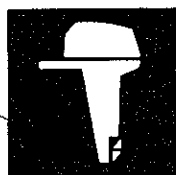


# YAMAHA

OWNER'S MANUAL



outboard  
motor

F9.9BM/F9.9BE



**CAUTION:**

**THE ENGINE OIL SUMP IS EMPTY.  
BEFORE OPERATING THE ENGINE,  
BE SURE TO FILL THE SUMP  
WITH OIL.**

**RECOMMENDED OIL**

<b>SAE</b>	<b>API</b>
<b>10W — 30</b>	<b>SE, SF</b>
<b>10W — 40</b>	<b>SE — SF</b>
<b>20W — 40</b>	<b>SE — SF — CC</b>

- \* Avoid using the SAE 20W-40 type when temperature is below 20°C (68°F)
- \* Do not use oil whose grade is indicated by CD designated in API Service Classifications

A 510\*

**F9.9BM/F9.9BE OWNER'S MANUAL**

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**1st Edition, August 1985**

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**Printed in Japan**

## TO THE OWNER

Thank you for choosing a Yamaha outboard motor. This manual contains the information required for proper maintenance, care and operation. A thorough understanding of these simple instructions will help you to obtain maximum enjoyment from your new Yamaha.

### IMPORTANT

**Before operating this outboard motor, read this Owner's Manual thoroughly and carefully. It will give you a good grasp of the engine's characteristics and the technical information required for safe operation.**

Particularly important information is distinguished in this manual by the following notations:

### NOTE

A NOTE provides key information to make procedures easier or clearer.

### CAUTION

A CAUTION indicates special procedures that must be followed to avoid damage to the outboard motor.

### WARNING

A WARNING indicates special procedures that must be followed to avoid personal injury or damage to the unit.

- \* Specifications given in this manual are subject to change without prior notice.

Yamaha Motor Co., Ltd.

## SAFETY WARNING

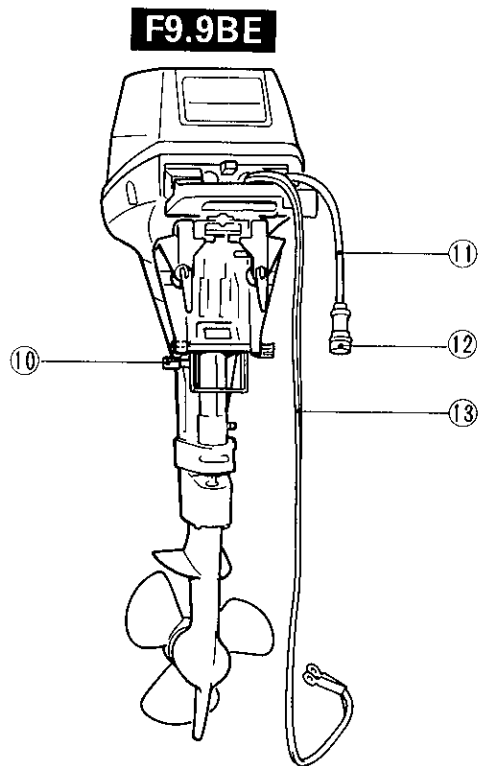
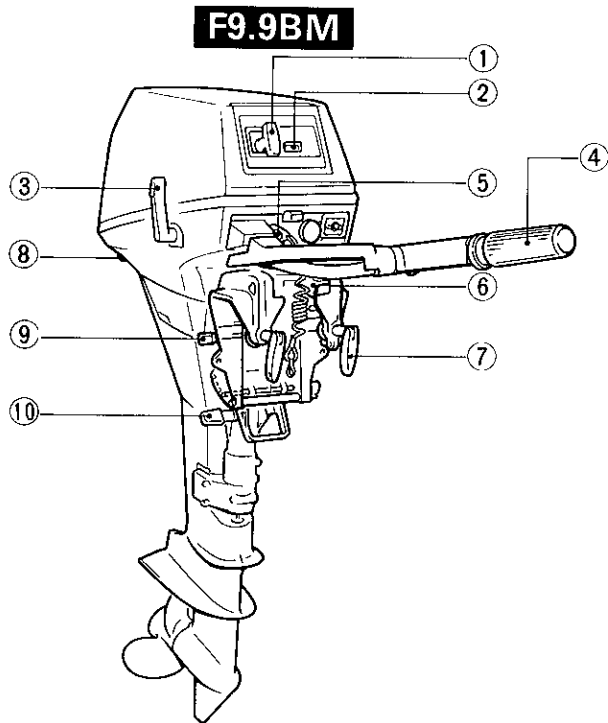
- 1 Before operating this outboard motor, familiarize yourself with the regulations set forth by your state in relation to outboard motor operation.
- 2 Gasoline is highly flammable and explosive. Handle it with special care.
- 3 Never attempt to modify this outboard motor.
- 4 Be sure to wear life jackets on board.
- 5 Exercise special care to protect the environment.

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## GENERAL INFORMATION

### Location of Main Components



① Recoil starter handle

⑥ Tilt lock lever

⑪ Wire harness

② Oil pressure indicator lamp

⑦ Transom clamp handle

⑫ Coupler

③ Shift lever

⑧ Pilot holes

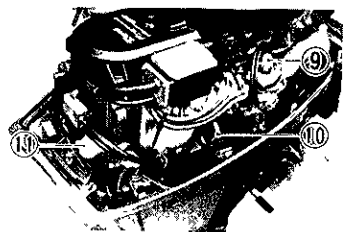
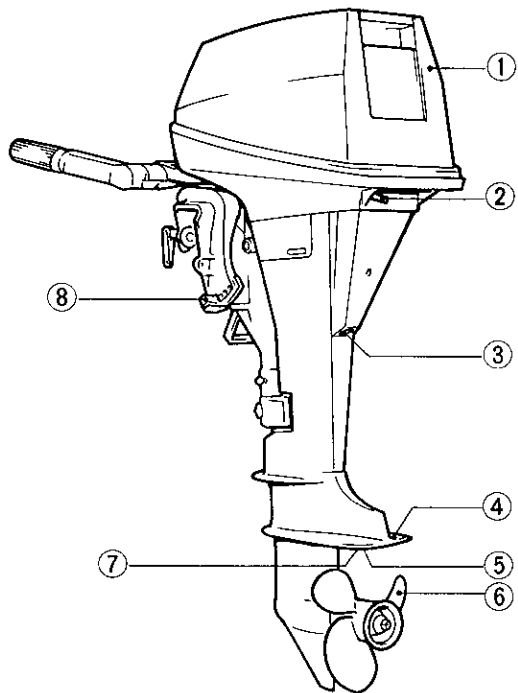
⑬ Battery lead

④ Throttle control/Steering handle

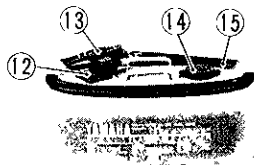
⑨ Tilt support lever

⑤ Emergency stop switch

⑩ Shallow water lever

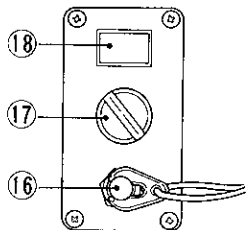


Fuel tank

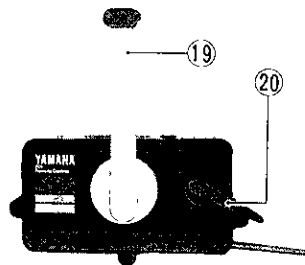


F9.9BE

Switch panel

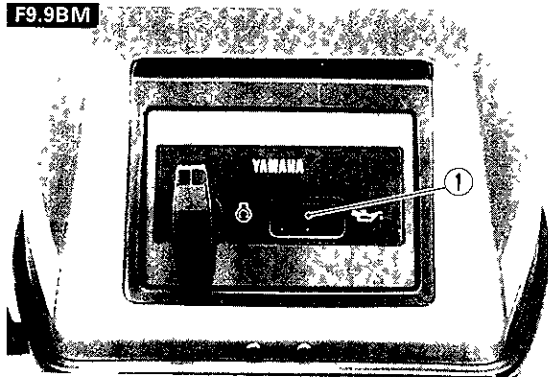


Remote control box





- ① Top cowling
- ② Cowling lock lever
- ③ Engine oil drain bolt
- ④ Anti-cavitation plate
- ⑤ Anode
- ⑥ Propeller
- ⑦ Cooling water inlet
- ⑧ Trim angle adjusting rod
- ⑨ Auto starter carb emergency knob
- ⑩ Oil dipstick
- ⑪ Oil filler cap
- ⑫ Fuel meter
- ⑬ Primer bulb
- ⑭ Fuel tank cap
- ⑮ Fuel line
- ⑯ Emergency stop switch
- ⑰ Main switch
- ⑱ Oil pressure indicator lamp
- ⑲ Remote control lever
- ⑳ Neutral throttle lever

**F9.9BM**

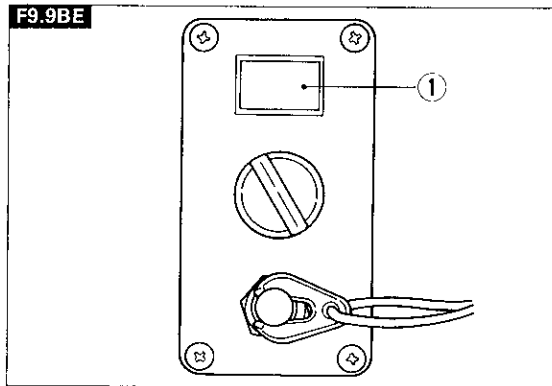
## Control Functions

### Oil pressure warning system

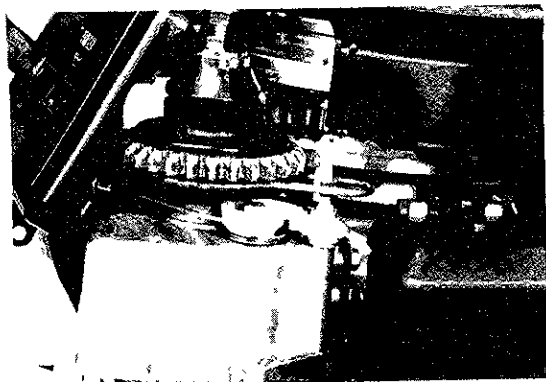
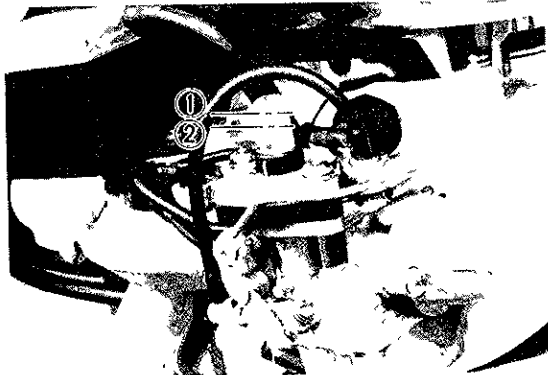
When the engine is started, oil is supplied from the oil pump to the various engine components. This causes the oil pressure indicator lamp on the front panel or the switch panel to light to show that oil pressure is normal. When the oil level becomes low, oil pressure drops and the indicator lamp goes off. At the same time, engine speed slows to and remains at about 2,000 rpm.

#### **CAUTION\***

If the oil pressure indicator lamp does not come on after the engine is started, stop the engine and check the oil level. If the oil level is correct, consult a Yamaha dealer.

**F9.9BE**

① Oil pressure indicator lamp



#### **Auto starter carb system**

To start the engine, a rich mixture is required. This is supplied to the cylinder automatically by the auto starter carb system to make quick, easy starting possible without choke operation.

#### **CAUTION:** - -

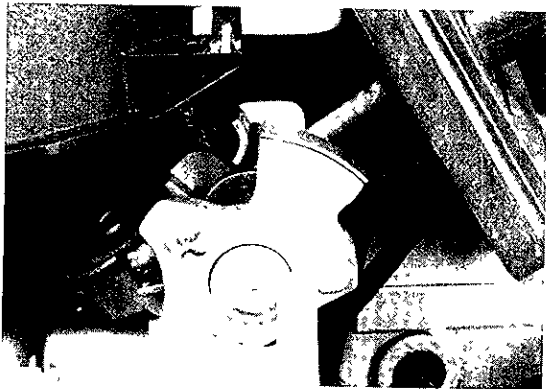
This system determines that a rich mixture is required by sensing the cylinder wall temperature. Avoid operating the engine with the thermostat removed as this causes a rich mixture to be supplied continuously. Engine trouble will result.

Emergency knob position

- ① When the engine is cold
- ② When the engine is warm

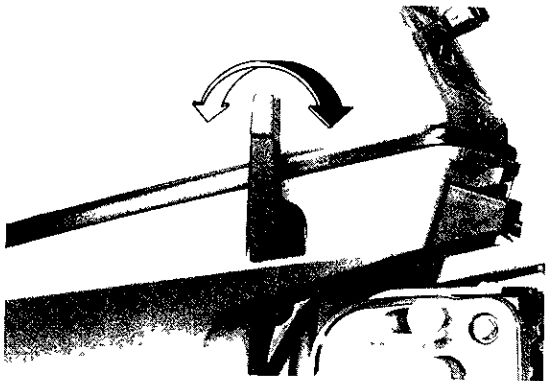
#### **Start-in-gear protection system**

This system permits the engine to start only when the gears are in neutral. Be sure to shift into neutral when starting.



### **Neutral throttle opening control system**

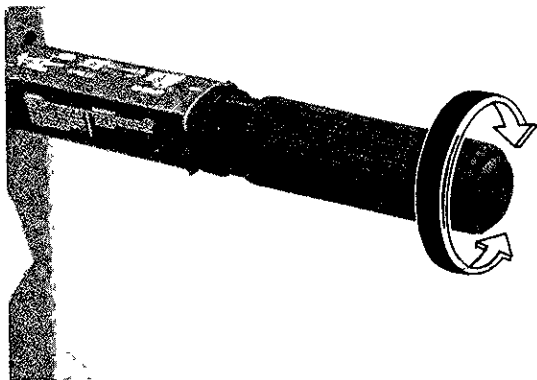
The neutral throttle opening control system protects the engine by preventing the engine speed from rising abnormally when the engine is started. It does this by controlling the throttle opening when the transmission is in neutral.



### **F9.9BM**

#### **Shift lever**

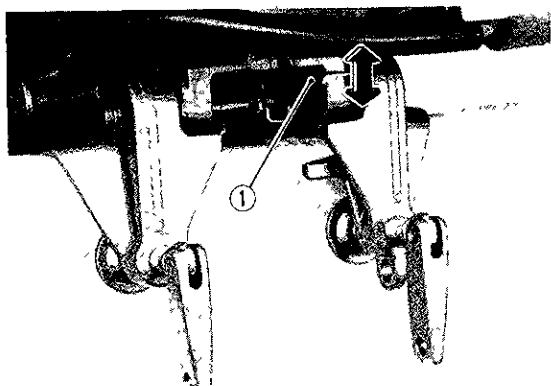
Turning the shift lever toward you engages the clutch with the forward gear so the boat moves ahead. Turning it in the opposite direction engages the reverse gear to move the boat backward.



#### **F9.9BM**

#### **Throttle control/Steering handle**

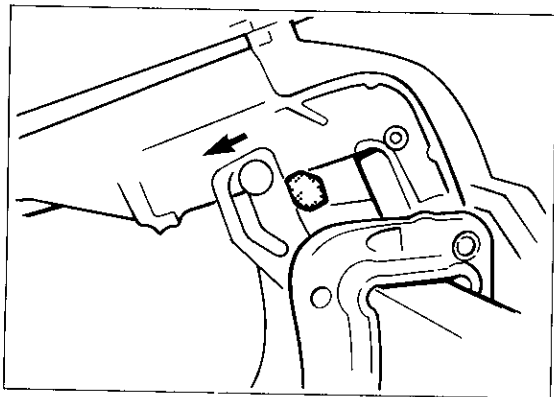
Turning this grip adjusts the throttle opening and moving it sideways adjusts the steering angle



#### **Tilt lock mechanism**

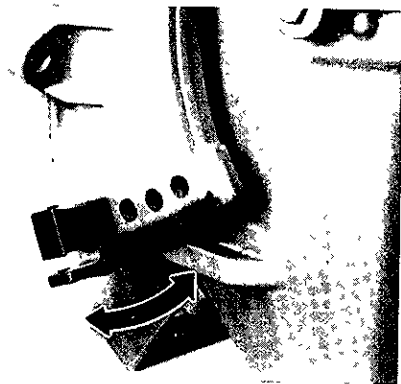
The tilt lock mechanism is designed to prevent reverse thrust from lifting the outboard when the boat is moved backward. To operate, set the tilt lock lever to the up position. To release, push the lever down. A strong shock to the gear case will release this mechanism even when locked.

① Tilt lock lever



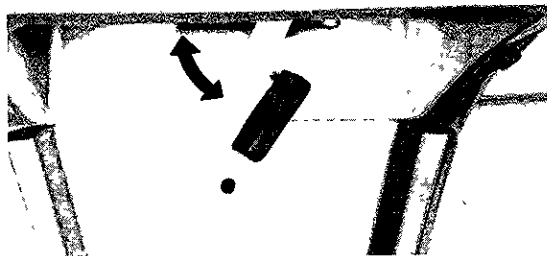
#### **Tilt support lever**

To keep the outboard tilted up, lock the tilt support lever to the swivel bracket



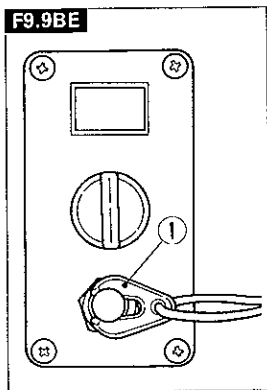
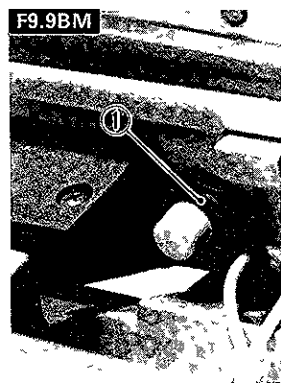
#### **Trim angle adjusting rod**

The trim angle can be adjusted by changing the position of the trim angle adjusting rod. The rod locks by a tab. To move the rod, unlock the tab first so the rod can be pulled out.



### Cowling lock lever

The top cowling can be removed and reinstalled by operating the cowling lock lever. Pushing the lever down unlocks the top cowling for removal. After reinstalling the cowling, lock it with the lever.



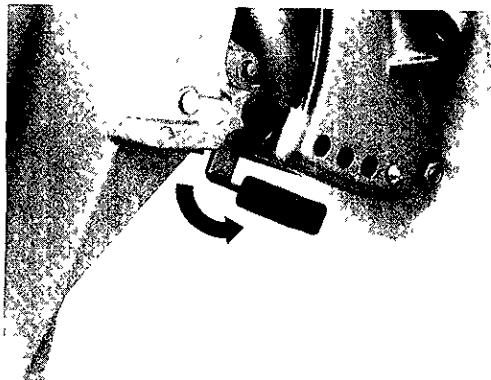
### Emergency stop switch

The emergency stop switch is provided for the safety of the operator. When the lock plate is pulled out from the emergency stop switch, the ignition circuit opens and stops the engine immediately. Should the operator fall off the boat or lean too far over one side, the lock plate will be pulled out by the rope attached to the operator's wrist, thus causing the engine to stop.

#### NOTE

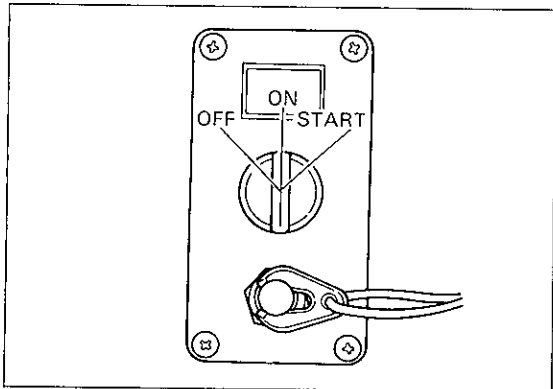
The engine will not start when the lock plate is removed.

① Lock plate



### Shallow water lever

This lever is used to turn up the outboard motor in shallows



### F9.9BE

#### Main switch

The main switch controls the ignition system, its operation is described below

#### OFF (⊖)

Electrical circuits switched off (The key can be removed)

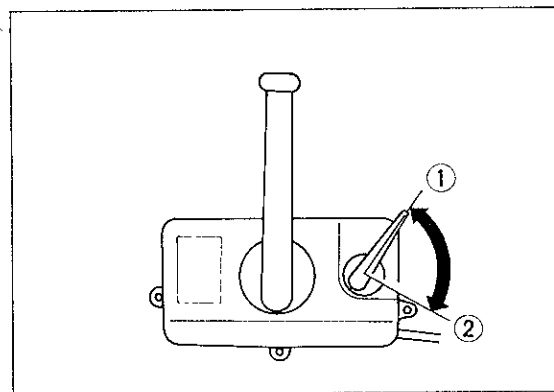
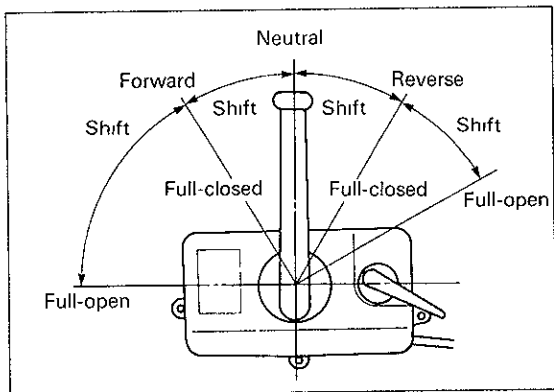
#### ON (|)

Electrical circuits switched on (The key cannot be removed)

#### START (⊕)

Starter-motor will turn and start engine (When the key is released, it returns automatically to 'ON')





## F9.9BE

### Remote control box

This feature enables both the clutch and the throttle to be actuated by the remote control lever

#### Remote control lever

To engage Forward or Reverse gear from Neutral gear position, turn the remote control lever forward or backward through approximately 32 degrees (the detent position), where upon the boat will commence to move forward or backward

Turning the lever further downward opens the throttle

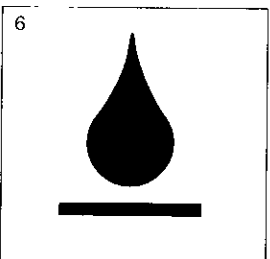
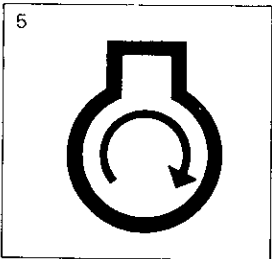
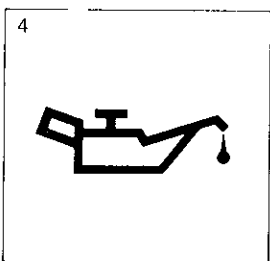
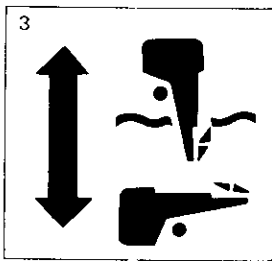
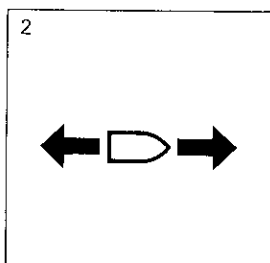
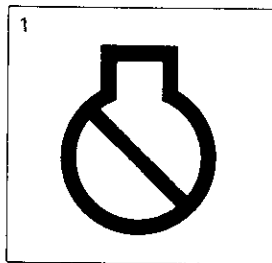
#### Neutral throttle lever

To open the throttle without shifting into either driving gear, place the control lever in the Neutral position and turn the neutral throttle lever upward

### CAUTION:

The neutral throttle lever can only be operated when the remote control lever is in the Neutral position. The remote control lever can only be operated when the neutral throttle lever is in the closed position.

- ① Full-open
- ② Full-closed



### Symbols

1 Position of throttle control device for stopping motor

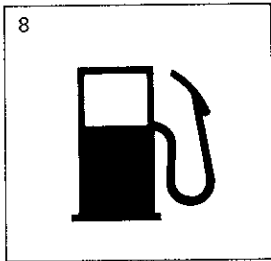
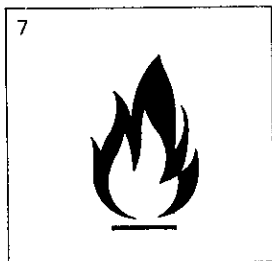
2 Gear shift control for forward-neutral-reverse

3 Outboard motor tilt movement

4 Point to be lubricated with oil

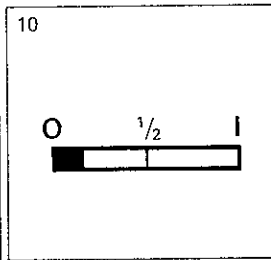
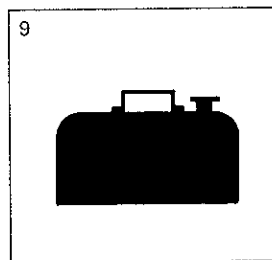
5 Operating device for starting motor

6 Fluid level



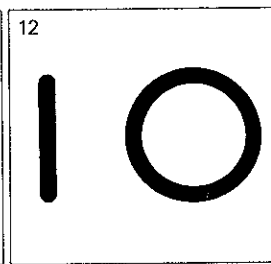
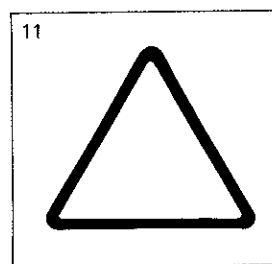
7 Warning against fire hazard

8 Engine fuel



9 Portable fuel tank

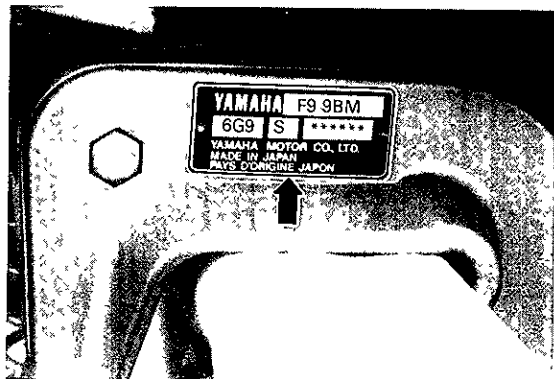
10 Amount of fuel in tank (empty-half full-full)



11 A serious risk is present

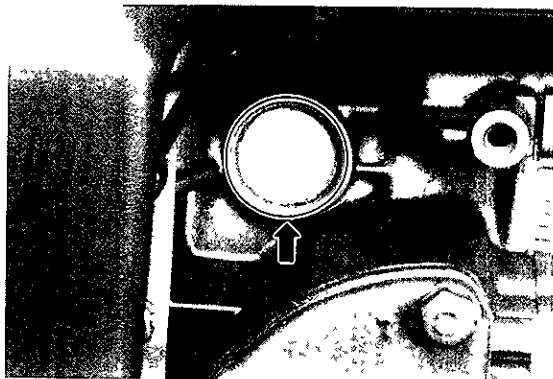
Read and follow the instructions before operating

12 Electrical switch functions-ON, OFF



### Serial Numbers

The outboard motor serial number is stamped on the plate attached to the port side of the clamp bracket



The engine serial number is stamped on the port side of the cylinder body

### NOTE

Both the outboard motor and engine serial numbers are important when you want to have service performed or place an order for parts. Please take note of the numbers.

### **Coating of the Boat Bottom**

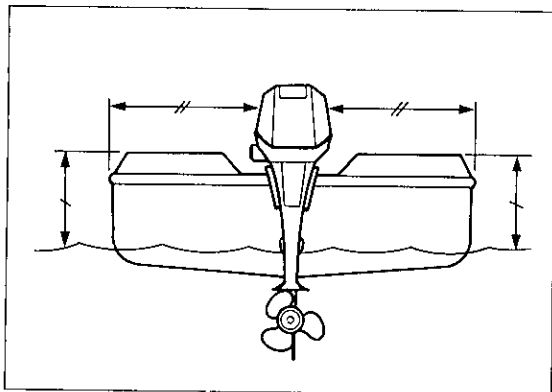
Avoid coating the boat bottom with anti-fouling paint containing copper. Such anti-fouling paint will corrode the engine faster.

### **Replacement Parts**

Whenever the replacement of parts is necessary, be sure to use genuine Yamaha parts or equivalents of the same type and of equal strength and material. Any inferior quality part can malfunction and the resulting loss of control may endanger the operator and passengers.

### **Operation in Salt Water**

After operating in salt water, wash out the cooling water passages with fresh water. Otherwise, the cooling water passages may clog up with salt deposits.



## RIGGING

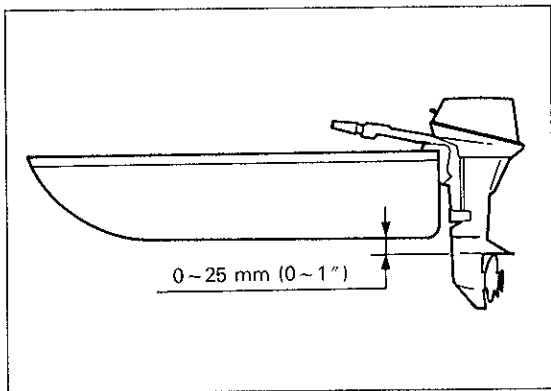
### Outboard Motor Mounting

**WARNING:**

Never equip a boat with an outboard motor whose power exceeds the maximum rating shown on the capacity plate. Over-powering the boat may cause severe instability. If the boat has no capacity plate, consult your Yamaha dealer or the boat manufacturer.

### Mounting position

The outboard motor must be mounted on the boat center line (keel line), and the boat itself must be well balanced. Otherwise, the boat will be very hard to steer. For boats without keel or which are asymmetrical, consult your Yamaha dealer.

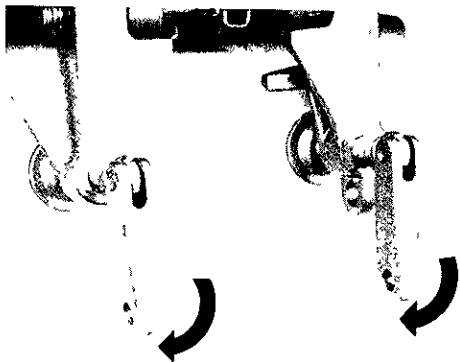


### Mounting height

To run your boat with maximum efficiency, water resistance to the boat hull and outboard motor must be minimized. The mounting height of the outboard motor greatly affects water resistance. If the mounting height is high, cavitation tends to occur, thus reducing propulsion by the engine. If the propeller tips are too high, they cut the air and engine speed rises abnormally causing the engine to overheat. If the mounting height is too low, splash resistance will increase and thereby reduce engine efficiency. The engine should be mounted so that the anti-cavitation plate is between the bottom of the boat and a level 25 mm (1") below it.

#### **WARNING:**

The mounting height varies depending on the purpose of the boat and the outboard motor. Determine the proper height by making test runs.

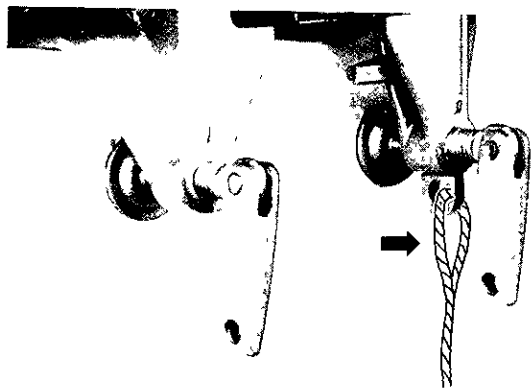


### Clamp

Place the outboard on the transom so that it is positioned as close to the center as possible. Tighten the clamp screws evenly and securely. Occasionally check the screws for tightness during operation.

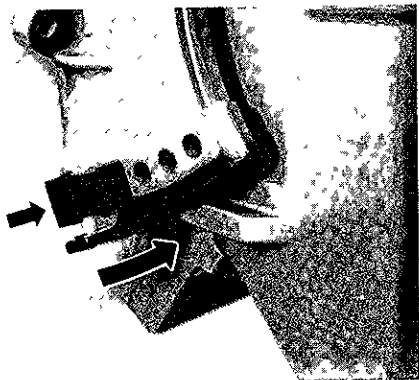
### **WARNING:**

Be sure to tighten the transom clamp screws securely. Check the tightness of the screws while the motor is in operation because they can work loose due to engine vibration. Loose clamp screws may allow the motor to fall off into the water or cause serious injury.



When the boat makes a sharp turn with loose clamp screws, the motor may fall off into the water. The use of a safety chain or cable is recommended. Attach one end to the safety attachment (beside clamp screw) and the other to a secure mounting point on the boat.





### Trim angle

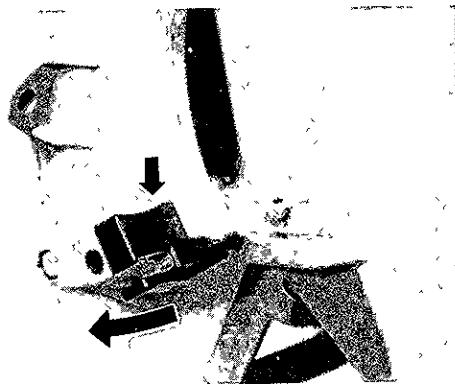
To ensure steering stability and good performance, always maintain the correct trim angle. The appropriate trim angle varies depending on the combination of boat, engine and propeller as well as on operating conditions. It is, however, safe to say that the boat is in a stable trim when the trim is  $3^{\circ}$  to  $5^{\circ}$  by stern.

If the trim angle is too pronounced, the buoyancy center of the boat will shift toward the stern. If this happens and the stability moment at the bow is great, the boat will tend to "porpoise," possibly causing the operator and passengers to be thrown overboard. If the trim angle is insufficient, the bow will "plow," thus making the boat unstable.

To adjust the trim angle, remove the adjusting rod from the stern bracket assembly and, tilt the motor to reposition the rod in the desired hole.

### **WARNING:**

When mounting the outboard motor on a boat, be sure to make a test run and set the proper trim angle.

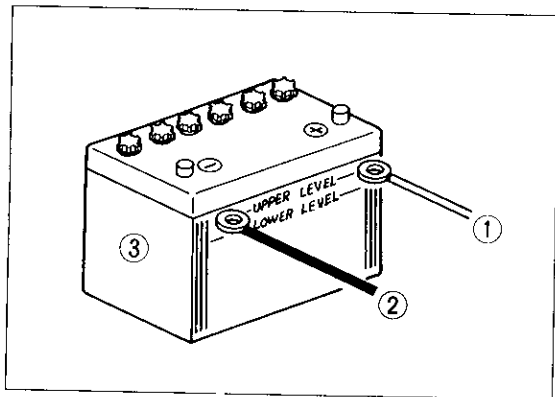


### NOTE.

When operating against a strong wind, it is advisable to reduce the trim angle slightly for greater steering stability. If the wind is favorable, the trim angle should be increased for better steering stability.

### NOTE

To lower the bow, move the rod towards the mounting plate. To raise the bow, move the rod towards the engine.



### F9.9BE

#### Battery Mounting

#### **WARNING:** -

Before connecting or disconnecting the battery leads, turn off the main switch and remove the switch key to avoid risks of electric shock fire of explosion

The battery should be securely mounted in a dry, vibration-free location in the boat. The battery should be a 12V, 144KC (40AH)

To wire the battery, connect the red lead to the positive terminal of the battery and the black lead to the negative terminal

- ① Red lead
- ② Black lead
- ③ Battery

When removing or installing the battery, proceed as follows

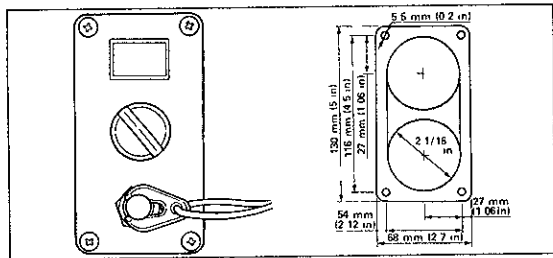
Removal	Disconnect the negative terminal side (black lead) first
Installation	Connect the positive terminal side (red lead) first

#### **CAUTION:**

- 1 If leads are incorrectly connected, starting failures may result
- 2 If the battery connections are reversed, the rectifier will be damaged

#### **WARNING:**

The battery fluid (electrolyte) is corrosive. If it gets in your eyes or on your skin, immediately wash the area with water and see your doctor. If the fluid spills on or around the engine, thoroughly wash it away. When the battery is being charged, explosive hydrogen gas is produced. The battery should therefore be charged in a well-ventilated area.



## F9.9BE

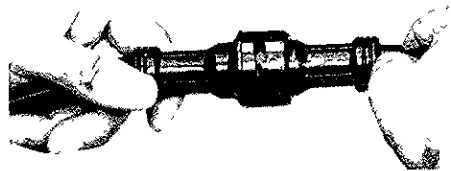
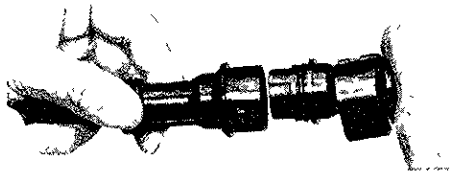
### Switch Panel Mounting

#### **WARNING:**

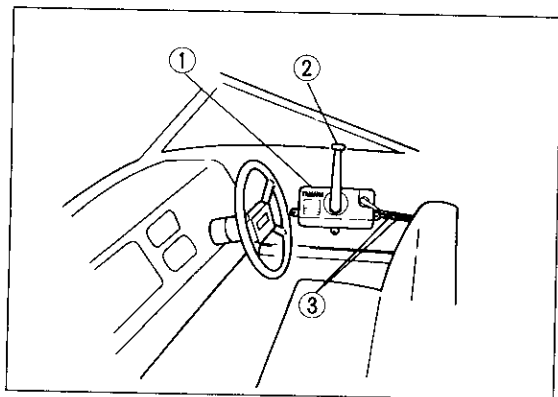
Disconnect the battery leads before installing or disconnecting electrical components

#### **CAUTION:**

Install the switch panel on the dashboard at a location allowing easy access from the helmsman's seat. If the boat has no dashboard, install the switch panel at an accessible location protected from water spray.



- 1) Cut a hole in the instrument panel as indicated in this mounting diagram. Using a 2-1/16-inch hole saw, make holes and then cut out the center portion as shown.
- 2) Connect the wire harness to the switch panel assembly, and pass it back through the hole.
- 3) Secure the switch panel assembly to the instrument panel with the bind screws, washers and nuts.
- 4) Connect the wire harness to the coupler, aligning the marks on the coupler, and lock the connection with the wire harness lock.



### F9.9BE

#### Remote Control Mounting

#### **WARNING:**

Incorrect selection or installation of a remote control could result in sudden and unexpected loss of control leading to accident or personal injury. Get advice from your Yamaha dealer.

For installation of the steering system, see your Yamaha dealer. It is advisable to ask your Yamaha dealer to install the remote control box and cables.

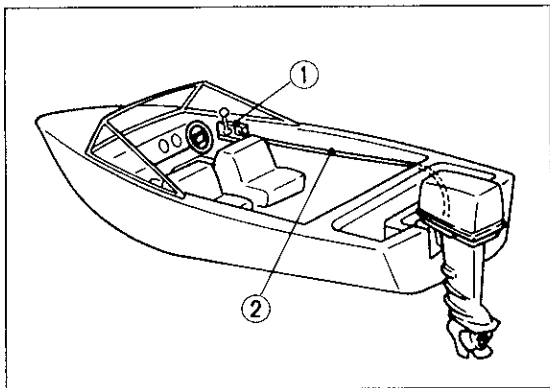
#### Positioning the remote control box

#### **NOTE**

The remote control box described in this Owner's Manual is designed for starboard-side steering-wheels.

Position the remote control box so as not to obstruct operation of the remote control lever, and ensuring that the route for the remote control cables is unobstructed.

- ① Remote control box
- ② Remote control lever
- ③ Remote control cable



### Remote control cables

Position the remote control cables, and check they are of adequate length, and that when installed and connected they will not get tangled, strained or kinked when the steering wheel is turned

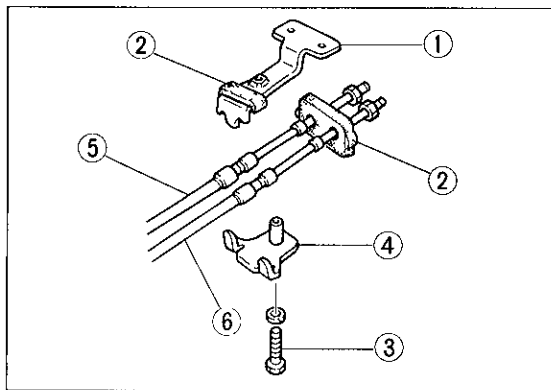
#### **WARNING:**

Do not cause any sharp bends or kinks in the remote control cables. Check that the cables are not formed into a loop of diameter smaller than 400 mm (16 in)

- ① Remote control box
- ② Remote control cable

#### NOTE

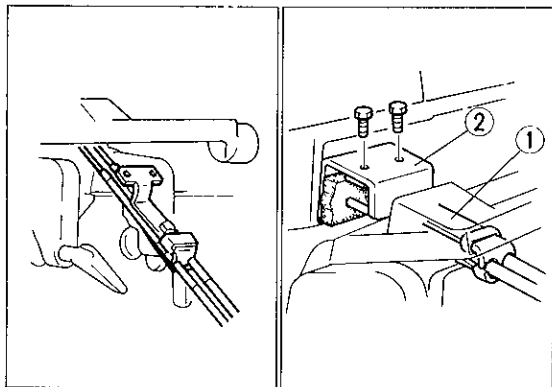
- 1 Connect the remote control cables, first to the remote control box and then to the engine
- 2 For information on the handling of the remote control box and connection of cables, refer to the remote control box operation manual contained in the packing



#### Installing remote control cables (on the motor side)

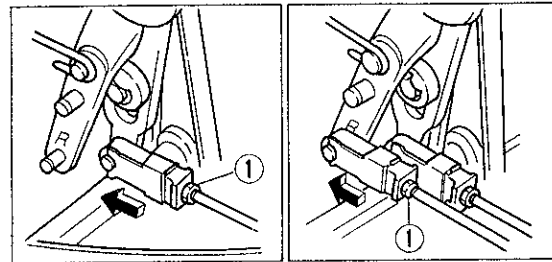
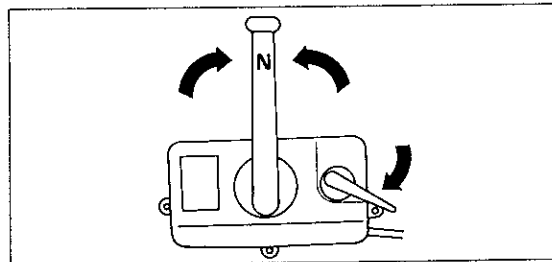
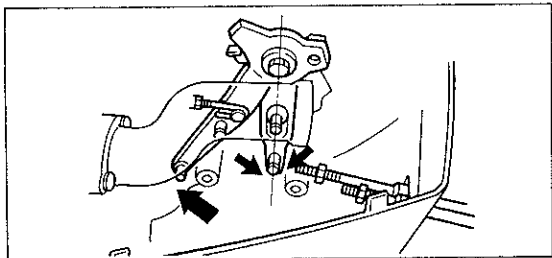
- 1) Remove the top cowling
- 2) Fit the each grommet into the fitting plate 1 and remote control cables
- 3) Fit the fitting plate 1 and 2 into the grooves around the cables

- |                   |                                     |
|-------------------|-------------------------------------|
| ① Fitting plate 1 | ④ Fitting plate 2                   |
| ② Grommet         | ⑤ Remote control cable for throttle |
| ③ Bolt            | ⑥ Remote control cable for shift    |



- 4) Pass the remote control cables through the bottom cowling
- 5) Secure the fitting plate 1 onto the remote control bracket with the bolts

- |                          |
|--------------------------|
| ① Fitting plate 1        |
| ② Remote control bracket |



## Cable joint installation

### NOTE

The cable joints, both on the shift and on the throttle sides, should be connected to the cable joint set pins on the lower side. If they are connected to the upper set pins, the remote control will not operate normally.

- 1) Place the gear shift lever in neutral. Set the throttle control level in the fully-closed position.
- 2) Place the remote control lever in neutral. Set the neutral throttle lever in the fully-closed position.
- 3) Screw in the cable joint over the end of the remote control cable so that the cable joint hole aligns with cable joint set pin, and lock it with the lock nut.

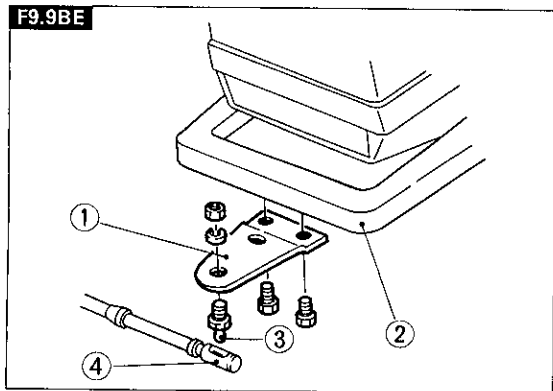
### CAUTION:

Screw the end of the remote control cable into the cable joint a minimum of 8 mm.

- 4) After installing the cable joints on the set pins on the shift and throttle cable sides, lock the cable joints to the set pins by sliding the plates.

① Lock nut

**F9.9BE**



**F9.9BE**

**Installing the Steering Attachment (Ball Post type)**  
Install the ball-joint to the steering hook with the nut and washer, then install the steering cable to the ball-joint

**NOTE**

For details, consult your Yamaha dealer

- ① Steering hook
- ② Steering bracket
- ③ Ball-joint
- ④ Steering cable



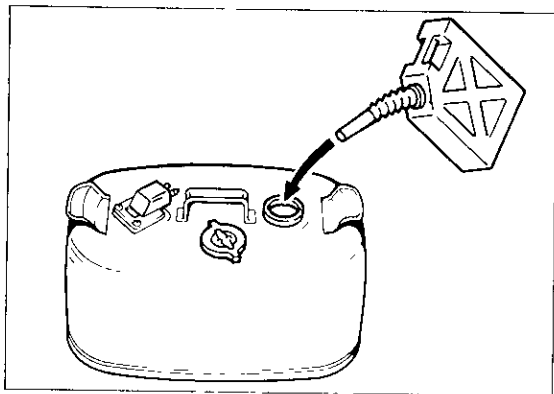
### Propeller Selection

The propeller is one of the most critical elements in the performance of an outboard. Selection of an incorrect propeller can adversely affect the performance and could seriously damage the motor.

Yamaha outboards are equipped with propellers that have been selected to perform well in a variety of applications. There may be uses, however, where a propeller with a different diameter or pitch would work better. For greater operating loads, a smaller-pitch propeller is best suited because it can maintain proper engine rpm. Likewise, a large-pitch propeller is suited for smaller operating loads. The engine speed changes greatly depending on the propeller size and boat load. If the engine speed is extremely low or high, it will adversely affect the engine. For this reason, Yamaha dealers stock a variety of propellers and can install a suitable propeller on your outboard. Consult your dealer when selecting a proper propeller for your particular application.

#### **WARNING:**

When removing or installing the propeller, shift into **NEUTRAL** and remove the spark plug caps. Otherwise, the engine may start suddenly, resulting in a serious injury or accident. It is good practice to insert a piece of wood between the anti-cavitation plate and the propeller to lock the propeller. This protects your hands from the propeller blades.



## FUEL AND ENGINE OIL

### Fuel

Use unleaded gasoline

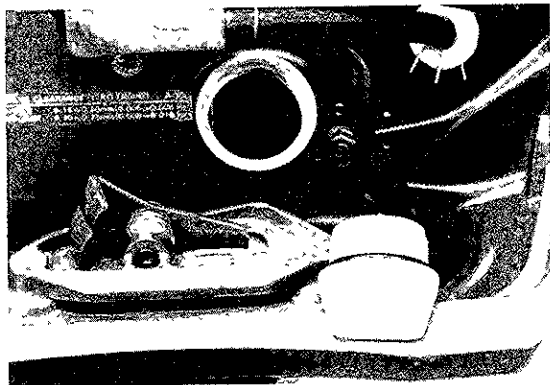
#### **WARNING:**

- 1 Gasoline is highly inflammable and explosive. When refueling, refrain from smoking and keep away from open flames or sparks.
- 2 When refueling, be sure to stop the engine. Also take care not to spill gasoline.
- 3 Be sure to wipe off any gasoline spilt on board immediately and thoroughly with dry rags.
- 4 Never fill the fuel tank to more than the specified level. Safe filling level is 3 mm (1/8 inch) below the bottom of filler neck.
- 5 After filling, tighten the tank filler cap securely.
- 6 Refueling must be done offboard in a well-ventilated area.

Fuel tank capacity 14 litres (3.7 US gal, 3.1 Imp gal)

#### **CAUTION:**

Always use new gasoline



## Engine Oil

### Recommended oil

SAE

10W — 30

10W — 40

20W — 40

API

SE, SF

SE — SF

SE — SF — CC

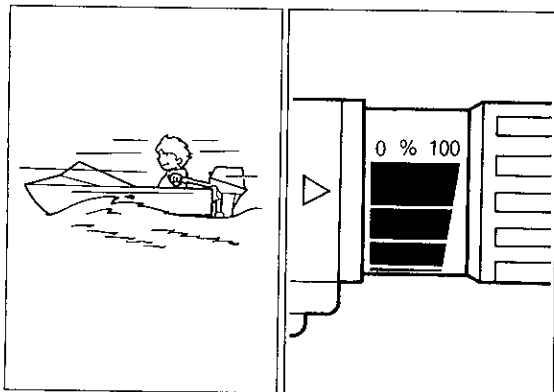
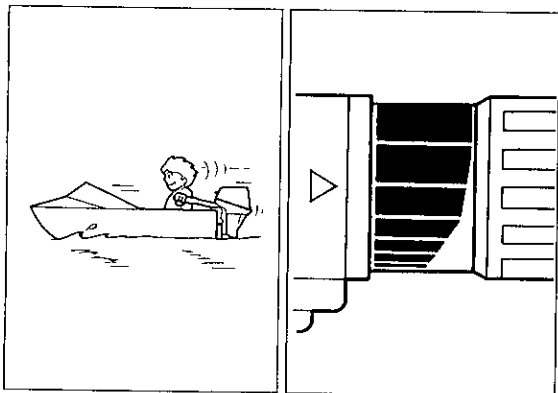
### CAUTION

- 1 Avoid using the SAE20W-40 type when temperature is below 20°C (68°F)
- 2 Do not use oil whose grade is indicated by CD designated in API Service Classifications

Oil sump capacity 1.0 litres (1.1 US qt, 0.9 Imp qt)

### NOTE

When filling with oil, place a dry cloth around the oil filler, slightly incline the outboard and feed oil slowly through a funnel



### Break-In Procedure

A period of break-in is required to allow the mating surfaces of all moving parts to wear evenly when new. This procedure will ensure proper performance and longer the engine life.

- 1) Break-in time 10 hours
- 2) Procedure
  - a Run the engine at 2,000 rpm or one-half (approximate) throttle for the one (1) hour
  - b Then, increase throttle to 3,000 rpm or three-quarter (approximate) throttle for one (1) hour

### NOTE

Run at full throttle for approximately one (1) out of every 10 minutes

- c For the next eight (8) hours, avoid continuous full throttle operation for more than five (5) minutes

### CAUTION: —

Failure to follow the break-in operation procedure may result in severe engine damage

## OPERATING INSTRUCTIONS

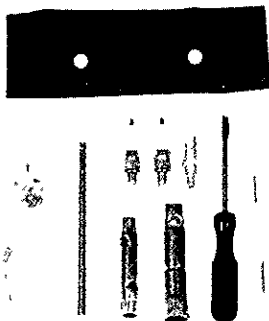
### Prior to Operation

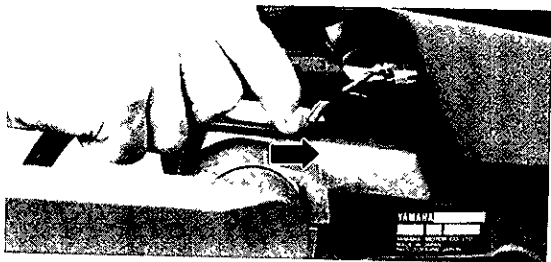
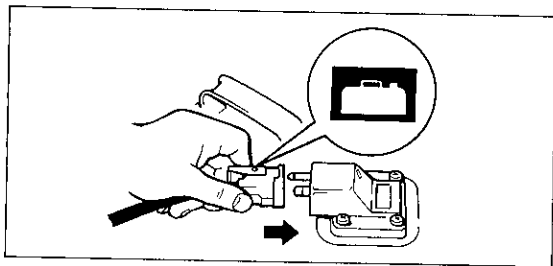
#### **WARNING:**

Before starting the engine, make sure the boat is tightly tied to the jetty and can be steered clear of any obstacles

#### **CAUTION:**

- 1 Do not start the engine out of water
- 2 Make sure that there is sufficient fuel in the fuel tank
3. Make sure that there is sufficient engine oil in the sump tank
- 4 The fuel tank should be placed on a flat area in the bottom of the boat
- 5 Check to see that the necessary service tools and spare parts are on the boat
- 6 The fuel line should be routed in such a way as to prevent any kinks or sharp bends and to allow full steering movement Do not allow fuel line to contact sharp objects or to become pinched





## Starting

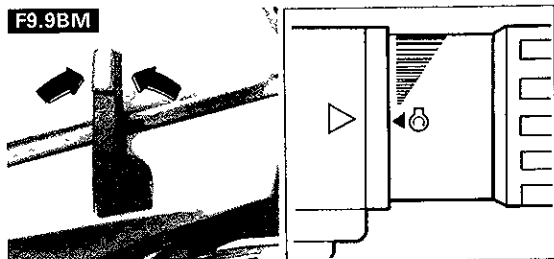
- 1) Firmly connect the fuel joint (marked fuel tank) to the fuel tank

### **WARNING:**

When inserting the fuel joint into the fuel tank, vaporized gasoline will squirt out of the air bleeding hole. Gasoline is highly flammable and explosive under certain conditions. Refrain from smoking and keep away from open flames or sparks when inserting the fuel joint.

- 2) Firmly connect the other joint to the motor

- 3) Squeeze the primer bulb until it becomes firm

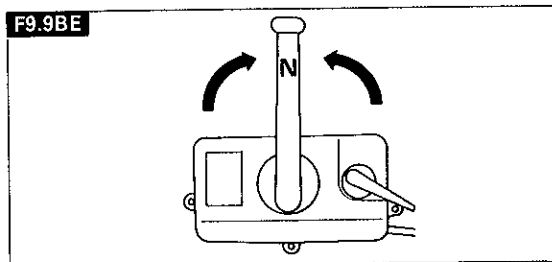
**F9.9BM****F9.9BM**

4-1) Place the shift lever in the neutral position

**NOTE:**

The start-in-gear protection system prevents the engine from starting when the transmission is not in neutral

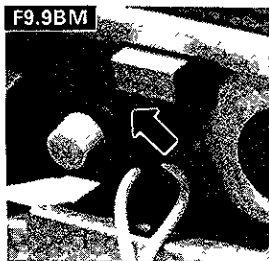
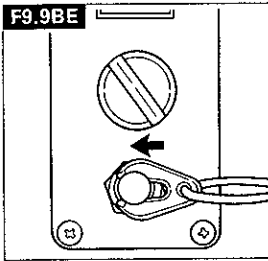
4-2) Place the throttle grip in the full-closed position

**F9.9BE****F9.9BE**

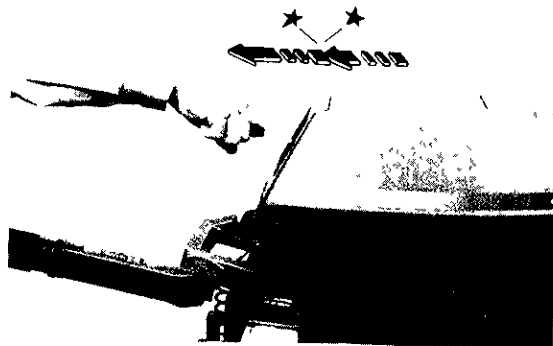
4) Place the remote control lever in the neutral position

**NOTE:**

The start-in-gear protection system prevents the engine from starting when the transmission is not in neutral

**F9.9BM****F9.9BE**

5) Install the lock plate firmly onto the emergency stop switch. Tie the rope attached to the lock plate to your wrist.

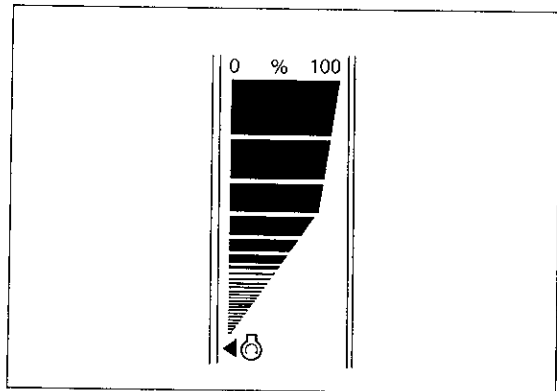


#### F9.9BM

- 6) Pull the starter handle slowly, until resistance is felt, then give it a strong pull
- 7) After the engine has started, allow the starter handle to return slowly to its home position without letting go

#### CAUTION

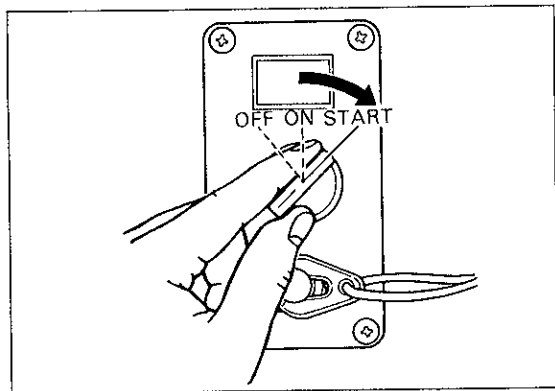
When the throttle is full closed, a warm engine may be impossible to start because of the auto starter carb system. If the engine fails to start after the starter handle has been pulled five times, slightly open the throttle and pull the starter again.



#### NOTE

A fuel consumption curve is shown on the throttle indicator. By referring to this curve, determine the best throttle position for the use you wish to make of the boat.



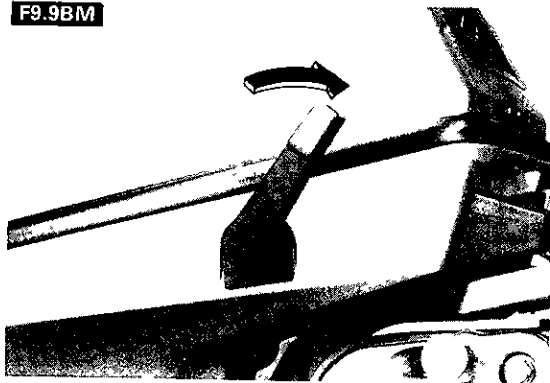
**F9.9BE**

- 6) Turn the main switch to "START", and hold it turned for a maximum of five seconds
- 7) Immediately the engine starts, release the main switch to return it to "ON"

**CAUTION:**

- 1 Never turn the main switch to the "START" position while the engine is running
- 2 Do not keep the starting motor turning for more than five seconds with the main switch in "START". If the engine will not start after five seconds return the main switch to "ON" and crank the engine again after waiting 10 seconds  
If the starting motor is turned continuously for more than 5 seconds, the battery will quickly run dead making it impossible to start the engine
- 3 When the throttle is closed, starting a warm engine is sometimes impossible due to the function of the auto starter carb. If the engine fails to start after the main switch has been turned five times, slightly open the throttle (neutral throttle lever upward) and turn the main switch again

**F9.9BM**



### Gear Selection (Forward and Reverse)

**WARNING:**

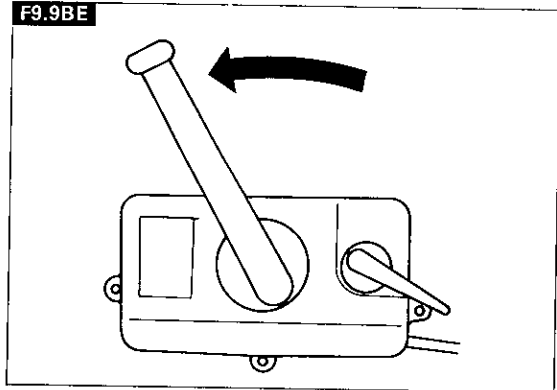
Should the engine hit an underwater obstacle, be sure to check the gear case and brackets for damage

**Forward**

**F9.9BM**

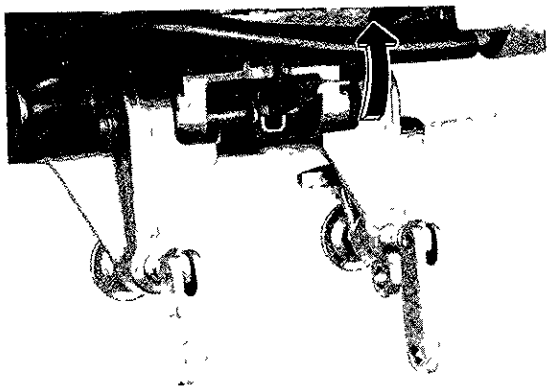
Turn the shift lever to the forward position quickly and firmly

**F9.9BE**



**F9.9BE**

Turn the remote control lever to the forward position quickly and firmly



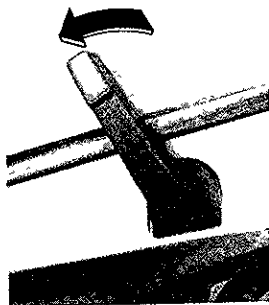
#### Reverse

- 1) Keep the tilt lock lever in the lock position

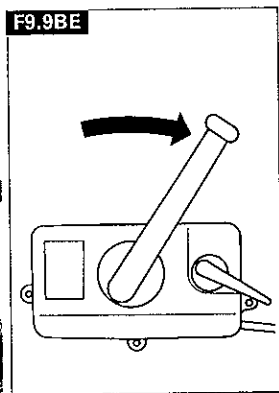
#### **WARNING:**

When operating in reverse, be sure to set the tilt lock lever to the lock position. If this is not done, the tilt lock mechanism will not prevent the engine from lifting out of the water and loss of control may occur, possibly causing injury to the occupants of the boat.

**F9.9BM**



**F9.9BE**



**F9.9BM**

- 2) Turn the shift lever to the reverse position quickly and firmly

#### **CAUTION:**

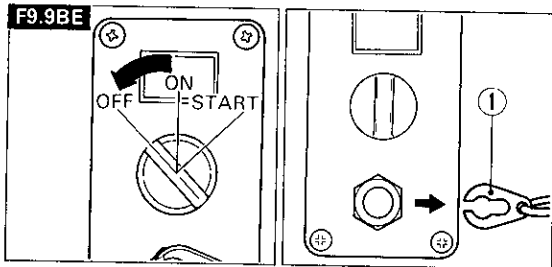
To change the boat direction from forward to reverse or vice versa, close the throttle first so that the engine idles (or runs at low speeds).

**F9.9BE**

- 2) Turn the remote control lever to the reverse position quickly and firmly

**F9.9BM****Stopping****F9.9BM**

- 1) Push the emergency stop switch to stop the engine  
Pull out the lock plate from the emergency stop switch to stop the engine

**F9.9BE****F9.9BE**

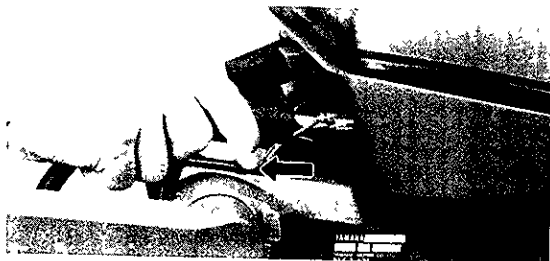
- 1) Turn the main switch to OFF  
Pull out the lock plate from the emergency stop switch to stop the engine

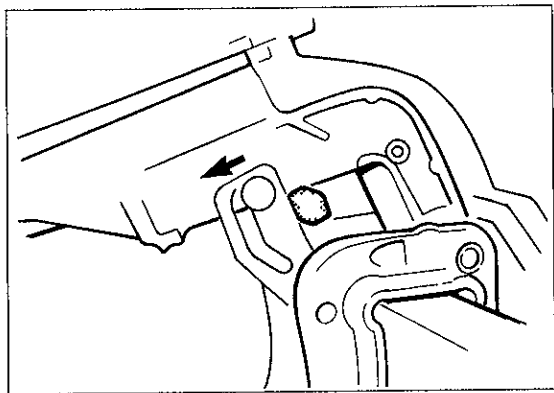
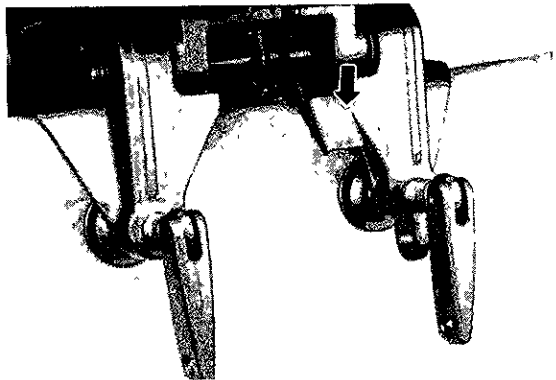
① Lock plate

- 2) After stopping the engine, remove the fuel joint from the motor

**CAUTION**

Before stopping the engine, reduce the engine temperature by running it at idle or low speeds for 2 to 3 minutes





### Tilt-Up

If the motor will be stopped for some time, or if the boat is moored in shallows, the motor should be tilted up. This protects the propeller and lower casing from damage by rocks or any other underwater obstacle when the tide is ebbing, and from fast corrosion by salt water.

#### CAUTION:

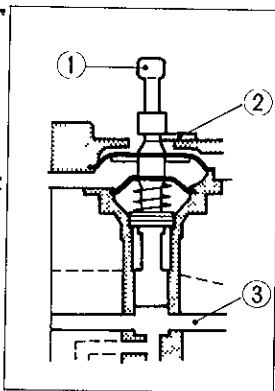
##### F9.9BM

- 1) Do not tilt up the motor by pushing the steering handle, as the handle may break off.
- 2) Make sure the power unit is kept higher than the propeller at all times. Otherwise, water and engine oil may run into the engine and damage it.

- 1) Push the tilt lock lever down to the release position.
- 2) Hold the rear of the top cowling with one hand, tilt it up and lock the tilt support lever to the swivel bracket.
- 3) Remove the fuel joint from the motor.

#### WARNING:

When keeping the motor tilted up for more than a few minutes, be sure to disconnect the fuel line linking the motor to the fuel tank. Otherwise, fuel may leak out.



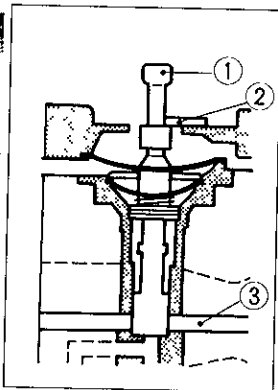
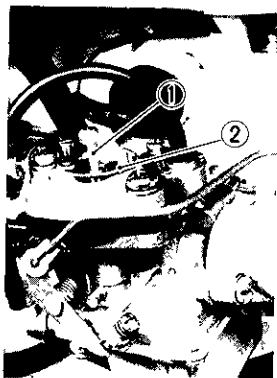
## Emergency Starting Procedure

**Auto starter carb system will not work**

- 1) Remove the cap, pull up the emergency knob and lock the lock lever

### NOTE

With the emergency knob in this position, the by-pass is open so that the rich mixture required to start the engine is supplied to the cylinder

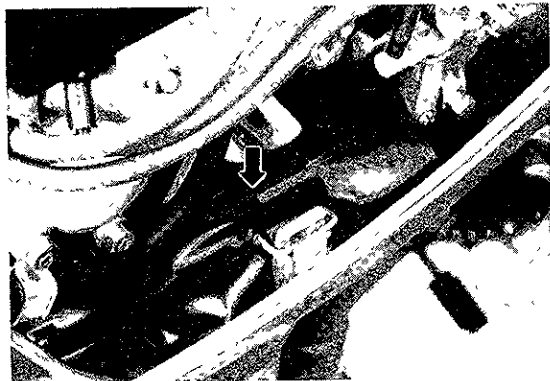


- 2) After starting the engine, push down the emergency knob and lock it with the lock lever

### NOTE

With the emergency knob in this position, the by-pass is closed and a mixture required for normal operation is supplied to the cylinder

- (1) Emergency knob
- (2) Lock lever
- (3) By pass



### Starter failure

If starter failure prevents the engine from starting the emergency starter rope can be used

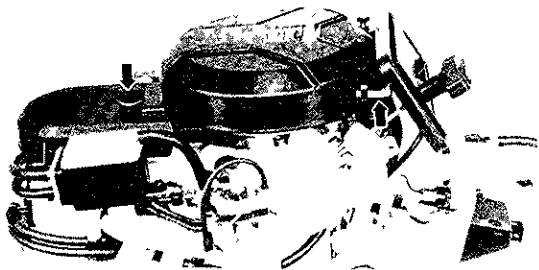
### NOTE

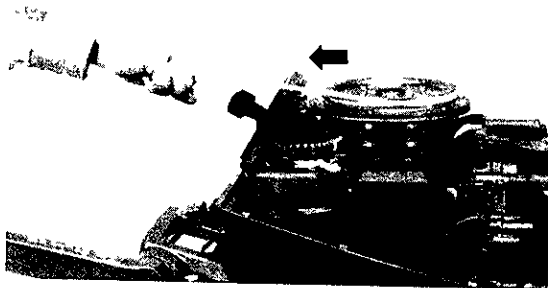
The emergency rope is carried in the bottom cowling on the starboard side

### **WARNING:**

When the engine is started with an emergency rope, the Start-In-Gear Protection does not work. Be sure to check that the transmission is in neutral. Otherwise the boat may lurch ahead or astern, causing serious damage or personal injury

- 1) Remove the top cowling by depressing the lock lever at the rear of the cowling. Lift up and back to remove
- 2) Pull out the lock pin, loosen the bolt and remove the flywheel cover





- 3) Lock the front panel with lock pin

**F9.9BE**

- 4) Turn the main switch to ON

**NOTE**

Without setting the main switch to ON, it is impossible to start the engine

- 5) Insert the knotted end of the rope into the notch in the flywheel rotor. Wind the rope 2 or 3 turns in a clockwise direction, then pull to start. Repeat if necessary.

**WARNING:**

When starting or operating the engine, never touch the ignition coil, hightension wire, spark plug cap or any other electrical parts to which high voltage is applied

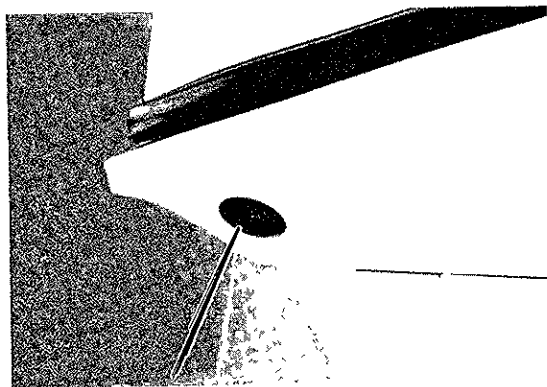
**WARNING:**

When pulling the emergency starter rope, be sure to keep loose clothing and other objects away from the engine.

A rotating flywheel is very dangerous. Never attempt to install the top cowling on the engine when it is in operation.

Proceed to the nearest port to get the engine repaired as quickly as possible. Take care that no water splashes onto the flywheel.





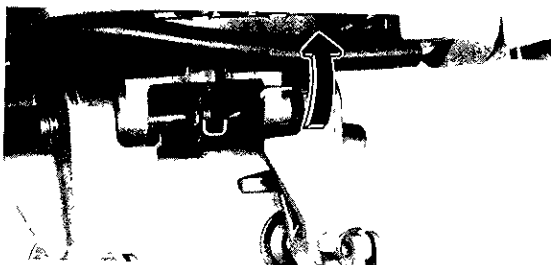
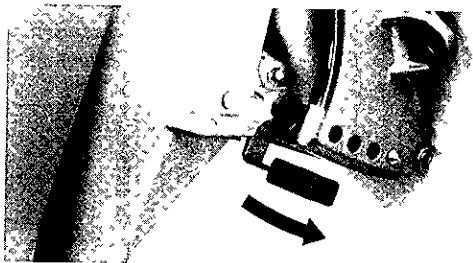
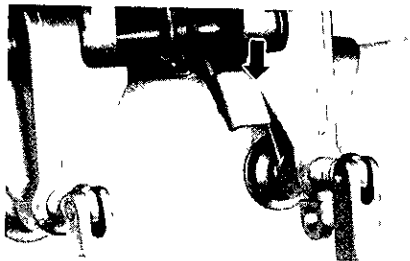
### Engine Warm-Up

Before beginning operation, the engine should be warmed up at idle speed for three minutes. Failure to do so will shorten the life of the engine.

Make sure that water runs out from the cooling water pilot holes.

### CAUTION

If water does not run out during operation, the motor may overheat and be seriously damaged. Should this occur, stop the engine and check that the water inlet on the lower casing is not blocked. (If not, take the engine to your nearest Yamaha dealer.)



## Shallow Water Cruising

### **WARNING:**

In shallows, run the boat at trolling speed or thereabouts. The reverse lock will not operate and may thus cause the motor to lift out of the water and the boat to lose control when the lower casing hits an underwater obstacle. Personal injury may result when the motor is operating in reverse, as it can easily be lifted by the force of reverse thrust.

To cruise in shallows, proceed as follows

- 1) Push the tilt lock lever down to the release position
- 2) Slightly tilt up the motor and pull the shallow water lever toward you

### **NOTE**

If the motor is tilted up completely, the reverse lock automatically returns from the release to the lock position and thus the shallow water lever becomes ineffective.

- 3) To push back the shallow water lever, slightly tilt up the motor, set the reverse lock to the lock position, and slowly tilt the motor down.

## TRANSPORTATION AND STORAGE

### Outboard Motor

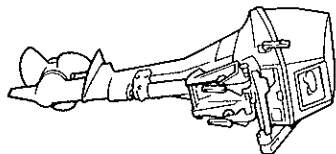
When transporting or storing the outboard, proceed as follows

- 1 Wash the cooling water passages and the motor body with fresh water. Refer to "Motor Body and Cooling Water Passages" in the "ADJUSTMENT AND MAINTENANCE" section.
- 2 Remove the fuel joint from the motor.
- 3 Idle the engine until the carburetor is drained off.
- 4 Completely drain the water out of the outboard motor, and thoroughly clean the body.
- 5 Add a small quantity of engine oil through the spark plug hole in the cylinder.
- 6 Avoid direct sunlight. Select a well-ventilated and dry place.

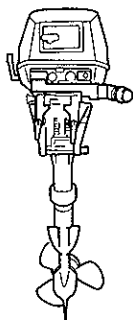
### CAUTION

- 1 For transportation and storage, be sure to keep the motor as shown. Otherwise, oil will enter the cylinder and possibly cause engine problems.
- 2 If the outboard is placed on its side before the cooling water has been completely drained, water may enter the cylinder through the exhaust port and cause engine trouble.

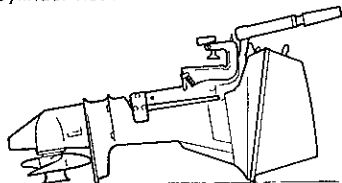
Steering handle downward

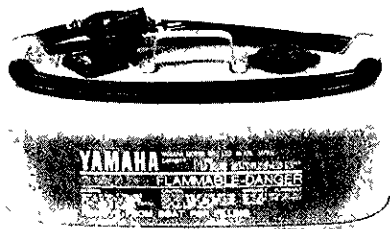


Upright



Cylinder head downward



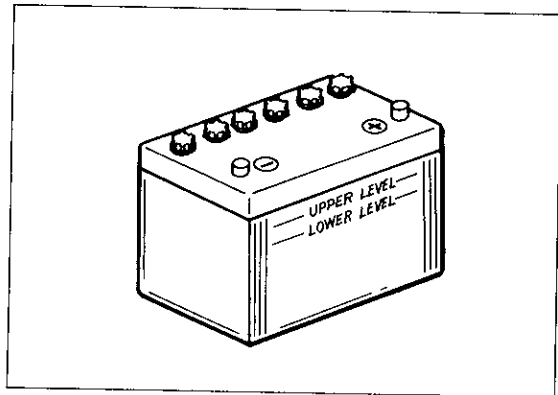


### Fuel Tank

Store the fuel tank with its filler cap securely fitted in a well-ventilated, dry and level place free from exposure to the direct sun

#### **WARNING:**

For long periods of storage, drain the fuel from the tank



### Battery

- 1 Remove the battery leads (positive and negative)
- 2 Select a cool, dark and level place
- 3 For long periods of storage, check the specific gravity of the fluid at least once a month and recharge the battery when it is too low

#### NOTE

Follow the manufacturer's instructions for battery details

## ADJUSTMENT AND MAINTENANCE

### Periodic Inspection Chart

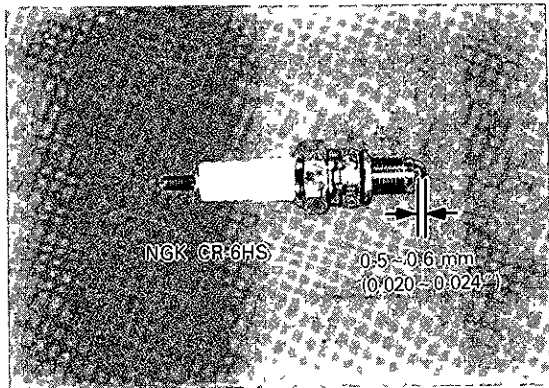
The following chart should be considered strictly as a guide to general maintenance intervals. Intervals of maintenance can change depending on operating conditions.

The mark (●) indicates the check-ups which may be done by yourself.

The mark (○) indicates work to be carried out by your Yamaha dealer.

Item	Time interval	Time interval				
		10 hours (Break-in)	Initial 50 hours (3 month)	100 hours (6 month)	100 hours (6 month)	200 hours (12 month)
Spark plug	Cleaning/Adjustment	●	●	●	●	
Greasing points	Greasing			●	●	
Engine oil and oil strainer	Change	●		●	●	
Gear oil	Change	●		●	●	
Fuel system	Inspection			●	●	
Fuel filter	Cleaning					●
Fuel tank	Cleaning					●
Idle speed	Adjustment			●	●	
Timing belt	Inspection			●	●	
Anode	Inspection/Replacement			●	●	

Item	Time interval	Time interval				
		10 hours (Break-in)	Initial 50 hours (3 month)	100 hours (6 month)	Thereafter every	
					100 hours (6 month)	200 hours (12 month)
Outboard motor body	Inspection		●	●	●	●
Cooling water passages	Cleaning		●	●	●	●
Propeller	Inspection		●	●	●	●
Cotter pin	Inspection/Replacement		●	●	●	●
Battery fluid	Inspection/Refilling	● (every 1 month)				
Carburetor setting	Inspection/Adjustment			○	○	○
Ignition timing	Inspection/Adjustment			○	○	○
Bolts and nuts	Retighten	○		○	○	○
Valve clearance	Inspection/Adjustment	○		○	○	○



### Spark Plug

The spark plug is an important engine component and is easy to inspect. The condition of the spark plug can indicate something of the condition of the engine. For example, if the center electrode porcelain is very white, this could indicate an intake tract air leak or carburetion problem for that cylinder. Do not attempt to diagnose any problems yourself. Instead, take the outboard motor to a Yamaha dealer. You should periodically remove and inspect the spark plug because heat and deposits will cause the spark plug to slowly break down and erode. If electrode erosion becomes excessive, or if carbon and other deposits are excessive, you should replace the spark plug with a proper type plug.

Standard spark plug NGK CR-6HS

Before installing the spark plug, measure the electrode gap with a wire thickness gauge, adjust the gap to specification as necessary.

Spark plug gap 0.5~0.6 mm (0.020~0.024 in)

When installing the plug, always clean the gasket surface and use a new gasket. Wipe off any grime from the threads and torque the spark plug properly.

Spark plug torque

13 Nm (1.3 m·kg, 9.4 ft·lb)

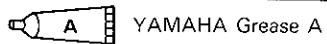
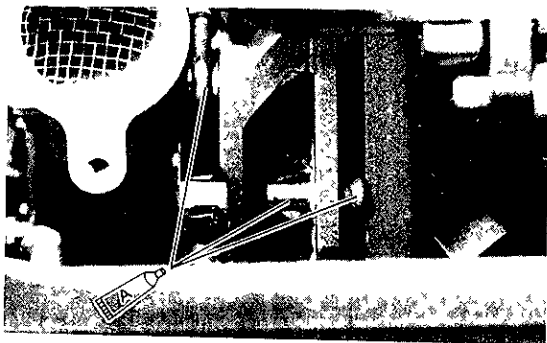
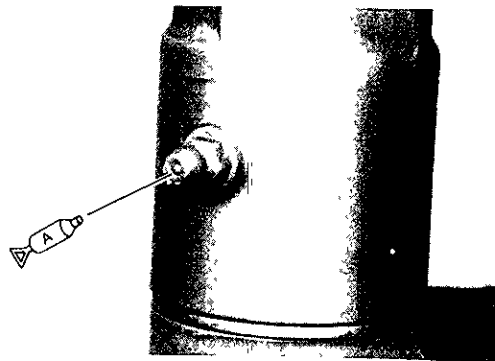
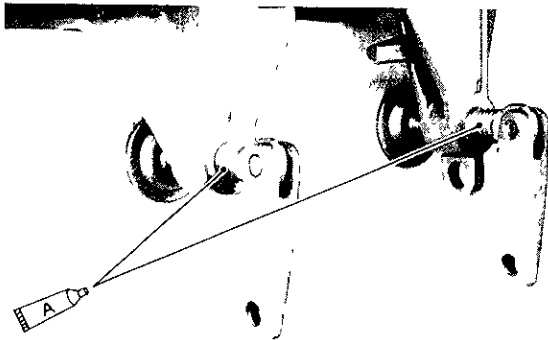
### NOTE

If a torque wrench is not available when you are installing a spark plug, a good estimate of the correct torque is 1/4 to 1/2 turns past finger tight. Have the spark plug torqued to the correct value as soon as possible with a torque wrench.

### WARNING:

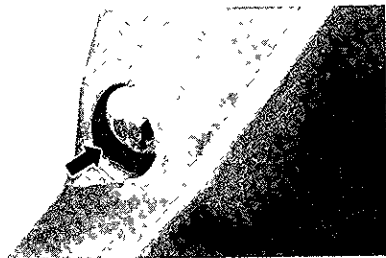
When installing or removing a spark plug, be careful not to damage the insulator.

## Greasing Points



YAMAHA Grease A





## Engine Oil and Oil Strainer

### Procedure

- 1) Place the outboard in an upright position
- 2) Remove the oil filler cap
- 3) Remove the engine oil drain bolt and drain the oil. Be sure to drain the oil into a can or similar container which is placed between the anti-cavitation plate and the oil drain hole. Thoroughly wipe up any spilt oil.

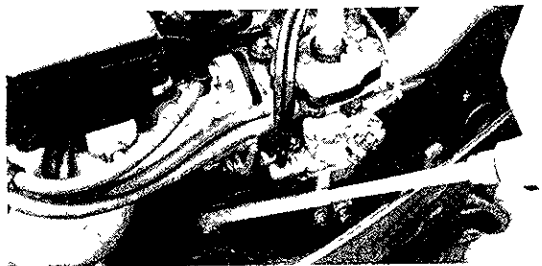
### NOTE

Replace the oil strainer whenever the oil is changed.



### **WARNING:**

Avoid draining the engine oil immediately after stopping the engine. The oil is hot and should be handled with care to avoid burns.



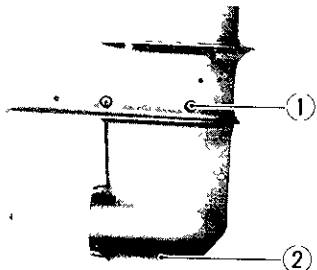
- 4) After draining the oil, tighten the drain bolt completely.
- 5) Pour oil through the oil filler.

Engine oil capacity 1.0 L (1.1 US qt, 0.4 Imp qt)

- 6) After filling, check that the oil level is correct.

### **CAUTION:**

Replace the engine oil after the first 10 hours of operation (break-in) and every 100 hours (6 months) thereafter.



### Gear Oil

- 1) Place a container under the gear case
- 2) Remove the oil drain plug
- 3) Remove the oil level plug to drain the oil thoroughly
- 4) With the outboard in an upright position, inject outboard motor hypoid gear oil SAE 90 into the oil drain plug hole using a flexible or pressurized filling device

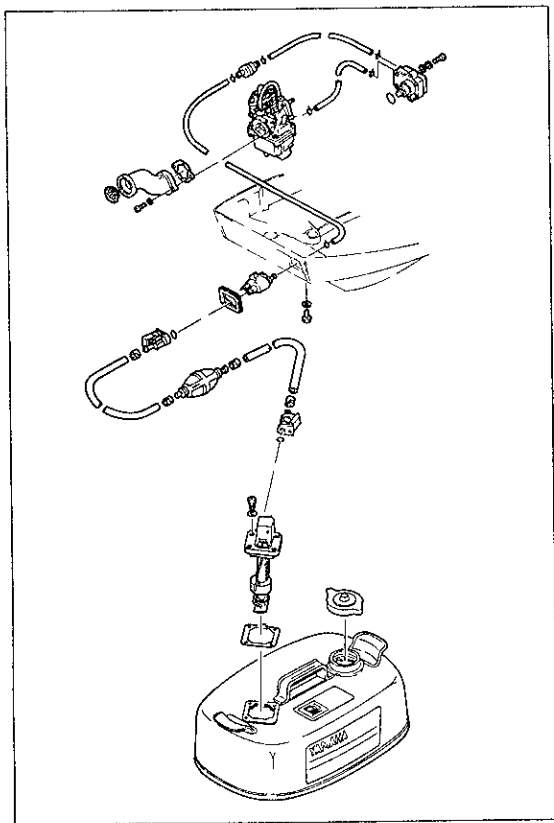
Gear oil capacity 185 cm<sup>3</sup> (6.25 US oz, 6.51 Imp oz)

- 5) When the oil begins to flow out of the oil level plug hole, insert and tighten the plug
- 6) Screw in the oil drain plug

### CAUTION:

Replace the gear oil after the first 10 hours of operation (break-in) and every 100 hours (6 months) thereafter. If the gear oil becomes "milky," consult a Yamaha dealer.

- (1) Oil level plug
- (2) Oil drain plug



## Fuel System

### **WARNING:**

**Gasoline is highly inflammable and explosive.  
Handle with special care.**

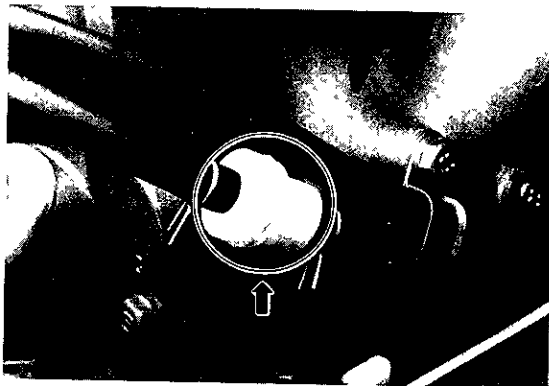
Check the fuel system for leaks, cracks, or malfunctions. If any problem is found, do the necessary repair or replacement as required. If no cause can be found, consult your nearest Yamaha dealer.

### Checking points

- 1 Carburetor leakage
- 2 Fuel pump malfunction or leakage
- 3 Fuel tank leakage
- 4 Fuel hose joint leakage
- 5 Fuel hose cracks or any damage
- 6 Fuel filter leakage
- 7 Fuel connector leakage
- 8 Primer bulb leakage or damage

### **WARNING:**

**Failure to check for fuel leakage may result in fire or explosion.**

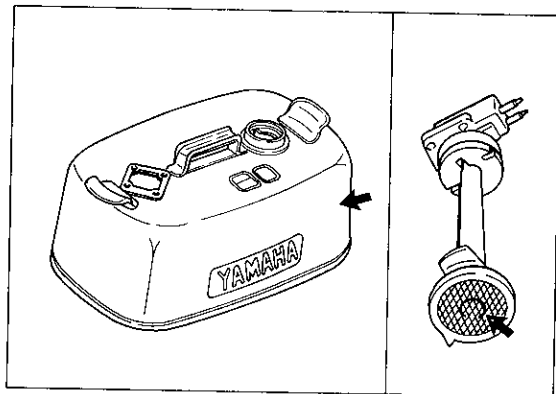


#### Fuel Filter

Remove the fuel hoses and wash the filter in suitable cleaning solvent. If compressed air is available, blow-dry the filter.

#### **WARNING:**

When cleaning the fuel filter be sure to stop the engine. Also refrain smoking and keep away from open flames or sparks.



#### Fuel Tank Tank

Add a small quantity of suitable cleaning solvent to the tank and thoroughly clean the tank interior by shaking the tank. After cleaning, drain off the cleaning solvent completely.

#### Tank filter

Thoroughly clean the filter on the end of the suction pipe in suitable cleaning solvent. If compressed air is available, blow-dry the filter.



### Idle Speed

- 1) Start the engine and fully warm up
- 2) Set the idle speed to specification by adjusting the throttle stop screw (see "SPECIFICATIONS" for idle speed)

To increase the idle speed

Turn the throttle stop screw clockwise

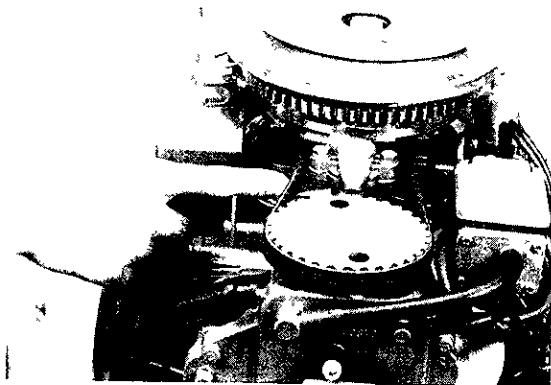
To decrease the idle speed

Turn the throttle stop screw counterclockwise

### NOTE

When adjusting an idle speed, shift into neutral and warm up the engine completely. Make sure the engine is running smoothly. Correct idle speed adjustment will be impossible if the engine is cold as engine speed could be adjusted higher than normal.

- ① Throttle stop screw



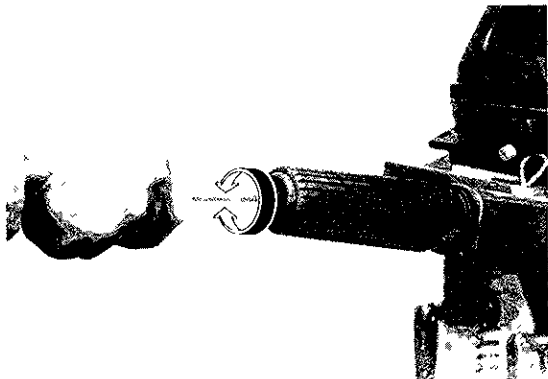
### Timing Belt

If any one of the following symptoms is noticed, the timing belt should be replaced

- 1 Cracks in the back of the belt or in the roots of the cogs
- 2 Excessive wear on the roots of cogs
- 3 Rubber portion swelled by oil
- 4 Roughened belt surfaces
- 5 Wear on belt edges and outer surface
- 6 Stretching (10 mm (0.39 in) or more) of the belt when pushed with a finger

### CAUTION:

For timing belt replacement, consult a Yamaha dealer



### **Throttle Grip Friction**

The throttle grip has an adjustable friction device located in the steering handle. Friction can be adjusted by tightening or loosening the adjusting screw.

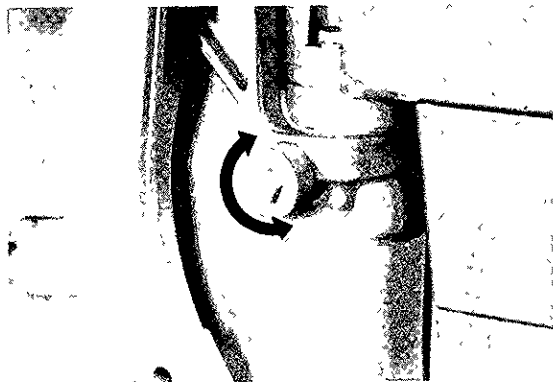
To increase tension

Turn the adjusting screw clockwise

To decrease tension

Turn the adjusting screw counterclockwise

When constant speed is required, tighten the adjusting screw to retain the required throttle setting.



### **Steering Tension**

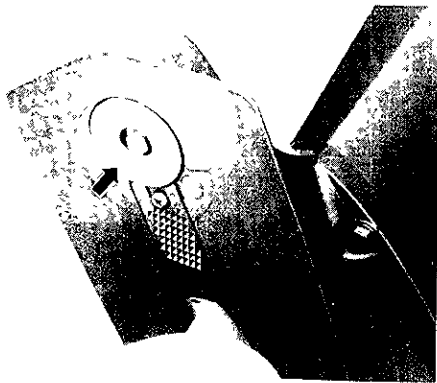
Steering tension can be adjusted by turning the adjusting bolt on the swivel bracket.

To increase tension

Turn the adjusting bolt clockwise

To decrease tension

Turn the adjusting bolt counterclockwise



#### **Anode**

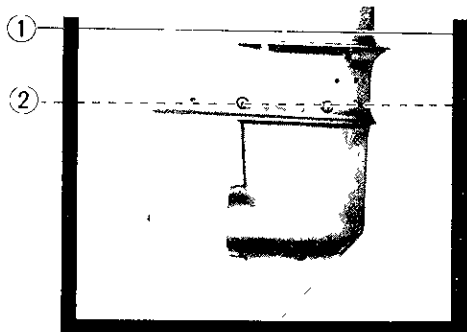
The gear case is protected from corrosion by a sacrificial anode. Check the anode periodically and replace it if it is more than two thirds worn.

#### **CAUTION:**

Never paint the anode as it will become ineffective.

#### **Motor Body and Cooling Water Passages**

After use, wash the body and cooling water passages with fresh water to remove mud, salt, seaweeds, etc. These substances may clog or corrode water passages and thus shorten engine life.



#### **Cleaning the cooling water passages**

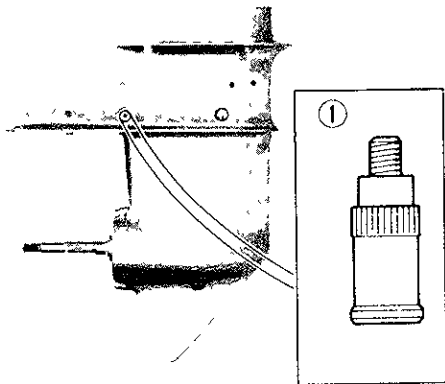
- a) Install the outboard motor on the water tank and add water up to above the anti-cavitation plate. Next, shift into neutral, start the engine and run at low speed for a few minutes.

#### **CAUTION:**

When the fresh water level is below the anti-cavitation plate or when water supply is insufficient, engine seizure may occur.

- 1) Water surface
- 2) Lowest water level





- b Remove the screw located beside the "WASH" mark on the lower casing, install the water check plug (accessory) and connect it to a water faucet  
Next, shift into neutral, start the engine while supplying water, then run at low speed for a few minutes

① Water check plug

**CAUTION:**

Never operate the engine even momentarily without running cooling water. Either the water pump will become damaged or the engine will overheat. Before starting the engine, be sure to install the water check plug and feed water.

**WARNING:**

When using the water check plug, be sure to remove the propeller for safety.

### Battery Fluid

A poorly maintained battery will deteriorate quickly. The battery fluid should be checked at least once a month.

- 1 The level should be between the upper and lower level marks. Use only distilled water if refilling is necessary.

#### **CAUTION**

Normal tap water contains minerals which are harmful to a battery, therefore, refill only with distilled water.

- 2 Always make sure the battery is charged sufficiently. It is advisable to install a voltmeter for better battery maintenance.

### SUBMERGED MOTOR

The engine will be very adversely affected if submerged. Should the motor be submerged, take it to a Yamaha dealer as quickly as possible for servicing. If this cannot be done, take the following measures:

- 1 Thoroughly wash away mud, salt, seaweeds, etc. with fresh water.
- 2 Check if the engine oil contains water. If water is found, remove the oil drain plug and drain the oil. After draining, tighten the oil drain plug.
- 3 Remove the spark plug and crank the engine several times while holding it with the spark plug hole facing downward, until water drains out of the engine and carburetor.
- 4 When the oil has been drained, refill with about 500cc (16.9 US oz, 17.6 Imp oz) of oil through the oil filler, and crank the engine so that the oil spreads over to engine parts.  
Then drain the engine oil.
- 5 Add oil again and crank the engine.
- 6 Reinstall the spark plug.

## TROUBLESHOOTING

Problem situations with your outboard motor can in most cases be prevented by ensuring proper, scheduled maintenance. Many problems result from careless handling and abuse. The situations listed and their possible causes are intended to assist the operator in identifying and rectifying such problems. Should you continue to experience any difficulties after following these procedures, please

contact your Yamaha dealer.

- A The engine will not start
- B The engine runs irregularly or stalls
- C The engine idles roughly
- D Engine speed will not increase
- E The engine is overheating
- F Engine speed is higher than normal
- G Engine speed is lower than normal
- H Boat speed is too low

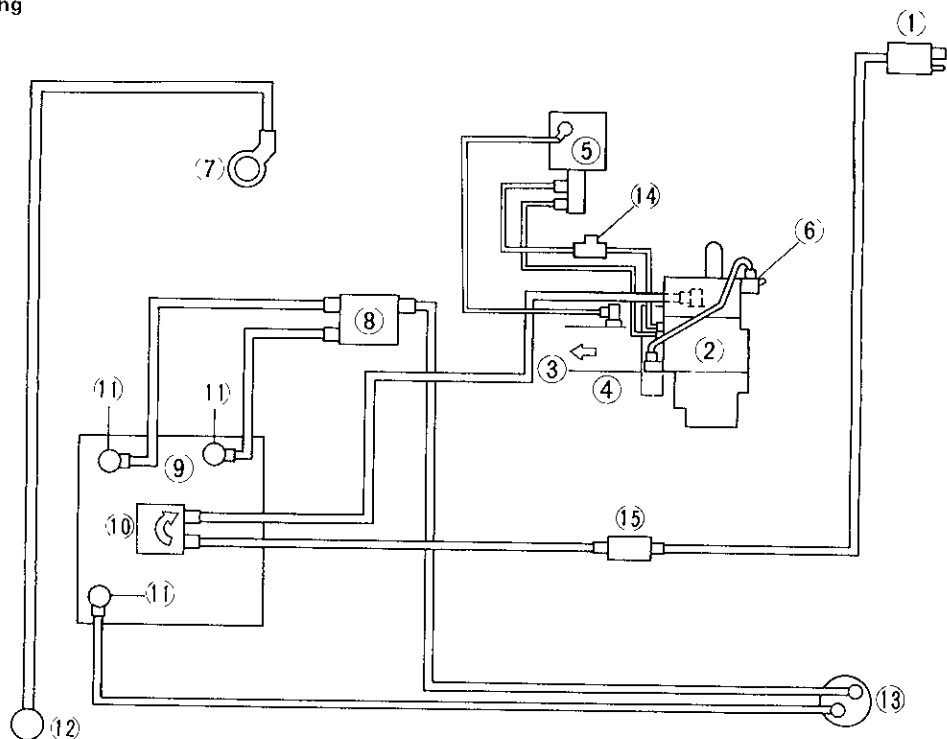
A	B	C	D	E	F	G	H	Possible Cause
<input type="radio"/>	<input type="radio"/>							Fuel tank is empty
<input type="radio"/>	<input type="radio"/>		<input type="radio"/>					Fuel hose is connected incorrectly
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>		Fuel hose is flattened or kinked
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>		Fuel filter is clogged
<input type="radio"/>								Fuel pump is malfunctioning
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>		Fuel is contaminated or stale
<input type="radio"/>	<input type="radio"/>							Auto starter carb system is malfunctioning
<input type="radio"/>	<input type="radio"/>							Incorrect starting procedure
<input type="radio"/>								Hose routing is faulty
	<input type="radio"/>			<input type="radio"/>				Specified engine oil has not been used
			<input type="radio"/>	<input type="radio"/>				Engine oil level is low
				<input type="radio"/>				Engine oil is contaminated, stale or deteriorated
			<input type="radio"/>	<input type="radio"/>				Oil pump is malfunctioning
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>		Spark plug is fouled or defective
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>		<input type="radio"/>		Spark plug is in incorrect heat range
	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>		Spark plug gap is incorrect
<input type="radio"/>								Spark plug cap is installed incorrectly
<input type="radio"/>								Wiring or wire connections are faulty
<input type="radio"/>								CDI unit is malfunctioning

A	B	C	D	E	F	G	H	Possible Cause
---	---	---	---	---	---	---	---	----------------

<input type="radio"/>								Ignition coil is malfunction
				<input type="radio"/>				Water passages are clogged
				<input type="radio"/>				Water pump is faulty
	<input type="radio"/>			<input type="radio"/>				Thermostat is clogged or faulty
					<input type="radio"/>		<input type="radio"/>	Cavitation is occurring
					<input type="radio"/>		<input type="radio"/>	Propeller is damaged
			<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Propeller is incorrect in pitch or diameter
					<input type="radio"/>		<input type="radio"/>	Trim angle is incorrect
			<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	Loads on boat are improperly distributed
							<input type="radio"/>	Transom is too low
					<input type="radio"/>		<input type="radio"/>	Transom is too high
<input type="radio"/>								Starter motor is faulty <b>F9.9BE</b>
<input type="radio"/>								Battery is undercharged <b>F9.9BE</b>
<input type="radio"/>								Switch is faulty <b>F9.9BE</b>

# HOSE ROUTING AND WIRING DIAGRAM

## Hose Routing



① Fuel connector

⑥ Bimetal vacuum switching  
valve for air temperature

⑪ Check valve

② Carburetor

⑦ Thermostat

⑫ From water pump

③ To cylinder

⑧ Oil separator

⑬ Pilot holes

④ Intake manifold

⑨ Head cover

⑭ Pilot air jet

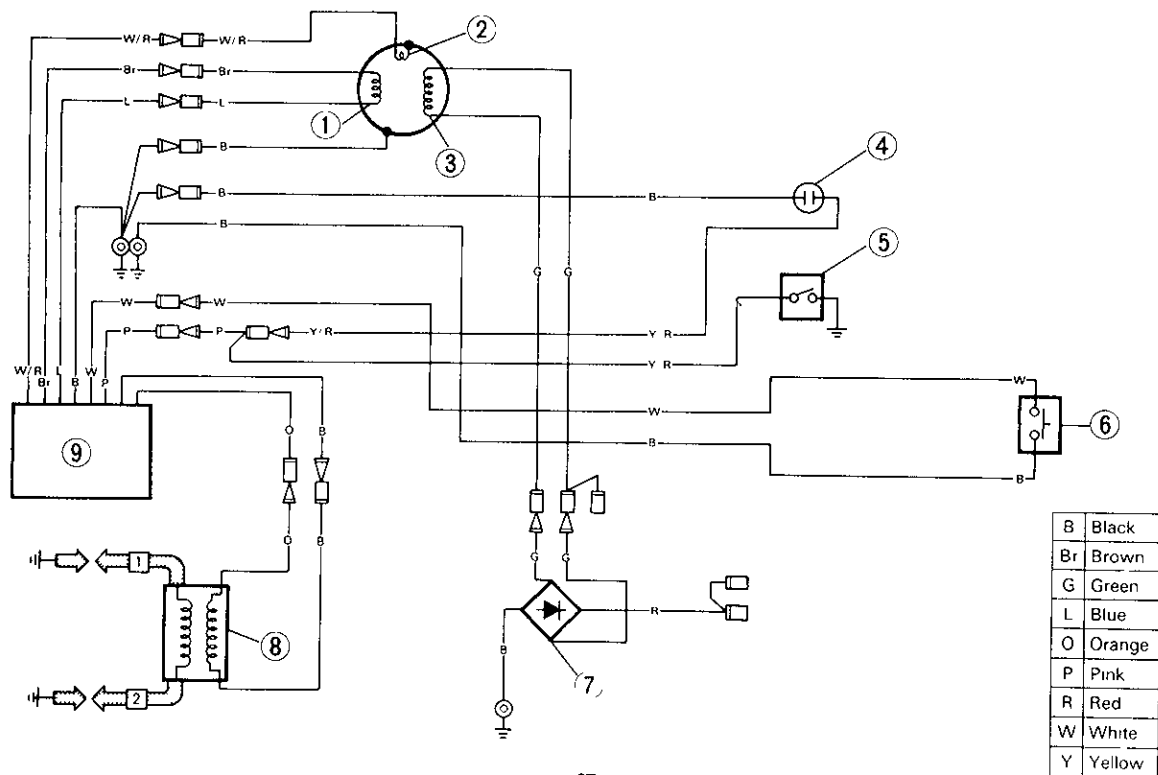
⑤ Bimetal vacuum switching  
valve for cylinder body temperature

⑩ Fuel pump

⑮ Fuel filter

# Wiring Diagram

## F9.9BM





① Charge coil

⑥ Emergency stop switch

② Pulser coil

⑦ Rectifier

③ Lighting coil

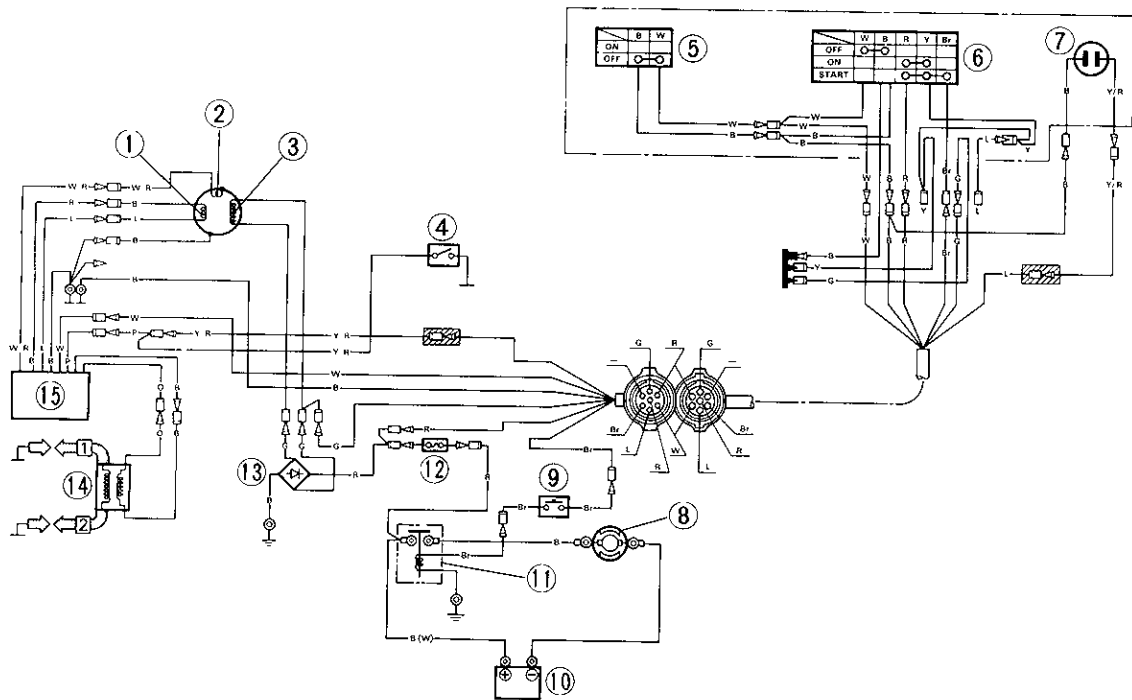
⑧ Ignition coil

④ Oil pressure indicator lamp

⑨ CDI unit

⑤ Oil pressure switch

# F9.9BE



① Charge coil

⑥ Main switch

⑪ Starter relay

② Pulser coil

⑦ Oil pressure indicator lamp

⑫ Fuse (20A)

③ Lighting coil

⑧ Starting motor

⑬ Rectifier

④ Oil pressure switch

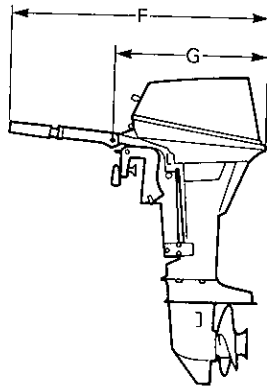
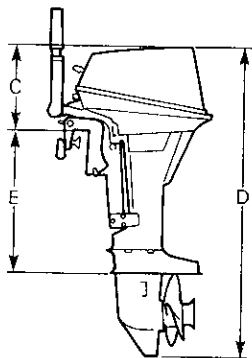
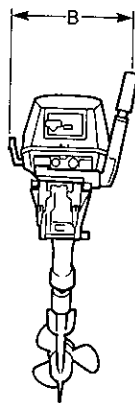
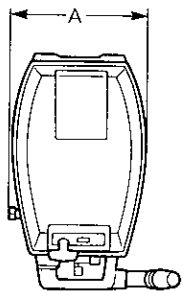
⑨ Neutral switch

⑭ Ignition coil

⑤ Emergency stop switch

⑩ Battery

⑮ CDI unit



## SPECIFICATIONS

Item	Model	Unit	YAMAHA F9 9BM	YAMAHA F9 9BE
<b>DIMENSIONS</b>				
•Overall width "A"		mm	364 (14 33)	334 (13 15)
•Overall width "B"		mm	389 (15 32)	—
•Overall height "C"		mm	290 (11 42)	290 (11 42)
•Overall height "D"		mm	S = 981 (38 62), L = 1,108 (43 62)	S = 981 (38 62), L = 1,108 (43 62)
•Transom height "E"		in (mm)	S = 17 1 (434), L = 22 1 (561)	S = 17 1 (434), L = 22 1 (561)
•Overall length "F"		mm	871 (34 29)	—
•Overall length "G"		mm	588 (23 15)	588 (23 15)
•Weight		kg	S = 41 5 (91 3), L = 42 5 (93 5)	S = 43 5 (95 7), L = 44 5 (97 9)
<b>PERFORMANCE</b>				
•Full throttle operating range		r/min (RPM)	4,500 ~ 5,500	4,500 ~ 5,500
•Maximum output		kW (HP)/ min <sup>-1</sup> (RPM)	7 3 (9 9)/5,500	7 3 (9 9)/5,500
•Idle speed		r/min (RPM)	1,100 ~ 1,200	1,100 ~ 1,200
<b>ENGINE</b>				
•Type			4 stroke	4 stroke
•Number of cylinder			2	2
•Bore and stroke		mm (in )	59 × 42 4 (2 32 × 1 67)	59 × 42 4 (2 32 × 1 67)
•Piston displacement		cm <sup>3</sup> (cu in )	232 (14 15)	232 (14 15)

Item	Model	Unit	YAMAHA F9.9BM	YAMAHA F9.9BE
•Valve clearance (cold engine)				
Intake		mm (in )	0.15 ~ 0.20 (0.006 ~ 0.008)	0.15 ~ 0.20 (0.006 ~ 0.008)
Exhaust		mm (in )	0.20 ~ 0.25 (0.008 ~ 0.010)	0.20 ~ 0.25 (0.008 ~ 0.010)
•Cooling system			Water	Water
•Ignition system			CDI	CDI
•Spark plug		NGK	CR6HS	CR6HS
•Spark plug gap		mm (in )	0.5 ~ 0.6 (0.020 ~ 0.024)	0.5 ~ 0.6 (0.020 ~ 0.024)
<b>DRIVE UNIT</b>				
•Gear positions			Forward-Neutral-Reverse	Forward-Neutral-Reverse
•Gear ratio			2.08 (13/27)	2.08 (13/27)
<b>FUEL AND OIL</b>				
•Fuel			Unleaded gasoline	Unleaded gasoline
•Recommended oil			SAE 10W-30 (API SAE-SF)	SAE 10W-30 (API SAE-SF)
			SAE 10W-40 (API SAE-SF-CC)	SAE 10W-40 (API SAE-SF-CC)
•Lubrication system			Pressur lubrication by trochoid pump	Pressur lubrication by trochoid pump
•Fuel tank capacity		L (US gal) Imp gal	14 (3.70) (3.08)	14 (3.70) (3.08)
•Engine oil capacity		L (US qt) Imp qt	1.0 (1.1) (0.9)	1.0 (1.1) (0.9)
•Gear oil capacity		cm <sup>3</sup> (US oz) Imp oz	185 (6.25) (6.51)	185 (6.25) (6.51)



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