(2) Washing the Cooling Water System and Checking and Maintaining Parts

This maintenance requires specialized knowledge. Consult your Yanmar dealer or distributor.
Over time rust and scale builds up in the seawater and fresh water systems reducing their cooling performance. Additionally, when the inside of the engine oil cooler become dirty, lube oil cooling worsens causing the oil to deteriorate more quickly.
Wash the following related parts when the cooling water is being replaced.
Cooling water system related parts: seawater pump, engine oil cooler, fresh water pump, fresh water cooler, thermostat, etc.

(3) Checking and Replacing the fuel pipe and the cooling water pipe

This maintenance requires specialized knowledge. Consult your Yanmar dealer or distributor.
Check the hoses of the fuel and cooling water pipings and replace if damaged.

(4) Replacing the Mixing Elbow (Option)

This maintenance requires specialized knowledge. Consult your Yanmar dealer or distributor.
The mixing elbows which are constantly in contact with exhaust gas and seawater deteriorate with use and must be replaced. If operation is continued without replacing faulty elbows, water will leak into the boat, and gas leakage may result in fires.

(5) Lapping of Intake/Exhaust Valves

This maintenance requires specialized knowledge. Consult your Yanmar dealer or distributor.
Adjustment is necessary to maintain proper contact of the valves and seats.

(6) Checking and Adjusting the Fuel Injection Timing

This maintenance requires specialized knowledge. Consult your Yanmar dealer or distributor.
Fuel injection timing must be adjusted to ensure optimal engine performance.

5.3 Replacement Parts

【NOTICE】

Be sure to use genuine Yanmar parts when making replacements. Using other parts lowers engine performance and shortens the life of the engine.

Name of Part	Code Number	Remarks
Fuel filter (cartridge)	127695-55630	—
Lube oil filter (cartridge)	127695-35150	—
Lube oil bypass filter (cartridge)	128633-35450	—
Oil/water separator element	127695-55760	option
Rubber impeller for seawater pump	128620-42200	—
V-belt (alternator)	25132-004500	—

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6. TROUBLE AND TROUBLESHOOTING

6.1 Simple problems and the appropriate countermeasures

If you should encounter some difficulty during operation. refer to the following table for countermeasures.

Trouble	Probable Cause	Measure	Reference

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5.2 Periodic Inspection Items

5.2.1 Inspection After Initial 50Hrs. Operation

(1) Replacing the Engine Lube Oil and Lube Oil Filters (1st time)

⚠ CAUTION



Precautions for Removing Hot Oil to Prevent Burns

If extracting oil from the engine while it is still hot, do not let the oil splash on you.

During initial operation of the engine, the oil is quickly contaminated due to the initial wear of internal parts. The lube oil must therefore be replaced early. Replace the lube oil filter and the bypass filter at the same time.

① Drain off the lube oil.

It is easier and more effective to drain the engine lube oil while the engine is still warm after operation.

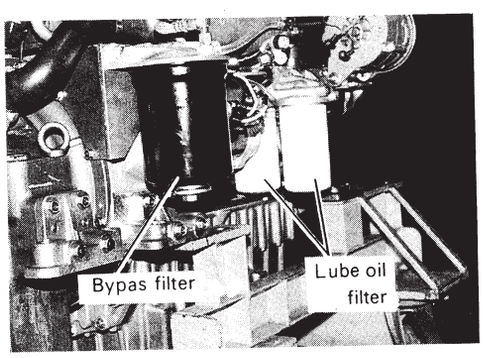
1) After removing the oil dipstick, attach the hose of the oil drain pump (optional) to the dipstick guide.
2) Drain off the oil with the drain pump.(Option)

② Changing the lube oil filter

Remove the filters, and replace the filters with new one.

- Procedure for changing the filter

1) Remove the filter using the oil filter wrench.
2) Replace the filters with new one. At the same time, clean the seating surface of the packing to prevent improper sealing caused by foreign material. Apply small amount of lube oil onto filter sealing ring.
3) Check that there is no oil leakage during operation.



③ Changing the bypass filter

Remove the bypass filter, and replace the filter with a new one.

- Procedure for changing the filter.

Replace the filter with a new one with the same procedure (above ②-1), 2), 3))

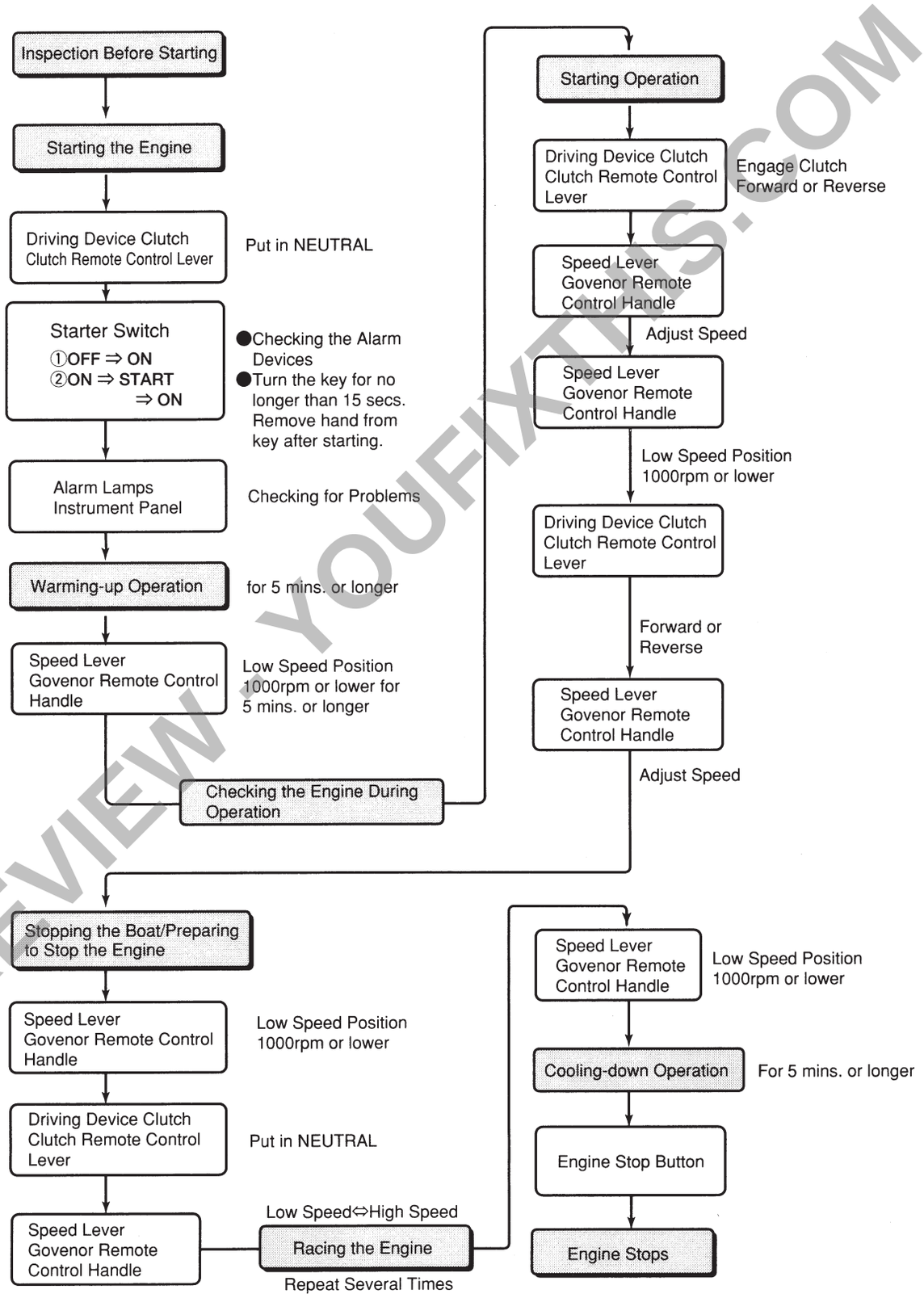
④ Fill with new lube oil.

1) Fill with the specified amount of oil. → **See 3.3**
2) Run the engine for approximately 5 minutes and check to see if there is any oil leakage.
3) Approximately 10 minutes after stopping, check the oil level again with the oil dipstick and add more oil if necessary.

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4.7 Operation Procedure

The following diagram shows the procedures for operation explained up to this point.
Parts of the operation may differ depending on the remote control system being used. Accompanying operation manuals should be read carefully and understood.



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1.2 Safety Precautions

(Observe these instructions for your own safety.)

■ Precautions for Operation

⚠ DANGER



Burns from Scalding

- Never remove the filler cap of the fresh water cooler while the engine is still hot. Steam and hot water will spurt out and seriously burn you. Wait until the water temperature has dropped, then wrap a cloth around the cap and loosen it slowly.
- After inspection, refasten the filler cap firmly. If the cap is not secure, steam or scalding water may be emitted during operation causing burns.

⚠ DANGER



Proper Ventilation of the Battery Area

- Be sure the area around the battery is well-ventilated and there is nothing which could start a fire. During operation and charging, hydrogen gas is emitted from the battery and can be easily ignited.

⚠ DANGER



Fires from Oil Ignition

- Be sure to use the correct type of fuel when refueling.
  Mistakenly filling with gasoline or the like will result in ignition.
- Be sure to stop the engine before refueling.
  If you spill fuel, wipe such spillage carefully.
- Never place oils or other flammable material close to the engine as this could result in ignition.

⚠ WARNING



Exhaust Gas Poisoning

- Be sure to establish good ventilation in the engine room with windows, vents, or other ventilation equipment. Check again during operation to be sure that ventilation is good. Exhaust gas contains poisonous carbon monoxide and should not be inhaled.

⚠ WARNING



Moving Parts

- Do not touch the moving parts of the engine (propeller shaft, V-belt, PTO-pulley, etc.) during operation or let your clothing get caught in them as this can result in injury.
- Never operate the engine without the covers on the moving parts.
- Check before starting the engine to see that any tools or cloths used in maintenance have been removed from the area.

⚠ CAUTION



Burns from Contact with Hot Engine Parts

- The whole engine is hot during operation and immediately after stopping.
  The turbocharger, exhaust manifold, exhaust pipe, and engine are very hot.
  Never touch these parts with your body or clothing.

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1. FOR SAFE OPERATION

Following the precautions described in this manual will enable you to use this engine with complete satisfaction. Failure to observe any of the rules and precautions, however, may result in injury, burns, fires, and engine damage. Read this manual carefully and be sure you fully understand it before beginning operation.

1.1 Warning Symbols

These are the warning signs which are used in this manual and on the products.
Pay special attention to them.

⚠ DANGER

DANGER- Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠ WARNING

WARNING- Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

⚠ CAUTION

CAUTION- Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.

- The descriptions captioned by 【NOTICE】 are for the particularly important cautions for handling. If you ignore them, the performance of your machine may deteriorate leading to trouble.

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3.2 Supplying with Fuel

⚠ DANGER



Fires from Oil Ignition

- **Be sure to use the correct type of fuel when refueling. Mistakenly filling with gasoline or the like will result in ignition.**
- **Be sure to stop the engine before refueling. If you spill fuel, wipe such spillage carefully.**
- **Never place oils or other flammable material close to the engine as this could result in ignition.**

3.2.1 Filling the Fuel Tank

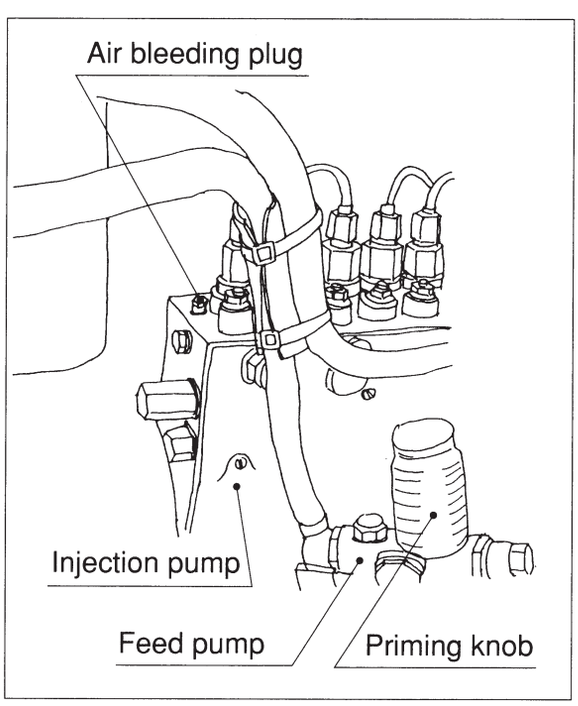
Fill the tank with clean fuel which has not been contaminated with water or dust.
Fill the tank to approximately 90% of its capacity, and take care not to let the fuel spill over during operation.

3.2.2 Bleeding the Fuel System

Bleed the fuel system according to the following procedure. When there is air in the fuel system, the fuel injection pump will not be able to function.

The fuel system includes the fuel tank, water separator, fuel oil filter, feed pump, fuel injection pump, high pressure pipe and fuel injection valve.
If air enters this system, fuel oil cannot be injected. Completely bleed air from the fuel system by using the following procedure:

(1) Open all the shut-off valves of the fuel system.
(2) Loosen the air bleeding plug of the fuel injection pump.
(3) Loosen the bleeding bolts on the fuel oil filter.
(4) Pump the priming knob.
when the fuel comming out of the air bleeding hole is clear and not mixed with any bubbles, tighten the air bleeding bolts.



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(3) Cleaning, Draining Fuel Oil, Greasing

- Clean the outside of the engine wiping off any dust or oil.
- To prevent condensation inside the fuel tank, either drain off the fuel or fill the tank.
- Grease the exposed area and joints of the remote control cable and the bearings of the remote control handle.

(4) Safeguarding the Engine Against Water and Moisture

- Cover the intake silencer, exhaust pipe, etc. with vinyl sheets and seal them to prevent moisture from entering.
- Drain bilge in the hull bottom completely.
- Water may leak into the boat when it is moored, and whenever possible it should be landed.
- Waterproof the engine room to prevent rain and seawater from entering.

(5) Maintaining the Battery Charge

- Be sure to turn off the battery switch.
  During long-term storage, charge the battery once a month to compensate for the battery's self-discharge.

4.8.2 Checking the Engine for Reuse After a Long Storage Period

When using the engine after a long period of storage, prepare for operation in the same manner as for a new engine. →**See [3. BEFORE OPERATION]**

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