TB80FR

Compact Excavator

BOOK No. CL4E000

WORKSHOP MANUAL

Serial No. 17820001~

TAKEUCHI

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SAFETY PRECAUTIONS

SAFETY ALERT SYMBOL

This symbol means Attention! Be Alert! Your Safety Is Involved.
The message that follows the symbol contains important information about safety.
Read and understand the message to avoid personal injury or death.

■ SIGNAL WORDS

Safety messages appearing in this manual and on machine decals are identified by the words "DANGER", "WARNING" and "CAUTION". These signal words mean the following:

⚠ DANGER	⚠ WARNING	⚠ CAUTION
The word "DANGER" indicates an imminently hazardous situation which, if not avoided, can result in serious injury or death.	The word "WARNING" indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.	The word "CAUTION" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT: The word "IMPORTANT" is used to alert against operators and maintenance personnel about situations which can result in possible damage to the machine and its components.

This manual is intended for trained and qualified personnel only. Warnings or cautions described in this manual do not necessarily cover all safety measures. For maintenance work, each person must take adequate safety precautions against possible hazards present in the respective working environment.

Observe all safety rules

- Operation, inspection and maintenance of this machine must be performed only by a trained and qualified person.
- All rules, regulations, precautions and safety procedures must be understood and followed when performing operation, inspection and maintenance of this machine.
- Do not perform any operation, inspection and maintenance of this machine when under the adverse influence of alcohol, drugs, medication, fatigue, or insufficient sleep.

Wear appropriate clothing and personal protective equipment

- Do not wear loose clothing or any accessory that can catch on controls or in moving parts.
- Do not wear oily or fuel stained clothing that can catch fire.


E3A040

- Wear a hard hat, safety shoes, safety glasses, filter mask, heavy gloves, ear protection and other protective equipment as required by job conditions. Wear required appropriate equipment such as safety glasses and filter mask when using grinders, hammers or compressed air, as metal fragments or other objects can fly and cause serious personal injury.
- Use hearing protection when operating the machine. Loud prolonged noise can cause hearing impairments, even the total loss of hearing.

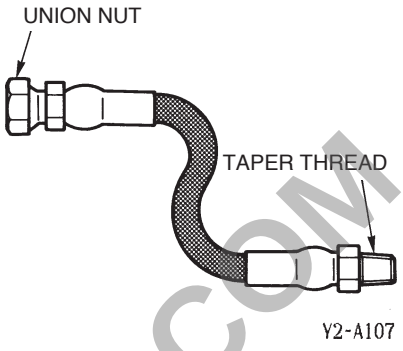
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TIGHTENING TORQUES

Hydraulic Hoses

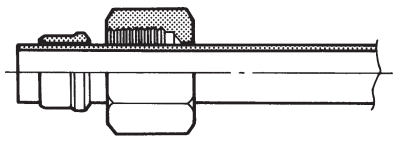
Hose Fitting Size	Torque			
	Union Nut (G)		Taper Thread (R)	
	N·m	ft-lb	N·m	ft-lb
1/8	9.8 $^{+4.9}_{0}$	7.3 $^{+3.5}_{0}$	11.8 ±1.2	8.7 ±0.8
1/4	24.5 $^{+4.9}_{0}$	18.1 $^{+3.5}_{0}$	29.4 ±2.9	21.7 ±2.1
3/8	49 $^{+4.9}_{0}$	36.2 $^{+3.5}_{0}$	53.9 ±5.4	39.8 ±3.9
1/2	58.8 $^{+4.9}_{0}$	43.4 $^{+3.5}_{0}$	88.3 ±8.8	65.1 ±6.4
3/4	117.7 $^{+4.9}_{0}$	86.8 $^{+3.5}_{0}$	147.1 ±14.7	108.5 ±10.7
1	137.3 $^{+4.9}_{0}$	101.3 $^{+3.5}_{0}$	196.1 ±19.6	144.7 ±14.3



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Bite Type Pipe Fitting for Steel Pipe

Pipe Outer Diameter (mm)	Torque	
	N·m	ft-lb
8	34.3 ±4.9	25.3 ±3.5
10	41.7 ±2.5	30.7 ±1.7
12	58.8 ±4.9	43.4 ±3.5
15	88.3 ±4.9	65.1 ±3.5
16	93.2 ±4.9	68.7 ±3.5
18	132.4 ±4.9	97.6 ±3.5
22	205.9 ±9.8	151.8 ±7.2
27.2	245.2 ±9.8	181.0 ±7.2
28	313.8 ±19.6	231.4 ±14.3
32	313.8 ±19.6	231.4 ±14.3
35	411.9 ±19.6	303.7 ±14.3


Y2-A108

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SPECIFICATION TABLES

SPECIFICATIONS

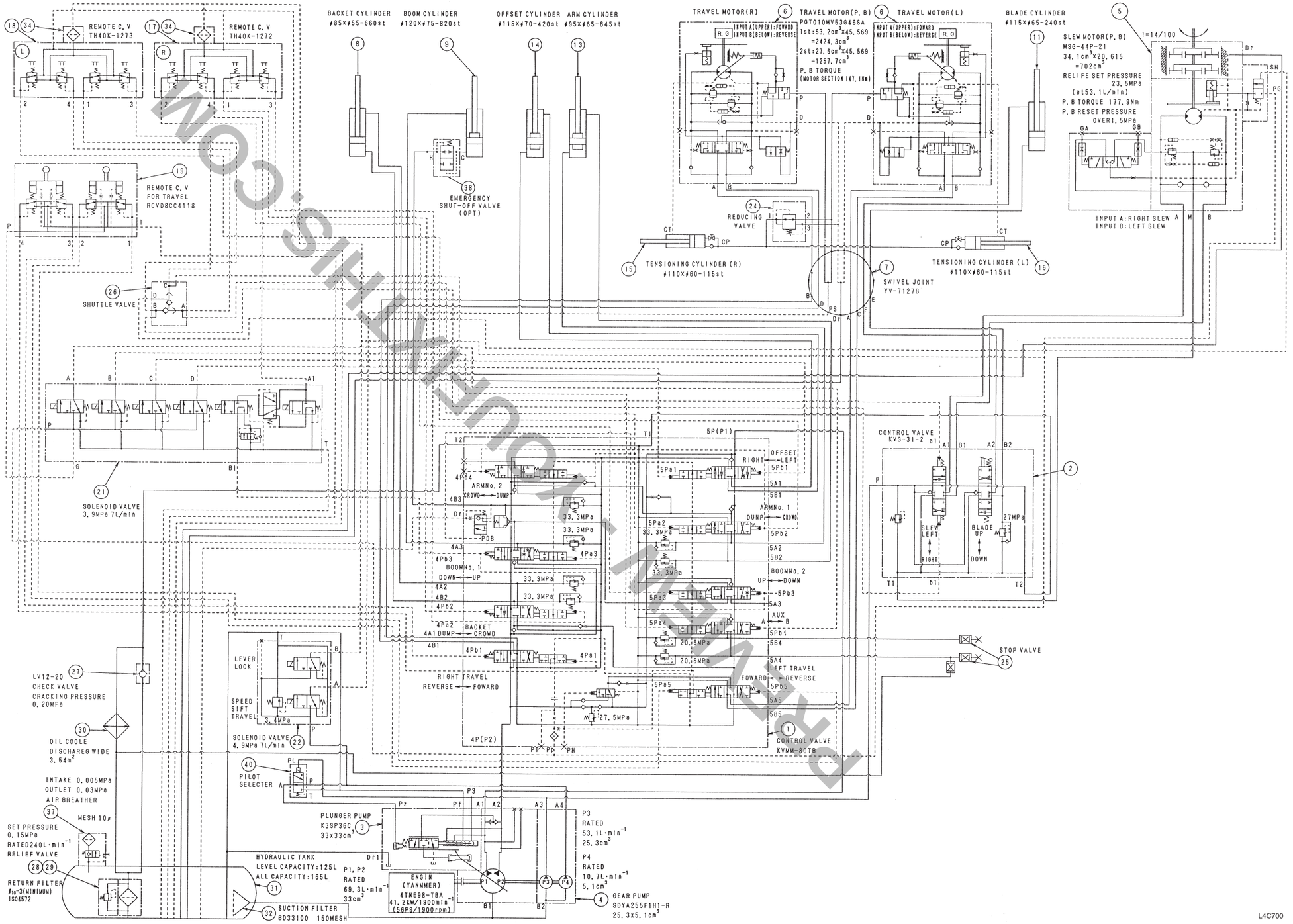
Serial Number		17820001~
Machine Type		Cab
Machine Mass (not including operator)		
Rubber Crawler	kg	8005
Steel Crawler	kg	8130
Engine Rated Output	kW/min^{-1}	41.2/1900
Bucket Capacity (Standard Bucket)		
Rated Capacity	m^3	0.245
Struck Capacity	m^3	0.165
Performance		
Slew Speed	min^{-1}	10.4
Travel Speed: Rubber Crawler 1st/2nd	km/h	2.8/5.2
Steel Crawler 1st/2nd	km/h	2.7/5.0
Gradeability	% (degree)	58 (30)
Ground Pressure: Rubber Crawler	kPa	35.6
Steel Crawler	kPa	36.1
Noise Level: Sound-power	dB (A)	—
Sound-pressure level	dB (A)	—
Auxiliary Hydraulic Flow Rate	L/min	69.3
Dimensions		
Overall Length in Transport Position	mm	6150
Overall Width	mm	2300
Overall Height	mm	2715
Dimensions of Base Machine		
Tail Swing Radius	mm	1150
Distance of Rearmost Upper Structure from Axis of Rotation	mm	1150
Clearance Height under Upper Structure	mm	725
Crawler base	mm	2195
Crawler: Overall Length	mm	2830
Overall Width	mm	2300
Crawler Shoe Width	mm	450
Minimum Ground Clearance	mm	345

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HYDRAULIC SYSTEM

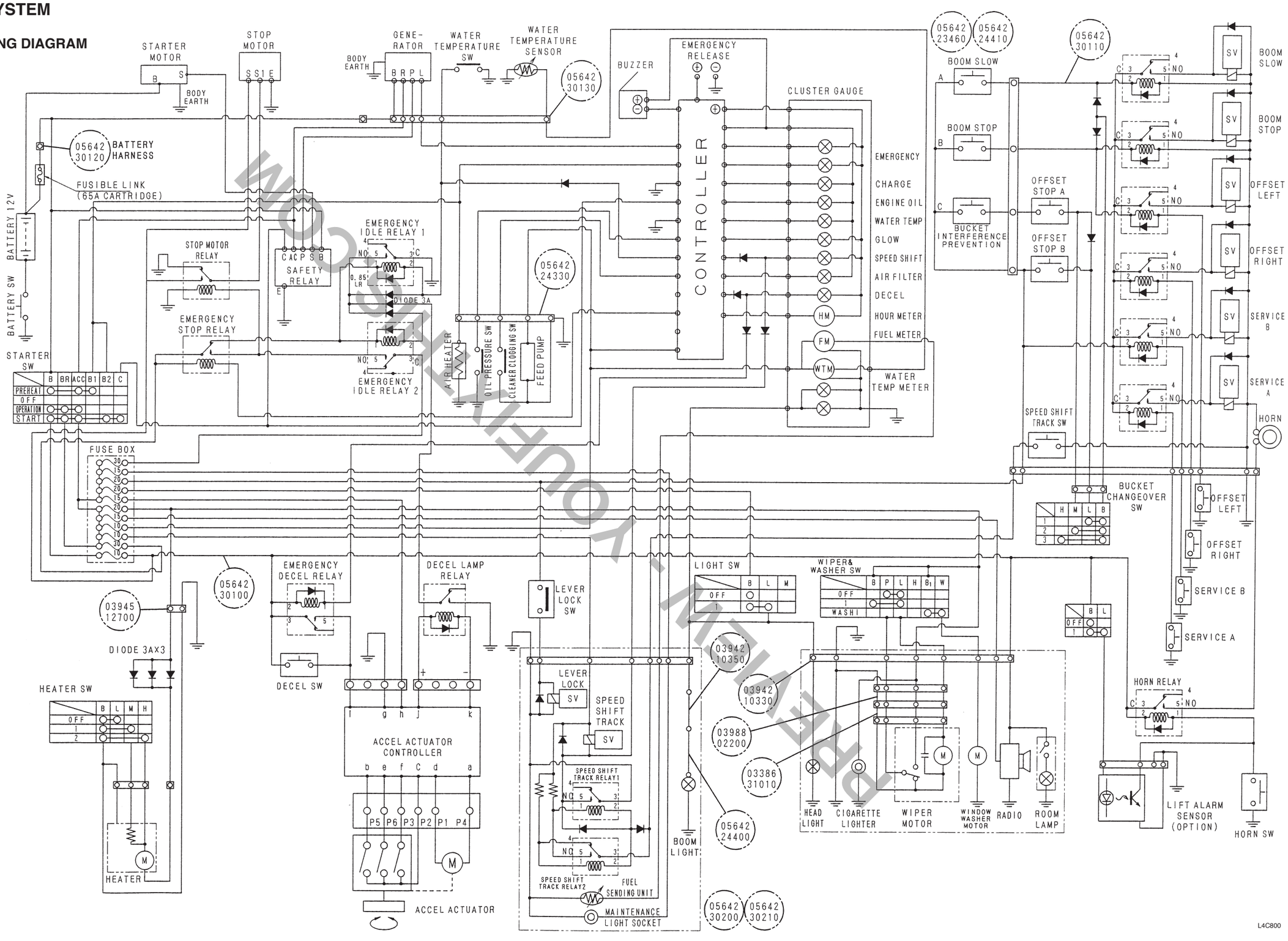
HYDRAULIC CIRCUIT DIAGRAM



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ELECTRICAL SYSTEM

ELECTRICAL WIRING DIAGRAM

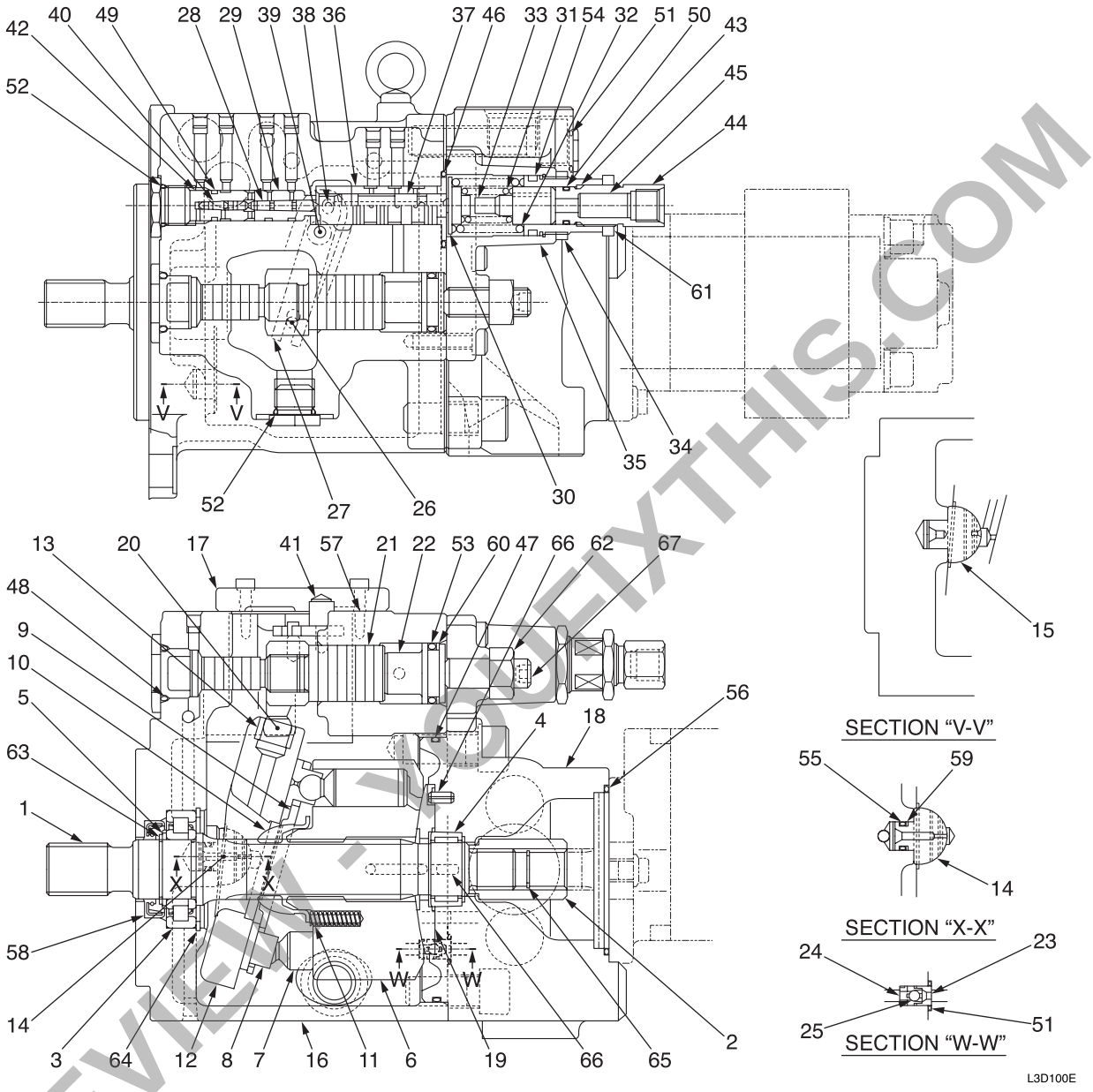


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Sofinox - Wiring

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HYDRAULIC PUMP

CONSTRUCTION



1. Shaft
2. Coupling
3. Collar Bearing
4. Needle Bearing
5. Spacer
6. Cylinder Block
7. Piston
8. Shoe
9. Shoe Holder
10. Guide
11. Spring
12. Swash Plate
13. Bushing
14. Pin
15. Pin
16. Housing
17. Cover
18. Cover
19. Valve Plate
20. Pin
21. Piston
22. Stopper
23. Seat
24. Stopper
25. Ball
26. Pin
27. Lever
28. Piston
29. Case
30. Spring Seat
31. Spring
32. Spring
33. Stem
34. Nut
35. Cover
36. Sleeve
37. Spool
38. Pin
39. Pin
40. Piston
41. Pin
42. Case
43. Set Screw
44. Stem
45. Piston
46. O-ring
47. O-ring
48. O-ring
49. O-ring
50. O-ring
51. O-ring
52. O-ring
53. O-ring
54. O-ring
55. O-ring
56. O-ring
57. Packing
58. Oil Seal
59. Backup Ring
60. Backup Ring
61. Nut
62. Nut
63. Ring
64. Ring
65. Ring
66. Spring Pin
67. Set Screw

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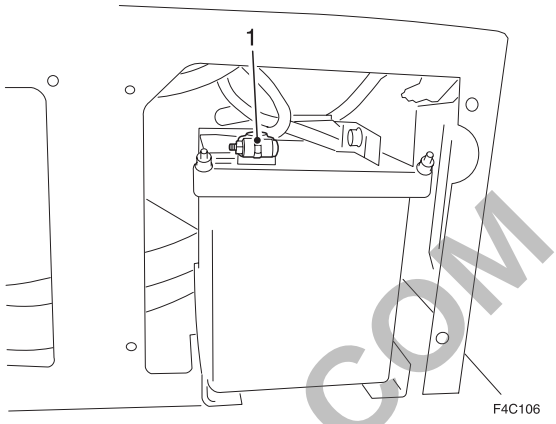
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DRIVE SYSTEM

DISASSEMBLY AND ASSEMBLY

Removing the Engine

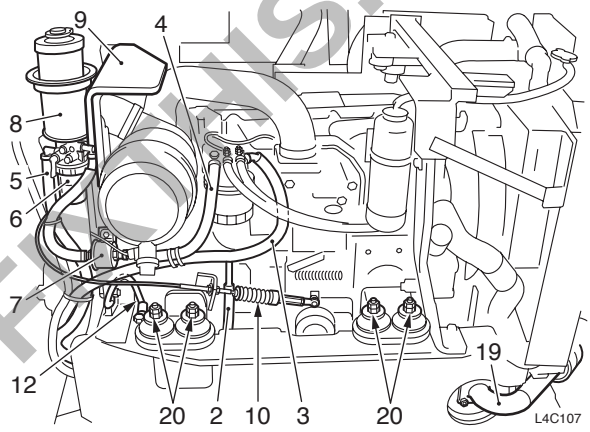
1. Disconnect the battery ground cable (1) from the battery.



2. Remove the engine hood and side cover.
   ☞ "Removing the Covers"

3. Remove the counterweight.
   ☞ "Removing the Upper Frame"

4. Tilt up the floor frame.

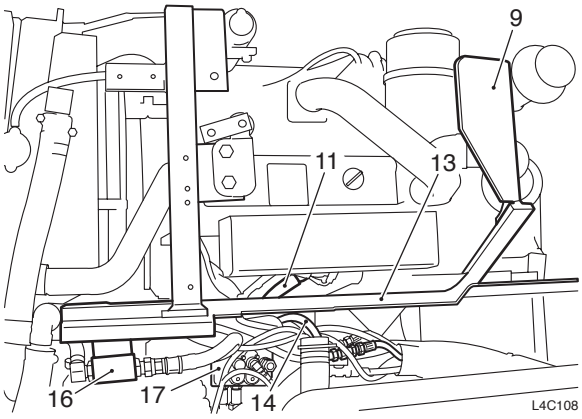


5. Remove the hydraulic tank.
   ☞ "Removing the hydraulic tank"

6. Remove the radiator and oil cooler.
   ☞ "Removing the Radiator and Oil Cooler"

7. Disconnect the coolant drain hose (2).

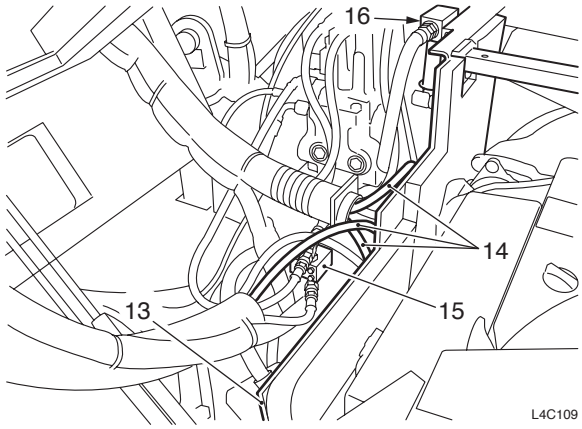
8. Close the valves and disconnect two heater hoses.



9. Disconnect the fuel hoses (3) and (4) from the engine.

10. Disconnect the fuel hose (5) from the water separator (6).

11. Disconnect the electric wiring to the feed pump (7).



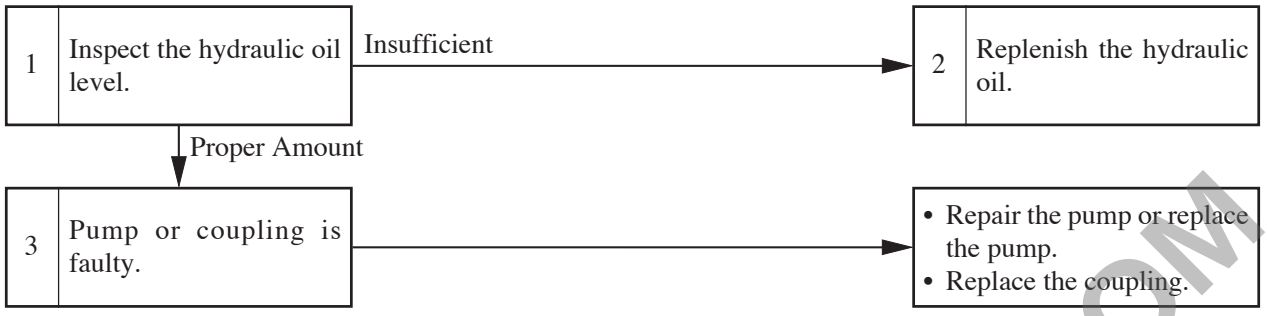
12. Remove the filler cap (8) from the bracket (9).
    - Remove the filler cap with hose attached and put it on the fuel tank.

13. Remove the water separator (6) and the feed pump (7) together with the bracket (9).

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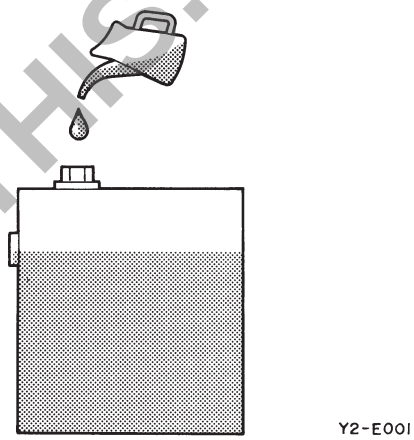
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NO OPERATIONS CAN BE DONE.



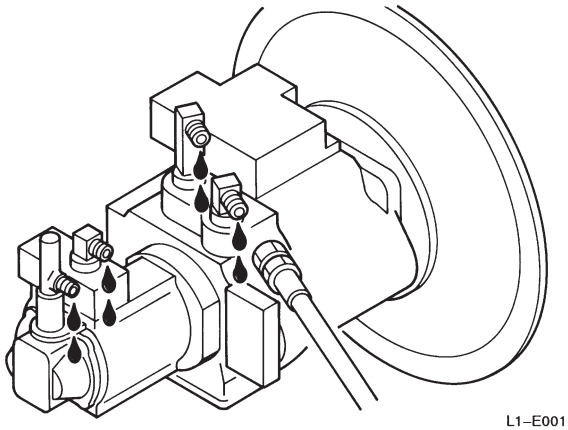
1. Inspect the hydraulic oil level.
   ☞ "III. Machine Configuration, Hydraulic Tank"

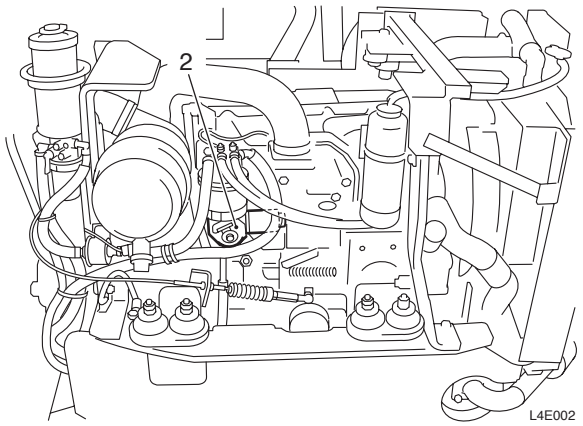
2. Replenish the hydraulic oil.
   Take out the plug and replenish the hydraulic oil.
   - The hydraulic oil supplied should be the same brand as the oil currently in the tank.
     ☞ "II. Specifications, Fluid Capacities"


Y2-E001

3. Pump or coupling is faulty.
   a. Disconnect the discharge hose from the pump side.
      Also fit a plug in the disconnected hose to keep the hydraulic oil from pouring out.
   b. Disconnect the electrical wiring to the engine stop solenoid (2).
   c. Turn the engine over using the starting motor and inspect if hydraulic oil is discharged by the pump.
      - The throttle lever should be in the engine stop position.

   If the pump is normal, hydraulic oil will be discharged from it. If hydraulic oil is not discharged, the pump or the coupling is faulty.


L1–E001



L4E002

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RECOMMENDED LUBRICANTS

Use different fuels, lubricants and greases according to the temperature, referring to the chart below.

- Change the lubricant earlier than as shown in the table if it is extremely dirty or its performance has deteriorated severely.
- Whenever possible, use the same brand of lubricant as before. If changing with a different brand, replace the entire quantity – do not mix different brands.

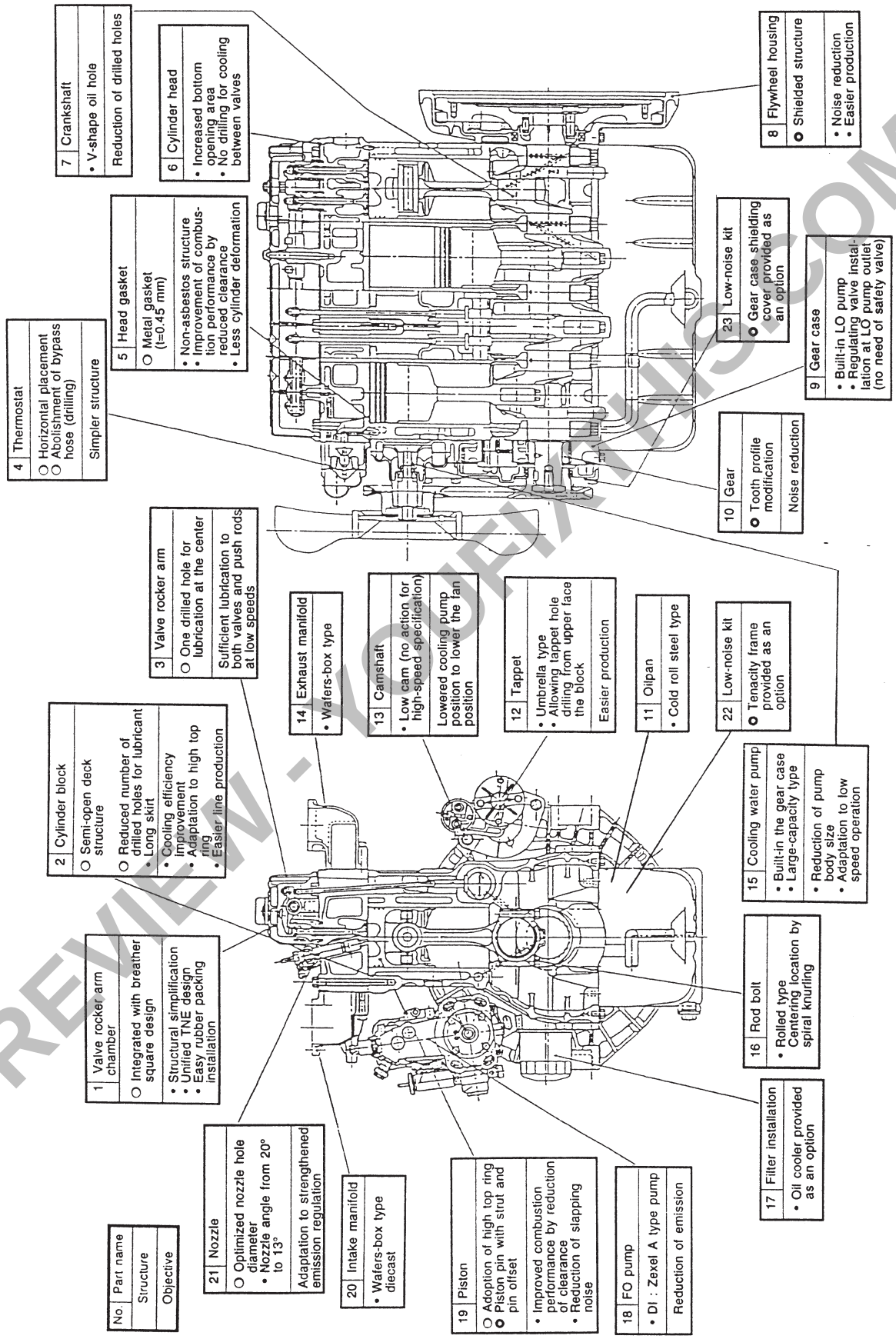
Part	Type	Type by temperature -22 -4 14 32 50 68 86 104°F -30 -20 -10 0 10 20 30 40°C	Replacement interval	Capacity
Engine oil pan	Diesel engine oil API service CD	SAE 5W-20 SAE 10W-30 SAE 15W-40	After first 50 hrs. Every 250 hrs.	Upper limit: 10.2 L Lower limit: 5.7 L
Hydraulic tank	Antiwear hydraulic oil (Option: Biodegradable oil)	ISO VG68 ISO VG46 ISO VG32	Every 2000 hrs.	Total system: 165 L Tank level: 125 L
Fuel tank	Diesel fuel	Use a clean, Quality fuel for performance and optimum engine life. • To prevent fuel flow problems in cold weather, use diesel fuel with a pour point of at least -12°C (10°F) below the lowest expected ambient temperature. • Minimum cetane number is 45. Low temperature or high altitude operation may require the use of fuel with a higher cetane number.		100 L
Engine cooling system	Coolant (water**+Coolant***)	30% coolant mixture 50% coolant mixture	Every 1000 hours	9.5 L
Travel reduction gear	Gear oil API-GL-4	SAE 90	After first 250 hrs.* Every 1000 hrs.	1.5 L
Carrier Roller	Diesel engine oil API service CD	SAE 30	—	150 mL
Track Roller	Mobil gear SHC 680	——	—	170 mL
Idler	Diesel engine oil API service CD	SAE 30	—	150 mL
Slew Grease Bath	Lithium based grease EP-2 NLGI No. 2	——	—	8.5 L
Slew bearing		——	Every 50 hrs.	As required
Working equipment		——	Daily or every 10 hrs.	
Levers		——	When required	

* If the percentage of the traveling time within the total operating time is high, replace the gear oil earlier than the specified time.
** For water, use tap water (soft). Do not use well or river water.
*** When the ambient temperature drops below 0°C, add coolant (antifreeze). Follow the coolant manufacture's instructions to determine the mixture ratio.

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1.5 Structural Description



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FOREWORD

This manual is intended for persons who engage in maintenance operations, and explains procedures for disassembly and reassembly of the machine, check and maintenance procedures, maintenance reference values, troubleshooting and outline specifications, etc. Please use this manual as a reference in service activities to improve maintenance techniques.
Further, please be advised that items contained in this manual are subject to change without notice due to design modifications, etc.

MACHINE FRONT AND REAR, LEFT AND RIGHT

The end where the dozer blade is mounted is the front and the end with the travel motors is the rear. Also the right and left sides of the operator when he is seated in the driver's seat are the right and left sides of the machine.

MACHINE SERIAL NUMBER

The machine serial number is stamped on the identification plate. When sending reports and inquiries, and when ordering parts, etc., be sure to include this number.

MANUAL CONTROL

Information on those to whom this manual is distributed is recorded in the ledger in the section in charge at this company, so please decide on a person to be in charge of it and control it. When there are updates or additions, etc., we will notify the person in charge.

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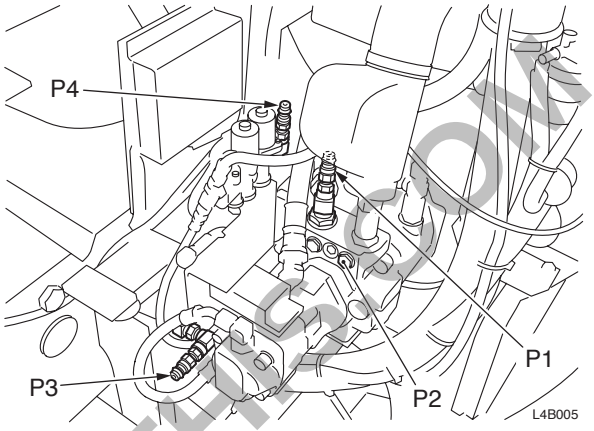
METHODS FOR INSPECTING PERFORMANCE

Hydraulic Oil Pressure (Main Relief Valve Set Pressure)

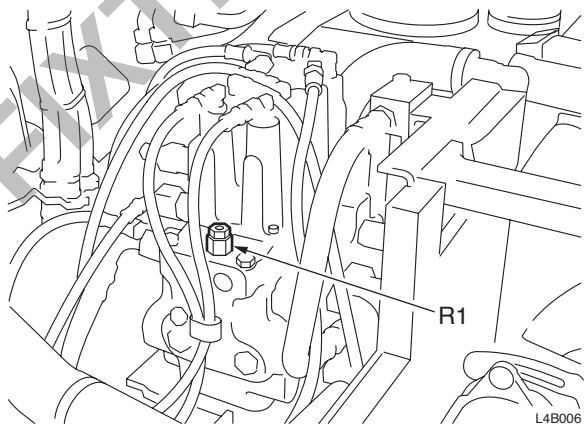
Boom, Arm

Measuring Method

- Engine : Rated r.p.m.
- Hydraulic Oil Temp. : 50~60°C
- Mount the pressure gauge on the pressure detection port, operate the desired hydraulic circuit and measure the relief pressure.

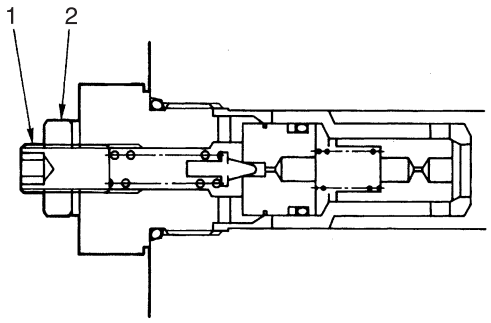


Circuit	Pressure Detection Port		Relief Valve
	Port Position	Size	
Boom	P1	G1/4	R1
Arm	P2	G1/4	



Adjusting Method

1. Loosen locknut (2), then begin adjusting pressure by turning setting screw (1).
   Turning clockwise ..... raises the set pressure.
   Turning counterclockwise .... lowers the set pressure.
2. In order to keep the setting screw from turning after pressure has been adjusted, tighten the locknut while at the same time holding the setting screw firmly in place.
3. Operate the relief valve once more to confirm that the pressure that has been set it stabilized.



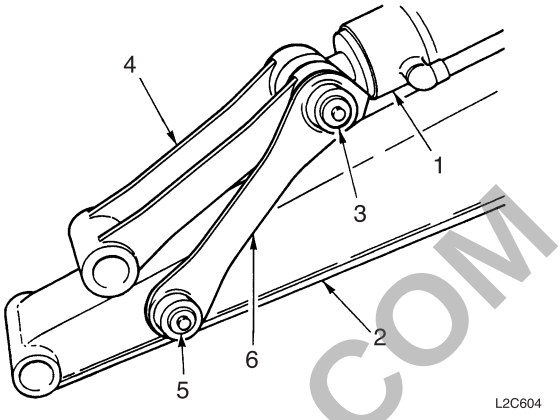
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Removing the Links

- Fully retract the bucket cylinder (1) and ground the end of the arm (2).

1. Push out the pin (3) on the rod side and remove the bucket link (4).
   a. Guide links (6) ..... Be careful not to drop
   b. Cylinder (1) ..... Set on a tie
   c. Bucket link (4) ..... Attach and tighten hoisting cable
2. Push out the link installation pin (5), then remove the guide links (6).



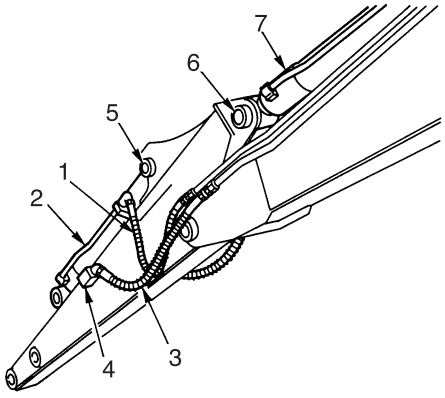
L2C604

Installing the Links

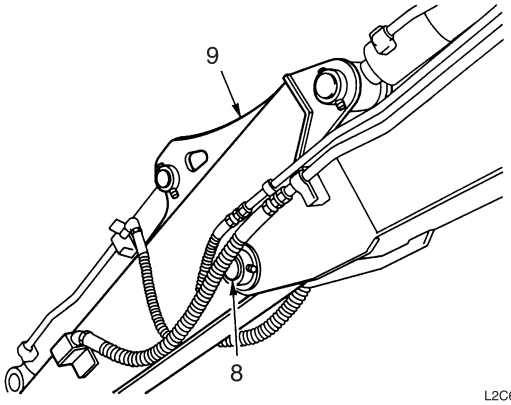
Follow the procedure used for removal in reverse order.

Removing the Arm

1. Disconnect hydraulic hoses (1) from the bucket cylinder (2). Next, disconnect hydraulic hoses (3) from the auxiliary ports (4).
2. Push out the pin (5) on the head side, then hoist the bucket cylinder (2).
   - Attach and tighten the hoisting cable to the cylinder beforehand.
   - Bucket cylinder: 43 kg
3. Push out the pin (6) on the rod side and detach the rod side of the arm cylinder (7).
   - Set the cylinder on a tie beforehand.
4. Push out the boom point pin (8) and hoist the arm (9).
   - Attach and tighten the hoisting cable to the arm beforehand.
   - Arm: 118 kg



L2C605



L2C606

Installing the Arm

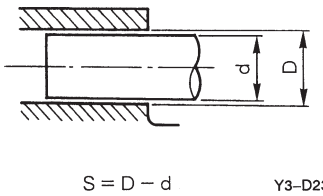
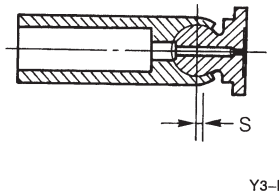
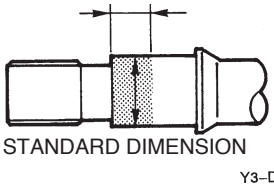
Follow the procedure used for removal in reverse order.

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INSPECTION AND ADJUSTMENT

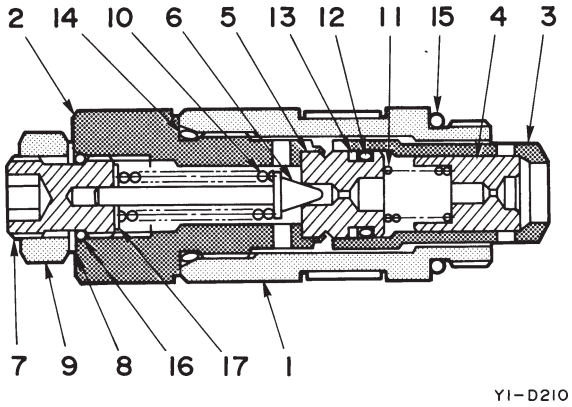
Checking the Parts

Parts		Judgment Criteria	Treatment
Piston and cylinder block assembly		• A clearance S of 0.05 mm or more between the piston and the cylinder block • Occurrence of scratches, scoring, abnormal wear, etc. on sliding parts	• Exchange • Exchange.
Slack of the piston shoe		• A slack S of 0.2 mm or more for the piston shoe	• Exchange
Shaft and oil seal installation part		• A wear amount of 0.025 mm at the installation part of shaft and oil seal	• Exchange
Valve plate		• No abnormal scratches (0.02 mm or more), wear, or sticking for the sliding surfaces	• Correct by lapping or exchange.
Bushing		• No abnormal wear or harmful scratches of the sliding surfaces	• Exchange
Seals and O-rings		• At the time of reassembly after disassembly	• Exchange
Drive gear and driven gear		• No abnormal scratches, wear, or flaking of the tooth surfaces	• Exchange
Ball bearings and needle bearings		• No abnormal scratches, wear, or flaking of the rolling surfaces	• Exchange the shaft and the assembly.

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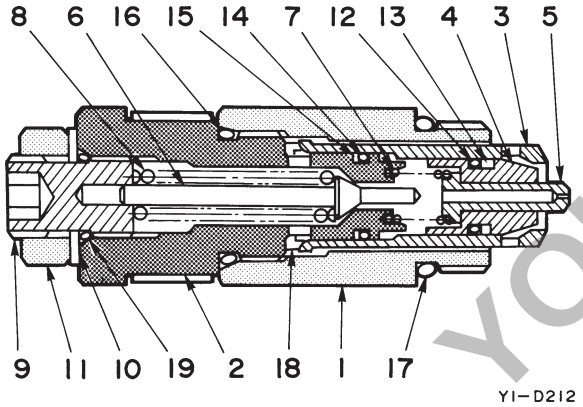
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Main Relief Valve



1. Housing
2. Plug
3. Sleeve
4. Main Poppet
5. Piston
6. Needle Valve
7. Set Screw
8. Washer
9. Lock Nut
10. Spring
11. Spring
12. O-ring
13. Backup Ring
14. O-ring
15. O-ring
16. O-ring
17. Washer

Port Relief Valve



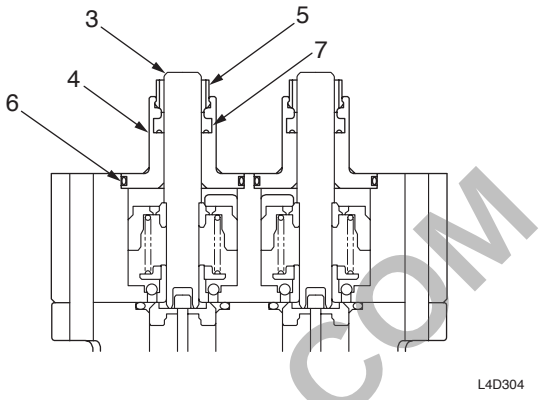
1. Housing
2. Plug
3. Sleeve
4. Main Poppet
5. Piston
6. Needle Valve
7. Spring
8. Spring
9. Set Screw
10. Washer
11. Lock Nut
12. O-ring
13. Backup Ring
14. O-ring
15. Backup Ring
16. O-ring
17. O-ring
18. Wave Washer
19. O-ring

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5. Remove the push rods (3) together with the plugs (4).
   - Be careful not to let the push rod fly out from the spring's force.

6. Take out the plug (4) then remove the cap (5), the O-ring (6) and seal (7) from the plug.
   - Be careful not to let the plug fly out from the spring's force.

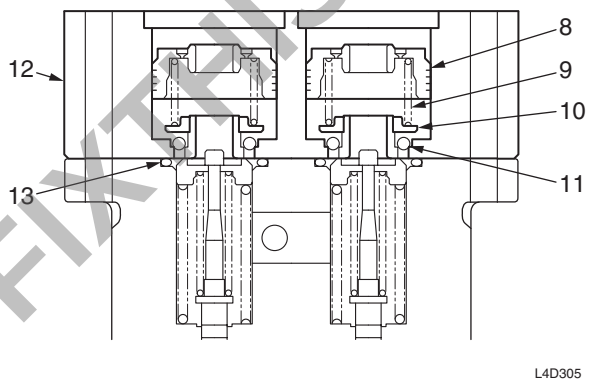


7. Remove the pistons (8) and springs (9).

8. Remove the spring sates (10).

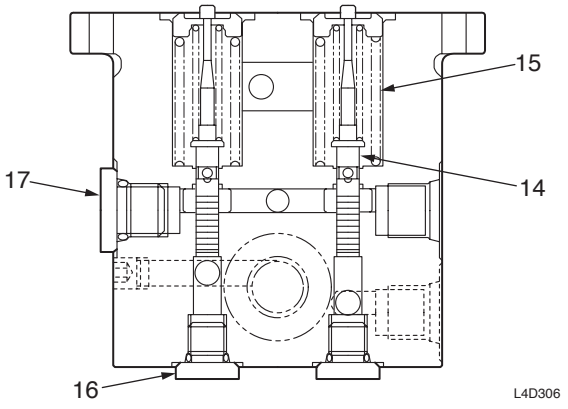
9. Remove the balls (11).
   - Use a magnet.

10. Remove the Casing (12) and O-ring (13).



11. Remove the spool assembly (14) and spring (15) from the casing.
    - Never disassemble the spool assembly as the pressure has been adjusted by the shim.

12. Take out the plugs (16) and (17) then remove the O-ring from the plugs.



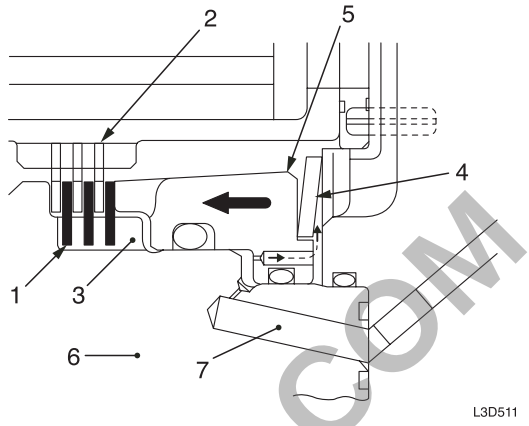
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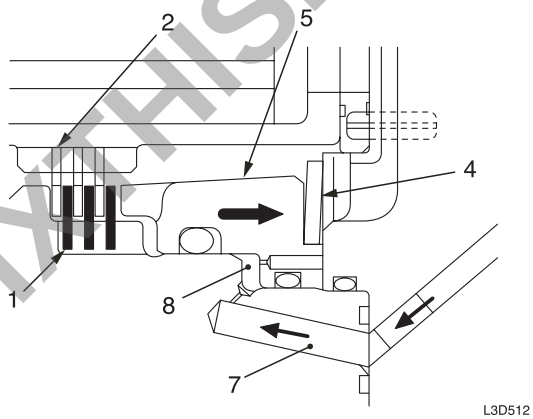
Parking brake

The center discs (1) are connected to the flange holder and the friction discs (2) are connected to the cylinder block (3) via the spline, respectively. The center discs (1) and friction discs (2) are pressed against the flange holder (6) by the spring (4) via the brake piston (5). The friction force between these discs generates the brake torque to prevent the cylinder block (3) from rotating.

When the pressure oil is introduced into the motor, the spool of the counterbalance valve moves and the oil flows from the parking brake release port (7) into the brake piston chamber (8). The oil pressure overpowers the spring force and moves the brake piston (5) to the right. This generates a clearance between the center discs (1) and friction discs (2) to release the parking brake. When the motor stops, the spool returns to the neutral position to close the parking brake release port (7). The pressure oil in the brake piston chamber (8) is introduced into the motor case and the spring (4) operates the parking brake.



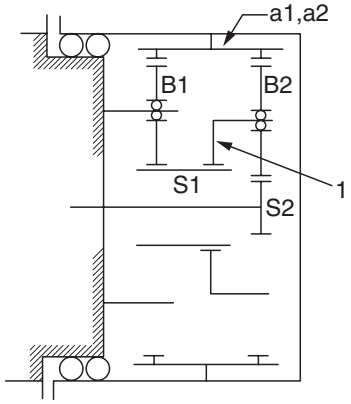
L3D511



L3D512

Reduction Gears

The reduction gear has a simple planetary two-stage configuration. It decelerates the high speed rotary motions of the hydraulic motor, converts them into low speed high torque, and rotates the case. The output shaft of the hydraulic motor is connected to the gear S2 via the spline. The rotation of the gear S2 is decelerated by one stage among the gears S2, B2 and a2. This one-stage decelerated rotation is further decelerated by two stages among the gears S1, B1 and a1 that are connected to the carrier 2 (1) via the spline. This rotation is conveyed to the rotary main body via the inner gears a1 and a2 as the driving force of the motor.



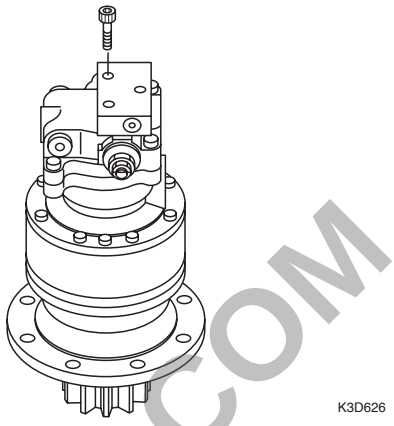
C4D560

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2. Fit the O-ring to the cover.

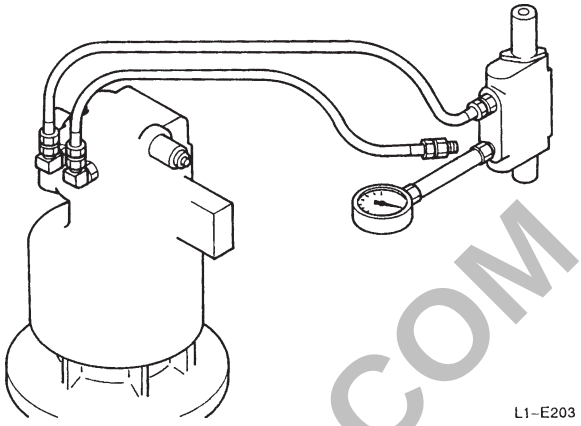
3. Fit the anti-rebound valve to the cover and mount the washer, seal and screws.
   Screw: 32.4 ±2.0 N·m


K3D626

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3. Inspect the operation of the spool.
   Inspect if the spool of the control valve (slew section) returns to the neutral position when the operation lever (slew) is released after operation. Disconnect the line from the slew section of the control valve, then set a pressure gauge in its supply port.
   - Read the pressure gauge after operating the lever (slew), then releasing it.
   - If the pressure is zero, the pilot valve is normal.


L1–E203

4. Inspect the slew hydraulic pressure.
   ☞ "V-22"

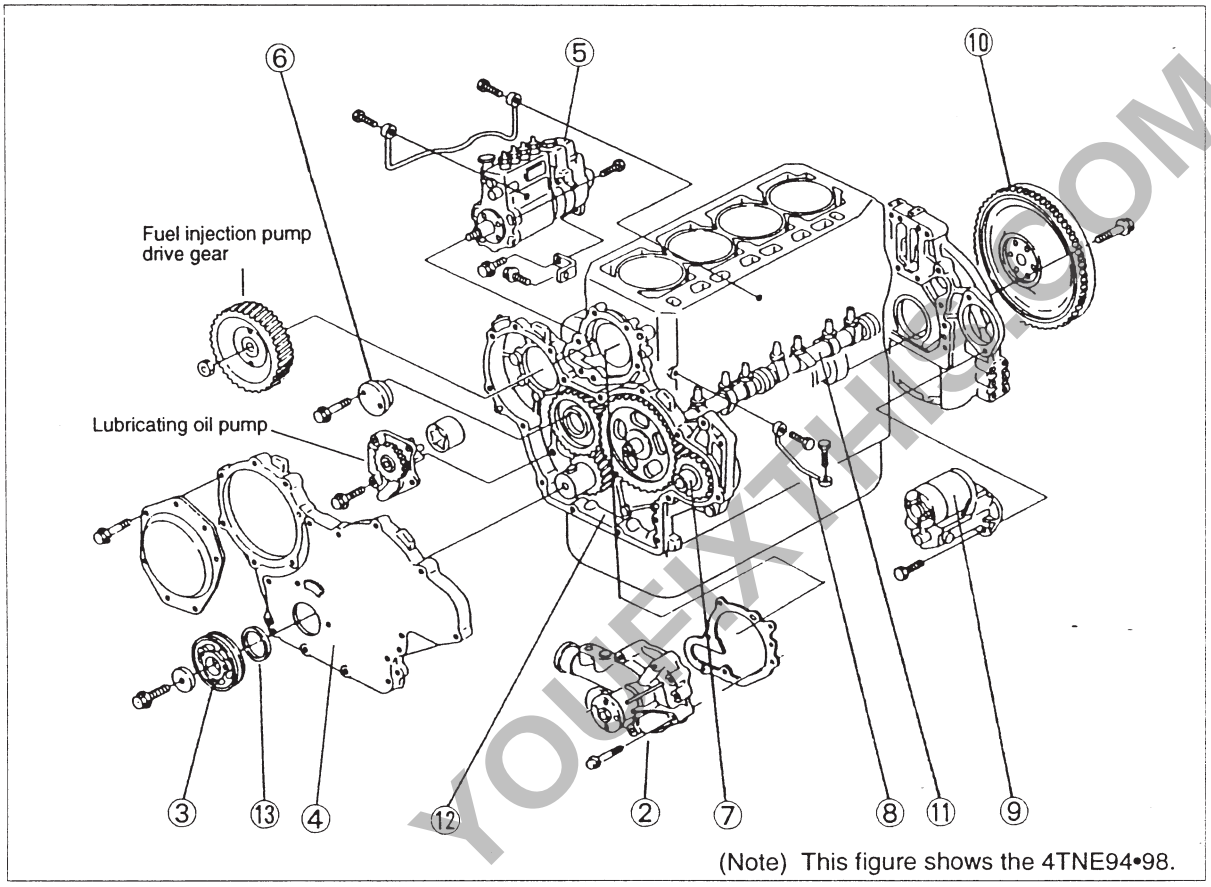
5. Inspect the slew brake valve.
   ☞ "IV. Hydraulic Units, Slew Motor"

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4.3 Gear Train and Camshaft

(1) Components



(Note) This figure shows the 4TNE94•98.

(2) Disassembly procedure:

Disassemble in the order of the numbers in the illustration.

① Perform steps ① to ⑫ of the cylinder head disassembly procedure.
② Remove the cooling water pump.
③ Remove the crankshaft pulley. ***(Point 1)***
④ Remove the gear case cover. ***(Point 2)***
⑤ Remove the fuel injection pump. ***(Point 3)***
⑥ Remove the idle gear assy. ***(Point 4)***
⑦ Remove the PTO drive gear. ***(Point 5)***
⑧ Remove the PTO lubrication pipe.
⑨ Remove the starting motor.
⑩ Remove the flywheel. ***(Point 6)***
⑪ Remove the camshaft assy. ***(Point 7)***
⑫ Remove the gear case. ***(Point 8)***
⑬ Remove the oil seal from the gear case cover. ***(Point 9)***

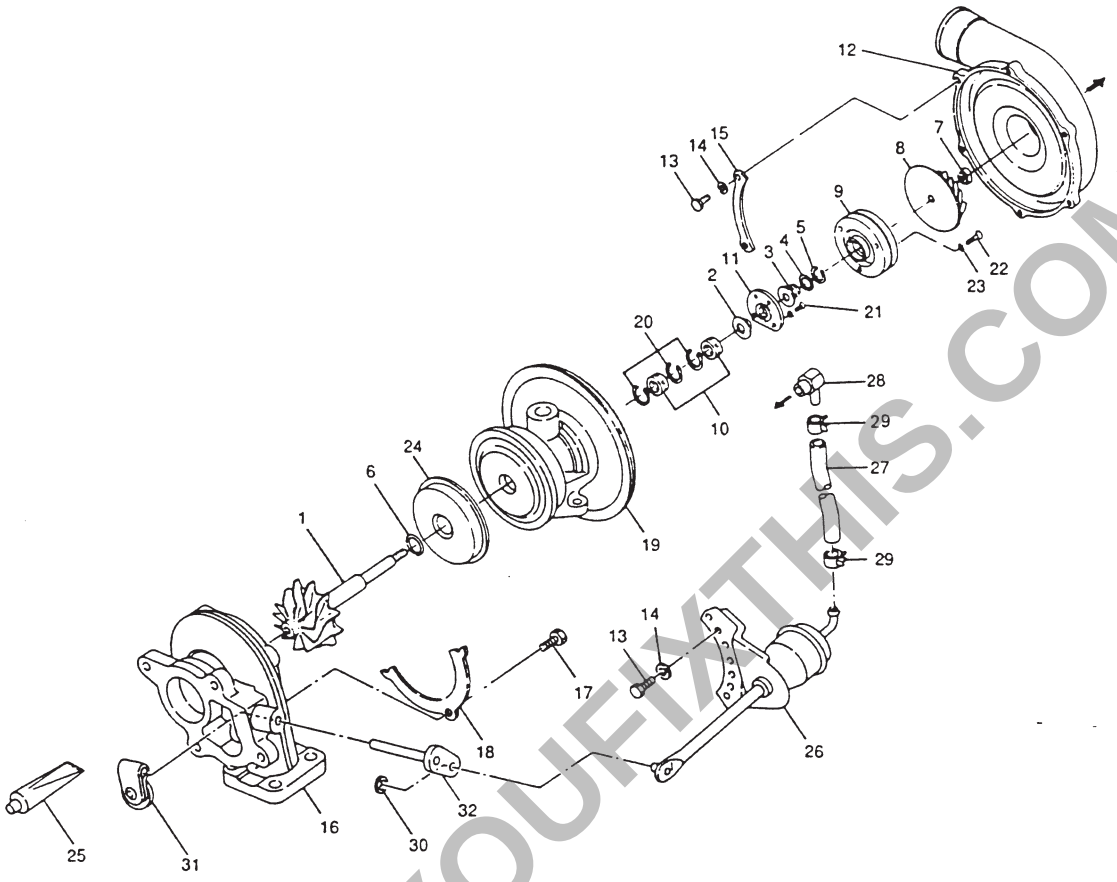
(3) Reassembly procedure:

Reverse of the disassembly procedure.

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(3) Components



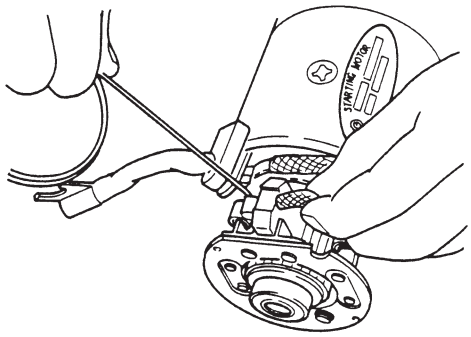
No.	Part name	No.	Part name
1	Turbine shaft	17	Bolt
2	Thrust bushing	18	Lock plate
3	Oil thrower	19	Bearing housing
4	Seal ring	20	Retaining ring
5	Seal ring	21	Screw
6	Seal ring (turbine side)	22	Screw
7	Lock nut	23	Lock washer
8	Impeller	24	Heat protector
9	Seal plate	25	Liquid gasket
10	Journal bearing	26	Waste gate actuator
11	Thrust bearing	27	Hose
12	Compressor housing	28	Adapter
13	Flanged bolt	29	Clip
14	Spring washer	30	Retaining ring
15	Clamp	31	Waste gate valve
16	Turbine housing	32	Link plate

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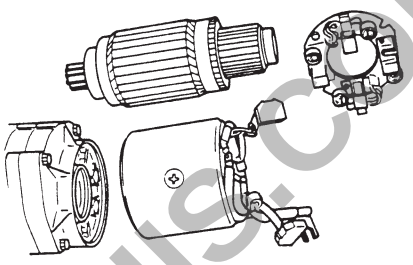
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(4) Removal of brush holder

For the negative ⊖ brush, bring the brush spring into contact with the side of the brush for lifting from the commutator surface.
For the positive ⊕ brush, extract the pull out the brush from the brush holder.
After the brush holder is removed, the armature and yoke can bedisassembled.



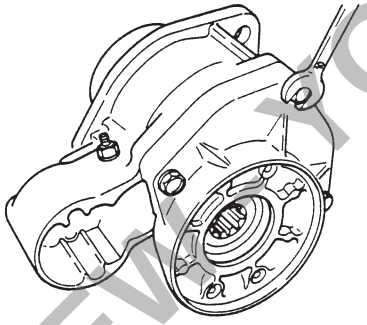
(Lifting up the brush)



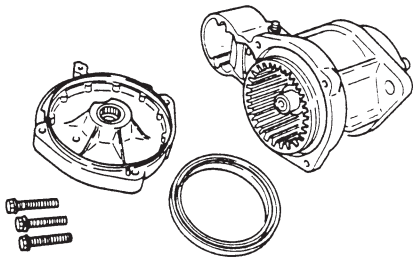
(After disassembly)

(5) Separating gear case from center bracket

Remove three M6 bolts (10 mm) fastening the gear case to the center bracket.
After removal of the M6 bolts, the center bracket and oil seal can beremoved.



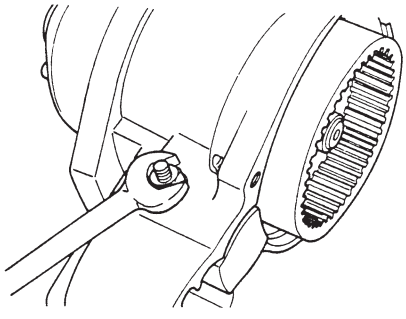
(Removing M6 bolts)



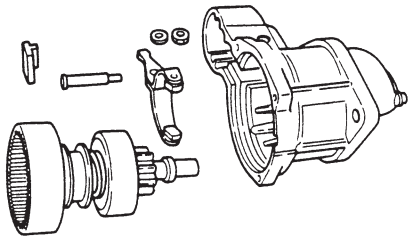
(Disassembling the center bracket)

(6) Removal of shift lever pin

Remove the M6 nut (10 mm) and pull out the shift lever pin.
Now, the dustcover, shift lever, gear case and gear shaft can be removed.



(Removing M6 nut)



(Disassembling the gear case and gear shaft)

Printed in Japan
HINSHI-H8013-R1

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