

Operating Instructions



JOHNSON
Sea-Horse "5 1/2"
(MODEL CD)



1

introduction

Your new Johnson Sea Horse 5 $\frac{1}{2}$ is designed and constructed to give you the maximum in service and performance for a motor of its size—take full advantage of the qualities built into it by understanding the details of its operation.

You should *study* this Instruction Book—not just read it or glance through it. When you have done so, then take a little extra time to gradually become familiar with the controls. Practice until their operation becomes an instinctive habit. Then you'll not find yourself sometime “doing the wrong thing at the right time” and vice versa.

If you will take good care of your Johnson motor, rest assured it will take good care of you.

JOHNSON MOTORS



fuel mixture

lubrication

Since fuel vapors are first compressed in the crankcase of the engine, the most practical method of lubrication is by mixing the lubricating oil with the gasoline. Lubrication is obtained as the mixture of oil and gasoline enters the crankcase and is later transferred to the cylinders. Oil being less volatile than gasoline, a large portion of the oil in the fuel mixture remains in the crankcase to lubricate the bearings and other moving parts. The remainder enters the cylinder with the pre-compressed charge to aid in the lubrication of piston and piston rings.

Oil: We recommend Mobiloil Outboard or another outboard oil, or a regular SAE 30 grade automotive engine oil.

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Avoid use of low price third grade (ML) oils.

NOTE: Many first quality automotive engine oils are of the heavy-duty type, indicating that they contain additives which are beneficial in minimizing ring-sticking and the formation of varnish and sludge deposits on pistons and engine interiors. Under certain conditions in two-cycle (outboard) engines, some additives may deposit excessive ash on the spark plugs, thus causing missing or failure to fire the charge. Such deposits are not otherwise harmful to outboard engines, and proper amounts of suitable refinery-blended additives are beneficial because of their ability to maintain clean engine interiors; Mobiloil Outboard contains special, yet very effective, additives.

When changing from one oil to another because of spark plug difficulty caused by deposits, it is necessary to thoroughly clean the combustion chambers, ports and piston heads, as otherwise the existing deposits may continue to cause spark plug trouble.

Gasoline: Select a good quality of regular grade gasoline—where possible; premium grades, such as “ETHYL” gasoline should be avoided. “ETHYL” gasoline may shorten the life of the spark plugs.

Due to atmospheric conditions and temperature changes, moisture condensation is more or less continually taking place within the gas tank. This results in water droplets accumulating in the



tank, gas line and carburetor which, if excessive, is sufficient to interfere with performance of the motor, causing it to act, in many instances, as though it were starving for gasoline. (Water will not pass through the fine screens and small carburetor jets.) Be sure fuel system is free of moisture—likewise, all fuel should be run through a fine screen before pouring into gas tank. A funnel with screen installed serves this purpose nicely.

CAUTION: Benzol, which is sometimes used to blend with gasoline, is harmful to the motor—avoid use of such fuel.

mixing of oil and gasoline

Amount • Mix $\frac{1}{2}$ pint of Mobiloil Outboard (as specified) to each gallon of gasoline.

Procedure • Pour into the fuel tank (Fig. 1) approximately one-half the amount of gasoline required. Add all the oil required (at the ratio of $\frac{1}{2}$ pint of oil to each gallon of gasoline). Shake the two together until they are thoroughly mixed. Add the balance of gasoline. Shake tank briskly to insure mixing.

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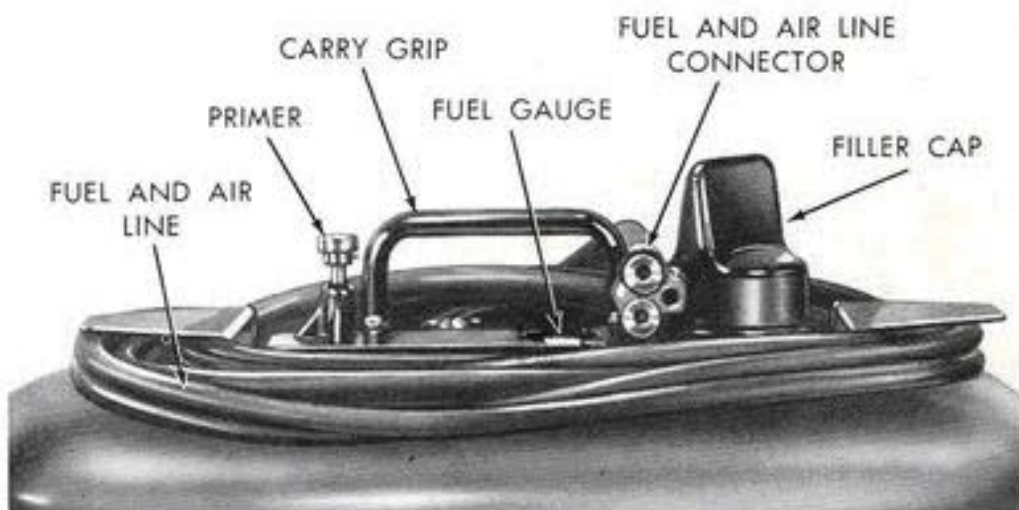
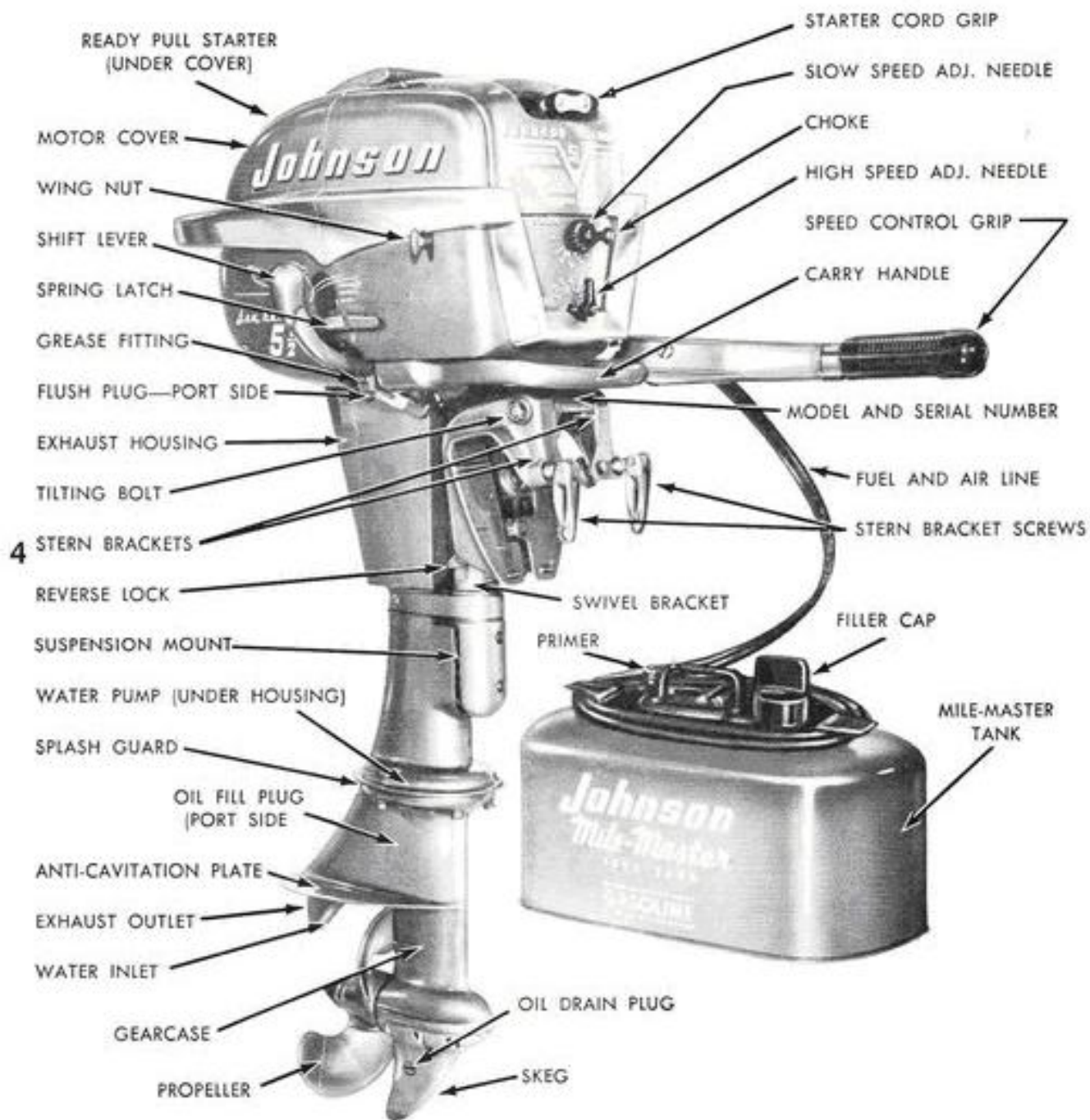


Figure 1



J O H N S O N M O D E L C D



model CD



specification chart

POWER HEAD	Two cycle—Alternate Firing 2 Port—Automatic Intake
Bore and Stroke	1 3/4" x 1 1/2"
No. of Cylinders	2
O.B.C. Certified Brake H.P. at 4000 R.P.M.	5 1/2
Piston Displacement	8.84 Cu. In.
Weight	CD—47 1/2 lb. (App.)* CDL—48 1/2 lb. (App.)*
Propeller Dia. Pitch	8" x 7 1/4" 2 Blade
Fuel Tank Capacity	4 Gal.
Starting	Ready Pull
Ignition	Magneto—Johnson
Make Carburetor	Johnson
Gear Ratio	12-21
Type of Exhaust	Underwater
Cooling System	Vari-Volume Water Pump
Steering	Pivot
Gear Shift Control	Neutral, Forward, Reverse
Stern Height (Max.)	CD 15" CDL 20"

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JOHNSON MOTORS reserves the right to change weight, construction, materials or specifications without notice and without obligation.

*Basic weight without Mile-Master Fuel Tank which weighs 10 pounds.



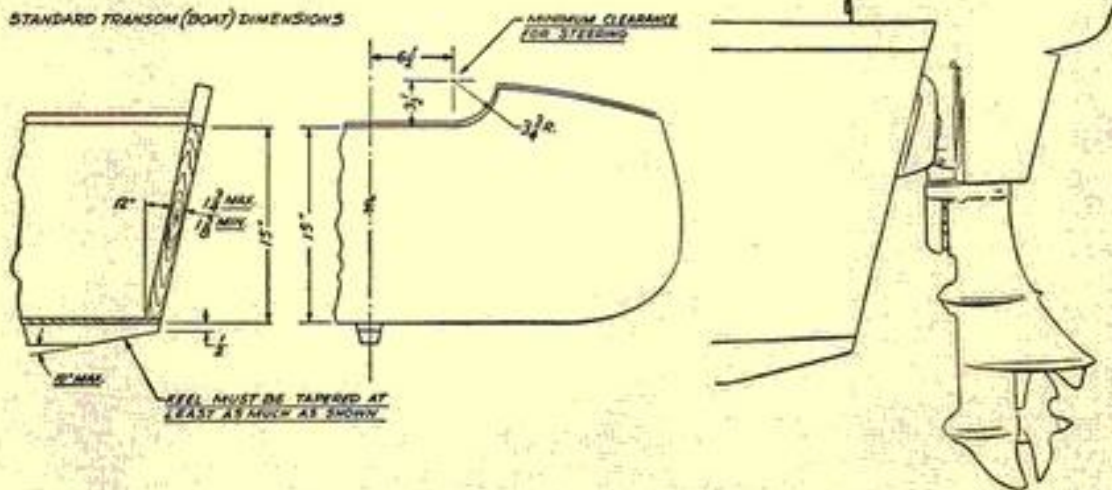
attaching the motor to the boat

It is essential the motor be properly mounted on the stern of the boat to get results. The object is to be sure the propeller operates at correct depth below the surface of the water and that the drive-shaft casing comes to rest at right angle to the line of boat travel.

Height of the stern governs the depth at which the propeller operates—the angle of propeller drive being determined by adjustment of the thrust bar. Be sure stern bracket screws (Fig. 2) are tight at all times—check periodically. Do not use pliers on screws.

- 6 REMOVING MOTOR FROM BOAT—Lift straight up, hold several seconds to insure all water draining from under water exhaust. Exhaust channels lead directly to cylinder. (Do not raise lower unit higher than power head before draining; if so water will flow into the cylinder. Result—rust, failure to start and run, and expensive repairs.)

STANDARD TRANSOM (BOAT) DIMENSIONS



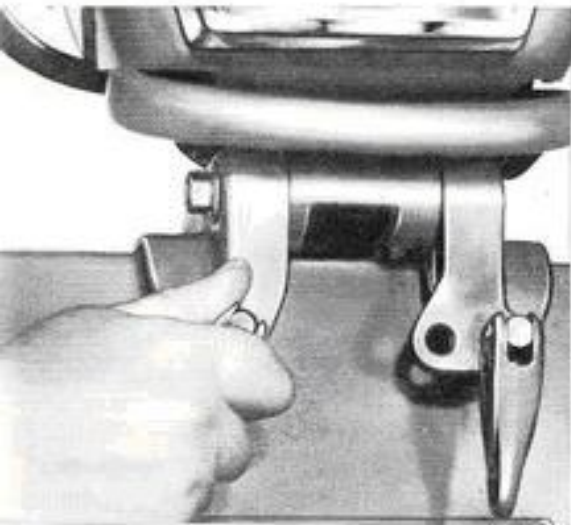


Figure 2

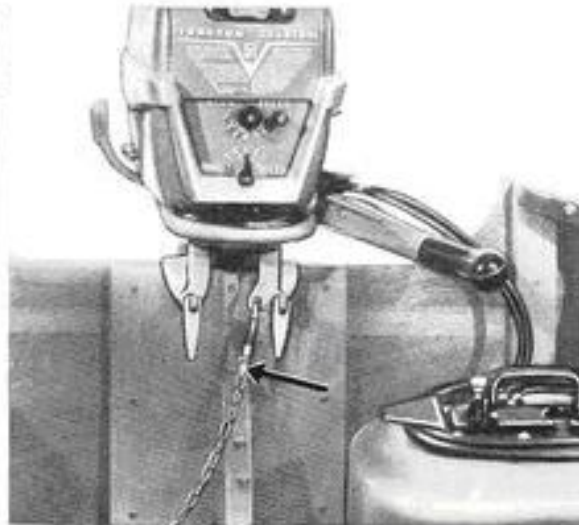


Figure 3

stern height

For maximum efficiency, the following stern heights are recommended:

Model	Recommended Stern Height
CD	15 Inches
CDL	20 Inches

Should the stern be too high, the propeller is apt to "spin" too near surface of the water; if too low, a large portion of the gearcase will be exposed below the surface of the water, resulting in excessive drag to retard boat speed.

precaution

Note that provisions have been made for attaching a short length of rope, cable or chain to the motor for the purpose of anchoring to the boat, thus, guarding against loss overboard in event the stern bracket clamp screws work loose (Fig. 3). See your Johnson Dealer for precautionary devices of this sort.



angle adjustment

A simple means for adjusting the motor in a vertical position to make allowance for angle of the transom on the boat is provided as shown (Fig. 4). Transom (stern) angles vary somewhat; however, range of thrust bar adjustment is sufficient to accommodate angles ordinarily encountered in most boats.

Note that four notches are cast into the quadrant of each stern bracket to permit proper thrust bar adjustment by simply bearing down on small lever against spring tension with thumb and forefinger, then moving assembly (thrust bar) in or out as desired.

To accomplish this adjustment; (1) hang motor on transom of the boat, (2) move shift lever to neutral or forward position and tilt motor out far enough to set thrust bar in second notch (from transom), (3) tilt motor back against thrust bar—correct position for the motor is vertical to line of boat travel (boat lying level on water under normal loaded condition), (4) in event motor does not come to rest in a vertical position, move thrust bar to next notch as required.

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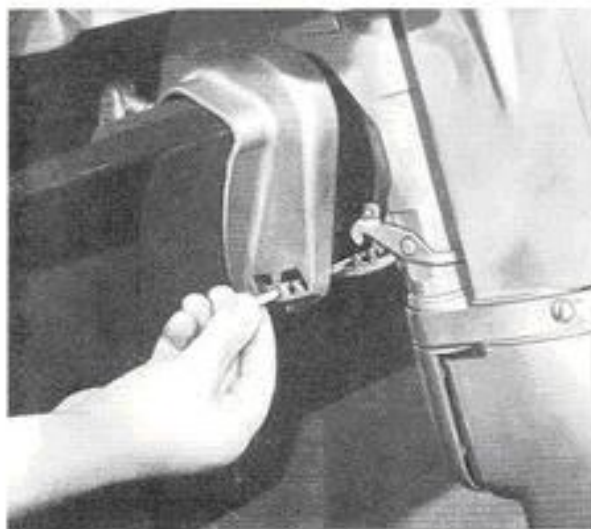


Figure 4

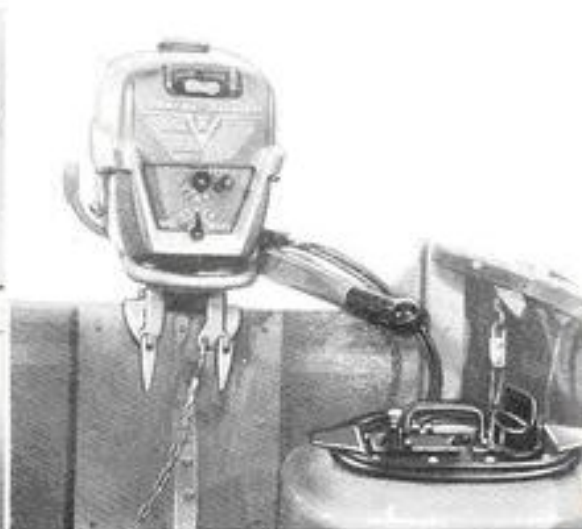


Figure 5





Figure 6



Figure 7

connecting fuel supply

The fuel container (Mile Master Tank) should be placed in the boat at a convenient position near the operator (Fig. 5). The fuel line may be strung out, allowing ample loop for steering as the motor is pivoted from side to side. The fuel line connector can then readily be attached to the coupling on the motor provided for this purpose—simply compress small lever on the fitting and slide into position as shown (Fig. 6).

operating instructions

“Spark” and “throttle” are synchronized by a system of linkage to correctly proportion degree of spark advance with respect to volume of fuel charge admitted throughout entire speed range of the motor. Desired motor speeds (within capacity of the motor) are thus obtained by manipulation of the control grip (Fig. 7).



To further facilitate operation of the motor, "neutral," "reverse" and "forward" are provided, which permits starting in neutral—"out of gear." The motor may be started at the dock and run at idle speeds for warming up purposes or until ready for power application. It may then be "shifted" into reverse or forward as required to suit the particular occasion—of extreme importance when docking or operating out of congested areas.

NOTE: ALWAYS RETARD MOTOR SPEED BEFORE SHIFTING.

Shifting is accomplished by an arrangement of gears in the gearcase through linkage with the shifting lever conveniently located for ease of operation (Fig. 8).

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The reversing feature has been installed primarily for maneuvering of the boat—docking, backing out of congested areas, etc.

If desiring to shift with the motor standing idle, it may be found impossible to do so regardless of having previously set the speed control grip to position for shift, since the shifting member and gear (in the gearcase) may at the moment "butt" to prevent engaging. To accomplish shifting in this event, simply pull on the starter cord slightly to turn the assembly over a bit, thus permitting the gear and shifting member to fully engage.

Note raised rib (arrow) running full length of the speed control grip—this provides ready reference to actual position of the control grip at all times, thus eliminating necessity of constantly referring to printed instructions on the steering arm.

CAUTION: Be careful not to strike submerged obstructions when in reverse—the motor does not tilt in reverse.

Under no circumstances tilt motor out of water by bearing or pushing down on the steering handle.



starting instructions

Since fuel is fed to the carburetor by means of pressure created within the crankcase of the motor and built up in the fuel tank, some arrangement is required to fill the carburetor on having attached the fuel line to the motor and prior to starting. This is accomplished by operation of a primer or pump built into the mechanism of the fuel tank.

The fuel line connector includes a valving mechanism which automatically closes off fuel and air when disconnected from the motor (Fig. 6).

1. Depress primer button on the tank several times as shown (Fig. 9). Note that the pressure required to operate the primer increases as the fuel line and carburetor fill up. **THIS IS YOUR SIGNAL TO STOP PUMPING.** It is not necessary to pump beyond this point. Fuel level is automatically maintained in the carburetor by pressure built up in the tank during operation of the motor.

2. Set speed control grip to SHIFT position.

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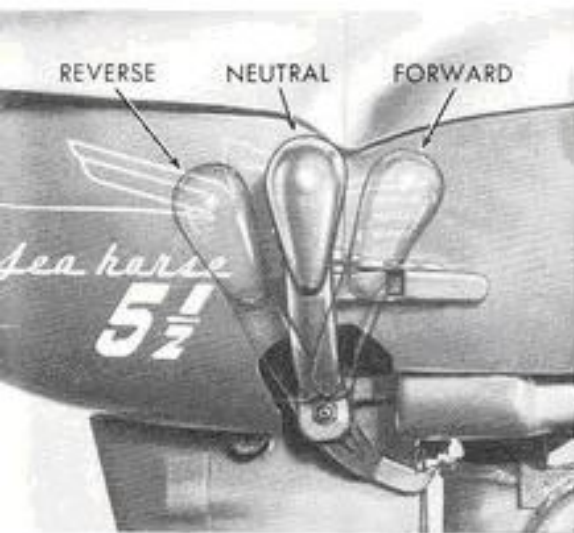


Figure 8



Figure 9



3. Move gear shift lever to center or "neutral" position (Fig. 8).
DO NOT ATTEMPT TO START MOTOR IN GEAR.

4. Turn speed control grip to position marked "START" as indicated on the steering arm (Fig. 7).

5. Pull choke "out" to extreme limit (Fig. 10) (in temperature below 40° F., turn high speed lever to number one (1) to provide a richer starting fuel mixture). *Warm motor* (immediately after previous running) choke not ordinarily required. However, in event motor fails to start on third attempt, apply choke.

6. Pull rapidly on starting cord grip to start motor (Fig. 11).

7. On having started motor—push choke in. Additional choking may be required momentarily after starting cold motor.

The motor may be operated in neutral position for warm up or for an indefinite period at the option of the operator.

8. Retard motor speed and shift to forward or reverse as desired.

9. When in "forward" turn speed control grip toward position "FAST" to gain speed; turn high speed needle adjusting lever (page 4) to left or right as required to obtain maximum performance.

12



Figure 10



Figure 11



10. To retard motor speed, turn speed control grip toward position "slow." Adjust slow speed needle dial, in slow position, by turning to right or left as required.

11. To stop motor, turn speed control grip to position "stop." Hold until motor stops running.

The above starting instructions are given in step by step form—it is advisable to become familiar with each detail prior to actually operating the motor. A few moments spent in practice are well worth while.

carburetor adjustment

The carburetor being of the two jet (float feed) type, is designed for maximum, efficient carburetion at all speeds, two adjustments are thus required, namely; high and slow speed. Both high and slow speed needles are adjusted at the factory with provisions for limited variations to compensate for atmospheric conditions. However, if ultimate adjustment does not fall within the limited range or in case of repairs, proceed as follows:

The slow speed dial and high speed lever are held firmly in position on their respective adjusting needle shafts by expansion of slotted serrated ends as a result of drawing up on the countersunk head screws.

Remove the screws from the center of the slow speed dial (Fig. 12) and high speed lever (Fig. 13). The dial and lever are now free to be removed from respective shafts.

Carefully insert small screwdriver in slot of slow speed needle and turn to the right (clockwise) until needle comes to rest *gently* on its seat. Be careful not to injure the seat by turning down too tightly. Then back off (turn left) about $1\frac{1}{4}$ turns.



Adjust high speed needle in like manner, turning needle until it rests gently on its seat, then back off (turn left) about $\frac{1}{3}$ turn.

Replace dial, lever and center screws. Before securing the center screws arrange both dial and lever to position No. 4 on the panel.

slow speed adjustment

Start motor as instructed—run at “fast” speed until normal operating temperature has been reached. Throttle down to “slow speed range.” Turn dial to right or left as required to obtain best setting for slow speed.

(Note: Turning needles to left enriches the fuel mixture—that is, increases proportion of fuel to air to result in rich mixture. An excessively rich mixture is indicated by “rough” running of the motor. “Spitting or coughing” in the carburetor is indicative of a lean mixture, caused by turning needle too far to right.)

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Loosen center screw to properly arrange dial, without disturbing position of the slow speed needle (this is IMPORTANT). Should dial tend towards binding on the needle shaft, it may become nec-

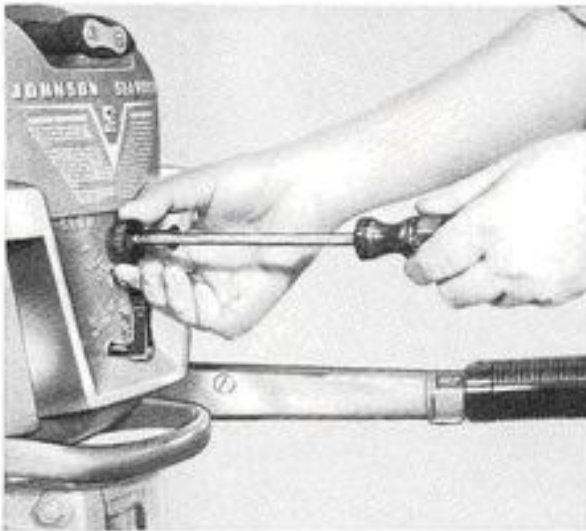


Figure 12



Figure 13



essary to pull it free entirely to permit rearranging its position without affecting adjustment of the needle at this time. Arrange dial to position No. 4 on panel. Push dial back onto the shaft so that the face of the dial is flush with the end of the needle shaft. This will permit dial to engage limitation stop on the panel. Tighten center screw to firmly secure dial. Atmospheric conditions may necessitate slight variation from time to time—limited range provided in this respect should be sufficient, nevertheless.

high speed adjustment

(Must be performed only after final slow speed adjustment has been made.) Start motor as instructed—run at “fast” speed until normal operating temperature has been reached. Turn lever to left or right as required to obtain best setting for top speed performance. Rearrange lever as described above to position No. 4 on panel.

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cooling

Water for cooling purposes is provided by action of the Vari-Volume pump, which functions as a displacement pump at slow motor speeds and as a centrifugal pump during operation in the higher speed ranges (Fig. 14).

Note twin water inlets in the gearcase (Fig. 15). During FORWARD operation of the motor, water is picked up by the cavity in the gearcase immediately back of the propeller and forced through the cooling system, later to be discharged at the outlet in the exhaust tube provided for this purpose. Water enters the cooling system through the small holes above the anti-cavitation plate when operating in REVERSE.



Ordinarily the cooling system requires little or no attention (except as instructed on page 28 titled—*care of the motor when operated in salt water*) and continues to function during operation of the motor provided the water inlets are submerged, open and free of obstruction. Take care when maneuvering in shallow, muddy water.

break-in of new motor

No breaking-in required. No extra lubrication required.

lubrication of gearcase

16

GEAR HOUSING LUBRICANT: We recommend Mobilube GX90 or any other good grade of SAE 90 automotive (hypoid) gear lubricant. If hypoid lubricant is not available, in emergency use Mobiloil Outboard or other SAE 30 engine oil until recommended lubricant can be obtained.



Figure 14

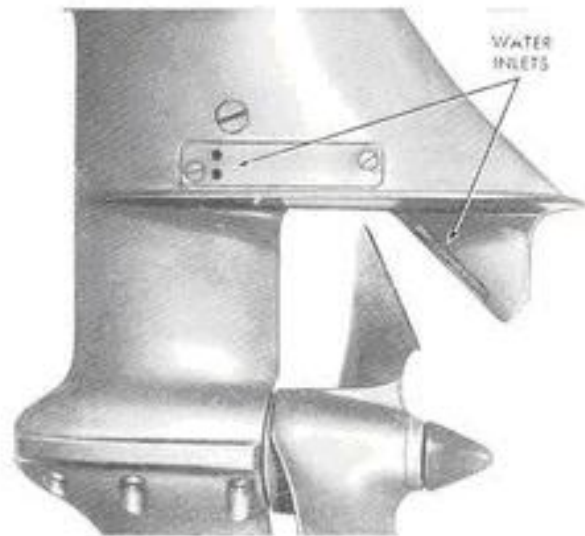


Figure 15



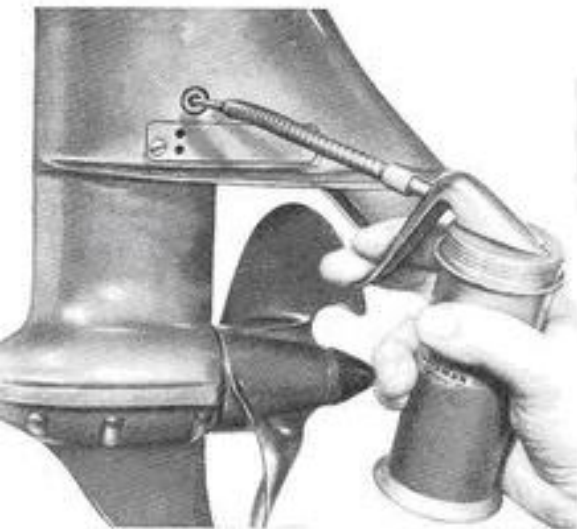


Figure 16

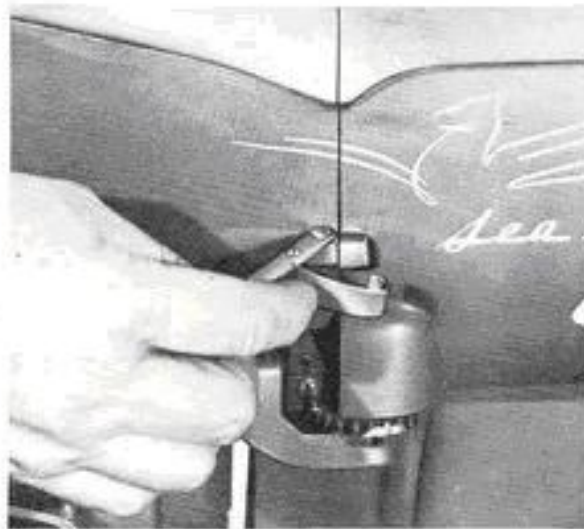


Figure 17

Check gearcase for oil after first five hours of operation to be sure it is filled. Then check periodically—at least every 50 hours. Drain and refill at the end of the season.

17

filling of gearcase

When a complete change of lubricant is required, remove both Drain and Fill plugs. Permit all of the oil, water or residue if any to drain out; replace drain plug. Insert fresh lubricant with pump type oil can as shown (Fig. 16); fill to maximum level. Replace fill plug. Capacity 9 fluid ounces.

When checking for water in the gearcase, remove the fill plug, then loosen the drain plug just enough to permit seepage—water being heavier than oil, if present, will drain off first. In event of no water accumulation, the drain plug may be retightened without material loss of lubricant. Gear lubricant if necessary, however, should be inserted to “fill” level. When refilling with automotive type pressure gun, fill from bottom—oil drain hole. Check condi-



tion of gasket on both screws to avoid possibility of leaks. Replace, if necessary.

See your Johnson dealer or gasoline service station with regard to obtaining a small quantity of hypoid oil in event it becomes necessary to occasionally add to the gearcase. Small pressure type oil cans suitable for this purpose are readily available through local automotive supply houses, hardware dealers or your Johnson dealer.

spark plugs

Recommended Spark Plug—Champion J6J (formerly known as Champion J-10 Commercial). Adjust spark gap—.030.

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causes of plug failure

A certain amount of spark plug replacement may be necessary, depending upon the quality of fuel and oil used in fuel mixture



Figure 18

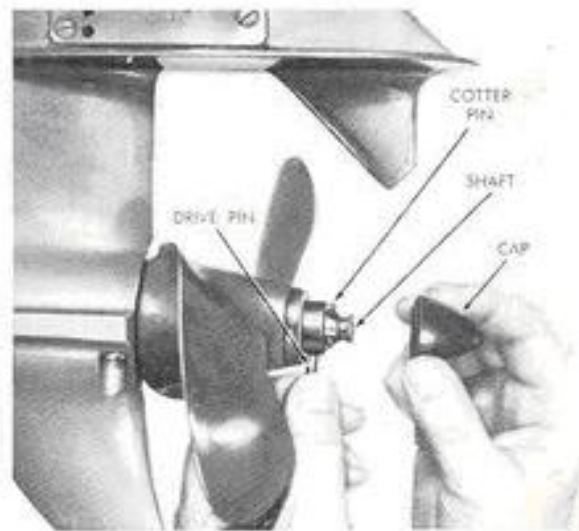


Figure 19



and the amount of carbon deposit in the combustion chamber. If spark plug replacements become excessive, consult Johnson Service Station with respect to removing carbon from the pistons and the cylinder head. Seek his advice, based on experience, as to the best grade of oil and gasoline available in the locality.

spark plug replacement procedure

To gain access to the spark plugs for inspection and/or replacement, simply release latches on both sides of the motor cover (Fig. 17) to permit rear half being lifted upward (Fig. 18).

Detach rubber covered spark plug terminal, then remove spark plugs for inspection or replacement as required. Attach spark plug terminals and return cover to original position—make certain latches are properly seated and corresponding levers drawn into position to secure.

19

propeller drive pin replacement

If required to replace the drive pin, remove the rubber cap and fragments of broken drive pin from shaft (Fig. 19). The new drive pin may be used to drive out the broken pin. Replace the rubber cap after inserting new drive pin. Note—make certain the cap properly engages grooved end of the propeller shaft and is correctly “seated” to insure its holding fast.

removal of propeller

Remove rubber cap, cotter pin and drive pin. Propeller is now free and may be removed from the shaft. Reassemble in reverse order, using new cotter pin if necessary.



shock absorber drive

The shock absorber assembly (Fig. 20) consists of a comparatively strong spring inserted tightly into a retainer and pilot. Retainer is locked to upper driveshaft and pilot pinned to lower driveshaft. Action of the shock absorber assembly is such that when the propeller strikes an underwater obstruction the spring is caused to coil slightly in either the retainer or pilot—or in both, to release its grip, thereby absorbing shock of sudden impact.

steering friction adjustment

20

Steering friction may be adjusted to individual requirements by simply loosening or tightening the adjusting screw (Fig. 21), in the swivel bracket provided for this purpose. To adjust—insert screwdriver as shown (Fig. 22).

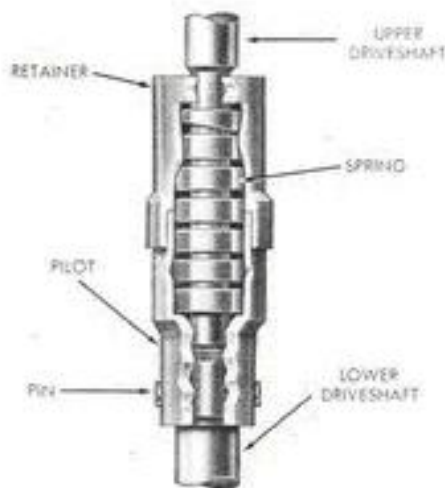


Figure 20

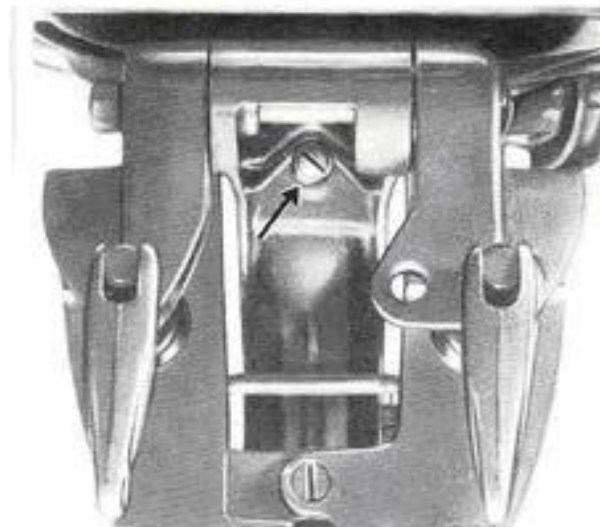


Figure 21



to adjust tension of tilting

To obtain adjustment of tilting tension, loosen or draw up on tilting bolt nut (large bolt attaching stern brackets to the swivel bracket) as required. Tension of tilt need not be too great, but just sufficient to maintain the motor in any position of tilt.

to remove motor cover

To remove the motor cover assembly, simply release latches on both sides of the rear half as shown in Fig. 17; unscrew front cover wing screws (Fig. 23). Lift rear half as shown in Fig. 18; then shift entire assembly slightly forward to lift off. Assemble in reverse order.

21

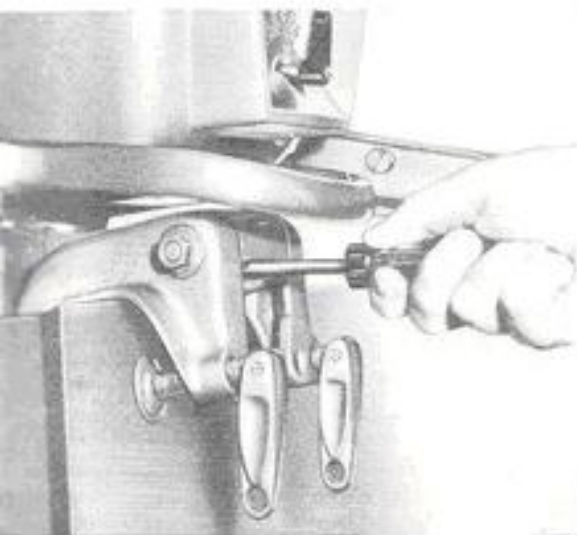


Figure 22



Figure 23



to install new starting cord

1. Remove motor cover and starter assembly.
2. Place starter assembly in vise as illustrated (Fig. 24).
3. Remove fragments of broken or damaged cord.
4. Obtain new cord . . . use only special cord provided by manufacturer.
5. Insert punch in hole of pulley provided for this purpose. Turn pulley against tension of spring until all of the tension is taken up, then permit pulley to unwind one (1) full turn.
6. Insert cord as illustrated. (End opposite anchor on cord through slot in pulley.)
7. Attach grip to cord as shown (Fig. 25).
8. Gradually release tension on pulley until all of the cord is taken up.
9. Attach starter assembly and cover to motor.

22



Figure 24

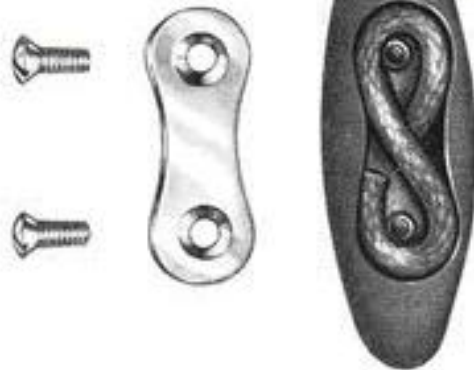


Figure 25



cleaning of gasoline filter

The gasoline filter element and bowl are located immediately below the carburetor as an integral assembly and accessible for inspection or cleaning on removal of the motor cover as described on page 21.

Observe first the amount of foreign matter in the filter (glass) bowl to determine necessity of cleaning. If required to clean, unscrew "square" nut below the glass bowl to permit its removal (Fig. 26). Care should be taken at this time to avoid loss or damage to the gasket placed between the filter bowl and body of the assembly. The filter element may be freed for cleaning by removing the center screw holding it in place—wash filter element in a container of alcohol.

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assembling of filter

The filter should be assembled in reverse order of that described above—taking care that the gasket between the bowl and filter body is replaced in the same relative position it had prior to disassembly.

lubrication of magneto oiler felt

The magneto is provided with a lubricating felt riding against the breaker cam to minimize wear on the breaker arm cam follower. To function properly, the felt requires an application of light machine oil at least once a year—five to six drops will do. See your Johnson Service Station.



magneto breaker point cleaning and adjustment

From time to time it may be necessary to clean and adjust the magneto breaker points. Storing the motor in a damp place or in a closed space where the humidity is relatively high, may create a condition affecting performance of the breaker points to cause faulty ignition.

disassembly and preparation for access to breaker points

Remove motor cover, starter housing, ratchet and inspection cover. Turn flywheel to position where port comes to rest above the points (two sets of breaker points are employed).

24

cleaning operation

Carefully spread points with blunt instrument (small screwdriver), insert point dresser. Release points, work point dresser gently

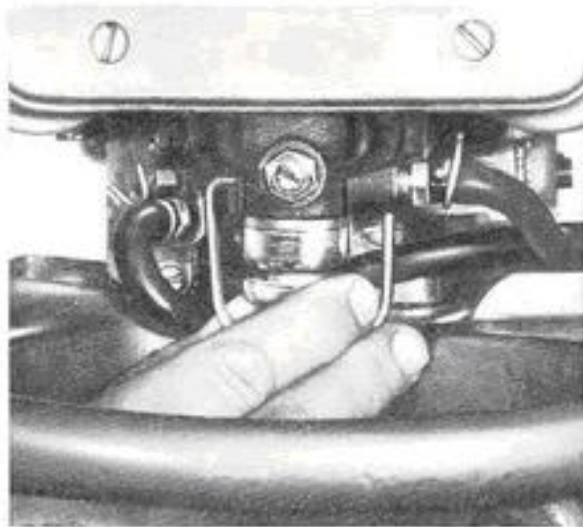


Figure 26



Figure 27



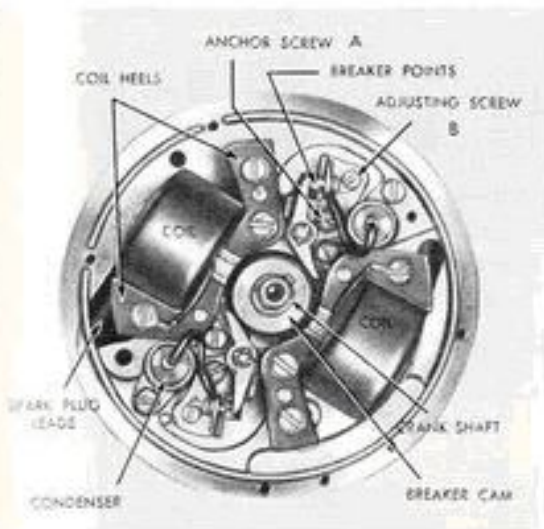


Figure 28



Figure 29

up and down to clean point surfaces (Fig. 27). On completion of cleaning operation, insert strip of clean paper and in like manner work up and down to remove possible traces of dressing material left on point surfaces.

adjusting operation

Correct breaker point gap setting is .020" full open. To adjust, loosen breaker point assembly anchor screw "A" (Figs. 28 and 29) slightly—just enough to permit shifting of the assembly. Ultimate adjustment is accomplished by turning adjusting screw "B" (eccentric) right or left as required to obtain recommended gap setting—turn left to increase gap, right to reduce. Check with .020" feeler strip. Tighten anchor screw "A" to secure position of the assembly. Repeat procedure for adjusting other point assembly.

After checking with feeler strip it is advisable to again insert a strip of clean paper to make certain that no foreign matter is left on the breaker point surfaces to interfere later with performance.



assembling

Reassemble in reverse order of that described in proceeding paragraphs.

care of the motor

The service obtained from this motor is dependent largely upon the care it is given. The following suggestions will assist in its proper maintainance.

Remove sediment bowl from filter periodically to free element and bowl of foreign substance which might have accumulated.

Inspect spark plugs occasionally. Clean and if necessary adjust gap. (Correct setting of gap .030".) Wipe off ignition leads with a dry cloth to remove residue.

26

Check breaker points as instructed.

Draw up on all nuts and screws at least once each season.

Remove drain and fill plugs from gearcase at frequent inter-



Figure 30



Figure 31

Handwritten signature or scribble in yellow ink.

vals to drain off water. Refill with Mobilube GX 90 as previously instructed.

The shift lever and swivel bracket are provided with grease fittings for periodical lubrication.

Wipe motor off regularly with a damp cloth. A clean motor is readily accessible for inspection and less apt to foul.

Observe condition of propeller blades.

Do not cover the motor with a canvas hood or other device to avoid as much as possible the effects of condensation. The motor otherwise is well protected against weather under normal circumstances.

preparations for storage

27

No outboard motor should be placed in storage, especially Winter storage, without considering the necessary precautions.

Prior to storing the motor, run it on an extremely rich mixture (choke out) to flood the interior and functional parts with fuel mixture to assist in minimizing effects of condensation during storage.

Check for accumulated water in the gearcase. See page 17. Refill with gear lubricant, if necessary.

If operated in salt water, flush cooling system with fresh water.

Make certain that all the water has been drained from the cooling system. This may be accomplished by hanging motor in upright position and tilting the lower unit up and down two or three times. The foregoing information is especially important if the motor is subject to temperatures below freezing when not in use. Failure to take precautions may result in bursting the cylinder block or cause possible injury to the water channels.

Remove spark plugs; pour about a tablespoonful of clean oil



through each spark plug opening. Turn flywheel slowly by pulling on the starter cord grip to distribute oil on cylinder walls. Replace spark plugs.

Drain all fuel from the Mile-Master tank, gas line and carburetor. Remove and clean gasoline filter element—see page 23.

Under no circumstances should the motor be stored in an inverted position. It should be hung on a rack similar to the manner in which it is mounted on a boat.

preparation for operation after storage

28 Attach spark plugs to ignition leads; ground plugs to motor at a distance from the spark plug holes to avoid possibility of “outside” ignition; crank motor briskly to clear cylinders of excess oil and/or fuel mixture. Clean and adjust spark gap to .030”.

Replace spark plugs if necessary. See your Johnson Dealer for spring check-up.

Check screws and nuts for tightness; also condition of the propeller and propeller pin.

care of the motor when operated in salt water

Certain conditions, not ordinarily encountered in fresh water, appear during operation in salt water as result of corrosion—applying particularly to the exposed motor parts. Following suggestions will assist in reducing corrosive effects to a minimum.

Remove the motor from the boat after salt water operation. Flush cooling system by operating several minutes in a tank or



barrel of fresh water or by use of flushing arrangement (available through your Johnson dealer) attached to garden hose. Note that provisions have been made for flushing in this manner. Simply remove flush plug (Fig. 30) from the upper exhaust housing on the port side; flush with fresh water. A minute or two of flushing will suffice—guard against applying excessive water pressure, to avoid possible damage to cooling system gaskets.

If the motor cannot be conveniently removed from the boat, tilt the gearcase out of the water. Rinse exposed parts off with fresh water and wipe with oily cloth.

Under no circumstances permit the gearcase to remain submerged when the motor is not in use for a long period of time.

Remove motor cover at regular intervals for inspection of under cover parts. In event corrosion has taken place, carefully remove from affected parts. Spread thin film of oil over the area to guard against similar recurrence. Wipe exposed parts with oily cloth, including inside surfaces of motor cover.

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if the motor is dropped overboard

Possibility of this occurrence can be eliminated entirely by exercising a few simple precautions. Make certain the stern bracket clamp screws have been properly tightened to secure position of the motor on the boat. Check screws periodically during operation of the motor to guard against their having worked loose. Attach safety chain or rope to eyelet on the stern bracket provided for this purpose, anchoring opposite end at some convenient position on the stern of the boat. (See your Johnson dealer.)

However, if the motor unfortunately goes overboard, recover it immediately if possible.

Remove carburetor bowl, magneto and spark plugs. Remove traces of remaining water.



Work as much water as possible out of the cylinders and crankcase by turning the motor over slowly in upright and inverted positions.

Pour small amount of oil into each cylinder.

Blow off armature plate with air pressure, if available; wipe dry with cloth. Set in warm, dry place. Allow ample time for thorough drying—make certain no water remains about the coils.

When overboard in salt water, rinse armature plate with fresh water to avoid corrosive effects which may lead to difficulty later on. Blow off with air stream and allow to dry.

Install armature plate and flywheel. Ground spark plug leads to motor—this is important. Crank motor rapidly with starter cord to blow water out of cylinders and crankcase.

Replace all parts previously removed.

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Start motor as instructed and allow to run until reasonably sure no water remains.

CAUTION: Do not, under any circumstances, attempt to start the motor until the armature plate has been thoroughly dried. Remaining drops of water are apt to set up a short circuit which may result in extensive repairs.

If the motor cannot be started, it should be disassembled at once to remove all traces of water clinging to the inside walls and motor parts. Each part should be dried and coated liberally with oil to prevent rusting. This is **IMPORTANT**—the motor should be attended to immediately. Consult your local Johnson Dealer or Service Station.

hard starting or failure to start is caused by—

1. Gas tank empty.



2. Failure to pull choke.
3. Clogged fuel line and/or screen in gas tank.
4. Water in gasoline.
5. Carburetor needles not properly adjusted (see carburetor adjustment).
6. Improperly mixed fuel.
7. Fouled or defective spark plug.
8. Loose or disconnected spark plug leads.
9. Loose electrical connections.
10. Magneto breaker points corroded or out of adjustment.

overheating is caused by—

1. Water pump not operating.
2. Water inlet obstructed.
3. Water tube disconnected, loose or clogged with foreign matter.
4. Insufficient oil in the fuel mixture.

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excessive vibration or rough running is caused by—

1. Carburetor needles set too rich (open too far).
2. Motor loose on boat.
3. Propeller blades out of pitch (striking submerged obstructions).

Look for a sheared propeller drive pin in event the motor suddenly commences to "race" with little or no forward boat speed. Be certain too that transom height of the boat does not exceed 15 inches, Model CD or 20 inches Model CDL. See page 6.



register your motor

Your motor is known to the factory only by its Model and Serial Number, both of which are stamped on the name plate attached to the stern bracket—port side as shown (Fig. 31).

For assistance in case of theft, register the model and serial number of your motor with the factory—accomplished by filling in and returning the registration card (enclosed in the tool kit) to the factory.

Always provide model and serial number of the motor when ordering parts or otherwise seeking information regarding it.

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insurance



Insurance on your outboard motor and/or boat is available at nominal cost through the Outboard Boating Club of America. This insurance includes protection against loss by fire, theft, etc. Write direct to Outboard Boating Club of America, 307 North Michigan Avenue, Chicago 1, Illinois, for further details.

Johnson service

It has always been the belief of Johnson Motors that a sale does not complete the transaction between the manufacturer and the buyer. It establishes, rather, a new obligation—an obligation whereby Johnson Motors agrees to assist the buyer in obtaining utmost service from a Johnson outboard motor.



With this policy ever uppermost in our minds, we have built up an organization that consists of a nation-wide network of Johnson Service Stations to give prompt and efficient service to owners of Johnson outboard motors.

The first step in this structure is the local Johnson Dealer, who is supplied with first-aid parts, enabling him to make emergency and minor repairs. Second, the Authorized Service Station, which carries a stock of parts and equipment necessary to properly service Johnson outboard motors. Third is the District Service Station, with a complete stock of parts for all models, tool equipment and factory trained mechanics capable of making extensive repairs.

It has, therefore, been our endeavor to place a Service Station within easy reach of every Johnson outboard motor owner. See Dealer Service Station list.

Always consider the Mile-Master tank as part of the motor assembly—include it with the motor whenever requiring service.

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warranty

We warrant each new outboard motor of our manufacture to be free from defects in material and workmanship under normal use and service; our obligation under this warranty being limited to making good at the factory any part or parts thereof which shall, within three (3) months after delivery of such motor to original purchaser, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties and representations expressed or implied and of all other liabilities in connection with the sale or use of any motors.

This warranty shall not apply to any motor which shall have



been repaired or altered outside the factory in any way so as to affect its stability, nor which has been subject to misuse, negligence or accident, or operated for racing purposes.

We make no warranty in respect to trade accessories not of our manufacture; inasmuch as they are usually warranted separately by their respective manufacturers.

Because of the unusual strains and accidents to which such products may be subjected we make no warranty of either material or workmanship in racing outboard motors or any of our products when used for racing.

Claims must be entered on motors or motor parts returned to the factory for inspection, repair or replacement. Request form No. SE-16 from local Johnson Dealer or Service Station. **This form should be filled in, signed by the motor owner and dealer or service station representatives and mailed to the factory with returned material. TRANSPORTATION CHARGES PREPAID.**

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your boat equipment

If you use your outboard motor on navigable waterways of the United States you are subject to the Federal Motor Boat Law which became effective April 25th, 1940.

NOTE: Navigable waters under Federal jurisdiction include the ocean and Gulf coasts, bays and rivers tributary to them, the Great Lakes and connecting waterways, any body of water which is customarily used for interstate navigation, or other specifically designated locations. If there is any doubt concerning the status of your locality, you can get a ruling from the Bureau of Marine Inspection and Navigation, Department of Commerce, Washington, D. C.



Under the law you are required to carry the following equipment on board your boat at all times:

1. Life preservers sufficient to sustain afloat every person on board. These may be either life vests or approved floating cushions.
 2. An efficient whistle or horn. (Only if over 16 ft. long.)
 3. A fire extinguisher of at least one pint capacity capable of putting out gasoline fires. (Only if used for "hire.")
 4. To be exhibited from sunset to sunrise—
 - (a) A bright white light aft to show all around the horizon.
 - (b) A combined lantern to show green to starboard (right) and red to port (left) carried in the fore part of the boat.
- Federal law also requires the numbering of all motor driven boats operated on navigable waters under Federal jurisdiction. However, numbering is not required on rowboats, canoes, or sailboats not exceeding sixteen feet in length which are equipped with outboard motors, but which are designed for and used primarily with other means of propulsion.

Numbers are assigned upon application to the Officer in Charge, Marine Inspector, U. S. Coast Guard, having jurisdiction over the area in which the vessel is owned.



