

VIKING

outboard motor
owner's manual

EATON'S OF CANADA

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3.5 H.P. SPECIFICATIONS

HORSEPOWER — 3.5 Brake H.P. @ 4500 R.P.M.

ENGINE — Two-Cycle, Single Cylinder.

BORE AND STROKE — $2\frac{1}{16}$ " x $1\frac{9}{16}$ "

DISPLACEMENT — 5.18 Cu. In.

CARBURETOR — Float Feed.

CONNECTING ROD — Die Cast Aluminum — Cast-In Bronze Bearing.

CRANKSHAFT — Molded Nodular Iron. Precision Ground Finish.

FUEL TANK — Pressed Aluminum Tank — 5 U.S. Pints or 4 Imperial Pints.

PROPELLER SHAFT AND DRIVE SHAFT — Stainless Steel, Hardened, Ground and Polished.

PROPELLER — Aluminum: $7\frac{1}{2}$ " Dia. x $4\frac{1}{2}$ " Pitch — Left Hand Rotation.

COOLING — Air Cooled.

TRANSOM HEIGHT — 15".

WEIGHT — 29 Lbs.

6 H.P. SPECIFICATIONS

HORSEPOWER — 6 Brake H.P. @ 4500 R.P.M.

ENGINE — Two-Cycle, Twin Cylinder, Alternate Firing.

BORE AND STROKE — $2\frac{1}{8}$ " x $1\frac{1}{16}$ "

DISPLACEMENT — 10.6 Cu. In.

CARBURETOR — Float Feed.

CONNECTING ROD — Die Cast Aluminum — Cast In Bronze Bearing.

CRANKSHAFT — Forged Nickel Steel, Cased Needle Upper Main Bearing. Bronze Lower Main, Center Main and Thrust Bearings.

FUEL TANK — Separate Steel Tank — 6 U.S. Gallons, 5 Imperial Gallons.

PROPELLER AND DRIVE SHAFT — Stainless Steel, Hardened, Ground and Polished.

PROPELLER — Aluminum Alloy — $7\frac{1}{2}$ " Dia., $7\frac{1}{2}$ " Pitch, Right Hand Rotation.

COOLING — Water Cooled — Positive Displacement Type Water Pump.

TRANSOM HEIGHT — 15".

WEIGHT — 55 Lbs.

TILT LOCK — Positive Tilt Lock Permits Engine to Remain in Tilted Position When Not in Use.

RECOMMENDED OPERATING RANGE — 4000-5000 R.P.M.

9.2 H.P. SPECIFICATIONS

HORSEPOWER — 9.2 Brake H.P. @ 4750 R.P.M.

ENGINE — Two-Cycle, Twin Cylinder, Alternate Firing.

BORE AND STROKE — $2\frac{1}{8}$ " x $1\frac{1}{16}$ "

DISPLACEMENT — 11.97 Cu. In.

CARBURETOR — Float Feed.

CONNECTING ROD — Forged Nickel Steel — Uncased Needle Bearings at Crankshaft, Cased Needle Bearings at Piston Pin.

CRANKSHAFT — Forged Nickel Steel — Cased Needle Upper and Lower Main Bearing. Bronze Center Main and Thrust Bearings.

FUEL TANK — Separate Steel Tank — 6 U.S. Gallons, 5 Imperial Gallons.

PROPELLER AND DRIVE SHAFT — Stainless Steel, Hardened, Ground and Polished.

PROPELLER — Aluminum Alloy — 8" Dia., 8" Pitch, Right Hand Rotation.

COOLING — Water Cooled — Positive Displacement Type Water Pump.

TRANSOM HEIGHT — 15".

WEIGHT — 55 Lbs.

TILT LOCK — Positive Tilt Lock Permits Engine to Remain in Tilted Position When Not in Use.

RECOMMENDED OPERATING RANGE — 4000-5500 R.P.M.

15 H.P. SPECIFICATIONS

HORSEPOWER — 15 Brake H.P. @ 4500 R.P.M.

ENGINE — Two-Cycle, Twin Cylinder, Alternate Firing.

BORE AND STROKE — $2\frac{7}{16}$ " x 2.14"

DISPLACEMENT — 19.96 Cu. In.

CARBURETOR — Float Feed.

CONNECTING ROD — Forged Nickel Steel — Uncased Needle Bearings at Crankshaft, Cased Needle Bearings at Piston Pin.

CRANKSHAFT — Forged Nickel Steel — Cased Roller Bearings at Upper and Lower Main, Uncased Needle Bearings at Center Main with Bronze Thrust Bearing.

FUEL TANK — Separate Steel Tank — 6 U.S. Gallons, 5 Imperial Gallons.

PROPELLER AND DRIVE SHAFT — Stainless Steel, Hardened, Ground and Polished.

PROPELLER — Aluminum Alloy — $8\frac{1}{2}$ " Diameter, 8" Pitch, Right Hand Rotation.

COOLING — Water Cooled — Positive Displacement Type Water Pump.

TRANSOM HEIGHT — 15" or 20".

WEIGHT — 74 Lbs. for Standard Shaft Model.

TILT LOCK — Positive Tilt Lock Permits Engine to Remain in Tilted Position When Not in Use.

RECOMMENDED OPERATING RANGE — 4000-5000 R.P.M.

35 H.P. SPECIFICATIONS

HORSEPOWER — 35 Brake H.P. @ 4750 R.P.M.
ENGINE — Two-Cycle, Twin Cylinder, Alternate Firing.
ELECTRIC AND MANUAL START, NEGATIVE GROUND, MAGNETO IGNITION SYSTEM.
BORE AND STROKE — 3" x 2.540".
DISPLACEMENT — 35.9 Cu. In.
CARBURETOR — Float Feed.
CONNECTING ROD — Forged Nickel Steel, Caged Roller Bearings at Crankshaft. Cased Needle Bearings at Piston Pin.
CRANKSHAFT — Forged Nickel Steel. Ball Bearings at Upper Main. Caged Rollers at Center and Lower Main.
FUEL TANK — Separate Steel Tank — 6 U.S. Gallons, 5 Imperial Gallons.
PROPELLER AND DRIVE SHAFT — Stainless Steel, Hardened, Ground and Polished.
PROPELLER — Aluminum Alloy — $10\frac{3}{8}$ " Diameter, $11\frac{1}{2}$ " Pitch, Right Hand Rotation.
COOLING — Water Cooled, Thermostatically Controlled, Positive Displacement Type Water Pump.
TRANSOM HEIGHT — 15" or 20".
WEIGHT — 116 Lbs. for Standard Shaft Model.
TILT LOCK — Positive Tilt Lock Permits Engine to Remain in Tilted Position When Not in Use.
RECOMMENDED OPERATING RANGE — 4400-5100 R.P.M.

50 H.P. SPECIFICATIONS

HORSEPOWER — 50 Brake H.P. @ 4750 R.P.M.
ENGINE — Two-Cycle, Twin Cylinder, Alternate Firing.
ELECTRIC START, NEGATIVE GROUND, MAGNETO IGNITION SYSTEM.
BORE AND STROKE — $3\frac{3}{16}$ " x 2.800".
DISPLACEMENT — 44.7 Cubic Inches.
CARBURETOR — Float Feed.
CONNECTING RODS — Forged Nickel Steel, Caged Roller Bearings at Crankshaft. Cased Needle Bearings at Piston Pin.
CRANKSHAFT — Forged Nickel Steel. Ball Bearings at Upper Main. Caged Rollers at Center and Lower Main.
FUEL TANK — Separate Steel Tank, 6 U.S. Gallons, 5 Imperial Gallons.
PROPELLER SHAFT AND DRIVE SHAFT — Stainless Steel, Hardened, Ground and Polished.
PROPELLER — Aluminum Alloy, $10\frac{3}{8}$ " Diameter, $12\frac{1}{2}$ " Pitch, Right Hand Rotation.
COOLING — Water Cooled, Thermostatically Controlled, Positive Displacement Type Water Pump.
TRANSOM HEIGHT — 15" or 20".
WEIGHT — 134 Lbs. for Standard Shaft Model.
TILT LOCK — Positive Tilt Lock Permits Engine to Remain in Tilted Position When Not in Use.
RECOMMENDED OPERATING RANGE — 4400-5100 R.P.M.

GENERAL INFORMATION

SERVICE RECOMMENDATIONS

Do not attempt to make repairs or adjustments not specifically covered in this manual. Should you ever need technical assistance, please contact your Authorized Viking Service Facility.

INFORMATION REQUESTS

When asking for technical assistance, be sure to give complete information. Include the Model Number; Serial Number; Purchase Date and place of purchase and State Briefly the Trouble you are having.

IDENTIFICATION PLATE

An identification plate that lists the engine Model and Serial number is located on the side of the steering handle on 3.5 H.P. models and under the engine cover on the forward floor of the support plate on 6, 9.2, 15, 35 and 50 H.P. models.

INSTALLING ENGINE

BOAT TRANSOM

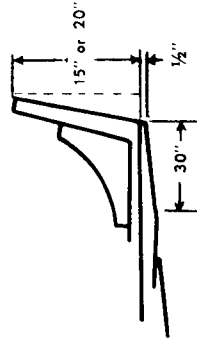
Your new Viking Outboard (if a standard shaft model) is designed to be installed on a boat with a vertical transom height of 15". For a long shaft model, the correct transom height is 20". Proper transom height is essential to obtain maximum forward thrust from your engine.

If the transom is too high, propeller slippage (cavitation) may result, affecting general performance and proper cooling of the engine.

If the transom is too low, the lower unit will be riding too low in the water, causing excessive drag.

Interference from the keel is frequently the cause of propeller cavitation. By tapering the keel as shown, this can be eliminated.

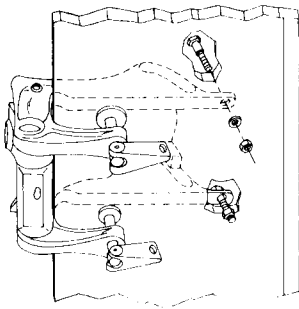
Keel should be faired from a point 30" ahead of the transom so that at the transom the keel is no more than 1/2" in thickness.



MOUNTING ENGINE

Mount the engine at the center of the transom and tighten the stern bracket clamp screws alternately by hand until tight. If the engine is not centered on the transom, the torque of the propeller will tend to cause the boat to run off course and create hard steering and control.

Do Not Use a Wrench to Tighten the Clamp Screws as the Brackets May Be Damaged.



Check the tightness of the clamp screws occasionally during operation. The stern brackets and clamp screws not only support the weight of the engine but also are subjected to thrust loads, shock loads and steering stresses. Tight clamp screws will guard against damage to the transom and also prevent the engine from working loose during operation.

NOTE:

On all 15 through 50 H.P. models, due to the immense amount of thrust delivered by the propeller, it is recommended that the engine be bolted to the transom utilizing the holes provided in the lower end of the stern brackets. (Refer to illustration.) By securing the engine in this manner, you will be assured against loss of the engine when maneuvering at high speeds or when the engine is developing high thrust loads.

When using this method to secure the engine, make sure that the stern brackets remain parallel to each other to prevent their breakage and distortion. When installing the mounting bolts, the holes through the transom should be caulked liberally to prevent water leakage.

This procedure of securing the engine should not be attempted until the final position of the engine on the transom has been determined.

CURVED AND REVERSE ANGLE TRANSOMS

Most outboards do not adapt well to mounting on curved or reverse angle boat transoms. In order to mount the engine on boats with these types of transoms, shims will be required between the stern brackets and boat transom in order to have a flat, vertical or slightly reclined transom mounting surface.

ADJUSTING ENGINE ANGLE

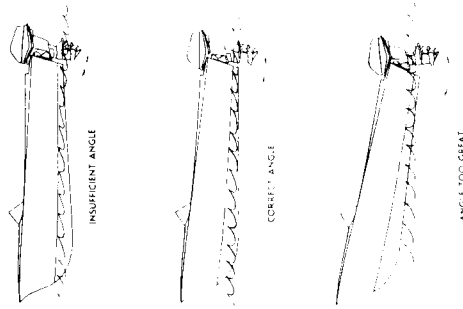
Under ideal conditions, efficiency is greatest with the lower unit operating in a level position as the entire thrust of the propeller is then applied parallel to the direction of motion.

The angle of the engine is easily adjusted by changing the position of the angle adjusting bar in the holes or slots provided in the stern brackets.

Important:

On 3.5 H.P. models, after the correct adjustment has been determined, tighten the wing nut on the angle adjusting bar securely using a suitable tool.

If the engine is tilted too close to the transom, the bow of the boat will "dig in" or "plow." If it is tilted too far away from the transom, the bow will ride high and the boat may "gallop" or "porpoise." If the engine races or overspeeds on sharp turns, lower the adjustment until the correct position is found.



TILTING ENGINE / 3.5 H.P. Models

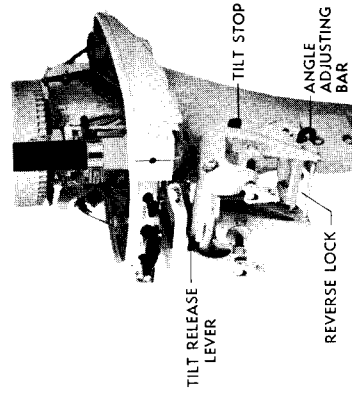
Before tilting, close the carburetor shut-off valve as a precautionary measure against fuel spilling into the boat. (Refer to illustration under "Adjusting Carburetor" for location of shut-off valve.)

Tilt the engine up and out of the water by grasping the back of the fuel tank and pulling up and all the way forward. The engine will remain tilted until returned manually to the operating position. **THE ENGINE WILL NOT TILT OUT OF WATER WHEN IN REVERSE OPERATING POSITION.** (Refer to Reverse Lock.)

TILTING ENGINE / 6 and 9.2 H.P. Models

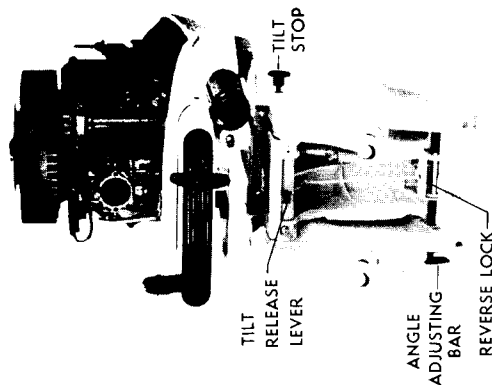
To tilt your engine up out of the water, push the tilt release lever down, and grasping the engine by the back of the support plate, pull the engine up and forward, out of the water until the tilt stop engages. The engine will automatically lock in the tilted position.

To tilt the engine back down, pull the tilt stop forward and allow the engine to slowly return to the normal operating position. The engine should automatically lock in the running position. However, if the lock does not engage, push the tilt release lever down to lift the reverse lock clear of the lock bar. Push engine down into running position and then return the tilt release lever to the "up" or locked position. This will lock the engine in the normal operating position and prevent it from tilting up under rapid deceleration or normal reverse thrust loads.

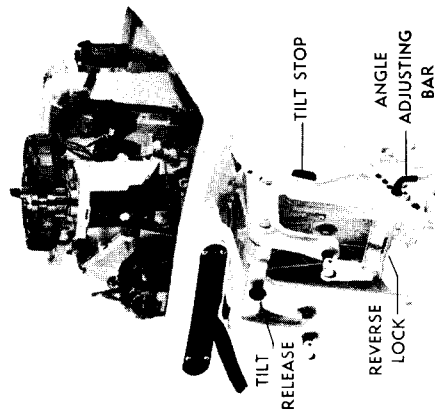


TILTING ENGINE / 15 H.P. Models

To tilt your engine up out of the water, push the tilt release lever down and grasping the engine by the rear carrying handle pull the engine up out of the water until the tilt stop engages. To tilt back down, pull out tilt stop knob and allow engine to slowly return to the operating position. After engine has been tilted back down, make sure to return the tilt release lever to the "up" or locked position. This will lock the engine in the normal operating position and prevent it from tilting up under rapid deceleration or high reverse thrust loads.

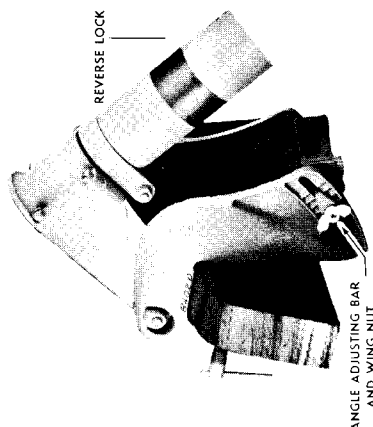


To tilt the engine back down, grasp the handle on the back of the engine cover and pull slightly forward. Pull the tilt stop lever forward to release the engine and slowly return the engine to the operating position. After the engine is tilted back down, make sure to return the tilt release knob to the "in" or locked position. This will lock the engine in the normal operating position and prevent it from tilting up under rapid deceleration or high reverse thrust loads.



REVERSE LOCK / 3.5 H.P. Models

Your engine is equipped with a reverse lock that prevents it from tilting up when operating in reverse (180° from forward position). BE EXTREMELY CAREFUL WHEN OPERATING IN REVERSE. IF YOU STRIKE AN UNDERWATER OBJECT, THE SHOCK WILL BE TRANSMITTED DIRECTLY TO THE BOAT TRANSOM AND ENGINE MAY BE DAMAGED.



TILTING ENGINE / 35 and 50 H.P. Models

To tilt your engine out of the water, first make sure it is pointing straight ahead, then pull the tilt release knob out and grasping the engine by the handle on the back of the engine cover, pull the engine up and forward out of the water until the tilting limit is reached. Then, push the tilt stop lever back to lock the engine in the tilted position.

REVERSE LOCK / 6 Through 50 H.P. Models

Your engine is equipped with a reverse lock to prevent it from tilting out of the water when operating in reverse and also to release the engine when an underwater object is struck during operation in forward gear.

The impact load triggers the release system and allows the engine to tip up and pass over the object. After passing over the object, the engine may not lock back in the running position, therefore, manually return the tilt release knob to the locked position if necessary.

NOTE: When operating at very slow trolling speeds in shallow water, due to the high impact load required to release the tilt-reverse lock mechanism, it is permissible to release the tilt-reverse lock mechanism to avoid damage to the lower unit, propeller and boat. This will allow the engine to tilt over minor obstructions such as small rocks, sand bars and logs. **WHEN OPERATING IN REVERSE OR AT OTHER THAN TROLLING SPEEDS, IT IS ABSOLUTELY ESSENTIAL THAT THE ENGINE BE OPERATED WITH THE TILT-REVERSE LOCK MECHANISM ENGAGED AT ALL TIMES. FAILURE TO DO SO COULD RESULT IN SEVERE DAMAGE TO STRUCTURAL PARTS OF THE ENGINE.**

CAUTION: Be extremely careful to avoid striking any underwater objects when operating in reverse gear as the engine will transmit all shock loads directly to the transom of the boat with the possibility of subsequent damage both to the engine and to the boat.

INSTALLING REMOTE CONTROLS TO ENGINE

6 and 9.2 H.P. Models

A remote control accessory kit, Model 150, is available for 6 and 9.2 H.P. models. Contact your nearest Viking Service Facility for additional information. If this remote control kit is used, assembly and removal of the remote control cables from the engine is as follows:

Gear Shift Cable

1. Insert trunnion notch of shift cable housing into trunnion retainer on mounting bracket, (A) and close retaining clip.
2. Place the "at engine" gear shift lever (B) in neutral (lever

vertical) and manually turn the propeller to make sure it turns freely.

3. Install gear shift cable end connector (small connector) on shift cable.

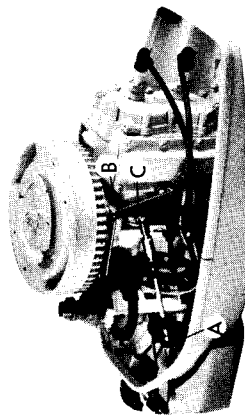
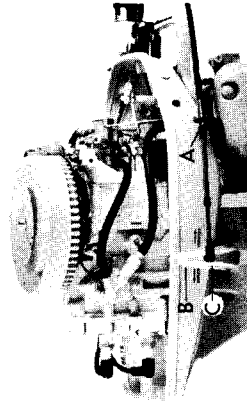
4. Place control lever in remote control box in "neutral."

5. Turn shift cable end connector on shift cable until the hole in the end connector is exactly centered on the rod end connector stud (C) installed on the "at engine" shift lever (B). Slide cable end connector retaining sleeve back and attach connector to shift lever.

Throttle Cable

6. **NOTE:** Before installing the throttle cable, refer to "Throttle Stop," section of this manual. Then insert trunnion notch of throttle cable housing into trunnion retainer on mounting bracket (A) and close retaining clip.

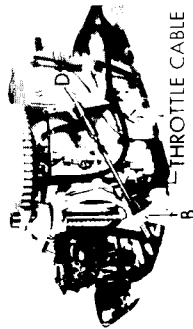
7. Place control lever in remote control box in full advance. Advance magneto control lever (B) to full advance position. Install large spring-loaded throttle cable end connector on throttle cable so that the hole in the end connector extends $\frac{3}{8}$ " beyond the rod end connector stud (C) on the magneto control lever (B). Lock connector in place with lock-nut. Retard throttle cable so that the hole in the end connector is centered on the rod end connector stud on the magneto control lever. Slide retaining sleeve back and attach connector to stud on magneto control lever.



INSTALLING REMOTE CONTROLS TO ENGINE

15 H.P. Models

1. Install remote control cables to the engine, routing them through the grommets in the face of the control panel. **NOTE:** Before routing the control cables through the grommets, it will be necessary to slit the centers to allow the cables to pass through.
2. Install the throttle and gear shift end connectors to the control cables. (The large, spring-loaded connector should be installed to the throttle cable, and the small connector to the shift cable.)
3. Remove shift cable clamp (A) from support plate. Position cable clamp over shift cable so that the detent in the cable clamp lies directly over the detent in the shift cable. Install cable clamp assembly to support plate. Tighten securely.
4. Remove throttle cable clamp (B) from bracket. Position cable clamp over throttle cable so that the detent in the cable clamp lies directly over the detent in the throttle cable. Install cable-clamp assembly to bracket. Tighten securely.
5. **GEAR SHIFT CABLE:** With the shift lever in "Neutral" (check by turning propeller) adjust the cable end connector so that the hole in the end connector is exactly centered on the rod end connector stud on the shift lever (C). Slide the end connector retaining sleeve back and attach the connector to the shift lever. Slide the retaining sleeve forward to lock the control cable to the shift lever.
6. **THROTTLE CABLE:** Before installing the throttle cable, refer to "Throttle Stop" section of this manual. Then, with the throttle fully retarded, adjust the large, spring-loaded throttle end connector so that the hole in the connector is 3/16" short from connecting to the rod end connector stud located on the magneto control lever (D).



THROTTLE CABLE



GEAR SHIFT CABLE

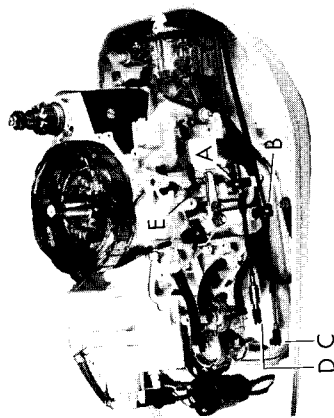
NOTE: The throttle end connector is spring-loaded to assure smooth throttle operation. Stretch the throttle end connector until it drops in place over the rod end connector stud on the magneto control lever.

7. Located on the forward carrying handle are two sets of holes which are used to install the remote steering bracket. The inner set of holes (closest to engine) is to be used with all 15 H.P. engines. Mount bracket with "loop" forward.

INSTALLING REMOTE CONTROLS TO ENGINE

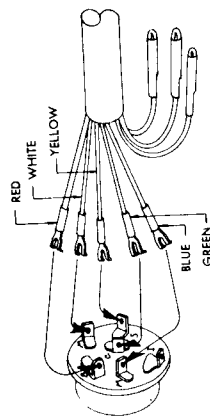
35 and 50 H.P. Models

1. Install throttle and gear shift cable end connectors to the control cables. (The large, spring-loaded connector should be installed on the throttle cable and the small connector to the shift cable).
2. Route remote control cables over carrying handle (with gear shift cable on bottom), into the cable guide on the starboard side of the control panel. **(NOTE:** for ease of installation, insert throttle cable first.)
3. Remove the remote control cable clamp retaining screws from the throttle tower shaft (A) and gear shift lever (B).
4. Route the throttle and gear shift cables under the cable clamps. Position cable clamps over cables so that the detent in the cable clamps lie directly over the detent in the remote control cables. Install screws removed in step 3 and tighten securely.
5. **GEAR SHIFT CABLE:** With the gear shift lever in "Neutral" (check by turning propeller) adjust the cable end connector so that the hole in the end connector is exactly centered on the lower rod end connector stud located directly below the fuel pump (C). **NOTE:** When the engine is in neutral, the "hooked" end of the gear shift arm will be centered on the



ASSEMBLY OF ELECTRIC CONTROL CABLE TO IGNITION SWITCH

35 and 50 H.P. Models



1. Inspect the back of the ignition switch and note the imprinted letters which appear next to each of the SIX terminals (refer to wiring diagram). The letters denote the function of the terminal, and will be used as an aid when assembling the lead wires to the switch.
2. The remote electric cable lead wires are secured to the terminals on the ignition switch using the screws and lockwashers furnished. When installing, route screw through hole in lead wire terminal, assemble lockwasher over screw and turn screw securely into switch terminal.
3. Attach lead wires to switch as follows:

WHITE (magneto) to terminal "M" UPPER (WHITE PAINT DOT)
 YELLOW (start) to terminal "S" (YELLOW PAINT DOT)
 GREEN (choke) to terminal "C" (GREEN PAINT DOT)
 RED (battery) to terminal "B" (RED PAINT DOT)
 BLUE (ignition) to terminal "I" (BLUE PAINT DOT)
 THE TERMINAL MARKED "T" IS NOT AND MUST NOT BE USED UNLESS OTHER ELECTRICAL ACCESSORIES ARE USED.

NOTE: The BLACK (Ground), ORANGE (Heat Indicator) and PURPLE (not used on 35 and 50 H.P. Magneto Ignition Models) lead wires if not used, should be individually covered with a sleeve, taped and folded back out of the way.

"Neutral Lock" boss on the Throttle Tower Shaft. Refer to "E" in illustration.

6. **THROTTLE CABLE:** NOTE: Before installing the throttle cable, refer to "Throttle Stop" section of this manual. Then, with the throttle fully retarded, adjust the large spring-loaded throttle end connector so that the hole in the connector is 3/16" short from connecting to the upper rod end connector stud located directly below the fuel pump (D).

NOTE: The throttle end connector is spring-loaded to assure smooth throttle operation. Stretch the throttle end connector until it drops in place over the rod end connector stud.

7. Slide the retaining sleeves on the rod end connectors back, and attach cables to connector studs. Slide sleeves forward to lock cables in place.

CHECKING REMOTE CONTROL INSTALLATION

All Models

CAUTION: After the throttle and gear shift cables are installed, check to make sure the end connectors have a minimum of 1/4" thread engagement on the cables. Also, the sleeve assembled over the throttle cable on 6 and 9.2 H.P. models should be pushed as far as possible toward the cable end connector so as not to interfere with the fuel line coupler when connected.

● Check the controls for correct operation by moving the control lever in the remote control box to the "Forward," "Neutral," and "Reverse" positions. With the control lever in the "Forward" and "Reverse" positions, the propeller should be locked firmly in place. When in "Neutral," the propeller should turn freely.

NOTE: The initial installation of your remote controls and adjustments other than those outlined above should be made by your Authorized Viking Service Facility.

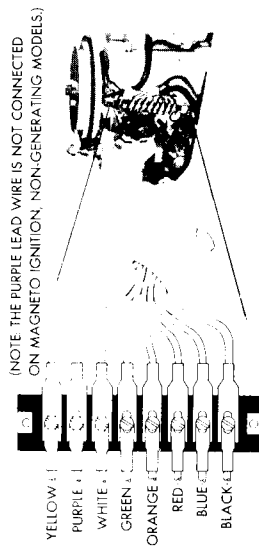
REMOTE STEERING BRACKET

A remote steering bracket, Model 137 that adapts your engine to cable or rope type steering, is available from your Authorized Viking Service Facility. When installing, mount from underside of carrying handle with "loop" forward. On 15 H.P. models, there are two sets of mounting holes. The inner set of holes (closest to engine) must be used.

ASSEMBLY OF ELECTRIC CONTROL CABLE TO ENGINE

1. Route electric control cable over carrying handle, and through grommet on port side of control panel.
2. Remove the cable clamps (located on the port side of the support plate) and install over remote electric cable.
3. Back the eight terminal plate connecting screws out until they begin to bind or resist.
(Note: The screws are locked into the terminal plate to prevent their loss and are not intended to be removed.)
4. Route the remote electric cable along the floor of the support plate toward the back of the engine, up the back side of the engine terminal plate and attach to the terminal plate with the hooked ends of the lead wire connectors "down" over terminal plate. Tighten screws securely.
5. The lead wires must be installed as illustrated in the diagram below.

NOTE: A decal indicating the correct wiring sequence is provided on the exhaust port cover, directly alongside the engine terminal plate.



CAUTION: When installing the lead wires, make sure that the bare metal ends of the different colored lead wires do not touch each other. If they do, the engine may not operate properly or will not operate at all.

6. Reinstall cable clamps and screws removed in step 2 above, tighten securely.

PROPELLERS

Your engine is equipped with a propeller which will give you good all around operating characteristics. However, the performance of your engine under special conditions can be improved by changing to a propeller that is designed for your particular boat and application.

The correct propeller will be determined by the boat design, the weight of the boat and the application. No one particular propeller can deliver optimum performance under the different conditions of boat design and applications met with in present day boating. Each application requires the use of a propeller specifically designed for the purpose.

If a propeller change is going to be made, it is very important that a tachometer be used to determine engine R.P.M. with the new propeller. THE R.P.M. MUST FALL WITHIN THE OPERATING LIMITS GIVEN ON THE "SPECIFICATIONS" PAGE OR SERIOUS DAMAGE TO THE ENGINE MAY RESULT.

See your Authorized Viking Service Facility for more information on how to prop your motor and for information on what propellers are available.

PROPELLER MAINTENANCE

If the propeller is bent, unbalanced or badly nicked or clogged with weeds, unusual or excessive vibration will occur. If any of these symptoms are evident, operation of the engine should be avoided or limited, and the propeller cleaned, replaced or repaired as soon as possible. As a safety measure, always carry a spare propeller, shear pins, propeller nut and cotter pin.

OPERATION

BREAK-IN PERIOD / 3.5 H.P. Models

During the first four (4) hours of operation, the engine MUST be operated with the Magneto Control Lever advanced to within one (1) inch of the "wide open" position. DO NOT run the engine below this speed except for very brief periods such as when entering or leaving the docking area. This procedure must be followed to assure adequate cooling during break-in. Do not use the engine for trolling during the break-in period.

After the four (4) hour break-in is completed, the engine may be operated at any speed desired.

Since this engine is air-cooled, operating temperatures may increase from time to time during the first 10 hours of operation.

If the engine should stop or slow down during this period, allow it to cool for a short time and then restart the engine. Continue to operate as described above.

BREAK-IN PERIOD / 6 and 9.2 H.P. Models

During the first hour of operation, it is extremely important that care be exercised to properly break-in your new engine. Operate engine in gear with throttle control set between idle (900 R.P.M.) and "Start" position (3000 R.P.M.). This speed must not be exceeded during the first hour of operation for any period of time except as noted below.

NOTE: During the break-in period when the engine is mounted on planing type boats, bring the engine R.P.M. up to a point where the boat planes quickly, then, reduce the throttle control to lower the engine R.P.M. to that specified for the given time of the break-in period and continue operation. Check the operation of the water pump and cooling system frequently. (Refer to "Checking Water Pump Operation.")

After the one (1) hour break-in period has been completed, the engine may be operated at any speed desired. No special fuel mixture is required during the break-in period for 6 and 9.2 H.P. models. However, refer to "Recommended Fuel Mixture" section for proper mixing procedure to be used.

BREAK-IN PERIOD / 15 Through 50 H.P. Models

BEFORE STARTING 15 THROUGH 50 H.P. MODELS, READ THE FOLLOWING INSTRUCTIONS CAREFULLY: During the first ten (10) hours of operation, it is imperative that a gasoline to oil ratio of one (1) part heavy duty outboard motor oil to oil ratio of one (1) part heavy duty outboard motor oil (SAE 30) to twenty-four (24) parts of gasoline be used. (Refer to "Recommended Fuel Mixture" section for proper mixing procedure to be used.)

During the first hour of operation, run engine in gear with throttle control set between idle (900 R.P.M.) and "Start" position.

tion (3000 R.P.M.). This speed must not be exceeded during the first hour of operation for any period of time except as noted below.

NOTE: During the break-in period when the engine is mounted on planing type boats, bring the engine R.P.M. up to a point where the boat planes quickly, then, reduce the throttle control to lower the engine R.P.M. to that specified for the given time of the break-in period and continue operation.

Check the operation of the water pump and cooling system frequently. (Refer to "Checking Water Pump Operation.")

After the one (1) hour break-in period has been completed, the engine may be operated at any speed desired. However, during the first ten (10) hours of operation, it is imperative that the gasoline to oil ratio of one (1) part heavy duty outboard motor oil (SAE 30) to twenty-four (24) parts of gasoline be used. (Refer to "Recommended Fuel Mixture" section for proper mixing procedure to be used.)

IMPORTANT

When the engine is used in COMMERCIAL, RACING OR HEAVY DUTY applications, it is imperative that a gasoline to oil ratio of one (1) part heavy duty outboard motor oil (SAE 30) to twenty-four (24) parts of gasoline be used.

RECOMMENDED FUEL MIXTURE

3.5 H.P. Models

USE MARINE WHITE or REGULAR GRADE automotive gasoline (approximately 85 octane).

Thoroughly mix one-half (1/2) pint of a high grade S.A.E. 30 motor oil with each gallon of gasoline.

IMPORTANT

Avoid the use of PREMIUM (approximately 95 octane with anti-knock additives) gasolines. Gasolines and oils containing TCP or Phosphorous additives or additive compounds such as "Break-in" oils, "Tune-up" compounds, "Tonics," "Friction Reducing" compounds, etc., are entirely unnecessary and are Not recommended for use in your engine.

NOTE: Most outboard engine oils are designed for best performance.

formance in Water-Cooled Outboards. If your Air-Cooled Outboard seems to run hot and sluggish when operated for extended periods at part throttle, optimum performance may be obtained by using a No. 30 MM or MS grade of Automotive Type Oil.

USE ONLY THE RECOMMENDED OIL TO GASOLINE RATIO (Regardless of the claims made for some lubricants).

FOR A PROPER FUEL MIX:

1. Use a clean, well marked container.
2. Strain all fuel through a fine mesh filter. This will remove dirt and water, thus preventing fouling of the carburetor.
3. Fill container half full of fresh gasoline.
4. Add the correct amount of oil (1/2 pint per gallon of gasoline).
5. Shake container vigorously to assure proper mixing.
6. Add balance of gasoline and shake mixture again. Observe all fire prevention rules — mix fuel in a well ventilated area (preferably outdoors), and avoid sparks and open flames.

RECOMMENDED FUEL MIXTURE

6 and 9.2 H.P. Models

USE MARINE WHITE or REGULAR GRADE automotive gasoline (approximately 85 octane). Thoroughly mix one-third (1/3) pint of S.A.E. 30 Outboard Engine Oil with each gallon of gasoline.

IMPORTANT: Avoid the use of PREMIUM (approximately 95 octane with anti-knock additives) gasolines. Gasolines and oils containing TCP or Phosphorous additives or additive compounds such as "Break-In" oils, "Tune-Up" compounds, "Tonics," "Friction Reducing" compounds, etc., are entirely unnecessary and are not recommended for use in your engine.

FOR A PROPER FUEL MIX:

1. Use a clean, well marked container.
2. Strain all fuel through a fine mesh filter.
3. Fill container half full of fresh gasoline.
4. Add the correct amount of oil (1/3 pint per gallon of gasoline).
5. Shake container vigorously to assure proper mixing.

6. Add balance of gasoline and shake mixture again. Observe all fire prevention rules — mix fuel in a well ventilated area (preferably outdoors) and avoid sparks and open flames.

NOTE: If the fuel tank is to be transported, or stored in an area subject to temperature increases, do not fill tank to top as spillage due to expansion of the fuel will occur. Close fuel tank vent screw on filler cap.

RECOMMENDED FUEL MIXTURE

15 Through 50 H.P. Models

IMPORTANT: BEFORE ATTEMPTING TO RUN YOUR NEW ENGINE, REFER TO THE "BREAK-IN PERIOD." The MINIMUM recommended fuel mixture after the first ten hours of operation have been completed is ONE (1) Part Heavy Duty Outboard Motor Oil (SAE 30) to FIFTY (50) PARTS OF MARINE WHITE OR REGULAR GRADE (APPROXIMATELY 85 OCTANE) GASOLINE. For easy measurement, mix ONE (1) PINT of oil with SIX (6) GALLONS of gasoline.

THIS MIXTURE MUST NOT BE USED UNTIL AFTER THE FIRST TEN (10) HOURS OF OPERATION HAVE BEEN COMPLETED.

IMPORTANT: When the engine is used in COMMERCIAL, RACING OR HEAVY DUTY applications, it is imperative that a gasoline to oil ratio of one (1) part heavy duty outboard motor oil (SAE 30) to twenty-four (24) parts of gasoline be used.

IMPORTANT: Avoid the use of PREMIUM (approximately 95 octane with anti-knock additives) gasolines. Gasolines and oils containing TCP or Phosphorous additives or additive compounds such as "Break-In" oils, "Tune-Up" compounds, "Tonics," "Friction Reducing" compounds, etc., are entirely unnecessary and are not recommended for use in your engine.

FOR A PROPER FUEL MIX:

1. Use a clean, well marked container.
2. Strain all fuel through a fine mesh filter.
3. Pour one (1) gallon of gasoline into fuel tank (Six U. S. gallons capacity). Add one (1) pint of oil, shake vigorously to mix. Add balance of gasoline and shake vigorously again. USE ONLY THE RECOMMENDED OIL TO GASOLINE RATIO (regardless of the claims made for some lubricants).

STARTING PROCEDURE / 3.5 H.P. Models

1. Be sure fuel tank has a sufficient amount of properly mixed fuel. Open vent screw on the fuel tank filler cap.
2. Open the carburetor shut-off valve.
3. Move the Magneto Control lever to the "START" position.
4. Set the high speed adjustment knob on the control panel at the "Start" position.
5. (For a cold engine only), move the choke lever to the "Choke" position, lever all the way forward.
6. Pull starter rope out slowly until you feel the starter engage, then give a smooth, fast pull.

The engine should start on the second or third pull. If it does not start on the third pull, recheck steps one through five and refer to the Trouble-Check list, in the back of this manual. However, when starting for the first time, several additional pulls on the starter may be required in order to initially prime the engine.

WHEN ENGINE STARTS

1. Open choke and allow engine to warm up. If engine "pops" and begins to stall, move the choke lever to the "Warm-up" position (straight up and down), until engine runs smoothly.
2. Move the "high speed" adjustment knob to the "Run" position.

GETTING UNDERWAY

Simply advance the Magneto Control lever to "FAST" position and you are under way.

TO STOP

Move Magneto Control lever to "STOP" position.

REVERSE OPERATION

Your engine can be rotated through a full 360° circle. To operate engine in reverse, grasp the cowl and rotate until engine is in reverse position. CAUTION: REDUCE ENGINE SPEED TO HALF THROTTLE BEFORE TURNING ENGINE TO THE REVERSE OPERATING POSITION.

STARTING PROCEDURE / 6 Through 35 H.P. Manual Start Models

1. Make sure that the fuel tank has a sufficient amount of properly mixed fuel and that the vent screw located on the fuel tank filler cap or gauge is open.
2. On 6 through 15 H.P. models, connect the fuel tank to the engine by engaging the fuel line coupling with the bushing on the forward carrying handle. To remove, pull lock ring back while holding coupler.

On 35 H.P. manual start models, connect the fuel tank to the engine by engaging the fuel line coupling with the bushing on the fuel tank. Pull back the lock ring and push the coupling onto the bushing. Release the lock ring. It should snap back into place. Check coupling to make sure that it is secure. Route the fuel supply line through the center-starboard grommet in the control panel. Slide a fuel line clamp over end of fuel line and attach fuel line to fitting on fuel pump on starboard side of power head. Slide fuel line clamp up on fuel line to prevent it from detaching during operation.

3. Squeeze the prime bulb in the fuel line several times to pump fuel from the fuel tank to the engine. Continue to squeeze until prime bulb becomes firm.
4. Place "at engine" gear shift lever in "NEUTRAL" on 6 through 15 H.P. steering handle models. Place the remote control unit in the "START" position as outlined in the following sections for 35 H.P. remote control operated models.

- Never Start Engine in Gear.

5. For a cold engine, pull out choke.

6. On 6 through 15 H.P. steering handle models, turn twist grip throttle control to the "START" position.

7. Pull starter rope out slowly until the starter pinion gear engages with the flywheel, then give the rope a smooth, rapid, even pull.

The engine should start on the second or third pull. If it does not start, recheck steps 1 through 7 above and see the Trouble-Check list in the back of this book. However, when starting your engine for the first time, several additional pulls on the starter may be required in order to initially prime the engine.

WHEN ENGINE STARTS

Push choke rod in and allow engine to warm up. If engine "pops" and begins to stall, choke momentarily until it runs smoothly.

GEAR SHIFT — (At Engine)

6 Through 15 H.P. Models

Your engine is equipped with a gear shift control to provide operation in "Forward," "Neutral," and "Reverse" gear. If the engine is not running, "DO NOT FORCE THE SHIFT LEVER."

- Never shift with engine speed control set above "Shift" position. The gear shift mechanism will not disengage from forward or reverse gear to neutral gear at speeds above this setting.

FORWARD

To go forward:

1. Turn twist grip throttle control so that pointer on the handle is at the "SHIFT" position on grip.
2. Move shift lever to "FORWARD."
3. Advance throttle control.

REVERSE

To go in reverse:

1. Turn twist grip throttle control so that the pointer on the handle is at the "SHIFT" position on grip.
2. Move shift lever to "REVERSE."
3. Advance throttle control.

TO STOP

1. Retard twist grip throttle control to "SHIFT" position and shift engine into "NEUTRAL" (shift lever straight up and down). Turn twist grip throttle control to "STOP" position.

To provide a means of stopping 6 through 35 H.P. manual start models operated with remote controls, an Ignition Shorting Switch Kit, Model 167, has been developed and is available from your Authorized Viking Service Facility.

If this kit is installed, depress the shorting switch button to stop the engine. If the kit is not installed, it will be necessary to "Choke" the engine until it stops when using single lever remote controls.

When the Twin Lever remote control is used, there are two methods that can be used to stop the engine if the shorting switch kit is not installed.

1. The throttle stop screw should be turned to a point where it is inoperative. This will allow the magneto to be retarded to a point where either the output is no longer high enough to sustain engine operation or the idle stop switch in the magneto stops the engine.
2. The throttle stop screw can be adjusted to maintain a set idle speed with the throttle fully retarded (see "Throttle Stop"). If this method is used it will be necessary to "Choke" the engine to stop.

STARTING PROCEDURE

35 and 50 H.P. Electric Start Models

CONNECTING BATTERY

Extreme caution must be exercised when connecting the battery cables to the battery. THE RED CABLE MUST BE CONNECTED TO THE (+) POSITIVE TERMINAL OF THE BATTERY, AND THE BLACK TO THE (-) NEGATIVE TERMINAL. Failure to connect the battery cables correctly will result

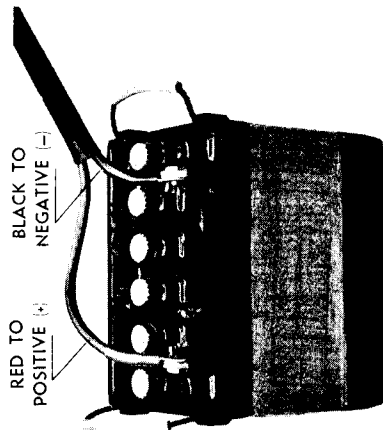
in serious damage to the electrical system of the engine.

NOTE: A 12 Volt battery with a minimum rating of 70 Amp. Hrs. is recommended to insure instant starting and long starter motor life.

IMPORTANT

When making dual engine installations of electric start models, it is absolutely necessary that engines with the same Ground Polarity be used. An installation of one Positive Ground and one Negative Ground engine CAN NOT be made.

Consult your Authorized Service Facility for additional information.



BATTERY CARE

The battery is actually the "heart" of your new engine in that without it, your engine will not start. Therefore, it is important that it be maintained at or near a full charge rate at all times.

The battery should be periodically inspected and recharged according to the battery manufacturer's specifications.

IMPORTANT: Keep battery cells filled to level indicated. Never charge a battery without checking water level.

For best battery performance, make sure battery connections are **CLEAN** and **TIGHT**.

ELECTRIC STARTER

The electric starter used is a light weight, high output motor which requires a certain amount of special attention and care. If operated incorrectly, failure and expensive repairs can be expected.

NEVER operate the starter motor for a continuous period of more than 15 seconds before allowing intermittent cooling periods of not less than three (3) minutes. If the engine fails to start, check the Trouble Check List and the steps outlined under Starting Procedure.

IGNITION SWITCH

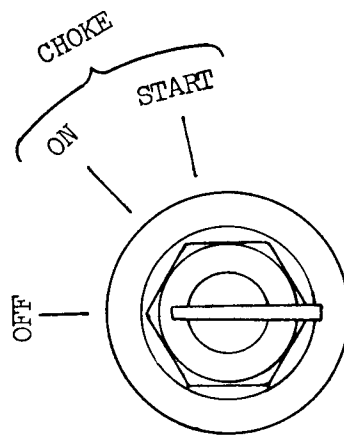
Your electric start engine is equipped with a four position ignition switch: **START**, **CHOKE**, **ON** AND **OFF**.

START — Turn key to extreme right until it stops.

ON — Turn key to right one notch.

OFF — Turn key to extreme left until it stops.

CHOKE — The Choke position of the switch can be utilized in either the "ON" or "START" positions. Simply depress or push key into barrel of switch in either position. As long as the key is depressed, choking will continue. When it is released, choking stops.



STARTING PROCEDURE — 35 and 50 H.P. Electric Start Models

1. Make sure that the fuel tank has a sufficient amount of properly mixed fuel and that the vent screw located on the fuel tank filler cap or gauge is open.
2. Connect the fuel tank to the engine by engaging the fuel line coupling with the bushing on the fuel tank. Pull back the lock ring and push the coupling onto the bushing. Release the lock ring. It should snap back into place. Check coupling to make sure that it is secure.
3. Route the fuel supply line through the center-starboard grommet in the control panel. Slide a fuel line clamp over end of fuel line and attach fuel line to fitting on fuel pump on starboard side of power head. Slide fuel line clamp up on fuel line to prevent fuel line from detaching during operation.
4. Squeeze the prime bulb in the fuel line several times to pump fuel from the fuel tank to the engine. Continue to squeeze until prime bulb becomes firm.
5. Place the remote control unit in the "START" position as outlined in the following sections.
6. Engage the electric starter motor by turning the ignition key all the way to the right. For a cold engine, choke engine at the same time by pushing the key into the barrel of the switch.
7. After engine has started, release the key and allow it to return to the "ON" position. If engine pops and begins to stall, choke engine again by pushing key into barrel of the switch. Continue the choking operation until engine is thoroughly warmed up.

NOTE: The starter motor will not engage unless the engine is in "NEUTRAL" gear. A neutral interlock switch prevents the starter from engaging while in "FORWARD" or "REVERSE" gear.

8. After engine has warmed up, return remote controls to the "NEUTRAL" position and proceed as outlined on following pages.

TO STOP

1. Return remote control unit to "Neutral" position.
2. Turn ignition key to the "OFF" position (all the way to the left).

STARTING A WARM ENGINE — All Models

Proceed as above but do not choke. If the engine fails to fire after several attempts, then use the choke.

ENGINE FLOODING — All Models

Flooding, a condition where the fuel-air mixture is too rich for combustion, normally occurs only when a warm engine is over-choked or cranked with the throttle setting reduced below the "START" position. Generally, a cold engine that has not fired is not flooded. If engine is flooded, open choke, advance throttle control to the start position and continue cranking until it fires. (Observe caution for electric starter motors.)

OPERATION WITH SYNCHRO-DRIVE SINGLE LEVER REMOTE CONTROLS (For Use On All 6 Through 50 H.P. Models)

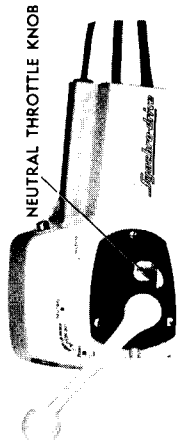
The Synchro-Drive, Single Lever remote control provides simplicity and ease of operation. Both the shift and throttle control are combined into a single operating lever.

The Synchro-Drive remote control is available for both right and left hand mounting. Order control Model 161 for Right Hand Mounting and Model 163 for Left Hand Mounting.

STARTING

To start engines equipped with Synchro-Drive, Single Lever Controls, proceed as follows:

1. Pull out "Neutral Throttle Knob." This inactivates the gear shift mechanism and allows the engine speed to be increased for neutral warm-up and starting.
2. 6 and 9.2 H.P. Models — Advance remote control lever until the word "START" on the "at engine" twist grip throttle control lines up with the arrow on the steering handle. Mark a line on the control box to indicate this position for future use. **DO NOT ADVANCE ENGINE SPEED BEYOND THIS POINT WHEN IN NEUTRAL GEAR.**



15, 35 and 50 H.P. Models — Advance remote control lever until it stops.

3. Start engine as outlined under "STARTING PROCEDURE."
4. After engine has warmed up—move control lever to "NEUTRAL" position and push in neutral throttle knob.
5. Move the control lever ahead for "FORWARD" and pull back for "REVERSE" operation.

CAUTION: To avoid damaging the shifting mechanism and shear pin, always shift with a quick snapping action—never "ease" engine into gear.

TO STOP

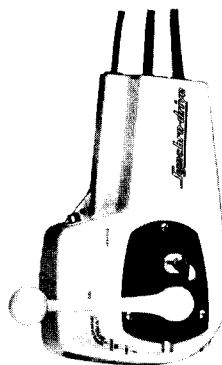
Return control lever to "NEUTRAL" position, turn ignition key to "OFF" position or depress ignition shorting switch button. If your engine is not equipped with an ignition switch, or an ignition shorting switch, "CHOKE" the engine until it stops.

NEUTRAL

Control Lever straight up and down. Neutral throttle knob pushed in.

IMPORTANT

Adjust the throttle stop as outlined on the following pages to establish the correct idle speed.

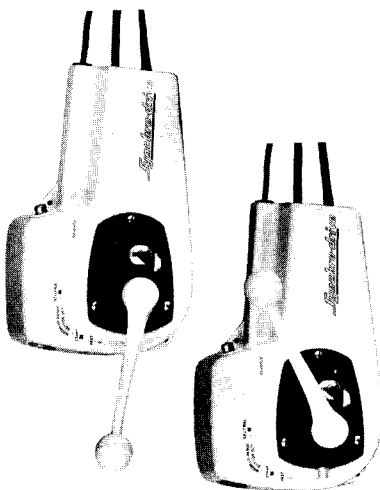


FORWARD

With Neutral throttle knob pushed in, move control lever forward.

REVERSE

With Neutral throttle knob pushed in, move control lever back.



CAUTION: Exercise care when operating in reverse as too high a speed may cause water to be taken into the boat over the transom.

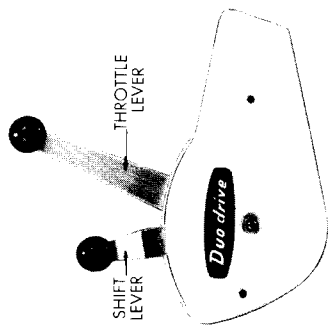
OPERATION OF TWO LEVER REMOTE CONTROLS (Used On 6 Through 50 H.P. Models) STARTING

1. Place shift lever in "NEUTRAL" position.

2. 6 and 9.2 H.P. Models — Advance throttle control lever until the word "START" on the "at engine" twist grip throttle control lines up with the arrow on the steering handle. Mark a line on the control box to indicate this position for future use. **DO NOT ADVANCE ENGINE SPEED BEYOND THIS POINT WHEN IN NEUTRAL GEAR.**

15, 35 and 50 H.P. Models — Advance throttle lever until it stops. **NOTE:** The throttle lever may move only a slight amount but this will be more than adequate to obtain the correct starting speed.

3. Start engine as outlined under "STARTING PROCEDURE."
4. After engine has warmed up retard throttle to "SHIFT" position.
5. To go forward — snap the gear shift lever all the way forward with a quick snapping action and advance throttle lever.
6. To go in reverse — pull shift lever all the way to the rear with a quick snapping action and advance throttle.



CAUTION: To avoid damaging the shifting mechanism and shear pin, shift with a quick snapping action — never “ease” engine into gear.

- NEVER SHIFT WITH THROTTLE ABOVE A FAST IDLE.
- NEVER START ENGINE IN GEAR.

TO STOP

1. Retard throttle lever to “SHIFT” position.
2. Move shift lever to “NEUTRAL” position.
3. Turn ignition key to “OFF” position or depress the ignition shorting switch button.

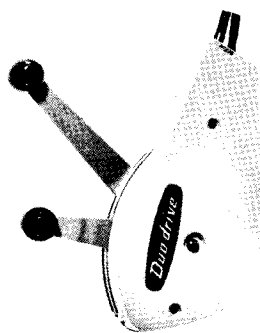
NOTE: on 6 and 9.2, 15 and 35 H.P. manual start models not equipped with the ignition shorting switch, there are two methods that can be used to stop the engine.

1. 6, 9.2 and 35 H.P. Models — The throttle stop screw should be turned to a point where it is inoperative. This will allow the magneto to be retarded to a point where the output is no longer high enough to sustain engine operation.
- 15 H.P. Models — Turn the throttle stop screw “up” so that there is 5/16” clearance between the top-hex portion of the throttle stop screw and the lower surface of the mounting bracket. This will allow the throttle to be retarded to a point where the ignition shorting switch in the magneto shuts off the engine.

2. The throttle stop screw can be adjusted to maintain a set idle speed with the throttle fully retarded (see “Throttle Stop”). If this method is used, it will be necessary to “Choke” the engine to stop.

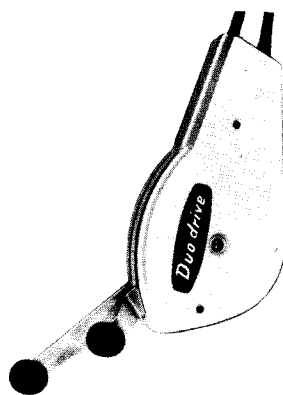
NEUTRAL

Gear shift lever straight up and down — throttle lever at idle position.



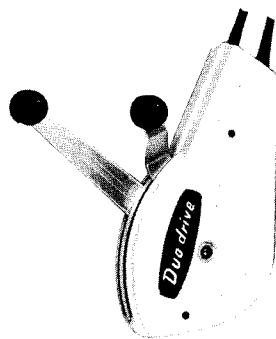
FORWARD

Gear shift lever all the way forward — throttle lever forward.



REVERSE

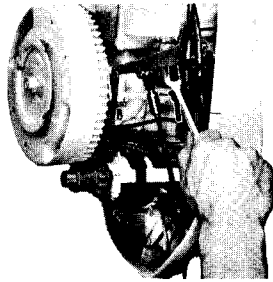
Gear shift lever all the way back — throttle lever forward.



CAUTION: Exercise care when operating in reverse as too high a speed may cause water to be taken into the boat over the transom.

THROTTLE STOP

6 and 9.2 H.P. Remote Control Models



Your engine, when equipped with remote controls, incorporates the use of a throttle stop which can be adjusted to establish the correct idle speed.

When using single lever remote controls, turn the throttle stop screw in or out as required to obtain an idling speed of 700-800 R.P.M. when in "Neutral" gear and approximately 650 R.P.M. when in "Forward" or "Reverse" gear.

When using Twin-Lever Remote Controls, refer to section "TO STOP" under "OPERATION WITH TWO LEVER REMOTE CONTROLS."

THROTTLE STOP

15 H.P. Models

When operating your engine with single lever remote controls, the throttle stop must be adjusted to establish the correct idle speed (800 to 1,000 R.P.M.).

TO ADJUST

1. Place control lever in "NEUTRAL."
2. Turn the throttle stop screw "down" (clockwise), to increase the idle speed. Turn the throttle stop screw "up" (counter-clockwise), to decrease the idle speed.

If you are not using remote controls, the throttle stop screw should be turned up so that there is 5/16" clearance between the top-hex portion of the throttle stop screw and the lower surface of the mounting bracket.

NOTE: When using two lever remote controls, refer to section "To Stop" as listed under "Operation of Two Lever Remote Controls."



THROTTLE STOP

35 and 50 H.P. Models

Your engine is equipped with a throttle stop which can be adjusted to establish the correct idle speed. It is located on the Throttle Tower Shaft. See illustration this page.

The throttle stop should be adjusted for an idling speed of approximately 700 to 800 R.P.M. when in "FORWARD" or "REVERSE" gear and from 800 to 900 R.P.M. when in "NEUTRAL" gear. To increase the idle speed, loosen the lock nut and turn the throttle stop screw "in," and to decrease idle speed turn the throttle stop screw "out." After adjusting, tighten lock nut securely.

When using Twin-Lever Remote Controls, refer to section "TO STOP" under "OPERATION WITH TWO LEVER REMOTE CONTROLS."

COOLING / 3.5 H.P. Models

This is an air-cooled engine which dissipates engine heat to the air through cooling fins on the cylinder and on the exhaust portion of the engine leg. A fan incorporated on the flywheel blows an air stream over these fins to accelerate cooling.

A cooling tube that picks up water from the slipstream below the anti-cavitation plate circulates water up into the exhaust portion of the engine leg to cool the aluminum leg and lower exhaust portion of the cylinder.

- CAUTION: NEVER RUN YOUR ENGINE OUT OF WATER.

COOLING / 6 Through 50 H.P. Models

Your engine is water cooled by a water pump which acts as a displacement pump at low engine speeds and as a centrifugal pump at high engine speeds. The pump is located in the lower engine leg. (CAUTION: The water pump has a rubber impeller which can be damaged by operation in excessively silty or sandy water.)

Cooling water is picked up on the underside of the anti-cavitation plate just ahead of the propeller and is discharged after circulation through the power head, along with the exhaust gases.

- CAUTION: NEVER RUN YOUR ENGINE OUT OF WATER.

CHECKING WATER PUMP OPERATION

6 and 9.2 H.P. Models

Normal operation of the water pump is indicated by a spray of water issuing from the idle exhaust relief port located on the back of the engine leg. However, when running the engine at "wide open throttle," little or no water at all will be visible. Water MUST clearly be visible at all other operating speeds. If, when operating at speeds below "wide open throttle," this spray is not evident, STOP ENGINE IMMEDIATELY. Check cooling water intake passages on underside of anti-cavitation plate located just ahead of the propeller, to make sure weeds or other foreign materials are not blocking the passages. If trouble persists contact your Authorized Viking Service Facility immediately. Operation of the motor with insufficient cooling water will result in severe internal damage due to overheating if not immediately corrected.

CHECKING WATER PUMP OPERATION

15 Through 50 H.P. Models

Normal operation of the water pump is indicated by a spray of water issuing from the idle exhaust relief port located on the back of the engine leg. If at any time during operation, this spray is not evident, STOP ENGINE IMMEDIATELY. Check cooling water intake passages on underside of anti-cavitation plate located just ahead of the propeller, to make sure weeds or other foreign materials are not blocking the passages. If trouble persists, contact your Authorized Viking Service Facility immediately. Operation of the engine with insufficient cooling water will result in severe internal damage due to overheating if not immediately corrected.

THERMOSTAT

35 and 50 H.P. Models

Your engine is equipped with a thermostat that controls the temperature of the cooling water. This temperature control pro-

vides good idling characteristics and complete combustion of the fuel charge. The thermostat **MUST NOT** be removed for summer operation.

ENGINE OVERHEAT INDICATOR

An Engine Overheat Indicator, Model 562, is available for 35 and 50 H.P. models. Contact your Authorized Viking Service Facility for more information.

EMERGENCY STARTING

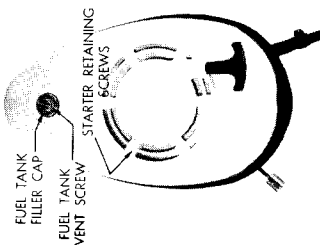
3.5 H.P. Models

A starter collar has been provided on the flywheel which may be used to start the engine if the automatic rewind starter does not work.

To start, remove the starter assembly and wrap a rope or cord around the starter collar. Then follow normal starting procedure.

REMOVING STARTER ASSEMBLY

Remove the three screws which attach the starter assembly to the fuel tank and lift off starter.

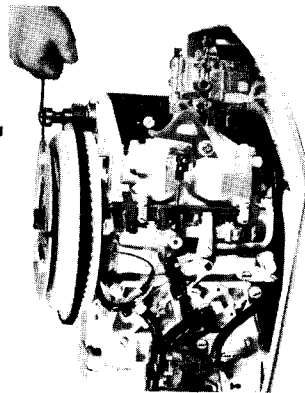


EMERGENCY STARTING

6 Through 50 H.P. Models

A starter collar has been provided on the flywheel which may be used to start the engine if the regular starter does not work.

To start, remove the engine cover and wrap a rope around the starter collar. Then follow normal starting procedure.



SERVICING ENGINE

REMOVING COVER

6 Through 50 H.P. Models

To remove the engine cover, turn the Cover Release Lever, located under the front carrying handle, counter-clockwise one half turn. Lift cover up and off.

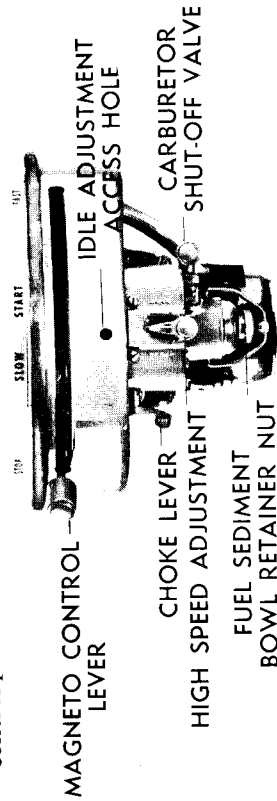
ADJUSTING CARBURETOR

If engine is not performing correctly, check for other causes of trouble before readjusting carburetor. However, extreme changes in temperature, humidity or barometric changes may make carburetor adjustments necessary.

3.5 H.P. Models

The carburetor has two adjustment needles. The idle or low speed needle is accessible with a screwdriver through the hole in the lower-center portion of the fuel tank skirt, directly above the high-speed adjustment knob.

The high-speed adjustment knob is located on the face of the control panel.



INITIAL SETTING

If the carburetor is so far out of adjustment that the engine will not start, make an approximate setting. Turn the high-speed adjustment knob on the face of the control panel all the way to the left (start position). Turn the idle adjustment needle

in (clockwise) until it seats lightly. DO NOT OVERTIGHTEN AS NEEDLE AND SEAT MAY BE DAMAGED. Back the screw out one full turn. The engine will start at this setting but the mixture may be too rich for normal operation.

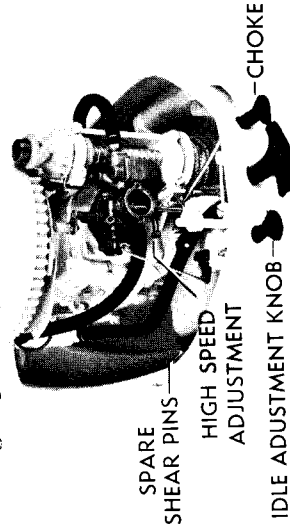
FINAL ADJUSTMENT

1. Start engine and run until warmed up.
2. Advance throttle to wide-open position.
3. Turn high-speed knob to the left (start position) until engine loses power and begins to "roll" or "gallop" due to an over-rich mixture. Turn the knob to the right (lean position) until engine fires evenly and picks up speed. Continue turning to lean position until engine slows down or "stalls" because of too lean a mixture. Set adjustment knob halfway between these two points. This will align the adjustment knob in the "Run" range on the control panel.
4. Retard throttle to idle position and adjust low-speed needle in the same manner. Do not adjust leaner than necessary to obtain smooth idling. It is better to have the idle setting a little rich rather than too lean.

ADJUSTING CARBURETOR

6 and 9.2 H.P. Models

The carburetor has two adjustment needles as illustrated. The top needle is the low speed or idle adjustment. The bottom needle is the high speed adjustment.



INITIAL SETTING

NOTE: BE SURE TO MAKE THE ADJUSTMENTS AS LISTED BELOW WHEN RUNNING YOUR ENGINE FOR THE FIRST TIME.

IDLE ADJUSTMENT

Position the idle adjustment knob (starboard knob) on the face of the control panel so that it is centered within the travel limits. The idle adjustment screw on the carburetor is pre-set at the factory so that only "fine" adjustments will be necessary.

HIGH SPEED ADJUSTMENT

Turn high speed adjustment screw on carburetor "in" (clockwise) until it seats lightly. **DO NOT OVER-TIGHTEN AS NEEDLE AND SEAT MAY BE DAMAGED.** Back the high speed screw out 1-1/8 turn. The engine will start at this setting but mixture may be too rich for normal operation.

FINAL ADJUSTMENT

1. Start engine and run until warmed up.
2. Shift engine to "Forward" and advance throttle to wide-open position.
3. Turn high speed adjustment screw counter-clockwise (open) until engine loses power and begins to "roll" or "gallop" due to an over-rich mixture. Then slowly turn the screw clockwise (closed) until cylinders fire evenly and engine picks up speed. Continue turning clockwise until engine slows down or "stalls" because of too lean a mixture. Set adjustment screw halfway between these two points, favoring the "rich mixture."
4. Retard throttle and shift engine to "Neutral." Turn the idle adjustment knob on the control panel as necessary to obtain smooth idling. It is better to have the idle setting a little rich rather than too lean. If any other carburetor adjustments are necessary, contact your Authorized Viking Service Facility.

ADJUSTING CARBURETOR

15 Through 50 H.P. Models

The carburetor used has two separate fuel systems; a high speed system which governs the fuel-air mixture at full throttle and an idle or low speed system which controls the mixture at idle speeds. The high speed system is equipped from the factory with a fixed or non-adjustable jet which should not be changed or altered except by an authorized agent.

NOTE: Replacement high speed jets for high altitude areas are available through your Authorized Viking Service Facility.

The low speed or idle system is controlled by an adjustable needle located at the top of the carburetor and can be adjusted as follows:

INITIAL SETTING

If the carburetor is out of adjustment to the point that the engine will not run at low speed, start out by making an approximate setting. Turn the idle adjustment needle "in" (clockwise) until it seats lightly. **DO NOT OVER-TIGHTEN AS NEEDLE AND SEAT MAY BE DAMAGED.** Back screw out one full turn. The engine will run at this setting but the mixture may be too rich for normal operation.

FINAL ADJUSTMENT

Make the final carburetor adjustment as follows:

1. Start engine and run in gear until it is fully warmed up.
2. Set controls in "NEUTRAL" position.
3. Turn the idle adjustment needle counter-clockwise (open) until the engine loses power and begins to "roll" or "gallop," due to an over-rich mixture. Slowly turn the needle clockwise (closed) until cylinders fire evenly and engine picks up speed. Continue turning clockwise until engine slows down or "stalls" because of too lean a mixture. Set adjustment screw halfway between these two points.
4. Do not adjust leaner than necessary to obtain smooth idling. It is better to have the idle setting a little rich rather than too lean.

SERVICING SPARK PLUGS

Hard starting, missing, overheating, pre-ignition, or lack of power are signs of defective, improperly gapped, insufficiently tightened, or wrong type spark plugs. Whenever engine performance indicates that the spark plugs are in need of attention (See Trouble Check List) service as follows:

1. Remove engine cover.
2. Disconnect spark plug leads (twist slightly counter-clockwise and pull off).
3. Remove spark plugs. Clean and inspect. If the tip of the insulator is rough, cracked, broken, blistered, or if the electrodes are burned away so they cannot be gapped at .030", then replace with new plugs.

The Correct Replacement Spark Plug Is As Follows:

3.5 H.P.	Champion H8J
6 H.P.	Champion H10J
9.2 H.P.	Champion J4J
15 H.P.	Champion H8J
35 H.P.	Champion H4J
50 H.P.	AC AC-M42K

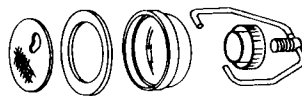
4. Be sure to check the condition of the spark plug gaskets and clean the spark plug seats in the cylinder before re-installing spark plugs.
5. Install plugs in cylinder head. Turn spark plugs in until finger tight on the gasket, and then tighten with a wrench. The correct torque is 120-180 inch pounds for all models.
6. Install spark plug lead wires. The spring inside the rubber terminal lead cover must be positioned to fit properly over spark plug terminal.

NOTE: On 15 H.P. models, position spark plug lead wires so that the top lead wire is pointing "down" and the bottom lead wire is pointing "up."

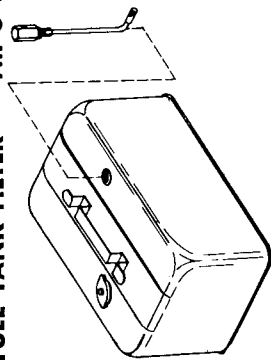
SERVICING FUEL FILTERS

Fuel Strainer Bowl Screen 3.5 H.P. Models

Close the fuel tank shut-off valve and then unscrew retainer nut located below the fuel strainer bowl on the carburetor and remove the bowl and wire screen. Screen may be cleaned by rinsing in clean gasoline. CAUTION: When cleaning strainer, exercise care so the strainer and bowl are not dropped overboard.



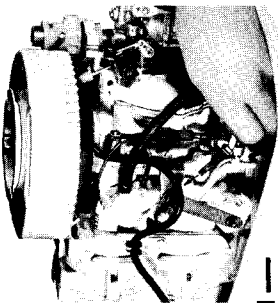
FUEL TANK FILTER — All 6 Through 50 H.P. Models



Remove the fuel supply line from the elbow on fuel tank and unscrew fuel tank adapter to remove the fuel pick-up tube. The filter, a fine wire mesh screen, attached to the end of the pick-up tube, can be cleaned by rinsing in clean gasoline.

FUEL PUMP FILTER — 6 Through 15 H.P. Models

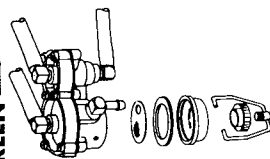
1. Remove engine cover.
2. Remove the fuel pump filter from the inlet side of the fuel pump located on the starboard side of the power head.
3. The filter, a fine wire mesh, can be cleaned by rinsing in clean gasoline.



FUEL PUMP FILTER BOWL SCREEN —

35 and 50 H.P. Models

Unscrew the retainer nut located below the sediment bowl on the fuel pump and remove the bowl and filter screen. The screen may be cleaned by rinsing in clean gasoline.



REPLACING SHEAR PIN

To prevent accidental starting put engine in neutral or disconnect spark plug wires.

1. Remove cotter pin from propeller shaft nut and remove nut and seal.

2. On 3.5 through 15 H.P. models, pull propeller from shaft to gain access to the shear pin. If the propeller is "frozen" to the shaft, a light tap with a block of wood will loosen it. On 35 and 50 H.P. models, the shear pin is located in the hub on the back of the propeller.
3. Remove damaged or broken shear pin. Drive out with new pin if necessary.
4. Install new shear pin and reassemble propeller, seal, propeller shaft nut, and cotter pin.

LUBRICATING LOWER GEAR HOUSING

The grease in the lower gear housing should be checked after every (30) thirty hours of operation and replaced every 100 hours or at least once each season with a Non-Corrosive Leaded Outboard Gear Oil - EP90, such as Texaco Outboard Gear Oil - EP90 or equivalent. **DO NOT USE A CORROSIVE HYPOID OIL UNDER ANY CIRCUMSTANCES.**

TO DRAIN

With engine in an upright position, remove both the upper and lower plug screws and allow grease to drain completely.

TO REFILL

1. When all water and diluted grease has drained, insert nozzle of gear lubricant into lower screw hole.
2. Add lubricant until it appears at the top hole.
3. Reinstall top plug screw and washer.
4. Reinstall lower plug screw and washer. Tighten securely.
5. Allow engine to stand in an upright position for at least one-half (1/2) hour to permit the gear lubricant to completely fill all cavities in gear housing.
6. Remove top plug screw and washer and recheck gear lubricant level. Add grease as outlined below if necessary, to bring lubricant level up to top hole. Reinstall top screw and washer, tighten securely.

TO ADD GREASE

1. Remove lower plug screw and washer and insert nozzle of gear lubricant into lower screw hole.
2. Remove upper plug screw and washer.
3. Add lubricant until it appears at the upper hole.
4. Reinstall the upper plug screw and washer and tighten securely.
5. Reinstall the lower plug screw and washer and tighten securely.

STERN BRACKETS, STARTER DRIVE GEARS AND CONTROL LINKAGE

Lubricate all moving parts and control linkage with SAE No. 30 oil twice each season or oftener if required.

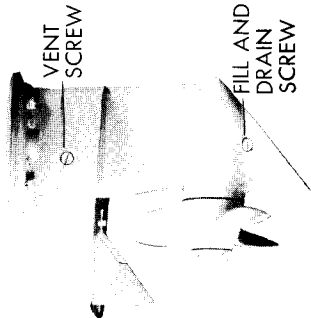
GREASE FITTINGS

Grease fittings are provided at critical points where bearing surfaces are not exposed externally. Using an automotive type grease gun and lubricant, grease twice each season or oftener if required.

CARE AFTER OPERATION IN SALT WATER

All engine parts that contact the water have been chemically treated to retard salt water corrosion. However, you should take some special precaution after running your engine in salt water.

1. Always tilt the engine out of the water when not in use. (See Note For "Operation In Freezing Temperatures").
2. Run engine in fresh water to flush out salt deposits.
3. Wash engine down with fresh water and periodically apply an automotive type wax to protect the finish.
4. Periodically remove the propeller and grease the propeller shaft.



OPERATION IN FREEZING TEMPERATURES

When operating the engine in freezing or near freezing temperatures, keep the lower unit submerged in the water. If the engine is tilted out of the water, water remaining in the cooling system and lower unit may freeze and cause the related parts to rupture. If there is a chance of ice forming on the water, the engine should be removed from the water and drained completely. Any water left in the cooling system or lower unit may freeze and rupture the associated parts.

SUBMERGED ENGINE — FRESH WATER

If the engine is recovered within a short time after being submerged, try to start it as outlined below:

1. Remove spark plugs. With spark plug holes facing down, turn engine over several times with hand starter to expel all water from crankcase and cylinder. **IF THE ENGINE DOES NOT TURN OVER FREELY, TAKE IT TO YOUR AUTHORIZED VIKING SERVICE FACILITY IMMEDIATELY.** If it is not possible to have the engine serviced immediately after submersion, the powerhead should be submerged in clear, fresh water to prevent rust or oxidation until it can be serviced.
2. If fuel tank was submerged, drain all fuel from tank and flush with fresh fuel until all water is removed.
3. Dry and install spark plugs.
4. Drain fuel lines and carburetor. Flush with fresh fuel until all water is removed.
5. Try starting engine using fresh fuel mixture. If engine starts, run for at least an hour, or until all parts are thoroughly warmed-up and all water is evaporated from internal moving parts. If engine does not start or turn over freely, **TAKE IT TO YOUR AUTHORIZED VIKING SERVICE FACILITY IMMEDIATELY.**

SUBMERGED ENGINE — SALT WATER

Do not attempt to start an engine that has been submerged in salt water regardless of the length of time involved. Perform

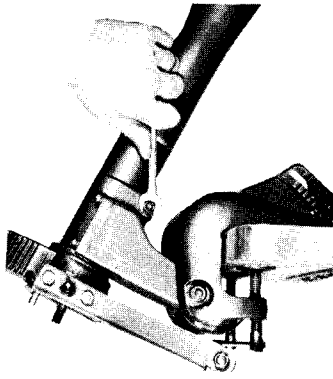
steps as listed below and **TAKE IT DIRECTLY TO YOUR AUTHORIZED VIKING SERVICE FACILITY.**

1. Remove spark plugs. With spark plug holes facing down, turn engine over several times with hand starter to expel all water from the crankcase and cylinder.
2. Perform steps 2, 3 and 4 as listed under "Submerged Engine — Fresh Water." If it is not possible to have the engine serviced immediately after submersion, the powerhead should be submerged in clean fresh water to prevent rust, oxidation or salt accumulation until it can be serviced.

ADJUSTING STEERING FRICTION

3.5 H.P. Models

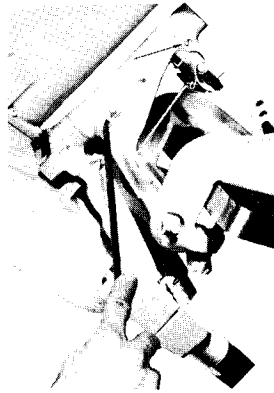
Steering friction on 3.5 H.P. models is controlled through a friction clamp and springs attached to the swivel bracket. Adjust as desired by tightening or loosening hex nut indicated in illustration.



ADJUSTING STEERING FRICTION

6 and 9.2 H.P. Models

Steering friction on 6 and 9.2 H.P. models is controlled through two set screws in the top and bottom port side of the swivel bracket. Adjust as desired by tightening or loosening screws indicated in illustration.



ADJUSTING STEERING FRICTION

15 H.P. Models

Steering friction on 15 H.P. Models is controlled by a friction plate attached to the swivel bracket. Adjust nut as shown in illustration to obtain steering friction desired. Note: The powerhead is removed for illustrative purposes only and is not necessary for making the friction adjustment.



ADJUSTING STEERING FRICTION

35 and 50 H.P. Models

Steering friction on 35 and 50 H.P. Models is controlled by a friction screw in the top-starboard side of the swivel bracket. Adjust as desired by tightening or loosening screw indicated in illustration.



REMOVING ENGINE FROM BOAT

To remove the engine from the boat, simply reverse the installation procedure. CAUTION: When removing the engine from the boat, maintain in an upright position, resting on its skeg until all water has drained from the engine leg. Do not transport or store engine in a position where the lower unit is elevated above the powerhead, as water may drain into the powerhead through the exhaust ports and cause extensive damage.

NOTE: When re-installing electric start models, make sure that the battery cables are connected properly, RED CABLE TO THE POSITIVE (+) TERMINAL AND THE BLACK CABLE TO THE NEGATIVE (-) TERMINAL OF THE BATTERY.

PROLONGED STORAGE

Before storing your engine for prolonged periods, it must be protected against rust and possible damage from freezing temperatures.

To Prepare Engine for Storage

1. If the engine has been operated in salt water, it is a good idea to flush out the cooling system with fresh water prior to storage. To do this, run the boat in a body of fresh water or remove the engine from the boat and run in a test tank.
2. Run the engine until it is thoroughly warmed-up. On 3.5 H.P. models, advance throttle control to the wide open position and choke the engine until it stops.
3. On 6 through 50 H.P. models, when storing the engine for any period of time, run the engine until it is thoroughly warmed-up. Place gear shift in "Neutral" and allow engine to run at a fast idle. Remove fuel line from fuel tank or engine. Using a rust preventative oil, rapidly inject the oil into the carburetor air intake for a period of ten (10) to twenty (20) seconds until the engine stops. The above procedures will coat the interior of the crankcase with a protective coating of oil.
4. When the unit has been removed from the water or test tank, and fuel line disconnected, turn the starter over several times to expel all water from the cooling system. Any water which is left in the cylinder may freeze and cause extensive damage.
5. Drain all fuel from lines and carburetor. On 3.5 H.P. models, also drain the fuel tank.

6. Remove spark plugs. Put an ounce or two of SAE 30 Engine Oil into each spark plug hole. Turn the engine over several times to distribute the oil. This will lubricate the pistons, rings and cylinder walls. Clean and re-gap spark plugs and re-install.
7. Drain all grease from lower gear housing as outlined under "Lubrication." Refill gear housing as outlined under "Lubricating Lower Gear Housing."
8. Lubricate all moving parts as outlined under "Lubrication."
9. Wipe engine down with a clean rag. Apply an automotive type wax to protect the finish and prevent rust or corrosion.
10. Remove the propeller and apply a coating of grease on propeller shaft. Re-install propeller.
11. Store engine in a dry, well ventilated area. Store in an upright position.

INSURE YOUR ENGINE

Many insurance companies offer protection contracts for your boat and outboard engine. Insurance covering your own equipment against damage, theft, etc., as well as liability insurance for property damage and personal injury to others is available. It would be wise to contact your insurance agent for further information about adequate protection.

RECORD SERIAL NUMBER

For your convenience, blanks have been provided below to record your Engine Model Number, Serial Number, and Ignition Key Number. This information will be invaluable in case of loss or theft.

MODEL NO.

SERIAL NO.

IGNITION KEY NO.

TROUBLE CHECK LIST

	Engine Does Not Start	Starts But Does Not Run	Engine Misses	Does Not Idle	Does Not Develop Full Power
Remote Fuel Tank Not Connected	X	X			
Battery Cables Not Connected	X	X			
Battery Discharged	X				
Remote Electric Cable Not Connected	X				
Remote Controls in Need of Adjustment	X		X	X	
Fuel Tank Empty	X	X			
Fuel Shut-Off Valve Closed	X	X			
Puddle Drain System Dirty or Clogged	X	X	X		
Fuel Line Kinked or Pinched	X	X	X	X	
Fuel Filters Dirty or Clogged	X	X	X	X	
Vent Screw Gasket Obstructing Air Flow	X	X	X	X	
Vent Screw on Fuel Tank Filler Cap Closed	X	X	X	X	
Air Leak In Engine	X	X	X	X	
Air Leak In Fuel System	X	X	X	X	
Carburetor Passages Clogged or Dirty	X	X	X	X	
Incorrect Fuel-Oil Mixture	X	X	X	X	
Carburetor Out of Adjustment	X	X	X	X	
Engine Flooded	X	X			
Wrong Type Spark Plugs	X	X	X	X	
Defective or Fouled Spark Plugs	X	X	X	X	
Breaker Contact Points Out of Adjustment	X	X	X	X	
Breaker Contact Points Burned or Pitted	X	X	X	X	
Weak Ignition Coils	X	X	X	X	
Weak or Defective Condenser	X	X	X	X	
Spark Plug Lead Wires Interchanged	X				
Frayed or Cracked Lead Wire Insulation	X	X			
Disconnected, Grounded or Loose Wiring in Electrical System	X	X			

* See Your Authorized Viking Outboard Service Facility.