Cleanliness and Care of Outboard Motor

A marine power product is a combination of many machined, honed, polished and lapped surfaces with tolerances that are measured in the ten thousands of an inch. When any product component is serviced, care and cleanliness are important. Throughout this manual, it should be understood that proper cleaning, and protection of machined surfaces and friction areas is a part of the repair procedure. This is considered standard shop practice even if not specifically stated.

Whenever components are removed for service, they should be retained in order. At the time of installation, they should be installed in the same locations and with the same mating surfaces as when removed.

Before raising or removing and outboard engine from a boat, the following precautions should be adhered to:

(1) Check that flywheel is secured to end of crankshaft with a locknut and lifting eye is threaded into flywheel a minimum of 5 turns.

(2) Connect a hoist of suitable strength to the lifting eye.

In addition, personnel should not work on or under an outboard which is suspended. Outboards should be attached to work stands, or lowered to ground as soon as possible.

We reserve the right to make changes to this manual without prior notification.

Refer to dealer service bulletins for other pertinent information concerning the products described in this manual.

Service Manual Outline

Section 1 - General Information & Specifications

Section 2 - Electrical & Ignition

Section 3 - Fuel System & Carburetion

Section 4 - Powerhead

Section 5 - Mid-Section

Section 5A - Gear Housing (Non-Shifting)

Section 5B - Gear Housing (Shiftable-F/N)

Section 6 - Rewind Starter Assembly

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Notice

Throughout this publication, “Dangers”, “Warnings” and “Cautions” (accompanied by the International HAZARD Symbol ⚠) are used to alert the mechanic to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. **OBSERVE THEM CAREFULLY!**

These “Safety Alerts” alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the service, plus “Common Sense” operation, are major accident prevention measures.

⚠ DANGER

DANGER - Immediate hazards which WILL result in severe personal injury or death.

⚠ WARNING

WARNING - Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠ CAUTION

Hazards or unsafe practices which could result in minor personal injury or product or property damage.

Notice to Users of This Manual

This service manual has been written and published by the service department of Mercury Marine to aid our dealers’ mechanics and company service personnel when servicing the products described herein.

It is assumed that these personnel are familiar with the servicing procedures of these products, or like or similar products manufactured and marketed by Mercury Marine, that they have been trained ing the recommended servicing procedures of these products which includes the use of mechanics’ common hand tools and the special Mercury Marine or recommended tools from other suppliers.

We could not possibly know of and advise the service trade of all conceivable procedures by which a service might be performed and of the possible hazards and/or results of each method. We have not undertaken any such wide evaluation. Therefore, anyone who uses a service procedure and/or tool, which is not recommended by the manufacturer, first must completely satisfy himself that neither his nor the products safety will be endangered by the service procedure selected.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. As required, revisions to this manual will be sent to all dealers contracted by us to sell and/or service these products.

It should be kept in mind, while working on the product, that the electrical system and ignition system is capable of violent and damaging short circuits or severe electrical shocks. When performing any work where electrical terminals could possibly be grounded or touched by the mechanic, the battery cables should be disconnected at the battery.

Any time the intake or exhaust openings are exposed during service they should be covered to protect against accidental entrance of foreign material which could enter the cylinders and cause extensive internal damage when the engine is started.

It is important to note, during any maintenance procedure replacement fasteners must have the same measurements and strength as those removed. Numbers on the heads of the metric bolts and on the surfaces of metric nuts indicate their strength. Customary bolts use radial lines for this purpose, while most customary nuts do not have strength markings. Mismatched or incorrect fasteners can result in damage or malfunction, or possibly personal injury. Therefore, fasteners removed should be saved for re-use in the same locations whenever possible. Where the fasteners are not satisfactory for re-use, care should be taken to select a replacement that matches the original.

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GENERAL INFORMATION AND SPECIFICATIONS

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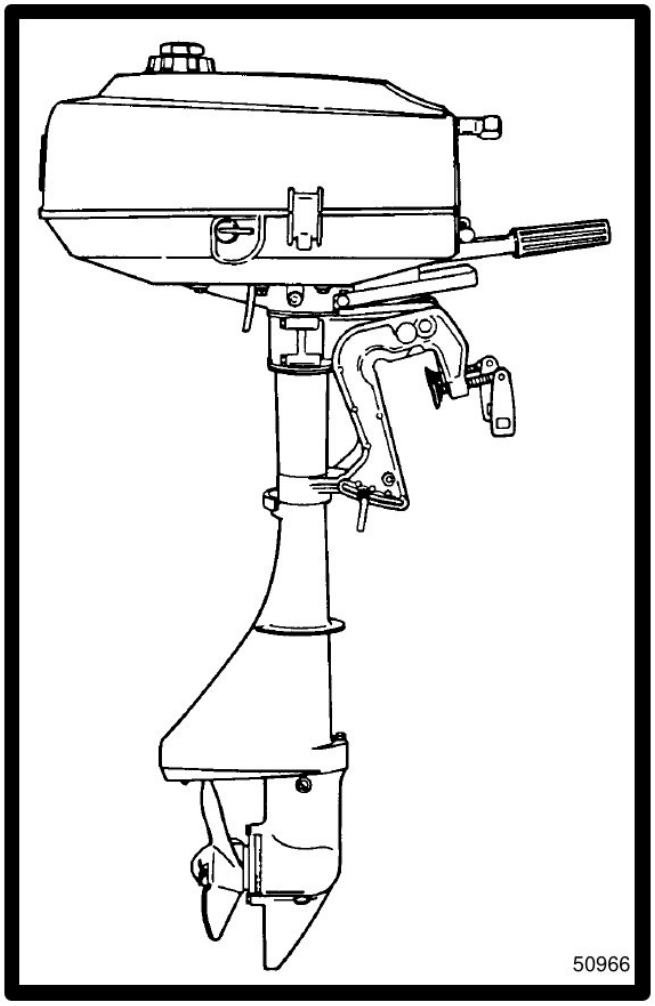
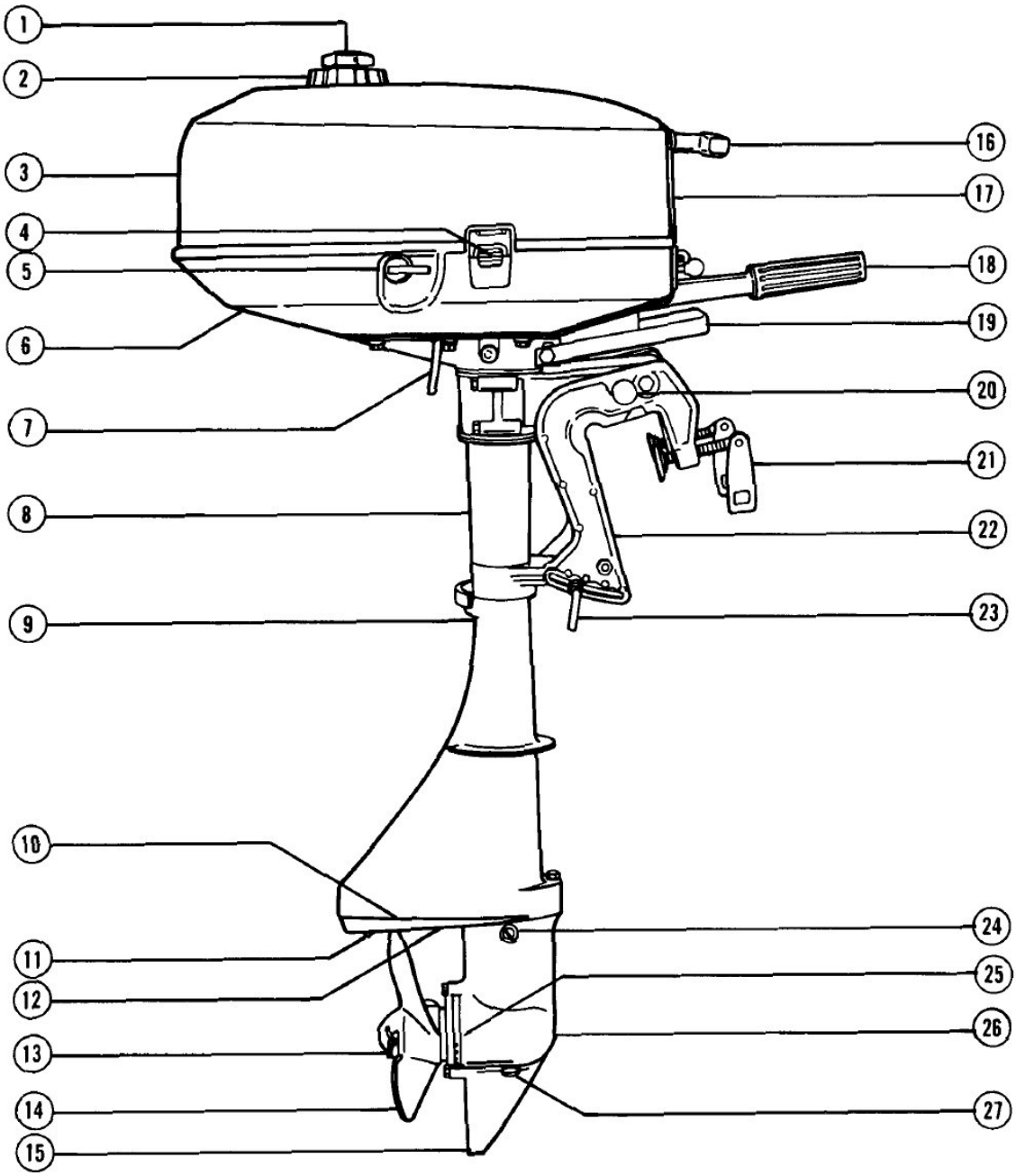


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Motors Parts Identification



50649

1 - Air Vent Knob
2 - Fuel Tank Cap
3 - Cowl
4 - Cowl Latch (Model 2.5/3.0/3.3)
5 - Fuel Cock Knob
6 - Spark Plug Access Door
7 - “Tell-Tale” Outlet
8 - Driveshaft Housing
9 - Exhaust Relief Outlet
10- Anti-Ventilation Plate
11- Exhaust Outlet
12- Anodic Plate
13- Cotter Pin
14- Propeller
15- Skeg
16- Starter Handle
17- Control Panel
18- Tiller Handle
19- Lift Handle
20- Tilt Lock Pin
21- Clamp Screw (2)
22- Clamp Bracket (2)
23- Tilt Angle Adjustment Pin
24- OIL LEVEL Plug
25- Cooling Water Intake
26- Gear Housing
27- OIL FILL Plug

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General Specifications

NOTE: Other specifications (torque, etc) are listed in the respective sections.

Dimensions

Overall Length w/Tiller Handle ..... 23-1/4 in.(591mm)

Overall Width ..... 8-1/2 in.(215mm)

Overall Height (Short Shaft) ..... 38 in. (965mm)

Recommended Boat Transom Height .. 15 in. (381mm)

Weight (Short Shaft) ..... 27.5 lb. (12.5kgs)

Powerhead

Horsepower (Model 2.2) ..... 2.2 @ 5000 RPM

Kilowatts* ..... 1.6 @ 5000 RPM

Horsepower (Model 2.5) ..... 2.5 @ 5000 RPM

Kilowatts* ..... 1.9 @ 5000 RPM

Horsepower (Model 3.0) ..... 3.0 @ 5000 RPM

Kilowatts* ..... 2.2 @ 5000 RPM

Horsepower (Model 3.3) ..... 3.3 @ 5000 RPM

Kilowatts* ..... 2.5 @ 5000 RPM

RPM Range at Full Throttle

Model 2.2 ..... 4200 - 5200

Model 2.5 ..... 4000 - 5000

Model 3.0 ..... 4500 - 5500

Model 3.3 ..... 4500 - 5500

Type ..... Two-Stroke Cycle

Number of Cylinders 1

Displacement ..... 4.6 cu. in. (74.6cc)

Bore ..... 1.85 in. (47mm)

Dia. 0.5mm Oversized ..... 1.869 in. (47.5mm)

Out of Round (Max.) ..... 0.002 in. (0.05mm)

Taper (Max.) ..... 0.002 in. (0.05mm)

Crankshaft

Runout (Max.) ..... 0.001 in. (0.05mm)

Connecting Rod Deflection ... 0.022 in. to 0.056 in. (0.6mm to 1.5mm)

Stroke ..... 1.69 in. (43mm)

Intake System ..... Reed Valve

Reed Block

Reed Stop Opening ..... 0.236 in. to 0.244 in. (6mm to 6.2mm)

Scavenging System ..... Loop Charge

Exhaust System ..... Thru-Prop

Lubrication System ..... Pre-Mixed Gasoline and Oil

Cooling System ..... Water-Cooled

Starting System ..... Manual Start

*Measured at the propeller shaft in accordance with ICOMIA 28

Fuel System

Carburetor ..... Center Bowl Gravity Feed

Float Level (All Models) ..... 0.090 in. (from gasket) (2.0mm) Ref. Section 3

Main Jet (Model 2.2) ..... #96

Main Jet (Model 2.5) ..... #92

Main Jet (Model 3.0) ..... #92

Main Jet (Model 3.3) ..... #94

Idle RPM ..... 900 - 1000

Fuel ..... Pre-Mixed Gasoline and Oil

Recommended Gasoline ..... Automotive Leaded or Lead-Free Gasoline

Recommended Oil ..... Quicksilver 2-Cycle Outboard Oil

Gasoline/Oil Ratio ..... 50:1 (Including Break-In)

Integral Fuel Tank Capacity

U.S. Gallons 0.375

Imperial Gallons 0.3

Liters 1.4

Ignition System

Ignition Type (Models 2.0/2.5/3.0) .. Flywheel Magneto

Spark Plug (All Models) ..... NGK BPR6HS-10 or Champion RL87YC

Spark Plug Gap ..... 0.040 in. (1.0mm)

Breaker Point Gap ..... 0.012 - 0.016 in. (0.3mm - 0.4mm)

Primary Ignition Coil Test ..... 1.5 Ohms

Condenser Capacity ..... 0.22mF - 0.28mF

Secondary Ignition Coil Test

Primary Winding Resistance .... 0.81 - 1.09 Ohms

Secondary Winding Resistance .. 4250 - 5750 Ohms

Ignition Type [1993 Models (2.5/3.3)] ..... Capacitor Discharge

Test Specifications ..... Refer to DVA Chart

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Gear Housing

Gear Ratio (Model 2.2) 1.85:1

Gear Ratio (Models 2.5/3.0/ 3.3) 2.18:1

Gear Type . . . . . Spiral Bevel

Clutch Type . . . . . Sliding Dog

Propeller Drive System . . . . . Drive (Shear) Pin

Lubricant

Type . . . . . Quicksilver Gear Lube

Capacity . . . . . 3 oz. (90ml)

Mid-Section

Steering Angle . . . . . 360°

Tilt Pin Positions 4

Full Tilt-Up Angle . . . . . 75°

Allowable Transom Thickness . . . . . 1.18 in. - 2.165 in. (30mm - 55mm)

Torque Specifications

1. All torque values are for clean, dry, corrosion free threads, except where locking compounds are specified. Refer to appropriate section of this manual.
2. Cover and housing screws MUST BE torqued by tightening in 3 progressive steps (following specified torque sequence) until specified torque is reached. Refer to appropriate section of this manual.
3. When retightening powerhead and gear housing mounting bolts, first back them out one turn, and then retorque to specification.
4. To retighten spark plug, start engine and warm-up to operating temperature. Stop engine and allow to cool, then retorque plug to specification.
5. Propeller MUST BE secured with cotter pin.

Powerhead

Flywheel Nut . . . . . 30 lb. ft. (4.1 N·m)

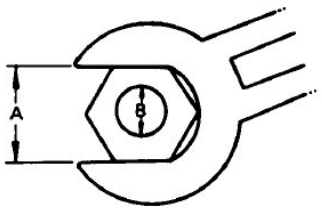
Crankcase Cover to Cylinder Block Bolts . . . . . 50 lb. in. (5.6 N·m)

Cylinder Head Bolts . . . . . 85 lb. in. (9.6 N·m)

Spark Plug . . . . . 20 lb. ft. (27.1 N·m)

STANDARD BOLTS AND NUTS

A	B	TORQUE SPECIFICATION		
		N·M	LB. IN.	LB. FT.
8mm	M5	4	36	3
10mm	M6	8	70	6
12mm	M8	18	156	13
14mm	M10	36	312	26
17mm	M12	42	372	31



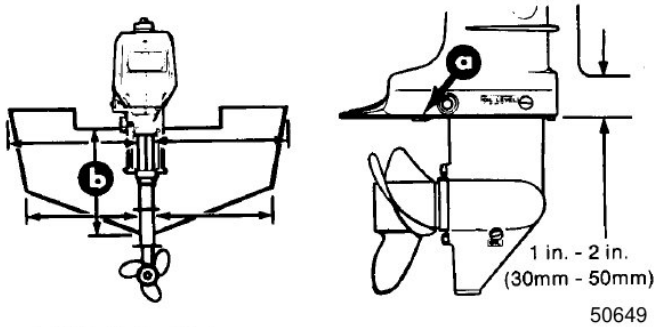
Outboard Installation

⚠ WARNING

DO NOT OVERPOWER - Most boats are rated and certified for the maximum horsepower capabilities of the boat. Refer to the boat "Certification Plate" for the maximum horsepower limit. If in doubt, contact your dealer.

Transom Height

1. This outboard is designed to provide optimum performance when mounted at the recommended transom height. If the transom is too high, the propeller may operate too close to the water surface introducing air over the propeller blades, causing a lost of thrust (particularly when attempting to plane off or during a turn). If the transom is too low, a performance loss is created by excessive lower unit drag and water spray (additionally, under clearance may also present a problem).
2. Conventional installations generally locate the gear housing anti-ventilation plate parallel to and approximately 1 in. - 2 in. (30mm - 50mm) below the boat bottom.



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a - Anti-Ventilation Plate
b - Recommended Boat Transom Height - 15 in. (381mm)

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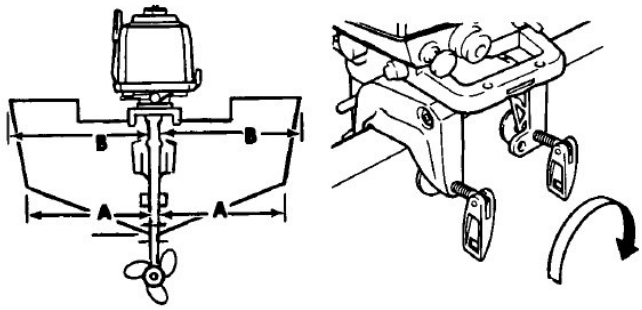
Mounting Outboard on Transom

⚠ WARNING

Before operating the outboard, it MUST BE PROPERLY SECURED to the boat transom. Failure to adhere to the outboard mounting instructions, following, may result in loss of the outboard, damage to boat and/or outboard and injury to occupants of the boat.

1. Center outboard on boat transom at recommended transom height (see **"Transom Height,"** preceding) and secure outboard to transom with clamp screws. To avoid damage to transom and to prevent clamp screws from working loose during operation, make certain that clamp screws are tightened securely and equally. Clamp screws should be checked for tightness periodically.

IMPORTANT: During use, a periodic check of the clamp screws is recommended to ensure that the outboard remains secure on the transom.



Fuel Recommendations

Gasoline Recommendations

⚠ WARNING

Use CARE when transporting fuel container, whether in a boat or car. DO NOT fill fuel container to maximum capacity. Gasoline will expand considerably as it warms up and can build up pressure in the fuel container. This can cause fuel leakage and a potential fire hazzard.

Any gasoline that will satisfactorily operate an automobile engine is suitable for your outboard motor.

IMPORTANT: While the use of REGULAR LEADED gasoline is entirely satisfactory, LEAD FREE or LOW LEAD regular gasolines are PREFERRED as they generally provide an "extra margin" of spark plug life.

Some fuel distributors pre-mix gasoline and oil for 2-cycle engines. Such fuels, if known to be of of recommended quality, are acceptable. If in doubt, check with your local dealer.

⚠ CAUTION

DO NOT USE white gasolines or fuels intended for stoves and lanterns. Use of improper gasolines and/or oils can cause serious damage to your outboard motor.

Oil Recommendations

Mix recommended gasoline with Quicksilver 2-Cycle Outboard Oil in ratio shown in the following chart. If Quicksilver 2-Cycle Oil is not available, substitute a high quality 2-cycle oil intended for outboard use and meets NMMA rating TC-WII™, as shown on oil container. NMMA rating TC-WII™ is the Boating Industry Association's designation for approved, 2-cycle water-cooled outboard oils. Use at oil manufacturer's recommended gasoline-oil mixture as shown on the label. (NOT TO EXCEED 50:1 RATIO.)

⚠ CAUTION

The use of other than recommended gasoline and Quicksilver 2-Cycle Outboard Oil or an acceptable oil may cause piston scoring, bearing failure or both. DO NOT, under any circumstances, use multi-grade or other highly detergent automobile oils or oils which contain metallic additives.

IMPORTANT: When checking fuel level and/or filling the motor fuel tank ALWAYS check the fuel tank cap to verify that the seal is properly seated inside the cap. Tighten fuel tank cap securely.

FUEL MIXTURE

Use a 50:1 gasoline-oil ratio for "break-in" and all normal operation of your outboard motor. (See chart, following.)

	U.S. Measure	Imperial Measure	Metric Measure
Quicksilver 2-Cycle Oil	16 U.S. oz. to each 6 gallons of gasoline	15 Imp. oz. to each 5 Imp. gallons gasoline	400cc to each 20 liters of gasoline
Other Acceptable Oils	Use at manufacturer's recommended gasoline/oil ratio, not to exceed 50:1		

IMPORTANT: Using less than the recommended proportion of oil may result in very serious damage from lack of sufficient lubrication. Using more than the recommendations will cause spark plug fouling, erratic carburetion, excessive smoking and faster-than-normal carbon accumulation.

Correct Fuel Mixing Procedure

⚠ WARNING

Observe fire prevention rules, particularly the matter of smoking. Mix fuel outdoors or in a well-ventilated location.

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Mix fuel in a **separate container**. Measure accurately the required amounts of oil and gasoline. Pour a small amount of gasoline into container and add a small amount of oil (about the same amount as gasoline). Mix thoroughly by shaking or stirring vigorously; then add balance of oil and gasoline, mix again and pour into fuel tank. Cleanliness is important in mixing fuel. Be consistent; prepare each batch of fuel exactly the same as previous amounts (to avoid readjustment of carburetor low speed mixture screw).

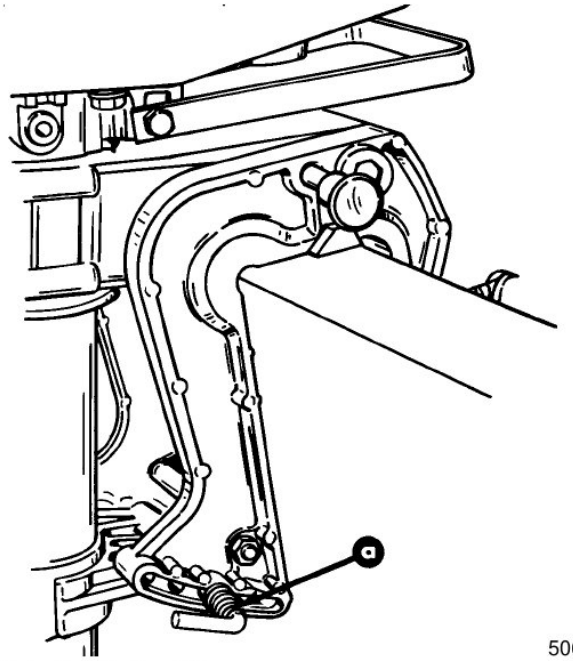
IMPORTANT: Always use fresh gasoline. Gasoline forms gum and varnish deposits and when kept in a tank for a length of time, may cause trouble.

⚠ WARNING

Use care to prevent spilling fuel when filling the motor fuel tank. DO NOT OVERFILL. If tank is overfilled, fuel may spill into the cowling and if gasoline vapors are present, an errant spark could cause an explosion or fire.
If fuel is spilled, remove cowling and clean up as much of the spill as possible. Allow a minimum of 5 minutes for ventilation/evaporation of fuel and/or vapors BEFORE ATTEMPTING TO START ENGINE.

Tilt Angle Adjustment

The angle of the motor can be adjusted by changing the position of the tilt angle adjustment pin in the holes provided in the clamp brackets.

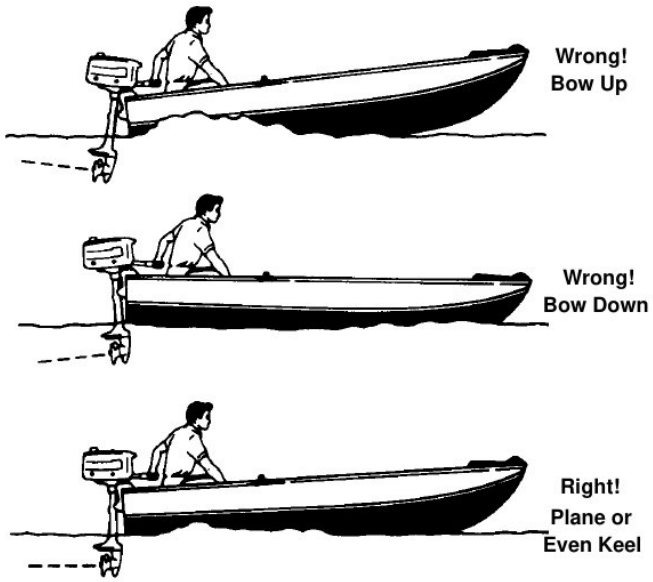


a - Tilt Angle Adjustment Pin

Adjusting Tilt Angle of the Motor - 2.5/3.0

Model 2.2/3.3 - Reposition tilt screw/nut as in (a) above.

The angle of the motor is important for obtaining the best performance of the motor. The tilt angle should be adjusted so that the motor anti-ventilation plate is parallel to the water surface when at full speed.



Outboard Motor Angle Positions

Adjustments and Maintenance

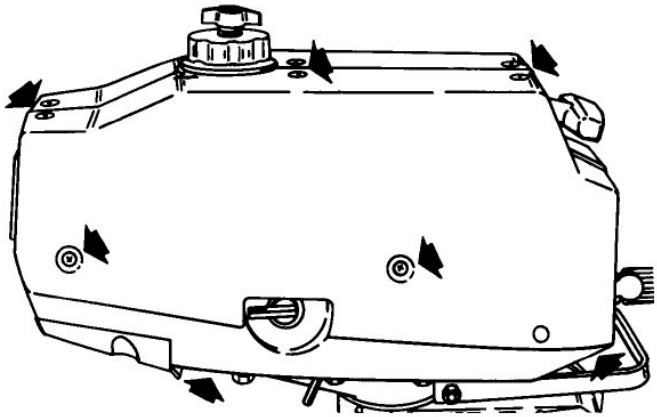
⚠ WARNING

DO NOT attempt to remove or install cowl while engine is running.

Cowl Removal and Installation

MODEL 2.2

Remove spark plug access cover. Remove 10 screws to remove cowling. Replace 10 screws and access cover to reinstall cowl.

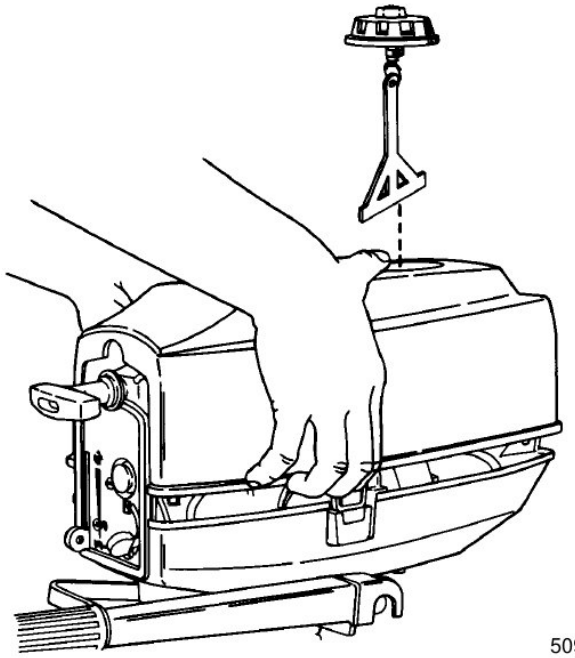


MODELS 2.5/3.0 (1990)

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Remove gas tank cap and retainer from tank. Push in on inner portion of cowl latches to disengage latches and lift top cowl off.

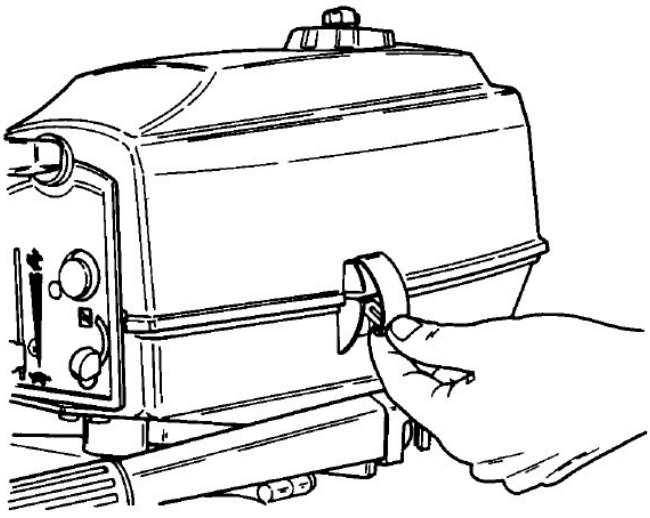
To replace cowl, position cowl over engine and push down until latches engage. Replace gas tank cap and tighten securely.



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MODELS 2.5/3.0/3.3 (1991 AND LATER)

Lift up on latches to remove cowl. Replace cowl by engaging latches over top cowl latch recess.



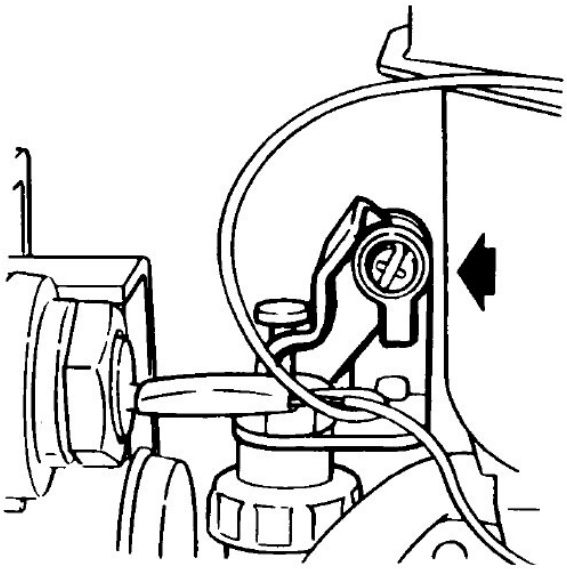
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Throttle Lever Friction Adjustment

Turn the screw attached to the throttle lever end.

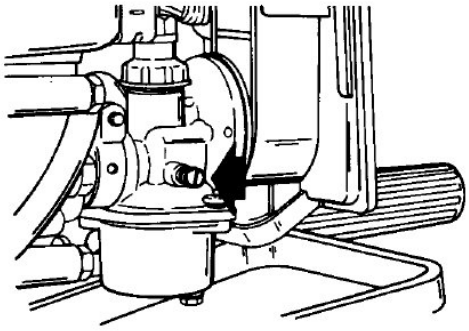
To increase, turn screw clockwise.

To decrease, turn screw counterclockwise.



Idle Speed Adjustment

With engine running, position throttle lever to slowest speed. Adjust the idle speed screw to obtain recommended idle speed (see **"Specifications"** on page 1-1).



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