

Figure 4-2. Hot and Cold Plugs

at which they are designed to operate, HOT or COLD. See Figure 4-2.

Selection of the correct spark plug depends on the type of service to which it is subjected. Unless the spark plug is properly suited to the motor, trouble may arise which might be interpreted as carburetor difficulty. Very low trolling speeds will tend to foul plugs due to the oil not burning from the core. However, at full throttle with a hotter plug, the operating temperature may be too high, resulting in pre-ignition.

An extreme temperature range will be difficult to control with one plug. Spark plugs furnished with the motor are selected for average service. See Section 2, Specifications.

## REMOVAL OF MAGNETO FROM POWER HEAD

a. Remove motor cover.

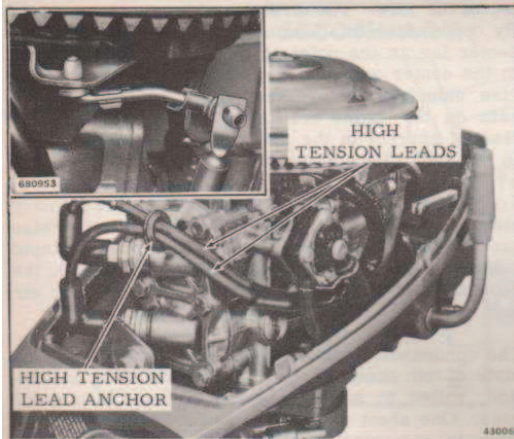


Figure 4-3. High Tension Lead Anchor and Throttle Lever Link

b. Unscrew flywheel nut. (See Figure 4-4). Use an appropriate flywheel holding tool when removing flywheel nut. Using flywheel puller (Special Tool #378103), pull flywheel from crankshaft. See Figure 4-5.

replaced without removing the armature plate.

c. If necessary to replace the high tension leads, twist leads counterclockwise off spark plugs and remove high tension lead anchor. See Figure 4-3.

d. Disconnect throttle lever to armature link. See insert, Figure 4-3.

e. Loosen the four Phillips head screws retaining the armature plate. Remove armature plate from power head. See Figure 4-6.

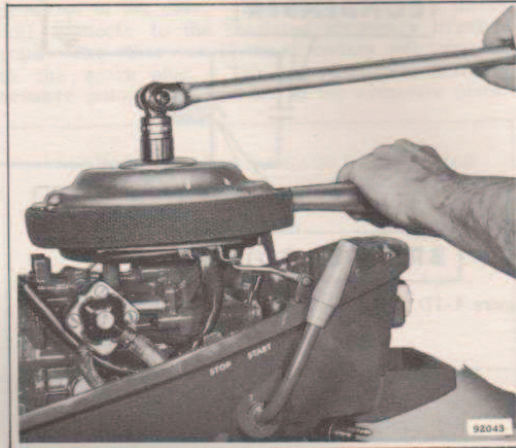


Figure 4-4. Removing Flywheel Nut

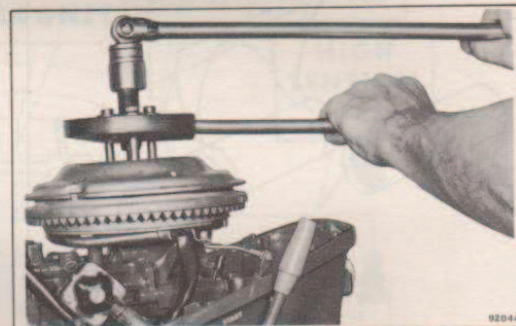


Figure 4-5. Pulling Flywheel

## MAGNETO DISASSEMBLY

All components may be removed from the armature plate by removing the attaching-screws. The spark plug high tension leads can be pulled from the coil and lamination assemblies after removing the clamps on the under side of the armature plate. See Figure 4-7.

## CLEANING, INSPECTION, AND REPAIR

### ARMATURE PLATE

Inspect bushing (Figure 4-7) for evidence of wear. If worn, a slight lip will appear on upper end of bushing bore. Excessive wear affects breaker point adjustment. Replace breaker plate if bushing is worn excessively.

### SPARK PLUGS

Inspect plugs for cracked porcelain and worn electrodes. Clean the electrodes with a point file. Adjust gap to the specified .030 inch. In re-gapping, adjust only the ground electrode, as attempting to bend the center electrode will crack the insulator. See Figure 4-8.

Poor motor performance and premature spark plug failure may result from improper spark plug installation.

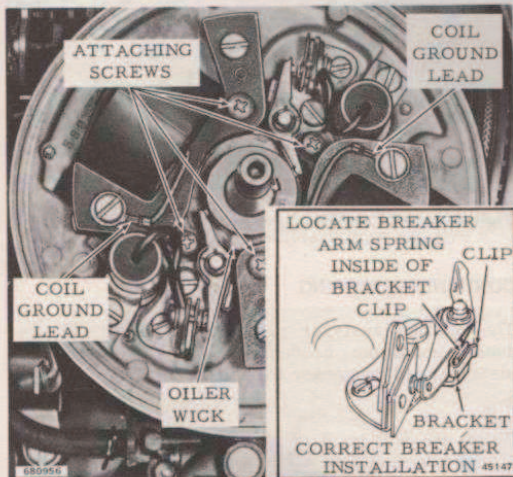


Figure 4-6. Armature Plate Attaching Screws

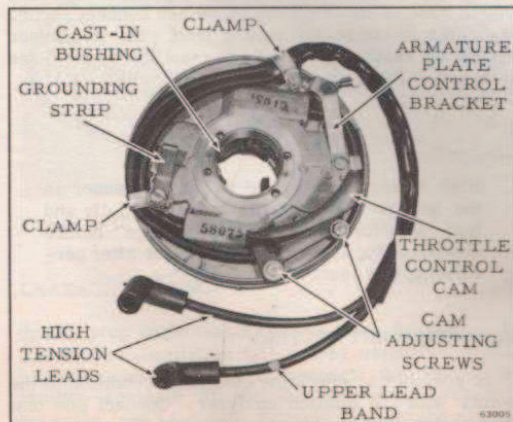


Figure 4-7. Bottom of Armature Plate

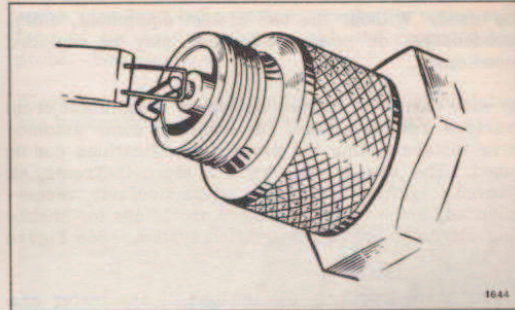


Figure 4-8. Checking Spark Plug Gap

Before installing the plug, be sure the plug seat in the cylinder head is clean and free from obstructions. Screw the plug in by hand, then tighten to the specified 17-1/2 to 20-1/2 foot pounds.

If threads are stripped in cylinder head, Heli-coil inserts are available. Caution should be taken when installing Heli-coil inserts. Tools and inserts are available from your parts distributor.

### CLEANING BREAKER POINTS

a. After extensive service, the breaker points may become worn, dirty, or out of adjustment. Inspect the breaker assemblies for corrosion or unusual wear. Questionable breaker points should be replaced. Check action of the spring and free movement of the breaker arm. Do not change breaker arm spring tension.

b. Dirt, foreign particles, and oil are very detrimental to contact performance. The oils and acids from a person's hand, even though clean, can affect contact resistance. Oil deposits on the points will cause them to burn out after a very short period of operation. NEVER FILE POINTS --- replace them.

c. To remove any traces of dirt from contacts, insert a strip of bias tape dipped in alcohol or trichlorethylene and work it up and down between the points. Repeat entire cleaning procedure for second set of points.

d. Check points for good electrical contact, using ignition analyzer as described under "Breaker Point Testing." Check and adjust breaker point setting as necessary as described under "Breaker Point Adjustment."

## TESTING COILS, CONDENSERS, AND BREAKER POINTS

### TEST EQUIPMENT

To determine accurately the condition of components of the ignition system, an ignition analyzer should

be used. Without the use of test equipment, coils, condensers, or point assemblies may be replaced needlessly.

A wide variety of ignition analyzers is available from various manufacturers. In addition, some automotive testers having the proper specifications can be used. The use of the Graham, Merc-O-Tronic, or Stevens ignition analyzers is particularly recommended, since these units have provisions for checking all functions of the ignition system. See Figure 4-22.

Detailed instructions for the use of any tester are provided with the unit; therefore, only general information is given here. All components of the ignition system should be checked, even though replacing a part seems to have corrected the trouble. For example, replacing points may have increased spark, but a further improvement might be realized if a condenser is found to be weak and is replaced.

#### COIL TESTING

The coil is tested under conditions of actual operation, as the ignition analyzer provides an interrupted primary current and measures the induced secondary voltage. See Coil Test Specifications, Section 2. If the coil is in good condition and is suitable for use, the meter will so indicate.

The coil must be removed from the armature plate for this test. Connect the test leads from the ignition analyzer to the coil, making sure that the black lead is connected to the ground lead of the coil, the red lead to the coil breaker point lead, and the high tension lead to the coil secondary. With the coil index adjusted as specified, note the meter reading. See Figure 4-9.

A low reading on the tester indicates a weak coil which must be replaced. No attempt should be made to improve this spark by increasing primary current; the coil is defective if it cannot be made to give a good reading on the specified primary current. A completely dead coil is indicated if there is no reading.



Figure 4-9. Coil Testing

Check for leakage from the coil (caused by moisture, cracks in the coil housing, or carbon paths) by running the test probe over the outside of the coil. Replace any coil which shows any leakage. See Figure 4-10.

#### △ SAFETY WARNING

Perform all tests on the coil on a wooden or insulated bench top to prevent leakage or shock hazards.



Figure 4-10. Coil Leakage Test

#### CONDENSER TESTING

The ignition analyzer provides three tests of condenser condition: condenser leakage, condenser resistance, and condenser capacity.

Refer to Section 2 of this manual for condenser specifications. The condenser may be tested while mounted on the armature plate by disconnecting the lead from the breaker assembly. Connect one test lead to the breaker plate (or the condenser mounting clip if test is made off the plate) and connect second test lead to condenser pigtail lead. The condenser should be replaced if it fails to meet any of the three tests. See Figure 4-11.

#### △ SAFETY WARNING

High voltage is applied to the condenser in the leakage test. Handle leads carefully and turn selector switch to "Discharge" before disconnecting leads from condenser after performing this test.

#### BREAKER POINT TESTING

It is possible to check the electrical condition of the points with the ignition analyzer. Connect one test lead to the breaker arm, and connect the second test lead to the breaker assembly screw terminal.



Figure 4-11. Condenser Testing

If the points are good, meter reading will be in the green area on the "Breaker Test" scale. If reading is in red area, do not immediately reject the points, but check the test lead connections to make sure that they are tight. A secure contact is necessary because of the current used in this test. See Figure 4-12.

**NOTE**

NEVER FILE POINTS to bring reading within the green ("good") area. Reject the points if cleaning with trichlorethylene does not give a satisfactory reading.



Figure 4-12. Breaker Point Testing

**LEAKAGE TESTING**

Spark plug high tension leads may be tested for leakage or insulation failures by using the ignition analyzer and a coil. Connect the coil to the ignition analyzer as for the coil test. Connect a separate test lead with suitable clips to the secondary terminal of the coil and the conductor of the

spark plug lead being tested. Probe the entire surface of the lead insulation with the grounded test probe. See Figure 4-13.

Flashover will be apparent wherever the insulation has broken down, due to moisture or carbon.



Figure 4-13. Testing Leads

**MAGNETO REASSEMBLY**

Reassemble components which were removed from the magneto armature plate, following the reverse order of disassembly and paying particular attention to the following:

- a. Refer to Figures 4-6 and 4-7 for correct assembly. Correct locating of the coil and lamination assemblies is governed by machined mounting surfaces on the armature plate. Coil lamination heels should be flush with machined surfaces. See Figure 4-14.

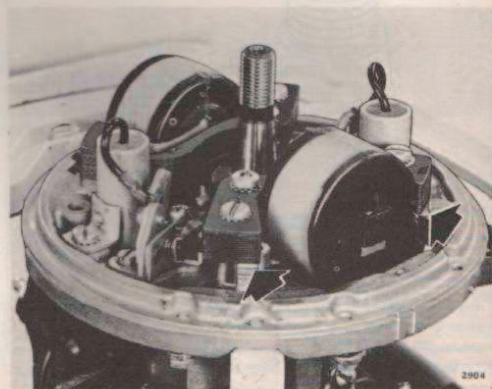


Figure 4-14. Coil Locating Bosses

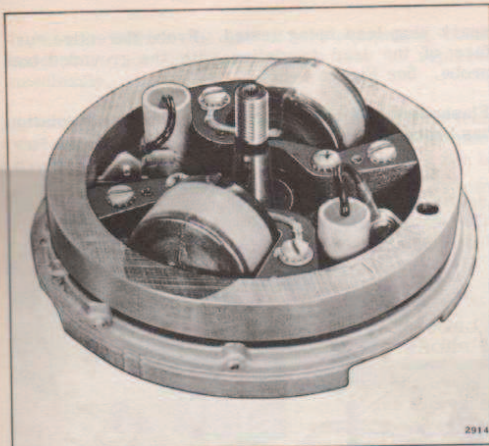


Figure 4-15. Coil Locating Ring

Alignment of the magneto coils will be simplified with the use of a coil locating ring (Special Tool #317001) machined to fit over the four bosses. See Figure 4-15.

**NOTE**

Do not connect breaker point leads until after making breaker point adjustments.

b. Make sure that a new oiler wick is installed under the forward coil. See Figure 4-6.

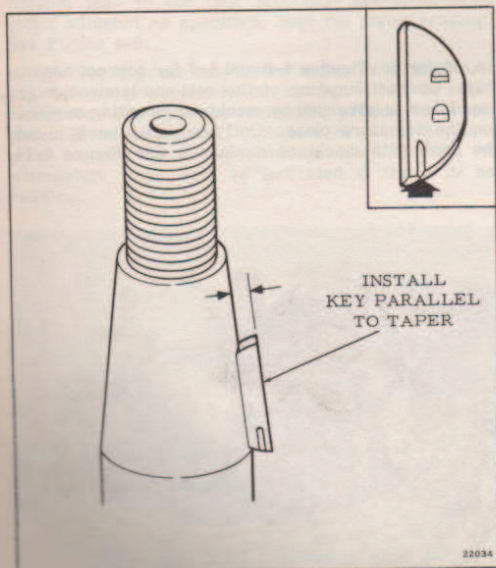


Figure 4-16. Flywheel Key Position

\*Trade Mark

## REASSEMBLY OF MAGNETO TO MOTOR

a. If flywheel key has been removed, reassemble to crankshaft with outer edge parallel to taper. See Figure 4-16.

**NOTE**

Be sure that the single upset mark on the side of the key is facing down. See Figure 4-16. Incorrect installation of the key will affect cam position and ignition timing.

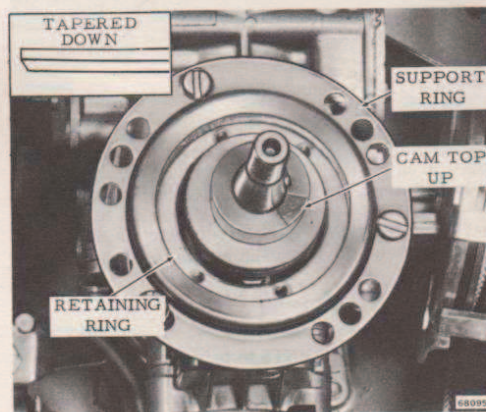


Figure 4-17. Armature Plate

b. Install cam, making certain that side marked "TOP" is up. See Figure 4-17.

c. Apply a coat of OMC Sea-Lube\* Moly Lube to the armature plate support ring, retaining ring, and bushing in armature plate. Install retaining ring with tapered side down, and support ring. Align retaining ring to correspond to the position of the armature plate. See Figure 4-17. DO NOT add oil or grease to the oiler wick on the magneto.

d. Place the armature plate in position over the crankshaft, using care to avoid damaging the breaker arms on the cam. Make sure that throttle cam follower is not caught under throttle control cam. See Figure 4-18. Tighten the four Phillips head screws. See Figure 4-6.

e. Connect armature plate link to throttle lever. See Figure 4-3.

## BREAKER POINT ADJUSTMENT

a. For breaker point adjustment, armature plate must be assembled to motor with flywheel removed.

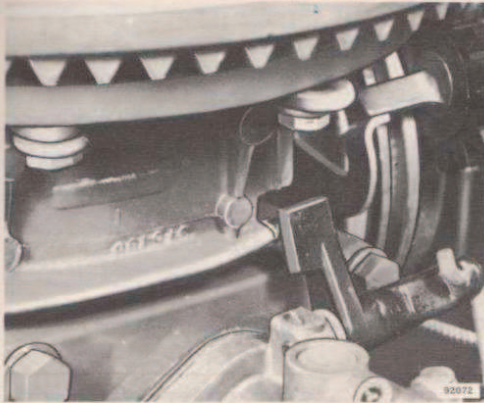


Figure 4-18. Throttle Control Cam and Follower

b. Disconnect all leads from breaker point assemblies. Connect meter or test light between breaker plate and forward breaker point screw terminal. See Figure 4-19. Fully advance throttle lever to Fast position.

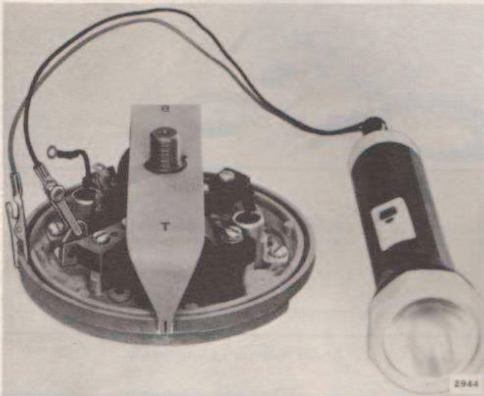


Figure 4-19. Connections for Checking Timing

c. Place timing fixture (Special Tool #383603) on crankshaft. Rotate the crankshaft clockwise so that the side of the fixture marked "T" (top) is aligned with the first projection on the armature plate. See Figure 4-19.

**NOTE**

To avoid water pump impeller damage rotate the crankshaft in a clockwise direction only.

d. Move the timing fixture slowly clockwise until the exact instant at which the points open is determined, as indicated on the light (light goes out) or meter. The points should break open when the timing fixture is midway between the two projections on the armature plate.

e. If timing is not correct, rotate the timing fixture clockwise one complete turn and align the timing fixture between the timing marks. Adjust points until the meter or light just indicates an open circuit. See Figure 4-20.

**NOTE**

If new breaker points have been installed, adjust points to break open at the first timing mark to allow for seating of the fibre breaker block.

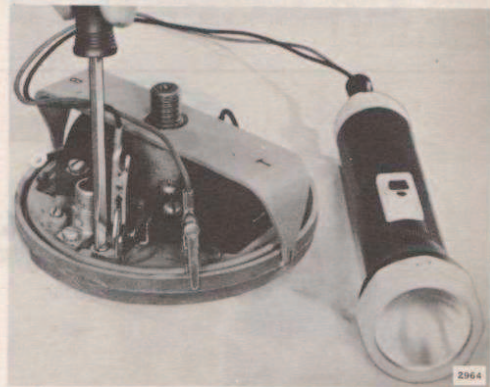


Figure 4-20. Adjusting Breaker Points

f. Recheck timing as described in (d) above.

g. If timing light or meter is not available, use a feeler gage to adjust breaker points. Point gap should be set to .020 inch (.022 inch for new points) with the breaker arm on the high lobe of the cam (full open).

h. Rotate crankshaft through 180° clockwise, and repeat entire procedure for second set of points.

i. Check crankshaft and flywheel tapers for any traces of oil. This assembly must be perfectly dry—swab tapered surfaces with solvent and blow dry with compressed air. Inspect both tapers for burrs or nicks.

**NOTE**

DO NOT permit solvent used to clean tapers to wash oil out of oiler wick.

j. Replace flywheel but do not torque nut. Check for spark on each cylinder by connecting the spark plug high tension leads to a spark checker (Stevens Experimental Co. Part #S-21 or S-13), gap set to 1/4" and cranking the engine. If spark jumps gap, tighten flywheel nut to torque specified in Section 2.



# SECTION 5 POWER HEAD

## Table of Contents

	Page
Description .....	5-2
Theory of Operation .....	5-2
Checking Motor Temperature .....	5-3
Removal of Power Head .....	5-3
Disassembly of Power Head .....	5-4
Cleaning, Inspection, and Repair .....	5-6
Reassembly of Power Head .....	5-8
Reassembly of Power Head to Exhaust Housing	5-10
Break-In .....	5-10

OMC  
SPECIAL TOOL REQUIRED

P.H. Holding Fixture

Part Number 303605