

# YANMAR

## MARINE DIESEL ENGINE

### MODELS:

2GM20(F)(V)(C), 3GM30(F)(V)(C)

EPA Certified Engine

It meets the low emission standards set by the EPA

## OPERATION MANUAL

### California Proposition 65 Warning

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

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# Introduction

Thank you for purchasing a YANMAR Marine Diesel Engine.

This Operation Manual describes the operation, maintenance and inspection of the 2GM20(F)(V)(C), 3GM30(F)(V)(C) Yanmar Marine Diesel Engines.

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.

Make sure this manual is transferred to subsequent owners. It should be considered as a permanent part of the engine and remain so.

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.

The marine gear described in this manual is Yanmar Model KM Series.

|                                         |           |                                   |
|-----------------------------------------|-----------|-----------------------------------|
| Operation Manual<br><br>(Marine Engine) | Models    | 2GM20(F)(V)(C),<br>3GM30(F)(V)(C) |
|                                         | Code. No. | 499611 - 00680                    |

With regard to the sail drive, this manual describes lube oil selection and specification only. Please read the Sail Drive Operation Manual, which is supplied with the Sail Drive Unit, for further information.



# 1. For your safety

## 1.1 WARNING SYMBOLS

Most operation, maintenance and inspection problems arise due to users' failure to comply with the rules and precautions for safe operation described in this operation manual. Often, users do not understand or recognize the signs of approaching problems. Improper handling can cause burns and other injuries and can result in death.

Be sure to read this operation manual carefully before operating the engine and observe all of the instructions and precautions described in this manual.

Below follow the warning signs used in this manual. Pay special attention to parts containing these words and signs.



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.

This sign is also be used to alert against unsafe practices.

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

## 1.2 SAFETY PRECAUTIONS

(Observe these instructions for your own safety!)

### Precautions for Operation



#### Filler Cap of Fresh Water Tank

Never open the cap of the fresh water tank while the engine is still hot. Steam and hot water will spurt out and burn you seriously. Wait until the temperature of the fresh water tank has dropped, wrap a cloth around the filler cap and loosen the cap slowly. After inspection, refasten the cap firmly.

# 1. For your safety

## ⚠ DANGER



### Battery

Never smoke or permit sparks near the battery, because it may emit explosive hydrogen gas. Place the battery in a well-ventilated place.

## ⚠ DANGER



### Fuel

Use only diesel oil. Never use other fuels, including gasoline, kerosene, etc., because they could cause a fire. The wrong fuel could also cause the fuel injection pump and injector to fail due to lack of proper lubrication. Be sure to check that you have selected the correct diesel fuel before filling the fuel tank.

## ⚠ WARNING



### Fire Prevention

Be sure to stop the engine and confirm that there are no open flames in the vicinity before supplying fuel. If you do spill fuel, wipe such spillage carefully and dispose of the wiping materials properly. Wash your hands thoroughly with soap and water.

Never place oil or other flammable material in the engine room. Install a fire extinguisher near the engine room, and familiarize yourself with its use.

## ⚠ WARNING



### Exhaust Gas

Exhaust gas contains poisonous carbon monoxide and should not be inhaled.

Be sure to install ventilation ports or ventilators in the engine room and ensure good ventilation during engine operation.

## ⚠ WARNING



### Moving Parts

Do not touch or let your clothing get caught in the moving parts of the engine, such as the front drive shaft, V-belt or propeller shaft, during engine operation. You will be injured.

Never operate the engine without the covers on the moving parts.

## ⚠ CAUTION



### Burns

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

# 1. For your safety

## ⚠ WARNING



### Alcohol

Never operate the engine while you are under the influence of alcohol. Never operate the engine when you are ill or feeling unwell.

## SAFETY PRECAUTIONS FOR INSPECTION

## ⚠ DANGER



### Battery Fluid

Battery fluid is dilute sulfuric acid. It can blind you if it gets in your eyes, or burn your skin. Keep the fluid away from your body. If you touch it, wash it off immediately with a large quantity of fresh water and call your doctor for treatment.

## ⚠ WARNING



### Fire by Electric Short-Circuits

Always turn off the battery switch before inspecting the electrical system.

Failure to do so could cause short-circuiting and fires.

## ⚠ WARNING



### Stop the engine before servicing

Stop the engine before you service it.

Turn the battery switch off. If you must inspect while the engine is in operation, never touch moving parts. Keep your body and clothing well clear of all moving parts.

## ⚠ CAUTION



### Scalds

If extracting oil from the engine while it is still hot, don't let the oil splash on you.

Wait until the temperature has dropped before extracting cooling water from the engine. Don't let it splash on you.

## ⚠ DANGER

### Forbidden Modifications

Never release the limiting devices such as the engine speed limit, fuel injection limit, etc.

Modification will impair the safety and performance of the product and shorten product life.

Also note that any troubles arising from modification are not covered by our warranty.

## ⚠ DANGER

### Precautions for Treating Waste

Never dispose of waste oil or other fluid in a field, sewer, river, or the sea. Treat waste matters safely observing regulations or laws.

Ask a waste recovery company to collect it.

# 1. For your safety

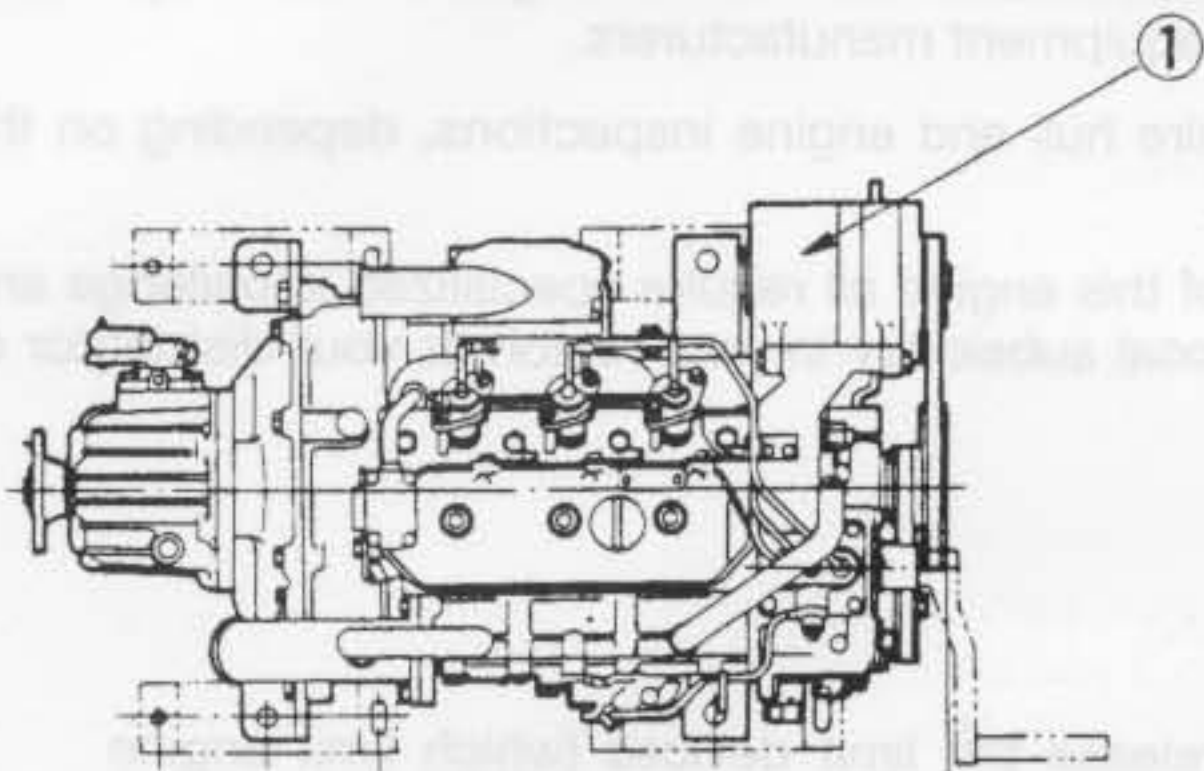
## SAFETY PRECAUTIONS FOR INSPECTION

### 1.3 WARNING LABELS

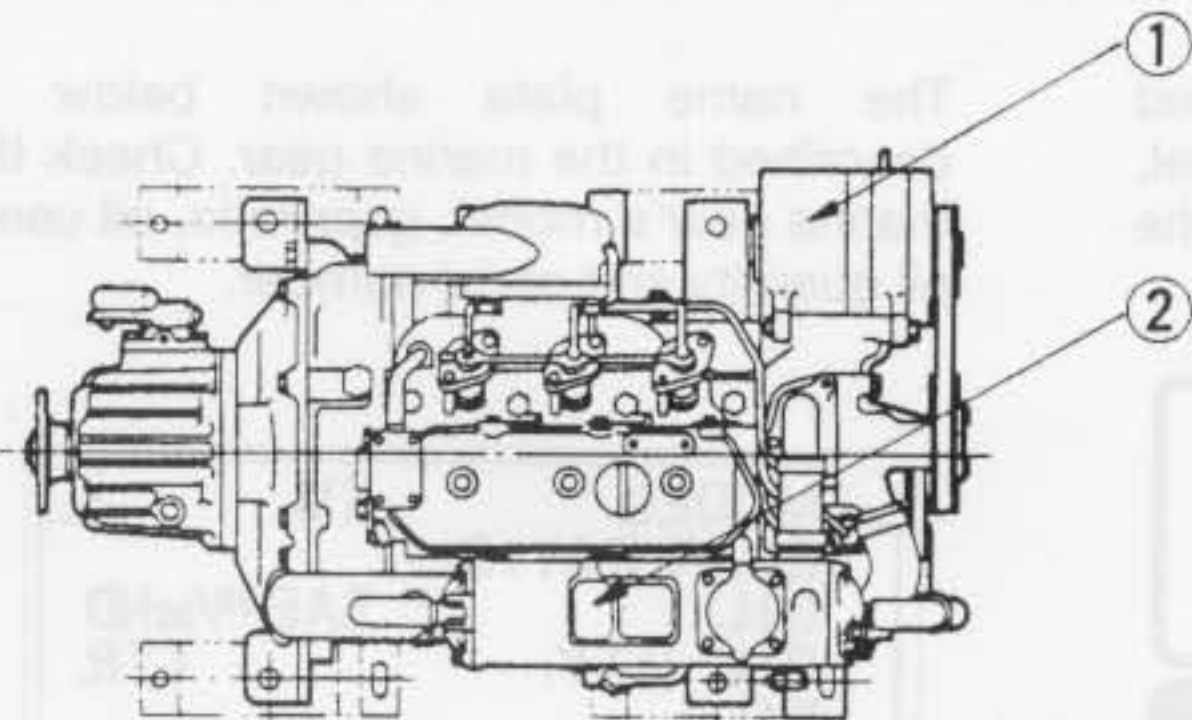
To insure safe operation, warning device labels have been attached. Their location is shown below and they should always be visible. Please replace if damaged or lost.

Warning Device Labels, Parts Numbers

| No. | Part Code No. |
|-----|---------------|
| ①   | 128296-07350  |
| ②   | 128296-07260  |



2GM20(C)(V), 3GM30(C)(V)



2GM20F(C)(V), 3GM30F(C)(V)



## 2. Product explanation

### 2.1 USE, DRIVING SYSTEM, ETC.

The engine is equipped with marine gear, connect the marine gear output shaft to the propeller shaft.

In order to obtain full performance from your engine, it is imperative that you check the size and structure of the hull and use a propeller of the appropriate size.

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.

To handle the drive equipment, driven systems (including the propeller) and other onboard equipment, be sure to observe the instructions and cautions given in the operation manuals supplied by the shipyard and equipment manufacturers.

The laws of some countries may require hull and engine inspections, depending on the use, size and cruising area of the boat.

The installation, fitting and surveying of this engine all require specialized knowledge and engineering skills. Consult Yanmar's local subsidiary in your region or your distributor or dealer.

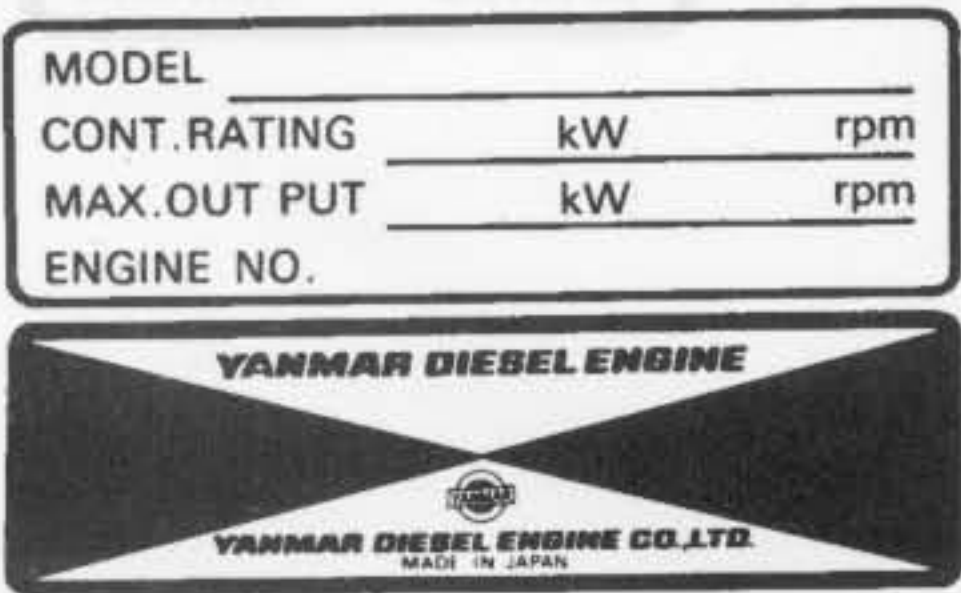
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#### WARNING

Never modify this product or release the limit devices (which limit engine speed, fuel injection quantity, etc.). Modification will impair the safety and performance of the product and functions and shorten the product life. Please note that any troubles arising from modification of the product will not be covered by our warranty.

#### DETAIL OF NAME PLATE

The name plate shown below is attached to the engine. Check the engine's model, output, rpm and serial number on the name plate.



The name plate shown below is described in the marine gear. Check the marine gear's model, gear ratio, oil used, oil quantity and serial number.



## 2. Product explanation

### 2.2 Engine Specifications

#### 2.2.1 Direct Seawater Cooling Type, GM series

| Engine Model             |                               |                                               | 2GM20                                       |  |  | 3GM30                    |  |  |  |  |  |
|--------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------|--|--|--------------------------|--|--|--|--|--|
| Type                     |                               |                                               | Vertical 4-cycle water cooled diesel engine |  |  |                          |  |  |  |  |  |
| Combustion system        |                               |                                               | Swirl pre-combustion chamber                |  |  |                          |  |  |  |  |  |
| Number of cylinders      |                               |                                               | 2                                           |  |  | 3                        |  |  |  |  |  |
| Bore × stroke            |                               | mm (in.)                                      | 75 × 72 (2.95 × 2.83)                       |  |  |                          |  |  |  |  |  |
| Displacement             |                               | ℓ (cu.in.)                                    | 0.636 (38.81)                               |  |  | 0.954 (58.21)            |  |  |  |  |  |
| Continuous rating output | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 11.8/3400<br>(16.0/3400)                    |  |  | 17.7/3400<br>(24.1/3400) |  |  |  |  |  |
|                          | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 6.66<br>(94.71)                             |  |  |                          |  |  |  |  |  |
|                          | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.16<br>(26.77)                             |  |  |                          |  |  |  |  |  |
| One hour rating output   | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 13.4/3600<br>(18.2/3600)                    |  |  | 20.1/3600<br>(27.3/3600) |  |  |  |  |  |
|                          | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 7.07<br>(100.54)                            |  |  |                          |  |  |  |  |  |
|                          | Piston speed                  | m/sec                                         |                                             |  |  |                          |  |  |  |  |  |

## 2. Product explanation

### 2.2.2 Fresh Water Cooling Type, GMF series

|                          |                               |                                               |                                             |  |  |                          |  |  |  |  |  |
|--------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------|--|--|--------------------------|--|--|--|--|--|
| Engine Model             |                               |                                               | 2GM20F                                      |  |  | 3GM30F                   |  |  |  |  |  |
| Type                     |                               |                                               | Vertical 4-cycle water cooled diesel engine |  |  |                          |  |  |  |  |  |
| Combustion system        |                               |                                               | Swirl pre-combustion chamber                |  |  |                          |  |  |  |  |  |
| Number of cylinders      |                               |                                               | 2                                           |  |  | 3                        |  |  |  |  |  |
| Bore × stroke            |                               | mm (in.)                                      | 75 × 72 (2.95 × 2.83)                       |  |  |                          |  |  |  |  |  |
| Displacement             |                               | ℓ (cu.in.)                                    | 0.636 (38.81)                               |  |  | 0.954 (58.21)            |  |  |  |  |  |
| Continuous rating output | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 11.8/3400<br>(16.0/3400)                    |  |  | 17.7/3400<br>(24.1/3400) |  |  |  |  |  |
|                          | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 6.66<br>(94.71)                             |  |  |                          |  |  |  |  |  |
|                          | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.16<br>(26.77)                             |  |  |                          |  |  |  |  |  |
| One hour rating output   | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 13.4/3600<br>(18.2/3600)                    |  |  | 20.1/3600<br>(27.3/3600) |  |  |  |  |  |
|                          | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 7.07<br>(100.54)                            |  |  |                          |  |  |  |  |  |
|                          | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.64<br>(28                                 |  |  |                          |  |  |  |  |  |

## 2. Product explanation

### 2.2.3 Direct Seawater Cooling Type, GMV series

| Engine Model                     |                               |                                               | 2GM20V                                      | 3GM30V                   |
|----------------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------|--------------------------|
| Type                             |                               |                                               | Vertical 4-cycle water cooled diesel engine |                          |
| Combustion system                |                               |                                               | Swirl pre-combustion chamber                |                          |
| Number of cylinders              |                               |                                               | 2                                           | 3                        |
| Bore × stroke                    |                               | mm (in.)                                      | 75 × 72 (2.95 × 2.83)                       |                          |
| Displacement                     |                               | ℓ (cu.in.)                                    | 0.636 (38.81)                               | 0.954 (58.21)            |
| Continuous rating output         | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 11.8/3400<br>(16.0/3400)                    | 17.7/3400<br>(24.1/3400) |
|                                  | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 6.66<br>(94.71)                             |                          |
|                                  | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.16<br>(26.77)                             |                          |
| One hour rating output           | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 13.4/3600<br>(18.2/3600)                    | 20.1/3600<br>(27.3/3600) |
|                                  | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 7.07<br>(100.54)                            |                          |
|                                  | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.64<br>(28.35)                             |                          |
| Compression ratio                |                               |                                               | 23.0                                        |                          |
| Fuel injection timing (b.T.D.C.) |                               | °                                             | 15±1                                        | 18±1                     |
| Fuel injection pressure          |                               | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 170±5<br>(2347 – 2489)                      |                          |
| Main power take off              |                               |                                               | at Flywheel side                            |                          |
| Front power take off             |                               |                                               | at Crankshaft V-pulley side                 |                          |
| Direction of rotation            | Crankshaft                    |                                               | Clockwise viewed from stern                 |                          |

## 2. Product explanation

### 2.2.4 Fresh Water Cooling Type, GMFV series

| Engine Model                     |                               |                                               | 2GM20FV                                     |  | 3GM30FV                  |  |  |  |
|----------------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------|--|--------------------------|--|--|--|
| Type                             |                               |                                               | Vertical 4-cycle water cooled diesel engine |  |                          |  |  |  |
| Combustion system                |                               |                                               | Swirl pre-combustion chamber                |  |                          |  |  |  |
| Number of cylinders              |                               |                                               | 2                                           |  | 3                        |  |  |  |
| Bore × stroke                    |                               | mm (in.)                                      | 75 × 72 (2.95 × 2.83)                       |  |                          |  |  |  |
| Displacement                     |                               | ℓ (cu.in.)                                    | 0.636 (38.81)                               |  | 0.954 (58.21)            |  |  |  |
| Continuous rating output         | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 11.8/3400<br>(16.0/3400)                    |  | 17.7/3400<br>(24.1/3400) |  |  |  |
|                                  | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 6.66<br>(94.71)                             |  |                          |  |  |  |
|                                  | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.16<br>(26.77)                             |  |                          |  |  |  |
| One hour rating output           | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 13.4/3600<br>(18.2/3600)                    |  | 20.1/3600<br>(27.3/3600) |  |  |  |
|                                  | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 7.07<br>(100.54)                            |  |                          |  |  |  |
|                                  | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.64<br>(28.35)                             |  |                          |  |  |  |
| Compression ratio                |                               |                                               | 23.0                                        |  |                          |  |  |  |
| Fuel injection timing (b.T.D.C.) |                               | °                                             | 15±1                                        |  |                          |  |  |  |

## 2. Product explanation

### 2.2.5 Direct Seawater Cooling Type, GMC series

| Engine Model                     |                               |                                               | 2GM20C                                      | 3GM30C                   |
|----------------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------|--------------------------|
| Type                             |                               |                                               | Vertical 4-cycle water cooled diesel engine |                          |
| Combustion system                |                               |                                               | Swirl pre-combustion chamber                |                          |
| Number of cylinders              |                               |                                               | 2                                           | 3                        |
| Bore × stroke                    |                               | mm (in.)                                      | 75 × 72 (2.95 × 2.83)                       |                          |
| Displacement                     |                               | ℓ (cu.in.)                                    | 0.636 (38.81)                               | 0.954 (58.21)            |
| Continuous rating output         | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 11.8/3400<br>(16.0/3400)                    | 17.7/3400<br>(24.1/3400) |
|                                  | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 6.66<br>(94.71)                             |                          |
|                                  | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.16<br>(26.77)                             |                          |
| One hour rating output           | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 13.4/3600<br>(18.2/3600)                    | 20.1/3600<br>(27.3/3600) |
|                                  | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 7.07<br>(100.54)                            |                          |
|                                  | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.64<br>(28.35)                             |                          |
| Compression ratio                |                               |                                               | 23.0                                        |                          |
| Fuel injection timing (b.T.D.C.) |                               | °                                             | 15±1                                        | 18±1                     |
| Fuel injection pressure          |                               | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 170±5<br>(2347 – 2489)                      |                          |
| Main power take off              |                               |                                               | at Flywheel side                            |                          |
| Front power take off             |                               |                                               | at Crankshaft V-pulley side                 |                          |
| Direction of rotation            | Crankshaft                    | Counter-clockwise viewed from stern           |                                             |                          |
|                                  |                               |                                               |                                             |                          |

## 2. Product explanation

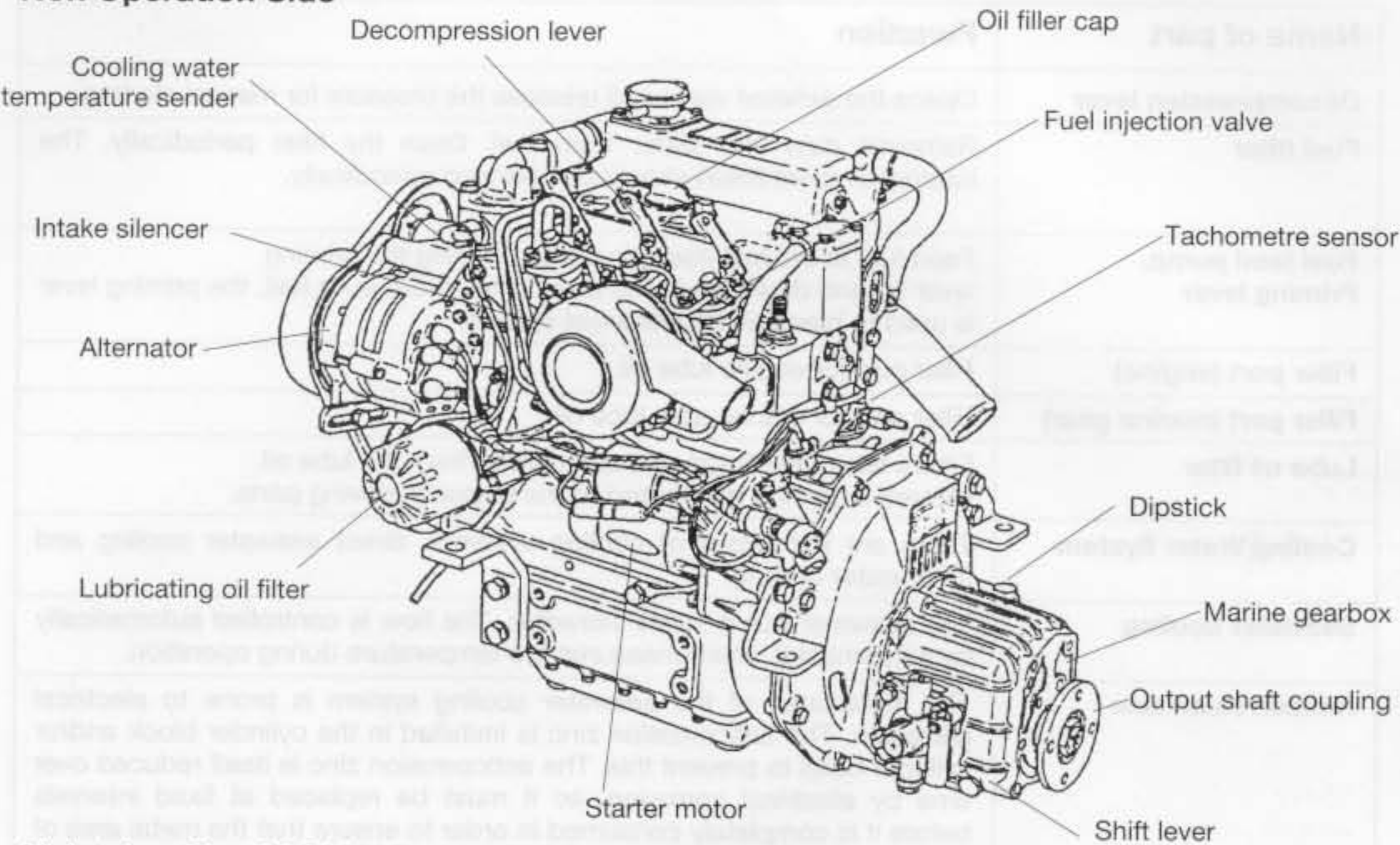
### 2.2.6 Fresh Water Cooling Type, GMFC series

| Engine Model                     |                               |                                               | 2GM20FC                                     | 3GM30FC                  |
|----------------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------|--------------------------|
| Type                             |                               |                                               | Vertical 4-cycle water cooled diesel engine |                          |
| Combustion system                |                               |                                               | Swirl pre-combustion chamber                |                          |
| Number of cylinders              |                               |                                               | 2                                           | 3                        |
| Bore × stroke                    |                               | mm (in.)                                      | 75 × 72 (2.95 × 2.83)                       |                          |
| Displacement                     |                               | ℓ (cu.in.)                                    | 0.636 (38.81)                               | 0.954 (58.21)            |
| Continuous rating output         | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 11.8/3400<br>(16.0/3400)                    | 17.7/3400<br>(24.1/3400) |
|                                  | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 6.66<br>(94.71)                             |                          |
|                                  | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.16<br>(26.77)                             |                          |
| One hour rating output           | Output/crankshaft speed       | kW/rpm<br>(HP/rpm)                            | 13.4/3600<br>(18.2/3600)                    | 20.1/3600<br>(27.3/3600) |
|                                  | Brake mean effective pressure | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 7.07<br>(100.54)                            |                          |
|                                  | Piston speed                  | m/sec.<br>(ft./sec.)                          | 8.64<br>(28.35)                             |                          |
| Compression ratio                |                               |                                               | 23.0                                        |                          |
| Fuel injection timing (b.T.D.C.) |                               | °                                             | 15±1                                        | 18±1                     |
| Fuel injection pressure          |                               | kg/cm <sup>2</sup><br>(lb./in. <sup>2</sup> ) | 170±5<br>(2347 – 2489)                      |                          |
| Main power take off              |                               |                                               | at Flywheel side                            |                          |
| Front power take off             |                               |                                               | at Crankshaft V-pulley side                 |                          |
| Direction of rotation            | Crankshaft                    |                                               | Counter-clock                               |                          |

## 2. Product explanation

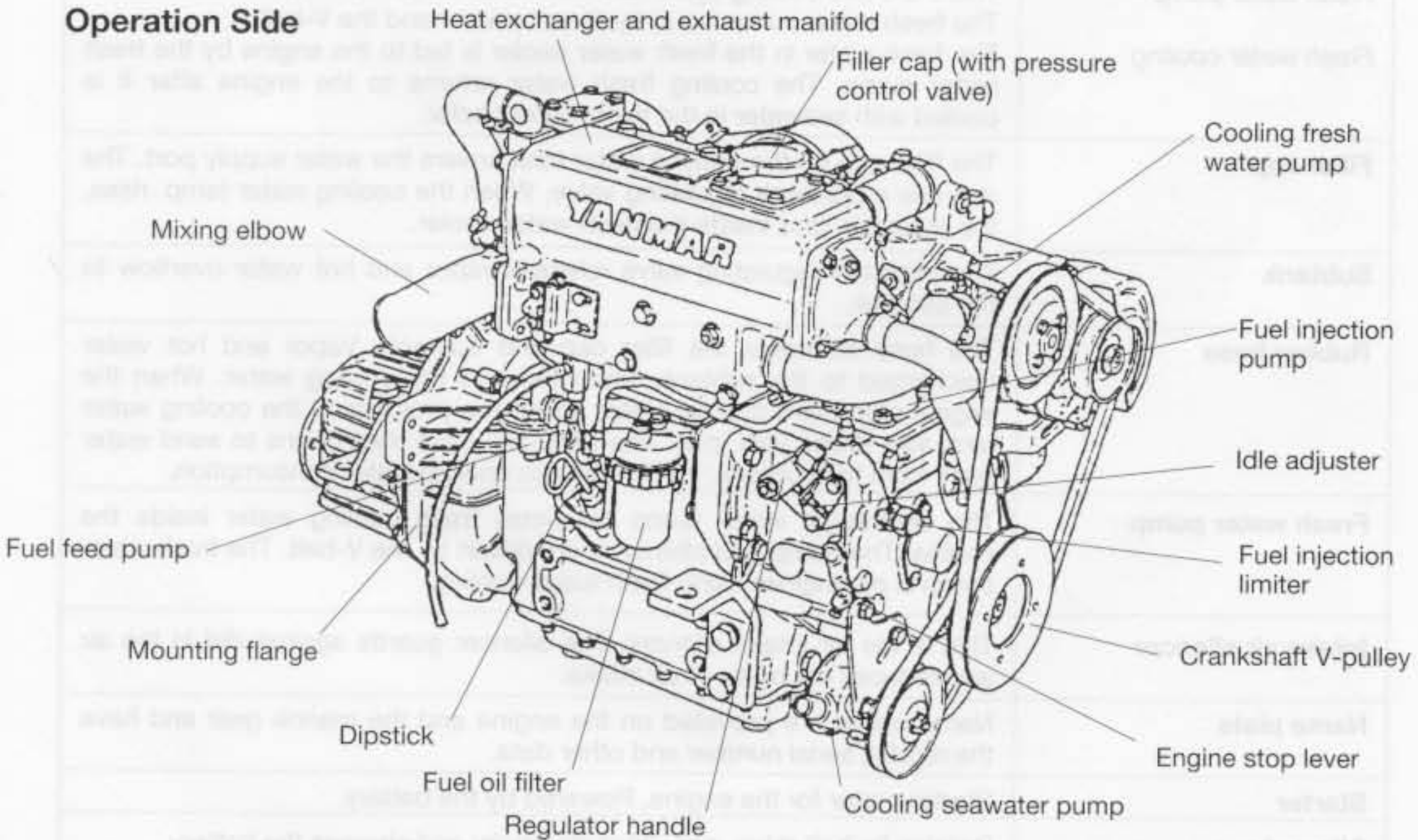
### 2.3 Names of Parts

#### Non Operation Side



Air intake side of 3GM30F with KM3P

#### Operation Side



Exhaust side of 3GM30F with KM3P



## 2. Product explanation

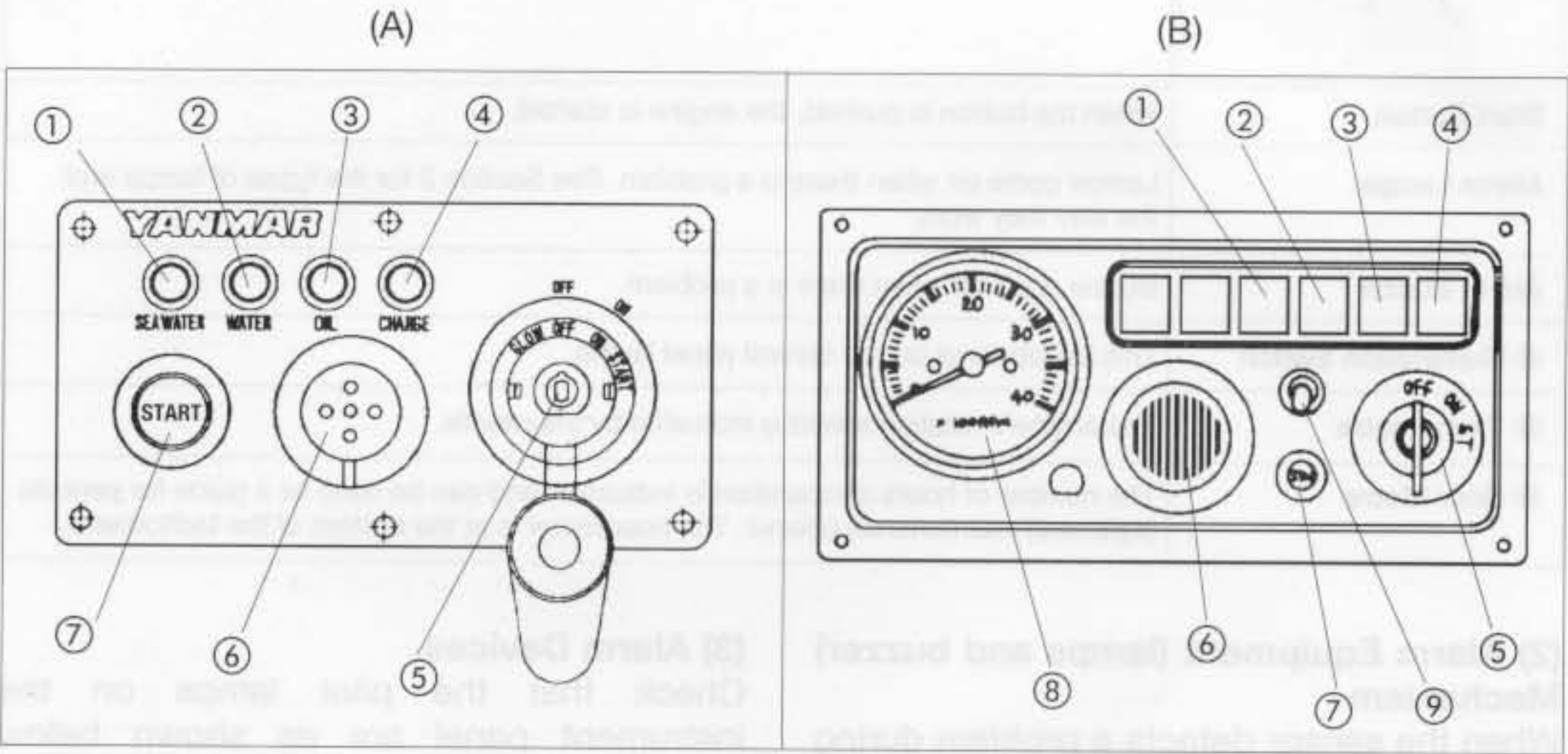
### 2.5 Control Equipment

The equipment in the control room, making remote control possible, consists of: the instrument panel, which is connected by wire harness; the remote control handle, which is hooked up by remote control cable to each of the engine control levers, and the stopping equipment.

#### 2.5.1 Control Panel

##### Electric Operation

There are two control panel options. The controls and alarm lamps included are shown below.



- ① Water Proof (sail drive)
- ② High temp. cooling water
- ③ Low lube oil pressure

- ④ Charge
- ⑤ Key switch
- ⑥ Buzzer

- ⑦ Start switch
- ⑧ Tachometre
- ⑨ Illumination switch

## 2. Product explanation

### (1) Controls and Equipment

Note: The mark **Ⓑ** indicates equipment for type B control panel only.

| Controls and Equipment                                                             | Mechanism                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Key Switch</p> <p>Rotary switch with 2 positions.</p> <p>In the OFF position, the switch key can be inserted or removed.</p> <p>In OFF, all electric current is cut off.</p> <p>In ON (1 position to the right), the engine is turned on.</p> <p>In ON, electric current to the controls and equipment is turned on.</p> <p>The engine cannot be stopped with the key switch.</p> |
| Start Button                                                                       | When the button is pushed, the engine is started.                                                                                                                                                                                                                                                                                                                                    |
| Alarm Lamps                                                                        | Lamps come on when there is a problem. See Section 2 for the types of lamps and the way they work.                                                                                                                                                                                                                                                                                   |
| Alarm Buzzer                                                                       | Buzzer goes off when there is a problem.                                                                                                                                                                                                                                                                                                                                             |
| <b>Ⓑ</b> Illumination Switch                                                       | This switch turns on the control panel lamps.                                                                                                                                                                                                                                                                                                                                        |
| <b>Ⓑ</b> Tachometre                                                                | The engine's rotation speed is indicated by the needle.                                                                                                                                                                                                                                                                                                                              |
| <b>Ⓑ</b> Hour Metre                                                                | The number of hours of operation is indicated, and can be used as a guide for periodic <b>(optional)</b> maintenance checks. The hour meter is at the bottom of the tachometre.                                                                                                                                                                                                      |

### (2) Alarm Equipment (lamps and buzzer) Mechanism

When the sensor detects a problem during operation, the lamps come on and the buzzer goes off.

*Control Panel (Type A)*

There are 4 separate alarm monitors on the upper left side of the control panel.

*Control Panel (Type B)*

Alarm monitors are located on the upper right side of the control panel. Under normal conditions, the monitors are off. When there is a problem, the monitors light up.

### (3) Alarm Devices

Check that the pilot lamps on the instrument panel are as shown below when the starter key is turned on:

|             |                                |     |
|-------------|--------------------------------|-----|
| Pilot lamps | Low L.O. pressure alarm lamp   | Lit |
|             | Charge lamp                    | Lit |
|             | Cooling water temp. alarm lamp | Off |

#### NOTE:

*All these signals will continue until the engine starts up or the key is turned off.*

## 2. Product explanation

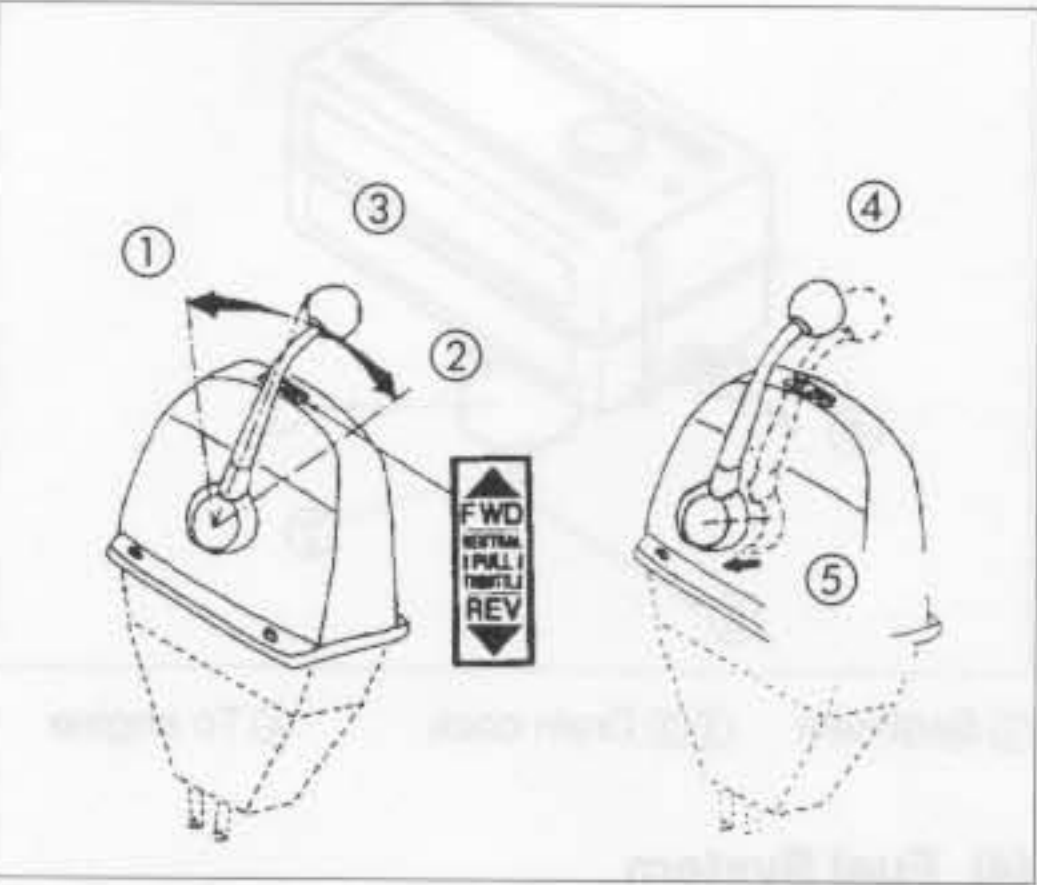
### 2.5.2 Single Lever Remote Control Handle (Morse Type) - Optional.

This remote control system uses a single handle to operate marinegear-clutch-(neutral, forward, reverse) and to control the engine speed.

NEUTRAL: Power to the propeller shaft is cut off and the engine idles.

FWD (FORWARD)

REV (REVERSE)



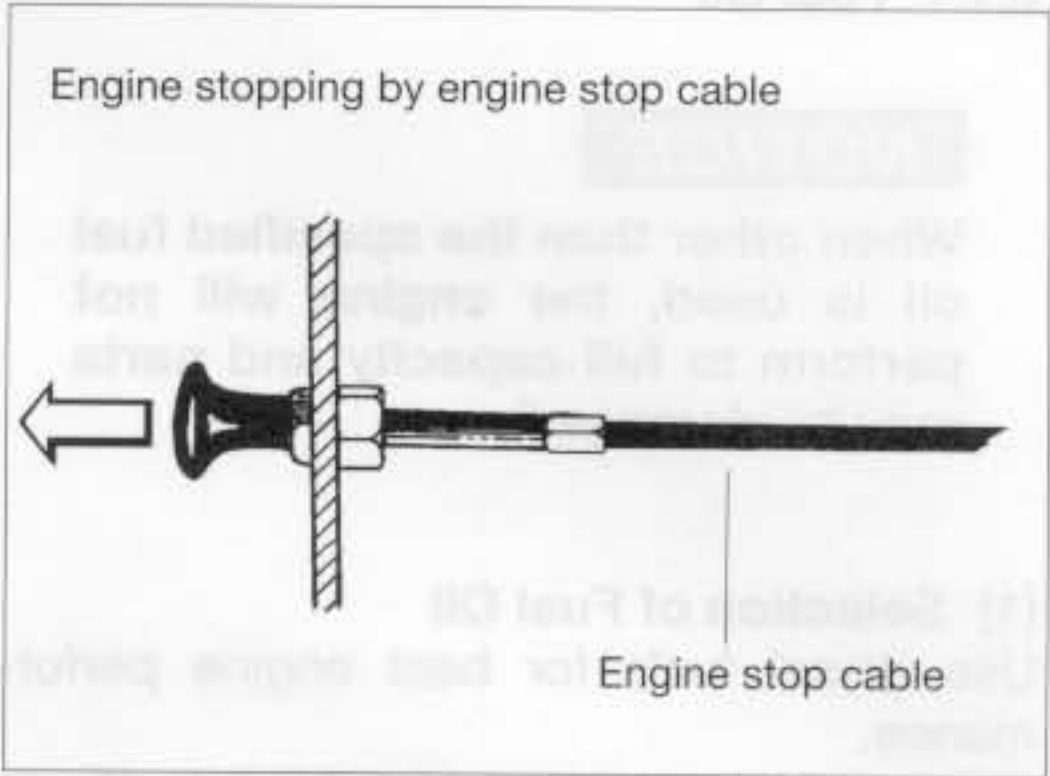
The handle controls the course of the boat (ahead or astern) and, at the same time, acts as an accelerator increasing the engine speed as it is pushed further in the FWD or REV direction. If the handle is pulled out, engine speed can be controlled without engaging the clutch (clutch remains in the NEUTRAL, no load position).

### 2.5.3 Stopping Equipment

#### Manual Operation

The engine is stopped by pulling out the engine stop knob, which catches the fuel

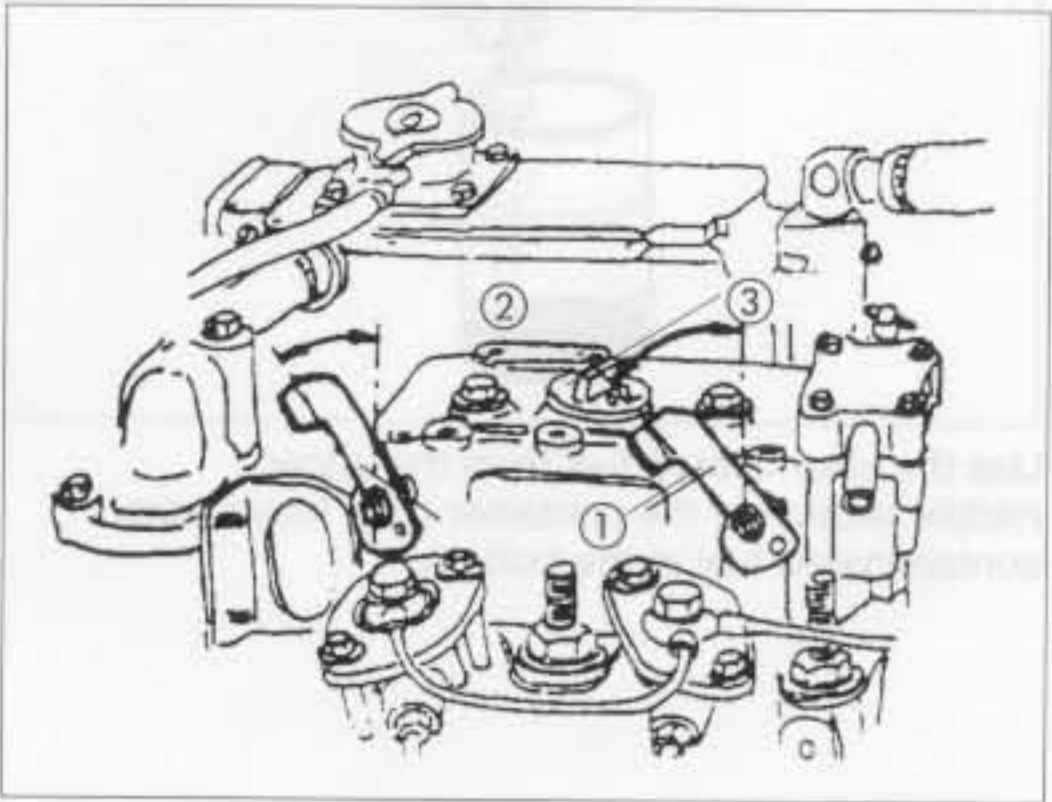
injection pump stop lever thus cutting off fuel injection.



### 2.5.4 Decompression Equipment

When the decompression lever is pulled, the exhaust valve opens causing decompression inside the cylinders and making hand-turning possible. Returning the lever to the original position closes the exhaust valve, allowing compression and operation condition. For either manual or electric starting, when low rotation speed makes starting difficult, use the decompression lever to augment the rotation speed and enable starting.

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# 3. Operation

## 3.1 Fuel Oil, Lube Oil, and Cooling Water

### 3.1.1 Fuel Oil

NOTICE

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

#### (1) Selection of Fuel Oil

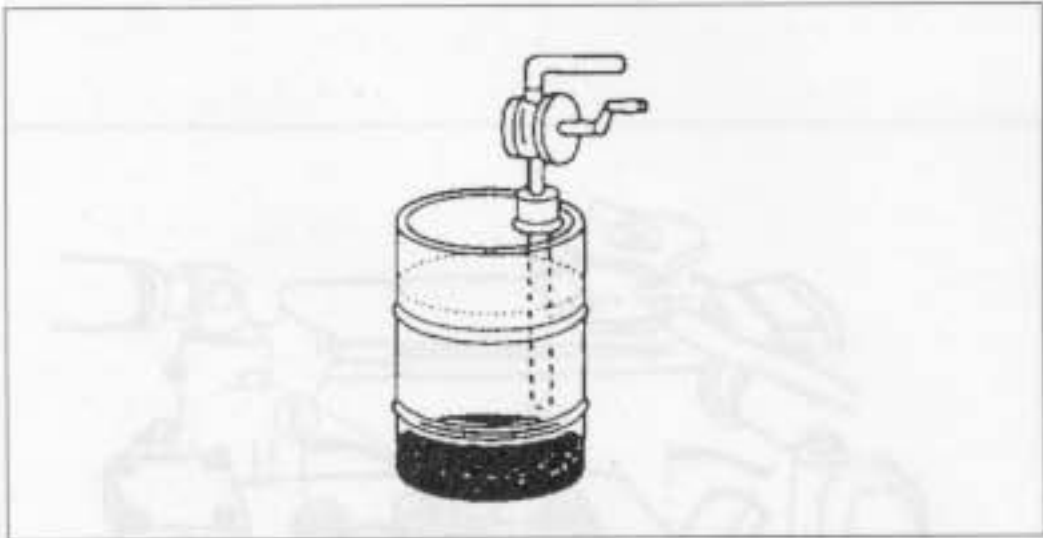
Use diesel fuels for best engine performance.

Cetane fuel number should be 45 or greater.

#### (2) Handling of Fuel Oil

- GB
- 1) Water and dust in the fuel cause engine failure. When fuel is stored, be sure that the inside of the storage container is clean, and that the fuel is stored away from dirt or rain water.

2) Keep the fuel container stationery for several hours to allow any dirt or water to settle to the bottom. Use a pump to extract the clear, filtered fuel from the top of the container for use.

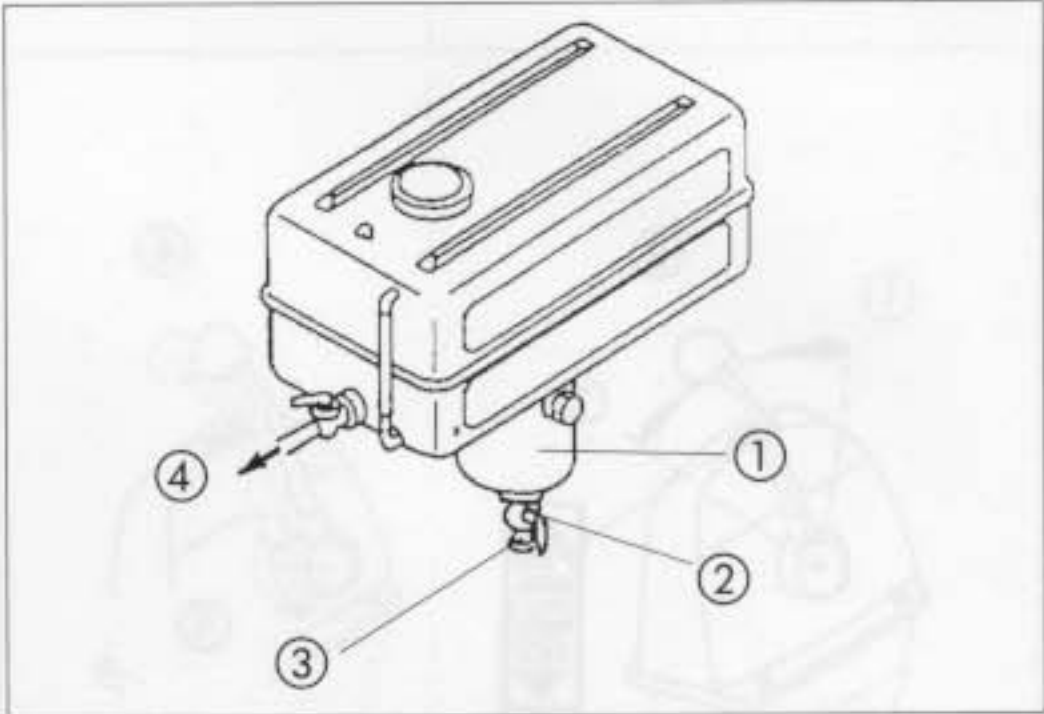


Use the clear filtered fuel from the upper middle section of the container only, leaving any contaminated fuel at the bottom.

#### (3) Fuel Tank (optional)

Be sure to attach a drain cock to the fuel tank to enable dirt and water to settle at the bottom of the tank to be drained off.

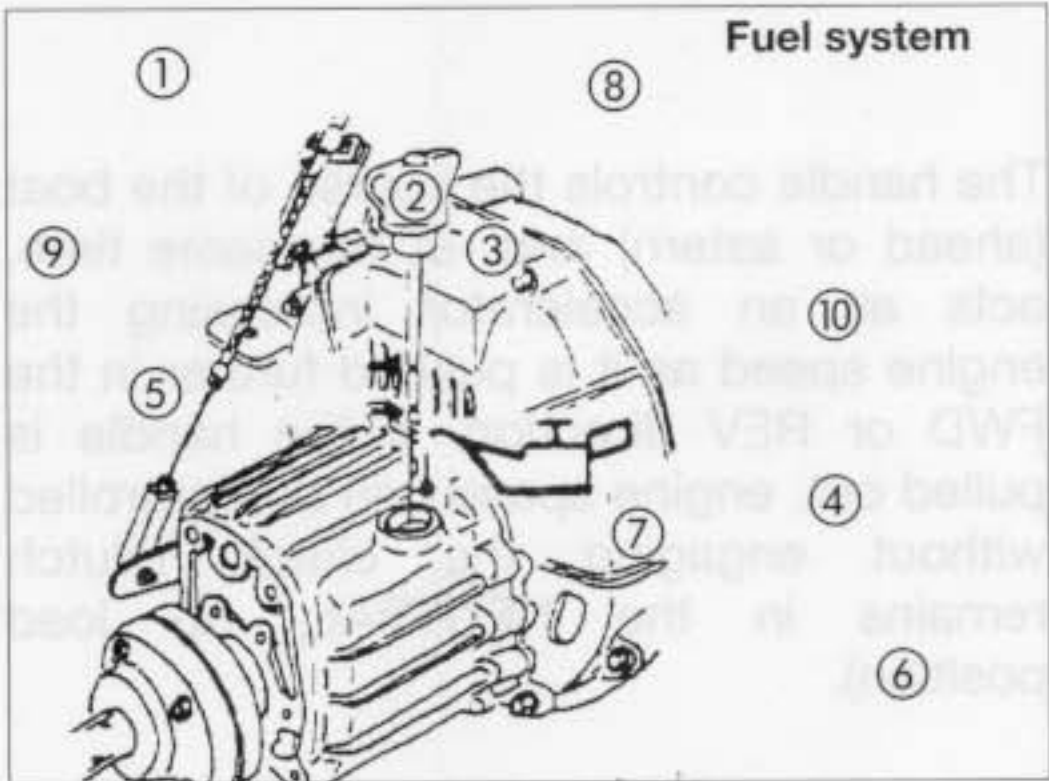
The fuel outlet should be positioned 20-30mm above the bottom of the tank so that only clean fuel is used.



① Sediment    ②③ Drain cock    ④ To engine

#### (4) Fuel System

Install the fuel pipe from the fuel tank to the fuel pump in accordance with the diagram. The oil/water separator (optional) is placed at the centre section of the line.



# 3. Operation

## 3.1.2 Lube Oil

### NOTICE

Using other than the specified lube oil will lead to seizure of parts, abnormal wear, and shorten engine life.

### (1) Selection of Engine Lube Oil

Use the following lube oil:

- API Classification.....CD
- SAE Viscosity.....15W40

### (2) Selection of Oil for Marine Gear

- SAE Viscosity .....30

### (3) The Sail Drive attached to 2GM20(F)(C) and 3GM30(F)(C)

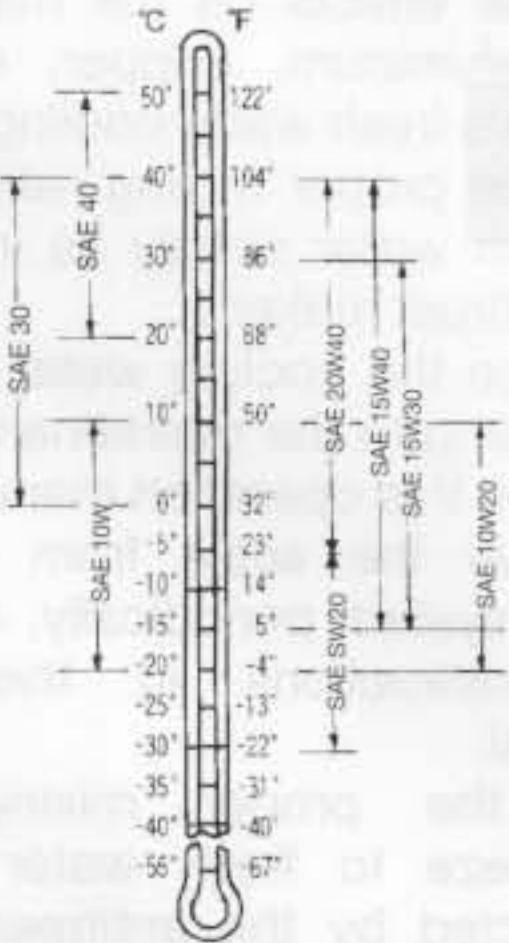
- SAE Viscosity .....90 or 80W90

### (4) Handling the Lube Oil

- 1) When handling and storing lube oil, be careful not to allow dust and water to enter the lube oil. Clean around the filter port before refilling.
- 2) Do not mix lube oils of different types or brands. Mixing may cause the chemical characteristics of the lube oil to change and lubricating performance to drop, reducing the engine's life.  
Before supplying lube oil to the engine and marine gear for the first time, extract all the lube oil already in the tank. Use new lube oil.
- 3) Lube oil supplied to the engine will undergo natural degeneration with time even when the engine is not used. Lube oil should be replaced at the specified intervals, regardless of whether the engine is being used or not.

### Air temperature

Single grade                      Multi grade







### 3. Operation

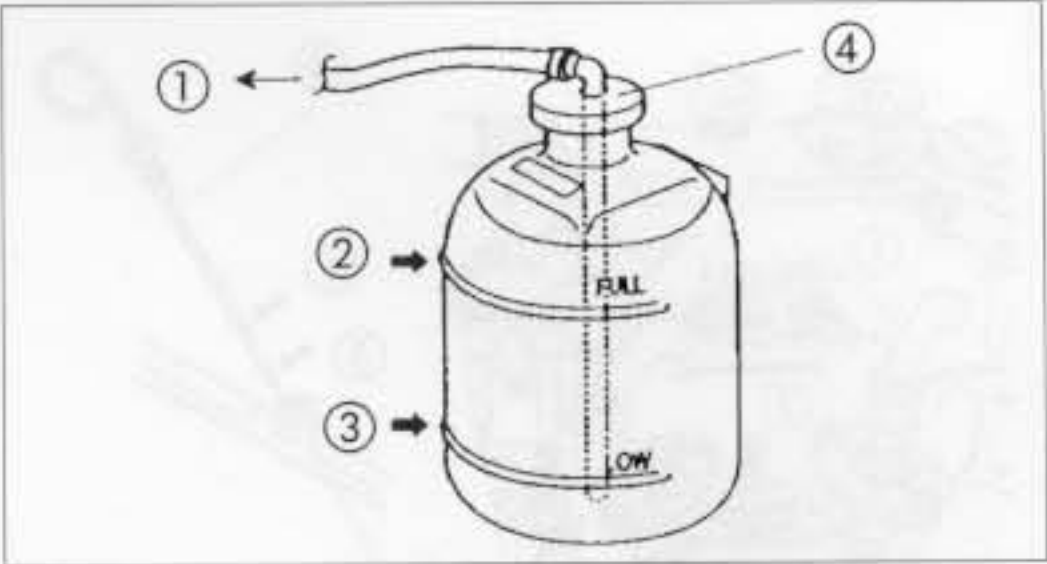
3. Pour cooling water slowly into the fresh water tank so that air bubbles do not develop. Supply until the water overflows from the filler port.

| Fresh water cooling capacity |       |
|------------------------------|-------|
| 2GM20F (V)(C)                | 2.9 / |
| 3GM30F (V)(C)                | 3.4 / |



**⚠ DANGER**

If the filler cap is loose, hot steam and water will spout out which may cause burns.



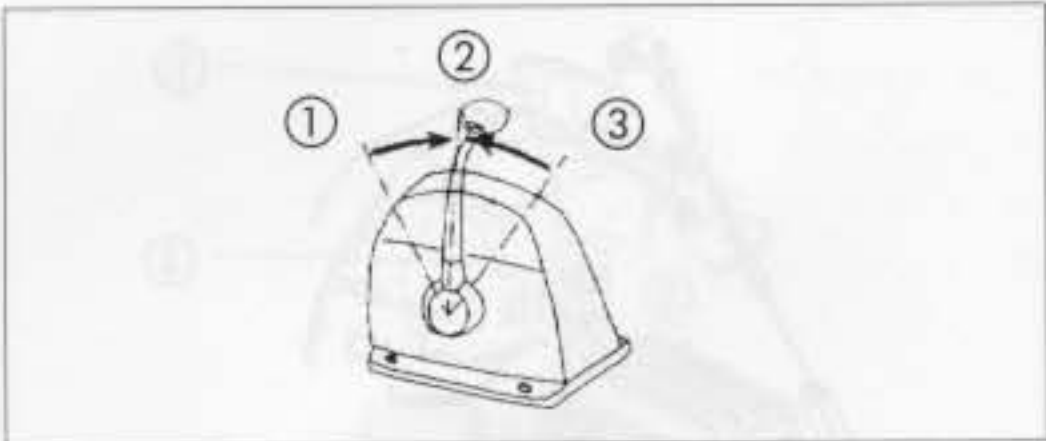
- ① To fresh water cooler
- ② Upper limit
- ③ Lower limit
- ④ Cap

#### 3.2.5 Cranking

When the engine has not been used for a long period of time, lube oil will not be distributed to all of the operating parts. Using the engine in this condition will lead to seizure.

After a long period of disuse, distribute lube oil to each part by cranking. Perform in accordance with the following procedures before beginning operation.

1. Open Kingston cock.
2. Open fuel tank cock.
3. Put remote control lever in NEUTRAL.



- ① Forward
- ② Neutral
- ③ Reverse

#### Manual Operation (Seawater Cooling only)

4. Pull out decompression lever.
5. Put starting handle on the starting shaft, and turn about 10 times. Check for abnormal noise while cranking.













# 3. Operation

## NOTICE

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

### 3.3.5 Stopping the Engine

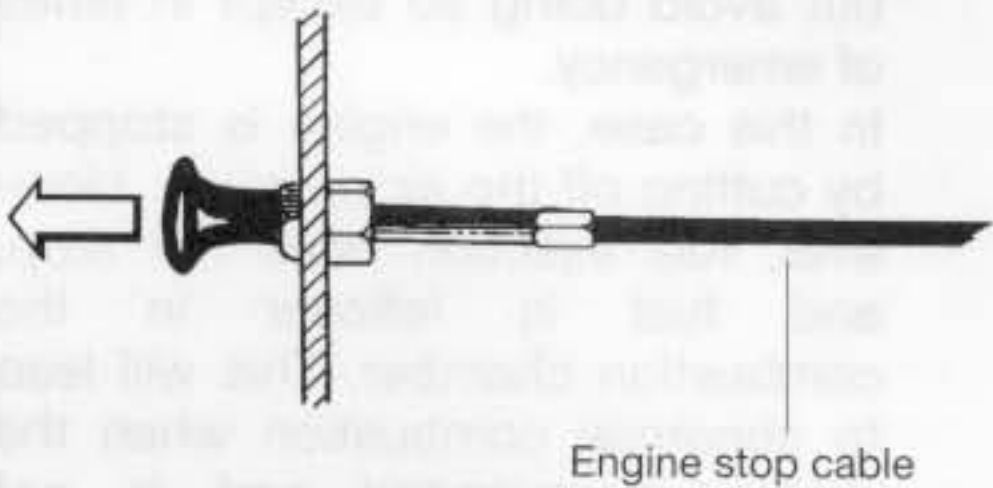
Stop the engine in accordance with the following procedures:

- 1. Put the remote control handle in NEUTRAL.
- 2. Be sure to race the engine before stopping it. (See 3.3.4 (7))
- 3. Cool down the engine at low speed (approximately 1000 rpm) for about 5 minutes.

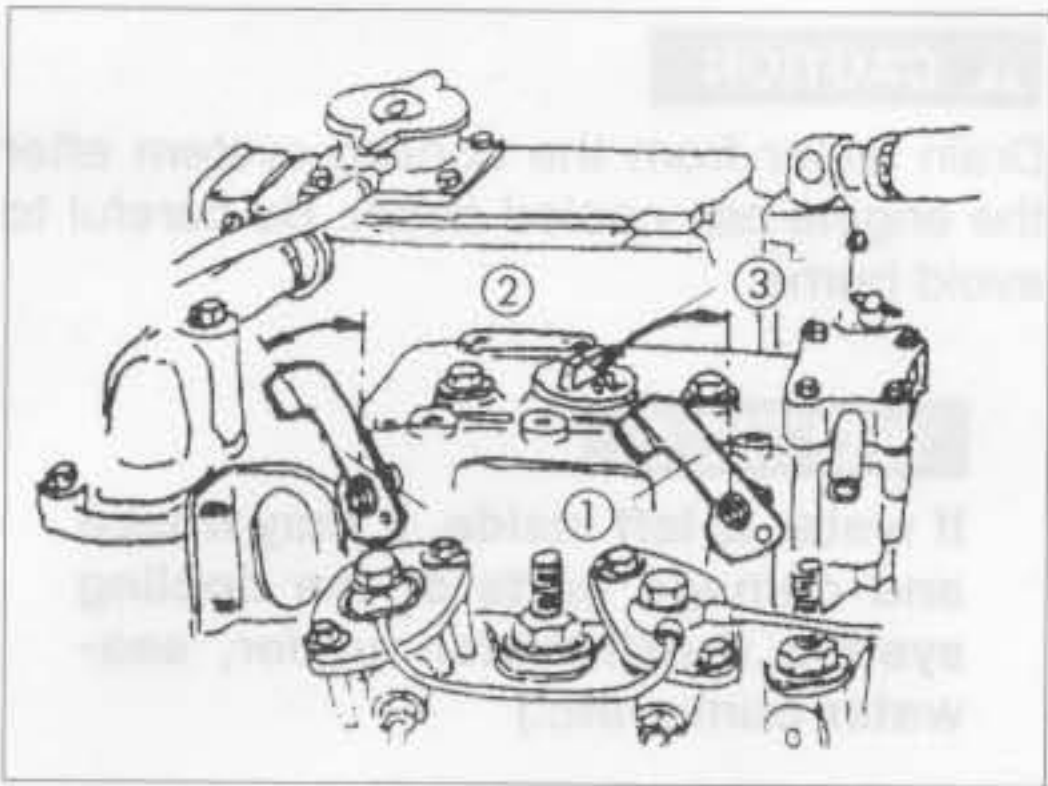
## NOTICE

Stopping the engine suddenly while operating at high speed will cause the engine temperature to rise quickly, causing deterioration of the oil and sticking of parts.

Engine stopping by engine stop cable



- 4. Continue to pull out the engine stop knob (stop lever) until the engine is completely stopped. If you release the knob before the engine has completely stopped, it may restart.



① Decomp. lever    ② Drive    ③ Decompression

- 5. Close the fuel tank cock.
- 6. Close the Kingston cock.

## 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.

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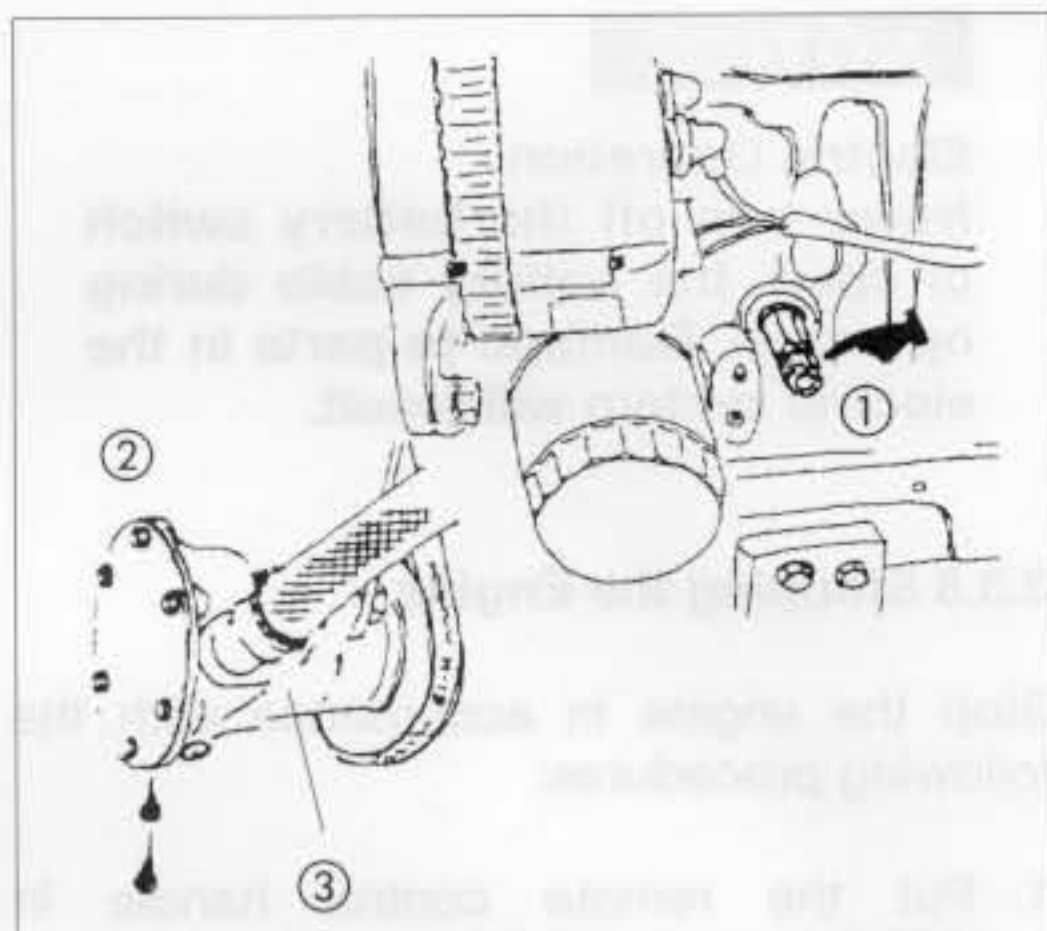
## 3. Operation

**Note:** The engine may be stopped by pulling out the decompression lever, but avoid doing so except in times of emergency.

In this case, the engine is stopped by cutting off the air pressure. However, fuel injection does not stop, and fuel is leftover in the combustion chamber. This will lead to abnormal combustion when the engine is restarted and is not desirable.

### 3.4 Long Term Storage

(1) *In cold temperatures or before long term storage, be sure to drain the water from the seawater cooling system.*



- ① Water drain cock      ③ Seawater pump  
② Loosen bolts and pull out top

1. Loosen the drain cocks at the side of the cylinder block, and drain off the water inside.
2. Loosen the 6 bolts fixing the side cover of the seawater pump, remove the cover and drain the water from inside. Retighten the bolts when finished.
3. Close the drain cocks.

(2) *If antifreeze has not been added to the cooling fresh water, be sure to drain off the water from the fresh water cooling system daily after use.*

### Fresh Water Cooling

#### **NOTICE**

If the water is not removed, it may freeze and damage parts of the cooling water system (fresh water cooler, cylinder block, cylinder head, etc.)

GB

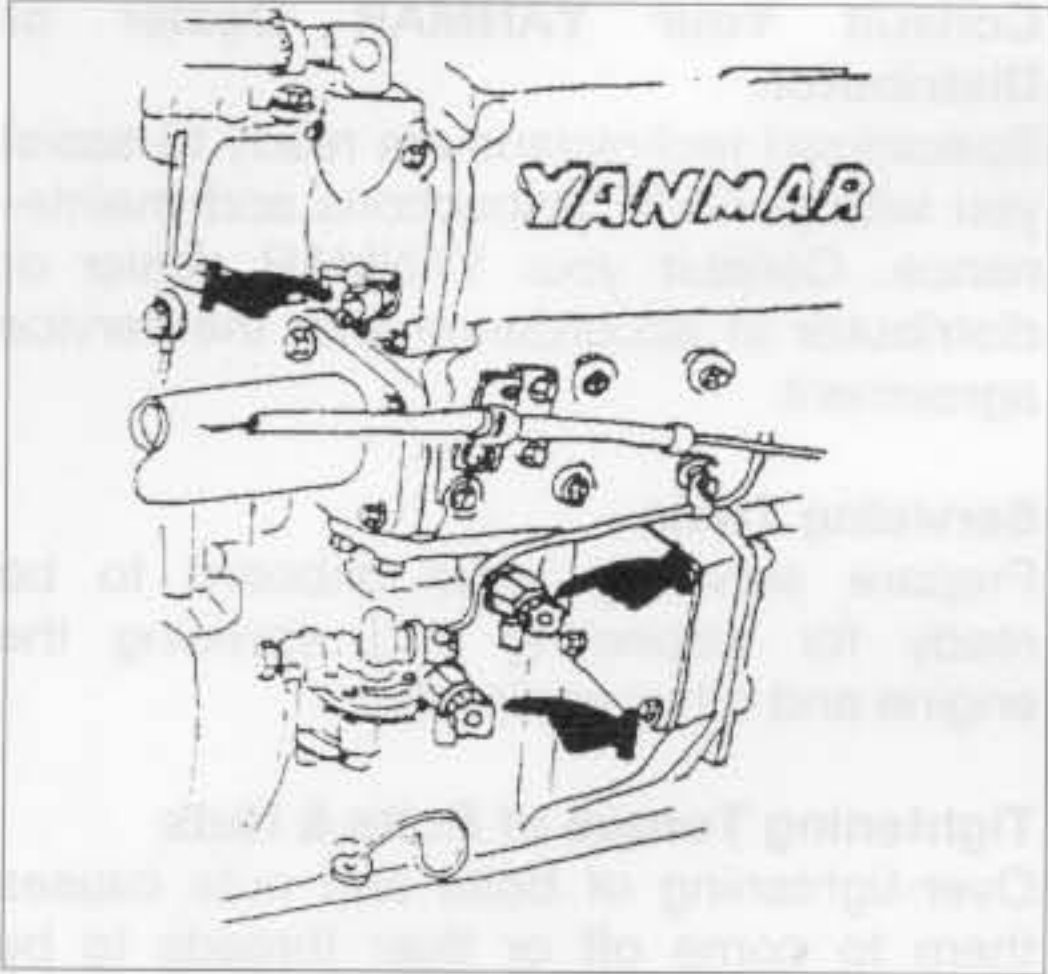
#### **CAUTION**

Drain water from the cooling system after the engine has cooled down. Be careful to avoid burns.

#### **NOTICE**

If water is left inside, it may freeze and damage parts of the cooling system (fresh water cooler, seawater pump, etc.)

### 3. Operation



● Cooling water drain cocks

- 1. Open the water drain cocks (3 positions as illustrated) and drain the cooling water from inside.
- 2. Close the drain cocks after draining the water.

(3) Carry out the next periodic inspection before placing the engine in storage. Clean the outside of the engine wiping off any dust or oil.

(4) To prevent condensation inside the fuel tank, either drain off the fuel or fill the tank.

(5) Grease the exposed area and joints of the remote control cable and the bearings of the remote control handle.

(6) Cover the intake silencer, exhaust pipe, etc. with vinyl sheets and seal them to prevent moisture from entering.

(7) Drain bilge in the hull bottom completely. Water may leak into the boat when it is moored, and whenever possible it should be landed.

(8) Waterproof the engine room to prevent rain and seawater from entering.

(9) During long term storage, charge the battery once a month to compensate for the battery's self-discharge.

GB

### NOTICE

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

| Tightening torque Nm | 1/2"   | 5/8"   | 3/4"   | M10x1.5 | M12x1.5 | M14x1.5  | Bolt dia. x pitch mm |
|----------------------|--------|--------|--------|---------|---------|----------|----------------------|
| 20 ± 2               | 25 ± 3 | 35 ± 5 | 50 ± 8 | 60 ± 10 | 80 ± 12 | 100 ± 15 |                      |



# 4. Maintenance & Inspection

## 4.2 List of Periodic Inspection Items

Daily and periodic inspections 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 should 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 as a general standard only. Section 4.3 gives a detailed explanation of which parts must be inspected and the procedure for doing so for each interval.

NOTICE

Schedule your own periodic inspection plan according to the operational conditions of your engine and inspect every item. Neglect of periodic inspection may lead to engine troubles and shorten the life of the engine. Inspection and servicing at 600 hours and thereafter require special knowledge and techniques. Consult your Yanmar dealer or distributor.

GB

# 4. Maintenance & Inspection

○: Check      ●: Replace      ●: Consult local dealer

| System             | Item                                                         |             | Before starting       | After 50 hrs or one month | Every 150 hrs | Every 300 hrs | Every 600 hrs (1 year) |
|--------------------|--------------------------------------------------------------|-------------|-----------------------|---------------------------|---------------|---------------|------------------------|
| Fuel system*       | Check the fuel level, and refill                             |             | ○                     |                           |               |               |                        |
|                    | Drain the fuel tank                                          |             |                       | ○ (first)                 |               | ○             |                        |
|                    | Drain the fuel filter                                        |             |                       | ○                         |               |               |                        |
|                    | Replace the fuel filter                                      |             |                       |                           |               | ●             |                        |
|                    | Check the injection timing                                   |             |                       |                           |               |               | ●                      |
|                    | Check the injection spray condition                          |             |                       |                           |               |               | ●                      |
| Lubricating system | Check the lube oil level                                     | Crankcase   | ○                     |                           |               |               |                        |
|                    |                                                              | Marine gear | ○                     |                           |               |               |                        |
|                    | Replace the lube oil                                         | Crankcase   |                       | ● (first)                 | ●             |               |                        |
|                    |                                                              | Marine gear |                       | ● (first)                 | ●             |               |                        |
|                    | Check the oil pressure warning lamp function                 |             | ○                     |                           |               |               |                        |
|                    | Replace the lube oil filter                                  |             |                       | ● (first)                 |               | ●             |                        |
| Cooling system     | Seawater outlet                                              |             | ○<br>During operation |                           |               |               |                        |
|                    | Check cooling water level                                    |             | ○                     |                           |               |               |                        |
|                    | Adjust the tension of cooling water pump driving belt        |             |                       | ○ (first)                 |               | ○             |                        |
|                    | Check the impeller of the cooling water pump (seawater pump) |             |                       |                           |               |               | ○                      |
|                    |                                                              |             |                       |                           |               |               |                        |











# 4. Maintenance & Inspection

## b) 3GM30 (F) series

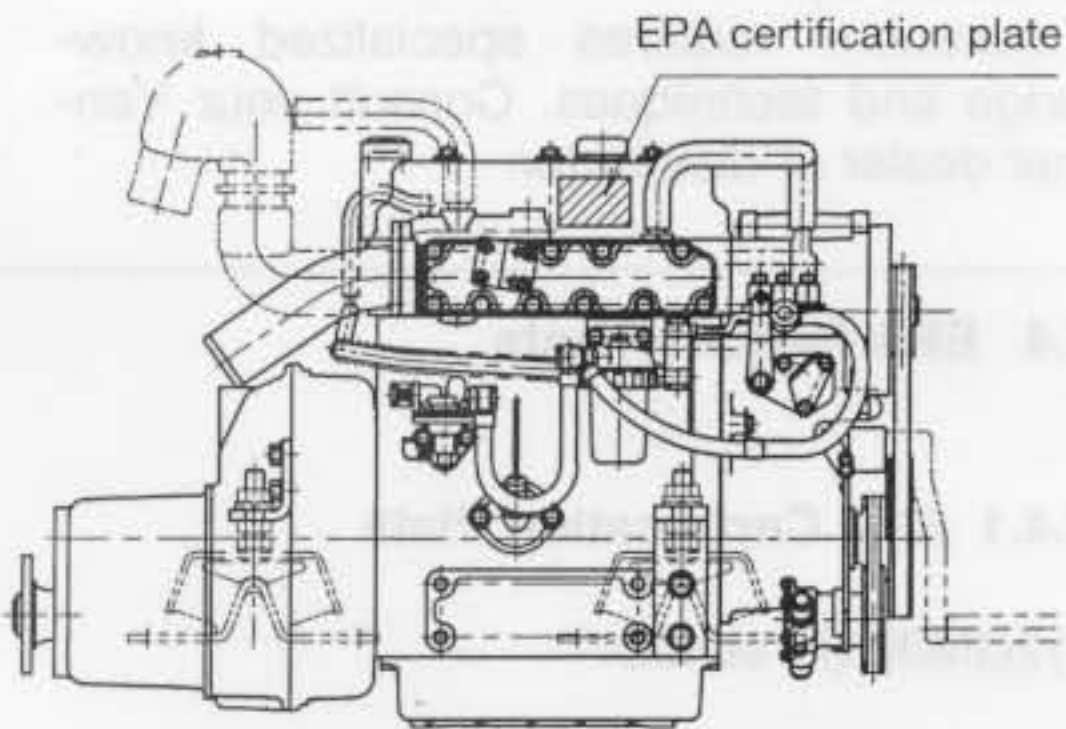
This engine has the following EPA Certification Plate attached:

- EPA Certification Plate

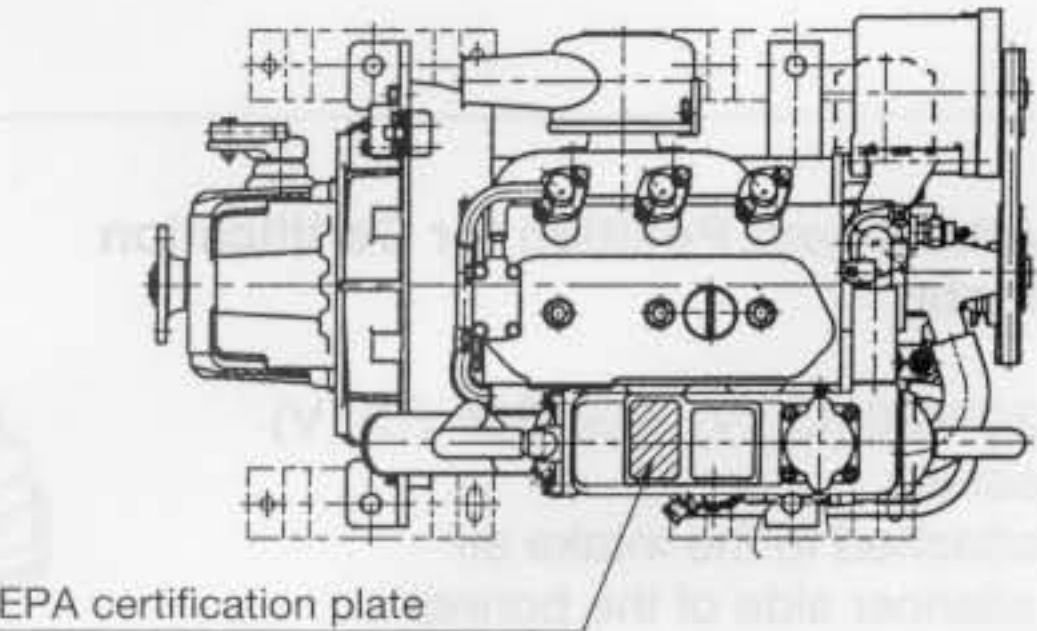
| IMPORTANT ENGINE INFORMATION                                                                                                                                                     |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| THIS ENGINE CONFORMS TO <input type="checkbox"/> G <input type="checkbox"/> MODEL YEAR U. S. EPA REGULATIONS NONROAD COMPRESSION IGNITION ENGINES.                               |  |
| THIS ENGINE IS CERTIFIED TO OPERATE ON 'US-20' FUEL                                                                                                                              |  |
| ENGINE FAMILY : <input type="checkbox"/> A <input type="checkbox"/> DISPLACEMENT : <input type="checkbox"/> B <input type="checkbox"/> LITRES                                    |  |
| ENGINE MODEL : <input type="checkbox"/> C <input type="checkbox"/> EMISSION CONTROL SYSTEM : FM                                                                                  |  |
| FUEL RATE : <input type="checkbox"/> D <input type="checkbox"/> MM <sup>3</sup> /STROKE @ <input type="checkbox"/> E <input type="checkbox"/> KW/EE <input type="checkbox"/> RPM |  |
| REFER OWNER'S MANUAL FOR MAINTENANCE SPECIFICATIONS AND ADJUSTMENTS                                                                                                              |  |
| YANMAR DIESEL ENGINE Co., Ltd.                                                                |  |

- Attachment Position for Certification Plate

3GM30(C)(V): attached to the exhaust side of the bonnet



3GM30F(C)(V): attached to the top of the fresh water cooler







# 5. Trouble and Troubleshooting

| Trouble                                          | Probable Cause                                                                                                                                                                                                                                                                              | Measure                                                                                              | Reference            |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------|
| Alarm Buzzer and Alarm Lamps On During Operation | <div>NOTICE</div> Shift to low speed operation immediately, and check which lamp has come on. Stop the engine for inspection. If no abnormality is identified and there is no problem with operation, return to port at your lowest speed and request repairs.                              |                                                                                                      |                      |
| Eng.Lube Oil Press. Warning Lamp goes on         | Engine Lube Oil insufficient;<br>Fuel filter clogged.                                                                                                                                                                                                                                       | Check Lube Oil level.<br>Replenish or replace.                                                       | 3.2.2<br>4.3.1(1)    |
| *Water proof warning lamp goes on                | Breakage of seal mount on the sail drive.                                                                                                                                                                                                                                                   | Check and change the rubber mount.                                                                   |                      |
| C.W.Temp.(Fresh Water) warning lamp goes on      | Insufficient water in fresh water cooler.<br>Insufficient seawater causing temp. to rise.<br>Contamination inside cooling system.                                                                                                                                                           | Check cooling water and replenish.<br>Check seawater system.<br>Ask for repairs.                     | 3.2.4                |
| Faulty Warning Devices                           | <div>NOTICE</div> Do not operate the engine if alarm devices are not repaired.<br>Serious accidents may result if difficulties are not spotted due to faulty alarm lamps.<br>When switch is turned ON:<br>Alarm buzzer does not sound. Circuit broken or buzzer defective. Ask for repairs. |                                                                                                      |                      |
| Warning lamps do not go on                       | Eng. Lube Oil Press.<br>Seawater.<br>No current available.<br>Circuit broken or lamp burnt out.                                                                                                                                                                                             | Ask for repairs.                                                                                     |                      |
| One of the warning lamps does not go out         | Sensor switches faulty.                                                                                                                                                                                                                                                                     | Ask for repairs.                                                                                     |                      |
| Charge lamp does not go out during operation     | V-belt is loose or broken.<br>Battery defective.<br>Alternator power generator failure.                                                                                                                                                                                                     | Replace V-belt; adjust tension.<br>Check fluid level, specific gravity; replace.<br>Ask for repairs. | 4.3.4(3)<br>4.3.2(4) |

\*Note: Other warning lamps do not go on when the switch is turned on. They only go on when there is an abnormality.







































