GENERAL INSTRUCTION BOOK

for

JOHNSON *Sea-horse*
OUTBOARD MOTOR

MODELS OK-15 - OKL-15

Johnson Motors

PETERBORO CANADA

P.P.Co. 11-48-1682

Part No. 401393

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.

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

JOHNSON MOTORS
Peterborough, Ontario.

JOHNSON SEA HORSE

Model OK-15

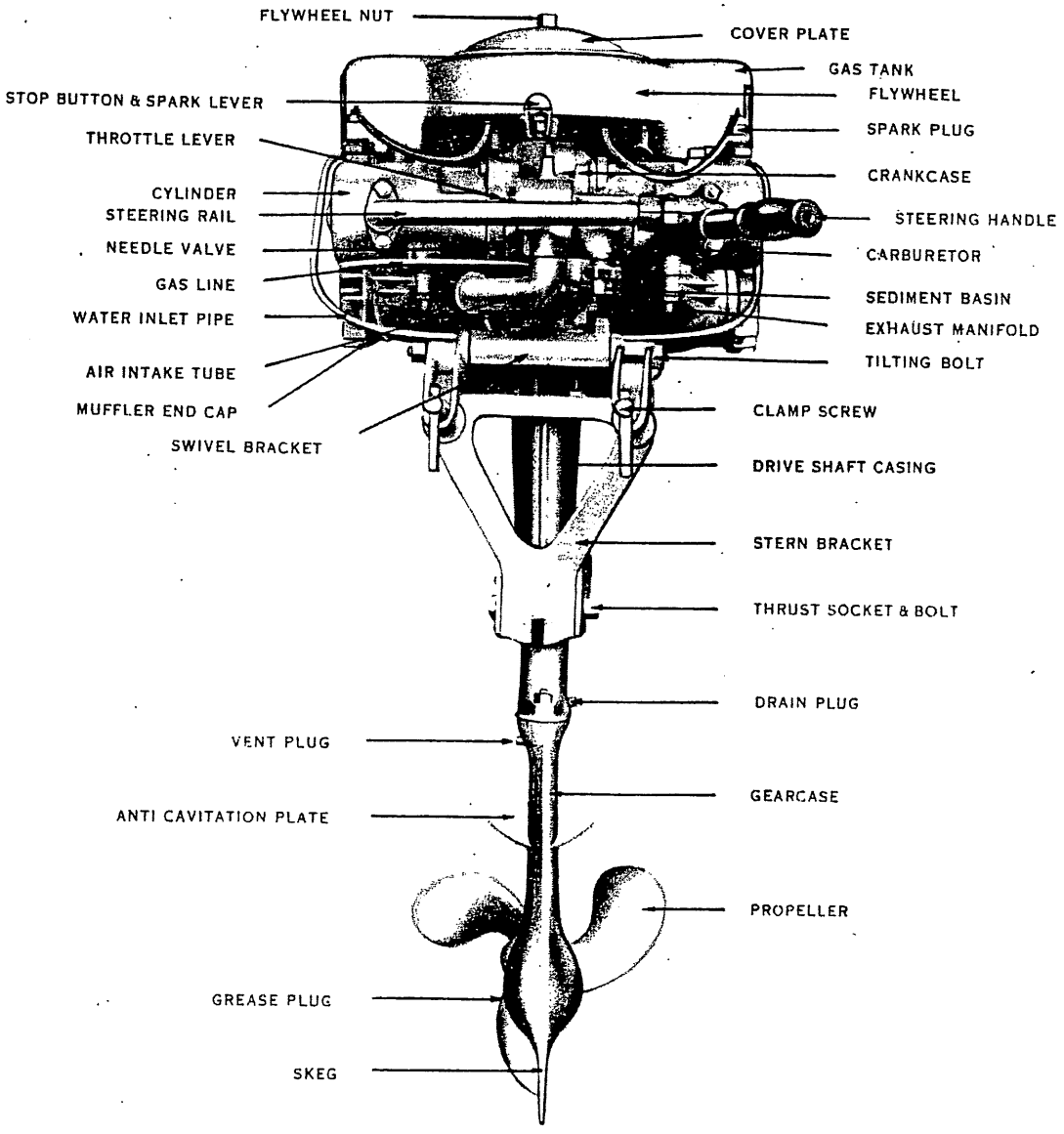
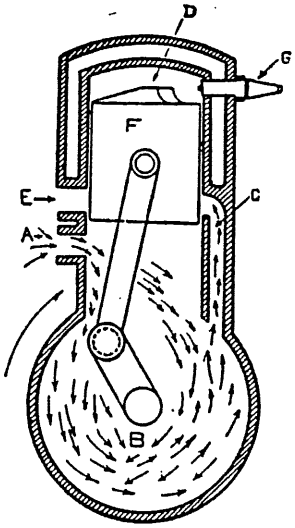


Fig. 1

The Two Stroke Cycle

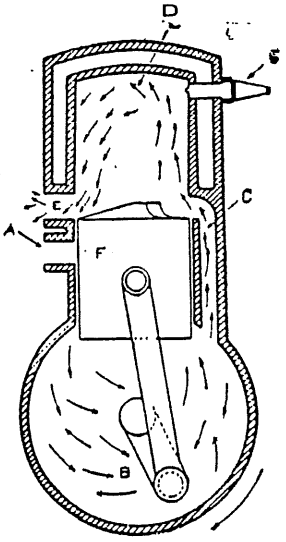
The two (stroke) cycle engine, such as used in all Johnson Outboard Motors, differs somewhat from the four (stroke) cycle engine used in your automobile, this difference being due to the method of conducting gases to and from the cylinder while in operation. The two (stroke) cycle engine employs an arangement of ports rather than mechanically operated valves to accomplish this purpose, as shown in the following illustrations.

Illustration No. 1



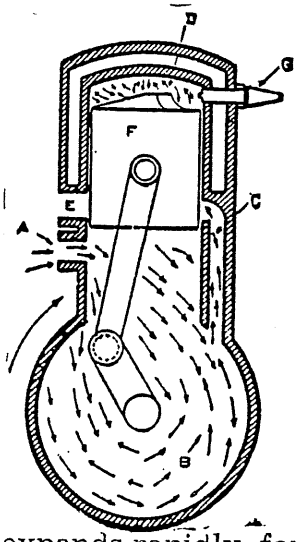
On the first upward stroke of the piston, a partial vacuum or low pressure is created in the crankcase. As the piston progresses in its upward movement and nears the end of the stroke, intake port "A" is uncovered causing fuel vapor from the carburetor to flow into the crankcase—"B". The crankcase is now fully charged. (Three-port type.)

Illustration No. 2



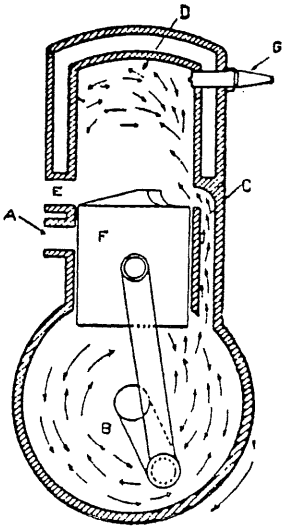
The piston on reaching the end of the stroke reverses its direction and begins a downward movement —covering or closing intake port "A". On its continued downward movement, the vapor charge in the crankcase is compressed until the piston nears the end of the stroke, when the by-pass port "C" is uncovered. This instantly releases the compressed crankcase charge, which flows thru the by-pass and into cylinder "D"—being directed upward by the piston deflector provided for this purpose.

Illustration No. 3



On the following upward stroke, the vapor now having being transferred to the cylinder is compressed and prepared for ignition. However, during this period a second charge has been drawn into the crankcase through intake port "A". There are now two charges—one compressed in cylinder "D" and the charge in the crankcase.

Illustration No. 4



At the end of the compression stroke, a spark, created by the magneto, jumps the gap between the points of spark plug "G"—igniting the compressed fuel vapor in cylinder "D". The vapor in burning expands rapidly, forces piston "F" downward to deliver power required to turn the propeller. Power, however, is not delivered throughout the entire length of the stroke. Some time is required to rid the cylinder of burned gases and to receive a fresh charge from the crankcase for the succeeding power impulse.

As the piston travels downward on its power stroke, the fresh charge previously drawn into the crankcase is being compressed—Illustration No. 2.

Avoid expensive repairs—take advantage of the qualities built into this motor by thoroughly mixing the oil and gasoline as instructed below:

Model	Oil Quantity	Capacity of Fuel Tank (Fuel oil mixture)
OK-15	1 Pint per Gal. of Gasoline	1¼ Gallons

Use Mobiloil Marine LH or Mobiloil AF or an S.A.E. No. 40 oil of similar character and refined by a reputable concern. BE SURE IT IS THOROUGHLY MIXED.

(Note: The compression ratio of Johnson Outboard Motors is not high enough to warrant the use of gasoline containing ethyl lead (colored) to overcome certain combustion characteristics, common to high compression, high speed engines; however, since most gasolines now on the market contain ethyl lead in various quantities, it can be used successfully.)

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.

Attaching the Motor to the Boat

It is essential that the motor be properly mounted on the stern of the boat to get results. The object is to be sure that the propeller operates at correct depth below the surface of the water and that the line of propeller drive is horizontal or parallel 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 socket. Fig. 2.

For maximum efficiency, the following stern height is recommended.

Model	Recommended Stern Height
OK-15	15 Inches
OKL-15	20 Inches

Should the stern be too high, cavitation will occur (see cavitation, page 15) if too low, large portion of the gearcase will be exposed below the surface of the water, resulting in excessive drag to retard boat speed.

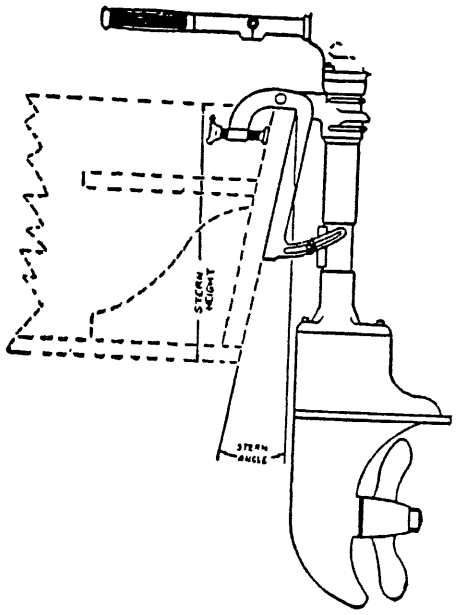


FIG. 2

Thrust Socket Adjustment

(Angle of Drive)

Since most boats are constructed with stern angle, it will be necessary to estimate the proper angle of drive with relation to the angle of stern.

The boat should "plane" or ride on an even keel. Hang motor on the stern

Starting Instruction

1. Open air vent in gas tank filler cap.
2. Open gas tank shut-off valve.
3. Unscrew needle valve one (1) turn from closed position. (Turn right to close and left to open.) Fig. 1.
4. Move throttle lever to position marked "choke". Fig. 1. (Do not use choke to start when motor is warm unless necessary.)
5. Set magneto lever to center position. Fig. 1.
6. Wrap starting cord around starting pulley in clockwise direction. (Knot of cord in notch of starting pulley.)
7. Depress float pin (one or two seconds) to flush carburetor. Fig. 1. (Note—float chamber is filled with fuel-oil mixture when float pin is up; chamber is empty when float pin is down.)
8. Pull quickly on starting cord. Upon having started motor, proceed as follows:
9. Advance spark by moving magneto lever to right (facing motor.)
10. Move throttle lever to fast position.
11. Turn needle valve right or left as required to obtain maximum speed. (Throttle open—spark full advance).
12. To reduce motor speed, move throttle lever to slow and retard spark by moving magneto lever to left (facing motor).
13. To stop motor, depress stop button on magneto lever. Hold until motor stops running.
    If motor is flooded by over choking and cannot be started, close needle valve. Crank motor to start and allow to run until excess fuel in the crankcase is consumed. Open needle valve and start again as instructed above.

Spark Plugs

Due to the different speeds at which the various motors operate, it is IMPORTANT that spark plugs of certain characteristics be installed in each. Champion 5M or G-5 are recommended for Model OK-15.

If a new spark plug is required, be sure to secure one of the above mentioned. This is important. Unless the correct number and make of spark plug is used, consistent fouling of the plug or pre-ignition is likely to be experienced.

If pre-ignition is taking place, the insulator or porcelain exposed within the cylinder will be pitted or partially burned away. In extreme cases, the motor will continue to fire after pressing stop button. Proper functioning of the plug is indicated by a comparatively dry insulator. (Section exposed within cylinder.)

Any tendency towards fouling is noticeable by a black gummy deposit on the insulator. This, however, may not be due entirely to the qualities of the spark plug, but to operation at slow speeds for long periods, such as trolling or during the breaking-in period of a new motor or to the use of more oil than recommended.

Pre-ignition in an outboard motor frequently leads the operator to believe the carburetor or the gas line at fault, or the difficulty due to lack of lubrication, causing sluggish action of the motor. The motor, when cold and just having been started, will operate normally for a short period until it heats up, then slow down or stop as though it were starving for gas. In slowing down, it cools off considerably and begins to operate normally again, but only until the temperature of the spark plug rises, then pre-ignition reappears. Pre-ignition is usually accompanied by rattling noises in the motor.

The spark plugs require very little attention other than occasional removal for inspection, cleaning and adjustment of the points. Correct gap setting .030".

The insulator should be wiped off with a dry cloth regularly, especially if operating in salt water, to remove all traces of moisture or residue, which often interferes with starting.

To Install Propeller Drive Pin

To install a new drive pin, withdraw cotter pin securing propellor nut. Remove nut, propeller and fragments of sheared pin. Install new pin. Replace propeller and nut. Do not draw up too tightly on propeller nut but just enough to make certain the propeller hub rests firmly against the drive pin. It is possible to partially shear the new pin by drawing up too tightly on the nut. Insert cotter pin and lock in position.

The Cooling System

Water for cooling purposes is provided by the PRESSURE-VACUUM principle, that is, water thrown from the tips of the propeller blades is picked up by the water scoop, forced thru the water passages and on into the water jackets to carry off excess heat generated within the cylinders. The discharge is conducted thru a second channel or pipe and emitted from the water outlet in the gear case immediately forward of the propeller. Action of the propeller and motion of the boat aid in drawing the heated water from the cooling system.

But NO propeller is 100% efficient—certain losses prevail under all circumstances. The percentage of loss or slippage frequently runs as low as 10%, on extremely light racing hulls—and upwards of 40 to 60% on the heavier or cruising types.

EFFICIENCY of the propeller depends, to a great extent, upon the shape and weight of the hull. The light weight HYDRO-PLANE type possibly offers the least resistance to forward motion—therefore—high propeller efficiency. The heavier SQUARE STERN types offer the greater resistance, especially if the power applied is insufficient and incapable of planing the boat—resulting in low propeller efficiency.

Keel interference—angle of propeller thrust, with relation to the line of forward motion—depth, at which the propeller operates—marine growth. below the water line—and, of course, the load carried are also factors affecting propeller efficiency.

Cavitation

Cavitation should not be confused with a sheared propeller pin.

Cavitation is a condition created whereby the propeller is forced to operate in turbulent or greatly disturbed water. Consequently, air is drawn from the surface into the propeller stream, which, naturally, lessens the load on the propeller, resulting in the propeller being turned at a high rate of speed. However, since the propeller is acting largely on air and turbulent water, its effectiveness is reduced considerably in that the propeller is merely churning the water rather than propelling the boat.

In most instances, cavitation is brought about by the propeller operating too near the surface of the water or to interferences created by the stern being too high. (See recommended stern heights, Page 9). A wide keel. extended to the stern of the boat is often responsible for such interference and can be corrected by tapering to a feather edge—commencing approximately two feet forward of the stern.

Collection of grass and weeds on the gear case also causes cavitation.

Bent or damaged propeller blades frequently result in excessive vibration and loss in propeller efficiency as well as to contribute towards causing cavitation.

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 properly maintaining the motor:

Remove screen from carburetor periodically to free screen and sediment basin of any foreign substance which might have accumulated. Remove and clean screen in tank.

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

Check breaker points as instructed.

Be sure flywheel nut is secure.

Failure to Start

Vent in gas tank filler cap closed.

Fuel valve closed.

Tank empty.

Needle valve not properly adjusted. (See starting instructions.)

Water in fuel.

Clogged fuel line, screens and sediment basin.

Improperly mixed fuel.

Fouled or defective spark plugs.

Breaker points corroded and pitted.

Spark plug leads disconnected.

Excessive accumulation of carbon (after long periods of operation) in muffler outlets, exhaust passages, exhaust ports and piston ring grooves, causing rings to stick.

If Motor is Dropped Overboard

Recover motor from water immediately, if possible.

Remove fuel tank fuel line, carburetor, magneto and spark plugs. Drain all water that may remain. Wash with gasoline.

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

Pour a small amount of oil into each cylinder; turn crankshaft to distribute oil.

Blow off armature plate with air pressure, if available; wipe with dry cloth. Place in warm dry place, be sure it is thoroughly dried and that no water remains about the coil.

Replace all parts previously removed. Clean and fill tank with fresh fuel mixture. (Make certain no water remains in tank.)

Start motor as instructed and allow to run until you are 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 likely 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.

MISCELLANEOUS NOTES

Even under conditions at their best, moisture will accumulate in a partially filled gas tank or gasoline-oil mixture container as result of atmospheric conditions (moisture laden air and changing temperature). This can best be prevented or at least reduced to a minimum by filling the motor tank with fuel prior to setting it (motor) aside, particularly over night. MOISTURE IS DETRIMENTAL TO OPERATION OF THE MOTOR —KEEP IT OUT OF THE FUEL MIXTURE. USE A FILTERING FUNNEL WHEN FILLING MOTOR TANK. DON'T LET THE MOTOR STAND FOR ANY LENGTH OF TIME WITH A PARTIALLY FILLED TANK.

Do the following at regular intervals—

1. Remove vent and grease plugs (Fig. 1) in gearcase—fill with gear lubricant as required.

2. Inspect spark plugs—if fouled or burned, replace—wipe off porcelain of plugs with dry cloth to remove accumulated residue.

3. Check gas line screen—clean if necessary; remove water from sediment bowl if present (end of gas line attached to carburetor).

4. Make sure flywheel nut is tight.

5. Remove propeller to inspect condition of (1) propeller drive pin—replace if necessary; (2) condition of propeller blades—straighten if bent.

DON'T let the motor stand for any length of time with the gearcase submerged—tilt gearcase out of water.

6. Check nuts, screws and bolts to make certain all are tight (pull up just enough to make secure).