## 1) Contact Breaker Type Ignition

### a. Construction

As the diagram shows, this ignition system consists mainly of the breaker arm, breaker cam, points, spring and condenser. The rubbing end of the breaker arm is formed from bakelite, electrically insulating the points on the other end of it, from the plate on which the parts are mounted. Due to the eccentric rotation of the cam on the end of the generator rotor shaft, the breaker arm riding the cam is periodically pushed up to open and close the contacts. By adjusting the time at which the breaker arm is pushed, ignition timing can be changed. The points are made of tungsten steel, which has both electrical and mechanical durability. However, since it is impossible to completely avoid wearing of the points, they too are designed to be adjustable.
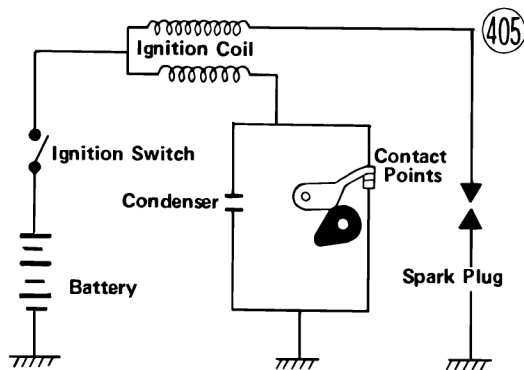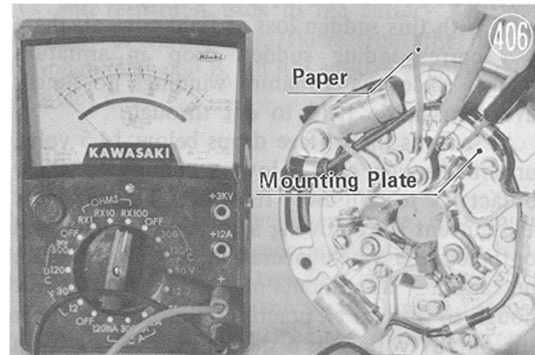


### b. Operation

The contact points in Fig. 405 are in the closed position. If the ignition switch is closed at this time, current flow from the battery is through ground, the breaker points, the primary winding of the ignition coil, and via the switch back to the battery.

Current through the primary winding of the coil creates a magnetic field, strengthened by the iron core. As the generator rotor turns, the breaker cam rotating with it pushes against the breaker arm and opens the contacts, suddenly cutting off current through the primary winding. The magnetic field then collapses, and as a result of the high turns ratio between the secondary and primary ignition coil windings, an extremely high voltage is induced in the secondary winding. This high voltage is introduced to the spark plug via the plug cable, and causes a spark to jump across the spark plug point gap and ignite the gasoline mixture in the combustion chamber.

Besides the voltage induced in the secondary winding, self-induction also causes current to continue to flow in the primary winding even after the contacts have opened. This current builds up to a pressure of several hundred volts which, without the condenser, would jump across the breaker contacts and gradually burn them away. To avoid this, a condenser is connected in parallel with the contacts, and the self-induced current charges the condenser instead of sparking at the contacts.

### c. Inspection

(1) Check that the breaker arm is insulated from the mounting plate when the points are open. If the breaker arm is not insulated due to poor mounting or damage, it will not be possible to interrupt primary current to produce the spark.



(2) Check the contact points for wear or fouling. The points must be inspected periodically since they become worn after a long period of operation, and the slight sparking at each break gradually burns the surface.

Depending on the extent of point damage, grind the surface smooth with emery cloth or oilstone, or replace the points as set. Oil on the contact surface will prevent proper contact and the ignition spark may be lost, so wipe off any oil with paper or cloth, taking care that no paper or cloth particles remain on the point surface.

The contact point gap, and therefore ignition timing, change due to point wear or grinding down, and must be adjusted. For gap adjustment procedure, see the paragraph on ignition timing adjustment.

### (3) Condenser

When the condenser can or the internal insulation deteriorates or becomes punctured, the ignition spark may become weakened or the contacts might not break electrically. If a long blue-white spark can be seen jumping between the breaker contacts, the condenser is most likely to be defective.

(i) Capacity

The condenser capacity is $.22\mu f$. Check the capacity with a condenser (capacitor) tester. If such a tester is not available, and the multitester used gives no instructions on capacitance testing with it, charge the capacitor with a direct voltage source, observing correct polarity. After giving the condenser several seconds to charge, remove the voltage source and short the condenser leads together. If a spark jumps between the leads at this time, the capacity is sufficient.

(ii) Insulation resistance

Disconnect the capacitor ground and check for no continuity between the + side and the can. If there is a current path, the condenser is shorted, if no current flows the condenser is probably good.