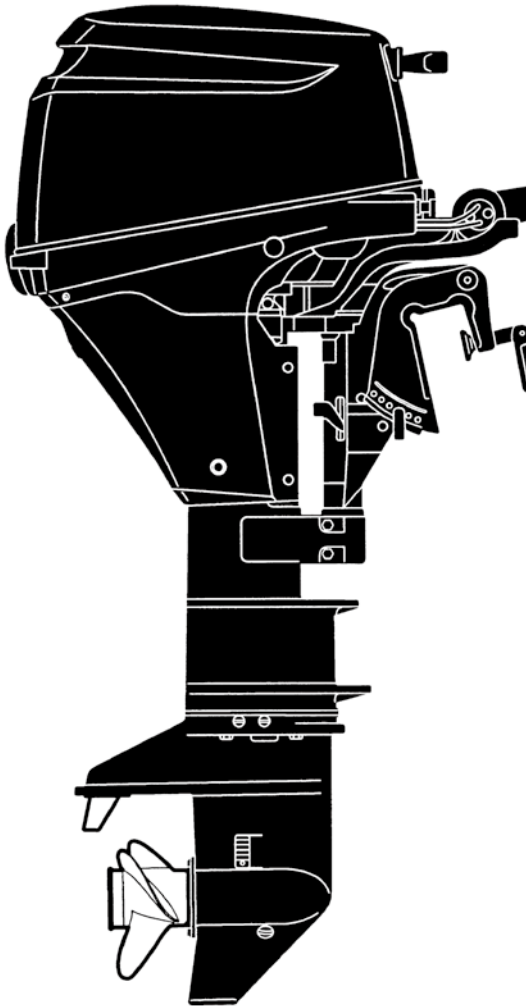


# OWNER'S MANUAL



**TOHATSU**  
*Outboards*

**MFS 8A3**  
**9.8A3**

**OB No.003-11082-5**

**⚠ READ THIS MANUAL BEFORE USING THE OUTBOARD MOTOR. FAILURE TO FOLLOW THE INSTRUCTIONS AND SAFETY PRECAUTIONS IN THIS MANUAL CAN RESULT IN SERIOUS INJURY OR DEATH. KEEP THIS MANUAL IN A SAFE LOCATION FOR FUTURE REFERENCE.**

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# **YOUR TOHATSU OUTBOARD MOTOR**

## **OWNER REGISTRATION AND IDENTIFICATION**

Upon purchasing this product, be sure that the WARRANTY CARD is correctly and completely filled out and mailed to the addressee noted there on. This WARRANTY 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 THE APPLICABLE LIMITED WARRANTY.**

## **PRE-DELIVERY CHECK**

Be sure that the product has been checked by an authorized TOHATSU dealer before you take delivery.

## **Limited Warranty**

Please refer to the TOHATSU outboard motor Limited warranty provided to you with this product, the terms and conditions of which, as amended from time to time, are incorporated by reference into the manual.

## **Serial Number**

In the space below, please record the outboard motor's serial number (indicated both on the lower motor cover and on the cylinder block). The serial number will be needed in the event of theft or to quickly identifying the outboard motor type.

Serial Number :

---

## **To You, Our Customer**

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

This manual should be read in its entirety and the inspection and maintenance procedures described later in this manual should be followed carefully. Should a problem arise with the outboard motor, please follow the troubleshooting procedures listed at the end of this manual. If the problem persists, contact an authorized TOHATSU service shop or dealer.

We hope you will enjoy your outboard motor and wish you good luck in your boating adventures.

**TOHATSU CORPORATION**

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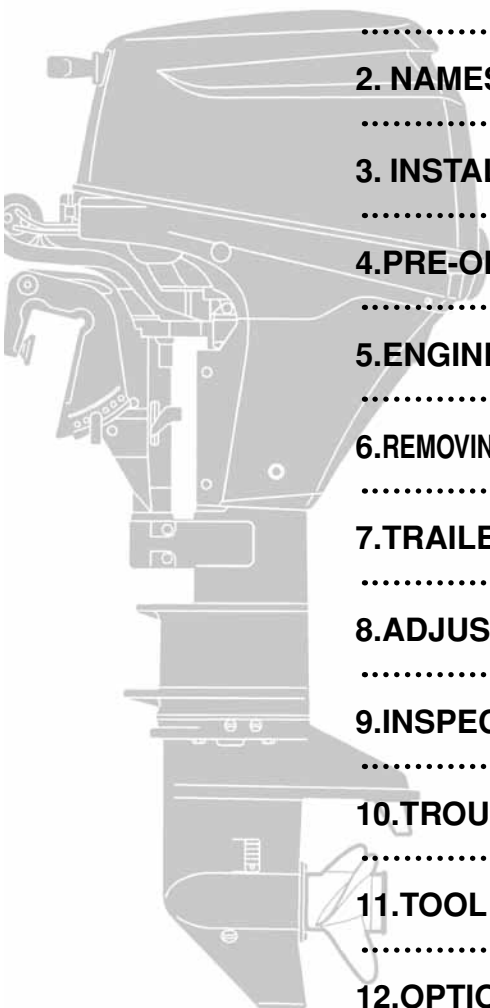
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# GENERAL SAFETY INFORMATION

## NOTICE : DANGER/WARNING/CAUTION/Note

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

### **DANGER**

Failure to observe will result in severe personal injury or death, and possibly property damage.

### **WARNING**

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

### **CAUTION**

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

### Note

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

## EMERGENCY STOP SWITCH

The Emergency Stop Switch will stall the outboard motor when the stop switch tether is pulled off. This stop switch tether can be attached to the operator of the outboard motor to minimize or prevent injuries from the propeller in case the operator falls overboard.

We highly recommend use of the Emergency Stop Switch tether.

### **WARNING**

Accidental activation of the Emergency Stop Switch (such as the tether 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 minimize accidental activation of the Emergency Stop Switch, the 500 mm (20 inch.) stop switch tether is coiled and can extended to a full 1,300 mm (51 inch.).



## SAFE OPERATION OF BOAT

As the operator/driver of the boat, you are responsible for the safety of those aboard and those in other boat around yours, and for following local boating regulations. You should be thoroughly knowledgeable on how to correctly operate the boat, outboard motor, and accessories. To learn about the correct operation and maintenance of the outboard motor, 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 outboard motor should be shifted to neutral and shut off.

### **WARNING**

**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.**

## SERVICING, REPLACEMENT PARTS & LUBRICANTS

We recommend that only an authorized service shop perform service or maintenance on this outboard motor. Be sure to use genuine parts, genuine lubricants, or recommended lubricants.

## MAINTENANCE

As the owner of this outboard motor, you should be acquainted with correct maintenance procedures. 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. Please comply with all instructions concerning lubrication and maintenance. You should take the engine to an authorized dealer or service shop for periodic inspection at the prescribed intervals.

Correct periodic maintenance and proper care of this outboard motor will reduce the chance of problems and limit overall operating expenses.

## MOUNTING

Outboard motor mounting must be performed by trained service person(s) using lift or hoist with sufficient capacity.

# SPECIFICATIONS

## MF , EF , EP

Item		MODEL	8A3		9.8A3	
			MF	EF	EP	
Overall Length	mm (in)	975 (38.4)			590 (23.2)	
Overall Width	mm (in)	354 (13.9)			320 (12.6)	
Overall Height S·L·UL	mm (in)	1,035 (40.7) · 1,162 (45.7) · 1,289 (50.7)				
Transom Height S·L·UL	mm (in)	435 (17.1) · 562 (22.1) · 689 (27.1)				
Weight	S Kg (lb)	37.0 (81.5)	40.0 (88.0)	40.0 (88.0)		
	L Kg (lb)	38.0 (84.0)	41.0 (90.5)	41.0 (90.5)		
	UL Kg (lb)	39.5 (87.0)	42.5 (93.5)	42.5 (93.5)		
Output	kW (Hp)	5.9 (8)		7.2 (9.8)		
Max. Operating Range	rpm	5,000-6,000				
Idle Speed in Forward Gear	rpm	900				
Idle Speed in Neutral Gear	rpm	950				
Engine Type		4-Stroke				
Number of Cylinder		2				
Bore × Stroke	mm (in)	55 × 44 (2.17 × 1.73)				
Piston Displacement	mL (Cu in)	209 (12.8)				
Exhaust System		Through hub exhaust				
Cooling System		Water cooling				
Engine Lubrication		Trochoid pump				
Starting System		Manual	Electric starter motor *			
Ignition System		Flywheel Magneto C.D. ignition				
Spark Plug		NGK DCPR6E				
Trim Position		6			3	
Engine Oil		NMMA FC-W certified 10W-30 or API SF, SG, SH, SJ, SL or SM, 10W-30/40, Approx. 800mL				
Gear Oil		Genuine Gear Oil or API GL5, SAE #80-90, Approx. 320mL				
Fuel Tank Capacity	L (US gal)	12 (3.17)				
Gear Reduction Ratio		2.08 (13 : 27)				

\* : with manual    \* Specifications subject to change without notice.

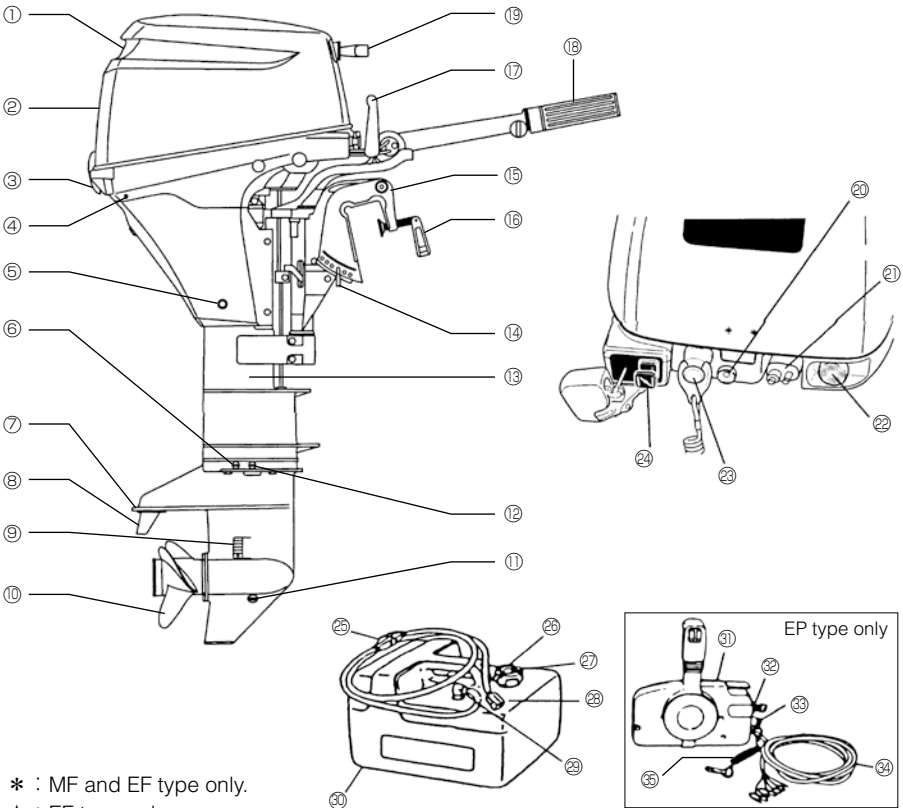
## EFT , EPT

Item	MODEL	8A3	9.8A3
		EFT	EPT
Overall Length	mm (in)	975 (38.4)	590 (23.2)
Overall Width	mm (in)	354 (13.9)	320 (12.6)
Overall Height S·L·UL	mm (in)	1,035 (40.7) · 1,162 (45.7) · 1,289 (50.7)	
Transom Height S·L·UL	mm (in)	435 (17.1) · 562 (22.1) · 689 (27.1)	
Weight	S Kg (lb)	46.5 (102.5)	46.0 (101.4)
	L Kg (lb)	47.5 (104.7)	47.0 (103.6)
	UL Kg (lb)	49.0 (108)	48.5 (106.9)
Output	kW (Hp)	5.9 (8)	7.2 (9.8)
Max. Operating Range	rpm	5,000-6,000	
Idle Speed in Forward Gear	rpm	900	
Idle Speed in Neutral Gear	rpm	950	
Engine Type		4-Stroke	
Number of Cylinder		2	
Bore × Stroke	mm (in)	55 × 44 (2.17 × 1.73)	
Piston Displacement	mL (Cu in)	209 (12.8)	
Exhaust System		Through hub exhaust	
Cooling System		Water cooling	
Engine Lubrication		Trochoid pump	
Starting System		Electric starter motor *	
Ignition System		Flywheel Magneto C.D. ignition	
Spark Plug		NGK DCPR6E	
Trim Position		6	3
Engine Oil		NMMA FC-W certified 10W-30 or API SF, SG, SH, SJ, SL or SM, 10W-30/40, Approx. 800mL	
Gear Oil		Genuine Gear Oil or API GL5, SAE #80-90, Approx. 320mL	
Fuel Tank Capacity	L (US gal)	12 (3.17)	
Gear Reduction Ratio		2.08 (13 : 27)	

\* : with manual ※ Specifications subject to change without notice.

# ■ NAMES OF PARTS

## MF , EF , EP



\* : MF and EF type only.

☆ : EF type only.

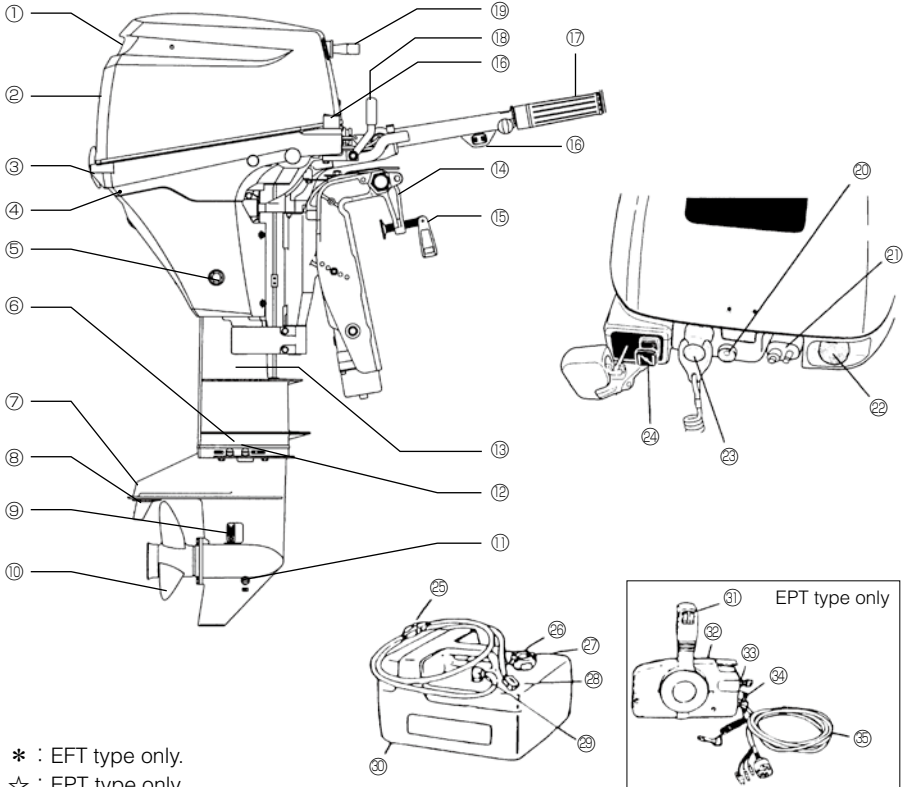
- ① Tilt Handle
- ② Top Cowl
- ③ Cowl Latch
- ④ Cooling Water Check Port
- ⑤ Oil Drain Bolt
- ⑥ Water Plug
- ⑦ Anti Ventilation Plate
- ⑧ Anode / Trim Tab
- ⑨ Water Inlet
- ⑩ Propeller
- ⑪ Oil Plug (Lower) (Fill)
- ⑫ Oil Plug (Upper) (Level)

- ⑬ Drive Shaft Housing
- ⑭ Thrust Rod
- ⑮ Clamp Bracket
- ⑯ Clamp Screw
- ⑰ \* Shift Lever
- ⑱ \* Throttle Grip
- ⑲ Starter Handle
- ⑳ Warning Lamp
- ㉑ Fuel Connector
- ㉒ ☆ Starter Switch
- ㉓ Stop Switch
- ㉔ \* Choke Knob

- ㉕ Primer Bulb
- ㉖ Fuel Tank Cap
- ㉗ Air Vent Screw
- ㉘ Fuel Connector
- ㉙ Fuel Pick up Elbow
- ㉚ Fuel Tank
- ㉛ Remote Control Box
- ㉜ Main Switch
- ㉝ Stop Switch
- ㉞ Cord Assembly
- ㉟ Engine Stop Switch Cord

EFT , EPT

2



\* : EFT type only.

☆ : EPT type only.

- |                            |                       |                           |
|----------------------------|-----------------------|---------------------------|
| ① Tilt Handle              | ⑬ Drive Shaft Housing | ⑳ Primer Bulb             |
| ② Top Cowl                 | ⑭ Clamp Bracket       | ㉑ Fuel Tank Cap           |
| ③ Cowl Latch               | ⑮ Clamp Screw         | ㉒ Air Vent Screw          |
| ④ Cooling Water Check Port | ⑯ * Power tilt switch | ㉓ Fuel Connector          |
| ⑤ Oil Drain Bolt           | ⑰ * Throttle Grip     | ㉔ Fuel Pick up Elbow      |
| ⑥ Water Plug               | ⑱ * Shift Lever       | ㉕ Fuel Tank               |
| ⑦ Anti Ventilation Plate   | ⑲ Starter Handle      | ㉖ Remote Control Box      |
| ⑧ Anode / Trim Tab         | ㉔ Oil warning Lamp    | ㉗ Main Switch             |
| ⑨ Water Inlet              | ㉑ Fuel Connector      | ㉘ Stop Switch             |
| ⑩ Propeller                | ㉒ ☆ Starter Switch    | ㉙ Cord Assembly           |
| ⑪ Oil Plug (Lower) (Fill)  | ㉓ Stop Switch         | ㉚ Engine Stop Switch Cord |
| ⑫ Oil Plug (Upper) (Level) | ㉔ * Choke Knob        |                           |

# INSTALLATION

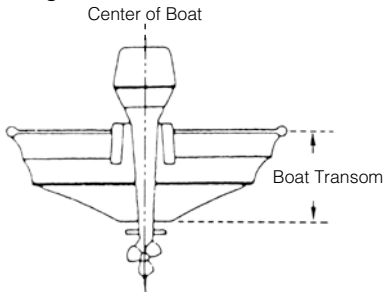
## 1. Mounting the outboard motor on boat

### **WARNING**

Most boats are rated and certified in terms of their maximum allowable horsepower, as shown on the boat's certification plate. Do not equip your boat with an outboard motor that exceeds this limit. If in doubt, contact your dealer. Do not operate the outboard motor until it has been securely mounted on the boat in accordance with the instructions below.

### Position ... Above keel line

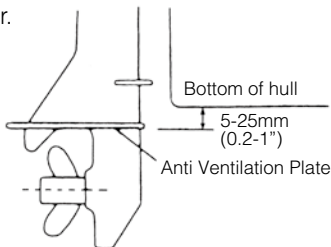
Set engine at center of boat.



### Transom matching

Be sure that the anti ventilation plate of the outboard motor is below the water surface when running with the throttle wide open.

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



### **CAUTION**

- Before beginning the running test, check that the boat with maximum capacity loading floats on the water in a proper attitude. Check the position of water surface on the driveshaft housing. If the water surface is near the bottom cowling, in high waves, water may enter the engine cylinders.
- Incorrect outboard motor mounting height or existence of underwater object(s), such as hull bottom design, bottom surface conditions or underwater accessories, can cause production of water spray possibly reaching the engine through an opening of the bottom cowling during cruising. Exposing engine to such conditions for extended periods can lead to severe engine damage.

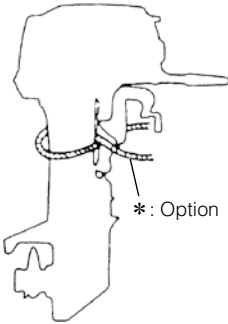
**MF, EF, EP type**

① To attach the outboard motor to the boat, tighten the clamp screws by turning their handles.

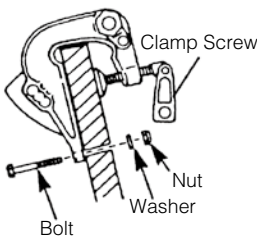
Also, tighten the bolts. Secure the outboard motor with a rope to prevent loss overboard.

**Note**

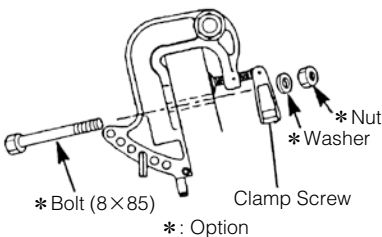
The rope is not included in the standard accessories.



EP



MF & EF



**Note**

It is recommended to install upper mounting bolts with bolt head at inside surface of transom. Bolts with threaded end at inside surface of transom can cause personal injury.

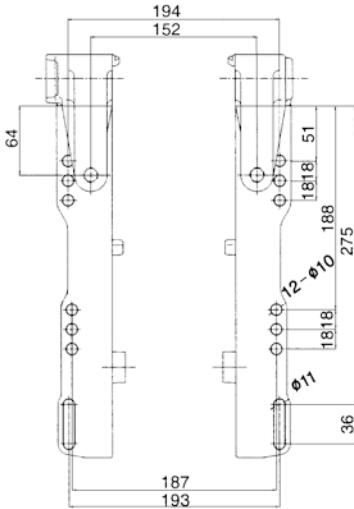
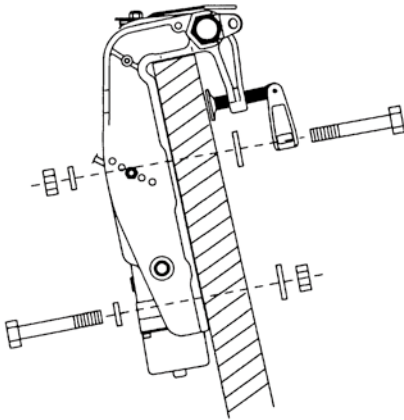
**Notes**

1. Apply sealing agent such as silicone sealed between the bolts and transom board holes before tightening the bolts.
2. Be sure to tighten mounting bolt nuts to the specified torque.  
(30 Nm(3.0kgf)13ft-lb)

**! WARNING**

- Mounting outboard motor without following this manual can lead to unsafe conditions such as poor maneuverability, going out of control or fire disaster.
- Loose clamp screws and/or mounting bolts can lead to coming off or displacement of outboard motor, possibly going out of control or causing serious personal injury. Be sure that fasteners are tightened to the specified torque (30 Nm (3.0kgf)13ft-lb). Check fasteners for tightness from time to time.
- Be sure to use outboard mounting fasteners included in outboard motor package delivered or their equivalents in terms of size, material, quality and strength.  
Tighten fasteners to the specified torque (30 Nm (3.0kgf)13ft-lb). Test cruise to check if fasteners are tightened securely.
- Outboard motor mounting must be performed by trained service person(s) using lift or hoist with sufficient capacity.

EFT, EPT type (Power tilt model)



3

Note

It is recommended to install upper mounting bolts with bolt head at inside surface of transom. Bolts with threaded end at inside surface of transom can cause personal injury.

Notes

1. Apply sealing agent such as silicone sealed between the bolts and transom board holes before tightening the bolts.
2. Be sure to tighten mounting bolt nuts to the specified torque.  
(30 Nm(3.0kgf)13ft·lb)

**! WARNING**

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Tighten fasteners to the specified torque (30 Nm (3.0kgf)13ft·lb). Test cruise to check if fasteners are tightened securely.
- Outboard motor mounting must be performed by trained service person(s) using lift or hoist with sufficient capacity.



## 2. Installing the remote control devices

It is recommended that you consult with your authorized dealer for installation and adjustment of the remote control device.

### ■ Installation of the Remote Control Cables (Box side) :

Follow the instruction manual provided with the remote control.

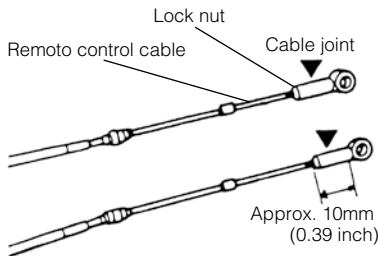
### ■ Installation of the Remote Control on your boat :

Follow the instruction manual provided with the remote control.

### ■ Installation of the Remote Control Cable (engine side) and the Cord Assembly (Wiring Harness) :

#### ① Fitting of connecting parts to cables

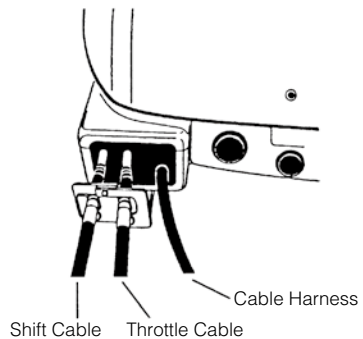
Screw the tip of the remote control cable into the cable joint up to approx. 10 mm (0.39 inch), then lock them with a lock nut. Apply grease to the hole of the cable joint.



#### ② Fitting of Remote Control Cable to Engine.

#### ○ Note

Put the control lever in the Neutral position and the Free Accel lever in the fully closed position.



#### ⚠ CAUTION

Be careful not to loop remote control cables to diameter of 406 mm (16 inches) or less.

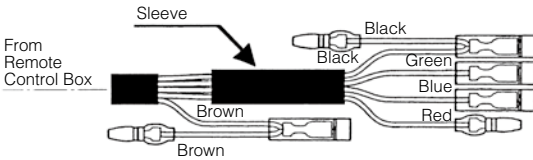
#### ○ Note

Confirm the engine shifts correctly when the shift lever is placed in Forward and Reverse position. also confirm the throttle valve is closed at idle, in Neutral, Forward, and Reverse. Confirm the throttle valve is fully open when in Forward at the wide open position.

③ Connecting the Cord assembly (Wiring Harness)

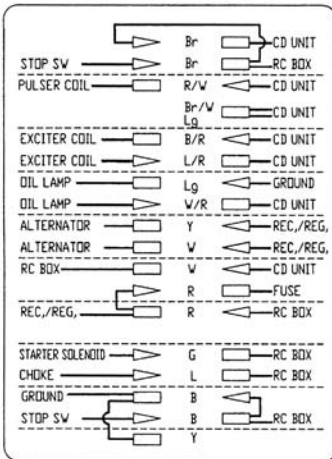
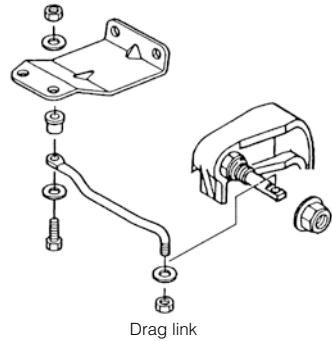
Pass the Cord assembly from the Remote control box through the hole in the Lower motor cover and cover the wire ends with the Sleeve (provided in a tool bag) and then connect the electric terminals according to the drawing below.

EP model

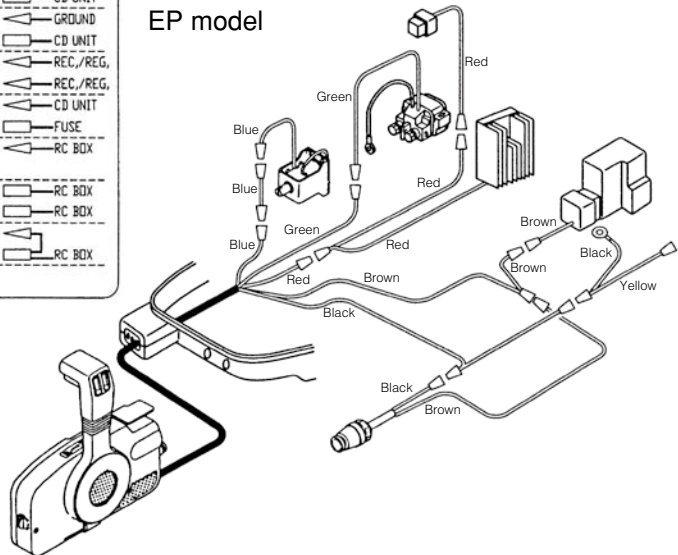


**! WARNING**

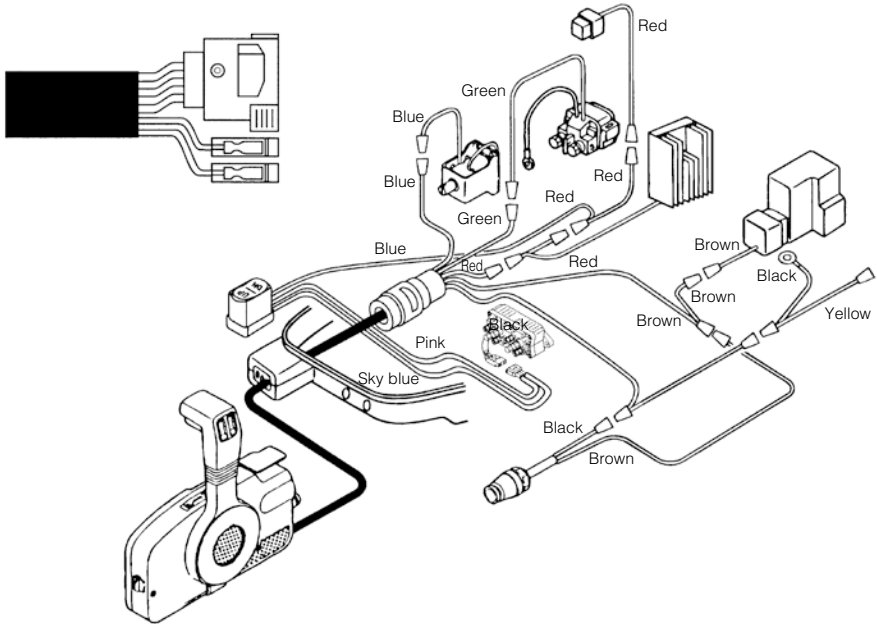
Do not disconnect cord ass'y when engine is in operation, or engine will go out of control.



EP model



EPT model



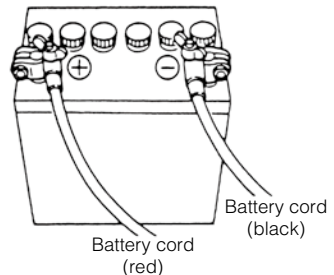
**⚠ CAUTION**

- Make sure that the battery cords do not get stuck between the outboard motor and boat when turning, etc.
- The starter motor may fail to operate if the cords are incorrectly connected.
- Be sure to correctly connect the (+) and (-) cords. If not, the charging system will be damaged.
- Do not disconnect the battery cords from battery while the engine is operating, the electrical parts could be damaged.
- Always use a fully charged battery.

**⚠ CAUTION**

Do not use a battery that is not recommended. Use of a battery not recommended can lead to poor performance of, and / or damage to, the electrical system.

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



### 3. Installing the battery

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

#### Note

Minimum recommended battery : 12V, 70AH or 12V, 40AH  
Specifications and features of batteries vary among the manufacturers. Consult the manufacturer for details.

#### WARNING

Battery generates explosive hydrogen gas. Be sure to:

- Charge the battery in a well-ventilated place.
- Place the battery away from any source of fire, sparks and open flames such as burners or welding equipment.
- Do not smoke when handling the battery.
- Do not smoke near the battery when the battery is charging.

#### WARNING

Battery electrolyte contains sulfuric acid and thus is hazardous, causing a burn if it comes in contact with your skin, or poisonous if swallowed.

**KEEP BATTERY AND ELECTROLYTE AWAY FROM REACH OF CHILDREN**

When handling the battery, be sure to:

- Read all warnings shown on the battery case
- Prevent electrolyte from coming in contact with any part of your body. Contact can cause serious burn or, if it comes in contact with your eye, loss of sight. Use safety glasses and rubber gloves.

In case battery electrolyte comes in contact with:

- Skin, flush thoroughly with water.
- Eye, flush thoroughly with water, and then seek immediate medical treatment.

In case battery electrolyte is swallowed:

- Seek immediate medical treatment.

# PRE-OPERATING PREPARATIONS

## **DANGER**

Consult an authorized dealer for details on handling gasoline, if necessary.

Gasoline and its vapors are very flammable and can be explosive.

When carrying a fuel tank containing gasoline:

- Close the air vent screw of fuel tank cap, or gasoline vapor will be emitted through the air vent screw, creating a fire hazard.
- Do not smoke.

When or before refueling:

- Stop the engine, and do not start the engine during refueling.
- Do not smoke.
- Be careful not to overfill fuel tank. Wipe up any spilled gasoline immediately.

When or before cleaning the gasoline tank:

- Dismount fuel tank from the boat.
- Place the fuel tank away from every source of ignition, such as sparks or open flames.
- Do the work outdoors or in a well ventilated area.
- Wipe off gasoline well immediately if spilt.

After cleaning gasoline tank:

- Wipe off gasoline well immediately if spilt.
- If the fuel tank is disassembled for cleaning, reassemble carefully. Imperfect assembly may cause a fuel leak, possibly leading to fire or explosion.
- Dispose aged or contaminated gasoline in accordance with local regulations.

## 1. Recommended gasoline types

### **CAUTION**

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

We recommend use for Fuel stabilizer.

## Use of unleaded gasoline

### UNITED STATES AND CANADA:

Use a major brand of automotive unleaded gasoline with a minimum posted octane rating of 87. Mid-grade automotive gasoline that contain fuel injector cleaner are preferred for added internal engine cleanliness. Leaded gasoline is not recommended.

**INTERNATIONAL** : Use a major brand of automotive unleaded gasoline with a minimum posted octane rating of 91RON. Automotive gasoline that contain fuel injector cleaner are preferred for added internal engine cleanliness. Leaded gasoline is acceptable in areas where unleaded gasoline is not available.

## Use of alcohol free gasoline

### **CAUTION**

Use of gasoline containing alcohol can cause engine starting and/or operating difficulties, wear of and damages to engine parts, and deterioration of chemical parts, which may lead to shortening of your outboard motor's life.

### Note

The adverse effect caused by the alcohol content is more severe with methanol than with ethanol.

TOHATSU recommend the use of gasoline if its ethanol content is less than 10% or methanol content is less than 5%, only in case alcohol free gasoline is not available.

The alcohol component of the gasoline absorbs moisture from the air, which may disturb regular fuel flow in the fuel system,

and also accelerate rusting of engine parts. Mixing of the moisture in the engine oil can also deteriorate the properties of the lubricant.

If the use of gasoline containing alcohol is inevitable, or presence of alcohol is suspected in the gasoline, it is strongly recommended to add a filter that has water separating capability, and check the fuel system for leaks and mechanical parts for corrosion and abnormal wear more frequently.

4

And, in case any of such abnormality is found, discontinue the use of such gasoline and contact our dealer immediately.

Damages resulting from the use of gasolines that contain alcohol are not covered under the limited warranty.

Fuel tank capacity :

25 liters (6.6 U.S. gal)--for 30, 40, 50

Fuel Tank : When using a fixed fuel tank in place of genuine fuel tank, it is recommended to select a one with a structure facilitating interior cleaning.

**! WARNING**

Do not fill the fuel tank over capacity. The rise of gasoline temperature may cause gasoline to expand which, if overfilled, may leak through air vent screw when it is open. Leaking gasoline is a dangerous fire hazard.

**2. Recommended engine oil**

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

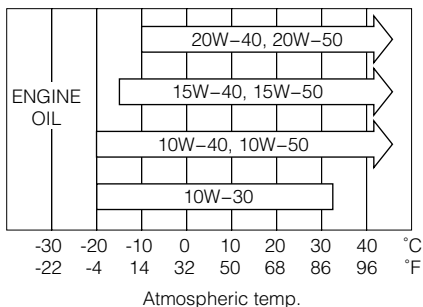
Use NMMA FC-W certified 4-stroke

engine oil below.

10W-30: is recommended for use in all temperature.

25W-40: may be used at temperatures above 4°C (40°F).

You can also use oils that carry the API rating of SF, SG, SH, SJ, SL, or SM. Select the appropriate viscosity, based on atmospheric temperature, from the chart below.



**! CAUTION**


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)

**Note**

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

### 3. Break-in

Your new outboard motor and lower unit require break-in for the moving components according to the conditions described in the following time table.


** CAUTION**

Operating the outboard motor without break-in can shorten service life of the product.

If any abnormality is experienced during the break-in:


- Discontinue the operation immediately.
- Have the dealer check the product and take proper action(s) if necessary.

	1-10min	10min-2hrs	2-3hrs	3-10hrs	After 10hrs
Throttle Position	Idle	Less than 1/2 throttle	Less than 3/4 throttle	3/4 throttle	Full throttle available
Speed		Approx. 3,000 rpm max	Full throttle run allowed for 1 min every 10 min	Approx. 4,000 rpm. Full throttle run allowed for 2 min every 10 min	

** Note**

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Proper break-in allows outboard motor to deliver it full performance for longer service life.

** DANGER**

Do not operate the outboard motor in closed area or area with no forced ventilation.

Exhaust gas emitted by this outboard motor contains carbon monoxide that will cause death if inhaled continuously. Inhaling the gas initially causes symptoms such as feeling of sickness, drowsiness and headache.

During operation of the outboard motor:

- Keep peripheral area well ventilated.
- Always attempt to stay on the windward side of emission.

### 4. 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.

Remark : When engine is first started, the red light will turn on for several seconds to confirm that it is working and then turn off.

#### CAUTION

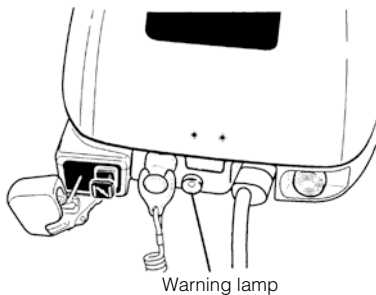
Never run the engine if the warning lamp is on or blinking on and off.

When the warning lamp is on or blinking on and off, as an additional alert of the low oil pressure condition, the engine will run rough and not exceed 3,000 rpm;

\*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.



### 5. ESG (A device preventing over revolution)

ESG is a device to prevent over revolution of the engine (more than approximately 6,250 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.

#### Note

If the engine speed drops frequently after restarting the engine, please contact your dealer.



# ENGINE OPERATION

## Before starting

Before starting engine for the first time after reassembling engine or off-season storage, disconnect stop switch lock and pull the starter handle completely out approximately 10 times in order to prime the oil pump.

## 1. Starting

### WARNING

In case engine starts in gear, do not start cruising. Stop engine immediately and consult an authorized dealer.

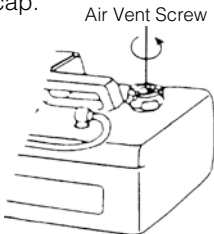
### Note

The engine will not start unless the switch lock has been properly connected into the emergency stop switch.

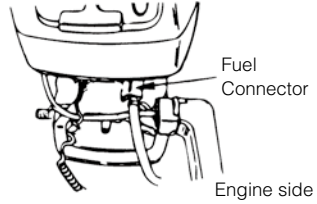
### WARNING

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

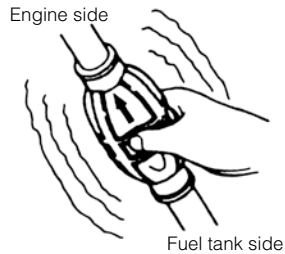
- Loosen the air vent screw on the tank cap.



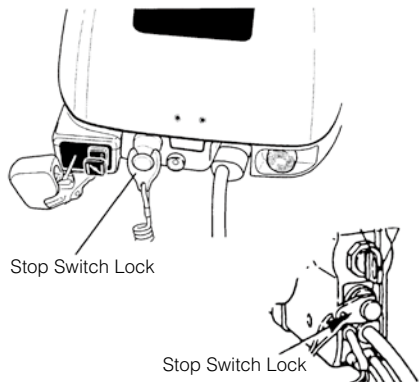
- Attach the fuel connector to the engine connector.  
The arrow mark on the primer bulb should be facing the engine.



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



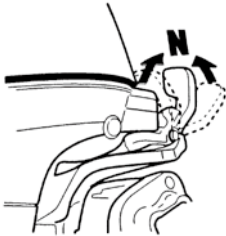
- Be sure to install the stop switch lock to the stop switch.



**MF, EF and EFT type**

- ⑤ 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.



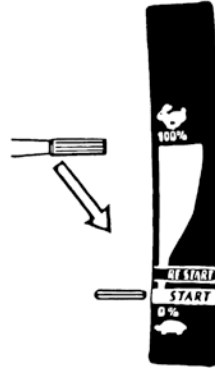
**⚠ CAUTION**

If the engine starts in gear, do not use it. Contact an authorized dealer.

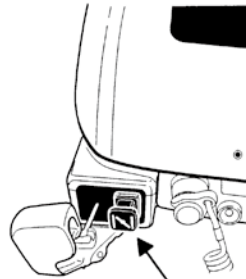
**Note**

Start-in-gear protection prevents engine from starting at other than neutral shift. In-gear starting of engine will move the boat immediately, potentially leading to falling down or causing passenger(s) to be thrown overboard.

- ⑥ Set the throttle grip to "START" position.



- ⑦ Pull the choke knob fully.



**Note**

Choke is not necessary when the engine is warm. Set the throttle grip to "RE-START" position.

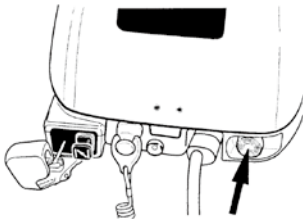
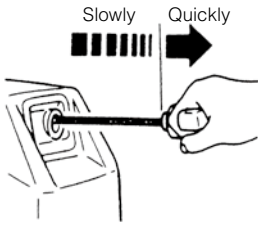
**Note**

If engine does not start with 4 or 5 times starting operation, push the knob back and restart.

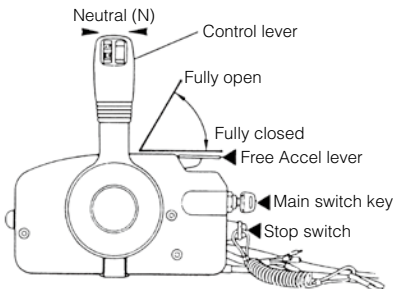
**MF type**

Engine is equipped with a compression release mechanism.

- ⑧ Pull the starter handle slowly until you feel engagement, keep pulling till you feel less resistance. Then pull it quickly.  
Repeat if necessary until started.
- ⑨ When starting the engine, push the choke knob back.

**EF and EFT type**

- ⑧ Push the starter switch button.
- ⑨ Release the button when the engine has started.
- ⑩ When starting the engine, push the choke knob back.

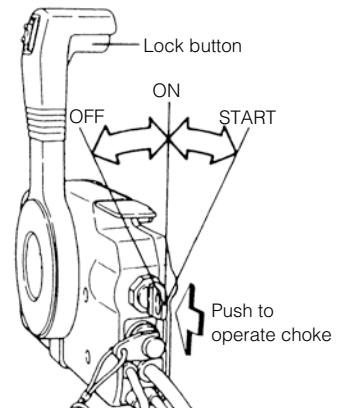
**EP and EPT type**

- ⑤ Insert the main switch key.
- ⑥ Set the control lever in the Neutral position.
- ⑦ Raise the Free accel lever a little (both of cold engine and warm engine).
- ⑧ 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.

- ⑨ Stop pushing the key when the engine has started.  
The key returns to the original position, automatically.
- ⑩ Return the Free accel lever to closed position.

**Note**

The free accel lever can not be raised when the control lever shift is in Forward or Reverse.

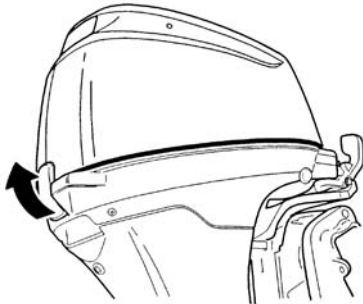
**⚠ CAUTION**

Do not keep turning starter motor for over 5 seconds, or the battery may be consumed, potentially making the engine starting impossible and/or damaging the starter.  
If cranking over 5 seconds fails to start engine, return main switch to "ON", and crank engine again after 10 seconds or more.

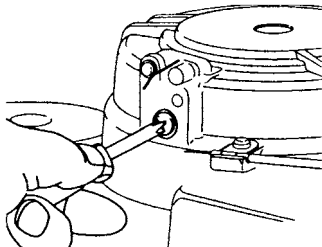
**If the recoil starter fails to operate**

- Remove the top cowl and the recoil starter.

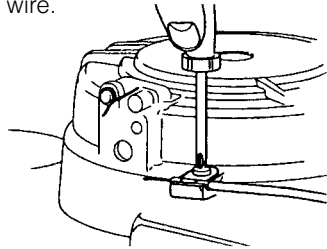
**5**



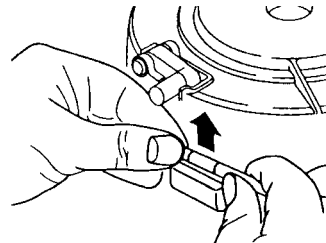
- ① Remove the starter lock cam.



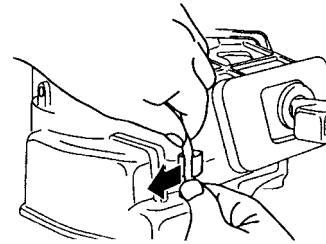
- ② Loosen the screw for starter lock wire.



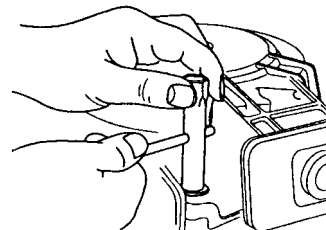
- ③ Remove the upper portion of the starter lock wire.



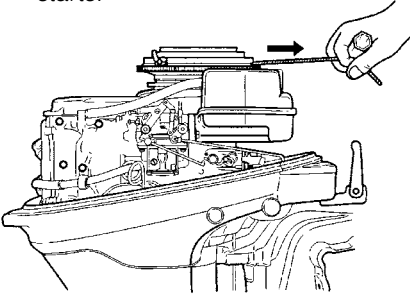
- ④ Remove the lower portion of the starter lock wire.



- ⑤ Remove the bolts (3cps). and remove the recoil starter assembly.



- ⊙ Confirm that the shift lever is at neutral position.
- ⊙ Wrap a rope around the starter pulley then pull quickly to start.
- ⊙ Use a 10 mm socket wrench as a rope handle.
- ⊙ Reinstall top cowl after engine starts.



### **⚠ WARNING**

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 top cowl back on.

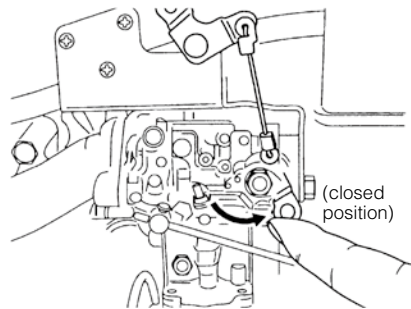
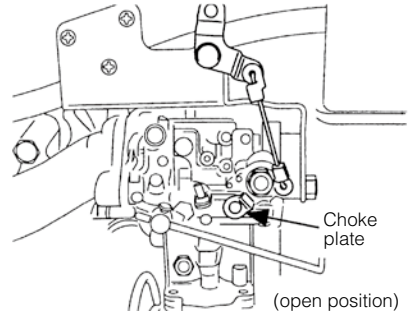
Immediately contact an authorized dealer when reaching shore.

### **⚠ WARNING**

- Be sure that no bystander(s) is within 2 meters from back of starting operator.
- Do not operate the outboard motor with top cowl removed from the power unit, or contacting turning flywheel which can lead to serious personal injury.

### If the choke solenoid fails to operate (EP and EPT type only)

- ① Remove the top cowl.
- ② Close the choke plate by finger.
- ③ Raise the Free accel lever a little.
- ④ Turn the main switch key to start position.
- ⑤ Stop pushing the key when the engine has started.
- ⑥ Return the choke plate to open position.



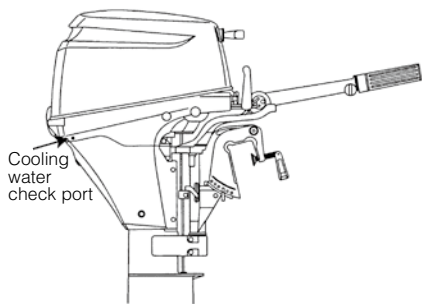
## 2. Warming up the engine

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.



### CAUTION

Be sure to stop engine immediately if cooling water check port is not discharging water, and check if cooling water intake is blocked. Operating engine could lead to overheating potentially leading to engine damage. Consult an authorized dealer if the cause cannot be found.

### Engine speeds

Idling speed after warming up.

Remark: In case of cold engine starting, idling speed is increased about 300 rpm for several minutes.

Clutch in (In gear)	Clutch off (Out of gear)
900rpm	950rpm

### 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
5,000~6,000rpm

Genuine propellers are listed on PROPELLER TABLE of this manual.

### 3. Forward and reverse

#### WARNING

Before shifting into forward or reverse, make sure that boat is properly moored and outboard motor can be steered fully to the right and left. Make sure that no swimmer(s) is ahead or astern of the boat.

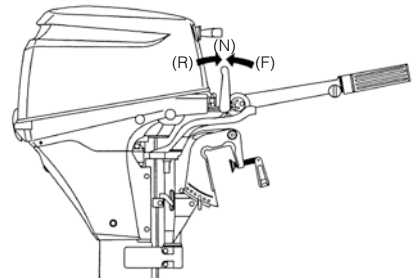
#### WARNING

- Attach other end of emergency stop switch tether to the operator's clothing or arm and keep it attached during cruising.
- Do not attach the tether to a part of clothing that can be torn easily when pulled.
- Arrange the tether so that will not be caught by any object when pulled.
- Be careful not to pull the tether accidentally during cruising. Unintentional stop of engine can cause loss of control of outboard motor. Rapid loss of engine power can lead to falling down or causing passenger(s) to be thrown overboard.

#### Note

Do not increase engine speed unnecessarily in reverse.

MF, EF and EFT type



#### WARNING

Severe damage, and personal injury, may occur if shifting at high engine speed. Engine must be in the slow idle position before shifting is attempted.

#### ■ 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.

#### ■ Reverse

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

#### WARNING

Before shifting, make sure that no swimmer(s) or obstacle(s) is ahead or astern of the boat.

**CAUTION**

Be sure to warm up engine well before starting cruise. Operating cold engine may cause damage to your motor.

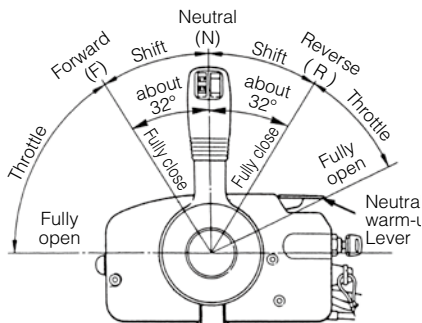
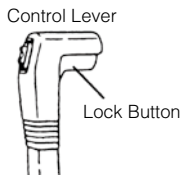
**Note**

Idle speed may be higher during warming up of engine. If shifted to Forward or Reverse during warming up, it may be difficult to shift back to neutral. In such case, stop engine, shift to neutral, and restart engine to warm up.

**Note**

Frequent shifting to forward or reverse can accelerate wear or degradation of parts. In such case, replace gear oil earlier than the period specified.

**EP and EPT type**



**Forward**

Quickly push the control lever to the Forward (F) position 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.

**Reverse**

Quickly 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 free accel lever is in the fully closed position.

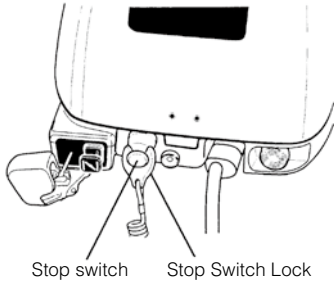
**Note**

Reduce the engine speed when the control lever is in Neutral and do not increase the engine speed unnecessarily.



## 4. Stopping

### MF, EF and EFT type

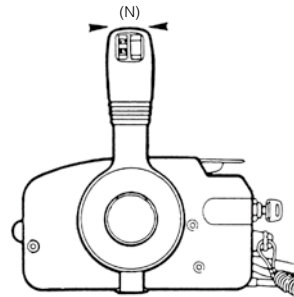
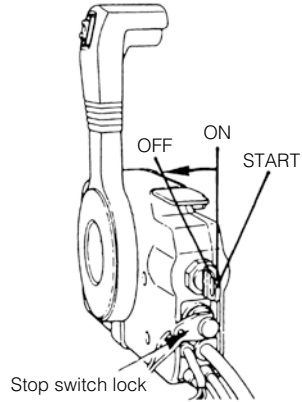


- ① Turn the throttle grip to the slow position.
- ② Put the shift lever in the Neutral position.  
Run the engine for 2-3 minutes at idling speed if it has been running at full speed.
- ③ Push the stop switch to stop the engine or release the stop switch lock.

### **!** WARNING

- Do not shift into Reverse during planing, or control will be lost leading to serious personal injury, boat may swamp, and/or hull may be damaged.
- Do not shift into Reverse during cruising, or control may be lost, falling down or causing passenger(s) to be thrown overboard. Leading to serious personal injury, and steering system and/or shifting mechanism may be damaged.

### EP and EPT type



- ① Put the shift lever in the Neutral position and run the engine for 2-3 minutes at idling speed if it has been running at full speed.
- ② Turn the main switch key to the OFF position.

### ○ Notes

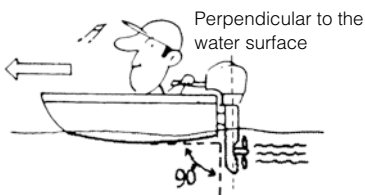
- After stopping the engine, close the air vent screw on the tank cap.
- Disconnect the fuel connector of the engine or the fuel tank.
- Disconnect the battery cord of the EF, EP, EFT or EPT type engine, if the engine will not be used for more than 3 days.

## 5. Trim angle

The trim angle of the outboard motor can be adjusted to suit the transom 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 (or preset knob) is correct if the hull is horizontal during operation.



### ■ Improper trim angle

Set the thrust rod (or preset knob) lower if the bow of the boat rises above horizontal.



Remark) Thrust rod is for MF and EF, and preset knob is for EP.

## ⚠ WARNING

- Do not put hand or finger in between outboard motor body and clamp bracket when adjusting trim angle to prevent injury in case the outboard motor body falls.
- Unsuitable trim position can cause loss of control of boat.  
When testing a trim position, run boat slow initially to see if it can be controlled safely.

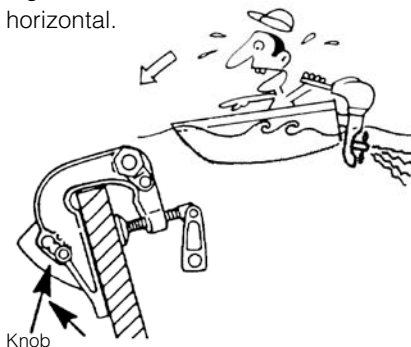
## ⚠ WARNING

Excessive trim up or down may lead to unstable boat operation, potentially causing the steering difficulty that leads to accident during cruising.

- Do not cruise at high speed if improper trim position is suspected. Stop the boat and readjust trim angle before continuing cruise.
- For outboard motor model with PTT switch on the bottom cowl, do not operate the switch during cruising, or control of boat may be lost.

### ■ Improper trim angle

Set the thrust rod (or preset knob) higher if the bow of the boat is below horizontal.



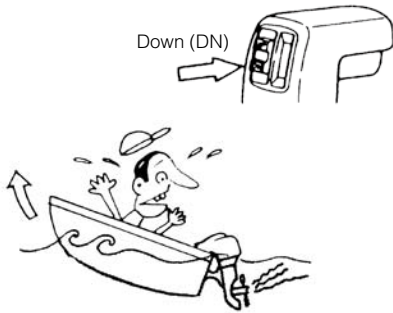
## EFT and EPT type

### ■ Improper Trim Angle (bow rise too high)

If the trim angle is excessive, the bow will rise out of the water and the speed will decrease.

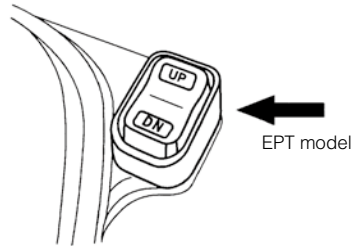
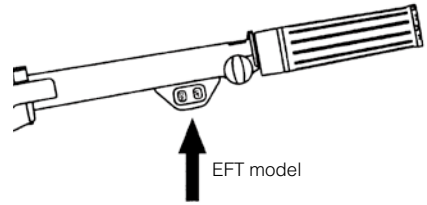
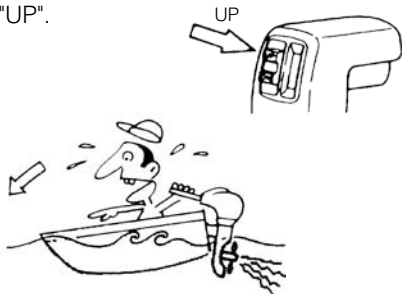
Furthermore, the bow may sway or the bottom may slam the water while cruising.

In this case, decrease the trim angle by pressing the switch on the Remote Control Lever to "DN".



### ■ Improper Trim Angle (bow dips into the water)

If the trim angle is too small, the bow will dip into the water, the speed will decrease, and water may enter the boat. In this case, the trim angle should be increased by pressing the switch on the Remote Control Lever to "UP".

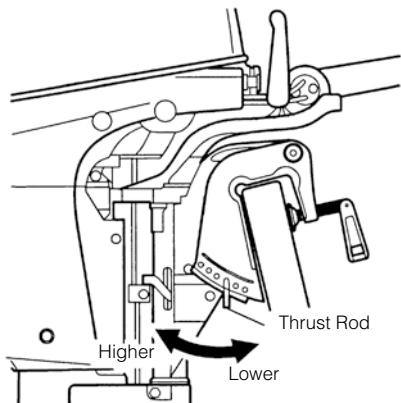


### ■ Proper Trim Angle

The trim angle is optimum when the boat is parallel to the water surface while running.

MF, EF type

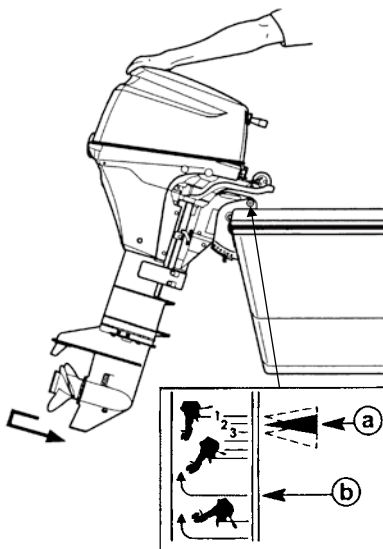
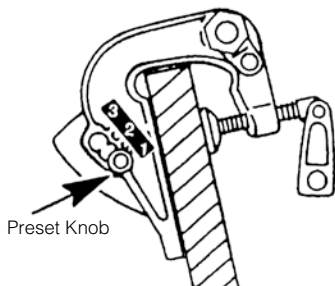
- ① Stop the engine.
- ② Shift the outboard into neutral.
- ③ Raise the engine to the tilt up position.
- ④ Change the thrust rod position.
- ⑤ Gently lower the outboard.



5

EP type

- ① Stop the engine.
- ② Shift the outboard into forward.
- ③ Raise the engine to the tilt release position(b).
- ④ Change the preset knob position.
- ⑤ Gently lower the outboard.



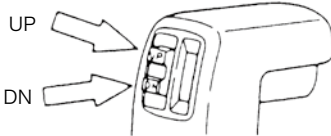
Ⓐ: Transom angle settings  
 Ⓑ: Tilt release position

**⚠ WARNING**

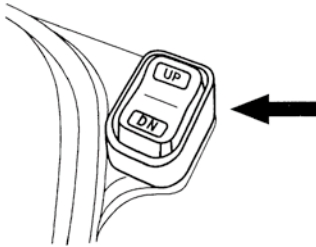
- Do not put hand or finger in between outboard motor body and clamp bracket when adjusting trim angle to prevent injury in case the outboard motor body falls.
- Unsuitable trim position can cause loss of control of boat.  
 When testing a trim position, run boat slow initially to see if it can be controlled safely.

**EPT type**

- ① Operate the Power Tilt switch and tilt the outboard motor up. (The Main Switch must be "ON".)

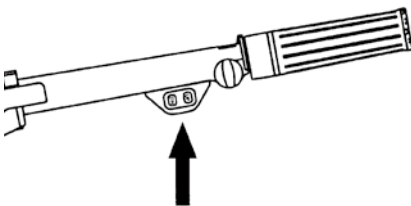


The outboard motor can also be tilted up using the switch provided under the bottom cowl. (The Main Switch need not be turned "ON" in this case.)

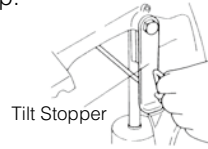


**EFT type**

- ① Operate the Power Tilt switch and tilt the outboard motor up.

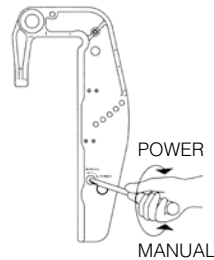


- ② Lock the tilt with the Tilt stopper after the outboard motor has been tilted up.



- ③ Manual tilting

If the battery is dead, and the Power Tilt Switch inoperative, turn the manual valve to counter-clockwise. This will allow manual tilting of the outboard motor.



**⚠ WARNING**

Excessive trim up or down may lead to unstable boat operation, potentially causing the steering difficulty that leads to accident during cruising.

- Do not cruise at high speed if improper trim position is suspected. Stop the boat and readjust trim angle before continuing cruise.
- For outboard motor model with PTT switch on the bottom cowl, do not operate the switch during cruising, or control of boat may be lost.

**○ Note**

Stop the engine before adjusting trim angle.

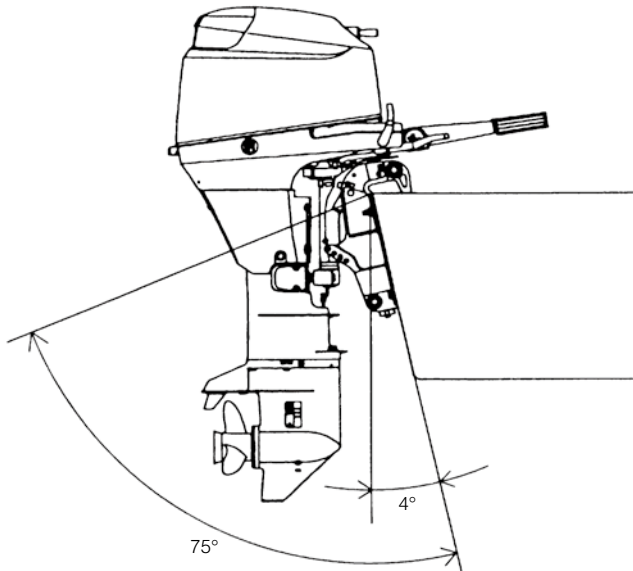
EFT/EPT type

The provided Power tilt makes tilt-up/down electrically. It may be used as a power trim and tilt when the outboard motor is used with the light load condition. In this case, it can be adjusted to set the desired trim angle of the outboard motor in relation to the transom shape, planing speeds and load. It is imperative that the trim angle is adjusted correctly. Incorrect adjustment will cause the boat to sway, deteriorate engine performance and may cause unsafe steering conditions.

**⚠ CAUTION**

The power Tilt can be set to any trim angle, however, avoid cruising with the outboard motor tilted in the tilt range. Operating the boat in this manner, the outboard motor may ingest air into the water cooling system, resulting in engine overheating.

5



## 6. Tilt up, tilt down and shallow water operation

### WARNING

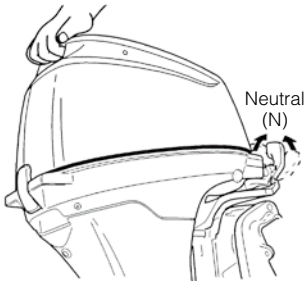
When tilting up or down, be careful not to place your hand between the swivel bracket and the stern bracket.

Be sure to tilt the outboard motor down slowly.

### Note

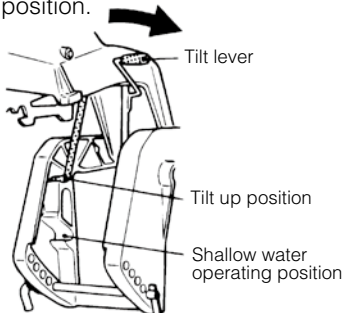
Stop the engine before tilting up.

### MF, EF type



### ■ Tilt up

With the shift lever in Neutral or Forward, fully tilt the motor up toward you by holding the tilt handle provided at the rear of the top cowl. Then lower the tilt lever for locking at tilt-up position.



### ■ Tilt down

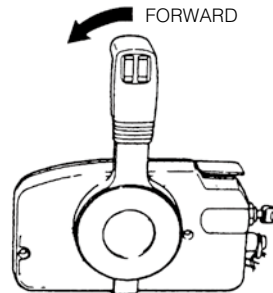
Slightly tilt the motor up, and pull the tilt lever toward you to release the tilt-lock. Then lower the motor slowly.



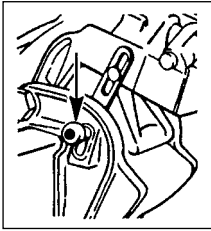
### EP type

### ■ Tilt up

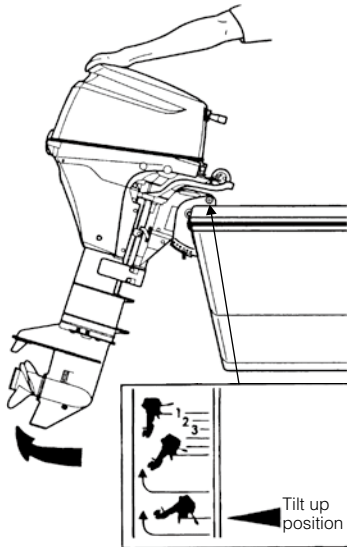
- ① Stop the engine.
- ② Shift the outboard into forward.



- ③ Take hold of the tilt handle and raise the engine to the full up position and release.
- ④ Pull out the tilt lock knob and move it to the lock position.



Tilt lock knob in lock position

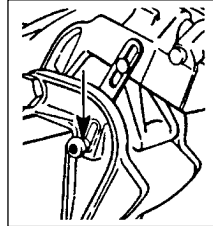


**! WARNING**

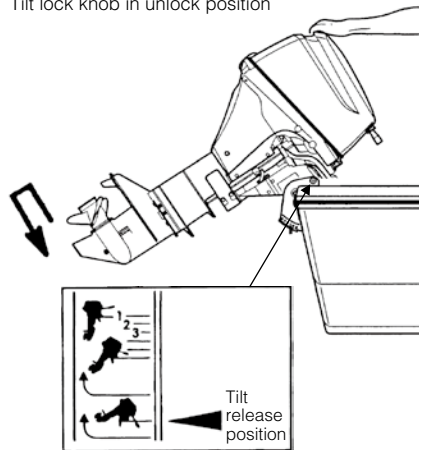
- Do not put hand or finger in between outboard motor body and clamp bracket when adjusting trim angle to prevent injury in case the outboard motor body falls.
- When tilting up outboard motor with fuel joint for over a few minutes, be sure to disconnect fuel hose or close fuel cock, or fuel may leak, potentially catching fire.

■ Tilt down

- ① Move the tilt lock knob to the unlock position.
- ② Raise the outboard to the tilt release position.
- ③ Gently lower the outboard.



Tilt lock knob in unlock position



**! CAUTION**

Do not tilt up outboard motor during operation, or engine may be damaged from overheating due to lack of sufficient cooling water.



## 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 motor down slowly.

### Note

Slow down to trolling speed, and shift into neutral before setting outboard motor to shallow water drive position.

### WARNING

- Run at lowest possible speed when using shallow water drive.
- Tilt lock is disabled when in shallow water drive position.
- When driving shallow water, be careful not to strike outboard motor against sea bottom, or propeller may be pushed out of water, resulting in loss of control.

### CAUTION

While in shallow water drive position, do not operate the outboard motor in Reverse. Operate the outboard motor at slow speed and keep the cooling water intake submerged.

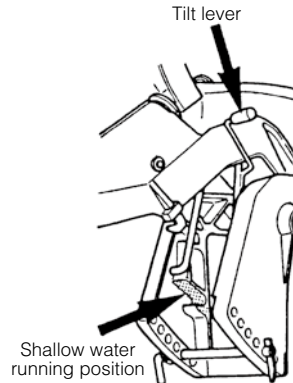
MF, EF type

#### ■ Shallow water running position

With the shift lever in Neutral or Forward, tilt the motor up slowly by about 40° and then lower the tilt lever for setting at the shallow water running position.

#### ■ Tilt down from shallow water running position

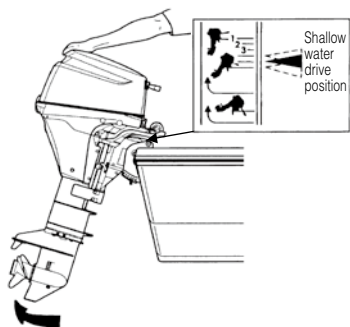
Tilt the motor up fully and then return the motor down slowly to the normal running position.



EP type

■ Setting shallow water drive

- ① Stop the engine.
- ② Shift the outboard into forward.
- ③ Tilt the outboard up to one of the shallow water drive positions.



**⚠ WARNING**

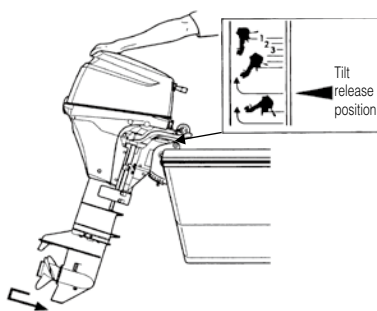
Do not tilt up or down outboard motor when swimmer(s) or passenger is near to prevent them from being caught between outboard motor body and clamp bracket in case the outboard motor body falls.

**⚠ WARNING**

When tilting up outboard motor with fuel joint for over a few minutes, be sure to disconnect fuel hose or close fuel cock, or fuel may leak, potentially catching fire.

■ Releasing shallow water drive

- ① Stop the engine.
- ② Tilt the outboard up to the tilt release position.
- ③ Gently lower the outboard.



**⚠ CAUTION**

Do not tilt up outboard motor while engine operates, or no cooling water may be fed, leading to engine seizure due to overheating.

○ Note

**For U.S.A. market only**

**High altitude :**

When engine operates at high altitude engine may need to have a high altitude kit installed. Otherwise, operating the engine at high altitude may increase its emissions and decrease fuel efficiency and performance. Please see "LIMITED WARRANTY INFORMATION" for more detail.

# REMOVING AND CARRYING THE OUTBOARD MOTOR

## 1. Removing the outboard motor

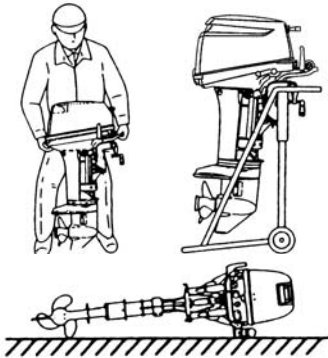
- ① Stop the engine.
- ② Disconnect the fuel connector, the remote control cables and the battery cords from the outboard motor.
- ③ Remove the outboard motor from boat and completely drain the water from the gear case.

### CAUTION

Engine may be hot immediately after operating and could cause burns if touched. Allow Engine to cool down before attempting to carry the outboard.

## 2. Carrying the outboard motor

Keep the outboard motor in a vertical position when carrying.



### WARNING

Close air vent screw of fuel tank and fuel cock before carrying or storing outboard motor and fuel tank, or fuel may leak, potentially catching fire.

## 3. Storing the outboard motor

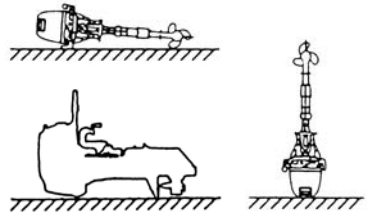
Outboard motor should be stored in a vertical position.

### Note

If the outboard motor must be laid down be sure the tiller handle faces down as shown in the drawing above. Elevate power unit 2 inches to 4 inches if traveling to avoid oil spillage.

### CAUTION

Do not carry or store outboard motor in any of positions described below. Otherwise, engine damage or property damage could result from leaking oil.



## TRAILERING

### **⚠ WARNING**

Do not go under outboard motor tilted up even if it is supported by support bar, or accidental fall of outboard motor could lead to severe personal injury.

### **⚠ WARNING**

Close air vent screw of fuel tank and fuel cock before carrying or storing outboard motor and fuel tank, or fuel may leak, potentially catching fire.

### **⚠ WARNING**

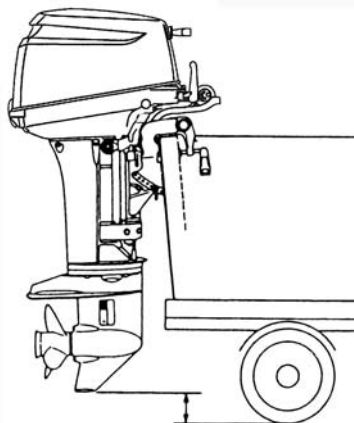
When taking outboard motor from package or removing outboard motor from the boat, never release the lock lever. If the lock lever is released, it will very easy for the clamp bracket to spring up to the tilting direction because it is not fixed.

### **⚠ WARNING**

Never attempt to disassemble shock absorber of gas assist tilt system. It is dangerous because high pressure gas is included in the shock absorber.

### **⚠ CAUTION**

When trailering the outboard motor should be in a vertical (normal running) position, fully down. Trailering in the tilted position may cause damage to the outboard motor, boat, etc. If trailering with outboard fully down is not available (the gear case skeg is too close to the road in a vertical position), fix the outboard motor securely using a device (like a transom saver bar) in the tilted position.



### **⚠ CAUTION**

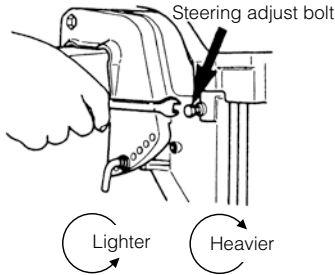
The tilt support device (Transom Saver) supplied on your outboard motor is not intended for towing. It is intended to support the outboard motor while the boat is docked, beached, etc.

# ADJUSTMENT

## 1. Steering friction

### MF, EF, EFT and EPT type

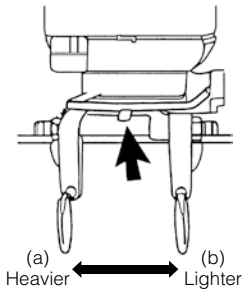
The steering friction can be adjusted in accordance with your preference by turning the steering adjust bolt.



### Note

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

### EFT and EP type

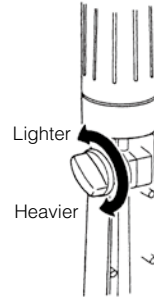


Adjust this lever to achieve the desired steering friction (drag) on the tiller handle. Move lever towards (a) to tighten friction and move lever towards (b) to loosen friction.

## 2. Throttle grip

### MF, EF and EFT type

The turning force of the throttle grip can be adjusted with a throttle adjust screw.



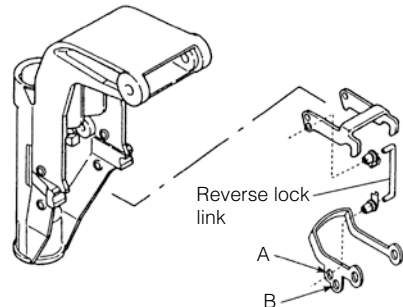
## WARNING

Do not overtighten the throttle grip or remote control tensioner or it could result in difficulty of movement resulting in the loss of control causing an accident and could lead to severe injury.

## 3. Reverse lock

### MF, EF type

The shift lever is normally locked in Reverse (R). (the reverse lock link is in position A).



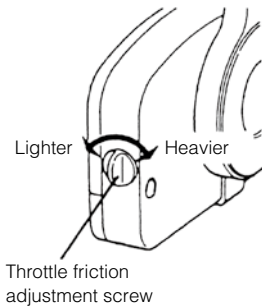
- ⊙ When locking the shift lever in Reverse (R) and Neutral (N), shift the reverse lock link from A to B position.

#### 4. Remote Control Lever Load

##### EP and EPT type

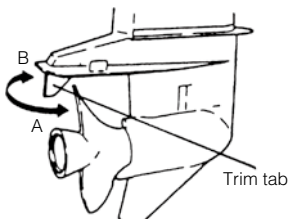
(Throttle friction adjustment screw)

To adjust the load of the remote control lever, turn the throttle friction adjustment screw on the front of the remote control. Turn clockwise to increase the load and counter-clockwise to decrease it.



#### 5. Trim Tab Adjustment

If straight-line cruising can not be achieved, adjust the trim tab located under the anti-ventilation plate.



- ⊙ If the boat veers toward the right, direct the trim tab towards A.
- ⊙ If the boat veers toward the left, direct the trim tab towards B.

#### Notes

- The trim tab also acts as an anode to prevent electrolytic corrosion. Therefore do not paint or grease this part.
- After adjustment securely tighten the trim tab fixing bolt.
- Check for looseness of the bolt and the trim tab at regular intervals.

#### Notes

Due to corrosion, the trim tab will wear down over time. The trim tab should be replaced when it has eroded 2/3 of it's regular size.

#### ! WARNING

- Inappropriate adjustment of trim tab could cause steering difficulty. After installing or readjusting trim tab, check if steering load is even.
- Tighten trim tab bolt to specified torque.

#### ! WARNING

- Be sure that outboard motor is secured to transom or service stand, or accidental drop or fall of outboard motor could lead to severe personal injury.
- Be sure to lock outboard motor if it is tilted up, or accidental fall of outboard motor could lead to severe personal injury.
- Do not go under outboard motor tilted up and locked, or accidental fall of outboard motor could lead to severe personal injury.

# INSPECTION AND MAINTENANCE

## Care of your outboard motor

To keep your outboard 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 motor 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 regulating air pollution from new outboard motors. All new outboard 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.**

## 1. Daily inspection

Perform the following checks before and after use.



### WARNING

Do not use outboard motor if any abnormality is found during pre-operation check or it could result in severe damage to the motor or severe personal injury.

Item	Points to Check	Remedy
<b>Fuel System</b>	<ul style="list-style-type: none"> <li>● Check the amount of fuel in the tank.</li> <li>● Check for debris or water in the fuel filters.</li> <li>● Check the rubber hoses for fuel leakage.</li> </ul>	Replenish Clean or replace Replace
<b>Engine Oil</b>	<ul style="list-style-type: none"> <li>● Check the oil level.</li> </ul>	Fill to the upper level mark on dipstick
<b>Electrical Equipment</b>	<ul style="list-style-type: none"> <li>● Check that the main switch functions normally.</li> <li>● Check that the battery electrolyte level and specific gravity are normal.</li> <li>● Check for loose connections on the battery terminal.</li> <li>● Check that the stop switch functions normally and make sure the lock plate is there.</li> <li>● Check cords for loose connections and damage.</li> <li>● Check the spark plugs for dirt, wear and carbon build-up.</li> </ul>	Replace Replenish or recharge  Retighten Remedy or replace  Correct or replace Clean or replace
<b>Throttle system</b>	<ul style="list-style-type: none"> <li>● Check carbureter linkage is working normally when turning the throttle grip.</li> </ul>	Correct
<b>Recoil Starter</b>	<ul style="list-style-type: none"> <li>● Check the rope for wear and chafing.</li> <li>● Check the ratchet engagement.</li> </ul>	Replace Correct or replace
<b>Clutch and Propeller System</b>	<ul style="list-style-type: none"> <li>● Check that clutch engages correctly when operating the shift lever.</li> <li>● Visually Check propeller for bent or damaged blades.</li> <li>● Check the propeller nut is tightened and the split pin is present.</li> </ul>	Adjust  Replace
<b>Installation of Motor</b>	<ul style="list-style-type: none"> <li>● Check all the bolts attaching the motor to the boat.</li> <li>● Check the thrust rod installation.</li> </ul>	Tighten
<b>Cooling Water</b>	<ul style="list-style-type: none"> <li>● Check that cooling water is discharged from the cooling water check port after the engine has started.</li> </ul>	Repair
<b>Tools and Spares</b>	<ul style="list-style-type: none"> <li>● Check that there are tools and spare parts for replacing spark plugs, the propeller, etc.</li> <li>● Check that you have the spare rope.</li> </ul>	
<b>Steering Devices</b>	<ul style="list-style-type: none"> <li>● Check the operation of the steering handle.</li> </ul>	Repair
<b>Other parts</b>	<ul style="list-style-type: none"> <li>● Check if the anode is securely installed.</li> <li>● Check the anode for corrosion and deformation.</li> </ul>	Repair if necessary Replace

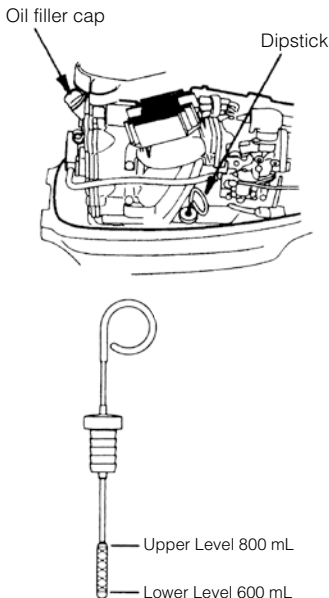


## Maintaining engine oil

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 top cowl.
- ③ Remove the dipstick.
- ④ Wipe oil off the oil dipstick with a clean rag.
- ⑤ Put in the dipstick.
- ⑥ Take out the dipstick and check the oil level.
- ⑦ Replace the dipstick.



### ○ Notes

The oil level should be checked when the engine is cold.

### ○ Notes

Consult with an authorized 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

- Do not add engine oil of brand and grade other than existing one. In case engine oil of other brand or grade is added, drain all oil and ask dealer for treatment.
- In case other than engine oil such as gasoline is put in the oil chamber, empty the chamber and ask dealer for treatment.
- When replenishing engine oil, be careful not to allow entry of foreign matters such as dust and water into oil chamber.
- Wipe off engine oil well immediately if spilled.
- Do not replenish engine oil over upper limit. If overfilled, remove oil to upper limit. If engine oil is over the upper limit, it can leak potentially leading to engine damage.

### Washing outboard motor

If outboard motor is used in salt water, brackish water or water with a high acidic level, use fresh water to remove salt, chemicals or mud from exterior and cooling water passage after every cruising or before storing outboard motor for long time. Before flushing, remove the propeller and the forward thrust holder.

#### **CAUTION**

Keep cooling water passage free of clogs, or lack of cooling water flow could lead to engine overheating, potentially resulting in engine trouble.

#### Notes

It is recommended to check chemical properties of water on which your outboard motor is regularly used.

#### **WARNING**

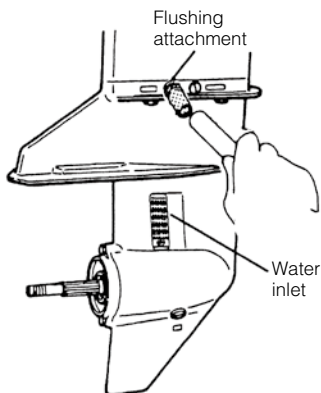
Do not start engine without removing propeller, or accidentally turning propeller could cause personal injury.

#### **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.

#### ■ Use flushing attachment.

- ① Remove propeller (refer to Propeller Replacement). Remove the water plug from the motor, and screw in the flushing attachment.
- ② Attach a water hose to the flushing attachment. Turn on the water and adjust the flow. (Be sure to seal the water inlet, located in the gear case, with tape.)
- ③ Start the engine and run it at idle speed in neutral shift position.
- ④ Check for a steady stream of water flowing out of the water pump indicator hole. Continue flushing the outboard motor for 3 to 5 minutes, carefully monitoring water supply at all times.
- ⑤ Stop the engine, turn off the water supply, and remove the flushing attachment and tape. Reinstall the propeller.



#### **CAUTION**

Keep engine at idle speed during flushing.

## Replacing the propeller

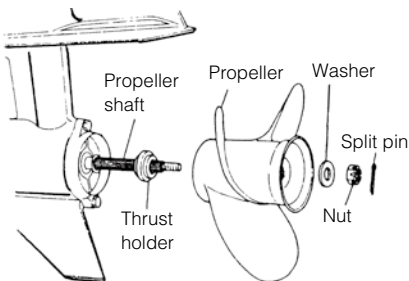
A worn-out or bent propeller will lower the motor's performance, and cause engine trouble.

Before removing the propeller, remove the spark plug caps from the spark plugs to protect against personal injury.

### **! WARNING**

Do not begin propeller removal and installation procedure with spark plug caps attached, shift in forward or reverse, main switch at other than "OFF", engine stop cord attached to the switch, and starter key attached, or engine could accidentally start leading to serious personal injury. Disconnect battery cable if possible.

- ① Remove the split pin, propeller nut and washer.
- ② Remove the propeller and thrust holder.
- ③ Apply genuine grease to the propeller shaft before installing a new propeller.
- ④ Install the thrust holder, propeller, washer and propeller nut onto the shaft.
- ⑤ Install a new split pin into the nut hole and bend it.



### **! WARNING**

Do not hold propeller with hand(s) when loosening or tightening propeller nut. Put a piece of wood block between propeller blade and anti-ventilation plate to hold propeller.

### **! CAUTION**

- Do not install propeller without thrust holder, or propeller boss could be damaged.
- Do not reuse split pin.
- After installing split pin, spread the pin apart to prevent it from falling out which could lead to the propeller coming off during operation.

## Replacing the spark plugs

### WARNING

- Do not reuse spark plug with damaged insulation, or sparks can leak through crack, potentially leading to electric shock, explosion and/or fire.
- Do not touch spark plugs immediately after stopping engine as they will be hot and could cause severe burns if touched. Allow motor to cool down first.

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

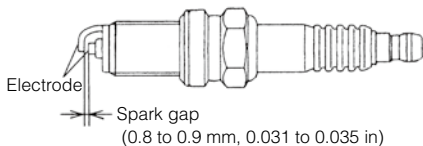
When reusing spark plugs, remove dirt from the electrodes and adjust spark gap to specification.

### Notes

When inspecting the plug, always clean the gasket surface and use a new gasket. Wipe off any dirt from the threads and screw in the spark plug to the correct torque.

- ① Stop the engine.
- ② Remove the top cowl.
- ③ Remove the spark plug caps.
- ④ Remove the spark plugs by turning it counter-clockwise, using a 5/8" socket wrench and handle.

Use spark plug NGK DCPR-6E.



- ⑤ Attach spark plug and tighten to specified torque.

### Notes

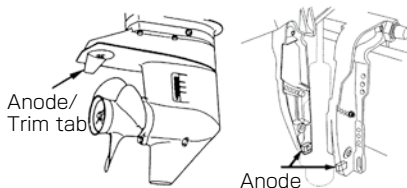
- ◎ Spark plug torque :  
18.0Nm(13.3ft-lb)(1.84kgf-m)
- If a torque-wrench is not available when you are fitting a spark plug, a good estimate of the correct torque is 1/4 to 1/2 a turn past finger-tight. Have the spark plug adjusted to the correct torque as soon as possible with a torque-wrench.

## Replacing the anode

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

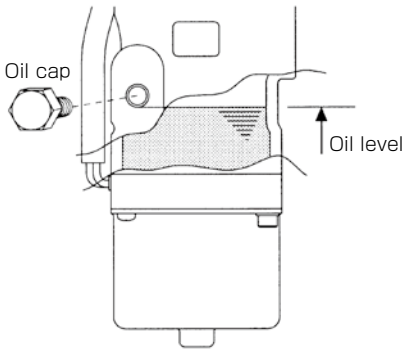
### Notes

- 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.



## Checking and Refilling Oil in the Power Tilt.

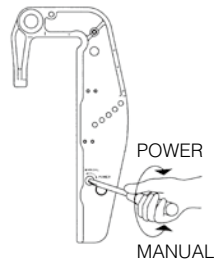
① Check the oil level of the reservoir tank as shown on the right while the tank is kept in a vertical position. Tilt the outboard motor up to check the oil level in the tank. Remove the oil cap by turning counter-clockwise, then check if the oil level reaches the bottom line of the plug hole.



### **CAUTION**

Do not fully unscrew the oil plug with the outboard motor tilted down. Pressurized oil in the oil tank may spurt out.

- ② Recommended oil  
Use an automatic transmission fluid or equivalent. Recommended oils are as shown below.  
ATF Dexron III
- ③ Air purging from the Power Tilt unit.  
Entrapped air in the Power Tilt unit will cause poor tilting movement. With the outboard motor mounted on the boat, set the manual release valve to the Manual side, and tilt the outboard motor manually up/down 5-6 times while checking the oil level. When done, close the valve by turning it clockwise towards the Power side.



## 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.

Description		Inspection intervals			Inspection procedure	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.	0.8-0.9mm (0.031-0.035in)
	*Ignition timing	○		○	Check timing.	
Starting System	Starter rope	○	○	○	Check for wear or chafing	
	*Starter motor			○	Check for salt deposits and the battery cable condition.	
	Battery	○	○	○	Check installation, fluid quantity, gravity.	
Engine	Engine oil	○		○	Replace	
	Valve Clearance	○		○	Check & adjust	
	*Timing belt			○	Check and Replace if necessary.	
	*Thermostat			○	Check and Replace if necessary.	
Lower Unit	Propeller	○	○	○	Check for bent blades, damage, wear.	
	Gear oil	Replace ○	○	Replace ○	Change or replenish-oil and check for water leaks.	320mL
	*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 your dealer.

## Notes

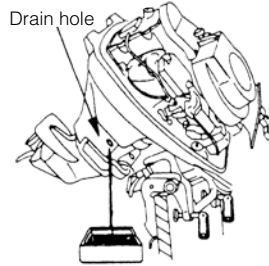
Your outboard motor should receive careful, and complete inspection at 300 hours. This is the best time for major maintenance procedures to be carried out.

## Replacing engine oil

Engine oil mixed with dust or water will dramatically shorten the life of the engine.

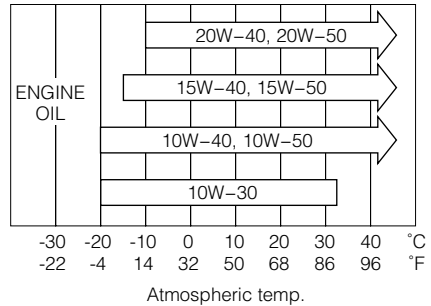
To change engine oil:

- ① Stop the engine and set it in a tilted position.
- ② Remove the top cowl and oil filler cap. Allow it to cool.
- ③ Turn the steering on the outboard motor so that the drain hole is facing downward.
- ④ Put a oil drain pan under the oil drain screw.
- ⑤ Remove the oil drain screw and completely drain oil from the engine.
- ⑥ Tighten the oil drain screw.
- ⑦ Reset the engine in a vertical position.
- ⑧ Repeat ⑤ and ⑥ .
- ⑨ Fill the engine through filler port with recommended oil (see chart below) to the upper dipstick mark.
- ⑩ Tighten the oil filler cap.



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

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



You can also use NMMA FC-W certified 4-stroke outboard oil below.

10W-30: is recommended for use in all temperature.

25W-40: may be used at temperatures above 4°C (40°F).

## CAUTION

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

**⚠ 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.

**⚠ CAUTION**

- Do not overfill engine oil, or engine oil could leak and/or engine could be damaged. If engine oil level is over upper limit marks of oil gauge, drain oil to level lower than upper limit.
- Be sure that outboard motor is in upright and level position when checking or changing oil.
- Stop engine immediately if low oil pressure warning lamp is lit or oil leak is found, or engine could be severely damaged. Consult dealer.

**○ Notes**

- If any amount of water is found in engine oil, making it milky white, consult dealer.
- If engine oil is contaminated with fuel, emitting strong fuel smell, consult dealer.

Cleaning the fuel filters and the fuel tank

Fuel filters are located inside the fuel tank and engine.

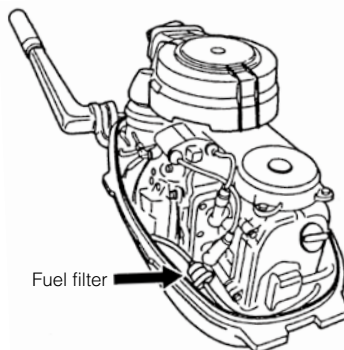
**⚠ WARNING**

Gasoline and its vapors are very flammable and can be explosive.

- Do not start this procedure while engine is operating or hot even after stopping it.
- Place fuel filter away from every source of ignition such as sparks or open flames.
- Wipe off gasoline well immediately if spilled.
- Install fuel filter with all related parts in place, or fuel leak could occur, leading to catching fire or explosion.
- Check fuel system regularly for leakage.
- Contact an authorized dealer for fuel system services. Services by unqualified person could lead to engine damage.

**■ Fuel filter (for engine)**

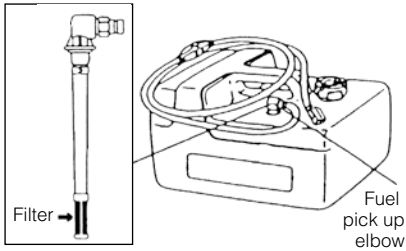
- ① Replace the filter provided inside of engine cover if there is water or dirt inside.





**■ Fuel filter (for fuel tank)**

Loosen the fuel pickup elbow shown at left, remove it and clean the fuel filter.

**■ Fuel tank**

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

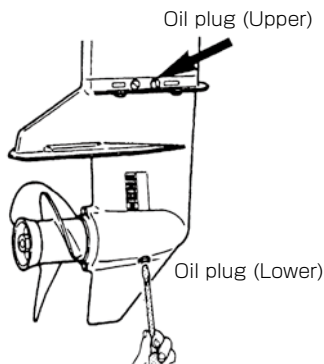
Check and clean the tank at periodical inspection or after the outboard motor has been stored for a long period of time (over three months).

### Replacing gear oil

#### **⚠ WARNING**

- Be sure that outboard motor is secured to transom or service stand, or accidental drop or fall of outboard motor could lead to severe personal injury.
- Be sure to lock outboard motor if it is tilted up, or accidental fall of outboard motor could lead to severe personal injury.
- Do not go under outboard motor tilted up and locked, or accidental fall of outboard motor could lead to severe personal injury.

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

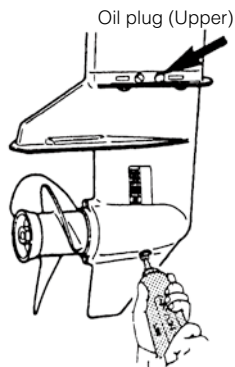


- ② Insert the oil tube nozzle into the lower oil plug hole, and fill with gear oil by squeezing the oil tube

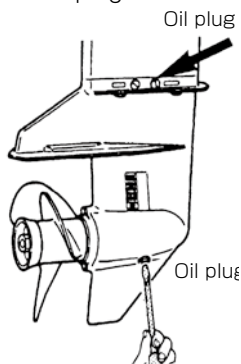
#### **⚠ CAUTION**

Do not reuse oil plug gasket. Always use new gasket and tighten oil plug properly to prevent entry of water into lower unit.

until oil flows out from upper plug hole.



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



#### ○ Notes

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

#### ○ Notes

Use genuine gear oil or the recommended one (API GL-5: SAE #80 to #90).  
Required volume: approx. 320 ml.

### 3. Off-season storage

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

#### CAUTION

Before servicing the motor for storage:

- Remove the battery cables.
- Remove the spark plug caps from the spark plugs.
- Do not run the motor out of the water.

#### ■ Engine

- 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 oily 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, restricting the fuel flow.
- ④ Remove the spark plugs and spray storage oil (available from an authorized dealer) into the combustion chamber through the spark plug holes 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 outboard motor up vertically in a dry place.

#### WARNING

Be sure to use cloth to remove fuel remaining in the cowl and dispose of it in accordance with local fire prevention and environment protection regulations.

#### ■ Battery

- ① Disconnect the battery cables.
- ② Wipe off any chemical deposits, dirt, or grease.
- ③ Apply grease to the battery terminals.
- ④ Charge the battery completely before storing it for the winter.
- ⑤ Recharge the battery once a month to prevent it from discharging and the electrolyte from deteriorating.
- ⑥ Store the battery in a dry place.

#### ■ Electric Starter Motor

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

Do not put grease on the teeth of the starter pinion or flywheel or increased wear or damage will occur.

### 4. Pre-season check

- ① 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.)

**○ Notes**

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.

- ② 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

- ③ Check that the battery is secure and the battery cables are properly installed.

### 5. Motor submerged in water

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


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

- ① Wash the outboard 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 plugs, and completely drain the water from the engine by pulling the recoil starter several times.

Replace oil filter and oil to the correct level.

The oil and filter may need to be changed again after running a short period to get all moisture completely out of the crankcase.

- ④ Inject a sufficient amount of engine oil through the spark plug holes. Pull the recoil starter several times to circulate the oil throughout the outboard motor.
- ⑤ Take outboard motor to your dealer.

** CAUTION**

Do not attempt to start submerged outboard motor immediately after it is recovered, or engine could be severely damaged.

## 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, tilt down and submerge the lower unit under the water.

## 7. Checking after striking underwater object

Striking the sea bottom or an underwater object may severely damage the outboard motor. Immediately bring the outboard motor 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 or propeller shaft upper and lower mount rubber bolts, and/or mount bracket bolts.

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

- ② Damage to mount rubber, the tilt stopper, thrust rod, gears and clutch, and/or propeller.

Ask an authorized dealer to replace damaged or defective parts.

# TROUBLESHOOTING

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

An authorized 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	Warning lamp ON	Power tilt inoperative	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

		ELECTRICAL SYSTEM										Possible cause
		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	Warning lamp ON	Power tilt inoperative	
●	●	●	●	●		●	●	●				Spark plug other than specified
●	●	●	●	●		●	●					Dirt, soot, etc. on spark plug
						●			●			Faulty oil pressure switch
●	●	●	●		●	●						No Spark or weak spark
●												Short circuit of engine stop switch
●		●	●			●	●					Ignition timing incorrect
●										●		Lock plate not fitted
●										●		Disconnection of wire or loose ground connection
●												Blown 20 Amp fuse in the starting circuit
●												Not shifted to neutral position
●										●		Weak battery or battery connections are loose or corroded
●										●		Ignition key switch failure
●										●		Wiring or electrical connection faulty
●												Starter motor or starter solenoid failure

	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	Warning lamp ON	Power tilt inoperative	Possible cause
COMPRESSION & OIL SYSTEM		●	●	●		●	●				Low compression
			●					●			Carbon deposits in the combustion chamber
				●			●				Incorrect valve clearance
								●			Low oil pressure/level
ENGINE OIL SYSTEM						●		●	●		Low oil level
								●	●		Use of improper oil
						●		●	●		Oil deterioration
						●		●	●		Clogged oil strainer
						●		●	●		Faulty oil pump
OTHERS	●		●	●		●	●				Incorrect adjustment of throttle link
							●	●			Insufficient cooling water flow, clogged or defective pump
			●				●	●			Faulty thermostat
				●	●		●	●			Cavitation or ventilation
				●	●	●	●	●			Incorrect propeller selection
			●	●	●	●	●	●			Damaged or bent propeller
				●	●		●	●			Improper thrust rod position
				●	●	●	●	●			Unbalanced load on boat
				●	●	●	●	●			Transom too high or too low



# TOOL KIT AND SPARE PARTS

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

Items		Quantity	Remark
Service tools	Tool bag	1	
	Pliers	1	
	Socket wrench	1	10 × 13 mm
	Socket wrench	1	16 mm (spark plug)
	Socket wrench handle	1	
	Screwdrivers	1	Cross-and straight-point
	Screwdriver handle	1	
Spare parts	Starter rope	1	1,600 mm
	Spark plug	1	NGK DCPR6E
	Split pin	1	
Parts Packaged with Engine	Fuel tank	1	12L
	Primer bulb	1 set	
	Remote control box	1 set	EP/EFT only
	Harness sleeve	1	EP only $\phi$ 12-90mm (Tool bag)
	Bracket bolts, nuts and washers	1 set	EP only
	Bracket fixing	4	8 mm EPT/EFT only
	Bolt	4	8 mm //
Nut	4 (big)	8 mm //	
Washer	4 (small)	8 mm //	

# OPTIONAL ACCESSORIES



Tachometer



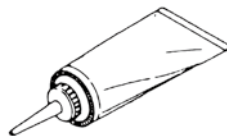
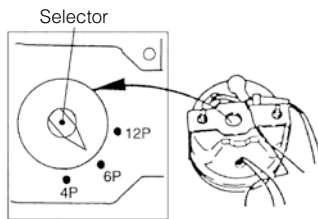
Tachometer with oil lamp (for EPT)



Propeller



High thrust propeller



Genuine gear oil (500ml)



Touch-up paint (300ml)



Genuine engine oil (450ml)



Flushing attachment

# 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.

5,000 to 6,000 rpm

	Propeller Mark	Propeller Size (Diameter × pitch)		
		No. of Brades	inch	mm
Light boats   Heavy boats	9.5	3	8.9 × 10	226 × 255
	8.5	3	8.9 × 8.3	226 × 211
	7.5	3	8.5 × 7.5	216 × 190
	7.0	3	8.9 × 7.0	226 × 178
Heavy boats	6.5	3	8.5 × 6.5	216 × 165

	Propeller Mark	Propeller Size (Diameter × pitch)		
		No. of Brades	inch	mm
Light boats   Heavy boats	7.0	4	8.7 × 7.0	226 × 178
Heavy boats	5.0	4	8.7 × 5.0	221 × 127

# MEMO

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# MEMO

A series of horizontal dashed lines providing a template for writing a memo.





**OWNER'S MANUAL**  
**MFS 8A3**  
**9.8A3**

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