWM – Pulse Width Modulate
Qt. – Quart
REF – Reference
RF – Right Front
RH – Right Hand
RPM – Revolutions Per Minute
RPM Sensor – Engine Speed Sensor
RR – Right Rear
RS – Right Side
RTV –Room Temperature Vulcanizing
SAE – Society of Automotive Engineers
Sec – Secondary
SI – System International
SOHC – Single Overhead Camshaft
Sol – Solenoid
SPEC – Specification
Speedo – Speedometer
ST – Start / Scan Tool
Sw – Switch
SYN – Synchronize
Tach – Tachometer
TDC – Top Dead Center
Term – Terminal
TEMP – Temperature
TURBO – Turbocharger
V – Volt(s)
VAC – Vacuum
V-ref – ECM Reference Voltage
VSS – Vehicle Speed Sensor
VSV – Vacuum Switch Valve
V-6 – Six Cylinder “Vee” Engine
V-8 – Eight Cylinder “Vee” Engine
W – Watt(s)
w/ – With
w/o – Without
WOT – Wide Open Throttle

Service Standard

ITEMS		SERVICE STANDARD		SERVICE LIMIT
ENGINE				
Compression Pressure MPa(kg/cm^2/psi)/min^{-1}		27.5 (28 / 400) / 200 or more, after warm up the engine.		21.6 (22 / 312)
CYLINDER HEAD and VALVE				
Camshaft End Play	mm(in)	0.085 – 0.170 (0.0033-0.0067)		0.25 (0.0098)
Clearance between Camshaft and Bracket	mm(in)	0.065 – 0.125 (0.0026-0.0049)		0.15 (0.0059)
Idle Gear “C” End Play	mm(in)	0.05 – 0.14 (0.0020-0.0055)		0.25 (0.0098)
Clearance between Shaft and Idle “C” Gear	mm(in)	0.04 – 0.105 (0.0016-0.0041)		0.2 (0.0079)
Valve Spring Free Height	mm(in)	Outer		
		Inlet	79.3 (3.1220)	75.3 (2.965)
		Exhaust	102.7 (4.0433)	97.6 (3.843)
		Inner		
		Inlet	–	–
		Exhaust	96.5 (3.7992)	91.7 (3.6102)
Valve Spring Squareness	mm(in)	Inlet	3.5 (0.1378)	4.8 (0.1890)
		Exhaust		
		Outer	4.5 (0.1772)	6.2 (0.2441)
		Inner	4.2 (0.1654)	5.9 (0.2323)
Valve Spring tension	N(kg/lb)/mm	Outer		
		Inlet	392 (40.0/88.2)/64	372 (37.9/83.6)/64
		Exhaust	610 (62.2/137)/69	579 (59.0/130)/69
		Inner		
		Inlet	–	–
		Exhaust	224 (22.8/50.3)/66	213 (21.7/47.8)/66
Valve Stem and Guide Clearance	mm(in)	Inlet	0.040 – 0.077 (0.0016 – 0.0030)	0.15 (0.0059)
		Exhaust	0.065 – 0.102 (0.0026 – 0.0040)	0.25 (0.0098)

Timing Gears

N·m (kgf·m/lb ft)



014EY00127

6. Engine Cooling Trouble

Condition	Possible Cause	Correction
Overheating	Insufficient cooling water	Replenish coolant
	Defective pressure cap or clogged radiator core	Replace the radiator pressure cap or clean radiator core
	Defective water pump	Repair or replace the water pump
	Defective sealing cap resulting in the cooling water leakage	Replace the sealing cap
	Defective thermostat	Replace the thermostat
	Cooling system clogged by foreign material	Take out the foreign material from the cooling system
	Fuel injection timing improperly adjusted	Adjust the fuel injection timing

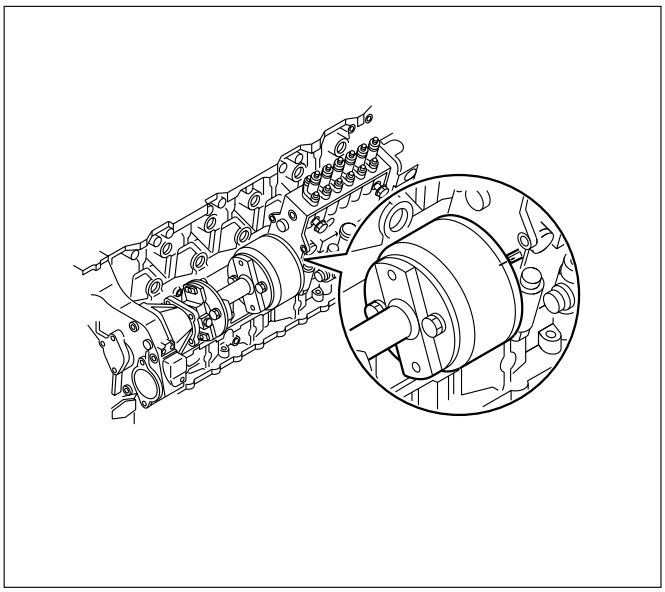
7. White Exhaust Smoke

Condition	Possible Cause	Correction
Trouble in the fuel system	Water particles in fuel	Replace the fuel
	Retarded fuel injection timing	Adjust the fuel injection timing
Low compression pressure	Blown out cylinder head gasket Worn cylinder liner Piston ring sticking or broken Improper seating between the valve and valve seat.	Replace the related parts
Trouble in the cooling system	Defective thermostat	Replace the thermostat
Trouble in the turbocharger system	Defective turbocharger	Repair or replace

8. Black Exhaust Smoke

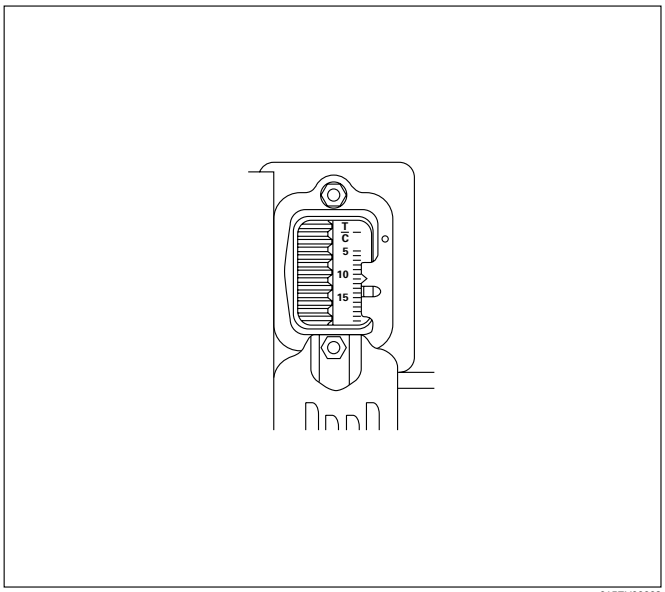
Condition	Possible Cause	Correction
Trouble in the fuel system	Clogged air cleaner element	Clean or replace the air cleaner element
Trouble in the fuel system	Injection nozzle starting pressure tool low	Adjust or replace the injection nozzle
	Improper spray condition	
	Advanced fuel injection timing	Adjust the fuel injection timing
	Excessive injection volume	Adjust the injection volume
Trouble in the valve train	Worn camshaft lobe	Replace the camshaft

3. Check that the timing advancer notched line is aligned with the injection pump notched line.
   If the notched lines are out of alignment, the injection timing must be adjusted.



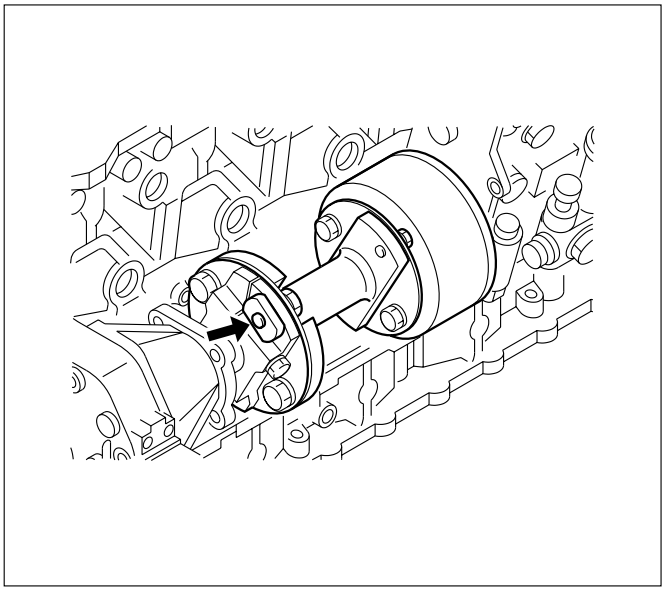
Injection Timing Adjustment

1. Rotate the crankshaft in normal direction of rotation until the timing mark on the timing advancer can be seen.
2. Align the injection timing mark on the flywheel with the pointer.

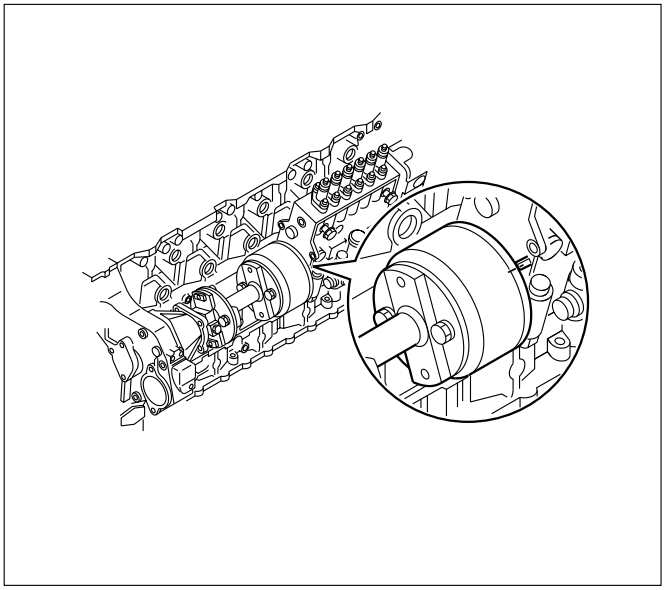


015EY00003

3. Loosen the two coupling bolts.



4. Move the timing advancer to the correct timing.
5. Tighten the two coupling bolts.
6. Rotate the crankshaft two turns in normal direction of crankshaft rotation.
7. Verify the new setting is correct injection timing.
8. Connect the negative battery cable.



Gear Train

The gear train is located at the front of cylinder block to minimize influence of the torsional vibration of the crankshaft and the radiant sound.
Noise is further reduced, to the same level as a timing belt driven system, by integrating the crankshaft gear with the crankshaft by shrink fit careful tuning of the gear precision, contact gear ratio, backlash, bearing rigidity neutral frequency, etc.

Combustion System

The combustion chamber has a clean and simple design for maximum operating economy also easy starting. A direct fuel injection system is adopted.
The injection nozzles are placed at the center of each cylinder. Intake ports generate optimum swirl effect while exhaust ports minimize exhaust resistance. Isuzu's unique combustion chamber design provides maximum power output and fuel economy.

Value Arrangement

Each cylinder has two intake valves and two exhaust valves.
To ensure high efficiency and complete combustion, the intake system has a Isuzu's unique designed inlet ports. The two exhaust valves are connected to a single port.

Lubrication

All engine parts are lubricated by a gear pump pressure circulation system.
Oil flows from the oil pump though oil cooler to main oil filter for oil cooling and oil cleaning.
From the main oil filter it moves to the cylinder block oil gallery and the oil circulates to lubricates the engine parts.
Oil jets are installed to the cylinder block main oil gallery. The jet spray oil to the inside portions of the pistons for lubrication and cooling.

Oil Pump and Oil Filter

The oil pump is a gear type with a relief valve. The pump is driven by the timing gear. A full flow main oil filter with a highly efficient paper element used.
Should the element become clogged with sludge or other foreign material, a by-pass valve open to route the oil directly to the oil gallery.

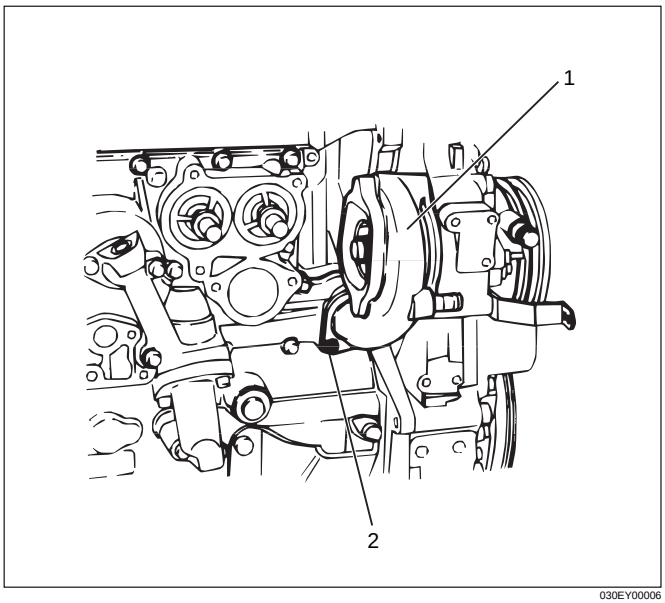
Oil Cooler

The temperature of the engine oil circulating through the lubricating system tends to rise with an accompanying decrease in lubricating efficiency.
The oil cooler maintains the oil temperature at the optimum level for effective engine lubrication.
The oil cooler consists of the body and the cooling element.

Water Pump

Removal

1. Remove the water inlet pipe.
2. Remove the thermostat housing.
3. Remove the water pump (1).

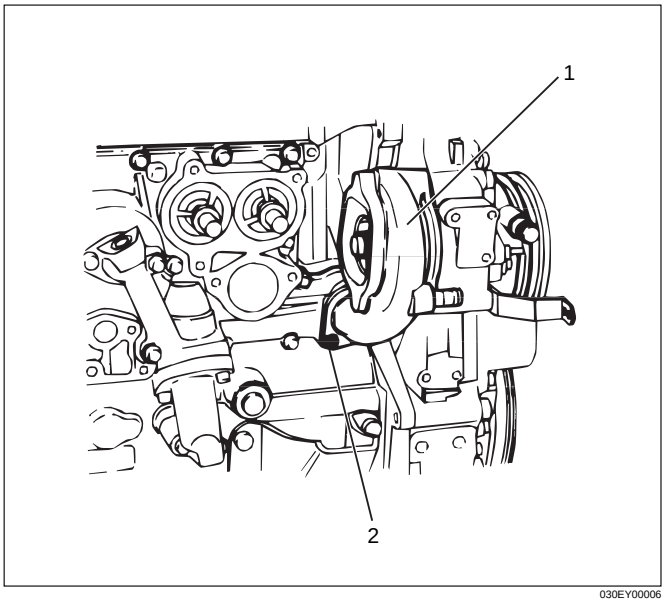


030EY00006

Installation

1. Install the water pump (1) with new gasket, tighten to the specified torque.
   - First tighten the bolts (2) to the oil cooler side then tighten

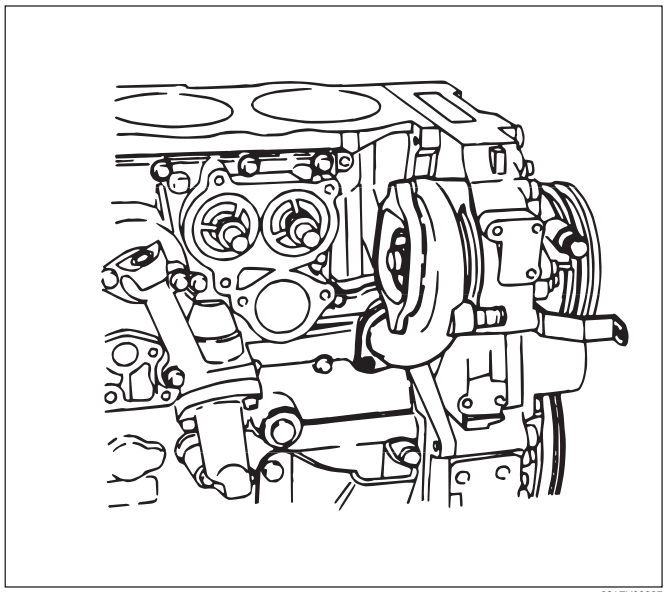
   Torque: 39 N·m (4.0 kgm)

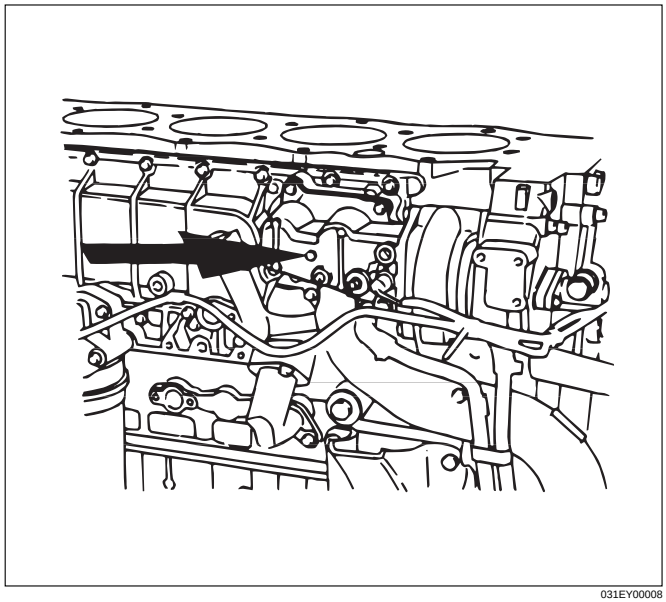


030EY00006

2. Install the thermostat housing.
   - Install the thermostat to the oil cooler.
     Refer to “Thermostat installation” in this manual.
   - Tighten the bolts to the specified torque.

   Torque: 39 N·m (4.0 kgm)


031EY00007


031EY00008

3. Install the water inlet pipe (1) to the oil cooler.
   Tighten the bolts to the specified torque.

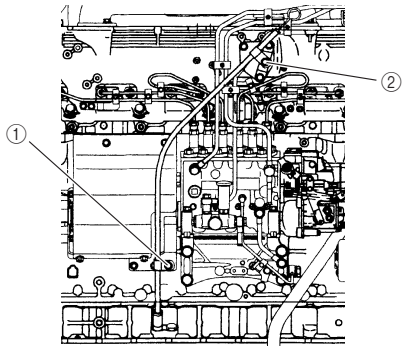
   Torque: 43 N·m (4.4 kgm)

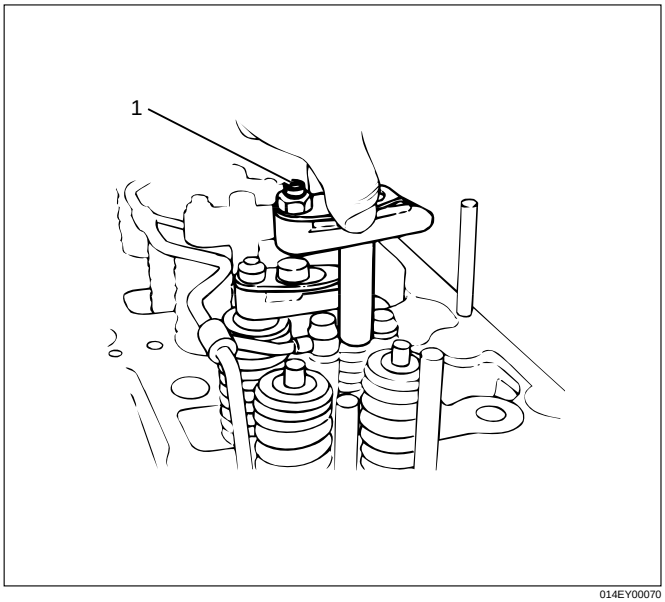
7. Install the air pipe for the boost.
8. Install the guide tube to the cylinder block in the order shown.

Torque:

Bolt (1) 88 N·m (9.0 kgm)

Bolt (2) 49 N·m (5.0 kgm)

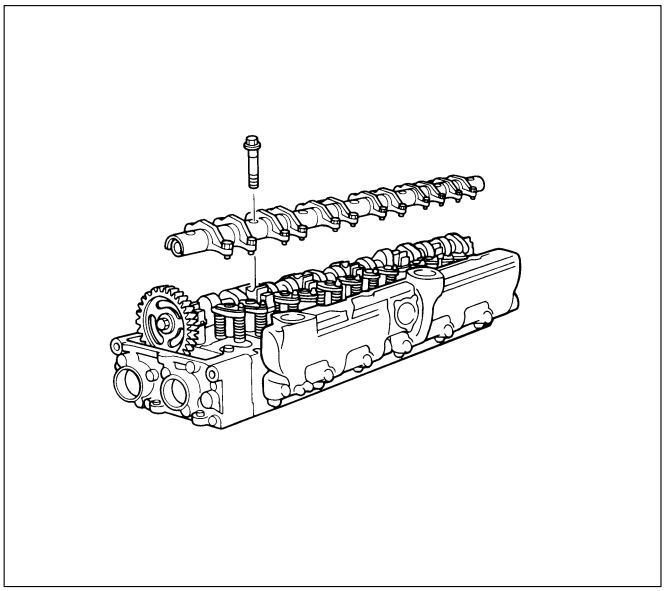


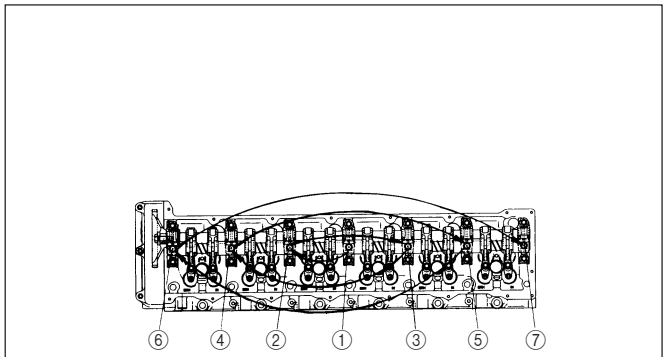


014EY00070

9. Install the rocker arm assembly.
   - Tighten the bolts in numerical order to the specified torque shown in the illustration.

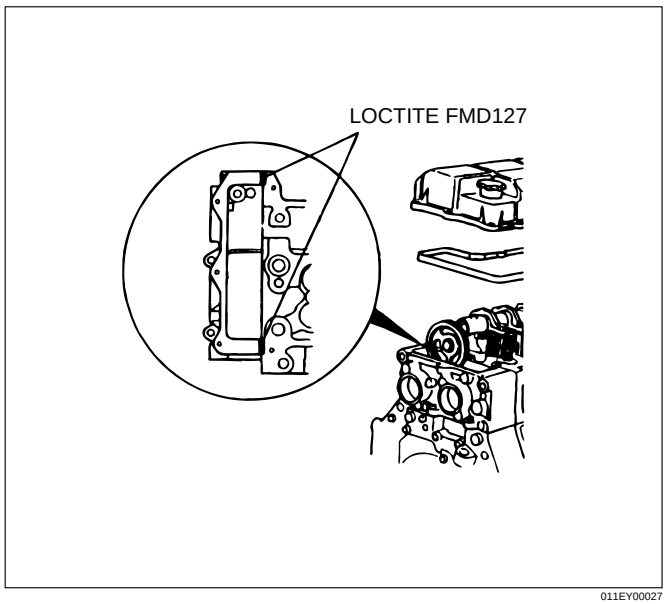
   Torque: 90 N·m (9.2 kgm)





10. Install the gasket of the head cover.
11. Install the cylinder head cover.
    - Apply Loctite FMD127 or equivalent to the upper surface of cylinder head and timing gear case fitting area shown as illustration.

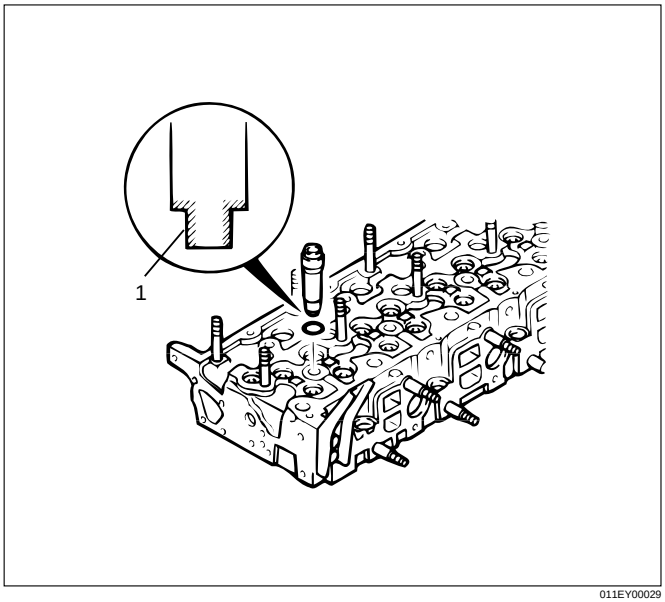
      The sealant must be 1.0 – 2.0 mm (0.04 – 0.08 in.) thick and 5.0 mm (0.20 in.) wide.



011EY00027

    - Tighten cylinder head cover bolt, follow the numerical order shown in the illustration.

    Torque: 20 N·m (2.1 kgm)



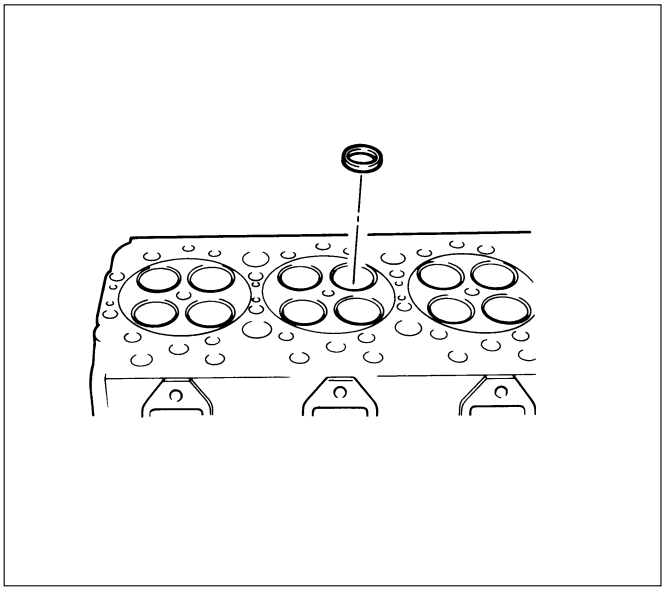
011EY00029

2. Install the valve seat insert into the cylinder head.
   - Carefully place the attachment (1) (having a smaller outside diameter than the valve seat insert) on the valve seat insert (2).

NOTE: The smooth side of the attachment must contact the valve seat insert.

   - Use a bench press (3) to gradually apply pressure to the attachment and press the valve seat insert into place.

CAUTION: Do not apply excessive amount of pressure with the bench press. Damage to the valve seat insert will result.



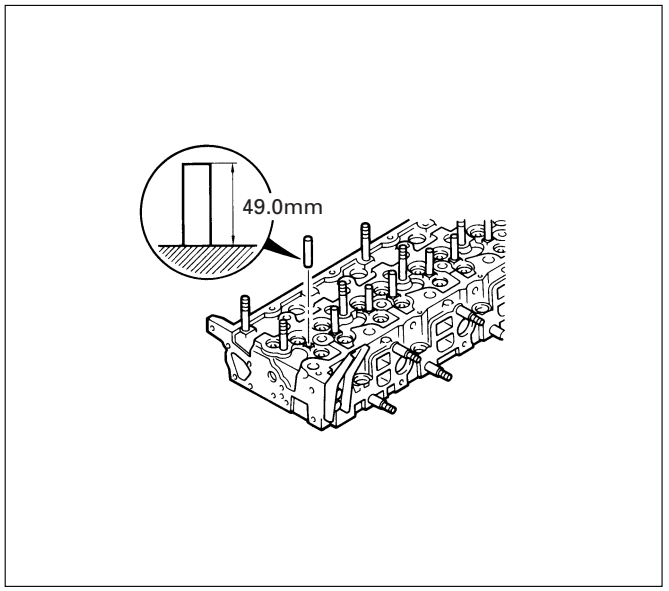
   - The valve should be lapped before final assembly to ensure a good valve seal.

     Refer to “Valve Seat Insert Correction” in this section.

3. Install the bridge guide.
   - Apply engine oil to the valve bridge guide outer circumference.
   - Attach the valve bridge guide installer 9-8522-1324-0 to the bridge guide.
   - Use a brass hammer to tap the guide into position from the cylinder head upper face.
   - Measure the height of the valve bridge guide upper end from the cylinder head upper face (cylinder head cover fitting surface).

   Valve bridge guide upper end height

   Standard: 49.0 mm (1.929 in.)



4. Install the valve guide into the cylinder head.
   - Apply engine oil to the valve guide outer circumference.
   - Attach the valve guide replacer 9-8523-1202-0 to the valve guide.
   - Use a hammer to drive the valve guide into position from the cylinder head upper face.
   - Measure the height of the valve guide upper end from the upper face of the cylinder head.

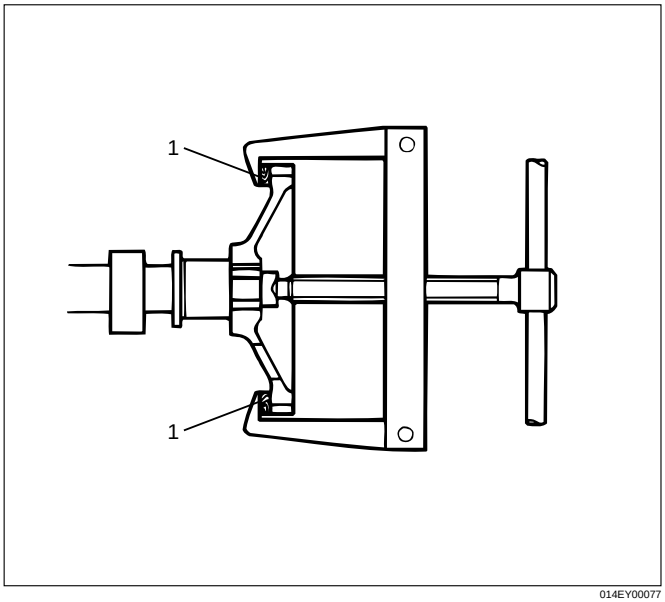
   Valve guide upper end height

   Intake side: 27.0 mm (1.0630 in.)

   Exhaust side: 29.0 mm (1.1417 in.)

NOTE: If the valve guide has been removed, both the valve and the valve guide must be replaced as a set.

1. Remove the camshaft gear.
   - Check visually gear for excessive wear or damage.
   - Use an universal puller to pull out the camshaft gear with wooden plate (1) for prevent make damage gear.
2. Loosen nuts to remove the camshaft bearing cap.
3. Remove the camshaft.



014EY00077

Inspection and Repair

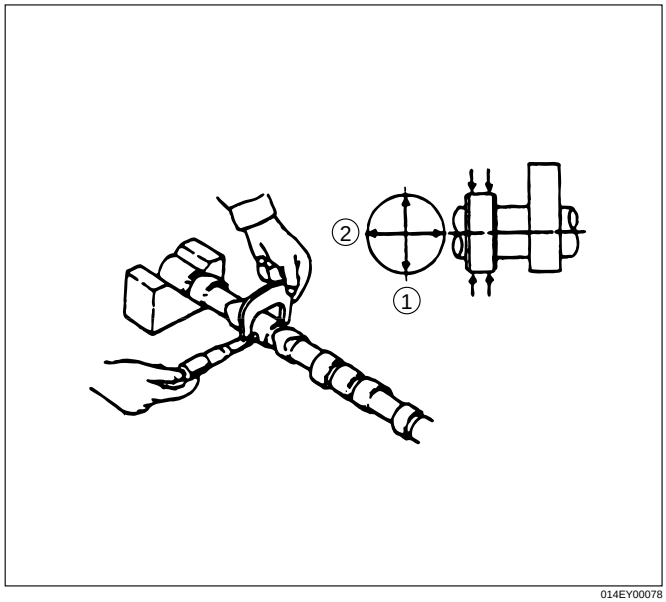
Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

1. Use a micrometer to measure each camshaft journal diameter in two directions ((1) and (2)). If the measured value is less than the specified limit, the camshaft must be replaced.

   Camshaft journal diameter

   Standard: 39.915 – 39.940 mm (1.5715 – 1.5724 in.)

   Limit: 39.890 mm (1.5705 in.)



014EY00078

2. Measure the cam height A and B with a micrometer.

   If the measured value is less than the specified limit, the camshaft must be replaced.

   Cam height (A – B)

   Inlet

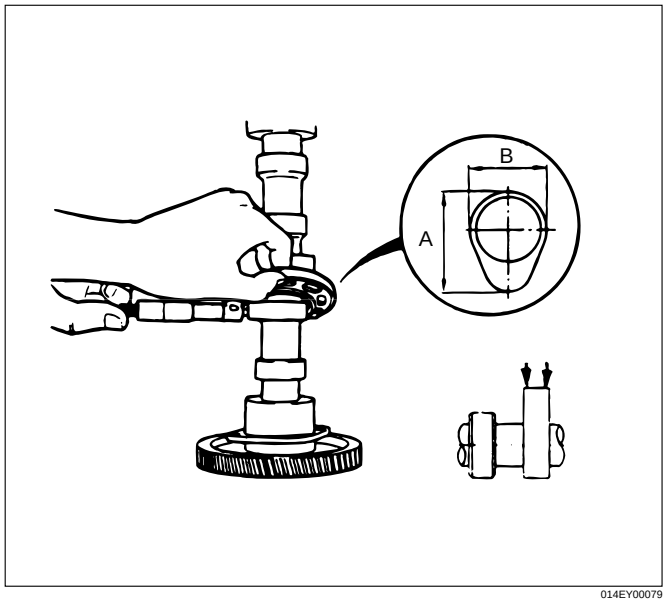
   Standard: 9.4 mm (0.370 in.)

   Limit: 8.85 mm (0.3484 in.)

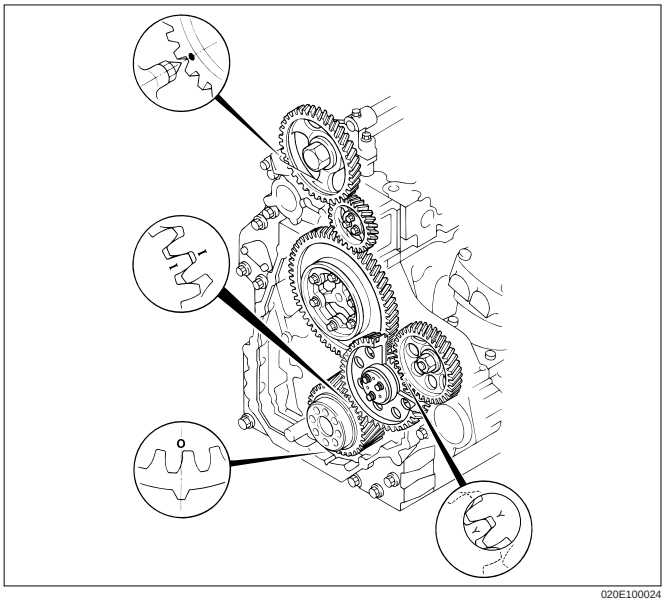
   Exhaust

   Standard: 10.4 mm (0.4094 in.)

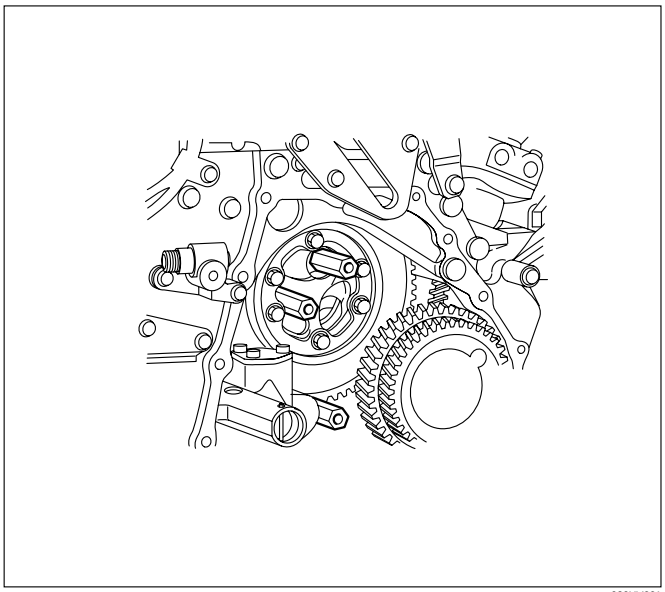
   Limit: 9.75 mm (0.3839 in.)



014EY00079


020E100024

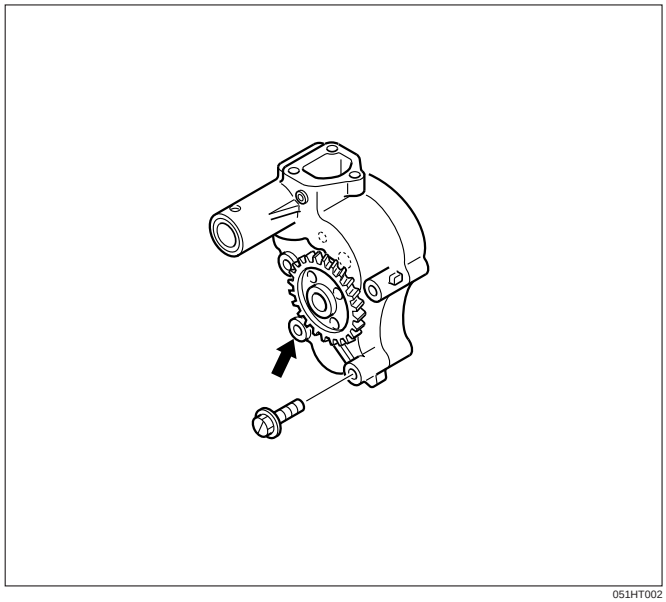
4. Install the distance bolt to the gearcase.
   Tighten the distance bolts to the specified torque.
   Torque: 39 N·m (4.0 kgm)


020HV001

5. Install the oil pump assembly.
   - Install the new gasket to the oil pump assembly.
   - Install the oil pump assembly to the cylinder pump.
   - Tighten the oil pump bolts to the specified torque.

   Torque: 49 N·m (5.0 kgm)

CAUTION: Do not tighten arrow mark bolt shown in the illustration.


051HT002

6. Install the timing gearcase cover.
   - Apply Loctite FMD127 or equivalent to the timing gearcase fitting face.
   - Install the timing gearcase cover with new gasket.
   - Tighten the bolts to the specified torque.

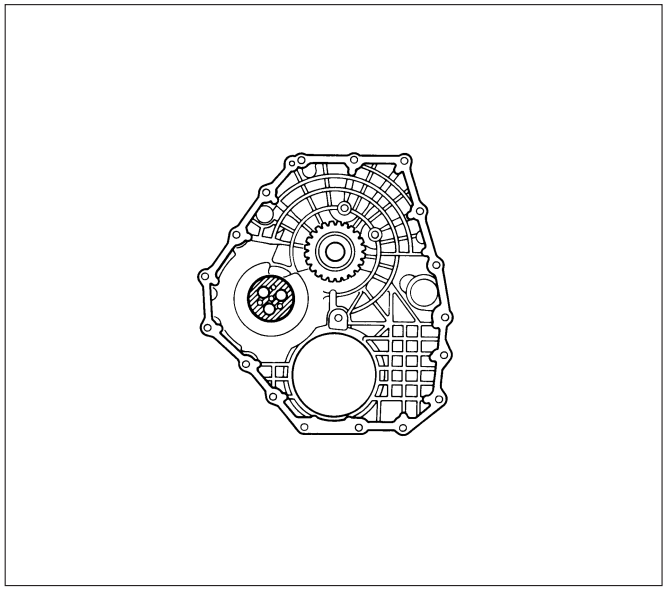
   With cooling fan

   M10 bolts

   Torque: 39 N·m (4.0 kgm)

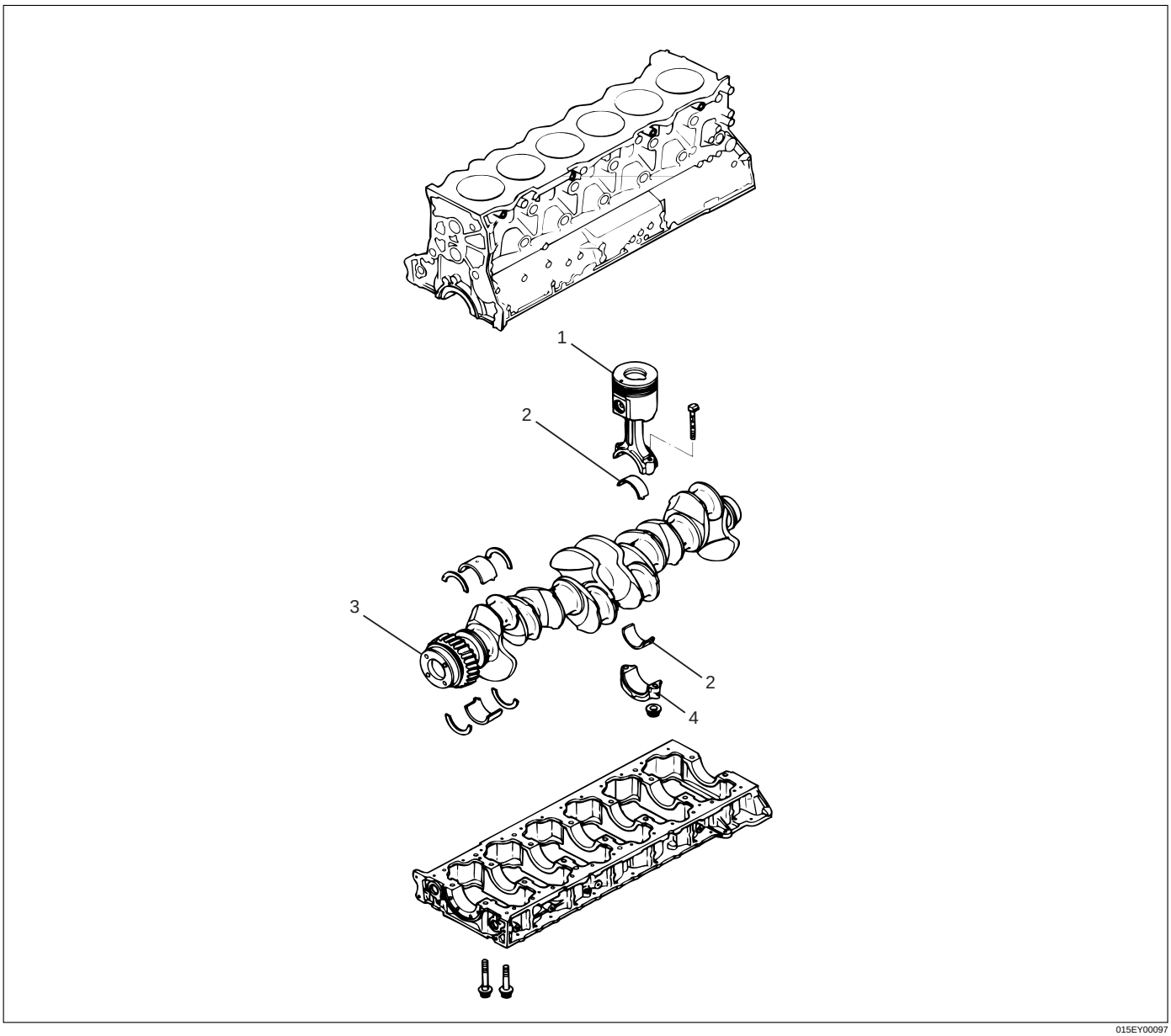
   M8 bolts

   Torque: 26 N·m (2.6 kgm)



Piston

Removal



015EY00097

Legend

(1) Piston with connecting rod
(2) Connecting rod bearing
(3) Crankshaft
(4) Connecting rod bearing cap

The grade mark is stamped on the top of the piston installed at the factory, but the piston for service part does not have any grade.

Piston outside

Standard: 146.830 – 146.845 mm (5.7805 – 5.7813 in.)

Piston and Liner bore clearance

Standard: 0.166 – 0.200 mm (0.0065 – 0.0079 in.)

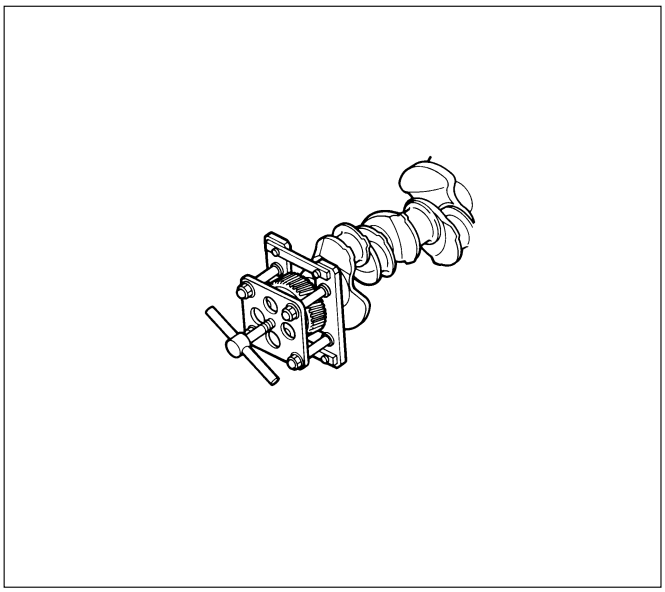
If the piston and liner clearance exceeds the standard value, the piston and/or liner must be replaced.

CAUTION: Cylinder liner kit clearances are preset. However, the cylinder liner installation procedure may result in slight decreases in cylinder liner clearances. Always measure the cylinder liner clearance after installation to be sure that its is correct.

1. Remove the crankshaft assembly (1) from the cylinder block.
2. Remove the crankshaft bearing and thrust bearing (2).
3. Use the crankshaft gear remover 1-8521-0064-0 to remove the crankshaft gear (3).

   If the slinger on the crankshaft remain, remove slinger by the slinger remover 1-8521-0027-0.

CAUTION: The crankshaft must not be ground as it has been treated by soft nitriding to enhance the crankshaft strength.



Inspection and Repair

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

Crankshaft Journal and Crankpin Diameter

- Use a micrometer to measure the crankshaft journal diameter across points shown in the illustration.
- Use a micrometer to measure the crankshaft journal diameter at the two points as shown in the illustration (1) and (2).
- Repeat steps 1) and 2) to measure the crankpin diameter.

  If the measured values are less than the standard value, the crankshaft must be replaced.

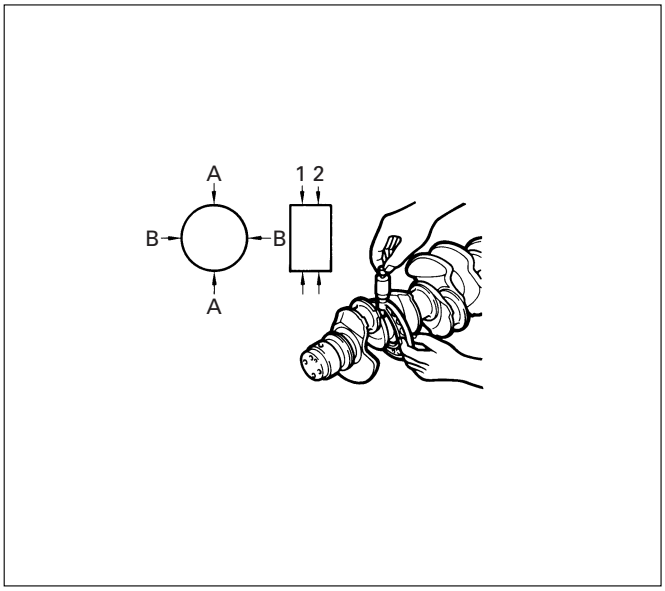
Crankshaft journal and Crankpin diameter

Standard

No. 4 journal: 104.850 – 104.875 mm (4.1279 – 4.1289 in.)

Others: 104.880 – 104.905 mm (4.1291 – 4.1309 in.)

Crankpin: 91.895 – 91.925 mm (3.6179 – 3.6191 in.)



Crankshaft Run-Out

- Set a dial indicator to the center of the crankshaft No. 4 journal.
- Gently turn the crankshaft in the normal direction of rotation.

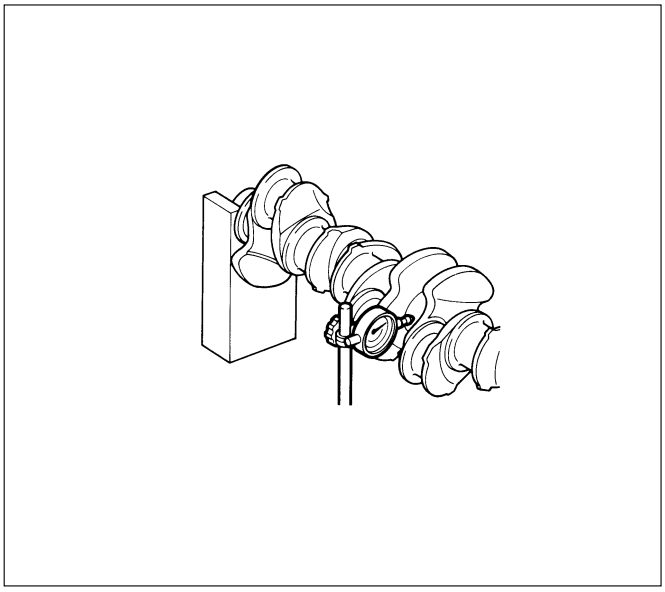
  Read the dial indicator as you turn the crankshaft.

  If the measured value exceeds the specified limit, the crankshaft must be replaced.

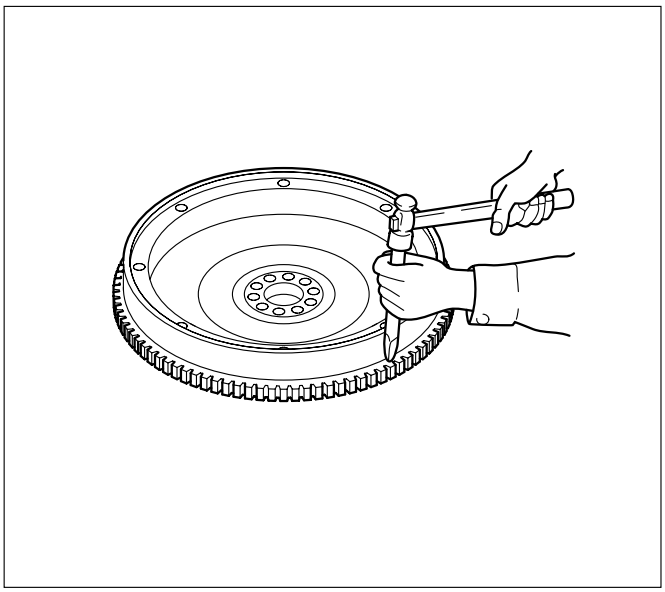
Crankshaft run-out

Standard: 0.120 mm (0.0005 in.)

Limit: 0.15 mm (0.0059 in.)

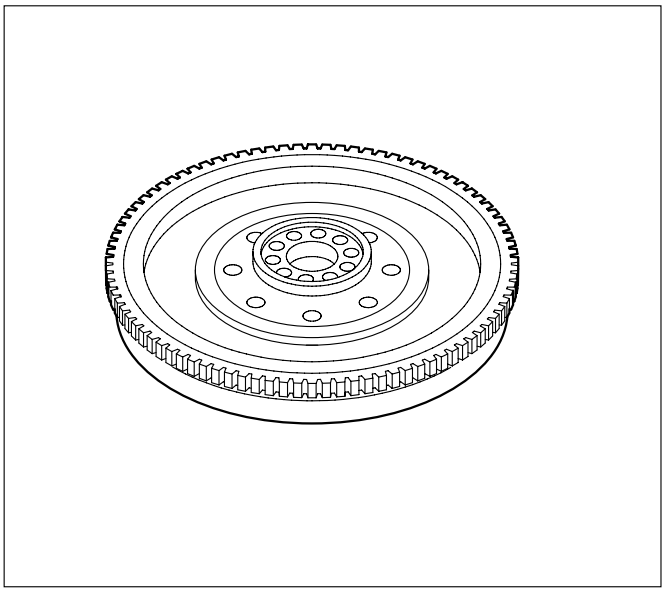


1. Loose the fixing bolts to remove flywheel from the crankshaft.
2. Put the flywheel with ring gear on the wood piece, and strike around the edges of the ring gear with a hammer and brass bar to remove it.



Inspection and Repair

1. Visually inspect the flywheel for cracking, scratching or worn out.
2. Visually inspect the ring gear for damage.



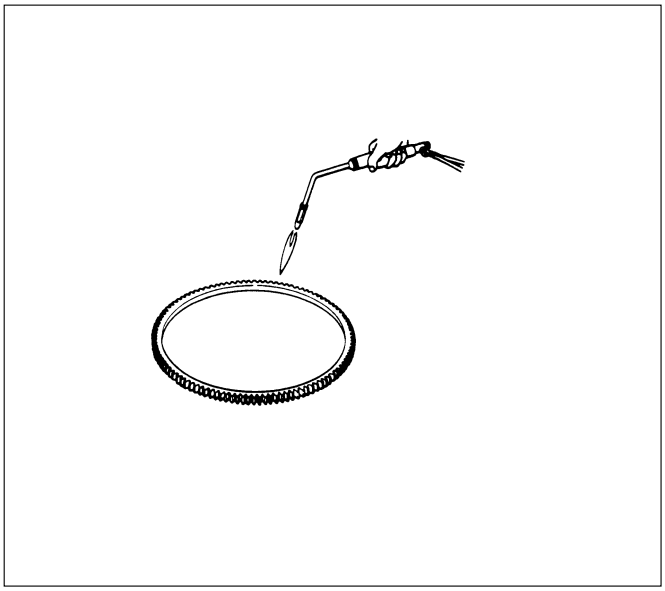
Reassembly

1. Heat the ring gear evenly with a burner to invite thermal expansion.

   Do not allow the temperature of the gas burner to exceed 200°C (390°F).
2. Install the ring gear to the flywheel when it is sufficiently heated.

   The ring gear must be installed with the chamfer facing the flywheel.

WARNING: Take care not to burn yourself on the heated ring gear.



ENGINE COOLING

CONTENTS

Service Precaution 6B-1
General Description 6B-2
Water Pump 6B-3
Disassembly 6B-4
Inspection and Repair 6B-5
Reassembly 6B-5
Thermostat 6B-8
Disassembly 6B-8
Inspection and Repair 6B-9
Reassembly 6B-10

Service precaution

CAUTION: Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (Paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.

ENGINE FUEL

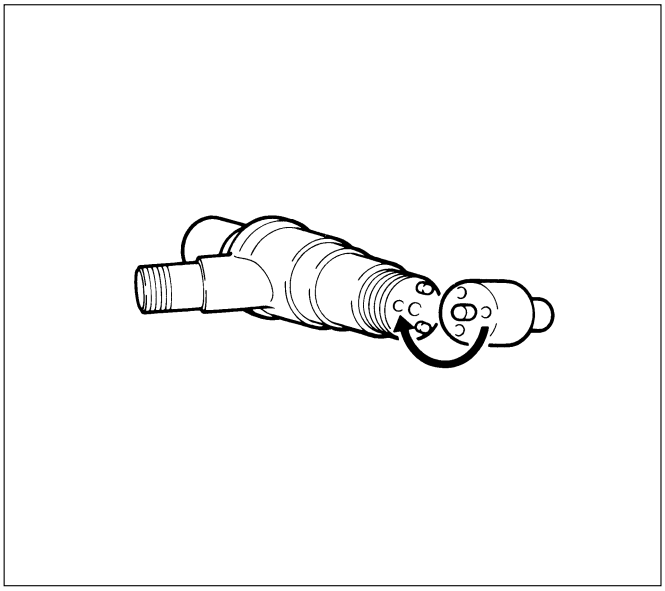
CONTENTS

Service Precaution 6C-1
General Description 6C-2
Fuel Filter 6C-5
Disassembly 6C-5
Inspection and Repair 6C-6
Reassembly. 6C-6
Injection Nozzle Holder 6C-7
Disassembly 6C-7
Inspection and Repair 6C-8
Reassembly. 6C-10
Injection Pump 6C-13
Identification 6C-13
Calibration Data. 6C-14
Injection Nozzle Holder – Two-Stage Injection Type 6C-17
Nozzle and Holder Specification 6C-17
Reassembly and Opening Pressure Adjustment 6C-18

Service precaution

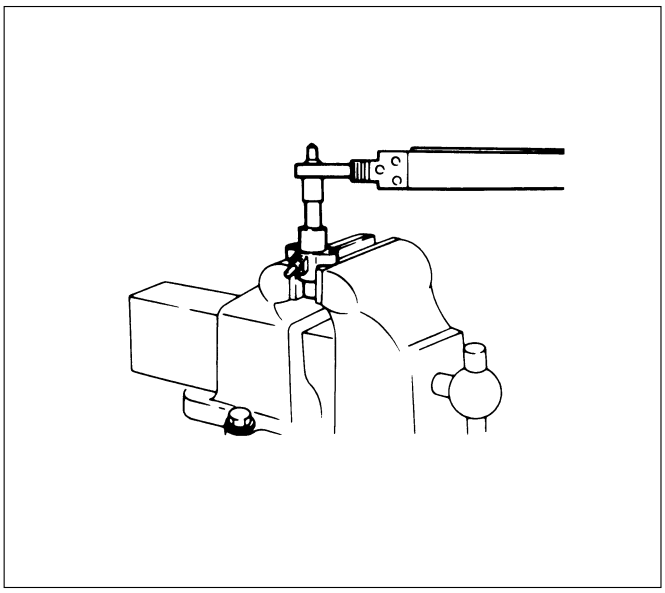
CAUTION: Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (Paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.

1. Install the locating pin to the nozzle holder body.
2. Install the adjusting shim, spring and spring seat into the nozzle holder body.
3. Install the spacer to the nozzle holder body over the locating pin.
4. Install the locating pin to the nozzle.
5. Install the nozzle to the nozzle holder.



6. Install the retaining nut
   - Clamp the injection nozzle holder in a vice.
   - Tighten the retaining nut to the specified torque.

   Torque: 93 N·m (9.5 kgm)



7. Install the new gasket to the nozzle holder.

Adjustment of Injection Nozzle Opening Pressure

After reassembling the injection nozzle, recheck the opening pressure and spray condition.
With the nozzle holder set to the nozzle tester, adjust the pressure with an adjusting shim so that the pressure becomes equal to the specified injection nozzle opening pressure.

Injection nozzle opening pressure: 20.1 MPa (2920 psi)

An adjusting shim of 0.007 mm (0.0003 in.) allows the press to change by about 100 kPa (14.2 psi).
The adjusting shim thickness calculation method as follows.

WARNING: The test fluid from the injection nozzle tester will spraying out of the injection nozzle under great pressure. It can easily puncture a person's skin. Keep your hands away from the injection nozzle at all times.

The adjusting shim thickness calculation method.

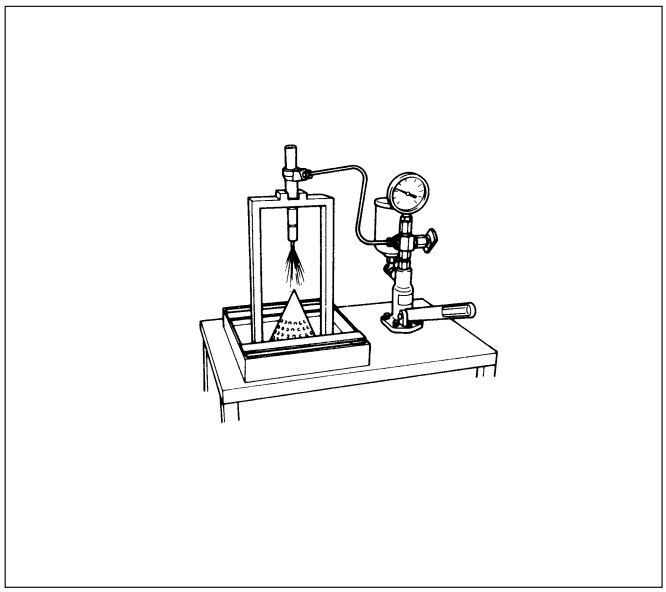
$$\frac{P \times \pi/4 \times (A^2 - B^2)}{C \times 100} = \text{Additional shim thickness (mm)}$$

P (kPa) = (Target injection nozzle opening pressure – Indicated value (pressure) of nozzle tester)

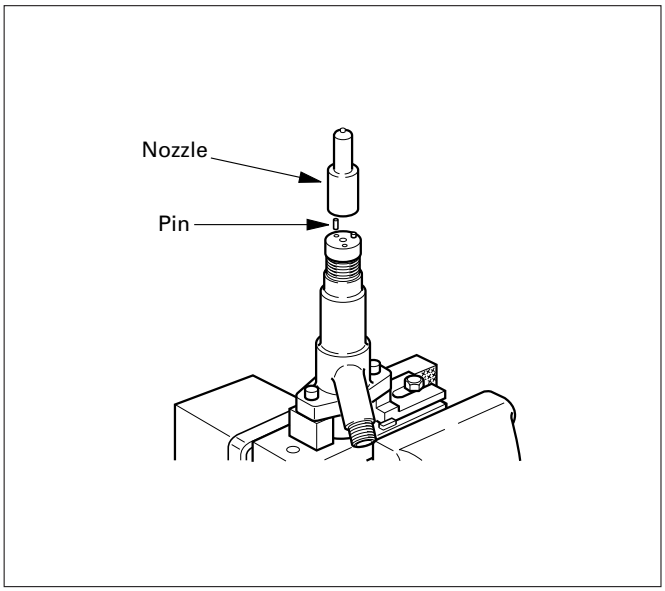
A (cm) = Needle diameter. 0.6 cm

B (cm) = Sheet diameter. 0.3 cm

C (N/mm) = Spring constant. 264.0 N/mm



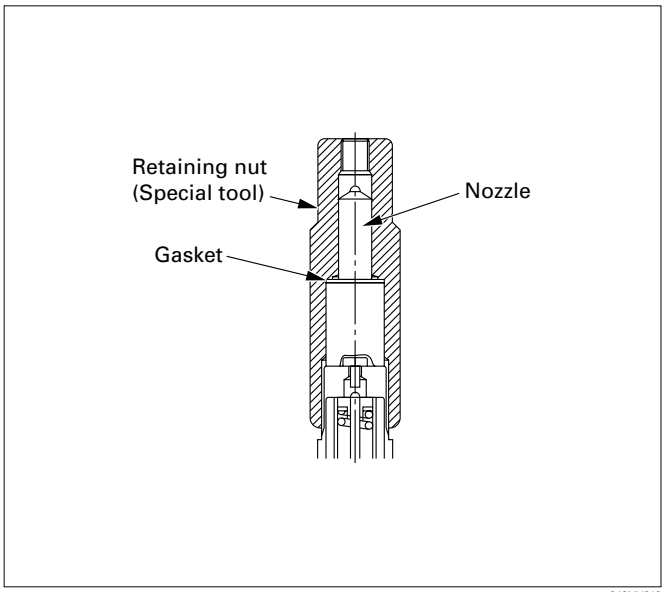
5. Install the pins in the spacer.
6. Install the nozzle on the spacer.



040MV019

7. Hand-tighten the adjustment retaining nut together with the gasket to the nozzle holder.

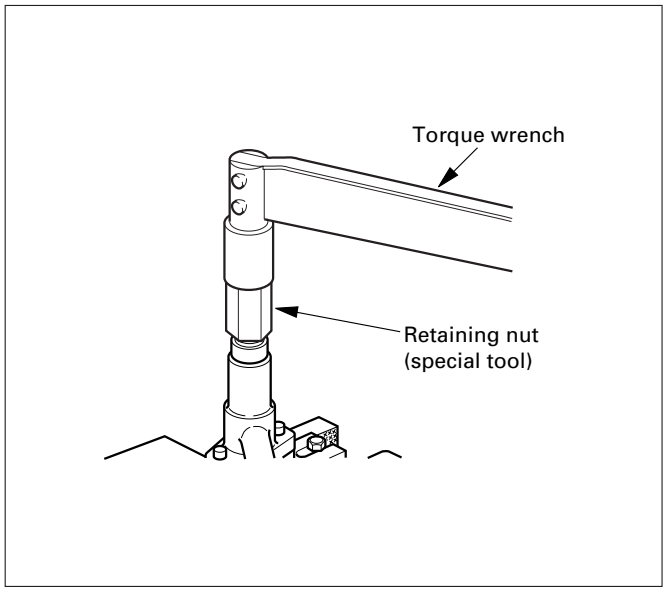
Retaining nut: 157892-4000 (★Bosch AS)
5-86777-145-0 (ISUZU)
Gasket: 157892-1500 (★Bosch AS)
5-86777-146-0 (ISUZU)
(★Bosch Automotive Systems Corporation)



040MV010

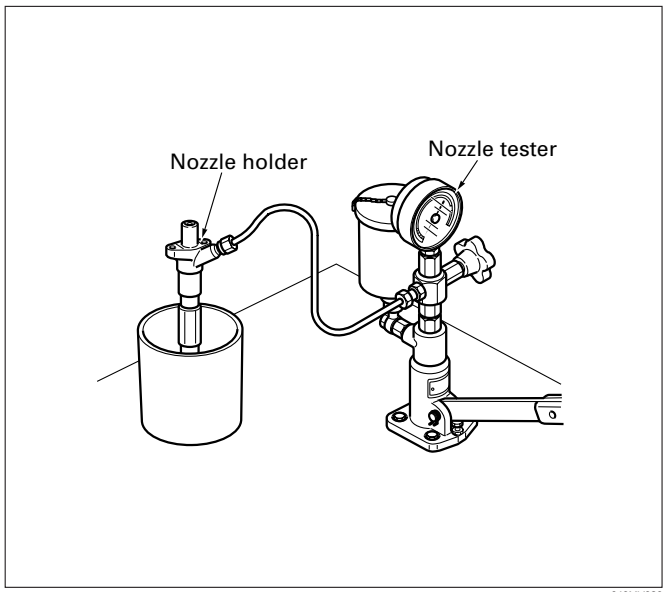
8. Tighten the adjustment retaining nut to the specified torque.

Torque: 34 N·m (3.5 kg·m / 25 lb·ft)



040MV014-1

9. Set the nozzle holder to the nozzle tester.
10. Operate the nozzle tester and measure the first nozzle opening pressure.
11. If the first nozzle opening pressure is not as specified, disassemble the nozzle holder and replace the shim until the pressure is as specified.

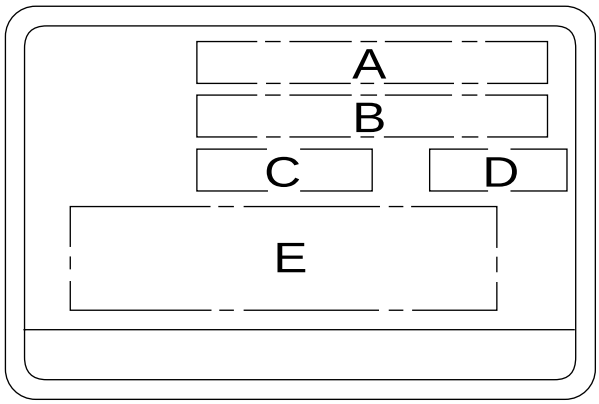


040MV030

Identification

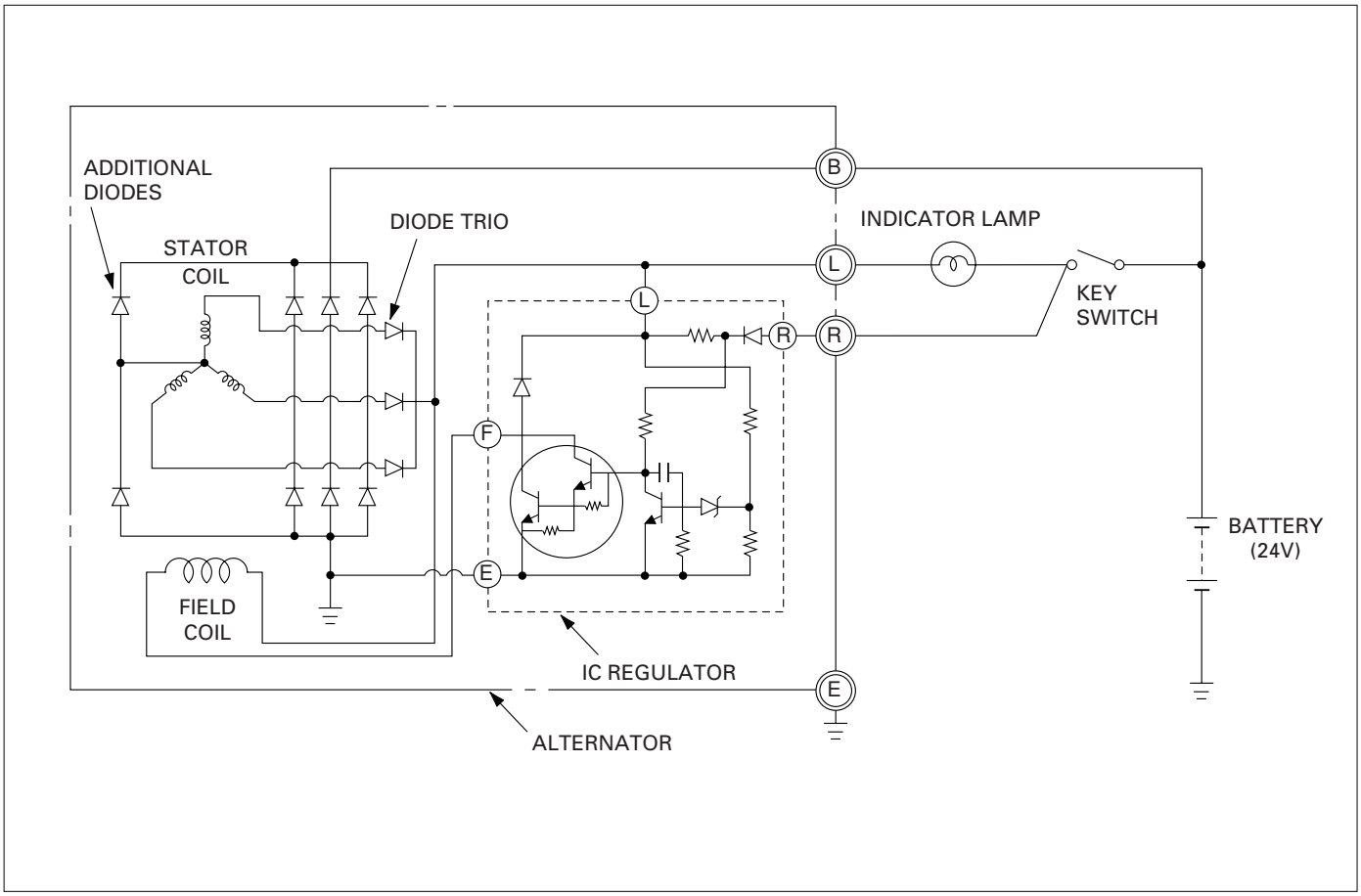
The alternator identification plate is attached to the alternator rear bracket. The ISUZU part number, the manufacturer's code number, and other important information are stamped on the plate.
Refer to the identification plate together with the "Main Data and Specifications" Tables and accompanying charts in this Manual when requesting service assistance from a qualified electrical repair shop.
If you are unable to locate the data applicable to your engine, please contact ISUZU MOTORS LIMITED through your machine supplier.

MITSUBISHI IDENTIFICATION PLATE



A: Isuzu part number
B: Manufacturer's short type name
C: System voltage output
D: Manufacturer's lot no.
E: Bar code

Charging Circuit



Identification

MITSUBISHI starter motor is identified by the name plate attached to the yoke. (Illustration)

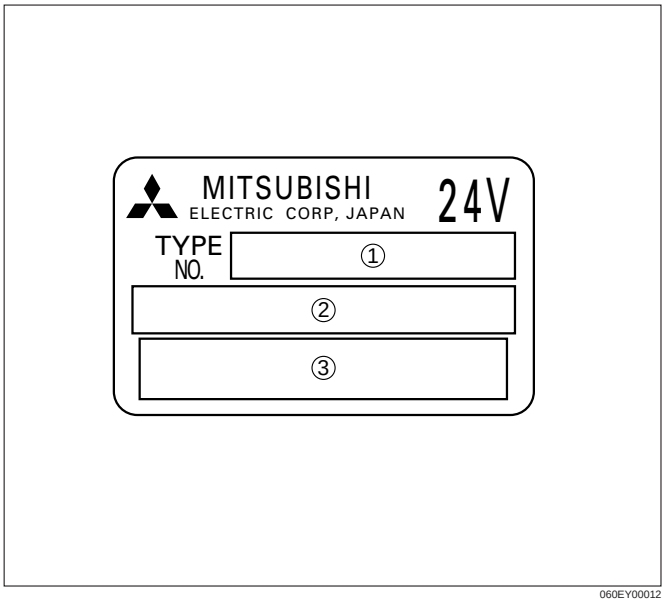
(1) Manufacturer's type

(2) Isuzu part number

(3) Bar code

NOTE: Always check the identification number before beginning a service operation.

Applicable service data will vary according to the identification number. Use of the wrong service data will result in starter damage.



060EY00012

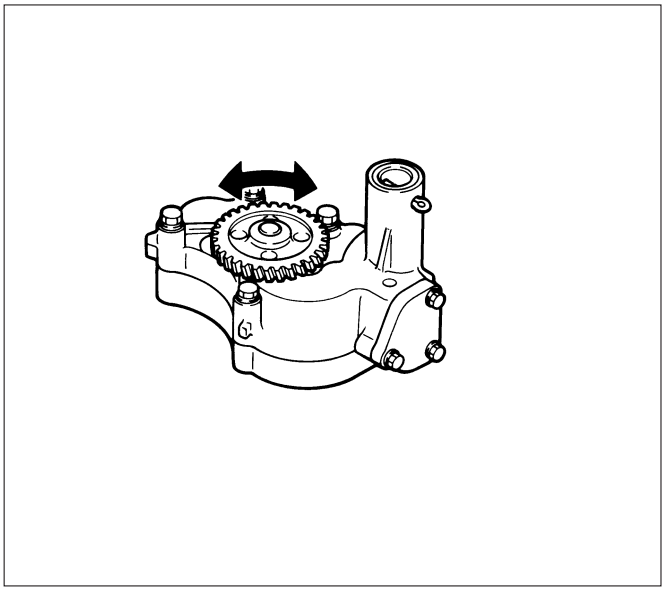
ENGINE LUBRICATION

CONTENTS

Service Precaution 6G-1
General Description 6G-2
Oil Pump 6G-4
Disassembly 6G-5
Inspection and Repair 6G-6
Reassembly 6G-9
Oil Cooler 6G-12
Disassembly 6G-12
Inspection and Repair 6G-13
Reassembly 6G-14

Service precaution

CAUTION: Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (Paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.



CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO DOWNLOAD THE COMPLETE MANUAL