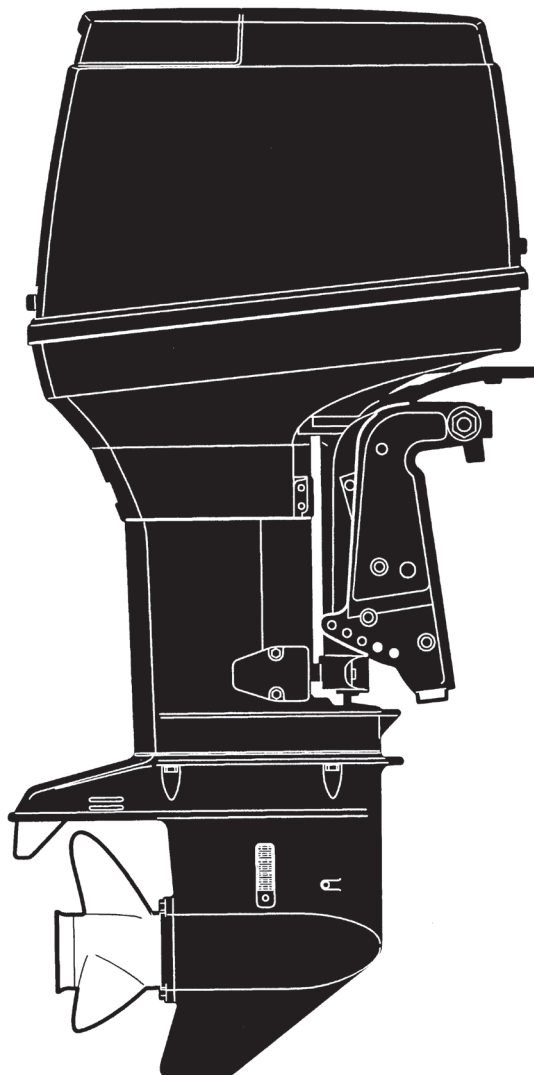


OWNER'S MANUAL



TOHATSU
Outboards

M 60C
70C
70CX
90A2
115A2
120A2
140A2

OB No.003-11039-A

⚠ 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 bottom cowl 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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GENERAL SAFETY INFORMATION

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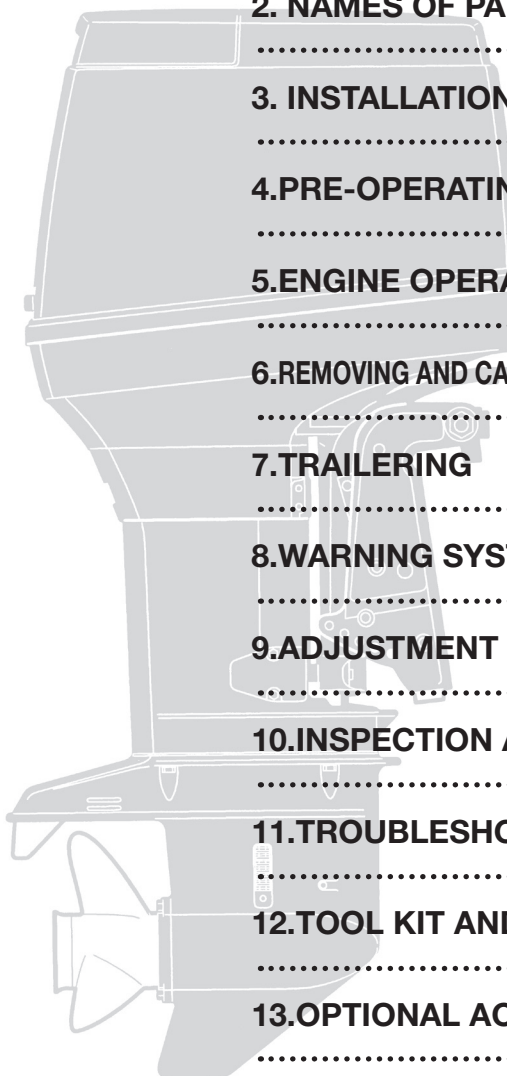
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13. OPTIONAL ACCESSORIES

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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

60C/70C EFO, EFTO, EPO, EPTO, 70C/70CX MFG

Item	MODEL	60C•70C EFO	60C•70C EFTO	60C•70C EPO	60C•70C EPTO	70C•70CX MFG	
Overall Length mm	(in)	Approx. 1,280		Approx. 720		Approx. 1,280	
Overall Width mm	(in)	Approx. 360					
Overall Height	mm (in)	L	1,415			1,455	
		UL	1,542			1582	
Transom Height	mm (in)	L	517				
		UL	644				
Weight	kg (lb)	L	108	120	103	115	105.5
		UL	110.5	122.5	105.5	117.5	108
Output	kW (Hp)	60C: 44.1 / 70C: 51.5				51.5	
Max. Operating Range	rpm	5,150 - 5,850					
Number of Cylinder		3					
Piston Displacement	mL (Cu in)	938					
Bore x Stroke	mm (in)	74 x 72.7					
Exhaust System		Through hub exhaust					
Lubrication System		Auto mixing				Premixed fuel	
Fuel Mixing Ratio		120:1 - 50:1				50:1	
Cooling System		Forced water cooling					
Starting System		Electric starter motor				Manual	
Ignition System		Flywheel Magneto C.D. Ignition					
Spark Plug		NGK B8HS-10 or BR8HS-10					
Alternator		12V, 130W (12V, 11A)					
Trim Position		5	2	5	2		
Engine Oil Mixing Ratio		Unleaded Gasoline 50 : Genuine 2-stroke Engine Oil or recommended one (TCW-III) 1					
Gear Oil		Genuine Gear Oil or API GL5, SAE #80 to #90, approx. 900mL					
Fuel Tank Capacity	L (US gal)	25 (6.6)					
Engine Oil Capacity	L (US gal)	Approx. 2.6 (0.69)				-	
Gear Reduction Ratio		2.33 (12 : 28)					
Fuel		Unleaded regular gasoline pump posted 87 Octane (research octane rating of 91)					

Remark : Specifications subject to change without notice.

90A EPTO, EFO, 120A2 EPTO, 140A2 EPTO

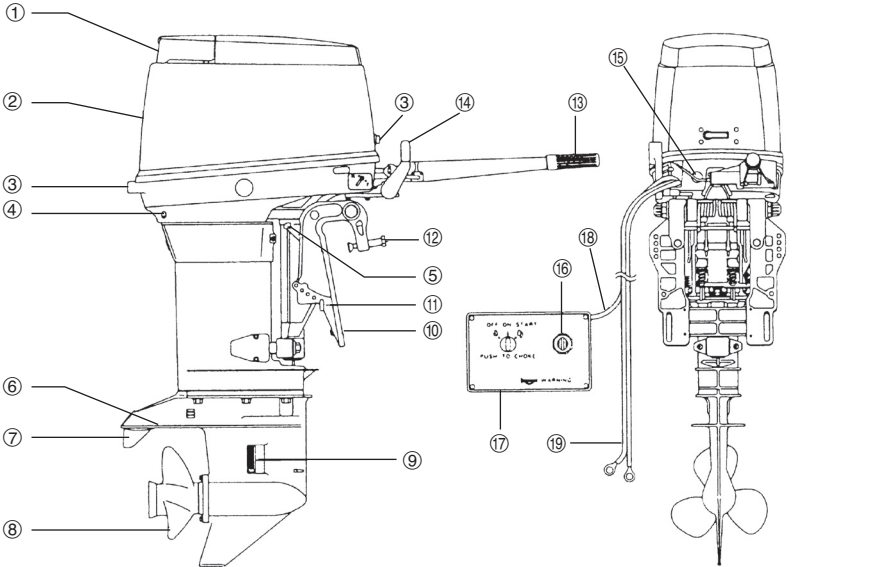
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MODEL		90A2 EPTO	120A2 EPTO [115A2 ETPO]	140A2 EPTO
Overall Length mm	(in)	Approx. 690	Approx. 747	
Overall Width mm	(in)	Approx. 360	Approx. 390	
Overall Height	mm (in)	L	1435	1560
		UL	1562	1687
Transom Height	mm (in)	L	517	
		UL	644	
Weight	kg (lb)	L	135	164
		UL	137.5	166.5
Output	kW (Hp)	66.2	88.3 [84.6]	103
Max. Operating Range	rpm	5,000 - 5,500	5,200 - 5,700	
Number of Cylinder		3	4	
Piston Displacement	mL (Cu in)	1267	1768	
Bore x Stroke	mm (in)	86 x 72.7	88 x 72.7	
Exhaust System		Through hub exhaust		
Lubrication System		Auto mixing		
Fuel Mixing Ratio		120:1 - 50:1		
Cooling System		Forced water cooling		
Starting System		Electric starter motor		
Ignition System		Flywheel Magneto C.D. Ignition		
Spark Plug		NGK B8HS-10 or BR8HS-10		
Alternator		12V, 130W (12V, 11A)	12V, 330W (12V, 27.5A)	
Trim Position		2		
Engine Oil Mixing Ratio		Unleaded Gasoline 50 : Genuine 2-stroke Engine Oil or recommended one (TCW-III) 1		
Gear Oil		Genuine Gear Oil or API GL5, SAE #80 to #90, approx. 900mL		
Fuel Tank Capacity	L (US gal)	25 (6.6)		
Engine Oil Capacity	L (US gal)	3.5 (0.92)	6 (1.6)	
Gear Reduction Ratio		2 (13:26)		
Fuel		Unleaded regular gasoline pump posted 87 Octane (research octane rating of 91)		

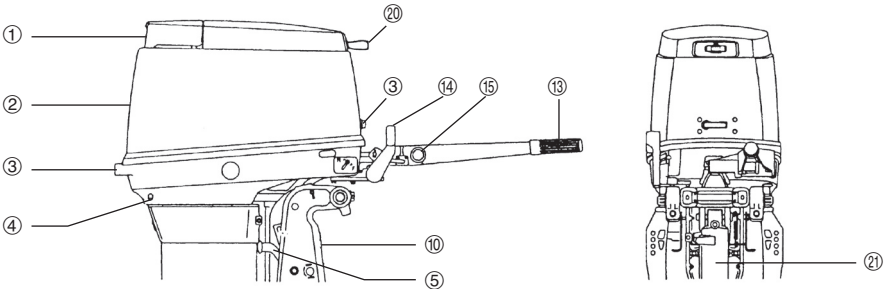
Remark : Specifications subject to change without notice.

NAMES OF PARTS

60/70 EFO, 70 MFG

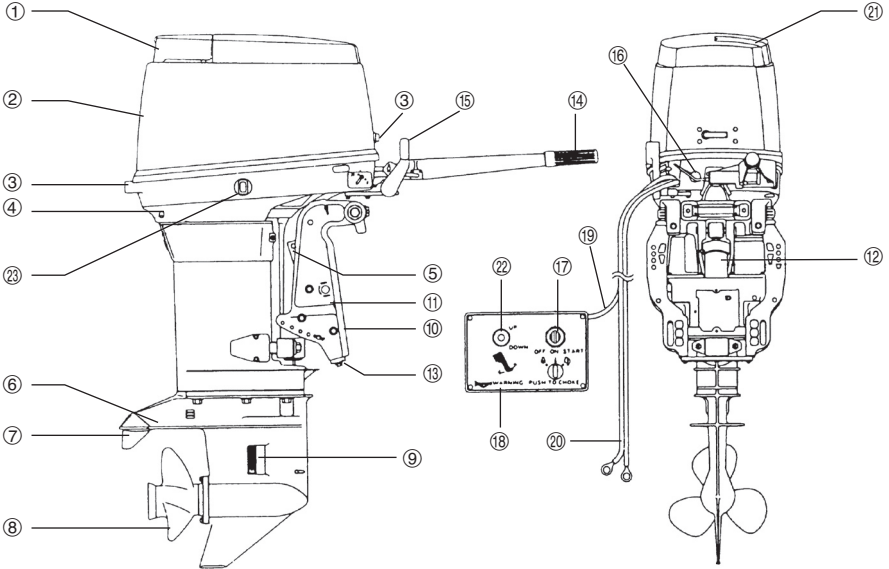


MFG



- | | | |
|--------------------------|-----------------|------------------|
| ① Tilt Handle | ⑩ Clamp Bracket | ⑲ Battery Cords |
| ② Top Cowl | ⑪ Thrust Rod | ⑳ Starter handle |
| ③ Hook Lever | ⑫ Clamp Screw | ㉑ Gas Assistant |
| ④ Water Check Port | ⑬ Throttle Grip | |
| ⑤ Reverse Lock Lever | ⑭ Shift Lever | |
| ⑥ Anti-ventilation Plate | ⑮ Stop Switch | |
| ⑦ Trim Tab | ⑯ Main Switch | |
| ⑧ Propeller | ⑰ Switch Box | |
| ⑨ Water Inlet | ⑱ Cord Ass'y C | |

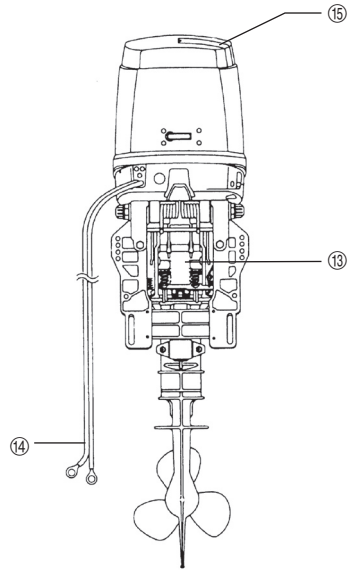
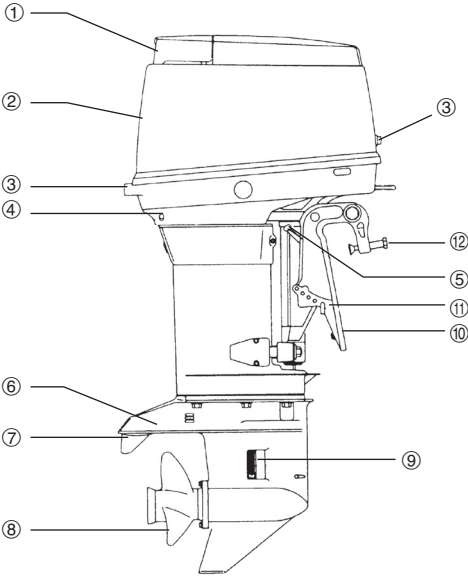
60/70 EFTO



2

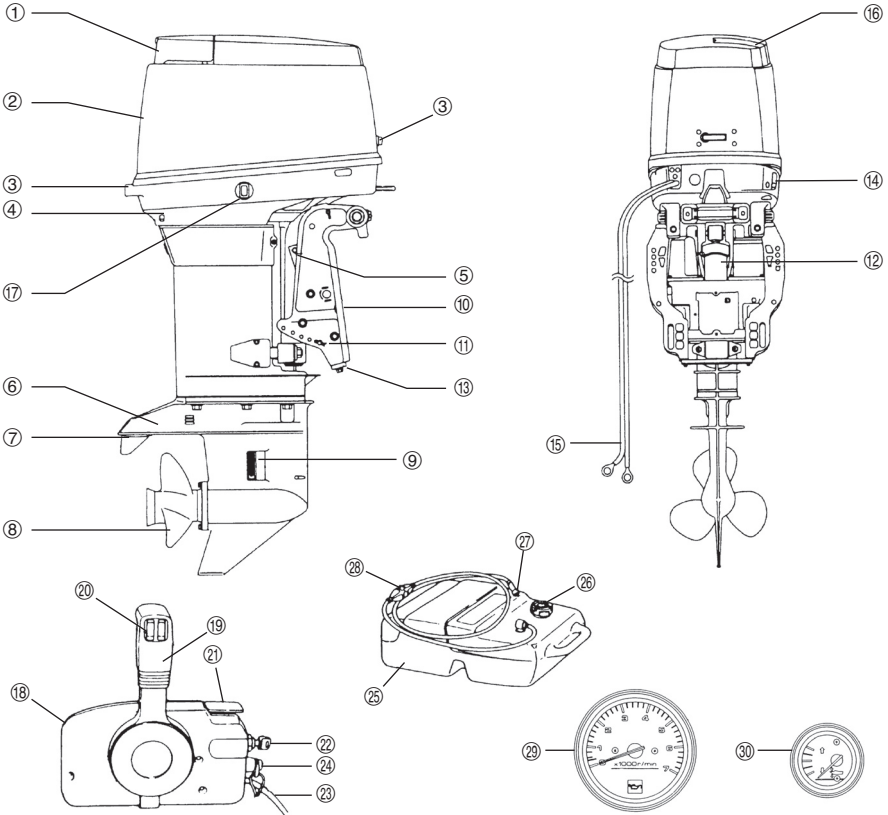
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|--------------------------|---------------------|------------------------------|
| ① Tilt Handle | ⑩ Clamp Bracket | ⑲ Cord Ass'y C |
| ② Top Cowl | ⑪ Thrust Rod | ⑳ Battery Cords |
| ③ Hook Lever | ⑫ Power Trim & Tilt | ㉑ Filter Lid |
| ④ Water Check Port | ⑬ Anode | ㉒ Power Trim & Tilt Switch A |
| ⑤ Reverse Lock Lever | ⑭ Throttle Grip | ㉓ Power Trim & Tilt Switch B |
| ⑥ Anti-ventilation Plate | ⑮ Shift Lever | |
| ⑦ Trim Tab | ⑯ Stop Switch | |
| ⑧ Propeller | ⑰ Main Switch | |
| ⑨ Water Inlet | ⑱ Switch Box | |

60/70 EPO



- ① Tilt Handle
- ② Top Cowl
- ③ Hook Lever
- ④ Water Check Port
- ⑤ Reverse Lock Lever
- ⑥ Anti-ventilation Plate
- ⑦ Trim Tab
- ⑧ Propeller
- ⑨ Water Inlet
- ⑩ Clamp Bracket
- ⑪ Thrust Rod
- ⑫ Clamp Screw
- ⑬ Fuel Connector
- ⑭ Battery Cords
- ⑮ Fillter Lid

60/70 EPTO



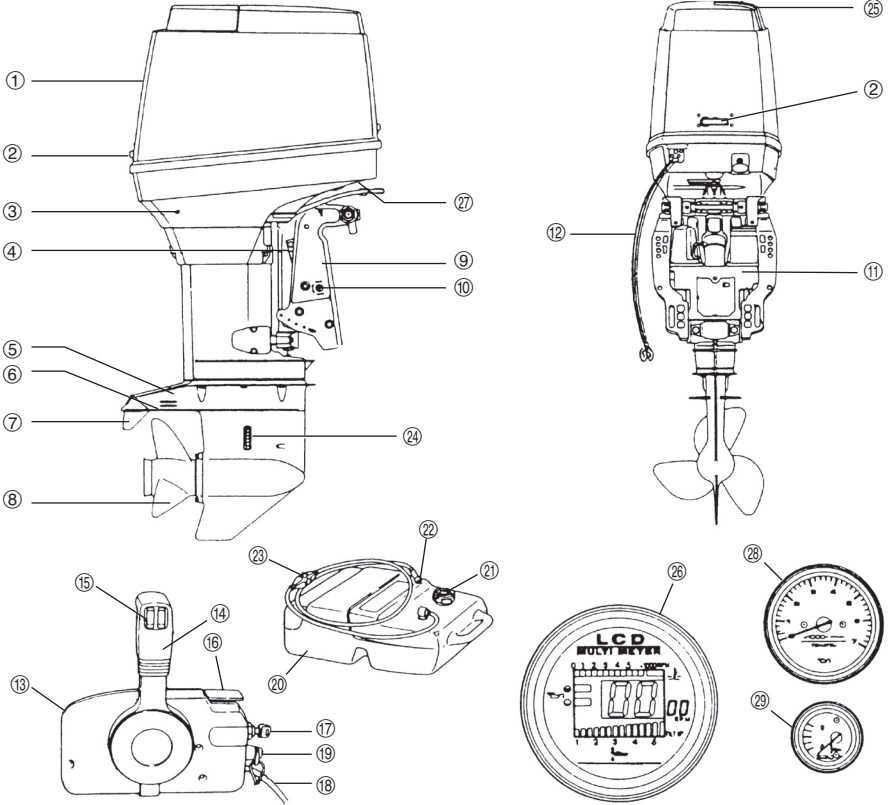
for P Type

for P Type

for T Type

- | | | |
|--------------------------|------------------------------|-------------------------|
| ① Tilt Handle | ⑪ Thrust Rod | ⑳ Neutral Warm-up Lever |
| ② Top Cowl | ⑫ Power Trim & Tilt | ㉑ Main Switch |
| ③ Hook Lever | ⑬ Anode | ㉒ Harness B |
| ④ Water Check Port | ⑭ Fuel Connector | ㉓ Stop Switch |
| ⑤ Reverse Lock Lever | ⑮ Battery Cords | ㉔ Fuel Tank |
| ⑥ Anti-ventilation Plate | ⑯ Filter Lid | ㉕ Air Vent Screw |
| ⑦ Trim Tab | ⑰ Power Trim & Tilt Switch B | ㉖ Fuel Connector |
| ⑧ Propeller | ⑱ Remote Control Box | ㉗ Primer Bulb |
| ⑨ Water Inlet | ㉘ Remote Control Lever | ㉙ Tachometer |
| ⑩ Clamp Bracket | ㉚ Power Trim & Tilt Switch | ㉛ Trim Meter |

90, 115/120/140 EPTO



- ① Top Cowl
- ② Hook Lever
- ③ Water Check Port
- ④ Tilt Stopper
- ⑤ Gear Case
- ⑥ Anti-ventilation Plate
- ⑦ Trim Tab
- ⑧ Propeller
- ⑨ Clamp Bracket
- ⑩ Manual Valve (Port side)
- ⑪ Power Trim & Tilt
- ⑫ Battery Cords
- ⑬ Remote Control Box
- ⑭ Remote Control Lever
- ⑮ Power Trim & Tilt Switch
- ⑯ Neutral Warm-up Lever
- ⑰ Main Switch
- ⑱ Harness B
- ⑲ Stop Switch
- ⑳ Fuel Tank
- ㉑ Air Vent Screw
- ㉒ Primer Bulb
- ㉓ Water Inlet
- ㉔ Filler Lid
- ㉕ Multi-purpose Meter (120, 140)
 - Tachometer
 - Trim Gauge
 - Overheat Alert Indicator
 - Oil Level Indicator
- ㉖ Power Trim & Tilt Switch (Except 90)
- ㉗ Tachometer (90)
- ㉘ Trim Meter (90)

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.

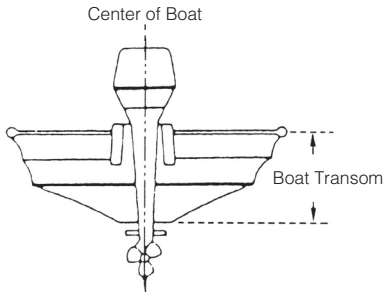
Note

Consult your authorized dealer to receive the proper instructions or ask your dealer to mount the motor as necessary.

Installation

■ Single-engine Installation

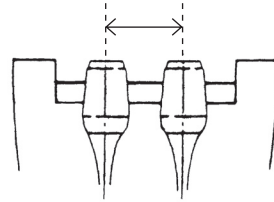
Set engine at center of boat, and mount it using a cushioning pad or plate.



■ Twin-engine Installation

When installing two outboard engines, be sure to keep an interval of approximately 580 mm (22.8 in) between the two.

Approx. 580 mm (22.8 in)

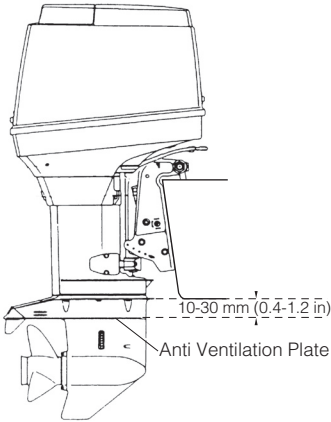


CAUTION

- 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.

Transom Height

Install the engine with the Anti-ventilation Plate at a level 10~30mm (0.4~1.2in.) below the bottom of the boat.



Transom Matching

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

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

⚠ CAUTION

Overheating may occur if the Anti-ventilation Plate is at a level higher than the bottom of the boat, as a result of a lack of cooling water.

If the height difference exceeds 10~30mm (0.4~1.2 in) engine power performance is likely to be reduced a result of increased water resistance to the gear case assembly.

Attaching the Clamp Bracket

After positioning the Clamp Bracket, fix it with clamp screw fitted on the type “without Shock Absorber” then drill four holes in the transom board, matching the holes in the Clamp Bracket. Secure the engine with the supplied bolts (M12×105mm) and nuts, Be sure to use the washers.

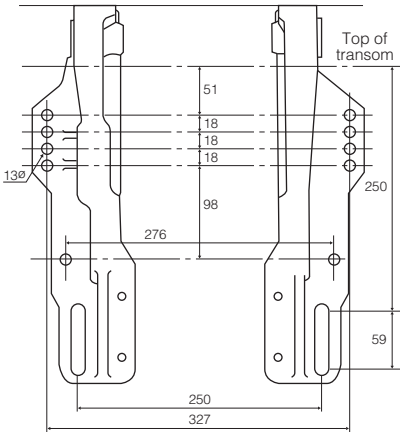
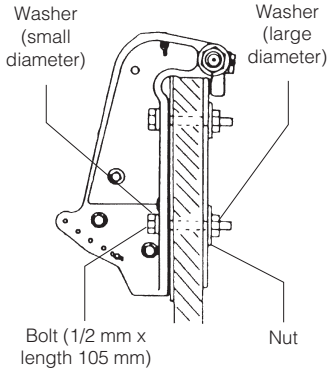
Use the larger diameter washers inside of the transom board and use the small diameter washers outside of the clamp bracket.

The mounting holes may be drilled beforehand by referring to the dimensional drawing.

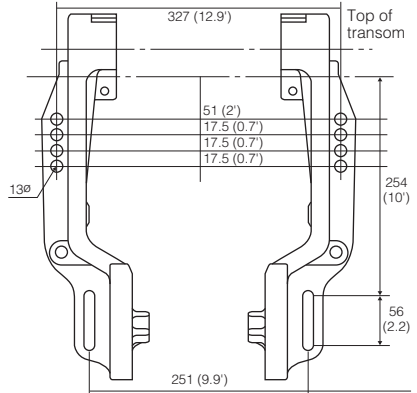
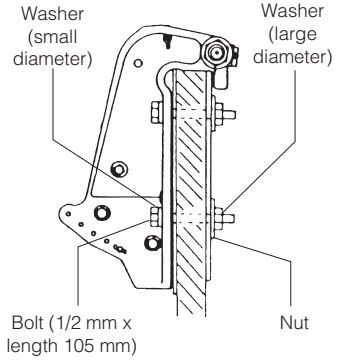
⚠ WARNING

- Mounting the outboard motor without following this manual can lead to unsafe conditions such as poor maneuverability, going out of control or fire disaster.
- Loose clamp screws and/or mounting bolts can lead to 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.

Manual tilting type



Power trim and tilt type, gas assistant type

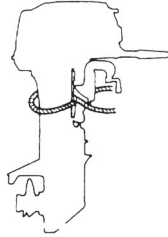


Notes

1. Apply sealing agent, such as silicone sealer between bolts and transom board holes before tightening bolts.
2. Be sure to tighten mounting bolt nuts to specified torque.

After installing the outboard, make sure that its steering and tilt movements are not obstructed by any part of the boat. Also, the battery cables is fitted, make sure that it does not interfere with the movement of the outboard.

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



Note

A rope is not included in the standard accessories.

From time to time, check the bolts (and clamp screws) for tightness.

CAUTION

Mounting bolts should be installed with the bolt head at inside surface of the transom. Mounting bolts installed with the threaded end at the inside surface of the transom can cause personal injury.

2. Propeller selection

A propeller must be selected so that the engine rpm measured at wide open throttle while cruising is within the max. operating range;

Model	Wide-open throttle rpm range
60/70	5,150 - 5,850 rpm
90	5,000 - 5,500 rpm
115/120/140	5,200 - 5,700 rpm

For genuine propellers, refer to Propeller Table of this manual.

3. 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 adjustment of the remote control device.

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

Follow the instruction manual provided with the remote control.

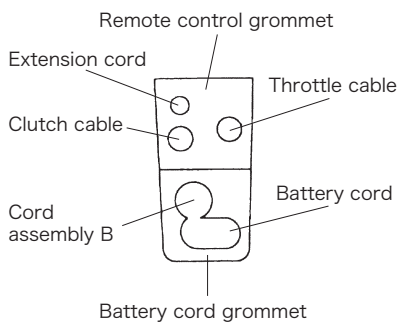
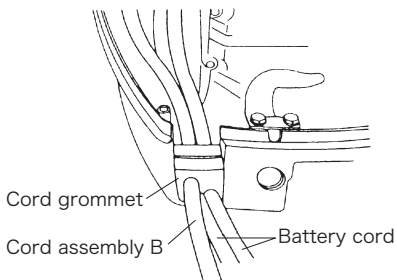
■ **Installation of the Remote Control on your boat :**

Follow the instruction manual provided with the remote control.

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

60/70

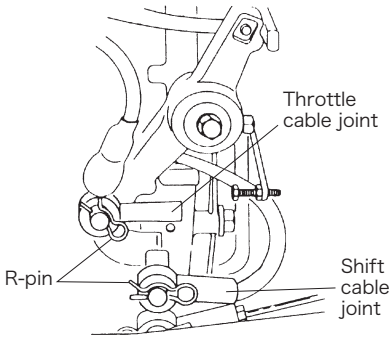
- ① Detach the bracket and set cord assembly B and the remote control cables in position. After fixing the remote control cables to the bracket, re-secure the bracket to the lower cowl.



⚠ CAUTION

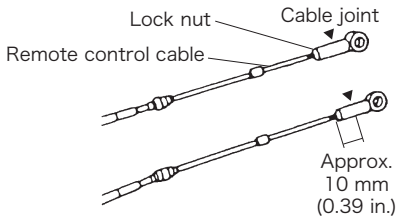
Be careful not to loop the remote control cables to a diameter of 406 mm (16 inches) or less.

- ② Detach the throttle and shift cable joints by removing the R-pins.



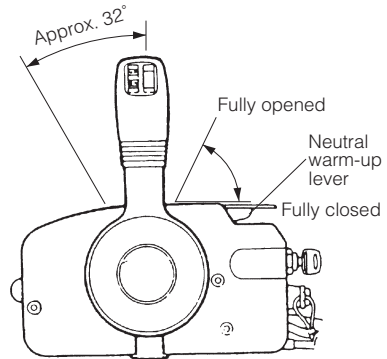
Screw the tip of the remote control cable into the cable joint up to approx. 10 mm (0.39 inch), then lock them with a lock nut. Here, apply grease to the hole of the cable joint.

- ③ Move the remote control lever to the "FORWARD" "NEUTRAL" and "REVERSE" positions to confirm that the shift is working properly, then set the lever to "NEUTRAL".

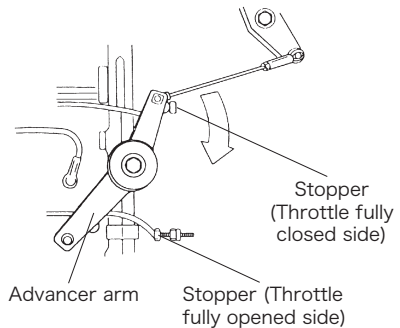


- ④ Double-check that the remote control cables (i.e., the throttle cable and shift cable) have been connected correctly. Move the remote control lever forward

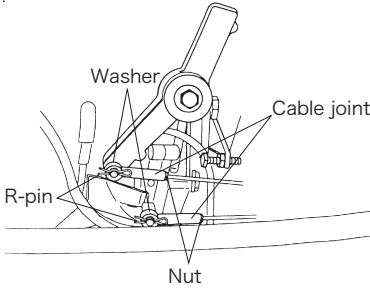
to the first point at which it engages (approx. 32°). The cable which moves first when the lever is turned should be the shift cable. Check that the shift lever is in "NEUTRAL" position and that the neutral warm-up lever is fully closed when the remote control cables have been connected.



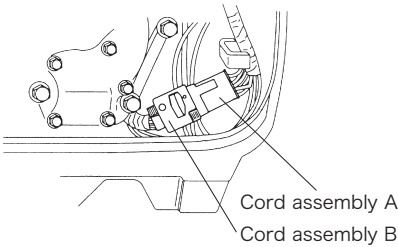
* The advancer arm on the engine should be contact with the stopper of the cylinder crank case assembly so that the throttle valve of the carburetor is to be fully closed condition.



- ⑤ Adjust the cable joints until the hole of each is aligned with the advancer arm pin. After adjustment, lock each cable joint with the nut and secure it with the R-pin.



- ⑥ Connect cord assembly B to cord assembly A. Connect the pink and light-blue leads from cord assembly A and B together.

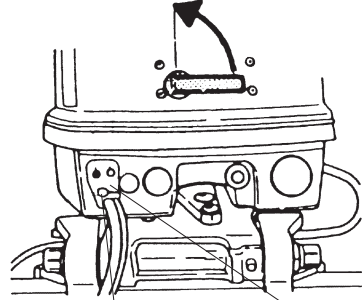


! CAUTION

Do not disconnect the electric couplers while the engine is running, as this will damage the C.D. unit and could result in a serious electric shock.

90

- ① Detach the upper engine cover.



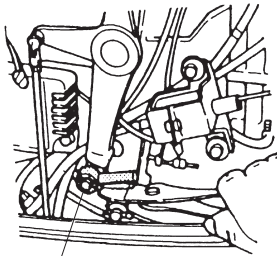
Cord assembly B hole Upper grommet

- ② Detach the upper grommet cord clamp bolt.
- ③ Detach the throttle and shift cable joints by removing the R-pins.

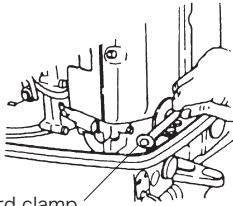
! CAUTION

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

- ④ Move the remote control lever to the “FORWARD” “NEUTRAL” and “REVERSE” positions to confirm that the shift is working properly, then set the lever to “NEUTRAL”.



Cable joint



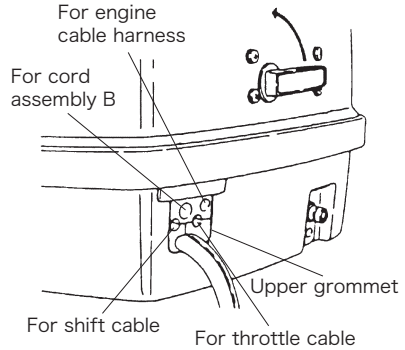
Cord clamp

⚠ WARNING

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

115/120/140

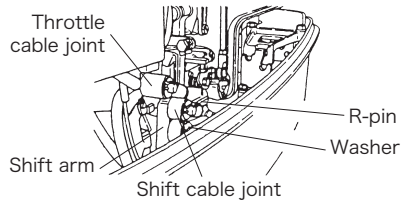
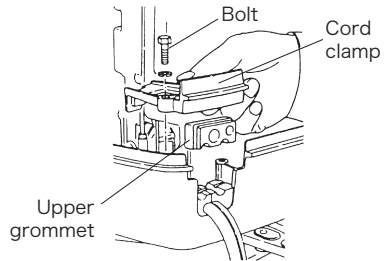
- ① Detach the upper engine cover.



- ② Detach the upper grommet cord clamp bolt.

- ③ Detach the throttle and shift cable joints by removing the R-pins.

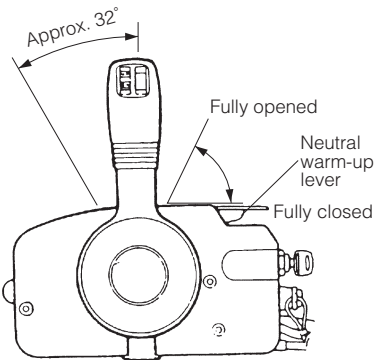
- ④ Move the remote control lever to the “FORWARD” “NEUTRAL” and “REVERSE” positions to confirm that the shift is working properly, then set the lever to “NEUTRAL”.



⚠ CAUTION

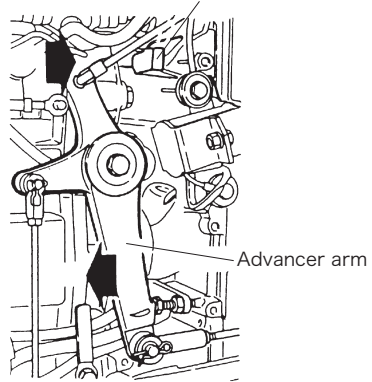
Be careful not to loop the remote control cables to a diameter of 406 mm (16 inches) or less.

- ⑤ Double-check that the remote control cables (i.e., the throttle cable and shift cable) have been connected correctly. Move the remote control lever forward to the first point at which it engages (approx. 32). The cable which moves first when the lever is turned should be the shift cable. Check that the shift lever is in “NEUTRAL” position and that the neutral warm-up lever is fully closed when the remote control cables have been connected.



* The advancer arm on the engine should be contact with the stopper of the carburetor throttle valve to enable it to be fully closed.

Carburetor throttle valve (fully closed side)



- ⑥ Connect cord assembly B to cord assembly A, and connect the meter cord assembly.

⚠ CAUTION

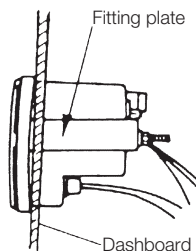
Do not disconnect the electric couplers while the engine is running, as this will damage the C.D. unit and could result in a serious electric shock.

- ⑦ Connect the pink and light-blue leads from cord assembly A and B to each other.
- ⑧ Using the washers and R-pins to adjust the thread length, connect the throttle and shift cables to the pins on the engine-side.
- ⑨ Insert the outer groove of each cable into the cable grip provided in the lower engine cover. (120, 140) Attach the cord clamps and fix the cables securely with the bolts.

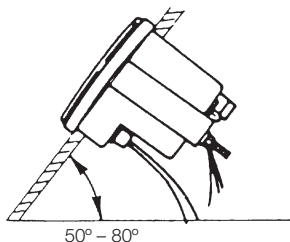
4. Installing the meters

60/70/90

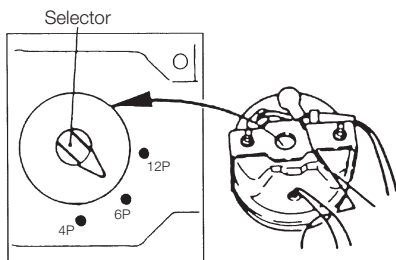
- Install the meters securely in the dashboard where they can be easily read and are not exposed to water splashes. The recommended dashboard thickness is 2 – 11 mm (0.08 – 0.43 in). For dashboards thicker than 11 mm (0.43 in), the fitting plate should be cut accordingly. Be sure to tighten the fitting nuts on the fitting plate evenly.



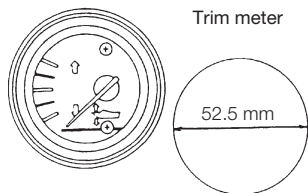
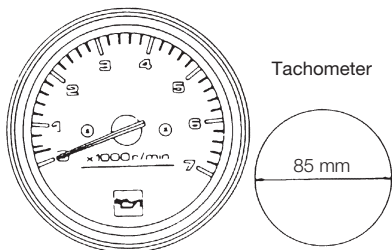
- The dashboard inclination should be $50^{\circ} - 80^{\circ}$.



- Set the tachometer selector knob to "6P".



- Cut a hole 85 mm (3.346 in) in diameter for the tachometer, and a hole 52.5 mm (2.067 in) in diameter for the trim meter.

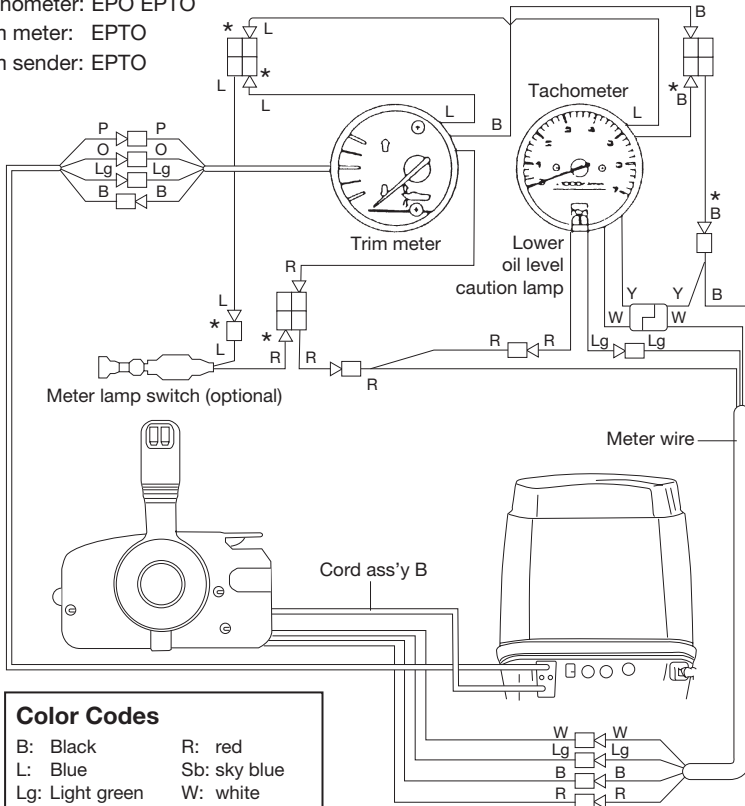


Connection of Leads

Tachometer: EPO EPTO

Trim meter: EPTO

Trim sender: EPTO



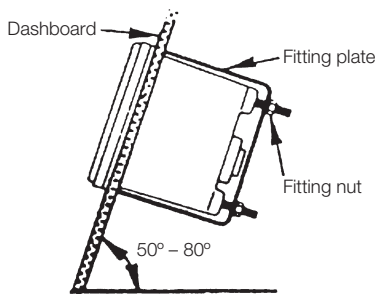
Color Codes	
B: Black	R: red
L: Blue	Sb: sky blue
Lg: Light green	W: white
O: Orange	Y: yellow
P: pink	

Note
 The parts marked with * mark are to be wired when a Meter Lamp Switch (optional) is used.

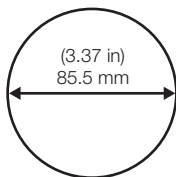
115/120/140

- ① Install the multi-purpose meter securely in the dashboard where the instrument can be easily read and is not exposed to water splashes. The recommended dashboard thickness is 2 – 11 mm (0.08 – 0.43 in). For dashboards thicker than 11 mm (0.43 in), the fitting plate should be cut accordingly. Be sure to tighten the fitting nuts on the fitting plate evenly.

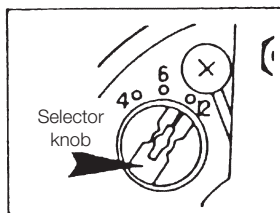
The dashboard inclination should be 50° – 80°.

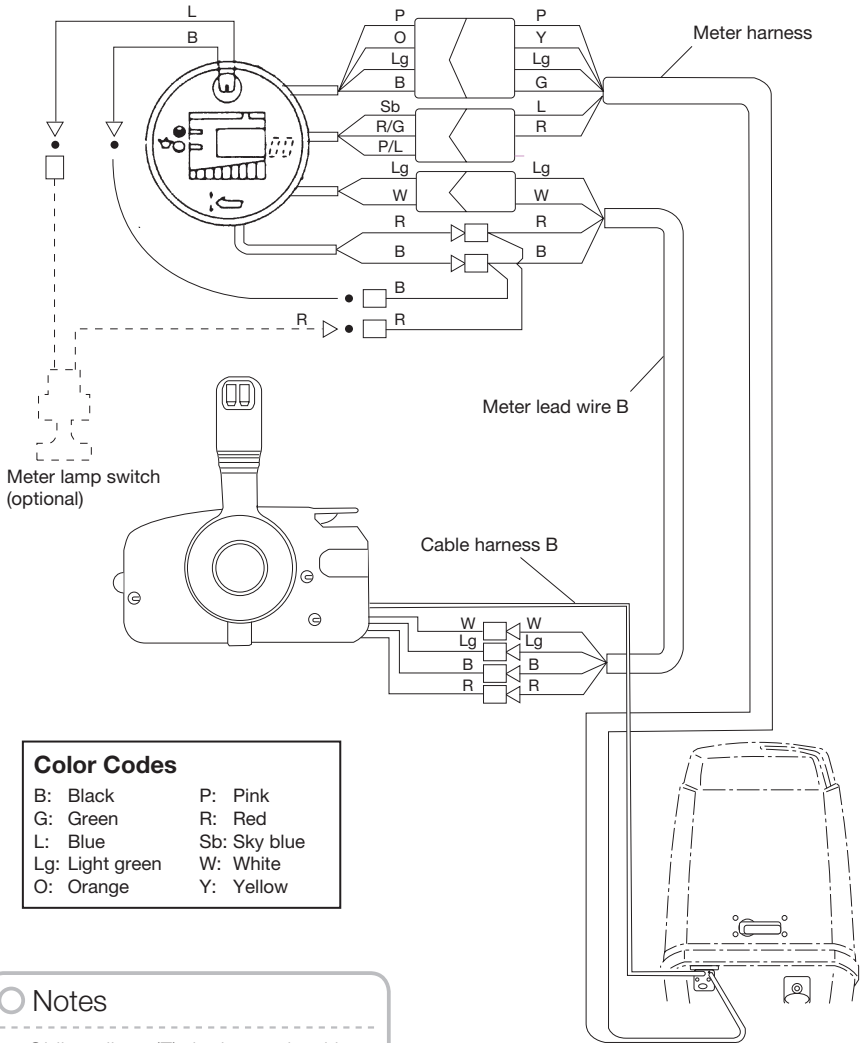


- ② Cut a hole 85.5 mm (3.37 in) in diameter for the multi-purpose meter.



- ③ Set the selector knob at the back of the meter to “12P”.





5. Installing the drag link assembly

(Standard accessories for EPTO and EPO types)

Incorrect or unstable installation of the Drag Link assembly can result in accidents while riding the boat or breakage of the hull.

Installation of the Drag Link Assembly by your dealer is highly recommended.

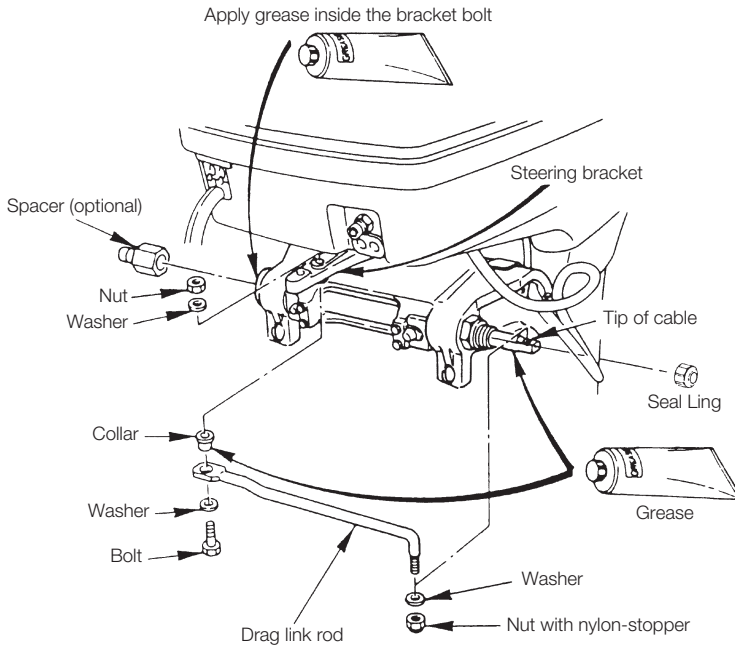
Note

Depending on the steering cable manufacture, spacers (optional) may be required.

- ① Connect the Drag Link rod to the tip of the steering cable. Tighten the rod using the nut with nylon-stopper, making sure the rod can swing freely.
- ② Connect the other tip of the rod to the steering bracket with a bolt, first applying a collar and washer. The bolt head must face downward.

Note

Apply grease in required places.



6. Installing the battery

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 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.

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.

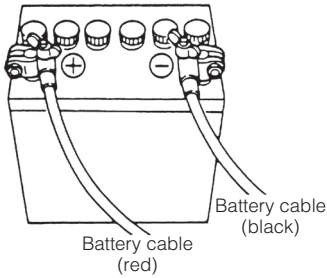
CAUTION

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

CAUTION

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

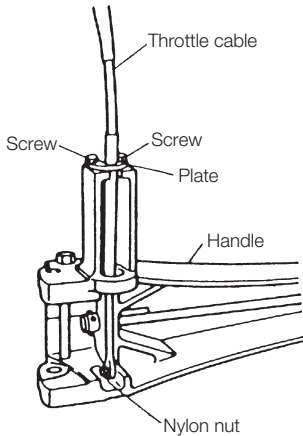
- ① Keep the battery in the designated battery space of the boat. Secure it tightly and make sure it cannot be reached by water.
- ② Connect the positive (+) cord connector (with red tube) to the positive (+) terminal first. Then connect the negative (-) cord connector to the negative (-) terminal. When disconnecting the battery, always disconnect the negative (-) cord first.



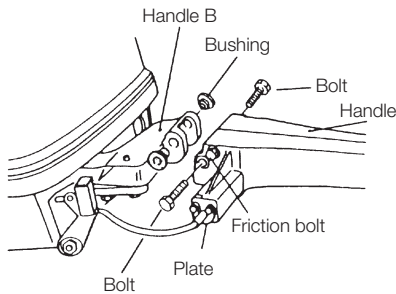
7. Installing the Steering Handle and Main Switch Box

MFG/EFO/EFTO types

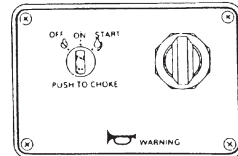
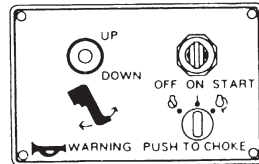
- ① Connect the throttle cable coming from the motor to the handle, then fix it with a nylon nut. After that, place the plate in the outer groove, and fix it with screws.



- ② Install the steering handle to the motor with two bolts.



- ③ Install the main switch box at a place where the driver is able to operate the switches easily. And confirm no obstacles at the cord passage before installing the main switch box. When the cord is excessively long, adjust the length by hauling the cord inside the upper motor cover.



PRE-OPERATING PREPARATIONS

DANGER

Consult an authorized dealer for details on handling of 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 well ventilated area.
- Wipe up any spilled gasoline immediately.

After cleaning gasoline tank :

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

1. Recommended gasoline types


CAUTION

Use of low-quality gasoline results in a short engine life as well as starting difficulties and other engine problems. We recommend use for Fuel stabilizer.

Use of unleaded gasoline

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

Use of alcohol free gasoline

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

<p>Note</p> <p>The adverse effect caused by the alcohol content is more severe with methanol than with ethanol.</p>
--

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

The alcohol component of the gasoline absorbs moisture from the air, which may disturb regular fuel flow in the fuel system, and also accelerate rusting of engine parts.

Mixing of the moisture in the engine oil can also deteriorate the properties of the lubricant.


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

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

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

Fuel tank capacity : 25 liters (6.6 U.S. gal)

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
<p>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.</p>

2. Recommended engine oil

Use a genuine engine oil or recommended one. Refer to your Distributor.

Will not recommend use of other two stroke engine oil.

CAUTION

Do not mix different brands of oil. Mixing different brands of oil, or different types of oil even if the brand is the same, may cause gelling, resulting in possible filter screen blockage. This could result in serious engine damage because of impaired lubrication performance.

4

Note

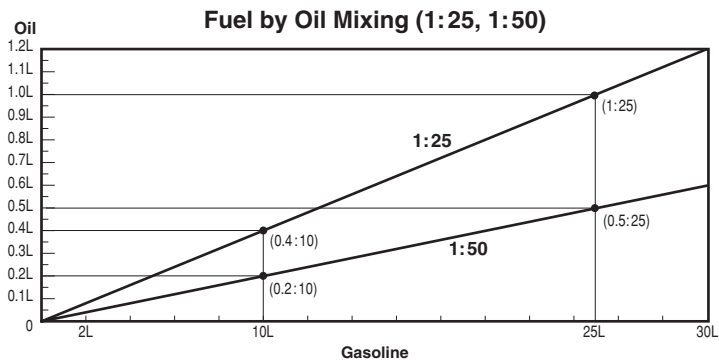
Use of engine oils that do not meet these requirements will result in reduced engine life, and other engine problems.

Non Auto-mixing Model (MFG)

Add engine oil into fuel oil tank. The mixing ratio with gasoline is 1 : 50 (one part oil and 50 parts gasoline). Mix well by hand. The mixing ratio during break-in running is 1 : 25.

Mixing Ratio

	Engine Oil : Gasoline
During break-in	1 : 25
After break-in	1 : 50



Engine oil – gasoline mixing procedure

For quantities of engine oil and gasoline to be pre-mixed, refer to table in previous page.

CAUTION

- Do not use other than two stroke engine oil with specified grade, or the engine may be damaged.
- Do not use fuel prepared in other than specified mixing ratio.
 - Lack of engine oil can cause severe engine trouble such as piston seizure.
 - Excess of engine oil can shorten spark plug life, and/or cause increase of noxious exhaust.

■ When portable fuel tank is used for operation of outboard motor(s):

- ① Pour engine oil into fuel tank, and then, gasoline.
- ② Put cap on the tank, and close tightly.
- ③ Close air vent plug tightly.

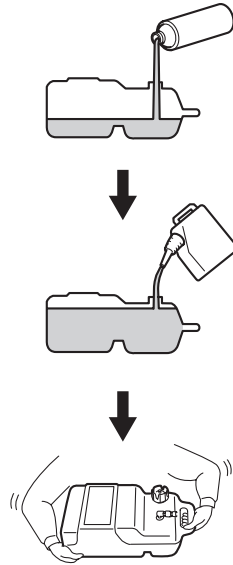
WARNING

Loose cap or air vent plug can cause leak of fuel during shaking the tank.

- ④ Shake the tank to mix engine oil and gasoline well and even.

■ When fuel tank built in the boat is used for operation of outboard motor(s):

- ① Prepare separate fuel container for pre-mixing.




- ② Pour engine oil into fuel container, and then, gasoline.
- ③ Put cap on the container, and close tightly.
- ④ Shake the container to mix engine oil and gasoline well and even.
- ⑤ Pour the mixture into fuel tank.

Notes

- It is recommended to pre-mix by using separate fuel container. Attempting to pre-mix in the fuel tank built-in the boat can make the mixture uneven.
- If built-in fuel tank is used for mixing, pour engine oil into the tank little by little while putting gasoline into the tank.

**Auto-mixing Model
(EFO, EFTO, EPO, EPTO)**

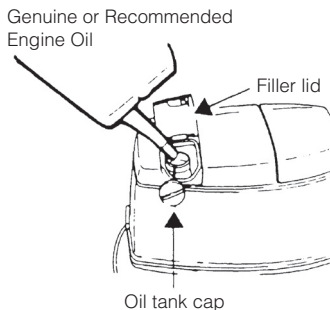
 CAUTION
During break-in of the engine, engine oil must be added to the fuel gasoline in addition to the oil which is automatically supplied from the oil tank.


The required amount of engine oil is automatically supplied from the oil tank, through the oil pump, according to the engine running conditions. Gasoline is fed over a separate feeding line.

Mixing Ratio (during break-in on auto-mixing models)

	Engine Oil : Gasoline
During break-in	1 : 50
After break-in	Automatic. Fill up oil tank regularly.

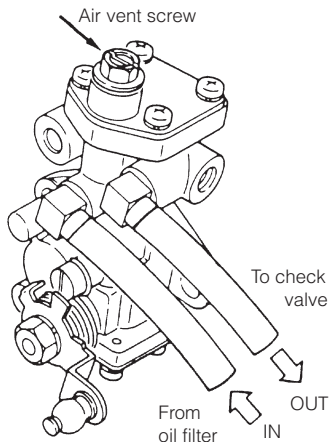
- ① Replenishing oil in the engine oil tank.
1. Open the filler lid of the upper engine cover.
 2. Remove the oil tank cap.
 3. Fill up the tank with Genuine Engine Oil or recommended oil.



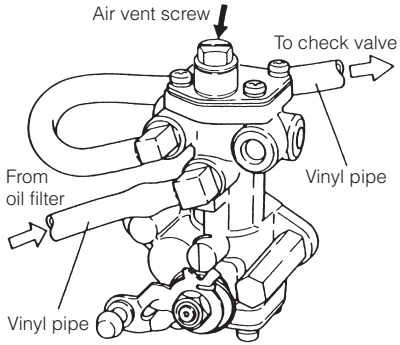
 CAUTION
<ol style="list-style-type: none"> 1. In the unlikely event that gasoline by mistake is filled into the oil tank, drain the oil tank completely, and consult an authorized service shop for advice. 2. Check the amount of oil in the oil tank visually before starting the boat. Running out of oil at sea is a cause for potential disaster.

- ② Oil pump air vent
- Visually check whether there is air in the oil through the vinyl pipe connecting the oil tank with the oil pump. If present, purge the air as follows:
- * Loosen the air vent screw on the oil pump to purge the air, and tighten it when all air, as seen through the vinyl pipe on the oil pump side, has been purged.

60/70



■ 90, 115/120/140




○ Note

Wipe off any spilled oil with a rag, and dispose of it in an appropriate manner.

3. Break-in

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

 CAUTION

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

If any abnormality is experienced during the break-in:

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

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


Note

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

Fuel mix ratio for break-in

Gasoline 25: Genuine Engine Oil 1

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

 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.

ENGINE OPERATION

Before starting

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

1. Starting

WARNING

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

Note

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

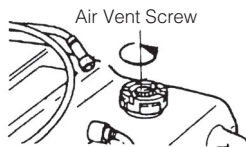
WARNING

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

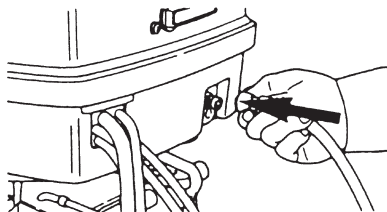
CAUTION

Never fill up portable fuel tanks on board to avoid fire or explosion resulting from spilled gasoline. If gasoline is ever spilled on board, wipe it up thoroughly. Fuel tanks must always be filled up on land.

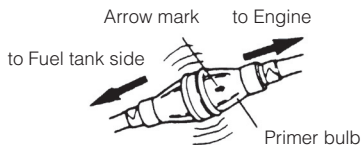
- ① Loosen the air vent screw on the tank cap.



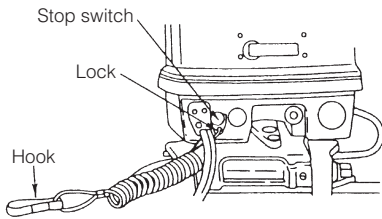
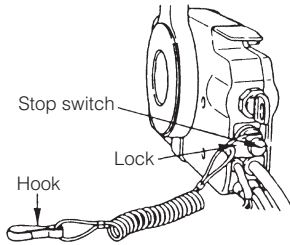
- ② Attach the fuel connector to the engine connector.
The arrow mark on the primer bulb should be facing the engine.



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



- ④ Install the lock in the stop switch.



⚠ CAUTION

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

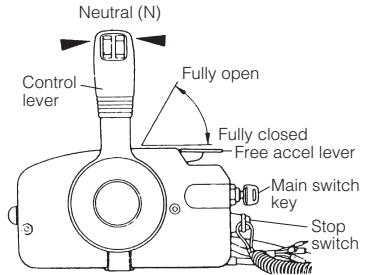
Note

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.

- ⑤ Insert the key into the main switch.

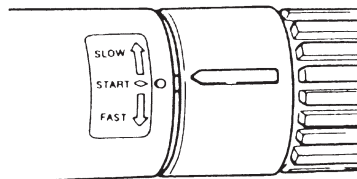
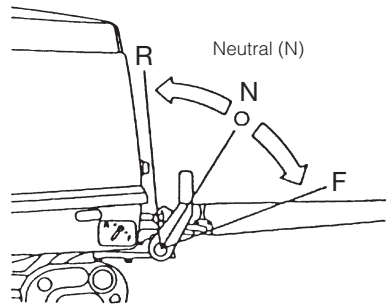
- ⑥ **P Type:**

Set the Remote Control lever to Neutral (N), and move the free accel lever to Open.



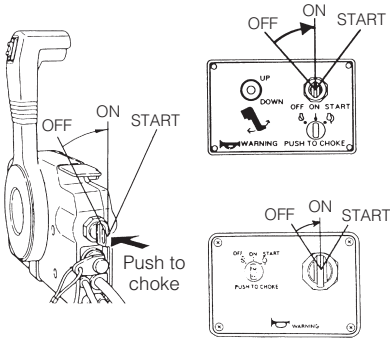
- ⑥ **F Type:**

Place the shift lever in Neutral. Turn the throttle grip to the START position.



⑦ E Type:

Turn the main switch key to ON, and push on it for choke operation. (The key need not be pushed if the engine is warm)

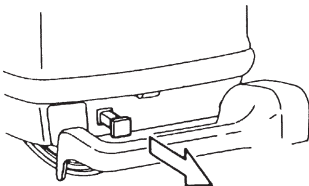


○ Note

For P type: the free accel lever is inoperative unless the Remote Control lever is set to Neutral.

⑦ MF Type:

Pull the choke knob. (Operation of the choke knob is not required if the engine is warm)

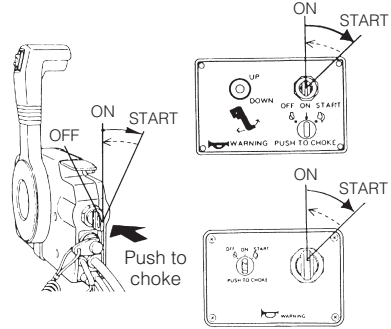


○ Note

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

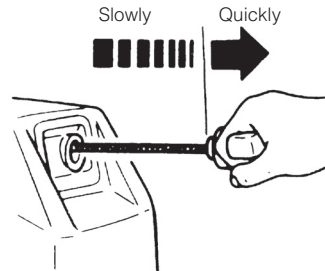
⑧ E Type:

While keeping the key pressed, turn it to START.



⑧ M Type:

Pull the starter handle slowly until you feel engagement, then pull it quickly. Repeat if necessary until started. When the engine starts push back choke knob to the open position.



○ Note

Choke operation is not necessary if the engine is warm.

- ⑨ When the engine starts, release the key and allow it to return to ON. Then return the throttle grip to the “SLOW” position.

⚠ CAUTION

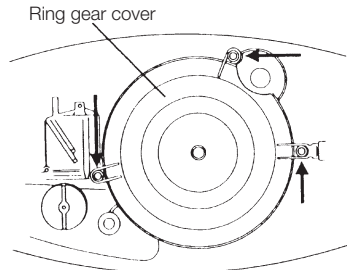
Do not keep turning starter motor for over 3 seconds, or the battery may be consumed, potentially making the engine starting impossible and/or damaging the starter.
 If cranking over 3 seconds fails to start engine, return main switch to "ON", and crank engine again after 5 seconds or more.

5

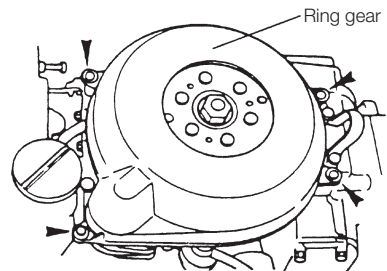
Manual Rope Start

■ **In case of trouble with the Recoil Starter or the Electric Starter Motor:**

- ① Set the shift lever or the remote control lever to Neutral.
- ② Remove the top cowl.
- ③ Take off the ring gear cover, by removing the fixing bolts.

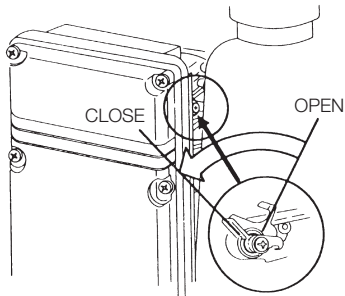


60/70

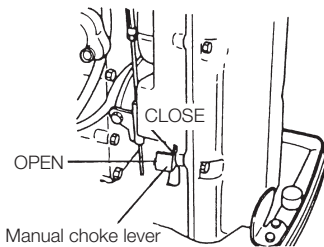


90, 115/120/140

- ④ Move the manual choke lever to the closed position.
 When the engine is warm, turn the manual choke “OPEN” position.

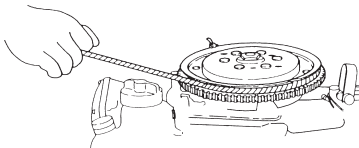


60/70



90, 115/120/140

- ⑤ Turn the main switch key to ON.
- ⑥ Wind the starter rope around the flywheel a few turns. Give it a sharp tug to start the engine. Use a socket wrench or similar to get a firm grip on the end of the rope.



- ⑦ When the engine starts, return the manual choke lever to the open position.

Note

The battery cables must be connected to the battery also when starting the engine manually.

WARNING

- DO NOT re-install the ring gear cover, after the engine has been started using the emergency start procedure.
- When fitting the motor cover upper on the motor, the shift lever should be "NEUTRAL" position.
- Do not continue to use the emergency start procedure for routine engine starting. Contact your dealer to have the starter system repaired as soon as possible.

WARNING

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

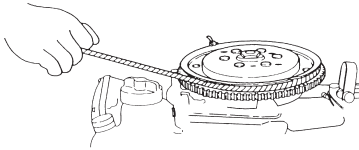
To prevent accident and injury, do not re-attach the recoil starter after the engine has been started using the emergency starter rope. Be sure to put the top cowl back on. Immediately contact an authorized dealer when reaching shore.

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.

■ In case of trouble with the Recoil Starter:

- ① Set the shift lever to Neutral (N).
- ② Remove the top cowl.
- ③ Take off the recoil starter by removing the fixing bolts.
- ④ Pull the choke knob (Operation of the choke knob is not required if the engine is warm.)
- ⑤ Wind the starter rope around the flywheel a few turns. Give it a sharp tug to start the engine. Use a socket wrench or similar to get a firm grip on the end of the rope.



- ⑥ When the engine starts, push back the choke knob to the open position.

! WARNING

- DO NOT re-install the recoil starter, after the engine has been started using the emergency start procedure.
- When fitting the motor cover upper on the motor, the shift lever should be "NEUTRAL" position.
- Do not continue to use the emergency start procedure for routine engine starting. Contact your dealer to have the starter system repaired as soon as possible.

! 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

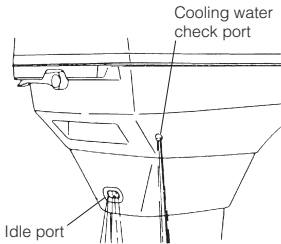
- Be sure that no bystander(s) is within 2 meters from back of starting operator.
- Do not operate the outboard motor with top cowl removed from the power unit, or contacting turning flywheel which can lead to serious personal injury.

2. Warming up the engine

Before driving the boat, let the engine run at low speed for approximately three minutes to let it warm and allow the oil to circulate through the machine. If the engine is not warmed up beforehand, the engine life will shorten greatly. During the warm-up operation, confirm that cooling water is discharged from the check port and idle port.

CAUTION

If the engine is operated without water discharging from the check port or idle 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 speed

Proper idle speed after warm-up operation.

Note

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

Model	Clutch in (In gear)	Clutch off (Out of gear)
60/70	750 rpm	900 rpm
90	700 rpm	900 rpm
115/120/140	700 rpm	900 rpm

CAUTION

Do not shift to "F" or "R" until turning into proper idle speed.

Do not exceed the full-throttle engine speed.

Model	Wide-open throttle rpm range
60/70	5,150 - 5,850 rpm
90	5,000 - 5,500 rpm
115/120/140	5,200 - 5,700 rpm

3. Forward and reverse

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

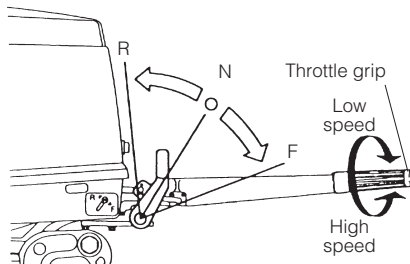
Be sure to connect the emergency tethered stop hook to your waist or clothing. The engine will shut down when the switch lock becomes disconnected from the engine.

○ Note

Do not increase engine speed unnecessarily in reverse.

F type

Turn the throttle grip toward "SLOW" and move the Shift Lever quickly to Forward or Reverse when the engine speed has reached the lowest rpm.



⚠ WARNING

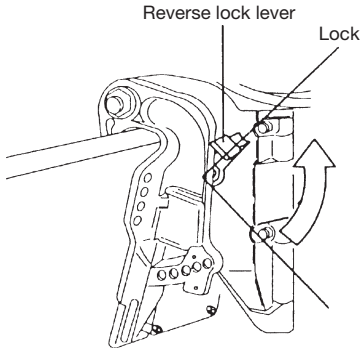
Severe damage, and personal injury, may occur if shifting at high engine speed. Engine must be in the slow idle position before shifting is attempted.

⚠ WARNING

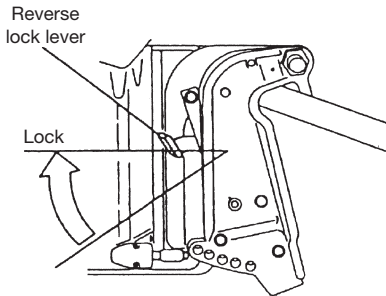
Before shifting, make sure that no swimmer(s) or obstacle(s) is ahead or astern of the boat.

⚠ CAUTION

- Before moving the Shift Lever to Reverse, make sure the Reverse Lock is engaged (in up position).



EFO

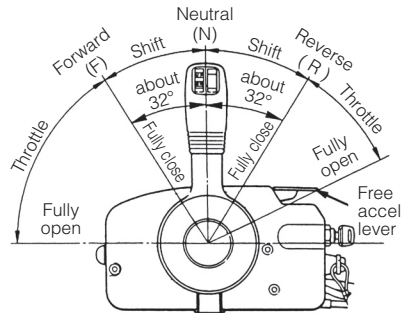
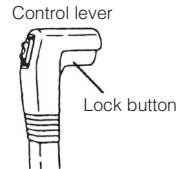


MFG

- Do not increase the engine speed unnecessarily while reversing.
- The Shift Lever cannot be turned from Neutral to Reverse unless the throttle grip has been turned fully toward "SLOW".

P type

While pressing the lock button on the Remote Control lever upward, swiftly move the Lever to Forward (F) or Reverse (R) to the engaging point (approx. 32° forward or backward from Neutral). If the lever is moved further forward or backward, the throttle will open.

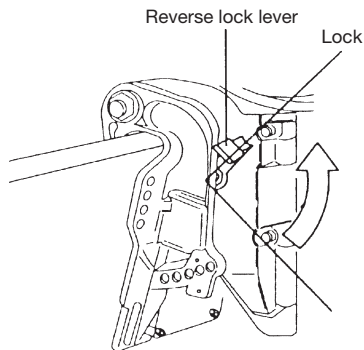


○ Note

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

⚠ CAUTION

- Before moving the Shift Lever to Reverse, make sure the Reverse Lock is engaged (in up position).



EPO

- Do not increase the engine speed unnecessarily while reversing.

○ 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.

4. Shallow water running

⚠ 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 before setting outboard motor to shallow water drive position.

⚠ WARNING

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

⚠ CAUTION

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

EFTO, EPTO type

Shallow water running is available only on the EFTO and EPTO types.

Tilt up the engine using the Power Trim & Tilt system.

5. Stopping the engine

WARNING

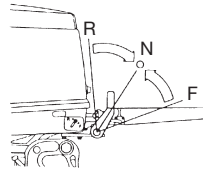
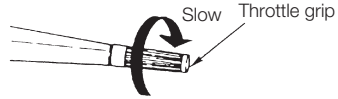
- Do not shift into Reverse during planning, or control will be lost leading to serious personal injury, boat may swamp, and/or hull may be damaged.
- Do not shift into Reverse during cruising, or control may be lost, falling down or causing passenger(s) to be thrown overboard. Leading to serious personal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

CAUTION

Never stop the engine immediately after a full throttle run. Keep it running for two or three minutes at idling speed (Shift Lever set to Neutral) to allow it to cool down.

F Type

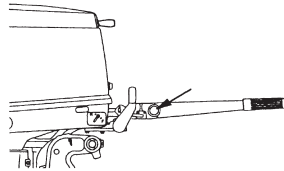
- ① Return the throttle grip to the "Slow" speed position, then shift the shift lever to Neutral (N) position.



- ② Reduce the engine speed to idling rpm.

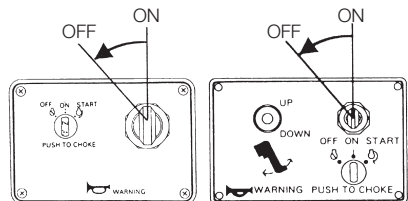
③ M Type

Keep pressing on the Stop Switch or pull out the lock plate. The engine will then stop.



③ E Type

Turn the Main Switch to "OFF", keep pressing on the Stop Switch or pull out the lock plate. The engine will then stop.



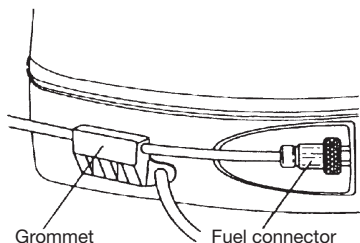
EF/EFO

EFTO

○ 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 cables from the battery if the engine will not be used for an extended period of time.

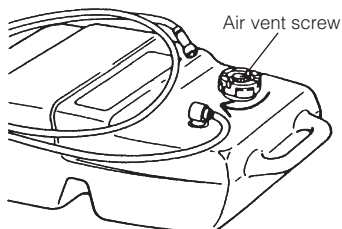
- ④ Disconnect the fuel connector from the engine.



CAUTION

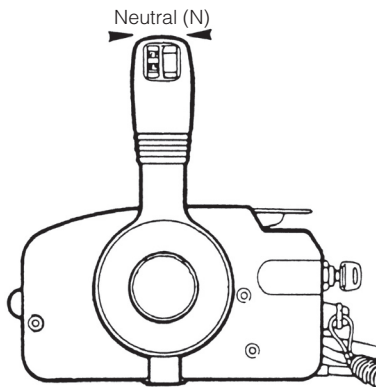
Never fill up portable fuel tanks on board to avoid fire or explosion resulting from spilled gasoline. If gasoline is ever spilled on board, wipe it up thoroughly. Fuel tanks must always be filled up on land.

- ⑤ Close the air vent screw on the fuel tank cap.

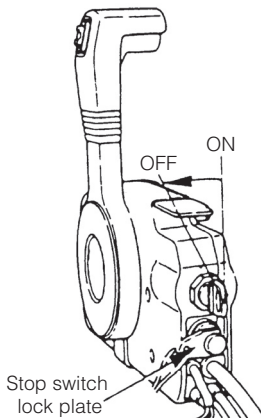


P Type

- ① Move the Remote Control lever to Neutral (N) and let the engine idle for 2-3 minutes to allow it to cool down.



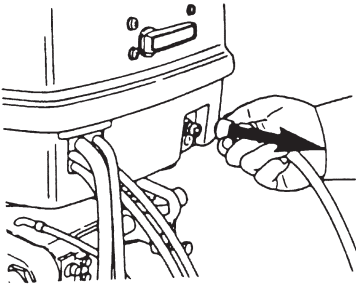
- ② Turn the main switch key counter-clockwise or pull out the stop switch. The engine will stop. The engine can also be stopped by pressing on the stop switch.



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 cables from the battery if the engine will not be used for an extended period of time.

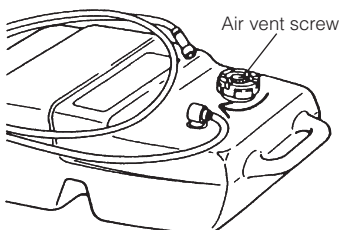
- ③ Disconnect the fuel connector from the engine.



CAUTION

Never fill up portable fuel tanks on board to avoid fire or explosion resulting from spilled gasoline. If gasoline is ever spilled on board, wipe it up thoroughly. Fuel tanks must always be filled up on land.

- ④ Close the air vent screw on the fuel tank cap.



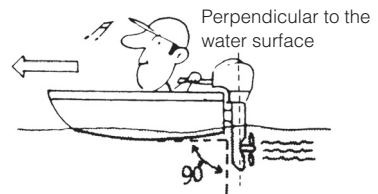
6. Trim angle

The following instructions explain how to set the best trim angle of the boat.

The trim angle is adjusted by setting the thrust rod in the correct thrust rod hole.

■ Proper trim angle

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



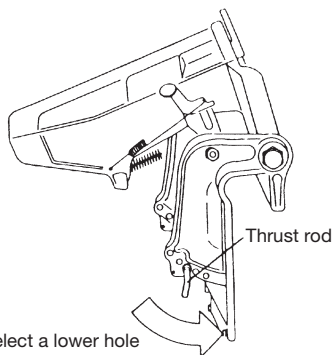
■ Improper trim angle (bow rises too high)

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 setting the thrust rod in a lower hole.



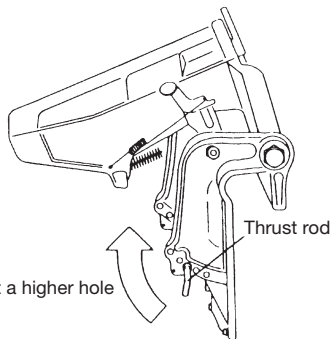
Select a lower hole

■ Improper Trim Angle (bow dips into the water)

If the trim angle is too small, the bow will dip into water, the speed will decrease, and water may enter the boat.



In this case, the trim angle should be increased by setting the thrust rod in a higher hole.



Select a higher hole

! 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.

EFTO, EPTO Type

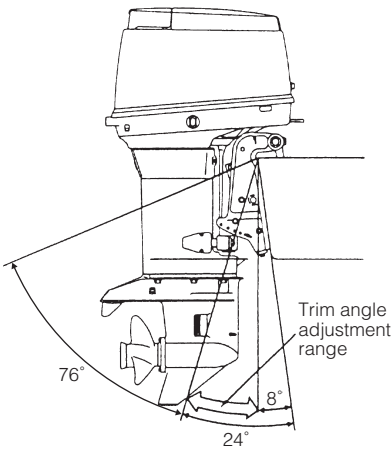
The Provided Power Trim & Tilt can be adjusted to set the desired trim angle of the outboard motor in relation to the transom shape, planing speeds and load. It is imperative that the trim angle is adjusted correctly. Incorrect adjustment will cause the boat to sway, deteriorate engine performance and may cause unsafe steering conditions.

CAUTION

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

■ How to use the trim meter

When the trim angle is set as desired, take a reading off the trim meter, and record it for future reference.

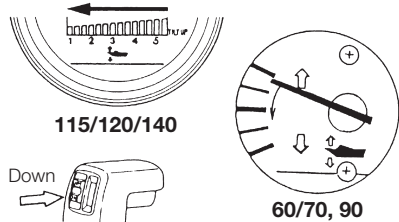


■ Improper Trim Angle (bow rises too high)

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".

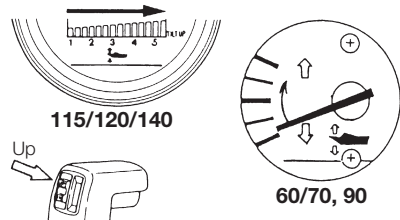


■ Improper Trim Angle (bow dips into the water)

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.

WARNING

- Do not put hand or finger in between outboard motor body and clamp bracket when adjusting trim angle to prevent the body parts from being caught 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.

7. Mooring with the engine tilted up

When the engine has been stopped and it will not be used for a long time or when mooring in shallow water, tilt the engine up to prevent damage to the propeller and gear case.

WARNING

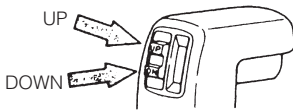
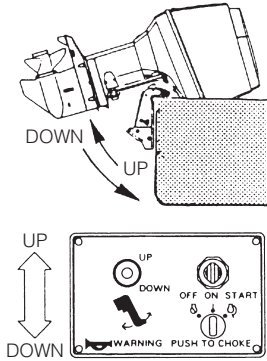
When tilting up or down, be careful not to place your hand between the swivel bracket and the stern bracket. Be sure to tilt the outboard motor down slowly.

Note

Stop the engine before tilting up.

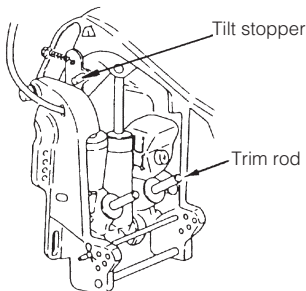
EFTO, EPTO Type**■ Tilt up**

- ① Disconnect that fuel connector from the engine.
- ② Operate the Power Trim & Tilt switch and tilt the engine up.



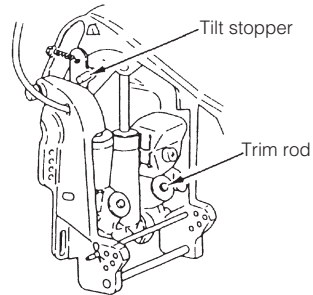
- ③ Lock the tilt stopper.

If the outboard is leaving in the tilt up condition without locking with the tilt stopper, the outboards may be tilted down.



- ④ Operate the Power Trim & Tilt switch to DN to retract the trim rods.

If the trim rods are not retracted shells and other foreign matter may stick to the rods, and could cause damage when the rods are later retracted.

**⚠ 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

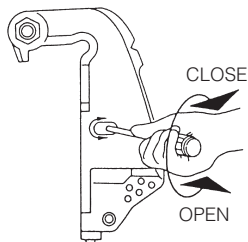
Do not tilt up outboard motor during operation, or engine may be damaged from overheating due to lack of sufficient cooling water.

Tilt down

- ① Operate the Power Trim & Tilt switch to UP.
- ② Unlock the tilt stopper.
- ③ Operate the Power Trim & Tilt switch to DOWN.

Note

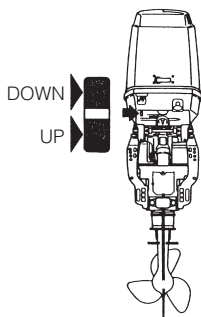
If the battery is dead, and the Power Trim & Tilt switch thus inoperative, turn the manual valve a few turns in the OPEN direction. This will allow manual tilting of the engine. Always lock the engine in the upper position with the tilt stopper.



For reference:

Engine-mounted Power Trim & Tilt Switch (Except 90)

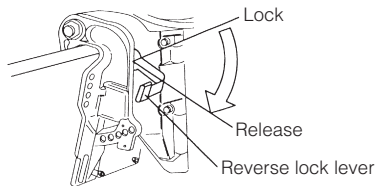
In addition to the Power Trim & Tilt switch installed on the Remote Control lever, a similar switch can be found on the bottom cowl.



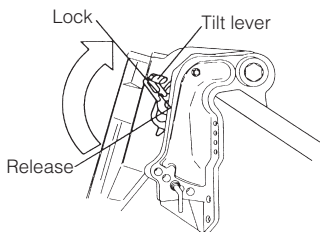
Manual Tilt Type:

Tilt up

- ① Disconnect the fuel connector.
- ② Set the reverse lock lever on the port side to "RELEASE" by turning it downward.



- ③ Set the tilt lever on the starboard side to "LOCK" by turning it upward. Tilt the outboard up entirely. The outboard will be locked automatically in the raised position.



Tilt down

To tilt the engine down, turn the tilt stopper lever downward (toward "RELEASE"). Tilt the engine up slightly and then let it back slowly down. (The reverse lock will be set automatically.)

WARNING

When tilting up or down, be sure that no finger or hand is placed in between the swivel bracket and stern bracket.

Gas Assistant Type:

■ **Tilt up**

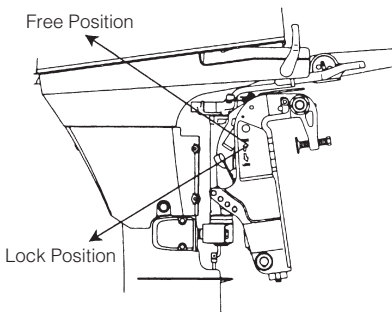
Move (UP) lock lever to “Free” position. Fully tilt up the outboard motor.

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, although the outboard motor is kept in the tilt up position after the lock lever is moved (DOWN) to “Lock” position.

■ **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.



8. Caution while in boating

While in boating, observe the weather and surrounding conditions at all time for safe. Stop the engine and check when you face the following situations:

Situations required emergency stop	Items to be checked
When hitting driftwood or rock*	Check stern bracket bolt for loosening. (Tighten the bolt if it loosens.) Check propeller, gear case, propeller shaft, driveshaft housing, stern bracket, steering handle, etc. for damage.
When the engine rpm suddenly increase*	Check propeller slip and deformation.
When a vinyl sheet or foreign material is caught on the propeller	Remove vinyl sheet or foreign material.
When the cooling water does not discharge or decrease*	Check cooling water intake port for dust, vinyl sheet, etc.
When abnormal vibration and noise are felt and heard*	Check mounting bolts of the outboards, bolts and nuts of each part for loosening, and check propeller deformation.
When the engine rpm suddenly drop*	Check engine over heating, cooling water discharge volume, propeller and related sections, fuel amount in tank and oil amount in oil tank.

* If the engine condition could not recover or remedy, return your boat to a mariner at low speed as much as possible. And consult a dealer for check and servicing the engine.

⚠ CAUTION

If neglected a check for damage and repairing, it may sometimes happen not to be able to run the boat and the outboards.

REMOVING AND CARRYING THE OUTBOARD MOTOR

1. Removing the outboard motor

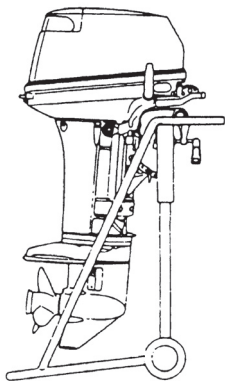
- ① Stop the engine.
- ② Disconnect the fuel connector, the remote control cables, the battery cords, bracket fixing bolts and nuts, etc.
- ③ Remove the outboard motor from the hull and completely drain the water from the gear case.

CAUTION

Do not carry the outboard motor immediately after stopping engine when they are so hot that they burn hands if touched.

2. Carrying the outboard motor

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

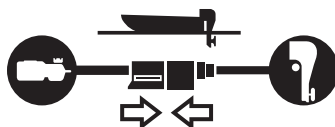
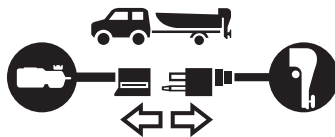


WARNING

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.

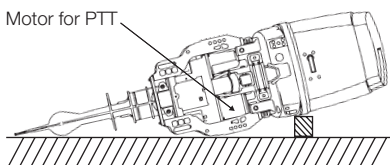
WARNING

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



EFTO, EPTO type

When carrying or putting the engine up for storage, make sure the side with the electric motor of the Power Trim and Tilt is down otherwise air will enter the pump system for the Power Trim and Tilt operation.

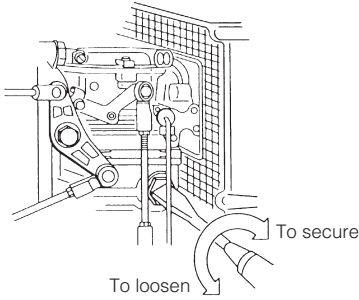


EFO type

Lay the engine with the shift lever up.

Note

If you can not carry the engine in an upright position, loosen the drain screw on the carburetors to drain fuel from them.



CAUTION

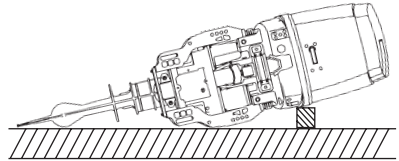
Beware of explosion danger. Spilled and vaped gasoline may easily catch fire and explode. Be sure to fully discharge gasoline from the carburetors when transporting the engine. Wipe off spilled gasoline with a rag.

3. Storing the outboard motor

Keep the motor in a vertical position when you store it.

Note

If you store the motor in a horizontal position, lay the motor as shown in figure of below.

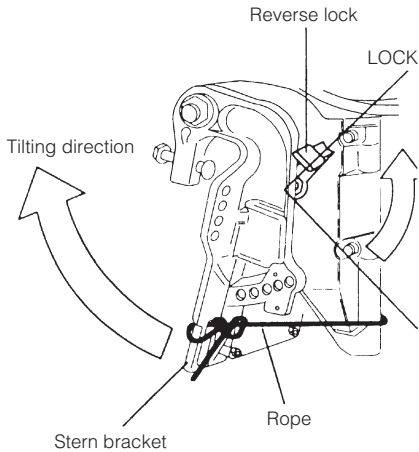


EF, EFO, EPO Type

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.

- * 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 clamp bracket.



6

⚠ 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.



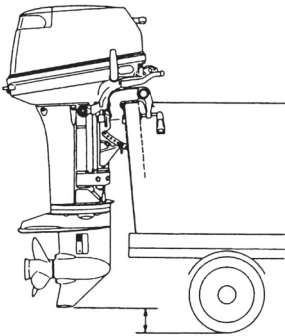
TRAILERING

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.



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.

WARNING SYSTEM

1. Outline

This outboard warns of engine trouble using the following three ways.

- ① Warning buzzer
- ② Illumination or flashing (115/120/140) / Illumination (60/70) of warning lamp
- ③ Engine RPM limitation

The warning system includes the following functions.

- ① Overheat sensor that checks cylinder temperature.
- ② Water pressure switch that checks pressure of cooling water. The switch functions with engine speed over 2800 rpm. (60/70: option)

- ③ Oil level sensor that informs oil level in the tank at 3 liters and 1.5 liters. (115/120/140) / at 0.7 liters (90) / at 0.5 liters (60/70).
- ④ Warning buzzer that is built in the remote control box. The buzzer can be activated only in forward or reverse shift, and not in neutral.
- ⑤ Warning a lamp that is built in the MULTI-PURPOSE METER. (115/120/140) / Tachometer (60/70, 90).
- ⑥ ESG (engine revolution limiter) that is built in the CDI unit. The device limits engine rpm according to the case.

2. Troubleshooting at warning

Use the following table to pinpoint trouble in case the warning system functions.

115/120/140

Buzzer	Lamp	RPM limitation (approx.)	Trouble	Action
On	None	2,800	Cooling water intake is clogged	A
On	Overheat lamp flashes.	None	Engine overheats	A
On	Lower oil level indicator B flashes	2,800	Remaining oil, less than 1.5 liters	B
Off	Upper oil level indicator A illuminates	None	Remaining oil, less than 3 liters	B
Off	"X 1000RPM" indicator flashes	6,000	Over-revolution	C
Off	Engine speed indicates "00"	1,500	Incorrect connection of cord assembly B	D

60/70, 90

Buzzer	Lamp	RPM limitation (approx.)	Trouble	Action
On	None	3,500	Cooling water intake is clogged	A
On	None	3,500	Engine overheats	A
On	Oil level indicator illuminates	None	Remaining oil, less than 0.7 liters (90) / 0.5 liters (60/70)	B
Off	None	5,900 (90) 6,150 (60/70)	Over-revolution	C

3. Corrective actions at warning

Take one of the following actions as applicable, in case a warning condition has occurred.

A Buzzer and RPM Reduction: Overheat Warning or Water Intake Clogged Warning

1. Shift into neutral.
2. Check that cooling water is running out of the check port.
3. If no water is running out, check if the water intake is clogged.

B Buzzer and Lamp: Low Oil Warning

1. Shift into neutral.
2. Turn the main switch off.
3. Fill the oil tank.
4. Turn the main switch on to check if the buzzer and lamp are off.

C Engine RPM is limited to approximately 6,000 and "X 1,000 RPM" indicator flashes. (115/120/140) / to approximately 5,900 rpm (90) / to approximately 6,150 rpm (60/70).

Over-revolution protection function is turned on.

Notes

This function may be turned on in case a propeller has run out of the water.

In such a case, the function will be turned off automatically after the propeller gets into the water again.

1. Shift into neutral.
2. Check the propeller for damage. In case the propeller is damaged, return to port immediately at a low or medium speed to replace it with new one. If the propeller is not damaged, go to step 3. (The propeller pitch may be unfit for the outboard.)
3. Replace the current propeller with a proper pitch. For selection of the propeller, consult with the dealer.

D Engine RPM is indicated "00" and limited to approximately 1,500. (115/120/140)

Red / yellow lead of cord assembly B. (For location of the lead, refer to WIRING DIAGRAM of this manual) is not connected.

1. Shift into neutral.
2. Turn off the engine.
3. Check if the lead is connected.

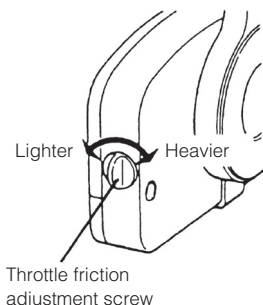
ADJUSTMENT

1. Remote control lever load

EPO, EPTO

(Throttle friction adjustment screw)

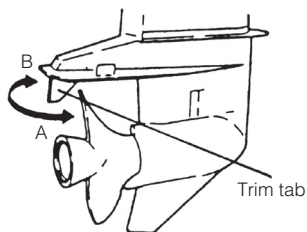
To adjust the load of the remote control lever, turn the throttle friction adjustment screw on the front of the remote control Box. Turn clockwise to increase the load and counter-clockwise to decrease it.



2. 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. Due to corrosion, the trim tab will wear down over time.

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.

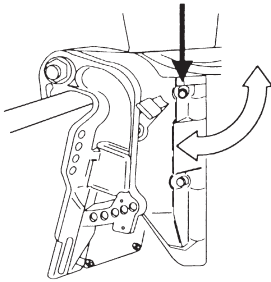
3. Steering load adjustment

EFO/EPO

Steering load can be adjusted by turning the steering adjust bolt on the Swivel Bracket.

Turn clockwise to increase load

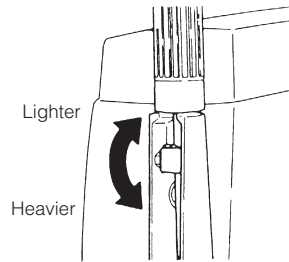
Turn counter-clockwise to decrease the load



4. Throttle grip turning load adjustment

EF/EFO/EFTO/MFG

Turn the friction adjustment screw on the steering handle to adjust the turning load of the throttle grip.



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.

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.



1. Daily inspection

Perform the following checks before and after use.



WARNING

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

Item	Points to Check	Action
Fuel System	<ul style="list-style-type: none"> • Check the amount of fuel in the tank. • Check for dust or water in the fuel filter. • Check rubber pipes for oil leakage. 	Replenish Clean Replace
Lubrication System	<ul style="list-style-type: none"> • Check the amount of engine oil in the oil tank. • Check for dust or water in the oil filters. 	Replenish Clean
Electrical Equipment	<ul style="list-style-type: none"> • Check the spark plugs for dirt, wear and carbon built-up. Spark plugs : NGK BR-8HS-10 (1.0mm gap) (0.0394 in) • Check if the main switch functions normally. • Check if the battery electrolyte level and specific gravity are normal • Check for loose connections on battery terminal. • Check if the stop switch functions normally and make sure the lock plate is present. • Check cords for loose connections and damage. 	Clean or replace Remedy or replace Replenish or recharge Retighten Remedy or replace Correct or replace
Throttle System	<ul style="list-style-type: none"> • Check that the choke solenoid and valve for the carburetor works normally. • Check if the carburetor and magneto work normally when turning the throttle grip, and also check links for looseness. 	Replace Correct
Clutch and Propeller System	<ul style="list-style-type: none"> • Check if the clutch engages correctly when operating the Remote Control. (or Shift lever) • Check the propeller for bent or damaged blades. • Check if the propeller nut is tightened and the split pin is present. 	Adjust Replace
Installation of Motor	<ul style="list-style-type: none"> • Check all the motor installation bolts with the boat. • Check the thrust rod installation. 	Tighten Tighten
Power Trim & Tilt	<ul style="list-style-type: none"> • Check working of the tilt up and down of the motor. 	
Cooling Water	<ul style="list-style-type: none"> • Check that cooling water is discharged from the cooling water check port after the engine has started. 	
Tools and Spares	<ul style="list-style-type: none"> • To be prepare tools and spare parts for replacing spark plugs, propeller, etc. • Check if the spare rope is provided. 	
Steering Devices	<ul style="list-style-type: none"> • Check working of steering handle and remote control. 	
Other Parts	<ul style="list-style-type: none"> • Check if the anode and trim tab are securely installed. • Check the anode and trim tab for corrosion and deformation. 	Repair if necessary Replace

Washing with fresh water

When the engine has been used in salt water or polluted water, wash the exterior and flush the cooling passage with fresh water using the flushing attachment.

Screw the included flushing attachment into the wash hole on the gear case.

Connect a water hose to the flushing attachment and flush out with water.

(Be sure to secure the water inlet and sub-water inlet on the gear case beforehand.)

⚠ CAUTION

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

⚠ WARNING

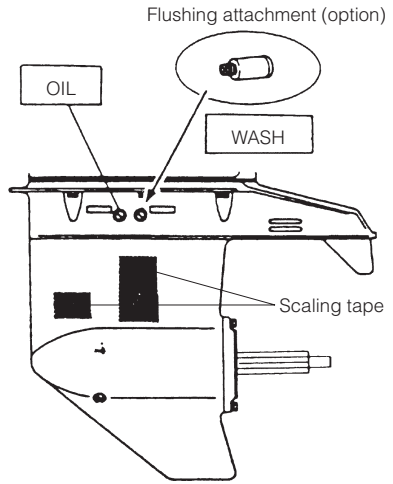
Do not start engine without removing propeller, or accidentally turning propeller could cause personal injury.

⚠ 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.

Note

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



⚠ CAUTION

Keep engine at idle speed during flushing.

Wash the engine before long-term storage.

Run the engine at low speed with the Remote Control lever (or Shift lever) set to Neutral to flush out fresh water from the cooling system and in the process remove salt, mud and other foreign particles.

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 Pull out the split pin and remove the propeller nut and washer.
- ② Remove the propeller by pulling toward you.

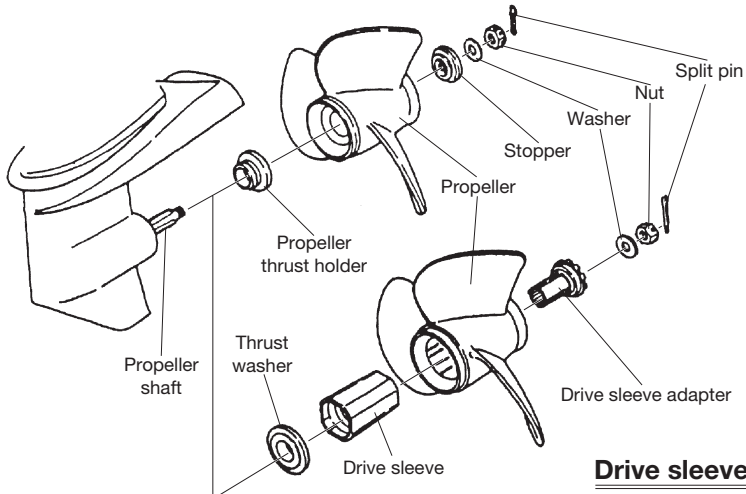
- ③ Apply genuine grease to the propeller shaft before mounting the new propeller.
- ④ Fit the washer, securely tighten the nut and insert the split pin.

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.



Drive sleeve type

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.

Note

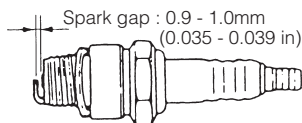
When inspecting the plug, always clean the gasket surface and use a new gasket. Wipe off any dirt from the threads and screw in the spark plug to the correct torque.

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.

- ① Remove the top cowl.
- ② Remove the spark plugs by turning counter-clockwise with the socket wrench (21 mm: 13/16 in) fitted with the handle. Tap lightly on the spark plugs if they are hard to turn.

Use spark plug NGK B8HS-10 or BR8HS-10.

**Notes**

- Spark plug torque :
27.0Nm (20ft-lb) (2.7kgf-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.

CAUTION

Do not touch the high tension cords running from the ignition coil to the spark plugs while the engine is running or is turned by the electric starter motor, not even for testing the high tension cords or the spark plugs. The high tension cords and the spark plugs generate very high electric voltage, which can cause a serious electric shock if touched.

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. For periodic inspection and maintenance, consult your servicing dealer.

Item		Servicing Interval			Action	Remarks
		10 hours or 1 month	50 hours or 3 months	Every 100 hours or 6 months		
Fuel System	Carburetor*	●		●	Strip, clean and adjust. Adjust idling.	
	Fuel filter	●	●	●	Check and clean.	
	Piping			●	Check and Replace.	
	Fuel tank	●	●	●	Clean.	
Ignition	Spark plugs	●	●	●	Check gaps. Remove carbon deposits or Replace.	
	*Ignition timing	●		●	Adjust timing.	
Starting System	Starter motor*			●	Check for salt deposits and battery cable condition.	
	Battery	●	●	●	Check Installation, fluid quantity, gravity.	
	Starter rope	●	●	●	Check for wear or damage.	
Lower Unit	Propeller	●	●	●	Check for bend blades, damage, wear.	
	Gear oil	●	●	●	Change or replenish-oil and check for water leaks.	
	Water pump*		●	●	Check for wear or damage.	Replace impeller every 12 months.
Bolt and Nuts		●	●	●	Retighten.	
Sliding and Rotating Parts Grease Nipples			●	●	Apply and pump in grease.	
Power Trim & Tilt*		●		●	Check power unit oil level and refill. Check function of manual release valve.	
Engine Oil System*	Oil Tank				Check for leakage, damage, position of clips and filter conditions	Repair or consult your dealer
	Oil Pipe	●		●		
	Oil Filter					
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.

Cleaning the fuel filters and the fuel tank

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 authorized dealer for fuel system services. Services by unqualified person could lead to engine damage.

10

Fuel filters are provided inside the fuel tank and on the engine.

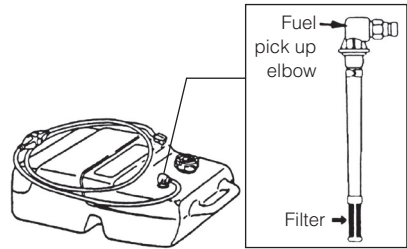
Fuel filter (for fuel tank)

Loosen a Fuel Pick-up Elbow and remove it. Then clean the Fuel Filter.

Fuel tank

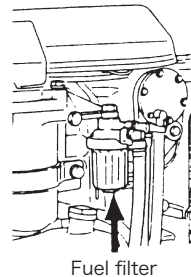
Water or dirt in the fuel tank may cause engine problems.

Clean the tank at specified times or after long time storage (over three months).



Fuel filter (for engine)

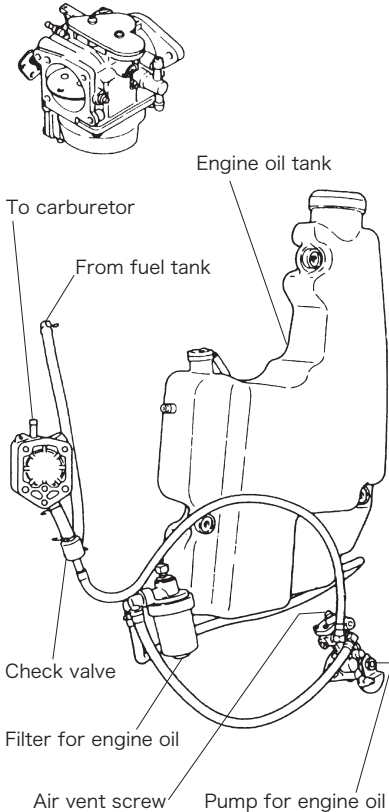
Remove the cap, then clean the fuel filter in the engine.



Cleaning Engine Oil Line

Oil filter and oil tank. Check the oil tank and/or filter for entrapped water and dust.

- ① Disconnect all pipes between the oil tank and oil pump.
- ② Clean out foreign matter.
- ③ Refit the pipes to the oil tank and pumps, and then fill up with new engine oil.
- ④ For air purging, refer to Item No. 5: Fuel and Engine Oil.

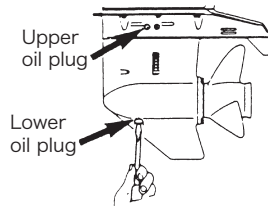


Replacing gear oil

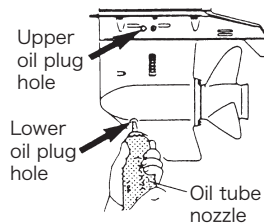
WARNING

- 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.

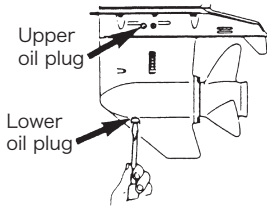
- ① Remove the oil plugs (upper and lower), and completely drain the gear oil into a pan.



- 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.



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



⚠ CAUTION

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

Note

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

Note

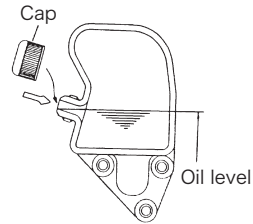
Use only genuine or recommended gear oil or, if not available, an API (American Petroleum Institute) oil grade of GL5 SAE #80 – SAE #90.
 Required volume :
 60/70 approx. 700 mL (23.60 U.S. fluid oz)
 90/120/140 approx. 900 mL (30.40 U.S. fluid oz)

Checking and Refilling Oil in the Power Trim & Tilt Unit.

Oil level

Check the oil level of the reservoir tank as shown below while the tank is kept in a vertical position. Tilt the engine up to check the oil level.

Remove the oil cap by turning counter-clockwise, then check if the oil level reaches the bottom line of the cap 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 fully unscrew the oil plug with the engine tilted down. Pressurized oil in the oil tank may spurt out.

■ Recommend oil

Use an automatic transmission fluid approved by GM.

Recommended oils are as shown below.

- MOBIL : MOBIL DTE #22, MOBIL ATF 220
- SHELL : SHELL DEXTRON-II, SHELL TELLUS OIL #22 K22
- ESSO : ESSO AUTOMATIC TRANSMISSION FLUID

Oil filter and oil tank. Check the oil tank and/or filter for entrapped water and dust.

■ 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.

3. Off-season storage



WARNING

- When the motor is out of the water, being transported, or in storage, always remove the negative (-) battery cable to prevent accidental starting of the engine. Accidental starting when the motor is out of the water will cause water pump failure, overheating and damage to the engine due to a lack of cooling water.
- DO NOT disconnect the electrical harness when operating the motor. This model will continue to run and can be started with the electrical harness disconnected. Remove all spark plug connectors from the spark plugs when servicing the engine or propeller.

When your outboard motor is in storage, this is a good opportunity to have it serviced or overhauled by your dealer.

■ Engine

- ① Wash the engine exterior and flush the cooling water system thoroughly with fresh water. Let the water drain completely.
Wipe off any surface water with an oily rag.
- ② Drain all fuel from the fuel pipes, fuel pump and carburetor, and clean these parts. To prevent corrosion of the fuel tank, fill it up with engine oil-rich gasoline.

Keep in mind that if gasoline is kept in the carburetor for a long time, gum and varnish will be generated, causing the float valve to stick.

- ③ Remove the spark plugs and feed genuine engine oil or storage fogging oil through the spark plug holes.

The oil will be fed into the crank case from the air silencer attached to the carburetors. Turn the engine over several times while feeding the oil into it and make sure it is evenly distributed.

- ④ Apply grease to the propeller shaft.
- ⑤ Change the gear oil in the gear case.
- ⑥ Apply grease to all sliding parts, joints, nuts, and bolts.
- ⑦ Use a dry cloth to completely wipe off water and salt from the electrical components.
- ⑧ Remove the fuel connector from the engine.
- 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 cords.
- ② Clean the exterior of the battery with fresh water or compressed air. Wipe off any chemical deposits, dirt and grease from the battery.
- 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 with its cover attached.

⚠ CAUTION

- Do not allow the battery to discharge, since it can be damaged by freezing.
- When storing your outboard for the winter, open up all the water drain holes in the gear case to permit any remaining water to drain out. If a speedometer is installed, disconnect the pickup tube and allow it to drain, then reconnect it after draining. Trapped water may crack the gear case or water pump case as a result of expansion when frozen. Check and replenish the gear case with case specified Gear Oil before storing the motor, to avoid water leakage into the gear case due to a loose lubricant vent plug or grease fill plug. Inspect the gaskets under the lubricant vent and grease plugs, replace them if necessary, and reinstall the plugs.

■ **Electric Starter Motor**

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

4. Pre-season check

Have your dealer check the engine before the season starts, or if you prefer, be sure to check the following items yourself:

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

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

- ② Check that the battery is secure and the battery cables are properly installed.
- ③ Clean the engine oil filter.
- ④ Purge air in the vinyl pipe connecting the oil tank to the oil pump.
- ⑤ 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.)

CAUTION

The following steps must be taken when first using the engine after pre-season storage.

- In addition to the oil in the oil tank, mix engine oil with the fuel in the following mixing ratio and fill up the fuel tank completely with 25 liters (6.6 U.S. gal.):
Mixing ratio : Gasoline 50 : 1 Engine oil
Use unleaded gasoline and genuine Outboard Motor oil. If this oil is not available, use another NMMA TC-W3 certified outboard motor oil from another manufacture.
- Purge any air from the oil filter assembly.
- Warm up the engine for 3 minutes with the remote control lever in "NEUTRAL" position.
- Run the engine for 5 minutes at the slowest speed.
- Run the engine for 10 minutes at the half speed,
In steps 2 and 3 above, the oil used for winter storage inside the engine will be cleaned out, and optimum performance will be assured.
- When the full volume, 25 liters (6.6 U.S. gal.), of gasoline mixed with oil has been used, fill up the tank with pure gasoline only. (For the auto-mixing types)

5. Checking after striking underwater object

Striking sea bottom or underwater object may severely damage the outboard motor.

Immediately bring the outboard motor to your 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 nuts, power trim and tilt bolts, and mount rubber cap bolts.

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

- ② Deformation and damage of mount rubber, tilt stopper, thrust rod, gears and clutch, and propeller.

Ask to replace damaged or deformed parts.

6. If the engine becomes submerged in water

After pick up, immediately bring the outboard to your dealer.

Following are the emergency measures to be taken on the submerged outboard.

- ① Take it out of water immediately and wash it with fresh water to remove all traces of salt and dirt.
- ② Remove the spark plugs, and drain the engine completely of water. Turn the flywheel several times, using the starter rope.
- ③ Inject a liberal amount of genuine engine oil or storage fogging oil into the engine through the spark plug holes and the air silencer. Turn the flywheel several times with the starter rope while injecting the oil to make sure the oil is evenly distributed.
- ④ After the above steps, it is still possible for the internal engine parts to be damaged. The electrical components and carburetors will soon deteriorate and become inoperative. Therefore, be sure to have the engine completely overhauled by a service shop immediately.

CAUTION

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

7. Precautions in cold weather

When morning in cold weather at sub-zero temperatures the water in the cooling water pump may freeze and severely damage the pump, impeller, and associated parts. To avoid this, submerge the lower half of the engine into the water, or tilt the engine and operate the electric starter motor for 5 seconds with the stop switch lock plate taken away to allow the water to drain completely.

TROUBLESHOOTING

If you encounter problem with the engine, check the list below and locate the problem you are experiencing. Then follow the suggested remedies.

Do not hesitate to contact your dealer, as professionals advice and assistance is the best way to keep the engine in optimum condition.

Difficult to start engine	Engine starts, but stops soon	Poor idling	Unstable engine running speed or engine stops	Abnormally high engine speed	Abnormally low engine speeds	Cannot obtain high engine speeds	Overheating of engine	Power Trim & Tilt inoperative	
●	●		●						Empty fuel tank
●	●	●	●		●	●	●		Incorrect connection of fuel system
●	●	●	●		●	●	●		Air enters fuel line
●	●	●	●		●	●	●		Deformed or damaged fuel pipe
●	●	●	●		●	●	●		Closed air vent on fuel tank cap
●	●	●	●		●	●	●		Clogged fuel filter, fuel pump or carburetor
		●	●		●	●	●		Use of improper engine oil
●	●	●	●			●	●		Use of improper gasoline
●	●								Excessive supply of gasoline
●	●	●	●		●	●	●		Poor carburetor adjustment
●	●	●	●			●	●		Recirculation pipe broken
●	●	●	●		●	●	●		Use of non-specified spark plugs
●	●	●	●		●	●			Dirt or carbon deposits on spark plugs
●	●	●	●		●	●			No sparks or weak sparks
			●		●	●	●		insufficient cooling water flow

Difficult to start engine	Engine starts, but stops soon	Poor idling	Unstable engine running speed or engine stops	Abnormally high engine speed	Abnormally low engine speeds	Cannot obtain high engine speeds	Overheating of engine	Power Trim & Tilt inoperative	
		●	●			●	●		Faulty thermostat
				●		●	●		Propeller cavitation
				●	●	●	●		Incorrect propeller selection
		●		●	●	●	●		Damaged or bent propeller
				●	●	●	●		Unbalanced load in boat
				●		●	●		Transom too high
					●	●	●		Transom too low
●	●	●			●	●	●		Incorrect adjustment of throttle link
●	●	●			●	●	●		Incorrect adjustment of ignition timing
●									Insufficient battery capacity, loose terminals, corrosion
●									Faulty ignition switch or Power Trim & Tilt switch
●									Remote Control lever not set to Neutral
●									Safety switch lock plate not fitted
●								●	Incorrect wiring disconnected or broken wire
●									Starter motor failure
								●	Air in power trim & tilt unit

TOOL KIT AND SPARE PARTS

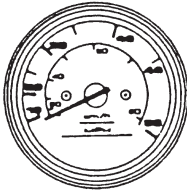
The following a list of the tools and spare parts provided with the motor.

Items		Quantity	Remark
Service Tools	Tool Bag	1	
	Pliers	1	
	Socket Wrench	1	10 X 13mm
	Socket Wrench	1	21mm
	Socket Wrench Handle	1	
	Screwdriver (Phillips-type and flat head)	1	Adapter-type
Spare Parts	Emergency Starter Rope	1	1,600 mm
	Spark Plug	2	NGK BR8HS-10
	Split Pin	1	Diameter x length = 3 x 25 mm
Parts Packaged with Engine *	Bracket Fixing Bolt	4	12 mm
	Bracket Fixing Nut	4	12 mm
	Washers A, B	4 each	A (large), B (small)
	Fuel Tank (with primer bulb)	1	Removable
	Remote Control	1	
	Drag Link	1	
	Multi-purpose Meter	1	For 115/120/140
	Meter Harness	1	
	Lead Wire for Meter	1	
	Remote Control	1	
	Drag Link	1	
	Tachometer	1	For 60/70, 90 EPTO & EPO
	Trim Meter**	1	
	Lead Wire for Meter	1	

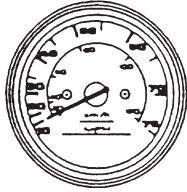
* Not provided with the motor in some markets.

** Not included for EPO

OPTIONAL ACCESSORIES



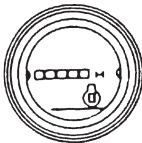
Speedometer
(50MPH)



Speedometer
(75MPH)



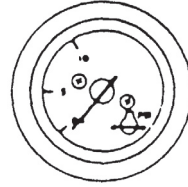
Voltmeter



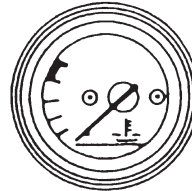
Hour Meter
(engine operation hour counter)



Tachometer



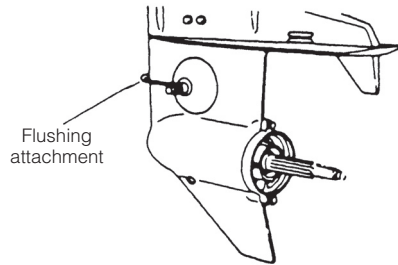
Water Pressure Meter

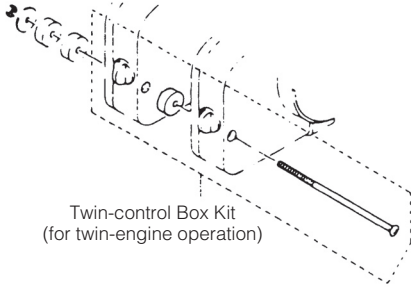


Water Temperature Meter

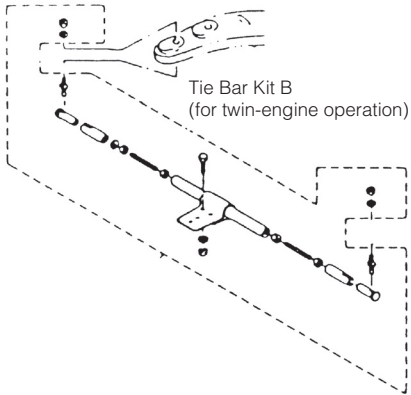


Flushing attachment

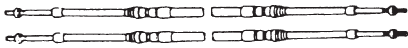




Twin-control Box Kit
(for twin-engine operation)



Tie Bar Kit B
(for twin-engine operation)



Remote control cable (7 – 30 feet, 19 kind length)



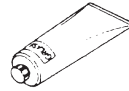
Extension cord (2 m) for trim meter



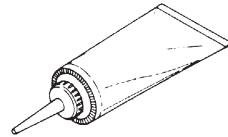
10P extension cord (2 m) for RC box



Propeller



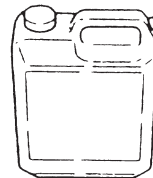
Genuine grease (250g)



Genuine gear oil (500mL)



Touch-up Paint



Genuine Engine Oil (0.4L, 1L, 4L, 20L)

PROPELLER TABLE

To ensure optimum performance, the propeller should match the boat type and its load.

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.

115/120/140 5,200 to 5,700 rpm

90 5,000 to 5,500 rpm

60, 70 5,150 to 5,850 rpm

60/70

	Pitch
lighter load Heavier load	21
	19
	17
	15
	13
	11
	9

90

	Pitch
lighter load Heavier load	21
	19
	17
	15
	13
	11
	9

115/120/140

	Pitch
lighter load Heavier load	21
	19
	17
	15
	13
	11
	9

MEMO

A series of horizontal dashed lines for writing.

MEMO

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MEMO

A series of horizontal dashed lines for writing.

OWNER'S MANUAL

M 60C
70C
70CX
90A2
115A2
120A2
140A2

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