

# CLINTON

CLINTON ENGINES CORPORATION

Outboard Division  
Clinton, Michigan

## CONDENSED SERVICE DATA

Year Produced	Model
1957 .....	J7
1958 .....	J8
1959 .....	J9
1960 .....	J9
1961 .....	J9
1962 .....	J9
1963 .....	J9

NOTE: Motors may be marked "CLINTON," "CHIEF" or "APACHE." Model number is given on identification plate on swivel bracket.

### TUNE-UP

HP @ rpm .....	5 @ 4200
Bore — Inches .....	2 1/8
Stroke — Inches .....	1 5/8
Number of Cylinders .....	1
Displacement — Cubic Inches .....	5.76
Spark Plug	
Champion .....	J12J
AC .....	M48
Auto-Lite .....	A11X
Electrode Gap .....	0.025
Magneto	
Point Gap .....	0.020
Timing .....	See Text
Carburetor	
Make .....	Tillotson
Model .....	MT
Adjustment .....	See Text
Fuel-Oil Ratio .....	16:1

### SIZES-CLEARANCES

#### POWER HEAD

Piston Rings	
End Gap .....	0.007 -0.017
Side Clearance .....	0.0015-0.004
Piston Skirt Clearance .....	0.005 -0.007

### LUBRICATION

The power head is lubricated by oil mixed with the fuel. Use 1/2 pint of non-detergent, SAE 30, or Outboard Motor oil with each gallon of regular gasoline.

The lower unit gears and bearings are lubricated by oil contained in the gearcase. SAE 90 EP automotive or a good Outboard Motor gear lubricant should be used. Lubricant should be checked every 20 hours of operation and maintained at the level of drain plug (D—Fig. CL1) when

motor is laying on starboard side with the drain plug down. If level is overfull, check for water in the lubricant. To renew the lubricant, remove gearcase lower cover (C), clean the case and inspect the gears. If excessive water is noted renew seals and/or bearings as outlined in LOWER UNIT section. Reinstall cover using a new gasket and suitable sealant. Remove drain plug (D) from starboard side of gearcase and filler plug (F) from opposite (port) side. Lay the motor on its side with filler plug up and fill the gearcase until the level

reaches drain plug hole. Reinstall plugs, using new gaskets and making sure plugs are tight.

### FUEL SYSTEM

**CARBURETOR.** Tillotson, model MT65A or MT65B carburetors are used. Normal initial setting of high speed mixture needle (19—Fig. CL2) is one turn open. Initial setting of slow speed adjustment needle (16) is 3/4-turn open. Final adjustment must be made under normal load after motor has reached operating temperature.

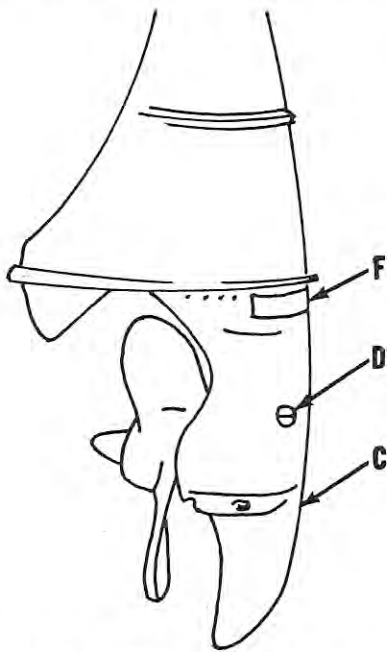
### SIZES-CLEARANCES (Cont.)

Crankshaft Bearing Diameter	
Upper Main Bearing .....	0.7495-0.7502
Lower Main Bearing .....	0.7495-0.7502
Crankpin .....	0.6594-0.6599
Crankshaft Bearing Clearances	
All Bearings .....	Ball or Roller
Piston Pin	
Diameter .....	0.4999-0.5001
Clearance in Piston .....	0.0000-0.0002
Clearance in Rod .....	0.0004-0.001
LOWER UNIT	
Drive Shaft Bearing Clearance	
Upper .....	0.002 -0.0035
Lower .....	0.002 -0.0035
Propeller Shaft Bearing Clearance	
Front .....	0.0025-0.004
Rear .....	0.0025-0.004

### TIGHTENING TORQUES

(All Values In Inch-Pounds)

Connecting Rod .....	70-80
Crankcase Bearing Plate .....	75-95
Reed Plate .....	60-65
Flywheel Nut .....	350
Spark Plug .....	300



**Fig. CL1 — Clinton outboard motor gear case showing points of lubrication.**

- C. Gear case cover
- D. Drain plug
- F. Filler plug (on port side of unit).

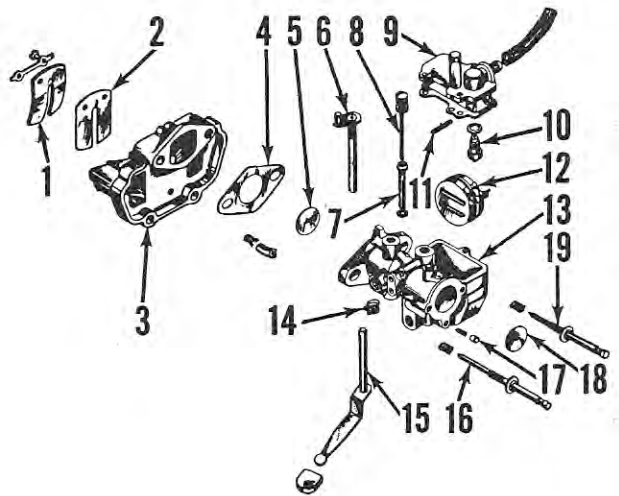
To make the final adjustment, proceed as follows: Advance the throttle until motor is at approximately half-speed, then slowly turn the high-speed mixture needle counter-clockwise until motor falters or slows down, then clockwise until motor runs smoothly. Adjust the slow-speed mixture needle in the same manner AFTER high-speed mixture has been adjusted. After both mixture needles have been adjusted, alternately open and close the throttle a few times while under load. Motor should not hesitate, stall, or die at slow speed. If it does, readjust the mixture needles, starting with high-speed mixture needle. If still not corrected, check the float level and/or overhaul carburetor.

The mixture adjustment knobs on control panel are designed so that the needles cannot be turned completely without removing the knobs. If a major adjustment is required, remove knobs using an Allen wrench. After adjustment is complete re-install knobs with indicators pointing horizontally outward away from each other. This position will allow the maximum of adjustment without removing knobs.

To adjust the float level, disconnect the fuel line and remove and invert bowl cover (9) with float (12) attached. Float setting is correct if the distance from gasket surface of cover to farthest edge of float is  $1\frac{3}{32}$  inches. Adjust by removing float and bending float lever tang where it contacts inlet needle (10). Measurement should be made without the gasket and should not vary more than 1/64-inch from the given setting. Float must be removed to renew the inlet needle valve assembly (10).

**Fig. CL2—Exploded view of carburetor, intake manifold and reed valve assembly used on Clinton outboard motor.**

1. Reed stop
2. Reed petals
3. Inlet manifold and reed plate
4. Gasket
5. Throttle valve
6. Throttle shaft
7. Main nozzle
8. Idle tube
9. Bowl cover
10. Inlet needle valve assembly
11. Float shaft
12. Float
13. Body assembly
14. Choke spring
15. Choke shaft
16. Idle adjustment needle
17. Friction pin
18. Choke valve
19. Main mixture needle



**SPEED CONTROL LINKAGE.** The speed control lever rotates the magneto stator plate to advance or retard the timing. The throttle valve is synchronized with the plate to open throttle as timing is advanced. The high-speed position is fixed. Slow idle throttle setting can be adjusted as follows: Move speed control lever (1—Fig. CL3) against slow speed end of stop as shown. Loosen the two cap screws retaining speed control cam (3) to stator plate and move plate toward or away from throttle arm (2). Do not attempt to adjust slow speed by turning the slow speed MIXTURE needle. Check to make sure throttle valve is fully open when speed control lever is moved to "FAST" position.

**REED VALVES.** The inlet reed valve unit is located between carburetor and crankcase as shown in Fig. CL2. Reed plate (3) should be removed and reeds (2) checked, whenever carburetor is removed for service. Reed petals (2) should seat very lightly against reed plate (3). Do not attempt to straighten a bent reed or to bend a reed in an effort to alter performance. Reed petals should be handled and stored with the utmost care.

Seating surface of reed plate should be smooth and flat and the reed stop (1) should not be twisted, bent or broken. Reed stop setting, measured at tip, should be approximately 0.280 from plate. When installing the reed plate (3) and carburetor, tighten the retaining cap screws to a torque of 60-65 inch-pounds.

**FUEL PUMP.** The fuel pump is mounted on port side of carrying handle and uses pressure and vacuum pulsations from the crankcase for the power source. Fuel pump outlet pressure should be 1-3 psi and can be adjusted by means of the screw (9—Fig. CL9) in carrying handle immediately below fuel pump mounting boss. Normal setting of adjusting screw will vary from flush to one screw thread showing. The fuel pump impulse tube attaches to a fitting on reed plate below carburetor mounting boss.

## IGNITION

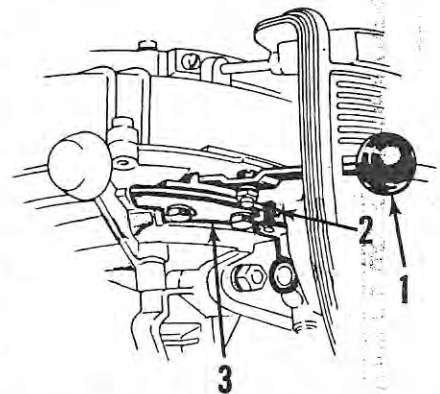
Breaker contact gap should be 0.020 and can be adjusted after removing the power head shroud, recoil starter, blower housing and flywheel. On some models, the points are housed in a separate breaker box underneath the flywheel and the breaker cover must also be removed.

Some models are equipped with an auxiliary electrical system which produces 42 watts of alternating current at rated engine speed.

## COOLING SYSTEM

All models are air cooled by a blower fan built into the flywheel. There is, however, a coolant pump which supplies liquid cooling for the lower leg and exhaust gases. Coolant intake is located just below the anti-cavitation plate on each side of gearcase and coolant is pumped to exhaust deflector at upper part of lower unit where it cools the exhaust housing.

Coolant outlet consists of a series of holes arranged vertically on each side of the lower unit upper leg, just below the swivel



**Fig. CL3 — Speed control lever and synchronizing cam showing points of adjustment.**

1. Lever
2. Cam follower
3. Synchronizing cam

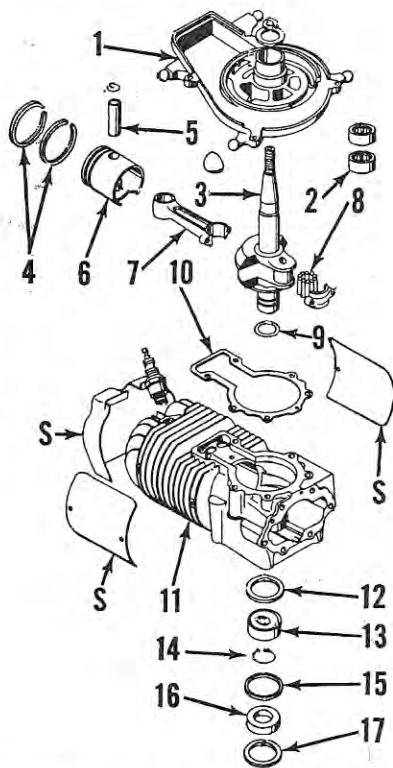


Fig. CL5 — Exploded view of power head and associated parts. Refer to Fig. CL2 for intake manifold and carburetor.

- |                    |                          |
|--------------------|--------------------------|
| 1. Bearing plate   | 10. Gasket               |
| 2. Needle bearing  | 11. Cylinder & crankcase |
| 3. Crankshaft      | 12. Retaining ring       |
| 4. Piston rings    | 13. Ball bearing         |
| 5. Piston pin      | 14. Snap ring            |
| 6. Piston          | 15. Retaining ring       |
| 7. Connecting rod  | 16. Shaft seal           |
| 8. Bearing needles | 17. Retaining ring       |
| 9. "O" ring        | S. Shrouds               |

bracket. If a spray of water does not emerge from outlet holes when motor is running, first check the coolant inlet for plugging, then if not corrected, remove gearcase from lower unit as outlined in LOWER UNIT section and overhaul the pump.

**POWER HEAD**

**REMOVE AND REINSTALL.** To remove the power head, first remove the engine shroud and disconnect fuel outlet line and impulse line from fuel pump. Remove the six cap screws retaining power head to exhaust housing and lift the complete power head straight up off lower unit.

**When reinstalling,** use a new mounting gasket on each side of exhaust deflector and coat the drive shaft splines with a high melting-point grease before positioning the power head. Tighten the four front (1/8-inch) retaining cap screws to a torque of 90—120 inch pounds; and the two rear (1/4-inch) screws to 80—100 inch pounds.

**DISASSEMBLE AND REASSEMBLE.** If service is not required on the recoil starter assembly, remove starter and blower housing as a unit and remove control panel at the

same time to avoid disconnecting the starter rope. Remove the flywheel, magneto assembly, shrouds (S—Fig. CL5), carburetor and reed plate assembly, and the spark plug.

Remove connecting rod cap and the loose needle rollers and push the rod and piston assembly to closed end of cylinder. Remove the retaining ring from above oil seal at upper end of crankshaft, then remove the upper plate assembly. Remove retaining ring (17) from lower side of power head and pry out oil seal (16). Remove snap ring (14) from below lower ball bearing (13) and tap crankshaft upward out of lower bearing and crankcase. **NOTE:** When removing crankshaft, use special care not to damage connecting rod, as little clearance exists during removal.

Assemble by reversing the disassembly procedure. The sharp, vertical side of deflector on crown if piston must be installed toward intake transfer ports at top of power head as shown in Fig. CL6. Refer to CONDENSED SERVICE DATA table for tightening torques.

**PISTON, PIN, RINGS & CYLINDER.** The piston is equipped with three compression rings and three lock rings which fit in the same groove. Refer to Fig. CL7. To install lock rings and piston rings, hold piston with sharp side of deflector (intake side) to right. Install upper and lower locking rings with ring locating tab to right of locating hole (H) in piston and center locking ring with ring locating tab to left of locating hole. Install piston rings with cutout of ring gap surrounding locking tab as shown. Make sure ring gap will completely close before attempting to install piston assembly. Piston and rings are available in 0.010 oversize as well as standard.

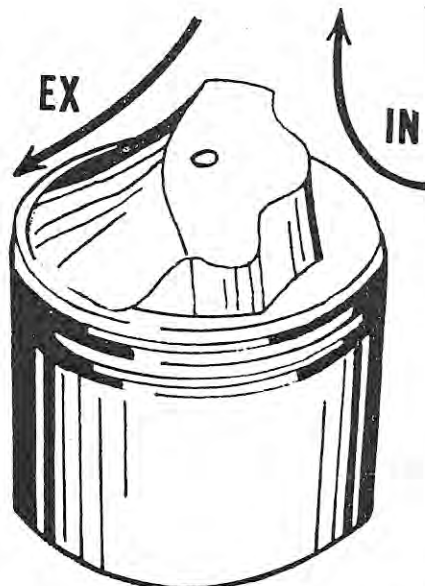


Fig. CL6 — Long sloping side of piston deflector must be installed downward, toward exhaust ports.

- EX, Exhaust flow  
IN, Intake flow

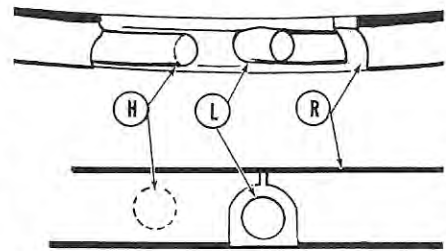


Fig. CL7 — Piston rings are equipped with a retaining lock ring which fits on inside of ring in piston groove as shown. Locking tab is installed to right of locating hole in piston on upper and lower rings, and to left on center ring.

- H. Locating hole (in piston)  
L. Locking ring  
R. Piston ring

The full floating piston pin should have a clearance of 0.0004-0.001 in connecting rod and 0.0000-0.0002 in piston bosses. Piston pin is 0.4999-0.5001 in diameter.

Make a visual check of block bore for excessive wear or scoring, and check for broken or damaged cooling fins. Broken cooling fins can cause power head to over-heat.

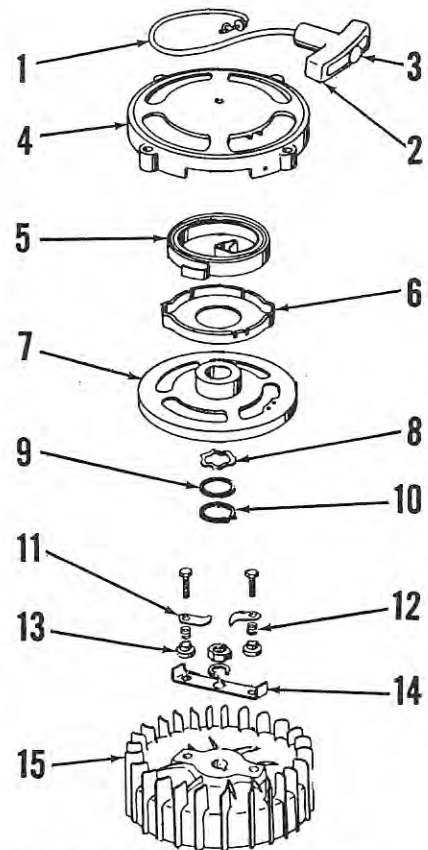


Fig. CL8 — Exploded view of recoil starter used on all motors.

- |                  |               |
|------------------|---------------|
| 1. Rope          | 9. Washer     |
| 2. Handle        | 10. Snap ring |
| 3. Plug          | 11. Pawl      |
| 4. Housing       | 12. Spring    |
| 5. Recoil spring | 13. Spacer    |
| 6. Retainer      | 14. Plate     |
| 7. Pulley        | 15. Flywheel  |
| 8. Wave washer   |               |

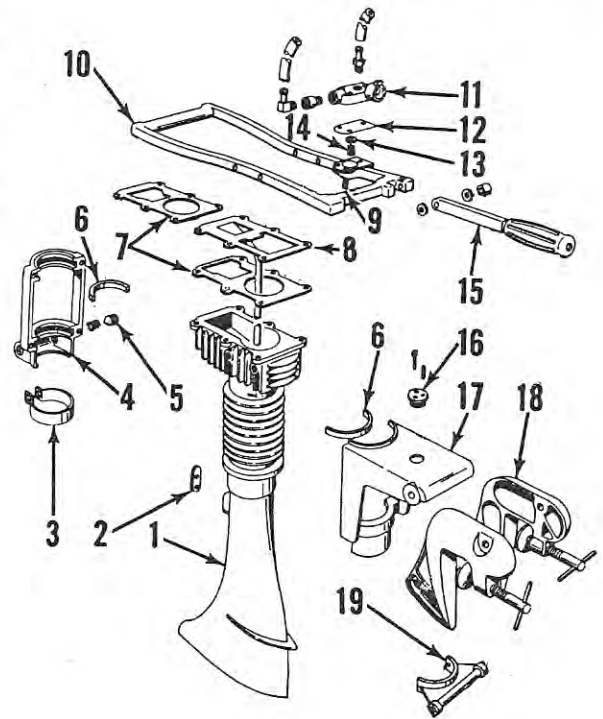
**CONNECTING ROD, BEARINGS AND CRANKSHAFT.** Lower end of crankshaft is carried by a ball bearing which also controls crankshaft end play. Upper main bearing consists of two identical caged needle bearings. The connecting rod bearing consists of loose needle rollers which ride on the hardened, polished surfaces of connecting rod bore and crankpin journal.

The crankshaft lower ball bearing (13—Fig. CL5) is a slip fit on shaft. The bearing is retained in cylinder block by retaining rings (12 and 15) above and below outer race and is retained on shaft by the Tru-Arc snap ring (14) which fits into groove in shaft. Lower seal (16) must be removed before crankshaft can be removed, and will be damaged on removal. A new seal must be installed on reassembly.

Examine the crankshaft and bearing race of connecting rod bore for discoloration due to heat, or for wavy appearance due to damaged rollers, excess heat, or foreign material. If any such damage is found, both shaft (or rod) and bearings must be renewed. Lubricate parts thoroughly with new oil during assembly to provide initial lubrication.

**Fig. CL9 — Exploded view of Clinton Outboard Motor lower motor leg, carrying handle, swivel bracket, stern brackets, etc. Fuel pump mounts on carrying handle as shown.**

1. Lower motor leg
2. Reverse lock lug
3. Friction band
4. Swivel bracket end
5. Set screw
6. Spacer ring
7. Gaskets
8. Exhaust deflector
9. Adjusting handle
10. Carrying handle
11. Fuel pump body
12. Pump diaphragm
13. Washer
14. Pump spring
15. Steering handle
16. Shear pin holder
17. Swivel bracket
18. Stern brackets
19. Thrust bracket



## MANUAL STARTER

A recoil type, pull starter is used. Refer to Fig. CL8. To disassemble the starter, first remove the unit from powerhead shroud; remove handle cap (3) and untie or cut the knot in end of starter rope. Allow recoil spring to completely unwind, then remove snap ring (10). Starter can now be completely disassembled. When reassembling, make sure recoil spring is installed as shown in Fig. CL8. While holding starter housing (4), turn starter sheave (7) until recoil spring is completely wound; back sheave off one complete turn and install starter rope. Examine starter pawls (11) on flywheel and renew if worn or damaged.

## LOWER UNIT

**PROPELLER AND DRIVE PIN.** All motors use a  $\frac{5}{16}$  by  $1\frac{3}{16}$  inch, brass shear pin. A 7 inch pitch, 5 inch diameter, two blade propeller is required.

**OVERHAUL.** Most service on the lower unit can be performed by removing gearcase assembly from lower motor leg; or by removing gearcase housing lower cover (22—Fig. CL10). To remove the gearcase, remove spring cover (16) for access to front stud nut. The rear housing retaining cap screw is accessible inside exhaust outlet.

To remove the propeller shaft or disassemble gearcase, drive the gear retaining roll pin (7) a short distance into gear hub, rotate propeller shaft  $\frac{1}{2}$ -turn and pull the roll pin with vise grip pliers. Gearcase must be completely sealed against water and grease leakage when reassembling.

Refer to CONDENSED SERVICE DATA TABLE for drive shaft bearing clearances. When installing gearcase to lower motor leg, tighten the (front) retaining stud nut to a torque of 50-60 inch pounds and the (rear) retaining screw to a torque of 75-90 inch pounds.

**Fig. CL10 — Exploded view of lower unit gearcase, water pump and associated parts.**

1. Propeller
2. Shaft washer
3. Shear pin
4. Propeller shaft
5. Oil seal
6. Shaft bushing
7. Roll pin
8. Propeller shaft gear
9. Drive shaft
10. Gear case
11. Water pump body
12. Impeller
13. Pump cover
14. Oil seal
15. Shaft bushing
16. Snap-on cap
17. Shaft bushing
18. Spacer
19. Shaft bushing
20. Drive pinion
21. Gasket
22. Gearcase cover

