

OWNER'S MANUAL

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YOUR TOHATSU OUTBOARD MOTOR

OWNER REGISTRATION AND IDENTIFICATION

Upon purchasing this product, be sure your dealer* fills out the WARRANTY CARD correctly and completely and mails it to the distributor. This card identifies you as the legal owner of the product and serves as your warranty registration.

If this procedure is not followed, your outboard motor will not be covered by warranty.

*: In this manual, "dealer" always means an authorized TOHATSU dealer.

PRE-DELIVERY CHECK

Be sure that the product has been checked by the dealer before the delivery.

LIMITED WARRANTY

This TOHATSU product is fully guaranteed against defective materials and workmanship for the period from the date of purchase, provided that the purchase has been registered in accordance with the above.

The limited warranty will not apply to the normal wear and tear of parts, adjustments, tune-ups, or to any damage caused by:

- 1) Use or operation NOT conforming to the instructions described in this owner's manual,
- 2) Participation in or preparation for racing or other competitive activities,
- 3) Water entering the engine or the engine room,
- 4) Damage of an accidents, collisions, contact with foreign materials, or submersion.
- 5) Growth of marine organisms on motor surfaces.
- 6) Any other careless use or operation.
- 7) Normal deterioration.

The limited warranty does not cover maintenance items. The following items are some examples not to be covered by the limited warranty.

spark plugs, anode, trim-tub, propeller, fuel filter, oil filter, carbon brush, starter rope, shear-pin, split-pin, bolt-nut-washer, wire cable, rubber goods: pump impeller, oil seal, "O"-ring, fuel pipe, primer bulb, etc., vinyl tube

The warranty will become void if the product has been altered, modified, or repaired by anyone other than a company or service firm authorized by TOHATSU.

The warranty will cover only your TOHATSU product and will not cover the boat the product is mounted on, the trailer, equipment, or accessories associated with the product.

Serial Number

In the space below, please record the engine's serial number (indicated both on the lower motor cover and on the cylinder block). This number will come in handy in the event of theft or to help in quickly identifying the product type.

Serial Number: _____

To You, Our Customer:

Thank you for selecting a TOHATSU product. You are now the proud owner of an excellent outboard engine that will serve you for many years to come.

We would like to point out that carefree usage can only be assured on condition that this manual is read through in its entirety and the maintenance routines described later in this manual are followed carefully. Should difficulty arise with the engine, please follow the troubleshooting procedures listed at the end of this manual. If the problem persists, contact an authorized TOHATSU service shop or your dealer.

We hope you will get much enjoyment from this product and wish you good luck in your boating adventures.

TOHATSU CORPORATION

NOTICE: DANGER/WARNING/CAUTION/Note

Before operating your outboard motor, be sure to thoroughly read and understand this Owner's Manual and follow all of the instructions shown. Of particular importance is information preceded by the words "DANGER," "WARNING," "CAUTION," and "Note." Always pay special attention to such information to ensure safer and trouble-free operation at all times.

▲ DANGER

Failure to observe will result in severe personal injury or death.

▲ WARNING

Failure to observe could result in severe personal injury or death.

▲ CAUTION

Failure to observe could result in minor personal injury or product or property damage.

Note:

This instruction provides special information to facilitate the use or maintenance of the outboard or to clarify important points.

EMERGENCY STOP SWITCH

The stop switch will cut off the engine when the stop switch line is pulled out. This line can be attached to the body of the operator, effectively preventing injuries from the propeller in case he/she falls overboard.

We highly recommend use of the stop switch line because it can save the life of the operator if something bad happens. However, we would also like to point out the drawbacks of the switch. Accidental activation of the switch (such as the line being pulled out in heavy seas) could cause passengers to lose their balance and even fall overboard, or it could result in loss of power in heavy seas, strong currents, or high winds. Loss of control while mooring is another potential hazard.

To prevent such hazardous situations, the 500 mm line is coiled and can extend to a full 1,300 mm.

WARNINGS

As the operator/driver of the boat, you are responsible for the safety of those aboard and those in other crafts around yours, and for following local boating regulations. Therefore you should possess thorough knowledge of correct operation of the boat, its accessories, and the engine. To learn about the correct operation and maintenance of the engine, please read through this manual carefully.

It is very difficult for a person standing or floating in the water to take evasive action should he or she see a power boat heading in his/her direction, even at a slow speed. Therefore, when your boat is in the immediate vicinity of people in the water, the engine should be shifted to neutral and shut off.

SERIOUS INJURY IS LIKELY IF A PERSON IN THE WATER MAKES CONTACT WITH A MOVING BOAT, GEAR HOUSING, PROPELLER, OR ANY SOLID DEVICE RIGIDLY ATTACHED TO A BOAT OR GEAR HOUSING.

It is the operator's responsibility to perform all safety checks and to ensure that all lubrication and maintenance instructions are complied with for safe operation. It is also the operator's responsibility to return the unit to the local dealer for periodic inspection.

Correct periodic maintenance and good care of this outboard engine will lessen the chance of problems and keep overall operating expenses at a minimum.

SERVICING, REPLACEMENT PARTS, & LUBRICANTS

Only let an authorized TOHATSU service shop perform servicing or maintenance on this product. Be sure to use genuine parts and genuine lubricants or recommended lubricants.

MAINTENANCE

As the owner of this outboard engine, you should be acquainted with its correct maintenance. Please comply with all instructions on lubrication and maintenance, and return the engine to the dealer or service shop for periodic inspection at the prescribed intervals.

Troublefree operation cannot be expected unless the engine receives adequate periodic maintenance. If maintenance is performed periodically, it is not likely that a costly overhaul will ever be required.

USE OF SERVICE SHOP

When subjecting your TOHATSU product to a check or repair, please be sure to use a TOHATSU dealer authorized by TOHATSU or a TOHATSU agent.

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1. SPECIFICATIONS

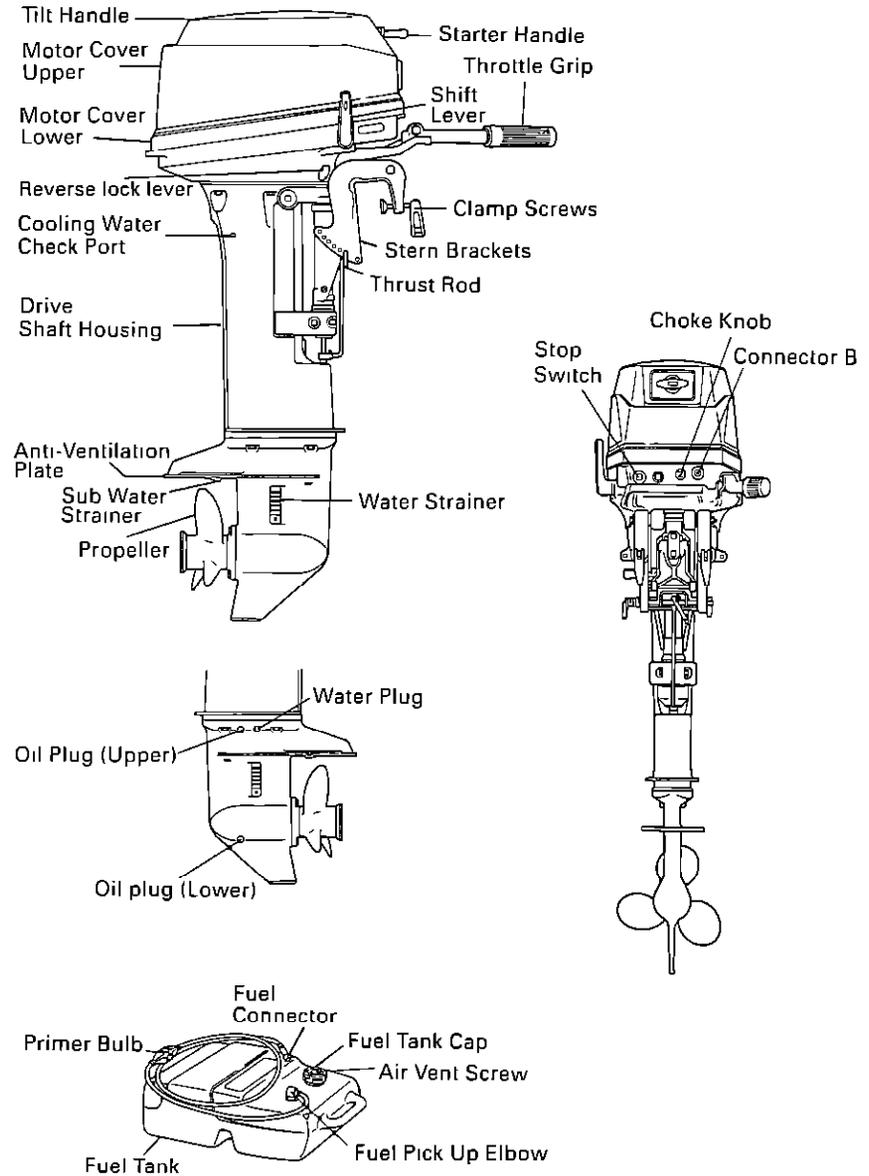
MODEL	9.9D	9.9DEF(*)	9.9DEP(*)	15D	15DEF(*)	15DEP(*)	18E	18E EF(*)	18E EP(*)
Overall Length, mm (in)	869 (34.2)		565 (22.2)	869 (34.2)		565 (22.2)	869 (34.2)		565 (22.2)
Overall Width, mm (in)	345 (13.6)		288 (11.3)	345 (13.6)		288 (11.3)	345 (13.6)		288 (11.3)
Overall Height, mm (in)	S: 1052 (41.4)			L: 1179 (46.4)		LL: 1255 (49.4)	UL: 1306 (51.4)		
Transom Height, mm (in)	S: 435 (17.1)			L: 562 (22.1)		LL: 639 (25.1)	UL: 689 (27.1)		
Weight (S**), kg (lb)	37 (81.6)	39 (86)	38.5 (84.9)	37 (81.6)	39 (86)	38.5 (84.9)	37 (81.6)	39 (86)	38.5 (84.9)
Output, KW (PS)	7.4 (9.9)			11.2 (15)			13.5 (18)		
Max. Operating Range	4,500-5,300 rpm			4,750-5,500 rpm					
Number of Cylinders	2								
Piston Displacement, cc (in ³)	247 (15.1)						294 (17.9)		
Bore x Stroke, mm (in)	55 x 52 (2.17 x 2.05)						60 x 52 (2.36 x 2.05)		
Exhaust System	through hub exhaust								
Lubrication	engine oil mixed gasoline								
Cooling System	forced water cooling								
Starting System	manual	electric starter motor		manual	electric starter motor		manual	electric starter motor	
Ignition	C.D. ignition								
Spark Plugs	NGK B7HS-10 or CHAMPION L82C (gap 1.0 mm) = (0.039 in.)								
Trim Stages	6								
Engine Oil Mixing Ratio	unleaded gasoline 50: Genuine Engine Oil 1								
Gear Oil	Genuine Gear Oil API (GL5 SAE #80-90)								
Fuel Tank Capacity, l (U.S. gal)	25 (6.6)								
Gear Reduction Ratio	13 : 24								

*: factory option

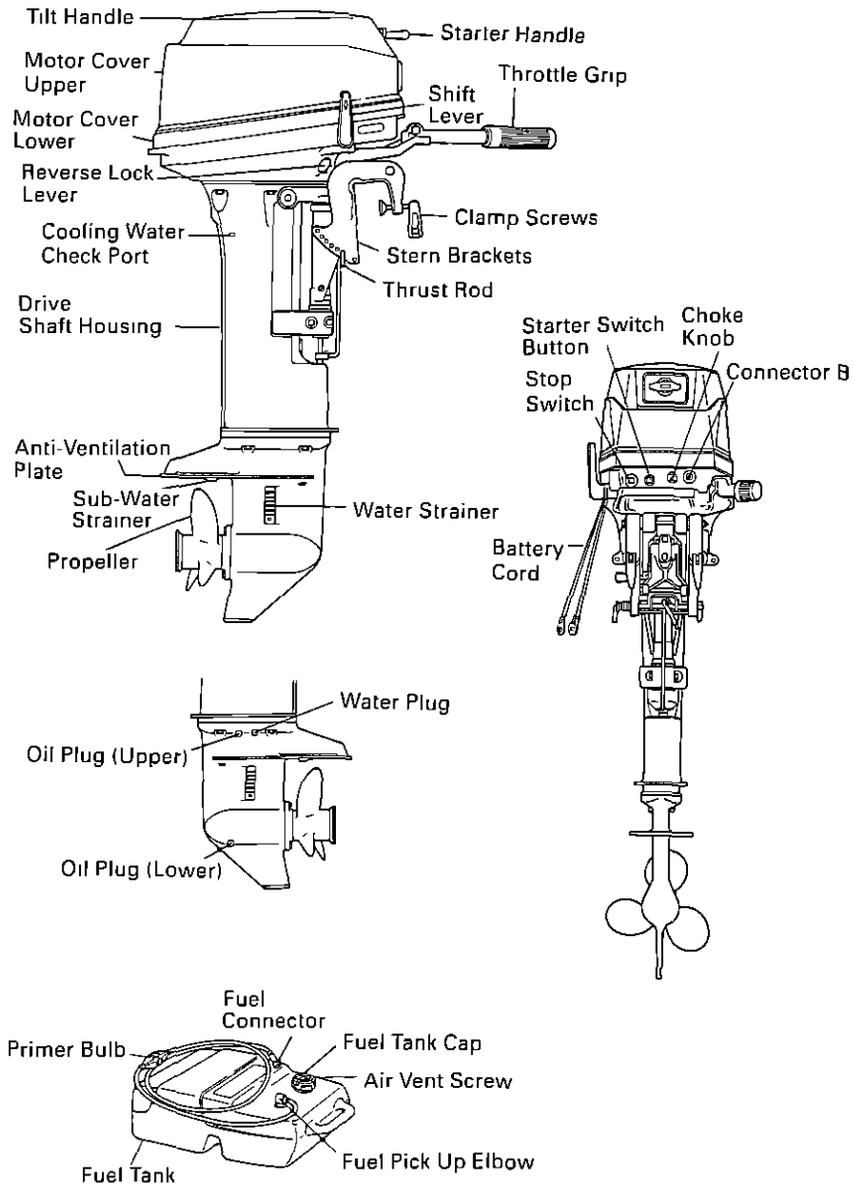
** : short shaft

2. NAME OF PARTS

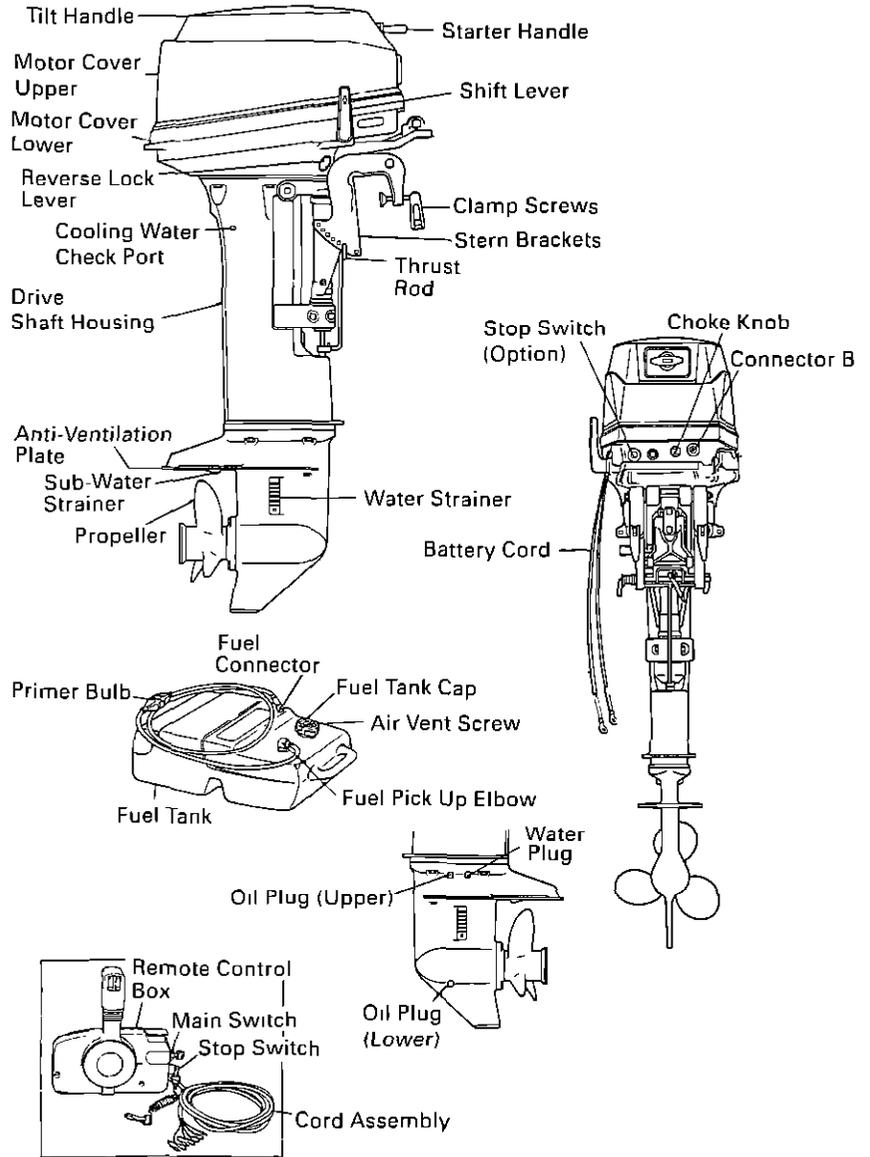
9.9D /15D /18E



9.9DEF /15DEF /18EEF



9.9DEP /15DEP /18EEP



3. INSTALLATION

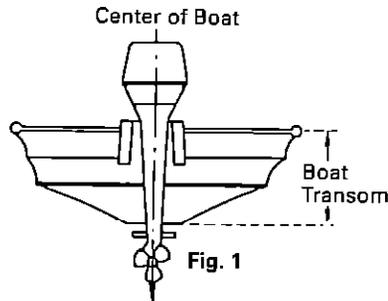
▲ WARNING

Most boats are rated and certified in terms of their maximum horsepower, and this is shown on the boat's certification plate. Do not equip your boat with an outboard that exceeds this limit. If in doubt, contact your dealer.

Do not operate the engine unit until it has been securely mounted on the boat in accordance with the instructions below.

3-1. Mounting engine(s) on boat

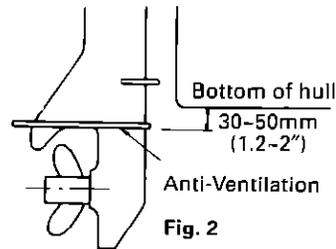
- (1) Position above keel line
 - Set engine center of boat (Fig. 1)
 - Distance between engines if two are mounted approximately 580 mm (22.8")



- (2) Transom matching

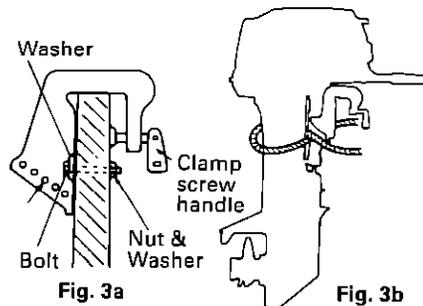
Be sure that the anti-ventilation plate of the outboard is below the water surface when running with the throttle wide open. (Fig. 2)

If the above condition cannot be met due to the shape of the bottom of your boat, please consult the dealer.



- (3) To attach the engine to the boat, tighten the clamp screws by turning their handles. Also, tighten the bolts. (Fig. 3a)

Make sure the engine is secure (Fig. 3b) to prevent loss or damage.



(4) **Trim angle**

The trim angle of the outboard motor can be adjusted to suit the stern angle of the boat and the loading conditions. Choose an appropriate trim angle for the motor so that the anti-ventilation plate is parallel to water surface during operation.

- **Proper trim angle**

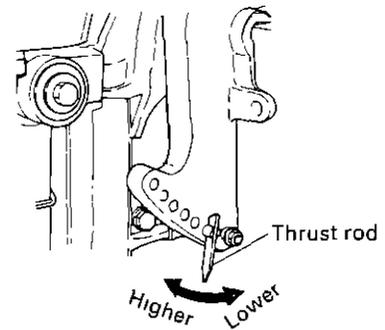
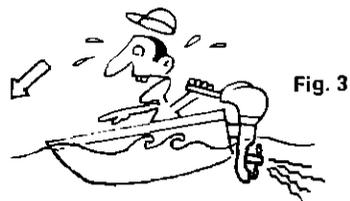
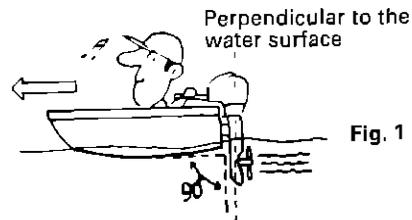
The position of the thrust rod is correct if the boat is horizontal during operation. (Fig. 1)

- **Improper trim angle**

Set the thrust rod lower the bow of the boat rises due to heavy pitching or unstable straight running. (Fig. 2)

- **Improper trim angle**

Set the thrust rod higher the bow of the boat goes under a wave. (Fig. 3)



3-2. Installing the remote control device

The following is an explanation of a right-hand Remote Control Box.

(1) Position of the Remote Control Box and length of the Remote Control Cable.

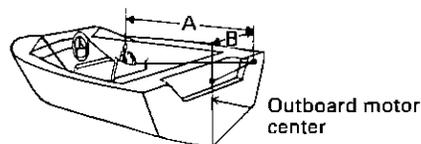
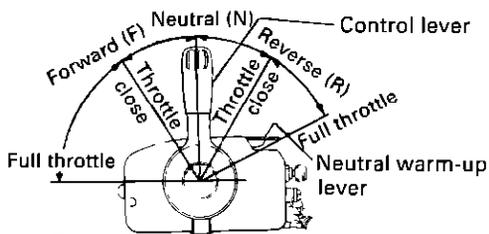
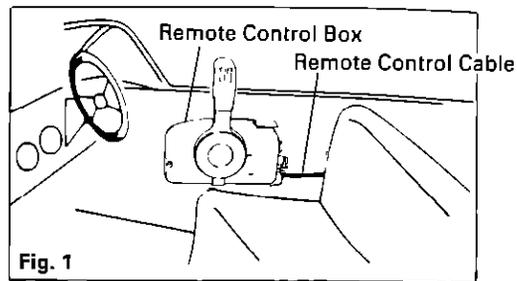
① Decide where to install the Remote Control Box, there should be no obstruction in operating the Remote Control Lever or switches.

Check if there is any obstruction for the Remote Control Cables.
(Fig. 1 & 2)

② The length differs depending on the type of boat.
To determine your length, measure the distance between points A and B in Fig. 3 and add 300 mm (1 foot) to that number. This is your length. (Fig. 3)

Note:

Do not roll up the Remote Control Cable to a diameter less than 406 mm (16 inches).



(2) Installation of the Remote Control Cables (the Box side)

- ① Take off the back panel of the Remote Control Cables by loosening the two screws. (Fig. 4)
- ② Screw in the Remote Control Cable Terminal Eyes 11 mm (0.43 inch). (Fig. 5)
Secure each Terminal Eye with a nut.
- ③ Put the Shift Remote Control Cable outer groove into the clamp groove.
Place the Terminal Eye on the pin of the Shift Arm and attach it with the E-ring. (Fig. 6)
- ④ Insert the grommet into the clamp groove of the Remote Control Box. (Fig. 6)

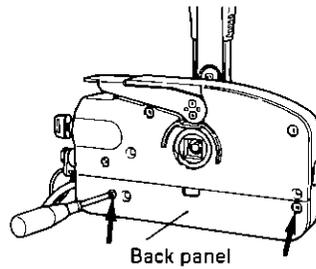


Fig. 4

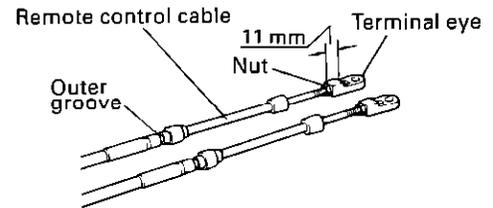


Fig. 5

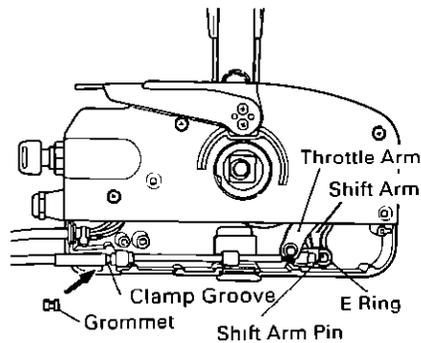


Fig 6

- ⑤ Connect the Throttle Remote Control Cable to the Throttle Arm same as ③. (Fig. 7)
- ⑥ Put the Back Panel on the Remote Control Box. (Fig. 8)

(3) Installation of the Remote Control Box on your boat

Mount the Remote Control Box by using the attachment screws, spacers, washers, and nuts (3 each). (Fig. 9)

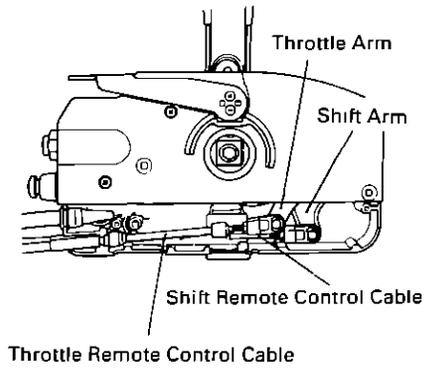


Fig. 7

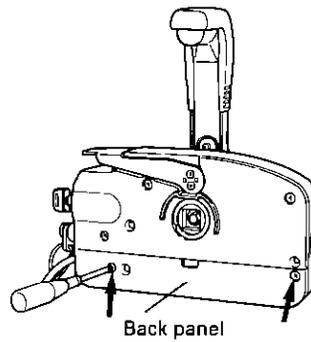


Fig. 8

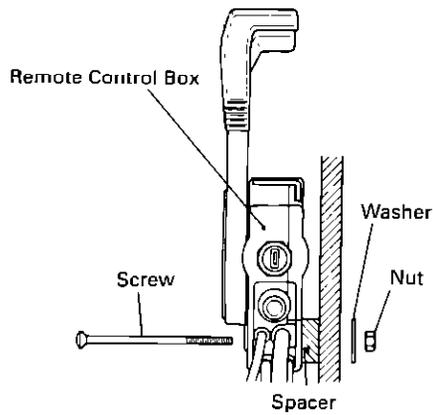


Fig. 9

(4) Installing the Remote Control Cable (engine side) and the Cord Assembly (Wiring Harness)

Fig. 10 illustrates parts for the Remote Control of engine side.

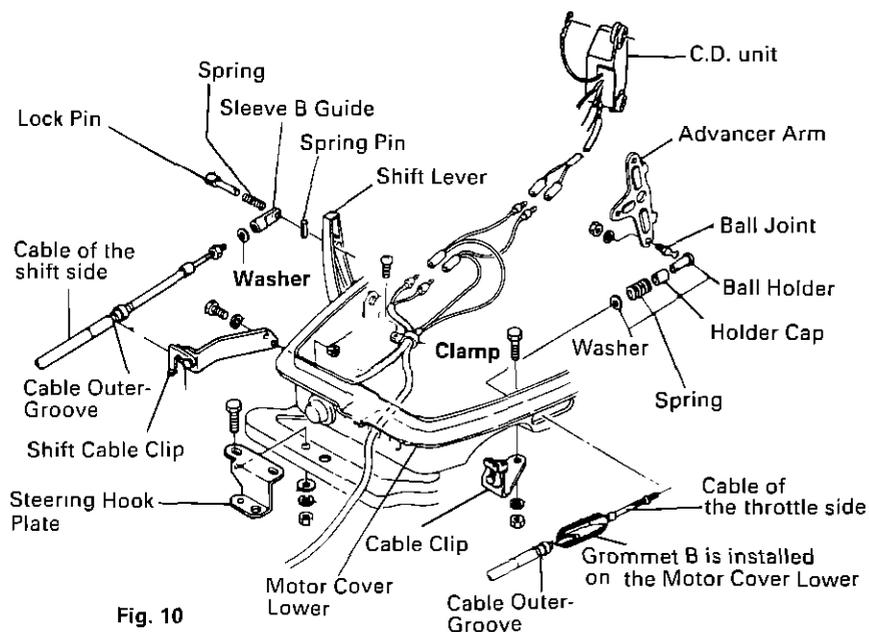


Fig. 10

- ① Connecting the Holder Cap and Sleeve B Guide
 - Throttle side Insert the cable in the Grommet B and install the Washer, the Spring, the Holder cap and the Ball Holder on the end of the Cable. Secure it with the Nut. (Fig. 11)
 - Shift side Insert the Lock pin with the Spring in the Sleeve B guide and press the spring pin into the Lock pin. Screw the sleeve B guide into the end of the Cable. Secure it with the Nut. (Fig. 12)
- ② Connecting the Remote control cable (engine side)
 - Throttle side
Insert the Throttle cable into the hole in the Motor cover lower. Attach the Holder cap at the end of the cable to the Ball joint.

Attach the Cable clip to the cable outer groove to secure the cable.

Re-install grommet B into the Motor cover lower. (Fig. 10)

- Shift side

Insert the Lock pin at the Shift lever fitting hole and turn it 90° to lock it.

Attach the Cable outer groove to the Shift cable clip to secure it. (Fig. 10)

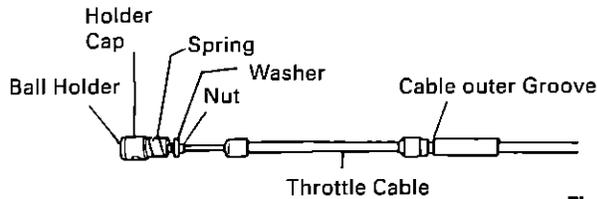


Fig. 11

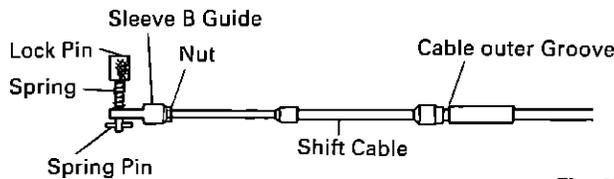


Fig. 12

Note:

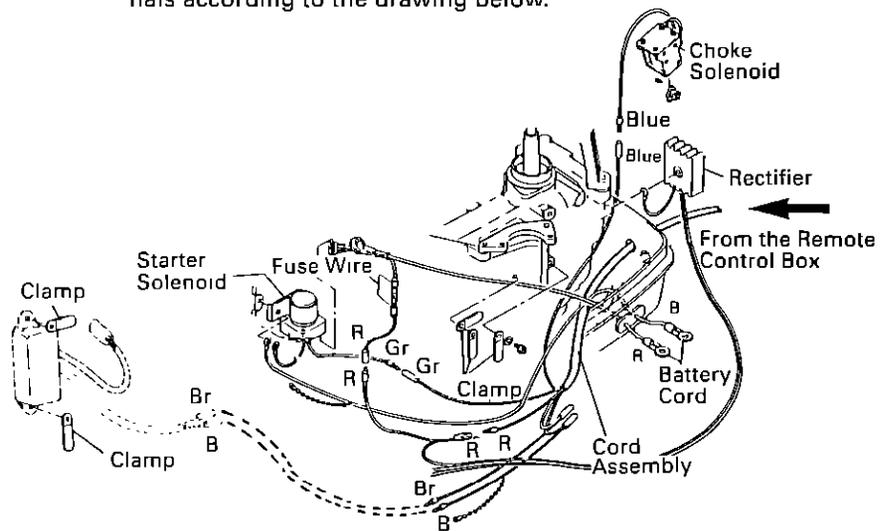
Put the control lever on the Neutral position and the Neutral warm-up lever in the fully closed position. (Fig. 2)

Note:

Confirm whether the engine side shift is in gear when shifting the control lever of the Remote Control Box to its first position in Forward or Reverse (about 32°) and whether the throttle of the carburetor is fully open when shifting the lever further. (Fig. 2)

Confirm whether the carburetor's throttle is fully closed when the control lever is shifted to the Neutral position. If it is not, adjust the position of the ball holder. (Fig. 11)

- ③ Connecting the Cord assembly (Wiring Harness)
- Pass the Cord assembly from the Remote control box through the hole in the Motor cover lower and connect the electric terminals according to the drawing below.



3-3. Mounting the battery

- (1) Place the battery box in a convenient position away from possible spray damage. Securely fasten both the box and battery so they do not shake loose.

A 12 V battery with a recommended capacity of 40 AH or more is recommended.

▲ WARNING

Hydrogen gas is generated when a battery is charged. Therefore, keep the battery well ventilated during charging.

Electric sparks, cigarette smoking and other sources of fire must be avoided in the charging area to prevent explosion of the battery.

*The battery fluid (electrolyte) contains sulfuric acid.

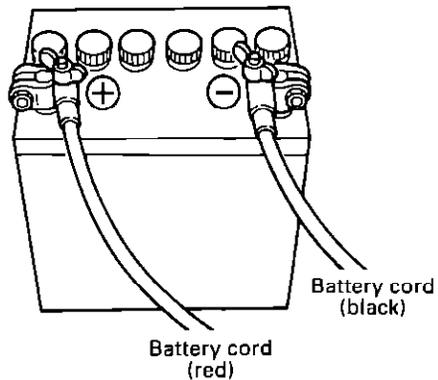
If any electrolyte is spilled on the skin, clothes, etc., wash with copious amounts of water and consult a doctor. Always use safety glasses and rubber gloves when handling the battery.

Remark: Further to notice on the label of your battery.

Note:

- (1) Make sure that the battery leads do not get stuck between the motor and boat when turning, etc.
- (2) The starter motor may fail to operate the leads are incorrectly connected.
- (3) Be sure to correctly connect the (+) and (-) leads. If not, the charging system will be damaged.
- (4) Always use a fully charged battery.

- (2) Connect the positive lead (+) to the positive terminal (+) of the battery, and then connect the negative lead (-). When disconnecting the battery always remove the negative lead (-) first. After connecting the positive terminal (+), securely place a cap on it to prevent short circuits.



4. PRE-OPERATING PREPARATIONS

4-1 Fuel and oil

▲ DANGER

Gasoline vapors are present, an errant spark could cause an explosion or fire.

- Do not smoke near gasoline.
- Do not overfill gasoline.
If any gasoline is spilt, wipe it up immediately.
- Stop the engine before fill gasoline into the fuel tank.

- **Required types**

Gasoline

Unleaded gasoline is recommended for outboard motors.

The minimum octane rating should be 87 based on the pump-posted octane rating method (91 based on the research octane rating method).

Note:

Gasoline containing alcohol, methanol (methyl), or ethanol (ethyl), may cause:

- Wear and damage to bearings, pistons, piston rings, and cylinder liners.
- Corrosion of metal parts.
- Deterioration of rubber parts and plastic parts.

Engine Oil

Use genuine engine oil or the other recommended one, that is, TCW3. We can not recommend any other two-stroke engine oil.

Caution

Do not mix different brands of oil. The mixing of different brands, or different kinds even if the same brand, may cause gelling, resulting in blockage of filter screens. This may lead to serious engine damage due to the lack of lubrication.

- **Mixing ratio (50:1)**
 unleaded gasoline 50: GENUINE ENGINE OIL
 or
 recommended engine oil (TCW3) 1

Note:
 You must break in the engine by operating it for 10 hours with mixing ratio of 25:1.

- Use of low-quality gasoline results in a short engine life as well as starting difficulties and other engine trouble.

4-2 Breaking In the Engine

1) Running time 10 hours

Time	0 min.-	10 min.-	1 hr.-	2 hrs.-	10 hrs.-
Method of operation	Idling or trolling	Throttle open less than 1/2 way (about 3,000 rpm)	Throttle open less than 3/4 of the way (about 4,000 rpm)	Throttle open 3/4 of the way (about 4,000 rpm)	Normal operating
Conditions	Cruising at no more than minimum speed		A full-throttle run is allowed for 1 min. every 10 min.	A full-throttle run is allowed for 2 min. every 10 min.	

2) Fuel mix ratio for break-in running

Gasoline 25: Genuine Engine Oil 1

- 25:1 when using genuine engine oil or the recommended one (TCW3)

5. ENGINE OPERATION

5-1. Starting

▲ WARNING

Be sure to connect the emergency stop hook to your waist or clothing. The engine will shut down if the hook's line becomes disconnected from the engine.

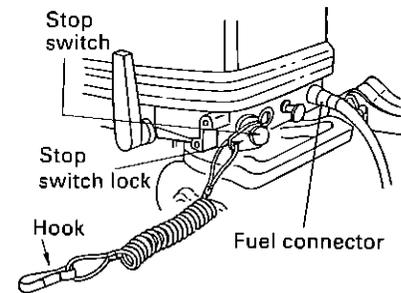
Note:

The engine will not start unless this switch has been properly connected and locked beforehand.

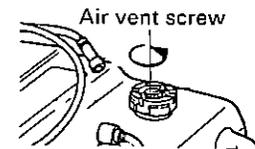
Note:

Do not operate the engine without cooling water.

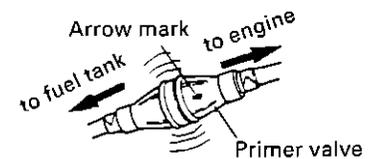
- ① Attach the fuel connector to the engine connector. The arrow mark on the primer valve should be facing the engine.



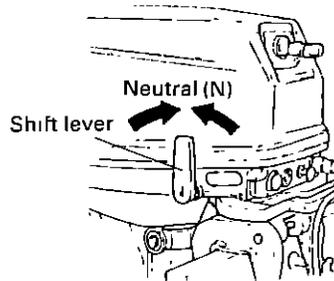
- ② Loosen the air vent screw on the tank cap.



- ③ Feed fuel to the carburetor by squeezing the primer valve until it is firm.



9.9D /15D /18E and EF type



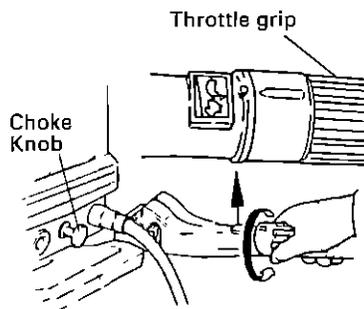
- ④ Place the shift lever in the Neutral position.

Be sure that the shift is in neutral when starting the engine.
This model is provided with a function that prevents starting in gear protection.

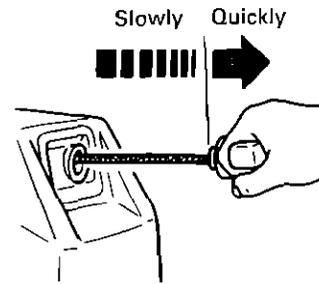
⚠ CAUTION

If the motor somehow does start in gear, do not use it. Contact your authorized dealer.

- ⑤ Turn the throttle grip until the mark on the grip faces the triangular mark on the steering handle.
- ⑥ Pull out the choke knob all the way.
(No choke operation is necessary when the engine is warm.)

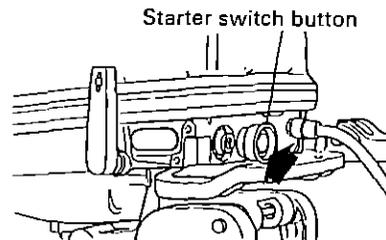


9.9D /15D /18E type



- ⑦ Pull the starter handle slowly until you feel resistance. Then pull it quickly.

EF type



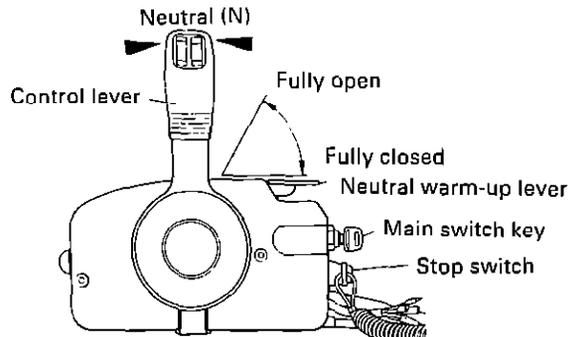
- ⑦ Push the starter switch button.
- ⑧ Stop pushing the button when the engine has started.

Note:

If use the choke knob for the engine start, push back it when the engine has started.

EP type

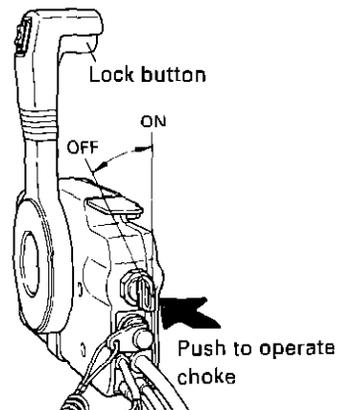
- ④ Insert the main switch key.
- ⑤ Set the control lever in the Neutral position.
Raise the Neutral warm-up lever.



- ⑥ Turn the main switch key to START position. Then, continuously push the key to operate the choke.

Note: Choke operation is not necessary if the engine is warm.

- ⑦ Stop pushing the key when the engine has started.
The key returns to the original position automatically.



Note:

The neutral warm-up lever can not raise when the control lever shift in Forward or Reverse.

Note:

Types EF and EP

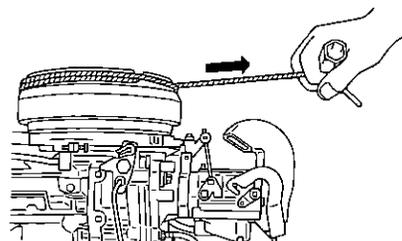
- Continuous operation of the starter motor shortens battery and starter motor life.

Operate the starter motor for a maximum of 3 seconds. If the engine does not start, wait 5 seconds before engaging the starter motor again.

- Do not engage the starter motor after the engine has started.

(3) If the recoil starter or starter motor fails to operate

- Remove the recoil starter cover and pull direct on the starter rope by hand.
- Use a 10 mm socket wrench as a handle on the rope.



▲ CAUTION

Be careful that your clothes or other items do not get caught in the rope or other engine parts.

To prevent getting things caught in the engine, do not re-attach the recoil starter after the engine has been started using the starter rope, but be sure to put the motor upper back on.

Immediately contact an authorized service shop when reaching shore.

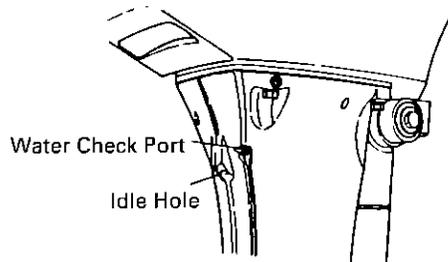
5-2 Warming up the engine

Warm the engine at low engine speeds for about three minutes. This allows the lubricating oil to circulate to all parts of the engine. Operating the engine without warming it up shortens the engine's life.

Be sure to check that cooling water is coming out of the water check port when warming up the engine.

Note:

If the engine is operated continuously without water discharging from the check port or idle hole, the engine may heat over.



- Engine speeds

Idling speed when warming up.

Clutch in	Clutch off
600~700 rpm	800~900 rpm

PROPELLER SELECTION

Propeller must be selected so that the engine rpm when cruising with a wide-open throttle is within the recommended range.

Model	Wide-open throttle rpm range
9.9D	4,500~5,300 rpm
15D/18E	4,750~5,500 rpm

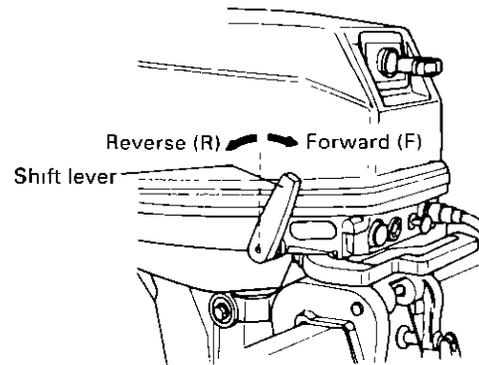
Genuine propellers are listed on Page 45 of this manual.

5-3. Forward and reverse

▲ CAUTION

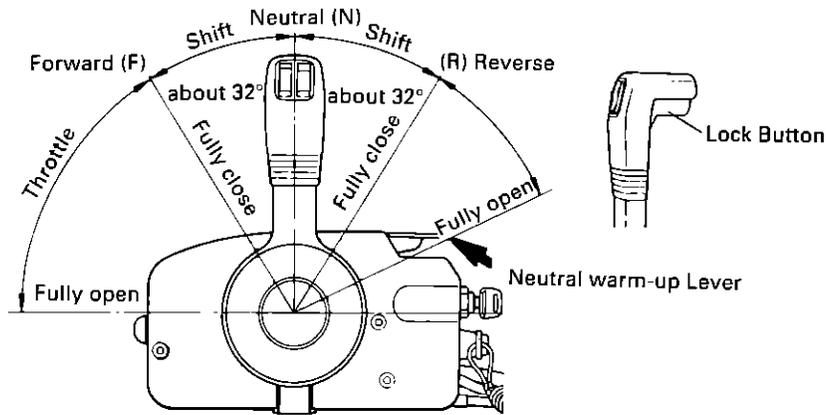
It may be dangerous to attempt shifting at high engine speed.
Be sure to slow down to trolling or idling speed before shifting.

9.9D /15D /18E and EF Type



- (1) Forward
Turn the throttle grip to reduce engine speed. When the engine reaches trolling speed, quickly pull the shift lever to the Forward position.
- (2) Reverse
As when shifting to Forward, reduce the engine speed, when the engine reaches trolling speed, quickly push the shift lever to the Reverse position.

EP type



(1) Forward

Quickly push the control lever to the Forward (F) position at 32°, where the gear is connected, while lifting up on the lock button located at the bottom of the control lever grip. Further shifting will open the throttle.

(2) Reverse

Quick pull the control lever to the Reverse (R) position at 32°, where the gear is connected, while lifting up on the lock button located at the bottom of the control lever grip. Further shifting will open the throttle.

Note:

The Control Lever is inoperative unless the Neutral Warm-up Lever is in the fully closed position.

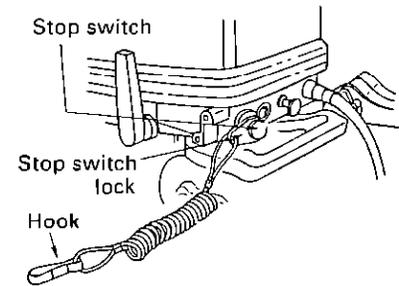
Note:

Reduce the engine speed when the Control Lever is in Neutral and do not increase the engine speed unnecessarily.

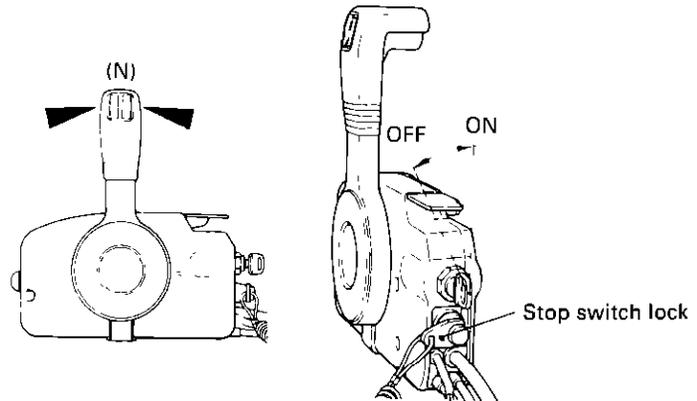
5-4. Stopping

9.9D /15D /18E /EF type

- ① Turn the throttle grip to the low speed position.
- ② Put the shift lever in the Neutral position.
Run the engine for 2-3 minutes at idling speed if it has been running at full speed.
- ③ Push the stop switch to stop the engine.



EP type



- ① Put the shift lever in the Neutral position and run the engine for 2-3 minutes at idling speed.
- ② Turn the main switch key to the OFF position or pull out the stop switch lock.

Note:

- After stopping the engine, close the air vent screw on the tank cap.
- Disconnect the fuel connector of the engine or the fuel tank.
- Disconnect the battery cord of the EF or EP type engine, if the engine will not be used for more than 3 days.

5-5. Tilt up, tilt down

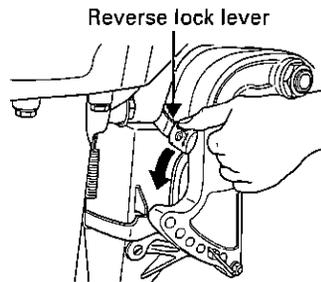
▲ WARNING

When tilting up or down, be careful not to place your hand between the swivel bracket and the stern bracket.
Be sure to tilt the outboard down slowly.

Note:
Stop the engine before tilting up.

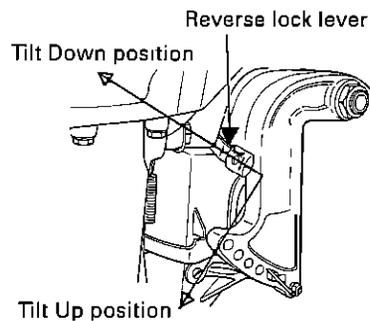
(1) Tilt up

Push the reverse lock lever down until it stops. (This is the tilt up position). Now, tilt the engine all the way up until it is locked in place.



(2) Tilt down

Pull the reverse lock lever upward until it stops. (This is the tilt down position.) Now, lift up the engine slightly, and then allow gravity to lower it for you.



5-6. Shallow water operation

▲ WARNING

When shallow water operation, be careful not to place your hand between the swivel bracket and the stern bracket.
Be sure to tilt the outboard down slowly.

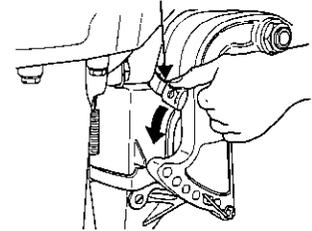
Note:

Slow down to trolling speed, and shift to the Neutral before shallow water operating.

(1) Tilt up

Put the reverse lock lever in the tilt up position, and tilt up the engine to put the engine in the shallow water running position.

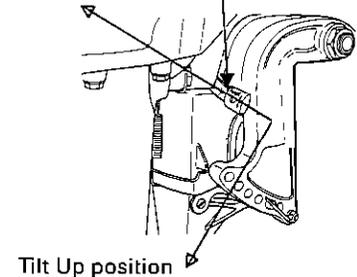
Reverse lock lever



(2) Tilt down

Put the reverse lock lever in the tilt down position, slightly lift up the engine, and then put it down.

Tilt Down position Reverse lock lever



⚠ CAUTION

- Make sure that the water strainer is submerged at all times and that water is continuously running out of the cooling water check port.
- Be sure to run the engine slowly when using the shallow water drive. Running at higher speeds will result in lack of control and may damage the gear case.
- Make sure that the motor does not strike the bottom, especially when running in REVERSE. If the motor does strike the bottom while in reverse, the impact is transmitted to the transom, which could damage both the motor and the boat.

6. REMOVING AND CARRYING THE MOTOR

6-1. Removing the motor

- ① Stop the engine.
- ② Disconnect the fuel pipe connector, the remote control cables and the battery cords from the motor.
- ③ Remove the motor from the hull and completely drain the water from the gear case.

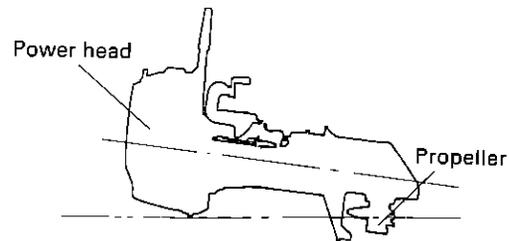
6-2. Carrying the motor

Be sure to keep the engine vertical posture whenever you carry the motor.

Note:

If you carry the motor horizontal posture, keep the power head higher than the propeller.

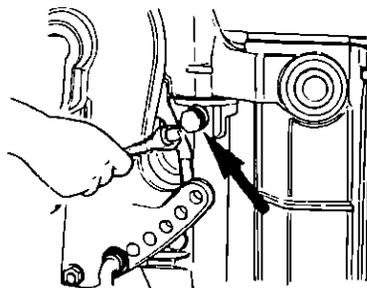
Lay the engine down on the ground with the handles facing upward.



7. STEERING FORCE ADJUSTMENT

The steering force can be adjusted in accordance with your preference by turning the steering bolt.

For heavier steering Turn clockwise
For lighter steering Turn counterclockwise



8. INSPECTION AND MAINTENANCE

8-1. Daily Inspection Checklist

Perform the following checks before and after use.

Item	Points to Check	Action
Fuel System	<ul style="list-style-type: none"> Check the amount of fuel in the tank Check for dust or water in the fuel filters Check the rubber pipes for fuel leakage. 	Replenish Clean Replace
Electrical Equipment	<ul style="list-style-type: none"> Check that the main switch functions normally. Check that the battery electrolyte level and specific gravity are normal Check for loose connections on the battery terminal. Check that the stop switch functions normally and make sure the lock plate is there Check cords for loose connections and damage Check the spark plugs for dirt, wear and carbon build-up. 	Replace Replenish or recharge Reighten Remedy or replace Correct or replace Clean or replace
Throttle System	<ul style="list-style-type: none"> Check that the choke solenoid and valve for the carburetor function normally Check if the carburetor and magneto work normally when turning the throttle grip, and check the links for looseness 	Replace Correct
Recoil Starter	<ul style="list-style-type: none"> Check the ropes for wear and damage. Check the latchet for engagement 	Replace Correct or replace
Clutch and Propeller System	<ul style="list-style-type: none"> Check that the clutch engages correctly when operating the shift lever and remote control. Visually check the propeller for bent or damaged blades. Check that the propeller nut is tightened and the split pin is there 	Adjust Replace
Installation of Motor	<ul style="list-style-type: none"> Check all the bolts attaching the motor to the boat Check the thrust rod installation 	Tighten
Cooling Water	<ul style="list-style-type: none"> Check that cooling water is discharged from the cooling water check port after the engine has started. 	
Tools and Spares	<ul style="list-style-type: none"> Check that there are tools and spare parts for replacing spark plugs, the propeller, etc. Check that you have the spare rope 	
Steering Devices	<ul style="list-style-type: none"> Check the operation of the steering handle and remote control. 	
Other parts	<ul style="list-style-type: none"> Check if the anode is securely installed Check the anode for corrosion and deformation. 	Repair if necessary Replace

A. Washing

After operating the motor in sea water or polluted water, or if it will be stored for a long period, wash all enclosures and the water cooling system with fresh water.

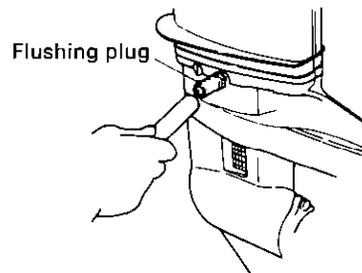
▲ WARNING

Before flushing, remove the propeller.

▲ WARNING

Never start or operate the engine indoors or in any space which is not well ventilated. Exhaust gas contains carbon monoxide, a colorless and odorless gas which can be fatal if inhaled for any length of time.

- Remove the water plug from the motor, and screw in the flushing plug (hose adapter).
Connect a hose to the flushing plug to flush out the inside of the motor with water. (Be sure to seal the water strainer and sub water strainer, located in the gear case, with tape.)
- With the shift lever in Neutral (N), run the engine at a low speed while flushing the cooling system to ensure all sea water and mud are removed.



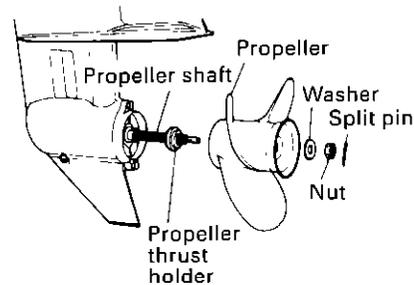
B. Replacing the propeller

A worn-out or bent propeller will lower the motor's performance, and cause engine trouble.

⚠ CAUTION

Before removing the propeller, remove the spark plug caps from the spark plugs to protect the propeller from damage.

- ① Take out the split pin, and remove the propeller nut and washer.
- ② Pull the propeller toward you and remove it.
- ③ Apply genuine grease to the propeller shaft before putting a new propeller on.

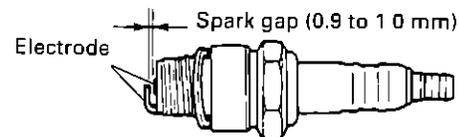


C. Replacing the spark plugs

If the electrode is fouled, has carbon deposits or is worn, clean or replace it as necessary.

- ① Remove the engine cover.
- ② Remove the spark plug by turning counter-clockwise while tapping it gently, using a 21 mm socket wrench and handle.

Use spark plugs (NGK B7HS-10 or BR7HS-10) or recommended ones (CHAMPION L 82 C with 1.0 mm gap).



D. Replacing the anodes

A sacrificial anode protects the outboards from the electrolytic corrosion (metallic corrosion developed by feeble electricity). Two anodes are fitted at the gear case and the mount bracket, and when the anodes has been eroded more than 2/3, replace it immediately.

Note:

- Never grease or paint the anode.
- At each inspection, retighten the anode fixing bolt, as it is likely to be subjected to electrolytic corrosion.

8-2. Periodic Inspection Checklist

It is important to inspect and maintain your outboard motor regularly. At each interval on the chart below, be sure to perform the indicated servicing. Maintenance intervals should be determined according to the number of hours or number of months, whichever comes first.

Item		Servicing Interval			Action	Remarks
		10 hours or 1 month	50 hours or 3 months	Every 100 hours or 6 months		
Fuel System	*Carburetor	○		○	Strip, clean, and adjust. Adjust idling.	
	Fuel filter	○	○	○	Check and clean.	
	Piping	○	○	○	Check and clean.	
	Fuel tank		○	○	Cleaner.	
Ignition	Spark plugs		○	○	Check gaps. Remove carbon deposits.	
	*Ignition timing	○		○	Adjust timing.	
Starting System	*Starter motor			○	Check for salt deposits and the battery cable condition.	
	Battery	○	○	○	Check installation, fluid quantity, gravity.	
	Starter rope	○	○	○	Check for wear or damage.	
Lower Unit	Propeller	○	○	○	Check for bent blades, damage, wear.	
	Gear oil	○	○	○	Change or replenish oil and check for water leaks.	
	Water pump		○	○	Check for wear or damage.	Replace impeller every 12 months.
Bolts and Nuts		○	○	○	Retighten.	
Sliding and Rotating Parts Grease Nipples			○	○	Apply and pump in grease.	
Outer Equipment		○	○	○	Check for corrosion.	
Anode			○	○	Check for corrosion and deformation.	Replace.

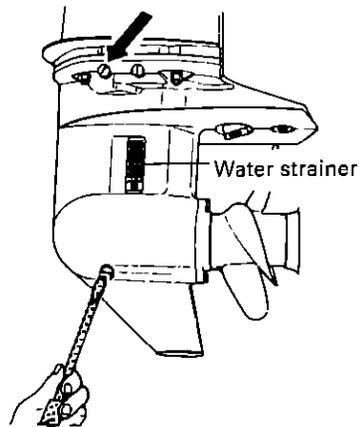
* Have this handled by the dealer.

Note:

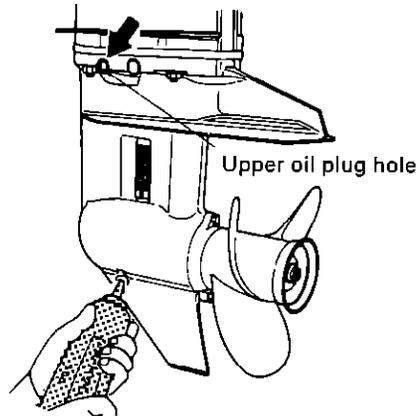
Recommended to overhaul your motor by the dealer when it has been reached around 300 hours in use.

A. Changing gear oil

- 1) Remove the oil plugs (upper and lower), and drain the gear oil completely.



- 2) Insert the oil tube nozzle into the lower oil plug hole, and fill with gear oil by squeezing the oil tube until oil flows out of the upper plug hole.



- 3) Install the upper oil plug, and then remove oil tube nozzle and install the lower oil plug.

Note:

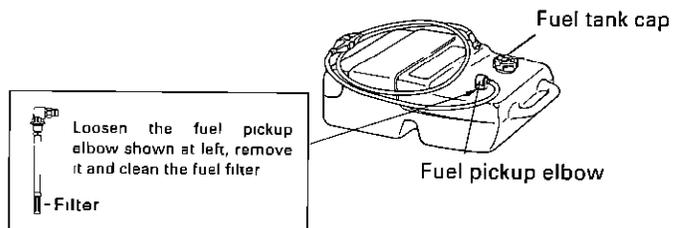
Use genuine gear oil or the recommended one (API GL-5: SAE #80 to #90).

Required volume: approx. 370 cc (0.10 U.S. gal.)

B. Cleaning the fuel filters and the fuel tank

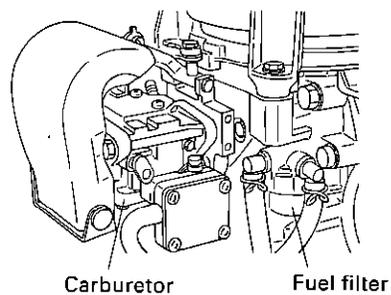
Fuel filters are provided inside the fuel tank and engine.

① Fuel tank filter



② Engine filter

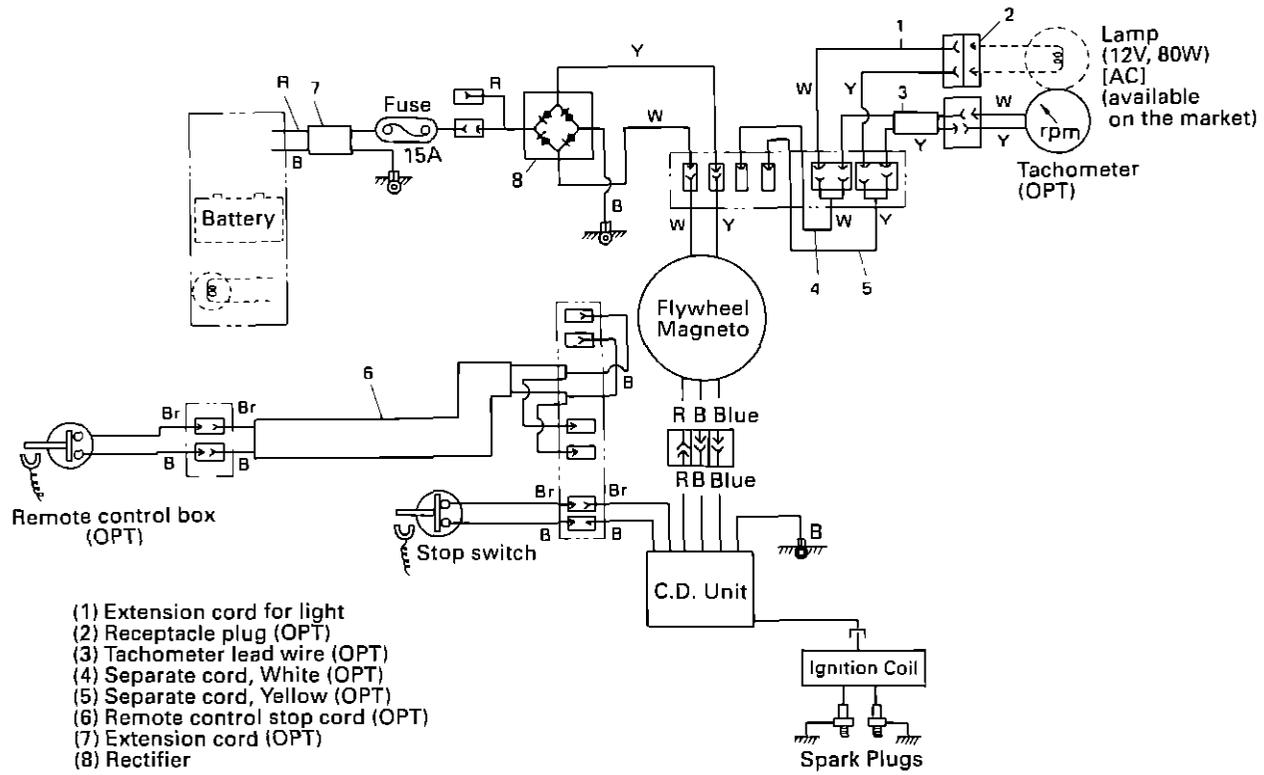
Remove the cap, then clean the fuel filter in the engine.



③ Fuel tank

Water or dirt in the fuel tank may cause engine trouble.

Clean the tank at specified times or after the motor has been store for a long period (over three months).



- ⑥ Store the battery in a dry place.

C. Electric Starter Motor

Coat the pinion gears and the shaft of the electric starter motor with grease.

8-4. Pre-season check

- ① Check the electrolyte level, and measure the voltage and specific gravity of the battery.

Specific Gravity at 20°C	Terminal Voltage (V)	Charge Condition
1.120	10.5	Fully discharged
1.160	11.1	1/4 charged
1.210	11.7	1/2 charged
1.250	12.0	3/4 charged
1.280	13.2	Fully charged

- ② Check that the battery is secure and the battery cables are properly installed.
- ③ Check that the shift and throttle function properly.
(Be sure to turn the propeller shaft when checking the shift function or else the shift linkage may be damaged.)

Note:

The following steps must be taken when first using the engine after winter storage.

- 1 Fill up the fuel tank completely with 25 liters (6.6 U.S. gals.)
Mixing ratio: Gasoline 25:1 Engine oil
Use unleaded gasoline and genuine Outboard Motor Oil. If this oil is not available, use NMMA TC-W 3 certified outboard motor oil.
 2. Warm up the engine for 3 minutes in the "NEUTRAL" position.
 3. Run the engine for 5 minutes at the slowest speed.
 4. Run the engine for 10 minutes at half speed.
- : In Steps 2 and 3 above, the oil used for winter storage inside the engine will be finished out to assure optimum performance.

8-5. Motor submerged in water

After taking your motor out of the water, immediately take it to your dealer.

The following are the emergency measures to be taken for a submerged outboard, if you can not take it to your dealer right away.

- 1) Wash the motor with fresh water to remove salt or dirt.
- 2) Remove the spark plugs, and completely drain the water from the engine by pulling the recoil starter several times.
- 3) Inject a sufficient amount of genuine engine oil through the spark plug hole and into the crank case from the carburetor side. Pull the recoil starter several times to circulate the oil throughout the motor.

8-6. Cold weather precautions

If you moor your boat in cold weather at temperatures below 0°C (32°F), there is the danger of water freezing in the cooling water pump, which may damage the pump, impeller, etc. To avoid this problem, submerge the lower half of the motor in water, or tilt the motor up above water level and pull the recoil starter several times to drain the water completely.

8-7. Checking after striking underwater object

Striking the sea bottom or an underwater object may severely damage the outboard. Immediately bring the outboard to the dealer and ask for the following checks.

- (1) Looseness or damage of power unit installation bolts, gear case and extension case bolts, propeller shaft housing bolts, upper and lower mount rubber bolts, and/or mount bracket bolts.

Ask the dealer to tighten any loose bolts any nuts, and to replace damaged parts.

- (2) Deformation and damage of mount rubber, the tilt stopper, thrust rod, gears and clutch, and/or propeller.

Ask the dealer to replace damaged or defective parts.

9. TROUBLESHOOTING

If you encounter a problem, consult the check list below to determine the cause and to take the proper measure.
Your dealer will always be happy to provide any assistance and information.

FUEL SYSTEM		Possible cause
•	Engine failing to start	Possible cause
•	Engine starting but stopping soon	
•	Poor idling	
•	Poor acceleration	
	Engine speed abnormally high	
•	Engine speed abnormally low	
•	High engine speeds not possible	
•	Overheating of engine	
•	Empty fuel tank	
•	Incorrect connection of fuel system	
•	Air entering fuel line	
•	Deformed or damaged fuel pipe	
•	Closed air vent on fuel tank	
•	Clogged fuel filter, fuel pump, or carburetor	
•	Use of improper engine oil	
•	Use of improper gasoline	
•	Excessive oil in mixture	
•	Shortage of oil in mixture	
•	Excessive supply of fuel	
•	Poor carburetor adjustment	
•	Recirculation pipe broken	
•	Spark plugs other than specified	
•	Dirt, soot, etc. on spark plugs	

	Engine failing to start	Engine starting but stopping soon	Poor idling	Poor acceleration	Engine speed abnormally high	Engine speed abnormally low	High engine speeds not possible	Overheating of engine	Possible cause
ELECTRIC SYSTEMS	•	•	•	•		•	•		No spark or weak spark
	•								Short circuit of engine stop switch
	•		•	•		•	•		Incorrect adjustment of ignition timing
	•								Loose battery terminal connection, corrosion
	•								Discharged battery
	•								Main switch trouble
	•								Lock plate not fitted to stop switch
	•								Disconnection of wire or loose ground connection
	•								Insufficient battery capacity, loose terminal connection, corrosion
OTHERS	•		•	•		•	•		Incorrect adjustment of throttle link
							•	•	Insufficient cooling water flow, clogged or defective pump
			•				•	•	Faulty thermostat
				•	•		•	•	Cavitation or ventilation
				•	•	•	•	•	Incorrect propeller selection
			•	•	•	•	•	•	Damaged and bent propeller
				•	•		•	•	Improper thrust rod position
				•	•	•	•	•	Unbalanced load on boat
				•	•	•	•	•	Transom too high or too low

10. TOOL KIT AND SPARE PARTS

The following a list of the tools and spare parts provided with the motor.

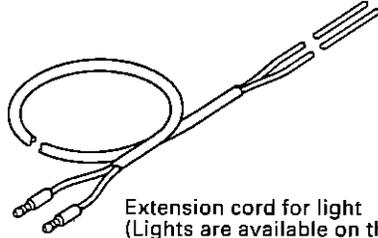
Items		Quantity	Dimensions	Remarks	
Service tools	Tool bag	1	10 x 13 mm 21 mm		
	Pliers	1			
	Socket wrench	1			
	Socket wrench	1			
	Socket wrench handle	1			
	Straight edge screw-driver	1			
Spare parts	Starter rope	1	1000 mm NGKB7HS-10 or CHAMPION L82C (Gap: 1.0 mm)		
	Spark plug	1			
	Split pin	1			
Parts Pack- aged with En- gine*	Fuel tank	1			
	Primer bulb	1 set			
	Remote control box	1 set			EP only
	Remote control attachment	1 set			
	Flushing plug	1			

* Not provided with the motor in some markets.

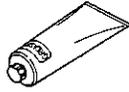
11. ACCESSORIES



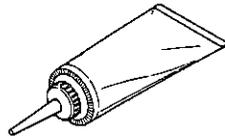
Tachometer



Extension cord for light
(Lights are available on the market.)



Genuine grease
(250g)



Genuine gear Oil
(260cc, 500cc)



Touch-up paint



Genuine engine oil
(0.4 l, 1 l, 4 l, 20 l)

12. PROPELLER TABLE

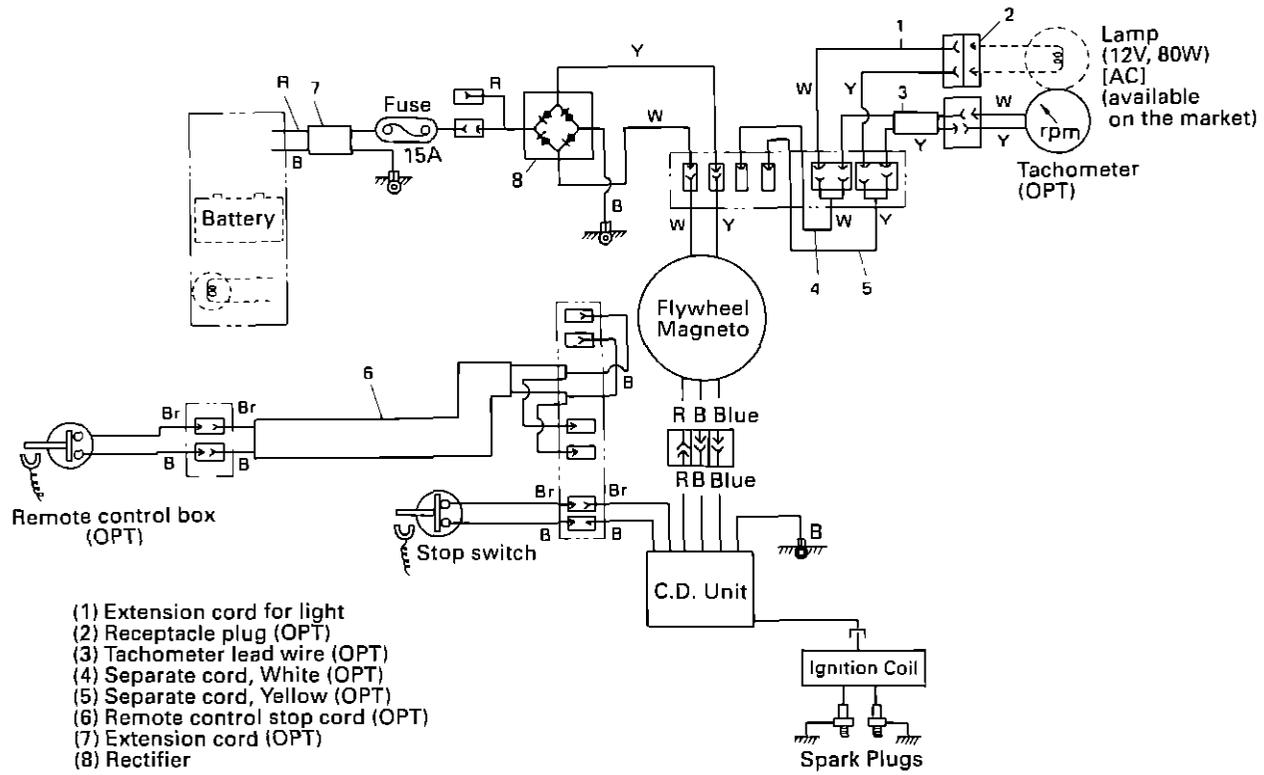
Use a genuine propeller.

A propeller must be selected so that the engine rpm measured at wide open throttle while cruising is within the recommended range: 9.9D = 4500 to 5300 rpm; 15D/18E = 4750 to 5500 rpm.

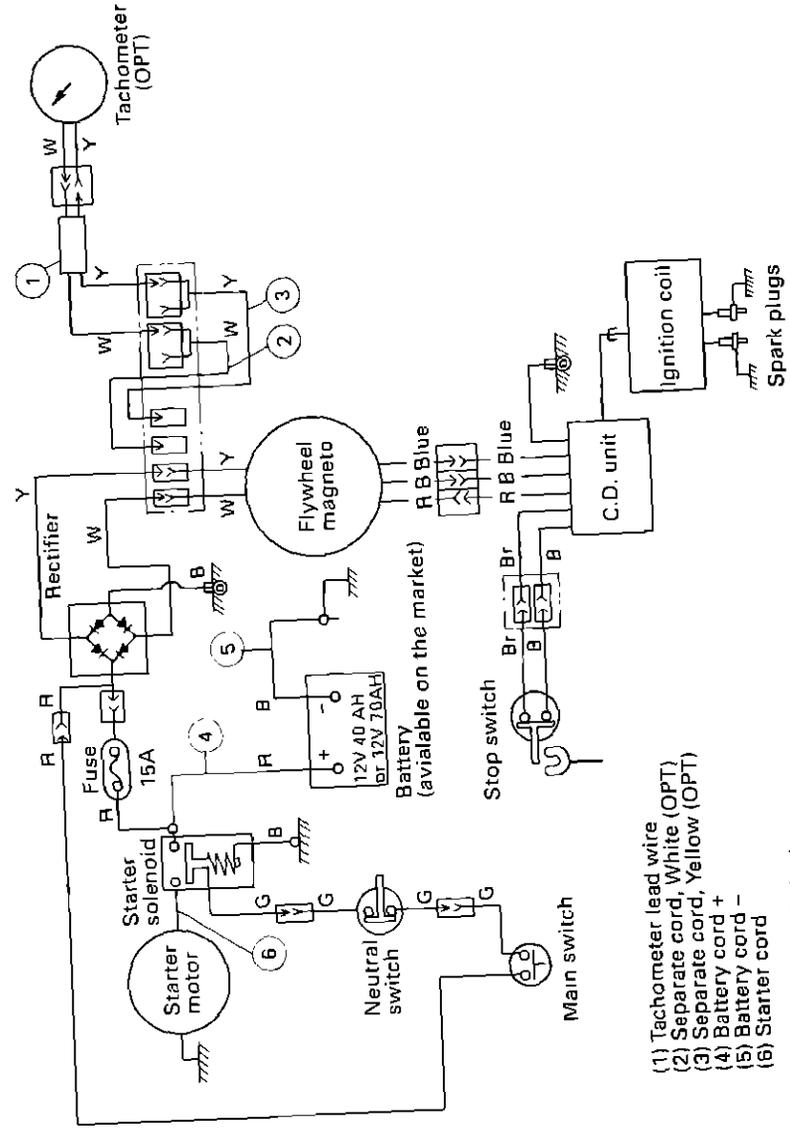
		Light boats			Heavy boats		
Size as Indicated on propeller		10	9	8.5	8	7	6
Propeller (mm) Size Diameter × pitch (inch)		234 × 250	234 × 231	234 × 214	234 × 199	234 × 174	234 × 155
		9.2 × 9.8	9.2 × 9.1	9.2 × 8.4	9.2 × 7.8	9.2 × 6.9	9.2 × 6.1
Model	18E	○	S	L	UL	○	○
	15D	○	○	S	L	UL	○
	9.9D	○	○	S	L	UL	○

○: Option

S (short), L (long), UL (extra long): Transom height



WIRING DIAGRAM (EF type)

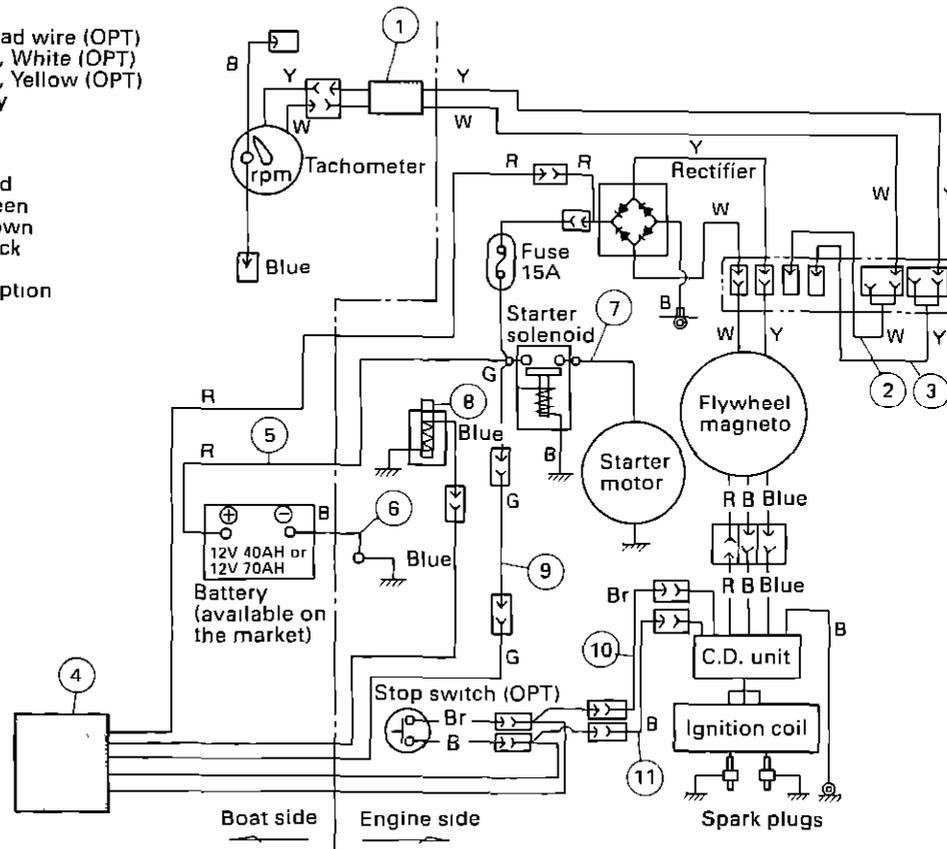


- (1) Tachometer lead wire
- (2) Separate cord, White (OPT)
- (3) Separate cord, Yellow (OPT)
- (4) Battery cord +
- (5) Battery cord -
- (6) Starter cord

OPT: Option

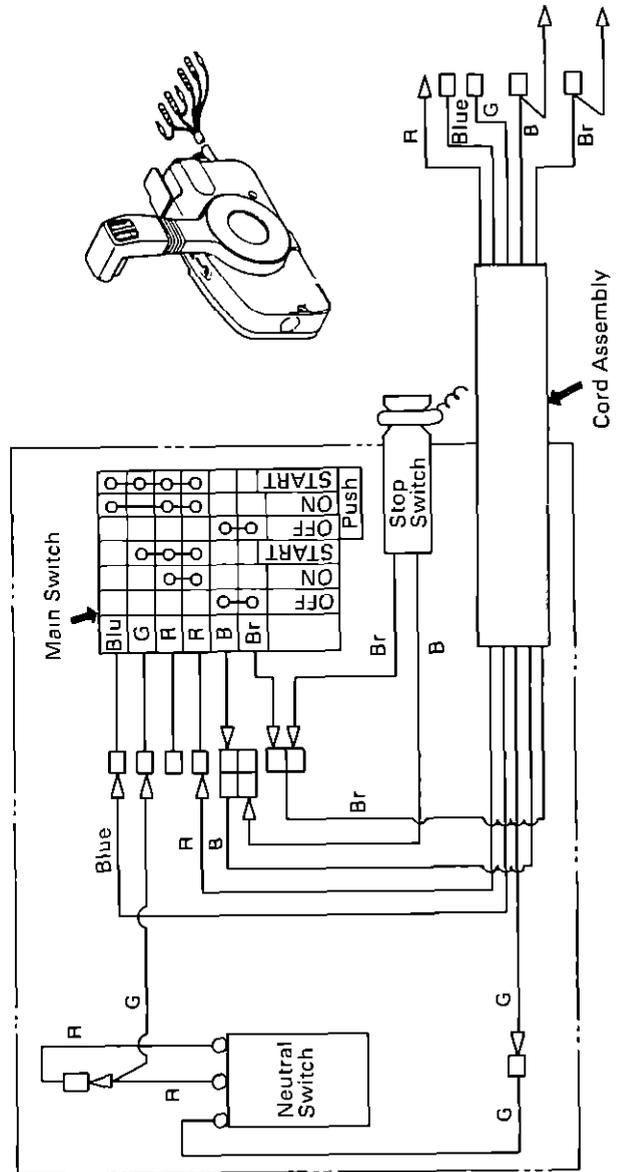
- (1) Tachometer lead wire (OPT)
- (2) Separate cord, White (OPT)
- (3) Separate cord, Yellow (OPT)
- (4) Cord assembly
- (5) Battery cord +
- (6) Battery cord -
- (7) Starter cord
- (8) Choke solenoid
- (9) Lead wire, Green
- (10) Lead wire, Brown
- (11) Lead wire, Black

OPT: Option



WIRING DIAGRAM (EP type)

WIRING DIAGRAM (Single Remote Control Box)



1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice" and "The Hon. Mr. Justice".



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