TB53FR

Compact Excavator

BOOK No. CJ1E001

WORKSHOP MANUAL

Serial No. 15810005~

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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SPECIFICATION TABLES

SPECIFICATIONS

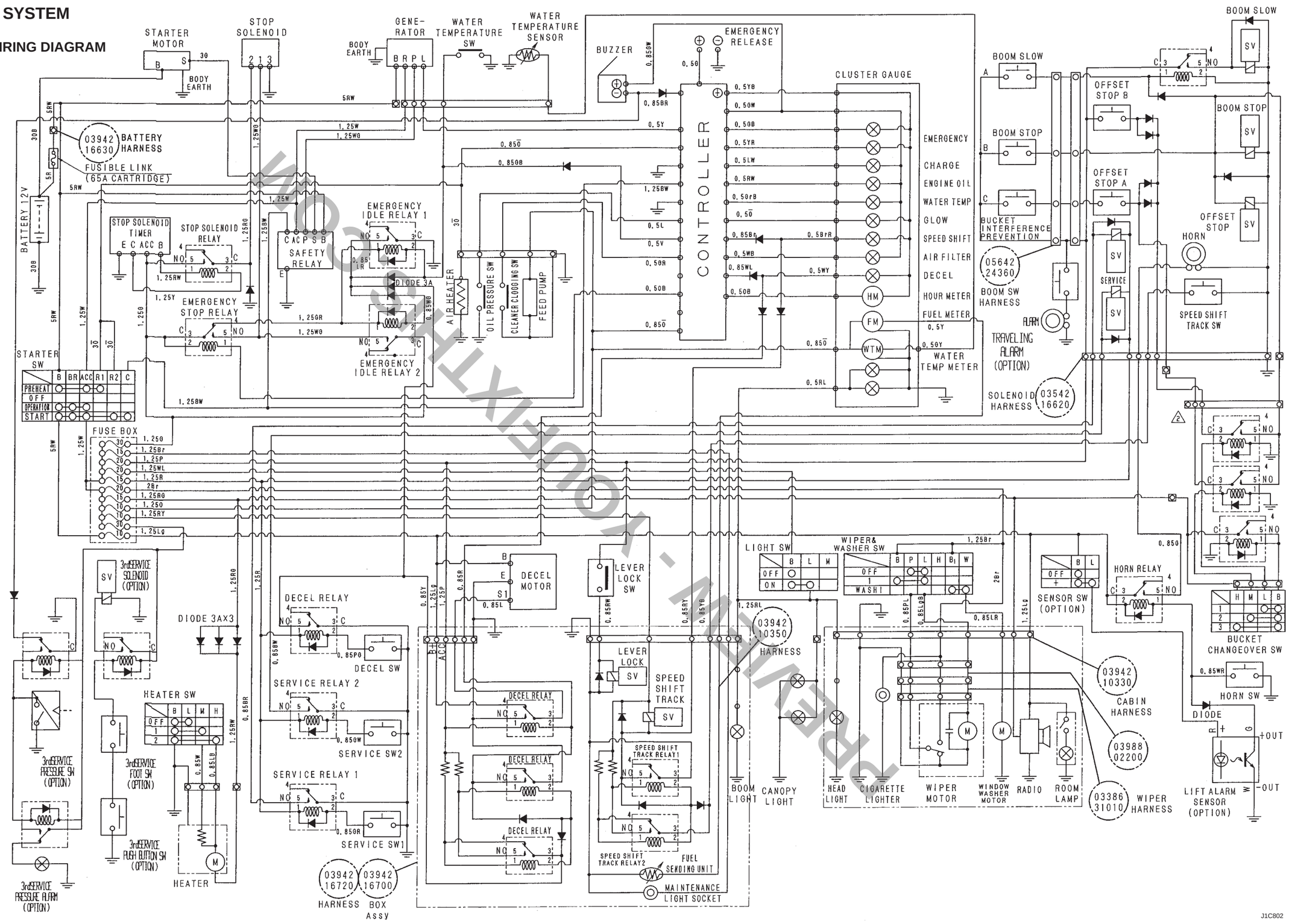
Serial Number		15810005~	
Machine Type		Canopy	Cab
Machine Mass (not including operator)			
Rubber Crawler	kg	5115	5195
Steel Crawler	kg	5195	5275
Engine Rated Output	kW/min^{-1}	27.9/2300	←
Bucket Capacity (Standard Bucket)			
Rated Capacity	m^3	0.141	←
Struck Capacity	m^3	0.102	←
Performance			
Slew Speed	min^{-1}	10	←
Travel Speed: 1st/2nd	km/h	3.0/5.2	←
Gradeability	% (degree)	58 (30)	←
Ground Pressure: Rubber Crawler	kPa	29.4	29.8
Steel Crawler	kPa	29.8	30.3
Noise Level: Sound-power	dB (A)	—	L_{WA}98
Sound-pressure level	dB (A)	—	L_{PA}79
Auxiliary Hydraulic Flow Rate	L/min	55.9	←
Dimensions			
Overall Length in Transport Position	mm	5330	←
Overall Width	mm	2000	←
Overall Height	mm	2580	2565
Dimensions of Base Machine			
Tail Swing Radius	mm	1000	←
Distance of Rearmost Upper Structure from Axis of Rotation	mm	1000	←
Clearance Height under Upper Structure	mm	615	←
Crawler Base	mm	1985	←
Crawler: Overall Length	mm	2500	←
Overall Width	mm	2000	←
Crawler Shoe Width	mm	400	←
Minimum Ground Clearance	mm	300	←

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ELECTRICAL SYSTEM

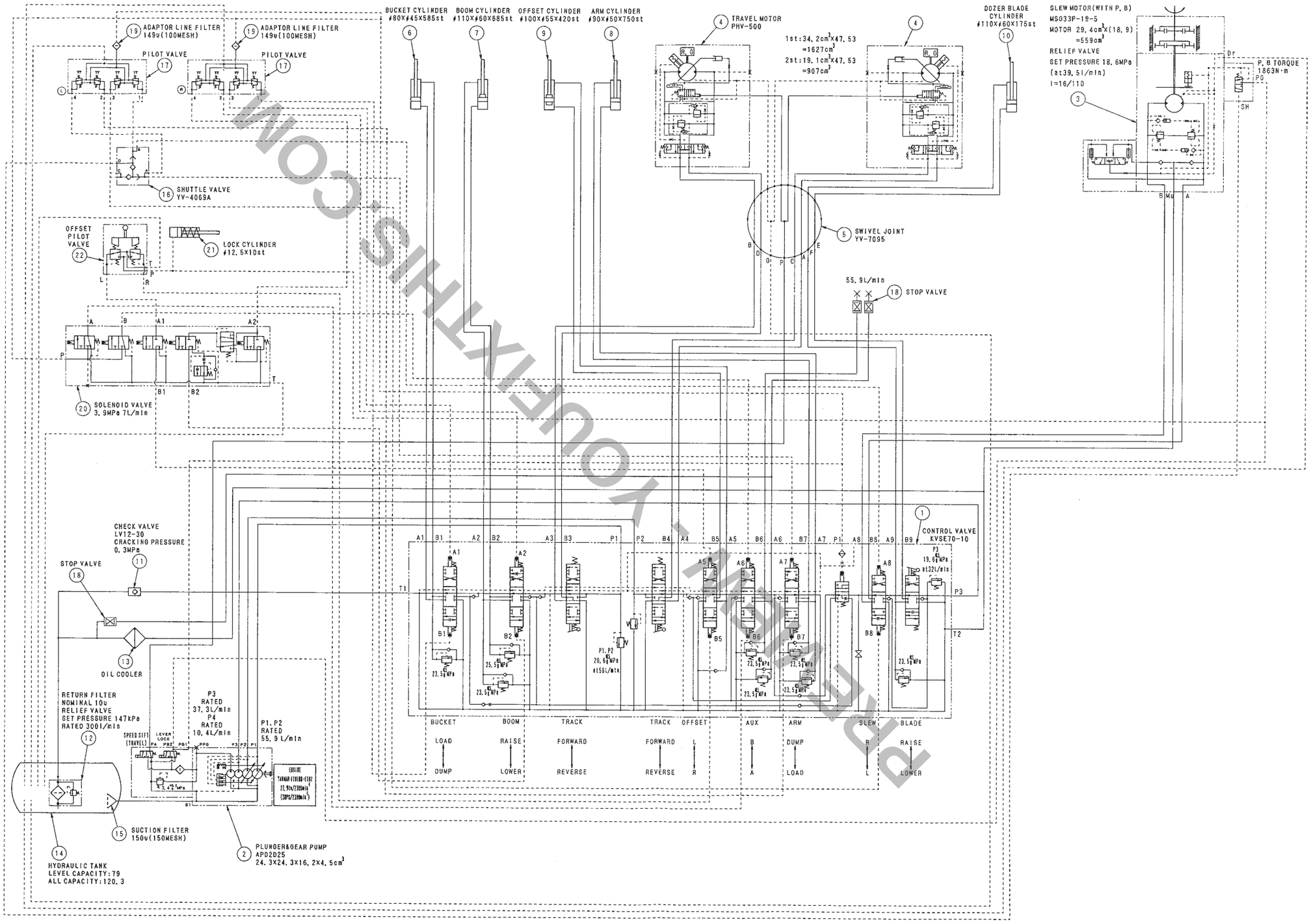
ELECTRICAL WIRING DIAGRAM



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HYDRAULIC SYSTEM

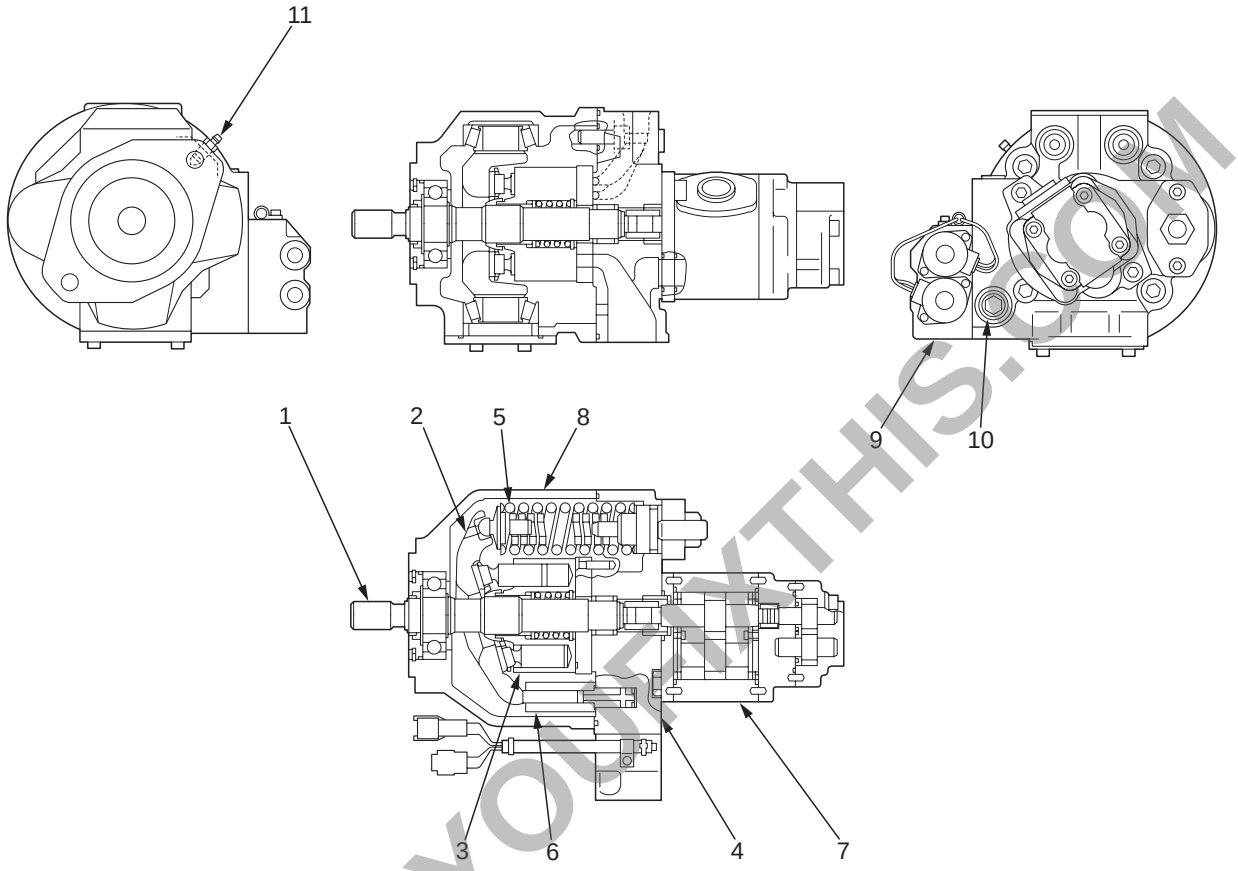
HYDRAULIC CIRCUIT DIAGRAM



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HYDRAULIC PUMP

CONSTRUCTION



1. Shaft
2. Swash Plate
3. Cylinder Block
4. Cover
5. Control Spring
6. Control Piston
7. Gear Pump
8. Housing
9. Solenoid Valve
10. Relief Valve
11. Valve

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Bolts and Nuts (for ISO Strength Category 10.9)

Thread	Size × Pitch	Torque					
		General Tightening Points			Special Tightening Points		
		N·m	kgf·m	ft-lb	N·m	kgf·m	ft-lb
Coarse	M 6 × 1.0	9.8 ±0.5	1.0 ±0.05	7.2 ±0.4	11.8 ±0.6	1.2 ±0.06	8.7 ±0.4
	M 8 × 1.25	22.6 ±1.1	2.3 ±0.11	16.6 ±0.8	26.5 ±1.3	2.7 ±0.13	19.5 ±0.9
	M10 × 1.5	47.1 ±2.4	4.8 ±0.24	34.7 ±1.7	54.9 ±2.7	5.6 ±0.28	40.5 ±2.0
	M12 × 1.75	83.4 ±4.1	8.5 ±0.42	61.5 ±3.0	97.1 ±4.8	9.9 ±0.49	71.6 ±3.5
	M14 × 2.0	134.4 ±6.7	13.7 ±0.68	99.1 ±4.9	155.9 ±7.7	15.9 ±0.79	115.0 ±5.7
	M16 × 2.0	207.9 ±10.4	21.2 ±1.06	153.3 ±7.7	241.2 ±12.1	24.6 ±1.23	177.9 ±8.9
	M20 × 2.5	410.9 ±20.5	41.9 ±2.09	303.1 ±15.1	475.6 ±23.7	48.5 ±2.42	350.8 ±17.5
Fine	M 8 × 1.0	24.5 ±1.2	2.5 ±0.12	18.1 ±0.9	28.4 ±1.4	2.9 ±0.14	21.0 ±1.0
	M10 × 1.25	50.0 ±2.5	5.1 ±0.25	36.9 ±1.8	58.8 ±2.9	6.0 ±0.30	43.4 ±2.2
	M12 × 1.5	87.3 ±4.3	8.9 ±0.44	64.4 ±3.2	102.0 ±5.1	10.4 ±0.52	75.2 ±3.8
	M14 × 1.5	135.3 ±6.8	13.8 ±0.69	99.9 ±5.0	157.9 ±7.8	16.1 ±0.80	116.5 ±5.8
	M16 × 1.5	220.6 ±11.0	22.5 ±1.12	162.7 ±8.1	256.0 ±12.7	26.1 ±1.30	188.8 ±9.4
	M20 × 1.5	452.1 ±22.6	46.1 ±2.30	333.4 ±16.6	524.7 ±26.1	53.5 ±2.66	387.0 ±19.2

1. General Tightening Points (Non-lubricated)
   - All securing points other than the special tightening points.

2. Special Tightening Points (Grease with molybdenum disulfide applied.)
   - Points where particularly necessary due to function.
     Special tightening positions and associated instructions are given in the text.

3. Points where thread-locking compound is used (Three Bond #1324 is applied.)
   Thread-locking compound positions and associated instructions are given in the text.

4. If tightening torque values are provided in this manual, then tightening should be done according to those values.
   (This indicates that the tightening torque differs from the values given in this table.)

5. In order to tighten bolts and nuts evenly, they should be tightened alternately top, bottom, left, right.

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OVERALL MACHINE
No operations can be done. 4
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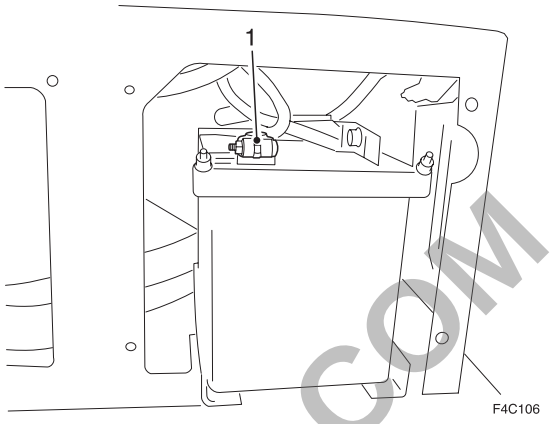
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DRIVE SYSTEM

DISASSEMBLY AND ASSEMBLY

Removing the Engine

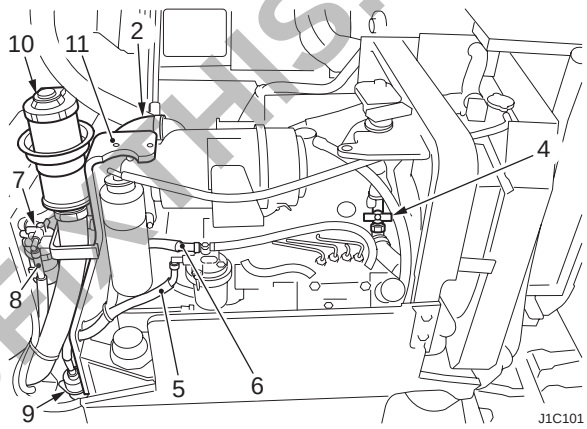
1. Disconnect the battery ground cable (1) from the battery.



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.

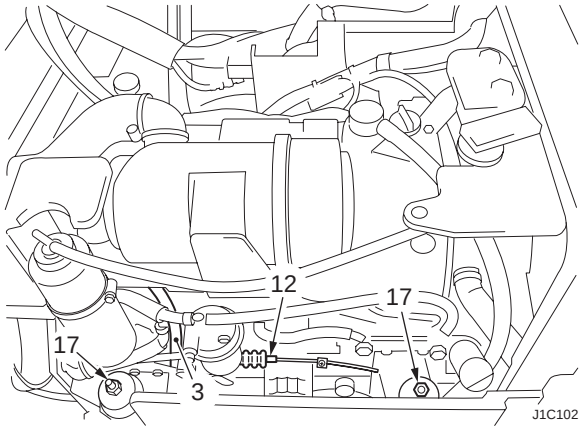


5. Remove the radiator and oil cooler.
   ☞ "Removing the Radiator and Oil Cooler"

6. Disconnect the air hose (2) from the engine.

7. Disconnect the coolant drain hose (3).

8. Close the valves (4) and disconnect two heater hoses.

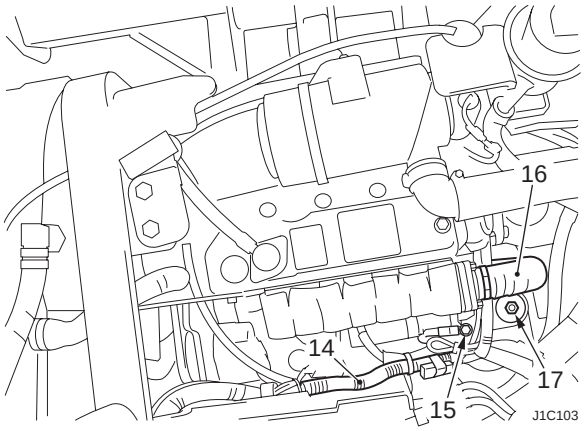


9. Disconnect the fuel hoses (5) and (6) from the engine.

10. Disconnect the fuel hoses (8) from water separator (7).

11. Disconnect the electric wiring to the feed pump (9).

12. Remove the filler cap (10) from the bracket (11).
    - Remove the filler cap with hose attached and put it on the fuel tank.



13. Remove the water separator (7) and the feed pump (9) together with the bracket (11).

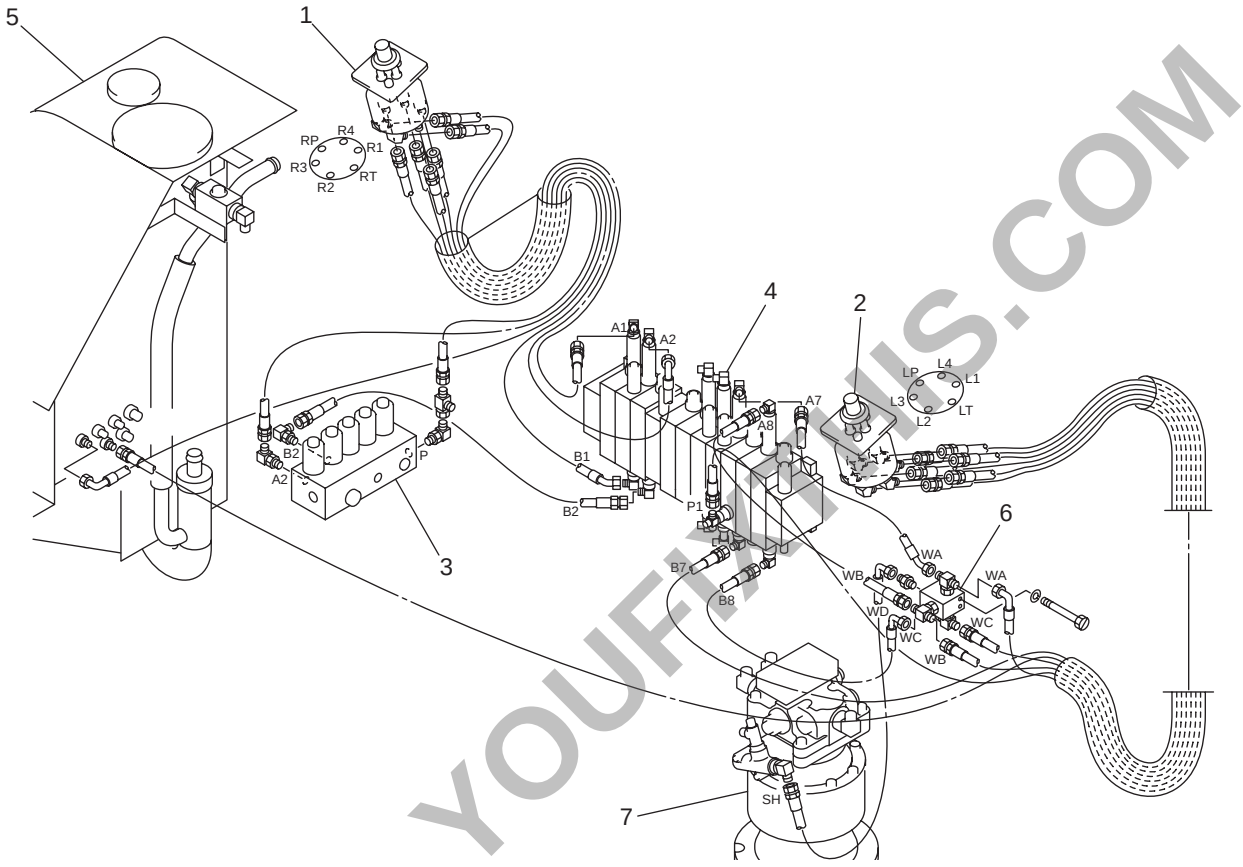
14. Remove the hydraulic pump.
    ☞ "Removing the Hydraulic Pump"

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CONTROL SYSTEM

Hydraulic Pilot Unit
A Type (ISO) – 1/2



J1C501

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♦ Table of Connections ♦

Pilot Valve	R1 ↔ B1	Control Valve
	R2 ↔ A2	
	R3 ↔ A1	
	R4 ↔ A2	Solenoid Valve
	RP ↔ P	
	RT ↔ T	Tank
	L1 ↔ WB	Shuttle Valve
	L2 ↔ B7	Control Valve
	L3 ↔ WC	Shuttle Valve
	L4 ↔ WA	
	LP ↔ P1	Control Valve
	LT ↔ T	Tank
Solenoid Valve	B2 ↔ B2	Control Valve
Shuttle Valve	WA ↔ A7	

Shuttle Valve	WB ↔ A8	Control Valve
	WC ↔ B8	
	WD ↔ SH	Slew Motor

1. Right Pilot Valve
2. Left Pilot Valve
3. Solenoid Valve
4. Control Valve
5. Hydraulic Tank
6. Shuttle Valve
7. Slew Motor

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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.

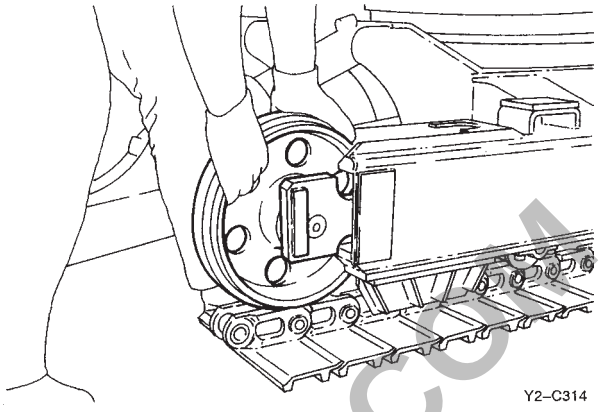
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Removing the Idler and Track Adjuster

1. Remove the Crawler.
   ☞ "Removing the Crawler"

2. Take out the idler and track adjuster.
   ⏢ Idler + Track adjuster: 66.2 kg



Installing the Idler and Track Adjuster

Follow the procedure used for removal in reverse order.

- Apply grease to the rubbing surfaces of the track adjuster piston and cylinder.

Removing the Travel Motor

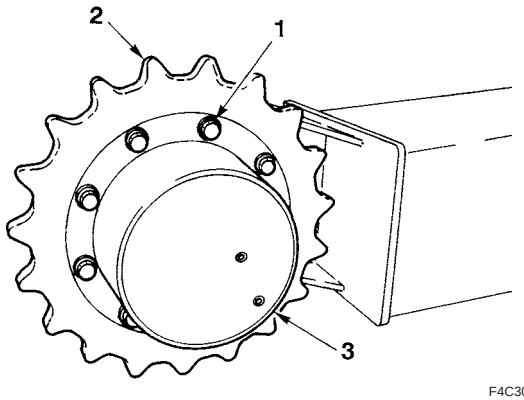
1. Remove the crawler.
   ☞ "Removing the Crawler"

2. Remove the installation bolts (1) and remove the sprocket (2).
   ⊂⊃ Bolt: 155.9 ±7.7 N·m
   - Apply thread lock to the bolts.

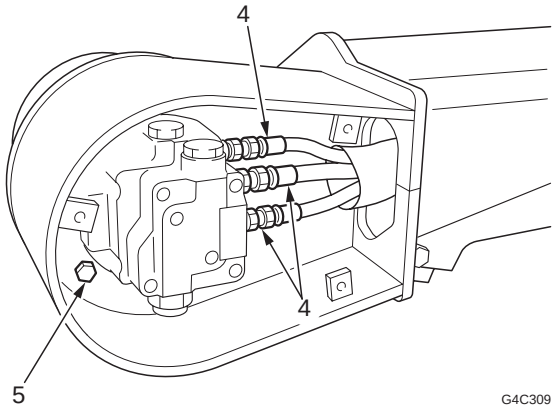
3. Remove the motor cover and disconnect the hydraulic piping (4).

4. Suspend the travel motor (3) temporarily and remove the fixing bolts (5).
   ⊂⊃ Bolt: 155.9 ±7.7 N·m
   - Apply thread lock to the bolts.

5. Suspend the travel motor (3) and remove it.
   ⏢ Travel motor: 57 kg



F4C303



G4C309

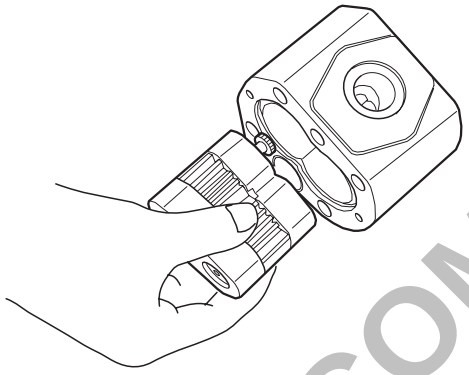
Installing the Travel Motor

Follow the procedure used for removal in reverse order.

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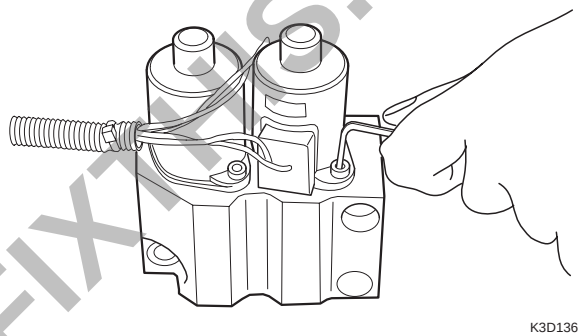
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f. Remove the drive gear, driven gear and bushing.



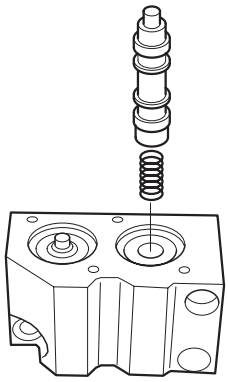
K3D135

17. Disassemble the solenoid valve.
    a. Remove the cap screws and then the solenoids.
       • Be careful not to miss the push rod in the solenoid valve.



K3D136

    b. Remove the spool and spring.
    c. Remove the O-ring.

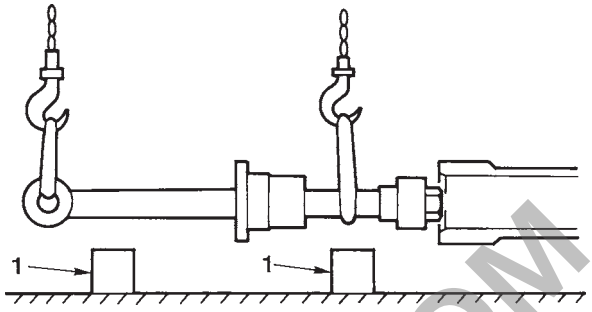


K3D137

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5. Pull the piston rod assembly out of the tube.
   - Use a wooden block (1) so as not to scratch the sliding surface, and pull the assembly straight out.

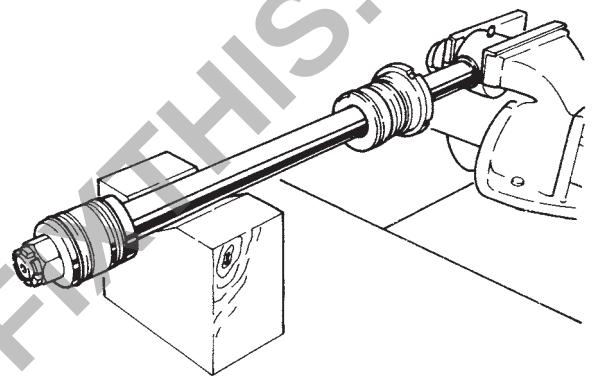


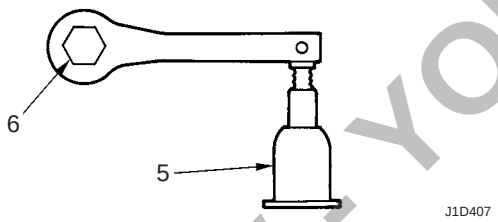
L1–D407

Piston Rod Assembly

1. Fasten the piston rod assembly securely in a level position.

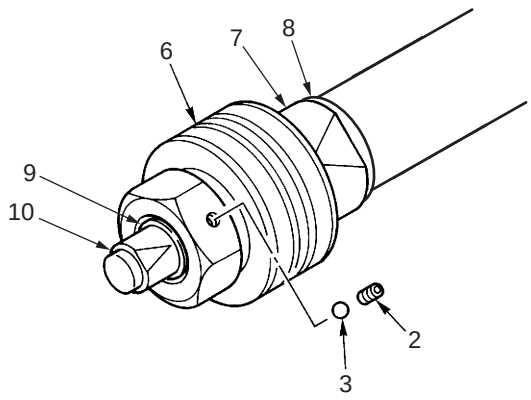
2. Remove the piston.
   a. Take out the set screw (2) and remove the steel ball (3).
      - The set screw is staked at 2 places with a punch, so grind off the staked portions using a hand drill.
   b. Loosen the piston nut (6) and remove it.
      - Use a wrench with a hydraulic jack (5).


Y1–D410



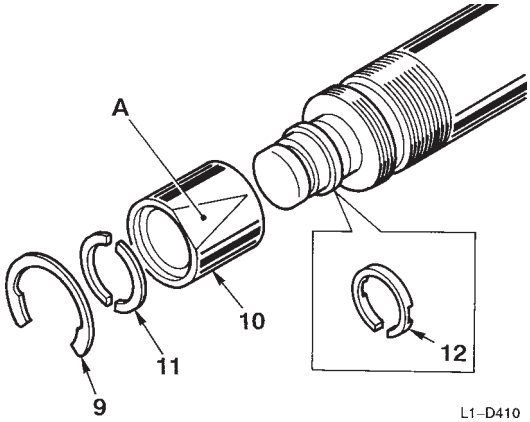
J1D407

3. Remove the cushion bearing (7) and spacer (8).



J1D406

4. Remove the cushion bearing.
   a. Remove the snap ring (9).
   b. Move the cushion bearing (10) and remove the stopper (11).
   c. Pull out the cushion bearing (10).
   d. Remove the cushion seal (12).



L1–D410

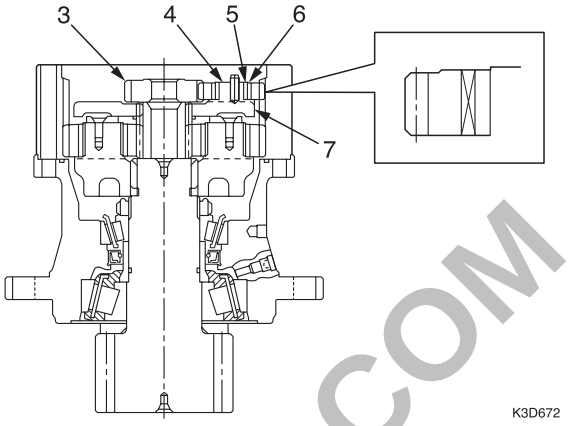
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16. Mount the carrier 1 (7).

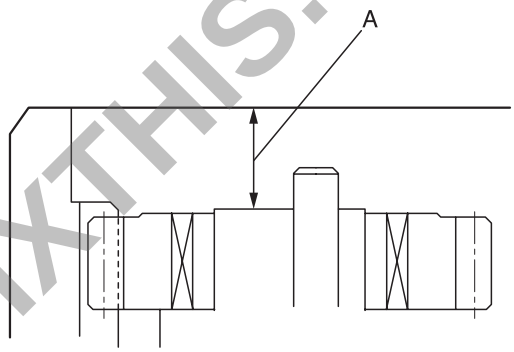
17. Mount the inner race (5), needles (6) and planetary gear A (4) on the carrier 1 (7).
    - Mount the planetary gear A as shown in the figure.

18. Mount the drive gear (3).



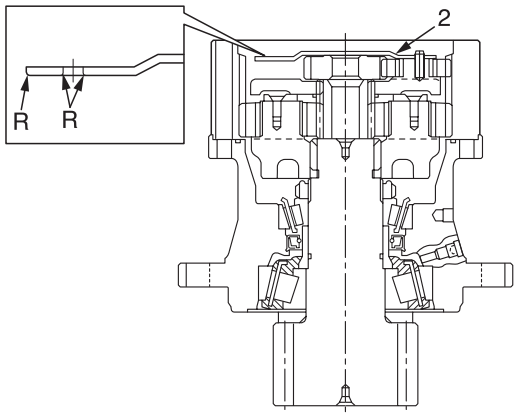
K3D672

19. Mount the thrust plate (2).
    - Measure the depth (A) from the case end to the carrier 1 and select a proper thickness for the thrust plate by referring to the table.
    - The largely-rounded side of the thrust plate circumference should face the planetary gear.



K3D673

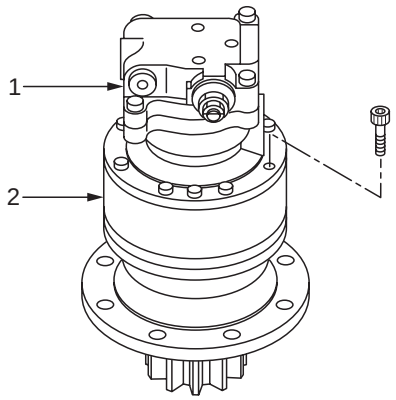
Depth (A)	Less than 14.0 mm	From 14.0 to less than 14.5 mm	14.5 mm or more
Thrust plate thickness	1.8 mm	2.3 mm	2.8 mm



K3D674

Slew Motor

1. Unite the hydraulic motor (1) and the reduction gear (2) and fix them with the cap screws.
   Cap screw: 128 ±7 N·m

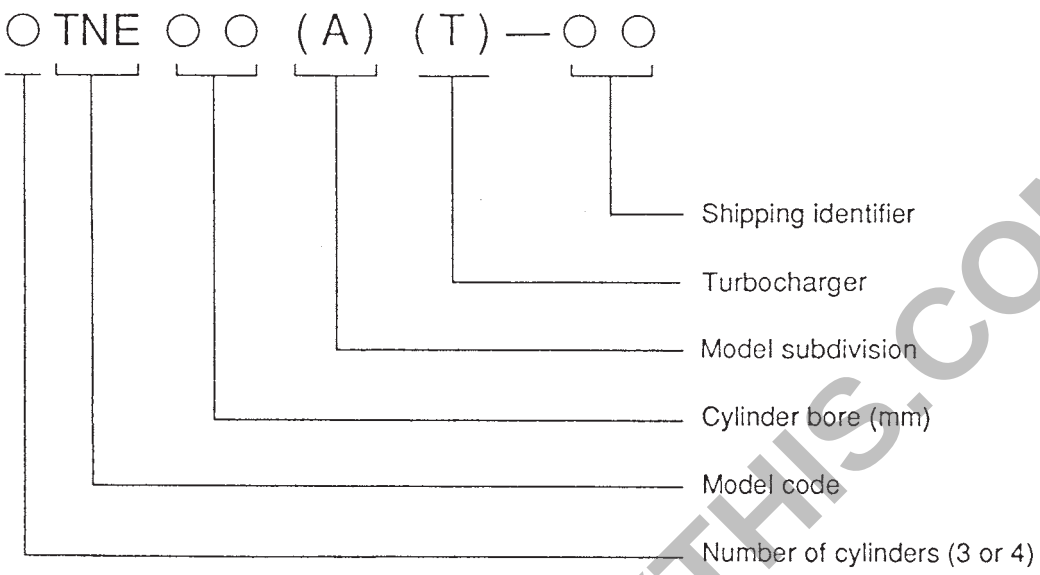


K3D627

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○ Descriptive Breakdown of Model Name



○ Application Category

Application code	Usage	Eng. Rev. type	Revolution speed (rpm)
CL	Generator drive	Constant	1500 / 1800
CH			3000 / 3600
VM	General use	Variable	2000 ~ 3000
VH			3000 ~ 3600

* *For engine application category described in Chapter 1, Specifications and Performance.*

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7-7. Crankshaft

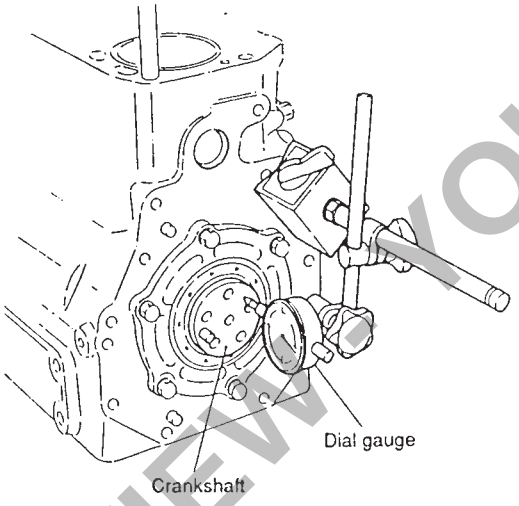
1. Side gap around the crankshaft

Before extracting the crankshaft and when reassembling it, bring a dial gauge into contact to the end of the crankshaft. Force the crankshaft to both sides in the axial direction to measure the thrust gap. Alternatively, insert a thickness gauge directly into a thrust gap between the thrust metal in the standard part and crankshaft to measure the side gap.

If the limit is exceeded, replace the thrust metal with a new one.

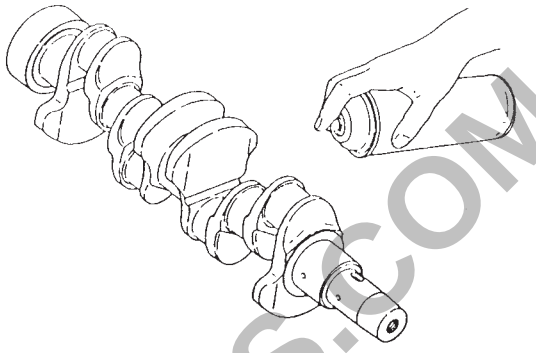
(mm)

	All models
Thrust gap	0.090~0.271



2. Color check of crankshaft

Clean the crankshaft and check it using a color check kit or a magnaflux inspector. Replace the crankshaft if cracked or badly damaged. If the crankshaft is slightly damaged, correct it by re-grinding.



(Color check inspection)

3. Checking the metal

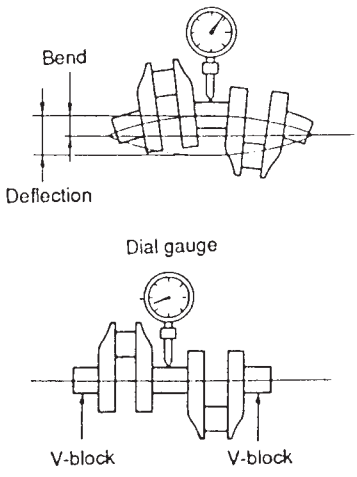
Check the metal for flaking, melting, seizure, and the state of the contact face. Replace the metal if found defective.

4. Bend of the crankshaft

Support the crankshaft with V-blocks at both ends of the journals; measure the runout at the center journal with a dial gauge while rotating the crankshaft to check the extent of crankshaft bend.

(mm)

	All models
	Standard
Bend	0.02 or less



(Measuring the crankshaft bend)

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