WEST BEND 5½ TO 9 HP

Year produced	5½, 6 hp	7½, 8, 9 hp
1955	160571	160772
1956	160501, 160511	160701, 160711
1957	160521, 160531	160721, 160731
1958	6801, 6802	8801, 8802, 8811, 8812
1959	6901, 6902	8901, 8902, 8911, 8912
1960	.....	7001, 7002, 8001
1961	.....	6101, 7101
1962	.....	6102, 7201
1963	.....	730
1964	640	.....
1965	650	950

NOTE: COMMODORE Outboard Motor Models 73001, 73201 and 7320 are similar in design and construction to WEST BEND 7½ and 8 hp motors. Service procedures outlined in this section will also apply to COMMODORE Motors.

CONDENSED SERVICE DATA

TUNE-UP		
Engine rpm	4000	4000
Bore—Inches	2	2⅛
Stroke—Inches	1 11/16	1 11/16
Number of Cylinders	2	2
Displacement—Cu. In.	10.60	11.97
Compression @ Cranking Speed (average)	55 psi	70 psi
Spark Plug		
Champion	H10J	H8J
AC	45L	M43L
Electrode gap	0.030	0.030
Magneto		
Point gap	0.020	0.020
Timing	See Text	See Text
Carburetor		
Make	Tillotson	Tillotson
Model	MD, MT	MD, MT
Adjustment	See Text	See Text
Fuel—Oil Ratio	16:1	16:1
SIZES — CLEARANCES		
Piston Rings		
End gap	0.006-0.011	0.006-0.011
Side clearance	0.0015-0.004	0.0015-0.004
Piston to Cylinder Clearance	0.002-0.003	0.002-0.003
Piston Pin		
Diameter	0.500	0.500
Clearance (Rod)	Roller Brng.	Roller Brng.
Clearance (Piston)	0.00005-0.0005	0.00005-0.0005

SIZES—CLEARANCES (Cont'd)		
Crankshaft Journal Diameters		
Upper Main	0.8711-0.8715	0.8711-0.8715
Center Main	0.8120-0.8125	0.8120-0.8125
Lower Main	0.7495-0.750	0.7495-0.750
Crankpin	0.7497-0.750	0.7497-0.750
Crankshaft Bearing Clearance		
Upper Main	Roller Brng.	Roller Brng.
Center Main	0.0025-0.0035	0.0025-0.0035
Lower Main	0.0015-0.0025	0.0015-0.0025
Crankpin	Roller Brng.	Roller Brng.
Crankshaft End Play	0.002-0.006	0.002-0.006
Rod Side Clearance	0.015-0.025	0.015-0.025
Lower Unit		
Driveshaft Brng. Clr.	0.0009-0.0023	0.0009-0.0023
TIGHTENING TORQUES		
(All Values in Inch-Pounds)		
Connecting rod	75-80	75-80
Flywheel nut	240-300	240-300
Cylinder head	70	70
Spark Plug	264-276	264-276
Standard Screws		
No. 10-24	30	30
No. 10-32	35	35
No. 12-24	45	45
¼-20	70	70
5/16 - 18	160	160
⅜-16	270	270

LUBRICATION

The power head is lubricated by oil mixed with the fuel. One-half (½) pint of two-cycle engine oil should be mixed with each gallon of gasoline. Marine white or automotive white gasoline is recommended; if not available, use a good grade of regular gasoline. Gasoline and oil should be thoroughly mixed.

The lower unit gears and bearings are lubricated by oil contained in the gear case. Only a non-corrosive, leaded, outboard, gear oil, EP90 such as "Texaco Outboard Gear Oil—EP90" or equivalent should be used. The gear case should be drained and refilled every 100 hours or once each year, and fluid maintained at the level of the upper (vent) plug hole.

To fill the gear case, have the motor in upright position and fill through the lower plug hole in port side of gear case until fluid reaches level of upper vent plug. Have both plugs removed while filling. Reinstall and tighten both plugs securely, using new gaskets if necessary, to assure a water tight seal.

FUEL SYSTEM

CARBURETOR. Tillotson, type MD or MT carburetors are used. Refer to Fig. WB10 or WB10A. Normal initial setting is one turn open from the closed position for both the high speed adjustment needle and the idle mixture adjustment needle. Carburetor must be readjusted under load, after motor is warm, for best high speed and low speed performance.

Type MD: Refer to Fig. WB10 for exploded view.

To adjust the float, remove and invert the fuel bowl assembly (20). With bowl inverted

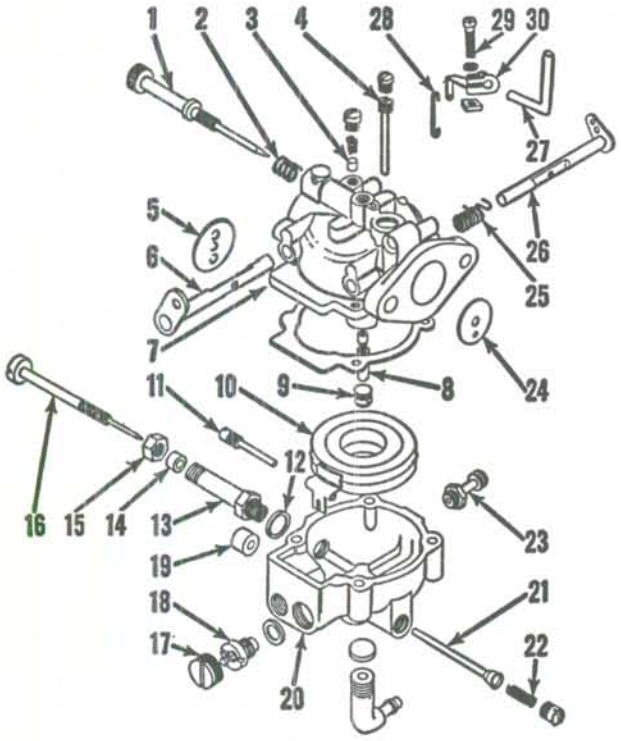


Fig. WB10 — Exploded view of Tillotson MD carburetor.

1. Idle adjustment screw
2. Spring
3. Choke detent
4. Idle tube
5. Choke valve
6. Choke shaft
7. Body
8. Main nozzle
9. Plug
10. Float
11. Float shaft
12. Gasket
13. Packing gland
14. Packing
15. Nut
16. High speed needle
17. Plug
18. Inlet needle & seat
19. Drain valve button
20. Float bowl
21. Drain valve
22. Valve spring
23. Fitting
24. Throttle valve
25. Throttle spring
26. Throttle shaft
27. Cam follower
28. Link
29. Clamp screw
30. Follower arm

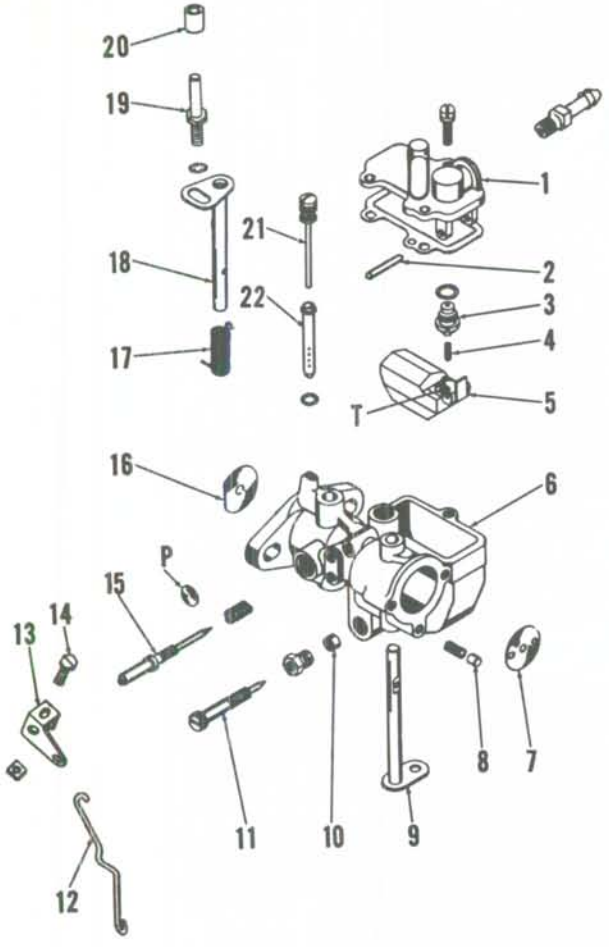


Fig. WB10A — Exploded view of Tillotson Type MT carburetor used on some motors.

P. Plug
T. Tang
1. Bowl cover
2. Float shaft
3. Inlet seat
4. Inlet needle
5. Float
6. Throttle body
7. Choke plate
9. Choke shaft
10. Packing
11. Main adjustment needle
12. Link
13. Arm
14. Screw
15. Idle adjustment needle
16. Throttle plate
17. Spring
18. Throttle shaft
19. Follower stud
20. Follower roller
21. Idle tube
22. Main nozzle

and inlet needle valve closed, the lowest point of float at free end should project approximately 1/64-inch below gasket surface of bowl. Adjust by bending the vertical valve fork on float. Float must be removed to renew the inlet needle assembly (18). When installing float, make sure that slot in float lever engages groove in needle.

Type MT: Refer to Fig. WB10A for exploded view. To adjust the float, remove float bowl cover (1) with float attached. Invert the cover and adjust the float by bending tang (T) until farthest edge of float measures 1 7/64-inch from gasket surface of bowl cover.

It may be necessary to remove welch plug (P) and blow out idle passages if carburetor is badly plugged.

SPEED CONTROL LINKAGE. The speed control lever or grip is connected to the magneto stator plate to advance or retard the ignition timing. Throttle linkage is synchronized to open the throttle as magneto timing is advanced. It is very important that the throttle linkage be properly synchronized for best performance.

To synchronize the linkage on models with Type MD carburetor, refer to Fig. WB11. With the engine not running, loosen the clamping screw (S) in throttle control bellcrank. Move the speed control grip or lever until the scribe mark (A) on throttle cam (2) is aligned with cam follower (1). Move cam follower until it just contacts cam at the scribe mark; then tighten screw (S). Throttle link (28 — Fig. WB10) should be hooked in attaching hole nearest the axis of throttle shaft (26).

On models with Type MT carburetor, loosen the nut retaining follower stud (19—Fig. WB10A) to throttle shaft (18) and move stud in slot until roller (20) contacts cam at scribe mark. Tighten stud nut with slack removed. As speed control grip or lever is moved further to the "Fast" position, the throttle valve should start to open.

On cable controlled models, install the cable as shown in Fig. WB12. Attach cable to cam pulley (1) in ball slot (A). Run cable over rear idler pulleys, then enter control pulley (2) at bottom as shown. Wrap cable

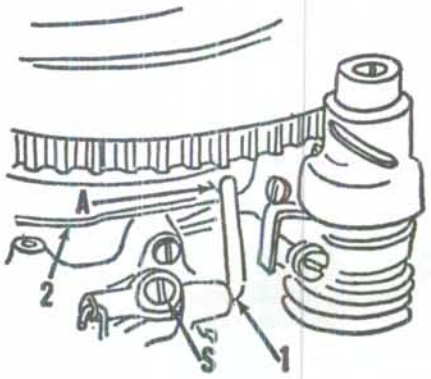


Fig. WB11 — Carburetor throttle linkage showing method of adjustment. Refer to text for details.

1. Cam follower
2. Throttle cam
A. Scribe line
S. Clamp screw

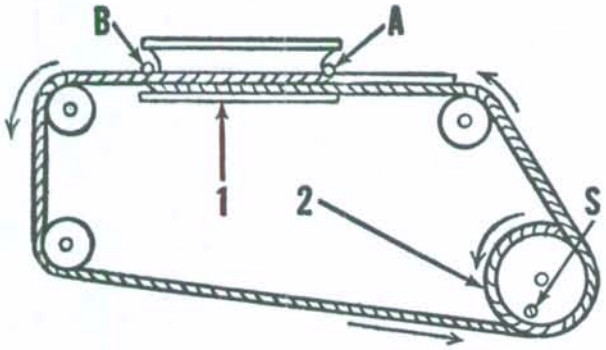


Fig. WB12 — Schematic view of speed control cable showing method of installation. Refer to text.

A. Front ball slot
B. Rear ball slot
S. Clamping screw
1. Magneto stator cam
2. Control pulley

around control pulley 1½ turns, with last wrap in outside of cable groove, AWAY from center of motor. Pass cable over front of idler and below the previously installed cable on cam pulley to ball slot (B).

To adjust the cable, loosen clamping screw (S). Fully advance stator plate (counter-clockwise). Turn speed control grip toward "Fast" position (clockwise) as far as it will go; then retighten screw (S). Speed control grip may be repositioned by loosening the clamping screw which attaches the pinion to speed control grip shaft.

REED VALVES. The inlet reed valves are located on reed plate between inlet manifold and crankcase. The reed valve assembly should be checked every time the carburetor is removed for service. Reed petals should seat very lightly against the reed plate throughout their entire length, with the least possible tension. Check seating visually. Reed stop setting should be $\frac{3}{16}$-inch when measured from free end of reed stop to seating surface on reed plate. Renew reeds if petals are broken, cracked, warped, rusted or bent. Never attempt to bend a reed petal or to straighten a damaged reed. Broken reed petals are sometimes caused by a bent or damaged reed stop. Seating surface of reed plate should be smooth and flat.

FUEL PUMP. A diaphragm type fuel pump is attached to the transfer port cover for the upper crankcase. Pressure and vacuum pulsations from the crankcase are directed through the port (1—Fig. WB13) to the rear of diaphragm (2). When the powerhead piston moves upward in its cylinder, vacuum in the crankcase draws the diaphragm inward and fuel enters the fuel chamber through filter (6) and the inlet reed valve (4) in reed plate (3). As powerhead piston moves downward, pressure forces the diaphragm outward into fuel chamber and fuel passes through the outlet reed valve to carburetor line (7).

Defective or questionable parts should be renewed. Reeds (4) should seat lightly and squarely on reed plate (3). Diaphragm should be renewed if air leaks or cracks are found, or if deterioration is evident.

IGNITION

Breaker point gap should be 0.020 for each set of points, and can be adjusted after the flywheel is removed. Both sets of points should be adjusted exactly alike. NOTE: High point of breaker cam coincides with location of flywheel key. Align key with rub block when adjusting each set of points.

COOLING SYSTEM

WATER PUMP. All motors are equipped with a rubber impeller water pump of the general type shown in Fig. WB14. The water pump is mounted in the lower unit drive shaft housing (upper gearcase).

When cooling system problems are encountered, first check the water inlet for plugging or partial stoppage, then if not corrected, remove the lower unit gearcase and check the condition of water pump, water passages and sealing surfaces.

One pump housing kit is used to service several West Bend outboard motors. This kit contains two water line seals and a retaining ferrule. When renewing the pump housing, install the seal with the smallest inside diameter; then press the ferrule in place over seal until upper edge of ferrule is $1\frac{11}{16}$ inches from bottom of housing as shown in Fig. WB15.

POWER HEAD

R&R AND DISASSEMBLE. To overhaul the power head, clamp the motor on a stand or support; and remove the engine cover (shroud), intake silencer and control panel. Remove flywheel, starter, magneto and carburetor. Remove all interfering wiring and linkage, and as many screws as possible retaining inlet manifold, exhaust covers, transfer port covers, cylinder head, etc., before detaching power head from lower unit.

Remove the screws which secure the power head assembly to lower unit, and lift off the power head assembly. Refer to Fig. WB16.

Crankshaft and pistons can be removed after removing upper bearing cage (21); then removing crankcase front half (14). Exhaust covers (2 & 3), cylinder head (1), transfer port cover (24) and cylinder drain cover (23) should be removed for cleaning and inspection if major repairs are to be performed. Pry lugs are provided adjacent to the retaining dowels, for removing the crankcase front half.

Engine components are now accessible for removal and overhaul as outlined in the appropriate following paragraphs. Assemble as outlined in the ASSEMBLY paragraph.

ASSEMBLY. When reassembling, make sure all joint and gasket surfaces are clean, free from nicks and burrs and hardened cement or carbon. Because of the two-cycle design, crankcase and inlet manifold must be completely sealed against both vacuum and pressure. Exhaust manifold and cylinder head must be sealed against water

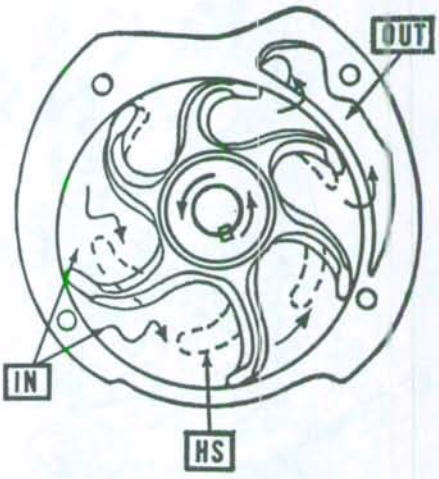


Fig. WB14 — Schematic view of rubber impeller type water pump showing method of operation. The offset housing and flexing impeller blades causes pump to operate by positive displacement at slow speeds. At high speeds impeller blades remain curved (HS) and pump operates by centrifugal action.

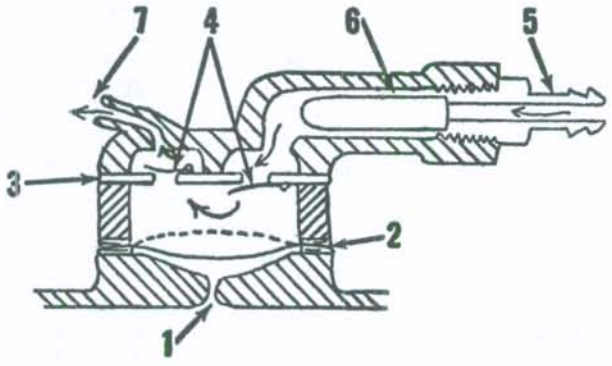


Fig. WB13 — Schematic view of the diaphragm type fuel pump used on all models. Check valves are of the reed type.

1. Pressure port
2. Diaphragm
3. Reed plate
4. Check valves
5. Inlet fitting
6. Filter
7. Outlet

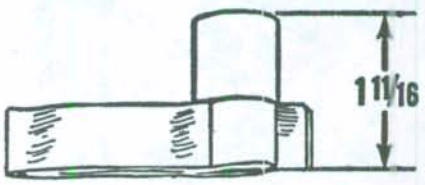
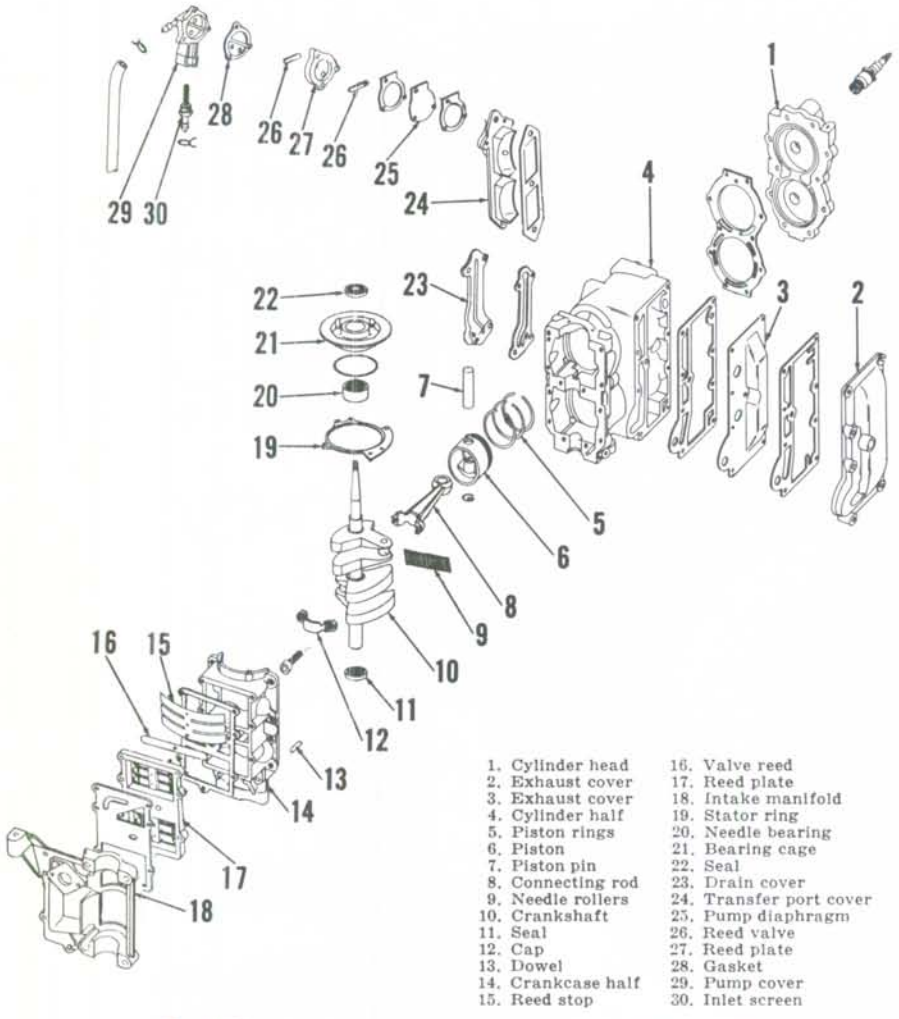


Fig. WB15 — When installing water pump housing seal, press retaining ferrule on housing until total height is 1 11/16 inches as shown.



1. Cylinder head
2. Exhaust cover
3. Exhaust cover
4. Cylinder half
5. Piston rings
6. Piston
7. Piston pin
8. Connecting rod
9. Needle rollers
10. Crankshaft
11. Seal
12. Cap
13. Dowel
14. Crankcase half
15. Reed stop
16. Valve reed
17. Reed plate
18. Intake manifold
19. Stator ring
20. Needle bearing
21. Bearing cage
22. Seal
23. Drain cover
24. Transfer port cover
25. Pump diaphragm
26. Reed valve
27. Reed plate
28. Gasket
29. Pump cover
30. Inlet screen

Fig. WB16 — Exploded view of power head and associated parts.

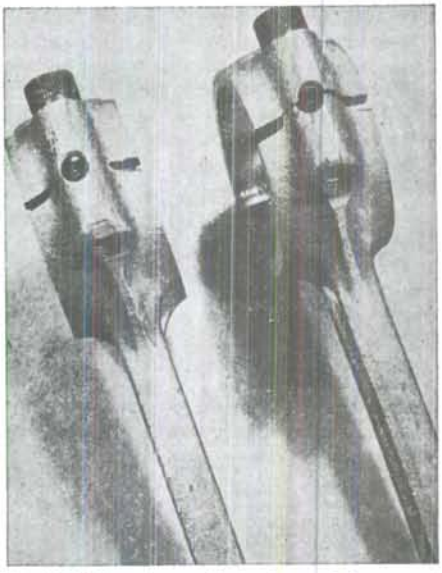


Fig. WB17 — Assembled views of fractured connecting rod showing correct and incorrect cap installation.

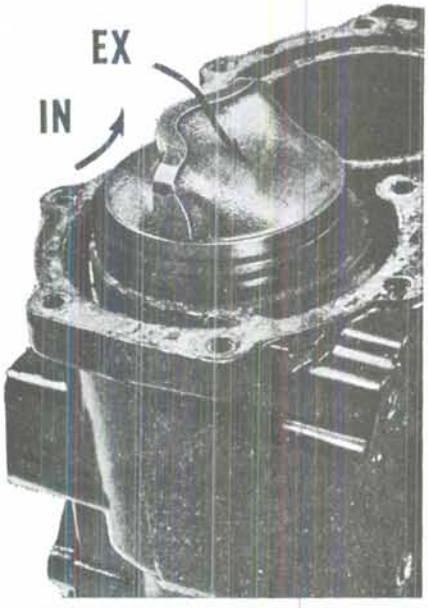


Fig. WB18—Piston correctly installed in cylinder, showing relation of piston baffle to inlet and exhaust ports.

leakage and pressure. Mating surfaces of water intake, and exhaust areas between power head and lower unit must form a tight seal.

Whenever power head is disassembled, it is recommended that all gasket surfaces, and mating surfaces without gaskets, be carefully checked for nicks and burrs and warped surfaces which might interfere with a tight seal. The cylinder head, head end of cylinder block, and some mating surfaces of manifolds and crankcase may be checked, and lapped if necessary, to provide a smooth surface. Use a regular lapping block or a sufficiently large piece of smooth plate glass. Lay a sheet of No. 00 emery paper on the lapping block, then place the surface to be lapped on the emery paper. Apply very light pressure and use a figure-eight motion, checking frequently to determine progress. Do not remove any more metal than is necessary. Finish lap using lapping compound or worn emery paper. Thoroughly clean the parts with new oil on a clean, soft rag then wash with soapsuds and clean rags.

Mating surfaces of crankcase may be checked on the lapping block, and high spots or nicks removed, but the surface must not be lowered. If extreme care is used, a slightly damaged crankcase may be salvaged in this manner.

A heavy, non-fibrous grease should be used to hold loose needle bearings in position during assembly. All friction surfaces should be lubricated with new engine oil. Check frequently as power head is being assembled, for binding of the working parts. If binding or locking is encountered, remove the cause before proceeding with the assembly.

Gasket and sealing surfaces should be lightly and carefully coated with a non-hardening gasket cement. Make sure entire surface is coated, but avoid letting excess cement squeeze out into crankcase, bearings or other passages. When installing the crankcase screws, tighten those next to the main bearings and dowels first. Refer to CONDENSED SERVICE DATA table for clearances and tightening torques.

PISTONS, PINS, RINGS AND CYLINDERS. Piston is fitted with three rings which should be installed with the beveled inner edge toward closed end of piston. Recommended ring end gap is 0.006-0.011, with a maximum wear limit of 0.016. Piston rings should have 0.0015-0.004 side clearance in piston grooves, with a wear limit of 0.005.

Piston skirt clearance should be 0.002-0.003 when measured at widest part of skirt at right angles to piston pin. Renew the piston if skirt clearance exceeds 0.005.

When installing piston in cylinder, the long, tapering side of baffle on piston head should be installed on port side of engine, toward the exhaust ports. See Fig. WB18. All friction surfaces should be lubricated with new engine oil when assembling.

CONNECTING RODS, BEARINGS AND CRANKSHAFT. Before detaching connecting rods from crankshaft, make certain that rod and cap are properly marked for correct assembly to each other and in the correct cylinder. The loose needle bearings at crankpin end of connecting rod should be kept with each assembly and not intermixed if reused.

The forged steel connecting rods contain 28 loose needle rollers at crankpin end of rod and a caged needle bearing at piston end. Parting faces of rod and cap are not machined, but are fractured, as shown in

Fig. WB17, to provide positive location. When installing cap, make sure the correlation marks are aligned; then shift cap back and forth slightly while tightening, until fractured sections are in perfect mesh. When properly insalled, the parting line is practically invisible as shown in the left hand view. Rod side play on crankpin should be 0.015-0.025, with a wear limit of 0.035.

The crankshaft upper main bearing is a part of bearing cap (21—Fig. WB16) on all except 1965 models which have a renewable needle bearing (20). Center and lower main bearings consist of bronze bushings cast into the crankcase housing; then align reamed. Recommended diametral clearance is 0.0025-0.0035 for the center bearing and 0.0015-0.0025 for the lower. Renew crankshaft and/or crankcase if clearance exceeds 0.004 for the center bearing or 0.0035 for the lower. Recommended crankshaft end play is 0.002-0.006, with a wear limit of 0.011. Oversize and undersize parts are not available.

When assembling, follow the procedures outlined in the ASSEMBLY paragraph. Tightening torques are listed in the CONDENSED SERVICE DATA table.

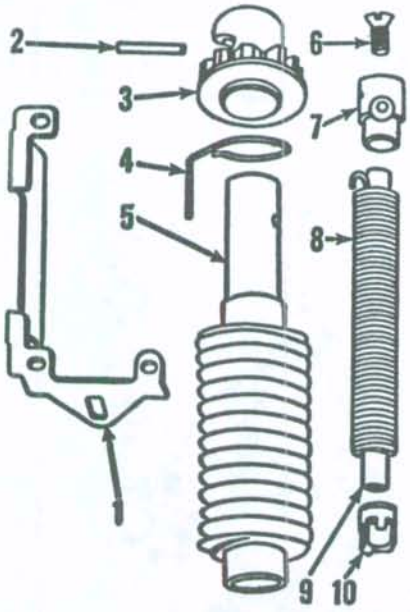


Fig. WB19—Exploded view of recoil starter of the type used.

1. Rope guide
2. Drive pin
3. Drive pinion
4. Pinion spring
5. Starter spool
6. Locking screw
7. Spring drive
8. Recoil spring
9. Guide post
10. Retainer

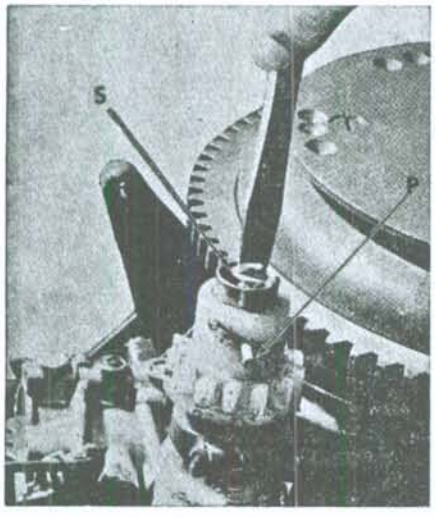


Fig. WB20—To disassemble the starter, first remove lock screw (S) and install the special tool before attempting to remove drive pin (P). Refer to text.

MANUAL STARTER

Fig. WB19 shows an exploded view of the recoil starter assembly. Starter pinion (3) engages a starter ring gear on the flywheel (See Fig. WB20).

To disassemble the starter assembly, first remove the engine cover, then remove screw (S—Fig. WB20). NOTE: This screw locks pin (P) in place in starter shaft. Thread the special "T" handle tool (West Bend, T3139) in threaded hole from which screw (S) was removed. Tighten the tool until it bottoms. Turn tool handle slightly counterclockwise to relieve spring tension; then carefully push the pin (P) out of pinion and starter spool. Allow the tool and starter drive (7—Fig. WB19) to turn clockwise until recoil spring (8) is unwound; then use the tool to withdraw the recoil spring (8) and drive (7) from center of starter spool (5). Guide post (9) and spring retainer (10) can be lifted out after recoil spring is removed.

Recoil spring, pinion (3) or associated parts can be renewed at this time. To renew the starter rope, remove the clamps retaining spool (5) to inlet manifold bracket and remove the spool. Thread the new rope through hole in lower end of spool (5) and install the hooked retainer link by pushing pointed end through rope approximately ½-inch from end. Pull secured end of rope into spool, then fully wind rope in spool grooves and install the spool. Install the recoil spring assembly, making sure that lug of lower spring retainer (10) engages slot in rope guide (1). With recoil spring assembly and drive pinion (3) reinstalled, use the "T" handle tool to wind the recoil spring counter-clockwise eight (8) turns. Align the holes in pinion (3), spool (5) and spring drive (7); then insert the drive pin (2). Remove the tool and reinstall the locking screw (6). Recoil spring cavity of starter spool (5) should be filled with lubriplate or a similar grease when reassembling.

LOWER UNIT

PROPELLER AND DRIVE PIN. Shear pin protection is carefully engineered for each unit. Protection depends on shear pin material as well as size. Although, in an emergency, the shear pin may be replaced by one of any available material, the correct shear pin should be installed as soon as possible to insure maximum performance and protection. Spare shear pins should always be carried.

All models use a 5/32-inch stainless steel shear pin which may vary in length from 31/32-inch to 1¼ inch. Two blade propellers are used on all models. All 5½ and 6 horsepower models except 1961 use a 7½-inch diameter 7-inch pitch propeller. 1955 model, 7½ horsepower motors use a 7½-inch diameter, 8-inch pitch propeller. All other models use an 8-inch diameter, 8-inch pitch propeller. Direction of rotation is clockwise on gearshift models and counter-clockwise on models with neutral clutch.

R&R AND OVERHAUL. Two types of lower unit drives are used; the full gear shift type; and the 360° pivot drive unit with neutral clutch. Refer to the appropriate following paragraphs for disassembly and overhaul porcedures.

1. Shift rod
2. Water pump housing
3. Top plate
4. Impeller
5. Back plate
6. Oil seal
7. Drive shaft housing
8. Inlet water tube
9. Inlet screen
10. Drive pinion
11. Shift cam
12. Gearcase housing
13. Forward gear
14. Thrust washer
15. Roll pin
16. Clutch dog
17. Shift plunger
18. Spring
19. Propeller shaft
20. Thrust washer
21. Reverse gear
22. Bearing
23. Bearing cage
24. "O" ring
25. Seal
26. Snap ring

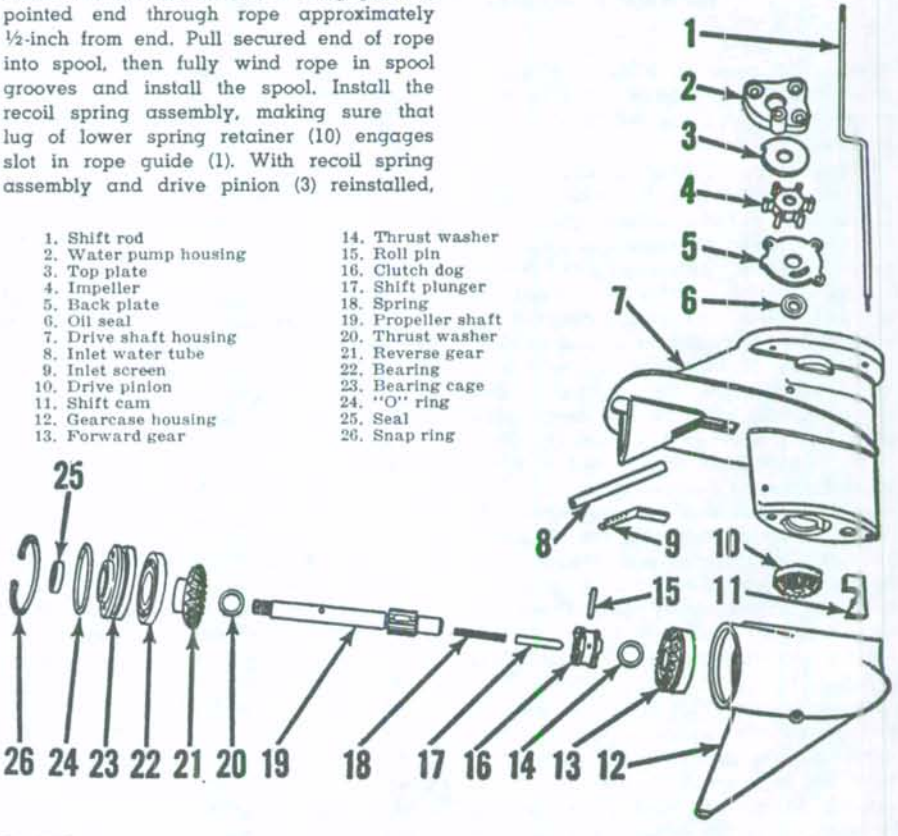


Fig. WB21—Exploded view of lower unit gearcase, drive shaft housing and associated parts.

Fig. WB22—Lower unit gearcase with propeller shaft bearing cage removed, showing location of rear stud nut.

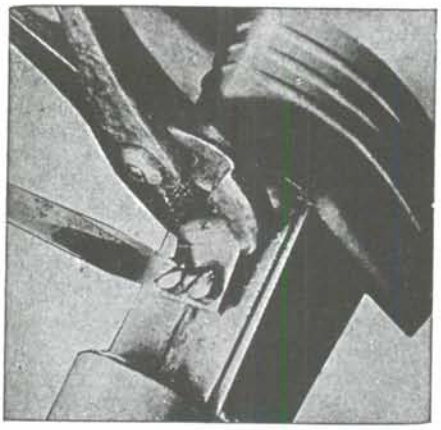


Fig. WB24—Disconnecting the neutral clutch cable clamp on 360° pivot models.

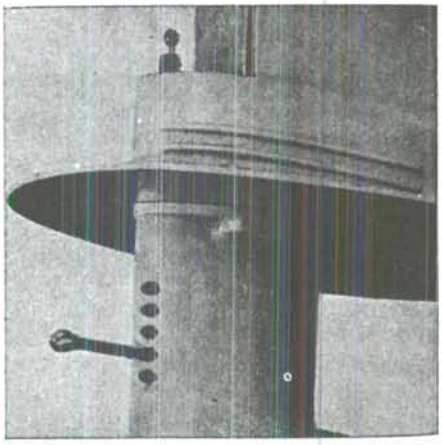


Fig. WB26 — Compress and hold the cam spring as shown, when assembling the lower unit.

Full Gear Shift Models: Refer to Fig. WB21. Loosen the locknut on the shift rod coupling, located behind swivel bracket below the power head. Remove the shift rod coupling turnbuckle to disconnect the shift rod; then unbolt and remove driveshaft housing (upper gearcase) and gearcase from motor leg. Turn shift rod (1) counter-clockwise to clear the water pump housing; then disassemble and remove the water pump assembly (2 through 5).

Remove the propeller and shear pin. Remove any burrs or rust from exposed end of propeller shaft. Remove snap ring (26), thread two screws in threaded holes of propeller shaft bearing cage (23); and remove the cage, using a puller.

To detach lower gearcase (12) from drive shaft housing (7), unscrew and remove shift rod (1). Housings are secured by a socket head cap screw at the front and the stud nut INSIDE the case shown by arrow, Fig. WB22.

Propeller shaft, gears, bearings and shift mechanism can be removed after housings are separated. Front gear and bearing (13—Fig. WB21) can usually be dislodged from housing by jarring open end of housing on a block of wood. If trouble is encountered, heat gearcase slightly with a torch to loosen bearing. When installing front gear in housing, assemble bearing cage (23), wihout the "O" ring (24) over rear of propeller shaft; install thrust washer (14) and gear assembly (13) on front of shaft; and use the shaft as a piloted driver. Backlash and mesh position of the gears are not adjustable.

Assemble by reversing the disassembly procedure. Adjust the gear shift rod coupling until gear shift control rod (Fig. WB23) is horizontal in the neutral position, and forward and reverse gears engage fully.

Neutral Clutch Type: To remove the gearcase housing, remove the motor leg clip and loosen the cable clamp screws as shown in Fig. WB24. Disconnect the lower cable (20—Fig. WB25) from clamp, then unbolt and remove the lower gearcase housing (15).

Remove the propeller and shear pin; and dress exposed end of propeller shaft to remove any burrs or rust. Unbolt and remove the propeller shaft bearing cage (3). Component parts can then be removed.

Assemble by reversing the disassembly procedure, making sure that plunger (14) is installed with rounded end protruding from propeller shaft. Plunger must fit in slotted notch of clutch release cam (20). Before installing gearcase to lower motor leg, depress the spacer (19) and insert a cotter pin or nail in next to lowest water inlet port as shown in Fig. WB26, to prevent interference during assembly.

To adjust the neutral clutch cable, loosen the cable clamps as shown in Fig. WB24, and pull the slack from upper cable, with shift lever in "Forward" position. Tighten the cable clamp screws slightly; then move the shift lever to "Neutral" position, while allowing upper cable to slip through clamp. Tighten the clamp screws with all slack removed, then check for proper operation of clutch.

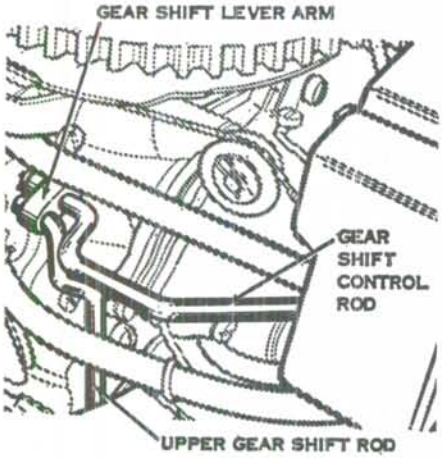


Fig. WB23—Adjust the gear shift rod coupling until the gear shift control rod is horizontal in the neutral position.

Fig. WB25 — Exploded view of lower unit gearcase and associated parts used on models with neutral clutch.

1. Retainer
2. Shaft seal
3. Bearing cage
4. Gasket
5. Retaining washer
6. Clutch spring
7. Propeller shaft
8. Cross pin
9. Clutch dog
10. Driven gear
11. Drive pinion
12. Lock ring
13. Thrust washer
14. Plunger
15. Gearcase
16. Washer
17. Cam spring
18. Washer
19. Spacer
20. Release cam