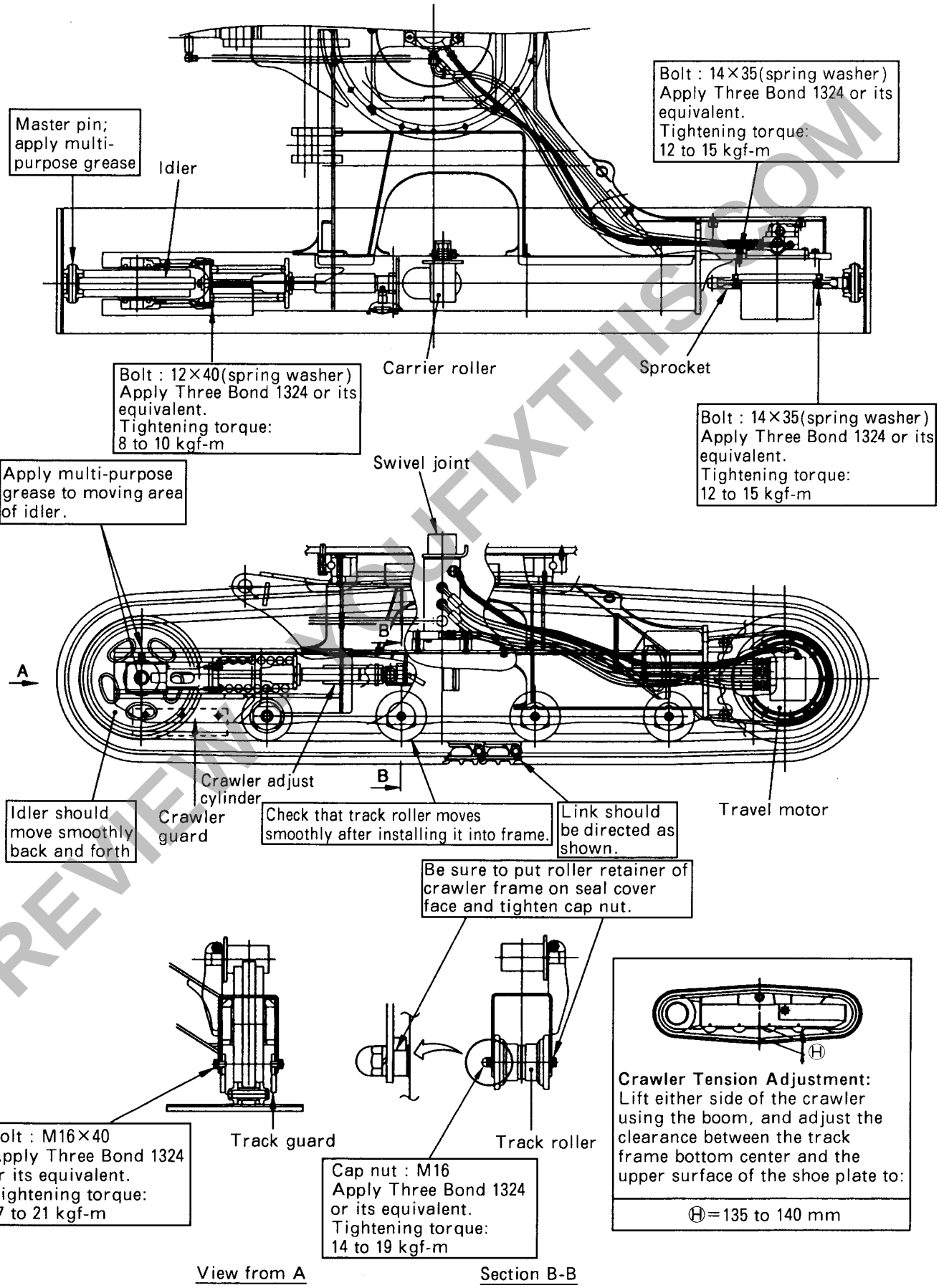
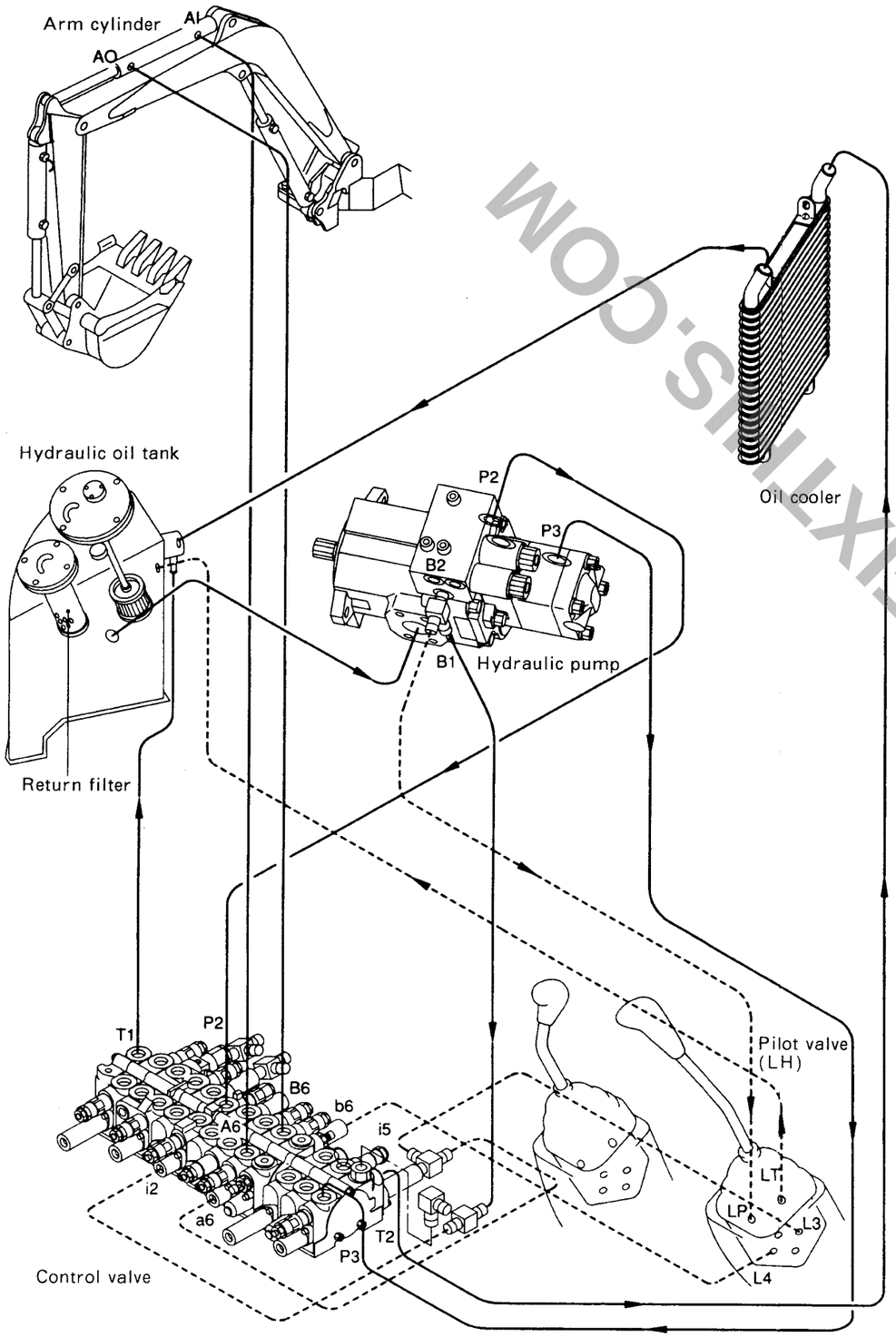
7-2-4 Points of Reassembly (Steel Crawler Models)



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5. HYDRAULIC SYSTEM



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3) Disassembly

Procedure	
1. Removal of valve block assembly Remove three hexagon socket head bolts **53** (M8 ×75) to take off valve block assembly **52**. **Tool:** Hexagon bar wrench 6	

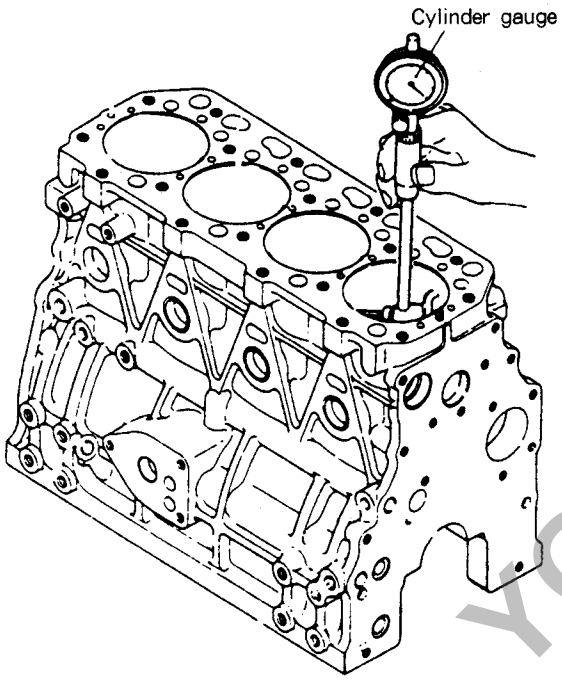
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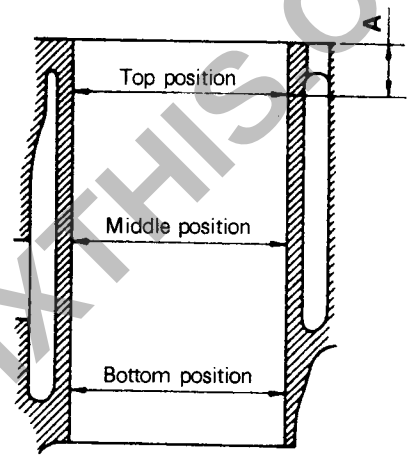
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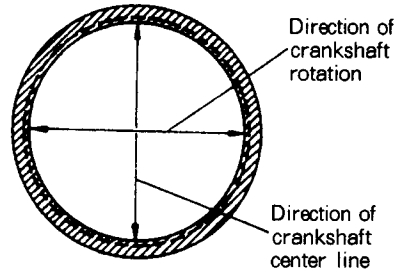
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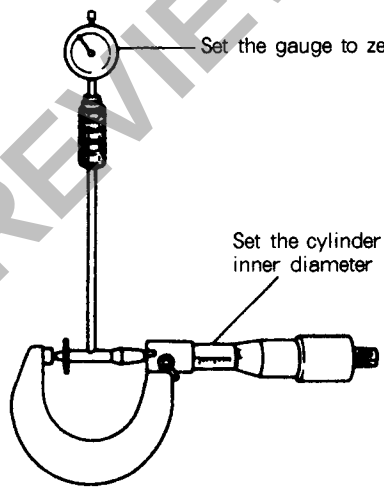
4-1-4 Cylinder bore measurement

Measure the bore diameter with a cylinder gauge at the positions shown in the figure.
Re-bore and refine the cylinder bore when the measured value exceeds the wear limit. Measurement must be done at 3 positions as shown in the figure, namely, top, middle and bottom positions in both directions along the crankshaft rotation and crankshaft center lines.









	Standard	Wear limit
Cylinder bore dia.	See separate service data (Page, 4–8–1)	
Cylinder roundness		

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4-11-8 Fuel Filter

The fuel filter which is located between the fuel feed pump and the fuel injection pump, removes any impurities from the fuel. It has a replaceable paper type element to ensure consistent fuel filtration.

The sucking action of the fuel injection pump draws fuel from the fuel tank and into the filter element to remove dirt particles. Clean fuel flows to the interior of the filter element, up through the central passage, into the outlet passage, and to the fuel injection pump.

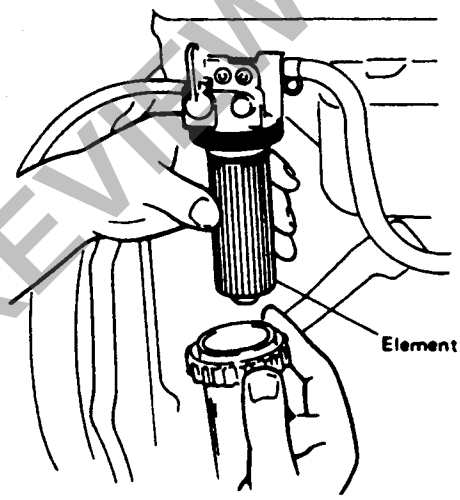
Specifications

Applicable model	3TNE88-BVB
Type	Paper
Feltration area	900 cm^2
Feltration grain dia.	8-9 μ
Air venting method	Auto-air venting

Inspection

Check and completely clean the fuel filter with clean fuel oil if it is contaminated with deposits, water, etc. The filter element should be replaced every 500 service hours, or sooner if it is stained or broken. If the fuel appears to be contaminated, check the filter carefully and replace it even if the maximum number of service hours has not been reached.

Cleaning the inside filter	Every 100 service hours
Replacing of filter element	Every 500 hours



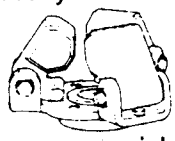
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2. Inspection of governor

Inspection of governor weight assembly

(1) Replace the governor weight if it does not open and close smoothly.

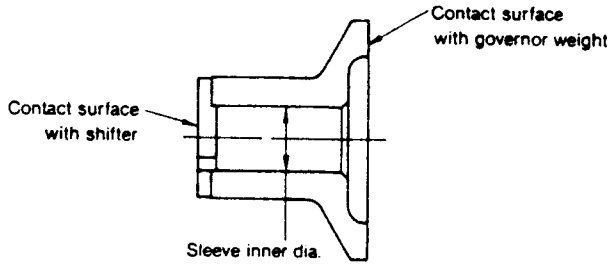


(2) Replace the governor weight if the contact surface with governor sleeve is extremely worn.

(3) Replace if there is governor weight support/pin wear or the caulking is loose.

(4) Replace if the governor weight support stopper is excessively worn.

Inspection of governor sleeve



(1) Replace the governor sleeve if the contact surface with governor weight is worn or there is pitching.

(2) Replace the governor sleeve if the contact surface with shifter is considerably worn or there is pitching.

(3) If the governor sleeve does not move smoothly above the camshaft due to governor sleeve inner dia. wear or other reasons, replace.

Inspection of governor lever assembly

(1) Measure the clearance between the governor shaft and bushing, and replace if it exceeds the limit.

mm

	Standard Dimension	Standard Clearance	Limit
Governor shaft outer dia.	7.986~7.995	0.065~0.124	0.5
Bushing inner dia.	8.060~8.110		

(2) Inspect the shifter contact surface, and replace the shifter (always by removing the pin to disassemble) if it is worn or scorched.

(3) Disassemble and replace excess fuel springs that are settled, broken or corroded by pulling the spring pin.

(4) Check link parts for bends or kinks that will cause malfunctioning, and replace any parts as necessary.

Note: *1. Side gap on top of governor lever shaft.*

mm

Standard side gap	0.4

2. Replace the governor lever, tension bar, bushing, shifter and throttle spring as an assembly.

(5) Inspection of springs

1) Check the governor spring and other springs and replace if they are broken, settled or corroded.

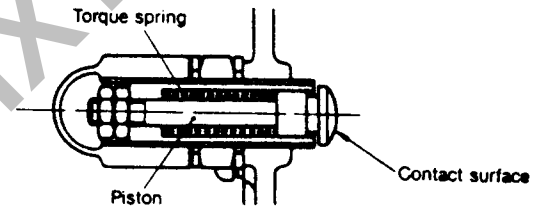
2) Measure the free length of the governor spring, and replace if it exceeds the limit.
See service data sheet for free length of governor spring.



(6) Inspection of torque spring assembly

1) Inspect the tip of the piston and contact surface for wear and replace if necessary.

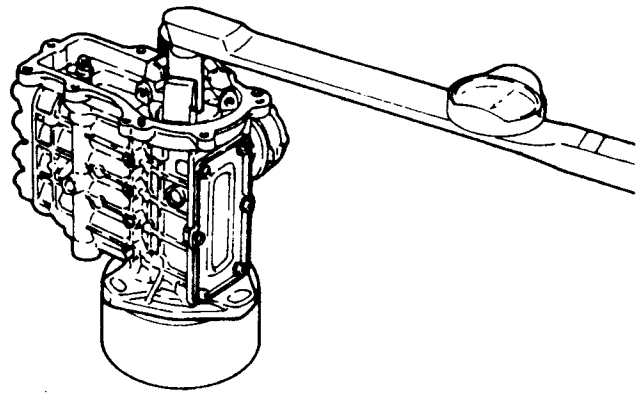
2) Replace the assembly if the torque spring is broken.



3. Assembling governor

Inspect all parts after disassembly and replace any parts as necessary. Before starting reassembly, clean new parts and parts to be reused, and put them in order.
Make sure to readjust the unit after reassembly to obtain the specified performance.

(1) Insert the governor weight assembly in the taper portion at the end of the fuel pump camshaft, stopping it with the hole in the fuel coupling ring or holding the coupling with a vise, mount the rest, and tighten the governor weight nut.



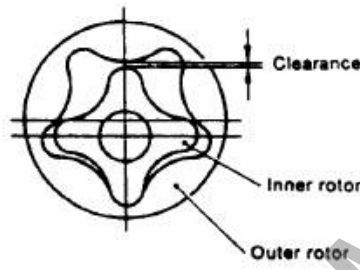
kgf-m

YPES type	4.5~5.0

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3. Lube oil pump disassembly

(1) Remove the lube oil pump assembly from the engine plate.
(2) The lube oil pump cover may be disassembled, but do not disassemble the rotor, rotor shaft or drive gear. The oil pressure regulating valve plug is coated with adhesive and screwed in, so it cannot be disassembled. These parts cannot be reused after disassembly. Replace if necessary



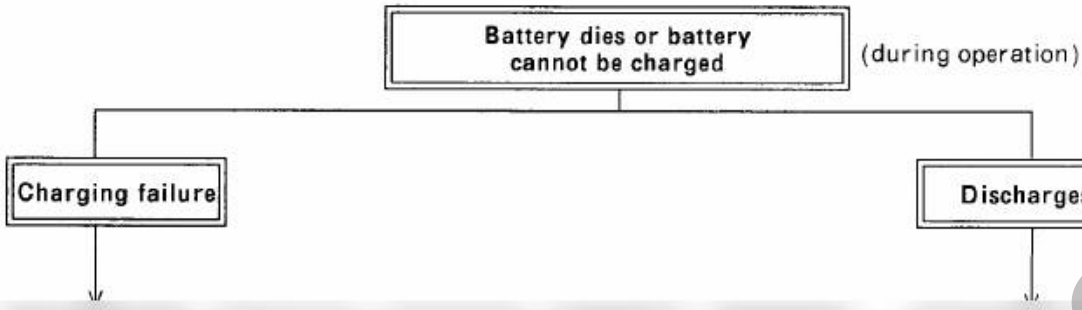
	Standard	Wear limit

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10. TROUBLESHOOTING



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2. TECHNICAL DATA

Item			Unit	Vi040-1
Hydraulic pilot oil control				
	Cut-off valve	Type		Magnetic solenoid type
		Relief set pressure	kgf/cm²	38 at 1.7 ℓ/min
Hydraulic oil tank				
	Oil capacity		ℓ	98 (Tank : 73, Others : 25)
	Suction filter	Type		SFB-16S
		Filtration area	cm²	1240

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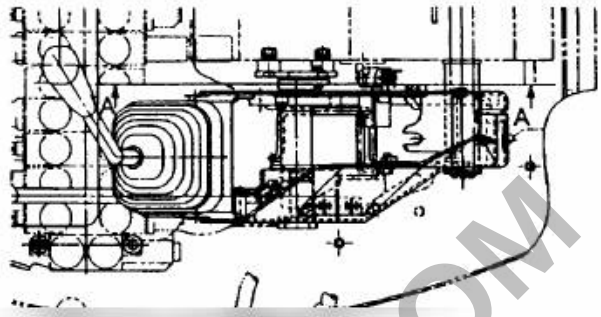
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3) Operation of lock lever

(1) The operating force for moving the lock lever forward should be less than 12 kgf.

(2) When the lock lever does not move smoothly or its operating force is out of specification, make adjustments according to the following procedure.



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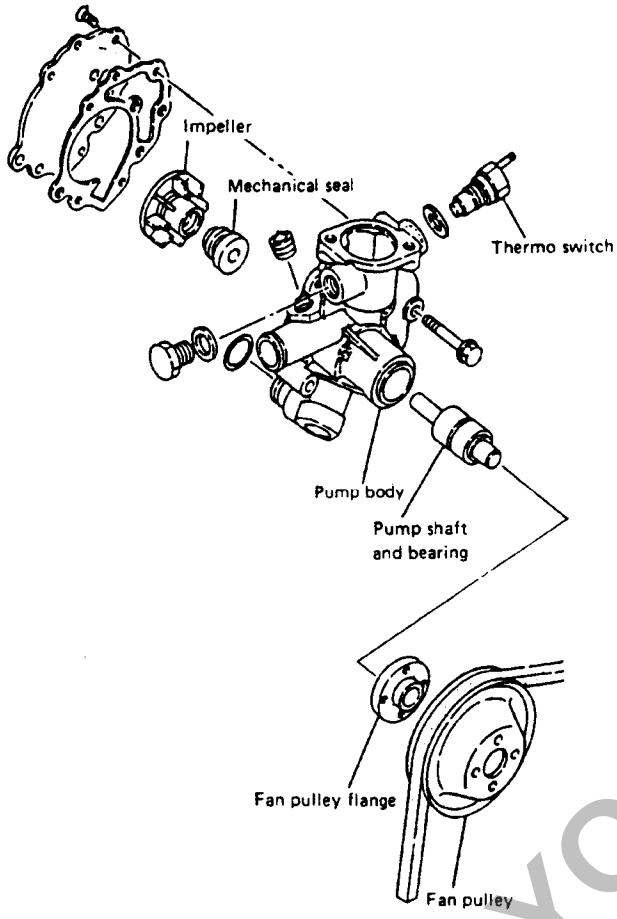
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4-9-5 Cooling water pump



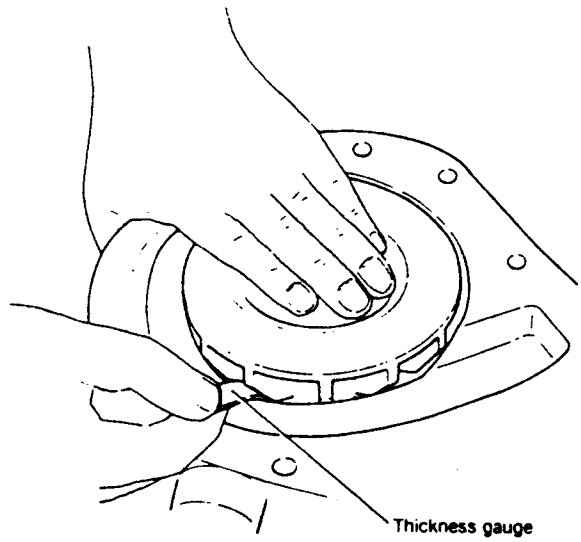
1. Cooling water pump inspection

(1) Make sure that the pump shaft rotates smoothly.
(2) Make sure that there is no "play" on the pump shaft. If there is excessively play, disassemble the pump and replace the pump shaft with bearing.
(3) Make sure that cooling water does not leak from the hole in the lower section of the pump unit during operation. If there is leakage, the mechanical seal in the hole may be broken. Disassemble the pump and replace the mechanical seal.
(4) Measure the clearance between the impeller and the pump body.

Checking mechanical seal leakage



Measuring clearance between impeller and pump body



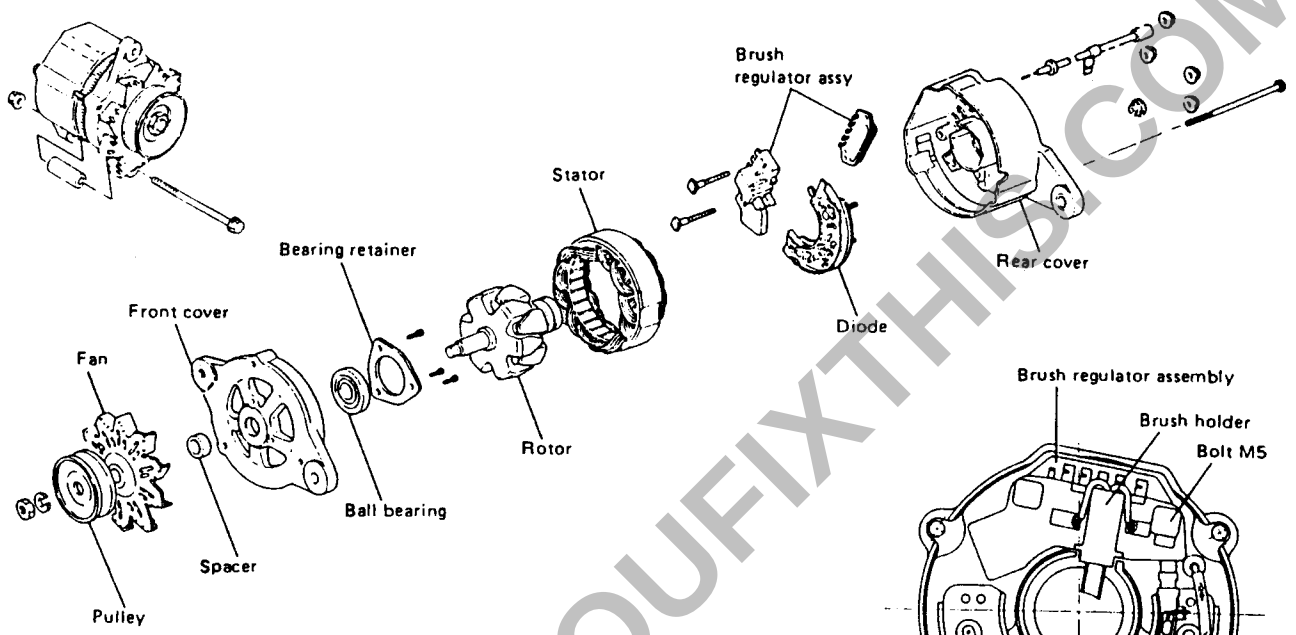
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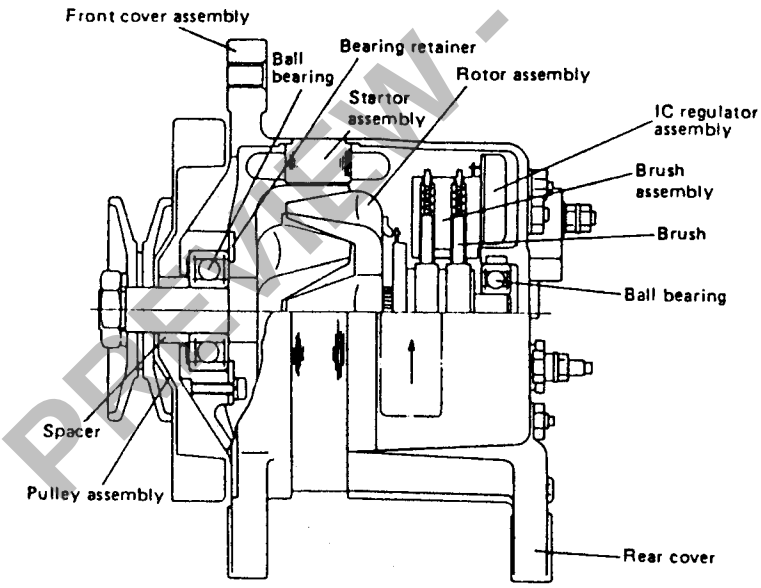
	Standard	Wear limit
Clearance between impeller and body	0.3~1.1	1.5

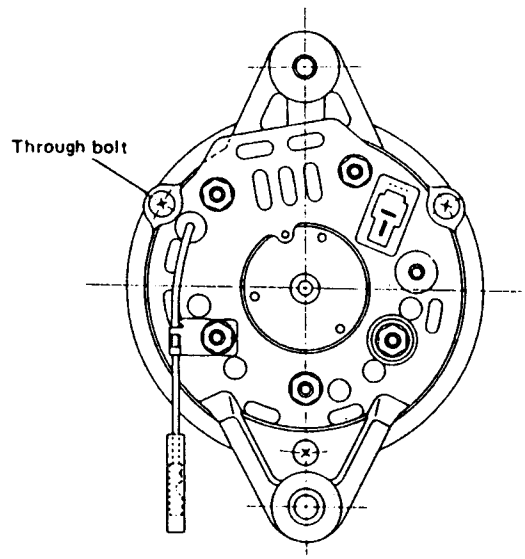
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4-13-4 Construction

This is a standard rotating field type three-phase alternator. It consists of six major parts: the pulley, fan, front cover, rotor, stator and rear cover. The IC regulator is an integral part of the alternator.



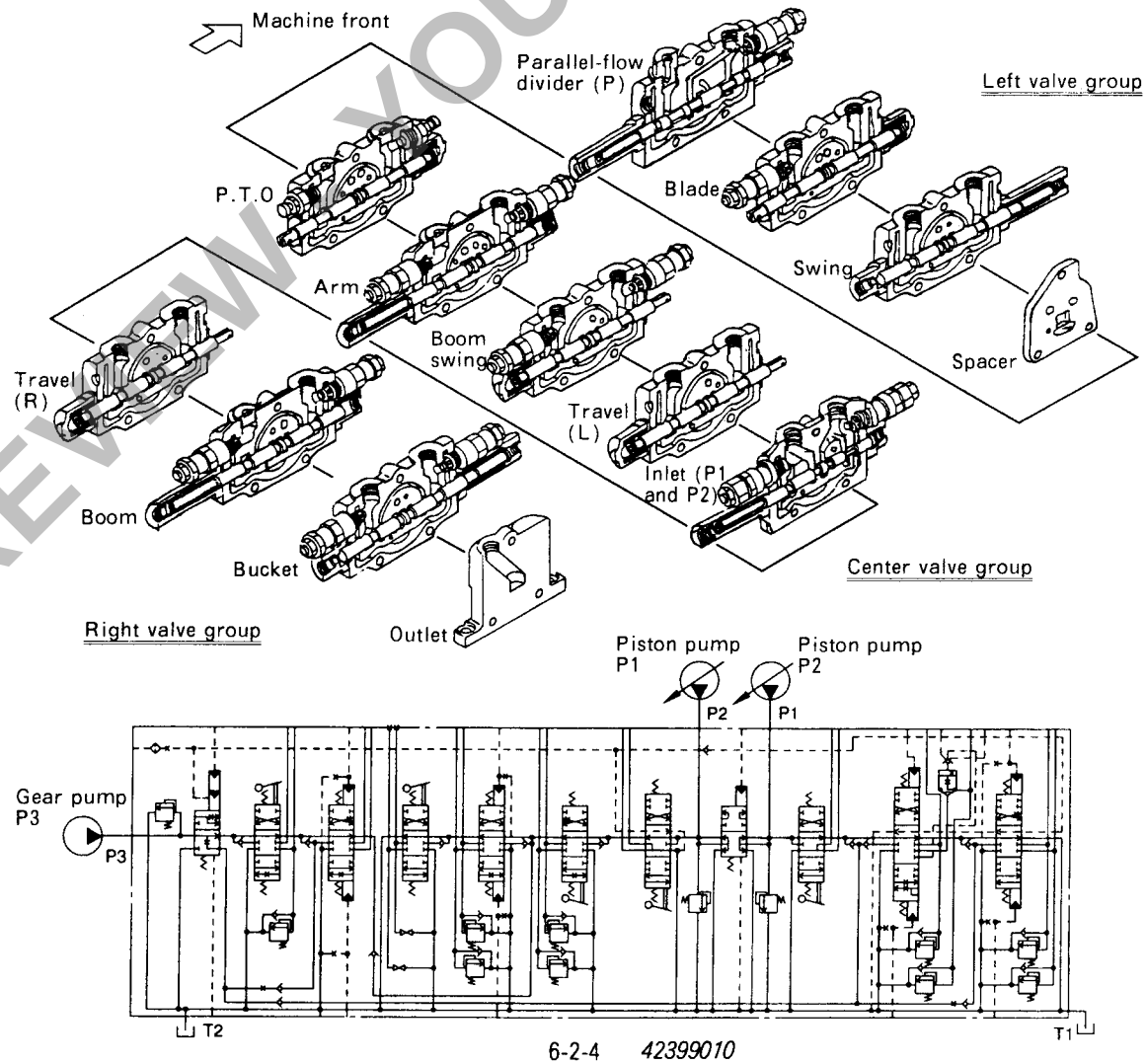




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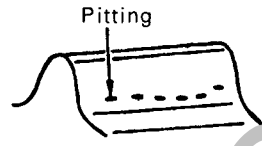
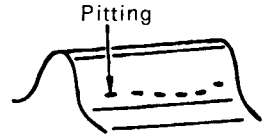
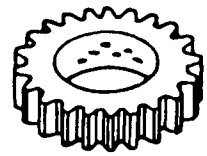
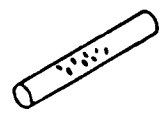
When all the spools are in the neutral position, the oil from the piston pump P1 to the inlet spool section flows through the neutral passages and the outlet section to the return passage and returns to the hydraulic oil tank through the return ports of the outlet, swing and parallel-flow divider sections.
The oil from the piston pump P2 to the inlet spool section and the oil flowing from the gear pump P3 to the inlet spool section flow through their respective neutral passages and are combined in the arm section. The combined oil flows into the return passage in the spacer section and returns to the hydraulic oil tank through the return ports of the outlet, swing and parallel-flow divider sections.
When any one of the three spools in the right valve group is operated and is out of the neutral position, the neutral passage is blocked and the oil is stopped flowing to the downstream sections. For the center and left valve groups, the oil flow from the piston pump P1 and that from the gear pump P3 are almost the same as that for the right valve group.
The right valve group has parallel passages to allow the simultaneous operation of the boom section and the bucket section. In that simultaneous operation, so that oil flows to the boom section even when the boom has got heavier load than the bucket, a check valve with an orifice (Boom priority orifice) is installed in the parallel passage before the bucket section.
When the bucket section is only operated, oil is supplied from the neutral passage.
When the bucket is only operated, oil is supplied from the neutral passage.
In the center valve group, the arm section is also supplied with oil through the spacer section from the neutral passage of the gear pump P3.
The P.T.O. section is connected to the arm section in series, and therefore, the two sections cannot be operated simultaneously. However, since the P.T.O. section is also supplied with oil through the arm section from the gear pump P3, it can be operated simultaneously with the travel (L) or boom swing section.
The left valve group has parallel passages to allow the simultaneous operation of the swing section and the blade section. In that simultaneous operation, so that oil flows to the blade section even when the blade has got heavier load than the swing, a check valve with an orifice (Blade priority orifice) is installed in the parallel passage before the swing section.
When the swing section is only operated, oil is supplied from the neutral passage.



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6) Service standards

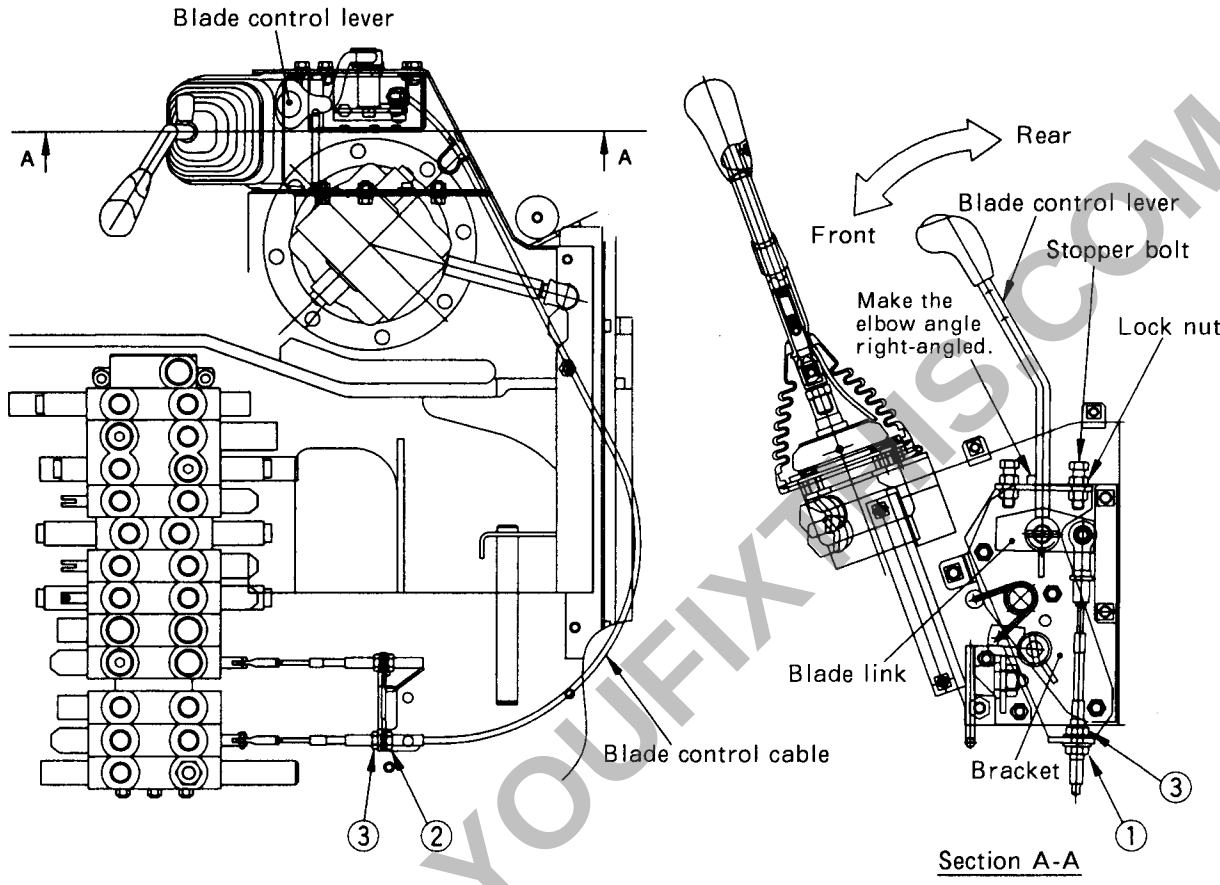
(1) Reduction gear

No.	Parts	Inspection item	Inspection standard		Remedy
1	Internal gear a	Wear of tooth surfaces	Pitting area rate: 5% or more of the engaged area	Rate of pitting area to tooth surface 	Replace pinion kit.
2	Carriers 1 and 2	Shear droop and damage in splined area	Check for any damage with eyes		Replace carrier kit.
		Looseness of pins b1 (Carrier 1)	Wear of holes	Looseness by manual check: 0.005 mm or more	
		Looseness of pins b2 (Carrier 2)	Wear of holes		
3	Gears S1, S2, b1 and b2	Wear of tooth surfaces and damage of teeth	Pitting area rate: 5% or more of the engaged area	Rate of pitting area to tooth surface 	Replace carrier kit and/or S2 gear.
		Wear of surface contacted with roller bearing (Gears b1 and b2)	Flaking or pitting seen by eyes		
4	Pins b1 and b2	Wear of surface contacted with roller bearing	Flaking or pitting seen by eyes		Replace carrier kit.
5	Bearings	Wear of rollers and contacted surfaces of inner and outer races	Flaking or pitting seen by eyes		Replace carrier kit.
6	Others (Screws, bolts, O-rings, etc.)	Damage and excessive rust			Replace part.

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7-3-7 Adjustment of Blade Control Lever



(1) Tighten the nut ① or ② to set the blade control lever at 90 degrees to the level surface of the bracket.
(2) Tighten the lock nut ③.
(3) Move the lever to the front (rear) to its full stroke end and tighten each stopper bolt until the bolt contacts with the blade linkage.
(4) Return the lever to the neutral position, tighten the stopper bolt one more turn and tighten the lock nut.

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