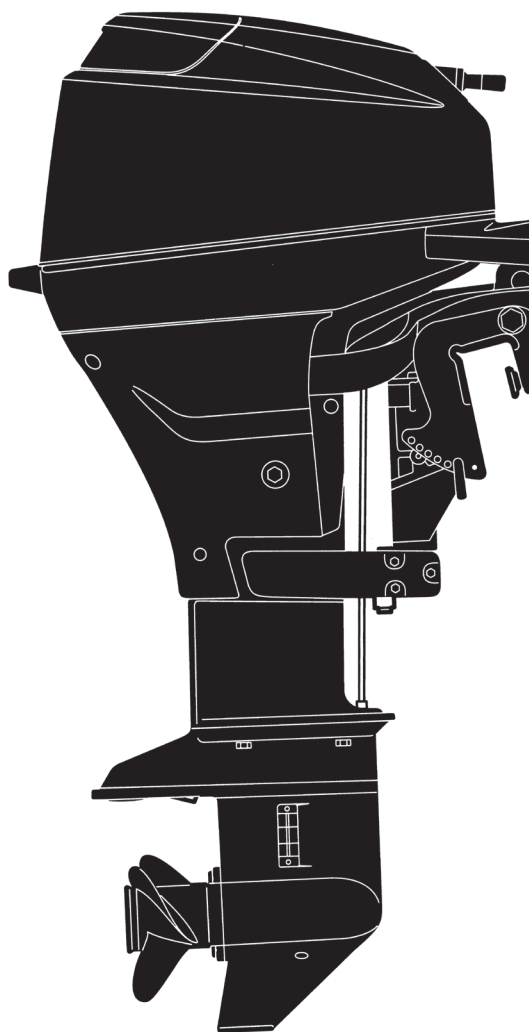


OWNER'S MANUAL

TOHATSU
Outboards



**MFS 15C
20C**

OB No.003-11090-5

⚠ 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.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, YOUR OUTBOARD MOTOR WILL NOT BE COVERED BY THE APPLICABLE LIMITED WARRANTY, IF THIS PROCEDURE IS NOT FOLLOWED.

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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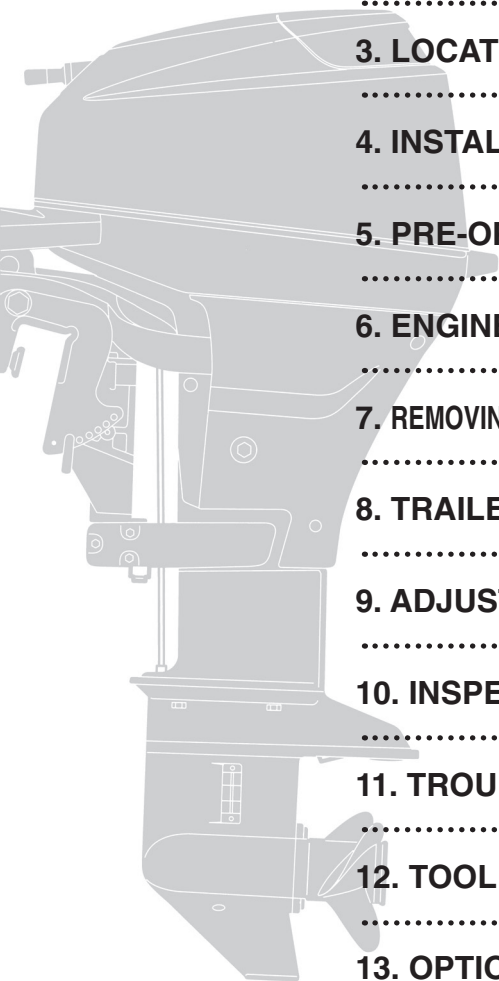
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GENERAL SAFETY INFORMATION

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 , EFT

Item		MODEL	15C MF 20C MF	15C EF 20C EF	15C EFT 20C EFT
Overall Length		mm (in)	980 (38.6)		
Overall Width		mm (in)	365 (14.4)		
Overall Height S-L-UL		mm (in)	1,065 (41.9) · 1,215 (47.8) · 1,342 (52.8)		
Transom Height S-L-UL		mm (in)	413 (16.3) · 562 (22.1) · 689 (27.1)		
Weight	S Kg (lb)		51.5 (114)	55.0 (121)	62.0 (136)
	L Kg (lb)		53.0 (117)	56.5 (125)	63.5 (139)
	UL Kg (lb)		54.5 (120)	58.0 (128)	65.0 (142)
Output		kW (Hp)	15C : 11.0 (15) 20C : 14.7 (20)		
Max. Operating Range		rpm	15C : 5,000-6,000 20C : 5,400-6,100		
Idle Speed in Forward Gear		rpm	900		
Idle Speed in Neutrl Gear		rpm	950		
Engine Type			4-Stroke		
Number of Cylinder			2		
Bore × Stroke		mm (in)	61 × 60 (2.40 × 2.36)		
Piston Displacement		mL (Cu in)	351 (21.42)		
Exhaust System			Through hub exhaust		
Cooling System			Water cooling		
Engine Lubrication			Trochoid pump		
Startring System			Manual	Electric starter motor*	
Ignition System			Flywheel Magneto C.D. ignition		
Spark Plug			NGK DCPR6E		
Trim Position			6		
Engine Oil		mL (fl.oz.)	API SF, SG, SH, SJ, SL or SM FCW 10W-30, Approx. 1,000 (33.8)		
Gear Oil		mL (fl.oz.)	Genuine Gear Oil or API GL5, SAE #80-90, Approx. 370 (12.5)		
Fuel			Unleaded regular gasoline : Pump posted 87 Octane (research octane rating of 91)		
Fuel Tank Capacity		L (US gal)	12 (3.17)		
Gear Reduction Ratio			2.15 (13 : 28)		
Emission Control System			Engine modification (EM)		
Operator Sound Pressure (ICOMIA 39/94) dB(A)			83.9		
Hand Vibration Level (ICOMIA 38/94) m/sec2			2.5		

* : with manual ※ This specifications might change without a previous notice.

EP , EPT

1

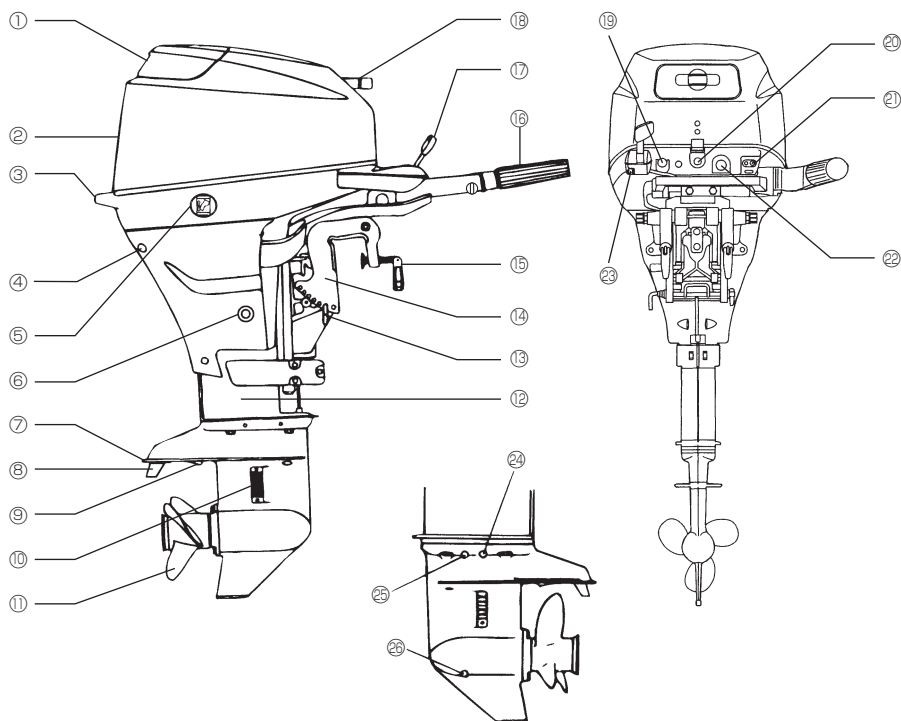
Item		MODEL	15C EP 20C EP	15C EPT 20C EPT
Overall Length	mm (in)		640 (25.2)	
Overall Width	mm (in)		345 (13.6)	
Overall Height S·L·UL	mm (in)		1,065 (41.9) · 1,215 (47.8) · 1,342 (52.8)	
Transom Height S·L·UL	mm (in)		413 (16.3) · 562 (22.1) · 689 (27.1)	
Weight		S Kg (lb)	54.0 (119)	61.0 (134)
		L Kg (lb)	55.5 (122)	62.5 (138)
		UL Kg (lb)	57.0 (126)	-
Output		kW (Hp)	15C : 11.0 (15) 20C : 14.7 (20)	
Max. Operating Range		rpm	15C : 5,000-6,000 20C : 5,400-6,100	
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)	61 × 60 (2.40 × 2.36)	
Piston Displacement		mL (Cu in)	351 (21.42)	
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	5
Engine Oil		mL (fl.oz.)	API SF, SG, SH, SJ, SL or SM FCW 10W-30/40, Approx. 1,000 (33.8)	
Gear Oil		mL (fl.oz.)	Genuine Gear Oil or API GL5, SAE #80-90, Approx. 370 (12.5)	
Fuel			Unleaded regular gasoline : Pump posted 87 Octane (research octane rating of 91)	
Fuel Tank Capacity		L (US gal)	12 (3.17)	
Gear Reduction Ratio			2.15 (13 : 28)	
Emission Control System			Engine modification (EM)	
Operator Sound Pressure (ICOMIA 39/94) dB(A)			83.9	
Hand Vibration Level (ICOMIA 38/94) m/sec ²			—	

* : with manual ※ This specifications might change without a previous notice.

NAMES OF PARTS

MF , EF , EP , EFT , EPT

2



* : MF, EF and EFT type only.

☆ : EF and EFT type only.

① Tilt Handle

② Top Cowl

③ Bottom Cowl

④ Cooling Water Check Port

⑤ Power Tilt Switch

(EPT and EFT type only)

⑥ Oil Drain Bolt

⑦ Anti Ventilation Plate

⑧ Anode / Trim Tab

⑨ Sub Water Inlet

⑩ Water Inlet

⑪ Propeller

⑫ Drive Shaft Housing

⑬ Thrust Rod

⑭ Clamp Bracket

⑮ Clamp Screw

⑯ * Throttle Grip

⑰ * Shift Lever

⑱ Starter Handle

⑲ Stop Switch

⑳ Warning Lamp

㉑ Fuel Connector

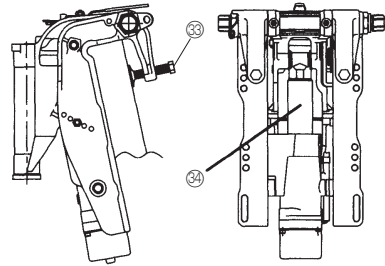
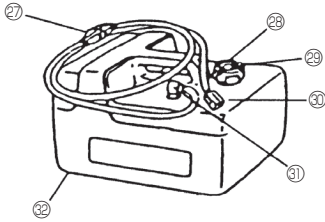
㉒ ☆ Starter Switch

㉓ * Choke Knob

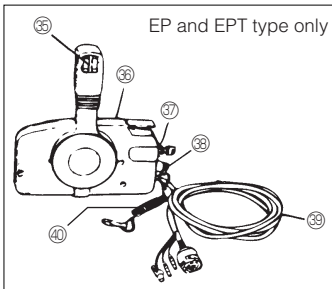
㉔ Water Plug

㉕ Oil Plug (Upper) (Level)

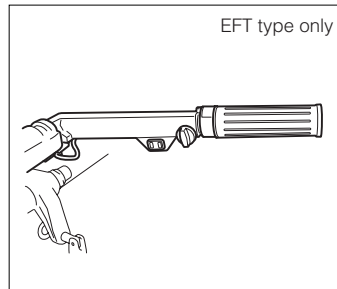
㉖ Oil Plug (Lower) (Fill)



Power Tilt Type



EP and EPT type only



EFT type only

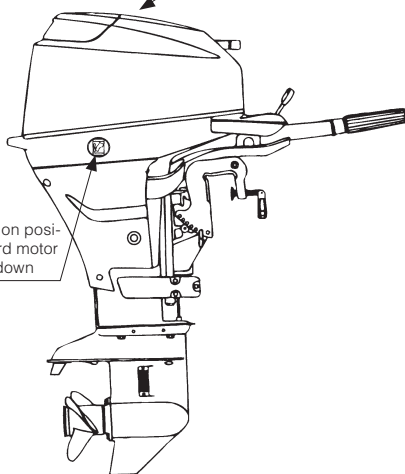
- ②⑦ Primer Bulb
- ②⑧ Fuel Tank Cap
- ②⑨ Air Vent Screw
- ③① Fuel Connector
- ③① Fuel Pick up Elbow
- ③② Fuel Tank

- ③③ Clamp Screw
(EFT type only)
- ③④ Power Tilt

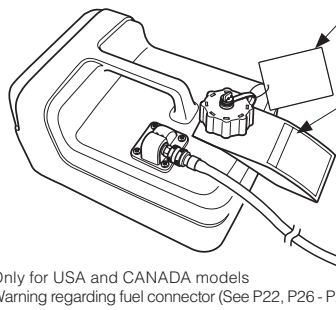
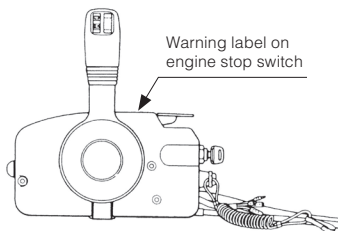
- ③⑤ Power Tilt Switch
(EPT type only)
- ③⑥ Remote Control Box
- ③⑦ Main Switch
- ③⑧ Stop Switch
- ③⑨ Cord Assembly
- ④① Engine Stop Switch Cord

Locations of warning labels

Warning label on position of outboard motor when setting down

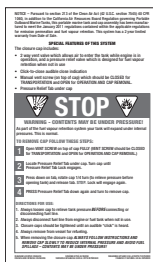
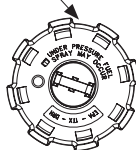


Only for USA and CANADA models
Warning regarding combination of fuel tank and
primer bulb ass'y.



Only for USA and CANADA models
When opening or closing fuel tank cap, be sure
to observe warning note on fuelling

Only for USA and CANADA models
Warning regarding fuel tank cap
(See P22, P26 - P29)



Individual symbol marks means as described below.



Up  



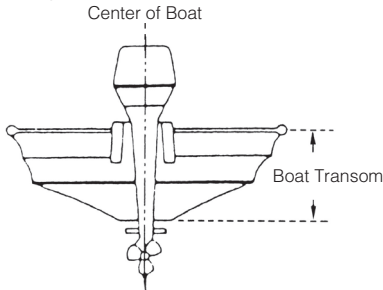
INSTALLATION

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.

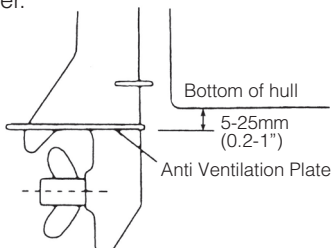
Position ... Above keel line
Set engine at center of boat.



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.

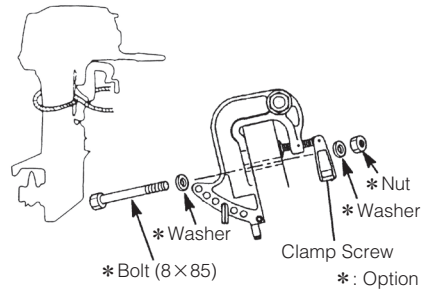


MF, EF, EP type

- 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

A rope is not included in the standard accessories.

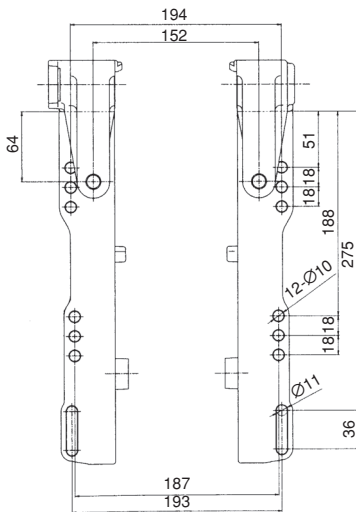
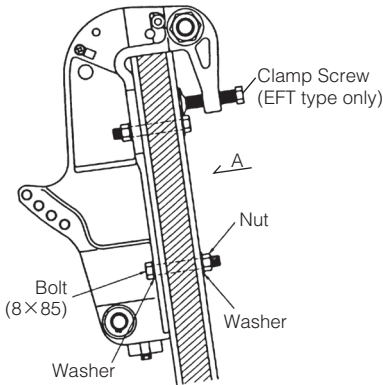


CAUTION

- 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 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.

EFT, EPT type

② Power Tilt and Gas Assist type



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 the outboard motor without following this manual can lead to unsafe conditions such as poor maneuverability, lack of control or fire.
- Loose clamp screws and/or mounting bolts can lead to the release or displacement of the outboard motor, possibly resulting in lost of control and/or serious personal injury. Be sure that fasteners are tightened to the specified torque (30 Nm (3.0kgf)13ft-lb). Check the fasteners for tightness from time to time.
- Be sure to use outboard mounting fasteners included in the outboard motor package 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.

2. Installing the remote control devices

WARNING

When using other than Tohatsu's genuine remote control box, DO NOT select the one without neutral safety switch that prevents in-gear start.

Use of remote control box without neutral safety switch can allow start of engine with gear at other than neutral shift, potentially leading passengers to falling or causing passenger to be thrown overboard.

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

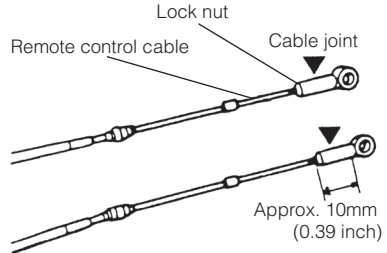
■ Installation of the Remote Control Cables (Box side) :
Follow the instruction manual provided with the remote control.

■ 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

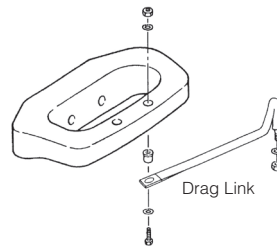
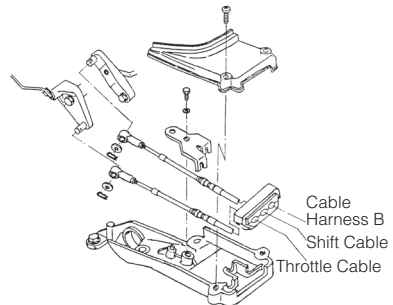
Screw the tip of the remote control cable into the cable joint up to approx. 10 mm (0.39 inch), then lock them with a lock nut. Apply grease to the hole of the cable joint.



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 the remote control cables to a diameter of 406 mm (16 inches) or less.

Note

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

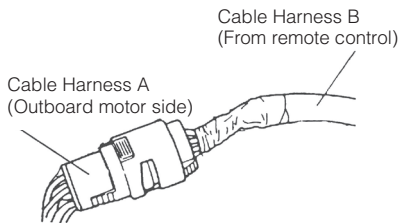
Confirm whether the throttle valve is fully closed when the control lever is shifted to the Neutral position.

4

③ Connecting the Cord assembly (Wiring Harness)

Connect cable harness B to cable harness A.

Location of the connectors is near the recoil starter of starboard side in the cowl.



WARNING

Do not disconnect the cord assembly when the outboard motor is in operation or you will lose control of the outboard motor.

3. Installing the battery

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



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.

Note

Minimum recommended battery : 12V, 70AH (800 Marine Cranking Amps (MCA) or 650 Cold Cranking Amps (CCA))
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.

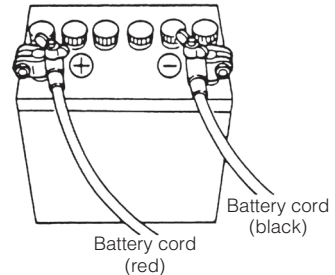
CAUTION

- Make sure that the battery leads do not get stuck between the outboard motor and boat when turning, etc.
- The starter motor may fail to operate if the leads are incorrectly connected.
- Be sure to correctly connect the (+) and (-) leads. If not, the charging system will be damaged.
- Do not disconnect the battery leads 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 lead (+) to the positive terminal (+) of the battery, and then connect the negative lead (-). When disconnecting the battery always remove the negative lead (-) first. After connecting the positive terminal (+), securely place a cap on it to prevent short circuits.



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 improper gasoline can damage your engine. Engine damage resulting from the use of improper gasoline is considered misuse of the engine, and damage caused thereby will not be covered under the limited warranty.

FUEL RATING

TOHATSU engines will operate satisfactorily when using a major brand of unleaded gasoline meeting the following specifications:

USA and Canada - having a posted pump Octane Rating of 87 (R +M)/2 minimum. Premium gasoline (92 [R+M]/2 Octane) is also acceptable. Do not use leaded gasoline.

Outside USA and Canada - Use unleaded gasoline with declared octane rating of 90 RON or over. Use of premium gasoline of 98 RON is also allowed. Use of name-brand leaded gasoline may be allowed only if unleaded gasoline is not available.

GASOLINES CONTAINING ALCOHOL

The fuel system components on your TOHATSU engine will withstand up to 10% alcohol content in the gasoline. But if the gasoline in your area contains either methanol (methyl alcohol) or ethanol (ethyl alcohol), you should be aware of certain adverse effects that can occur. These adverse effects are more severe with methanol. Increasing the percentage of alcohol in the fuel can also worsen these adverse effects. Some of these adverse effects are caused

because the alcohol in the gasoline can absorb moisture from the air, resulting in a separation of the water/alcohol from the gasoline in the fuel tank.

These may cause increased:

- Corrosion of metal parts
- Deterioration of rubber or plastic parts
- Fuel permeation through rubber fuel lines
- Starting and operating difficulties

WARNING

Fuel leakage can cause fire or explosion, potentially leading to severe injury or loss of life. Every fuel system part should be checked periodically, and especially after long term storage, for fuel leak, change of hardness of rubber, expansion and/or corrosion of metals. In case any indication of fuel leakage or degradation of fuel part is found, replace relevant part immediately before continuing operation.

If the use of gasoline containing alcohol is inevitable, or presence of alcohol is suspected in the gasoline, it is 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.

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 :

12 liters (3.17 U.S. gal)

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.

CAUTION

When operating a TOHATSU engine on gasoline containing alcohol, storage of gasoline in the fuel tank for long periods should be avoided. Long periods of storage, common to boats, create unique problems. In cars, alcohol blend fuels normally are consumed before they can absorb enough moisture to cause trouble, but boats often sit idle long enough for phase separation to take place. In addition, internal corrosion may take place during storage if alcohol has washed protective oil films from internal components.

2. Low permeation fuel hose requirement

EQUIPPED FOR UNITED STATES AND CANADA MODEL

Required for outboards manufactured for sale, sold, or offered for sale in the United States

- TOHATSU engine has used fuel hoses for The Environmental Protection Agency (EPA) requires from January 1, 2011.

3. EPA pressurized portable fuel tank requirements

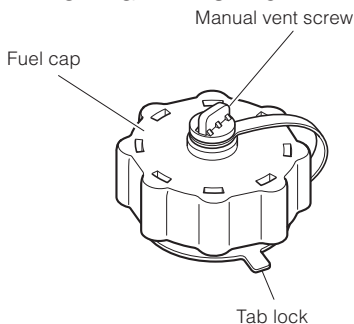
EQUIPPED FOR UNITED STATES AND CANADA MODEL

The Environmental Protection Agency (EPA) required portable fuel systems that are produced after January 1, 2011 for use with outboard engines to remain fully sealed (pressurized) up to 34.4 kPa (5.0 psi). These tanks may contain the following:

- An air inlet that opens to allow air to enter as the fuel is drawn out of the tank.
- An air outlet that opens (vents) to the atmosphere if pressure exceeds 34.4 kPa (5.0 psi). A hissing noise may be heard as the tank vents to the atmosphere. This is normal.
- When installing the fuel tank cap, turn the cap to the right until you hear two click. This signals that the fuel cap is fully seated. A built-in device prevents overtightening.
- The fuel tank has a manual vent screw which should be closed for transportation and full open for operation and cap removal.

Since sealed fuel tanks are not openly vented, they will expand and contract as the fuel expands and contracts during heating and cooling cycles of the outside air. This is normal.

REMOVING THE FUEL CAP



IMPORTANT: Contents may be under pressure. Rotate the fuel cap 1/4 turn to relieve pressure before opening.

- ① Open the manual vent screw on top of the fuel cap completely.
- ② Turn the fuel cap until it contacts the tab lock.
- ③ Press the tab lock and turn to remove cap.

4. EPA approval Primer valve/hose assembly

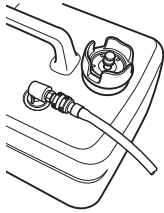
EQUIPPED FOR UNITED STATES AND CANADA MODEL

TOHATSU adopts Primer bulb/hose assembly approved by the Environment Protection Agency (EPA). Please use the EPA approved primer bulb/hose assembly with the identification mark on the fuel connector.

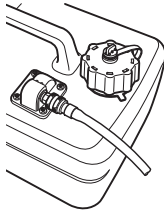


⚠ CAUTION

Be sure to use EPA approved tank and EPA approved primer bulb/hose assembly as a set. Confirm shapes of EPA approved tank and regular tank.



Except for U.S. model
(regular tank)



For U.S. and Canada model
(EPA approved tank)

5. Recommended engine oil

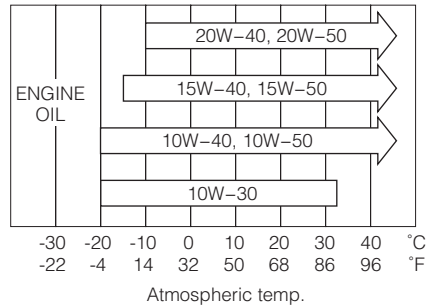
Use only high quality 4-stroke engine oil to insure performance and prolonged engine life.

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.

6. 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.

5

	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

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.

7. Engine oil warning lamp

Oil pressure is required to lubricate internal engine parts.

When the warning lamp (Red) is off, 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

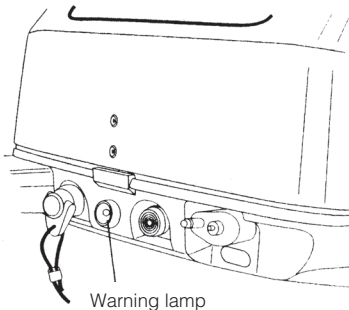
Never run the engine if the warning lamp is on or blinking on and off.

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 2,000 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.



8. ESG (A device preventing over revolution)

ESG is a device to prevent over revolution of the engine (more than approximately 6,400 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

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)

CAUTION

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. Filling the fuel

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 fuel tank cap and 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.

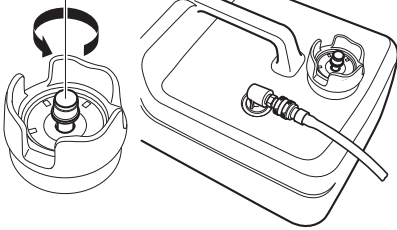
⚠ WARNING

When opening fuel tank cap, be sure to follow the procedure described below. Fuel could blast out through the fuel tank cap in case the cap is loosened by using another procedure when internal pressure of fuel tank is raised by heat from sources such as engine or sun light.

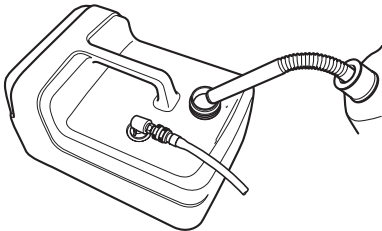
Except for USA and Canada model

- ① Full open the air vent screw on the tank cap and release internal pressure.

Full open the Air vent screw



- ② Open the fuel tank cap slowly.
- ③ Fill the fuel carefully not to over flow.

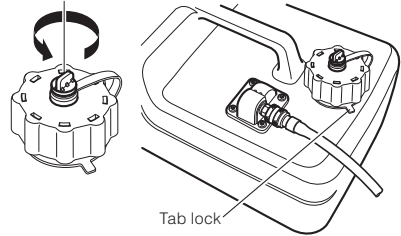


- ④ After filling the tank, close the tank cap.

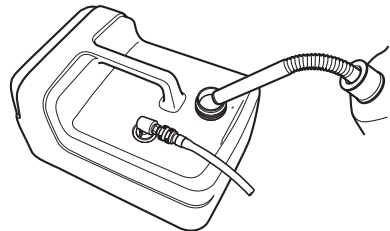
For USA and Canada model

- ① Full open the air vent screw on the tank cap and release internal pressure.

Full open
Air vent screw



- ② Loosen the tank cap until it contacts the tab lock and release internal pressure completely. After that, press down the tab lock and open the tank cap.
- ③ Fill the fuel carefully not to over flow.

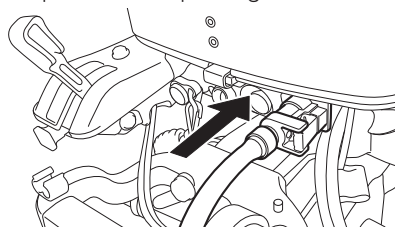


- ④ After filling the tank, close the tank cap until two clicks sound is heard.

2. Feeding the fuel

Except for USA and Canada model

- ① Full open the air vent screw on the tank cap.
- ② Open the fuel tank cap slowly and release internal pressure completely. After that, close the fuel tank cap.
- ③ Connect the fuel connector to the engine and squeeze primer bulb until it becomes stiff to feed fuel to carburetor. Direct arrow mark upward when priming.



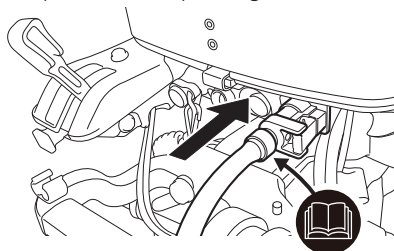
Engine side



Fuel tank side

For USA and Canada model

- ① Full open the air vent screw on the tank cap.
- ② Loosen the tank cap until it contacts the tab lock and release internal pressure completely. After that, close the tank cap until two clicks sound is heard.
- ③ Connect the fuel connector to the engine and squeeze primer bulb until it becomes stiff to feed fuel to carburetor. Direct arrow mark upward when priming.



Engine side



Fuel tank side

⚠ CAUTION

When using EPA approval fuel tank, only use a primer bulb/hose assembly that has a Fuel Demand Valve installed in the fuel hose or a sealing mechanism in the fuel connector as shown below. (FDV and fuel connector that has an sealing mechanism prevent pressurized fuel from entering the engine and causing a fuel system overflow or possible fuel spillage.)

FDV in fuel hose



Sealing mechanism in fuel connector

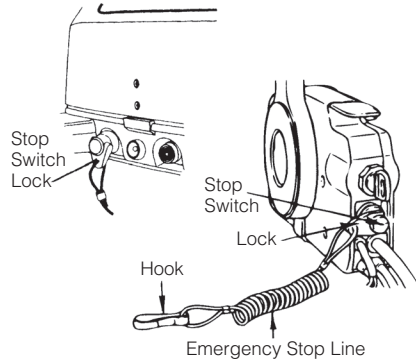


Do NOT use a primer bulb/hose assembly that does not contain a Fuel Demand Valve or a sealing mechanism as shown below: otherwise overflow the fuel system or fuel spillage may occur.



3. Starting

- ① After making sure the stop switch lock has been installed, connect the hook to a part of the operator's body.

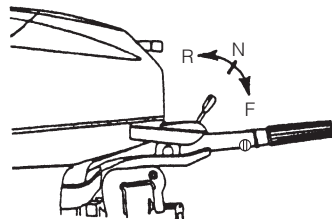


MF, EF, EFT type

- ② 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.

○ Note

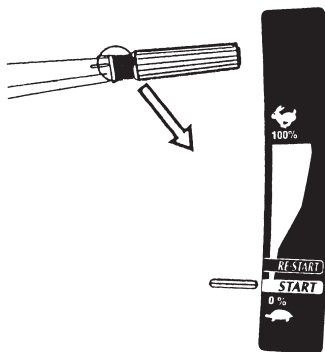
Choke is not necessary when the engine is warm. Set the throttle grip to "RE-START" position.

○ Note

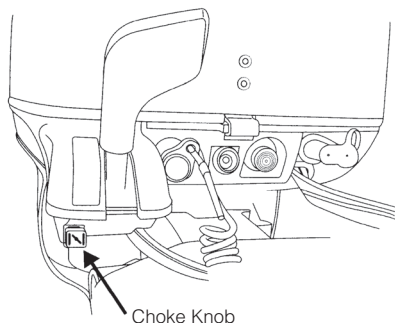
If engine does not start with 4 or 5 times starting operation, push the knob back and restart.

6

- ③ Set the throttle grip to "START" position.



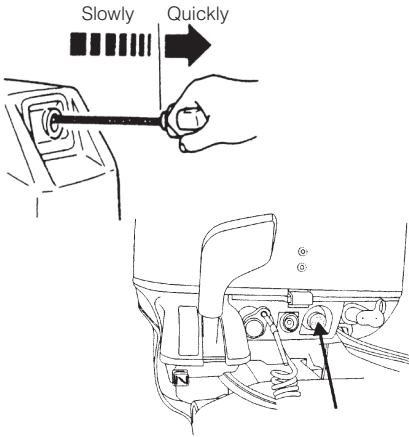
- ④ Pull the choke knob fully.



MF type

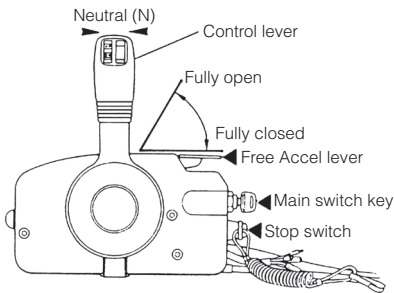
Engine is equipped with a compression release mechanism.

- ⑤ 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.
- ⑥ When starting the engine, push the choke knob back.



EF, EFT type

- ⑤ Push the starter switch button.
- ⑥ Release the button when the engine has started.
- ⑦ When starting the engine, push the choke knob back.



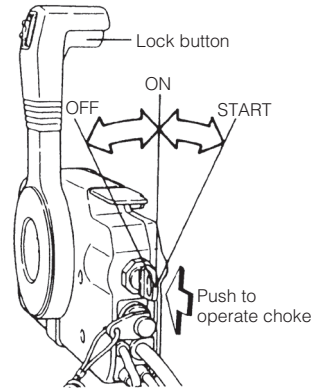
EP, EPT type

- ② Insert the main switch key.
- ③ Set the control lever in the Neutral position.
- ④ Raise the free accel lever a little (both of cold engine and warm engine).
- ⑤ 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.

- ⑥ Stop pushing the key when the engine has started.
The key returns to the original position, automatically.
- ⑦ Returns the Free accel lever to close position.



Note

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

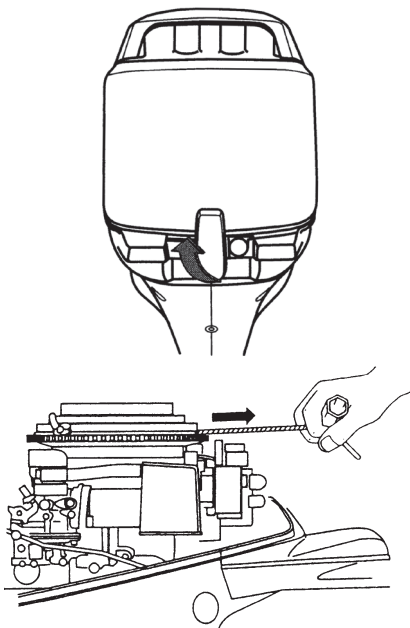
⚠ CAUTION

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. 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.

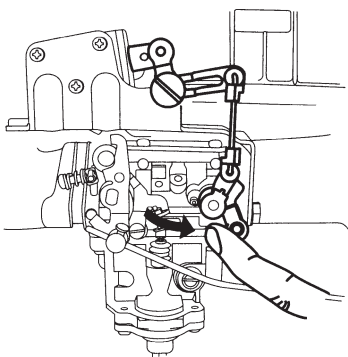
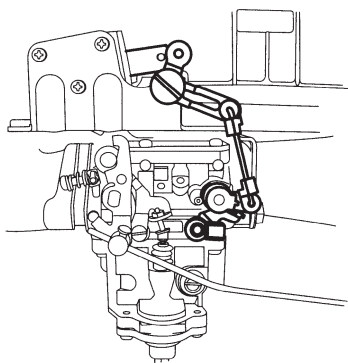
Immediately contact an authorized dealer when reaching shore.

⚠ 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.



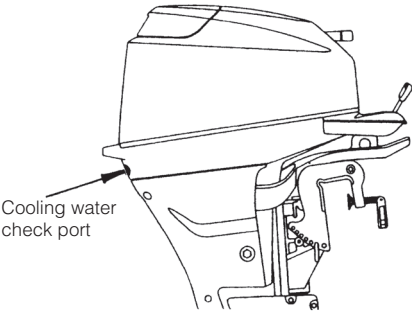
4. Warming up the engine

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	
15	20
5,000~6,000rpm	5,400~6,100rpm

Genuine propellers are listed on PROPELLER TABLE of this manual.

5. 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.

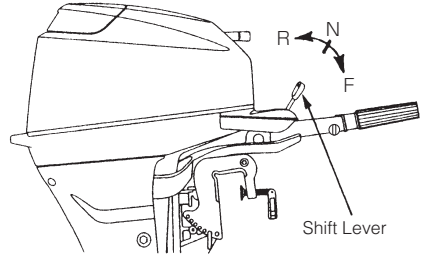
WARNING

Be sure to connect the emergency tethered stop hook to your waist or clothing. The engine will shut down when the switch lock becomes disconnected from the engine.

Note

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.

■ 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.

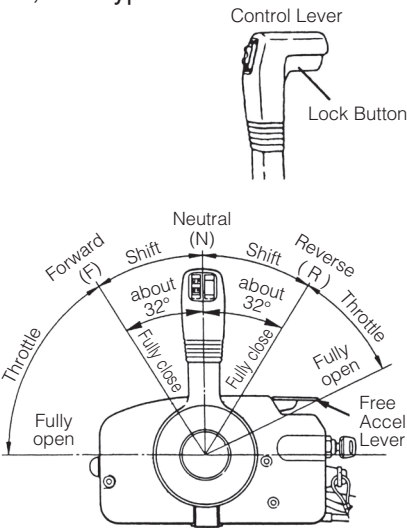
Note

The control lever is inoperative unless the free accel lever is in the fully closed position.

Note

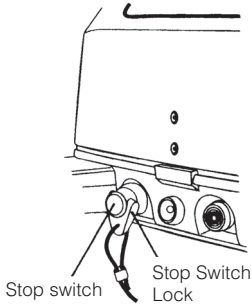
Reduce the engine speed when the control lever is in Neutral and do not increase the engine speed unnecessarily.

EP, EPT type



6. Stopping

MF, EF, EFT type

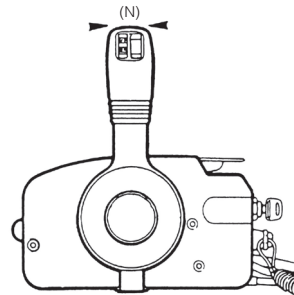
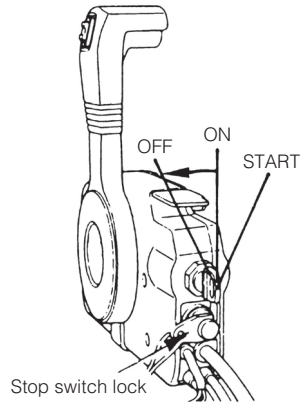


- ① Turn the throttle grip to the slow position.
- ② Put the shift lever in the Neutral position.
Run the engine for 2-3 minutes at idling speed if it has been running at full speed.
- ③ Push the stop switch to stop the engine or release the stop switch lock.

WARNING

- Do not shift into Reverse during planning, 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, 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 or EP type engine, if the engine will not be used for more than 3 days.

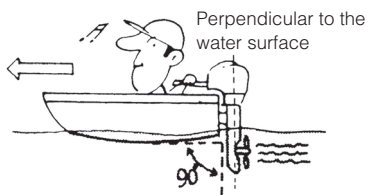
7. Trim angle

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.

MF, EF, EP type

■ Proper trim angle

The position of the thrust rod is correct if the hull is horizontal during operation.



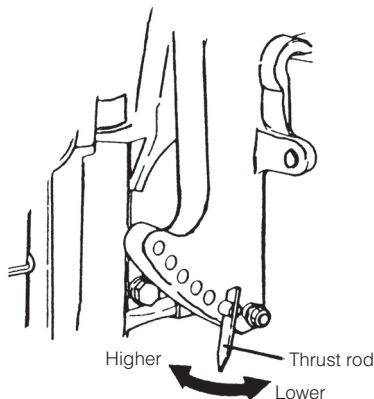
■ Improper trim angle

Set the thrust rod lower if the bow of the boat rises above horizontal.



■ Improper trim angle

Set the thrust rod higher if the bow of the boat is below horizontal.



⚠ 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.

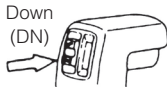
EFT, EPT type

■ Improper Trim Angle (bow rises 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 level to "DN".



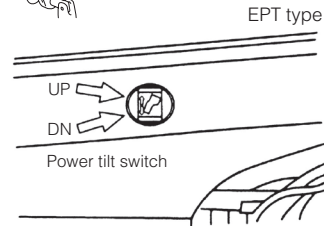
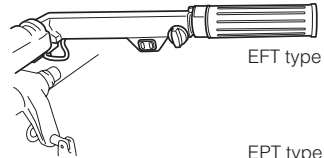
■ Improper Trim Angle (bow dips into the water)

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.



! 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.

8. Tilt up, tilt down and shallow water operation

MF, EF, EP type

WARNING

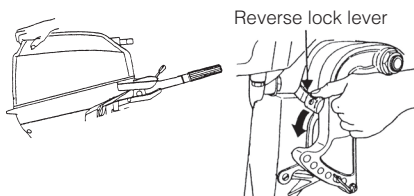
When tilting up or down, be careful not to place your hand between the swivel bracket and the stern bracket. Be sure to tilt the outboard motor down slowly.

■ Tilt up

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

Note

Stop the engine before tilting up.



WARNING

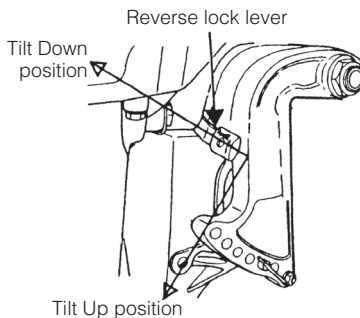
- Do not put hand or finger in between outboard motor body and clamp bracket when adjusting trim angle to prevent injury in case the outboard motor body falls.
- When tilting up outboard motor with fuel joint for over a few minutes, be sure to disconnect fuel hose or close fuel cock, or fuel may leak,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

CAUTION

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

■ Tilt down

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



■ 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

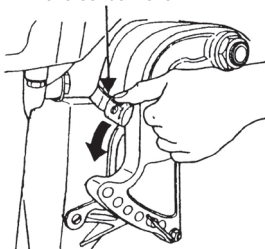
Slow down to trolling speed, and shift into neutral before setting outboard motor to shallow water drive position.

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.

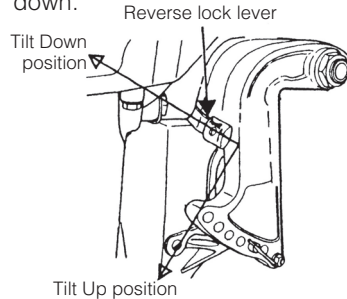
① Shallow water running position:

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



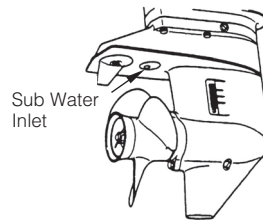
② Return to normal running position:

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



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.

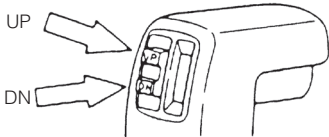


CAUTION

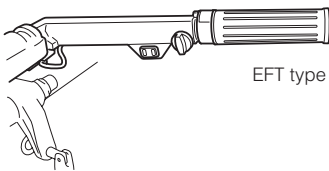
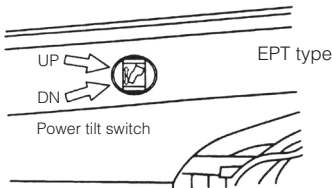
Do not overtilt outboard motor when driving shallow water, or air may be sucked through subwater inlet, potentially leading to engine overheating.

EFT, EPT type

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



The outboard motor can also be tilted up using the switch provided under the bottom cowl.



It is possible to tilt up or down in spite of main switch "ON" or "OFF".

⚠ 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.

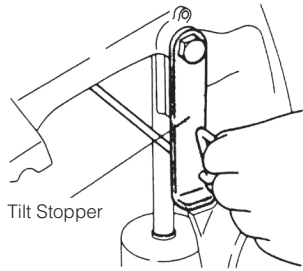
⚠ WARNING

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.

⚠ CAUTION

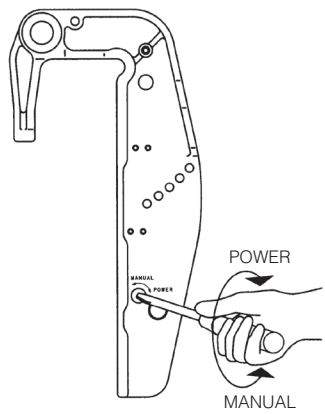
Do not tilt up outboard motor while engine operates, or no cooling water may be fed, leading to engine seizure due to overheating.

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



◎ Manual tilting

If the battery is dead, and the power trim & tilt switch thus inoperative, turn the manual valve a few turns in the Manual direction. This will allow manual tilting of the outboard motor.

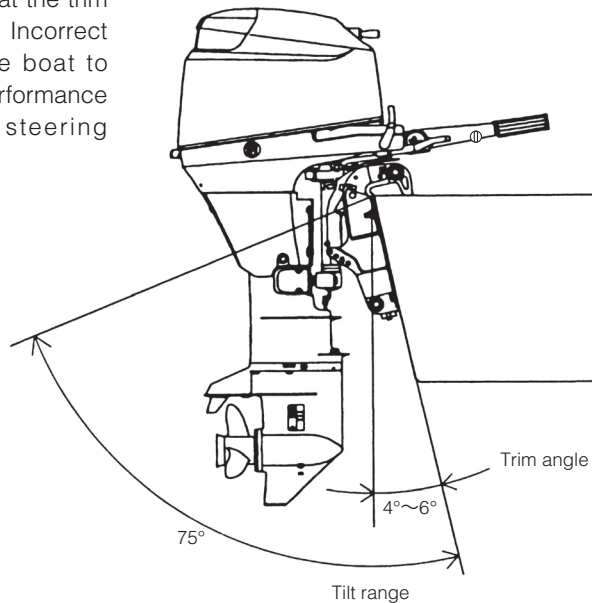


EFT, EPT type

The provided Power tilt makes tilt-up/down electrically. It may be used as a power trim and tilt when the engine is used with the light load condition. In this case, it can be adjusted to set the desired trim angle of the engine in relation to the transom shape, planning 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 Trim & Tilt can be set to any trim angle, however, avoid cruising with the engine tilted in the tilt range. Operating the boat in this manner, the engine may ingest air into the water cooling system, resulting in engine overheating.



6

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

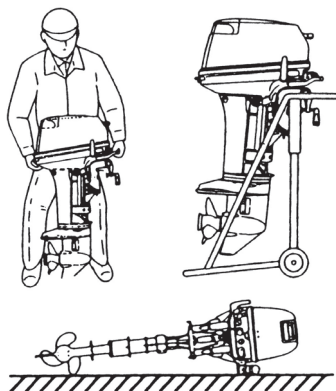
- ① Stop the engine.
- ② Disconnect the fuel connector, the remote control cables and the battery cords from the outboard motor.
- ③ Remove the outboard motor from boat and completely drain the water from the gear case.

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.
- Do not give a shock to an outboard motor during transportation. It becomes a cause of breakage.

3. Storing the outboard motor

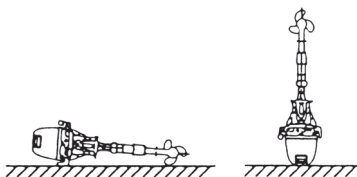
Outboard motor should be stored in a vertical position.

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.

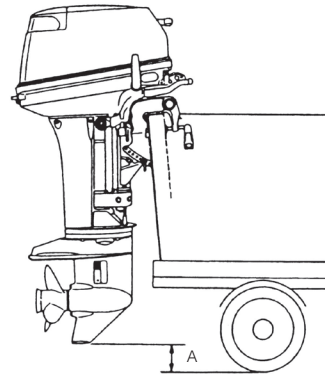
- *Care must be taken so as not to release lock lever by accident.
- *For more safety, tie the clamp bracket to the outboard motor with a rope.
- *Pay attention to the tilting direction so as not to be injured by the springing stern bracket.

CAUTION

The tilt support device 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.

CAUTION

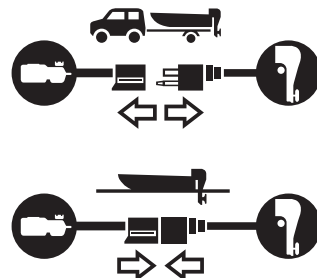
When trailering the outboard motor should be in a vertical (normal running) position, fully down. Trailering in the tilted position may cause damage to the outboard motor, boat, etc.
If trailering with outboard motor fully down is not available (the gear case skeg is too close to the road in a vertical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



A:Ground clearance should be provided sufficiently.

WARNING

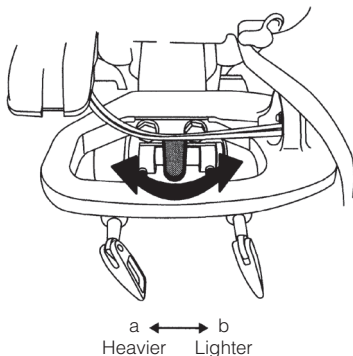
Please disconnect fuel connector except when operating engine. Fuel leakage is a fire or explosion hazard, which can cause serious injury or death.



ADJUSTMENT

1. Steering friction

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.

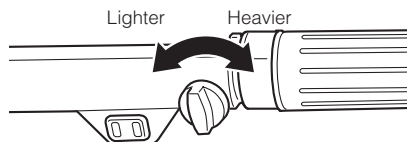


WARNING

Do not increase throttle friction excessively, or heavy movement of throttle grip or remote control lever movement could cause loss of throttle control potentially leading to accident.

2. Throttle grip

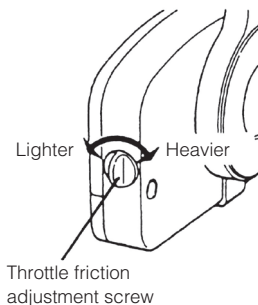
Friction adjustment of the throttle grip can be made with the throttle adjustment screw.



3. Remote Control Lever Load

(Throttle friction adjustment screw)

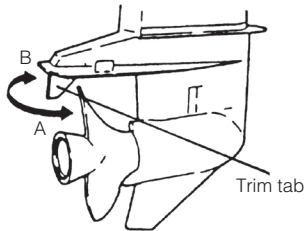
To adjust the load of the remote control lever, turn the throttle friction adjustment screw on the front of the remote control. Turn clockwise to increase the load and counter-clockwise to decrease it.



4. 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.

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 on which any abnormality is found during pre-operation check, or it could go into trouble during cruising potentially leading to accident.

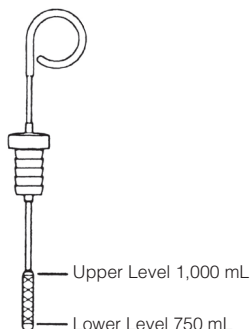
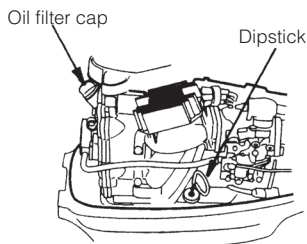
Item	Points to Check	Remedy
Fuel System	● Check the amount of fuel in the tank. ● Check for debris or water in the fuel filters. ● Check the rubber hoses for fuel leakage.	Replenish Clean or replace Replace
Fuel Tank Cap	● Check for crack, leakage, damage in the fuel tank cap. ● Check for crack, damage in the gasket and teather. ● Check for leakage at full close. ● Check for ratchet performance.	Replace Replace Replace Replace
Engine Oil	● Check the oil level.	Fill oil
Electrical Equipment	● Check that the main switch functions normally. ● Check that the battery electrolyte level and specific gravity are normal. ● Check for loose connections on the battery terminal. ● Check that the stop switch functions normally and make sure the lock plate is there. ● Check cords for loose connections and damage. ● Check the spark plugs for dirt, wear and carbon build-up.	Replace Replenish or recharge Retighten Remedy or replace Correct or replace Clean or replace
Throttle System	● Check carburetor linkage is working normally when turning the throttle grip.	Correct
Recoil Starter	● Check the rope for wear and chafing. ● Check the ratchet engagement.	Replace Correct or replace
Clutch and Propeller System	● Check that the clutch engages correctly when operating the shift lever. ● Visually Check propeller for bent or damaged blades. ● Check the propeller nut is tightened.	Adjust Replace
Installation of Motor	● Check all the bolts attaching the motor to the boat. ● Check the thrust rod installation.	Tighten
Power Tilt	● Check working of the tilt up and down of the motor.	
Cooling Water	● Check that cooling water is discharged from the cooling water check port after the engine has started.	Repair
Tools and Spares	● Check that there are tools and spare parts for replacing spark plugs, the propeller, etc. ● Check that you have the spare rope.	
Steering Devices	● Check the operation of the steering handle.	Repair
Other parts	● Check if the anode is securely installed. ● Check the anode for corrosion and deformation.	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

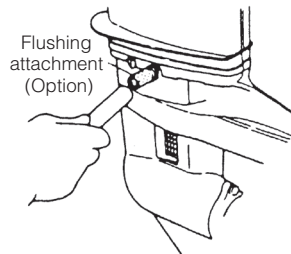
Do not start engine without removing propeller, or accidentally turning propeller could cause personal injury.

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 outboard 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 and sub water inlet, located in the gear case, with tape.
- ③ Insert a hose connected to a water tap into the flushing attachment and let the water running.
- ④ Put the shift lever in the neutral position and start the engine.
- ⑤ Make sure of cooling water flowing out of water pump indicator hole and continue engine running for 3 to 5 minutes.
- ⑥ Stop the engine and water supply. Remove the flushing attachment and tape, and then reinstall the water plug and the propeller.



CAUTION

Keep engine at idle speed during flushing.

Replacing the propeller

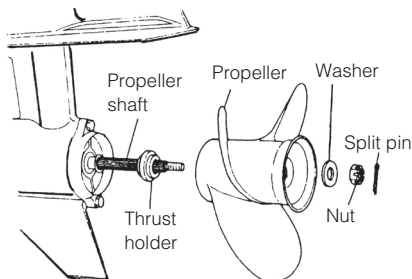
A worn-out or bent propeller will lower the motor's performance, and cause engine trouble.

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 putting split pin, open the end to prevent it from coming off which could lead to coming off of propeller.

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.

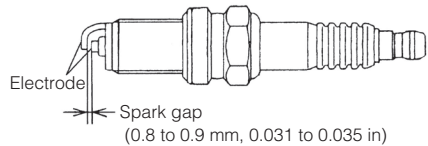
When reusing spark plugs, remove dirt from the electrodes and adjust spark gap to specification.

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.
- ⑤ Attach spark plug and tighten to specified torque.

Use spark plug NGK DCPR-6E.



Notes

Spark plug torque :

18.0Nm(13.3ft-lb)(1.8kgf-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

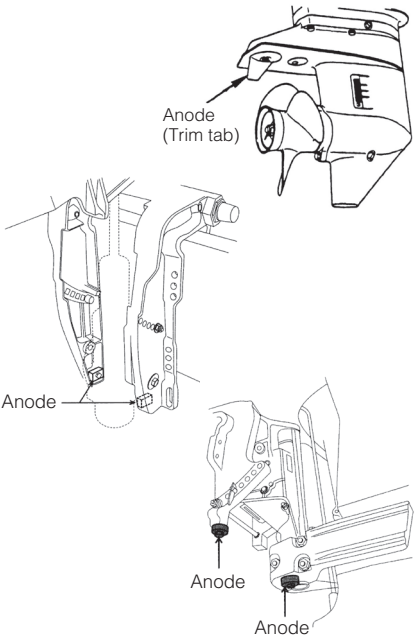
The anode protects the outboard motor from galvanic corrosion (metal corrosion caused by feeble electric current).

Anodes are installed under the anti-ventilation of the gear case, the left clamp bracket (port side) and the left mount bracket (port side).

When an anode is worn down under 2/3 of its original size (of new part), replace it.

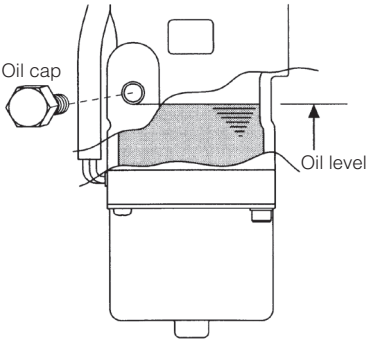
Notes

- 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 Trim & 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.



! 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.

⚠ CAUTION

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

Recommended oil

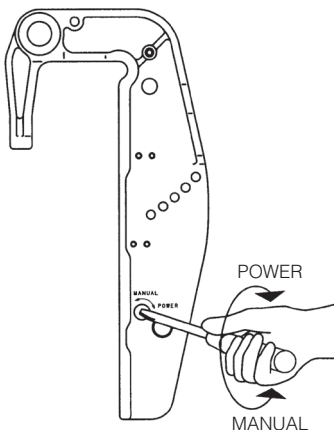
Use an automatic transmission fluid or equivalent.

Recommended oils are as shown below.

ATF Dexron III

Air purging from the Power Trim and Tilt unit.

Entrapped air in the Power Trim & Tilt unit will cause poor tilting movement and increased noise. 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 of 1 month	Every 50 hours of 3 months	Every 100 hours of 6 months	Every 200 hours or 1 year		
Fuel System	Carburetor *1			○	○	Strip clean, and adjust.	
	Fuel filter	○	○	○	○	Check and clean or Replace if necessary.	Entire cartridge
	Piping/Hoses *2	○	○	○	○	Check and clean or Replace if necessary.	
	Fuel tank *2	○		○	○	Clean	
	Fuel tank Cap *2	○	○	○	○	Check and clean or Replace if necessary.	
	Fuel Pump *1	○	○	○	○	Check and clean or Replace if necessary.	
Ignition	Spark plug	○		○	○	Check gaps. Remove carbon deposits or Replace if necessary.	0.8-0.9mm (0.031-0.035in)
	Ignition timing *1	○		○	○	Check timing.	
Starting System	Starter rope *1	○	○	○	○	Check for wear or chafing.	
	Starter motor *1			○	○	Check for salt deposits and the battery cable condition.	
	Battery	○	○	○	○	Check installation, fluid quantity, gravity.	
Engine	Engine oil	Replace ○		Replace ○	Replace ○	Replace if necessary.	
	Oil filter *1					Replace evry 200 hrs or 2 years	Entire cartridge
	Valve Clearance *1	○		○	○	Check & adjust	
	Timing belt *1			○	○	Check and Replace if necessary.	
	Thermostat *1			○	○	Check and Replace if necessary.	
Lower Unit	Propeller	○	○	○	○	Check for bent blades, damage, wear.	
	Gear oil	Replace ○		Replace ○	Replace ○	Change or replenish-oil and check for water leaks.	370mL (12.5 fl.oz.)
	Water pump *1		○	○	○	Check for wear or damage.	Replace impeller every 12 months.
Power trim & tilt *1		○		○	○	Check & replenish oil, manually operate	
Warning system *1			○	○	○	Check function	
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 if necessary.

*1 Have this handled by your dealer.
*2 In USA, you have to use EPA approved part (See P21 - P23).

Notes

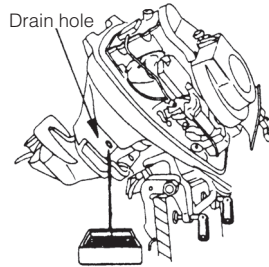
Your outboard motor should receive careful, and complete inspection at 300 hours. This is the best time for major maintenance procedures to be carried out.

Replacing engine oil

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

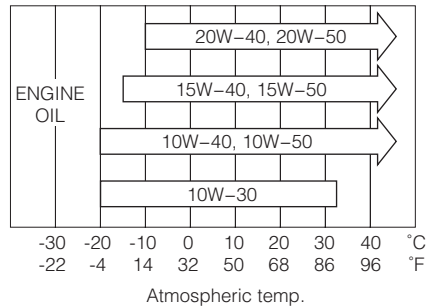
To change engine oil:

- 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 Release the tilt lock from engagement and stand up the engine upright.
- ⑦ Remove the oil drain plug again and drain out the oil.
- ⑧ Replace the drain plug seal with a new one and apply oil onto the sealed part.
- ⑨ Install the drain plug.
- ⑩ Fill new engine oil through the oil filler until the oil level reaches the upper limit.
- ⑪ 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.

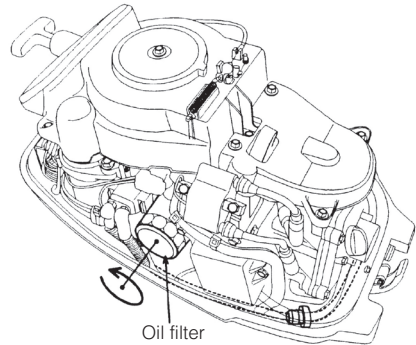
Replacing oil filter

- ① Drain oil from the engine.
- ② Place a rag or towel below the oil filter to absorb any spilled oil.
- ③ Unscrew old filter by turning the filter to the left.
- ④ Clean the mounting base. Apply film of clean oil to filter gasket. Do not use grease. Screw new filter on until gasket contacts base, then tighten 3/4 to 1 turn.



P/N 3AC-99090-0
P/N 3AC99090M
(US.CANADA Only)

Oil filter wrench



Oil filter

Cleaning the fuel filters and the fuel tank

Fuel filters are provided inside the fuel tank and engine.

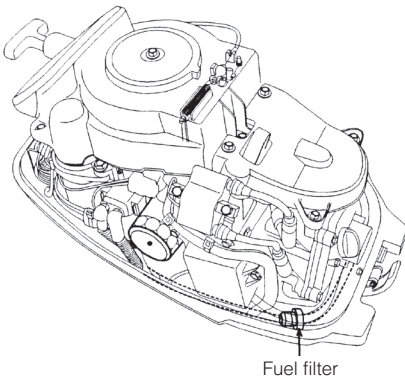
WARNING

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.

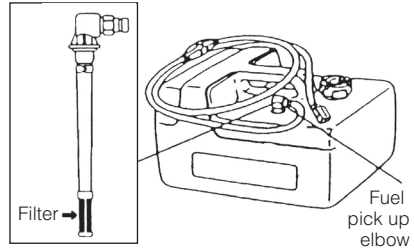
■ Engine filter

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



■ Fuel tank filter

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



■ Fuel tank

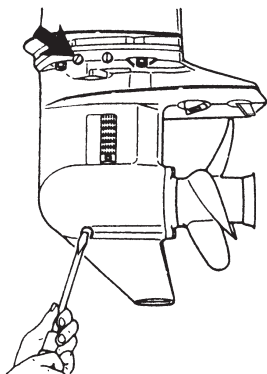
Water or dirt in the fuel tank will cause engine performance problems. Check and clean the tank at specified times or after the motor has been stored for a long period of time (over three months).

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.

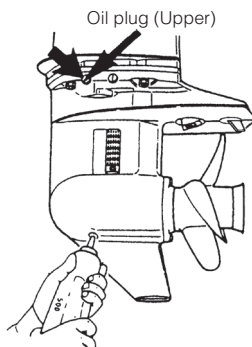
- ① Remove the oil plugs (upper and lower), and completely drain the gear oil into a pan.



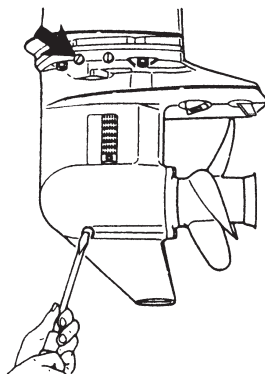
- ② Insert the oil tube nozzle into the lower oil plug hole, and fill with gear oil by squeezing the oil tube until oil flows out of the upper plug hole.

⚠ CAUTION

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



- 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. 370 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 vapor separator, and clean these parts.
Keep in mind that if gasoline is kept in the vapor separator 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.

- 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.

 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, submerge the lower half of the outboard motor into 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 falling to start	Engine starting but stopping soon	Poor idling	Poor acceleration	Engine speed abnormally high	Engine speed abnormally low	Overheating of engine	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

									Possible cause
	Engine failing to start	Engine starting but stopping soon	Poor idling	Poor acceleration	Engine speed abnormally high	Engine speed abnormally low	Overheating of engine	Power tilt inoperative	
ELECTRICAL SYSTEM	●	●	●	●		●	●		Spark plug other than specified
	●	●	●	●		●			Dirt, soot, etc. on spark plug
	●	●	●	●		●			No Spark or weak spark
	●								Short circuit of engine etop 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 into 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
								●	Power trim & tilt switch defective, Solenoid is defective

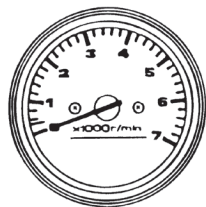
	Engine failing to start	Engine starting but stopping soon	Poor idling	Poor acceleration	Engine speed abnormally high	Engine speed abnormally low	Overheating of engine	Power tilt inoperative	Possible cause
COMPRESSION & OIL SYSTEM		●	●	●		●	●		Low compression
			●						Carbon deposits in the combustion chamber
				●			●		Incorrect valve clearance
									Low oil pressure/level
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
								●	A great deal of air is contained inside pump

TOOL KIT AND SPARE PARTS

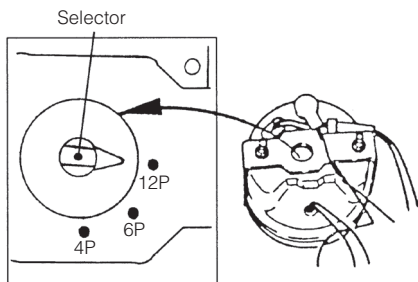
The following a list of the tools and spare parts provided with the motor.

Items		Quantity	Remark	
Service tools	Tool bag	1		
	Pliers	1		
	Socket wrench	1	10 × 13 mm	
	Socket wrench	1	16 mm	
	Socket wrench handle	1		
	Screwdrivers	1	Cross-and straight-point	
	Screwdriver handle	1		
Spare parts	Starter rope	1	1,600 mm	
	Spark plug	2	NGK DCPR6E	
	Split pin	1		
Parts Packaged with Engine	Fuel tank	1	12L	
	Primer bulb	1 set		
	Remote control box	1 set	EP/EPT only	
	Remote control attachment	1 set	EP/EPT only	
	Drag link	1	EP/EPT only	
	Bracket fixing			
	Bolt	4	8 mm	EPT/EFT only
	Nut	4	8 mm	EPT/EFT only
	Washer	8	8 mm	EPT/EFT only

OPTIONAL ACCESSORIES



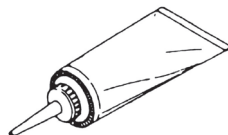
Tachometer



Propeller



Flushing attachment



Genuine gear oil (500ml)



Touch-up paint (300ml)



Genuine engine oil (450ml, 1L)

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.

15: 5,000 to 6,000 rpm
20: 5,400 to 6,100 rpm

	Propeller Mark	Propeller Size (Blades × diameter × pitch)	
		inch	mm
Light boats	11.5	3 × 9.25 × 11.5	3 × 235 × 292
	10	3 × 9.25 × 10	3 × 235 × 254
	9	3 × 9.25 × 9	3 × 235 × 229
	8	3 × 9.25 × 8	3 × 235 × 203
	7	3 × 9.2 × 6.9	3 × 234 × 174
	6	3 × 9.2 × 6.1	3 × 234 × 155
Heavy boats	7	4 × 10 × 4	4 × 254 × 178

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OWNER'S MANUAL
MFS 15C
20C

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