FLYWHEEL MAGNETO

PART 1. BREAKER POINT IGNITION SYSTEM

1. SPECIFICATIONS

Breaker point gap (early type)	0.685 mm (0.027 in)
Condenser capacity	1.65–1.80 microfarads
Ignition timing	3 mm (⅛ in) btdc
Spark plug gap	0.635 mm (0.025 in)

2. FUNCTION OF THE MAGNETO

The magneto is actually a small dynamo so constructed that electricity is generated at a very high voltage. The magneto is connected to the spark plug by the high tension lead and at appropriate times (which are controlled by the operation of the cam and the breaker points) a spark producing high voltage current appears across the gap in the plug. There are three main components in the magneto; the stator plate on which is mounted the coil, condenser and breaker points – the flywheel which carries the magnet and pole pieces – the cam which separates the breaker points once every revolution.

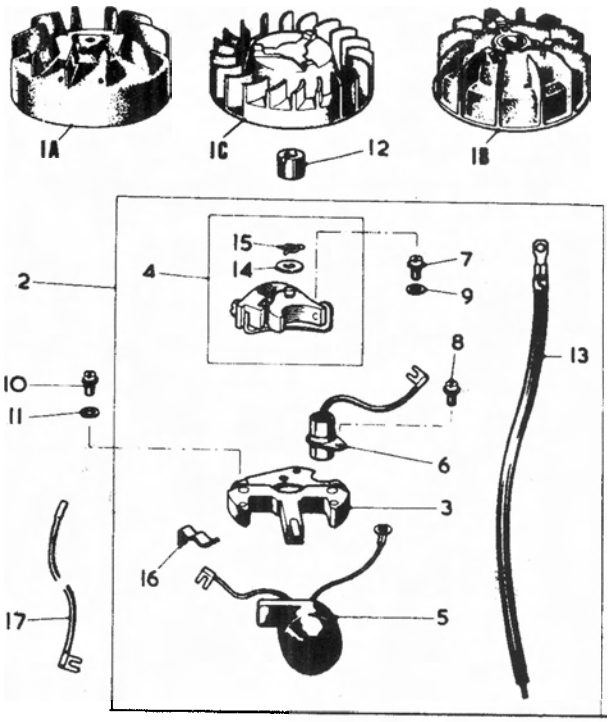
IGNITION COIL

The ignition coil, in which the high voltage current is built up, consists of two separate coils. The coil closest to the core consists of a relatively small number of turns of heavy gauge copper wire and is known as a primary coil. One end of this coil is connected to the frame of the magneto and the other end is connected to one side of the breaker points. Wound over the primary coil, but insulated from it, are many turns of very fine gauge copper wire which make up the secondary coil. One end of this coil goes to the frame of the magneto while the other end goes to the spark plug via the high tension lead. The other side of the breaker points referred to in the primary coil information is connected to the frame.

When the breaker points are closed, i.e., are in contact with one another, and the magnet in the flywheel passes the coil, current flows in the primary winding. When this primary current is interrupted by the opening of the breaker points, a very high voltage current is induced in the secondary winding and this is the current which, connected to the spark plug, causes a spark to jump across the points of the plug.

CONDENSER

The function of the condenser is to prevent sparking at the breaker points when they are opened. No magneto will function correctly if the condenser is faulty or does not make good electrical contact at its connections. Therefore, when servicing a magneto ensure that the condenser mounting screw or screws and the lead from the breaker points make clean and tight connections.



KEY

1A–1B–1C.	Flywheel assy.	9.	Washer.
2.	Stator plate assy.	10.	Screw – stator plate.
3.	Stator plate and E core assy.	11.	Washer.
		12.	Cam.
4.	Breaker point assy.	13.	High tension lead.
5.	Coil assy.	14.	Washer – no longer used.
6.	Condenser.	15.	Spring clip.
7.	Screw – breaker point.	16.	Coil wedge.
8.	Screw – condenser.	17.	Cut-out lead.

Dismantled view of magneto assembly. Early type.

TESTING THE CONDENSER

The condenser should be tested on an automotive tester of reputable manufacture. Its capacity should be within the limits set down in the magneto specifications.

TESTING THE IGNITION COIL

Always check that the screws in the stator plate are tight, as loose connections will result in a weak and erratic spark. The coil should be tested on a meter specially designed for magneto ignition coils. If the tester being used operates from a 6 volt battery, care should be taken that the battery is always in good order, as unless full voltage is applied an incorrect result will be achieved. A good coil should be kept on hand to provide a reference so that at any time the testing meter may be checked.

CONTACT BREAKER

This is the name given to the mechanism which breaks the circuit in the primary winding. It consists of

a fixed point, and a moving point mounted on a breaker arm. One end of the breaker arm makes contact with the cam to operate the contact points. The cam is relieved to ensure that the breaker arm is not touching the cam face whilst the contact points are closed. The adjustable point is fixed to a bracket pivotted in the centre and secured to the stator plate by a screw.

3. SYSTEMATIC DIAGNOSIS OF MAGNETO TROUBLE

(1) Remove the spark plug, reconnect the high tension lead to it and lay the plug on some metal part of the engine, ensuring that the end of the lead and the top of the plug are well clear of the metal so that the current is not shorted away before it reaches the plug points. Spin the engine over and observe if a spark jumps the gap at the plug points.

If there is a good spark the ignition system could be regarded as proved satisfactory.

(2) If there is no spark at the plug points, disconnect the high tension lead and hold it so that its terminal is 3 mm (⅛ in) away from a metal part of the engine.

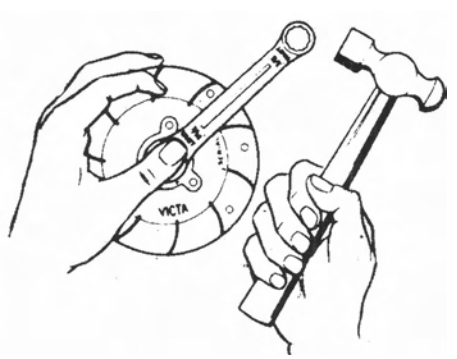
Spin the engine – if a spark jumps the 3 mm (⅛ in) gap the magneto will be proved as functioning and the spark plug as faulty. Clean the plug, reset the gap, and again make the test with the high tension lead connected to it. If there is no spark at the points, replace the plug.

Going back to the test from the terminal of the high tension lead across the 3 mm (⅛ in) gap, if there is no spark at this stage proceed to check the magneto as in para. 3.

One ignition trouble which could be present but not proved at this point is faulty timing. However, this is an unusual trouble and in making a rapid diagnosis, the timing could be left for subsequent checking if the preliminary systematic examination fails to unearth the trouble.

(3) Remove the magneto flywheel, clean and adjust the breaker points. Ensure that all the connections are clean and tight, that none of the leads are broken and that they do not rub on the flywheel.

Temporarily replace the flywheel and test whether a spark is obtainable at the terminal of the high tension lead. If there is a spark, the magneto can be regarded as satisfactory; if there is no spark, remove the flywheel, test the coil and condenser with suitable equipment, replace any parts found faulty.



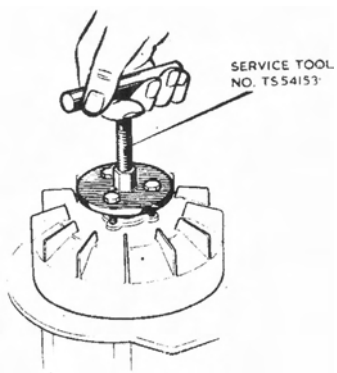
Showing method of loosening flywheel retaining nut.

4. ADJUSTMENTS

ACCESS TO THE MAGNETO

(1) Remove the engine cowl.

(2) Remove the flywheel nut, dog nut or starter drum. It is usually difficult to prevent the engine from turning during this operation, but the nut can be released easily if a suitable spanner, size 7/16 in Whit., ring or socket type is placed over it. Steady the flywheel and spanner with the left hand and with the right tap the handle of the spanner with a hammer. In most cases it will then be possible to slide the flywheel off the crankshaft. If the flywheel is tight on the crankshaft, remove by using Tool No. TL 18011A, Universal Flywheel Puller.



Removing the flywheel using the service tool.

(3) Remove the key from the crankshaft.

(4) Unscrew two holding down bolts or screws and remove the stator plate.

(5) If necessary, remove the magneto cam.

Assemble in reverse order, making sure that flywheel key engages in the keyway in cam.

BREAKER POINTS

Turn the engine clockwise until the moving arm is fully raised, loosen the two screws (later models one screw only is used) holding the point bracket and move the bracket until a 0.685 mm (0.027 in) feeler gauge can just be placed between the points. Retighten the screws and check the gap. It is important that all connections at the breaker arm spring are kept clean and tight.

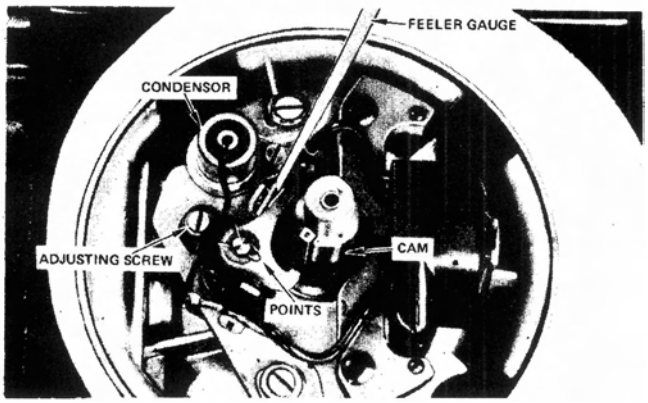
To obtain the maximum spark it is important that the points are kept clean and correctly adjusted. To clean the points they should be removed from the stator plate and carefully dressed with a fine oil stone. On no account should emery cloth be used. Remove all trace of oil from the points before reassembling.

Service problems can arise where excessive clearance between point arm and post allows the face of the points to slide causing misfiring and difficult starting when hot. Points found to have excessive clearance should be replaced.

TIMING THE MAGNETO

Early Type

First, check the contact breaker points and adjust to 0.685 mm (0.027 in) gap. If the points are pitted, they should be cleaned and dressed as previously described, ensuring that when fitted together they bear with a maximum contact. Turn the crankshaft until the piston is 3 mm (⅛ in) before top dead centre. Loosen the two locking screws on the stator plate, and rotate the stator plate until the breaker points are just beginning to open. Tighten the locking screws and recheck the timing for gap opening etc.



Checking the magneto point gap using a feeler gauge. Early type.

Late Type

NOTE: Access to the breaker points is the same procedure as the early type system except that the late type system incorporates a dust shield which is retained by two screws.

(1) If the points are pitted, they should be cleaned and dressed as previously described, ensuring that when fitted together they bear with a maximum contact.

(2) Set the breaker point gap to approximately 0.5 mm (0.02 in).

(3) Instal the flywheel and adjust the E core to flywheel gap as described in the electronic ignition system section.

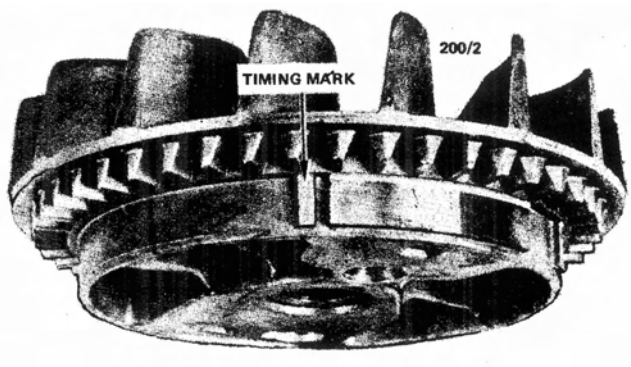
(4) Place the throttle lever in the GRASSCATCHING position and disconnect the breaker point lead at the coil connection.

(5) Connect a battery operated test lamp in series between the disconnected breaker point lead and the crankcase.

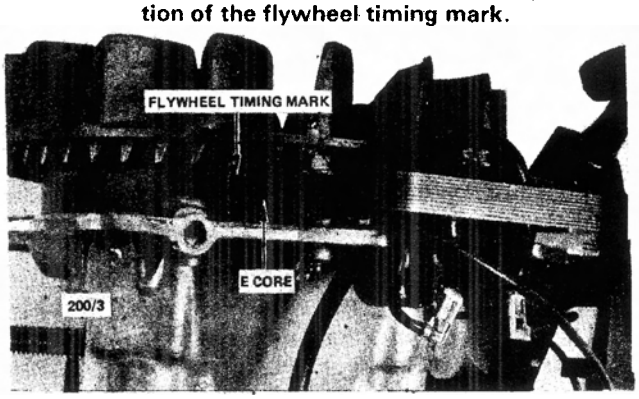
(6) While turning the flywheel in the direction of normal rotation, check that the test lamp is extinguished as the timing reference points are aligned.

(7) If necessary, remove the flywheel and increase the breaker point gap to advance the timing or decrease the breaker point gap to retard the timing.

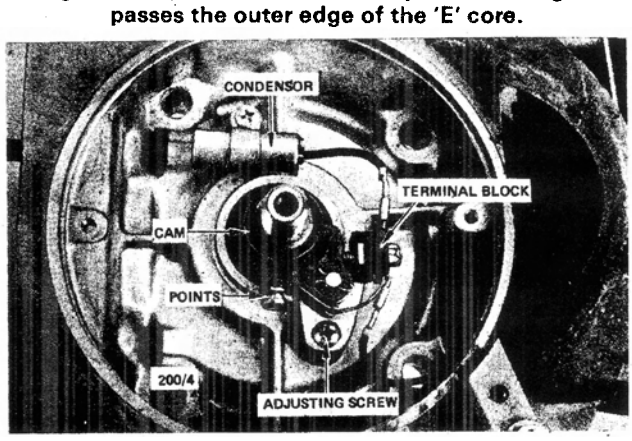
NOTE: The coil used on the late type contact breaker ignition system is unique to this system and cannot be substituted by any other type of coil. The coil is easily identified by its brown color.



View of flywheel removed from engine showing the position of the flywheel timing mark.



View of flywheel and 'E' core showing the timing reference points. Correct timing exists when the test lamp is extinguished as the centre of the flywheel timing mark passes the outer edge of the 'E' core.



Installed view of contact breaker points. Late type magneto.