FOREWORD

This service manual has been compiled for engineers engaged in sales, service, inspection and maintenance. Accordingly, descriptions of the construction and functions of the engine are emphasized in this manual, while items, which should already be common knowledge, are omitted.

One characteristic of a marine diesel engine is that its performance in a vessel is governed by the applicability of the vessel's hull construction and its steering system.

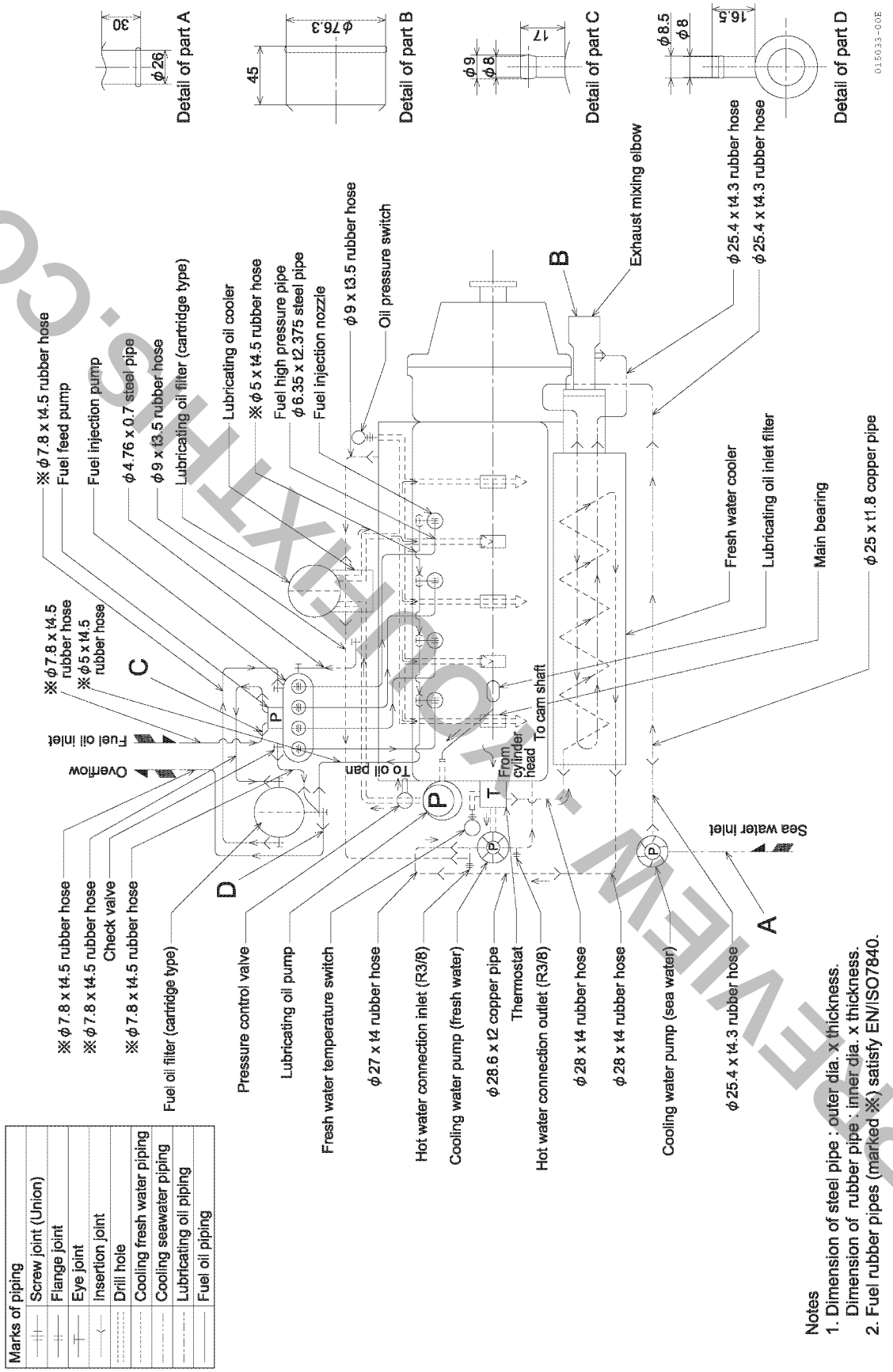
Engine installation, fitting out and propeller selection have a substantial effect on the performance of the engine and the vessel. Moreover, when the engine runs unevenly or when trouble occurs, it is essential to check a wide range of operating conditions - such as installation to the full and suitability of the ship's

Blurred on purpose. The manual you buy has this page in full quality.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

(3) 4JH4(B)E (with KM35P, KM35A2 marine gear)



PREVIEW ONLY
Download full manual at youfixthis.com

7) Read the timing scale on the flywheel from the matching mark on the flywheel housing hole. It is standard fuel injection timing if the timing mark position meets the fuel injection timing of the below table.

	Model	Standard
Injection timing FID (FIC-Air) bTDC	3JH4E	12±1 (13±1)
	4JH4E	13±1 (14±1)

8) Repeat the step 5) to 7) a few times.

Note:
Injection timing check for one cylinder is generally sufficient. If it is to be checked for all cylinders, check each cylinder in the ignition order. (1-3-2-1 for 3JH4E, 1-3-4-2-1 for 4JH4E) The cylinder to be checked is not limited to the No.1 cylinder and any cylinder may be checked.

9) If the injection timing is out of the standard value, loosen the fuel pump mounting nut and incline the fuel injection pump toward or away from the engine for adjustment. Incline toward the engine to delay the timing, and away from the engine to advance it.

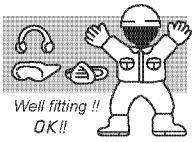
[4JH4-TE and 4JH4-HTE]
The fuel injection timing is adjusted so that engine performance may become the best condition and comply with the emission regulations.
This VE pump equips W-C.S.D (Wax type Cold Start Device), which improves the startability of the engine by advancing the injection timing according to the coolant temperature in a cold weather.
The injection timing of this engine can be adjusted by turning the VE pump, while reading the plunger lift by a dial gage. Make sure that the release of W-C.S.D is required at the time of injection timing adjustment.
The fuel injection timing is adjusted by the following procedure.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

(2) WORK - WEAR (GARMENTS)

⚠ CAUTION



• Safe Work Clothing

Appropriate safety wear (gloves, special shoes / boots, eye / ear protection, head gear, harness', clothing, etc.) should be used / worn to match the task at hand. Avoid wearing jewelry, unbuttoned cuffs, ties or loose fitting clothes around moving machinery. A serious accident may occur if caught in moving / rotating machinery.

(3) TOOLS

⚠ WARNING

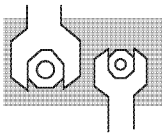
• Appropriate Lifting / Holding

When lifting an engine, use only a lifting device (crane, jack, etc.) with sufficient lifting capacity. Do not overload the device. Use only a chain, cable, or lifting strap as an attaching device. Do not use rope, serious injury may result.

To hold or support an engine, secure the engine to a support stand, test bed or test cart designed to carry the weight of the engine. Do not overload this device, serious injury may result.

Never run an engine without being properly secured to an engine support stand, test bed or test cart, serious injury may result.

⚠ WARNING



• Appropriate Tools

Always use tools that are designed for the task at hand. Incorrect usage of tools may result in damage to the engine and or serious personal injury.

(4) GENUINE PARTS and MATERIALS

⚠ CAUTION



• Genuine Parts

Always use genuine YANMAR parts or YANMAR recommended parts and goods. Damage to the engine, shortened engine life and or personal injury may result.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Marks of piping	
	Screw joint (Union)
	Flange joint
	Eye joint
	Insertion joint
	Drill hole
	Cooling fresh water piping
	Cooling seawater piping
	Lubricating oil piping

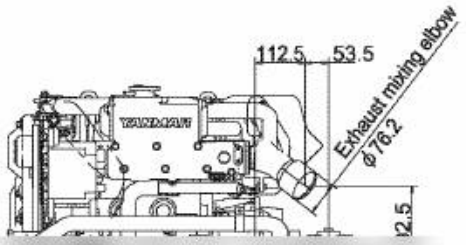


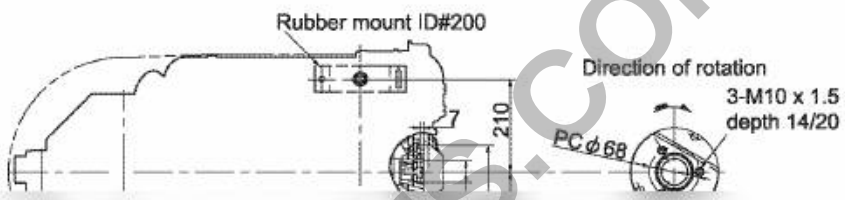
(11) 4JH4-HTE (

Blurred on purpose. The manual you buy has this page in full quality.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com





PREVIEW - YOUFIXTHIS.COM

Blurred on purpose. The manual you buy has this page in full quality.

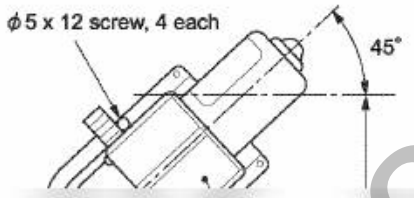
Download full manual at youfixthis.com

9.7.4 Assembly procedure

When bilge is being used, assemble in accordance with the following.

(1) Assembling the bilge pump

- Select a dry place above the bilge water level.
- Select the location for the bilge pump taking into consideration the length of the switch cable (approx. 3 m) and its attachment point, and the position of the battery.

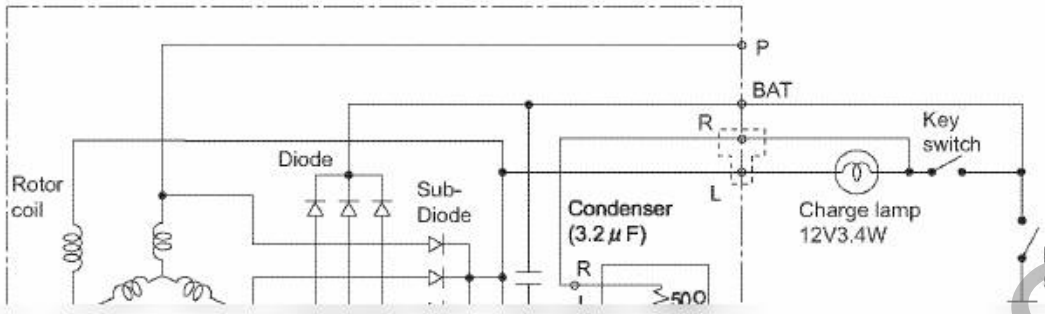


PREVIEW - YOUFIXTHIS.COM

Blurred on purpose. The manual you buy has this page in full quality.

Download full manual at youfixthis.com

12.5.3 Wiring diagram



Blurred on purpose. The manual you buy has this page in full quality.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

CONTENTS

1. General 1
1.1 Exterior views 1
1.2 Specifications 4
1.3 Fuel oil, lubricating oil and coolant 10
1.3.1 Fuel oil 10
1.3.2 Lubricating oil 12
1.3.3 Coolant 13
1.4 Engine outline 14
1.5 Piping diagrams 33
1.6 Exhaust Gas Emission Regulation in U.S.A. only 46
1.6.1 Engines under 37kw: 3JH4E 46
1.6.2 Engines of 37kW or more: 4JH4-TE and 4JH4-HTE 49

2. Inspection and adjustment 52
2.1 Periodic maintenance schedule 52
2.2 Periodic inspection and maintenance procedure 54
2.2.1 Check before starting 54
2.2.2 Inspection after initial 50 hours or one month operation 60
2.2.3 Inspection every 50 hours or monthly 69
2.2.4 Inspection every 250 hours or one year 74
2.2.5 Inspection every two years 84
2.2.6 Inspection every 1,000 hours or four years 84
2.3 Adjusting the no-load maximum or minimum speed 94
2.4 Sensor inspection 95
2.4.1 Oil pressure switch 95
2.4.2 Thermo switch 95
2.5 Thermostat inspection 96
2.6 Adjusting operation 97
2.6.1 Preliminary precautions 97
2.6.2 Adjusting operation procedure 97
2.6.3 Check points and precautions during running 98
2.7 Long storage 99

3. Troubleshooting 100
3.1 Preparation before troubleshooting 100

PREVIEW - YOUFIXTHIS.COM

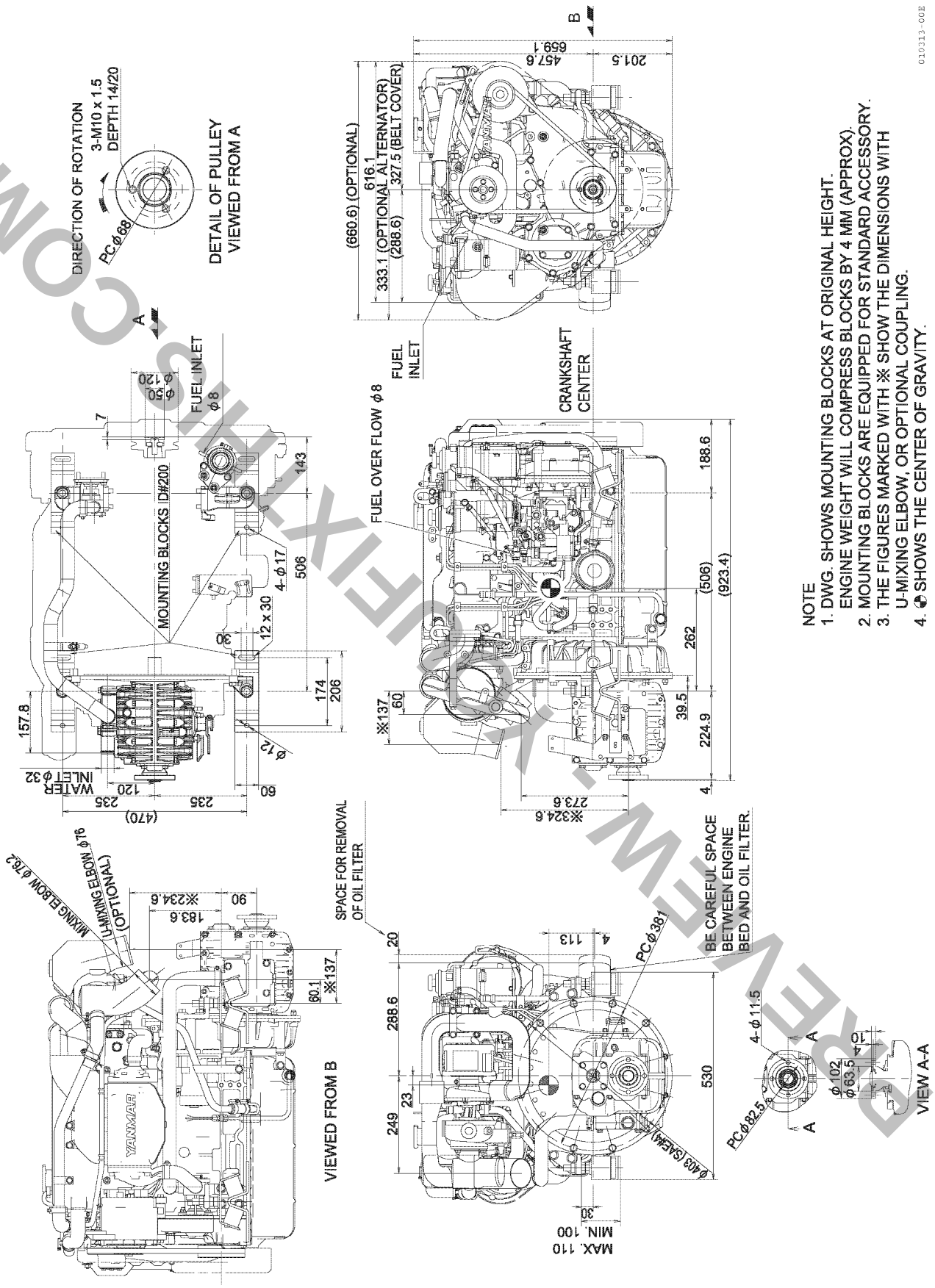
Download full manual at youfixthis.com

12.5.2 Structure 309
12.5.3 Wiring diagram 310
12.5.4 Standard output characteristics 310
12.6 Instrument panel 311
12.6.1 B-type instrument panel (Selectable optional) 311
12.6.2 C-type instrument panel (Selectable optional) 311
12.7 Warning devices 312
12.7.1 Oil pressure alarm 312
12.7.2 Sender unit for lube oil pressure gauge 313
12.7.3 Coolant temperature alarm 314
12.7.4 Sender unit for the coolant temperature gauge 314
12.8 Air heater (Optional) 315
12.9 Electric engine stopping device 316
13. Service standards 317
13.1 Engine tuning 317
13.2 Engine body 319
13.2.1 Cylinder head 319
13.2.2 Camshaft and gear train 321
13.2.3 Cylinder block 322
13.3 Lubricating oil system (Trochoid pump) 326
14. Tightening torque for bolts and nuts 327
14.1 Main bolt and nut 327
14.2 Standard bolts and nuts (without lube oil) 327

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

(16) 4JH4-HTFE (with ZF30M marine gear)



PREVIEW - YOUFIXTHIS.COM

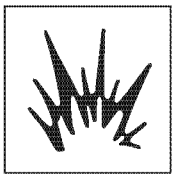
Download full manual at youfixthis.com

(2) Check the electrolyte level in the battery



Fire due to electric short-circuit

- Make sure to turn off the battery switch or disconnect the negative cable (-) before inspecting the electrical system. Failure to do so could cause short-circuiting and fires.
- Always disconnect the (-) Negative battery cable first before disconnecting the battery cables from battery. An accidental "Short circuit" may cause damage, fire and or personal injury.
  And remember to connect the (-) Negative battery cable (back onto the battery) LAST.



Proper ventilation of the battery area

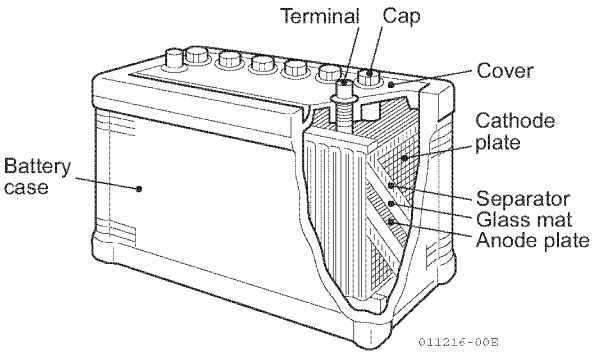
Keep the area around the battery well ventilated, paying attention to keep away any fire source. During operation or charging, hydrogen gas is generated from the battery and can be easily ignited.



Do not come in contact with battery electrolyte

Pay sufficient attention to avoid your eyes or skin from being in contact with the fluid. The battery electrolyte is dilute sulfuric acid and causes burns. Wash it off immediately with a large amount of fresh water if you get any on you.

Battery structure



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

(V) Coolant temperature is too high

No.	Cause and effect	Countermeasure
1	Insufficient amount of coolant.	Open closed parts.
2	Trouble with cooling water pump.	Check pump and repair.
3	Amount of water returning is too great.	Adjust amount of returning water.
4	Clogging in coolant system.	Clean.
5	Air in coolant.	Check suction opening.
6	Overloading.	Reduction load.

(VI) coolant pressure is too low

No.	Cause and effect	Countermeasure
1	Clogging in coolant system.	Clean.
2	Trouble with cooling water pump.	Check pump and repair.
3	Coolant lift is too great.	Lessen lift or replace pump.
4	Air in coolant.	Check suction opening.
5	Engine outlet not constricted.	Eliminate causes for high coolant temperature and constrict.
6	Water leakage from coolant joints.	Check and repair.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

4.3.2 Reassembly

(1) Clean all parts

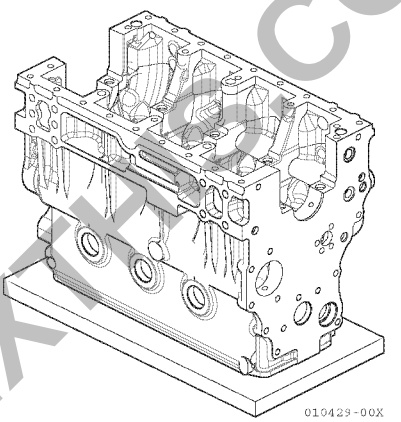
Clean all parts using by the cloth and diesel oil (or cleaning agent) before reassembly.

Note:

1) If the dust remain with the parts, engine may cause the seizing or damage.
2) The cleaning agent removes even carbon adhering to disassembled parts.

(2) Putting the cylinder block upside down

Place a wood block on the floor and put the cylinder block upside down (with the cylinder head mounting surface facing down).

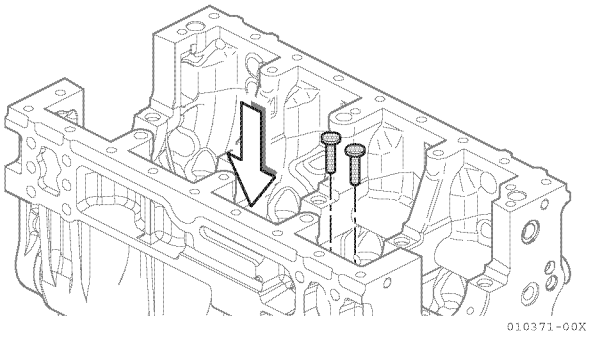


(3) Inserting the tappets

Coat the inside of the cylinder block tappet holes and the outside circumference of the tappets with engine oil, and insert the tappets in the cylinder block.

Note:

Separate the tappets to make sure that they are reassembled in the same cylinder No. and intake/ exhaust side as they came from.



PREVIEW - YOUFIXTHIS.COM

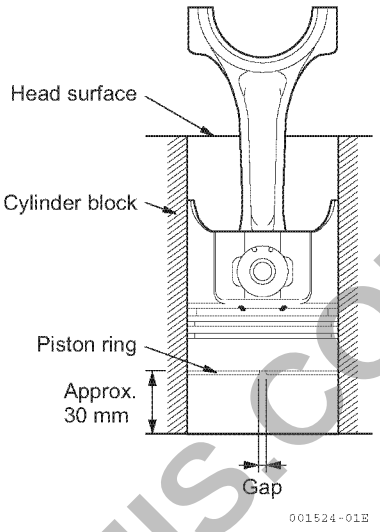
Download full manual at youfixthis.com

(2) Measuring piston ring gap (End clearance)

Press the piston ring onto a piston liner and measure the piston ring gap with a gauge. Press on the ring about 30mm from the bottom of the liner.

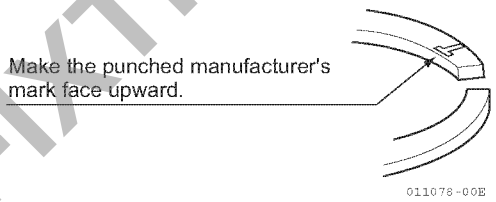
mm

	Standard	Limit
Top ring gap	0.200-0.400	0.490
Second ring gap	0.200-0.400	0.490
Oil ring gap	0.200-0.400	0.490

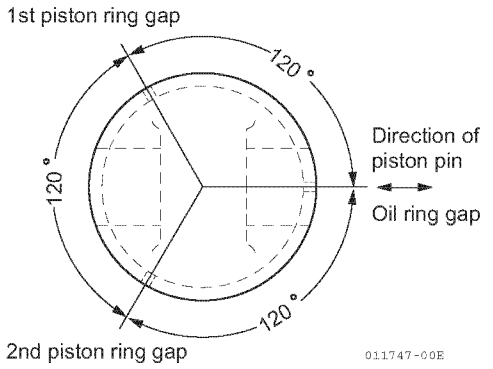


(3) Removing the piston rings

1) Thoroughly clean the ring grooves when removing piston rings.
2) The side with the manufacturer's mark should face up.
3) After fitting the piston ring, make sure it moves easily and smoothly.



4) Adjust the piston ring gaps at 120° intervals, making sure they don't line up.

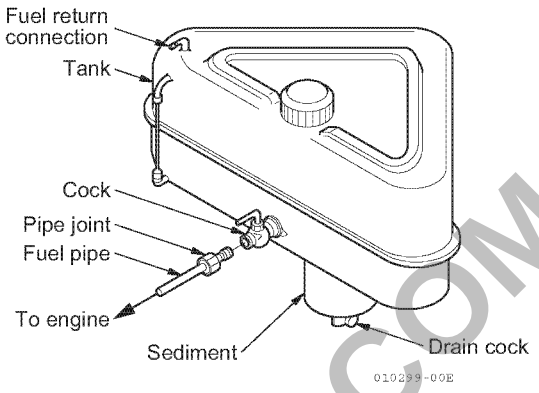


PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

6.6 Fuel tank

A triangular 30 liter fuel tank with a 2000mm (78.74 in.) rubber fuel hose to fit all models is available as an option.
A fuel return connection is provided on top of the tank of which a rubber hose can be connected to return fuel from the fuel nozzles.



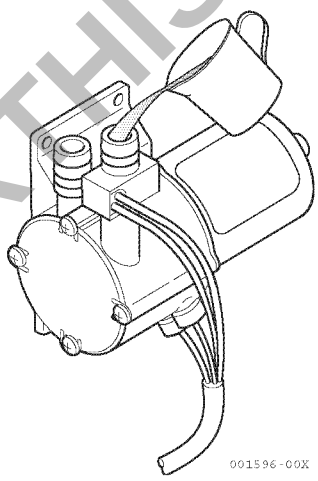
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

9.7.5 Cautions for assembling

Observe the following cautions for handling.

- Do not use gasoline or solvents.
  1) gasoline 2) ester 3) benzol 4) battery fluid
  5) liquids at 70°C or greater or engine oil
- Never run when there is no water in the bilge. Check to be sure that the strainer is in the water before turning on the switch.
- Keep the cord terminal away from the water. Water inside the motor or switch may lead to damage. When the insulation around the cord is damaged, water can seep in to the wires; thus, care should be taken not to scratch or nick the cord.
- When the pump has not been used for a long period of time, the inside of the pump will be dry and it may not operate properly at first. If after 10 seconds the pump is not working, turn off the switch and prime the pump before trying again.
  (Never run the pump dry for period of greater than 10 seconds.)



- Replace the diesel engine oil only after the engine has been stopped for a period of 30 minutes (oil temp. 20-70°C). Whenever possible refrain from operation when the oil temperature is below 15°C or above 50°C.
- Bilge water left in the hose or inside the pump can freeze, and care should be taken to see that any excess bilge is completely discharged. If bilge water should freeze, and care should be taken to see that any excess bilge is completely discharged. If bilge water should freeze inside the hose or pump, it should be completely melted before starting up the pump. When the temperature inside the pump is low, it will take a longer time for the pump to operate. (0°C, 5-10 seconds.)
- Keep the pump in a dry place away from rain or other water.
- Use the regulation hose; do no use thin vinyl hose or hose which is not heat-resistant.
- The pump cannot be used to drain off rainwater or large quantities of flood water. This pump can be operated continuously for a period of 10 minutes.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 17 of 346 pages

The full manual includes:

- All 346 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Yanmar 3JH4E, 4JH4E, 4JH4-TE, 4JH4-HTE Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual