GALE

GALE PRODUCTS DIVISION OF
OUTBOARD MARINE CORP.
P. O. Box 470, Galesburg, Illinois

CONDENSED SERVICE DATA

Series	35 hp	40 hp
Year Produced		
1958	35DE10B	.....
1959	35D11B-35D12B	.....
1960	35D13B	.....
1961	.....	40D14B
1962	.....	40D15B
1963	.....	40D17B

NOTE: The letter "E" in model number indicates Electric Starting Model without generator. The letter "G" in model number indicate Electric Starter and Generator. The letter "L" in model number indicates "Long" lower unit.

TUNE-UP		
Hp @ rpm	35.0 @ 4500	40.0 @ 4500
Bore—Inches	$3\frac{1}{16}$	$3\frac{3}{16}$
Stroke—Inches	2¾	2¾
Number of Cylinders	2	2
Displacement—Cu. In.	40.5	43.9
Spark Plug		
Champion	J6J	J4J
AC	M44C	M42K
Auto-Lite	A3X	A21X
Electrode Gap	0.030	0.030
Magneto		
Point Gap	0.020	0.020
Timing	See Text	See Text
Carburetor		
Make	Own	Own
Adjustment	See Text	See Text
Fuel—Oil Ratio	24:1	24:1
SIZES—CLEARANCES		
POWER HEAD		
Piston Rings		
End Gap	0.007-0.017	0.007-0.017
Side Clearance	0.005-0.0065	0.005-0.0065
Piston Skirt Clearance	0.003-0.0045	0.003-0.0045
Crankshaft Bearing Diameter		
Main Bearing	0.9995-1.000	0.9995-1.000
Crankpin	1.1813-1.1818	1.1813-1.1818
Crankshaft Bearing Diametral Clearance		
Mains and Crankpins	Roller Brng.	Roller Brng.
Piston Pin Diametral		
Clearance in Rod	Roller Brng.	Roller Brng.
LOWER UNIT		
Drive Shaft Diameter	0.624-0.625	0.624-0.625
Diametral Clearance	0.001-0.003	0.001-0.003
Propeller Shaft	Roller Brng.	Roller Brng.
TIGHTENING TORQUES		
(All Values in Inch-Pounds unless noted)		
Connecting Rod	180-186	180-186
Crankcase Halves		
Center Screws	162-168	162-168
Except Center Screws	144-168	144-168
Cylinder Head	216-240	216-240
Flywheel Nut	720-780	100-105 Ft.-Lbs.
Spark Plug	240-246	240-246

LUBRICATION

The power head is lubricated by oil mixed with the fuel. Use ⅓-pint of outboard motor oil (or a good grade of SAE 30, "Type MM" motor oil) to each gallon of gasoline. Mix gasoline and oil thoroughly, using a separate container, before pouring mixture into fuel tank.

The lower unit gears and bearings are lubricated by oil contained in the gear case. Special "Outboard Marine Corporation, Type 'C' Lubricant" should be used. This lubricant is supplied in a tube and filling procedures are as follows: Remove upper and lower gearcase plugs and, with motor in upright position, fill gearcase from lower plug hole until lubricant reaches level of upper (vent) plug hole. Reinstall vent plug; then remove lubricant tube and reinstall lower plug. Tighten both plugs securely, using new gaskets if necessary, to provide an oil and water tight seal. If OMC Type C lubricant is not available, gear case may be temporarily filled with outboard motor oil through vent (upper) plug opening. If outboard oil is used, drain and refill with OMC Type C lubricant as soon as possible. Lower gear lubricant should be maintained at level of vent plug, and drained and renewed every 100 hours of operation.

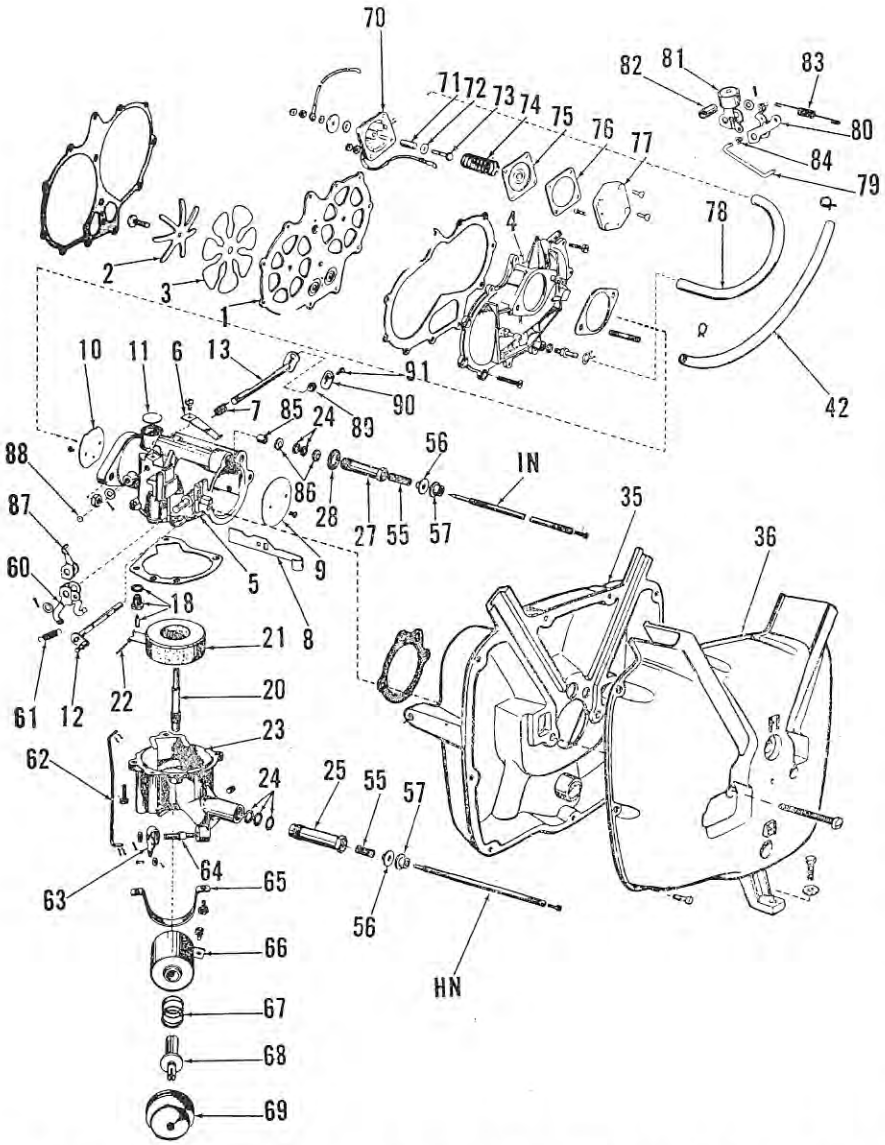


Fig. G75—Exploded view of carburetor and reed valves assembly used on electric starting models. Choke solenoid assembly (62 through 69) is not used on models without electric starter.

IN. Slow speed needle
HN. High speed needle
1. Reed plate
2. Reed stop
3. Reed petals
4. Inlet manifold
5. Body
6. Spring
7. Return spring
8. Choke rod
9. Choke valve
10. Throttle valve
11. Plug
12. Choke shaft
13. Throttle shaft
18. Inlet needle & seat
20. Main nozzle
21. Float
23. Float chamber
24. Packing
25. Packing nut
27. Packing nut
28. Washer
35. Air silencer
36. Cover
42. Fuel line
55. Spring
56. Washer
57. Grommet
60. Bellcrank
61. Spring
62. Choke link
63. Lever
64. Pivot shaft
65. Clamp
66. Solenoid
67. Spring
68. Plunger
69. Cover
70. Cut-out switch body
71. Tubing
72. Washer
73. Screw
74. Spring
75. Diaphragm
76. Gasket
77. Adapter
78. Hose
79. Throttle link
80. Throttle lever
81. Cam follower
82. Spacer
83. Spring
84. Bushing
85. Bushing
86. Washer
87. Lever
88. Cup plug
89. Cam bushing
90. Clamp
91. Screw

FUEL SYSTEM

CARBURETOR. A float type carburetor is used. Refer to Fig. G75. Normal initial setting for low speed mixture needle (IN) is 1½ turns open. Initial setting for high speed mixture adjustment needle (HN) is ¾-turn open. Final adjustment must be made when motor is in operation, by turning knobs on control panel. Clockwise rotation of both needles leans the mixture. Low idle speed can be adjusted by turning the screw on speed control gear shown in Fig. G76.

To set the carburetor float level, remove the shroud and control panel, then unbolt and remove the carburetor. Remove the float chamber and invert the carburetor body with float attached as shown in Fig. G77. The upper surface of float (lower surface when assembly is inverted) should be level and flush with gasket surface of carburetor body as shown. If it is not, carefully bend float lever, then check after assembly to be sure the float does not bind or rub.

Some models are equipped with an electrically operated choke which employs a carburetor mounted solenoid as shown in Fig. G78. To adjust the choke, loosen band (A) and pull out manual choke control until choke is fully closed. Push solenoid through band as indicated by arrow until plunger bottoms in housing. Tighten band; then check to see that choke operates properly.

SPEED CONTROL LINKAGE. 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 correctly synchronized to obtain satisfactory operation.

The speed control linkage incorporates a fixed cam attached to the magneto armature plate, a cam follower, and adjustable linkage to the carburetor throttle. To adjust

Fig. G76—Slow idle speed can be adjusted by turning the stop screw located on speed control vertical shaft gear as shown.

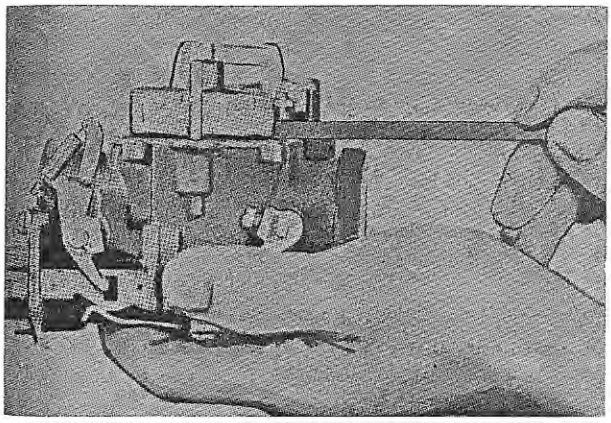


Fig. G77—When carburetor body is inverted, float should be level and flush with gasket surface as shown.

the linkage, refer to Fig. G79 and proceed as follows: With the engine not running, turn the speed control grip until the scribed line on armature cam is aligned with the cast pointer on inlet manifold as shown at (TM). Loosen the clamping screw (1) on throttle shaft. Hold throttle in closed position with the thumb and turn the eccentric bushing (2) until cam follower contacts the cam and all slack is removed from throttle linkage. Tighten clamping screw (1) and test the adjustment by turning speed control grip. If throttle fails to close, check linkage for binding and spring (83—Fig. G75) for tension.

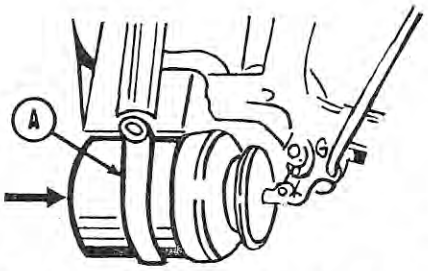


Fig. G78—To adjust the choke solenoid on motors so equipped, loosen band (A), pull out manual choke control, and push solenoid through clamp as shown by arrow, until plunger bottoms.

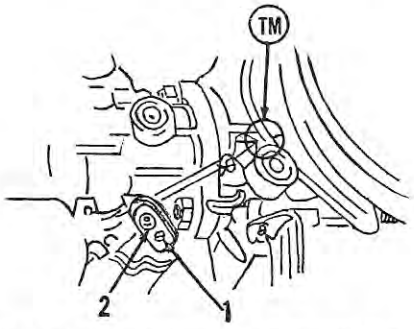


Fig. G79—To synchronize the throttle linkage, turn speed control grip until scribe line on speed control cam is aligned with timing pointer on block as shown at (TM), loosen clamp screw (1) and turn eccentric cam (2). With timing marks aligned, all slack must be removed from throttle linkage with throttle valve closed.

REED VALVES. Two sets of reed valves (3—Fig. G75) are used. Reed valves are located between carburetor and power head crankcase, and should be checked each time the carburetor is removed for service. Reed petals should seat very lightly against reed plate (1) throughout their entire length with the least possible tension. Check reed petal seating visually and/or by blowing and drawing air through ports with mouth. Renew petals (3) if broken, cracked, warped, rusted or bent. A broken reed petal is sometimes caused by a damaged, bent or mislocated reed stop. Seating surface of reed plate (1) should be smooth and flat, and petals should be centered over ports. Reed stop (2) must center over the petals of reed valve (3).

FUEL PUMP. All models are equipped with a diaphragm type fuel pump such as that shown in Fig. G80 or Fig. G81. Pressure and vacuum pulsations in crankcase are directed through a passage to one side of diaphragm (D—Fig. G80). Vacuum in the crankcase draws the diaphragm inward as shown in View "A". Fuel is thus drawn from the fuel tank past the inlet check valve (5) as shown by arrow. As power head piston moves downward in cylinder (View "B"), pressure is induced to back side of diaphragm, forcing fuel out past the outlet check valve (4) as shown. All defective or questionable parts should be renewed when overhauling fuel pump. Be particularly careful to examine the diaphragm for air leaks, cracks or pin holes.

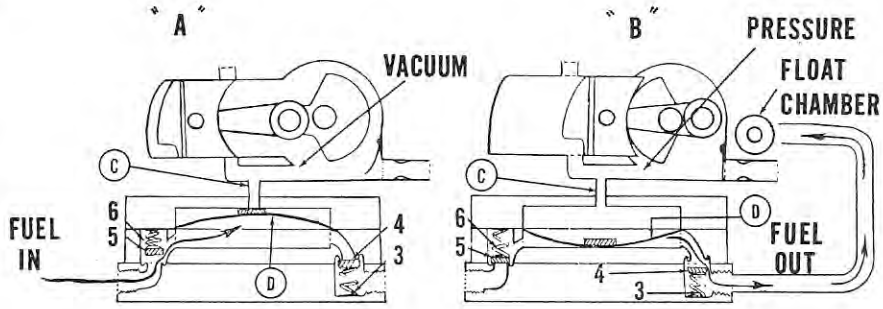


Fig. G80—Schematic view showing operation of the crankcase operated, diaphragm fuel pump. Pressure and vacuum pulsations from crankcase pass through connection (C) to rear of diaphragm (D) which induces a pumping action on fuel line as shown.

3. Valve spring
4. Outlet check valve
5. Inlet check valve
6. Valve spring

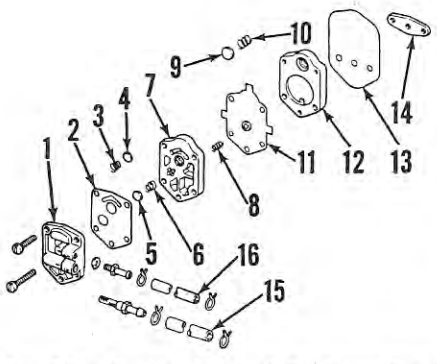


Fig. G81—Exploded view of diaphragm type fuel pump used on early models.

1. Valve housing
2. Gasket
3. Spring
4. Outlet check valve
5. Inlet check valve
6. Spring
7. Inner housing
8. Spring
9. Support
10. Spring
11. Diaphragm
12. Outer housing
13. Deflector
14. Gasket
15. Inlet hose
16. Outlet hose

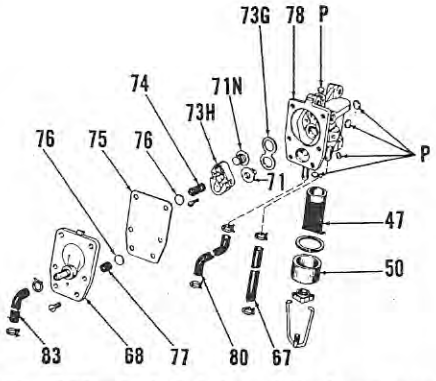


Fig. G82—Exploded view of diaphragm type fuel pump used on late models.

P. Plug
47. Filter element
50. Bowl
67. Fuel line
68. Pump cover
71. Outlet valve
71N. Inlet valve
73G. Gasket
73H. Valve holder
74. Spring
75. Diaphragm
76. Support
77. Spring
78. Housing
80. Outlet hose
83. Hose

CRANKCASE BLEEDER VALVE. Motors are equipped with a reed type bleeder valve as shown in Fig. G83. The bleeder valve is designed to remove any liquid fuel or oil which might accumulate in crankcase, thus lessening the possibility of spark plug fouling during slow-speed operation in addition to providing smoother operation at all speeds.

There is a small passage leading from the bottom of each crankcase to the bleeder valve. Any condensed liquid accumulates in the bleeder pocket and passage until piston travels its downward stroke. Crankcase pressure forces the leaf valve (LV) off its seat and blows the accumulated liquid out into exhaust passage.

The bleeder valve is covered by a separate plate which can be removed for service. Check bleeder valve whenever improper crankcase pressure or vacuum is indicated, or whenever the power head is overhauled. The leaf valve (LV) should exert a slight pressure against its seat. Seating surface of crankcase should be smooth and flat. Renew valve leaf and stop if leaf is broken, cracked, warped, rusted or bent. Bleeder passages should be blown out with compressed air whenever motor is overhauled.

IGNITION

Breaker point gap should be approximately 0.020 and both sets of points should be synchronized so that they open exactly 180° apart. The manufacturer provides a timing fixture (OMC Part No. 376969) to be used in adjusting and synchronizing the magneto. The fixture is installed on crankshaft in place of flywheel as shown in Fig. G84, and used in conjunction with a timing light of the type shown in Fig. G85.

To adjust the points using the timing fixture and light, remove the flywheel and install timing fixture, making sure it is properly fitted over flywheel key. Install timing light by attaching one clip to the insulated point (3—Fig. G86) and grounding the other clip. Bulb should light when points are closed, and go out when points are opened. Turn crankshaft until fixture pointer rests midway between the two embossed armature plate timing marks as shown in Fig. G84. Loosen the breaker point anchor screw (6—Fig. G86) and turn the adjusting screw (4) until points close and bulb lights up. Turn adjusting screw in opposite direction until points are barely open as indicated by timing light; then tighten the anchor screw (6). Turn crankshaft exactly ½-turn until opposite pointer of timing fixture is aligned with plate timing marks, then adjust the other set of points. NOTE: Timing fixture pointer legs are marked "T" and "B" to indicate upper and lower cylinders respectively.

COOLING SYSTEM

WATER PUMP. All motors are equipped with a rubber impeller type water pump. Impeller is mounted on and driven by the drive shaft in the lower unit. Refer to Fig. G87 for schematic view of pump operation; and to Fig. G97 for exploded view of pump parts. The main water inlet scoop is located below the exhaust outlet, above and aft of the propeller.

When cooling system troubles are encountered, first check the water inlet for plugging or partial stoppage, then if not corrected, remove the lower unit as outlined in the appropriate section and check the condition of the water pump, water passages, gaskets and sealing surfaces.

POWER HEAD

R&R AND DISASSEMBLE. To overhaul the power head, clamp the motor on a stand or support and remove the shroud, control panel, intake silencer, and lower cover pan. Remove starter unit or units, flywheel, magneto armature plate, carburetor and inlet manifold. Refer to Fig. G88.

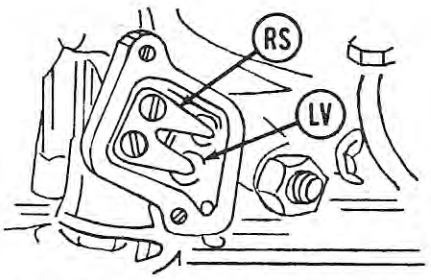


Fig. G83—The crankcase bleeder valve may be serviced without disassembly of power head by removing the valve plate.

LV. Leaf valve RS. Reed stop

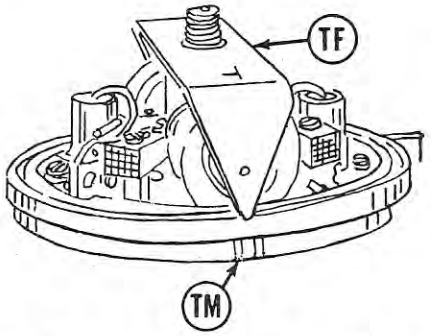


Fig. G84—Timing fixture (TF) installed and aligned with armature plate timing marks (TM) for adjusting points for the upper cylinder. Refer to text.

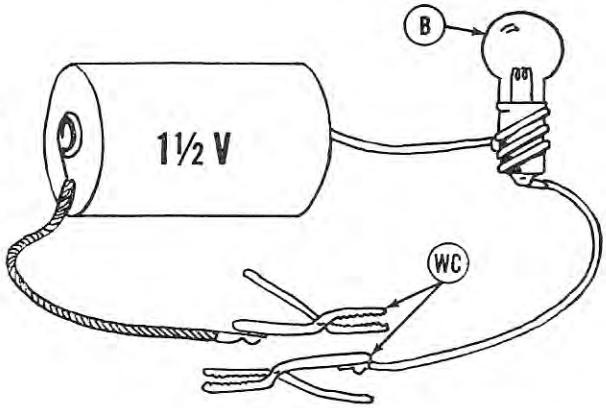


Fig. G85—A timing light such as the one shown, is required to properly synchronize the two sets of points. The light can be easily made from a flashlight battery, bulb (B), wire clips (WC) and short sections of wire.

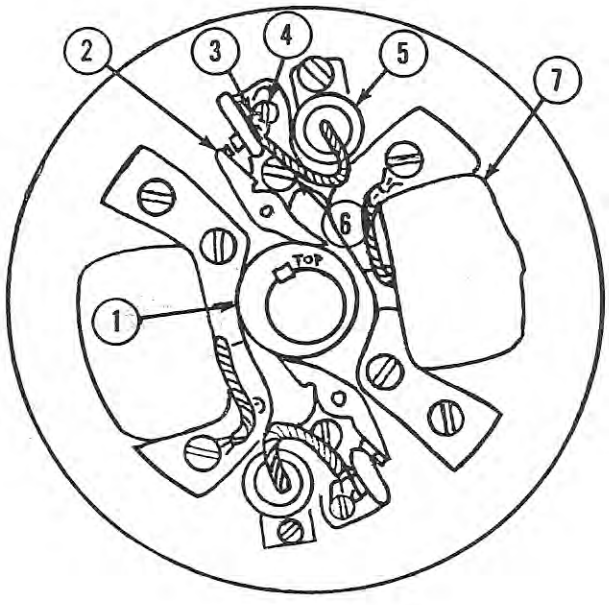


Fig. G86 — Magneto assembly with flywheel removed. Unit contains a separate coil, points and condenser for each cylinder.

1. Breaker cam
2. Contact points
3. Insulated connection
4. Adjusting screw
5. Condenser
6. Anchor screw
7. Coil

Remove armature plate support (11) and retainer (12), speed control lever (15) and outer and inner exhaust covers (30 & 29). Remove cylinder head (8) and port and starboard brackets (21 & 25) then unbolt and remove power head from lower unit.

On 40 hp models, the hex head mounting screws which secure power head to exhaust housing must be tightened to a torque of 120-144 inch pounds. On 1961 models, if slotted head screws are found, discard and use the hex head screws (OMC Part Number 554306) for installation.

Tap out the tapered crankcase aligning pins (P); then unbolt and remove crankcase (22). NOTE: Two center main bearing cap screws are accessible through the intake ports and must be removed.

Pistons, rods, and crankshaft are now accessible for removal and overhaul as outlined in the appropriate following paragraphs.

Remove crankcase bleeder valve (23) and oil line (24) and blow out oil line and passages. Refer to CRANKCASE BLEEDER VALVE paragraph in previous FUEL SYSTEM section for further information concerning bleeder valve.

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

Whenever power head is disassembled, it is recommended that all gasket surfaces and the mating surfaces of crankcase halves be carefully checked for nicks and burrs or warped surfaces which might interfere with a tight seal. The cylinder head, head end of cylinder block, or mating surfaces of manifold and crankcase may be checked, and lapped if necessary, to provide a smooth surface. For lapping, use a regular lapping block or a sufficiently large piece of smooth plate glass. Lay a sheet of No. 00 emery paper on the lapping block; then place the surface to be lapped on the emery paper. Use a very light pressure and 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 and a clean rag; then wash with hot soapsuds and clean rags until all traces of loose metal and grit are removed. Mating surfaces of crankcase may be checked for smoothness 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 can be salvaged in this manner. In case of doubt, renew the crankcase assembly.

The crankcase halves are positively located during assembly by the use of two tapered dowel pins. Check to make sure that the dowel pins are not bent, nicked or distorted, and that dowel holes are clean and true. When installing dowel pins, make sure they are fully seated but do not use excessive force.

When reassembling the crankcase, install the sealing strips (26—Fig. G88) and trim the ends to extend approximately 1/16-inch into bearing bores. Make sure mating surfaces of crankcase halves are completely clean and free from old cement or from nicks or burrs. Apply a hardening cement such as "Sealer 1000," available from Marprox Corporation, P. O. Box 955, Sheboygan, Wisconsin, to cylinder half of crankcase only. Apply cement sparingly and evenly, making sure entire surface is covered. Immediately install front half of crankcase and position by installing the locating dowel pins; then install and tighten the crankcase screws.

When installing gaskets, check to make sure correct gasket is used and that ALL

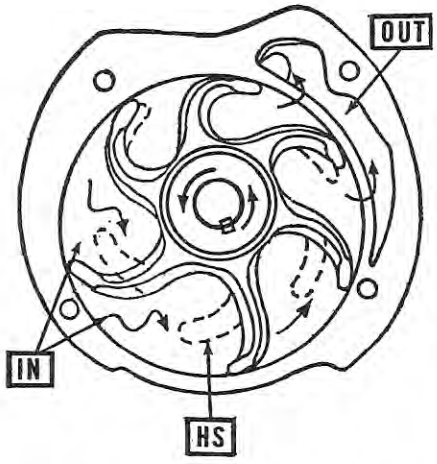


Fig. G87—Schematic view of the rubber impeller type water pump used. Impeller mounts on lower unit drive shaft and rotates in offset pump housing. Water is drawn into pump (IN) as area between blades increases, and is forced into power head (OUT) as area narrows. At high speeds, blades remain curved as shown by broken lines (HS) and pump operates by centrifugal action.

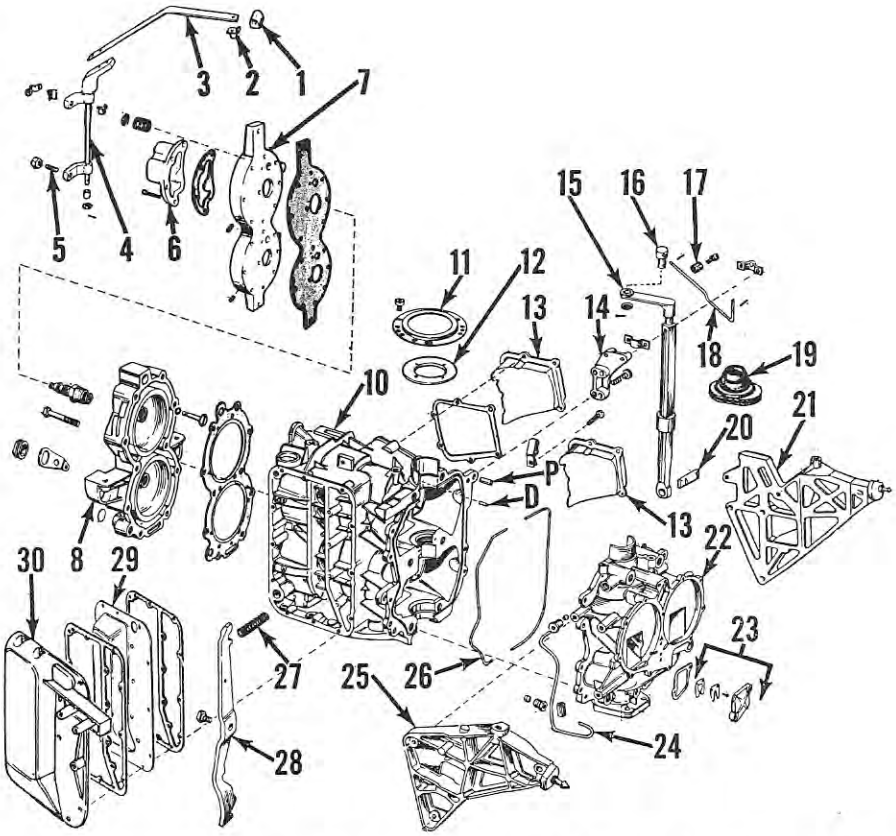


Fig. G88 — Exploded view of power head typical of that used on models prior to 1962. Late models are similar except compression release mechanism (1 through 6) is not used.

D. Dowel
P. Taper pin
1. Guide
2. Follower
3. Arm
4. Lever
5. Adjusting screw
6. Upper chamber
7. Lower chamber
8. Cylinder head
10. Cylinder half
11. Support
12. Retainer
13. Transfer port cover
14. Bracket
15. Lever
16. Pivot
17. Stop
18. Link
19. Boot
20. Pin
21. Bracket
22. Crankcase half
23. Bleeder valve
24. Oil line
25. Bracket
26. Seal strip
27. Spring
28. Lockout lever
29. Exhaust cover
30. Exhaust cover

water passage holes are open. All gasket surfaces must be sealed, using a non-hardening type cement such as Perfect Seal No. 4. Tightening torques are given in the CONDENSED SERVICE DATA table.

FLYWHEEL. When installing the flywheel on 40 horsepower models (1960 and later), turn the key (K—Fig. G89) so that outer (flat) edge is parallel with center line of crankshaft as shown at (A). Improper installation of key may prevent tightening of flywheel on crankshaft taper, resulting in possible damage. Tighten the flywheel retaining nut to a torque of 100-105 ft.-lbs. on all 40 horsepower models.

CYLINDER HEAD. Before 1962 the cylinder head was equipped with a compression release chamber and valve as shown in Fig. G90. The purpose of this mechanism is to lower the compression slightly for hand starting. The rocker arm (4) is actuated by a cam (See Fig. G91) on the top of the hand starter pulley. When the hand starter rope is pulled the release mechanism opens the poppet valve (3—Fig. G90), allowing part of the compression pressure to pass through valve and enter the compression release chamber (2). When starting cord is released, valve (3) returns to its seat and the motor functions normally. After assembly, adjust the clearance between the adjusting screw on rocker arm (4) and the release valve (3) to 0.015-0.025, with starter pulley in the normal position. Adjust the length of starting cord until, with starting handle retracted (running position), a distance of one inch exists between point of cam and forward edge of starter cover opening as shown in Fig. G91.

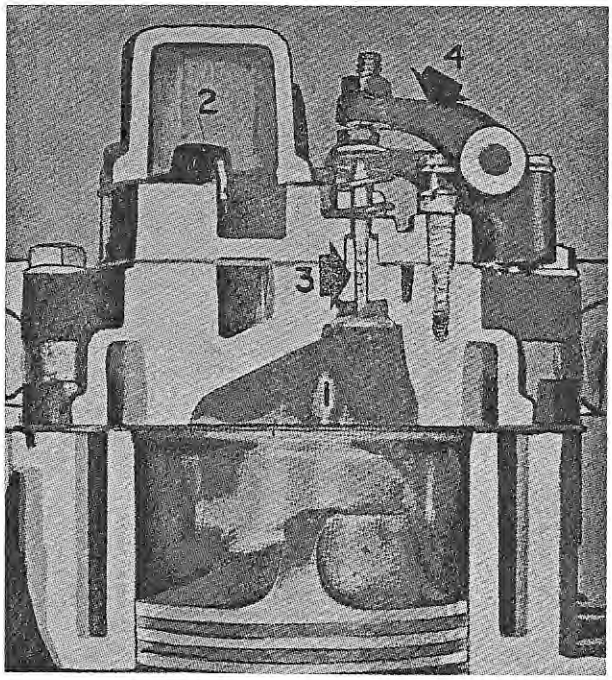


Fig. G90 — Cutaway view of compression release mechanism. Poppet valve (3) is opened by lever (4) which is actuated by starter pulley. When starter rope is pulled, valve opens to admit part of cylinder compression into release chamber (2) making motor easier to crank.

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

Each aluminum piston is fitted with three identical rings which are interchangeable and may be installed either side up. Pistons, pins and rings are available in standard size and oversizes of 0.020 and 0.040. The recommended piston ring end gap is 0.007-0.017 for all motors. Ring to groove clearance is 0.005-0.0065. Piston to cylinder wall clearance is 0.003-0.0045 when measured at piston skirt. Renew pistons, rings and/or cylinder assembly if scored or otherwise damaged, or if clearance is excessive.

When reassembling, all engine parts should be well coated with engine oil. Piston should be installed in cylinder with long, tapered side of piston head toward exhaust port side of cylinder as shown in Fig. G92. NOTE: Exhaust ports are located on starboard side of power head.

CONNECTING RODS, BEARINGS AND CRANKSHAFT. Before detaching connecting rods from crankshaft, make sure rod and cap are properly marked for correct assembly to each other and in the correct cylinder. Also notice alignment marks on rod and center main bearing cages.

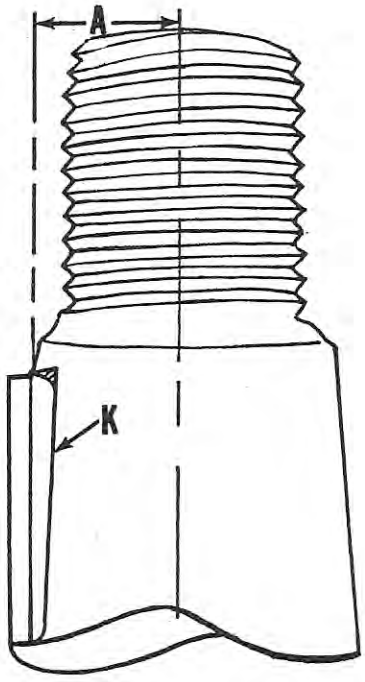


Fig. G89—When installing flywheel, make sure outer edge of key (K) is parallel with centerline of crankshaft as shown at (L).

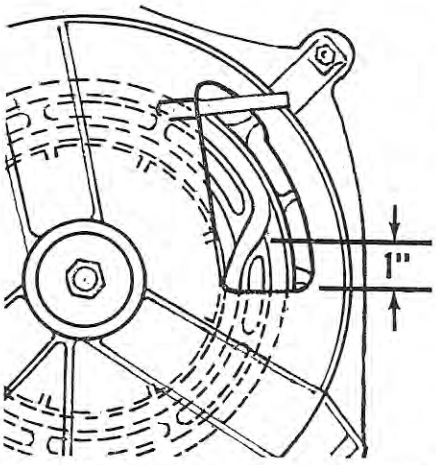


Fig. G91—Schematic view of compression release cam groove which is machined into top of starter pulley. Starter rope must be adjusted so that point of cam is 1 inch from edge of opening in starter housing as shown.

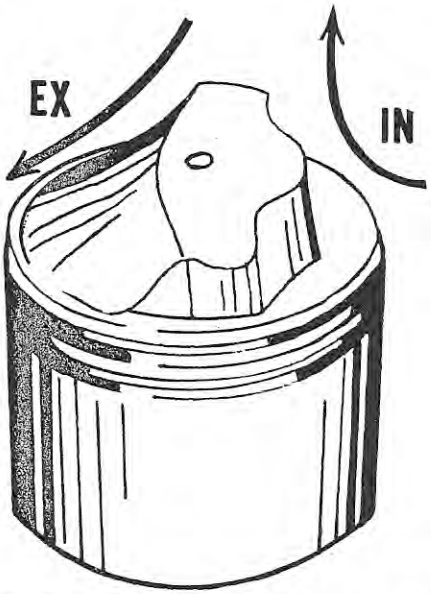


Fig. G92—Baffle on top of piston head is designed to direct the flow of incoming mixture for proper scavenging. Piston must be installed as shown with relation to cylinder ports.

EX. Exhaust port IN. Inlet port

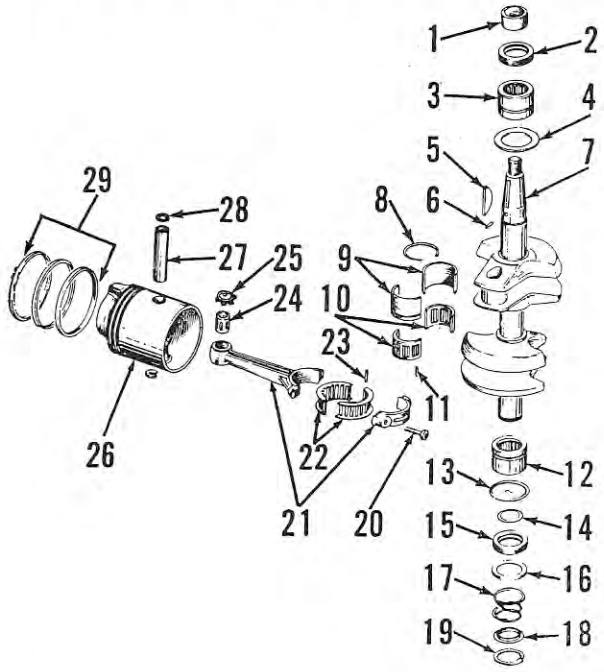


Fig. G93 — Power head crankshaft, piston, rings and bearings.

1. Magneto cam
2. Seal
3. Upper bearing
4. Washer
5. Key
6. Cam pin
7. Crankshaft
8. Retaining ring
9. Outer race
10. Bearing cage
11. Needle roller
12. Lower bearing
13. "O" ring
14. Sealing ring
15. Seal
16. Retainer
17. Spring
18. Retainer
19. Snap ring
20. Screw
21. Connecting rod
22. Bearing cage
23. Needle roller
24. Needle bearing
25. Retainer
26. Piston
27. Piston pin
28. Retaining ring
29. Piston rings

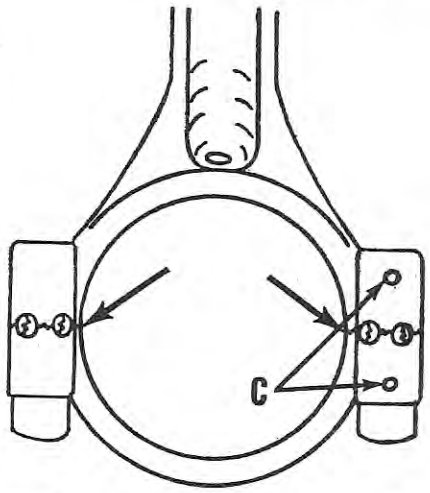
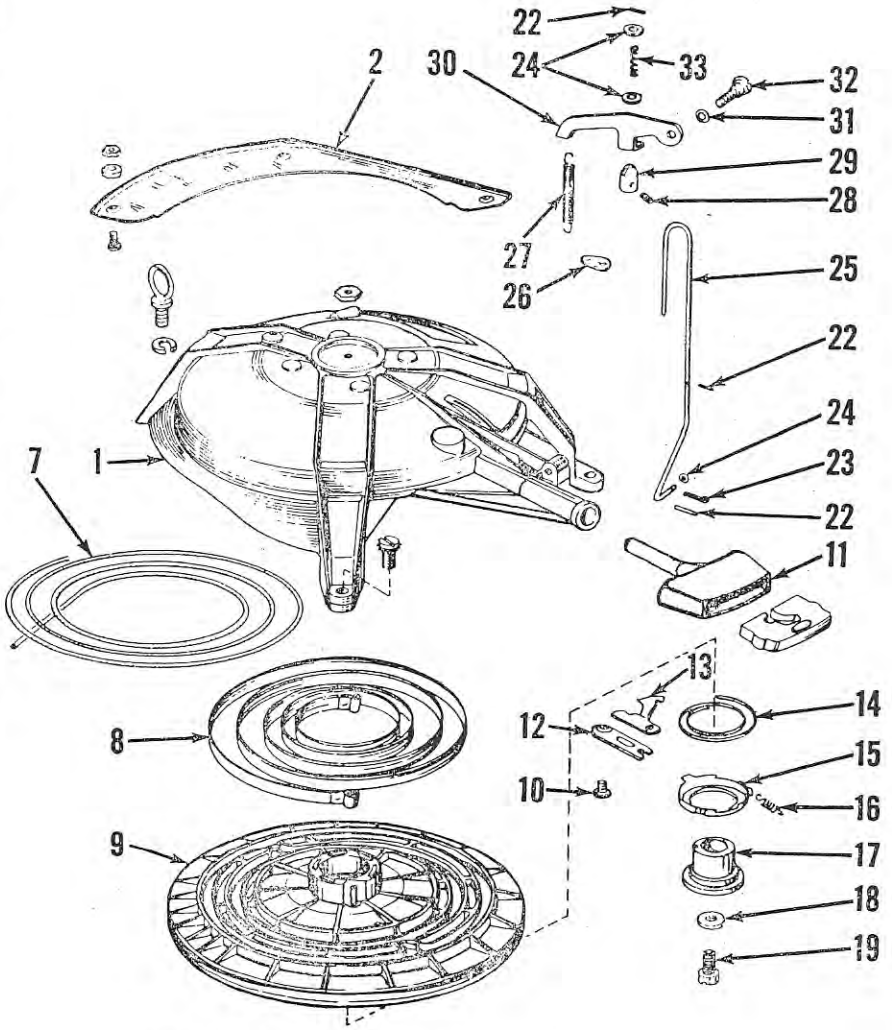


Fig. G94—Connecting rod is "fractured" at pin of arrows. When installing cap, make sure that correlation marks (C) are together then work cap back and forth a slight amount until fracture lines mesh.

Connecting rods are fitted with needle rollers in a two-piece bearing cage at crankpin end and a caged needle bearing at piston end. The bores at each end of the steel rod are hardened and ground to serve as the bearing outer race. All three main bearings are of the needle roller type. The top and bottom main bearings are of the cartridge type and include the outer bearing race. The center bearing is fitted with 18 rollers positioned in a two-piece cage. Outer race is two-piece and is held together by a retaining ring (8—Fig. G93).

Rod is drilled and finished, then carefully fractured at points shown by arrows, Fig. G94. Parting line is not machined. When assembled, the uneven edges of parting line fit together to align rod and cap. When assembling, align the index marks (C), then move cap back and forth slightly as rod screws are tightened until uneven fracture lines mesh. Test the alignment by scratching fingernail across parting line. The two-piece bearing cage is indexed by grinding off one corner of each cage flange. Place these index marks together when assembling.

Main outer cages are prevented from turning in crankcase by locating dowels (D —Fig. G88) in cylinder half of bearing bore. Dowel must fit in hole in bearing race. To renew the dowel, first center-punch end of dowel; then drill with a No. 25 drill. Tap



1. Housing
2. Guard
7. Rope
8. Spring
9. Pulley
10. Screw
11. Handle
12. Retainer
13. Pawl
14. Friction spring
15. Cup
16. Spring
17. Spindle
18. Washer
19. Screw
22. Pin
23. Cotter pin
24. Washer
25. Rod
26. Anchor
27. Spring
28. Set screw
29. Collar
30. Lock
31. Bow washer
32. Screw
33. Spring

Fig. G95—Exploded view of the recoil type manual starter.

the hole in dowel using a No. 10 - 24 thread tap and use a puller plate and jack screw to remove dowel.

Thoroughly lubricate all friction surfaces during assembly using engine oil. Use petroleum jelly or lubriplate to retain the loose needle bearings. Renew all crankshaft seals whenever motor is disassembled.

MANUAL STARTER

Fig. G95 shows a starter typical of the type used. When installing a new starter cord or spring, invert the removed starter assembly in a vise and wind the spring by turning the starter pulley counter-clockwise until spring is completely wound. Reverse the pulley one turn and install the cord. Make a final adjustment of cord to time the compression release mechanism as outlined in CYLINDER HEAD paragraph of POWER HEAD section.

All models are equipped with a starter latch which is mechanically linked to carburetor follower cam to prevent starting the motor when throttle is set for high speed. To adjust the starter latch, set shift lever in neutral position and the speed control to the fast limit recommended for starting. Loosen the set screw in stop collar (A—Fig. G96) and adjust the collar up or down on link until inner end of latch (B) just clears the cast lugs on the starter pulley. Tighten set screw (A) and check to make sure the release disengages throughout the throttle position recommended for starting.

LOWER UNIT

PROPELLER AND DRIVE PIN. Protection for the propeller and drive unit is provided by a cushioning and slip clutch built into the propeller hub. Use only a propeller especially designed for the motor.

A 10⅜-inch diameter, three blade propeller of either 13¼ or 14 inch pitch is used. All motors use a ¼ x 1$\frac{5}{32}$-inch, No. 416 Stainless Steel drive pin (OMC Part No. 304575).

Propeller clutch slippage can be tested using a torque wrench and a suitable holding fixture and adapter. Slippage should occur at a torque of 150-210 ft.-lbs. Service consists of renewing propeller.

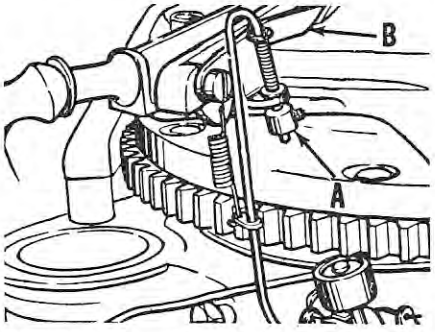


Fig. G96—To adjust the starter latch, first set speed control grip at the fast speed recommended for starting. Loosen stop collar (A) and adjust latch "B" until it just clears cast lugs on starter pulley.

REMOVE AND REINSTALL. Most service on the lower unit can be performed by detaching the gearcase housing from driveshaft and exhaust housing. When servicing 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 of the motor. Water leaks may also permit the inside of driveshaft casing to fill with water which can eventually find its way into motor crankcase through the lower bearing, and/or into the gearcase where it washes out the lubricant. Look for water leaks if the gearcase requires an abnormal amount of lubricant.

Use Fig. G97 as a guide when overhauling the lower unit, together with the special precautions listed below. All gasket surfaces must be smooth, free from nicks and burrs, and assembled using a non-hardening type cement such as Permatex No. 1 or Perfect Seal No. 4. All joints without gaskets must be smooth and free from nicks and burrs and old cement, and sealed with a hardening cement such as Sealer 1000. Refer to CONDENSED SERVICE DATA table for repair specifications.

The propeller shaft (43) and drive gears (38 and 45) can be removed after first draining lubricant from gear compartment, removing pivot pin (13) and unbolting and removing the gearcase lower housing (12). To remove pinion (19), it is necessary to remove retainer strap (20).

To separate gear case from the exhaust and drive shaft housing, it is necessary to remove cover (10—Fig. G98) and loosen the clamp screw in shift rod bracket (4—

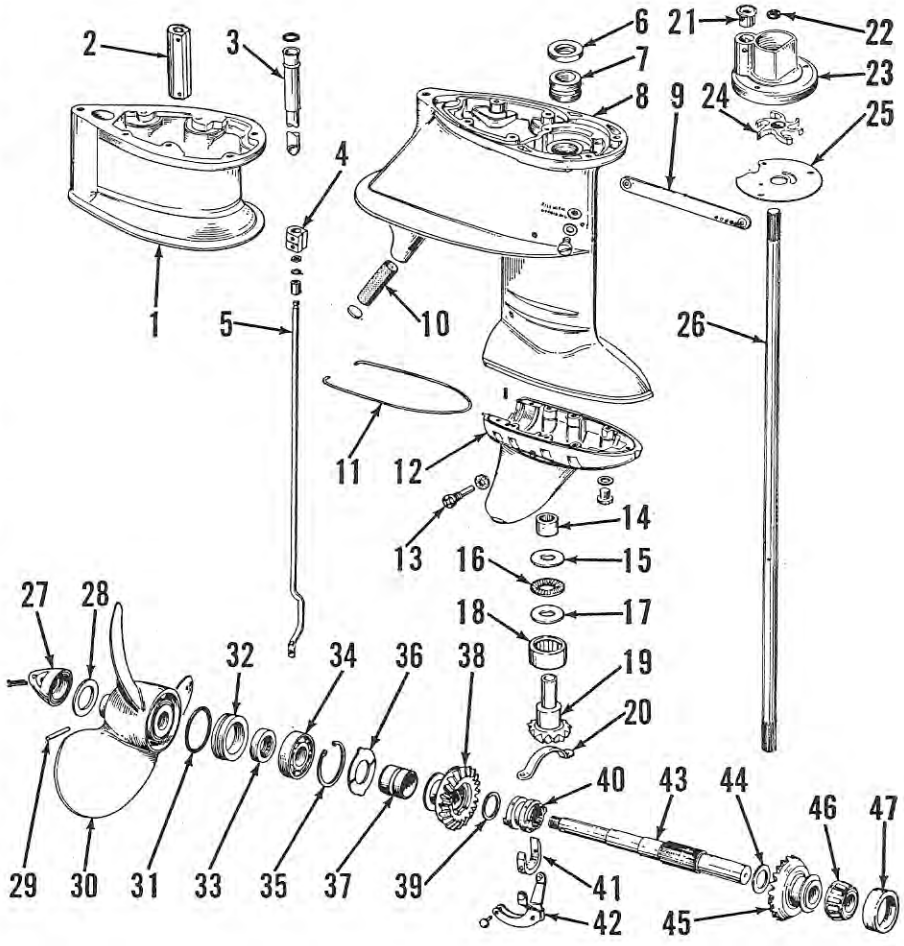


Fig. G97—Exploded view of lower unit gear housing, water pump and associated parts. Items (1 through 3) are used in "Long" models only.

1. Extension
2. Connector
3. Adapter
4. Connecter
5. Shift rod
6. Seal
7. Bushing
8. Gearcase
9. Cover
10. Screen
11. Seal strip
12. Lower housing
13. Pivot screw
14. Bearing
15. Upper race
16. Thrust bearing
17. Lower race
18. Bearing
19. Drive pinion
20. Retainer strap
21. Grommet
22. Drive shaft seal
23. Pump housing
24. Impeller
25. Plate
26. Drive shaft
27. Nut
28. Washer
29. Drive pin
30. Propeller
31. "O" ring
32. Housing
33. Oil seal
34. Bearing
35. Snap ring
36. Thrust washer
37. Bushing
38. Reverse gear
39. Thrust washer
40. Clutch dog
41. Cradle
42. Shift lever
43. Propeller shaft
44. Thrust washer
45. Forward gear
46. Bearing cone
47. Bearing cup

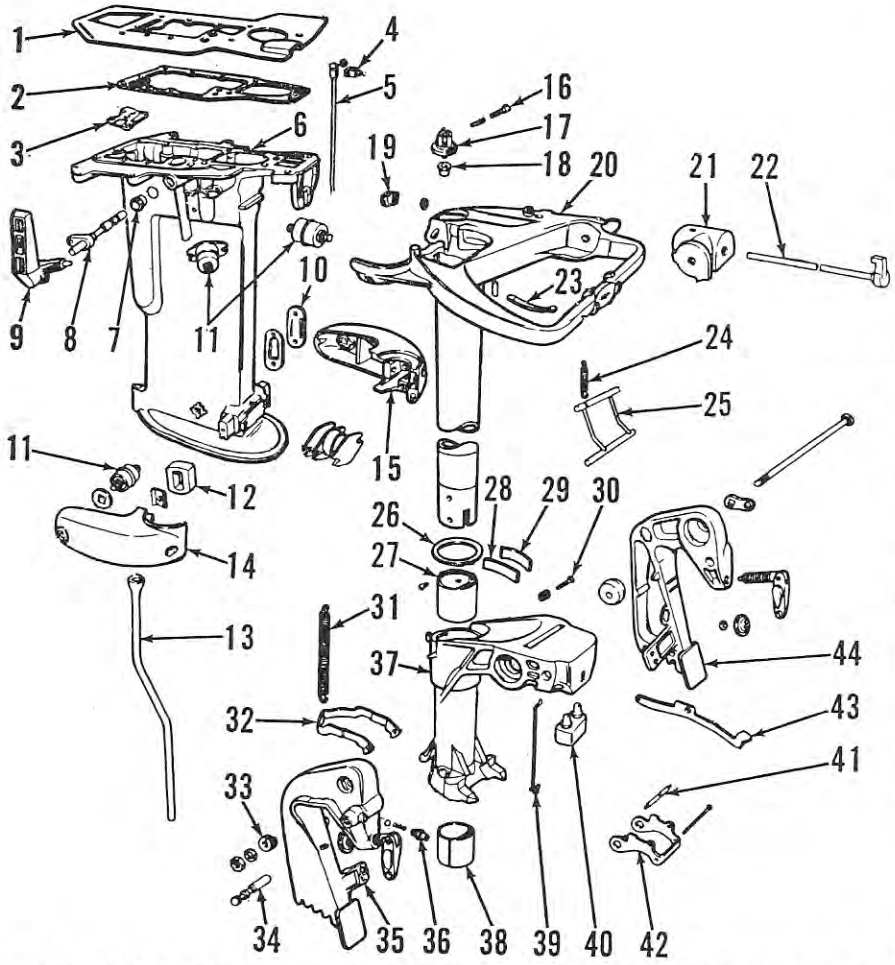


Fig. G98—Exploded view of stern bracket, exhaust housing, drive shaft housing and associated parts used on late models. Early models are similar.

1. Cover plate
2. Gasket
3. Exhaust plate
4. Clevis
5. Shift rod
6. Exhaust housing
7. Bushing
8. Shifter shaft
9. Shift handle
10. Cover plate
11. Rubber mount
12. Bumper
13. Water tube
14. Lower mount
15. Lower mount
16. Adjusting screw
17. Throttle gear
18. Bushing
19. Throttle pinion
20. Steering bracket
21. Throttle cover
22. Throttle control
23. Ground spring
24. Spring
25. Tilt lever
26. Thrust washer
27. Liner
28. Spacer
29. Plate
30. Adjusting screw
31. Spring
32. Reverse lock
33. Spring
34. Tilt lock
35. Stern bracket
36. Detent
37. Swivel bracket
38. Shock absorber
39. Link
40. Bumper
41. Lock pin
42. Link
43. Lever arm
44. Stern bracket

Fig. G97). Gear case can then be unbolted and separated from exhaust housing.

The pinion thrust bearing races (15 & 17 —Fig. G97) are of different size. Bearing race (17) has a 7/8-inch diameter inner hole and should be installed on pinion first. Race (15) has a 15/16-inch diameter hole and fits more snugly in gear case. When reassembling, install a new sealing strip (11) and trim the ends to extend 1/16-inch from ends of seal groove.

The shifting linkage must be adjusted to provide full engagement of the shifter collar with the forward and reverse gears. With the motor not running, set the shift lever in "Neutral" and the speed control lever at "Slow." Turn the propeller by hand while moving the shift lever (9—Fig. G98) slowly, first to the forward, then to the reverse positions. Note and mark position of shift lever with relation to shroud, at point of gear contact. "Neutral" detent position should be midway between points of contact in "forward" and "reverse" gears. If it is not, loosen the clamping screw securing shift lever (9) to shaft (8), and rotate shaft until travel is equalized.

Steering tension can be adjusted by turning screw (30—Fig. G98) in or out until motor is easy to steer but will maintain a set course.

ELECTRICAL UNITS

All models may be equipped with 12 volt electric starting system, with or without a generator. Refer to Fig. G99 for wiring diagram and to ELECTRICAL SYSTEM at end of GALE Section for overhaul data.

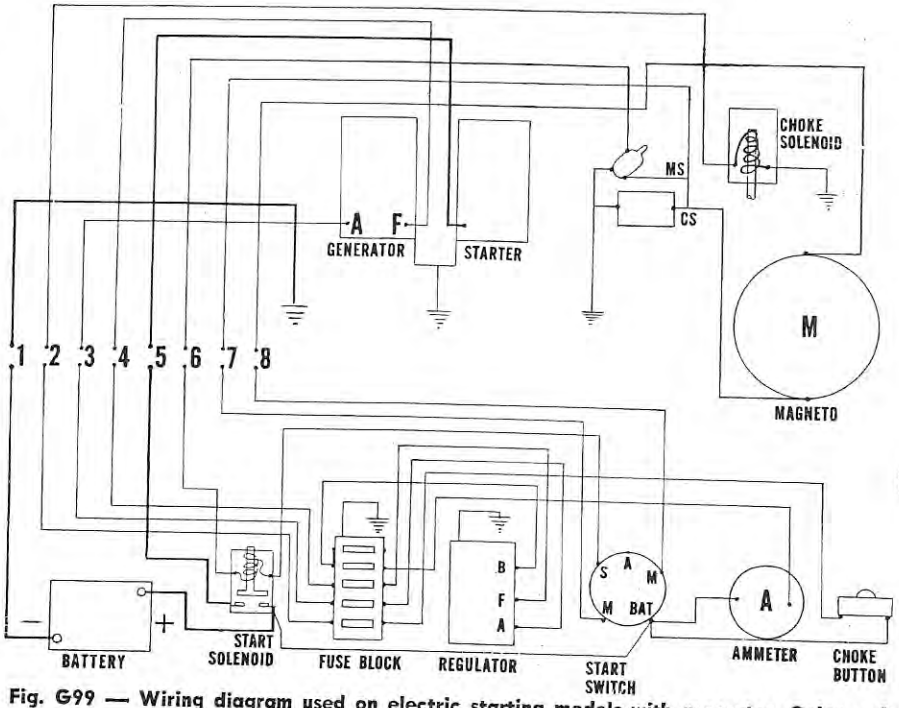


Fig. G99 — Wiring diagram used on electric starting models with generator. Color code is as follows:

1. Black
2. Red
3. Yellow
4. Blue
5. Red
6. White
7. Black
8. Black