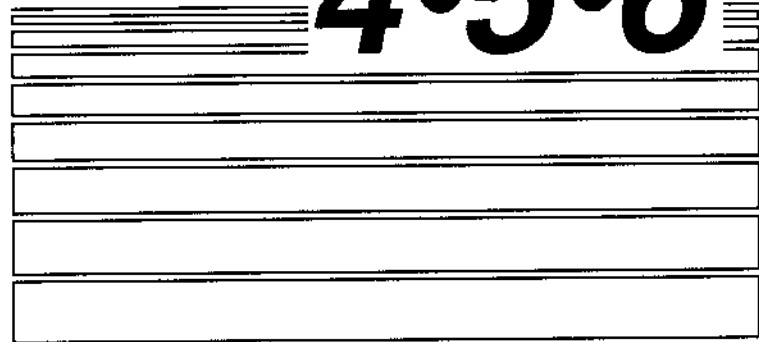




4-stroke **4•5•6**



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, 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, but not limited to:

- 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.
- 4) Damage from 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 a few examples not covered by the limited warranty:

Spark plugs, Anode, Trim-tab, Propeller, Fuel filter, Oil filter, Carbon brush, Starter rope, Shear-pin, Split-pin, Bolt-nut-washer, Wire cable, Rubber goods: water pump impeller, oil seal, "O"-ring, fuel hose, primer bulb, vinyl tube etc.

The limited 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 limited 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 service 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 safe 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 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 Emergency stop switch will kill the engine when the stop switch tether 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 Emergency stop switch line. 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 (20 inch.) line is coiled and can be extended to a full 1,300 mm (51 inch.).

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, engine, and accessories. 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 proper 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 service or maintenance on this product. Be sure to use genuine parts, genuine lubricants, or recommended lubricants.

MAINTENANCE

As the owner of this outboard engine, you must be acquainted with correct maintenance procedures. Please comply with all instructions concerning lubrication and maintenance, and you should 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 proper maintenance is performed, it is not likely that a costly repair will ever be required.

USE OF SERVICE SHOP

We recommend that you use only authorized dealers to carry out all of your maintenance and repair needs.

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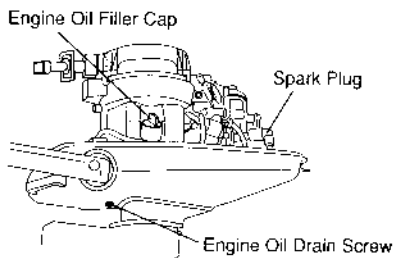
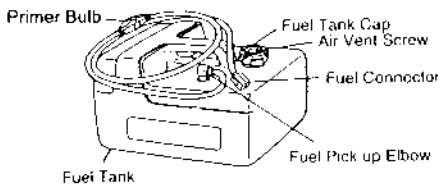
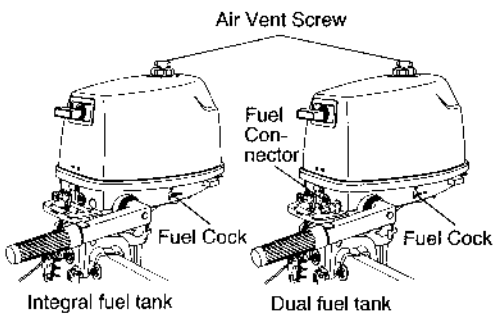
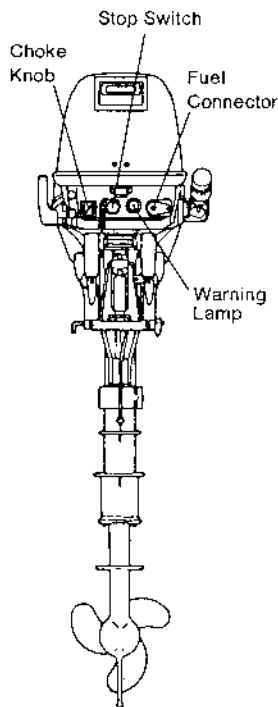
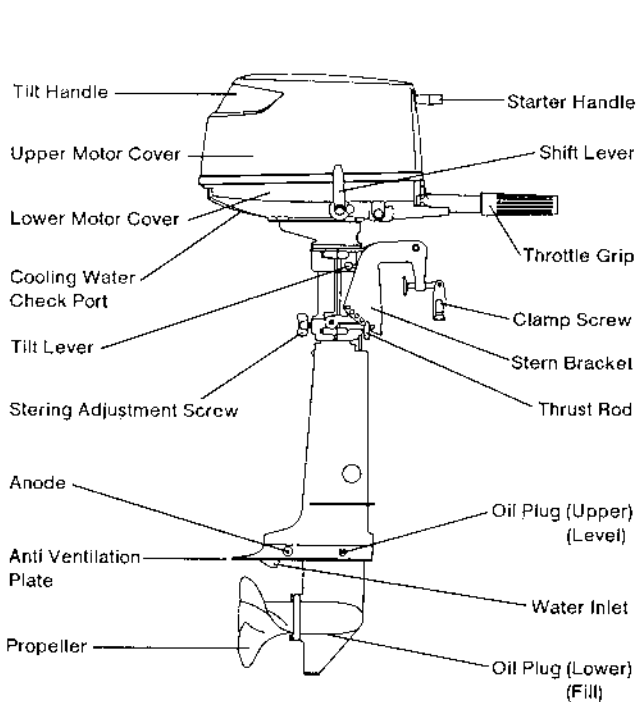
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1. SPECIFICATIONS

Item	MODEL	MFS 4A2	MFS 5A2S	MFS 6A2S
Overall Length,	mm	680		
Overall Width,	mm	325		
Overall Height,	mm	S:1,073 L:1,200 UL:1,327	S:1,020 L:1,147 UL:1,274	
Transom Height,	mm	S:435 L:562 UL:689		
Weight,	Kg	S:26 L:27 UL:28	S:25 L:26 UL:27	
Output,	kW	2.9	3.7	4.4
Max. Operating Range,	rpm	4,500 – 5,500	4,500 – 5,500	5,000 – 6,000
Engine Type		4-Stroke Cycle		
Number of Cylinders		1		
Bore and Stroke,	mm	59.0 × 45.0		
Piston Displacement,	mL	123		
Exhaust System		through hub exhaust		
Cooling System		forced water cooling		
Engine Lubrication		Trochoid pump pressure lubrication		
Starting System		manual starter		
Ignition System		Flywheel Magneto C.D. ignition		
Spark Plug		NGK DCPR6E		
Trim Stages		6 Position		
Engine Oil		API SF or SG or SH, SAE 10W – 30/40, Approx. 450mL		
Gear Oil		Genuine Gear Oil API GL5, SAE #80–90, Approx. 195mL		
Fuel Tank Capacity,	L	* 1.3 Integral	12 Separate	
Gear Reduction Ratio		13 : 28		

* In case of dual fuel tank system, use it together with 12L separate tank.

2. NAME OF PARTS



3. INSTALLATION

⚠ WARNING

Most boats are rated and certified in terms of their maximum allowable 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 the engine on boat

(1) Position . . . above keel line

● Set engine at center of boat.

(Fig. 1)

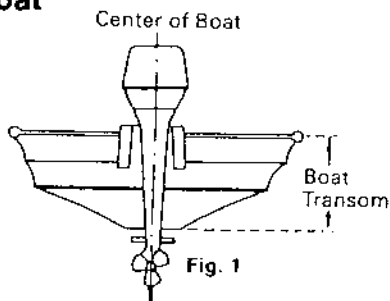


Fig. 1

(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.

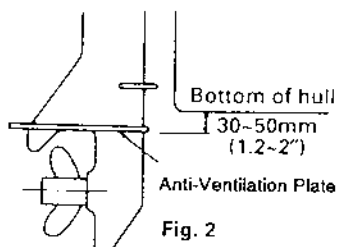


Fig. 2

(3) To attach the engine to the boat, tighten the clamp screws by turning their handles.

(Fig. 3)

Secure with a cable, or rope, to prevent loss overboard.

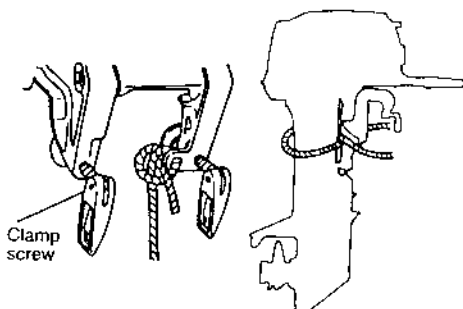


Fig. 3

4. PRE-OPERATING PREPARATIONS

4-1. Gasoline and engine oil

⚠ DANGER

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

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

● **Required Gasoline types**

Unleaded, minimum pump posted 87 octane gasoline is recommended.
(Octane is based on posted rating.)
(91 based on the research octane rating method)

Note:

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

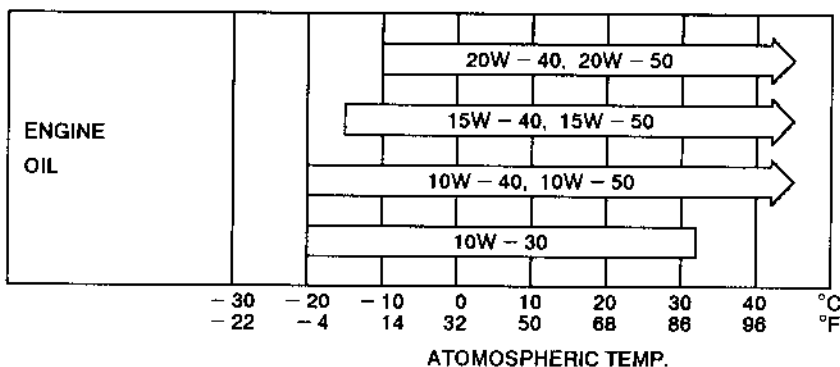
Note:

- (1) Gasoline containing alcohol {methanol (methyl), or ethanol (ethyl)}, acetone or benzene, may cause:
- Wear and damage to bearings, cams, piston(s), piston rings.
 - Corrosion of metal parts.
 - Deterioration of rubber parts and plastic parts.
 - Starting, idling, and other engine performance problems.
- (2) Do not use gasoline that contains more than 10% ethanol or more than 5% methanol.
- (3) Damages resulting from the use of gasolines that contain alcohol are not covered under the limited warranty.

● Engine Oil

Use only high quality 4-stroke engine oil to insure performance and prolonged engine life.

Use only oils that carry the API rating of SF, SG, SH. Select the appropriate viscosity, based on atmospheric temperature, from the chart below.



Note:

Use of engine oils that do not meet these requirements will result in reduced engine life, and other engine problems.

Note:

The engine oil is drained for shipping from the factory. Be sure to fill the engine to the proper level before starting engine. (To properly fill the engine with oil follow the instructions in section 9 of this manual)

4-2. Break-in

Break-in period 10 hours

Note:

You must break-in the engine by operating it for 10 hours according to the chart below.

Time	0	10 min.	2 hrs.	3 hrs.	10 hrs.~
Method of operation	Idling or trolling	Throttle open less than 1/2 of the 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.	

4-3. Engine oil warning lamp

Oil pressure is required to lubricate internal engine parts.

When the warning lamp (Red) is off, it indicates that oil pressure is present.

⚠ CAUTION

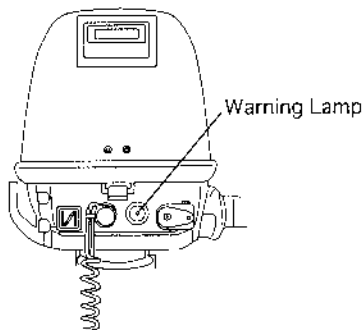
Never run the engine if the warning lamp is on or blinking on and off.

When the warning lamp is on or blinking on and off;

* Stop the engine immediately and check the engine oil level.

If the oil level is lower than the appropriate level: Replenish engine oil.

If the oil level is within the appropriate level: Consult with your dealer.



4-4. ESG (A device preventing over revolution)

ESG is a device to prevent over revolution of the engine (more than approximately 6,300 rpm).

If you sense that the ESG is activated return to shore at a reduced speed (rpm).

Possible causes of ESG activation are: Worn, broken, bent propeller. Slipping propeller rubber. Making sharp turns at high speeds.

5. ENGINE OPERATION

5-1. Starting

⚠ WARNING

Be sure to connect the emergency tethered stop hook to your waist or clothing.

The engine will shut down when the switch lock becomes disconnected from the engine.

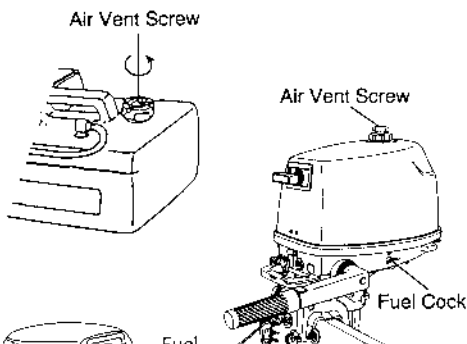
Note:

The engine will not start unless the switch lock has been properly connect into the emmergency stop switch.

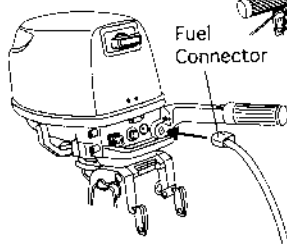
Note:

Do not operate the engine with gear case out of water.
Severe personal injury, or engine damage with result.

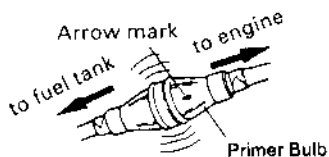
- ① Loosen the air vent screw on the tank cap.

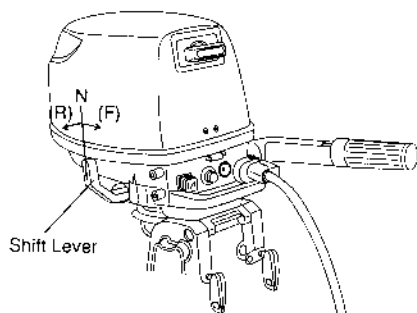


- ② • Attach the fuel connector to the engine connector.
The arrow mark on the primer bulb should be facing the engine. (Separate fuel tank)
• Open the fuel cock. (Integral fuel tank)



- ③ Feed fuel to the carburetor by squeezing the primer bulb until it is firm. (Separate fuel tank)





- ④ Place the shift lever in the Neutral position.

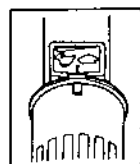
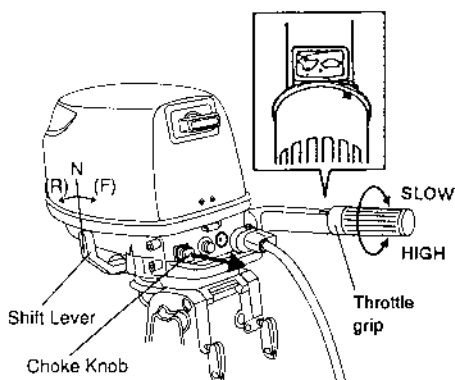
Be sure that the shift is in neutral when starting the engine.
This model is provided with start in gear protection.

▲ CAUTION

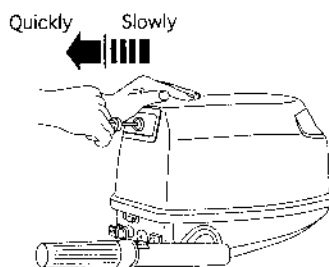
If the motor starts in gear, do not use it. Contact your authorized dealer.

- ⑤ Set the throttle grip to slow position.

- ⑥ Pull the choke knob out.
(Choke is not necessary when the engine is warm. Open the throttle grip until the triangular mark.)



Position for warm engine starting



- ⑦ Pull the starter handle slowly until you feel engagement .
Then pull it quickly. Repeat if necessary till started.

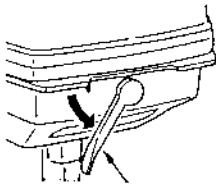
When starting the engine, push the choke knob back then return the grip to SLOW position and run the engine to warm up for several minutes.

Note:

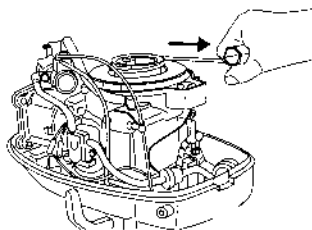
When warming up the engine in cold weather, set the choke knob to half opened position if necessary.

If the recoil starter fails to operate

- Remove the upper motor cover and the recoil starter. Wrap a rope around the starter pulley then pull quickly to start.
- Use a 10 mm socket wrench as a rope handle.



Hook Lever



⚠ CAUTION

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

To prevent accident and injury, do not re-attach the recoil starter after the engine has been started using the emergency starter rope. Be sure to put the upper motor cover back on.

Immediately contact an authorized service shop when reaching shore.

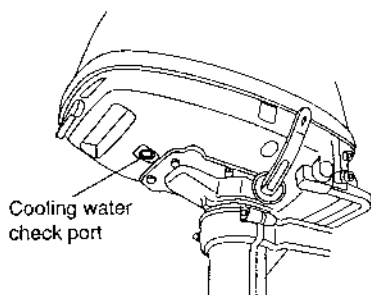
5-2. Warming up the engine

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 warm up shortens the engine's life.

Be sure to check that cooling water is coming out of the cooling water check port during warm up.

▲ CAUTION

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



● Engine speeds

Idling speed after warming up.

Clutch in	Clutch off
1,100 rpm	1,300 rpm

PROPELLER SELECTION

Propeller must be selected that will allow the engine to reach recommended rpm when cruising at wide-open throttle.

Wide-open throttle rpm range	
4A2 • 5A2S	6A2S
4,500~5,500 rpm	5,000~6,000 rpm

Genuine propellers are listed on PROPELLER TABLE of this manual.

5-3. Forward and reverse

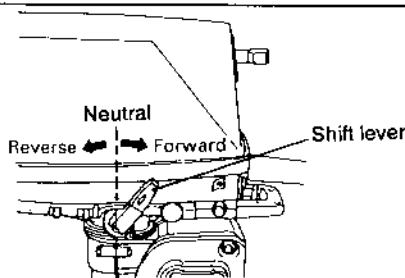
▲ CAUTION

Severs damage, and personal injury, may occur if shifting at high engine speed.

Engine must be in the slow running position before shifting is attempted.

Note:

Do not increase engine speed more than necessary in reverse.



(1) Forward

Turn the throttle grip to reduce engine speed. When the engine reaches trolling (or idling) speed, quickly pull the shift lever to the Forward position.

(2) Reverse

Reduce engine speed, when the engine reaches trolling (or idling) speed, quickly push the shift lever to the Reverse position.

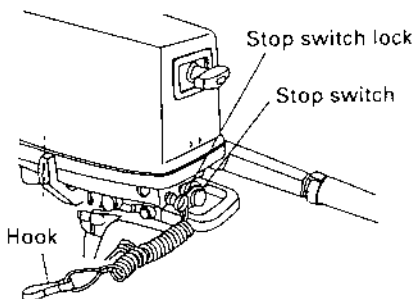
5-4. Stopping

① Turn the throttle grip to the slow position.

② Put the shift lever in Neutral position.

Run the engine for 2~3 minutes at idling speed if it has been running at full speed.

③ Release the stop switch lock or push the stop switch to stop the engine.



Note:

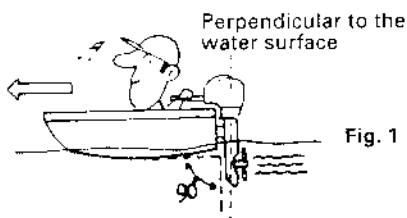
- After stopping the engine, close the air vent screw on the tank cap.
- Close the fuel cock. (Integral fuel tank)
- Disconnect the fuel connector of the engine or the fuel tank. (Separate fuel tank)

5-5. Trim angle

The trim angle of the outboard motor can be adjusted to suit the transam angle of the hull, and load conditions. Choose an appropriate trim angle that will allow the anti-ventilation plate to run parallel to the water surface during operation.

● **Proper trim angle**

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



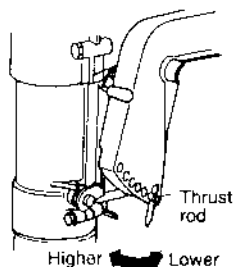
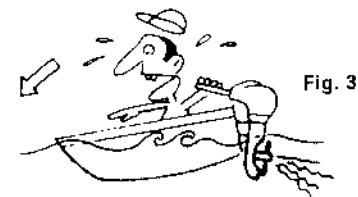
● **Improper trim angle**

Set the thrust rod lower if the bow of the boat rises above horizontal. (Fig. 2)



● **Improper trim angle**

Set the thrust rod higher the bow of the boat is below horizontal. (Fig. 3)



5-6. Tilt up, tilt down

▲ WARNING

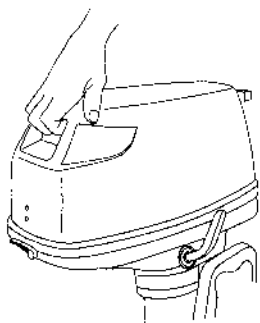
When tilting up or down, be careful not to place your hand between the swivel bracket and the stern bracket.
Be sure to tilt the outboard down slowly.

Note:

Stop the engine before tilting up.

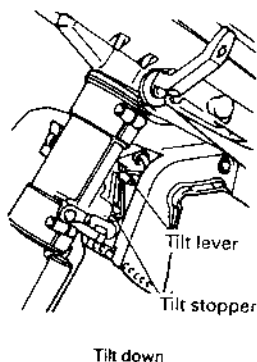
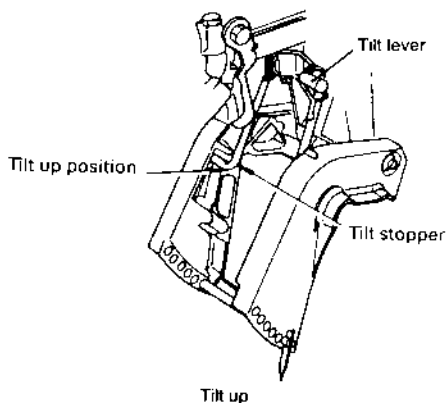
(1) Tilt up

With the shift lever in Forward, fully tilt the motor up toward you by holding the tilt handle provided at the rear of the upper motor cover. Then lower the tilt lever for locking in the up position.



(2) Tilt down

Slightly tilt the motor up and pull up on the tilt lever. Gently lower motor down. And shift the shift lever to the Neutral position.



5-7. Shallow water operation

▲ WARNING

During 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:

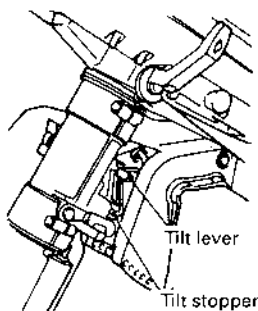
Slow down to trolling speed, and shift into Forward before shallow water operation.

(1) Shallow water running position:

With the shift lever in Forward, tilt the motor up slowly, to approximately 40° , then lower the motor it will automatically set in the shallow water operation angle.

(2) Return to normal running position:

Tilt the motor up, approximately 15° , then lower the motor slowly to the normal running position.



▲ CAUTION

- Be sure that the water inlet is submerged at all times and that water is continuously flowing from 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 mounting bracket.
- Care must be taken while running in this tilt position not to come in contact with the bottom, or submerged objects, especially in reverse. This may cause damage to the motor and/or boat.

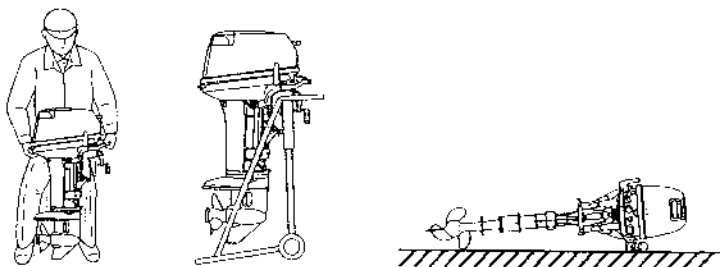
6. REMOVING AND CARRYING THE MOTOR

6-1. Removing the motor

- ① Stop the engine, close the air vent screw.
- ② Close the fuel cock. (Integral fuel tank)
Disconnect the fuel connector. (Separate fuel tank)
- ③ Remove the motor from boat and completely drain the water from the gear case.

6-2. Carrying the motor

Keep the motor in a vertical position when carrying.



6-3. Storing the motor

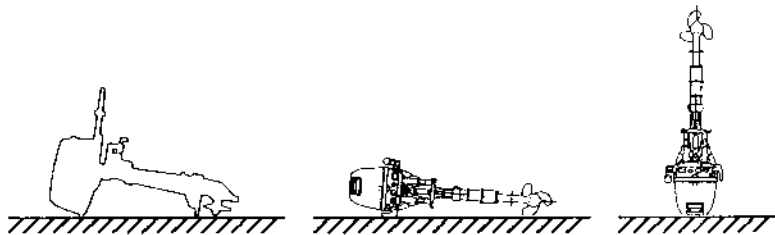
Motor should be stored in a vertical position.

Note:

If the engine must be laid down be sure the tiller handle faces down (The shift lever up) as shown in the drawing above.

⚠ CAUTION

Never carry, or store, the engine in the positions shown below.

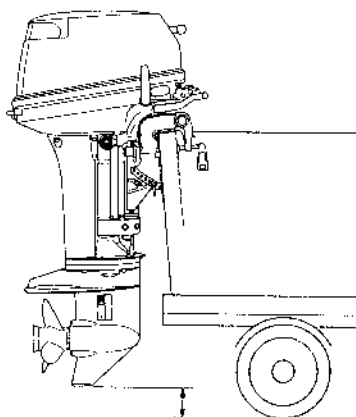


7. TRAILERING

▲ CAUTION

When trailering the engine should be in a vertical (normal running) position, fully down. Trailering in the tilted position may cause damage to the motor, boat, etc.

If trailering with engine fully down is not available (the gear case skeg is too close to the road in a vertical position), fix the motor securely using a device (like a transom saver bar) in the tilted position.



▲ CAUTION

The tilt support device supplied on your outboard is not intended for towing. It is intended to support the engine while the boat is docked, beached, etc.

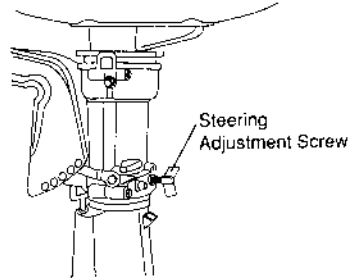
8. ADJUSTMENT

8-1. Steering friction

The steering friction can be adjusted in accordance with your preference by turning the adjustment screw.

For heavier steering Turn clockwise

For lighter steering Turn counterclockwise

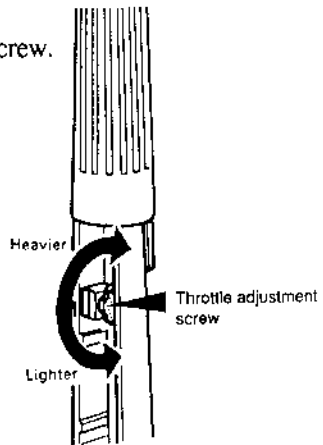


Note:

The steering adjustment screw is used to adjust the friction load of the steering, but not to fix the steering. Excess tightening of the adjustment screw may cause damage to the swivel bracket.

8-2. Throttle grip

Friction adjustment of the throttle grip can be made with the throttle adjustment screw.



9. INSPECTION AND MAINTENANCE

Care of your outboard motor

To keep your motor in the best operating condition, it is very important that you perform daily and periodic maintenance as suggested in the maintenance schedules that follow.

▲ CAUTION

- Your personal safety and that of your passengers depends on how well you maintain your outboard motor. Carefully observe all of the inspection and maintenance procedures described in this section.
- The maintenance intervals shown in the checklist apply to an outboard motor in normal use. If you use your outboard motor under severe conditions such as frequent full-throttle operation, frequent operation in brackish water, or for commercial use, maintenance should be performed at shorter intervals. If in doubt, consult your dealer for advice.
- We strongly recommend that you use only genuine replacement parts on your outboard motor. Damage to your outboard arising from the use of other than genuine parts is not covered under the warranty.

EPA Emissions Regulations

EPA (United States Environmental Protection Agency) has emission regulations and controlling air pollution from new outboard motors. All new motors manufactured by us are certified to EPA as conforming to the requirements of the regulations. This certification depends upon factory standards. Therefore, factory specifications must be followed when servicing emission related controls, or making adjustments. **Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine SI (Spark Ignition) engine repair establishment or individual.**

9-1. Daily Inspection

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 debris or water in the fuel filters. ● Check the rubber hoses for fuel leakage. 	Replenish Clean or Replace Replace
Engine Oil	<ul style="list-style-type: none"> ● Check the oil level. 	Fill to the upper level mark on dipstick.
Electrical Equipment	<ul style="list-style-type: none"> ● 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. 	Remedy or replace Correct or replace Clean or replace
Throttle System	<ul style="list-style-type: none"> ● Check that the carburetor choke valve functions normally. ● Check carburetor linkage is working normally when turning the throttle grip. 	Replace Correct
Recoil Starter	<ul style="list-style-type: none"> ● Check the rope for wear and chafing. ● Check the ratchet engagement. 	Replace Correct or replace
Clutch and Propeller System	<ul style="list-style-type: none"> ● Check that the clutch engages correctly when operation the shift lever. ● 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. 	
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

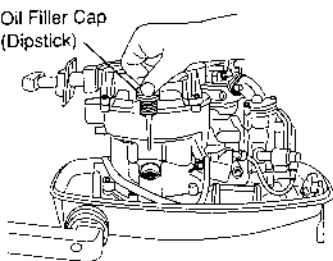
A. Maintaining engine oil

If the engine oil is low, the life of the engine will be shortened significantly.

Checking oil level:

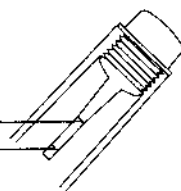
- ① Stop the engine and set it in a vertical position.
- ② Remove the upper motor cover.
- ③ Remove the oil filler cap.
- ④ Wipe oil on the oil dipstick with a clean rag.
- ⑤ Screw in the dipstick into the oil filter mouth (screw in completely).
- ⑥ Take out the dipstick and check the oil level.
- ⑦ Reset the dipstick in to the oil filter mouth.

Oil Filler Cap
(Dipstick)



Upper Level 450mL

Lower Level 350mL

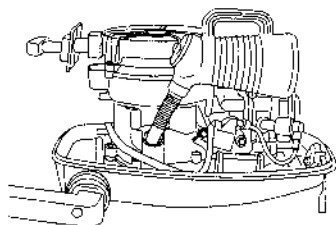


Note:

Consult with your dealer if the engine oil is milky color, or appears contaminated.

Replenishing engine oil:

If the oil level is low, or at lowest mark, add recommended oil to the upper dipstick mark .



⚠ CAUTION

- When adding engine oil, use the same brand and same grade oil.
- Be careful not to mix dust and water when adding the engine oil.
- If the oil over flows, wipe it up with rag.

B. 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.

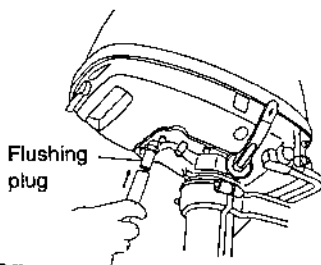
▲ WARNING

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.
- 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.



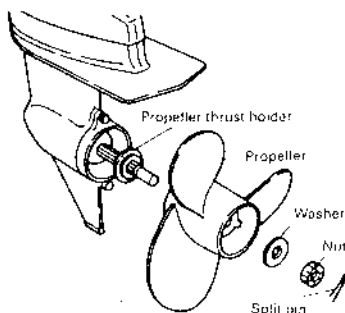
C. Replacing the propeller

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 cap from the spark plug to protect against personal injury.

- ① Remove the split pin, propeller nut and washer.
- ② Remove the propeller.
- ③ Apply genuine grease to the propeller shaft before installing a new propeller.

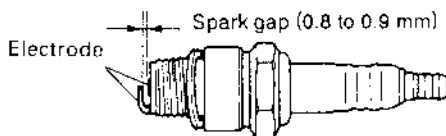


D. Replacing the spark plug

If the spark plug is fouled, has carbon build up, or is worn, it should be replaced.

- ① Stop the engine.
- ② Remove the upper motor cover.
- ③ Remove the spark plug cap.
- ④ Remove the spark plug by turning it counter-clockwise, using a 16 mm socket wrench and handle.

Use spark plug NGK DCPR-6E.



E. Replacing the anode

A sacrificial anode protects the outboard from the galvanic corrosion. Anode is located on the gear case. When the anode is eroded more than 2/3, replace it.

Note:

- Never grease or paint the anode.
- At each inspection re-tighten the anode attaching bolt. As it is likely to be subjected to electrolytic corrosion.

9-2. Periodic Inspection

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
		First 20 hours or 1 month	Every 50 hours or 3 months	Every 100 hours or 6 months		
Fuel System	*Carburetor			○	Strip, clean, and adjust.	
	Fuel filter	○	○	○	Check and clean or Replace.	
	Piping	○	○	○	Check and Replace.	
	Fuel tank	○		○	Clean	
Ignition	Spark plug	○		○	Check gaps. Remove carbon deposits or Replace.	
Starting System	Starter rope	○	○	○	Check for wear or chafing.	
Engine	Engine oil	○		○	Change	
	Valve Clearance	○		○	Check & adjust.	
Lower Unit	Propeller	○	○	○	Check for bent blades, damage, wear.	
	Gear oil	Change ○	○	Change ○	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:

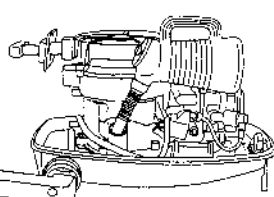
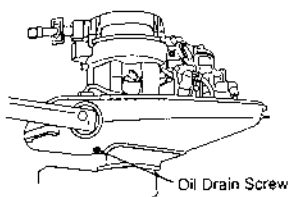
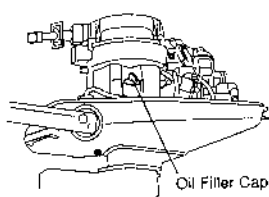
Your outboard motor should receive careful, and complete, inspection at 300 hours. This is the best time for major maintenance procedures to be carried out.

A. Changing engine oil

Engine oil mixed with dust and water will remarkably shorten the life of the engine.

To changing engine oil:

- ① Stop the engine and set it in a vertical position.
- ② Remove the upper motor cover and oil filter cap. Allow it to cool.
- ③ Put a oil drain pan under the oil drain screw.
- ④ Remove the oil drain screw and completely drain oil from the engine.
- ⑤ Tighten the oil drain screw.
- ⑥ Fill the engine through filler port with recommended oil (see chart below) to the upper dipstick mark.
- ⑦ Tighten the oil filler cap.

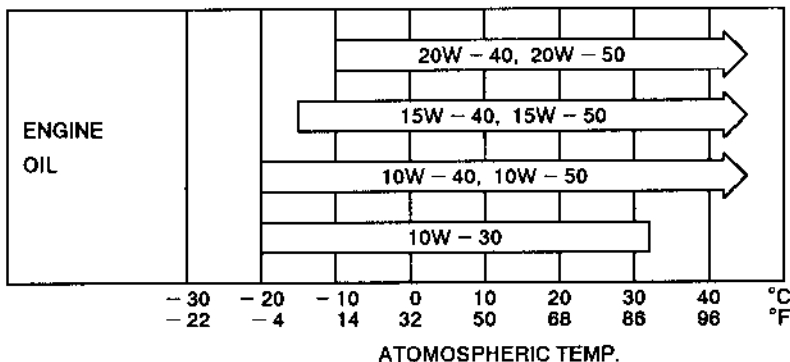


(Note)

Recommended engine oil:

4 stroke engine oil Use SAE 10W-30/40 of rated SF, SG or SH.
Use the proper viscosity oil from the chart below. This chart is based on the atmospheric temperature where the engine will be used.

Oil capacity 450 mL



⚠ CAUTION

You may be injured due to high engine temperatures. If you fill engine oil just after stopping. Changing engine oil should be done after the engine has been cooled.

Note:

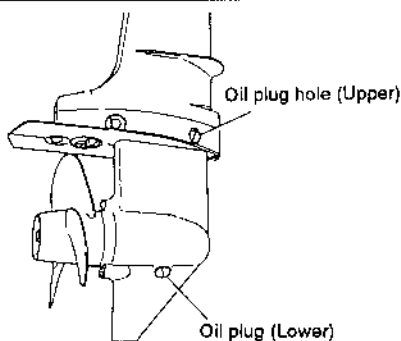
- If water in the oil, giving it a milky colored appearance. Contact your dealer.
- If oil contaminated with fuel will smell strongly of fuel. Contact your dealer.

B. Changing gear oil

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

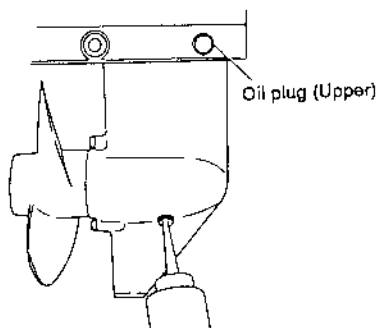
Note:

- If water in the oil, giving it a milky colored appearance. Contact your dealer.



- 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).

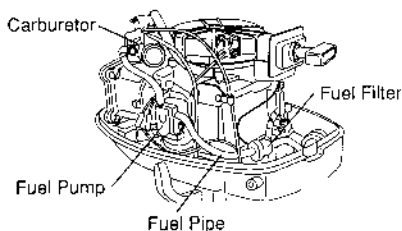
Required volume: approx. 195 mL.

C. Cleaning the fuel filters and the fuel tank

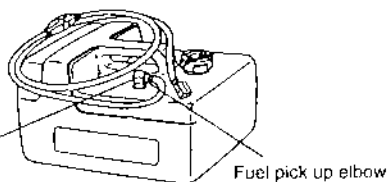
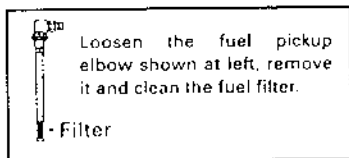
Fuel filters are provided inside the fuel tank and engine.

① Engine filter

Replace the filter provided inside of engine cover if there is water or dirt inside.



② Fuel tank filter



③ Fuel tank

Water or dirt in the fuel tank will cause engine performance problems.

Check and clean the tank at specified times or after the motor has been stored for a long period of time (over three months).

9-3. Off-season storage

To put your outboard motor in storage, it is a good opportunity to have it serviced and prepared your dealer.

▲ CAUTION

Before servicing the motor for storage:

- Remove the spark plug cap from the spark plug.
- Do not run the motor out of the water.

- ① Wash the engine exterior and flush the cooling water system thoroughly with fresh water. Drain the water completely.
Wipe off any surface water with an oil rag.
- ② Use a dry cloth to completely wipe off water and salt from the electrical components.
- ③ Drain all fuel from the fuel hoses, fuel pump, and carburetor, and clean these parts.
Keep in mind that if gasoline is kept in the carburetor for a long time, gum and varnish will develop, causing the float valve to stick, restrict the jets.
- ④ Remove the spark plug and spray storage oil (available from your authorized dealer) into the combustion chamber through the spark plug hole while slowly turning the motor over using the recoil starter.
- ⑤ Change the engine oil.
- ⑥ Change the gear oil in the gear case.
- ⑦ Apply grease to the propeller shaft.
- ⑧ Apply grease to all sliding parts, joints, nuts, and bolts.
- ⑨ Stand the engine up vertically in a dry place.

9-4. Pre-season check

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 the fuel tank completely with 12 liters.
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 storage inside the engine will be flushed out to assure optimum performance.

9-5. 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 engine oil drain screw and completely drain water and oil from the engine.
- 3) Remove the spark plug, and completely drain the water from the engine by pulling the recoil starter several times.
- 4) Inject a sufficient amount of engine oil through the spark plug hole. Pull the recoil starter several times to circulate the oil throughout the motor.

9-6. 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 engine into the water.

9-7. 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) Damage to mount rubber, the tilt stopper, thrust rod, gears and clutch, and/or propeller.

Ask the dealer to replace damaged or defective parts.

10. TROUBLESHOOTING

If you encounter a problem, consult the check list below to determine the cause and to take the proper action.

Your dealer will always be happy to provide any assistance and information.

	Engine failing to start	Engine starting but stopping soon	Poor idling	Poor acceleration	Engine speed abnormally high	Engine speed abnormally low	Boat speed low	Overheating of engine	Possible cause
FUEL SYSTEM	•	•							Empty fuel tank
	•	•	•	•		•	•	•	Incorrect connection of fuel system
	•	•	•	•		•	•	•	Air entering fuel line
	•	•	•	•		•	•	•	Deformed or damaged fuel hose
	•	•	•	•		•	•	•	Closed air vent on fuel tank
	•	•	•	•		•	•	•	Clogged fuel filter, fuel pump, or carburetor
			•	•		•	•	•	Use of improper engine oil
	•	•	•	•			•	•	Use of improper gasoline
	•			•					Excessive supply of fuel
	•	•	•	•		•	•	•	Poor carburetor adjustment
	•	•	•		•	•	•	Spark plug other than specified	
	•	•	•		•	•		Dirt, soot, etc. on spark plug	

	Engine failing to start	Engine starting but stopping soon	Poor idling	Poor acceleration	Engine speed abnormally high	Engine speed abnormally low	Boat speed low	Overheating of engine	Possible cause
ELECTRIC SYSTEMS	●	●	●	●		●	●		No spark or weak spark
	●								Short circuit of engine stop switch
	●		●	●		●	●		Ignition timing incorrect
	●								Lock plate not fitted to stop switch
	●								Disconnection of wire or loose ground connection
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
		●	●	●		●			Low compression
			●					●	Carbon deposits in the combustion chamber
	Engine makes noise							Too much the valve clearance	

11. TOOL KIT AND SPARE PARTS

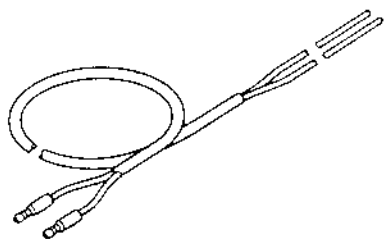
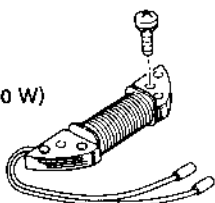
The following is a list of the tools and spare parts provided with the motor.

Items		Quantity	Dimensions	
Service tools	Tool bag	1		
	Pliers	1		
	Socket wrench	1	10 × 13 mm	
	Socket wrench	1	16 mm	
	Socket wrench handle	1		
	Screwdrivers	1	Cross- and straight-point	
	Screwdriver handle	1		
Spare parts	Starter rope	1	1,000 mm	
	Spark plug	1	NGK DCPR6E	
	Split pin	1		
Parts Packaged with Engine	Fuel tank *	1		12L
	Primer bulb *	1 set		
	Flushing plug	1		

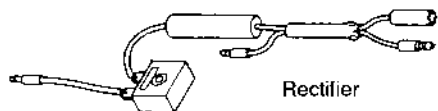
* : It is not attached to integral fuel tank model.

12. OPTIONAL ACCESSORIES

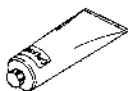
Alternator (12 V, 60 W)



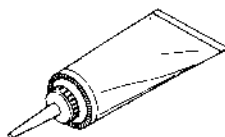
Extension cord for light
(Lights are available on the market.)



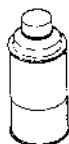
Rectifier



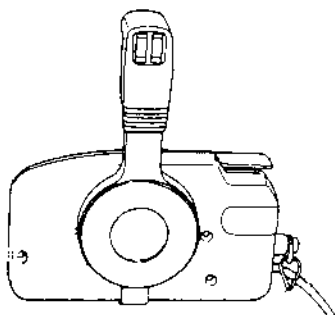
Genuine grease
(250g)



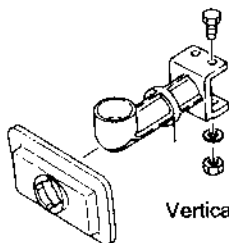
Genuine gear Oil
(500mL)



Touch-up paint
(300mL)



Remote control box
Various kinds of fitting parts are available.
Please consult with your dealer.



Vertical starter

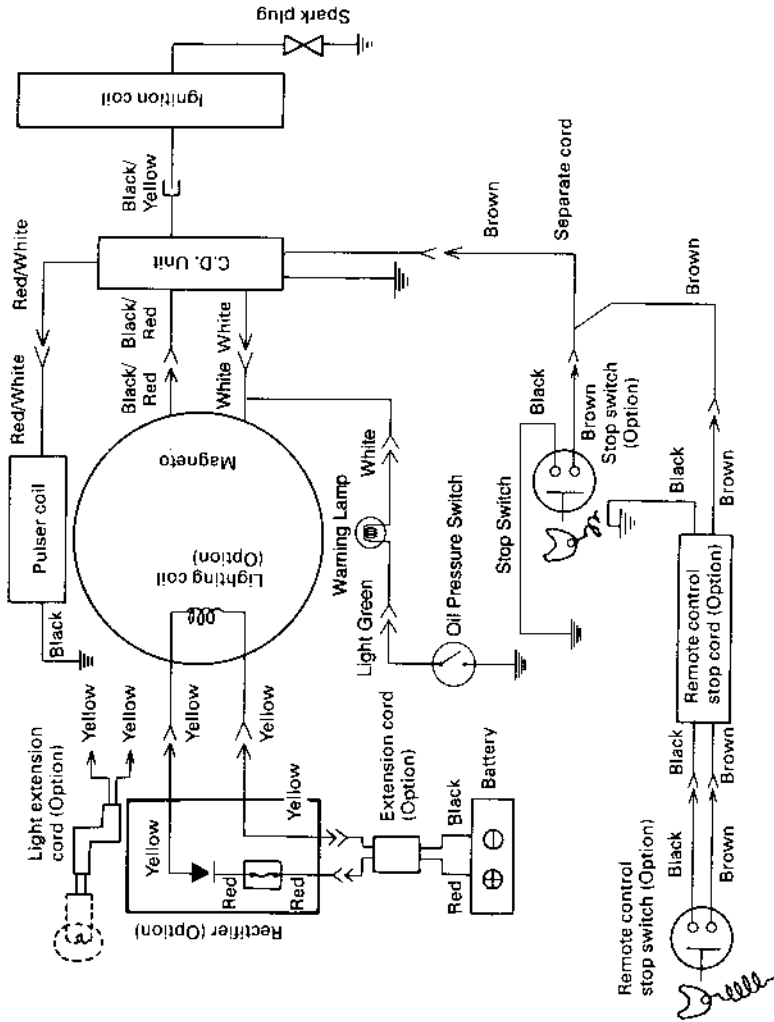
13. PROPELLER TABLE

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.

	Light boats		Heavy boats
Size as Indicated on propeller	9	8	7
Propeller (mm) Size	200 × 229	200 × 200	200 × 178
Diameter × pitch (inch)	7.9 × 9.0	7.9 × 7.9	7.9 × 7.0
Model		Standard for 5A2S and 6A2S.	Standard for 4A2.

14. WIRING DIAGRAM





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