ALTERNATE FIRING TWIN

4½ H. P.

36 LBS. (Approx.)

CERTIFIED AT 4300 R.P.M.

SPECIFICATIONS . . .

Power Head	Alternate Firing
Bore and Stroke	1 9/16x1½
No. of Cylinders	2
Certified Brake H.P. at 4300 R.P.M.	4½
Piston Displacement	5.76 Cubic Inches
Propeller Diameter Pitch	7½x6
Fuel Tank Capacity	6⅓ Pints
Starter	Depend-A-Pull
Ignition	High Tension, Positive Action Magneto
Carburetor	Full Range, Dual Adjustment, Concentric Bowl Type
Gear Ratio	13-20
Type of Exhaust	Pre-Cooled Underwater
Cooling System	Positive Displacement Rotor Type Water Pump
Steering	Full 360° Pivot
Stern Height	15″
Weight	(Approx.) 36 lbs.
Full Reverse	Yes

I.
TO DISASSEMBLE AND ASSEMBLE STARTER COVER ASSEMBLY
(Refer Picture, Page 5-13)

TO DISASSEMBLE:

A. Remove 4 screws located at each corner of starter housing. Keep filler cap latched during removal of starter. Care should be taken in removing filler cap assembly (124) which on some of the earlier motors is not attached. There is a possibility of losing assembly especially if starter cover is removed from motor while on water.

B. Remove pivot bolt screw (116) and lift off pivot bolt cover (115).

C. Place screw driver in pivot bolt slot to retain spring tension while loosening pivot nut (114) which will disengage starter assembly from housing.

D. Remove fiber disc (109) from starter cover.

E. If it is necessary to replace starter cord assembly (101), unhook pull cord from slot in pulley to free cord assembly. On later models it will be necessary to remove the starter pulley rivet as shown in information given in Sec. X, S.B. 25.

F. Unhook starter bias spring (118) from pawl retainer assembly and starter pulley assembly.

G. Remove screw (111) from spring anchor (110). Firmly grasp starter mechanism in both hands and holding by both the pulley drum and pawl retainer, force out pivot bolt by applying pressure from above with both thumbs.

H. Remove pawl retainer assembly (117) and spring washer (119).

I. Octagonal friction spring (107) can be removed from starter pivot bolt (112) if necessary.

J. Remove spring anchor (110).

K. Remove starter rewind spring (108). (CAUTION: Use care in removing spring from well in pulley as this is under heavy tension and may fly loose).

L. Remove spring washer (119) from well in pulley.

M. Remove fiber disc (109) from well in pulley.

TO REASSEMBLE:

A. Place octagonal friction spring around pivot bolt. Rekink spring at each bend to increase spring tension if necessary.

B. Insert pivot bolt into pawl retainer assembly through opening beginning at opposite side of smooth face of assembly. It will be necessary to compress octagonal friction spring in groove of starter pivot bolt to accomplish this. Start at one end and compress spring with screw driver at each bend meanwhile exerting pressure on pivot bolt with thumb at all times. Be sure the octagonal spring sets at all times in the groove of pivot bolt. (Refer Fig. 4-1).

C. Replace fiber disc in well of starter pulley assembly.

D. Replace spring washer over fiber disc in well of pulley.

E. To replace rewind spring, hold pulley assembly with well up. Insert outer spring anchor into slot of pulley assembly and gradually work spring into position. (CAUTION: Install in a counter clockwise direction).

F. Rekink spring washer (107) if necessary and place over pivot bolt on flat face of pawl retainer assembly. If there is an indication of wear or break in the spring washer, a replacement should be made.

G. Hold pawl retainer assembly in hand with index finger inserted into pivot bolt opening and replace pulley assembly making sure that the three pulley pins are engaged in the pawl slots.

H. Retain pressure on starter pivot bolt while replacing spring anchor (110). Match openings between pivot bolt and spring anchor and replace screw.

I. Turn pivot bolt to position where rewind spring can be properly inserted and attached to spring anchor opening.

J. Turn over mechanism and properly center spring washer located between pulley and pawl retainer. Spring will help align itself if shifted in proper position.

K. Before reassembling starter cord, be sure it is first inserted into starter cover opening. Check opening for any burrs that may damage covering of cord.

L. Engage starter cord hook into slot found on underneath side of pulley assembly. Wind cord ½ turn and insert rivet as shown in Sec. X, S.B. 25. Complete rewind of cord.

M. Replace fiber disc over pivot bolt hole in starter housing. Care should be taken to see that it is properly centered and that it retains its position.

N. Complete starter mechanism is now ready to install in housing by placing it so that pivot bolt enters center hole in housing. Hold starter assembly in housing with one hand and screw on pivot nut with other hand.

O. Place screw driver in pivot bolt slot and turn bolt 1½ turns counter-clockwise; then lock pivot nut with wrench. Tension adjustments can be made as desired.

P. Replace starter bias spring. Pair of needle nosed pliers should be used. Attach hook end of spring into opening in pawl assembly opposite anchor hook of starter cord assembly and attach to anchor found on starter pulley assem-

bly. Tension of bias spring aids in holding pawls in retracted position while motor is in operation.

Q. Place assembled starter mechanism and housing on tank and secure with 4 corner screws.

R. Methods of aligning starter mechanism.

1. To check alignment of starter mechanism, place a small pin in the pivot bolt hole. When alignment is correct, pin will drop in crankshaft center and stand vertical. If correction is necessary, place screw driver in pivot bolt slot to retain rewind spring tension while loosening nut with wrench, then shift pivot bolt, tighten nut and check for vertical pin position.
2. Alignment of starter while motor is running. Run motor at low speed. If starter is not centered properly a noise will be prevalent. Place screw driver in pivot bolt slot to retain rewind spring tension while loosening nut with wrench. Shift pivot bolt until noise is eliminated and tighten nut. Starter should then be properly aligned.

Figure 5-1

3. Alignment of starter by use of a starter centering ring PN 25268.
   a. Loosen lock nut on pivot bolt.
   b. Remove starter assembly.
   c. Place ring over magneto nut.
   d. Replace starter assembly and all four screws.
   e. Turn pivot bolt to left until starter knob hits housing and turn ¾ turn more and tighten lock nut securely.
   f. Remove starter and centering ring and replace starter assembly.

II.
TO DISASSEMBLE AND REASSEMBLE FILLER CAP ASSEMBLY
(Refer Picture, Page 5-13)

TO DISASSEMBLE:

A. Remove air vent bushing (128) and washer (127) holding rubber tank seal (126).

B. Remove spacer (125) for tank seal, spring for vent seal (129) and ball for vent seal (130).

C. To remove air vent screw PN 25210, remove vent retainer pin found on underneath side of filler cap cover.

TO REASSEMBLE:

A. Reverse above procedure.

SERVICE HINTS:

A. On later model motors a retainer clip (132) is used to prevent loss of filler cap assembly when starter cover is removed.

B. In case of leak around filler cap assembly replace tank seal with new seal PN25699 and washer PN 35-S-33. If this fails to eliminate leak, check tank opening for distortion causing improper sealing.

C. In case of starter failure, filler cap assembly may be removed from starter and inserted into tank opening.

D. If filler cap assembly fits loose, change tension spring (121) of filler cap latch (120). If necessary, file boss on underneath side of filler cap latch to secure increased tension.

III.
TO REMOVE FUEL TANK AND SHROUD
(Refer Picture, Page 5-13)

A. First remove all screws retaining rear shroud (145) and pull this section off.

B. Remove control knobs (147) and screws holding front shroud (143) and remove this section.

C. Before removing fuel tank (136) drain all fuel by inverting motor.

D. Detach fuel line (153) from tank to carburetor.

E. Remove 2 screws and release speed control knob (149) from control lever.

F. Remove 4 screws located beneath tank attaching tank to brackets.

G. Tank can now be lifted upward and off over flywheel.

TO REASSEMBLE:

A. Reverse the operation.

REASSEMBLY OF CHOKE CONTROL AND CARBURETOR

A. On all model motors manufactured prior to the '49ers, the prime and choke mechanism was controlled by a flexible cable. To correctly

install this cable it will be necessary to remove rear shroud.

B. With choke butterfly valve (9) (found in exploded view of carburetor page 5-13) in off position or run position insert flexible shaft into choke shaft of carburetor.

C. Rotate flexible shaft until pin in the opposite end points towards rear of motor.

D. Assuming butterfly has not changed position, tighten set screw.

E. Install front shroud and secure screws, meanwhile pushing loose end of choke control cable through proper opening in shroud.

F. With choke valve in run position (or open) install knob with arrow pointing to word run found on decal.

G. Use a long screw driver or other similar tool and it is comparatively simple to reach behind left side of front shroud and hold choke cable fitting tightly against front shroud so control knob can be installed.

H. After installation is completed, it may be checked by turning choke control from run position to prime position. The small pin located in the end of the choke cable acts as a stop when run and prime positions have been reached. This is a precaution against damage to choke cable through being turned too far.

NOTE: Beginning with the '49 models all motors were manufactured with a rigid prime and choke mechanism. For further information see Sec. X, S.B. 11.

IV.
WICO MAGNETO SERIAL FW2A-24
(Refer Picture, Page 5-16)

A. Remove 3 screws (34) and lift starter ring (33) from flywheel.

B. Remove flywheel nut (26) and washer (27).

C. Use Martin magpuller as follows:

1. Place magpuller over protruding end of crankshaft and align its 3 holes with 3 screw holes in flywheel.
2. Unscrew center bolt in magpuller until it rests flush on flywheel.
3. Insert 3 magpuller screws and draw down firmly. (CAUTION: Use only 3 screws furnished with magpuller or screw PN 25225. Longer screws will internally damage magneto. Tighten center screw of puller until flywheel is loosened. **Under no condition should you strike protruding end of crankshaft to loosen flywheel.**

D. Detach lead wires from spark plugs.

E. Remove key (31) and cam (30).

F. Loosen stator plate tension screw, (29) located on underside of magneto and lift stator plate from its position.

TO REASSEMBLE:

A. Replace stator plate on hub of block and case assembly.

B. Tighten stator plate tension screw until correct tension is obtained.

C. Replace cam and key. (CAUTION: Cam must be replaced with arrow up, otherwise motor will be out of time).

D. Breaker points should be checked for proper setting (.020). Complete information on magneto will be found in following paragraphs.

E. Remove magpuller from flywheel and place flywheel over magneto making sure key alignment is checked.

F. Replace washer (27) and nut (26).

G. Hold flywheel securely and screw flywheel nut as tightly as possible on crankshaft end. (CAUTION: Be positive flywheel nut is tight. Use of socket wrench recommended).

DESCRIPTION:

The FW2A-24 series is a two cylinder alternate firing flywheel type magneto with a pole shoe radius of 2.4 inches, delivering two sparks per revolution occuring 180°.

The design of the magneto provides a compact ignition unit, simple in construction and with all parts easily accessible for servicing. Incorporating two completely separate electrical circuits the magneto supplies independent ignition for each engine cylinder. This feature provides a reliability of operation previously unknown in the outboard magneto field. It's spark producing characteristics are such that an extremely hot spark is generated at a low speed insuring easy engine starting and sufficiently strong spark is produced throughout all speed ranges for efficient engine operation. The magnetic unit consists of an alnico type magneto assembled in a laminated core and cast into an aluminum rotor. This rotor serves as the flywheel of the engine. It is ribbed inside to resist centrifugal force.

The cam is highly polished and wear resistant lubricated by two cam wiper felts which are factory impregnated with long-life grease.

The stator plate unit includes the breaker mechanisms, which are of a reciprocating design, the coil and laminated coil core units and the condensers.

SERVICE INSTRUCTIONS:

A. Checking magneto for spark.

1. It is recommended that if there is an indication the magneto is causing trouble, that a test be made before attempting to repair it.
2. If the engine refuses to start, the magneto can be checked by holding the spark plug

cable about 1/16" away from a point of the frame of the engine. When the engine is cranked in the usual way, a properly performing magneto spark should jump this gap.

3. If the engine misses at high speed, first check the spark plug. With the spark plug in good condition and properly adjusted, the magneto should fire a spark without missing while the spark plug cable is held 1/16" away from the spark plug terminal.

B. Adjustment of Contacts.

1. The only adjustable parts on the FW magneto are the fixed contact plates which provide adjustment for the breaker contacts.
2. To adjust these contacts first remove the flywheel or rotor. Turn the engine over until the crankshaft keyway is pointing to one set of points and measure the opening between the contacts with a feeler gauge. The opening should be .020. If the contacts need adjusting, loosen the fixed contact screw until the fixed contact plate can be moved. Move the contact plate until the opening between the contacts measures .020 and then tighten the screw. This operation should be repeated with the other breaker contact to synchronize the breaker mechanisms. If the breaker contacts are pitted or worn, they should be replaced. To replace the contact, remove the condenser connection screw and the fixed contact clamp screw. The contacts can then be removed from the stator plate. If necessary, the breaker spring can then be removed by taking out the breaker clamp screw and lock washer. If the contacts need replacing, it is recommended that both the fixed and the movable contact be replaced at the same time.

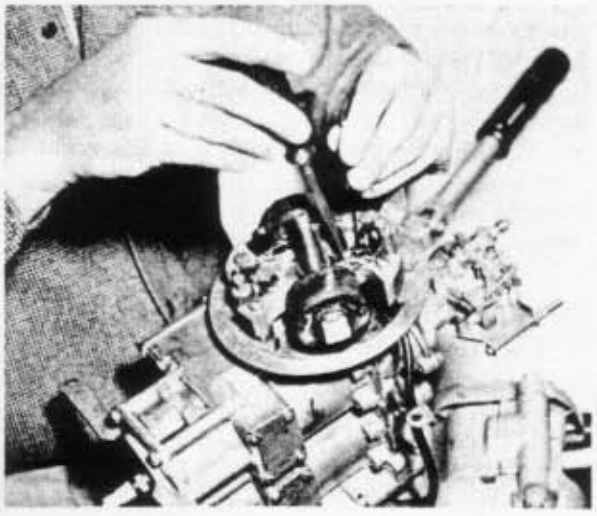


Figure 5-2

C. Removal of condenser.

1. To remove the condensers, first remove the condenser connection screw, lock washer and lead. Then remove the condenser clamp screw and lock washer. The condenser may then be lifted from its socket. The condenser capacity is .16-.20 microfarads and the part should be re-

MARTIN "40" WICO MAGNETO

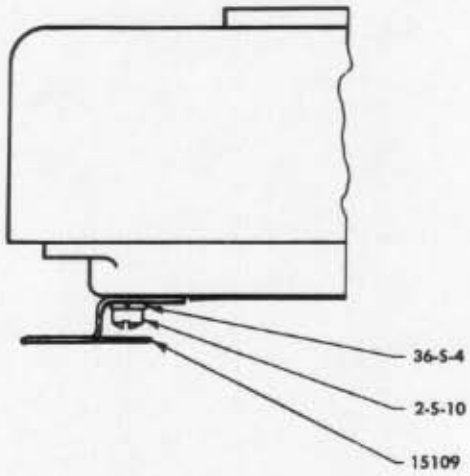


Figure 5-3

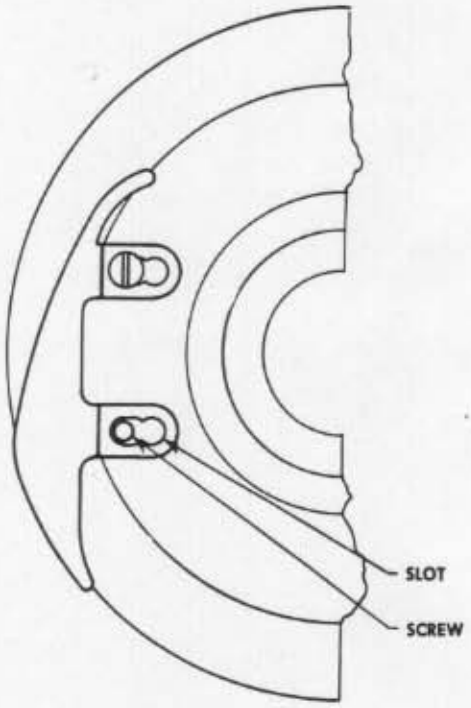


Figure 5-4

placed if the reading falls above or below this when checked. Condensers should also be checked for continuity.

D. To replace the coils.

1. To remove the coils, first disconnect the two coil primary leads from the condenser post and condenser clamp; then remove the two core screws which fasten the laminated core to the stator plate. Using a screw driver, pry up the core from the dowel pins which position is on the stator plate.
2. Remove the rubber coil terminal protector from around the coil and disconnect the spark plug lead wires.
3. With the coil and core group removed from the stator, bend up the coil locking lamination and using an arbor press, remove the coil from the core. Remove the wedges from inside the coil.
4. The new coil can then be assembled to the core and the wedges driven between the core and the coil. Before fastening the core on the stator plate, connect the spark plug lead wire to the coil terminal. Make sure that the core screws are securely tightened. Connect the black coil lead to the condenser post and the stranded lead to the condenser clamp.

E. Lubrication:

The cam wiper felts either should be replaced each season, or re-oiled with a few drops of heavy oil. No other lubrication of the magneto is necessary.

TO DISASSEMBLE CARBURETOR CONTROL CAM

A. Remove the following parts as shown in above figure in sequence order shown.

1. 2-s-10 cam locating screws.
2. 36-s-4 cam locating washers.
3. 15109 carburetor control cam.

TO REASSEMBLE CARBURETOR CONTROL CAM

A. Reverse the above procedure. (CAUTION: Be sure cam slot is located on screw as shown in figure 5-3, 4).

TO DISASSEMBLE CARBURETOR, FOLLOW IN SEQUENCE

(Refer Picture, Page 5-16)

A. Unscrew main adjusting screw gland (24) and remove complete main adjusting screw (23) and gland assembly from fuel bowl (14).

B. Remove 4 body retaining screws and lockwashers (4) to separate upper body and fuel bowl.

C. Unscrew float lever pinion pin (13) and remove float (12) from fuel bowl.

D. Unscrew fuel bowl plug screw (15) then inlet needle, seat and gasket assembly (21) from fuel bowl.

E. Unscrew idle adjustment screw (17) spring (18).

F. Unscrew idle tube and gasket (19) and (20).

G. Unscrew main nozzle channel plug screw (29) from upper body.

H. Remove throttle shutter (36) by unscrewing throttle shutter screw (37) and washer, then carefully remove shutter with long-nosed pliers. (CAUTION: Avoid marring walls of throttle barrel).

I. Remove throttle shaft return spring (35) and withdraw throttle shaft and lever assembly (34).

TO ASSEMBLE FOLLOW REVERSE PROCEDURE

CARBURETOR SERVICE HINTS

A. After carburetor is disassembled, per above instructions, and all parts thoroughly washed in clean gasoline, three sections of the unit should be carefully blown out with clean compressed air as follows:

1. Main nozzle and air bleed vent tube. It is only necessary to remove main nozzle from upper body casting to be cleaned.
2. Idle fuel supply channel. Install idle tube and gasket in upper body casting and then place air hose at open end of idle fuel supply channel at that point where idle adjustment screw installation is made.
3. Fuel inlet channel. Place air hose at that point of fuel body, where fuel line connection is made and carefully blow out fuel inlet channel.
4. Choke shaft and primer-plunger assemblies or parts thereof, should not require removal or replacement unless accidently damaged or broken. However choke shaft friction pin and spring may require replacement if found badly worn after lengthy service.
5. When installing float be sure the yoke or slotted end of float lever is inserted thru the groove around blunt end of inlet needle so that float movement will control inlet needle.
6. Further service data on carburetor will be found in Sec. X, S.B. 11 and 18. Note: Never attempt to blow out a carburetor with compressed air unless bowl is removed.

VI.
TO DISASSEMBLE AND ASSEMBLE THE MANIFOLD AND VALVE MECHANISM

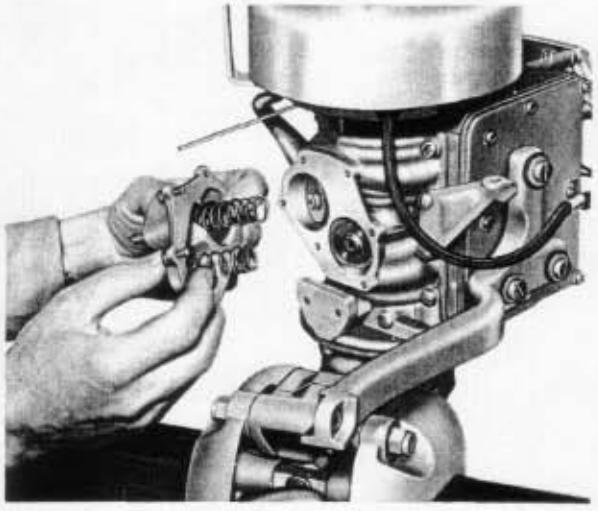


Figure 5-5

TO DISASSEMBLE:

A. First remove carburetor.

B. Remove all screws but one bordering manifold.

C. While removing last screw apply considerable manual pressure to center of manifold thereby offsetting valve spring tension. Manifold thus becomes detached and springs will drop loose.

D. Valves can be removed by fingers.

CAUTION: Be sure you mark valves and properly identify them so they can be replaced in the same valve seat.

NOTE: It is recommended that manifold gasket be kept in water until reassembled in order that it remain pliable.

SERVICE HINTS: While manifold and valves are disassembled refer to Sec. X, S.B. 10 for other information.

TO REASSEMBLE:

A. Follow reverse procedure and refer to figure showing method of retaining springs in proper position. (CAUTION: Be positive the springs are engaged on valve head boss and ring assembly. After assembly this spring alignment can be usually checked through fuel intake hole).

SYNCHRONIZATION OF MAGNETO AND CARBURETOR THROTTLE
(Refer Picture, Page 5-11)

A. Cam controlled timing.

1. Cam should be installed with screws in elongated slots as shown in Fig. 5-4.
2. Adjust rod of carburetor or butterfly linkage (69) so that throttle of carburetor begins to open when speed control knob is approximately ½ inch left of center.
3. Check for binding or failure of throttle valve to open completely by moving speed control knob to fast position. If there is indication of above failure, relocate cam by loosening screws and making necessary adjustment. Recheck throttle pickup time.

TO DISASSEMBLE AND REASSEMBLE THE STEERING HANDLE BRACKET
(Refer Picture, Page 5-14)

TO DISASSEMBLE:

A. Remove front shroud as previously explained. Remove the steering handle bracket nut (222) and washer (221). The steering handle bracket (218) may now be removed, exercising care not to lose the two compression blocks (220) or the grommet (219).

TO REASSEMBLE:

A. Reverse above operation.

CAUTION: Steering handle bracket must be removed before powerhead can be disassembled from lower unit.

VII.
POWERHEAD
(Refer Picture, Page 5-11, 12)

TO DISASSEMBLE:

To disassemble powerhead, remove the following parts: Starter cover assembly, front and rear shrouds, fuel tank, flywheel, magneto, carburetor and valve and manifold assembly as previously explained.

There are two procedures to follow, each depending on which internal part or parts of the powerhead are to be examined or checked.

A. If pistons are not to be removed.

1. Loosen 12 screws (52) holding crankcase to block.
2. Remove spark plugs (1).
3. Remove screws (229) holding powerhead to lower unit and detach powerhead.
4. Remove 3 screws from casting (42) found on underneath side of powerhead.
5. Remove 12 crankcase screws (52) which were previously loosened.
6. Detach crankcase from cylinder block. (CAUTION: Do not use any tool in separation of block and case that can in any way damage parting faces of cylinder block and crankcase assembly).

The above breakdown of powerhead permits inspection or replacement of the following parts: Crankcase, Cam Followers and Pins, Bearings and Crankshaft.

SERVICE HINTS: IMPORTANT

Refer to the following service bulletins for further information on powerhead: Sec. X, S. B. 6, 14, 15 and 23.

B. Complete breakdown of powerhead.

1. Remove spark plugs.
2. Remove cylinder head screws (4) and detach cylinder head (10). Separate cylinder head and cover (7).
3. Remove screws from intake port cover (81) and detach.
4. Remove screws from exhaust port cover (89) and detach. Separate cover and plate (87).
5. Loosen 12 screws holding block to case.
6. Remove screws holding powerhead to the lower unit and detach powerhead.
7. Remove 3 screws and casting (42) found on underneath side of powerhead.
8. Remove screws holding block and case together.
9. Remove oil seals (38) and (41).
10. Mark cam followers (50) and remove from crankcase assembly.
11. Remove screws holding connecting rod caps (22) keeping each screw in its original position. Caps and rods should be marked to insure correct reassembly.
12. Remove crankshaft (25) and journal bearing (40 and 39).
13. Pistons (19) may now be removed by pressing on cap ends of rod and forcing pistons out of top side of block.
14. To remove piston from connecting rod, take out two (2) wrist pin lock springs (20) from holes on either side of piston, at opposite ends of wrist pin. Carefully press or tamp out wristpin from piston. Recommend use of wrist pin punch PN 15113. If tamping is necessary, support piston in palm of hand while doing so to prevent distortion of piston assembly.
15. If necessary to replace rings (21), remove old ones by expanding top ring and work off over top end of piston using care not to mar outer piston wall. Remove second ring in sequence and in the same manner.

TO REASSEMBLE:

A. Replace all old gaskets with new gaskets.

B. Replace connecting rod on wrist pin in piston. Be sure rod assembly and piston are properly identified so that they are inserted into the proper cylinder bore.

C. Install wrist pin lock spring.

D. Clamp assembly in padded vise gripping connecting rod. Rings may now be easily replaced around pistons. (CAUTION: Factory rings are stamped "Top" and should be installed correctly. Align ring gaps with pins in piston grooves). Refer Fig. 6-5.

E. Coat both the cylinder wall and piston and rod assembly with oil before installation.

F. Use ring compressor PN 15123 and place piston and rod assembly in cylinder, connecting rod end first. Be sure piston ring slots and retaining pins are matched, otherwise rings cannot be compressed. (CAUTION: Be sure tapered side of piston faces exhaust ports).

G. Replace journal bearings on crankshaft and set crankshaft in position so that connecting rod caps may be replaced. A small hole is drilled in each journal bearing. These holes must match with pins located in cylinder block. Lubricate bearings and place so that holes are engaged.

H. Be sure rod caps are installed properly and on correct rod. Check identification marks made in disassembly. Double check connecting rod cap screws for tightness. Check rod or crankshaft for end play which is essential. If no end play exists, loosen connecting rod cap, then retighten. Repeat operation until slight end play occurs.

I. Replace cam followers spacer washers on cam follower pins, then replace cam followers on pins. Install cam follower so that drilled oil hole is visible through the intake manifold.

J. Spread thin film of 3M sealer on parting faces of block and case assembly. When assembling case and block, lay assembly on side so cam followers do not drop out of place. (Refer Fig. 5-6).

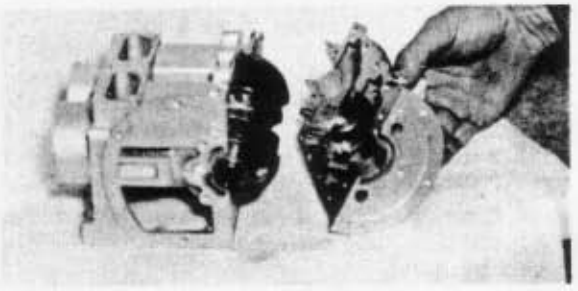


Figure 5-6

K. Replace screws attaching block to case. **Be sure tank brackets (55) are in place.** Before drawing screws tight, turn motor over by hand to make sure that cam followers are in proper channels and that journal bearings and anchor pins match. If powerhead functions properly, tighten screws.

L. Install water seal brass washer (46) and rubber washer (45) in recess in bottom of block and case assembly. Replace oil seal (41) and then replace the driveshaft seal enclosure casting (42) and gasket (44) and secure with three screws.

M. Replace powerhead on lower unit. Make sure the water tube, driveshaft and enclosure are properly inserted tightening screws. Lockwasher is used with all 7 screws.

N. Replace exhaust port cover and plate with necessary gaskets. (CAUTION: Gasket (86) with enclosed water passages should be between exhaust port cover plate and cylinder block).

O. Replace intake port covers and gaskets.

P. Before installing cylinder head be sure that all gasket surfaces are thoroughly cleaned. (Refer to Sec. X, S.B. 28). Replace cylinder head cover gasket and spark plug gaskets. Place cylinder head cover on head and insert spark plugs after checking gaps for .030. Spark plugs will hold plates and gaskets in place.

Q. Replace cylinder head screws and washers. **Make sure rear tank bracket is in place.**

R. Replace gaskets (12) and (11) and place cylinder head in position. Caution should be taken to see that no gasket or sealer gets into cylinder bores. Tighten and adjust screws in following sequence. Center 2 screws first, then extreme top 2 and bottom 2 screws tightly; then the remaining 4 snugly.

S. Replace oil seal (38) on crankshaft. Spread film of 3M sealer around outer band of seal. Work seal over step of shaft to avoid folding seal. Continue working seal down by hand as far as possible. Then with a tube large enough to fit loosely over crankshaft, carefully drive downward until seal bottoms.

VIII.
STEERING STABILIZERS
(Refer Picture, Page 5-15)

TO DISASSEMBLE:

A. Reduce tension on four stabilizer adjusting screws (275) found on underneath side of motor support tube casings (267) and (268).

B. With motor in full reverse position remove 4 screws (269) holding rear half of the motor support tube casing so that it can be removed by hand.

C. Turn motor to forward steering position and lift complete powerhead and lower unit from the front half of the motor support tube casing which is attached to stern bracket assembly.

D. Mechanism of steering stabilizer is now exposed. The two halves of the stabilizer friction ring (215) and stabilizer compression plates (274) and blocks (273) can now be removed.

TO REASSEMBLE:

A. Replace stabilizer friction plates, blocks and friction rings in respective recesses in the front half of motor support tube casing.

B. Replace motor and turn motor 180° to lock motor to the stern bracket during the remainder of the assembly.

C. Place remaining two stabilizer compression plates, blocks and one friction ring in rear half of motor support tube casing. Carefully place this unit in its former position attaching it to rest of assembly.

Service Hints: As an aide in this operation use the blade of a small screw driver to hold down the washer and elevate the rear half of motor support tube housing so it can snap into place. Note: Refer Sec. X, S.B. 12 and 17.

D. To adjust steering stabilizer, firmly tighten any one of 4 adjusting screws found on underneath side of casing. Adjust the other three screws until expansion is visible on the rubber compression blocks. Relieve tension on the first screw tightened until the compression on its rubber block is relative to the other three blocks. At this point you may test for firmness of steering action. If action is unsatisfactory, adjust tension of all 4 screws accordingly. If motor steers hard at high speed, refer to Sec. X, S.B. 12.

IX.
STERN BRACKET
(Refer Picture, Page 5-15)

TO DISASSEMBLE:

A. Remove nut (246) from end of tilting stud (245).

B. Pull stud from the position which will free entire lower unit including the swivel bracket.

C. By removing nut (261) from the thrust socket stud (259) the two halves of the stern bracket may be separated. This will expose all internal parts of the stern bracket for inspection or replacement. Remove parts in following order.

1. Tilt adjusting lever (253).
2. Spacer (254) and pin (255).
3. Thrust socket (258) and spacer (254).
4. Washer (247) swivel bracket (244) and 2nd spacer.
5. Stern adjusting assembly (249). Remove key reverse check (250) first. Tilt adjusting lever (253).

TO REASSEMBLE:

A. Clamp either of stern bracket assemblies to edge of work bench and reassemble reversing above procedure. (Refer Fig. 6-6).

X.
STERN SWIVEL MECHANISM
(Refer Picture, Page 5-15)

TO DISASSEMBLE:

A. Tilt motor forward to horizontal position and remove swivel bracket nut (271) and washer (263).

B. Loosen small allen head screw located beneath swivel bracket of front motor support tube casing.

C. Remove swivel retaining bolt (262). Spring (266) and bearing (264) may now be lifted from their respective positions.

TO REASSEMBLE:

A. Reverse the above procedure. (CAUTION: It is very important when reassembling the above mechanism that the proper tension be given swivel retaining bolt. This may be checked by reassembling the swivel bracket and swinging the mechanism to feel for proper tension. If adjusted properly, lock swivel retaining screw and secure by replacing lock washer and nut). Note: On later model motors there has been a change in swivel bolt assembly. Refer to Sec. X, S.B. 17.

XI.
LOWER UNIT
(Refer Picture, Page 5-14)

TO DISASSEMBLE:

NOTE: All model "40" motors after serial number B 43416 were assembled with newly designed motor support assembly which makes it unnecessary to remove powerhead in order to remove gears, gear case, driveshaft or water tube. The new style motor support tube is identified by a notch under front side of splash plate. Refer to Sec. X, S.B. 17. (Refer Fig. 4-2).

A. Remove propeller (211).

B. Remove 2 screws (195) in water pump housing (193) and lift off housing and pump rotor (188).

C. Remove snap ring (191) and pin (190) and take off pump eccentric (189) by sliding off over shaft.

D. Remove pump plate (187).

E. Remove propeller shaft bearing housing assembly (185) and gasket. (CAUTION: When removing or replacing bearing housing assembly, it is recommended that you unscrew the part to prevent damage to the lip of the grease seal (186). If there is any indication of wear on seal, replace seal).

F. Remove driveshaft (206) and water inlet tube (207). (NOTE: On all "40" motors prior to serial number B 43416 it is necessary to remove powerhead before you can disassemble and remove gear case).

G. Remove propeller shaft (181) and gear assembly (179) and (180).

H. Gear case may now be detached from motor support tube assembly by removing screw (201) located in gear case near top of water pump housing. Gear case may be turned counter-clockwise to loosen it from rear screw PN 11-S-1.

NOTE: Rear screw is held in place by a set screw PN 23-S-1 located in the side of the motor support tube. To remove gear case mounting screw it is necessary to loosen set screw. On motors after serial number B 43416 the gear case mounting screw and set screw have been replaced by a stud (197), lockwasher (200) and nut (199). On this type, gear case may be detached by removing nut from stud, and screw found under water pump housing.

TO REASSEMBLE:

A. Check driveshaft grease seal (172) in gear case housing. Seal should be installed so that part number is down. Refer to Sec. X, S. B. 24. NOTE: If motor does not have driveshaft seal assembly, make modification as per Sec. X, S.B. 9.

B. In models using long gear case mounting screw and set screw, place centering spacer (198) on screw before gear case is reassembled. Place gear case on screw and turn clockwise till properly set. If gear case is not properly aligned when drawn tight, loosen set screw in side of motor support tube and allow screw to turn until gear case is tight and properly aligned. Retighten set screw.

C. Replace gear case mounting screw (201) and lockwasher (202).

D. If pinion gear is separate from the propeller shaft assembly, use rivet (182) and snap ring (183) to assemble. Insert a small amount of lower unit grease in thrust bearing of gear case and replace propeller shaft assembly.

E. Replace bevel pinion gear in proper operating position and insert driveshaft into the gear's splined opening. Water tube may be also placed into proper position.

F. Coat both sides of propeller shaft bearing housing gasket (184) with 3M sealer or shellac and place in proper position.

G. Replace propeller shaft bearing housing assembly (185).

H. Replace pump plate (187).

I. Replace pump eccentric (189) pin (190) and snap ring (191).

J. Place seal for water pump (192) in recess in gear case housing.

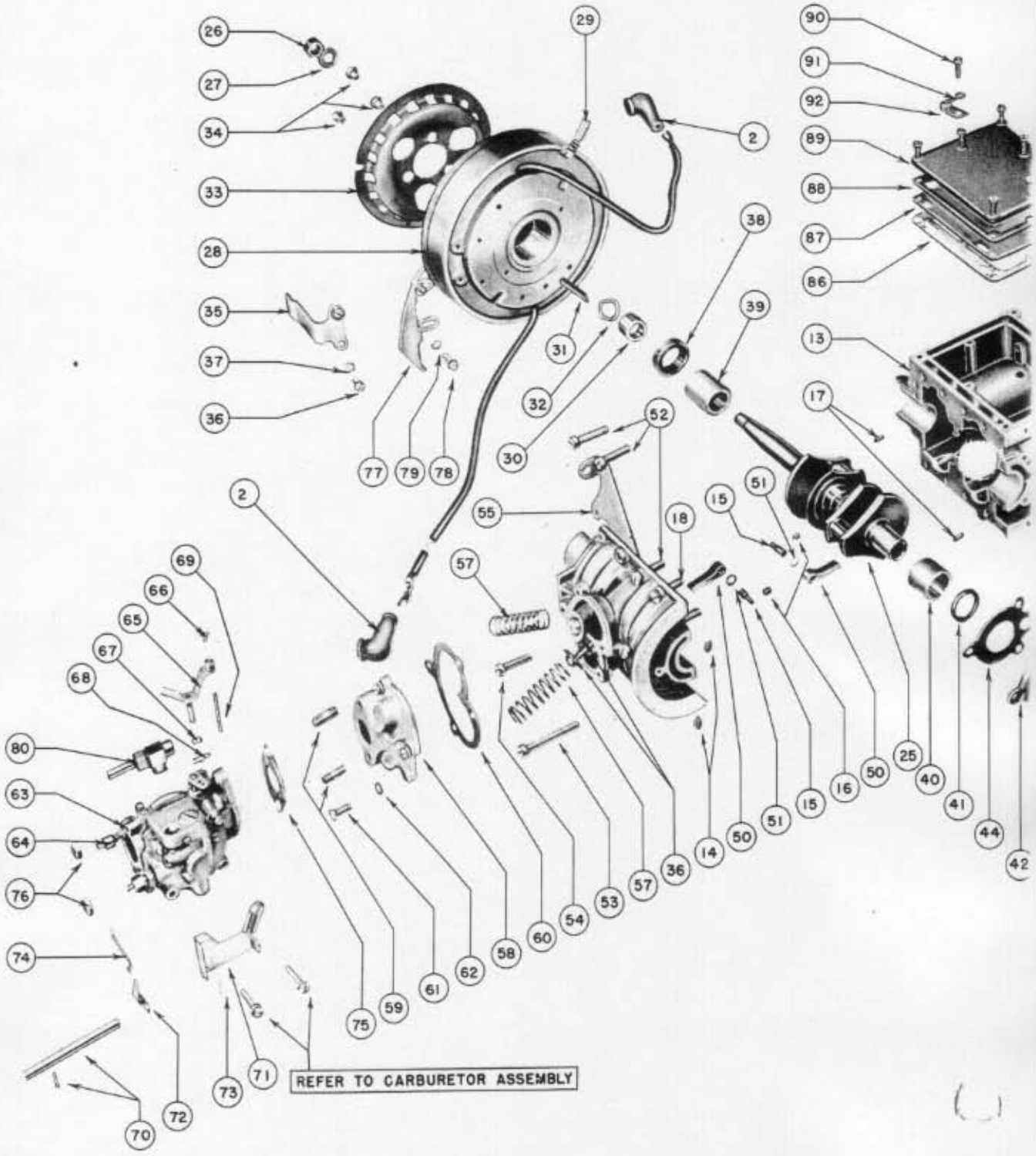
K. Insert the pump rotor (188) into the water pump housing (193) and reassemble on gear case. (CAUTION: Pump rotor should be installed in pump housing so that tapered sides match housing. Side with small hole should be visible when placed in housing).

L. Replace two oval head screws (210) and lockwashers.

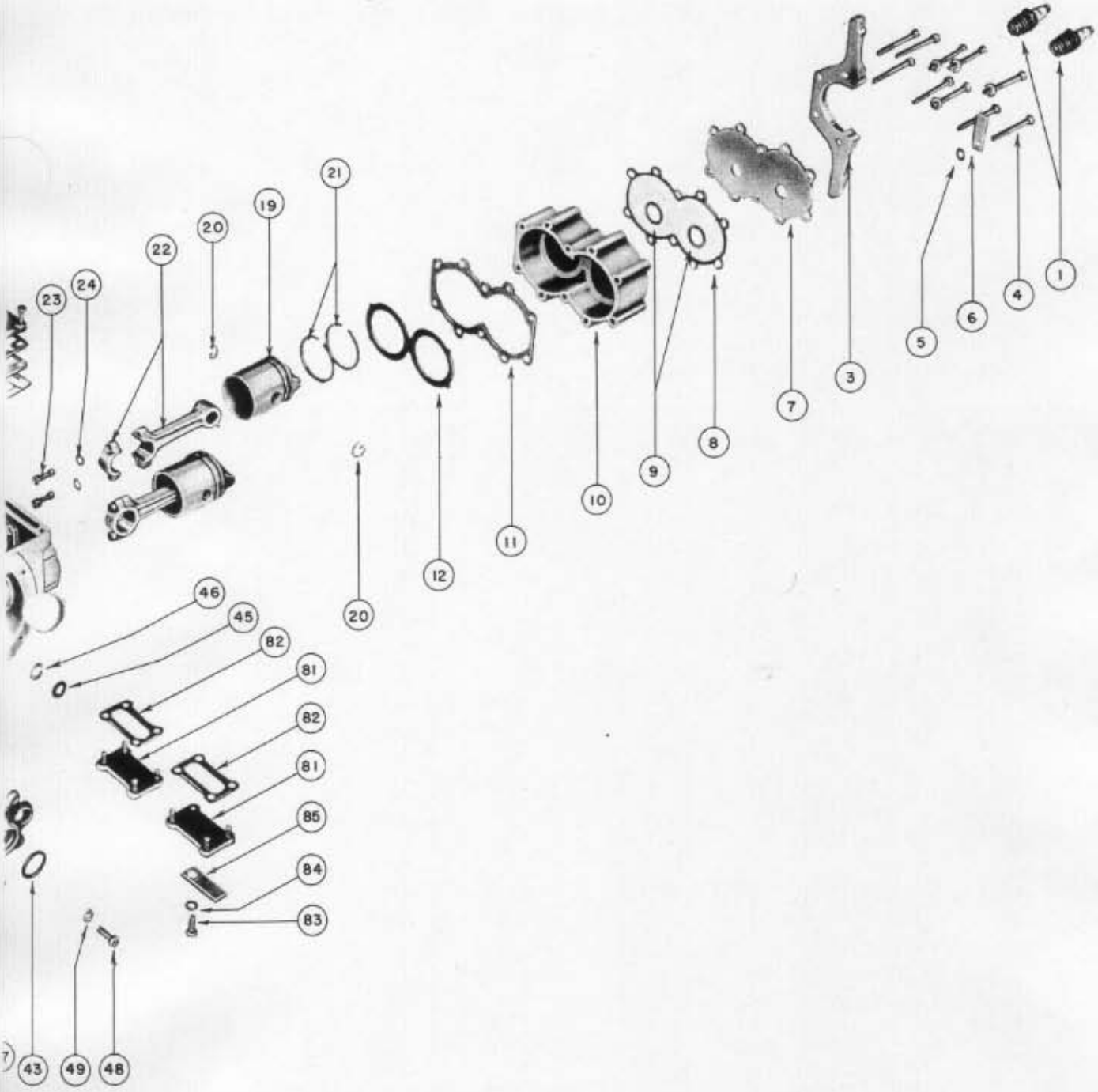
SERVICE HINTS:

After propeller (211) and friction clutch (210) have been assembled the proper tension of propeller nut (213) should be approximately ¾ of a turn past finger tight.

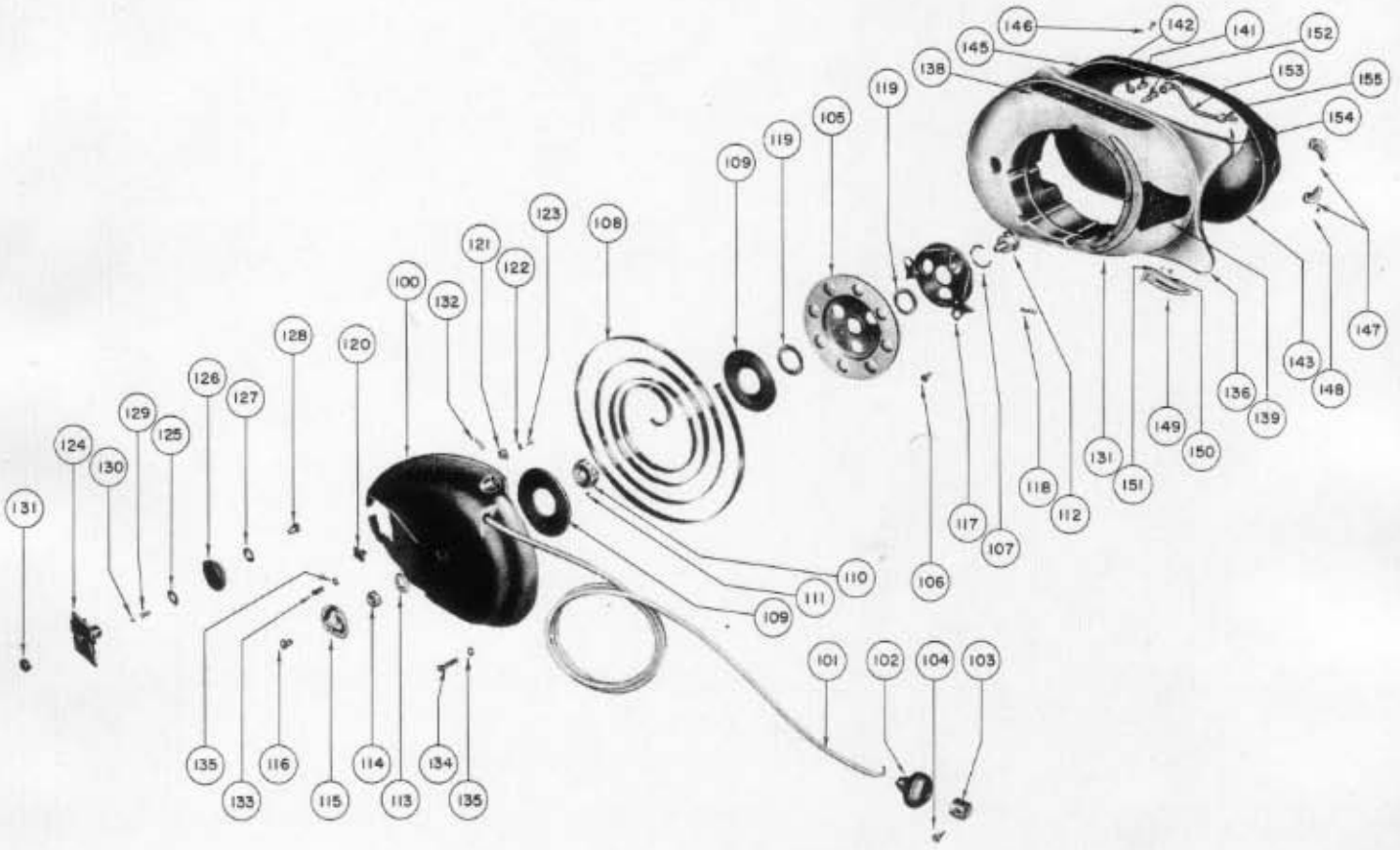
Martin Motors POWER HEAD ASSEMBLY



Martin Motors POWER HEAD ASSEMBLY

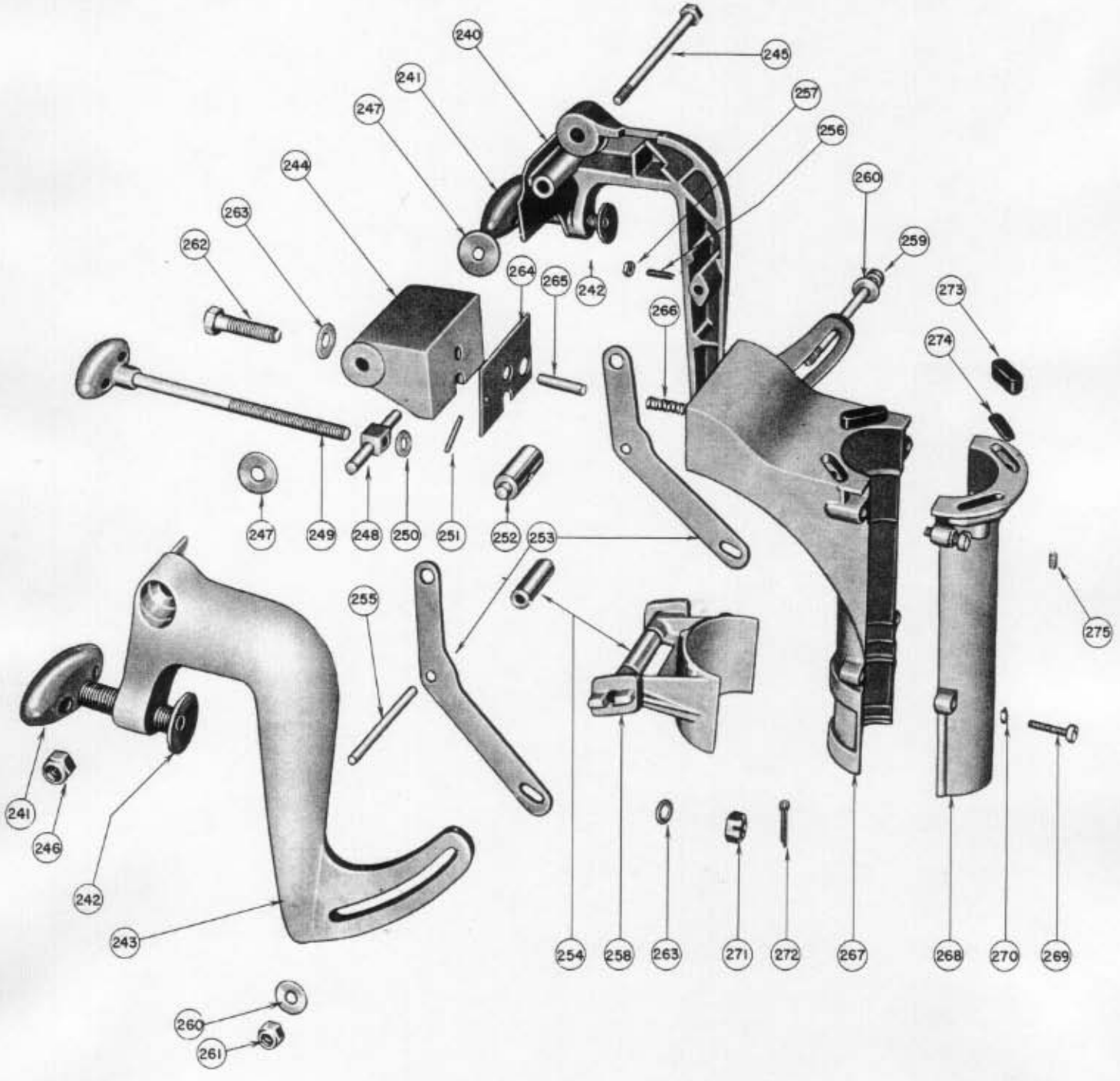


Martin Motors STARTER and COVER ASSEMBLY

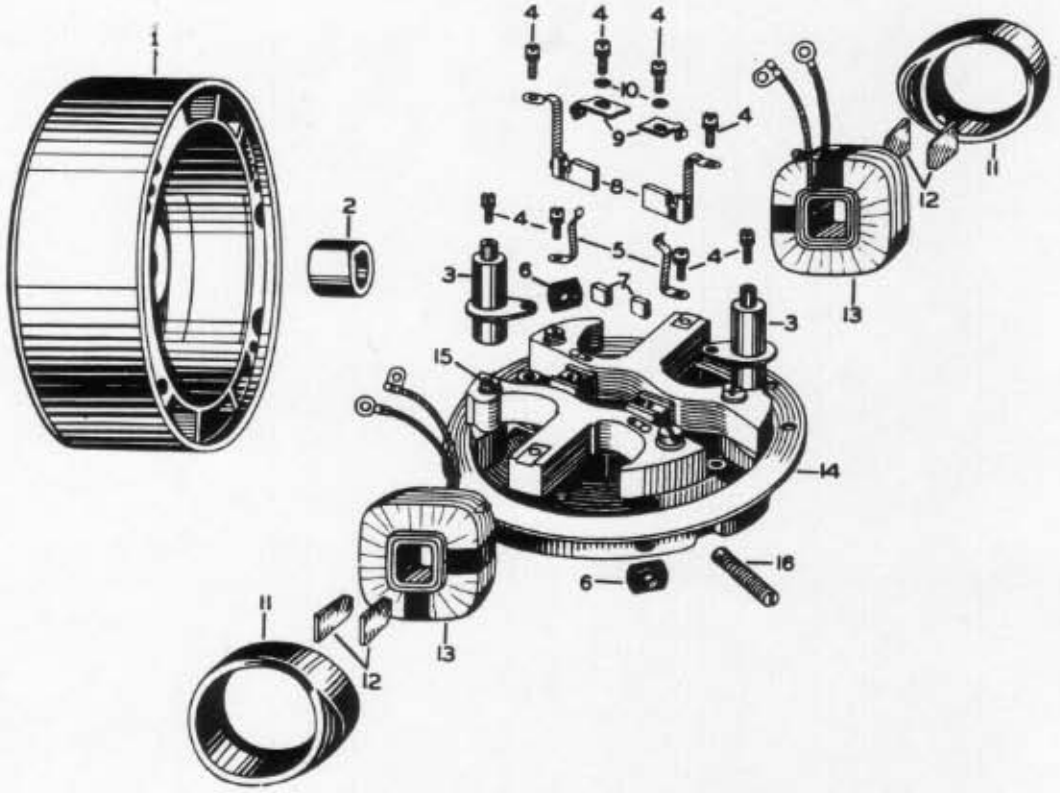


Martin Motors LOWER UNIT ASSEMBLY

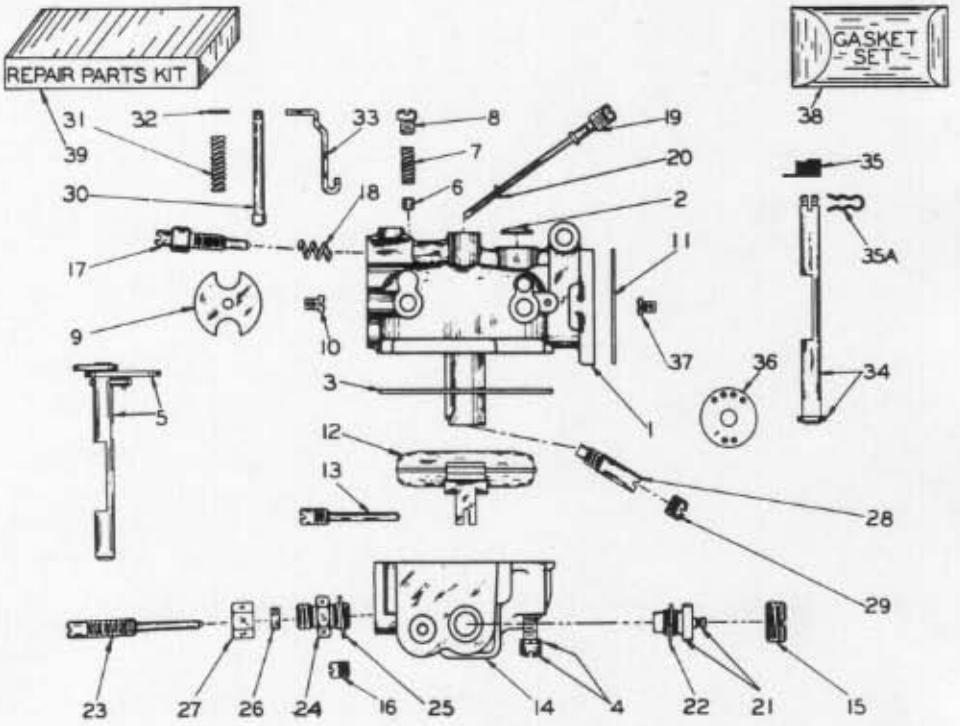
Martin Motors STERN BRACKET ASSEMBLY



Martin "40" - SERIES B3
WICO MAGNETO SERIES FW 2A-24



Martin "40" - SERIES B3
TILLOTSON CARBURETOR MODEL MD 8B



REPAIR PARTS LIST

Martin "40"-SERIES B3
POWER HEAD ASSEMBLY

Ref. No.	Part No.	Description
	15400	Powerhead assembly, complete, includes all parts listed to and including item 92
	15401	Powerhead assembly—same as 15400 less carburetor and magneto
1	100-S-1	Spark plug and washer
2	25605	Short angle rubber nipple, for spark plug
3	15000	Tank mounting bracket (rear)
4	2-S-17	Screw-cylinder head
5	35-S-17	Washer—cylinder head screw
6	15152	Clip—magneto wire
7	15001	Cover—cylinder head
8	15002	Gasket—cylinder head cover
9	25191	Gasket—spark plug
10	15003	Cylinder head
11	15005	Gasket—cylinder head water
12	15004	Gasket—cylinder head compression
13	15191	Cylinder block and crankcase assembly—includes item 13 to and including item 18 and items 39 and 40
14	50-S-3	Expansion plug
15	15093	Pin—cam follower
16	9-S-6	Screw—cam follower pin
17	25154	Pin—main bearing locating
18	15226	Taper dowel screw
19	15103	Piston and wristpin assembly
20	15012	Lock spring—wristpin
21	15011	Piston ring
22	15014	Connecting rod and cap assembly, includes items 22 to 24 inclusive
23	15159	Screw—connecting rod
24	37-S-3	Lockwasher—connecting rod screw
25	15018	Crankshaft
26	20-S-1	Nut—magneto
27	36-S-1	Lockwasher—magneto nut
28	15019	Magneto—includes items 28 to 32 inclusive
29	15139	Friction shoe—magneto } See Magneto Chart
30	15140	Cam—magneto } See Magneto Chart
31	25402	Key—magneto } See Magneto Chart
32	25315	Cam spring washer } See Magneto Chart
33	25113	Starter ratchet ring
34	8-S-6	Screw—starter ratchet ring
35	15027	Speed control lever
36	2-S-10	Screw—speed control lever
37	36-S-4	Lockwasher—speed control lever screw
38	15091	Oil seal—crankshaft (upper)
39	15182	Bearing—upper main
40	15181	Bearing—lower main
41	5036	Oil seal—crankshaft (lower)
42	25422	Seal—lower main bearing
43	25423	"O" ring—lower main bearing seal
44	25293	Gasket—lower main bearing seal
45	25297	Washer—water tube
46	41-S-1	Washer—water seal retaining
47	3-S-4	Screw—seal retainer (oval head)
48	2-S-31	Screw- seal retainer (fillister head)
49	36-S-10	Lockwasher, for seal retainer screw 2-S-31
50	25051	Cam follower
51	25170	Spacer—cam follower
52	2-S-1	Screw—block to case
53	2-S-3	Screw—block to case
54	2-S-7	Screw—block to case

WHEN ORDERING PARTS **ALWAYS** INDICATE MOTOR SERIAL NO.—MOTOR SERIES—AND MODEL

REPAIR PARTS LIST
Martin "40"-SERIES B3
LOWER UNIT

Ref. No.	Part No.	Description
55	15252	Tank mounting bracket (side)
56	15028	Valve assembly
57	25166	Valve spring
58	15120	Intake manifold, includes item 59
59	25197	Stud—carburetor
60	15024	Gasket—intake manifold
61	2-S-5	Screw—intake manifold
62	36-S-5	Lockwasher—intake manifold screw
	15186	Carburetor, linkage and choke control assembly—includes items 63 to and including item 74
63	15176	Carburetor assembly
64	15141	Idle adjustment screw—see carburetor chart Tillotson No. 08403
65	15114	Linkage lever assembly, includes item 66
66	1-S-3	Screw—linkage adjusting
67	35-S-23	Washer—lever retaining
68	61-S-1	Cotter—lever retaining
69	15118	Rod—carburetor linkage
	25341	Choke control assembly, includes item 70 to and including item 73
70	25364	Choke stem and pin assembly
71	25455	Bracket—choke control
72	25453	Arm—choke control
73	65-S-7	Pin
		} Available only as unit Part No. 25341
74	25454	Link—choke control
75	25199	Gasket—carburetor
76	22-S-3	Nut—carburetor
77	15109	Cam—carburetor control
78	2-S-10	Screw—cam locating
79	36-S-4	Lockwasher—cam locating screw
80	25275	Shut off cock
81	15037	Cover—intake port
82	15036	Gasket—intake port cover
83	2-S-4	Screw—intake port cover
84	36-S-5	Lockwasher—intake port cover screw
85	15152	Clip—magneto wire
86	15032	Gasket—exhaust port plate
87	15033	Plate—exhaust port cover
88	15034	Gasket—exhaust port cover
89	15035	Cover—exhaust port
90	2-S-11	Screw—exhaust port cover
91	36-S-5	Lockwasher—exhaust port cover screw
92	15152	Clip—magneto wire

WHEN ORDERING PARTS **ALWAYS** INDICATE MOTOR SERIAL NO.—MOTOR SERIES—AND MODEL

REPAIR PARTS LIST

Martin "40" - SERIES B3

STARTER AND COVER ASSEMBLY

Ref. No.	Part No.	Description
	25619	Starter and cover assembly—complete (black) includes items 100 to and including item 132
100	25650	Starter housing (black)
101	25251	Starter cord and handle assembly includes items 102 to and including 104
102	25125	Starter handle
103	25206	Starter handle plug assembly includes item 104
104	4-S-2	Screw—starter handle plug (oval head)
105	25127	Starter pulley assembly
106	72-S-1	Rivet—starter cord retaining
107	25107	Spring—starter friction
108	25103	Rewind spring
109	25338	Washer—rewind spring
110	25109	Anchor—rewind spring
111	8-S-5	Screw—rewind spring anchor
112	25096	Starter pivot bolt
113	25269	Washer—starter pivot bolt
114	24-S-1	Nut—pivot bolt
115	25173	Cover—pivot bolt
116	4-S-5	Screw—pivot bolt cover
117	25121	Pawl retainer assembly
118	25244	Starter bias spring
119	25273	Spring washer
120	25652	Filler cap latch (black)
121	25609	Tension spring—filler cap latch
122	35-S-4	Washer—filler cap latch
123	17-S-1	Screw—filler cap latch
	25604	Filler cap assembly—complete (black) includes items 114 to and including item 121
124	25624	Filler cap (black)
125	35-S-14	Spacer—tank seal
126	25188	Tank seal
127	35-S-6	Washer—tank seal
128	25209	Bushing—air vent
129	90-S-4	Spring—vent seal
130	80-S-1	Ball—vent seal
131	25449	Pad—air vent screw
132	25271	Retainer—filler cap
133	2-S-4	Screw—starter mounting (short)
134	2-S-6	Screw—starter mounting (long)
135	36-S-5	Lockwasher—starter mounting screw
136	15198	Gas tank and decal assembly
137	25255	Decal—speed control
138	15111	Decal—side Martin "40"
139	15160	Decal—operating instructions
140	15188	Decal—rear (not shown)
141	2-S-15	Screw—tank mounting
142	36-S-3	Lockwasher—tank mounting screw
143	25623	Shroud assembly (front) includes item 144
144	15212	Decal—carburetor control (not shown)
145	15195	Rear shroud and spray shield assembly
146	25218	Screw—shroud mounting
147	25487	Carburetor control knob includes item 148
148	25359	Set screw—control knob
149	25611	Knob—speed control
150	8-S-3	Screw—speed control knob
151	38-S-1	Lockwasher—speed control knob
152	25254	Gas line fitting
153	15143	Gas line assembly includes items 154 and 155
154	25340	Compression sleeve
155	25339	Compression nut

WHEN ORDERING PARTS **ALWAYS** INDICATE MOTOR SERIAL NO.—MOTOR SERIES—AND MODEL

REPAIR PARTS LIST

Martin "40"-SERIES B3

LOWER UNIT

Ref. No.	Part No.	Description
	15145	Lower unit assembly includes item 171 to and including item 214
	15146	Gear case assembly includes item 171 to and including item 196
171	15119	Gear case and seal assembly includes item 172 to and including item 178
172	40-S-6	Grease seal for drive shaft
173	25245	Grease plug
174	25268	Gasket—grease plug
175	25378	Grease plug
176	25379	Gasket—grease plug
177	1-S-7	Vent screw
178	15227	Gasket—vent screw
	15127	Gear set includes items 179 and 180
179	15069	Gear
180	25054	Pinion
181	15066	Propeller shaft
182	15067	Pin—gear and shaft
183	15068	Snap ring—gear and shaft pin
184	15070	Gasket—propeller shaft bearing housing
185	15184	Propeller shaft bearing housing assembly includes item 186
186	40-S-7	Oil seal—propeller shaft
187	15072	Pump plate
188	15073	Pump rotor
189	15074	Pump eccentric
190	25084	Pin—pump eccentric
191	25090	Snap ring—pump eccentric
192	25093	Seal—water pump
193	15075	Water pump housing assembly includes item 194
194	50-S-2	Expansion plug
195	8-S-4	Screw—water pump
196	38-S-3	Lockwasher—water pump screw
197	15237	Stud—lower unit
198	35-S-21	Washer gear case mounting
199	35-S-4	Nut—lower unit stud
200	36-S-11	Lockwasher—lower unit stud nut
201	11-S-2	Screw—gear case mounting
202	39-S-2	Lockwasher—gear case mounting screw
203	25429	Spacer—drive shaft seal
204	25423	"O" ring—lower main bearing seal
205	25428	Tube—drive shaft seal
206	25290	Drive shaft
207	25296	Water tube
208	15231	Motor support tube
209	25156	Shear pin
210	15078	Friction clutch assembly
211	15206	Propeller
212	35-S-3	Washer—propeller shaft nut
213	25085	Nut—propeller shaft
214	60-S-1	Cotter pin—propeller shaft nut
215	15102	Stabilizer friction ring
216	15185	Stabilizer friction washer
217	15101	Stud—handle bracket
218	15208	Bracket—steering handle
219	15100	Grommet—handle bracket
220	15099	Compression block—handle bracket
221	35-S-18	Washer—handle bracket nut
222	23-S-2	Nut—handle bracket
223	25612	Steering handle
224	25287	Friction washer—steering handle
225	3-S-3	Bolt—steering handle
226	26-S-1	Nut—steering handle
227	25342	Grip—steering handle
228	15095	Gasket—motor support tube
229	2-S-5	Screw—motor support tube
230	36-S-5	Lockwasher—motor support tube screw

WHEN ORDERING PARTS **ALWAYS** INDICATE MOTOR SERIAL NO.—MOTOR SERIES—AND MODEL

REPAIR PARTS LIST

Martin "40"-SERIES B3
STERN BRACKET ASSEMBLY

Ref. No.	Part No.	Description
	15147	Stern bracket assembly includes item 240 to and including item 272
	15038	Stern bracket clamping assembly (left) includes items 240, 241 and 242
240	15040	Stern bracket (left)
241	25145	Clamp screw and handle assembly
242	25061	Pressure pad
	15039	Stern bracket clamping assembly (right) includes items 241, 242 and 243
243	15041	Stern. bracket (right)
244	15045	Swivel bracket
245	15105	Bolt—tilting pivot
246	23-S-4	Nut—tilting pivot
247	15106	Washer—tilting friction
248	15051	Pin—stern adjusting anchor
249	15049	Stern adjusting screw and handle assembly
250	41-S-2	Washer—reverse stop
251	65-S-3	Drive pin—reverse stop
252	15052	Clevis pin—stern bracket
253	15055	Tilt adjusting lever
254	15054	Spacer—tilting lever
255	15053	Pin—tilting lever
256	15161	Set screw—stern bracket
257	25-S-1	Locknut—stern bracket set screw
258	15056	Thrust socket
259	25334	Stud—thrust socket
260	41-S-3	Washer—thrust socket stud
261	23-S-2	Nut—thrust socket
262	15164	Screw—swivel retaining
263	35-S-16	Washer—swivel retaining
264	15046	Swivel bearing
265	25281	Swivel locking pin assembly
266	90-S-3	Spring—swivel lock
267	15247	Motor support tube casing assembly includes item 268
269	2-S-7	Screw—motor support tube casing
270	39-S-2	Lockwasher—motor support tube casing screw
271	21-S-2	Nut—swivel bracket
272	60-S-2	Cotter pin
273	25220	Stabilizer compression block
274	25221	Stabilizer compression plate
275	13-S-1	Screw—stabilizer

WHEN ORDERING PARTS **ALWAYS** INDICATE MOTOR SERIAL NO.—MOTOR SERIES—AND MODEL

REPAIR PARTS LIST

Martin "40" - SERIES B3

TILLOTSON CARBURETOR MODEL MD 8B

Ref. No.	No. Req.	MD-8B Part No.	Part Name
1	1	08605	Body, Upper Half
2	1	*02531	Body Channel Welch Plug
3	1	07903	Body Gasket
4	4	06062	Body Retaining Screw & Lockwasher
5	1	08531	Choke Shaft & Primer Lever (Complete)
6	1	*07923	Choke Friction Pin
7	1	*07925	Choke Friction Pin Spring
8	1	*07912	Choke Friction Pin Screw
9	1	08010	Choke Shutter
10	1	*05430	Choke Shutter Screw
11	1	05591	Flange Gasket
12	1	07804	Float
13	1	*07901	Float Lever Pinion Screw
14	1	08332	Fuel Bowl
15	1	07896	Fuel Bowl Plug Screw (large)
16	1	*03311	Fuel Bowl Drain Screw (Small)
17	1	*08403	Idle Adjustment Screw
18	1	*05725	Idle Adjustment Screw Spring
19	1	*07921	Idle Tube
20	1	07900	Idle Tube Gasket
21	1	*08018	Inlet Needle, Seat & Gasket
22	1	02510	Inlet Seat Gasket
23	1	*08404	Main Adjustment Screw
24	1	0702	Main Adjustment Screw Gland
25	1	0676	Main Adjustment Screw Gland Gasket
26	1	0705	Main Adjustment Screw Packing
27	1	0703	Main Adjustment Screw Packing Nut
28	1	*08423	Main Nozzle
29	1	02395	Main Nozzle Channel Plug Screw
30	1	07993	Primer Pin
31	1	*08717	Primer Pin Return Spring
32	1	*03804	Primer Pin Washer
33	1	07995	Primer Pin Link
34	1	08421	Throttle Shaft and Lever (With Screw)
35	1	*07910	Throttle Return Spring
35A	1	*08597	Throttle Return Spring Retaining Clip
36	1	08716	Throttle Shutter
37	1	*05204	Throttle Shutter Screw
38		*08025	Gasket and Packing Set
39		08314	Repair Parts Kit

(*) Indicates contents of designated Repair Parts Kit.

WHEN ORDERING PARTS, PLEASE INDICATE NUMBER OF YOUR CARBURETOR

REPAIR PARTS LIST

Martin "40" - SERIES B3

WICO MAGNETO SERIES FW2A-24

Ref. No.	Part No.	Description
1	5479	Rotor
2	5465-F	Cam
3	X5463-F	Condenser assembly
4	5431-F	Condenser assembly clamp screw (SEMS)
4	5431-F	Fixed contact clamp screw (SEMS)
4	5431-F	Breaker spring clamp screw (SEMS)
4	5431-F	Condenser connecting clamp screw (SEMS)
5	5461-F	Breaker spring
6	5486-F	Lead wire bushing
7	5446-F	Cam wiper felt
8	X5449-F	Breaker shoe grp. (Use X5469-F Set)
9	5443-F	Fixed contact (Use X5469-F)
10	2965-F	Fixed contact clamp screw washer
11	5464-F	Coil terminal protector
12	2264A/B	Coil wedge
12	3497B-F	Coil wedge
13	X5460-F	Coil group
14	X5485-F	Stator plate replacement assembly
15	5445	Core screws
16	X5816-F	Friction shoe group
17	*2972-F	Shaft key
18	*3081-F	Cam spring washer
19	*5469-F	Breaker contact set (Includes fixed and movable contacts with brk. spring)
20	2215-F	Lead wire (15")
21		Lead wire (17")
22	5493	Stator plate unit
		MAGNETO COMPLETE

* Items marked as such are not shown in picture.

WHEN ORDERING PARTS **ALWAYS** INDICATE MOTOR SERIAL NO.—MOTOR SERIES—MODEL AND NUMBER OF YOUR MAGNETO