SCOTT

McCULLOCH CORPORATION
6101 West Century Blvd.
Los Angeles 45, Calif.

CONDENSED SERVICE DATA

Series	Sport Scott	
1958	135, 335	.....
1959	.....	135A, 335A
1960	.....	A3GB, B3GB, C3GB, D3GB
1961	.....	61302510, 61302520, 61302530, 61302540
1962	.....	62302710, 62302730
1963	.....	63302811, 63302821, 63302831, 63302841
TUNE-UP		
Hp @ rpm	22 @ 4000	25 @ 4000, 28 @ 4000
Bore—Inches	$2\frac{11}{16}$	2 51/64
Stroke—Inches	$2\frac{7}{16}$	$2\frac{7}{8}$
Number of Cylinders	2	2
Displacement—Cu. In.	27.65	29.97
Spark Plug		
Champion	J6J	J6J
AC	M44 or M44B	M44 or M44B
Electrode Gap	0.035	0.035
Magneto		
Point Gap	0.020	0.020
Timing	See Text	See Text
Carburetor		
Make	Carter	Carter or Walbro
Model	Type N	See Text
Adjustment	See Text	
Fuel - Oil Ratio	40:1*	40:1*

*Using Scott Crown Imperial Oil. Use 20:1 ratio with other Outboard Motor Oils in models before 1962.

SIZES—CLEARANCES			
Cylinder—Diameter	.....	.....	See Note.
Piston Rings			
End Gap	.....	.....	
Side Clearance	.....	.....	
Piston to Cylinder			
Clearance	.....	.....	
Piston Pin Diameter	.....	.....	
Crankshaft Journal Diameters			
Top Main Bearing	.....	.....	
Center Main Bearing	.....	.....	
Lower Main Bearing	.....	.....	
Crankpin	.....	.....	

NOTE: Publication not authorized by manufacturer.

TIGHTENING TORQUES (All Values in Inch-Pounds)		
Connecting Rod	180	180
Crankcase Halves		
Main Bearing Screws	200-225	200-225
Flange Screws	150	150
Cylinder Head	150	150
Powerhead Mounting Screws	80	80
Pump Housing & Gearcase		
Housing Screws	200	200
Gearcase Bearing Housing	175	175
Flywheel Nut	975	975
Spark Plug	250	250

LUBRICATION

The power head is lubricated by oil mixed with the fuel. One-fifth (⅕) pint of Scott Crown Imperial outboard motor oil or ⅜-pint of other approved outboard motor oil should be mixed with each gallon of regular gasoline in models before 1962. The manufacturer authorizes the use of 1/5 pint of any top-grade outboard motor oil per gallon of fuel in 1962 and 1963 motors. A fuel-oil mixture of 1 part oil to 100 parts regular gasoline is authorized for use in 1963 motors, provided Scott Crown Imperial Oil is used.

The lower unit gears and bearings are lubricated by oil contained in the gearcase. Only EP 90 Hypoid gear lubricant should be used. Lower unit gearcase should be drained and refilled every 30 hours or 60 days of operation. Check or renew the lower unit lubricant by filling to the level of the fill plug located on the forward, port side of the lower unit gearcase. Tighten fill and drain plugs securely, using new gaskets if necessary, to ensure a water-tight seal.

FUEL SYSTEM

CARBURETOR. Carter N type carburetors are used on all models before 1961. Beginning with the 1961 motors, Walbro carburetors incorporating a fixed high speed jet were installed. Refer to the appropriate following paragraphs for service and adjustment procedures.

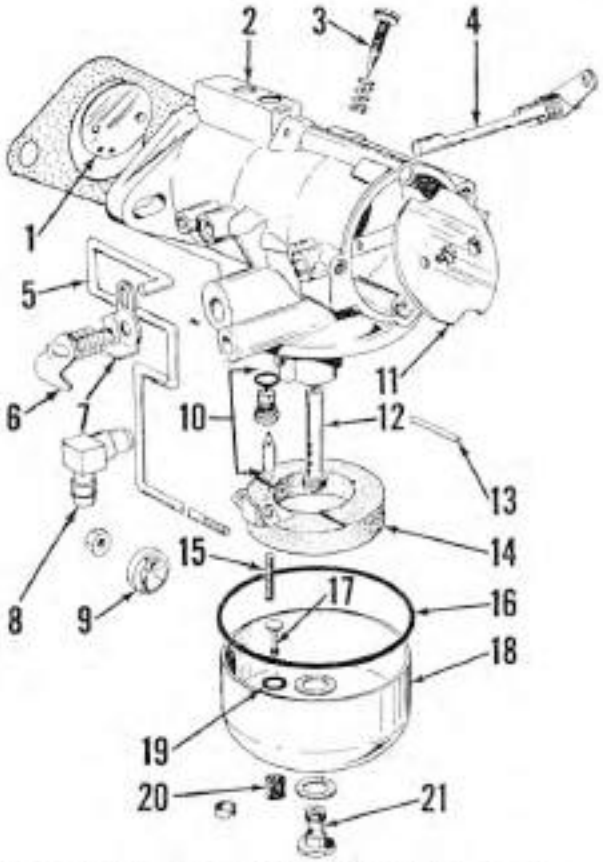


Fig. Mc76 — Exploded view of Walbro carburetor used on late models. Carburetor uses a fixed high-speed jet.

1. Throttle valve
2. Body
3. Idle needle
4. Throttle shaft
5. Choke rod
6. Choke shaft
7. Choke lever
8. Fitting
9. Choke knob
10. Inlet needle & seat
11. Choke valve
12. Main nozzle
13. Float shaft
14. Float
15. Adjustment screw
16. Gasket
17. Drain valve
18. Bowl
19. Seal
20. Spring
21. Bowl screw

Carter Model N: Refer to Fig. Mc75. Carburetors are provided with two mixture adjustment needles. The idle mixture needle (5) and high speed adjustment needle (20) should both be initially adjusted to approximately ¾-turn open, then readjusted under load for best performance after motor is warm. When engine is at normal operating temperature and under load, high speed needle should be adjusted to leanest position which will allow satisfactory acceleration. Clockwise rotation of the needle leans the mixture. Readjust the idle mixture needle for smoothest and fastest idle speed whenever a major adjustment is made of high speed needle. Recheck high speed setting after adjusting the idle mixture.

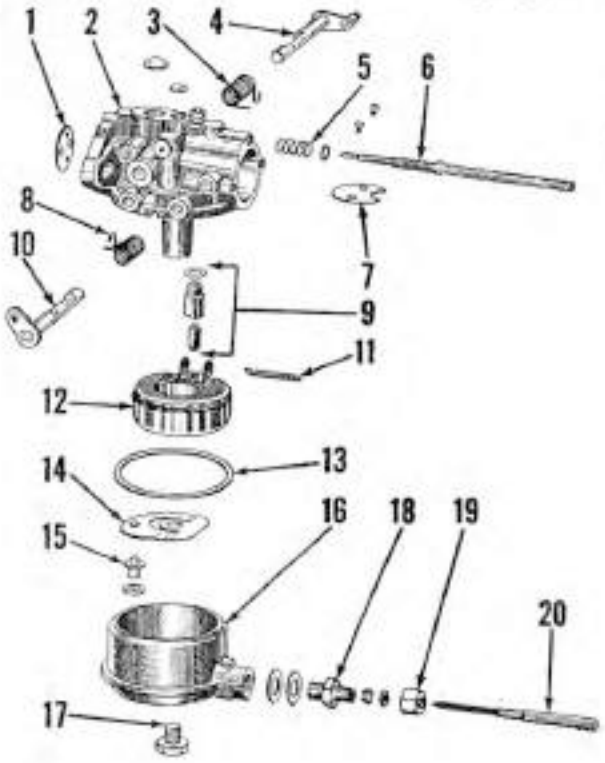


Fig. Mc75 — Exploded view of Carter N type carburetor used on early models.

1. Throttle valve
2. Body
3. Spring
4. Throttle shaft
5. Spring
6. Slow speed needle
7. Choke valve
8. Spring
9. Inlet needle & seat
10. Choke shaft
11. Float shaft
12. Float
13. Gasket
14. Spring
15. Drain plug
16. Float chamber
17. Retaining screw
18. Fitting
19. Packing nut
20. High speed needle

To disassemble the carburetor, first scribe a mark on body and bowl for proper location when reassembling. Remove high speed needle, packing nut and packing, then remove bowl retaining screw (17), gasket (13) and bowl (16). Bowl is provided with a spring loaded drain plug (15). Make sure sealing surfaces of plug and bowl are even and smooth, and that spring (14) applies sufficient pressure for a good seal. Float setting should be 11/64-inch, measured from nearest surface of float to carburetor body gasket flange, with body in inverted position and inlet needle valve closed. Adjust by bending the tab which contacts inlet needle.

Main nozzle and slow speed jet are installed permanently and cannot be renewed. Throttle valve (1) must be installed with trademark "C" on side toward idle port when viewed from flange side. Seat the valve by tapping lightly with small screwdriver and use new screws when installing valve.

Model designations and Carter part numbers are as follows:

Models: N-2874S, N-2899S, N-3026S, N-3034S, N-3049SA

Flange gasket	1A-93
Bowl drain plug	11B-375S
Float & lever	21-163S
Inlet needle & seat	25-332S
Idle needle	30A-84
High speed needle	37-76

Walbro Carburetor: Refer to Fig. Mc76. Carburetor is provided with an idle adjustment needle (3) and a fixed high speed jet. Initial setting of the idle needle is one turn open from the closed position. Final adjustment of the slow speed mixture must be made under load after engine is at operating temperature. Clockwise rotation of the idle needle will provide a leaner mixture.

The float level should be adjusted to 5/32 inch when measured from nearest edge of float to carburetor gasket surface; with carburetor body (2) inverted, and float bowl (18) removed. Adjust float height by turning the adjusting screw (15). Check the bowl drain valve (17) and washer (19) for damage, and the drain valve spring (20) for proper tension.

Walbro Model LOC-1 is used on models with electric starting. Model LOC-2 is used on models with manual start. Carburetors are identical except for choke shaft (6) and may be interchanged by substituting the correct choke shaft. The power jet is located at throttle side of body extension which accepts the bowl screw (21). Main nozzle (12) should not be removed except when absolutely necessary for cleaning, and a service nozzle should be installed if original nozzle is removed. Do not reinstall original nozzle. Tighten nozzle to a torque of 30-40 inch-pounds, and bowl retaining nut to a torque of 50-60 inch-pounds. Walbro part numbers are as follows:

Repair kit	300-562
Gasket set	92-511
Inlet needle and seat	200-510
Main nozzle	86-54
Power jet	112-53
Choke shaft (Electric start)	40-540
Choke shaft (Manual start)	40-549

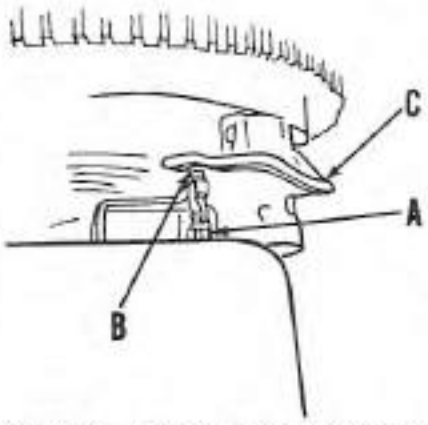


Fig. Mc79 — Throttle control linkage used on late models. Refer also to Fig. Mc78.

A. Adjusting screw
B. Measuring clearance
C. Synchronous cam

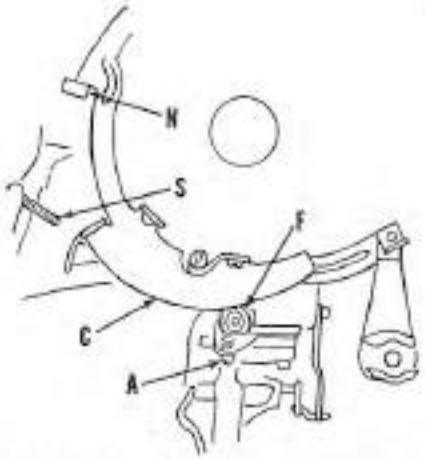


Fig. Mc77 — Schematic view of speed control mechanism used on early models. Refer to text for details.

A. Adjustment screw
C. Synchronous cam
F. Cam follower
N. Neutral stop arm
S. Idle stop screw

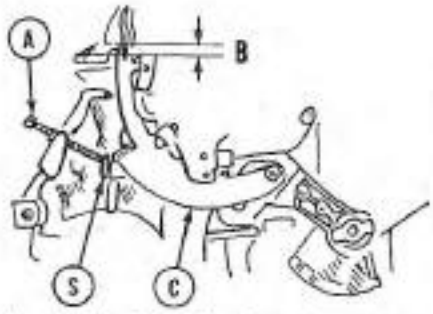


Fig. Mc78—Schematic view of speed control mechanism used on late models. Clearance (B) should be 1/4 inch. See also Fig. Mc79.

A. Idle stop screw
C. Magneto bracket
S. Idle stop

SPEED CONTROL LINKAGE. The speed control lever on all models is connected to the magneto stator plate, and moves the plate to advance or retard the ignition timing. The carburetor throttle valve is synchronized to open as the ignition timing is advanced. It is very important that ignition timing and throttle valve opening be properly synchronized to obtain satisfactory operation. To adjust the speed control linkage, refer to the appropriate following paragraphs:

Models Before 1961: Refer to Fig. Mc77. Move the speed control grip to "Slow" position and the shift lever to "Neutral." Turn the speed control grip toward the "Fast" position until the synchronous cam (C) contacts the "Neutral" stop limit lever (N). Turn the adjustment screw (A) until cam follower (F) just contacts cam (C) and throttle valve begins to open.

Models After 1960: Refer to Figs. Mc78 and Mc79. Move speed control grip to "Slow" position and shift lever to "Neutral" position. With idle stop (S—Fig. Mc78) contacting slow idle stop screw (A), adjust the screw until clearance (B) between neutral stop and limiting lever is 1/4 inch. NOTE: Fig. Mc78 illustrates mechanism used on electric starting models. Manual start model adjustment is identical except for location of idle speed stop screw (See 44—Fig. Mc87).

With idle speed stop screw properly adjusted and stop (S—Fig. Mc78) contacting screw (A), turn the throttle control adjusting screw (A—Fig. Mc79) in or out until a clearance (B) of 0.020 exists between adjusting screw (A) and synchronizing cam (C).

Start the motor and turn the speed control grip until clearance (B—Fig. Mc78) is eliminated and neutral stop contacts the limiting lever, then make final adjustment of the throttle control adjustment screw (A—Fig. Mc79) until the recommended fast (max-

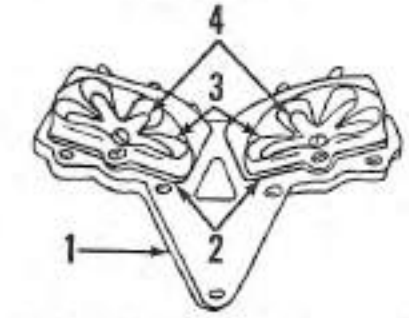


Fig. Mc80 — Rear view of inlet manifold showing inlet reed valve boxes. Reed petals (3) and reed stops (4) must be centered over holes in box (2).

1. Inlet manifold
2. Reed boxes
3. Reed petals
4. Reed stops

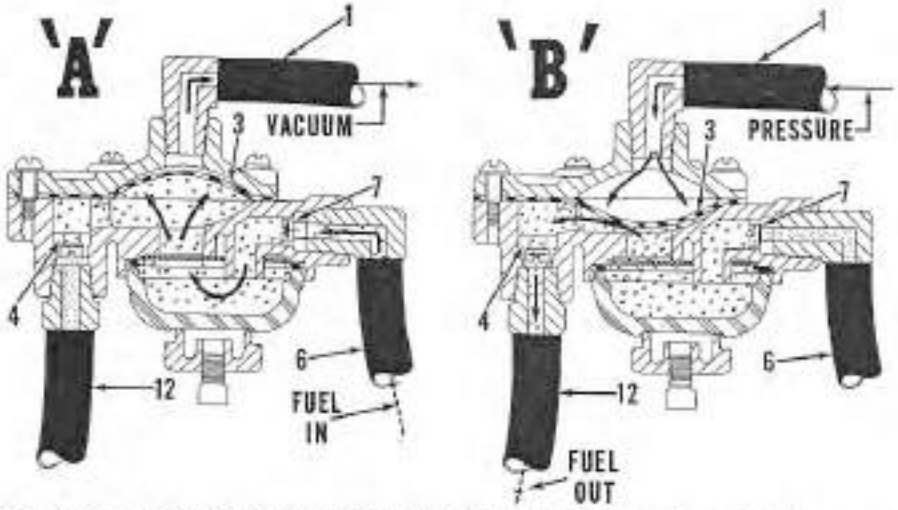


Fig. Mc81 — Schematic view of single stage fuel pump. The pump is operated by vacuum and pressure pulsations from one crankcase of the power head. Check valves (4 and 7) limit fuel flow to one direction through pump. Refer also to Fig. Mc82 for exploded view.

trull idle speed of 1800-2000 rpm is obtained.

When adjustments are correct, slow idle engine speed should be 700 rpm, with a loaded maximum speed of 4600 rpm using the recommended test propeller. The throttle control adjusting screw should follow the cam freely throughout the entire speed range. If sticking or binding occurs, check the throttle control linkage.

REED VALVES. The inlet reed valve unit is located between inlet manifold and crankcase. All motors use a pyramidal reed plate as shown in Fig. Mc80. Reed petals (3) must be centered in ports of reed box (2), and may stand open a maximum of 0.010. Examine reed petals to make sure they are not bent, broken or cracked, and will seat against reed box throughout their entire length with little pressure. If reed petals (3) or reed stops (4) are distorted or bent, they should be renewed. Reed stops (4) must be centered over the petals when installing. Examine the seating surfaces of reed boxes (2) to make sure they are smooth and flat.

FUEL PUMP. All motors are equipped with a diaphragm type fuel pump as shown in Fig. Mc81. Pressure and vacuum pulsations in one crankcase of the power head are directed through inlet (1) to rear of pump diaphragm (3). When the powerhead piston moves upward in its cylinder, vacuum in crankcase draws the diaphragm outward as shown in view "A". Fuel is drawn in past the inlet check valve (7) as shown. As powerhead piston moves downward in cylinder (view "B"), the pressure forces diaphragm down and fuel passes out through outlet check valve (4) into carburetor.

When overhauling fuel pump, use Fig. Mc82 as a guide. All defective or questionable parts should be renewed.

IGNITION

A flywheel magneto is used on all manual starting models, and on electric starting models of 335 (1958) series only. A crankshaft mounted distributor, and flywheel mounted alternator-generator is used on all late model electric starting models. Refer to the appropriate following paragraphs:

MAGNETO IGNITION. Breaker point gap should be 0.020 and can be adjusted after recoil starter and flywheel have been removed.

For a quick test of magneto condition, remove the spark plugs and hold spark plug wire about ¼-inch away from cylinder head. Have someone spin the motor and note the condition of spark. Although spark may not be visible in bright daylight, a distinct snap will be noted as spark jumps the gap. If spark is weak or erratic, adjust the points as outlined above. Be sure to note point condition. If spark is weak although points are in good condition and properly adjusted, examine the condition of point, condenser and coil wiring, and the insulation on the magneto coils. Look for broken or worn insulation or broken wires. Also check for loose or corroded connections. Renew any parts which are damaged or in poor condition. Magneto coils on Series 335 electric start motors are grouped alternately with the generator coils as shown in Fig. Mc84.

Tighten the flywheel nut to a torque of 975 inch-pounds on all models.

BATTERY IGNITION. The contact points are mounted on a breaker plate mounted underneath the flywheel as shown in Fig. Mc85. A complete ignition system consisting of coil, condenser and contact points is used for each cylinder. Contact point gap should be 0.020 for each set of points. The ignition system incorporates an ignition switch and a ballast (resistor) unit which is mounted on the exhaust cover plate. The ballast is designed to prevent burning of the points if

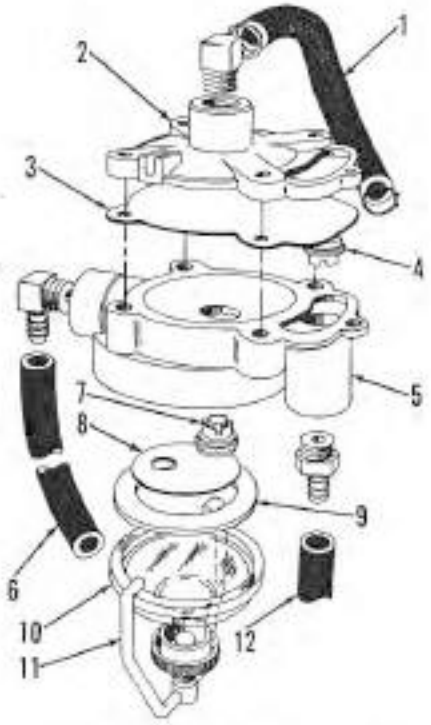


Fig. Mc82 — Exploded view of diaphragm type fuel pump. Refer also to Fig. Mc81.

1. Crankcase hose
2. Upper body
3. Diaphragm
4. Check valve
5. Lower body
6. Inlet hose
7. Check valve
8. Filter screen
9. Gasket
10. Filter bowl
11. Clamp
12. Outlet hose

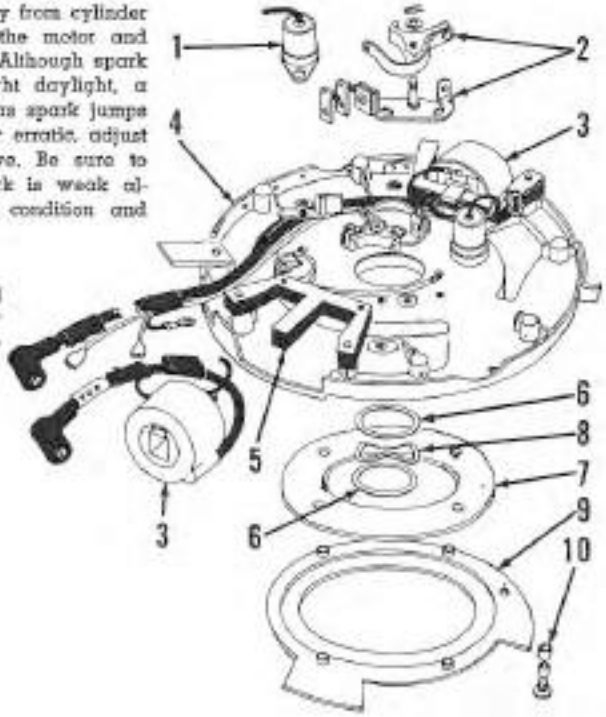


Fig. Mc83 — Exploded view of magneto typical of that used on manual starting models.

1. Condenser
2. Contact points
3. Coil
4. Stator plate
5. Laminated core
6. Washer
7. Adapter
8. Wave washer
9. Synchronous cam
10. Roller

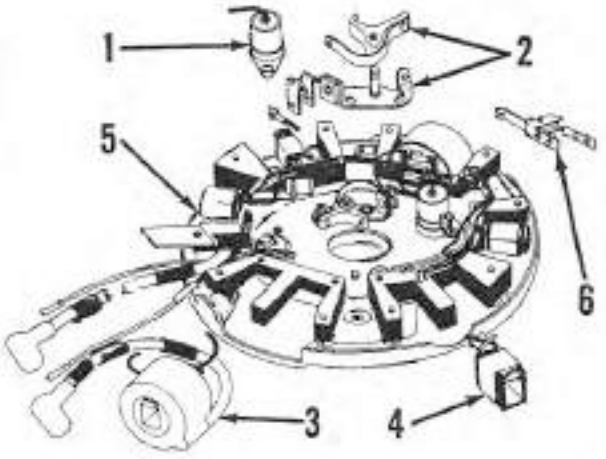


Fig. Mc84 — Exploded view of magneto-generator assembly used on early electric models.

1. Condenser
2. Contact points
3. Magneto coil
4. Generator coil
5. Stator plate
6. Ground

ignition switch is left on with motor not running and points closed. When ignition troubles are encountered, check the ballast (resistor) and ignition switch as well as points, condensers, coils and wiring.

Tighten the flywheel nut to a torque of 975 inch-pounds for all models.

COOLING SYSTEM

WATER PUMP. All motors are equipped with a rubber impeller water pump of the general type shown in Fig. Mc86. An identical pump is mounted directly above the cooling system pump, which operates the "Bail-A-Matic" bilge pump. Operation and service procedures on the two pumps are identical.

The cooling system and bailer pumps are mounted in the lower unit gearcase housing and driven by the driveshaft. Impeller housings are offset in relation to the driveshaft as shown in Fig. Mc86. At slow engine speeds, the tips of impeller blades bend to follow contour of housing as shown by solid lines. Water is drawn into impeller (IN) as area between impeller blades increases. As area decreases due to shape of housing, water is forced into outlet (OUT) passage of pump. At high speeds, the flexible blades remain curved as shown by broken lines (HS) and the pump operates by centrifugal action. Flow is thus maintained at an approximately constant level at most engine speeds.

The cooling system inlet is located above and aft of the propeller. When cooling system problems are encountered, first check the water inlet for plugging or partial stoppage, then if not corrected, remove lower unit gearcase housing and check the condition of the water pump, water passages, gaskets and sealing surfaces.

Pump housings are made of a bronze alloy with stainless steel insert. The manufacturer covers the pump mounting boss and a small area of the pump housing with vinyl tape to act as a shield and prevent electrolysis. Make sure the tape is in place and in good condition when servicing the pumps. Pump impellers are marked "TOP" for correct installation in the housings. Pump bodies and impellers should be liberally coated with water pump grease during installation.

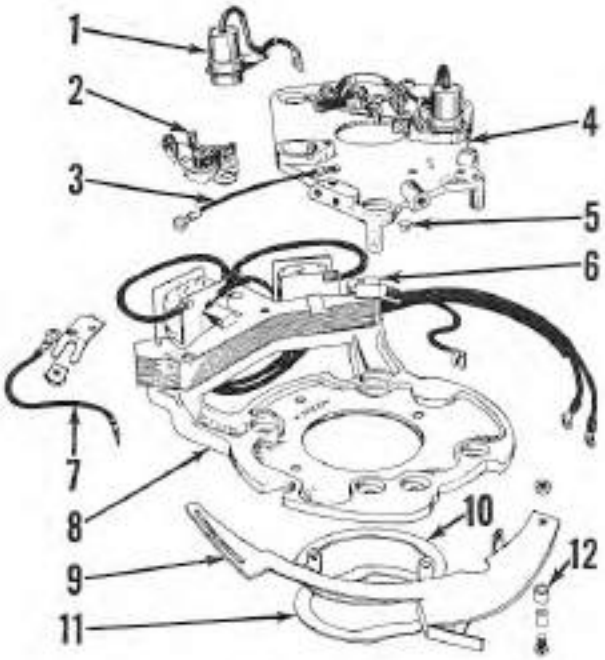


Fig. Mc85 — Exploded view of crankshaft mounted distributor assembly and alternator generator used on late models.

1. Condenser
2. Contact points
3. Ground lead
4. Distributor plate
5. Friction button
6. Generator coils
7. Primary lead
8. Generator plate
9. Speed control bracket
10. Washer
11. Wave washer
12. Roller

POWER HEAD

R&R AND DISASSEMBLE. To overhaul the power head, clamp the motor on a stand or support and remove the starter assembly, shrouds and flywheel. Remove carburetor, throttle linkage and fuel line. Remove the "Neutral" stop lever and the front mount bracket, then unbolt and lift off the power head. Refer to Fig. Mc87.

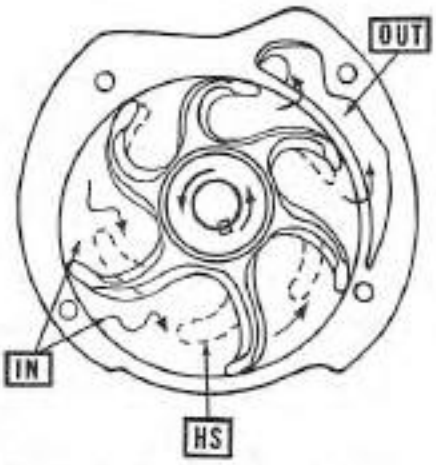


Fig. Mc86 — Schematic view of the rubber impeller type water pump used for cooling and for the automatic bailer unit. Impeller blades flex at slow speeds as shown by solid lines. The offset housing causes water to be drawn into pump body (IN) and forces water out (OUT) due to differences in area between blades. At high speeds, blades remain curved as shown by broken lines (HS) and pump operates by centrifugal action.

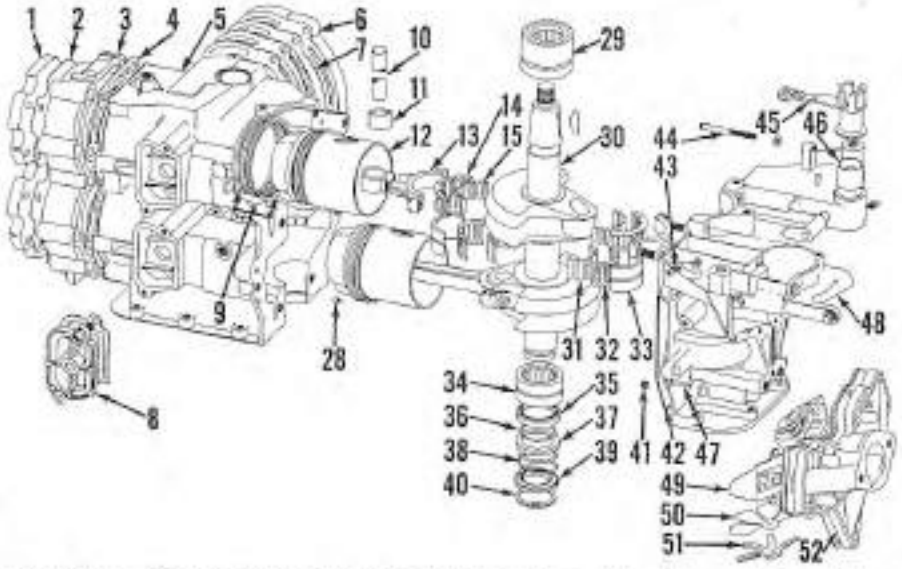


Fig. Mc87 — Exploded view of power head used on late models. Early models are similar.

1. Cover plate
2. Gasket
3. Cylinder head
4. Gasket
5. Cylinder
6. Exhaust cover
7. Exhaust cover
8. Transfer passage cover
9. Piston rings
10. Piston pin
11. Bearing
12. Piston
13. Connecting rod
14. Bearing cage
15. Bearing roller
28. Locating pin
29. Upper bearing
30. Crankshaft
31. Needle roller
32. Bearing cage
33. Bearing race
34. Lower bearing
35. Seal
36. "O" ring
37. Washer
38. Seal spring
39. Retainer
40. Snap ring
41. Bleeder valve
42. Seal strip
43. Slow idle stop screw (electric)
44. Slow idle stop screw (manual)
45. Speed control arm
46. Bushing
47. Dowel pin
48. Crankcase half
49. Reed box
50. Reed petal
51. Reed stop
52. Inlet manifold

One half of the crankcase is integral with the cylinder block. The upper and lower main bearings are of the caged, needle roller type. The center main bearing rollers are housed in a split cage.

To disassemble the removed power head, remove the cylinder head (3) and cover plate (1). Remove the magneto or distributor and generator mounting plates, and the inlet manifold assembly (52). Transfer port covers (8) and exhaust covers (6 & 7) should be removed for cleaning. Remove the cap screws retaining front crankcase half (40) to cylinder block and separate the crankcase halves.

Pistons, rods, crankshaft and bearings are now accessible for removal and overhaul as outlined in the appropriate following paragraphs. When reassembling, make certain that main bearing dowels are properly aligned, and follow the procedure outlined in the ASSEMBLY paragraph.

ASSEMBLY. Because of the two-cycle design, crankcase and inlet manifold must be completely sealed against both vacuum and pressure. Exhaust manifold and cylinder head must be sealed against water leakage and pressure. Mating surfaces of water intake, and exhaust areas between power head and lower unit must form a tight seal.

Whenever the power head is disassembled, it is recommended that all gasket surfaces, and mating surfaces without gaskets, be carefully checked for nicks, burrs and warped surfaces which might interfere with a tight seal. The cylinder head, head end of cylinder block, and some mating surfaces of manifolds and crankcase may be checked, and lapped if necessary, to provide a smooth surface. Use a regular lapping block or a sufficiently large piece of smooth plate glass. Lay a sheet of No. 00 emery cloth on the lapping block, then place the surface to be lapped on the emery cloth. Apply very light pressure and use a figure-eight motion, checking frequently to determine progress. Do not remove any more metal than is necessary. Finish lap using lapping compound or worn emery cloth. Thoroughly clean the parts with new oil on a clean, soft rag, then wash with soapsuds and clean rags.

Mating surfaces of crankcase may be checked on the lapping block, and high spots or nicks removed, but surface must not be lowered. If extreme care is used, a slightly damaged crankcase may be salvaged in this manner. In case of doubt, renew the crankcase assembly.

A heavy, non-fibrous grease should be used to hold loose needle bearings in position during assembly. Main bearing outer races are prevented from rotation by dowels located in crankcase bores. All friction surfaces should be lubricated with new engine oil during assembly. Check frequently as power head is being assembled, for binding or locking of the moving parts. If binding or locking is encountered, remove the cause before proceeding with the assembly. Make sure the piston rings are properly assembled with end gap surrounding the locating pins in piston grooves. Be sure to inspect the scavenging check valves (41) and to blow out the scavenging and oiling ports and lines.

Gasket and sealing surfaces should be lightly and carefully coated with a gasket cement. Make sure entire surface is coated, but avoid letting excess cement squeeze out into crankcase, bearings or other passages. When installing the cylinder head or joining the crankcase halves, tighten the retaining screws in the sequence shown in Fig. Mc88. Tightening torques are listed in the CONDENSED SERVICE DATA table.

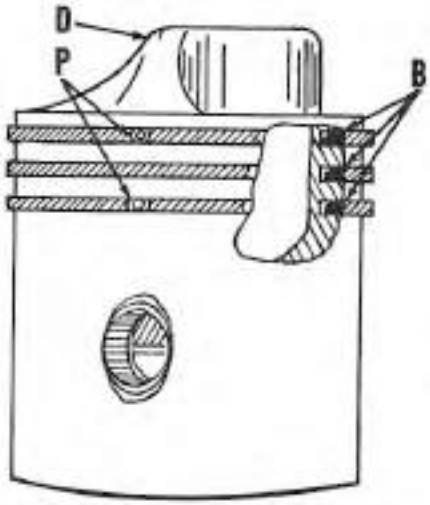
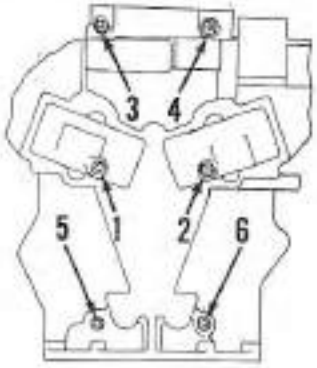


Fig. Mc89—Cross sectional view of piston showing two of the three piston ring locating pins (P). The other pin is in opposite side of piston. Rings are installed with beveled inner edge (B) toward closed end of piston. Deflector (D) directs the flow of incoming fuel charge for proper scavenging.



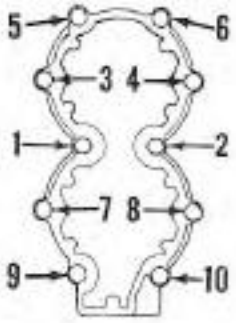


Fig. Mc88 — Tighten the cylinder head screws to a torque of 150 inch pounds in the sequence shown in right view. Tighten crankcase main bearing bolts to a torque of 200-225 inch pounds in the sequence shown in left view.

PISTONS, PINS, RINGS AND CYLINDERS. Before detaching connecting rods from crankshaft, make certain rod and cap are properly marked for correct assembly to each other and in the correct cylinder.

Each piston is fitted with three rings which are interchangeable in grooves. Rings are pinned to prevent rotation in ring grooves as shown at (P—Fig. Mc89). NOTE: Middle ring is pinned at opposite side of piston from upper and lower rings.

Rings have a beveled inner edge which should be installed toward closed end of piston as shown at (B). Head end of piston is provided with a deflector (D) which directs the flow of incoming fuel charge for proper scavenging of the cylinder. The long, sloping side of the deflector should be installed to the exhaust (port) side of cylinder block.

The piston pin is a tight press fit in connecting rod and runs in renewable caged needle bearings in piston bosses. Be sure to center pin during assembly so that neither end can protrude beyond outer edge of piston. Install bearings (11—Fig. Mc87) so that inner edge is almost flush with inner edge of piston boss. Connecting rod is marked "TOP" for proper assembly. All bearing and friction surfaces should be lubricated when power head is assembled.

CONNECTING ROD, CRANKSHAFT AND BEARINGS. Before detaching connecting rod from crankshaft, make certain that rod and cap are properly marked for correct assembly to each other and in the proper cylinder.

Connecting rod bearing is of the caged roller type as shown in Fig. Mc90. Cages and rollers are available as an assembly only, and the parts should be kept together and not interchanged. Examine bearings for wear, pitting or other damage, and bearing surfaces of rod and cap for roughness, scoring, wear or heat discoloration. When installing connecting rod bearings, make sure cage is properly installed, with the matching ground corners aligned as shown by arrow. Parting faces of rod and cap are not machined, but are fractured at point of arrows, Fig. Mc91, to provide a positive location. When installing cap, make sure

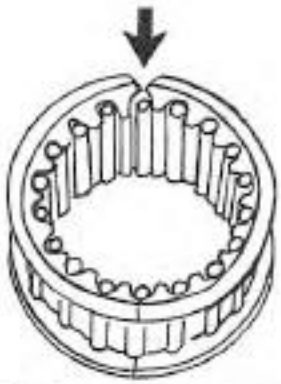


Fig. Mc90—Connecting rod bearing cages have one ground corner as indicated by arrow. Ground corners must be matched during assembly.

the correlation marks (C) are aligned, then shift cap back and forth a slight amount while tightening, until fractured sections are in perfect mesh. When tightened completely, the parting line of rod and cap is practically invisible. When installing the connecting rod, the side marked "TOP" should face flywheel end of crankshaft.

Inspect crankshaft crankpin and main bearing journal surfaces and if rough, scored, worn, out-of-round, or show evidence of overheating, renew the crankshaft. Renew main bearings if needle rollers are worn or pitted, or if crankshaft must be renewed because of a damaged main bearing. The split cage of the center main bearing is separated by fracturing as described for the connecting rod. When assembling the bearing around crankshaft journal, work the sections back and forth a slight amount until the fracture lines mesh, then install the retaining ring. When installing the crankshaft and main bearings assembly in crankcase, make sure the main bearing locating dowels enter the holes provided in bearing races.

All friction surfaces should be lubricated during assembly.

MANUAL STARTER

Fig. Mc92 shows an exploded view of the recoil starter assembly. To renew the starter pawls (6) or friction spring (9), remove and invert the assembled starter on a bench. Remove friction spring (9) with snap ring pliers, drive out the retaining pins and remove the pawls. Pulley (4) can be removed after removing the friction spring. Be careful that recoil spring (2) remains in cavity of housing (1) when pulley is removed. If spring is to be removed, clamp spring with a pair of vise-grip pliers to prevent uncoiling. Replacement spring is coiled and secured with a band clip. Leave clip in place until spring is installed in housing. When reassembling, make sure there is sufficient tension on recoil spring to completely rewind starter rope.

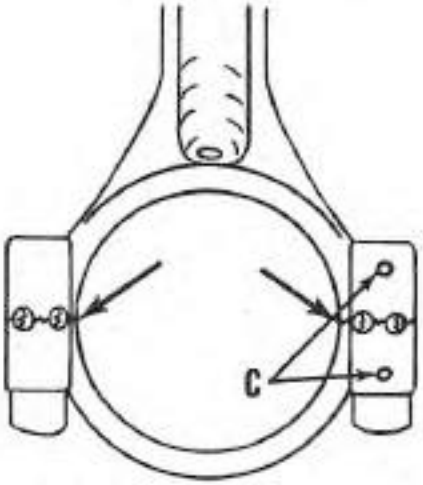


Fig. Mc91 — Uncover fractured parting line of rod and cap (shown by arrows) assures positive fit after assembly. Be sure correlation marks (C) are aligned.

Starter lock (13) must be adjusted so that it enters lugs in starter pulley (4) when shift lever is in "Forward" or "Reverse" positions, but is completely free of lugs in "Neutral" position. To adjust the lock, refer to Fig. Mc93. Move the shift lever to "Neutral" position and adjust the nuts (5) until lock (2) just clears the lugs on starter pulley. Move shift lever to "Forward" and "Reverse" positions, and check to make sure that lock engages pulley lugs.

LOWER UNIT

PROPELLER AND DRIVE PIN. Shear pin protection is carefully engineered for each unit. Protection depends on shear pin material as well as size. Although, in an emergency, the shear pin may be replaced by one of any available material, the correct shear pin should be installed as soon as possible to insure maximum performance and protection. All motors use a $\frac{1}{4}$ x $\frac{5}{8}$-inch brass shear pin, manufacturers part number 3965-3122. A spare supply of shear pins should be kept on hand. Motors are normally equipped with a 9-inch diameter, 10-inch pitch, three blade propeller.

R&R AND OVERHAUL. Most service on the lower unit can be performed by detaching the gearcase housing from driveshaft and exhaust housing. When servicing the lower unit, pay particular attention to water pump and water tubes with respect to air or water leaks. Leaky connections may interfere with proper cooling and performance of the motor.

Use Figs. Mc94 and Mc95 as a guide when overhauling the lower unit. To renew or service the propeller shaft, gear or bearings, first drain the lubricant and remove the propeller and shear pin. Remove the cap screws retaining the bearing housing (36—Fig. Mc94) to the gearcase housing (45) and remove the propeller shaft, gear, bearings and bearing housing as a unit. To disassemble the unit, remove the nut (44), washer (43), gear (42) and key (39), then press shaft (40) rearward out of front bearing (41) and housing (36). Seal (32) and rear bearing (34) will be removed with the shaft. When reassembling, tighten the nut (44) to provide a slight rotational drag on the shaft bearings, then lock in place by bending up a section of washer (43).

To detach the gearcase housing from the lower motor housing, remove the inspection cover (21—Fig. Mc95) from port side of exhaust housing and disconnect the shift rod.

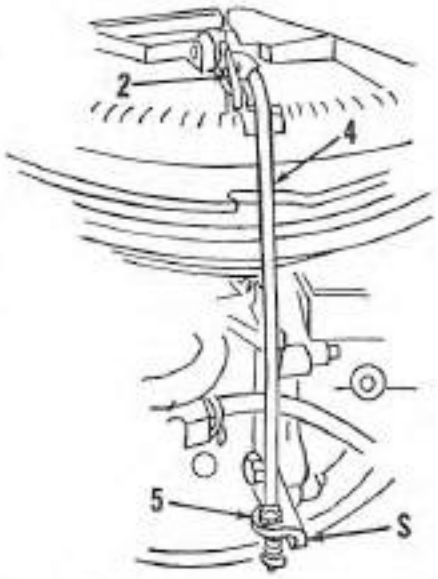
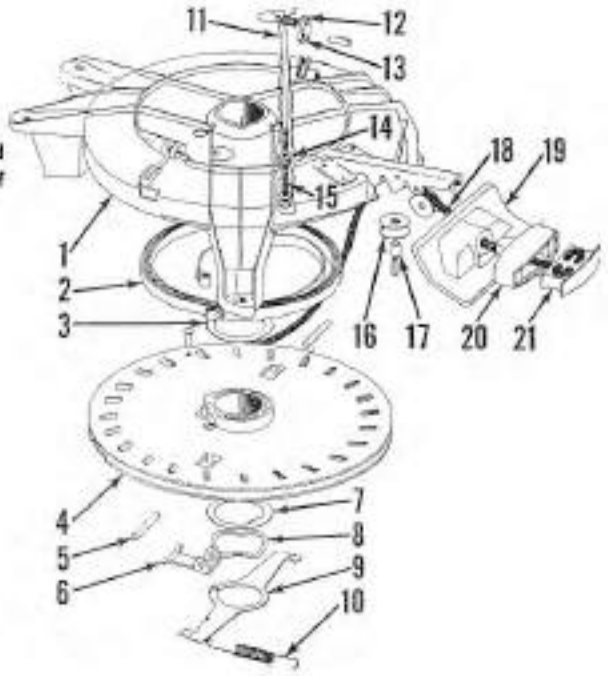


Fig. Mc93 — To adjust the starter lock, place the shift lever in "Neutral" and adjust the nuts (5) until lock (2) just clears lugs on starter pulley.

2. Lock
4. Link
6. Nut
8. Neutral stop arm

Fig. Mc92 — Exploded view of recoil starter of the type used.

1. Housing
2. Recoil spring
3. Washer
4. Pulley
5. Pin
6. Pawl
7. Washer
8. Wave washer
9. Friction spring
10. Spring
11. Lock link
12. Spring
13. Lock
14. Adjusting nut
15. Spring
16. Roller
17. Bushing
18. Rope
19. Panel
20. Handle
21. Anchor



Remove the screws retaining gearcase housing to exhaust housing and withdraw the unit straight down out of housing. Disassemble the bailer pump and cooling pump as they are removed, then reassemble as outlined in COOLING SYSTEM paragraph. After pump housing (15—Fig. Mc94) has been removed, the driveshaft can be lifted upward out of forward and reverse gears and clutch dog. Remove the propeller shaft assembly as previously outlined, then withdraw the parts from the housing.

Assemble by reversing the disassembly procedure but without installing the propeller shaft and gear assembly in gearcase. Assemble the pump unit and gearcase to motor and check to make sure that clutch dog (27) fully engages reverse gear (26) and forward gear (29), and completely clears both gears when shift lever is in "Neutral" position. Adjust by threading lower shift rod (18) in or out of shifter fork (28), then install propeller shaft and gear assembly. Adjust backlash of lower unit gears to minimum backlash without binding, by adding or removing shims (37).

Needle bearings and bushings in water pump and lower unit require special tools for installation. Tightening torques are given in the CONDENSED SERVICE DATA table.

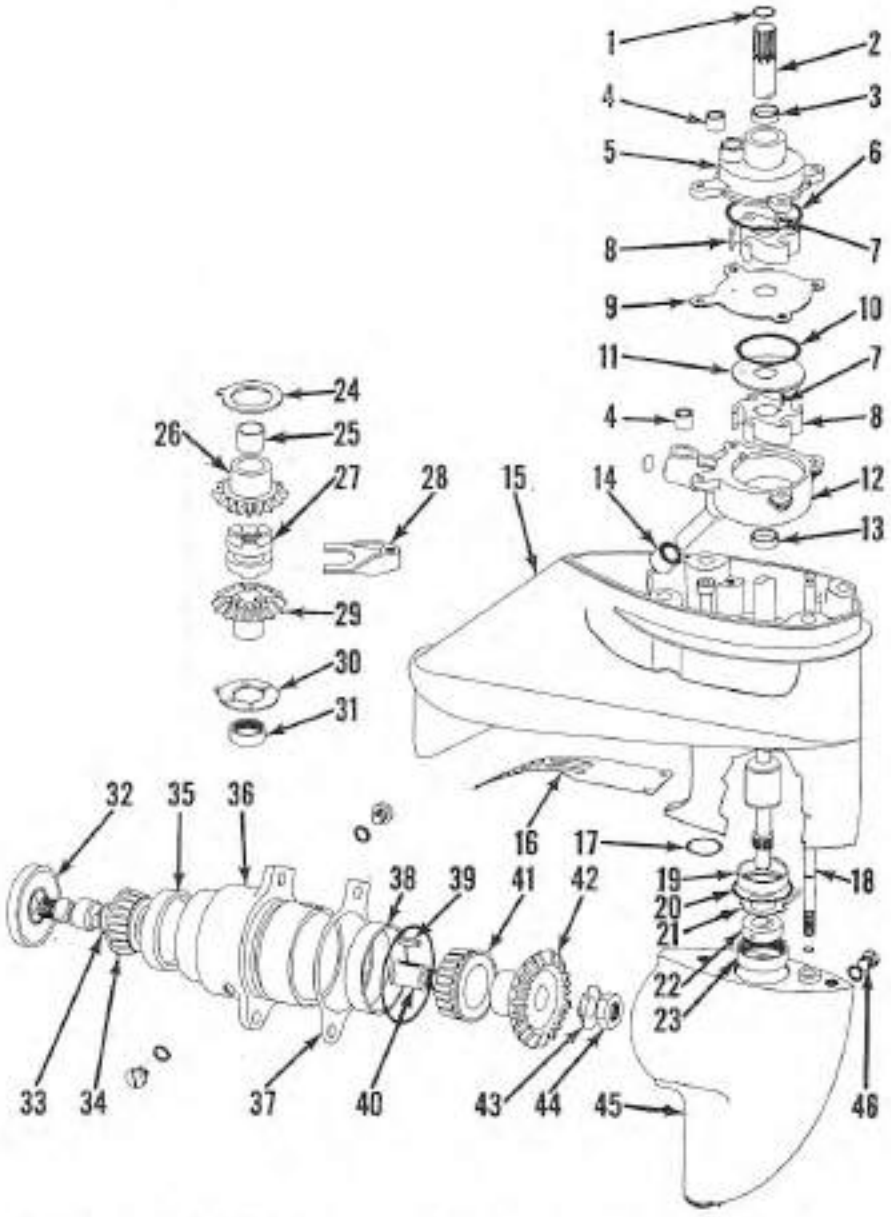


Fig. Mc94 — Exploded view of gearcase housing, water pumps and associated parts.

1. "O" ring
2. Drive shaft
3. Seal
4. Grommet
5. Bailer housing
6. Seal
7. Impeller key
8. Impeller
9. Cover plate
10. Seal
11. Cover plate
12. Pump housing
13. Seal
14. Grommet
15. Pump housing
16. Inlet plate
17. Seal
18. Shift rod
19. Sing dowel
20. Seal
21. Thrust washer
22. Collar
23. Bearing
24. Thrust washer
25. Bearing
26. Reverse gear
27. Clutch dog
28. Shift fork
29. Forward gear
30. Thrust washer
31. Bearing
32. Seal
33. Snap ring
34. Bearing cone
35. Bearing cup
36. Bearing cap
37. Shim
38. Bearing cup
39. Key
40. Propeller shaft
41. Bearing cone
42. Driven gear
43. Lock washer
44. Nut
45. Gearcase housing
46. Plug

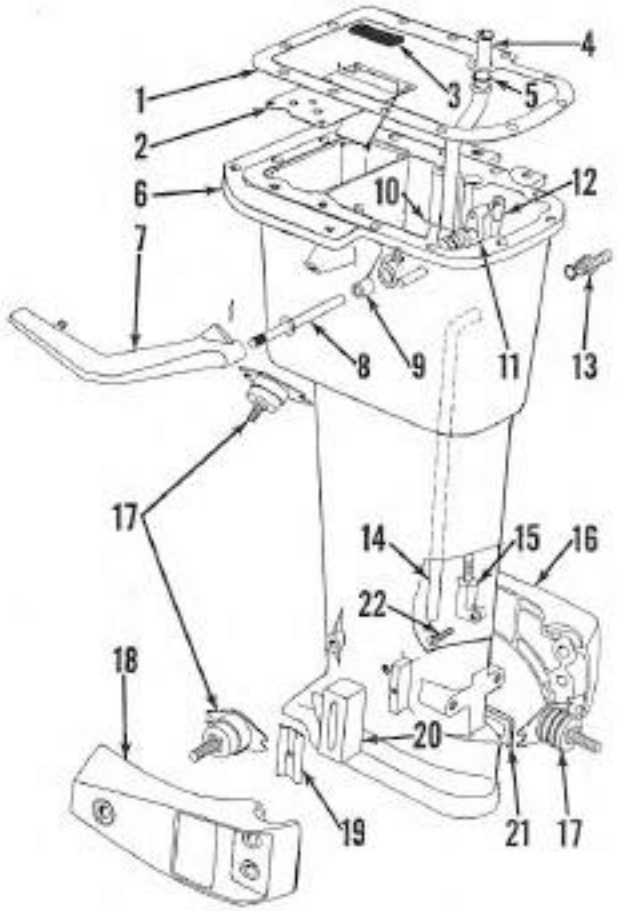


Fig. Mc95 — Exploded view of lower motor housing and associated parts.

1. Gasket
2. Idle roller
3. Gasket
4. Water tube
5. Seal
6. Housing
7. Shift lever
8. Shifter shaft
9. Bearing
10. Pin
11. Actuator
12. Shift rod
13. Roller fitting
14. Roller tube
15. Coupling
16. Yoke
17. Rubber mount
18. Yoke
19. Retainer
20. Snubber
21. Cover plate
22. Screw