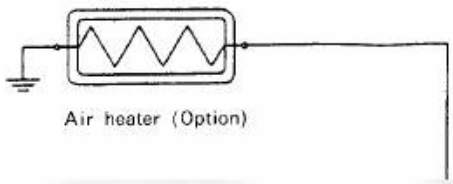
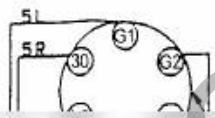
# 6. Wiring Diagram

**Model : 3JH2L, 4JH2L**




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### 4-2 Crank pin bushing

#### 4-2.1 Checking crank pin bushing

Check for flaking, melting or seizure on the contact surface.

#### 4-2.2 Measuring crank pin oil clearance

Use a plastic gauge.



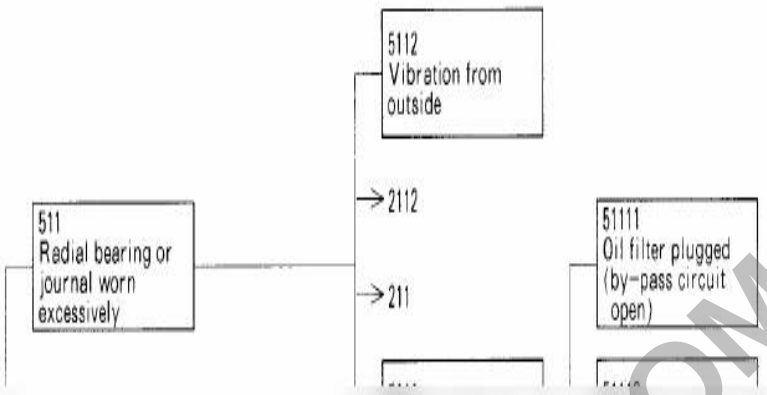
(3) When assembling the connecting rod, match up the large end and large end cap number. Coat the bolts with engine oil and gradually tighten them alternately to the specified torque.
If a torque wrench is not available, make match marks on the bolt heads and large end cap (to indicate the proper torque position) and retighten the bolts to those positions.



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CHAPTER 6

# COOLING WATER SYSTEM


1. Cooling Water System ..... 6-1
2. Sea Water Pump ..... 6-4
3. Fresh Water Pump ..... 6-7
4. Heat Exchanger ..... 6-10
5. Pressure Cap and Sub Tank ..... 6-12
6. Thermostat ..... 6-14



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# 7. Troubleshooting

### 1. Troubleshooting of fuel injection pump

Complete repair means not only replacing defective parts, but finding and eliminating the cause of the trouble as well. The cause of the trouble may not necessarily be in the pump itself, but must be in the engine or the fuel system. If the pump is removed prematurely, the true cause of the trouble may never be known. Before removing the pump from the engine, at least go through the basic check points given here.

Basic check points

- Check for breaks or oil leaks throughout the fuel system, from the fuel tank to the nozzle.
- Check the injection timings for all cylinders. Are they correctly adjusted? Are they too fast or too slow?
- Check the nozzle spray.
- Check the fuel delivery. Is it in good condition? Loosen the fuel pipe connection at the injection pump inlet, and test operate the fuel feed pump.

### 2. Major faults and troubleshooting

| Fault | | Cause | Remedy |
|---|---|---|---|
| 1. Engine won't start. | Fuel not delivered to injection pump. | (1) No fuel in the fuel tank.<br>(2) Fuel tank cock is closed.<br>(3) Fuel pipe system is clogged.<br>(4) Fuel filter element is clogged.<br>(5) Air is sucked into the fuel due to defective connections in the piping from the fuel tank to the fuel pump.<br>(6) Defective valve contact of feed pump<br>(7) Piston spring of feed pump is broken.<br>(8) Inter-spindle or tappets of feed pump are stuck. | Resupply<br>Open<br>Clean<br>Disassemble and clean, or replace element<br>Repair<br>Repair or replace.<br>Replace<br>Repair or replace |
| | Fuel delivered to injection pump. | (1) Defective connection of control lever and accel. rod of injection pump.<br>(2) Plunger is worn out or stuck.<br>(3) Delivery valve is stuck.<br>(4) Control rack doesn't move.<br>(5) Injection pump coupling is damaged, or the key is broken. | Repair or adjust<br>Repair or replace<br>Repair or replace<br>Repair or replace<br>Replace |
| | Nozzle doesn't work. | (1) Nozzle valve doesn't open or close normally.<br>(2) Nozzle seat is defective.<br>(3) Case nut is loose.<br>(4) Injection nozzle starting pressure is too low.<br>(5) Nozzle spring is broken.<br>(6) Fuel oil filter is clogged.<br>(7) Excessive oil leaks from the nozzle sliding area. | Repair or replace<br>Repair or replace<br>Inspect and tighten<br>Adjust<br>Replace<br>Repair or replace<br>Replace the nozzle assembly |
| | Injection timing is defective. | (1) Injection timing is retarded due to failure of the coupling.<br>(2) Camshaft is excessively worn.<br>(3) Roller guide incorrectly adjusted or excessively worn.<br>(4) Plunger is excessively worn. | Adjust<br>Replace camshaft<br>Adjust or replace<br>Replace plunger assembly |
| 2. Engine starts, but immediately stops. | | (1) Fuel pipes is clogged.<br>(2) Fuel filter is clogged.<br>(3) Improper air-tightness of the fuel pipe connection, or pipe is broken and air is being sucked in.<br>(4) Insufficient fuel delivery from the feed pump. | Clean<br>Disassemble and clean, or replace the element.<br>Replace packing; repair pipe<br>Repair or replace |

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# 1. Engine Specifications

### 1-1 3JH Series

| Model | 3JH2L | 3JH2L-T |
|---|---|---|
| Type | Vertical 4-cycle water cooled diesel engine | |
| Combustion system | Direct injection | |
| Aspiration | Naturally aspirated | Turbocharged |
| Number of cylinders | 3 | |

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(5) Check the surface of the commutator
If the commutator surface is rough, then please use No. 500-600 sandpaper to make it smooth.



**1-5.2 The field coil**

(1) Continuity test for the field coil
Check for continuity between the field coils' terminals with a tester. If there is continuity then it is still good.

No continuity : (Disconnected coil)
Replace the field coil.



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# MODELS 3,4JH2LE


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The Yanmar Model YPES Bosch type fuel injection pump is an in-line type pump with a governor and a timer incorporated.

A cam shaft is built into the fuel injection pump, which has a drive cam for the fuel feed pump and tappet-drive cams for the plunger. A timing gear and drive gear are mounted on the drive side of the cam shaft, and a governor weight on the opposite side.

As the plunger rises, the fuel oil opens the delivery valve and goes through the high pressure pipe to the fuel injection nozzles. When the control rack connected to the governor lever moves, the pinion turns the plunger. This changes the fuel dis-

The fuel injection pump supplies pressurized fuel to the injection nozzles through the action of the plunger. The plunger reciprocates in the plunger barrel through a fixed stroke and is lapped for a precise fit. A lead groove is helically cut in the plunger, and this leads to a connecting groove which goes to the top of the plunger.

There is a port in the plunger barrel which serves as both an intake and discharge port. The fuel comes through this port into the plunger chamber, is pressurized by the plunger, opens the delivery valve, flows to the fuel injection nozzle through the fuel injection pipe and is injected into the combustion chamber. Fuel injection terminates after the pres-

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**ASSEMBLING ( RH B3 )**

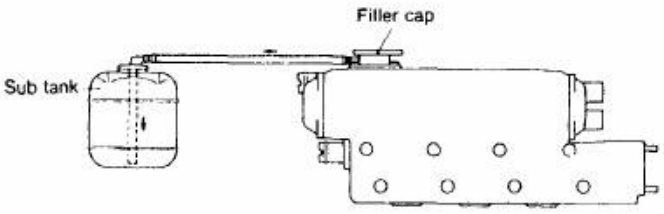
| Process | Method | Notice |
|---|---|---|
| Preparation | ------- Following are prepared.<br>(1) Liquid gasket (ex. Three Bond No.1215)<br>(2) Anti-loosening agent (ex. Lock Tight) | * Following parts should be used new ones.<br>(1) All seal ring (4,5,6)<br>(2) All screws (23,24)<br>(3) All bolts (13,17)<br>(4) Toothed lock washers (25)<br>(5) Journal bearings(10)<br>(6) Thrust bearing (11)<br>(7) All clamps (15,18) |

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**5-7 Precautions on usage of the sub tank**

(1) Check the sub tank when the engine is cool and refill with fresh water as necessary to bring the water level between the low and full marks.
(2) Check the overflow pipe and replace if bent or cracked. Clean out the pipe if it is clogged up.

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