

OPERATION MANUAL

***YANMAR***®

***YANMARDIESEL  
ENGINE***

**6CXM-GTE**

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Be sure to read this manual for safe and proper operation.  
Store this manual carefully after use.

Thank you for purchasing a Yanmar Marine Diesel Engine.

## [INTRODUCTION]

- This Operation Manual describes the operation, maintenance and inspection, and handling precautions for the **6CXM-GTE** Yanmar Marine Diesel Engine.

1. **FOR SAFE OPERATION :** Safety indications, safety precautions, explanation and use.
2. **EXPLANATION OF PRODUCT :** Specifications for this series and basic operation principles.
3. **PREPARATION FOR OPERATION :** Fuel oil, lube oil, cooling water, etc. check and supply.
4. **OPERATION :** Starting, speed regulation, stopping and long-term storage.
5. **MAINTENANCE & INSPECTION :** Periodic inspection, inspection items and time period, and detailed explanation.
6. **TROUBLE AND TROUBLESHOOTING :** Simple troubles and table of troubleshooting measures.

- Read this Operation Manual carefully before operating the engine to ensure that it is used correctly and that it stays in the best possible condition.
- Keep this Operation Manual in a convenient place for easy access.
- If this Operation Manual is lost or damaged, order a new one from your dealer or distributor.
- If giving your engine to someone else, be sure to attach this Operation Manual.
- Constant efforts are made to improve the quality and performance of Yanmar products, so some details included in this Operation Manual may differ slightly from your engine. If you have any questions about this, please contact your Yanmar dealer or distributor.

### California Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

### California Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm.  
Wash hand after handling

Operation Manual

Models : Marine Engine  
**6CXM-GTE**

Code No.  
**49961-204670**

<b>1. FOR SAFE OPERATION</b> .....	<b>1~4</b>
1.1 Warning Symbols .....	1
1.2 Safety Precautions .....	2~3
1.3 Location of Product Safety Labels .....	4
<b>2. PRODUCT EXPLANATION</b> .....	<b>5~10</b>
2.1 Use & Driving System .....	5
2.2 Engine Specifications .....	6
2.3 Location of Component .....	7
2.4 Operation Equipment .....	8~10
2.4.1 Instruments .....	8~10
<b>3. BEFORE OPERATION</b> .....	<b>11~16</b>
3.1 Fuel Oil, Lube Oil and Cooling Water .....	11~12
3.2 Supplying with Fuel .....	13
3.3 Supplying Engine Lube Oil .....	14
3.4 Supplying Cooling Water .....	15
3.5 Cranking .....	16
3.7 Checking the Lube Oil and Cooling Water .....	16
<b>4. HOW TO OPERATE</b> .....	<b>17~26</b>
4.1 Inspection Before Starting .....	17~18
4.2 Checking the Instrument Panel and Alarm Devices .....	19
4.3 Starting .....	20~21
4.4 Adjusting the Engine Speed .....	21
4.5 Check During Operationr .....	22
4.6 Stopping the Engine .....	23
4.7 Operation Procedure .....	24
4.8 Long-Term Storage .....	25~26
<b>5. MAINTENANCE &amp; INSPECTION</b> .....	<b>27~34</b>
5.1 List of Periodic Inspections .....	28
5.2 Periodic Inspection Items .....	29~34
5.2.1 Inspection After Initial 50Hrs. Operation .....	29
5.2.2 Inspection Every 50 Hours .....	30~31
5.2.3 Inspection Every 250 Hrs. or 1 yr. ....	32~33
5.2.4 Inspection Every 500 Hrs. or 2 yrs. ....	34
5.2.5 Inspection Every 1000 Hrs. or 4 yrs. ....	34~35
5.3 Replacement Parts .....	35
<b>6. TROUBLE AND TROUBLESHOOTING</b> .....	<b>36~38</b>
6.1 Simple problems and the appropriate countermeasures .....	36~37
6.2 Consulting Your Yanmar Dealer or Distributor .....	38

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



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



**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.



## 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.

**▲ WARNING**

## Alcohol

- Never operate the engine while you are under the influence of alcohol or when you are ill or feel unwell as this results in accidents.

## ■ Safety Precautions for Inspection

**▲ DANGER**



### Battery Fluid

- Battery fluid is diluted sulfuric acid. It can blind you if it gets in your eyes, or burn your skin. Keep the fluid away from your body. Wash it off immediately with a large quantity of fresh water if you get any on you.

**▲ WARNING**



### Fire due to Electric Short-Circuits

- Always turn off the battery switch or detach the earth cable (—) before inspecting the electrical system. Failure to do so could cause short-circuiting and fires.

**▲ WARNING**



### Precautions for Moving Parts

- Stop the engine before you service it. If you must inspect while the engine is operating, never touch moving parts. Keep your body and clothing well clear of all moving parts as this could result in injury.

**▲ CAUTION**



### Precautions for Removing Hot Oil and Water to Prevent Burns

- If extracting oil from the engine while it is still hot, do not let the oil splash on you.
- Wait until the temperature has dropped before removing cooling water from the engine to avoid getting scalded.

**[NOTICE]**

### Do not alter the diesel engine.

Rebuilding the engine or altering parts to increase the speed or the amount of fuel discharged, etc. will make operation unsafe, and result in damage and shortening of engine life.

**[NOTICE]**

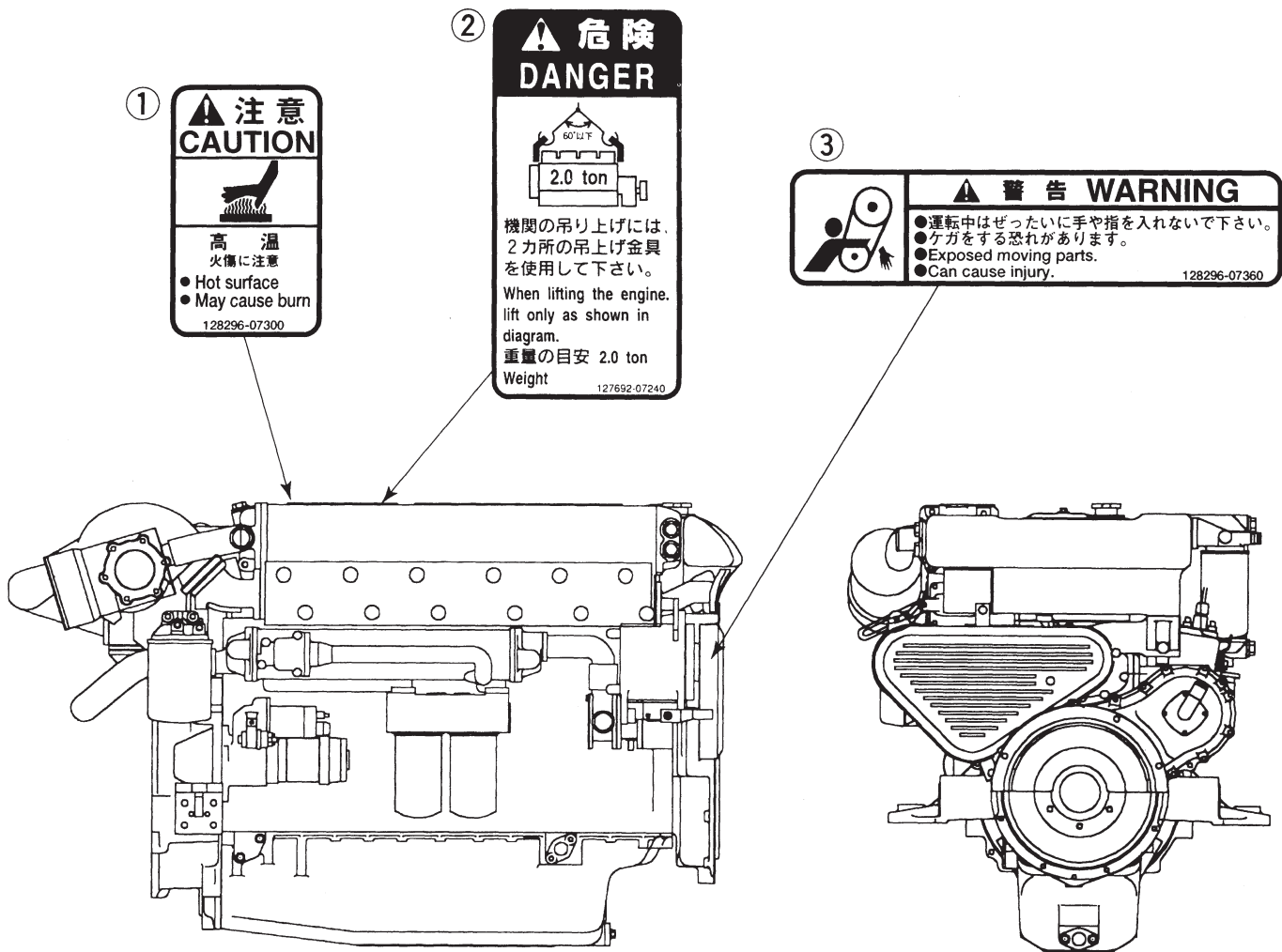
### Disposal of waste materials

- Put oil or liquids to be disposed in a container. Never dispose of waste oil or other fluids outside, in a sewer, river, or the sea.
- Treat waste materials safely observing all regulations and laws. Ask a waste recovery company to collect and dispose of it.

# 1.3 Location of Product Safety Labels

To insure safe operation, product safety labels have been attached. Their location is shown in the diagram below. Keep the labels from becoming dirty or torn and replace them if they are lost or damaged. Also replace labels when parts are replaced, ordering them in the same way as for the parts.

Product Safety Labels, Parts Code Numbers	
①	128296-07300
②	127692-07240
③	128296-07360



## 2. PRODUCT EXPLANATION

### 2.1 Use & Driving System

This is a light, compact diesel engine for use in pleasure boats. The engine is equipped with a turbocharger and intercooler which insures maximum output while preserving lightness and compact size.

In order to get full performance from your engine, it is imperative that the size and structure of the boat be suited to the engine. It is equally important to use the correct driving device and a propeller of the appropriate size and specifications.

The engine must be installed correctly with safe cooling water and exhaust piping and electrical wiring. The PTO work should be easy to use for onboard equipment.

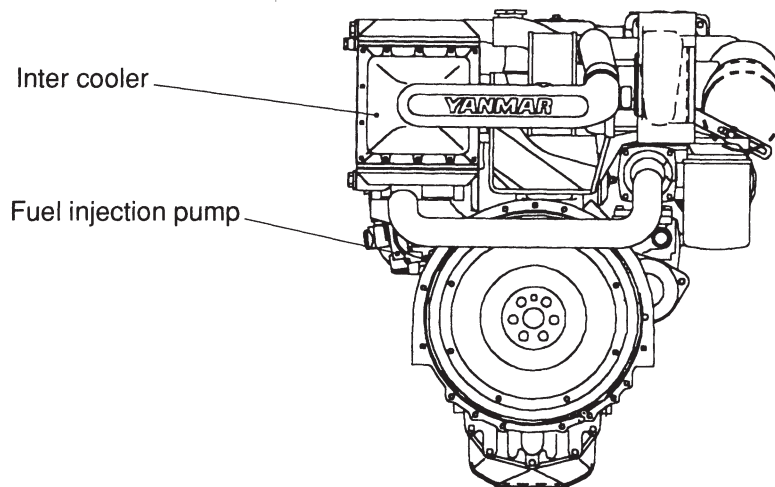
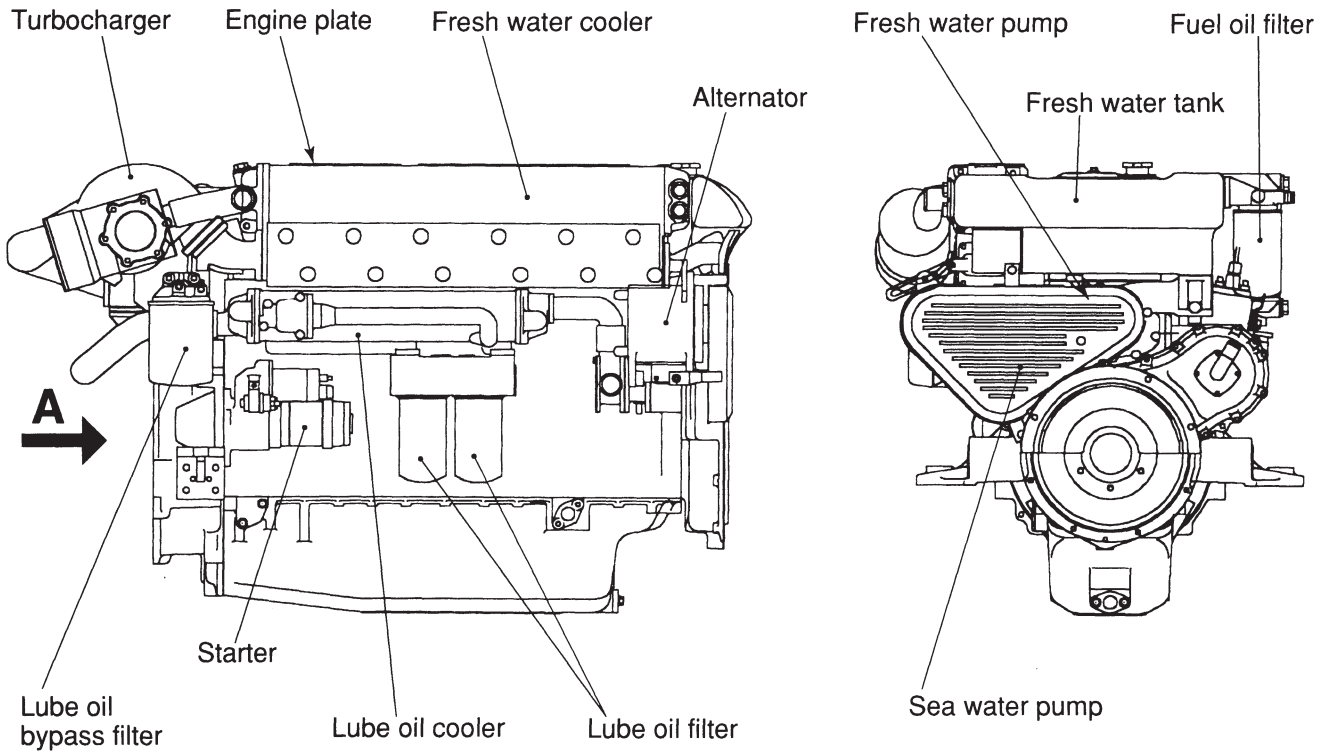
Consult your Yanmar dealer or distributor when selecting optional parts. Optional parts selections should take into account operational and surrounding conditions.

## 2.2 Engine Specifications

Engine Model		6CXM-GTE
Use		Pleasure boat
Type		Vertical water-cooled 4-cycle diesel engine
Number of cylinders-Bore × stroke	mm	6-110×130
Displacement	ℓ	7.413
Aspiration system		Turbocharger
Cont.rating output	kW(PS)/rpm	305(415)/2750
Max. output	kW(PS)/rpm	342(465)/2850
High idling	rpm	3200±25
Low idling	rpm	700±25
Combustion system		Direct injection
Starting system		Electric Starting
Cooling system		Constant high temperature fresh water cooling
Lubrication system		Forced lubrication system with gear pump
Direction of rotation (When viewed from stem side)	Crankshaft	Counter clockwise viewed from flywheel side
Fuel injection pump		In-line type
Fuel injection valve		Hole type
Turbocharger		Holset HX50
Elec.devices	Starter	12V-4.8kW
	Alternator	12V-55A
	Battery	12V-200Ah
Lube oil capacity	Engine oil (oil pan)	22/8
	Full/effective	
Cooling water capacity	System	35
	Subtank	1.5
Dimension (L×W×H)	mm	1190×805×905
Dry Mass	kg	840



## 2.3 Location of Component



See from A

## 2.4 Operation Equipment

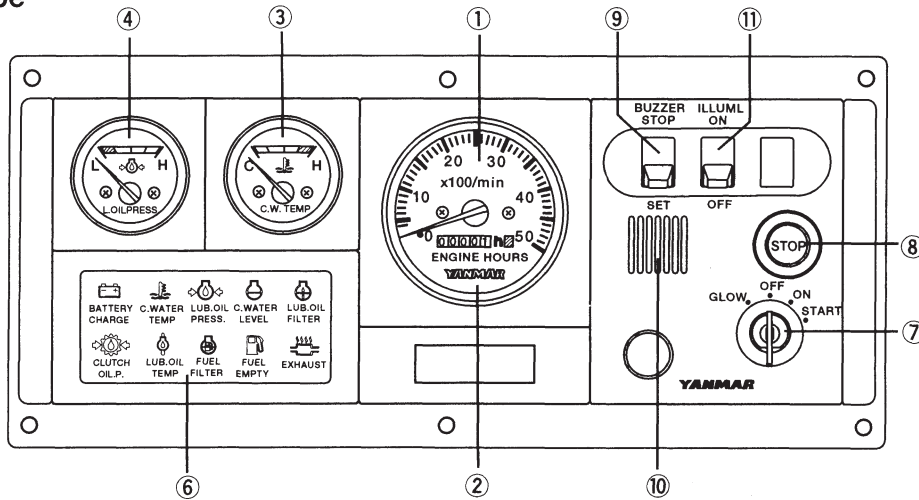
Explanation of the equipment used to operate the engine.

**OPTION**

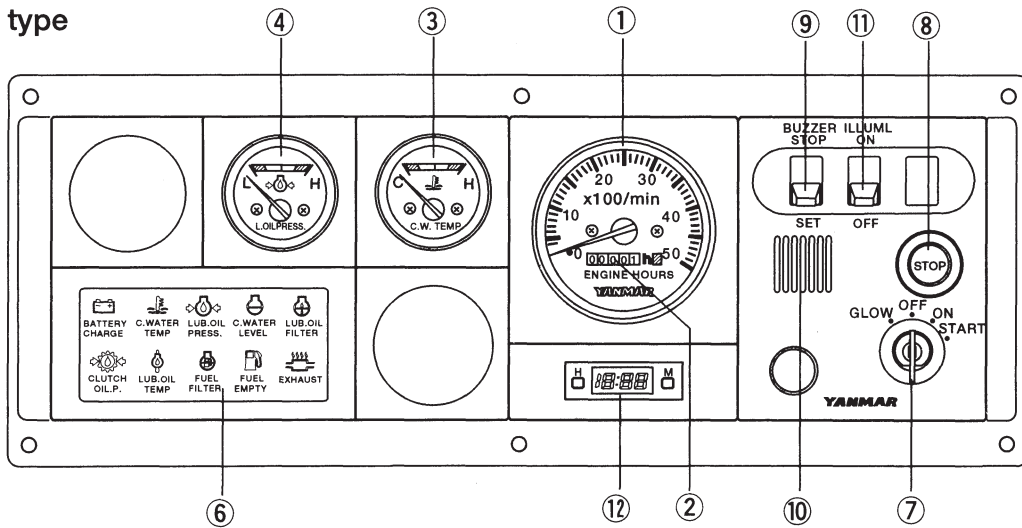
### 2.4.1 Instruments

The instrument panel is located in the cockpit, separate from the engine. The following instruments enable you to start and stop the engine and to monitor its condition during operation.

#### ■ New C type



#### ■ New D type



- |                       |                      |
|-----------------------|----------------------|
| ① Tachometer          | ② Hour meter         |
| ③ C.W. temp. meter    | ④ L.O. temp. meter   |
| ⑥ Alarm lamps         |                      |
| ⑦ Starter switch      | ⑧ Stop button switch |
| ⑨ Buzzer stop switch  | ⑩ Alarm buzzer       |
| ⑪ Illumination switch | ⑫ Quartz clock       |

## (1) Meters

The following meters are located in the upper center part of the instrument panel.

- New C/D type panels use analog electric systems and have a pointer indicator.
- E type panels use liquid crystal digital electric systems and have digital numbers or bar graphs for indicators.

Turn the panel light switch **ON** for easy viewing.

### ● Tachometer

The engine's rotation speed is indicated. Load and engine rotation can be monitored.

### ● Hour meter

The number of hours of operation is indicated, and can be used as a guide for periodic maintenance checks.

### ● Cooling Water Temperature Meter

The cooling water temperature is indicated. Enables monitoring of the cooling condition of the engine.

### ● Lube Oil Pressure Meter

The engine oil pressure is indicated.

Enables monitoring of the condition of the engine's lube oil.

## (2) Alarm Devices

When there is some problem during operation, the alarm buzzers and lamps will come on.

### ● Alarm buzzers

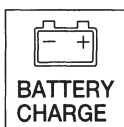
When the various alarm lamps come on, the alarm buzzers will come on at the same time and sound at intervals. However, no alarm buzzer will sound when the charge lamp comes on.

### ● Buzzer stop switch

When the buzzer sound is no longer necessary, it can be turned off with the **Buzzer stop** switch.

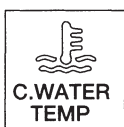
### ● Alarm lamps

The alarm monitor window indicates the trouble spot when one of the symbols shown below lights up. When operation is normal the alarm lights are off; however, should some problem arise, the sensors will pick it up and cause the light behind the appropriate symbol to come on.



#### ① BATTERY CHARGE

When the charge is abnormal, the lamp will come on. When charging begins the lamp will go off. (Alarm buzzer will not sound when the lamp comes on.)



#### ② C.WATER TEMP

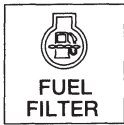
When the temperature of the cooling fresh water exceeds the maximum (95°C or higher), the lamp will light. Continuing operation at temperatures exceeding the maximum will result in damage and seizure. Check the load and the fresh water cooling system for any abnormalities.



#### ③ LUB. OIL PRESS.

When the lube oil pressure falls below normal the oil pressure sensor will register this and the lamp will come on. Continuing operation with insufficient oil will result in damage and seizure. Check the oil level.





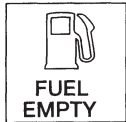
#### ④ FUEL FILTER

When the drain inside the water separator in the fuel filter becomes excessive, the sensor will cause the lamp to come on. Clean out the drain in the water separator. If operation is continued without cleaning, it will become impossible to feed fuel to the engine or damage and seizure of the fuel injection pump will result.



#### ⑤ EXHAUST

When the amount of cooling seawater being discharged becomes too small, the sensor will activate the lamp. Continuing operation under this condition will result in damage and seizure. Check for clogging in the seawater cooling system and damaged parts.



#### ⑥ FUEL EMPTY

When the amount of fuel in the tank is insufficient, the sensor will activate the lamp. Fill with fuel.

### (3) Starter Switch

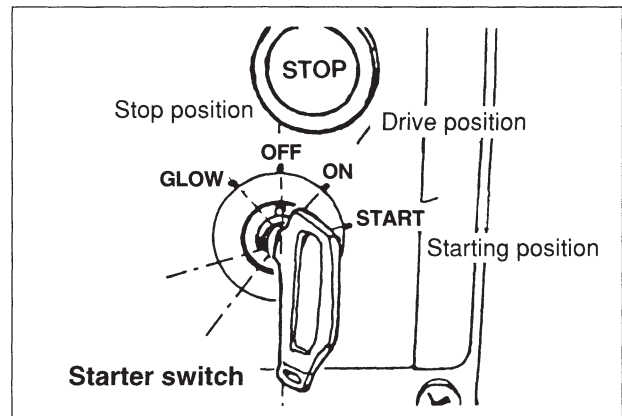
This is the main switch for starting engine operation. It is a rotary-type 3-step switch. Position is changed by turning the key in the switch.

**OFF** is the position where the engine is stopped. All current is cut off. The key can be inserted and removed in this position.

**ON** is the position for operation. Current flows to the instruments and alarm devices.

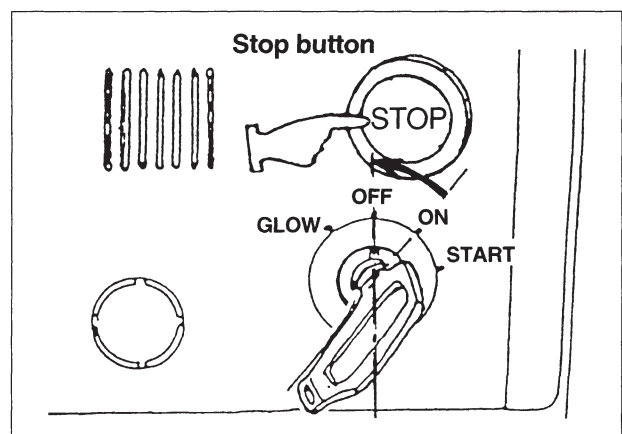
**START** is the position for starting. When the starter turns, the engine starts.

The key returns automatically to the ON position when you remove your hand.  
**GLOW** is the position for turning on the air heater. The air heater aids starting during cold conditions by warming up the intake air before starting.



### (4) Stop button

The engine is stopped by pushing the stop button on the right of the control panel. When the stop button is pushed, the solenoid valve on the fuel injection pump works to cut off the fuel supply and stop the engine. Continue to push the stop button until the engine has come to a complete stop.



# 3. BEFORE OPERATION

Perform items 3.1 - 3.6 before starting to prepare for operation.

## 3.1 Fuel Oil, Lube Oil and Cooling Water

### 3.1.1 Fuel Oil

#### (1) Selection of Fuel Oil

Use the following diesel fuels or equivalents. Select fuels of a higher quality for best engine performance.

[Diesel fuel standard for various countries]

- ISO 8217      DMA
- ASTM D 975    Grade No.1-D or No.2-D
- JIS K2204      Grade No.2,  
                          No.3 or special-No.3
- BS 2869        Part-1 class-A1 or A2

At low temperatures, fuel oil becomes difficult to ignite and will not flow easily, making starting difficult. Select fuel oil of a cetane of 45 or greater to insure ignitability, and use the outside temperature as a guide for selecting the proper grade to insure fluidity.

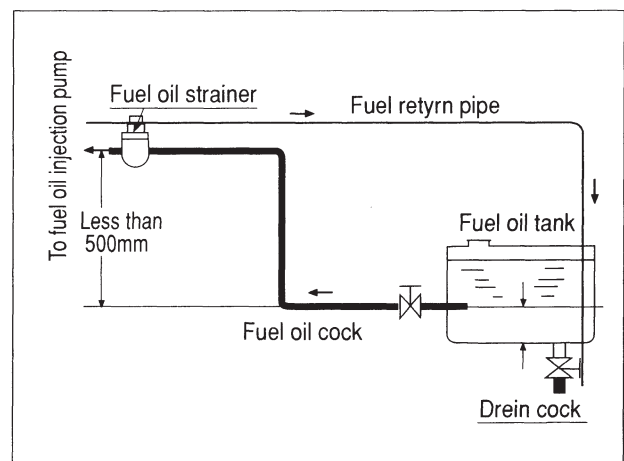
#### [NOTICE]

When other than the specified fuel oil is used, the engine will not perform to full capacity and parts may be damaged

Sample for recommended fuel oil		
Standard for fuel oil	JIS K2204	ASTM D975
Pour point (Temperature)		
-7.5°C or greater	Grade No.2	Grade No.2-D
-20°C or greater	Grade No.3	Grade No.1-D
-30°C or greater	Grade No.3-Sp.	
Cetane fuel numbe	45 or greater	40 or greater

#### (2) Fuel Piping

Install the fuel pipe from the fuel tank to the fuel pump in accordance with the diagram to the right. Be sure to attach a drain cock to the fuel tank to enable dirt and water which have settled at the bottom of the tank to be drained off.



### 3.1.2 Lube oil

#### (1) Selection of Engine Lube Oil

Use the following lube oil:

- \*API Classification.....CD  
(Standards of America Petroleum Institute)
- \*SAE Viscosity .....15W40  
(Standards of Society of Automotive  
Engineering)

#### [NOTICE]

Using other than the specified lube oil will lead to seizure of parts inside the engine and gear device, abnormal wear, and shorten engine life. It will also effect the starting ability and power output.

#### (2) Handling the Lube Oil

- When handling and storing lube oil, be careful not to allow dust and water to enter the lube oil. Clean around the filler port before refilling.
- Do not mix lube oils of different types or brands. Mixing may reduce the lubricating performance. Different oils are used for the engine and the marine gear. Be careful to use the correct oil for each one and store in separate clearly labeled containers.

### 3.1.3 Cooling Water

- Always use soft water (tap water) for the fresh water. Never use dirty water or hard water. Impurities in the cooling water cause scale and rust to build up in the cooling system reducing cooling efficiency and causing the engine to overheat.
- During the cold season, add antifreeze to the cooling water to prevent freezing. Failure to add antifreeze will result in damage to various parts in the cooling water system.
- Consult your Yanmar dealer or distributor on the use of antifreeze, and detergents.

#### [NOTICE]

- Refer to the instructions accompanying the antifreeze for the proper mixing ratio. Select the ratio for the lowest temperature of the cold season. If the mixture is too thick, the cooling efficiency will be reduced.
- Do not mix different brands of antifreeze. Mixing reduces cooling efficiency and leads to parts damage.
- When the amount of cooling water is too low, refill with fresh water only.

## 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.

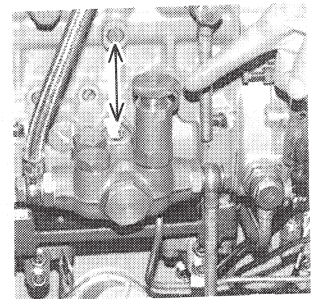
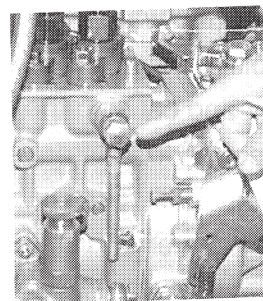
### 3.2.2 Bleeding the Fuel System

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) Set the regulator lever to the NORMAL position.
- (2) Open all the shut-off valves of the fuel system.
- (3) Loosen the air vent bolt of the fuel injection pump.





## 3.3 Supplying Engine Lube Oil

### [NOTICE]

Do not overfill.

Overfilling will cause oil to be sprayed out from the breather during operation and lead to engine problems.

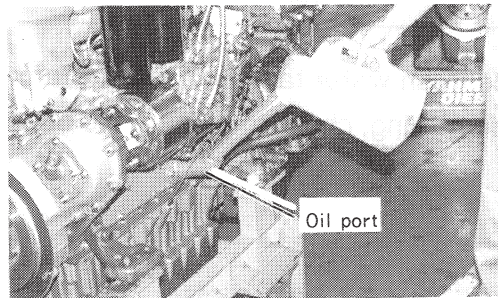
#### 1) Lube oil supply to oil pan

Remove the oil port cap from the side plate, and supply lube oil as shown in the photo right.

#### 2) Checking the oil level

Completely insert the dipstick and check the oil level. If the oil level is lowered, supply lube oil up to the full below the ADD mark marker on the dipstick.

#### 3) Replace the dipstick and tighten the oil inlet cap firmly by hand.



## 3.4 Supplying Cooling Water

**⚠ DANGER**

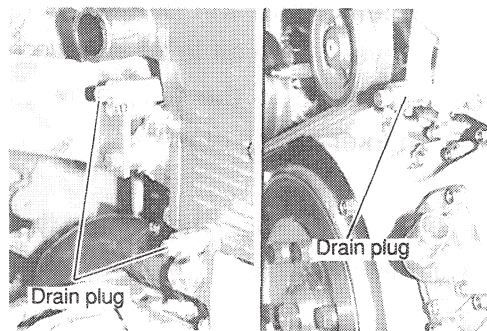


### Burns from Scalding

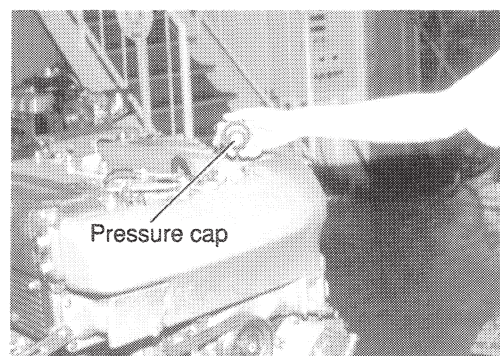
- Never remove the filler cap of the fresh water cooler while the engine is still hot. Steam and hot water will spurt out and seriously burn you. Wait until the water temperature has dropped, then wrap a cloth around the cap and loosen it slowly.
- After inspection, refasten the cap firmly. If the cap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

Fill the fresh water tank and the subtank with fresh cooling water.

- ① Before filling, check to be sure the drain cocks (indicated in the diagram) are closed.

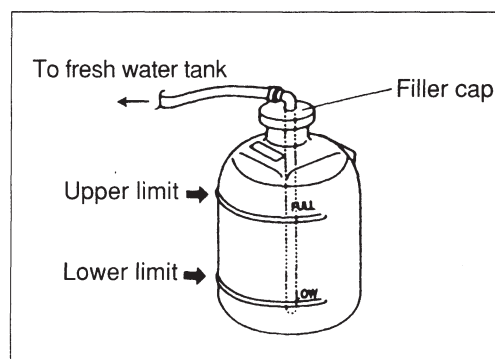


- ② Remove the filler cap of the fresh water tank by turning the cap counterclockwise 1/3 of a turn.
- ③ Pour cooling water slowly into the fresh water tank so that air bubbles do not develop. Supply until the water overflows from the filler port.
- ④ After supplying cooling water, replace filler cap and tighten it firmly. To replace the cap, align the detents on the bottom of the cap with the notches on the filler port and turn clockwise 1/3 of a turn.



(Cont. on next page.)

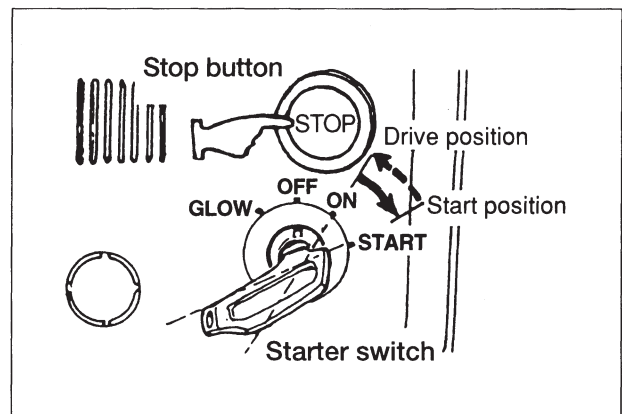
- ⑤ Remove the subtank cap and fill with water to the upper limit, **FULL**. Replace cap.
- ⑥ Check the rubber hose connecting the subtank to the fresh water cooler. Be sure the hose is securely connected and there is no looseness or damage. When the hose is not watertight, an excessive amount of cooling water will be used



## 3.5 Cranking

When the engine is being used for the first time or if it has not been used for a long period of time, perform cranking before starting to distribute oil to all of the parts. Using an engine which has been stored for a long period of time without the cranking procedure may result in engine seizure, since there will no longer be oil on the moving parts after storage.

- ① Open Kingston cock.
- ② Cut off all clutches and the main switch, making sure that all auxiliary machines are in a noload position.
- ③ Put marine gear in **NEUTRAL**
- ④ Crank the engine. Push the stop button to stop fuel ignition while starting.
  - 1) Put the key into the starter switch.
  - 2) While pushing the stop button, turn the key to the **START** position and hold it there. The engine will begin turning. If you remove your hand from the stop button, the engine will start. Do not take your hand off the button.
- ⑤ Continue cranking the engine for about 5 seconds, checking for abnormal sounds.
- ⑥ Return the key to the **OFF** position. The engine will stop.



## 3.6 Checking the Lube Oil and Cooling Water

When lube oil, gear oil, and cooling water are put in for the first time, or after they have been replaced, their levels should be checked after a trial operation. Oil and water will be distributed to the various parts during the operation, lowering the levels of oil and water. Replenish to the proper amounts.

- Supplying engine lube oil → See 3.3
- Supplying cooling water → See 3.4



# 4. HOW TO OPERATE

## ⚠ WARNING

### Alcohol

- Never operate the engine while you are under the influence of alcohol or when you are ill or feel unwell as this results in accidents.

## ⚠ 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.



### 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.

## 4.1 Inspection Before Starting

Be sure to check the following items daily before starting the engine.

### (1) Visual Check

Check for the following:

If any problem is found, do not use the engine until repairs have been completed.

- Oil leakage from the lube oil system.
- Fuel oil leakage from the fuel system
- Water leakage from the cooling water system
- Loosening or loss of bolts
- Damage to parts

### (2) Checking and Resupplying Fuel Oil

Check the fuel level inside the fuel tank and supply with the recommended fuel if necessary.

→See 3.2

### (3) Checking and Resupplying Engine Lube Oil

- ① Check the engine oil level with the oil dipstick.
- ② If the oil level is low, supply with the recommended lube oil using the filler port.  
Supply oil up to the upper mark on the oil dipstick.

→See 3.3



#### (4) Checking and Resupplying Cooling Water

**⚠ 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.

##### ① Check the cooling water level in the subtank.

If the water level is close to the lower limit, remove the subtank cap and fill with fresh water to the upper limit.

##### ② When the water level in the subtank is low, remove the filler cap for the fresh water tank and check the amount of cooling water in the fresh water tank. Fill with fresh water to overflowing if the level is low. → See 3.4

- Check the fresh water level before operation while the engine is cold. Checking the water level while the engine is hot is dangerous, and the cooling water reading will be misleading due to thermal expansion.
- Check and supply cooling water daily at the subtank. Do not remove the fresh water cooler filler cap regularly.
- The amount of water in the subtank will increase during operation. This is normal. When the engine is stopped, the temperature of the cooling water will drop causing the extra water in the subtank to return to the fresh water tank.

##### **[NOTICE]**

If the cooling water runs out too often, or if the water level in the fresh water tank falls without any change in the subtank water level, there may be some leakage of water or air. In such cases, consult your Yanmar dealer or distributor without delay.

#### (5) Preparing Reserves of Fuel, Lube Oil, and Cooling Water

Have sufficient fuel ready for the day's operation. In addition, have a reserve of fuel, lube oil, and cooling water (sufficient for at least one refill) close to the operation area in case of emergencies.

## 4.2 Checking the Instrument Panel and Alarm Devices

Be sure to check the alarm devices and other instruments on the panel before and after starting the engine. If the devices are not working properly, it is impossible to prevent any problems arising from insufficient oil and water in the engine. Make checking the alarm and other devices before and after starting a regular practice.

### 4.2.1 Checking the Instrument Panel Lamps

Turn on the light switch on the upper right of the instrument panel and check to see that the panel lights come on.

### 4.2.2. Checking the Alarm Devices

#### (1) Check before starting.

- ① Turn on the battery switch.
- ② Put the key in the starter switch.
- ③ Turn the key from the **OFF** position to **ON**, and check to see that the alarm devices as shown in the diagram to the right [Before Starting] are working properly.
  - Buzzer sounds.
  - Charge and other lamps light up.

#### (2) Check after starting.

When the key returns from the **START** position to **ON**, check to see that the alarm devices as shown in the diagram to the right [After Starting] are working properly.

- Buzzer stops.
- All of the lamps go off. However, the charge lamp will not go off until the engine speed reaches 1000rpm.

By performing these procedures, it can be determined whether or not the electric circuit is in good working order. If there is any problem, consult your yanmar dealer. → See 2.4.1(2)

Function of Alarm Devices		
Key Operation	Before Starting <b>OFF</b> → <b>ON</b>	After Starting <b>START</b> → <b>ON</b>
Alarm Buzzer	<b>On</b>	<b>Off</b>
Alarm Lamps		
Charge Lamp	<b>On</b>	<b>Off</b>
Cooling Water Temperature	<b>On briefly</b>	<b>Off</b>
Engine Oil Pressure	<b>On briefly</b>	<b>Off</b>
Oil/Water Separator Level	<b>On briefly</b>	<b>Off</b>

**[Note]** : The amount of time for "On briefly" is approx. 3 secs.

### 4.2.3 Checking the Panel Meters

Before starting, the pointer on the meter should be in a fixed position on the left side. The pointer on the various meters will begin moving once the engine is started. Check the position of the pointer to make sure there are no problems.

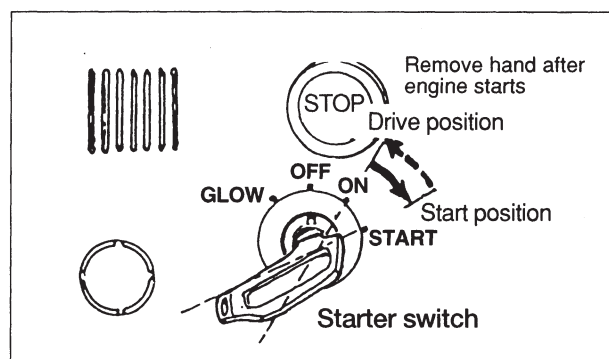
- **Tachometer**  
Meter pointer moves to indicate revolution speed.
- **Cooling Water Temperature Meter**  
Meter pointer in the white area is normal. Pointer in the red area indicates a problem.
- **Lube Oil Pressure Meter**  
Meter pointer in the white area is normal. Pointer in the red area indicates a problem.

## 4.3 Starting

### 4.3.1 Normal Starting

Follow the following procedures for starting under normal conditions.

- ① Open the Kingston cock.
- ② Open the fuel tank cock.
- ③ Cut off all clutches and main switches for all auxiliary machinery so there is no load.
- ④ Put the remote control handle in **NEUTRAL**.
- ⑤ Set the governor handle in the low speed position (when there is an independent governor remote system).
- ⑥ Turn on the battery switch.
- ⑦ Insert the key into the starter switch and turn it to **ON**, the buzzer sounds and the alarm device lamps come on, indicating that the alarm equipment is working properly.
- ⑧ Turn the key to **START** to start the engine. When the engine has started, remove your hand from the key. The key will automatically return to the **ON** position.



Check to see that alarm lamps have gone off and the buzzer has stopped.

→See 4.2.2

### 4.3.2 Starting Under Low Temperature Conditions

When starting the engine under low temperature conditions (approximately 0°C or lower), use the air heater to enable easier starting. Follow steps ①~⑥ of the above procedure, and then follow the steps below.

- ⑦ Turn the key from the OFF position to GLOW. Continue to hold the key in the GLOW position to allow the air heater to warm up the engine.
- ⑧ Turn the key to **START** and start the engine. After the engine starts, remove your hand from the key.

#### [NOTICE]

Do not leave the air heater on for longer than 20 seconds at a time. Leaving the air heater on for longer periods of time will result in damage.

### 4.3.3 Restarting After An Initial Failure

When attempting to start the engine after an initial attempt to do so has failed, be sure that the engine is at a complete stop before turning the starter switch key. If the engine is restarted while the engine still has not stopped, the pinion gear of the starter motor will be damaged.

- When the engine will not start after several attempts, check the fuel system. If there is air in the fuel system, the fuel will not be fed and starting will not be possible. After bleeding air from the system, attempt to restart the engine. →See 3.2.2

#### [NOTICE]

Do not hold the starter switch on for more than 15 seconds at a time. If the engine does not start the first time, wait for about 1 minute before trying again.

### 4.3.4 After the Engine has Started

#### (1) Warming-up running

After the engine has started, let it run for about 5 minutes. This warms up the engine and distributes oil to all of the parts.

#### [NOTICE]

The engine will seize if it is operated when cooling seawater discharge is too small or if load is applied without any warming up operation.

#### ■ Remote Control Handle

- ① Leave the remote control handle in **NEUTRAL**.
- ② Pull out the handle lever or the free throttle button and adjust the speed to no more than 1500rpm and run the engine at low speed with no load.

#### (2) Checking for problems

While warming up the engine, check the following items.

- ① Check that the meters and alarm devices on the instrument panel are normal.
- ② Check for water or oil leakage from the engine.
- ③ Check that exhaust color, engine vibrations and sound are normal.
- ④ Check that sufficient cooling water is discharged from the seawater outlet pipe.

Operation with too little seawater discharge will burn the impeller of the seawater pump.

If seawater discharge is too small, stop the engine immediately, identify the cause and repair

- Is the Kingston cock open ?
- Is the inlet of the Kingston cock clogged ?
- Is the seawater suction hose broken, or does the hose suck in air due to a loose joint ?

## 4.4 Adjusting the Engine Speed

Adjust the speed of the engine by moving the remote control handle slowly and smoothly. Move the handle forward and adjust the speed between **L** (low speed) and **H** (high speed).

#### [NOTICE]

For a new engine be especially careful not to change speeds abruptly or attach a heavy load for the first 50 hours of operation. Doing so will result in damage and shorten the life of the engine.



## 4.5 Check During Operation

Always be on the lookout for problems during engine operation.

Pay particular attention to the following.

**(1) Is sufficient water being discharged from the seawater outlet pipe ?**

If the discharge is small, stop the engine immediately, identify the cause and repair.

**(2) Is the exhaust color normal ?**

The continuous emission of black exhaust shows engine overloading.

This shortens the engine's life and should be avoided.

**(3) Are there abnormal vibrations or noise ?**

Do not operate at speeds which produce violent vibrations.

Depending on the hull structure, engine and hull resonance may suddenly become great at a certain engine speed range, causing heavy vibrations. Avoid operation in this speed range.

If you hear any abnormal sounds, stop the engine and inspect.

**(4) Alarm buzzer sounds during operation.**

If the alarm buzzer sounds during operation, lower the engine speed immediately, check the alarm lamps, and stop the engine for repairs.

**(5) Is there water, oil, or gas leakage, or are there any loose bolts ?**

Check the engine room periodically for any problems.

**(6) Is there sufficient oil in the fuel tank ?**

Replenish fuel oil in advance to avoid running out of fuel during operation.

**(7) When operating the engine at low speed for long periods of time, race the engine once every 2 hours.**

### Racing the Engine

#### ■ Remote Control Handle

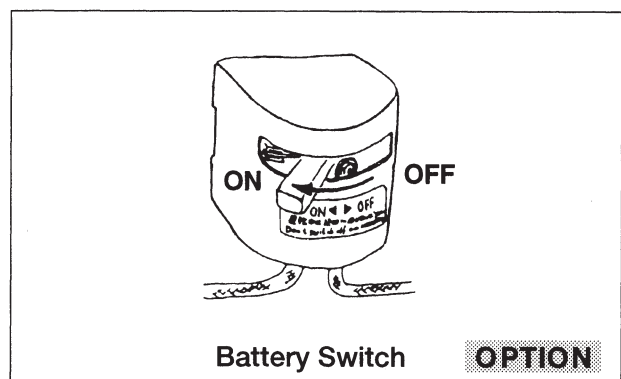
Pull out the handle lever or the free throttle button and shift the engine speed from high to low several times.

Racing the engine removes carbon built up in the combustion chamber and around the fuel injection valve.

Neglecting to race the engine will cause the exhaust to turn black and lower the efficiency of the engine.

#### [NOTICE]

Never turn off the battery switch or spark the battery cable during operation. Damage to parts in the electric system will result.



## 4.6 Stopping the Engine

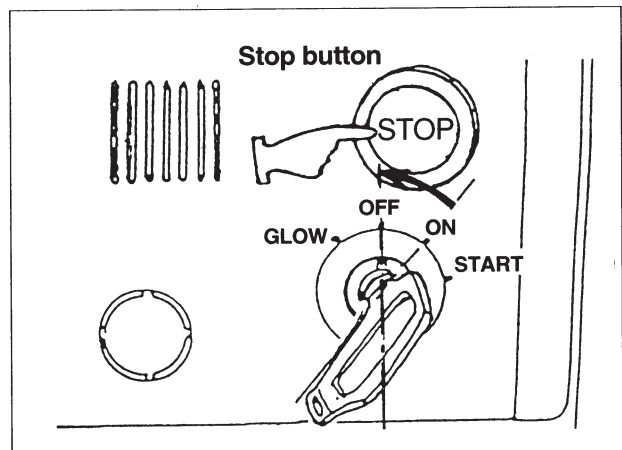
Stop the engine in accordance with the following procedures.

- ① Stop the boat.  
Put the remote control handle in **NEUTRAL** and reduce the engine speed to the lowest speed.
- ② Be sure to race the engine before stopping it. →See 4.5 (7)
- ③ Cool down the engine at low speed (1500rpm or lower) for about 5 minutes.
- ④ Continue to push the stop button until the engine is completely stopped. If you release the button before the engine has completely stopped, it may restart.
- ⑤ Turn the starter switch to OFF, remove the key and place it in a safe place.
- ⑥ Cut off the battery switch.
- ⑦ Close the fuel tank cock.
- ⑧ Close the kingston cock.

In the rare instance where the engine does not stop when the stop button is pushed, stop the engine by closing the fuel cock on the fuel tank.

### [NOTICE]

Stopping the engine suddenly after operating at high speed or heavy loading without cooling down operation. It will cause the engine temperature to rise quickly resulting in deterioration of the lube oil and sticking of parts.

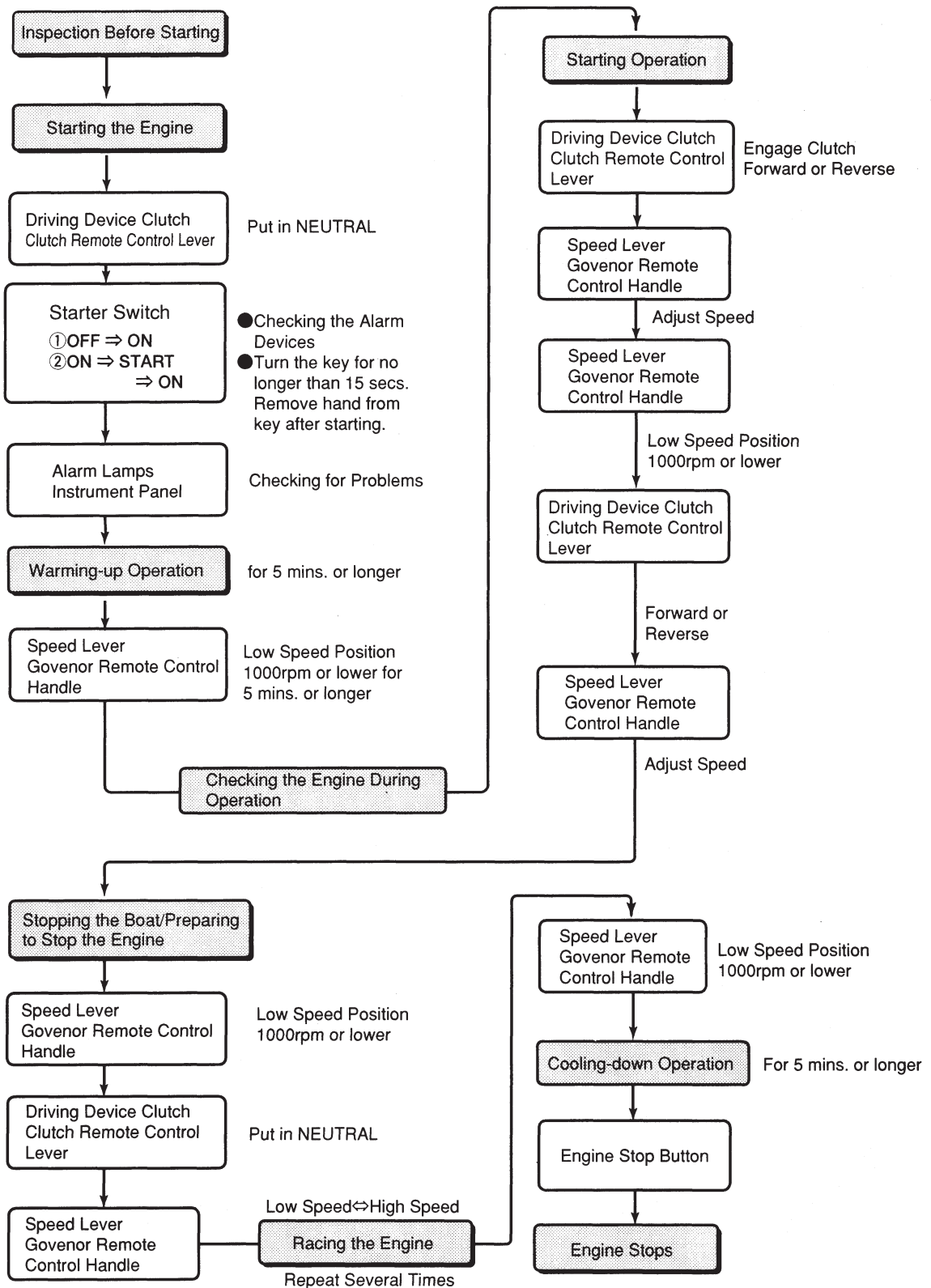


### [NOTICE]

Neglecting to close the kingston cock will allow water to leak into the boat and may cause it to sink. Be sure to close the cock.

# 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.



## 4.8 Long-Term Storage

4.8.1 Before storing for long periods of time, perform the following.

### (1) Periodic Inspection

If the time for a periodic inspection is close, perform it before storing the engine for a long period of time.

### (2) Draining the Cooling Water

When not using antifreeze, be sure to drain the water from the inside of the engine.

#### ⚠ CAUTION



#### Precautions for Removing Hot Water to Prevent Burns

Wait until the temperature has dropped before removing cooling water from the engine to avoid getting scalded.

Drain the water from both the seawater and fresh water systems.

#### [NOTICE]

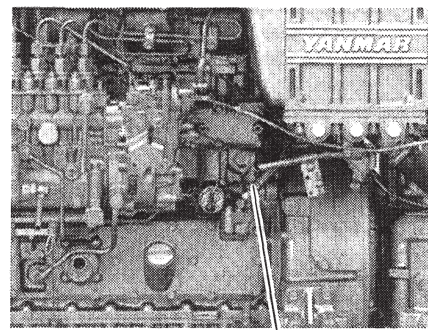
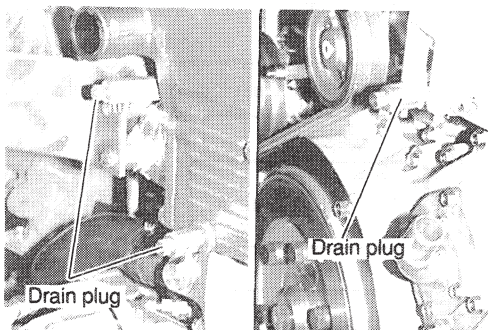
If the water is not drained, it may freeze and damage parts of the cooling water system .

#### ■ Draining the water from the seawater system

- ① Loosen the bolts on the side cover of the seawater pump and move the cover to drain off the cooling water inside.
- ② After draining off the water, tighten the water drain cocks and replace the side cover on the seawater pump.

#### ■ Draining the Water From the Fresh Water System

If antifreeze has not been added to the fresh cooling water, be sure to drain the water from the fresh water system in the cold season





### **(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. Preparation for Starting]

# 5. MAINTENANCE & INSPECTION

## Conduct Periodic Inspection for Your Safety.

The functions of engine components will degenerate and engine performance will fall according to the use of the engine. If countermeasures are not taken, you may encounter unexpected troubles while cruising at sea. Consumption of fuel or lube oil may become excessive and exhaust gas and engine noise may increase. These all shorten the life of the engine.

Daily and periodic inspection and servicing increase your safety at sea.

## Inspect Before Starting.

Make it a daily rule to inspect before starting. →See [4.1 Inspection Before Starting]

## Monitor the hour meter and conduct periodic inspections.

Keep a daily record of operation and maintenance. When the time for an inspection approaches, study the relevant pages in the Operation Manual. Inspections should be made after every 50 hrs., 250 hrs. (1 yr.), 500 hrs.(2 yrs.), 1000hrs.(4 yrs.) of use.

## Use Genuine Yanmar Parts.

Be sure to use genuine Yanmar parts for consumable and replacement parts. Use of other parts will reduce engine performance and shorten the life of the engine.

Specialty technicians are ready to assist you with periodic inspections and maintenance.

Consult your Yanmar dealer or distributor in accordance with the service agreement.

## Always Have Servicing Tools On Hand.

Keep servicing tools close to the machinery and ready for use in inspections.

## Tightening Torque of Bolts & Nuts

It is important to tighten bolts and nuts properly to the correct tightening torque. Over-tightening damages the threads of the bolts and nuts and ruins them. Insufficient tightening causes oil leakage from the installation face or damage to parts. Important parts must be tightened with a torque wrench to the correct tightening torque and in the right order.

Consult with your dealer or distributor if servicing requires the removal of parts.

The standard tightening torque for standard bolts & nuts is listed below.

### [NOTICE]

- Apply the following tightening torque to bolts having "7" on the head.  
(JIS strength classification: 7T)
- Tighten bolts with no. "7" mark to 60% tightening torque.
- If the parts to be tightened are made from light alloy aluminum, tighten the bolts to 80% tightening torque.



Bolt dia. × pitch	mm	M6×1.0	M8×1.25	M10×1.5	M12×1.75	M14×1.5	M16×1.5
Tightening torque	N·m (kgf·m)	10.8±1.0 (1.1±0.1)	25.5±2.9 (2.6±0.3)	49.0±4.9 (5.0±0.5)	88.3±9.8 (9.0±1.0)	137±9.8 (14.0±1.0)	226±9.8 (23.0±1.0)

## 5.1 List of Periodic Inspections

Daily and periodic inspection are important to keep the engine in its best condition. The following is a summary of inspection and servicing items by inspection interval. Periodic inspection intervals vary depending on the uses, loads, fuels and lube oils used and handling conditions, and are hard to establish definitively. The following should be treated only as a general standard. Schedule your own periodic inspection plan according to the operational conditions of your engine and inspect every item. Neglecting periodic inspection leads to engine troubles and shortens the life of the engine.

○: Check    ⊙: Replace    ●: Consult local dealer

Item	Content	Interval term	Daily			
			Every 50hrs	Every 250hrs (1 yr.)	Every 500hrs (2 yrs.)	Every 1,000hrs (4 yrs.)
Fuel oil	Check & supply of oil to the tank	○				
	Drain the fuel tank		○			
	Drain the fuel filter		○			
	Replace the fuel filter element			⊙		
Engine Lube oil	Check the quantity of lube oil	○				
	Replace the lube oil		1st time ⊙	2nd time & after ⊙		
	Replace the lube oil filter element		1st time ⊙	2nd time & after ⊙		
	Clean the engine oil cooler					●
Fresh cooling water system	Check & supply of cooling water tank	○				
	Replace the fresh cooling water			⊙		
	Clean & check the cooling water passage					●
Seawater cooling water system	Check the seawater outlet and discharge	○				
	Check & replace the impeller of seawater pump					●
	Clean & check the seawater passage					●
	Check & replace the anti corrosive ZINC			⊙		
Piping	Check & replace fuel oil pipe, cooling water pipe					●
	Replace mixing elbow.					●
Electrical equipment	Check the alarm lamps & devices	○				
	Check & supply electrolyte in battery		○			
Belt	Adjusting the V-belt tension			○		⊙
Intake and exhaust system	Wash turbocharger blower			○		
	Adjust the intake and exhaust valve clearance				●	
	Lapping the intake and exhaust valve					●
Fuel injection	Check & adjust the fuel injection pressure & atomizing condition				●	
	Check & adjust the fuel injection timing					●

## 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 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.

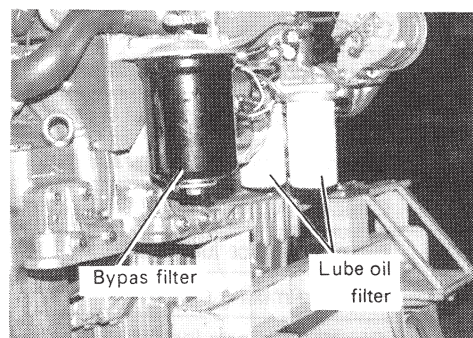
- 1) After removing the oil dipstick, attach the hose of the oil drain pump (optional) to the dipstick guide.
- 2) Drain off the oil with the drain pump.

#### ② Changing the lube oil filter

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

##### ● Procedure for changing the filter element

- 1) Remove the filter element using the oil filter wrench.
- 2) Replace the filter with a 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 filter sealing ring.
- 3) Check that there is no oil leakage during operation.



#### ③ Fill with new lube oil.

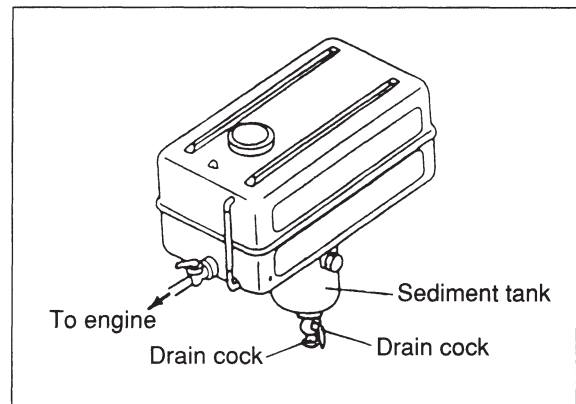
- 1) Fill with the specified amount of oil. → See 3.3
- 2) Run the engine for approximately 5 minutes and check to see if there is any oil leakage.
- 3) Approximately 10 minutes after stopping, check the oil level again with the oil dipstick and add more oil if necessary.



## 5.2.2 Inspection Every 50 Hours

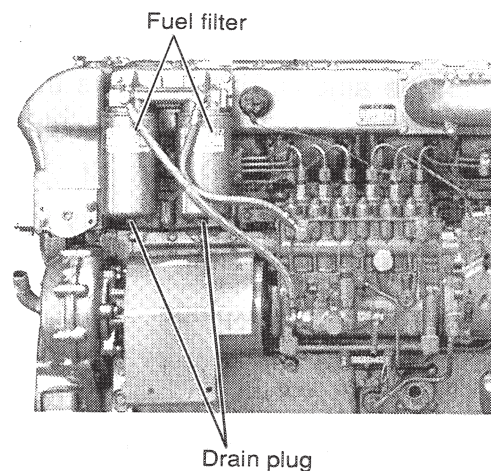
### (1) Draining the Fuel Tank

- ① Put a pan under the drain to catch the fuel.
- ② Loosen the drain cock at the bottom of the fuel tank, and drain off any water and dirt collected inside.
- ③ Once the water and dirt have been drained off and the fuel coming out is clear, close the drain plug.



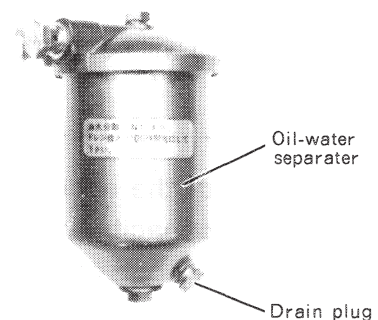
### (2) Drain the fuel filter

When water and dirt are mixed in with the fuel, it becomes impossible for the fuel injection pump and the valve to work. Drain periodically to keep the filter from becoming clogged. When there is a lot of drain collected in the oil/water separator at the bottom of the fuel filter, the fuel filter alarm lamp will light up.



### (3) Drainage of oil-water separator

Remove the drain plug, and discharge water and dirt accumulated in the oil-water separator.



#### (4) Inspection of Battery

#### ⚠ WARNING



#### Fire due to Electric Short-Circuits

Always turn off the battery switch or detach the earth cable (-) before inspecting the electrical system. Failure to do so could cause short-circuiting and fires.



#### Proper Ventilation of the Battery Area

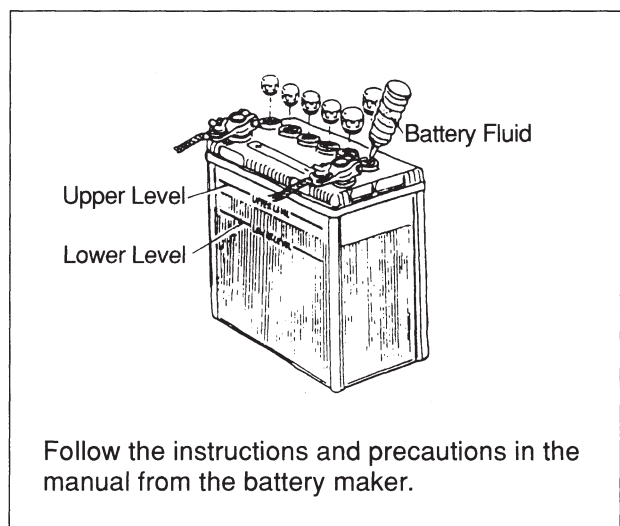
Be sure the area around the battery is well-ventilated and there is nothing which could start a fire. During operation and charging, hydrogen gas is emitted from the battery and can be easily ignited.



#### Battery Fluid

Battery fluid is diluted sulfuric acid. It can blind you if it gets in your eyes, or burn your skin. Keep the fluid away from your body. Wash it off immediately with a large quantity of fresh water if you get any on you.

- Check the level of fluid in the battery.  
When the amount of fluid nears the lower limit, fill with battery fluid (available in the market) to the upper limit. If operation continues with insufficient battery fluid, the battery life is shortened, and the battery may overheat and explode.
- Battery fluid tends to evaporate more quickly in the summer, and the fluid level should be checked earlier than the specified times.
- If the engine turns over at a slower than usual rate and refuses to start, recharge the battery.
- If the engine still will not start after charging, replace the battery.



#### [NOTICE]

The capacity of the specified alternator and battery is sufficient for regular operation, however, the capacity may be insufficient if they are used for other purposes such as lights inside the boat, etc. Consult your Yanmar dealer or distributor.

### 5.2.3 Inspection Every 250 Hrs. or 1 yr.

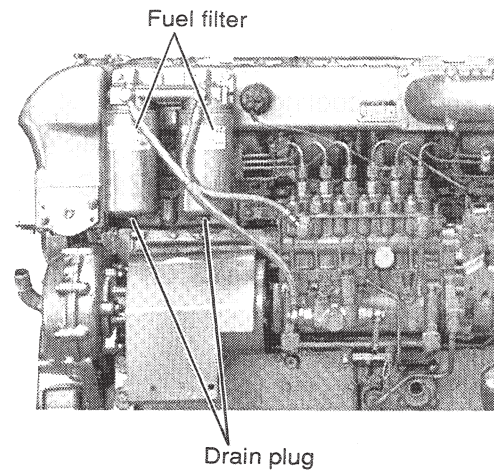
#### (1) Replacing the Fuel Filter

Replace the fuel filter periodically before there is clogging and the fuel flow is reduced.

- ① Close the fuel cock of the fuel tank.
- ② Turn the fuel filter to the left with the filter wrench and remove.
- ③ Clean the attachment face for the filter.
- ④ Turn the new filter to the right until it contacts the attachment face. After tightening by hand, use the filter wrench to tighten it another 3/4 of a turn.

(Tightening torque: 1.2~1.6kg-m)

- ⑤ Bleed the fuel system. → See 3.2.2.



#### (2) Replacing Cooling Water

Cooling performance drops when the cooling water is contaminated with rust and scale.

Even if antifreeze or antirust is added, the cooling water must be periodically replaced because the properties of the agent will degenerate. Replace the cooling water periodically.

- Draining the Cooling Water → See 4.8.1(2).
- Supplying Cooling Water → See 3.4

#### (3) Replacing the Engine Oil and Lube Oil Filter (2nd time & after)

After the second oil change, the engine oil should be replaced after every 250 hours.

Replace the lube oil filter at the same time.

→See 5.2.1(1)

#### (4) Checking the Tension of the V-Belt of the Alternator

When there is not enough tension in the V-belt, the belt will slip making it impossible for the alternator to generate power.

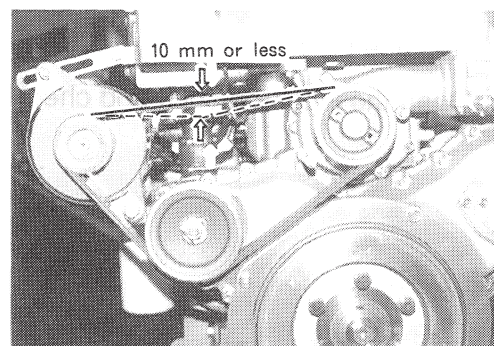
Additionally, the fresh water pump will not work causing the engine to overheat.

Check the tension of the V-belt in the following manner.

- ① Press the V-belt down with your thumb at the middle of the belt to check the tension. The give in the V-belt should measure about 8~10mm at the depression.
- ② To adjust the V-belt tension, loosen the set bolt and move the alternator.
- ③ Replace the belt if it is damaged.

#### [NOTICE]

- If the V-belt tension is too tight, the belt and the bearings of the alternator will be damaged.
- Be careful not to spill any oil on the V-belt as this will lead to stretching and slippage.



## (5) Inspecting and Replacing Anti-Corrosive Zinc

Inspect and replace the anti-corrosive zinc periodically.

- ① Close the kingston cock.
- ② Drain the cooling seawater.  
→ See 4.8.1(2)
- ③ Remove the plug labeled ZINC and indicated in the diagram.

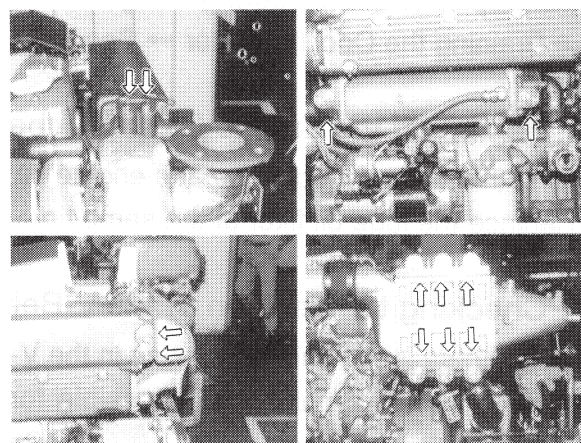
Anti-corrosive zinc is on the following parts.

Part	Parts No	Quantity
Intercooler	127692-09300	6
Engine oil cooler	27210-200370	2
Fresh water cooler	27210-200370	4

### [NOTICE]

If replacement of zinc is neglected and operation is continued with a small volume of anti-corrosive zinc, corrosion of the seawater cooling system will occur and water leakage, parts breakage, or accidents will result.

Anti-corrosive zinc label



- ④ Check the zinc on the inside of the plug to determine the amount of wear to the anti-corrosive zinc.
  - Replace the anti-corrosive zinc when it has been reduced to less than 1/2 of its original size.
  - If there is only a little bit of wear, clean the surface by sanding off any corroded areas.
- ⑤ Replace plug.
- ⑥ Open the kingston cock and check water leakage.



## 5.2.4 Inspection Every 500 Hrs.or 2 yrs.

### (1) Adjustment of Top-clearance of Intake/Exhaust Valves

This maintenance requires specialized knowledge. Consult your Yanmar dealer or distributor. Adjustment is necessary to maintain the correct timing for the opening and closing of valves. Neglecting adjustment will cause the engine to run noisily and result in reduced power output and other damage.

### (2) Inspecting and Adjusting Fuel Injection Valves

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

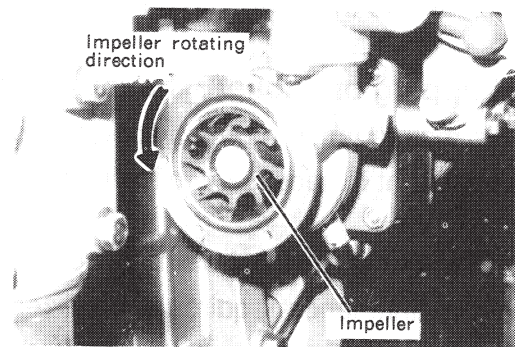
## 5.2.5 Inspection Every 1000 Hrs. or 4 yrs.

### (1) Inspecting Inner Parts of the Seawater Pump

The inside parts of the seawater pump will deteriorate with use, and discharge performance falls. At the specified interval or when the volume of seawater discharged is reduced, inspect the seawater pump in accordance with the following procedures.

→ See 4.8.1(2)

- ① Loosen the side cover set bolts (4) and remove the side cover.
- ② Illuminate the inside of the seawater pump with a flashlight and inspect. If any of the following problems is found, disassembly and maintenance are necessary.
  - Impeller blades are cracked or nicked. Edges or surfaces of the blades are marred or worn. The impeller must be replaced periodically every 2000 hrs.
  - Wear plate is damaged.
- ③ If no damage is found when inspecting the inside of the pump, replace the side cover. Fit the O-ring to the groove of the joint face before replacing the side cover.



#### [NOTICE]

- When the impeller has been disassembled, be careful to replace it so that it moves in the correct direction. The seawater pump turns clockwise, however, the impeller blades turn counterclockwise.
- When turning the engine by hand, be sure to turn it in the correct direction. Turning it in the opposite direction damages the blades of the impeller.

If a large amount of water leaks continuously from the seawater pump during operation, disassembly and maintenance (replacement of the mechanical seal) are necessary.

When disassembly and maintenance of the seawater pump are necessary, consult your Yanmar dealer or distributor.

## (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 and the clutch 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, clutch 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

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	—

# 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
<p>Problem occurs during operation.</p> <p>■ Alarm buzzer sounds and alarm lamps come on.</p>	<p><b>[NOTICE]</b></p> <p>When the alarm equipment indicates a problem, immediately put the clutch in neutral and run the engine at low speed. Check to see which alarm indicator is lit, then stop the engine and inspect. When you cannot determine the source of the problem, return to port at low speed and ask your Yanmar dealer for repairs.</p>		
Charge Lamp (Alarm buzzer does not sound.)	Faulty battery V-belt is loose or damaged  Alternator is not generating electricity	Check battery fluid. Adjust V-belt tension or replace belt. Ask for repairs.	5.2.2(4) 5.2.3(4)
C.W. Temp. Lamp goes on.	Insufficient cooling water in fresh water tank Leakage in fresh water cooling system Fresh water cooling pump is damaged Inside of C.W. system is dirty.	Check and replenish cooling water. Ask for repairs for water leakage. Ask for repairs. Ask for repairs.	3.4
L.O. Press. Alarm Lamp goes on.	Insufficient engine oil	Replenish engine oil.	3.3
C.W. Level Alarm Lamp goes on.	Insufficient cooling water in fresh water tank	Check and replenish fresh cooling water.	4.1(4)
Fuel Filter Alarm Lamp goes on.	Increased fuel filter drain	Drain the fuel filter.	5.2.2(2)
Exhaust Alarm Lamp goes on.	Insufficient discharge of cooling seawater  Damaged cooling seawater pump	Kingston cock is closed. Kingston cock is clogged. Suction hose is damaged or joints loose Check seawater pump impeller.	5.2.5(1)
Fuel Oil Alarm Lamp goes on.	Insufficient fuel oil	Replenish fuel oil.	3.2
Faulty Alarm Devices	<p><b>[NOTICE]</b></p> <p>Do not operate the engine if alarm devices are not working properly. Serious accidents may result if difficulties are not spotted due to faulty alarm lamps.</p>		
■ Before starting when switch is turned from OFF→ON, alarm devices do not work.			4.2.2
Alarm buzzer does not sound.	Circuit broken or buzzer damaged	Ask for repairs.	
Some alarm lamps do not light up.	Circuit broken or lamp burnt out.	Ask for repairs.	
■ After starting when switch returns from START→ON, alarm devices do not work.			4.2.2
Alarm buzzer does not cut off.	Short circuit	Ask for repairs.	
Some alarm lamps do not go out.	Damaged sensor or switch	Ask for repairs.	

Trouble	Probable Cause	Measure	Reference
<b>■ Starting Failures</b>			
Starter does not turn.	No fuel Air in fuel line Bad fuel  Clogged fuel filter Poor fuel injection Pressure leakage from intake/exhaust valves	Replenish fuel; bleed. Bleed. Replace with recommended fuel.  Replace fuel filter. Ask for repairs. Ask for repairs.	3.2 3.2.2 3.1.1  5.2.3(1)
Starter does not turn or turns too slowly (can be turned by hand)	Insufficient battery charge Faulty cable connection at terminal  Faulty starter switch Faulty starter	Check battery fluid, recharge. Remove rust from terminal; retighten  Ask for repairs. Ask for repairs.	5.2.2(4)
Cannot be turned manually.	Inner parts seized or damaged	Ask for repairs.	
<b>■ Poor exhaust color</b>			
Black smoke emitted.	Overload Insufficient fuel  Boost pressure low Faulty spraying of F.O. injection Excessive intake/exhaust valve top clearance	Reduce load. Replace with recommended fuel.  Wash turbocharger blower. Ask for repairs.  Ask for repairs.	3.1.1
White smoke emitted.	Insufficient fuel  Faulty spraying of F.O. injection Fuel injection timing off Lube oil burns/excessive consumption	Replace with recommended fuel.  Ask for repairs. Ask for repairs. Ask for repairs.	3.1.1



## 6.2 Consulting Your Yanmar Dealer or Distributor

Refer difficult problems and repairs to your Yanmar dealer or distributor.

At the time of trouble, check and report the following.

- ① Engine model and number (For engine nameplate, see 2.3 [Names of Parts].)
- ② Boat name, hull material, boat size (tons)
- ③ Use, type of work, no. of hours run
- ④ Total no. of operation hours (refer to hour meter), age of machine  
If there is no hour meter, use number of hours per day × number of days and amount of fuel used.
- ⑤ Condition immediately before trouble (engine rpm, type of operation, load condition, etc.)
- ⑥ Details of trouble  
(exhaust color, sound of engine, does engine start, can engine be turned manually, type of fuel used, brand and viscosity of lube oil, etc.)
- ⑦ Past problems and repairs.

### Warranty Service

#### Owner Satisfaction

Your satisfaction and good will are important to your dealer and to us.

Normally, any problems concerning the product will be handled by our dealer's service department. If you have a warranty problem that has not been handled to your satisfaction, we suggest you take the following action:

- Discuss your problem with a member of dealership management. Often complaints can be quickly resolved at that level. If the problem has already been reviewed with the Service Manager, contact the owner of the dealership or the General Manager.
- If your problem still has not been resolved to your satisfaction, contact your Yanmar local Subsidiary Company. (See the reverse side of manual cover)

We will need the following information in order to assist you:

- Your name, address and telephone number
- Product model and serial number
- Date of purchase
- Dealer name and address
- Nature of problem

After reviewing all the facts involved, you will be advised of what action can be taken.

Please bear in mind that your problem will likely be resolved at the dealership, using the dealer's facilities, equipment and personnel, so it is very important that your initial contact be with the dealer.



**Declaration of Conformity for Recreational Craft Propulsion Engine with the Exhaust and Noise emission requirements of Directive 94/25/EC as amended by 2003/44/EC**  
(To be completed by manufacturer of outboard or inboard engines with integral exhaust)

Name of engine manufacturer: Yanmar Co., Ltd.

Street: 1-32 Town: Chayamati, Kitaku, Osaka-City

Post Code: 530-8311 Country: Japan

Name of Authorised Representative ( if applicable): Yanmar Marine International B.V.

Street: Bruggplein 11 Town: Almere-de Vaart

Post Code: 1332 BS Country: The Netherlands

Name of Notified Body for **exhaust emission assessment**: Société National de Certification et d'Homologation

Street: 11, route de Luxembourg Town: Sandweiler

Post Code: L-5230 Country: Luxembourg ID Number: 0499

Name of Notified Body for **noise emission assessment**: Nederlands Keurings Instituut voor Pleziervaartuigen

Street: Nipkowweg 9 Town: Joure

Post Code: 8500 AB Country: The Netherlands ID Number: 0613

Module used for exhaust emission assessment: B+C  B+D  B+E  B+F  G  H   
or engine type-approved according to:  stage II of Directive 97/68/EC  Directive 88/77/EC

Module used for noise emission assessment: Aa  G  H

Other Community Directives applied: 89/336/EEC

**DESCRIPTION OF ENGINE(S) AND ESSENTIAL REQUIERMENTS**

**Engine Type:**  Outboard  z or sterndrive with integral exhaust  
**Fuel Type:**  Diesel  Petrol  
**Combusion cycle:**  2 stroke  4 stroke

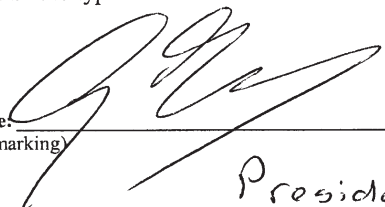
Essential requirements	Standards Used	Other normative document used	See technical file
<b>Annex I.B – Exhaust Emissions</b>			
engine identification (I.B.1)			<input type="checkbox"/>
exhaust emission requirements	EN ISO 8178-1:1996		<input checked="" type="checkbox"/>
durability			<input type="checkbox"/>
owner's manual			<input type="checkbox"/>
<b>Annex I.C – Noise Emissions</b>			
Noise emission levels (I.C.1)	EN ISO 14509		<input checked="" type="checkbox"/>
owner's manual (I.C.2)			<input type="checkbox"/>

**ENGINE(S) COVERED BY THIS DECLARATION**

Engine model(s) or engine family name(s):	EC Type certificate number (exhaust)
	SNCH*94/25*2003/44*
RCD-4LHAX1	0015*00
4LHA-HTZP	
RCD-6LY2X1	0008*00
4LHA-DTZP	
4LHA-STZP	
RCD-6LPADX1	0012*00
6LPA-DTZP	
RCD-6LPASX1	0007*00
6LPA-STZP	

I declare on behalf of the engine manufacturer that the engine(s) mentioned above complie(s) with all applicable essential requirements in the way specified and is in conformity with the type for which above mentioned EC type examination certificate(s) has been issued.

Name: G.J. Mantel  
(identification of the person empowered to sign on behalf of the engine manufacturer or his authorised representative)

Signature and title:   
(or an equivalent marking)

President  
Yanmar Marine Int'l

Date: (yr/month/day) 2005 / 10 / 20

**Declaration of Conformity for Recreational Craft Propulsion Engine with the Exhaust emission requirements of Directive 94/25/EC as amended by 2003/44/EC**  
(To be completed by manufacturer of inboard engines without integral exhaust)

Name of engine manufacturer: Yanmar Co., Ltd.  
 Street: 1-32 Town: Chayamachi, Kitaku, Osaka-City  
 Post Code: 530-8311 Country: Japan

Name of Authorised Representative: Yanmar Marine International B.V.  
 Street: Brugplein 11 Town: Almere-de Vaart  
 Post Code: 1332 BS Country: The Netherlands

Name of Notified Body for **exhaust emission assessment**: Société Nationale de Certification et d'Homologation  
 Street: 11, route de Luxembourg Town: Sandweiler  
 Post Code: L-5230 Country: Luxembourg ID Number: 0499

Module used for exhaust emission assessment:  B+C  B+D  B+E  B+F  G  H  
 or engine type-approved according to:  stage II of Directive 97/68/EC  Directive 88/77/EC  
 Other Community Directives applied: 89/336/EEC

**DESCRIPTION OF ENGINE(S) AND ESSENTIAL REQUIERMENTS**

**Engine Type:**  z or sterndrive without integral exhaust  Inboard engine  
**Fuel Type:**  Diesel  Petrol  
**Combustion cycle:**  2 stroke  4 stroke

Essential requirements	Standards Used	Other normative document used	See technical file
<b>Annex I.B – Exhaust Emissions</b>			
engine identification			
exhaust emission requirements	EN ISO 8178-1:1996		X
durability			
owner's manual			
<b>Annex I.C – Noise Emissions</b>	see craft manufacturer's Declaration of Conformity		

**ENGINE(S) COVERED BY THIS DECLARATION**

Engine model(s) or engine family name(s):	EC Type certificate number (exhaust)
	SNCH*94/25*2003/44*
RCD-1GM10X1	0009*00
RCD-2YM15X1	0004*00
RCD-3YM30X1	0005*00
RCD-4JH4X1	0014*00
RCD-4JH3TX1	0011*01
RCD-4LHAX1	0015*00
RCD-6LPADX1	0012*00
RCD-6LPASX1	0007*00
RCD-6CXM1	0006*00
RCD-6LY2X1	0008*00
RCD-6LY3X1	0010*00
RCD-4JH3TX2	0016*00
RCD-4JH4TX2	0017*00

I declare on behalf of the engine manufacturer that the engine(s) will meet the exhaust emission requirements of Directive 94/25/EC as amended by Directive 2003/44/EC when installed in a recreational craft, in accordance with the engine manufacturer's supplied instructions and that this (these) engine(s) must not be put into service until the recreational craft into which it is (they are) to be installed has been declared in conformity with the relevant provisions of the above mentioned Directive.

Name: G.J. Mantel Signature and title: [Signature]  
 (identification of the person empowered to sign on behalf of the engine manufacturer or his authorised representative) (or an equivalent marking)

*President  
Yanmar Marine S.r.l.*

Date: (yr/month/day) 2005 / 10 / 21



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PHONE: 81-6-6489-8032  
FAX: 81-6-6489-8041  
URL: WWW.YANMAR.CO.JP

### User's record

Date of purchase
Engine model Engine serial number Marine gear model & serial number Gear ratio
Place of purchase (Name of dealer)