EVINRUDE AND JOHNSON 5 AND 6 HP (1965-1968)

Year Produced	EVINRUDE 5 hp	EVINRUDE 6 hp	JOHNSON 5 hp	JOHNSON 6 hp
1965	5502, 5503	6502, 6503	LD-10, LDL-10	CD-22, CDL-22
1966	5602, 5603	6602, 6603	LD-11, LDL-11	CD-23, CDL-23
1967	5702, 5703	6702, 6703	LD-12, LDL-12	CD-24, CDL-24
1968	5802, 5803	6802, 6803	LD-13, LDL-13	CD-25, CDL-25

CONDENSED SERVICE DATA

TUNE-UP		
Hp @ rpm	5.0 @ 4000	6.0 @ 4500
Bore—Inches	$1\frac{5}{16}$	$1\frac{5}{16}$
Stroke—Inches	1½	1½
Number of Cylinders	2	2
Displacement—Cu. In.	8.84	8.84
Spark Plug		
Champion	J4J	J4J
AC	M42K	M42K
Autolite	A21X	A21X
Electrode Gap	0.030	0.030
Magneto		
Point Gap	0.020	0.020
Carburetor		
Make	Own	Own
Fuel—Oil Ratio	50:1	50:1
SIZES—CLEARANCES		
Piston Rings		
End Gap	0.005-0.015	0.005-0.015
Side Clearance	0.001-0.0035	0.001-0.0035
Piston Skirt Clearance	0.0018-0.003	0.0018-0.003
Crankshaft Bearings—Diameter		
Top Main Bearing	0.808-0.8085	0.808-0.8085
Center Main Bearing	0.8075-0.808	0.8075-0.808
Lower Main Bearing	0.808-0.8085	0.808-0.8085
Crankpin	0.6685-0.6690	0.6685-0.6690
Crankshaft Bearings—Diametral Clearance		
Top Main Bearing	0.001-0.002	0.001-0.002
Center Main Bearing	0.0015-0.0025	0.0015-0.0025
Lower Main Bearing	0.001-0.002	0.001-0.002
Crankpin	——Roller Bearing——	
Crankshaft End Play	0.007 Max.	0.007 Max.
Piston Pin—Diametral Clearance In Rod	0.0003-0.001	0.0003-0.001
TIGHTENING TORQUES (All Values in Inch Pounds)		
Connecting Rod	60-66	60-66
Crankcase Halves	60-80	60-80
Cylinder Head	60-80	60-80
Exhaust Cover	24-36	24-36
Flywheel Nut	480-540	480-540
Intake Manifold	24-36	24-36
Spark Plug	240-246	240-246

LUBRICATION

The power head is lubricated by oil mixed with the fuel. Use ⅛ pint of oil with each gallon of regular automotive or white marine gasoline. A good quality Outboard Motor Oil is recommended; if outboard oil is not available, use Type MM, SAE 30 Automotive Motor Oil. Use double the recommended amount of oil in the mixture with a new motor or after overhaul. Mix oil and gasoline 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 lower plug from gear case and attach tube. Remove upper (vent) plug from case and, with motor in an upright position, fill gear case 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 assure a water-tight seal. If OMC Type C Lubricant is not available, gear case may be temporarily filled with outboard motor oil through vent (top) 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.

FUEL SYSTEM

CARBURETOR. A float type carburetor is used; refer to Fig. OM4-1 for exploded view. Normal initial setting for slow speed mixture needle (25) is two (2) turns open from closed position. Major adjustment should be made with knob (27) removed. Clockwise rotation of needle leans the mixture. Make final adjustment after motor has reached operating temperature; then reinstall knob (27) with pointer down. High speed mixture is controlled with a fixed jet (2) and is not adjustable.

To set the carburetor float level, first remove the carburetor; then unbolt and remove float chamber (3). Invert the carbure-

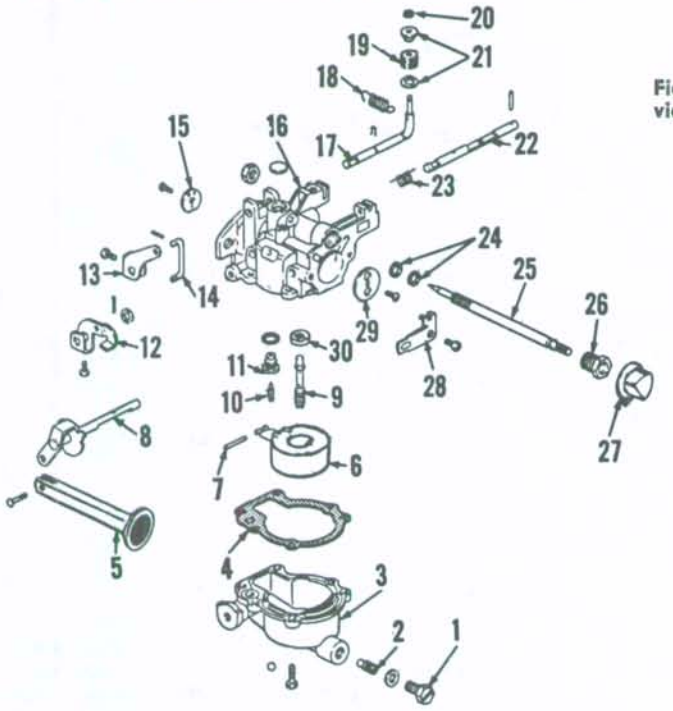


Fig. OM4-1—Exploded view of carburetor and associated parts.

1. Plug
2. High-speed jet
3. Float chamber
4. Gasket
5. Choke knob
6. Float
7. Float shaft
8. Choke shaft
9. Nozzle
10. Inlet needle
11. Needle seat
12. Throttle lever
13. Follower lever
14. Link
15. Throttle plate
16. Body
17. Cam follower
18. Spring
19. Cam roller
20. Retainer
21. Bushing
22. Throttle shaft
23. Spring
24. Packing
25. Slow speed needle
26. Nut
27. Adjusting knob
28. Choke spring
29. Choke plate
30. Gasket

tor body (16) and check the natural position of float with body inverted. Upper surface of float (6) (lower surface with body inverted) should be level and flush with gasket surface of carburetor body. If it is not, carefully bend float lever; then check after assembly to be sure float does not bind or rub.

Refer to Fig. OM4-1 when disassembling or reassembling the carburetor. High speed nozzle (9) can be removed with a blade screwdriver after float chamber (3) is removed. Needle valve (10) and seat (11) can be renewed after removing the float. Renew all gaskets and packing whenever carburetor is disassembled.

SPEED CONTROL LINKAGE. The speed control lever rotates the magneto armature plate to advance the timing. The throttle valve is synchronized with the plate to open throttle the proper amount as timing is advanced.

To synchronize the linkage, remove the top cowl and move speed control lever or grip until index mark on cam is aligned with center of cam follower roller on models prior to 1968 as shown in Fig. OM4-2. On 1968 models align cam follower leading edge with throttle cam mark. All slack should be removed from linkage, with throttle just ready to open at this time; if it is not, loosen the two screws securing synchronizing cam to armature plate, then retighten with all slack removed. To further check the adjustment, move speed control lever or grip to "Fast" position and check to make sure that throttle valve is fully open.

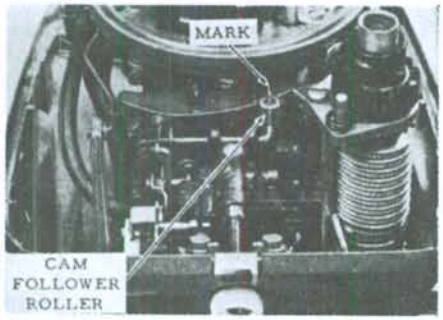


Fig. OM4-2—View of index mark on synchronizer cam aligned with center of cam follower roller.

LEAF (REED) VALVES. The inlet leaf valve unit is located between intake manifold and crankcase. Refer to Fig. OM4-3.

Leaf petals (3) should seat very lightly against leaf plate (2) throughout their entire length with the least possible tension. Seating surface of plate (2) should be smooth and flat. Make sure that leaf stop (4) is not bent or otherwise damaged. Do not attempt to straighten a bent valve leaf nor bend a leaf in an attempt to improve performance; if a valve leaf is bent or damaged, renew the leaf.

The crankcase bleeder valve can be checked as in the following paragraphs after leaf plate (2—Fig. OM4-3) is removed.

CRANKCASE BLEEDER VALVE. All motors are equipped with a crankcase bleeder valve (LV—Fig. OM4-4), designed to remove

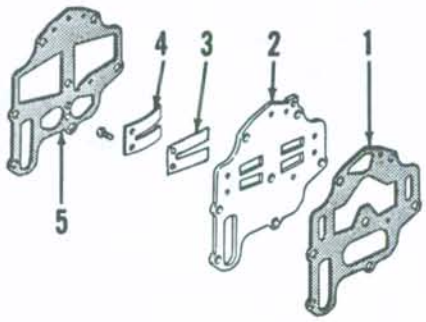


Fig. OM4-3—Exploded view of inlet leaf valve plate and associated parts.

1. Gasket
2. Leaf plate
3. Leaf petal
4. Leaf stop
5. Gasket

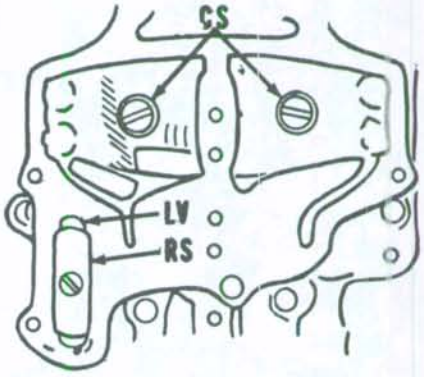


Fig. OM4-4—View of crankcase with intake manifold removed. The reed-type crankcase bleeder valve (LV) and stop (RS) can be removed for service, with manifold off. The two center main bearing screws (CS) must be removed before crankcase can be disassembled.

any liquid fuel or oil which might build up in crankcases. The bleeder valve thus provides smoother operation at all speeds and lessens the possibility of spark plug fouling during slow-speed operation. The bleeder valve is covered by intake manifold and may be inspected when inlet leaf valves are being serviced.

A small passage leads from the bottom of each crankcase to the bleeder valve. Any condensed liquid thus accumulates in the bleeder pocket until the piston travels its downward stroke, at which time the accumulated liquid is blown into the exhaust passage.

When engine is overhauled, bleed passages should be blown out with compressed air. The valve leaf (LV) should exert slight pressure against its seat. Seating surface on crankcase should be smooth and flat. Valve leaf should be renewed if broken, cracked, warped, rusted or bent. Clearance between stop (RS) and leaf valve (LV) should be 0.023-0.039 inch. Stop (RS) should be bent to set the correct clearance.

FUEL PUMP AND FILTER. The diaphragm type fuel pump (2—Fig. OM4-5) attaches to side of cylinder block and is actuated by pressure and vacuum pulsations in upper

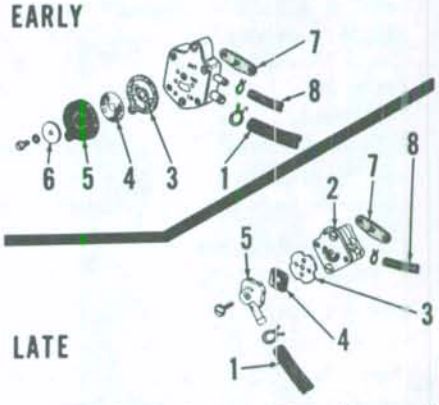


Fig. OM4-5—Fuel pump, fuel filter and associated parts. Early type pump is shown at top.

1. Inlet fuel line
2. Fuel pump
3. Gasket
4. Filter
5. Cover
6. Washer
7. Gasket
8. Outlet fuel line

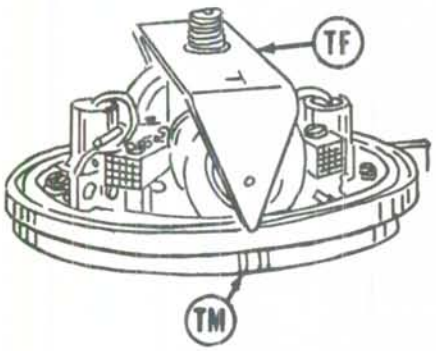


Fig. OM4-6—View of motor with timing fixture (TF) installed. Breaker points should just open when pointer is centered between timing marks (TM) on armature plate.

crankcase. The fuel pump (2) is available only as an assembly and includes the filter unit.

If fuel pump problems are encountered, first remove and clean the filter and blow through fuel lines to be sure they are open and clean; then, if trouble is not corrected, renew the fuel pump assembly.

IGNITION SYSTEM

Breaker point gap should be 0.020 and both sets of points should be set to open exactly 180° apart. Flywheel must be removed for breaker point adjustment or inspection.

The recommended method of breaker point adjustment is by using the special timing fixture (OMC Tool 383602) as shown in Fig. OM4-6 and a timing test light. Any test light or meter which indicates an open and closed circuit is satisfactory.

To adjust the points using the special tools, disconnect condenser and magneto coil leads from both points and install the timing fixture (TF—Fig. OM4-6) over crankshaft and flywheel key. Turn crankshaft until either end of pointer is aligned midway between the timing marks (TM) on armature plate. Attach the test light or meter to a suitable ground and to the terminal on the opening set of points; then adjust the gap until the points just open as indicated by test lamp going out. Turn crankshaft 180° until opposite leg of pointer is midway between timing marks (TM) on armature plate and adjust the other set of points in the same manner.

To adjust the points without the special tools, adjust each gap to exactly 0.020 when flywheel key is aligned with rub block on movable point.

Except for the permanent magnet built into the flywheel, the ignition system consists of a separate coil, condenser, point set and wiring for each cylinder. When ignition troubles are encountered, check point condition and gap adjustment; check also for loose or corroded connections, damaged insulation and broken wires. The three ends of the laminated coil core should be flush with machined bosses on armature (stator) plate. The side of ignition cam marked "TOP" should face up. The cam and flywheel key should be installed with upset mark down as shown in Fig. OM4-7.

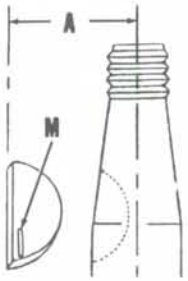


Fig. OM4-7—When installing breaker point cam and flywheel drive key, make certain that the upset mark (M) is down as shown.

COOLING SYSTEM

WATER PUMP. All motors are cooled by a rubber impeller type water pump which is mounted on and driven by the lower unit drive shaft. At slow speeds the flexible impeller blades follow the contour of the eccentric housing and the pump delivers cooling water by the displacement principle. As speed increases, the blades curve backward and coolant delivery becomes partially centrifugal, thus maintaining a relatively constant coolant flow regardless of engine speed.

When cooling system problems are encountered, first check water inlet for plugging or partial stoppage. Check the thermastat on models so equipped. If the difficulty is not thus corrected, remove the lower unit gearcase as outlined in the appropriate section and check the condition of water pump, water passages, gaskets and sealing surfaces. Refer to Fig. OM4-16 or OM4-17. The main water inlet is located in the lower unit gearcase housing below the anti-cavitation plate; at sides of housing and ahead of propeller on 5 hp models, and below the exhaust outlet above and behind the propeller on 6 hp units.

THERMOSTAT. Six horsepower models are equipped with a thermostat which controls engine temperature. Cylinder heads are interchangeable on all models, but the thermostat is not normally installed on 5 hp units. NOTE: Thermostat may be installed, and is recommended if motor is extensively used in water 50° F. or below.

The thermostat is calibrated to control coolant temperature within the range of 145°-150° F. Thermostat can be removed for inspection or renewal by first removing upper motor cover; then removing thermostat housing cover located on upper side of cylinder head. Refer to Fig. OM4-11 for exploded view of power head castings showing thermostat and associated parts.

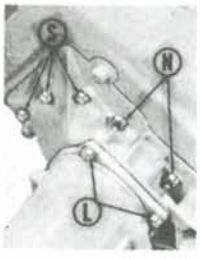


Fig. OM4-8—On 5 hp models, the power head is attached to the adaptor housing with three cap screws (S) and four nuts (N). Two of the screws are on other side.

Fig. OM4-9—On 6 hp models, the power head is attached to lower unit with seven cap screws (S). Two of the screws are on other side.

POWER HEAD

R&R AND DISASSEMBLE. To overhaul the power head, clamp the motor on a stand, remove the upper motor cover and disconnect choke control. Remove the starter assembly as outlined in the STARTER section. On 5 hp models, disconnect the link connecting speed control lever to armature plate and remove cap screws (S—Fig. OM4-8) and nuts (N). On 6 hp models, disconnect armature link from speed control shaft (22—Fig. OM4-11), remove clamp from upper end of shaft and lift shaft (22) and pin (23) out of lower cover. Remove the seven cap screws (S—Fig. OM4-9) attaching power head to exhaust housing. On all models, lift power head straight up off of lower unit.

Intake manifold and carburetor can be removed as an assembly. Remove flywheel, breaker point cam and key from crankshaft. After the four screws (X—Fig. OM4-10) are removed, the magneto armature plate can be lifted off. Remove support (17—Fig. OM4-11) and armature plate retainer (16). Remove cylinder head (10) and exhaust covers (19 & 21). Tap out the

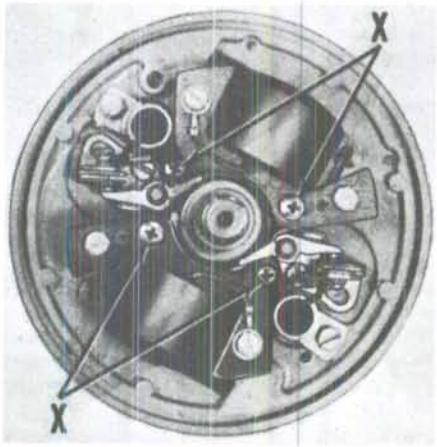


Fig. OM4-10—The magneto armature plate can be lifted off after removing the four screws (X).

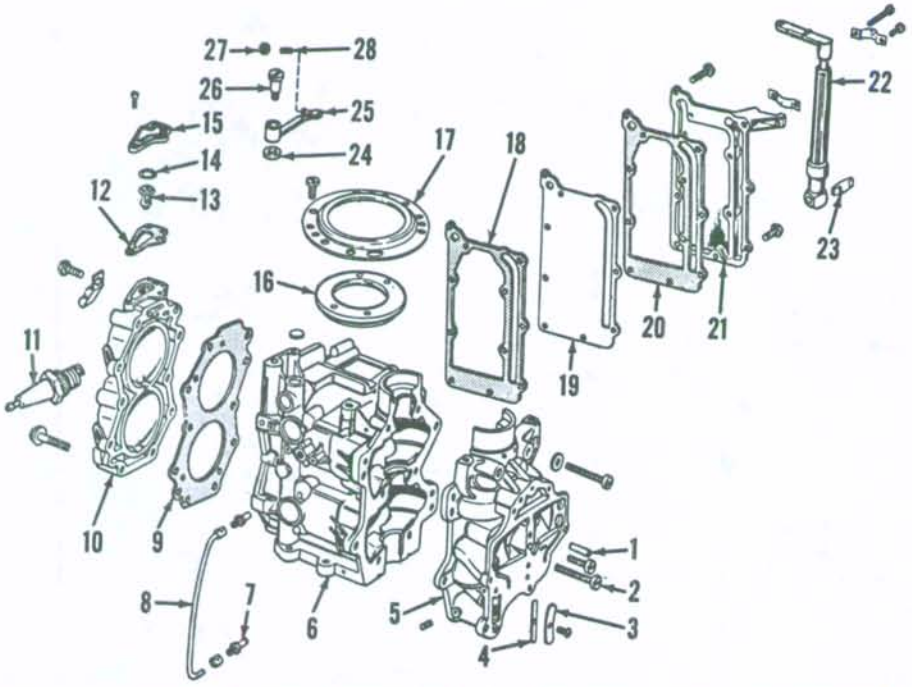


Fig. OM4-11—Exploded view of power head of the type used. Speed control lever (22 & 23) is used only on 6 hp models; armature detent (24 through 28) only on 5 hp units.

1. Tapered pin
2. Cap screw
3. Leaf stop
4. Bleeder valve
5. Crankcase front half
6. Cylinder block
7. Nipple
8. Oil line
9. Head gasket
10. Cylinder head
11. Spark plug
12. Gasket
13. Thermostat
14. Seal
15. Cover
16. Retainer
17. Support
18. Gasket
19. Inner cover
20. Gasket
21. Exhaust cover
22. Speed control shaft
23. Pin
24. Spacer
25. Detent arm
26. Screw
27. Spring seat
28. Spring

tapered crankcase aligning pins (1), working from cylinder side of crankcase flange. Remove the cap screws securing front crankcase housing (5) to cylinder (6) and separate the crankcase halves. NOTE: Center main bearing cap screws (CS—Fig. OM4-4) are accessible through intake ports and must first be removed.

Pistons, rods and crankshaft are now accessible for removal and overhaul as outlined in the appropriate following paragraphs. When reassembling, follow the procedures outlined in ASSEMBLY paragraph.

ASSEMBLY. When reassembling, the crankcase and intake 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 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. Do not remove any more metal than is necessary.

Mating surfaces of crankcase halves 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.

Remove crankcase bleeder valve (4—Fig. OM4-11), oil line (8) and blow out oil passages while crankcase is disassembled.

The crankcase halves are positively located during assembly by the use of two tapered dowel pins (1). Check to make sure that the dowels 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.

The mating surfaces of crankcase halves must be sealed during assembly by using a hardening cement such as "Sealer 1000" (Available from Marprox Corp., P. O. Box 955, Sheboygan, Wisconsin). Make sure that all old cement is removed and that surfaces are flat and free from nicks and burrs. Apply cement sparingly and evenly to cylinder half of crankcase only; then immediately install front half. Install the locating dowel pins; then install the crankcase screws. Tighten screws evenly to a torque of 60-80 inch pounds.

When installing gaskets, check to make sure correct gasket is used and that ALL water passage holes are open and unobstructed. All gasket surfaces must be sealed, using a non-hardening cement such as "Perfect Seal No. 4." Use the non-hardening sealer on all screw threads and tighten to the torques given in CONDENSED SERVICE DATA table or in table given in SERVICE FUNDAMENTALS section in front of manual.

The lip type seal used in place of oil slinger (13—Fig. OM4-13) on 1967 and late 1966 motors should be installed after crankcase is assembled. Lip of seal should be down. On all models, install armature plate retainer (16—Fig. OM4-11) with flat side up and tapered side down.

Thoroughly lubricate all friction surfaces during assembly. Refer to Fig. OM4-13 for exploded view of crankshaft, piston and associated parts.

PISTONS, RINGS, PINS AND CYLINDERS. Before detaching connecting rod caps 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 rings which are interchangeable and may be installed either side up. Pistons and rings are available in standard size and 0.020 oversize. The recommended piston ring end gap is 0.005-0.015. Recommended ring to groove clearance is 0.001-0.0035. Suggested piston to cylinder wall clearance is 0.0018-0.003. Renew pistons, rings and/or cylinder assembly if clearances are excessive. The piston pin is a loose fit in piston boss mark "L" (refer to Fig. OM4-12) and a tight fit in other boss. Piston pin should have 0.0003-0.001 clearance in unbushed rod.

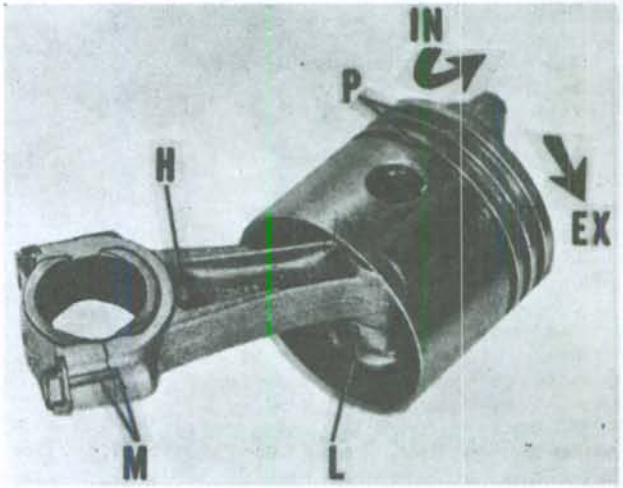


Fig. OM4-12 — Piston must be correctly assembled to rod with long, sloping side of piston head toward exhaust (EX) and oil hole (H) in rod up. When installing rod cap, make certain that marks (M) on rod and cap are aligned.

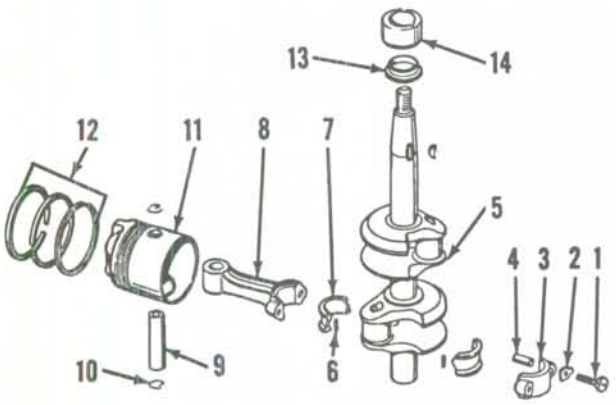


Fig. OM4-13—When attaching connecting rod to crankshaft, make certain that dowels (4) are positioned correctly and 30 bearing needles (6) are in each race. A lip type seal is used in place of slinger (13) on 1967 and late 1966 motors.

1. Cap screw
2. Lock
3. Rod cap
4. Dowel
5. Crankshaft
6. Bearing needle
7. Bearing race
8. Connecting rod
9. Piston pin
10. Retainer
11. Piston
12. Piston rings
13. Oil slinger
14. Breaker cam

When assembling, observe the following: Piston should have long, sloping side of head (EX—Fig. OM4-12) toward exhaust side of cylinder and oil hole (H) in connecting rod should be up. Piston pin should be installed from the loose (L) side of piston. Ends of piston rings must engage pins (P) in grooves. NOTE: Only two pins are shown, pin for center ring is on other side of piston.

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

The crankshaft end of each connecting rod contains 30 loose needle rollers which ride in a renewable split race in connecting rod and use the hardened, machined crankpin as the inner race. Piston end of connecting rod is unbushed; the rod should be renewed if clearance is excessive. If clearance is excessive between crankshaft main journals and bores in crankcase, renew crankshaft and/or crankcase. Refer to CONDENSED SERVICE DATA for recommended clearances and torque values.

When reassembling, make certain dowels (4—Fig. OM4-13) are correctly positioned and 30 bearing needles (6) are in each race. Marks (M—Fig. OM4-12) on connecting rod and cap should be aligned. All friction surfaces should be lubricated during assembly.

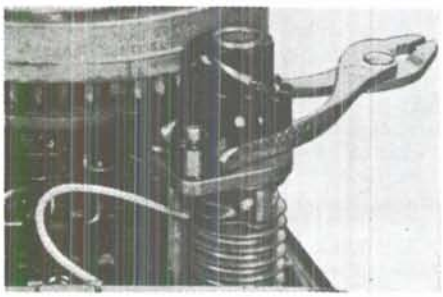


Fig. OM4-14—The starter pinion can be blocked up as shown for removing starter rope.

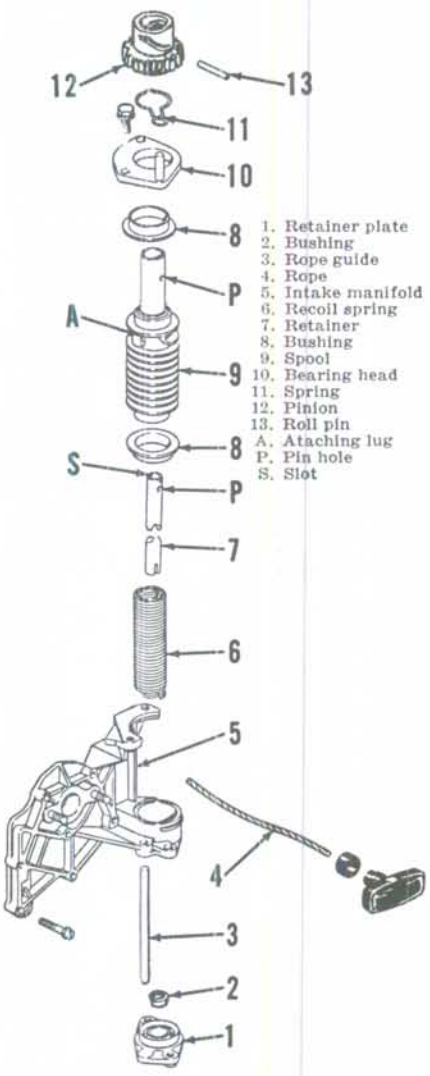
MANUAL STARTER

Refer to Fig. OM4-15 for an exploded view of starter assembly. Starter mounts on intake manifold as shown, and rope (4) extends through lower motor cover. The suggested procedure for rope renewal differs slightly from that required for other service; proceed as outlined for the type of service contemplated.

R&R STARTED ROPE. To RENEW a worn but still usable starter rope, remove upper motor cover and disconnect both spark plug high tension leads. Pull starter rope until almost fully extended. With rope-end in spool (9—Fig. OM4-15) accessible, block pinion into engagement with flywheel, thus locking the recoil mechanism. Refer to Fig. OM4-14. With starter securely locked, disconnect from rubber grip and lug (A—Fig. OM4-15). Install a new rope by reversing the removal procedure. With rope secured at both ends, remove the wedge and allow starter to recoil. If rope is broken or disconnected, assemble as outlined for service removal.

To disconnect starter rope for SERVICE removal of starter, intake manifold or power head, pull out starter rope about a foot and tie a slip knot in rope to prevent complete recoil. Pry rope anchor from grip and remove the grip. Remove knot and allow rope to slowly enter hole in cover until recoil spring is fully unwound. Starter can now be removed.

To renew a broken rope or reconnect starter rope after service, proceed as follows: Insert a heavy-duty screwdriver or brace with screwdriver bit through top of pinion (12—Fig. OM4-15) and spool (9) and into slot (S) in top of spring retainer (7). Turn screwdriver or brace counter-clockwise approximately 16½ turns until anchor (A) in spool is easily accessible; then engage pinion (12) in teeth in flywheel ring gear and lock the assembly by inserting a suitable block or wedge between pinion and upper bearing head. Refer to Fig. OM4-14. Thread the rope through hole in anchor (A—Fig. OM4-15), making sure rope is properly positioned behind rope guide (3); then reinstall the grip. Remove the previously installed locking block and allow starter to slowly recoil.



1. Retainer plate
2. Bushing
3. Rope guide
4. Rope
5. Intake manifold
6. Recoil spring
7. Retainer
8. Bushing
9. Spool
10. Bearing head
11. Spring
12. Pinion
13. Roll pin
A. Ataching lug
P. Pin hole
S. Slot

Fig. OM4-15—Exploded view of recoil starter and associated parts. Intake manifold (5) contains the mounting bracket for starter unit.

OVERHAUL. To overhaul the starter, first disconnect starter rope as previously outlined for service, and allow recoil spring to unwind. Remove the two cap screws securing upper bearing head (10—OM4-15) to intake manifold (5) and lift off items (6 through 13) as a unit. Drive out roll pin (13) and separate the components.

Wash the parts in a suitable solvent and renew any which are worn, damaged or questionable. When assembling the starter, lubricate recoil spring (6) with a light grease. Pinion gear (12) and spool (9) should not be lubricated, but installed dry to prevent dust accumulation. Align holes (P) in spring retainer (7) and spool (9) and slots in pinion gear (12), and tap the pin (13) through the holes and slots. Upper bearing head (10), spring (11) and upper bushing (8) must be properly positioned before installing pinion. Make sure slot in lower end of spring retainer (7) engages inner end of recoil spring (6) and enters bushing (2). Install rope and adjust recoil spring tension as outlined in the previous paragraph.

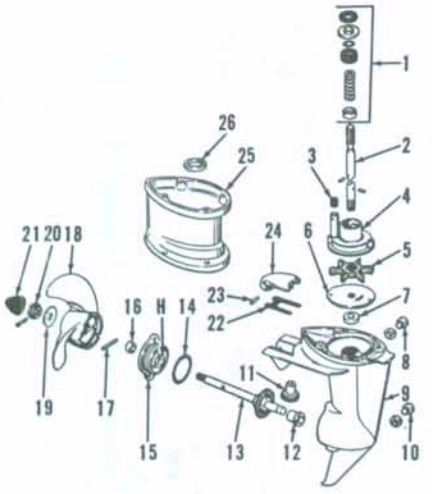


Fig. OM4-16—Exploded view of lower unit gearcase, water pump and associated parts used on 5 hp models.

1. Seal assembly
2. Drive shaft
3. Grommet
4. Pump housing
5. Impeller
6. Plate
7. Seal
8. Vent plug
9. Gearcase
10. Drain plug
11. Pinion
12. Bushing
13. Propeller shaft
14. "O" ring
15. Gearcase head
16. Seal
17. Drive pin
18. Propeller
19. Washer
20. Nut
21. Cap
22. Gasket
23. Rivet
24. Exhaust cover
25. Extension
26. Ring dowel
H. Hole

LOWER UNIT

PROPELLER AND DRIVE PIN. Cushioning protection of propeller and drive unit is built into propeller hub on all 5 hp models and 1966 and later 6 hp models. Cushioning protection for 1965, 6 hp motor is provided by a shock absorber built into lower drive shaft. Service consists of renewing propeller on models with cushioning hub. The pinion shaft clutch on 1965, 6 hp units should release at an applied torque of 155-225 inch pounds.

An 8 inch diameter, 7½ inch pitch, 3 blade propeller is used on 5 hp models; an 8 inch diameter, 7¼ inch pitch, 2 blade propeller on all 6 hp units.

The propeller drive pin (17—Fig. OM4-16) used on 5 hp models is ⅛ x 1¼ inch stainless steel. The drive pin (21—Fig. OM4-17 or OM4-18) used on 6 hp models is $\frac{3}{16}$ x ⅞ inch stainless steel.

REMOVE AND REINSTALL. Most service on the lower unit can be performed by detaching the gearcase housing from 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. Refer to the appropriate exploded views and to the special instructions following, when service on gearcase or water pump is indicated.

5 hp Models. Refer to Fig. OM4-16 for exploded view of gearcase and associated parts and to Fig. OM4-18 for exhaust housing and support assembly. Motor is equipped with full pivot steering and no neutral is provided for propeller shaft.

To remove the gearcase for service on the water pump or drive shaft, remove the four cap screws retaining gearcase housing (9—Fig. OM4-16) to exhaust housing and withdraw gearcase and drive shaft as an assembly. Water tube (8—Fig. OM4-18) will remain with exhaust housing. Withdraw crankcase lower seal components (1—Fig. OM4-16) from upper end of drive shaft to prevent loss. To renew the drive shaft, it is first necessary to unbolt water pump housing (4) from gearcase, then remove either of the two roll pins in driveshaft before pump housing can be withdrawn. Propeller shaft and gearcase head can be withdrawn from gearcase after removing retaining cap screw. Drive pinion (11) is free to fall from its bore after propeller shaft and gear is withdrawn. Front propeller shaft thrust bushing (12) is also free and may be withdrawn with shaft. The exhaust cover (24) is retained by rivet (23) and sealed by gasket (22) which is available in thicknesses of 1/32 and 3/64 inch for service installation. Exhaust cover need not be removed unless loose or damaged, or service is indicated. To remove the cover, file off peened portion and remove the rivet, then lift off the cover. When installing, use the thinnest gasket which will compress slightly when rivet holes are aligned. Coat both sides of the selected gasket with a non-hardening gasket cement and peen rivet slightly after installation. NOTE: Only one gasket should be installed.

When reassembling the gearcase, coat the parts lightly with gearcase lubricant. Use new seals and gaskets. Invert the gearcase so drive pinion can be properly positioned. Install pinion in housing and slip thrust bushing (12) over end of propeller shaft; then install shaft in housing without the gearcase head (15). Install gearcase head with shaft oil hole (H) up (toward power head) and install and tighten the retaining cap screws.

When reinstalling gearcase on exhaust housing, make sure drive shaft upper seal assembly (1) is properly installed. Coat ID of water pump outlet grommet with lubricant, and carefully guide water tube into position in pump housing as parts are assembled. Turn propeller shaft if necessary, to align upper drive shaft splines.

6 hp Models. Refer to Fig. OM4-17 for an exploded view of gearcase and associated parts and to Fig. OM4-19 for an exploded view of exhaust housing and support assembly. Six horsepower models are equipped with a full gear shift.

The propeller shaft (13—Fig. OM4-17) and drive gears (3 & 14) can be removed after first draining lubricant from gear housing, removing pivot screw (8), then unbolting and removing gearcase lower housing (10).

To separate gearcase assembly from exhaust housing, place the gear shift lever in

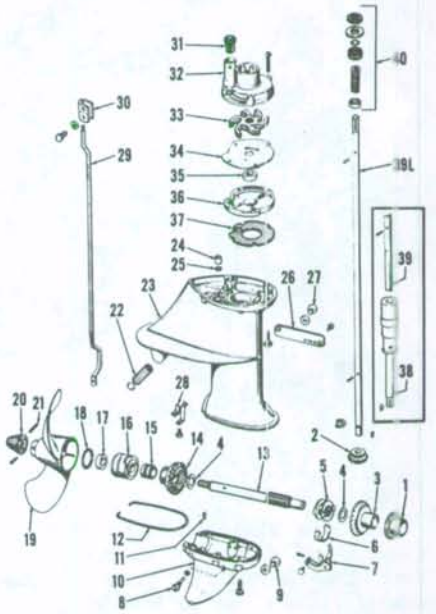


Fig. OM4-17—Exploded view of lower unit gearcase, water pump and associated parts used on 6 hp models.

1. Bushing
2. Pinion
3. Forward gear
4. Thrust washer
5. Clutch dog
6. Cradle
7. Shift fork
8. Pivot screw
9. Drain plug
10. Lower gearcase
11. Dowel
12. Seal strip
13. Propeller shaft
14. Reverse gear
15. Bushing
16. Gearcase head
17. Seal
18. "O" ring
19. Propeller
20. Nut
21. Drive pin
22. Inlet strainer
23. Upper gearcase
24. Bushing
25. "O" ring
26. Cover
27. Vent plug
28. Detent
29. Shift rod
30. Connector
31. Grommet
32. Pump housing
33. Impeller
34. Plate
35. Seal
36. Bearing housing
37. Gasket
38. Lower drive shaft (1965)
38L. Snap ring (1966 & up)
39. Upper drive shaft (1965)
39L. Drive shaft (1966 & up)
40. Seal assembly

"Forward" position and remove the gearcase retaining capscrews. Separate gearcase from exhaust housing far enough to remove either connector screw from shift lever clamp (30); then withdraw the gearcase and drive shaft as an assembly.

When assembling gearcase, use new seals, gaskets and "O" rings. Install new seal strip (12) in lower gearcase (10), and trim ends with a sharp knife to extend approximately $\frac{1}{32}$ inch beyond ends of groove and form a tight butt-joint against gearcase head (16). Use a small amount of hardening sealer (Such as Sealer 1000, available from Marprox Corporation, P. O. Box 955, Sheboygan, Wisconsin) on each end of sealing strip (12) and a thin line of sealer on housing flange. Install immediately after sealer is applied. Use a non-hardening thread sealant on all cap screw threads.

STEERING TENSION. Steering tension can be adjusted by turning the adjusting screw (6—Fig. OM4-18) for 5 hp models or (3—Fig. OM4-19) for 6 hp models. Steering tension is correct when motor is easy to steer but will maintain a set course.

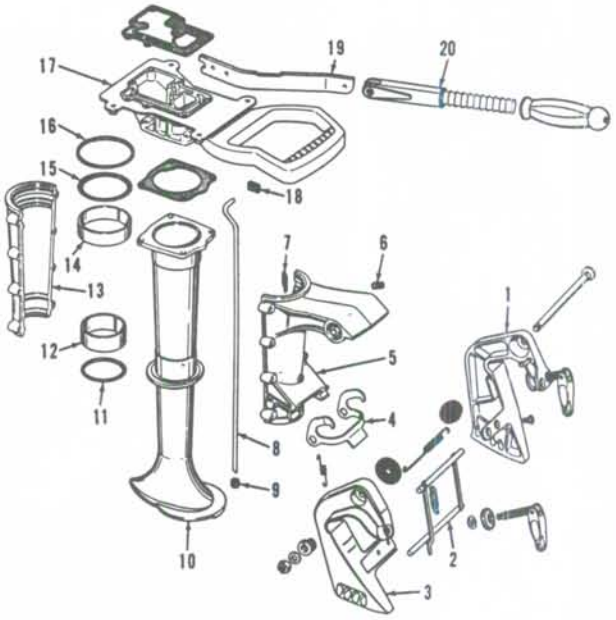


Fig. OM4-18 — Exploded view of exhaust housing, stern clamps and associated parts used on 5 hp models.

1. Stern clamp
2. Tilting lever
3. Stern clamp
4. Reverse lock
5. Swivel bracket
6. Adjusting screw
7. Friction block
8. Water tube
9. Grommet
10. Exhaust housing
11. "O" ring
12. Liner
13. Swivel clamp
14. Liner
15. "O" ring
16. Thrust washer
17. Powerhead adapter
18. Grommet
19. Support
20. Steering handle

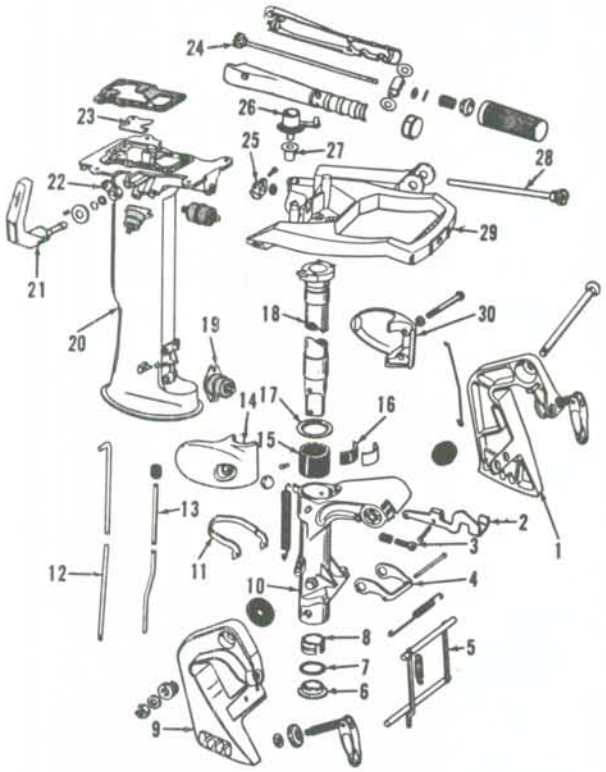


Fig. OM4-19 — Exploded view of exhaust housing, stern clamps and associated parts used on 6 hp models.

1. Stern clamp
2. Reverse lock arm
3. Adjusting screw
4. Reverse lock
5. Tilting lever
6. Thrust washer
7. "O" ring
8. Bushing
9. Stern bracket
10. Swivel bracket
11. Locking lever
12. Shift rod
13. Water tube
14. Lower mount
15. Liner
16. Friction block
17. Thrust washer
18. Pilot shaft
19. Rubber mount
20. Exhaust housing
21. Shift lever
22. Lever
23. Cover plate
24. Gear & shaft
25. Gear
26. Gear
27. Bushing
28. Gear & shaft
29. Steering bracket
30. Lower mount