

Location and Remedy of Faults

Although every precaution is taken to eliminate all possible causes of trouble, failure may occasionally develop through lack of attention to the equipment, or damage to the wiring. The following pages set out the recommended procedure for a systematic examination to locate and remedy the causes of some of the more probable faults. The sources of many troubles are by no means obvious, and in some cases a considerable amount of deduction from the symptoms is needed before the cause of the trouble is disclosed.

IGNITION CIRCUIT (see note, Substitute Ignition on page 58)

Engine will not start in IGN position

- (a) Turn switch to EMG position. If the engine will now fire, the alternator and rectifier are operating correctly and the indication is a discharged battery; this can be confirmed by poor light from the lamps and hydrometer readings below 1.200. Recharge the battery if necessary.
- (b) Remove the H.T. cable from the sparking plug terminal and hold it about $\frac{1}{8}$ -in. away from some metal part of the engine while the latter is slowly turned over. If sparks jump the gap regularly the ignition equipment is functioning correctly. Check for engine defects or examine sparking plug.
- (c) If sparks do not occur in test (b), check for a fault in the low tension wiring, i.e., from battery to switch, coil and contact breaker. If the wiring proves to be in order, examine the contact breaker; if necessary clean the contacts and adjust the gap setting.

Engine will not start in EMG position (if provided)

- (a) Remove the H.T. cable and test as described under (b) above; if sparks appear, then the trouble is due to engine defects, etc.
- (b) If the ignition equipment is not operative in the above test, check the snap connectors, rectifier connections and other wiring. All connections must be clean and tight.
- (c) Examine the contact breaker; if necessary clean the contacts and adjust the gap setting.
- (d) Make sure ignition timing is correct to engine maker's specification.
- (e) See that the alternator stator is fitted the correct way round on the engine shaft.

Engine misfires

- (a) Examine the contact breaker; if necessary, clean the contacts and adjust the gap.
- (b) Remove the sparking plug (or each plug in turn), rest it on the cylinder head and observe if a spark occurs at the plug points when the engine is turned. Irregular sparking may be due to dirty plugs, which may be cleaned and adjusted, or to defective high tension cables. Any cable on which the insulation shows signs of deterioration or cracking should be renewed.
- (c) If sparking is regular at each plug when tested as described in (b), the trouble is probably due to engine defects, and the carburetter, petrol supply, etc., must be examined.

- (d) If misfiring occurs after the engine has been running for some time, check that the ignition switch is in the normal IGN position. If run continuously in the EMG position, the rising voltage of the battery may eventually cause misfiring to occur.

A.C. IGNITION

Important

1. Keep the contact breaker clean and its maximum opening correctly set to 0.014" — 0.016".
2. Keep the sparking plug electrodes clean and correctly set.
3. Keep to the manufacturer's timing instructions.

Regarding notes 1 and 3 above, it is the magneto performance or spark energy developed by the alternator (in addition to the piston-to-spark relationship) that is involved. Since the rotor is keyed to the engine crankshaft, which, in turn, is coupled through the connecting rod to the piston, any movement of the piston whilst timing will affect the position of the crankshaft, and hence the magnetic timing position of the rotor. Thus the maximum magneto performance of the alternator can only be obtained with accurately set contact breaker and timing.

Engine will not start, difficult to start or misfires

- (a) Remove the H.T. cable from the sparking plug and hold the cable end about $\frac{1}{8}$ " from the cylinder block. Sparks should jump this gap regularly when the engine is turned at kick-start speed.
- (b) If sparks are obtained, check the sparking plug, reset and clean, or renew as necessary.
- (c) If no sparks are obtained, inspect the H.T. cable and renew, as necessary. Check contact breaker gap setting.
- (d) If the sparking plug, H.T. cable and contact breaker gap setting are satisfactory, check for engine defects, faulty fuel supply, etc.

MAGNETO IGNITION

Engine will not start or difficult to start

- (a) See that the controls are correctly set for starting, petrol turned on, etc.
- (b) Turn off the petrol tap. Remove the sparking plug (or plugs), and place on the cylinder head. If a spark occurs regularly at the plug points when the engine is slowly hand-cranked, the magneto is in order. Look for engine defects and check ignition timing.
- (c) If a spark does occur in (b), disconnect the high tension cable from the plug and hold the cable end about $\frac{1}{8}$ " from a metal part of the engine. If a spark occurs regularly when the engine is cranked, the plug is faulty. If there is no spark, disconnect the high tension cable at the magneto, replace with a new length of cable and test again as before.
- (d) Should there still be no spark, possible causes of trouble are: contact breaker gap out of adjustment or contacts dirty; contact breaker rocker arm sticking; or, with rotary armature magnetos, pick-up brush worn or broken, or slip ring track dirty. Remedy as described.

Engine misfires

- (a) Check as in para. (b) and (c) above to eliminate engine defects, faulty high tension cable and sparking plug.
- (b) Check magneto as in para. (d) above.

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CHARGING CIRCUIT

Battery in low state of charge

- (a) This state will be shown by poor or no light from the lamps when the engine is stationary, with a varying light intensity when the motor cycle is running.
- (b) If the engine starts and runs in the EMG position, this indicates that at least one plate of the rectifier is functioning correctly. But it should be checked.
- (c) Check the condition of the battery with a hydrometer. Top up, if necessary, and have battery recharged.
- (d) Check wiring from battery to switch, rectifier and alternator, tightening any loose connections or replacing broken cables.

Excess Circuit Voltage

- (a) This will be indicated by burnt-out or blackened bulbs, and possibly poor engine performance due to burned ignition contacts.
- (b) Examine all wiring for loose or broken connections.
- (c) Check the earthing of battery and rectifier.
- (d) Examine the battery for broken internal connections.
- (e) If the ignition is affected, clean the contact breaker contacts or if necessary renew them.

THE BATTERY POSITIVE (+ve) TERMINAL IS EARTHED TO THE MACHINE. UNDER NO CIRCUMSTANCES MUST THE NEGATIVE (-ve) TERMINAL BE EARTHED.

LIGHTING CIRCUITS

Failure of lights (machinery stationary)

- (a) If only one bulb fails to light, replace with new bulb.
- (b) If all lamps fail to light, test the state of charge of battery, recharging it if necessary either by a long period of daytime running or from an independent electrical supply.
- (c) Examine the wiring for a broken or loose connection, and remedy.

Lamps light when switch on, but gradually fade

Test the state of charge of the battery, recharging if necessary.

Brilliance varies with speed of motor cycle

Test the state of charge of the battery, recharging if necessary.

Lights flicker

Examine the wiring for loose connections, or short circuits caused by faulty cable insulation.

Headlamps illumination insufficient

- (a) If the bulb is discoloured or filaments have sagged as a result of long service, a new bulb of the same type should be fitted.
- (b) Check the setting of the lamp.

NOTE: MACHINES WITH A.C. IGNITION

SUBSTITUTE IGNITION EQUIPMENT

If an A.C. ignition machine cannot be started in order to carry out the test procedure, first check that the ignition timing and contact-breaker setting are in accordance with Manufacturer's recommendations. If they are satisfactory, and the ignition coil is suspect, a substitute ignition system can be connected to enable further tests to be carried out.

The procedure is as follows:—

Obtain a 6 or 12-volt battery and a standard type motor cycle ignition coil.

Connect battery Positive to frame of machine (Earth).

Negative to substitute ignition coil ("SW" or "-ve").

Connect coil ("CB" or "+ve") to motor cycle contact-breaker.

Remove existing cable from contact-breaker.

Start engine and proceed with tests.