McCULLOCH 14 HP AND SCOTT 12 HP

Year Produced	Fleet Scott McCulloch 14 OX140*
1960	A3FB, B3FB
1961	61301210, 61301220
1962	62301410, 62301470, 62301480, 62301490
1963	63301411, 63301412, 63301422, 63301491
1964	64301410, 64301420, 14000200
1965	65301410, 65301420, 14000200
1966	80370, 80373
1967	81442, 81443, 81444, 81448

*OX140 is a heavy duty work motor using the McCulloch 14 power head and a special lower unit. Use McCulloch 14 service procedures unless otherwise indicated.

CONDENSED SERVICE DATA

TUNE-UP

Hp @ rpm	12 @ 4800, 14.1 @ 5000
Bore—Inches	2¼
Stroke—Inches	2 1/16
Number of Cylinders	2
Displacement—Cu. In.	16.4
Compression Pressure @ Cranking Speed (psi)	120
Spark Plug	
Champion	J6J
AC	M44 or M44B
Electrode gap	0.035
Magneto	
Point gap	0.020
Timing	See Text
Carburetor	
Make	Carter
Model	Type N
Fuel-Oil Ratio	See Text

SIZES—CLEARANCES	
Cylinder—Diameter	
Piston Rings	
End Gap	
Side Clearance	
Piston to Cylinder Clearance	
Piston Pin Diameter	See Note.
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	80
Crankcase Halves	
Main Bearing Screws	80-90
Flange Screws	70
Cylinder Head	80
Powerhead Mounting Screws	80-90
Powerhead Adapter	80
Pump Housing & Gearcase	
Housing Screws	150
Gearcase Bearing Housing	75
Flywheel Nut	500
Spark Plug	250

LUBRICATION

The power head is lubricated by oil mixed with the fuel. Three-eighths (⅜) pint of 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 later motors. A fuel-oil mixture of 1 part oil to 100 parts regular gasoline is authorized for 1963 and later motors, provided McCulloch 100:1 Oil is used.

The lower unit gears and bearings are lubricated by oil contained in the gearcase. Only EP 90 outboard gear lubricant should be used. Lower unit gearcase should be drained and refilled every 30 hours or 60 days of operation. To fill the lower unit, install vent plug and fill to level of fill plug with motor resting on rear carrying handle. Tighten both plugs securely, using new gaskets if necessary, to ensure a water-tight seal.

FUEL SYSTEM

CARBURETOR. A Carter, model N, float type carburetor is used. Refer to Fig. Mc5-1. Carburetor is provided with two mixture adjustment needles. The idle mixture needle (6) and high speed adjustment needle (20) should both be initially adjusted to approxi-

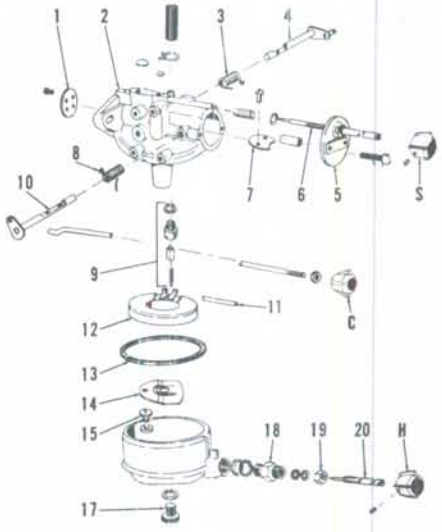


Fig. Mc5-1—Exploded view of Carter N type carburetor used.

C. Choke knob
H. High speed adj. knob
S. Idle adjustment knob
1. Throttle valve
2. Body
3. Spring
4. Throttle shaft
5. Shield
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
17. Retaining screw
18. Fitting
19. Packing nut
20. High speed needle

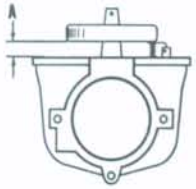


Fig. Mc5-2—Float setting (A) should be adjusted to 11/64-inch.

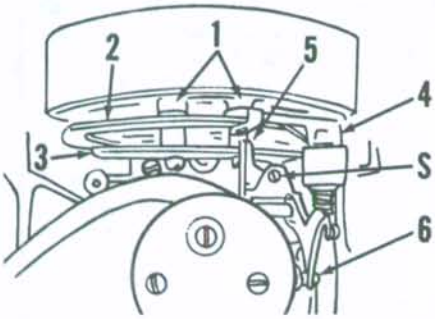


Fig. Mc5-3—Schematic view of speed control linkage used. Refer to text for details of adjustment.

1. Cam spacers
2. Magneto link
3. Synchronous cam
4. Speed control arm
5. Follower arm
6. Throttle shaft
S. Adjusting screw

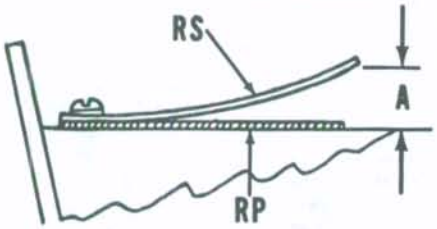


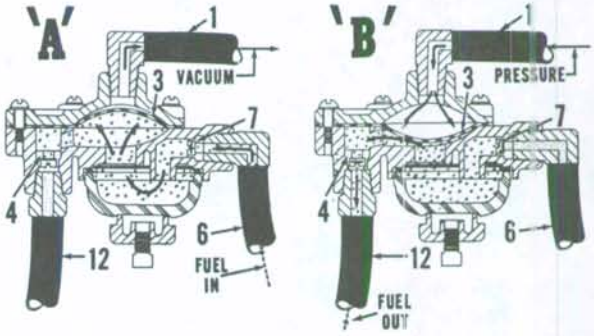
Fig. Mc5-4—Cross sectional view of reed-type inlet valve. Reed petal (RP) should make full contact with plate. Reed stop (RS) adjustment should not be changed. Clearance (A) should be ¼ inch.

mately 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 idle mixture.

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. 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 (A—Fig. Mc5-2), 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.

Fig. Mc5-5 — Schematic view of single stage fuel pump used. Fuel 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. Mc5-6 for exploded view.



DE-RATED MOTORS. Special de-rating kit is available to permit use of 14 hp motors in areas having horsepower restrictions. Use of the kit permits reduction to 9½ hp. The kit includes a carburetor restrictor gasket and, an overlay for the identification plate which gives the operating range in rpm. Check the identification plate when servicing or tuning de-rated motor.

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 linkage, turn the speed control grip until the cam follower arm (5—Fig. Mc5-3) is centered on the first cam attaching spacer (1) as shown. Turn the adjusting screw (S) until the follower arm just contacts the speed control cam (3) and throttle lever (6) has not yet started to move. As a speed control grip is moved further toward the "FAST" position the throttle valve should begin to move from the closed position. If the follower arm fails to stay in contact with speed control cam, check for binding or damaged linkage.

REED VALVES. The inlet reed valve unit is located between inlet manifold and crankcase. Reed petals should seat very lightly against reed plate throughout their entire length, with the least possible pressure. Check seating visually and/or by blowing and drawing air lightly through ports with mouth. Reed stop setting is fixed and should be ¼-inch when measured between end of stop and reed plate as shown at (A—Fig. Mc5-4). Renew reed stop if bent. Renew the reed petals if broken, cracked, warped, rusted or bent. A broken reed petal is sometimes caused by a bent or damaged reed stop. Seating surfaces of plate should be smooth and flat.

FUEL PUMP. A diaphragm type fuel pump is used. Refer to Fig. Mc5-5. 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.

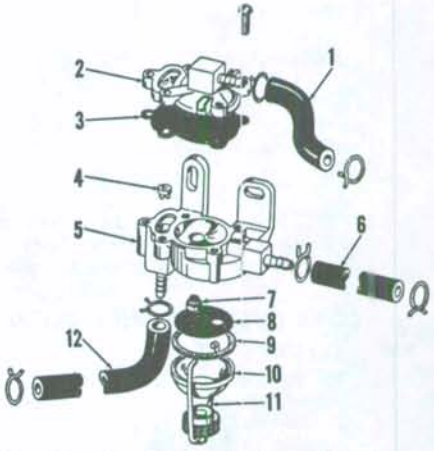


Fig. Mc5-6 — Exploded view of diaphragm type fuel pump. Refer also to Fig. Mc5-5.

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

Check valves (4 and 7—Fig. Mc5-6) are interchangeable. Fuel pump should develop approximately 1 psi at rated speed. To check the pressure, tee a suitable low-pressure gage into fuel pump outlet line (12). Low fuel pump pressure may be caused by a clogged fuel filter, plugged or collapsed inlet line, malfunctioning fuel pump, leaking carburetor float valve or malfunctioning inlet reed valves in crankcase.

When overhauling the fuel pump, all defective or questionable parts should be renewed.

FUEL FILTER. An inlet screen and sediment bowl is built into the fuel pump as shown in Fig. Mc5-6. The procedure for disassembly is obvious. Clean the filter screen and water trap once each month; when fuel system is serviced; or when trouble exists, using a suitable solvent and making sure wire-mesh filter is thoroughly clean. If gum or varnish cannot be removed, renew the screen.

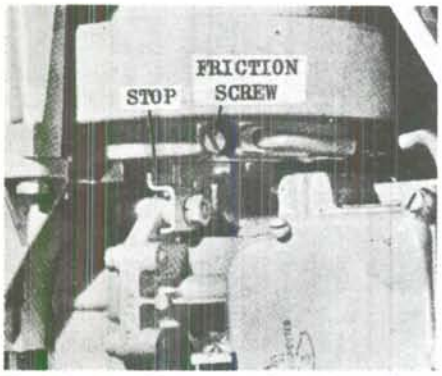


Fig. Mc5-7 — View of McCulloch 14 showing location of speed control friction screw. Maximum advance is controled by stop.

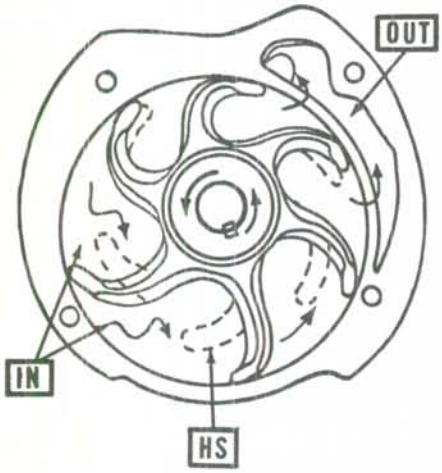


Fig. Mc5-8 — Schematic view of the rubber impeller type water pump used for cooling and for the automatic bailer unit. Impeller blades flex at slow speeds as shown by solid lines. The offset housing causes water to be drawn into pump body (IN) and forces water out (OUT) due to difference in area between blades. At high speeds, blades remain curved as shown by broken lines (HS) and pump operates by centrifugal action.

IGNITION

Breaker point gap should be 0.020 and can be adjusted after recoil starter and flywheel have been removed. Tighten the flywheel retaining nut to a torque of 500 inch-pounds.

Maximum ignition advance is controlled by a stop. Refer to Fig. Mc5-7. The friction screw should be adjusted to provide enough tension to prevent movement from vibration; but, should not prevent speed control handle from operating smoothly through the entire speed range.

COOLING SYSTEM

WATER PUMP. All motors are equipped with a rubber impeller water pump of the general type shown in Fig. Mc5-8. 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.

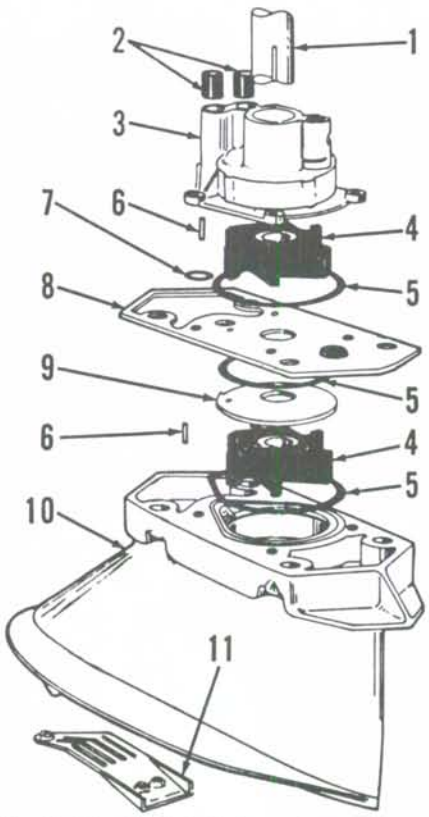


Fig. Mc5-9—Exploded view of pump housing and associated parts used on Fleet Scott models.

1. Drive shaft
2. Grommet
3. Bailer housing
4. Impeller
5. Seal
6. Impeller key
7. Seal
8. Cover plate
9. Cover plate
10. Pump housing
11. Inlet cover

The cooling system pump and bailer pump on Fleet Scott and McCulloch 14 are housed in a separate pump housing located on the lower unit just above the gearcase housing. See Fig. Mc5-9. The pumps are mounted on the lower unit driveshaft and impeller housing is offset in relation to the driveshaft as shown in Fig. Mc5-8.

On McCulloch OX 140, the water pump and bailer pump are mounted in lower unit gearcase housing and are accessible for service after removing gearcase as outlined in LOWER UNIT section. The bailer pump on OX models is equipped with separate inlet and outlet fittings which permit use of the pump as a utility pump for filling bait wells and other chores.

The cooling system inlet (11—Fig. Mc5-9) is located above and aft of the propeller. When cooling system problems are encountered, first check the water inlet for plugging or partial stoppage. On Fleet Scott models so equipped, and on all McCulloch 14 and OX 140, check the thermostat. If the trouble is not thus corrected, remove lower unit gearcase housing (or pump housing) and check the condition of the water pump, water passages, gaskets and sealing surfaces.

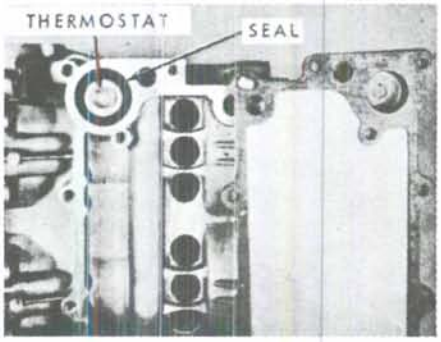


Fig. Mc5-10 — The thermostat on late models is located under the exhaust and water manifold covers.

When assembling the pumps, install impellers with side marked "TOP" toward power head. Pump bodies and impellers should be liberally coated with water pump grease during installation. On some late models, vinyl tape is installed on water pump housing mounting bosses to prevent electrolysis. Be sure tape is in position when installing housings.

THERMOSTAT. Beginning in 1963, Fleet Scott, McCulloch 14 and OX 140 models are equipped with a thermostat, located on port side of cylinder block underneath the exhaust and water manifold covers. Refer to Fig. Mc5-10. To remove the thermostat, first remove the covers, then withdraw seal and thermostat unit. Install by reversing the removal procedure. Tighten remaining cap screws evenly and securely.

POWER UNIT

R&R AND DISASSEMBLE. To remove the power head, clamp the motor on a stand or support and remove the starter assembly, shrouds and flywheel. Remove carburetor, then remove the screws securing power head to adapter plate and lift off the power head.

One half of crankcase (1—Fig. Mc5-11) is integral with 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, remove the cylinder head, inlet manifold and reed plate. Transfer port covers and exhaust covers should be removed for proper cleaning. Remove the capscrews retaining front crankcase half (13) to cylinder block (1) 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 main bearings (7, 10 & 15) are properly aligned with dowels (16) and follow the procedures outlined in the ASSEMBLY paragraph.

ASSEMBLY. When reassembling, the 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 in-

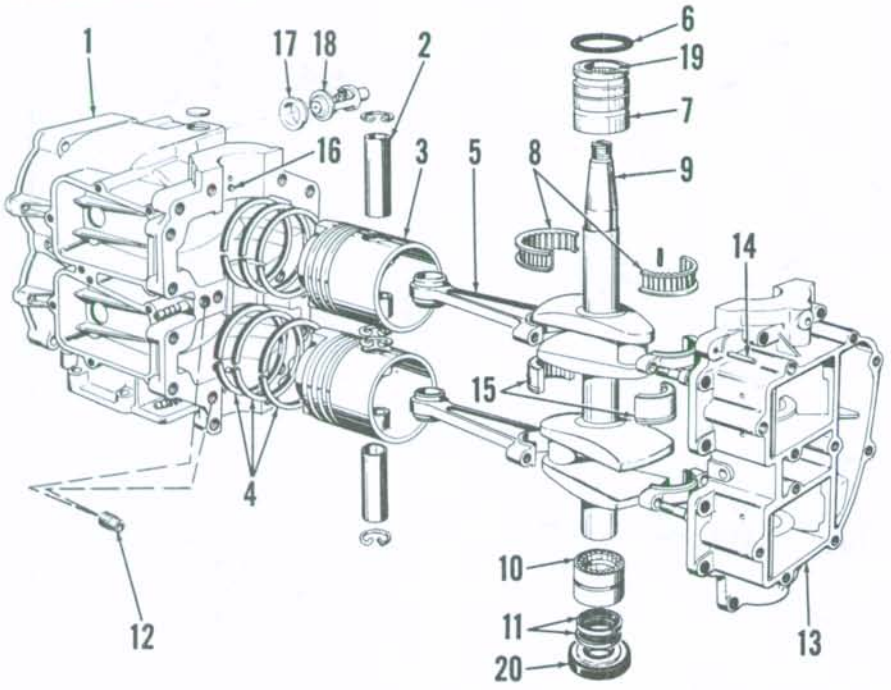


Fig. Mc5-11—Exploded view of power head typical of Fleet Scott, McCulloch 14 and OX 140.

1. Cylinder assembly	6. "O" ring	11. Seal	16. Dowels (3 used)
2. Piston pin	7. Upper bearing	12. Check valves	17. Seal
3. Piston	8. Bearing cage	13. Crankcase half	18. Thermostat
4. Piston rings	9. Crankshaft	14. Dowel pin	19. Seal
5. Connecting rod	10. Lower bearing	15. Center bearing	20. Seal

take, 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 lapped if necessary, to provide a smooth surface. If extreme care is used, a slightly damaged crankcase may be salvaged by lapping, but mating surfaces must not be lowered. In case of doubt, renew 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 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 (12—Fig. Mc5-11).

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. Mc5-12. Tightening torques are listed in the CONDENSED SERVICE DATA table.

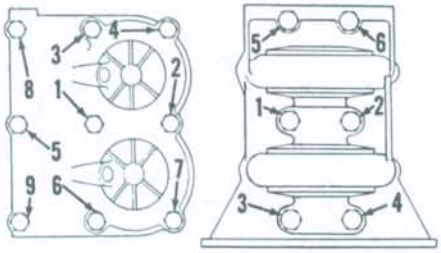


Fig. Mc5-12—On Fleet Scott, McCulloch 14 and OX 140, tighten the cylinder head screws to a torque of 80 inch pounds in the sequence shown in the left view. Tighten the crankcase main bearing screws to a torque of 80-90 inch pounds in the sequence shown in the right view, then tighten the flange screws to a torque of 70 inch pounds.

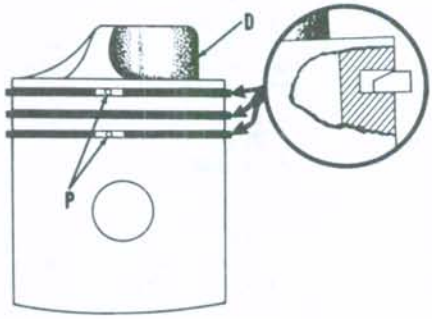


Fig. Mc5-13 — Cross sectional view of piston showing two of the three piston ring locating pins (P). The other pin is in opposite side of piston. Rings are installed with beveled inner edge (B) to the top. Deflector (D) directs the flow of incoming fuel charge for proper scavenging.

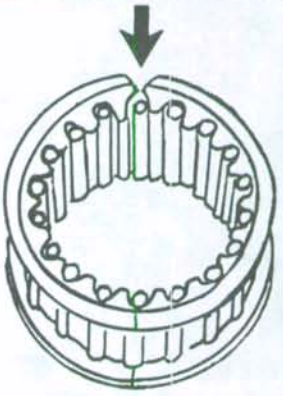


Fig. Mc5-14—Connecting rod bearing cages have one ground corner as indicated by arrow. Ground corners must be matched during assembly.

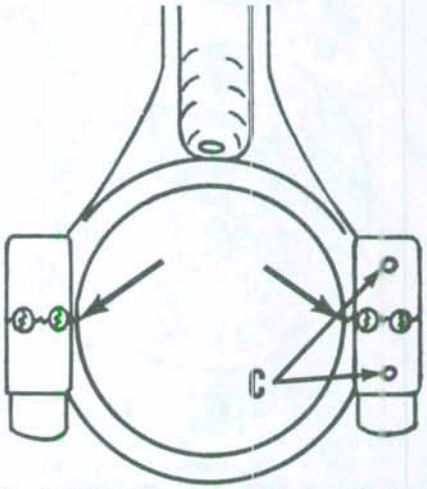


Fig. Mc5-15—Uneven fractured parting line of rod and cap (shown at arrows) assures positive fit after assembly. Be sure correlation marks (C) are aligned.

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. Rings are interchangeable in grooves but must be installed with beveled inner edge toward closed end of piston as shown in Fig. Mc5-13. Rings are pinned to prevent rotation in ring grooves as shown at (P). 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 high, straight side of piston head must be installed to the inlet (Starboard) side of cylinder block.

The full floating piston pin is a tight push fit in piston bosses and a slightly looser fit in rod. Fit is correct when piston will rock of its own weight on the rod, with no noticeable looseness. Connecting rod is marked "TOP" for proper assembly. All bearing and friction surfaces should be lubricated during assembly.

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.

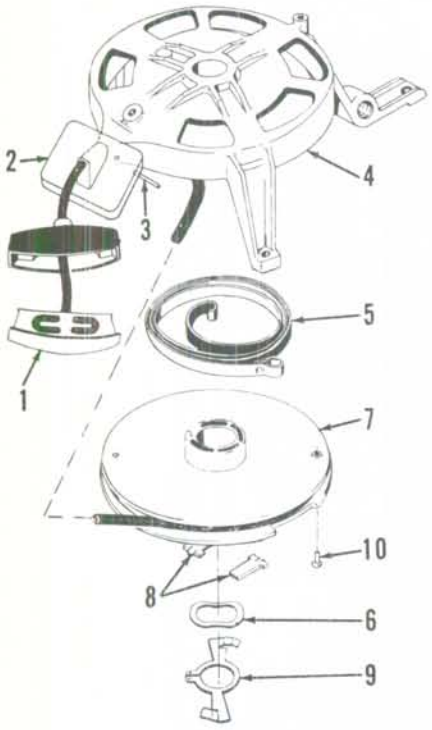


Fig. Mc5-16 — Exploded view of recoil starter assembly.

1. Handle
2. Panel
3. Roll pin
4. Housing
5. Recoil spring
6. Washer
7. Pulley
8. Pawl
9. Friction spring
10. Rivet

Connecting rod bearing is of the caged roller type as shown in Fig. Mc5-14. 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 surface 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. Mc5-15, to provide positive location. When installing cap, make sure 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 above 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. Mc5-16 shows an exploded view of the recoil starter assembly. To renew the starter pawls (8) or friction spring (9), remove and invert the assembled starter on a bench. Remove friction spring (9) with snap ring pliers and withdraw the pawls.

Pulley (7) can be removed after removing friction spring (9). Be careful that recoil spring (5) remains in cavity of housing (4) when pulley is removed. If spring is to be removed, clamp spring to prevent uncoiling, using a pair of vise-grip pliers. 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.

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. Fleet Scott and McCulloch 14 motors use a 11/64 x ⅞-inch stainless steel drive pin, part number 1393122. OX 140 motors use a stainless steel drive pin, part number 73423. A cushioning hub in the propeller is an integral part of propeller unit. Factory equipment propeller sizes are as follows:

Motor	Propeller Diameter	Propeller Pitch	Propeller Blades
Fleet Scott & McCulloch 14	6½ In.	7½ In.	3
OX 140	13 In.	7 In.	3

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 motor.

Fleet Scott and McCulloch 14. To renew or service the propeller shaft, gear or bearings, first drain the lubricant and remove the propeller, shear pin, and cushion hub. Remove the cap screws retaining the bearing housing (2—Fig. Mc5-17) and withdraw shaft, bearing, housing and gear as a unit. Remove the bearing retainers (8) then press the shaft bearing and gear assembly out of housing. Seal (1) can be renewed at this time. Gear (10) is retained to shaft by pin (9). Bearing (7) is positively located by the snap ring (5) and gear. Gasket (3) is available in thicknesses of 0.010 and 0.015 to provide the proper mesh for the drive gears. To adjust the backlash, shift the lever into neutral and install the propeller shaft assembly with one 0.010 shim. If the propeller shaft turns hard, increase the gasket thickness by 0.005 steps until propeller shaft turns freely with a minimum of backlash.

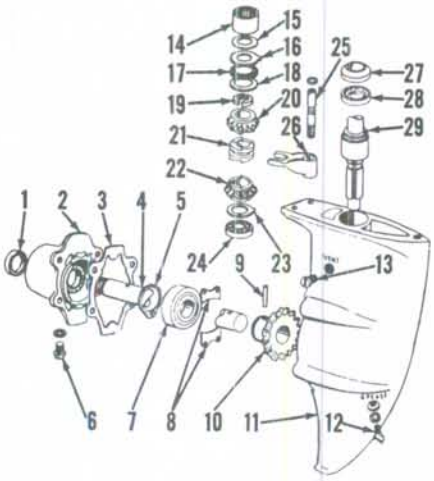


Fig. Mc5-17—Exploded view of gearcase housing and associated parts used on Fleet Scott and McCulloch 14.

1. Seal
2. Bearing cap
3. Shim gasket
4. Propeller shaft
5. Snap ring
6. Drain plug
7. Bearing
8. Retainer
9. Pin
10. Driven gear
11. Gearcase housing
12. Plug
13. Plug
14. Bearing
15. Shim
16. Upper race
17. Thrust bearing
18. Lower race
19. Retainer
20. Forward gear
21. Clutch dog
22. Reverse gear
23. Thrust washer
24. Bearing
25. Shift rod
26. Shift fork
27. Ring dowel
28. Seal
29. Snap ring

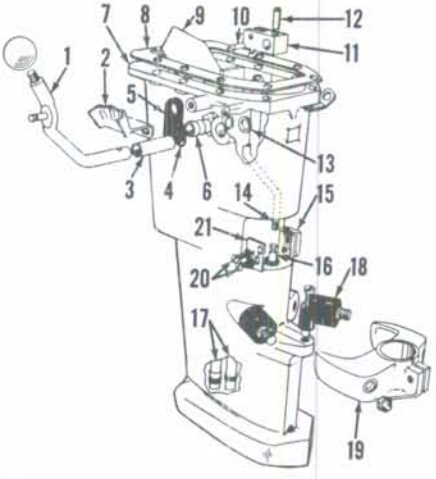


Fig. Mc5-18—Exploded view of lower motor housing and associated parts used on Fleet Scott and McCulloch 14.

1. Shift lever
2. Detent
3. Bushing
4. Seal
5. Bailer cover
6. Bailer fitting
7. Housing
8. Gasket
9. Relief plate
10. Pin
11. Actuator
12. Pin
13. Washer
14. Shift rod
15. Coupling
16. Shift rod
17. Water lines
18. Rubber mount
19. Bracket

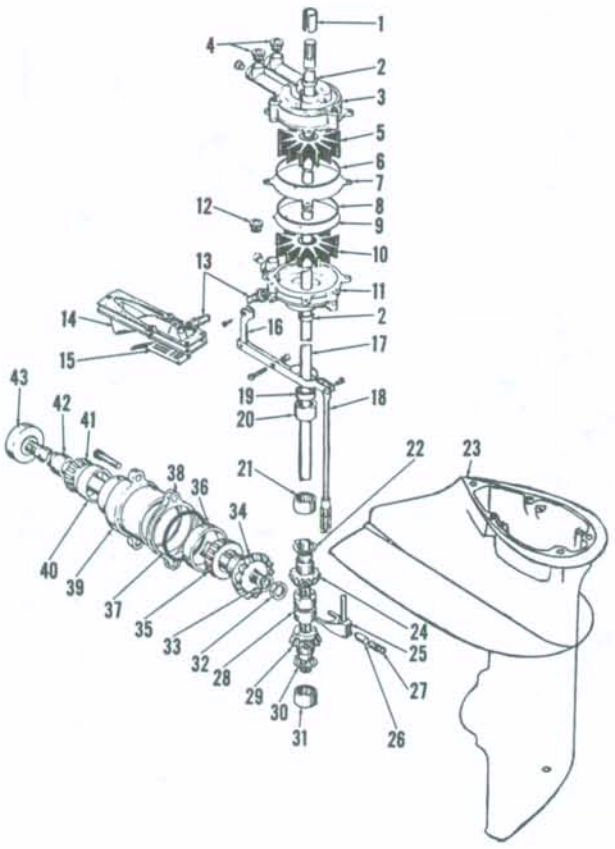


Fig. Mc5-19 — Exploded view of lower unit gearcase and associated parts used on OX 140.

1. Protector
2. Seal
3. Bailer pump body
4. Grommet
5. Impeller
6. "O" ring
9. Water pump cover
10. Impeller
11. Water pump body
12. Grommet
13. Inlet line
14. Exhaust housing
15. Water inlet
16. Shift rocker
17. Drive shaft
18. Shift rod
19. Seal
20. Bearing
21. Bearing
22. Thrust washer
23. Gearcase
24. Reverse gear
25. Shift fork
26. Detent
27. Spring
28. Clutch dog
29. Forward gear
30. Thrust washer
31. Bearing
32. Nut
33. Washer
34. Gear
35. Bearing cone
36. Bearing cup
37. "O" ring
38. Shim pack
39. Cap
40. Bearing cup
41. Bearing cone
42. Propeller shaft
43. Oil seal

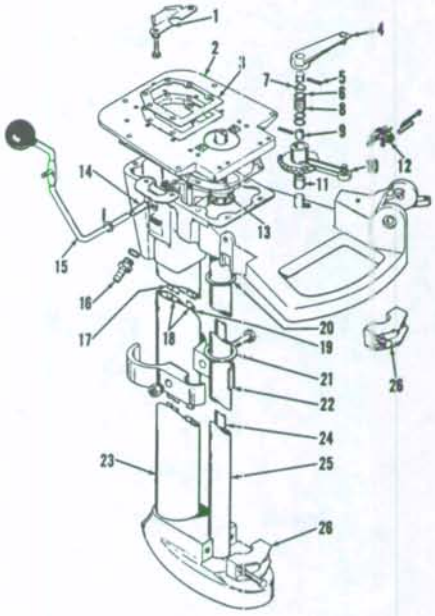


Fig. Mc5-20—Exploded view of lower motor leg and associated parts used on OX 140.

1. Exhaust baffle
2. Adapter
3. Gasket
4. Speed control lever
5. Pin
6. Washer
7. Bushing
8. Spring
9. Shaft
10. Gear
11. Bushing
12. Shear pin holder
13. Seal
14. Bushing
15. Shift lever
16. Bailer fitting
17. Shift rod
18. Water lines
19. Water line
20. Thrust washer
21. Thrust washer
23. Lower motor leg
24. Drive shaft
25. Pivot tube
26. Cap

To remove the gearcase housing from the exhaust housing, first disconnect the shift rod coupling (15—Fig. Mc5-18) then remove the capscrews retaining the pump housing to the exhaust housing (7). Remove the pump housing and gearcase housing as a unit. Disassemble the cooling system and bailer pumps as outlined in WATER PUMP paragraph, then remove pump housing from gearcase housing (11—Fig. Mc5-17). Drain the gearcase housing and remove the propeller shaft assembly as previously outlined. Remove the split driveshaft retainers (19) then pull the driveshaft, seal and inner bearing races out of gearcase. Remove the other gearcase components. Forward gear (20) and upper side of clutch dog (21) are marked with the letter "T" as an aid to proper assembly. Reverse gear (22) and lower side of clutch dog (21) are marked with the letter "R". To adjust the backlash of the gears when assembling, measure the combined assembled thickness of thrust bearing upper race (16), bearing (17) and lower race (18), then add shims (15) to give a total thickness (bearing and shims) of 0.299-0.300. Shims are available in thicknesses of 0.002, 0.003, 0.005 and 0.010 and no more than two shims should be used in the pack. If more than two 0.010 thick shims are required, renew the bearing assembly. Shims are color coded in the following order from the thinnest shim to the thickest: Silver; Orange; Blue; and Yellow. Make final backlash adjustment by varying the thickness of gasket (3) as previously outlined.

When final backlash adjustment has been determined, remove the propeller shaft, housing and gear assembly, reassemble the gearcase housing to exhaust housing, then adjust the shift mechanism as outlined in the following ADJUSTMENT paragraph. After shift linkage has been adjusted, reinstall the propeller shaft assembly and propeller then refill the gearcase with the recommended lubricant.

OX 140: The 140 OX is a work motor especially designed to propel heavy craft. The motor uses the McCulloch 14 power head, a special heavy duty lower unit with 16:41 gear ratio and a high-thrust 13 x 7 inch, three blade propeller. Refer to Figs. Mc5-19 and Mc5-20 for exploded views.

To remove the gearcase housing from lower motor casing, first remove the drain plugs and allow gear housing to drain. Remove water inlet housing (14—Fig. Mc5-19) from lower side of anti-cavitation plate, remove the concealed rear screw securing gearcase to motor casing and disconnect shift rocker (16) from upper shift rod by removing the screw. Remove the remaining cap screws and withdraw gearcase (23) and associated parts from lower motor casing.

Remove the propeller and drive pin. Remove the cap screws retaining bailer pump body (3) to gearcase and lift off the body, impeller (5), impeller pin, separator plates (7 & 9), water pump impeller (10), key, and body (11). Do not disassemble bailer pump body (3) or water pump body (11); these parts are factory sealed, and should be renewed if disassembled. Seals (2), in housings are available, however, and may be renewed. Withdraw drive shaft (17).

Remove the screws retaining bearing cap (39) and withdraw the propeller shaft, bearings, driven gear and bearing cap as an assembly. Bearing pre-load is established by tightening drive gear nut (32). Pre-load is correct when 1-3 inch-pounds torque is required to turn the shaft. Bend the flanges of lockwasher (33) to retain the adjustment when the correct pre-load is established. Shims (38) control the backlash of drive gears. Vary the thickness of shim pack until propeller shaft and gears turn freely without binding. Shims are available in thicknesses of 0.002, 0.003 and 0.010.

ADJUSTMENT. To adjust the gear shift linkage on Fleet Scott and McCulloch 14, drain the gearcase housing and remove the propeller, shear pin and cushion hub, then remove the propeller shaft and housing assembly. Move the shift lever (1—Fig. Mc5-18) to the neutral detent position and check to make sure that clutch dog (21—Fig. Mc5-17) is midway between the gears (20 and 22). If it is not, loosen the coupling screws (20—Fig. Mc5-18) and thread the coupling (15) up or down on upper shift rod (14). Move the shift lever into "Reverse" and move the actuator (21) up or down until the reverse lock yoke is fully depressed, then tighten screws (20).

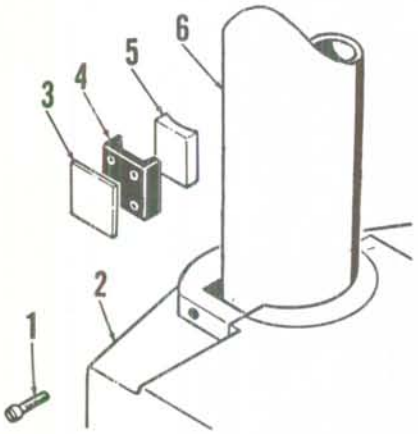


Fig. Mc5-21 — Exploded view of steering friction adjusting mechanism used on OX 140.

1. Adjusting screw
2. Swivel bracket
3. Plate
4. Cushion
5. Shoe
6. Pivot tube

On OX 140, the gear shift linkage requires no adjustment if properly assembled. Make sure motor shifts fully into forward and reverse detent positions.

STEERING FRICTION. OX 140 motors are equipped with a steering friction adjustment as shown in Fig. Mc5-21. Adjust the friction until motor steers easily but will maintain a set course.

SHALLOWATER DRIVE. OX 140 motors are equipped with a shallowater drive unit which allows motor to be operated in a tilted position as shown in Fig. Mc5-22. Adjust the tilt stop screws (S) so that exhaust outlet and water inlet are below the water line at all times as shown.

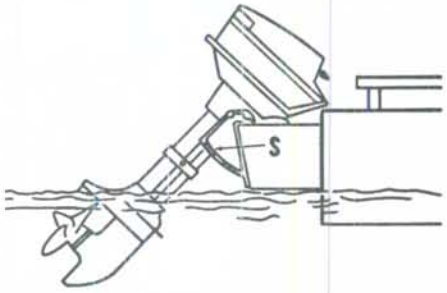


Fig. Mc5-22—In shallowater drive position, water inlet must always be below water line as shown. Adjustment is made by moving tilt-stop screws (S) in stern clamps.