MERCURY OUTBOARDS
MODELS
1966 THRU 1972

C-90-63094 (REV-1-11/73)
Know the channel markers to follow a SAFE and CONFIDENT course.

- When returning, keep the red buoys on your right; black buoys on your left.
- Black-and-white vertically striped buoys indicate middle of channel; always pass close to them, either side.
- Black-and-red horizontally striped buoys indicate obstruction; give them a wide berth.

**RULES of the MARINA**

Keep practicing water SAFETY night-and-day by observing the following simple rules:

- Do not operate boat near swimmers, skin divers or fishermen.
- Keep clear of sailing craft and rowboats, yielding right-of-way.
- Always keep to the right; show courtesy at all times.
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All information herein was in effect when this book was printed. Mercury Marine, whose policy is one of continuous
improvement, reserves the right to discontinue models at any time or to change specifications or designs without notice
and without incurring obligation.
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**Metric Conversion:** 1" = 25.4mm; 1 Cu. In. = 16.4cc

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<td>None</td>
</tr>
<tr>
<td>1972</td>
<td>1150</td>
<td>115</td>
<td>99.81</td>
<td>4800-5300</td>
<td>2.7/8&quot;</td>
<td>2.9/16&quot;</td>
<td>AC-V40FFM</td>
<td>None</td>
<td>Thunderbolt</td>
<td>None</td>
</tr>
<tr>
<td>1968-69</td>
<td>1250SS</td>
<td>125</td>
<td>98.81</td>
<td>4800-5300</td>
<td>2.7/8&quot;</td>
<td>2.9/16&quot;</td>
<td>AC-V40FFM</td>
<td>None</td>
<td>Thunderbolt</td>
<td>None</td>
</tr>
<tr>
<td>1968-69</td>
<td>1250BP and Super BP</td>
<td>125</td>
<td>98.81</td>
<td>5000-6600</td>
<td>2.7/8&quot;</td>
<td>2.9/16&quot;</td>
<td>AC-V40FFM</td>
<td>None</td>
<td>Thunderbolt</td>
<td>None</td>
</tr>
<tr>
<td>1970-71</td>
<td>1350</td>
<td>135</td>
<td>99.81</td>
<td>4800-5300</td>
<td>2.7/8&quot;</td>
<td>2.9/16&quot;</td>
<td>AC-V40FFM</td>
<td>None</td>
<td>Thunderbolt</td>
<td>None</td>
</tr>
<tr>
<td>1972</td>
<td>1400</td>
<td>140</td>
<td>99.81</td>
<td>4800-5800</td>
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<td>2.9/16&quot;</td>
<td>AC-V40FFM</td>
<td>None</td>
<td>Thunderbolt</td>
<td>None</td>
</tr>
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</table>

NOTE: Champion L-77V may be used in place of AC-V40FFM.
Champion L-78V may be used in place of AC-V40FFK.

**Metric Conversion:** 1" = 25.4mm; 1 Cu. In. = 16.3cc

Page 4
Section 1 - General Information

1-1. IMPORTANT
A standard one-year warranty, covering material and workmanship, was issued by your dealer for the outboard motor (not used commercially) when sold new. Replacement parts on service work after one year carry a 3 month warranty.

1-2. DIRECTIONAL REFERENCES
Front of boat is bow; rear is stern. Starboard is right side; port is left side. In this book, all directional references are given as they appear when viewing boat from stern, looking toward bow. (Figure 2)

1-3. PERIODIC CHECKUP
All mechanical products, such as your Mercury Outboard, require periodic care and maintenance. Your outboard should be taken to an authorized Mercury dealer every six months or 100 hours of operation – or at least once each year – for tune change, tuneup, etc, to include the following:

1. Clean filters on carburetor(s) and fuel system.
2. Check lubricant in lower unit.
3. Check water pump operation.
4. Lubricate control linkage, distributor or magneto adaptor (4 and 6-cylinder models) and swivel pin.
5. Lubricate reverse lock lever.
6. Check and tighten all nuts and bolts.
7. Test and adjust motor after completing checkup.

1-4. WRITE a LETTER of EXPLANATION
If writing to the factory, include the following information: 1) Serial number, 2) model number, 3) date purchased, 4) dealer from whom purchased, 5) number of hours motor has been operated, 6) details of trouble experienced, 7) dates of previous correspondence, 8) boat make and size, 9) propeller pitch and number of blades or part number, and 10) normal use and approximate load.

No Motor Is to Be Shipped to the Factory without Specific Written Authorization. All Shipping Charges Must Be Prepaid.

1-5. SERVICE RECOMMENDATIONS
This publication includes operating and service instructions applying to Mercury models listed on the preceding "specifications" page. In the preparation of this book, careful consideration was given to such adjusting and service operations as are usually required in normal service. Illustrations shown are typical of all specified motors, except where model is designated.
We do not recommend that the owner attempt repairs which are not specifically covered in this book. Other repairs, particularly those which require disassembly or replacement of internal parts, should be done only by Authorized Mercury Service facilities. Such facilities would have the necessary factory-designed tools and equipment, plus the knowledge and experience required to do the job correctly and economically.

1-6. SERIAL NUMBER
The serial number is stamped into the instruction plate on the swivel bracket. The number is the manufacturer's key to numerous engineering details which apply to your motor. When ordering parts, accessories and tools, or when corresponding with the manufacturer or dealer in regard to service matters, always specify model and serial number.

CAUTION: Water pump impeller will be damaged if motor is operated out of water. Read flushing instructions carefully in Paragraph 11-3, following.

1-7. MOTOR and BOAT INSURANCE
Your local insurance agent can offer you motor and boat protection which covers damage, theft, etc, as well as liability for property damage and personal injury to others. Contact your insurance dealer for full details.

1-8. RECORDING ELECTRIC STARTER KEY NUMBER
(Electric Starting Models)

<table>
<thead>
<tr>
<th>RECORD YOUR ELECTRIC STARTER KEY NO. HERE</th>
<th>If key is lost, a new key may be purchased from your local Mercury dealer. Give key number (left) at time of purchase.</th>
</tr>
</thead>
</table>

Section 2 - Motor Installation

2-1. OUTBOARD MOTOR MOUNTING
Installation of the motor on the transom should be given very careful attention. The clamp bracket not only must support the weight of the motor, but it is subject to thrust, impact, inertia and steering stresses. These forces are applied directly to the transom thru the clamp bracket assembly.

Your Mercury Motor is designed for a recommended transom height as shown in Figure 3. To avoid damage to transom and to prevent the motor from working loose during operation, it is important that clamp (thumb) screws are tightened securely and equally. Thumb screw grips should be in (or near) a horizontal plane to allow full tilt up and turn of the motor. Failure to observe this thumb screw position could result in damage to steering parts.
TRANSOM MOUNTING SPECIFICATIONS

(Refer to Illustrations on Next Page)

|-----------------------------|--------|--------|----------|--------|--------|----------------|------------|---|------|-----|----------------------
| 1400-1350-1250-1150-1100-1000-950 | 32"    | 17"    | 16"      | 27%"   | 32"    | 15%"          | 20"       | 30" | 4-3/8" | 2-3/8" | R. Side             |
| 800 & 650 (1966-thru-1971)  | 33     | 17     | 16       | 22%    | 28%    | 15%           | 20        | 24  | 4-3/8" | 2-3/8" | R. Side             |
| 650 (3-Cyl. 1972)          | 33     | 17     | 18       | 18     | 26%    | 15%           | 20        | 19' | 4-3/8" | 2-3/8" | R. Side             |
| 500                        | 31%    | 16     | 15%      | 20     | 25%    | 16%           | 20        | 20' | 4-3/8" | 2-3/8" | R. Side             |
| 402-400-350 (2-Cyl.)       | 34     | 16     | 18       | 16     | 24     | 16%           | 20        | 17-3/4 | 2-3/8" | 2% | R. Side             |
| 200                        | 39%    | 21     | 18%      | 16%    | 23-3/8 | 15%           | 20%       | 19-5/8" | 4-3/8" | 1-7/8" | R. Side             |
| 110-75-60                  | 35%    | 21%    | 13%      | 12%    | 18%    | 15%           | 20%       | 19-5/8" | 2-7/8" | 1-7/8" | R. Side             |
| 40-39                      | 35%    | 21%    | 13%      | 12%    | 18%    | 15%           | 20%       | 18%   | 2-7/8" | 1-7/8" | R. Side             |

* Best transom height for 4 and 6-cylinder engines is to locate engine's anti-cavitation plate parallel and even with the boat bottom. Boats with heavy keels will require lower settings to avoid propeller cavitation. Very fast boats may benefit from higher settings.

** Variable on deep "V" hulls

$ Includes clearance for Power Trim where applicable.

*** Allows sufficient clearance for Ride-Guide Steering. For rope steering, add to this figure according to type of bracket used.

▲ Recommended location for mounting remote throttle-shift and steering controls on boat to balance engine torque caused by direction of propeller rotation.

◆ 2¾" for 1971-72 models
◆ 15½" for 1970-71-72 Merc 400-500 and for Merc 402
◆ 21½" for 1966 Merc 350
∪ End of throttle-shift-steering (tiller) handle

Metric Conversion: 1" = 2.54cm
2.2. TILT PIN ADJUSTMENT

Do not operate motor with tilt lock pin removed. Holes are provided in the clamp bracket to permit changing location of tilt lock pin for proper adjustment of tilt angle. Tilt angle of motor on transom should be set so that anti-cavitation plate (Figures 1, 3 and 4) is about parallel and even with bottom of boat. Speed of boats, which have center of gravity located forward, may sometimes be improved by tilting motor out one tilt pin hole. This will tend to raise bow and reduce wetted surface. If motor is tilted in, boat will ride bow down, wetting more of the bottom and reducing speed. The preceding generally, will improve operation in rough water. Under ideal conditions, efficiency is best with lower unit operating in level position, because entire thrust then is applied parallel to plane of motion. With some boats, however, and under certain unfavorable conditions of loading, there will be a tendency to ride stern high or bow high. (Figure 3) This condition can be corrected considerably by adjusting tilt angle so that boat rides level.

It must be considered that operation with excessive tilt will reduce performance noticeably and may induce cavitation. It is, therefore, preferable to level boat by proper loading rather than by extreme adjustment of tilt angle. Except on very rough water, if tilt angle is correctly adjusted and boat is favorably loaded, a properly designed boat will ride level and will plane without "spanking" or "bucking." (Figure 4)
2-3. TILT-UP and SHALLOW WATER TROLL LEVER OPERATION (Models with Less Than 10 HP)

Motor is spring-locked in operating position and will tilt up only when striking a submerged object abruptly while in forward motion. To release motors of less than 10 horsepower for tilt pin adjustment, push tilt-up lever, then tilt motor up. (Figure 5) To lock in tilt position for running in shallow water, push lever in direction of “Release” arrow. To release, return to “Lock” position. Motors of more than 10 horsepower can be tilted-up by placing in “Forward” gear and lifting up-out on skeg. (Figure 1)

Model 1972 Merc 110-75-40 motors can be placed in shallow water “Troll” position and released from this position as follows:
1. Retard twist grip throttle to “Shift Range” and shift into “Forward”.
2. Push lever in direction of “Troll”.
3. Tilt motor manually to engage in shallow water “Troll” position (Figure 6)
4. To release from shallow water “Troll”, retard throttle and shift to “Forward”. Push lever to the side and down, then tilt motor manually by lifting up slowly to disengage from the “Troll” position.

Figure 4. How to Plane a Boat

Figure 5. Tilt-Up Lever

Figure 6. Tilt Stop Lever
Model 1969-70-71 Merc 110-7540 motors can be placed in a shallow water troll position automatically as follows:
1. Retard twist grip throttle to “Shift Range”.
2. Push lever in direction of “Release” arrow (Figure 5); shift to reverse.
3. Advance throttle in reverse. This will cause motor to tilt up and engage shallow water troll lever (Figure 6) automatically.
4. Retard throttle to “Shift Range” and shift into forward.

Release motor from shallow water troll as follows:
1. To release, return to “Lock” position. (Figure 6)
2. Retard throttle to “Shift Range” and place shift lever in reverse.
3. Advance throttle until shallow water troll lever becomes disengaged.
4. Retard throttle and shift into forward.

2-4. TILT STOP LEVER
Motor can be locked in tilt-up position by pulling tilt stop lever (Figure 6) with motor fully tilted.

IMPORTANT: DO NOT use tilt stop lever while trailering. Tilt motor and place a block of wood between clamp and swivel bracket.

2-5. CONDITIONS AFFECTING OPERATION
1. Center of Gravity Location: For minimum drag and maximum speed - which allow best fuel economy at a given throttle setting - move weight aft until boat porpoises or is about to porpoise. This reduces wetted surface to a minimum, only the rear half of the boat being wet.
2. Boat Bottom: For maximum speed, a boat bottom should be nearly a flat plane where it contacts the water and particularly straight and smooth in fore-and-aft direction.
   a. Hook: Exists when bottom is concave in fore-and-aft direction when viewed from below. When boat is planing, “hook” causes more lift on bottom near transom and allows bow to drop, thus greatly increasing wetted surface and reducing boat speed. “Hook” frequently is caused by supporting boat too far ahead of transom while hauling on a trailer or during storage.
   b. Rocker: The reverse of hook and much less common. “Rocker” exists if bottom is convex in fore-and-aft direction when viewed from below, and boat has strong tendency to porpoise.
   c. Surface Roughness: Moss, barnacles, etc., on boat or corrosion of motor’s gear case increase skin friction and cause speed loss. Clean surfaces when necessary.

2-6. ADJUSTING CO-PILOT (Models with 20 HP and Less)
The co-pilot provides velvet-smooth friction control in the steering mechanism. Recommended adjustment is such that the motor will remain in a fixed-course position without the need of manual control, yet will not be too tight to allow free and easy steering. Adjustment is attained by means of a hexagon head screw on bottom face of swivel bracket (top face on 1972 Merc 110-7540 models). (Figure 7) Tighten the screw to increase friction; loosen to decrease friction. Loosen friction when using remote controls.

![Figure 7. Co-Pilot Adjustment](image)
Section 3 - Propeller Recommendations

3-1. PROPELLERS
It is not possible to design a single propeller which will give optimum performance under all conditions of motor speed, boat type and speed and load. The Quicksilver propeller, which you have selected, is suitable for most applications. If it does not fit a particular application, we suggest that you keep it for general use and acquire another Quicksilver propeller for the particular application.

For propeller recommendations applying to your particular boat, consult your Mercury dealer and see the following paragraph. Using an improper propeller for the application on a new motor will void the Warranty Agreement.

3-2. PROPELLER SELECTION
The speed at which a given boat will travel is governed mainly by the horsepower available. Use of the correct propeller will allow the motor to turn at a recommended RPM and develop full power. First select trial propeller from dealer's listing, using approximate boat length and load, if known. This usually will be the correct choice. Refer to transom height recommendation in chart in Figure 3. Establish exact tilt pin setting by test.

To check, make a trial run, using an accurate tachometer. It is important that the motor speed (RPM) falls within the recommended limits. The trial run should be made with a light load (one person). Under these conditions, it is desirable to have the engine speed near the top of the recommended limit so that, under a heavy load, motor speed will not fall below recommendations. If the motor speed is too high, try a higher pitch or the same pitch cupped. Likewise, if motor speed is low, try a lower pitch prop. There normally is a 300-500 RPM charge between propeller pitches.

For dual installation, the next higher pitch propeller may be best. For water skiing, it may be desirable to use the next lower pitch propeller. However, be cautious - do not operate at full throttle when using ski propeller but not pulling skiers. If, in this connection, a propeller has too little pitch for the application, dangerous overspeed of the motor may result! If a propeller has too much pitch for the application, acceleration will be slow.

Light, fast boats require higher pitch propellers, while heavier boats require lower pitch propellers. Use aluminum propellers in salt water areas to reduce electrolytic action which can result in corrosion and pitting of metal surfaces.

3-3. INSTALLING PROPELLER
Apply a liberal coat of Perfect Seal (C-92-34227) or a waterproof-type lubricant on splines of propeller shaft, especially if operated in salt water, to aid in removing at any future time.

FOLLOW THESE STEPS:

WARNING: When installing or removing propeller, because of the motor’s ease in starting, be sure that switch is off on electric starting models, place a block of wood between anti-cavitation plate and propeller to prevent accidental starting and to protect hands from propeller blades while removing the propeller nut.
Figure 8. Installing/Removing Propeller - 6-Cyl. and 4-Cyl. Merc 800-650 Models

6-Cyl. Models and 4-Cyl. Merc 800-650 (Figure 8)

1. Place thrust hub into propeller hub (shoulder into recess of propeller).
2. While aligning splines, place Quicksilver jet-prop propeller (with thrust hub) and spline washer on propeller shaft in this order.
3. Place propeller nut in groove of tab washer.
4. Thread propeller nut on propeller shaft and tighten with 1-1/16" or adjustable wrench.
5. Bend 3 of the tabs of the tab washer down in grooves of spline washer to secure propeller nut.

Figure 9. Installing/Removing Propeller - Merc 650 (3-Cyl.)

Merc 650 (3-Cyl. 1972) (Figure 9)

1. Place small thrust hub into propeller hub (shoulder into recess of propeller).
2. While aligning splines, place Quicksilver jet-prop propeller (with small thrust hub) and large thrust hub on propeller shaft in this order.
3. Thread propeller nut on propeller shaft and tighten securely with 15/16" or adjustable wrench.
Figure 10. Installing/Removing Propeller - Merc 500-402-400 and 350

1. Place thrust hub into propeller hub (shoulder into recess of propeller).
2. While aligning splines, place Quicksilver jet-prop propeller (with thrust hub) and spline washer on propeller shaft in this order.
3. Thread propeller nut on propeller shaft and tighten securely with 15/16" or adjustable wrench.

Figure 11. Installing/Removing Propeller - Merc 200-110-75-60-40-39

2. Slide collar and propeller onto shaft.
3. Place washers (one washer on 1972 models) and nut on end of propeller shaft and tighten nut securely.

3-4. HOW to REMOVE PROPELLER

To remove propeller, reverse procedure from Paragraph 3-3, preceding.

3-5. PROPELLER REPAIR

If your propeller should become damaged, see your Mercury Outboard dealer for repair. This is your assurance that your propeller's original superb precision will be restored in the process of repair and that you will continue to enjoy its superior performance.
Section 4 - Accessories Installation

4-1. REMOTE CONTROL ATTACHMENT (Single Lever Mer- Control)
All 1966-thru-1972 Models, except Merc 200-110-75-60-40-39

Right side mounting is recommended. If left side mounting is necessary, remove throttle-shift control handle and place on opposite side of control housing. Install control cables on motor in the following manner:

1. Remove front cowl and wrap-around cowl. (See Paragraph 8-1.)
2. Place remote control handle and motor in neutral position and smaller neutral warmup lever (on side of remote control box) down all the way.
3. Place throttle and shift cables thru opening in bottom cowl.
4. Place SHIFT cable end guide over peg and secure brass barrel in recess without disturbing neutral setting. (Figures 12 and 13 are typical.)
5. If necessary, readjust brass barrel for correct position and to compensate for backlash.
6. Secure clamp lever (Figure 14) or latch (Figure 15) over peg.
7. Check that motor is in neutral when control is in neutral. If not, adjust shift cable brass barrel.
8. Secure brass barrel of THROTTLE cable over shift cable brass barrel. (Figures 16 and 17 are typical.)
9. Position vertical lever (Figure 16, typical) so that distributor (or magneto; throttle actuator on Merc 402) is held lightly against idle stop screw. (Figure 18 is typical.)
10. Attach throttle cable end guide to vertical lever without disturbing idle stop setting. If necessary, adjust brass barrel for correct position and to compensate for cable backlash.
11. Move single lever remote control handle to forward position, then back to neutral. Check that distributor (or magneto or throttle actuator) is held lightly against idle stop screw when control handle is in neutral.
Merc 200-110-75-60-40-39 Models

If control cables are removed from motor at any time, reinstall by following instructions included in remote control attaching kit. See Figure 19 for Merc 200 and Figure 20 for Merc 40.

NOTE: On all models without electric start, install stop switch (to stop motor) between remote control housing and "Stop" button on bottom cowl. (Figure 21) On all electric starting models, the stop switch is incorporated in the wiring harness and requires no separate installation.

4.2. DUAL MOTOR INSTALLATION

When operating two electric starting outboard motors on the same boat, it is recommended to use two batteries, each independent of the other. "RIDE-GUIDE" Dual Steering Control is recommended for dual motor installation.
Section 5 - Fuel Mixture and Fuel System

5-1. INSTALLING FUEL TANK

Set the fuel tank (Figure 22) in approximate correct position in bottom of boat. Connect fuel line to motor by inserting twist connector into receptacle in bottom cowl. (Figure 23) Lock by turning 1/8-turn clockwise. Determine the most favorable position of the fuel tank, bearing in mind the importance of arranging the fuel line in such a manner that it cannot become pinched, kinked, sharply bent or stretched during operation of the motor. Check with the motor in extreme left and right turn positions.

Secure tank to boat. Mercury “Tank Traps” (Mercury Accessory No. A-24016) are excellent for this purpose. They are simple, rugged thumb screw clamps which can be installed permanently in the boat. The tank then can be locked or freed by a turn of each thumb screw.

CAUTION: Use CARE when transporting fuel tanks, whether in a boat or car. DO NOT fill fuel tanks to maximum capacity. Cool gasoline expands considerably and builds up pressure in the fuel tank due to higher outside temperatures. This can cause fuel leakage and a potential fire hazard.

NOTE: In Imperial measure, one U.S. ounce is 0.3 liter; one U.S. gallon is .83 Imperial gallon or 3.8 liters.

CAUTION: DO NOT OPERATE your Mercury Outboard on white gasolines intended for use in stoves or lanterns. Regular-leaded, low-lead and lead-free automotive fuels are satisfactory in all Mercury Outboards. Some premium gasolines, other than Amoco lead-free premium, may contain additives harmful to 2-cycle engines, and their use should, therefore, normally be avoided.

Some oil companies manufacture high-grade fuels, leaded or lead-free, which are specifically designed for use in 2-cycle engines, either directly or as pre-mixes. Such fuels, if known to be of good quality, may continue to be used.

Mercury Marine reserves the right to refuse warranty on parts which are damaged when using improper fuels or lubricants.

5-2. RECOMMENDED FUEL MIXTURE

Use automotive regular leaded or low-lead or lead-free gasoline and mix with oil in the following ratios:

1. When using FORMULA S0 Quicksilver 2-Cycle Outboard Motor Oil (Figure 24), thoroughly mix one 12-ounce can with each 5 gallons
of gasoline (8 ounces with each 3 gallons) in your remote fuel tank; 50:1 ratio. (Figure 22) (Imperial measure: 15 imp. oz. oil to 5 imp. gals. gasoline; metric measure: 400cc oil to 20 liters gasoline)

2. When using FORMULA 50-D Quicksilver 2-Cycle Outboard Motor Oil, thoroughly mix one 8-ounce can with each 3 gallons of gasoline in your remote fuel tank; 50:1 ratio. (Figure 22)

3. In emergency, when FORMULA 50 or 50-D Quicksilver Oil are not available, substitute a high quality 2-cycle oil that is intended for outboard use and meets BIA rating TC-W, shown on oil container. BIA rating TC-W is the Boating Industry Association's designation for approved 2-cycle, water-cooled outboard oils. Use manufacturer's recommended gas/oil mixture or, if not available, mix 24 oz. oil with each 5 gallons of gas (25:1 ratio). (Imperial measure: 30 imp. oz. oil to 5 imp. gals. gasoline; metric measure: 800cc oil to 20 liters gasoline)

Figure 24.
Formula 50
Quicksilver
2-Cycle
Outboard
Motor Oil

5-3. CORRECT FUEL MIXING PROCEDURE

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

Mix directly in remote fuel tank. Measure accurately the required amounts of oil and gasoline. Pour a small amount of gasoline into the remote tank (Figure 22) and add a small amount of oil (about the same amount as gas). Mix thoroughly by shaking or stirring vigorously; then add balance of oil and gasoline and mix again. Cleanliness is of prime importance in mixing fuel, as even a very small particle of dirt can cause carburetion trouble.

**IMPORTANT:** Always use fresh gasoline. When standing, gasoline forms certain gum and varnish deposits and, when kept in a tank for a length of time, may give carburetor trouble and cause spark plug fouling.

5-4. IMPORTANCE OF CONSISTENT FUEL MIXTURES

Carburetor idle adjustment is sensitive to fuel mixture variations which result from use of different gasoholes and oils or due to inaccurate measuring or mixing. This may necessitate frequent readjustment of the carburetor idle needle. Be consistent. Prepare each batch of fuel exactly the same as previous ones.

**IMPORTANT:** Using less than the recommended proportion of oil may result in very serious motor damage from lack of sufficient lubrication. Using more than the recommended proportion of oil will cause spark plug fouling, erratic carburation, excessive smoking and faster-than-normal carbon accumulation.
Section 6 - Starting and Stopping

CAUTION: Never start motor while out of the water, or water pump impeller will become damaged.

6-1. DESCRIPTION - ELECTRIC STARTING

The electric starter system of electric start models is negative ground, a 12-volt type especially designed for outboard use, as simple and dependable as the starting system on your automobile. There are no adjustments to make. The starting system consists of a 12-volt electric starter, fully spray-proof, an electrically operated choke and a full-wave rectifier converting generated alternating current in direct current for charging the battery.

The electrical system consists of four circuits: The generating circuit, starter circuit, choke circuit and ignition circuit. (Merc 650S and 500S 1967-68-69 models do not have the generating circuit.)

1. Generating Circuit: Within the flywheel are permanent magnets and a wound stator. The alternating current generated in the stator windings passes to the rectifier which, in turn, produces direct current from the alternating current. Negative side of the rectifier is grounded; positive side goes to the internal harness plug. Through the plug, current passes to the battery on the positive side. Negative side of battery is connected through connector to ground of motor.

2. Starter Circuit: Consists of a 12-volt motor and starter engaging mechanism. A starter solenoid makes it unnecessary for full starting current to pass through the ignition switch.

3. Choke Circuit: To operate choke, key must be in “ON” position. While using electric choke, manual choke must be in down position.

4. Ignition Circuit: Motor is stopped by grounding the ignition. This is accomplished by turning key to “OFF” (left) position. Three, four and 6-cylinder models also are stopped by interrupting the ignition circuit via the mercury switch when the motor is tilted up.

6-2. ELECTRIC STARTING PROCEDURE

1. Be sure fuel tank contains a sufficient amount of fuel mixture and that tank is properly secured in boat.
2. Connect fuel line to motor by inserting twist connector into receptacle on cowl. Lock by twisting 1/8 turn clockwise, as shown in Figure 23.
3. Open air vent screw on fuel tank cap. (Figure 22)
4. Be sure that remote control cables are attached as instructed in Paragraph 4-1.
5. Fasten connector plug on end of electrical wiring harness to receptacle on front side of motor. (On 3-cyl. Merc 650, secure connector plug in place with retainer plate and 2 screws.) (Figure 25)

Figure 25. Securing 3-Cyl. Merc 650 (1972) Connector Plug
Figure 26. Quicksilver Battery (No. C-52941) for Electric Starting

6. Connect battery leads. Install battery hugs on end of lead wires and fasten securely to correct terminals on battery. Red lead of harness attaches to positive (+) post of battery and black lead to negative (-) post of battery. Use grease to prevent corrosion of terminals. The positive battery clamp has a 3/8" (9.5mm) stud for battery cable and negative battery clamp has a 5/16" (7.9mm) stud. The positive (+) battery lead from the harness will have a larger hole in the spade end.

7. Prime carburetors and fuel system by squeezing primer bulb on fuel line. (Figure 27) When fully primed, bulb will feel firm.

8. Shift into neutral.

9. With throttle handle in neutral, raise neutral warmup lever (on side of remote control housing, as shown in Figure 30) to the top and actuate electric starter by turning ignition key past “ON” position and allow to return to “ON”. Before shifting motor, return neutral warmup lever to closed position (down).

10. If motor should falter, actuate choke. (Figure 28 is typical.)

CAUTION: The starter motor is not designed for continuous operation, and serious damage may result if operated continuously. Do not operate for longer than 30 seconds. Allow a 2-minute cooling period between starting attempts.

CAUTION: Connect red cable to positive (+) battery terminal. (Figure 26) Failure to attach cables correctly will result in destruction of rectifier and/or switch box.

Figure 27. Priming Fuel System
NOTE: If motor is cold, engage starter with key in full right position and, simultaneously, depress choke button on the remote control box. During normal operation, do not depress choke button.

6-3. EMERGENCY STARTING PROCEDURE

Electric Starting Models

1. Be sure that fuel tank contains a sufficient amount of fuel mixture and that tank is properly secured in boat.
2. Connect fuel line to motor by inserting twist connector into receptacle in bottom cowl. Lock by twisting 1/8-turn clockwise as shown in Figure 23.
3. Open air vent screw on fuel tank cap. (Figure 22)
4. Be sure that remote control cables are attached as instructed in Paragraph 4-1.

5. Prime fuel system by squeezing primer bulb on fuel line. (Figure 27) When fully primed, bulb will feel firm.
6. Remove cowling as described in Paragraph 8-1.
7. Shift in neutral and raise neutral warmup lever (Figure 30) to the advance position.
8. Turn switch to "On" position.
9. If motor is cold, set manual choke (Figure 28, typical) in closed position (pull or turn "Up"). Avoid use of choke if motor is warm.
10. Engage end of hand starter rope in one of the recesses provided in the flywheel starter plate. (Figure 28) (On 2-cylinder models, hand starter rope handle is on the top cowl.) Grasp handle firmly and pull with a full, vigorous stroke.
11. After motor starts, open choke and replace cowling.

CAUTION: Battery leads must be installed to battery (even though battery may be dead) as described in Paragraph 6-2. Failure to connect battery leads correctly will result in destruction of rectifier and/or switch box.
64. MANUAL STARTING PROCEDURE

Manual Starting Models

1. Accomplish 1 through 4 in Paragraph 6-2.
2. Prime fuel system by squeezing primer bulb on fuel line. (Figure 27) When fully primed, bulb will feel firm.
3. If motor is cold, set manual choke in closed position (pull or turn “Up”). (Figure 29) Should motor begin to falter after starting, continue priming until fuel supply in carburetor is built up by running of motor. Avoid use of choke if motor is warm.
4. Shift into neutral.
5. On models so equipped, turn distributor or magneto shorting switch to “On” position. On electric starting models, turn key to “On” position.
6. With shift in neutral position and neutral warmup lever (if using remote controls) raised to the stop position, operate manual rewind starter. As soon as motor starts, move manual choke to open position and return neutral warmup lever to closed position (“Down”). (Figure 30) During normal operation, always keep choke in open position (“Down”).

NOTE: Starter is automatic rewind type. Proper operating technique will add many hours of life to starter cable and to starter internal mechanism. Grasp handle firmly and pull outward slowly until engagement of ratchet mechanism can be felt. Then continue outward pull with a full, vigorous stroke. Do not release handle at end of stroke and allow it to snap back. Retain grip on handle and allow cable to rewind slowly. Ratchet release mechanism is designed so that starter cannot engage during rewind.
6-5. STOPPING

**WARNING:** If the motor will not be operated for a period of time, if it is to be removed from the boat, or if it is to be tilted up, we recommend the following practice to prevent spillage from the carburetor throat and bowl and to prevent gum formation in the carburetor during storage:

1. Disconnect the fuel lines.
2. Allow motor to run at idling speed until it stops of its own accord, indicating that carburetor(s) have run dry.
3. Turn key to “Off” position on electric starting models (shorting switch “Off” on manual starting remote control box).

If the motor is to remain installed on the boat, ready for immediate re-start, stop by shifting into neutral gear and, with motor running at slow idle, turn key to “Off” position on electric starting models (by turning shorting switch off on manual starting remote control box; by depressing “Stop” button on 2-cylinder models (Figure 31) or by shifting into “Neutral” and moving choke lever to left on Merc 40-39 models).

6-6. REMOVING MOTOR from BOAT

Disconnect the remote controls, steering connections and electrical starting harness (if so equipped) from the motor. Disconnect the fuel line. Remove bolts which secure motor to transom and loosen the clamp bracket thumb screws.

**IMPORTANT:** Keep motor in an upright position, resting on its skeg until all water has drained from the drive shaft housing. If the motor is placed on its side while water remains trapped in the drive shaft housing, some water may enter the cylinders through the exhaust ports and cause internal damage. Be sure that all water drain holes in gear housing are open, so that water will drain completely.
Section 7 - Operation

7-1. THROTTLE and SHIFT

When Using Remote Controls (Figure 30)

SHIFT: Shift remote control with a firm, quick motion. Approximately
the first 45 degrees of control handle travel ... forward and reverse ...
shifts the motor.

THROTTLE: The remainder of the control handle movement advances
the throttle.

IMPORTANT: Smooth operation of the single-lever remote control
will ensure best results.

Figure 33. Shift Lever

Figure 32. Twist Grip Throttle

When Using Twist Grip Throttle - Merc 200-110-75-60-40
(Figure 32)

SHIFT: Gear shift is located on right side of motor. (Figure 33) Gear
positions are "Forward", "Neutral" (vertical, as shown in Figure 33)
and "Reverse".

THROTTLE: Ring on twist grip throttle has three settings - "Fast",
"Start" and "Shift Range". (Figure 32) On 1972 Merc 200-110-75-40
models, the end of the twist grip has a friction device ("Troll Set")
to hold throttle at a desired boat speed. To set the desired speed, select
the throttle setting by rotating the twist grip, then turn "Troll Set"
clockwise. To release the drag, turn the "Troll Set" counterclockwise.

FOR EMERGENCY THROTTLE OPERATION: Even though the
"Troll Set" has been set to maintain a constant speed, the twist grip
still can be turned manually to over-ride the setting without releasing
the "Troll Set".

IMPORTANT: FOR EMERGENCY STOP of models with "Stop
Button", depress "Stop Button" on bottom cowl. (Figure 31) Stop
single-cylinder model by choking.

7-2. DON'TS

1. Don't operate motor with tilt lock pin removed.
2. Don't try to shift into "Reverse" while motor is not running.
Reverse gear clutch may not be in exact relative position to permit engagement with shifter clutch. Forcing shift lever under this condition will result in bent or damaged shifting mechanism.

3. Don't operate motor out of water or with flushing attachment, or water pump impeller will be damaged. Read "Flushing" instructions carefully, following in Paragraph 11-3.

4. Don't try to shift gears unless twist grip throttle is in "Shift Range" position.

5. Don't ease gears into engagement. A firm, quick shift is recommended.

6. Don't force gears into engagement.

7-3. ADJUSTABLE TRIM TAB and GALVANIC CORROSION INHIBITOR - Merc 350 thru 1400 Models

The trim tab and galvanic corrosion inhibitor balances "steering torque" so that the steering wheel will turn with equal tension in each direction. (Figure 34) If the boat turns more easily to the left, remove plug on top of drive shaft housing extension (Figure 1), loosen cap screw and move trim tab to the left when viewing motor from behind. Tighten cap screw and replace plug. Reverse the procedure if boat turns more easily to right. This special alloy trim tab has been developed to aid in protecting the surfaces of the drive shaft housing and gearing from electrolytic action (corrosion and pitting of metal surfaces) on units operated in salt water areas. Surface erosion in salt water requires periodic replacement of the corrosion inhibitor. Do not paint or place protective coating on the trim tab, or its inhibiting value is lost.

For further protection from the effects of electrolysis, install the Quicksilver MercCathode System (C46733A1), which provides solid-state electronic corrosion protection and can be obtained from your Mercury dealer.

7-4. POWER TRIM OPERATION

**CAUTION:** When using Power Trim on some boats, operation at extreme "In" or "Out" positions greatly increases steering torque, and steering becomes difficult. Outboard should be trimmed to a safe operating angle to provide easy steering.

Trimming Up and Down for Forward Operation under High Thrust

**NOTE:** Do not turn at high speed with outboard tilted out beyond tilt pin flanges of clamp bracket, as outboard will have no side thrust support when tilted that high. Refer to "Tilt Pin Adjustment", Paragraph 2-2, before operating Power Trim. The tilt angle adjustment pin must be positioned as outlined to assure proper control of boat.

1. Raising with Power Trim: Press "Up/Out" button and hold button...
until outboard has moved out to angle required to properly trim boat. Power Trim unit is equipped with a cutout switch which will stop the outboard from moving out beyond the last tilt pin hole in the clamp bracket.

2. Lowering with Power Trim: Press “In” button and hold button until outboard has moved in to angle required to properly trim boat or until end of downward travel has been reached.

**CAUTION:** Exercise caution when operating engine at extreme tilt angles in shallow water. Should the water level fall below the water intake ports, overheating or water pump impeller damage could result.

To facilitate boat launching and loading, the outboard may be raised up beyond the clamp bracket flange by pressing the trailer “Up” and “Up/Out” buttons at the same time. Lower by using the “In” button. The outboard also may be raised and lowered when operating in shallow water at reduced throttle by using these buttons.

1. To raise outboard, press “Up” and “Up/Out” buttons and hold buttons until outboard has raised up to desired position or reaches end of upward travel.

   **NOTE:** If buttons remain depressed after outboard reaches end of upward travel, an outboard cutout switch will open and pump motor will stop. To prevent cutout from opening, it is recommended that “Up” and “Up/Out” buttons be released as soon as outboard reaches the end of upward travel. If cutout should open, do not depress switches for approximately one minute. After this period of time, cutout will close, and unit may be operated.

2. To lock outboard up for repairs, etc., pump full up, then tilt by hand an additional small amount and engage tilt lock.

3. To lower outboard, press “In” button (disengage tilt lock if previously locked) and hold button until outboard has moved down to desired position or reaches end of downward travel.

**Figure 35. Control Knob and Fill Plug - Power Trim**

**Tilting Up Manually**

1. Rotate control knob (Figure 35) full to the “right” (clockwise). This releases reverse lock and allows tilting up by hand from down position only. Manual control knob will not release to down position when it has been tilted up with pump.

2. To re-engage reverse lock in hydraulic pump, rotate knob fully to the “left” (counterclockwise) and press “In” button to return outboard to full down position.
NOTE: Unit will not hold reverse thrust if lock is not re-engaged.

Adjusting Trim Limit Switch

NOTE: Tilting and trimming up and down for operation under high thrust is done by using only the "Up/Out" and "In" buttons. This control allows a limit switch to stop pumping action while the engine still is within the clamp bracket for protection against breakage. Adjust tilt limit switch, if necessary, as follows:

1. Press "Up/Out" button and hold until engine tilts up and stops. Engine should not tilt beyond last tilt pin hole of clamp bracket.
2. Determine position to which engine has tilted by pulling out on lower unit to take up slack in hydraulic cylinders and attempt to install a tilt pin into the last pin hole. Proper adjustment is made when the tilt pin just inserts completely into the last hole.
3. If engine tilts out beyond last tilt pin hole of clamp bracket or does not tilt out far enough (as determined in preceding paragraph), loosen limit switch screw and adjust nut on limit switch. (Figure 36) Turn nut out (counterclockwise), if engine tilts out beyond last tilt pin hole, or turn nut in (clockwise) to allow engine to tilt out further.
4. Repeat steps No. 2 and 3, as necessary, to obtain proper trim position. Tighten limit switch screw.
5. To tilt engine up completely, see preceding information.

Checking Oil Level

Check hydraulic system oil level periodically as follows:

1. Tilt outboard to full up position.
2. Remove "Fill" plug. (Figure 35)
3. Fill to bottom of threads with a high quality, name brand SAE 20-20W specification MS automotive oil. Do not overfill.
4. Replace "Fill" plug and return outboard to normal operating position.

7-5. HOW TO TELL WHETHER WATER PUMP IS OPERATING

Normal operation of the water pump is indicated by a "tell-tale" stream of water issuing from a small hole at the rear of the bottom cowl. (Figure 1) If, at any time during operation, this stream is not evident, turn motor off immediately and check hole with a piece of wire to be sure that it is not clogged. If clogged, and unable to dislodge obstruction with wire, avoid further operation until water pump and cooling system have been checked for failure. Operation of motor with

Figure 36. Trim Limit Switch - Power Trim
inoperative water pump or with obstruction in the cooling system will cause severe damage from overheating. Motor should be referred to an Authorized Mercury Service facility for inspection and necessary repair.

7-6. CAVITATION

Cavitation is indicated by intermittent or continued overspeed of the motor, accompanied by violent water agitation and a sharp reduction of boat speed. Cavitation occurs when the slipstream (flow of water past propeller) changes from a smooth, consistent flow to a turbulent flow. Under conditions of cavitation, the turbulent area or cavity around the propeller causes a very noticeable loss of forward thrust. Most commonly, cavitation is caused by one of the following:

1. Propeller operating too close to surface. This may be due to transom being too high, tilt angle adjusted so that lower unit is too high or boat riding stern-high because of improper loading. (Figure 3)

2. Turbulence in slipstream due to obstruction such as a wide or deep keel. This can be helped in most cases by tapering keel in both width and depth from a point about 20” forward of trailing edge; however, for best results, boat should have no keel in last 4 feet of stern.

3. Propeller fouled by weeds, rope, etc.
4. Damaged or broken propeller blades. Broken blade is usually indicated by excessive vibration.
5. Propeller safety clutch slipping due to damage. This might be mistaken for cavitation.

7-7. SHALLOW WATER OPERATION

CAUTION: When shift lever is in “Neutral” or “Reverse” position, lower unit is locked in normal operating position. Shock load of impact could cause transom breakage, particularly when boat is backing up. Proceed cautiously when in reverse motion and be careful of underwater obstructions. DO NOT accelerate motor to high RPM.

7-8. OPERATION IN SALT WATER

Prior to operation in salt water, it is recommended that the cowl be removed, and the entire powerhead be sprayed with Quicksilver Corrosion and Rust Preventive (C-92-29152 or C-92-63260).

Section 8 - Fuel System Maintenance

8-1. REMOVING COWLNG

MODELS with FRONT COWL and WRAP-AROUND COWL (Figure 1): Remove front cover plate by pressing in and turning the knob on the bottom of the plate a ¼-turn and lifting up and out until the hinge disengages at the pivot point. (Figure 37) Release the fastening clamps (Figure 38) to permit the cowl band to be removed from the motor. Remove the top cowl by lifting up and releasing the latch located at the front (Figure 39) or side of the top cowl. Under normal conditions, all motor parts that need adjustment now are exposed.

MERC 650 (3-Cyl.): Remove front cowl by pushing release lever toward fuel line receptacle and lift cowl up until the hinge disengages at the pivot point. (Figure 40) Remove fastening clamps from the wrap-around cowl (Figure 38) and push both sides of the cowl outward. Lift cowl up and to the rear to remove.

MERC 402-400-350: Remove front cover plate by pressing down on button under starter handle and pulling off front cover plate. (Figure 41) Release the fastening clamps to permit removal of cowl band from motor.
Figure 37. Removing Front Cowl

Figure 38. Removing Wrap-Around Cowl

Figure 39. Removing Top Cowl

Figure 40. Removing Front Cowl - Merc 650 (3-Cyl.)
MERC 200: Press button above front cover plate (under starter handle) and remove plate. This exposes the fastening clamps which secure the cowl (wraparound) band. Release the two clamps and remove band.

MERC 110-75-60: Remove top cowl by pulling down on the two “Unlock” levers on the inside of the tilt handle from underneath. (Figure 42)

MERC 439: Pull the two latch pin levers outward from side of bottom cowl (Figure 43) and lift top cowl off (up and forward).

Avoid operation of motor with cowl- ing removed.

8-2. CARBURETOR ADJUSTMENT
Each carburetor is provided with one adjustment; however, before attempting to readjust carburetor(s), check for other possible causes of trouble as outlined in “Trouble Chart,” Section 12. The low speed mixture adjusting needle turns clockwise for leaner mixture, counterclockwise for richer mixture. High speed has a fixed jet, similar to those used in automobiles.

8-3. APPROXIMATE INITIAL SETTING
If carburetor(s) are out of adjustment so motor cannot be started, turn low speed mixture adjusting needle inward (clockwise) until it seats lightly, then turn back out one turn. (Turning tight will damage the needle and seat.) This approximate setting will permit starting but may be found too rich for normal operation; therefore, as soon as motor starts, correct final adjustment may be attained as instructed in “Low Speed Mixture Adjustment,” Paragraph 8-4.

Carburetor(s) are factory adjusted and, therefore, require no additional adjustment if operated at an elevation of less than 4,000 ft. In mountainous areas with high elevations, the dealer will select different high speed jet(s), install in the carburetor(s) and adjust carburetor(s) before delivery of the motor. In making final adjustment of 4 and 6-cylinder carburetors, it should be borne in mind that only two
cylinders are fed by one carburetor; therefore, adjustments on each carburetor will affect mixture to corresponding cylinders only.

8-4. LOW SPEED ADJUSTMENT
1. Warm up motor before attempting to make adjustment.
2. Remove cowling as instructed in Paragraph 8-1.
3. With the motor running at idle speed while in forward gear, turn the low speed mixture adjusting needle counterclockwise until motor starts to "load-up" or fire unevenly due to over-rich mixture. (Figure 44)
4. Then slowly turn the needle clockwise until cylinders fire evenly and motor picks up speed.
5. Continue turning clockwise until too lean a mixture is obtained and motor slows down and misfires.
6. Set adjustment screw halfway between rich and lean.
7. Do not adjust leaner than necessary to attain reasonably smooth idling. When in doubt, it is preferable to have the mixture set slightly rich rather than too lean.

NOTE: Idle cannot be adjusted effectively in "Neutral", or motor will sputter and stop when shifted to "Forward" because of "no load" condition while adjusting.

8-5. SERVICING FUEL TANK FILTER
Detach the fuel line from fuel tank and remove fuel pickup tube by removing screws in top connector housing. The filter, a fine wire mesh, can be cleaned by rinsing in clean benzol (benzine).

8-6. SERVICING MOTOR FUEL FILTER
1. Remove cowling as instructed in Paragraph 8-1.
2. Remove front bracket from 4 and 6-cylinder models by taking off cap screws which secure it to front of bottom cowl and top plate.
3. Remove screw from top of filter cover(s) on the carburetor(s).
4. Remove fuel filter cover(s).
5. Inspect filter(s), fuel lines and fittings for signs of wear or leakage.
6. Drain and clean filter(s).
7. Replace filter cover(s), tighten screw(s) and install front bracket (4 and 6-cylinder models) and cowl.

NOTE: Fuel filter is more than adequate to take care of all requirements under normal use. If, after all other checks, fuel filter is found to be the cause of the trouble, the filter element should be replaced.
**Section 9 - Lubrication**

9-1. MERCURY OUTBOARDS LUBRICATION CHART

<table>
<thead>
<tr>
<th>1966 thru 1972 Merc Models</th>
<th>Location</th>
<th>Fig. No.</th>
<th>Lubricant</th>
<th>Every 30 Days</th>
<th>Every 60 Days</th>
<th>Once in Season</th>
<th>Twice in Season</th>
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<tr>
<td>All</td>
<td>Lower Drive Unit</td>
<td>45</td>
<td>Super-Duty Gear Lubricant (C-92-52650 or C-92-63225)</td>
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<td>Propeller Shaft Splines</td>
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<td>Perfect Seal (C-92-34227)</td>
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<td>All</td>
<td>Swivel Pin</td>
<td>46</td>
<td>Anti-Corrosion Grease (C-92-45134 or C-92-63290)</td>
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<td></td>
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<tr>
<td>3-4 &amp; 6-Cyl.</td>
<td>Reverse Lock Cam</td>
<td>47</td>
<td>Multipurpose Lubricant (C-92-49588 or C-92-63250)</td>
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<td>If Equipped</td>
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*Units Operated in Salt Water*
9-2. LOWER DRIVE UNIT LUBRICATION

Periodically lubricate drive unit with SUPER-DUTY Quicksilver Outboard Gear Lubricant (C-92-52650 or C-92-63225) as follows:

1. Remove lubricant filler plug and washer, located on bottom of gear housing. (Figure 45)

2. Insert lubricant tube into filler hole, then remove air vent screw and washer.

   IMPORTANT: Never apply lubricant to the lower unit without first removing air vent screw, as the injected lubricant displaces air which must be allowed to escape so that the gear housing can be filled completely. DO NOT use regular automotive grease in the lower drive unit. Use ONLY SUPER-DUTY Quicksilver Gear Lubricant.

3. Fill gear housing with lubricant until excess starts to flow out of air vent screw hole.

4. Replace air vent screw and washer.

5. Remove lubricant tube from filler hole and install filler plug and washer.

Figure 45. Lower Drive Unit Lube

Figure 46. Swivel Pin Lubrication

Figure 47. Distributor Adaptor Fittings
Section 10 - Ignition Maintenance

10-1. MAINTENANCE

The electrical system is as trouble-free and as simple as our research and engineering department has been able to make it. If, for any reason, some part of the electrical system is not in operation, do not attempt to fix it yourself, but refer to your nearest Authorized Mercury Service facilities. (See Sections 8, 10 and 11).

10-2. SERVICING SPARK PLUGS

WARNING: Do not touch or disconnect any ignition system parts while engine is running or while battery cables of electric starting models are connected.

Do not remove spark plug connectors and hold them in your hand to check for spark while engine is running, as high voltage is present.

Operation with old or wrong type spark plugs will be reflected by motor performance as indicated by hard starting, fouling, missing, overheating, pre-ignition or lack of normal power. Therefore, whenever motor performance indicates that the spark plugs are in need of attention (see “Trouble Chart”, Section 12), service as follows:

1. Remove cowling as instructed in Paragraph 8-1.
2. Disconnect spark plug leads.
3. Remove spark plugs, clean and inspect. If the electrode on plugs with Thunderbolt Ignition is burned away to the extent that it is 1/32” (.5mm) below plug surface, replace with new spark plugs, as indicated on “Specifications” page, preceding. On models without Thunderbolt Ignition, adjust plug gap to recommendation shown on “Specifications” page, preceding.
4. Install spark plugs. Be sure that gaskets are in good condition. Start the threads one or two turns with fingers to avoid danger of cross-threading. After seating plug finger-tight on gasket, a additional 1/2-turn with a wrench generally will be sufficient to tighten. Do not overtighten; insulator may crack, due to over stressing spark plug body, or threads may strip in cylinder head.
5. Connect the spark plug leads. Be sure that each lead is connected to its respective spark plug. If high tension lead insulation is damage or deteriorated, new leads must be installed. Defective insulation will cause hard starting and mis-firing due to intermittent shorting of the high tension circuit.

10-3. BATTERY - ELECTRIC START MODELS

A strong battery . . . 70 ampere hour minimum capacity (32 amper hour or larger for Merc 200 with electric starting kit) . . . must be maintained. If the battery shows less than 9½ volts when under starting load, it should be recharged. Check with a DC voltmeter. A reading under 9½ volts (measured at the battery terminals under starting load) indicates insufficient voltage and subsequent shortage of power, with the result that the motor will not turn fast enough to start.

Check also can be made with a hydrometer. If the reading is below 1.230 (specific gravity), recharge or replace the present battery. When installing a new battery, make it a habit to wire brush the taper terminals and clamp terminals, then clean and grease them. This will protect against high resistance connections which make it difficult to keep the battery fully charged and may contribute to low available voltage in entire electrical starting system.
10-4. MAINTENANCE of BATTERY
All lead acid batteries (Figure 26) have an inherent self-discharge characteristic when not in use. Recharge every 60 days or when specific gravity drops below 1.230. (Recharge rate should not be over 6 amperes. Discontinue charging when gravity reaches 1.260.) Cover plates with distilled water, but not over 3/16" (4.8mm) above perforated baffles.

4. Store battery in a COOL-DRY place in a dry carton or box.
5. Remove battery from storage every 60 days. Check water level and put on charge for 5 to 6 hours at 6 amperes. DO NOT FAST CHARGE.
6. When ready to place the battery back into service, remove excess grease from terminals (leaving small amount on), recharge as necessary and reinstall in your equipment.

If unable to have above performed by your local Mercury dealer, contact your local automotive garage.

10-5. WINTER STORAGE CARE of BATTERY
1. Remove battery from its installation as soon as possible and remove all grease, sulfate and dirt from top surface with water hose and compressed air hose or other means.
2. Cover plates with distilled water, but not over 3/16" (4.8mm) above perforated baffles.
3. Grease terminal bolts well with cup grease or vaseline.

CAUTION: A discharged battery can be damaged by freezing.

Section 11 - Special Care Required

11-1. PERIODIC INSPECTION
Periodic systematic inspection is the simplest and most positive way of discovering and correcting a failure before it can cause inconvenience or mechanical damage. The recommended inspection interval is based on average operating conditions in utility service. Under severe conditions, continuous heavy duty or high speed operation, the inspection interval should be shortened.

In salt water, however, continuous operation is more beneficial than occasional use.

The inspection includes the following:
1. Clean the entire unit thoroughly, including all accessible powerhead parts.
2. Check entire unit for loose, damaged or missing parts. Tighten or replace as required.
3. Lubricate the lower drive unit as instructed in Paragraph 9-2.
4. Lubricate other points as instructed in Paragraph 9-1.
5. Lubricate starter motor shaft on electric start models with light film of S.A.E. No. 10 oil. Do not over-lubricate.
7. Lubricate starter motor shaft on electric start models with light film of S.A.E. No. 10 oil. Do not over-lubricate.
8. Lubricate starter motor shaft on electric start models with light film of S.A.E. No. 10 oil. Do not over-lubricate.
9. Inspect spark plug leads and electrical leads for damage or deterioration, particularly where insulation comes in contact with metal parts. Be sure to reconnect each lead to its respective post.
10. Inspect fuel lines for damage or deterioration.
11. Inspect spark plug leads and electrical leads for damage or deterioration, particularly where insulation comes in contact with metal parts. Be sure to reconnect each lead to its respective post.
12. Inspect spark plug leads and electrical leads for damage or deterioration, particularly where insulation comes in contact with metal parts. Be sure to reconnect each lead to its respective post.
13. Inspect the finish for damage or corrosion. Thoroughly clean damaged or corroded areas and apply matching paint (Quicksilver Spray Paints - See your local dealer).
14. Operate motor in water tank or flush cooling system according to instructions in Paragraph 11-3. Disconnect the fuel line from the motor and allow motor to run at idling speed until it stops of its own accord, indicating that carburetor(s) have run dry.
15. Drain fuel tank and fuel lines.
16. Remove cowling.
17. Service fuel filters as instructed in Paragraphs 8-5 and 8-6.
18. Lubricate lower drive unit as instructed in Paragraph 9-2.
19. Remove spark plug.
20. Rotate crankshaft to position where the number one (top) piston is at bottom dead center position. This can be determined by inserting a pencil or rod into the spark plug hole. Apply Quicksilver Storage Seal (C-92-34227) or a waterproof-type lubricant. Refer to Paragraphs 3-3 and 3-4.
21. Connect the spark plug cables. Be sure that each cable is connected to its respective spark plug.
22. Lubricate distributor adaptor on 3-4 and 6-cylinder models. See Paragraph 9-1.
23. Clean the motor thoroughly, including all accessible powerhead parts, and spray with Quicksilver Corrosion and Rust Preventive (C-92-29152 or C-92-63260). Install the cowling and apply a thin film of clean, fresh engine oil to all painted surfaces.
24. Remove the propeller, apply a liberal coat of Perfect Seal (C-92-34227) or a waterproof-type lubricant to the propeller shaft and reinstall propeller. Refer to Paragraphs 3-3 and 3-4.

In preparing a motor for storage or shipment, the unit must be protected 1) against physical damage and 2) from rust, corrosion and dirt. The original shipping carton is ideal for storage or shipment but, if it is no longer available and a new container must be made, see your dealer for proper bracing, ventilation, etc, and complete the following:

1. Operate motor in water tank or flush cooling system according to instructions in Paragraph 11-3. Disconnect the fuel line from the motor and allow motor to run at idling speed until it stops of its own accord, indicating that carburetor(s) have run dry.
2. Drain fuel tank and fuel lines.
3. Remove cowling.
4. Service fuel filters as instructed in Paragraphs 8-5 and 8-6.
5. Lubricate lower drive unit as instructed in Paragraph 9-2.
6. Lubricate control linkage as instructed in Paragraph 9-1.
7. Remove spark plugs.
8. Rotate crankshaft to position where the number one (top) piston is at bottom dead center position. This can be determined by inserting a pencil or rod into the spark plug hole. Apply Quicksilver Storage Seal (C-92-54778 or C-92-63233) into a spark plug hole, allowing time for some of the oil to drain into the crankcase via transfer ports. Repeat this operation on the other cylinder(s), then install spark plugs and operate the manual starter several times to distribute oil around the inside of the crankcase and cylinders.
9. Connect the spark plug cables. Be sure that each cable is connected to its respective spark plug.
10. Lubricate distributor adaptor on 3-4 and 6-cylinder models. See Paragraph 9-1.
11. Clean the motor thoroughly, including all accessible powerhead parts, and spray with Quicksilver Corrosion and Rust Preventive (C-92-29152 or C-92-63260). Install the cowling and apply a thin film of clean, fresh engine oil to all painted surfaces.
12. Remove the propeller, apply a liberal coat of Perfect Seal (C-92-34227) or a waterproof-type lubricant to the propeller shaft and reinstall propeller. Refer to Paragraphs 3-3 and 3-4.

**11-2. PREPARATION for STORAGE**

**WARNING:** As a safety precaution, remove positive (+) battery cable on electric start models when boat is placed in storage, on display or in transit. This will eliminate possibility of accidental starting of engine and result in overheating and damage to the engine due to lack of water.
and reinstall propeller. Refer to Paragraphs 3-3 and 3-4.


IMPORTANT: When storing outboard motors for the winter, be sure that all water drain holes in the gear housing are open and free and that the flushing plug is removed so that all water will drain out. Trapped water may freeze and expand, thus cracking the gear housing and/or water pump housing. Check and refill lower unit with SUPER-DUTY Quicksilver Gear Lubricant (C-92-52650 or C-92-63225) before storage to protect against possible water leakage into gear housing which is caused by loose air vent plug or loose grease filler plug. Be sure to replace gaskets under screws and flush plug, renewing any damaged gaskets.

11-3. ATTENTION REQUIRED following OPERATION in SALT WATER or SILT

Even though the interior surfaces of this outboard motor are treated to resist corrosion, there is a possibility of a mechanical build-up of salt and silt deposits which no form of protective coating can prevent and which can be eliminated only by occasional flushing with fresh water. While there is no complete protection known for exterior surfaces, there are ways by which electrolysis and corrosion damage can be minimized. (Refer to trim tab and galvanic corrosion inhibitor, on models so equipped, in Paragraph 7-3.) Follow the simple steps, 1 thru-6 following, to materially increase the life of all exposed parts and decorative finishes:

1. When outboard is left on boat, it is recommended that it be left in operating position when moored. If partially tilted out of water, the trim tab cannot act as a galvanic corrosion inhibitor.

2. Disconnect the negative battery terminal on electric starting motors when in dock or in storage for any long period of time.

3. Lubricate the thumb screws (Figure 50) of the motor with Anti-Corrosion Grease (C-92-45134 or C-92-63290) to ensure smooth operation.

4. Lubricate the propeller shaft splines occasionally with a liberal coat of Perfect Seal (C-92-34227) or a waterproof-type lubricant, thus enabling the propeller to be removed easily.

5. The entire powerhead can be sprayed with a coating of Corrosion and Rust Preventive (Part No. C-92-29152 or C-92-63260) to protect the finish of all parts beneath the cowl. The exterior of the motor also can be sprayed or wiped to prevent salt corrosion from dulling the finish.

6. With motor in an upright position, flush cooling system by removing plug in gear housing marked “FLUSH” (beneath drive shaft trim cover on Merc 110-75-60; in right side of bottom cowl on Merc 40-39) (Figure 52 or 53), threading flushing device (C-48755A1) into hole and attaching garden hose coupling with hose. Turn on water but DO NOT OPERATE the outboard while flushing. Water flow is strong enough that flushing can be done with water pressure provided from the city water tap. DO NOT USE full water pressure.

![Figure 52. "Flush" Plug - 4 and 6-Cylinder and Merc 650-402-200](image-url)
CAUTION: If outboard must be operated while flushing, in order to prevent damage to the water pump impeller it will be necessary to use a Flush-Test Device which attaches directly over the intake holes in the gear housing strut and provides cooling water at this point. DO NOT OPERATE outboard above idle speed while flushing with Flush-Test Device, or RPM cannot be controlled. See your local Mercury Outboard dealer for this device.

WARNING: When flushing, be certain that area in vicinity of propeller is clear and that no person is standing nearby, to avoid possible injury. It is advisable to remove propeller as a precautionary measure.

While and after flushing, keep motor in upright position, resting on skeg, until all water has drained from drive shaft housing to prevent water from entering the powerhead via drive shaft housing and exhaust ports. By following the preceding simple preventive maintenance operations at regular intervals, longer life will be added to your motor when used in salt water.

11-4. ATTENTION REQUIRED following COMPLETE SUBMERSION

Motor which has been submerged must be completely disassembled for cleaning and inspection. This requires the facilities and experience of Authorized Mercury Service facilities and should be accomplished as soon as possible after recovery. Delayed action will encourage rust and corrosion of internal parts. If Authorized Mercury Service is not immediately available, follow instructions in steps 6 through 11 under Paragraph 11-1. This will retard rust and corrosion. Basically the points to remember are these:

1. Recover motor and begin cleaning as quickly as possible.
2. Wash entire motor with fresh, clean water to remove salt, mud, silt, weeds, etc.
3. Get as much water as possible out of powerhead. Most of the water can be eliminated by removing spark plugs and operating manual starter (Figure 28) with spark plug holes facing downward. If starter does not turn over freely when starter is operated, do not force. This may be an indication of internal damage such as a bent connecting rod or a broken piston. Never run motor with water intake out of water.
4. Pour alcohol in cylinders first, or use Quicksilver Engine Cleaner (C-92-47949 or C-92-63214); rotate engine with manual starter, then lubricate with motor oil all internal parts which can be reached. This is best accomplished by injecting oil into spark plug holes, installing spark plugs and operating starter to distribute oil. If alcohol and oil are not available, insert a rod into fuel check unit to open check valve and actuate primer bulb. Direct fuel flow into cylinders.
5. Take motor to Authorized Mercury Service facilities as soon as possible.
## SECTION 12 - TROUBLE CHART

### A. Does Not Start
- **Possible Cause:** Fuel Tank Empty
  - **Reference:** Para. 5-3
- **Possible Cause:** Motor is Cold or Flooded
  - **Reference:** Para. 6-2
- **Possible Cause:** Fuel Line Not Connected
  - **Reference:** Para. 5-1
- **Possible Cause:** Fuel Line Pinched or Kinked
  - **Reference:** Para. 5-1
- **Possible Cause:** Fuel Filter(s) in Need of Cleaning
  - **References:** 8-5 & 8-6
- **Possible Cause:** Air Leak in Fuel System
  - **Reference:** Para. 5-1
- **Possible Cause:** Low Speed Needle Valves Mal-Adjusted
  - **Reference:** Para. 8-4
- **Possible Cause:** Wrong Oil or Not Enough Oil in Fuel Mixture
  - **Reference:** Para. 5-3
- **Possible Cause:** Wrong Gasoline or Too Much Oil in Fuel Mixture
  - **Reference:** Para. 5-3
- **Possible Cause:** Spark Plugs Fouled or Defective
  - **Reference:** Para. 10-2
- **Possible Cause:** Wrong Type Spark Plugs
  - **Reference:** Para. 10-2
- **Possible Cause:** No Spark
  - **Reference:** Para. 10-2
- **Possible Cause:** Weak Spark or Intermittent Spark
  - **Reference:** Para. 10-2
- **Possible Cause:** Spark Plug Leads Interchanged
  - **Reference:** Para. 10-2
- **Possible Cause:** Water Pump Failure or Cooling System Clogged
  - **Reference:** Para. 7-5
- **Possible Cause:** Cavitation
  - **Reference:** Para. 7-6
- **Possible Cause:** Propeller Damaged
  - **Reference:** Para. 3-5
- **Possible Cause:** Throttle Angle Not Correctly Adjusted
  - **Reference:** Para. 2-2
- **Possible Cause:** Boat Improperly Loaded
  - **Reference:** Para. 2-2
- **Possible Cause:** Transom Too Low
  - **Reference:** Para. 2-1
- **Possible Cause:** Transom Too High
  - **Reference:** Para. 2-1
- **Possible Cause:** Excessive Spark Advance
  - **References:** Pages 3-4
- **Possible Cause:** Insufficient Spark Advance
  - **References:** Pages 3-4
- **Possible Cause:** Propeller of Wrong Pitch or Diameter
  - **Reference:** Para. 3-1
<table>
<thead>
<tr>
<th>FORCE</th>
<th>KNOTS</th>
<th>DESCRIPTION</th>
<th>WAVE CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Light air</td>
<td>Glassy smooth with few ripple patches</td>
<td>Light airs</td>
</tr>
<tr>
<td>4-6</td>
<td>Light breeze</td>
<td>Surface now covered with ripples</td>
<td>Light airs</td>
</tr>
<tr>
<td>7-10</td>
<td>Gentle breeze</td>
<td>Short waves are beginning</td>
<td>Light airs</td>
</tr>
<tr>
<td>11-16</td>
<td>Moderate breeze</td>
<td>Waves are longer</td>
<td>Light airs</td>
</tr>
<tr>
<td>17-21</td>
<td>Fresh breeze</td>
<td>Few whitecaps are breaking</td>
<td>Light airs</td>
</tr>
<tr>
<td>22-27</td>
<td>Strong breeze</td>
<td>Larger waves, many whitecaps</td>
<td>Light airs</td>
</tr>
<tr>
<td>28-33</td>
<td>Moderate gale</td>
<td>Sea running high, some spray blown</td>
<td>Light airs</td>
</tr>
<tr>
<td>34-40</td>
<td>Fresh gale</td>
<td>Waves, crests growing, much spray</td>
<td>Light airs</td>
</tr>
<tr>
<td>41-47</td>
<td>Strong gale</td>
<td>Similar but more intense</td>
<td>Light airs</td>
</tr>
<tr>
<td>48-55</td>
<td>Whole gale</td>
<td>High waves, long crests, large foam patches</td>
<td>Light airs</td>
</tr>
<tr>
<td>56-66</td>
<td>Storm</td>
<td>Wind pressure is intense; air is filled with spray and the sea with streaky foam, while waves are so high that large vessels are hidden in the troughs</td>
<td>Light airs</td>
</tr>
<tr>
<td>Above 66</td>
<td>Hurricane</td>
<td></td>
<td>Light airs</td>
</tr>
</tbody>
</table>

By studying the wave action, a person can judge whether the water is calm enough for boating, or it is rough and dangerous. When combined with CURRENT, the action may differ somewhat, but can still be applied.