SINGLE CYLINDER

2⅓ H. P.

30 LBS. (Approx.)

CERTIFIED AT 4300 R.P.M.

SPECIFICATIONS . . .

PowerHead	Single Cylinder
Bore and Stroke	1 9/16x1½
No. of Cylinders	1
Certified Brake H.P. at 4300 R.P.M.	2⅓
Piston Displacement	2.88 Cubic Inches
Propeller Diameter Pitch	6½x4½
FuelTankCapacity	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.) 30 lbs.
Full Reverse	Yes

I.
STARTER COVER ASSEMBLY
(Refer Picture, Page **4-12)**

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 (123) 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 (117) and lift off pivot bolt cover (116).

C. Place screw driver in pivot bolt slot to retain spring tension while loosening pivot nut (115) which will disengage starter assembly from housing.

D. Remove fiber disc PN* 25338 from starter cover.

E. If it is necessary to **replace** starter cord assembly, 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. No. 25.

F. Unhook starter bias spring PN 25244 from pawl retainer assembly and starter pulley assembly.

G. Remove screw (112) from spring anchor (111). 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 (107) and spring washer (108).

I. Octagonal friction spring (105) can be removed from starter pivot bolt (113) if necessary.

J. Remove spring anchor (111).

K. Remove starter rewind spring (110). (CAUTION: Use care in removing spring from well in pulley as this is under heavy tension and may fly loose).

L. Remove spring washer PN 25107 from well in pulley.

M. Remove fiber disc PN 25338 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).

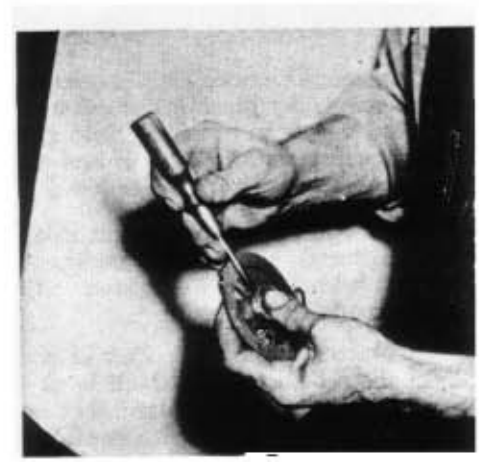


Figure 4-1

C. Replace fiber disc PN 25338 in well of starter pulley assembly.

D. Replace spring washer PN 25107 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 (108) 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 (111). 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.

*PN — Part Number.

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.

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 and washer 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 assembly. 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.

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 4 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.
FILLER CAP ASSEMBLY
(Refer Picture, Page **4-12**)

TO DISASSEMBLE:

A. Remove air vent bushing (127) and washer (126) holding rubber tank seal (125).

B. Remove spacer for tank seal (124) spring for vent seal (128) and ball for vent seal (129).

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

TO REASSEMBLE:

A. Reverse above procedure.

SERVICE HINTS:

A. On later model motors a retainer clip PN 25271 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 PN 25699 and washer PN 35-s-32. If this fails to eliminate leak, check tank opening for distortion causing improper sealing.

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

D. If filler cap assembly fits loose, change tension spring of filler cap latch (118). If necessary, file boss on underneath side of filler cap latch to secure increased tension.

m.
TO REMOVE FUEL TANK AND SHROUD
(Refer Picture, Page **4-12**)

A. First remove all screws retaining rear shroud (146) and pull this section off.

B. Remove control knobs (149) and screws holding front shroud (144) and remove this section.

C. Before removing fuel tank (133) drain all fuel by inverting motor.

D. Detach fuel line (141) from tank to carburetor.

E. Remove 2 screws and release speed control knob (152) 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 REPLACE:

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 (11) (found in exploded view of carburetor page 4-15) 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 refer Sec. X S. B. 11.

IV.
WICO MAGNETO SERIAL F.W.Z.A. SPECIFICATION 1741 B
(Refer Picture, Page 4-15)

TO DISASSEMBLE:

A. Remove 3 screws (57) and lift starter ring (54) from flywheel.

B. Remove flywheel nut (55) and washer (56).

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 crank shaft to loosen flywheel.

D. Detach lead wires from sparkplugs.

E. On the model 20 motors it will be necessary to disengage synchronized control rod from carburetor.

1. This can be done by placing speed control lever in "stop" position and opening carburetor throttle by manually pulling it towards the operator. This will release end of control rod and its spring.

F. Remove key (61) and cam (60).

G. Loosen stator plate tension screw (59) located on underside of magneto and lift stator plate from its location.

TO REASSEMBLE

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

B. Reassemble carburetor control rod **and** spring in proper position.

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

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

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

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

G. Replace washer (56) and nut (55).

H. 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 one cylinder alternate firing flywheel type magneto with a pole shoe radius of 2.4 inches, delivering one spark per revolution occuring 360".

The design of the magneto provides a compact ignition unit, simple in construction and with all parts easily accessible for servicing. Its spark producing characteristics are such that an extremely hot spark is generated at 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 a cam wiper felt which is factory impregnated with long-life grease. The stator plate unit includes the breaker mechanism, which is of a reciprocating design, the coil, laminated coil core unit and the condenser.

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 should jump this gap.
3. If the engine misses at high speed, fist check the spark plug. With a 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 iirst remove the flywheel or rotor. Turn the engine over until the crankshaft keyway is in line with the breaker arm shoes 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. 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 breakerspring 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.

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 replaced if the reading falls above or below this when checked. Condensers should also be rechecked 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.

1. 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.

V.
CARBURETOR
(Refer Picture, Page 4-15)

TO DISASSEMBLE

A. Unscrew main adjusting screw gland (27) and remove complete main adjusting screw **(26)** and gland assembly from fuel bowl **(3).**

B. Remove **4** body retaining screws and lockwashers (5) to separate upper body and fuel bowl.

C. Unscrew float lever pinion pin (16) and remove float (15) from fuel bowl.

D. Unscrew fuel bowl plug screw (17) then inlet needle, seat and gasket assembly (24) from fuel bowl.

E. Unscrew idle adjustment screw **(19)** and spring **(20).**

F. Unscrew idle tube and gasket (21) and (22) —

G. Unscrew main nozzle channel plug screw **(32)** from upper body.

H. Remove throttle shutter **(39)** by unscrewing throttle shutter screw **(40)** and washer, then carefully remove shutter with long nose pliers. (CAUTION: avoid marring walls of throttle barrel).

I. Remove throttle shaft return spring **(38)** and withdraw throttle shaft and lever assembly **(37).**

TO REASSEMBLE:

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 for the purpose of cleaning.

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 the 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 through 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.

VI.
MANIFOLD & VALVE MECHANISM
(Refer Picture, Page 4-10)

TO DISASSEMBLE:

A. First remove carburetor.

B. Remove all screws but one bordering the manifold.

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

D. Valve can be removed by fingers.

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

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

TO REASSEMBLE:

A. Follow reverse procedure. **(CAUTION:** Be positive spring is engaged on valve head boss and ring assembly. After assembly the spring alignment can be usually checked through fuel intake hole).

SYNCHRONIZATION OF MAGNETO AND CARBURETOR THROTTLE
(Refer Picture, Page 4-10)

A. Rod controlled timing.

1. Place magneto control lever in stop position.

2. Place linkage spring **(46)** on control rod **(48)**

3. Insert rod in carburetor throttle lever.

4. Manually open throttle lever and adjust rod collar **(47)** so that it starts to open throttle when magneto lever is about one half inch left of center.

THE STEERING HANDLE BRACKET
(Refer Picture, Page 4-13)

TO DISASSEMBLE:

A. Remove front shroud as previously explained. Remove the steering handle bracket nut **(216)** and washer **(215).** The steering handle bracket **(212)** may now be removed, exercising care not to lose the two compression blocks **(214)** or the grommet **(213).**

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 4-10)

TO DISASSEMBLE:

To disassemble power head remove the following parts: Starter cover assembly, front and rear shrouds, fuel tank, flywheel, magneto, carburetor, valve and manifold assembly and handle bracket 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 piston is not to be removed.

1. Loosen **8** screws **(31)** and **(32)** holding crankcase to block.

2. Remove spark plug *(5).*

3. Remove screws holding power head to lower unit and detach power head.

4. Remove **3** screws from driveshaft seal assembly found on underneath side of powerhead.

5. Remove 8 screws found between block and case and separate block and case assembly.

(CAUTION: Do not use any tool to pry block and case that can in any way damage the parting faces of the assembly).

The above breakdown of powerhead permits inspection or replacement of the following **parts.** Crankcase, cam follower and pin, bearings and crankshaft.

B. Complete breakdown of powerhead.

1. Remove spark plug (5).
2. Remove cylinder head screws and detach cylinder head (6).
3. Remove screws from intake port cover (17) and detach.
4. Remove screws from exhaust port cover (67) and detach.
5. Loosen 8 screws holding block to case.
6. Remove the screws holding powerhead to lower unit. Powerhead may now be lifted off —
7. Remove 3 screws and casting PN 25422 from underside of powerhead.
8. Remove screws holding block and case together and separate.
9. Remove oil seals for upper and lower main bearings.
10. Remove cam follower (28) and washer (27) —
11. Remove screws holding connecting rod cap (69). Keep each screw in original position.
12. Remove crankshaft (63) and bearings (22 and 62).
13. Piston (11) may now be removed by pressing on cap end of rod and forcing piston out of top side of block.
14. To remove piston from connecting rod, take out two (2)wrist pin lock spring (10) from holes on either side of piston at opposite ends of wrist pin. Carefully press or tamp out wrist pin from piston. Recommend use of wrist pin punch PN 15113. If tamping is necessary, support piston in palm of hand while doing so as to prevent distortion of piston assembly.
15. If necessary to replace rings (9), old ones may be removed by expanding top ring, etc. and work off over top end of piston, using care not to mar outer piston wall.

TO REASSEMBLE

A. Replace all old gaskets with new gaskets.

B. Replace connecting rod on wrist pin in piston.

C. Install wrist pin lock springs.

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.

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

F. Use ring compressor PN 15123 and place assembly in cylinder, connecting rod end first. Be sure piston ring slots and retaining pins are matched, otherwise rings cannot be compressed.

G. Replace journal bearings on crankshaft and set crankshaft in position so that connecting rod cap 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. Place connecting rod cap on rod so that screw boss with the flat side mates with the flat side of the connecting rod, Snug down both screws, then tap the rod cap lightly from side to side and retighten the two screws securely. If there is no end play in rod when pushed sideways with fingers after final tightening of screws, then loosen rod caps and repeat tightening process. **Rods must be free on shaft after tightening.**

I. Lay block and case on side to install cam follower and spacer. Cam follower should be installed so that drilled oil hole is visible through opening in intake manifold.

J. Spread thin film of 3M sealer on parting faces of block and case before reassembly together. Check cam follower to make sure it has not dropped out of place.

K. Replace screws attaching block to case. Be sure tank brackets (33) are in position. Before drawing screws tight, turn motor over by hand. If powerhead functions properly, tighten screws. Replace oil seal for lower main bearing.

L. Install water seal brass washer and rubber washer (12) in recess in bottom of block and case assembly and then replace drive shaft seal enclosure casting and gasket.

M. Replace powerhead on lower unit. Make sure water tube, drive shaft and enclosure are properly inserted and then tighten screws.

N. Replace exhaust port cover and gasket.

O. Replace intake port cover and gasket.

P. Replace cylinder head and gaskets. Make sure gasket surfaces are clean.

Q. Replace rear tank bracket and secure cylinder head with screws and lockwashers.

R. Replace oil seal (64) on crankshaft. Spread film of 3M sealer around outer band of seal. Work seal over step on 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 STABILIZER
(Refer Picture, Page **4-14**)

TO DISASSEMBLE:

A. Reduce tension on 4 stabilizer adjusting Screws (276) found on underneath side of motor support tube casings (267 and 271).

B. With motor in full reverse position remove 4 screws (272) holding rear half of the motor support tube casing (271). A slight movement exerted on the gearcase housing will free the 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 power head and lower unit from the front half of 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 (211) and stabilizer compression plates (275) and blocks (274) can now be removed.

TO REASSEMBLE:

A. Replace stabilizer friction plates, blocks and friction rings in respective recesses in 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 3 screws until expansion is visible on the rubber compression blocks. Relievetension on the first screw tightened until the compression on its rubber block is relative to the other 3 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 **4-14**)

TO DISASSEMBLE:

A. Remove nut (261) from end of tilting stud (260).

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

C. By removing nut (257) from the thrust socket stud (255) the two halves of the stern brackets 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 (249).
2. Spacer (250) and pin (251).
3. Thrust socket (254) and spacer (250).
4. Washer (259) and swivel bracket (258) and 2nd washer.
5. Stern adjusting assembly (244). Remove key reverse check (246) first. Tilt adjusting lever (249).

TO REASSEMBLE:

A. Clamp either of stern bracket assemblies to edge of work bench and reassemble reversing above procedure.

X.
STERN SWIVEL MECHANISM
(Refer Picture, Page **4-14**)

TO DISASSEMBLE

A. Tilt motor forward to horizontal position and remove swivel bracket nut (270) and washer (269).

B. Loosen small allen head screw (268) located beneath swivel bracket of front motor support tube casing.

C. Remove swivel retaining bolt (262) and swivel pin (265). Spring (266) and bearing (264) may now be lifted from their respective positions.

TOREASSEMBLE

A. Reverse the above procedure. **(CAU**TION: 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 with small allen set 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 4-13)

TO DISASSEMBLE:

NOTE: All model "20" motors after serial number A10284 were assembled with newly designed motor support assembly which makes it unnecessary to remove powerhead in order to remove gears, gearcase, 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.4. (Refer Fig. 4-2).

A. Remove propeller (194).

B. Remove 2 screws (188) in water pump housing (186) and lift off housing and pump rotor (181).

C. Remove snap ring (184) and pin (183) and take off pump eccentric (182) by sliding off over shaft.

D. Remove **pump** plate (180).

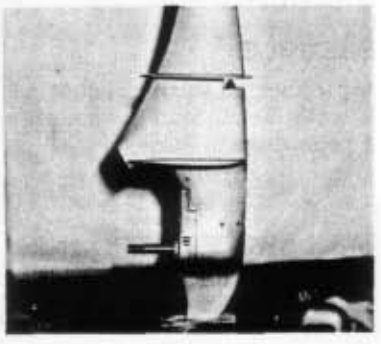


Figure 4-2

E. Remove propeller shaft bearing housing assembly (178) 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 (179). If there is any indication of wear on seal, replace seal).

F. Remove driveshaft (206) and water inlet tube (205). (NOTE: On all "20" motors prior to serial No. A10284 it is necessary to remove powerhead before you can disassemble and remove gear case).

G. Remove propeller shaft (174) and gear assembly (173).

H. Gear case may now be detached from motor support tube assembly by removing screw (203) located in gearcase near top of water pump housing. Gear case may be turned counter-clockwise to loosen it from rear screw (199).

NOTE: Rear screw is held in place by a set screw (202) located in the side of the motor support tube. To remove gear casing mounting screw it is necessary to loosen set screw. On motors after serial No. 10284 the gear case mounting screw and set screw have been replaced by a stud PN 15237 lockwasher PN 36-s-11 and nut PN 25-s-4. 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 gearcase mounting screw and set screw, place centering spacer (200) on screw before gearcase 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 gearcase is tight and properly aligned. Retighten set screw.

C. Replace gearcase mounting screw (203) and lockwasher (204).

D. If pinion gear is separated from the propeller shaft assembly, use rivet (175) and snap ring (176) to assemble. Insert a small amount of lower unit grease in thrust bearing of gearcase and replace propeller shaft assembly.

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

F. Coat both sides of propeller shaft bearing **housing *gasket*** (177) with 3M sealer or shellac and place in proper position.

G. Replace propeller shaft bearing housing assembly (178).

H. Replace pump plate (180).

I. Replace pump eccentric (182), pin (183) and snap ring (184).

J. Place seal for water pump (185) in recess in gear case housing.

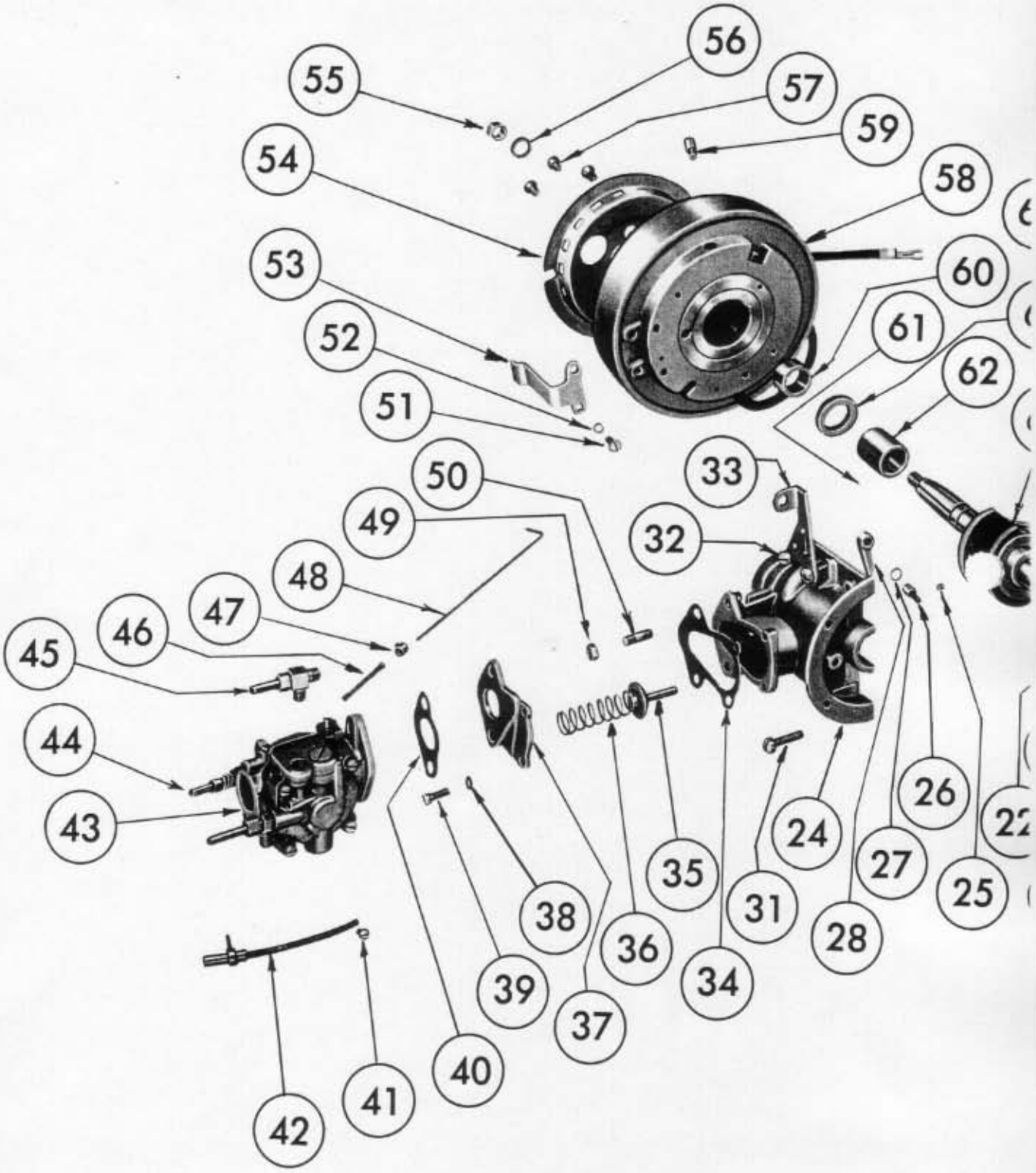
K. Insert the pump rotor (181) into the water pump housing (186) and reassemble on gear case. (CAUTION: Pump rotor should be installed in pump housing so that tapered sides match housing. Side with small hole should be visible when placed in housing).

L. Replace two oval head screws (188) and lockwashers.

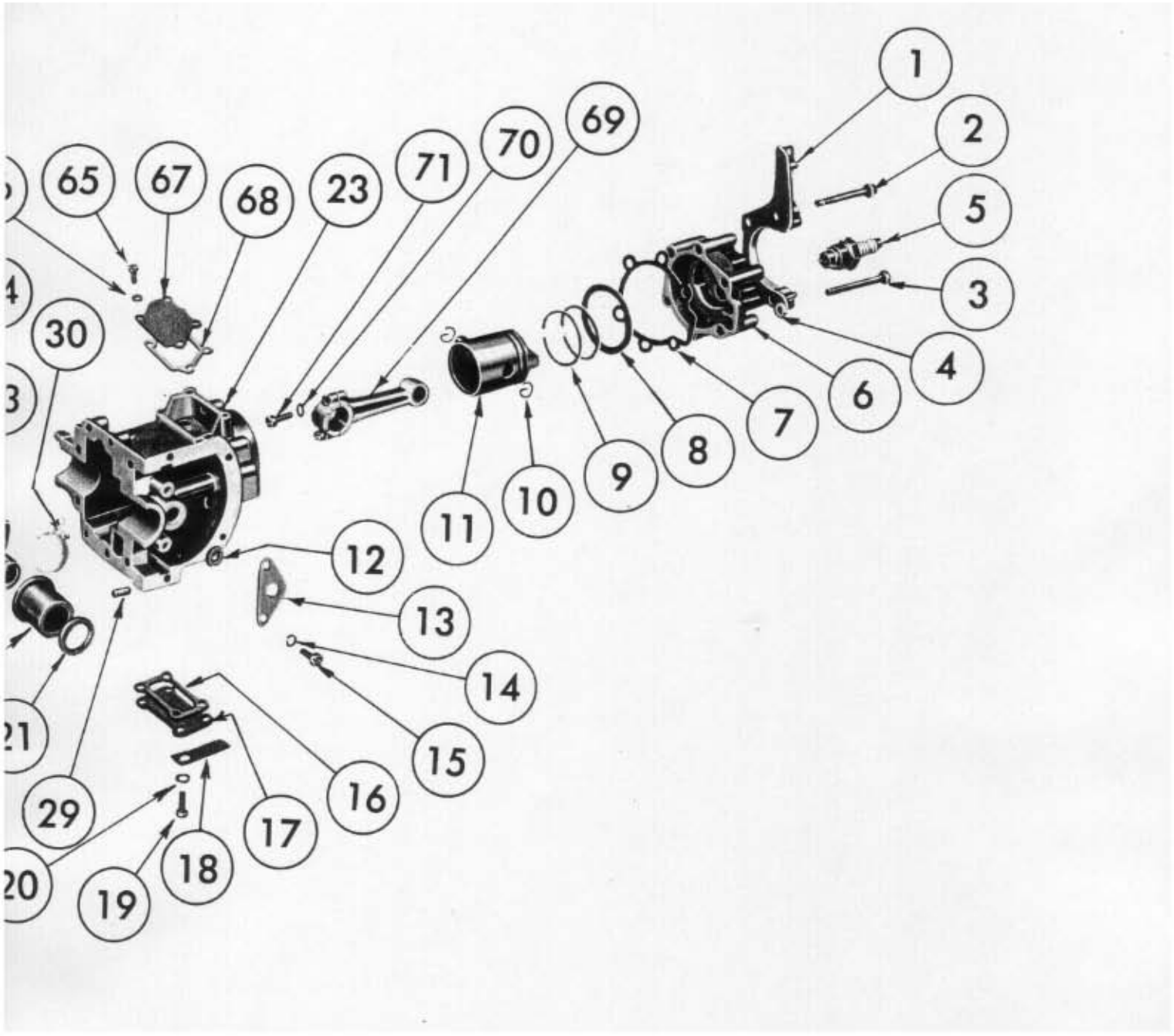
SERVICE HINTS:

After propeller (194) and friction clutch 193 have been assembled the proper tension of propeller nut (196) should be approximately 3/4 of a turn past finger tight.

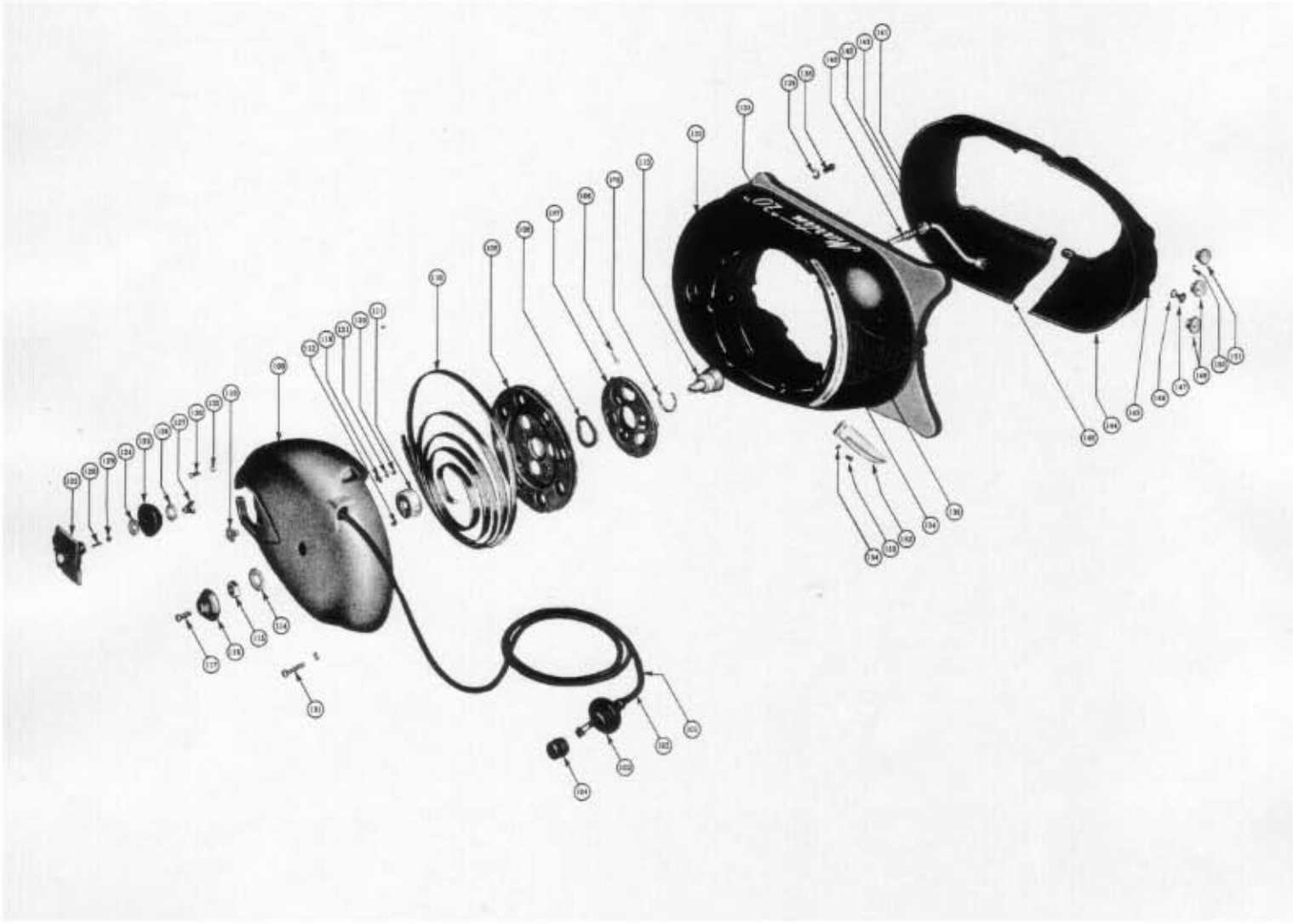
Martin Motors POWER HEAD ASSEMBLY



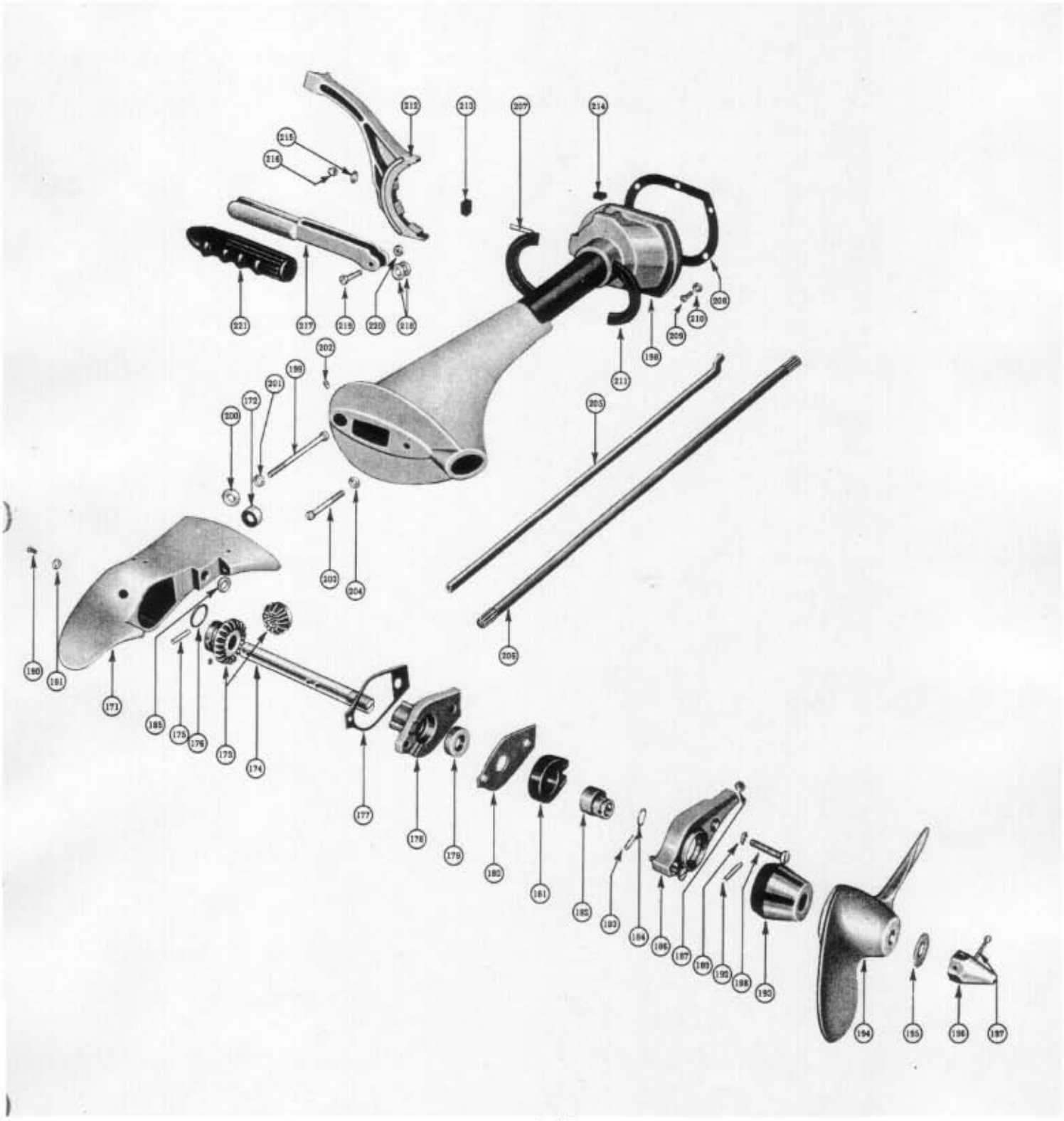
Martin Motors POWER HEAD ASSEMBLY



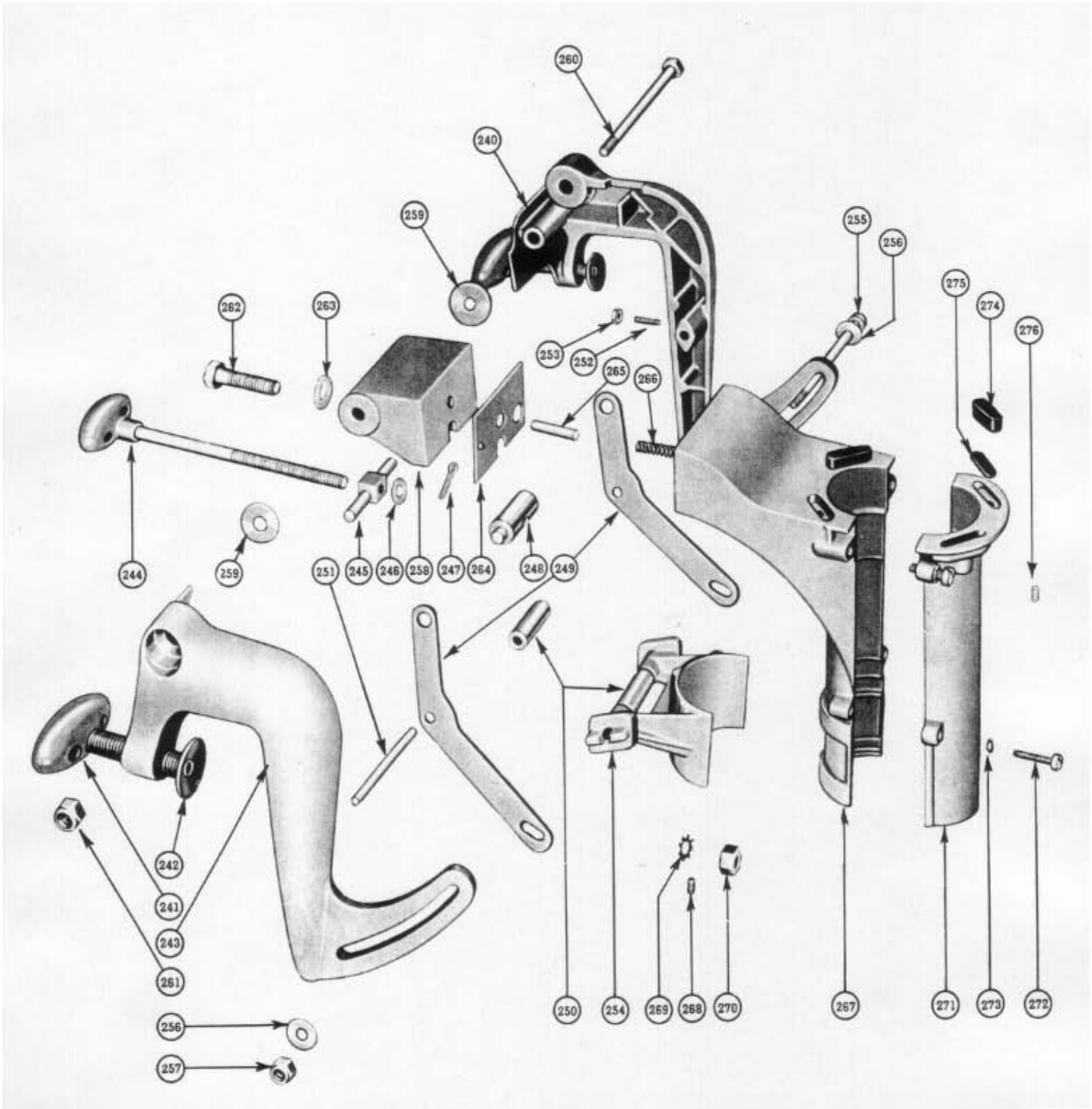
Martin Motors STARTER and COVER ASSEMBLY



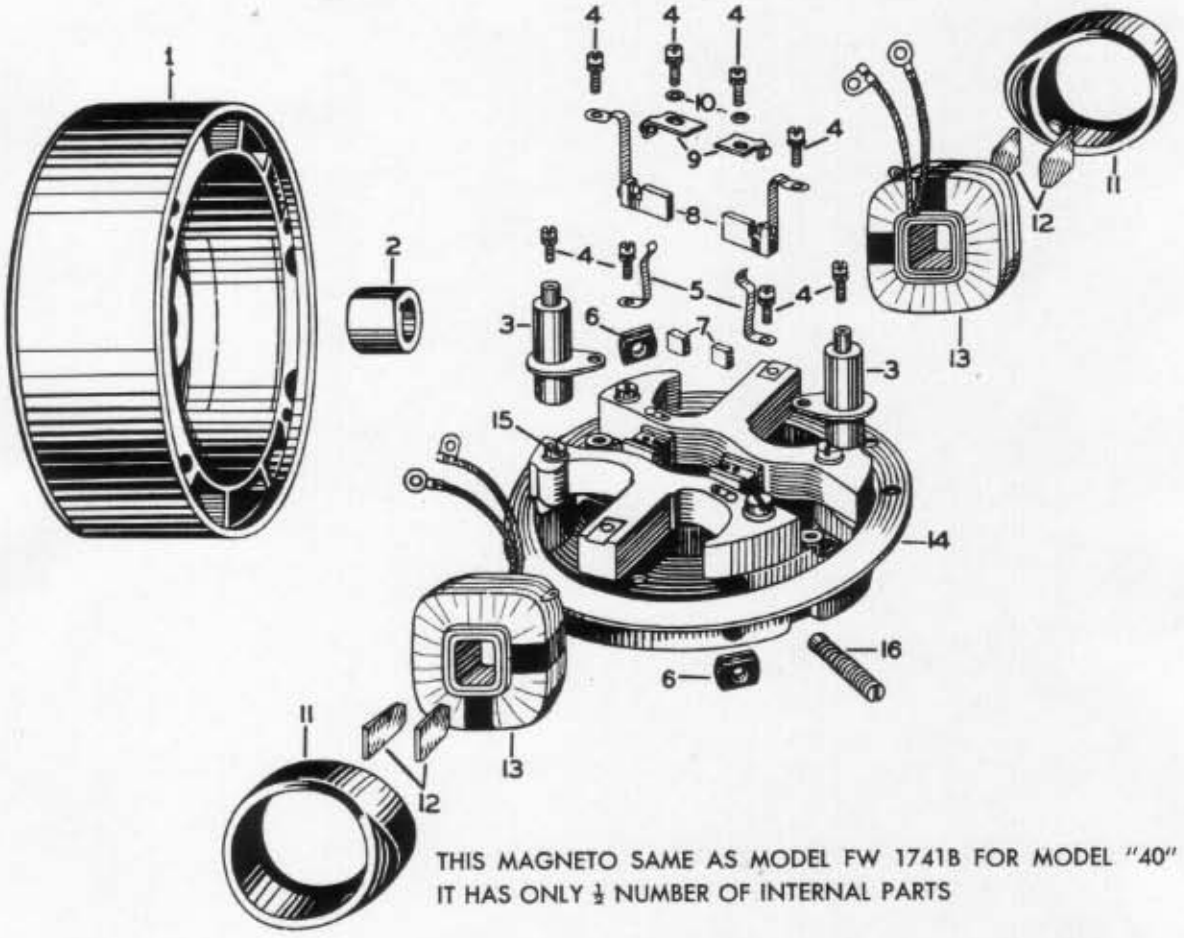
Martin Motors LOWER UNIT ASSEMBLY



Martin Motors STERN BRACKET ASSEMBLY

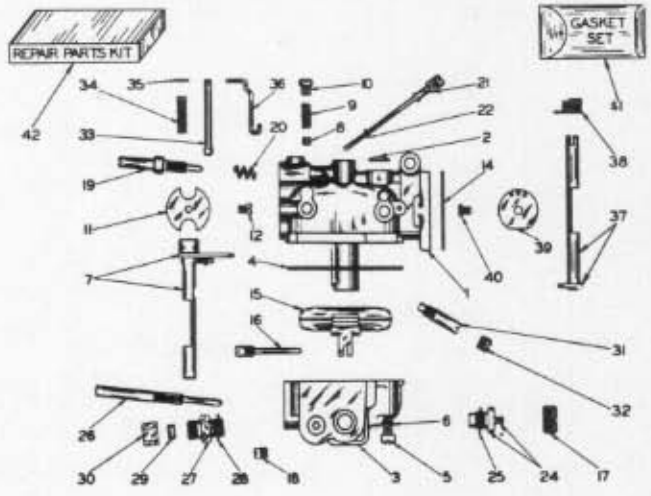


MODEL "20" WICO MAGNETO SERIES FW1883



THIS MAGNETO SAME AS MODEL FW 1741B FOR MODEL "40" EX
IT HAS ONLY ½ NUMBER OF INTERNAL PARTS

MODEL "20"
TILLOTSON CARBURETOR
MODEL MD9A



REPAIR PARTS LIST

Martin Motors POWER HEAD ASSEMBLY

Item	Part No.	Part Name
	5401	Powerhead Assembly (includes items 1-71 inclusive)
	5402	Powerhead Assembly (same as 5401 minus carburetor and magneto, items 43 to 38 and 58 to 61)
1.	15000	Tank Mounting Bracket — Rear
2.	2-s-12	Screw — Cylinder Head
3.	2-s-12	Screw — Cylinder Head
4.	35-S-17	Washer — Cylinder Head
5.	100-s-1	Spark Plug and Washer
6.	5003	Cylinder Head
7.	5005	Cylinder Water Gasket
8.	15004	Cylinder Head Compression Gasket
9.	15011	Piston Ring
10.	15012	Lockspring — Wristpin
11.	15103	Piston Assembly (including Wristpin)
12.	25297	Washer — Water Tube
13.	5035	Retainer — Water Seal
14.	36-S-5	Lockwasher — Seal Retainer Screw
15.	3-s-4	Screw — Seal Retainer
16.	15036	Gasket — Intake Port Cover
17.	15037	Cover — Intake Port
18.	25242	Clip — Magneto Wire
19.	2-S-4	Screw — Intake Port Cover
20.	36-S-5	Lockwasher — Intake Port Cover Screw
21.	5036	Oil Seal — Crankshaft — Lower
22.	15021	Bearing — Lower Main
23.	15022	Cylinder Block and Crankcase Assembly (includes items 23 to 26 and 29 to 30 inclusive)
25.	15240	Screw-Cam Follower Pin
26.	15093	Pin-Cam Follower
27.	25170	Spacer-Cam Follower
28.	25051	Cam — Follower
29.	25224	Dowel — Block to Case
30.	25154	Pin — Main Bearing Locating
31.	2-S-7	Screw — Block to Case (short)
32.	2-s-1	Screw — Block to Case (long)
33,	15031	Tank Mounting Bracket — Side
34.	5009	Gasket — Intake Manifold
35.	15028	Valve Assembly
36.	25166	Valve Spring
37,	5011	Cover — Intake Manifold
38.	36-S-5	Lockwasher — ManifoldCover Screw
39.	2-s-4	Screw — Intake Manifold
40.	25199	Gasket-Carburetor
41.	1-S-3	Screw-Cable Assembly
42.	25270	Carburetor Control Cable Assembly
43.	5016	Carburetor (includes item 44)
44.	15141	Idle Adjusting Stem
45.	15092	Shut-off Cock
46.	25235	Spring-Control Linkage
47.	25234Collar 25213-Screw	Collar Assembly — Control Linkage (consisting of parts)
48	5057	Rod-Control Linkage
49.	22-S-3	Nut-Carburetor Stud

REPAIR PARTS LIST

Martin Motors POWER HEAD ASSEMBLY

Item	Pari No.	Pari Name
50.	5015	Stud-Carburetor
51.	23-10	Screw—Speed Control Lever
52.	36-S-4	Lockwasher-Control Lever Screw
53.	15027	Speed Control Lever
54.	251 13	Starter Ratchet Ring
55.	20s-1	Nut—Magneto
56.	36-S-1	Lockwasher—Magneto Nut
57.	8-S-6	Screw—Ratchet Ring
58.	5002	Magneto Assembly F W 24 (includes items 58 to 61 inclusive)
59.	15139	Friction Shoe—Magneto
60.	15140	Cam—Magneto
61.	25402	Key—Magneto
62.	15020	Bearing—Upper Main
63.	5044	Crankshaft
64.	15091	Oil Seal-Crankshaft — Upper
65.	2-s–4	Screw—Exhaust Port Cover
66.	36-S-5	Lockwasher—Port Cover Screw
67.	5021	Cover—Exhaust Port
68.	5020	Gasket—Exhaust Port Cover
69.	15014	Connecting Rod and *Cap* Assembljj (includes items 69 to 71 inclusive)
70.	36-S-5	Lockwasher-Connecting Rod Screw
71.	15159	Screw-Connecting Rod

Martin Motors STARTER and COVER ASSEMBLY

Item	Pari No.	Part Name
	25144	Starter and Cover Assembly (Includes Items 100 to 129 Inclusive)
100	25176	Starter Housing
101	25251	Starter Cord and Handle Assembly (Includes Items 102 to 104 Inclusive)
102	25406	Starter Cord Assembly
103	25125	Starter Handle
104	25124	Plug—Starter Handle
105	25273	Spring Washer
106	25244	Starter Bias Spring
107	25121	Pawl Retainer Assembly
108	25107	Spring—Starter Friction
109	25127	Starter Pulley Assembly
110	25103	Rewind Spring
111	25109	Rewind Spring Anchor
112	8-S-5	Screw—Rewind Spring Anchor
113	25096	Starter Pivot Bolt
114	25269	Washer—Pivot Bolt
115	24-S-1	Nut—Pivot Bolt
116	25173	Cover—Pivot Bolt
117	4-s-5	Screw—Pivot Bolt
118	25208	Filler Cap Latch
119	25278	Tension Spring—Filler Cnp Latch
120	1-S-1	Screw—Filler Cap Latch
121	35-s-4	Washer—Filler Cap Latch Screw
122	25276	Filler Cap Assembly (Includes Items 123 to 129 Inclusive)
123	25407	Filler Cap (Includes Vent Screw)
124	35-S-14	Spacer—Tank Seal
125	25188	Tank Seal
126	35-S-6	Washer—Tank Seal

REPAIR PARTS LIST

Martin Motors STARTER and COVER ASSEMBLY

Item	Part No.	Part Name
127	25209	Bushing—Air Vent
128	90-s-4	Spring—Vent Seal
129	803-1	Ball—Vent Seal
130	2-s-4	Screw—Starter Mounting (Short)
131	2-S-6	Screw—Starter Mounting (Long)
132	36-S-5	Lockwasher-Starter Mounting Screw
133	5024	Gas Tank Assembly (Includes Items 133 to 137 Inclusive)
134	25255	Decal—Speed Control
135	5033	Decal—Martin "20"
136	5034	Decal—Operating Instructions
137	25259	Decal—Rear (Not Shown)
138	2-S-15	Screw—Tank Mounting
139	36-S-3	Lockwasher—Tank Mounting Screw
149	5032	Gas Line Fitting
141	5041	Gas Line Assembly (Includes Items 142 to 143 Inclusive)
142	25340	Compression Sleeve
143	25339	Compression Nut
144	5037	Shroud Assembly—Front (Includes Item 145)
145	5038	Decal-Carburetor ControlSee Decals Above)
146	5013	Shroud—Rear
147	25218	Screw-Shroud Mounting
148	37-S-2	Lockwasher—Shroud Mounting Screw
149	25410	Carburetor Control Knob Assembly (With Arrow) (Includes Item 150)
150	25359	Screw-Carburetor Knob
151	25411	Shut-Off Knob Assembly (Without Arrow) (Includes Item 150)
152	25181	Knob—Speed Control
153	8S-3	Screw—Speed Control Knob
154	38-S-1	Lockwasher—Speed Control Knob Screw

Martin Motors LOWER UNIT ASSEMBLY

Item	Part No.	Part Name
	15145	Lower Unit Assembly (Includes Items 171 to 207 Inclusive)
	15146	Gearcase Assembly (Includes Items 171 to 191 Inclusive)
171	15119	Gearcase and Seal Assembly (Includes Item 172)
172	40-S-6	Oil Seal—Drive Shaft
173	15127 or 15128	Gear Set
174	15066	Propeller Shaft
175	15067	Pin-Gear and Shaft
176	15068	Snap Ring—Bevel Gear
177	15070	Gasket—Propeller Shaft Bearing Housing
178	15148	Propeller Shaft Bearing Housing and Seal Assembly, (Includes Item 179)
179	405-7	Oil Seal—Propeller Shaft
180	15072	Pump Plate
181	15073	Pump Rotor
182	15074	Pump Eccentric
183	25084	Pin—Pump Eccentric
184	25090	Pump-Snap Ring
185	25093	Seal—Water Pump
186	15075	Water Pump Housing Assembly (Includes Item 187)
187	50-S-2	Expansion Plug
188	8-S-4	Screw—Water Pump
189	383-3	Lockwasher—Water Pump Screw

REPAIR PARTS LIST

Martin Motors LOWER UNIT ASSEMBLY

Item	Part No.	Part Name
190	25245	Grease Plug
191	25268	Gasket-Grease Plug
192	25156	Shear Pin
193	15136	Friction Clutch and Sleeve Assembly
194	5014	Propeller
195	353-3	Washer—Propeller Shaft Nut
196	25085	Nut-Propeller Shaft
197	60-S-1	Cotter Pin—Propeller Shaft
198	15058	Motor Support Tube Assembly
199	11-s-1	Screw-Gearcase Mounting
200	15154	Washer-Gearcase Mounting
201	35-S-18	Washer—Gearcase Mounting
202	12-s-1	Set Screw—Gearcase Mounting Screw
203	113-2	Screw-Gearcase Mounting
204	393-2	Lockwasher—Gearcase Mounting Screw
205	25296	Water Tube
206	25290	Drive Shaft
207	15101	Stud—Handle Bracket
208	15095	Gasket—Motor Support Tube
209	2-s-5	Screw—Motor Support Tube
210	36-S-5	Lockwasher—Motor Support Tube Screw
211	15102	Stabilizer Friction Ring
212	15098	Bracket—Steering Handle
213	15100	Grommet—Handle Bracket
214	15099	Compression Block—Handle Bracket
215	35-S-18	Washer—Handle Bracket
216	23-S-2	Nut—Handle Bracket
217	25179	Steering Handle
218	25287	Friction Washer—Steering Handle
219	3-s-3	Bolt—Steering Handle
220	26-S-1	Nut—Steering Handle Bolt
221	25342	Grip-Steering Handle

Martin Motors STERN BRACKET ASSEMBLY

Item	Part No.	Part Name
	15147	Stern Bracket Assembly (Includes Items 240 to 276 Inclusive)
240	15038	Stern Bracket Clamping Assembly (Left) (Includes Items 241 and 242)
241	25145	Clamp Screw and Handle Assembly
242	25061	Pad—Clamp Screw
243	15039	Stem Bracket Clamping Assembly (Right) (Includes Items 241 and 242)
244	15049	Stern Adjusting Screw and Handle Assembly
245	15051	Pin—Stem Adjusting Anchor
246	413-2	Washer—Reverse Stop
247	65-S-5	Drive Pin—Reverse Stop
248	15052	Clevis Pin—Stern Bracket
249	15055	Tilt Adjusting Lever
250	15054	Spacer—Tilting Lever
251	15053	Pin—Tilting Lever
252	93-2	Set Screw—Stem Bracket
253	25-S-1	Locknut—Stern Bracket Set Screw
254	15056	Thrust Socket
255	25334	Stud—Thrust Socket
256	41-S-3	Washer—Thrust Socket Stud
257	23-S-2	Nut—Thrust Socket

REPAIR PARTS LIST

Martin Motors STERN BRACKET ASSEMBLY

Item	Par! No.	Par! Name
258	15045	Swivel Bracket
259	15106	Washer—Tilting Friction
260	15105	Bolt—Tilting Pivot
261	23-s-4	Nut—Tilting Pivot Bolt
262	25284	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	15047	Motor Support Tube Casing—Front
268	9-s-1	Set Screw—Swivel Bracket
269	393-1	Lockwasher—Swivel Bracket
270	20-S-3	Nut—Swivel Bracket
271	15048	Motor Support Tube Casing—Rear
272	2-S-7	Screw—Motor Support Tube Casing
273	39-s-2	Lockwasher—Motor Support Tube Casing Screw
274	25220	Stabilizer Compression Block
275	25221	Stabilizer Compression Plate
276	13-S-1	Screw—Stabilizer

TILLOTSON CARBURETOR MODEL MD9A

Ref. No.	Par! No.	Part Name
1	08181	Body, Upper Half
2	'02531	Body, Channel Welch Plug
3	07929	Fuel Bowl
4	07903	Body Gasket
5	06062	Body Retaining Screw
6	0992	Body Retaining Screw Lockwasher
7	08002	Choke Shaft and Primer Lever (Complete)
8	'07923	Choke Friction Pin
9	'07925	Choke Friction Pin Spring
10	'07912	Choke Friction Pin Screw
11	08010	Choke Shutter
12	05430	Choke Shutter Screw
14	05591	Flange Gasket
15	07804	Float
16	'07901	Float Lever Pinion Screw
17	07896	Fuel Bowl Plug Screw (Large)
18	'0331 1	Fuel Bowl Drain Screw (Small)
19	'08252	Idle Adjustment Screw
20	'05725	Idle Adjustment Screw Spring
21	'07921	Idle Tube
22	07900	Idle Tube Gasket
23	'07283	Inlet Connection Screen
24	'08018	Inlet Needle, Seat and Gasket
25	02510	Inlet Seat Gasket
26	'08180	Main Adjustment Screw
27	0702	Main Adjustment Screw Gland
28	0676	Main Adjustment Screw Gland Gasket
29	0705	Main Adjustment Screw Packing
30	0703	Main Adjustment Screw Packing Nut
31	'08179	Main Nozzle
32	02395	Main Nozzle Channel Plug Screw
33	07993	Primer Pin
34	'07994	Primer Pin Return Spring

REPAIR PARTS LIST

TILLOTSON CARBURETOR MODEL MD9A

Ref. No.	MD-5A Part No.	MD-5B Part No.	Part Name
35	'03804		Primer Pin Washer
36	07995		Primer Pin Link
37	08185		Throttle Shaft and Lever
38	'07910		Throttle Return Spring
39	08011		Throttle Shutter
40	*05430		Throttle Shutter Screw
41	'08025		Gasket and Packing Set
42	08314		Repair Parts Kit

(*) Indicates contents of Repair Parts Kit No. 08314.

REPAIR PARTS LIST

Martin Motors WICO MAGNETO SERIES FW2A-24

Ref. No.	Part No.	Part Name
1	Y6404-F	Rotor
2	5465-F	*cam*
3	X5463-F	Condenser Assembly
4	5431-F	Condenser Assembly Clamp **Screw** GEMS)
4	5431-F	Fixed Contact Clamp Screw (SEMS)
4	5431-F	Breaker Spring Clamp Screw (SEMS)
4	5431-F	Condenser Connecting Clamp Screw GEMS1
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	'5884-F	Lead Wire (15")
21	*5884-F	Lead Wire (17")
22	'6277-F	Stator Plate Unit
		MAGNETO COMPLETE

* Items marked as such are not shown in picture.