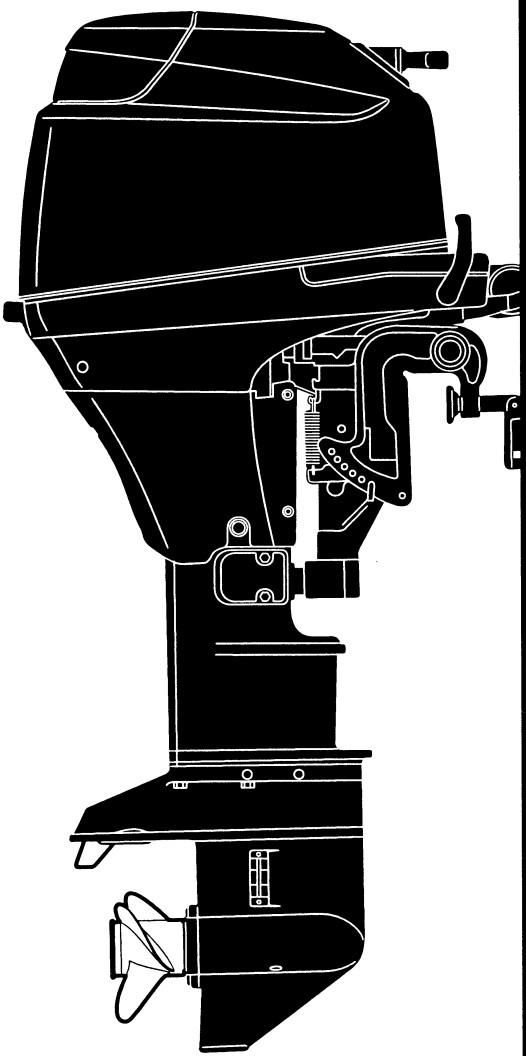
OWNER'S MANUAL

TOHATSU



MFS 25
30

No.003-11080-2

YOUR TOHATSU OUTBOARD MOTOR

OWNER REGISTRATION AND IDENTIFICATION

Upon purchasing this product, be sure your dealer* fills out the WARRANTY CARD correctly, completely and mails it to the distributor. This card identifies you as the legal owner of the product and serves as your warranty registration.
If this procedure is not followed, your outboard motor will not be covered by warranty.
* : In this manual, "dealer" always means an authorized TOHATSU dealer.

PRE-DELIVERY CHECK

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

Limited Warranty

This TOHATSU product is fully guaranteed against defective materials and workmanship for the period from the date of purchase, provided that the purchase has been registered in accordance with the above.
The limited warranty will not apply to the normal wear and tear of parts, adjustments, tune-ups, or to any damage caused by, but not limited to:

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

The limited warranty does not cover maintenance items. The following items are a few examples not covered by the limited warranty:

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

The limited warranty will become void if the product has been altered, modified, or repaired by anyone other than a company or service firm authorized by TOHATSU.
The limited warranty will cover only your TOHATSU product and will not cover the boat the product is mounted on, the trailer, equipment, or accessories associated with the product.

Serial Number

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

Serial Number :_____

To You, Our Customer:

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

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

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

TOHATSU CORPORATION

NOTICE: DANGER/WARNING/CAUTION/Note

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

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

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

EMERGENCY STOP SWITCH

The Emergency stop switch will stall the engine when the stop switch tether is pulled out. This line can be attached to the body of the operator, effectively preventing injuries from the propeller in case he/she falls overboard.
We highly recommend use of the Emergency stop switch line. However, we would also like to point out the drawbacks of the switch. Accidental activation of the switch (such as the line being pulled out in heavy seas) could cause passengers to lose their balance and even fall overboard, or it could result in loss of power in heavy seas, strong currents, or high winds. Loss of control while mooring is another potential hazard.
To prevent such hazardous situations, the 500 mm (20 inch.) line is coiled and can extended to a full 1,300 mm (51 inch.).

WARNINGS

As the operator/driver of the boat, you are responsible for the safety of those aboard and those in other crafts around yours, and for following local boating regulations. Therefore you should possess thorough knowledge of correct operation of the boat, engine, and accessories. To learn about the correct operation and maintenance of the engine, please read through this manual carefully.
It is very difficult for a person standing or floating in the water to take evasive action should he or she see a power boat heading in his/her direction, even at a slow speed. Therefore, when your boat is in the immediate vicinity of people in the water, the engine should be shifted to neutral and shut off.

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

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

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

SERVICING, REPLACEMENT PARTS & LUBRICANTS

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

MAINTENANCE

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

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

USE OF SERVICE SHOP

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

CONTENTS

1. SPECIFICATIONS

Item \ MODEL		25B MF 30B MF	25B EF 30B EF	25B EP 30B EP
Overall Length	mm (in)	1,031 (40.6)		652 (25.7)
Overall Width	mm (in)	391 (15.4)		367 (14.4)
Overall Height S·L	mm (in)	1,187 (46.7) · 1,335 (52.6)		
Transom Height S·L	mm (in)	404 (15.9) · 552 (21.7)		
Mass	S Kg (lb)	71.5 (158)	74.5 (164)	73 (161)
	L Kg (lb)	73 (161)	76 (167)	74.5 (164)
Output	kW (Hp)	25B : 18.4 (25) 30B : 22.1 (30)		
Max. Operating Range	rpm	25B : 5,000−6,000 30B : 5,250−6,250		
Idle Speed	rpm	850		
Engine Type		4-Stroke EFI		
Number of Cylinder		3		
Bore × Stroke	mm (in)	61 × 60 (2.40 × 2.36)		
Piston Displacement	mL (Cu in)	526 (32.09)		
Exhaust System		Through hub exhaust		
Cooling System		Water cooling		
Engine Lubrication		Trochoid pump		
Starting System		Manual	Electric starter motor *	
Ignition System		Flywheel Magneto C.D. ignition		
Spark Plug		NGK DCPR6E		
Trim Position		6		
Engine Oil	mL (qt.)	API SF or SG or SH or SJ, 10W-30/40 OR NMMA FC-W certified 10W-30 Approx. 1,800 (1.9)		
Gear Oil	mL (fl.oz.)	Genuine Gear Oil or API GL5, SAE #80−90, Approx. 280 (9.5)		
Fuel Tank Capacity	L (US gal)	25 (6.60)		
Gear Reduction Ratio		1.92 (12 : 23)		

* : with manual

Item \ MODEL		25B MFG 30B MFG	25B EFG 30B EFG	25B EFT 30B EFT	25B EPT 30B EPT
Overall Length	mm (in)	1,031 (40.6)			652 (25.7)
Overall Width	mm (in)	391 (15.4)			367 (14.4)
Overall Height S·L	mm (in)	1,187(46.7) · 1,335 (52.6)			
Transom Height S·L	mm (in)	404 (15.9) · 552 (21.7)			
Mass	S Kg (lb)	78 (172)	81 (179)	82.5 (182)	81 (179)
	L Kg (lb)	79.5 (175)	82.5 (182)	84 (185)	82.5 (182)
Output	kW (Hp)	25B : 18.4 (25) 30B : 22.1 (30)			
Max. Operating Range	rpm	25B : 5,000−6,000 30B : 5,250−6,250			
Idle Speed	rpm	850			
Engine Type		4-Stroke EFI			
Number of Cylinder		3			
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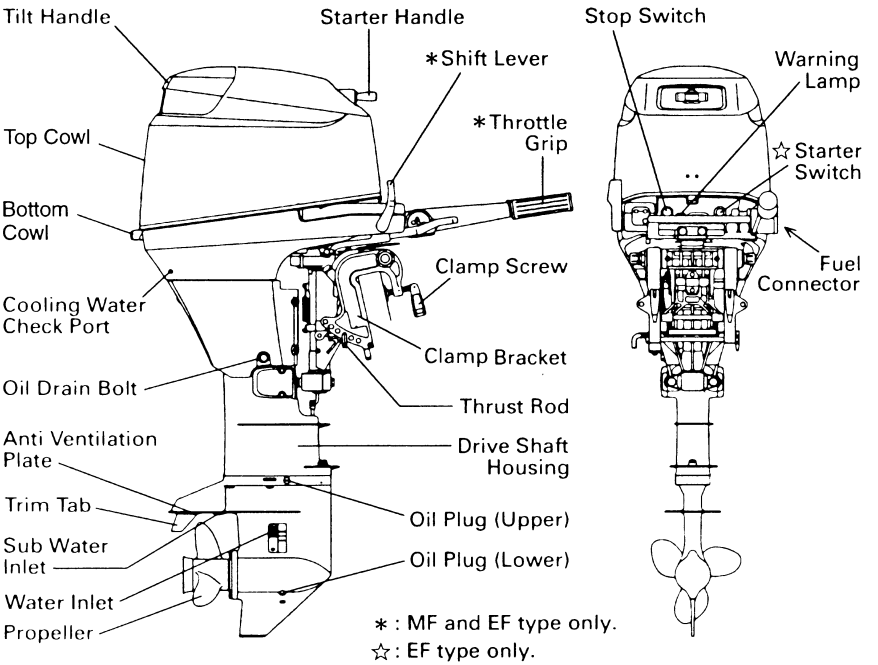
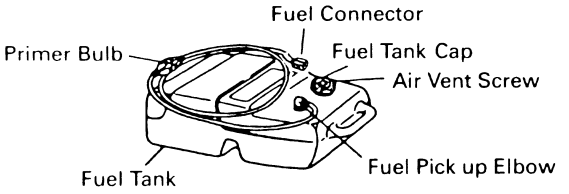
Ignition System		Flywheel Magneto C.D. ignition			
Spark Plug		NGK DCPR6E			
Trim Position		4			
Engine Oil		API SF or SG or SH or SJ, 10W-30/40 OR NMMA FC-W certified 10W-30 Approx. 1,800 (1.9)			
Gear Oil		Genuine Gear Oil or API GL5, SAE #80−90, Approx. 280 (9.5)			
Fuel Tank Capacity	L (US gal)	25 (6.60)			
Gear Reduction Ratio		1.92 (12 : 23)			

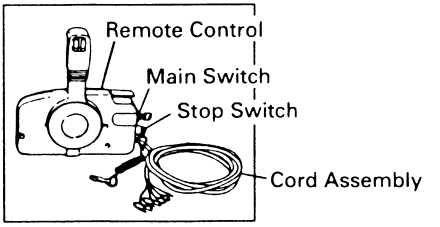
* : with manual

2. NAME OF PARTS

MF • EF • EP

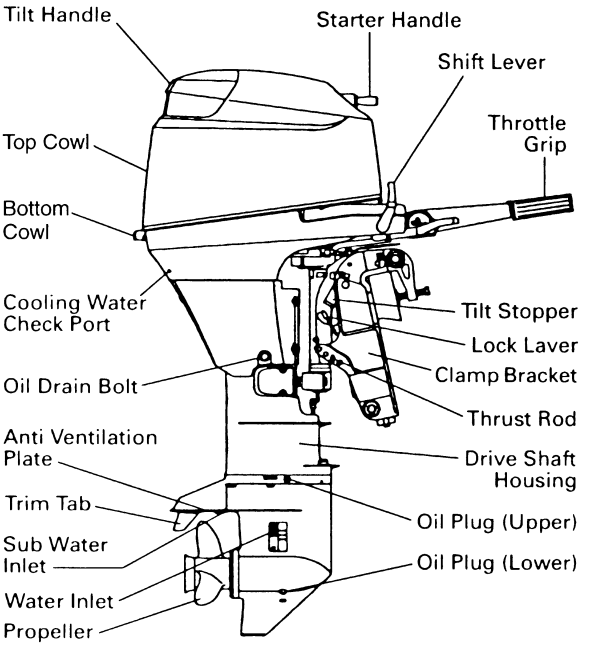


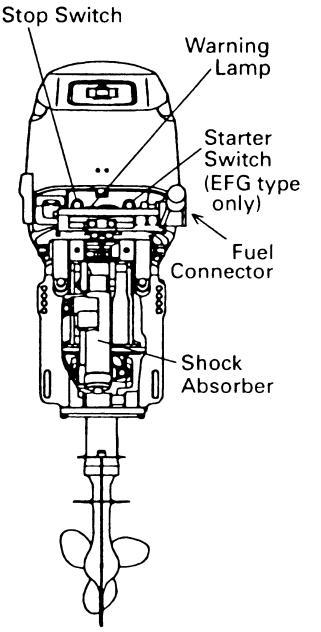


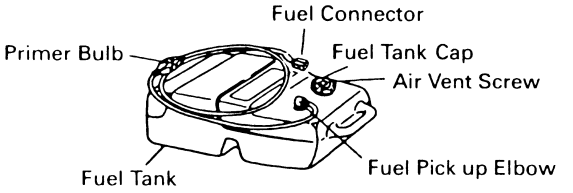


EP type only

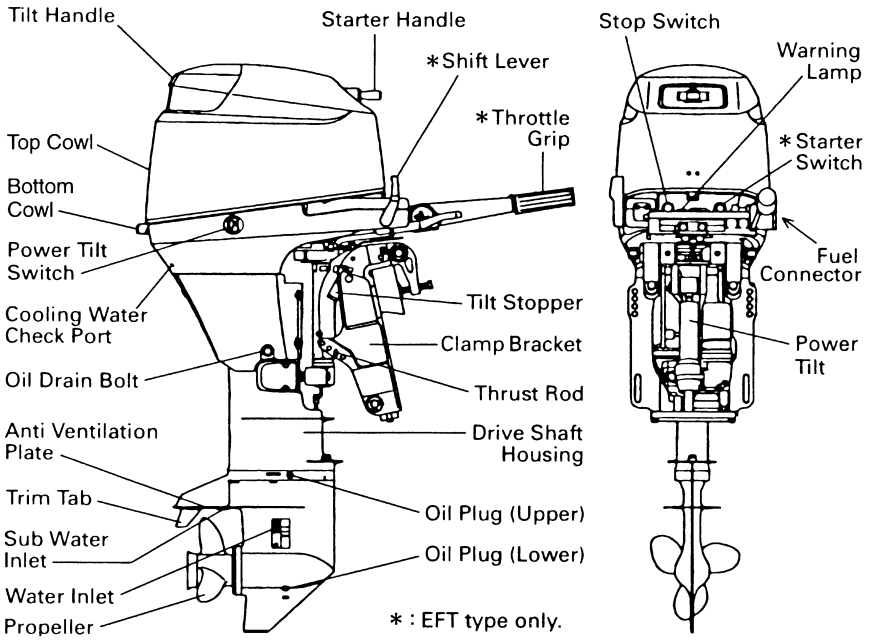
MFG • EFG

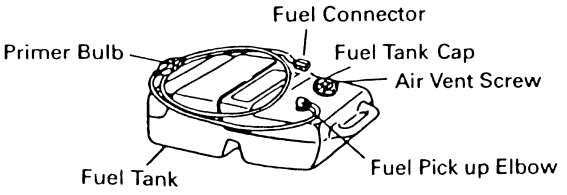

Tilt Handle
Starter Handle
Shift Lever
Throttle Grip
Top Cowl
Bottom Cowl
Cooling Water Check Port
Tilt Stopper
Lock Laver
Clamp Bracket
Oil Drain Bolt
Thrust Rod
Anti Ventilation Plate
Drive Shaft Housing
Trim Tab
Oil Plug (Upper)
Sub Water Inlet
Oil Plug (Lower)
Water Inlet
Propeller

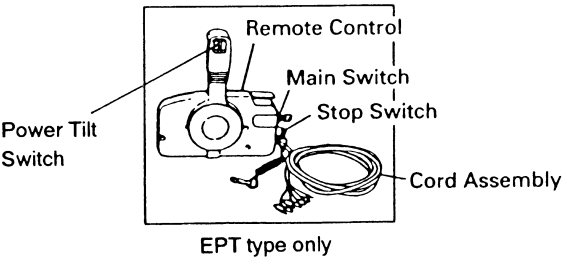

Stop Switch
Warning Lamp
Starter Switch (EFG type only)
Fuel Connector
Shock Absorber


Fuel Connector
Primer Bulb
Fuel Tank Cap
Air Vent Screw
Fuel Tank
Fuel Pick up Elbow

EFT • EPT







EPT type only

3. INSTALLATION

⚠ WARNING

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

3-1. Mounting the engine on boat

(1) Position . . . above keel line

● Set engine at center of boat. (Fig. 1)

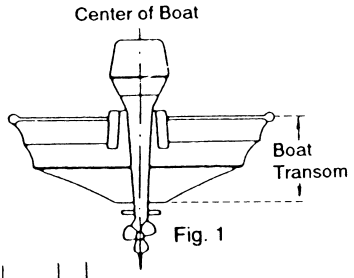


Fig. 1

(2) Transom matching
Be sure that the antiventilation plate of the outboard is 5−25mm (0.2−1 in) below the bottom of hull. (Fig. 2)
If the above condition cannot be met due to the shape of the bottom of your boat, please consult your dealer.

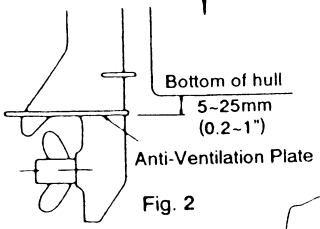


Fig. 2

MF/EF/EP type

(3) A : To attach the engine to the boat, tighten the clamp screws by turning their handles.
Also, use the bolts to secure outboard brackets on transom board.
Secure with a rope, to prevent loss overboard. (Fig. 3)

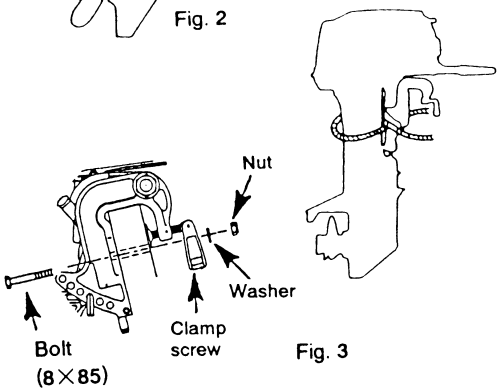
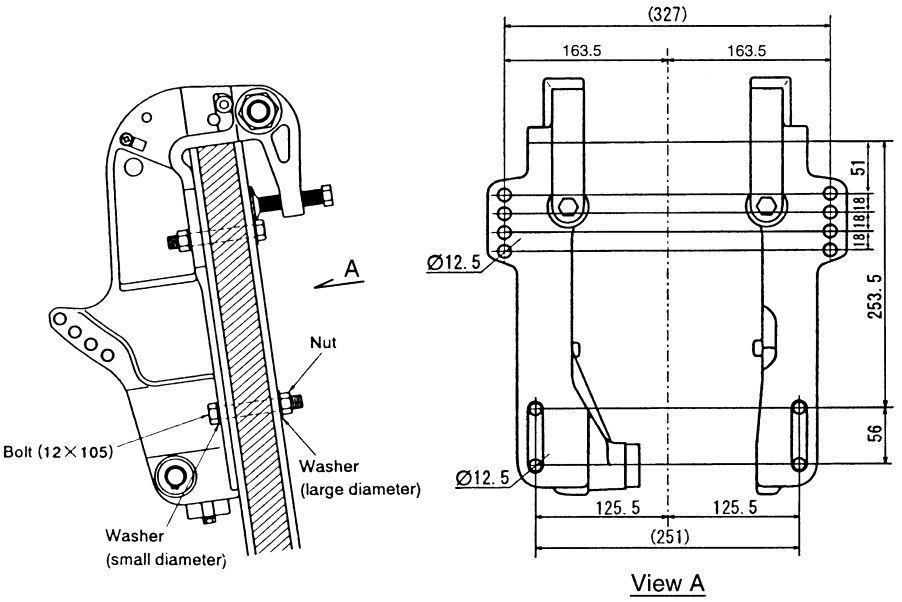


Fig. 3

MFG • EFG • EFT • EPT type

(3) B : Power Tilt and Gas Assist type



Note:
We recommend that the bolt head of the upper bolts face inward while the nuts are kept on the outside of the boat to prevent injury to the passengers.

Notes:
1. Apply sealing agent, such as silicon sealer, between the bolts and the transom board holes when tightening the bolt.
2. Be sure to fix the engine securely with the bolts.

3-2. Installing the remote control devices

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

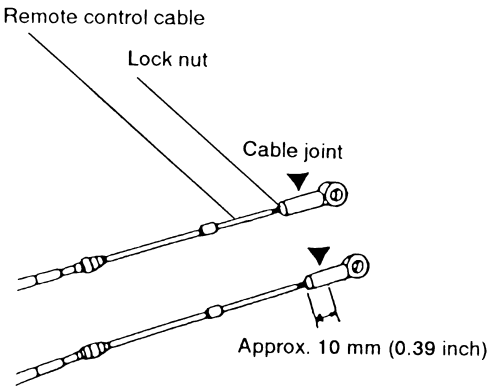
(1) Installation of the Remote Control Cables (Box side)
Follow the instruction manual provided with the remote control.

(2) Installation of the Remote Control on your boat
Follow the instruction manual provided with the remote control.

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

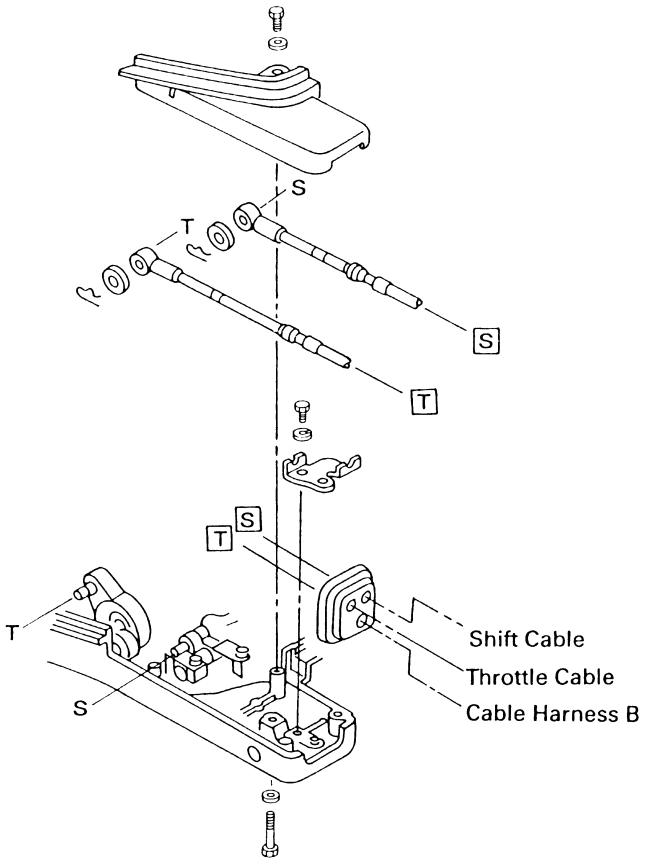
① Fitting of connecting parts to cables

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. Here, apply grease to the hole of the cable joint.



② Fitting of Remote Control Cable to Engine

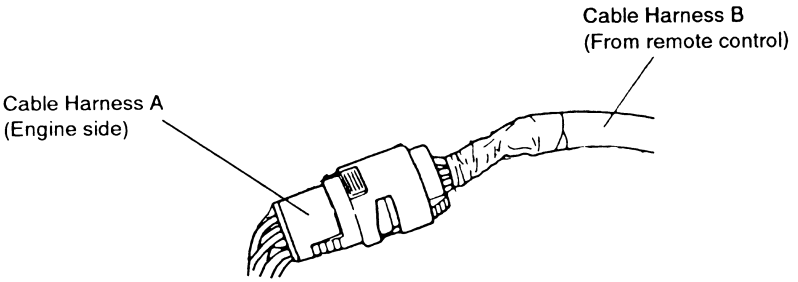
Note:
Put the control lever on the Neutral position and the Neutral warm-up lever in the fully closed position.



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.

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.



3-3. Installing the battery

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

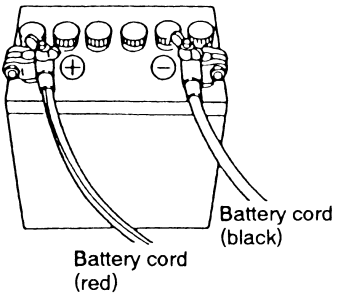
Recommended battery : 12V, 70AH (465 Marine Cranking Amps (MCA) or 350 Cold Cranking Amps (CCA))

⚠ WARNING

Hydrogen gas is generated when a battery is charged. Therefore, keep the battery well ventilated during charging.
Electric sparks, smoking and other sources of fire must be avoided in the charging area to prevent explosion of the battery.
* The battery fluid (electrolyte) contains sulfuric acid.
If any electrolyte is spilled on the skin, clothes, etc., wash with large amounts of water and consult a doctor. Always use safety glasses and rubber gloves when handling the battery.
Remark: Further to notice on the label of your battery.

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

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



4. PRE-OPERATING PREPARATIONS

4-1. Gasoline and engine oil

⚠ DANGER

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

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

● **Required Gasoline types**

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

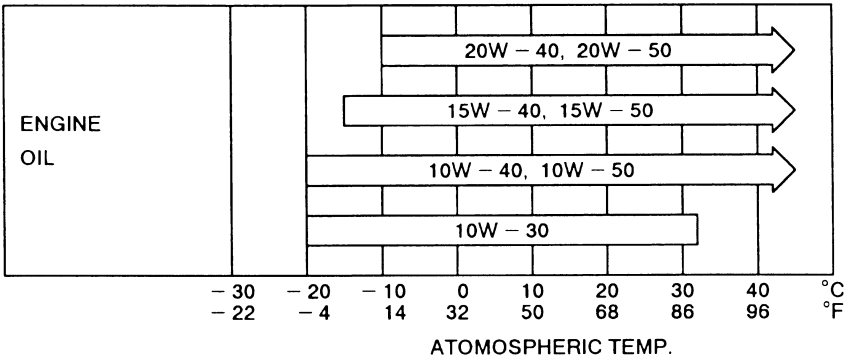
Note:
Use of low-quality gasoline results in a short engine life as well as starting difficulties and other engine problems.

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

● Engine Oil

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

Use oils that carry the API rating of SF, SG, SH or SJ. 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℃ (40℉).

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

⚠ 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)

4-2. Break-In

Break-in period . . . . . 10 hours

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

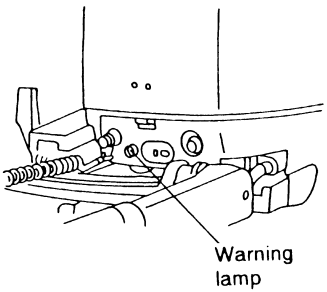
Time	0	10 min.	2 hrs.	3 hrs.	10 hrs.~
Method of operation	Idling or trolling	Throttle open less than 1/2 of the way (about 3,000 rpm)	Throttle open less than 3/4 of the way (about 4,000 rpm)	Throttle open 3/4 of the way (about 4,000 rpm)	Normal operating
Conditions	Cruising at no more than minimum speed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

4-3. Warning system

If engine takes abnormal condition or fault, the warning horn will emit a continuous beep or intermittent short beeps and the warning lamp (LED) will synchronize with the horn and engine speed will be limited (engine will not be stopped).

(1) Location of warning horn and lamp
- Warning horn: Located inside the remote control for EP models.
  Located in the engine cowl for other models.
- Warning lamp (LED): Locoted on the front of bottom cowl.

NOTE: Warning lamp for optional tachometer will synchronize with the LED.



(2) Warning indicators, faults and remedy

Warning indicators				Description of faults	Remedy
Sound	Lamp (LED)	Engine Low-speed limiter	Engine Over-speed limiter		
One beep	ON for 5 sec.			Normal system test when start up	
Continuous	ON	ON		Water over temperature	①
Continuous (*2)	ON (*2)	ON (*2)		Low oil pressure (*1)	②
Continuous	ON		ON	Engine speed exceeds maximum allowable RPM	③
Intermittent short beep (*2)	Flashing (*2)	ON (*2)		Water temp or MAP sensor out of range	④

Remarks

*1: In this case, oil pressure switch is "ON" .

*2: It is necesssary to stop the engine, if you want to stop the working indicators.

Note

Engine Low-speed limiter ON: Engine speed will be limited to 2800RPM, however you shold not continue to run engine.

Engine Over-speed limiter ON: Engine speed will be limited to 6300 RPM and also takes rough speed (hunting).

Remedy

① Move to safety place quickly, and check the discharge of cooling water from the water check port at idle speed and stop the engine.
Remove any foreign matter on the gear case and propeller if necessary.
Consult your dealer if no discharge of cooling water.

② Move to safety place quickly, and stop the engine.
Check the engine oil level, and add engine oil if necessary.
Consult your dealer if the engine oil is out of level.

③ Reduce the throttle less than half opening, and move to safety place quickly, and stop the engine.
Check the propeller for bent or damaged blades.
Consult your dealer if the engine takes same result when propeller has replaced to new one.

④ Return to your home mariner quickly, and stop the engine.
Consult your dealer.

5. ENGINE OPERATION

Before starting

Before starting engine for the first time, after re-assembled engine and off-season storage, disconnect stop switch lock and pull the starter handle completely out approximately 10 times. This will help in priming of the oil pump.

5-1. Starting

⚠ WARNING

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

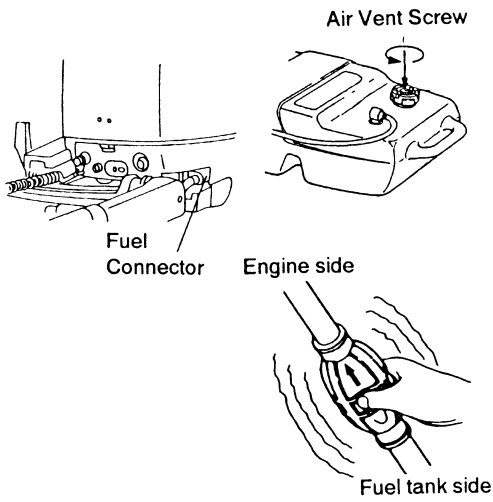
Note:
The engine will not start unless the switch lock has been properly connected into the emergency stop switch.

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

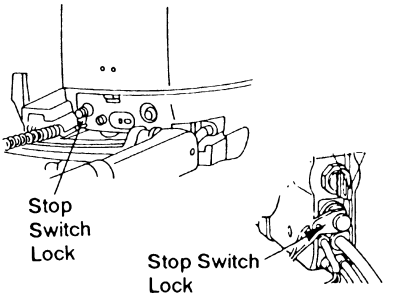
① Loosen the air vent screw on the tank cap.

② Attach the fuel connector to the engine connector.
The arrow mark on the primer bulb should be facing the engine.

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

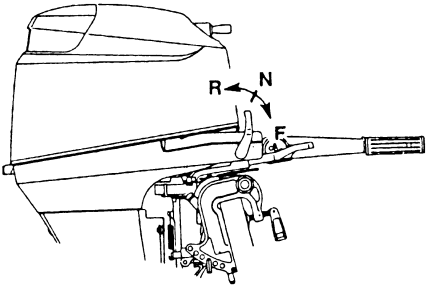


④ Be sure to install the stop switch lock to the stop switch.



MF/MFG and EF/EFG/EFT type

⑤ Place the shift lever in the Neutral position.



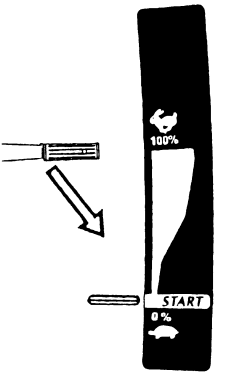
Be sure that the shift is in neutral when starting the engine.
This model is provided with start in gear protection.

⚠ CAUTION

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

⑥ Set the throttle grip to "START" position.

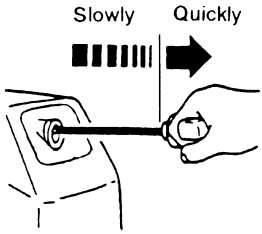
Note:
When the engine is warm, also set the throttle grip to "START" position.

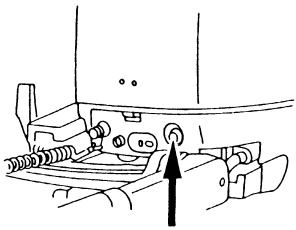


MF and MFG type

Engine is equiped with a compression release mechanism.

⑦ Pull the starter handle slowly until you feel engagement, keep pulling till you feel less resistance. Then pull it quickly. Repeat if necessary untill started.





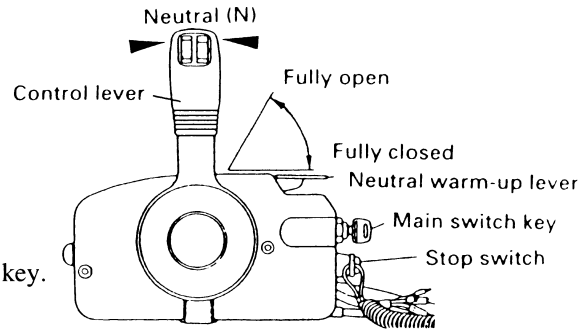
EF/EFG and EFT type

⑦ Push the starter switch button.

⑧ Release the button when the engine has started.

EP and EPT type

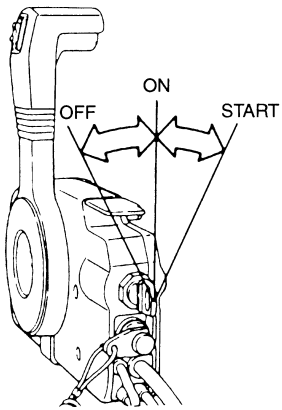
⑤ Insert the main switch key.



⑥ Set the control lever in the Neutral position.
Do not raise the Neutral warm-up lever when starting the engine.

⑦ Turn the main switch key to START position.

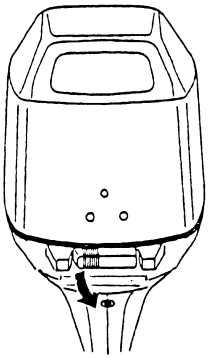
⑧ Release the key when the engine has started.
The key returns to the original position, automatically.

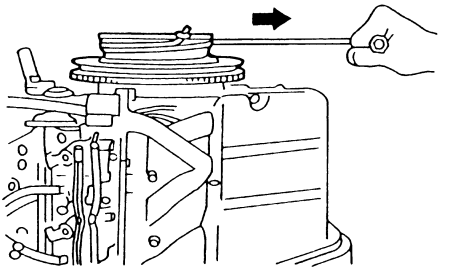


Note:
The neutral warm-up lever can not be raised when the control lever shift is in Forward or Reverse.

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.





⚠ CAUTION

Be careful that your clothes or other items do not get caught in the rotating engine parts.
To prevent accident and injury, do not re-attach the recoil starter after the engine has been started using the emergency starter rope. Be sure to put the top cowl back on.
Immediately contact an authorized service shop when reaching shore.

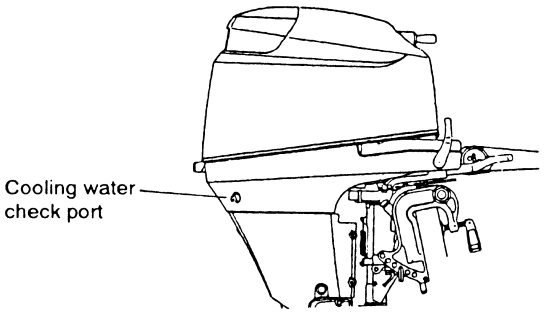
5-2. Warming up the engine

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

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

⚠ CAUTION

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



● **Engine speeds**

Idling speed after warming up.

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)
850 rpm	850 rpm

PROPELLER SELECTION

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

Wide-open throttle rpm range	
25	30
5,000－6,000 rpm	5,250－6,250 rpm

Genuine propellers are listed on PROPELLER TABLE of this manual.

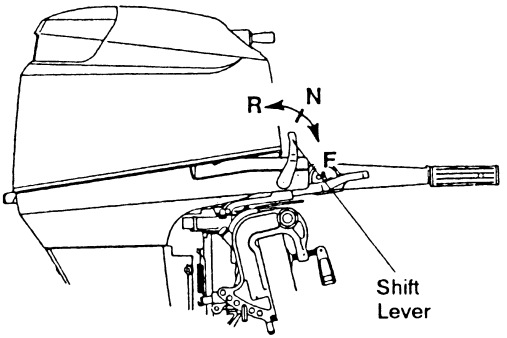
5-3. Forward and reverse

⚠ CAUTION

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.

Note:
Do not increase engine speed unnecessarily in reverse.

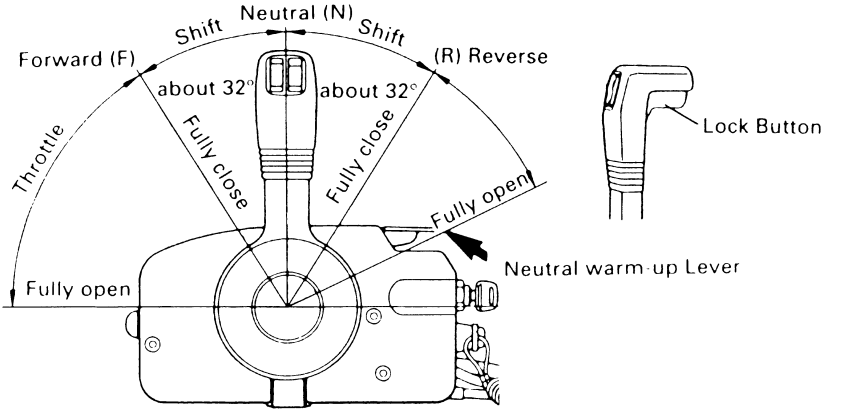
MF/MFG and EF/EFG/EFT type



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

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

EP and EPT type



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

(2) Reverse
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 Neutral Warm-up Lever is in the fully closed position.

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

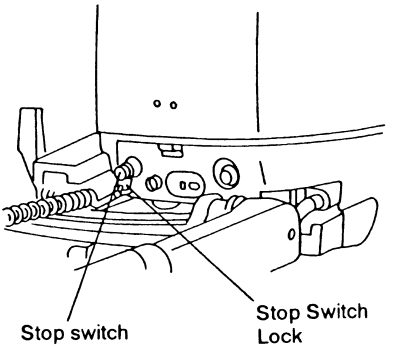
5-4. Stopping

MF/MFG and EF/EFG/EFT type

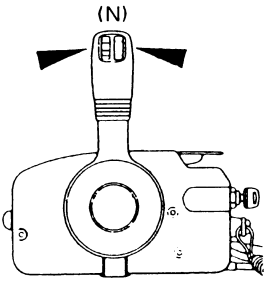
① Turn the throttle grip to the slow position.

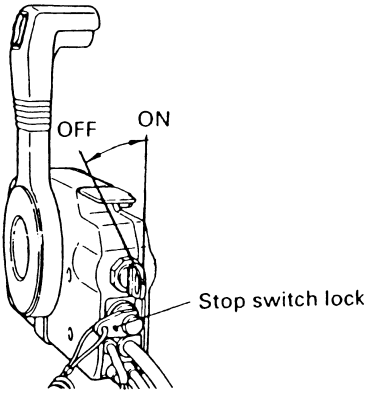
② Put the shift lever in the Neutral position.
Run the engine for 2 – 3 minutes at idling speed if it has been running at full speed.

③ Push the stop switch to stop the engine or release the stop switch lock.



EP and EPT type





① Put the shift lever in the Neutral position and run the engine for 2–3 minutes at idling speed if it has been running at full speed.

② Turn the main switch key to the OFF position.

Note:

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

5-5. 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/EFG/EFT and EP type

● **Proper trim angle**
The position of the thrust rod is correct if the hull is horizontal during operation. (Fig. 1)

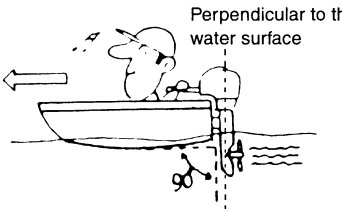


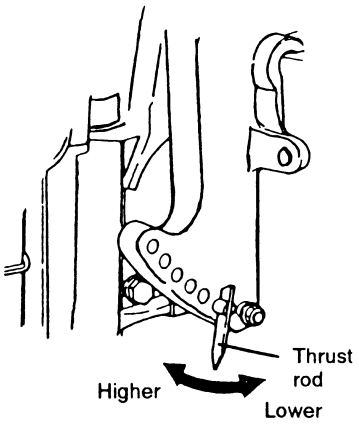
Fig. 1


Fig. 2

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


Fig. 3

● Improper trim angle
Set the thrust rod higher if the bow of the boat is below horizontal. (Fig. 3)



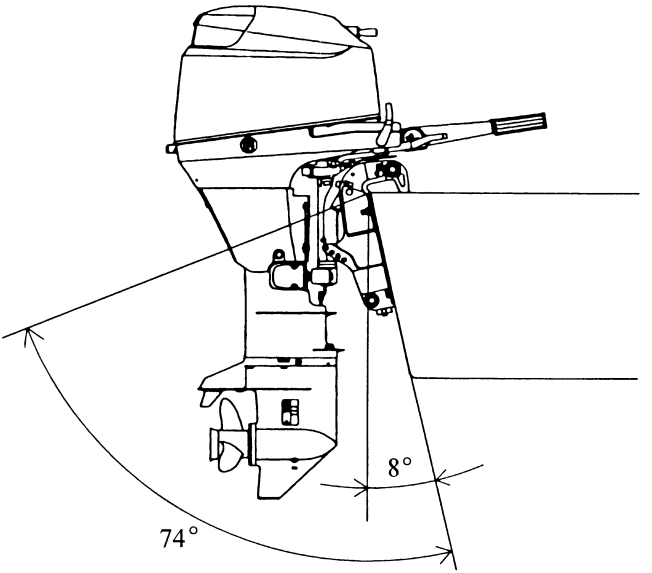
EFT and EPT type

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, planing speeds and load. It is imperative that the trim angle is adjusted correctly. Incorrect adjustment will cause the boat to sway, deteriorate engine performance and may cause unsafe steering conditions.

⚠ CAUTION

The Power 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.

■ How to use the trim meter (option):
When the trim angle is set as desired, take a reading off the trim meter, and record it for future reference.



■ Improper Trim Angle (bow rises too high)

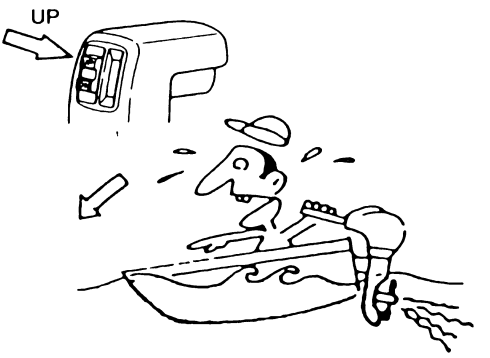
If the trim angle is excessive, the bow will rise out of the water and the speed will decrease.

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.

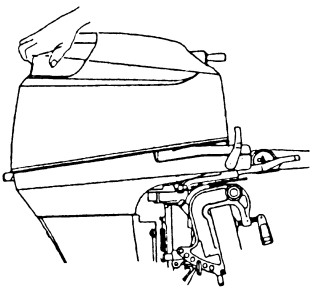
5-6. Tilt up, tilt down and shallow water operation
[MF/EF/EP type]

⚠ WARNING

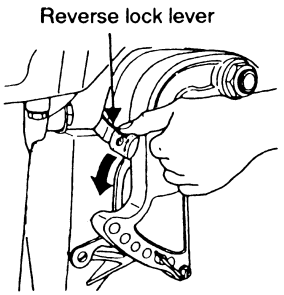
When tilting up or down, be careful not to place your hand between the swivel bracket and the stern bracket.
Be sure to tilt the outboard down slowly.

Note:
Stop the engine before tilting up.

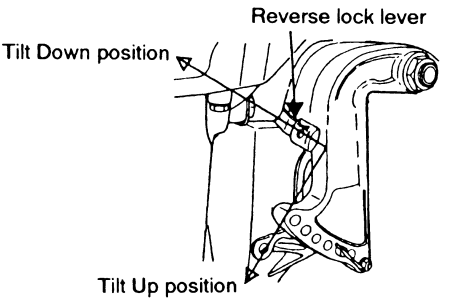
(1) Tilt up
Push the reverse lock lever down until it stops. (This is the tilt up position). Now, tilt the engine all the way up until it is locked in place.



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



Tilt Up



Tilt Down

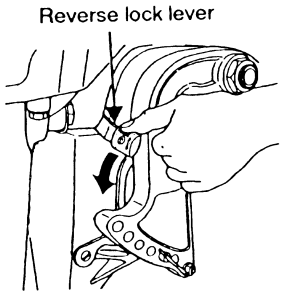
(3) Shallow water operation

⚠ WARNING

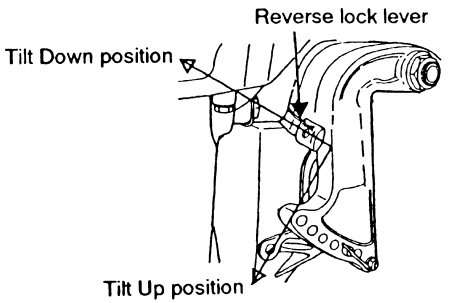
During shallow water operation, be careful not to place your hand between the swivel bracket and the stern bracket.
Be sure to tilt the outboard down slowly.

Note:
Slow down to trolling speed, and shift into Neutral or Forward before taking shallow water operation.

(A) Shallow water running position:
Put the reverse lock lever in the tilt up position, and tilt up the engine to put the engine in the shallow water running position.



(B) Return to normal running position:
Put the reverse lock lever in the tilt down position, slightly lift up the engine, and then put it down.



⚠ CAUTION

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

[MGF/EFG type (Gas Assist type)]

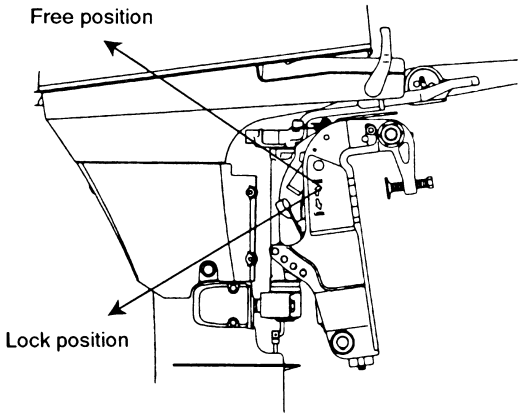
(1) Tilt up

Move (UP) lock lever to "Free" position. Fully tilt up the outboard motor. While keeping the outboard motor in full tilt up position, move, (DOWN) lock lever to "Lock" position.

For safety, set the tilt stopper into the set-up position, althouth the outboard motor is kept in the tilt up position after the lock lever is moved (DOWN) to "Lock" position.

(2) Tilt down

Move (UP) lock lever to "Free" position. Release the tilt stopper from the set-up position while slightly tilting up outboard motor. Release outboard motor down to thrust rod. Move (DOWN) lock lever to "Lock" position after the outboard motor is completely tilted down.

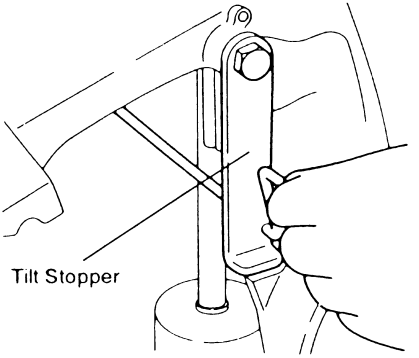


(3) Shallow water operation

⚠ WARNING

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

(A) Shallow water running position
Move (UP) lock lever to "Free" position. Tilt up outboard motor into desired shallow water running. While keeping the outboard motor in the desired shallow water running position, move (DOWN) lock lever "Lock" position.



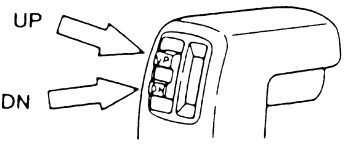
(B) Return to normal running position
Move (UP) lock lever to "Free" position. Outboard motor moves down to thrust rod.
Move (DOWN) lock lever to "Lock" position.

⚠ CAUTION

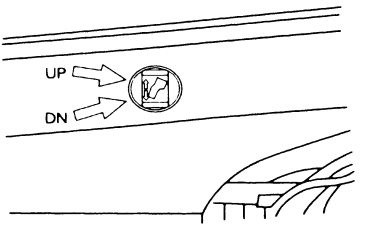
While in shallow water drive position, do not operate the outboard in reverse. Operate the outboard at slow speed and keep the cooling water intake submerged.

EFT/EPT type

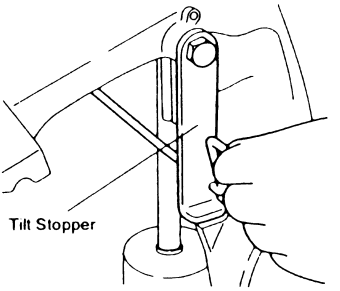
(1) Operate the Power Trim & Tilt switch and tilt the engine up. (The Main Switch must be "ON".)



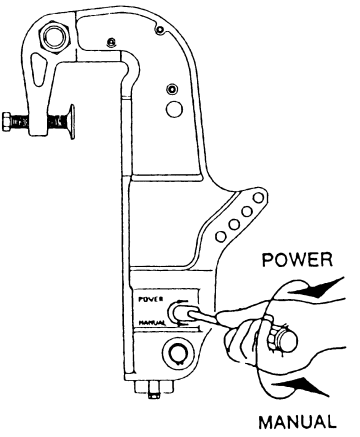
The engine can also be tilted up using the switch provided under the bottom cowl. (The Main Switch need not be turned "ON" in this case.)



(2) Lock the tilt with the Tilt stopper after the engine has been tilted up.



(3) 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 engine.



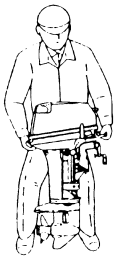
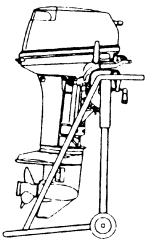
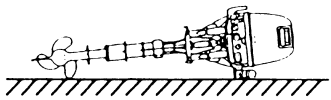
6. REMOVING AND CARRYING THE MOTOR

6-1. Removing the motor

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

6-2. Carrying the motor

Keep the motor in a vertical position when carrying.

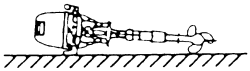
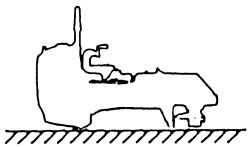
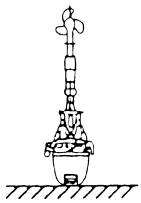
6-3. Storing the motor

Motor should be stored in a vertical position.

Note:
If the engine must be laid down be sure the tiller handle faces down as shown in the drawing above.

⚠ CAUTION

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

7. TRAILERING

MFG/EFG type (Gas Assist type)

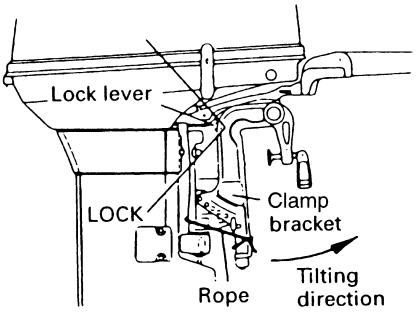
⚠ WARNING

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

⚠ WARNING

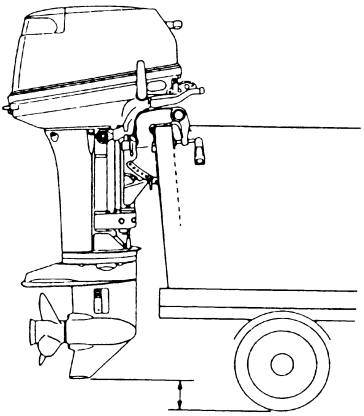
Never attempt to disassemble shock absorber of gas assist tilt system. It is dangerous because high pressure gas is included in the shock absorber.

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



⚠ CAUTION

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



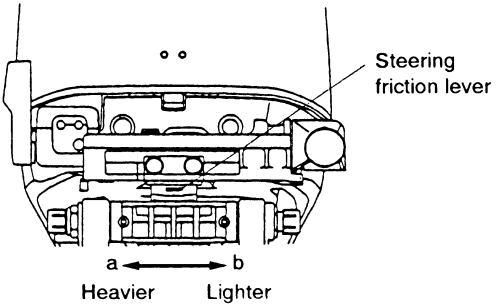
⚠ CAUTION

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

8. ADJUSTMENT

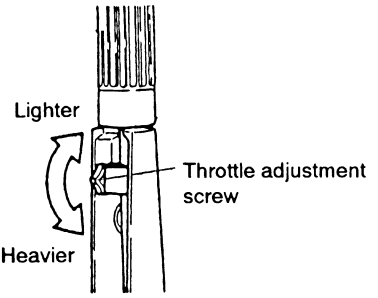
8-1. Steering friction

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.



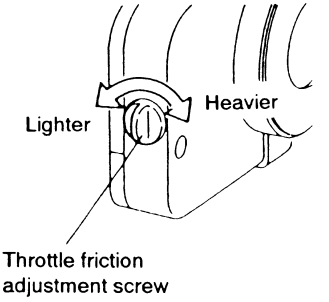
8-2. Throttle grip

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



8-3. Remote Control Lever Load

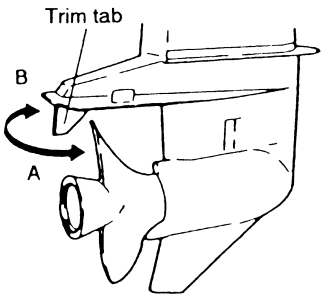
(Throttle friction adjustment screw)
To adjust the load of the Remote Control Lever, turn the throttle friction adjustment screw on the front of the Remote Control. Turn clockwise to increase the load and counter-clockwise to decrease it.



8-4. 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:
1. The trim tab also acts as an anode to prevent electrolytic corrosion. Therefore do not paint or grease this part.
2. After adjustment securely tighten the trim tab fixing bolt.
3. Check for looseness of the bolt and the trim tab at regular intervals. Due to corrosion, the trim tab will wear down over time.

9. INSPECTION AND MAINTENANCE

Care of your outboard motor

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

⚠ CAUTION

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

EPA Emissions Regulations

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

9-1. Daily Inspection

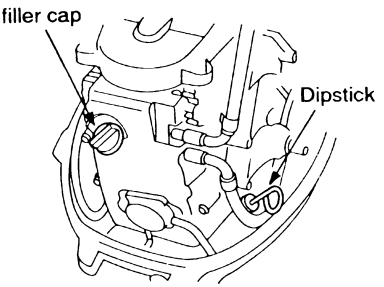
Perform the following checks before and after use.

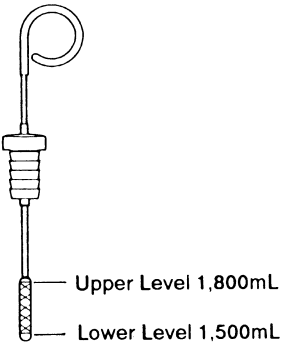
Item	Points to Check	Remedy
Fuel System	● Check the amount of fuel in the tank. ● Check for debris or water in the fuel filters. ● Check the rubber hoses for fuel leakage.	Replenish Clean or replace Replace
Engine Oil	● Check the oil level.	Fill oil
Electrical Equipment	● Check that the main switch functions 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. ● Check the warning horn (one beep) and warning LED lamp (ON for 5 sec.) when start up.	Replace Replenish or recharge Retighten Remedy or replace Correct or replace Clean or replace
Recoil Starter	● Check the rope for wear and chafing. ● Check the ratchet engagement.	Replace Correct or replace
Clutch and Propeller System	● Check that clutch engages correctly when operating the shift lever. ● Visually Check propeller for bent or damaged blades. ● Check the propeller nut is tightened and the split pin is present.	Adjust Replace
Installation of Motor	● Check all the bolts attaching the motor to the boat. ● Check the thrust rod installation.	Tighten
Power Trim & 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

A. Maintaining engine oil

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

Checking oil level:
① Stop the engine and set it in a vertical position.
② Remove the 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.





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

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

⚠ CAUTION

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

B. Washing

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

⚠ WARNING

Before flushing, remove the propeller and the forward thrust holder.

⚠ 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.

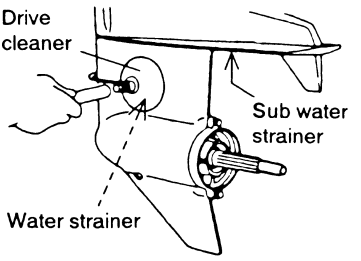
Use a drive cleaner

① Remove propeller and thrust holder (refer to Propeller Replacement).

② Seal the sub water strainer with tape.

③ Install the drive cleaner on the water strainer portion.

④ Attach a water hose to the drive cleaner.
Turn on the water and adjust the flow.



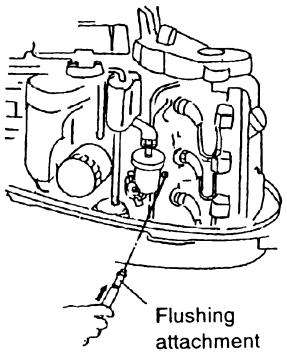
⑤ Start the engine and run it at idle speed in neutral position.

⑥ Check for a steady stream of water flowing out of the cooling water check port. Continue flusing the outbard for 3 to 5 minutes, carefully monitoring water supply at all times.

⑦ Stop the engine, turn off the water, and remove the drive cleaner and tape. Reinstall the propeller.

Use flushing attachment.

① Remove propeller and thrust holder (refer to Propeller Replacement).
② Seal the water strainer and sub water strainer with tape.
③ Remove the water plug from the motor, and screw in the flushing attachment.
④ Attach a water hose to the flushing attachment. Turn on the water and adjust the flow.
⑤ Start the engine and run it at idle speed in neutral position.
⑥ Check for a steady steam of water flowing out of the cooling water check port.
Continue flushing the outboard for 3 to 5 minutes, carefully monitoring water supply at all times.
⑦ Stop the engine, turn off the water, and remove the flushing attachment and tape.
Reinstall the propeller.



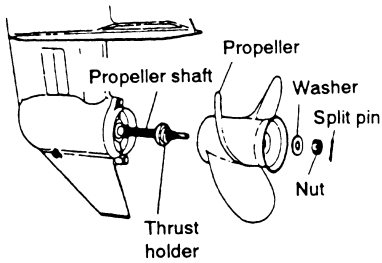
C. Replacing the propeller

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

⚠ CAUTION

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

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 intalling 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.

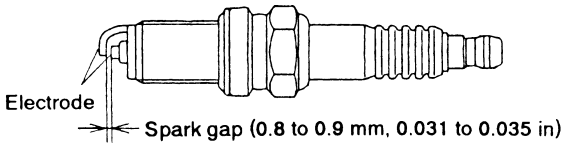


D. Replacing the spark plugs

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

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 16 mm socket wrench and handle.

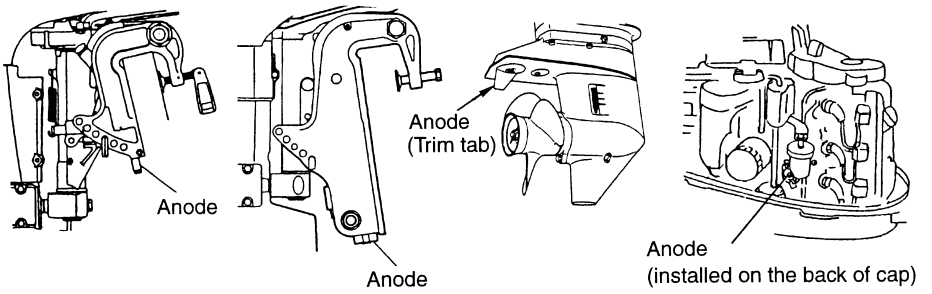
Use spark plug NGK DCPR-6E.



E. Replacing the anode

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

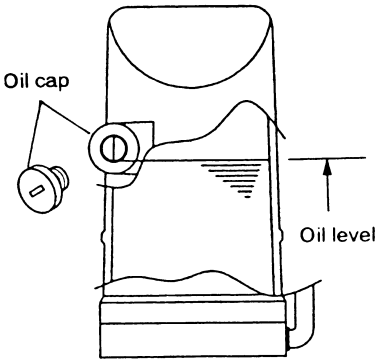
Note:
- Never grease or paint the anode.
- At each inspection re-tighten the anode attaching bolt. As it is likely to be subjected to electrolytic corrosion.



3) 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 engine up to check the oil level in the tank.

Remove the oil cap by turning counter-clockwise, then check if the oil level reaches the bottom line of the plug hole.

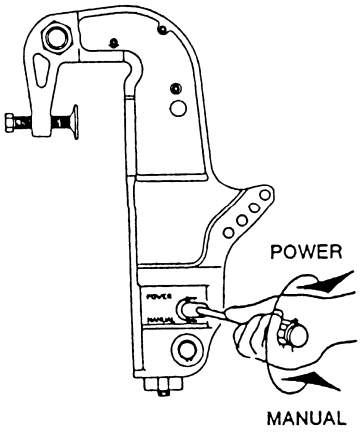


⚠ CAUTION

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

② Recommended oil
Use an automatic transmission fluid or equivalent.
Recommended oils are as shown below.
ATF Dexron Ⅲ

③ Air purging from the Power Trim and Tilt unit.
Entrapped air in the Power Trim & Tilt unit will cause poor tilting movement. With the engine mounted on the boat, set the manual release valve to the Manual side, and tilt the engine manually up/down 5－6 times while checking the oil level. When done, close the valve by turning it clockwise towards the Power side.



9-2. Periodic Inspection

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

Description		Inspection intervals			Inspection procedure	Remarks
		First 20 hours of 1 month	Every 50 hours of 3 months	Every 100 hours of 6 months		
Fuel System	Fuel filter	○	○	○	Check and clean or Replace.	
	*High pressure fuel filter				Replace every 200 hrs or 2 years	Entire cartridge
	Piping	○	○	○	Check and clean or Replace.	
	Fuel tank	○		○	Clean	
Ignition	Spark plug	○		○	Check gaps. Remove carbon deposits or Replace.	0.8-0.9mm (0.031-0.035in)
Starting System	*Starter rope	○	○	○	Check for wear or chafing	
	*Starter motor			○	Check for salt deposits and the battery cable condition.	
Engine	Engine oil	○		○	Replace	
	Oil filter				Replace every 200 hrs or 2 years	Entire cartridge
	*Valve Clearance	○		○	Check & adjust	
	*Timing belt			○	Check and Replace if necessary.	
	*Air filter				Replace every 200 hrs or 2 years	for ISC
Lower Unit	Propeller	○	○	○	Check for bent blades, damage, wear.	
	Gear oil	Replace ○		Replace ○	Change or replenish-oil and check for water leaks.	280mL (9.5 fl.oz.)
	*Water pump		○	○	Check for wear or damage.	Replace impeller every 12 months.
*Power trim & tilt		○		○	Check & replenish oil, manually operate	
*Warning system			○	○	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

* Have this handled by your dealer.

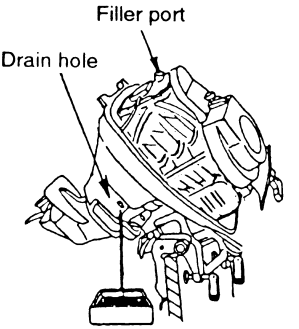
Note:
Your outboard motor should receive careful, and complete inspection at 300 hours. This is the best time for major maintenance procedures to be carried out.

A. Replacing engine oil

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

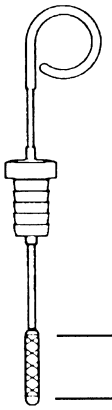
To change engine oil:

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 so that the drain hole is facing downward.
④ Put a oil drain pan under the oil drain screw.
⑤ Remove the oil drain screw and completely drain oil from the engine.
⑥ Tighten the oil drain screw.
⑦ Reset the engine in a vertical position.
⑧ Fill the engine through filler port with recommended oil (see chart below) to the upper dipstick mark.
⑨ Tighten the oil filler cap.



(Note)
Recommended engine oil: Refer to Engine Oil (page 13)

Oil capacity:



	Oil volume needed for complete oil replacement	
	With oil filter replacement	Without oil filter replacement
Upper limit (Max.)	1,800ml (1.90 US qt.)	1,600ml (1.69 US qt.)
Lower limit (Min.)	1,500ml (1.58 US qt.)	1,300ml (1.37 US qt.)

⚠ CAUTION

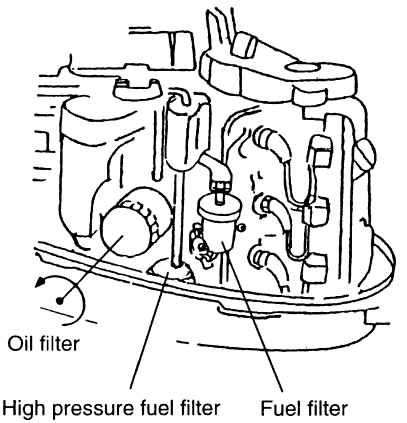
You may be injured due to high engine temperatures if you fill engine oil just after stopping. Changing engine oil should be done after the engine has been cooled.

Note:

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

B. 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.




Oil filter wrench

C. Cleaning the fuel filters and the fuel tank

Fuel filters are provided inside the fuel tank and engine.

(1) Fuel filter (for engine)

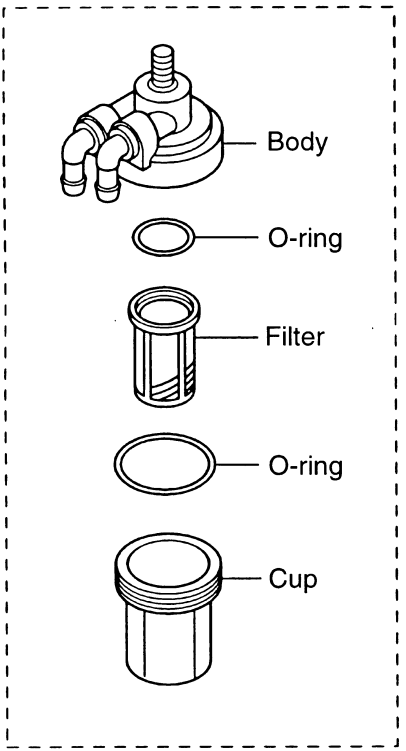
① Check in the cup for water and foreign matter.

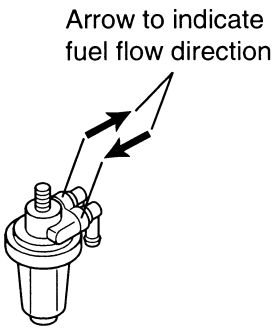
② If present, disconnect hoses from the fuel connector (male) and the fuel pump.

③ Remove the cup, filter and O-rings from the fuel filter body.

④ Remove fuel and any water or foreign matter from the cup, filter and hoses.

⑤ Reset all parts.

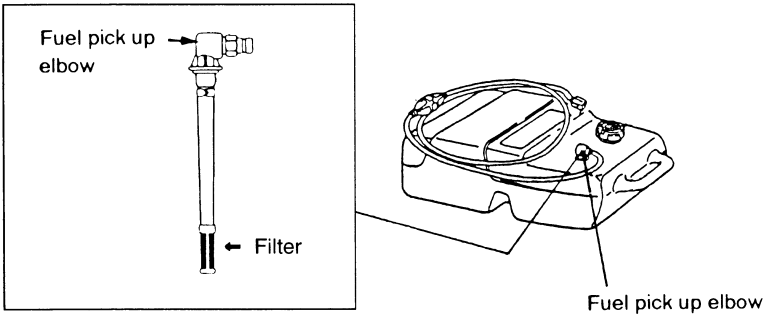




(2) High pressure fuel filter (for engine)
This is entire cartridge type, so that replase every 200 hours of operation or 2 years without inspection.

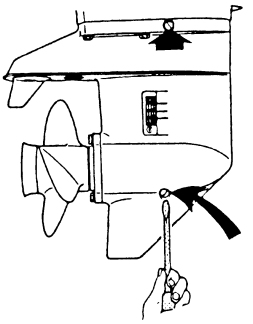
(3) Fuel filter (for fuel tank)
Remove the fuel pickup elbow of the fuel tank by turning it counterclockwise and clean the fuel filter.

(4) 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).



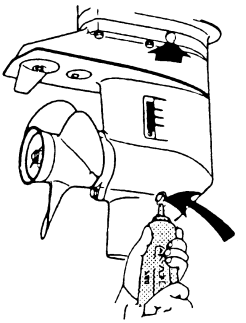
D. Replacing gear oil

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

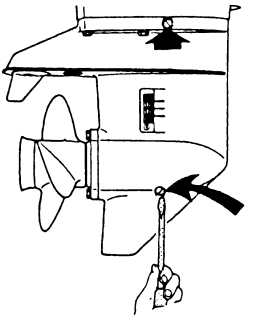


Note:
- If water in the oil, giving it a milky colored appearance. Contact your dealer.

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



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



Note:
Use genuine gear oil or the recommended one (API GL-5: SAE #80 to #90).
Required volume: approx. 280 mL.

9-3. 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.

A. Engine

① Wash the engine exterior and flush the cooling water system throughly 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 jets.

④ Remove the spark plugs and spray storage oil (available from your authorized dealer) into the combustion chamber through the spark plug holes while slowly turning the motor over using the recoil starter.

⑤ Change the engine oil.

⑥ Change the gear oil in the gear case.

⑦ Apply grease to the propeller shaft.

⑧ Apply grease to all sliding parts, joints, nuts, and bolts.

⑨ Stand the engine up vertically in a dry place.

B. 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.

C. Electric Starter Motor

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

9-4. 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.)

Note:
The following steps must be taken when first using the engine after winter storage.
1. Fill the fuel tank completely with 25 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℃	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.

9-5. Motor submerged in water

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

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

1) Wash the motor with fresh water to remove salt or dirt.
2) Remove the engine oil drain screw and completely drain water and oil from the engine.
3) Remove the spark plugs, and completely drain the water from the engine by pulling the recoil starter several times.
4) Inject a sufficient amount of engine oil through the spark plug holes. Pull the recoil starter several times to circulate the oil throughout the motor.

9-6. Cold weather precautions

If you moor your boat in cold weather at temperatures below 0℃ (32°F), there is the danger of water freezing in the cooling water pump, which may damage the pump, impeller, etc. To avoid this problem, submerge the lower half of the engine into the water.

9-7. Checking after striking underwater object

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

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

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

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

Ask the dealer to replace damaged or defective parts.

10. TROUBLESHOOTING

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

	Difficult to start engine	Engine runs erratically	Low engine speed/Poor boat speed	Battery will not hold charge	Starter motor will not crank	Power T & T inoperative	Warning lamp "ON" ※ 1	Warning lamp "Flash" ※ 2	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 or fuel pump
			●						Use of improper engine oil
	●	●	●						Use of improper gasoline
	●								Not enough fuel supply by primer
			●					●	Water temp or MAP sensor out of range or Wire breaking of circuit
E/SYSTEM		●	●						Spark plug other than specified
	●	●	●						Dirt, soot, etc. on spark plug
	●	●							No Spark or weak spark

	Difficult to start engine	Engine runs erratically	Low engine speed/Poor boat speed	Battery will not hold charge	Starter motor will not crank	Power T & T inoperative	Warning lamp "ON" ※ 1	Warning lamp "Flash" ※ 2	Possible cause
ELECTRICAL SYSTEM	●								Short circuit of engine stop switch
				●					Rectifier failure
	●								Lack of stop switch lock plate
				●	●	●			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
	●			●	●	●			Wrong wiring, disconnection, poor connection

	Difficult to start engine	Engine runs erratically	Low engine speed/Poor boat speed	Battery will not hold charge	Starter motor will not crank	Power T & T inoperative	Warning lamp "ON" ※ 1	Warning lamp "Flash" ※ 2	Possible cause
COMPRESSION & OIL SYSTEM		●	●						Low compression
			●						Carbon deposits in the combustion chamber
			●						Incorrect valve clearance
			●				●		Low oil pressure/level, oil pump failure, Clogged oil filter (Pressure switch ON)
OTHERS			●						Insufficient throttle aperture
			●				●		Insufficient cooling water flow, clogged or defective pump
		●	●						Faulty thermostat
		●	●						Cavitations 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

※ 1: Horn also sounds continuously.
※ 2: Horn also sounds intermittently.

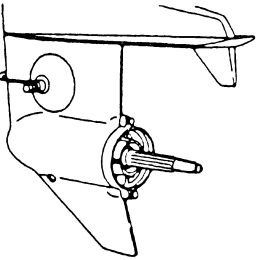
11. TOOL KIT AND SPARE PARTS

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

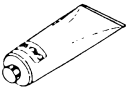
Items		Quantity	Remark
Service tools	Tool bag	1	
	Pliers	1	
	Socket wrench	1	10 × 13 mm
	Socket wrench	1	16 mm
	Socket wrench handle	1	
	Screwdrivers	1	Cross- and straight-point
	Screwdriver handle	1	
Spare parts	Starter rope	1	1,000 mm
	Spark plug	2	NGK DCPR6E
	Split pin	1	
Parts Packaged with Engine	Fuel tank	1	25L
	Primer bulb	1 set	
	Remote control box	1 set	for EP and EPT
	Drag link	1	for EP and EPT
	Bracket fixing		
	Bolt	2	8 mm
	Nut	2	8 mm
	Washer	4	8 mm
			for MF/EF and EP
	Bolt	4	12 mm
	Nut	4	12 mm
	Washer A, B	4 each	A (large)
			B (small)
			for MFG/EFG/EFT and EPT

12. OPTIONAL ACCESSORIES

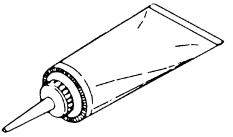
Flushing attachment



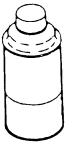
Drive cleaner



Genuine grease
(250g)

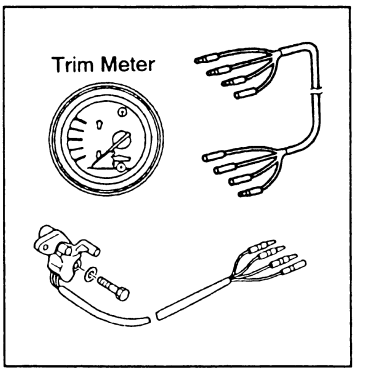


Genuine gear Oil
(500mL)



Touch-up paint
(300mL)

Genuine engine oil
(450mL)



Trim Meter Kit

13. PROPELLER TABLE

Use a genuine propeller.
A propeller must be selected so that the engine rpm measured at wide open throttle while cruising is within the recommended range.

25 : 5,000 to 6,000 rpm
30 : 5,250 to 6,250 rpm

	Propeller Mark	Propeller Size Diameter × pitch	Standard propeller on the model	
			25	30
Light boats	14	9.9 × 14.2 inch		
		252 × 360 mm		
	DS13	9.6 × 13 inch	S	S
		244 × 330 mm		
	DS12	9.8 × 12 inch		
		249 × 305 mm		
	DS11	9.8 × 11 inch	L	L
		249 × 279 mm		
	DS10	9.72 × 10 inch	UL	UL
		247 × 254 mm		
	DS9	9.72 × 9 inch		
		247 × 229 mm		
Heavy boats	8	10.2 × 8.3 inch		
		260 × 210 mm		

S : Short shaft
L : Long shaft
UL : Extra long shaft

TOHATSU

OWNER'S MANUAL

MFS 25
30

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