

# **LUCAS**

*Quality*

# **EQUIPMENT**

## **WORKSHOP INSTRUCTIONS**

### **MOTOR CYCLE COIL IGNITION EQUIPMENT**



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## MOTOR CYCLE COIL IGNITION EQUIPMENT

### 1. GENERAL

Coil ignition equipment fitted to motor cycles comprises an ignition coil and a contact breaker, and in the case of twin and four cylinder machines, a high tension distributor.

Figs. 1 and 2 illustrate the distributor types in most common use. Model D1A2 is arranged for flange fixing, and has the main shaft carried on two bearings, a bronze bush at the driving end supplied with lubricant from the engine, and a ball bearing above the cam, carried in a bridge piece forming part of the contact breaker plate. An adapter fitted to the end of the shaft above the ball bearing carries a standard type moulded rotor arm.

Model DKX is manufactured for single, twin and four-cylinder machines. It has a moulded contact breaker base, and the shaft is carried in two porous bronze bushes. Twin and four-cylinder units have high tension distributor rotors fitted on an extension of the cam spindle, the moulded distributor cover carrying electrodes in the usual manner.

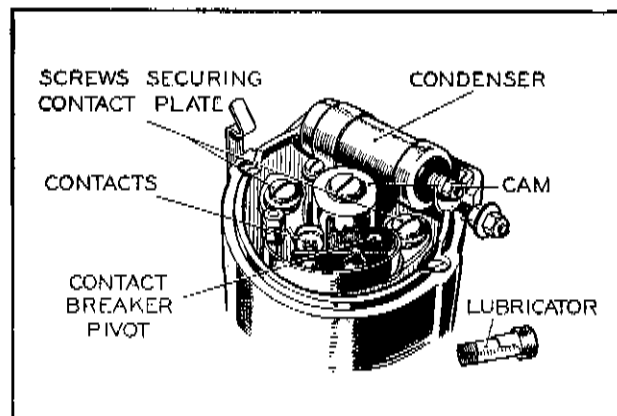


Fig. 1. Contact breaker, Model DKX.

Mounted immediately beneath the contact breaker base is an automatic timing control mechanism, consisting of a pair of spring-loaded governor weights linked by lever action to the contact breaker cam.

At low engine speeds, the spring force maintains the cam in a position in which the spark is slightly retarded. Under the centrifugal force imparted by increased

engine speeds, the governor weights swing out against the spring tension, to advance the cam and thereby the timing of the spark to suit engine conditions at the greater speed. It should be noted that in the case of Model D1A2 the moulded rotor arm is connected directly to the shaft and not to the cam as on Model DKX and it is not possible, therefore, to cause movement of the cam by turning the rotor arm by hand.

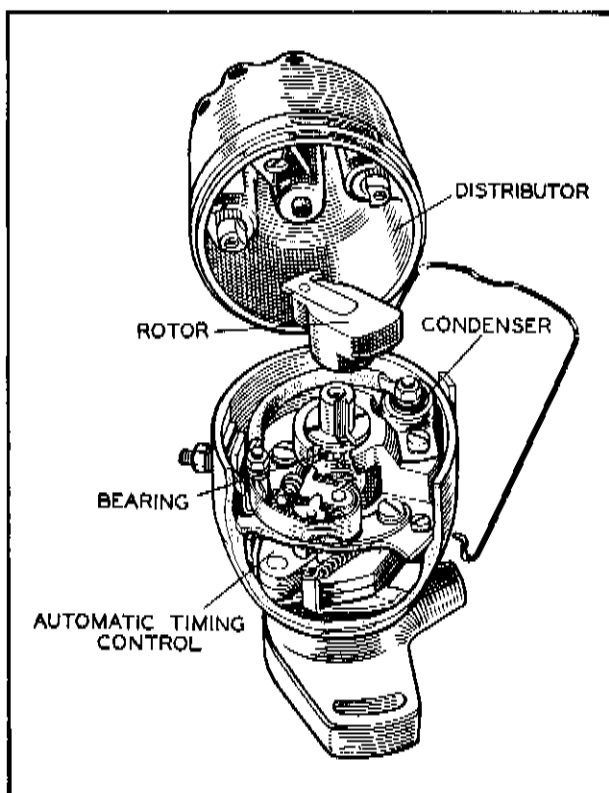


Fig. 2. Distributor Model DIA2.

The ignition coil consists of a laminated core around which are wound the secondary and primary windings. One end of each winding is connected to the CB terminal, the other end of the secondary winding is connected to the high tension outlet and that of the primary winding to the SW terminal. The coil assembly is wax-impregnated, and the sealed metal case is filled with an insulating compound.



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## 2. ROUTINE MAINTENANCE

### (a) Ignition Coil.

The only maintenance necessary is to keep the coil casing clean and free from oil and water, paying special attention to the moulding at the terminal end, and to check the terminal connections for tightness from time to time.

### (b) Distributor.

(i) Lubrication. To be carried out every 3,000 miles.

*Cam.* Smear the surface of the cam very lightly with Mobilgrease No. 2 or, if this is not available, clean engine oil may be used.

*Cam bearing.* Remove the screw from inside the rotor bore and apply a few drops of thin machine oil to the tapped hole thus exposed.

*Contact breaker pivot.* Place a small amount of Mobilgrease No. 2 or clean engine oil on the pivot on which the contact breaker lever works.

*Shaft.* When a lubricator is fitted in the shank of the unit, add a few drops of thin machine oil.

*Automatic Timing Control.*

*Model DKX:* Unscrew the two screws securing the contact breaker base plate to the distributor body and lubricate the timing control mechanism with thin machine oil, paying particular attention to the pivots. Refit the base plate.

*Model D1A2:* Take the distributor off the machine and remove cover and rotor. Inject a small quantity of thin machine oil through the aperture between cam and contact breaker base plate.

**NO GREASE OR OIL MUST BE ALLOWED TO GET ON OR NEAR THE CONTACTS WHEN CARRYING OUT THE FOREGOING PROCEDURE.**

(ii) Cleaning. To be carried out every 6,000 miles.

Wipe the inside and the outside of the cover moulding with a soft dry cloth. On twin and four cylinder units, pay particular attention to the spaces between the metal electrodes, and check that the small carbon brush moves freely in its holder.

Examine the contact breaker. The contacts must be free from grease or oil. If they are burned or blackened, clean them with a fine carborundum stone or very fine emery cloth, afterwards wiping away any trace of dirt or metal dust with a petrol-moistened cloth. Cleaning of the contacts is made easier if the contact breaker lever carrying the moving contact is removed. To do this, unscrew the nut securing the end of the contact breaker spring, and remove the nut, spring washer and bush. Lift the contact breaker lever off its bearing. After cleaning, check the contact breaker gap setting.

(iii) Contact breaker setting.

Contact breaker gaps should be checked every 3,000 miles. If the gap is allowed to decrease below the specified setting, rapid and excessive pitting and piling may occur.

Turn the engine until the contacts are seen to be fully opened and check the gap with a gauge having a thickness of .010-.012 in. (except for four-cylinder units manufactured 1952 onwards which must be .014-.016 in.). If the gap is correct, the gauge should be a sliding fit, but if the gap varies from the gauge, the setting must be adjusted.

To do this, keep the engine in the position giving maximum contact opening and slacken the two screws securing the fixed contact plate. Adjust the position of the plate until the gap is set to the thickness of the gauge and tighten the two locking screws.

With D1A2 units, while checking the gap, the driving dog must be fitted or the shaft must be properly supported at the base of the body.

### (c) High Tension Cables.

Examine the high tension cables. Any which have the insulation cracked or perished, or show signs of damage in any other way, must be renewed.

## 3. SERVICING

### (a) Testing in position to locate ignition fault.

If a failure of ignition or misfiring occurs, first make sure that the trouble is not due to defects in the engine, carburettor, petrol supply, sparking plug, etc. If necessary adjust the sparking plug gap to the setting recommended by the motor cycle manufacturer. Ensure also that the battery is not discharged.

(i) Examine the high tension cable(s). If the rubber shows signs of deterioration or cracking, the cable should be renewed.

(ii) Test each plug and high tension cable by removing the plug and allowing it to rest on the cylinder head and observing whether a spark occurs at the points when the engine is turned. It should, however, be noted that this is only a rough test, since it is possible that a spark may not take place when the plug is under compression.

(iii) Examine the contact breaker, checking the gap setting and measuring the contact breaker spring tension. This should be 20-24 oz. measured at the contacts.

(iv) Switch on the ignition, turn the engine and observe the ammeter reading. If an ammeter reading is given which rises and falls with the closing and opening of the contacts, then the low tension wiring is in order. If the reading does not fluctuate in this way a short circuit in the low tension wiring is indicated. When no reading is given, a broken or loose connection in the low tension wiring is indicated.



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(v) To trace a fault in the low tension wiring, switch on the ignition and then turn the engine until the distributor contacts are opened. With the aid of a voltmeter (0-10 volts), proceed to make a point-to-point check around the low tension circuit in the following manner (note that some machines may have a wiring layout different from the example quoted, and the appropriate wiring diagram should be referred to).

*Lead from the unearthed battery terminal to terminal B on ammeter.*

Connect voltmeter between ammeter terminal B and earth; no reading indicates faulty lead or loose connections.

## **Ammeter.**

Connect voltmeter to the second ammeter terminal and earth. No reading indicates faulty ammeter.

*Lead (purple) between ammeter and ignition switch.*

Connect voltmeter to terminal A on ignition switch and earth. No reading indicates faulty lead or loose connections.

## **Ignition switch.**

Connect voltmeter to terminal IG on ignition switch and earth. No reading indicates fault in switch.

*Lead (white) between ignition switch and ignition coil.*  
Connect voltmeter to ignition coil terminal 'SW' and earth. No reading indicates faulty lead or loose connections.

## **Ignition coil.**

Connect voltmeter to ignition coil terminal 'CB' and earth. No reading indicates that fault lies in the coil primary winding.

*Lead between ignition coil and contact breaker.*

Remove the lead from the terminal on the contact breaker, and connect voltmeter between the end of this lead and earth. No reading indicates faulty lead or loose connections. Reconnect lead.

## **Condenser.**

Connect the voltmeter across the contacts. If no reading is obtained, disconnect the condenser and test again. If a reading is now given, a new condenser (0.2 microfarad) is required.

(vi) If the primary circuit is in order, the secondary or high tension circuit can be checked as follows:—

Remove the high tension cable from the plug (in single cylinder engines) or the centre distributor terminal (twin and four cylinder engines). Switch on the ignition and turn the engine until the contacts close. Flick the contact breaker lever open while the high tension lead from the coil is held about  $\frac{3}{16}$  in. away

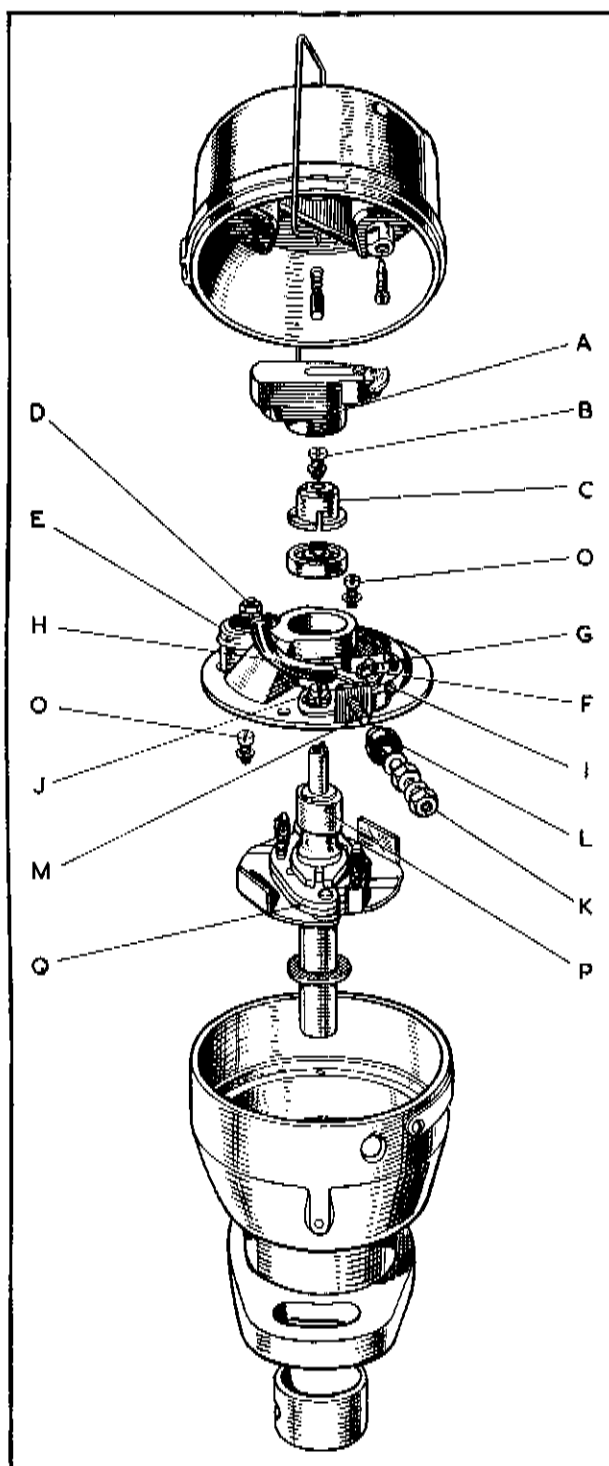


Fig. 3. Model DIA2-dismantled.



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from the cylinder block. If the ignition equipment is in order a strong spark should be obtained. If no spark is given, it indicates a fault in the circuit of the secondary winding of the coil and the coil should be replaced.

## (b) Dismantling the Distributor.

### (i) Model D1A2. (Fig. 3).

Spring back the securing clip and remove the moulded cover.

Lift the moulded rotor arm 'A' off the top of the spindle.

Take out the screw 'B' and spring washer from the top of the spindle. The adapter 'C' can now be withdrawn. Remove the nut 'D' and spring washer from the terminal of the condenser 'E'. Take the nut 'F', spring washer, flat steel washer and insulating bush from the pillar 'G'. The metal strip connector 'H' to the condenser can now be removed. Lift the end of the contact breaker spring 'I' from the pillar.

Take out the screw 'J', spring washer and flat steel washer from the plate carrying the fixed contact.

Unscrew the two terminal nuts 'K' and remove, together with spring washer, flat steel washer and insulating bush 'L'. The terminal bolt 'M', connecting link and insulation strip can now be removed. Take out the two screws 'O' together with spring washers which secure the contact breaker base plate to the distributor body. The contact breaker base, together with cam 'P', spindle and automatic timing control 'Q' can now be removed. Press the shaft and timing control from the bearing in which it is held.

The automatic timing control should not be dismantled unnecessarily. If it is desired to dismantle the mechanism, carefully note the position of the various components in order that they may be refitted correctly.

### (ii) Model DKX. (Fig. 4).

Spring back the securing clips and remove the moulded cover. Lift the moulded rotor arm off the top of the spindle (twin and four-cylinder units). Withdraw the two screws 'A' together with the spring washers, when the contact breaker base can be lifted off.

To remove the moving contact, unscrew the nut 'B' on the pillar 'C' and remove the nut, spring washer and bush. The contact breaker spring 'D' can then be lifted off and the contact arm lifted from its pivot 'E'.

The fixed contact is carried on a plate 'F' secured by two screws. The condenser can be removed when its terminal nuts and single securing screw are removed. The shaft 'G' carrying the cam 'H' and automatic timing control 'J' can be removed when the driving dog is taken off.

The automatic timing control should not be dismantled unnecessarily. If it is desired to dismantle the mechanism, carefully note the position of the various components in order that they may be refitted correctly.

## (c) Bearings.

Badly worn bearings are usually indicated by the maximum opening of the contacts varying considerably as the shaft is slowly rotated by hand, while side pressure is applied to the cam.

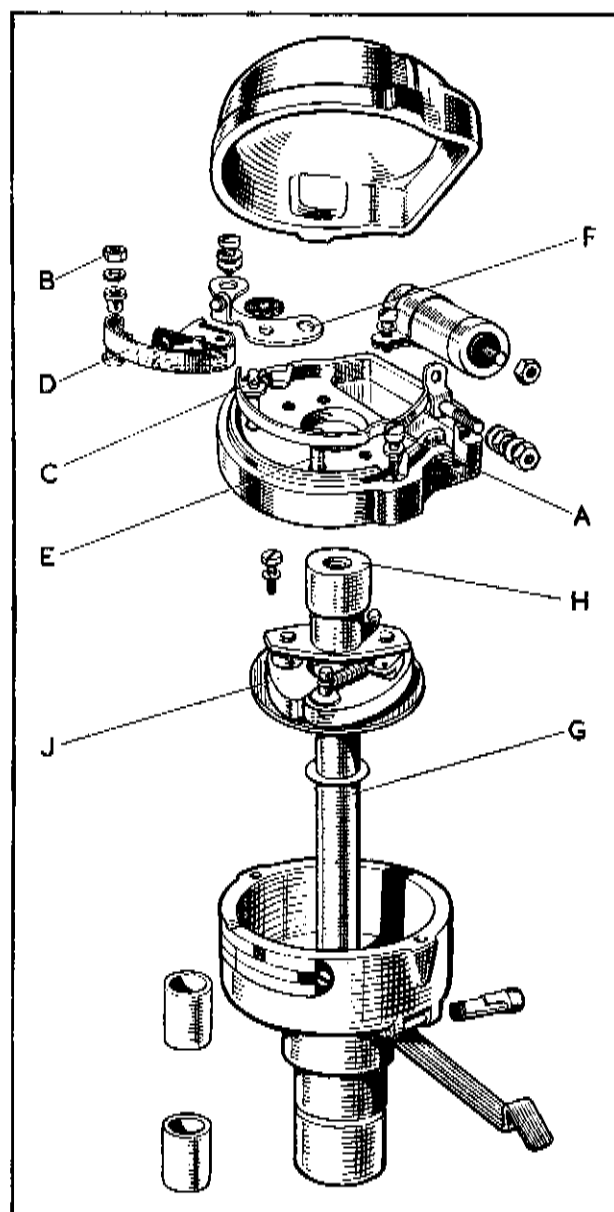


Fig. 4. Model DKX-dismantled.



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Porous bronze bearing bushes should be inserted in the body on a highly polished shouldered mandrel, which on withdrawal will give the finished bore diameter without machining. Before use, these bushes should be stored in a covered container, and fully covered with oil of a grade equivalent to Mobiloil Arctic or other good thin mineral oil. The minimum time of soaking should normally be 24 hours; in cases of extreme urgency, this period may be shortened by heating the oil to 100° C., when the time of immersion may be reduced to 2 hours.

The ball bearing in the D1A2 may be removed by means of a normal type of extractor.

**(d) Contact breaker.**

When trimming a pair of contacts, it is not essential to grind down a slightly pitted contact, but only to remove excess metal from the pitted contact. Should the pitting and piling be found excessive, a replacement contact set, comprising both fixed and moving contacts should be fitted. Before despatch, replacement contacts are given a protective coating of oil which should be removed with a petrol-moistened cloth before fitting.

**(e) Reassembly.**

Reassembly is a reversal of the dismantling procedure described in para. 3 (b). Note that an insulating washer must be placed over the contact breaker pivot before the moving contact is fitted.

