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LUCAS

Quality

EQUIPMENT

VOLUME 2

WORKSHOP INSTRUCTIONS

DISTRIBUTOR

MODEL DM2P4



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LUCAS WORKSHOP INSTRUCTIONS

DISTRIBUTOR

MODEL DM2P4

1. GENERAL

Mounted on the distributor driving shaft, immediately beneath the contact breaker, is a centrifugally operated timing control mechanism. It consists of a pair of spring loaded governor weights, linked by lever action to the contact breaker cam. At slow engine speeds, the spring force maintains the cam in a position in which the spark is slightly retarded. Under the centrifugal force imparted by high engine speeds, the governor weights swing out against the spring pressure to advance the contact breaker cam, and thereby the spark, to suit the engine conditions at the greater speed.

A built-in vacuum-operated timing control is also included, designed to give additional advance under part-throttle conditions. One side of a spring-loaded diaphragm is subjected to pressure variations in the induction pipe. This diaphragm is linked to the contact breaker plate and rotates the contact breaker heel about the cam, thus advancing the spark for part-throttle operating conditions. There is also a micrometer adjustment for making fine alterations in timing to allow for changes in running conditions, e.g., state of carbonisation, change of fuel, etc.

A completely sealed metallised paper capacitor is utilised. This has the property of being self-healing; should the dielectric break down, the metallic film around the point of rupture is vaporised away by the heat of the spark, so preventing a permanent short circuit.

The HT pick-up brush is of a composite construction, the centre portion being made of a resistive compound and the two end portions of softer carbon. The resistive portion of this carbon brush which is in circuit between the coil and the distributor gives a measure of radio interference suppression. Under no circumstances must a short non-resistive brush be used as a replacement for one of these longer resistive brushes.

THE PRE-TILTED CONTACT BREAKER UNIT

During 1955 an improved low-friction contact breaker unit was introduced on the DM2P4 distributor. Important features of this pre-tilted contact breaker unit are, improved sensitivity of vacuum con-

trol and elimination of any tendency for the moving contact breaker plate to rock at high cam speeds. Contact adjustment has also been simplified.

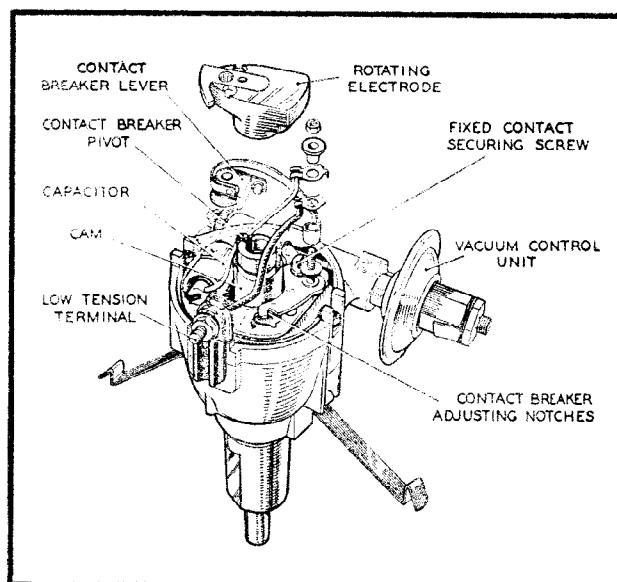


Fig. 1

Pre-tilted contact breaker dismantled

2. ROUTINE MAINTENANCE

In general, lubrication and cleaning constitute normal maintenance procedure.

(a) LUBRICATION—EVERY 3,000 MILES

Take great care to prevent oil or grease from getting on or near the contacts.

Add a few drops of thin engine oil (S.A.E. 30) through the aperture at the edge of the contact breaker to lubricate the centrifugal timing control. Lightly smear the cam with Mobilgrease No. 2.

Lift off the rotor arm and apply to the spindle a few drops of thin machine oil to lubricate the cam bearing. It is not necessary to remove the exposed screw, since it affords a clearance to permit the passage of oil.



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Replace the rotor arm, carefully locating its moulded projection in the keyway in the spindle and pushing it on as far as it will go.

(b) CLEANING—EVERY 6,000 MILES

Thoroughly clean the moulded distributor cover, inside and out, with a soft dry cloth, paying particular attention to the spaces between the metal electrodes. Ensure that the carbon brush moves freely in its holder. Examine the contact breaker. The contacts must be quite free from grease or oil. If they are burned or blackened, clean them with very fine carborundum stone or emery cloth, then wipe with a petrol-moistened cloth. Cleaning is facilitated by removing the contact breaker lever. To do this, remove the nut, insulating piece and connections from the post to which the end of the contact breaker spring is anchored. The contact breaker lever may now be removed from its pivot.

Before refitting the contact breaker, smear the pivot post with Ragosine Molybdenised non-creep oil or Mobilgrease No. 2.

After cleaning, check the contact breaker setting. Turn the engine by hand until the contacts show the maximum opening. This should measure 0.014" to 0.016". If the measurement is incorrect, keep the engine in the position giving maximum opening, slacken the screw(s) securing the fixed contact plate and adjust its position to give the required gap. Tighten the screw(s). Recheck the setting for other positions of the engine giving maximum opening.

3. DESIGN DATA

- (a) Firing angles: 0°, 90°, 180°, 270°, $\pm 1^\circ$.
Closed periods: $60^\circ \pm 3^\circ$.
Open period: $30^\circ \pm 3^\circ$.
- (b) Contact breaker gap: 0.014" to 0.016".
- (c) Contact breaker spring tension, measured at contacts: 18—24 oz.
- (d) Capacitor: 0.18—0.23 microfarad.
- (e) Checking centrifugal and vacuum timing controls: the advance characteristics of the automatic controls are individually determined for each engine model and Test Data is published by the Lucas Service Bulletin Department. The performance of the control may be checked against these figures if the requisite equipment is available.
- (f) For current consumption, etc., of ignition coils, see SECTION C—8.

4. SERVICING

Before starting to test, make sure that the battery is in good condition.

(a) TESTING IN POSITION TO LOCATE CAUSE OF UNEVEN FIRING

Run the engine at a fairly fast idling speed.

If possible, short circuit each plug in turn with the blade of an insulated screwdriver or a hammer head placed across the terminal to contact the cylinder head. Short circuiting the plug in the defective cylinder will cause no noticeable change in the running note. With the others, however, there will be a pronounced increase in roughness.

If short circuiting the sparking plugs is not possible, due to their being fitted with shrouded cable connectors, remove each plug connector in turn. Again, removal of the connection to the defective cylinder will cause no noticeable change in the running note, but there will be a definite increase in roughness when the other plugs are disconnected. Having thus located the defective cylinder, stop the engine and remove the cable from the sparking plug terminal.

Restart the engine and hold the cable end about $\frac{3}{16}$ " from the cylinder head. If sparking is strong and regular, the fault lies with the sparking plug, and it should be removed, cleaned and adjusted, or a replacement fitted. If, however, there is no spark, or only weak irregular sparking, examine the cable from the plug to the distributor cover for deterioration of the insulation, renewing the cable if the rubber is cracked or perished. Clean and examine the distributor moulded cover for free movement of the carbon brush. If a replacement brush is necessary, it is important that the correct type is used. If tracking has occurred, indicated by a thin black line between two or more electrodes and between one of the electrodes and the body, fit a replacement distributor cover.

(b) TESTING IN POSITION TO LOCATE CAUSE OF IGNITION FAILURE

Spring back the clips on the distributor head and remove the moulded cover. Lift off the rotor, carefully levering with a screwdriver if necessary.

Switch on the ignition and whilst the engine is slowly cranked, observe the reading on the car ammeter, or on an ammeter connected in series with the coil supply cable. The reading should rise and fall with the closing and opening of the contacts if the low tension wiring is in order. When a reading is given which does not fluctuate, a short circuit, or contacts remaining closed, is indicated. No reading indicates an open circuit in the low tension circuit, or badly adjusted or dirty contacts.

Check the contacts for cleanliness and correct gap setting as described in Para. 2(b). Ensure that the contact breaker lever moves freely on the pivot. If sluggish,



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remove the arm and polish the pivot post with a strip of fine emery cloth. Smear the post with Ragosine Molybdenised non-creep oil or Mobilgrease No. 2 and replace the lever.

If the fault persists, proceed as follows:

(c) LOW TENSION CIRCUIT—FAULT LOCATION

(i) No reading in ammeter test

Refer to wiring diagram and check circuit for broken or loose connections, including ignition switch. Check the ignition coil by substitution.

(ii) Steady reading in ammeter test

Refer to wiring diagram and check wiring for indications of a short circuit.

Check capacitor (either by substitution or on a suitable tester).

Check ignition coil by substitution.

Examine insulation of contact breaker.

(d) HIGH TENSION CIRCUIT

If the low tension circuit is in order, remove the high tension lead from the centre terminal of the distributor cover. Switch on the ignition and turn the engine until the contacts close. Flick open the contact breaker lever whilst the high tension cable from the coil is held about $\frac{3}{16}$ " from the cylinder block. If the ignition equipment is in good order, a strong spark will be obtained. If no spark occurs, a fault in the circuit of the secondary winding of the coil is indicated and the coil must be replaced.

Carefully examine the high tension cables and replace if the rubber insulation is cracked or perished, using 7 mm. (p.v.c. or neoprene-covered) rubber ignition cable.

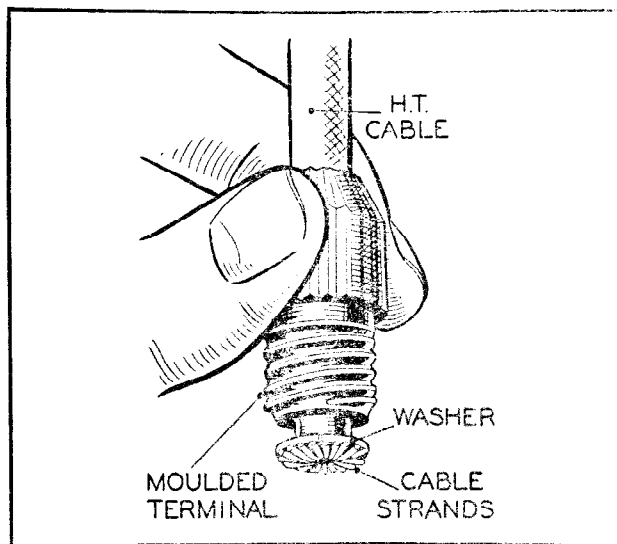


Fig. 2

Fitting H.T. cable to distributor terminal

To fit cables to ignition coils or to distributor covers with vertical outlets, pass the cable through the knurled, moulded terminal, bare about $\frac{1}{4}$ in. of the end of the cable, thread the wire through the split washer (removed from the original cable) and bend back the strands. Finally screw the moulded terminal into the coil moulding or distributor cover.

To make connections to the terminals in distributor covers having horizontal outlets, remove the cover and slacken the screws on the inside of the moulding. Cut the cables to the length required and push firmly home in the holes in the moulding. Tighten the screws, which will pierce the rubber insulation to make good contact with the cable core. The connection to the centre terminal is made accessible by removing the small carbon brush.

The cables from the distributor to the sparking plugs must be connected in the correct firing order.

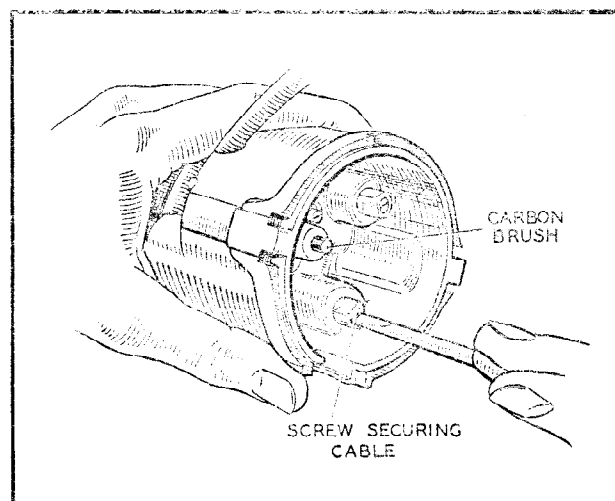


Fig. 3

Fitting H.T. cables to distributor cap having horizontal cable outlets

(e) DISMANTLING

When dismantling, carefully note the positions in which the various components are fitted, in order to ensure their correct replacement on reassembly. If the driving dog or gear is offset, or marked in some way for convenience in timing, note the relation between it and the rotor electrode and maintain this relation when reassembling the distributor. The amount of dismantling necessary will naturally depend on the repair required.

Spring back the securing clips and remove the moulded cover. Lift the rotor arm off the spindle, carefully levering with a screwdriver if it is tight.



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Disconnect the vacuum unit link to the moving contact breaker plate, and remove the two screws at the edge of the contact breaker base. The contact breaker assembly, complete with external terminal, can now be lifted off (see (i) below). Remove the circlip on the end of the micrometer timing screw, and turn the micrometer nut until the screw and the vacuum unit assembly are freed. Take care not to lose the ratchet and coil type springs located behind the micrometer nut.

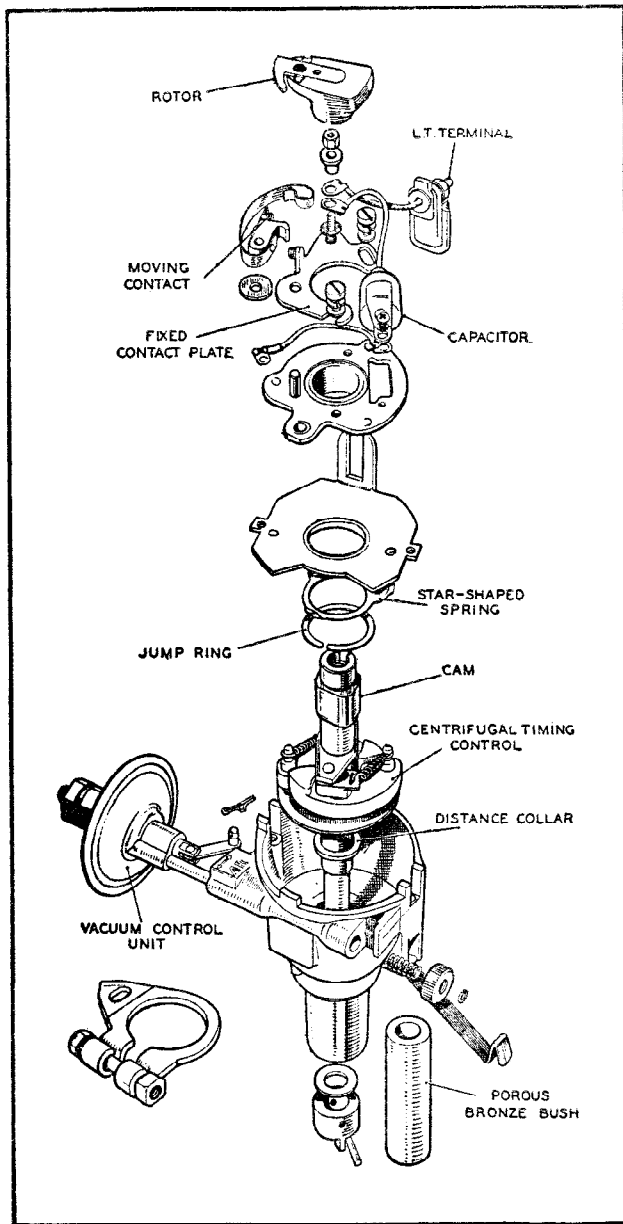


Fig. 4
Earlier distributor, dismantled

The complete shaft assembly, with centrifugal timing control and cam foot can now be removed from the distributor body (see (ii) below).

(i) Contact Breaker

To dismantle the assembly further, remove the nut, insulating piece and connections from the pillar on which the contact breaker spring is anchored. Slide out the terminal moulding. Lift off the contact breaker lever and the insulating washers beneath it. Remove the screw(s) securing the fixed contact plate, together with the spring and plain steel washers, and take off the plate. Withdraw the single screw securing the capacitor and (on earlier models) contact breaker earthing lead. Dismantle the contact breaker base assembly by turning the base plate clockwise and pulling to release it from the moving contact breaker plate. On earlier models remove the circlip and star washer located under the base plate.

(ii) Shaft and Action Plate

To dismantle the assembly further, take out the screw inside the cam and remove the cam and cam foot. The weights, springs and toggles (when fitted) of the centrifugal timing control can now be lifted off the action plate. Note that a distance collar is fitted on the shaft underneath the action plate.

(f) BEARING REPLACEMENT

The single long bearing bush used in this distributor can be pressed out of the shank by means of a shouldered mandrel. If the bearing bush has to be removed for **any** purpose the distributor must be assembled with a new bush fitted.

Prepare the new bush for fitting by allowing it to stand completely immersed in medium viscosity (S.A.E. 30-40) engine oil for at least 24 hours. In cases of extreme urgency, this period of soaking may be shortened by heating the oil to 100°C. for 2 hours, then **allowing the oil to cool before removing the bush**. Using a shouldered mandrel, press the bearing into the shank. The mandrel should be hardened and polished, and approximately 0.0005" greater in diameter than the distributor shaft. To prevent subsequent withdrawal of the bush with the mandrel, a stripping washer should be fitted between the shoulder of the mandrel and the bush.

Under no circumstances should the bush be over-bored by reamering or any other means, since this will impair the porosity and thereby the effective lubricating quality of the bush.



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(g) REASSEMBLY

The following instructions assume that **complete** dismantling has been undertaken.

(i) Place the distance collar over the shaft, smear the shaft with Ragosine Molybdenised non-creep oil or clean engine oil, and fit it into its bearing.

(ii) Refit the vacuum unit into its housing and replace the springs, milled adjusting nut and securing circlip.

(iii) Reassemble the centrifugal timing control. See that the springs are not stretched or damaged. Place the cam and cam foot assembly over the shaft, engaging the projections on the cam foot with the weights, or on earlier models, the toggles, and fit the securing screw.

(iv) Before reassembling the contact breaker base assembly, lightly smear the base plate with Ragosine Molybdenised non-creep oil or Mobilgrease No. 2. On earlier distributors, the felt pad under the rotating contact breaker plate should be moistened with a few drops of thin machine oil.

Fit the moving contact breaker plate to the contact breaker base plate and secure, following a reversal of the dismantling procedure. Refit the contact breaker base into the distributor body. Engage the link from the vacuum unit. Insert the two base plate securing screws, one of which also secures one end of the contact breaker earthing cable.

(v) Fit the capacitor into position. On earlier models the eyelet on the end of the contact breaker earthing lead is held under the capacitor fixing screw. Place the fixed contact plate in position and secure lightly with the securing screw(s). One plain and one spring washer must be fitted under the securing screw(s).

(vi) Place the insulating washers, etc., on the contact breaker pivot post and on the pillar on which the end of the contact breaker spring locates. Refit the contact breaker lever and spring.

(vii) Slide the terminal block into its slot.

(viii) Thread the low tension connector and capacitor eyelets on to the insulating piece, and place these on the pillar which secures the end of the contact breaker spring. Refit the washer and securing nut.

(ix) Set the contact gap to 0.014 to 0.016 in. and tighten the fixed contact securing screw(s).

(x) Refit the rotor arm, locating the moulded projection in the rotor arm with the keyway in the shaft, and pushing fully home. Refit the moulded cover.

(h) REPLACEMENT CONTACTS

If the contacts are so badly worn that replacement is necessary, they must be renewed as a pair and not individually. The contact gap must be set to 0.014" to 0.016"; after the first 500 miles' running with new contacts fitted, the setting should be checked and the gap reset to 0.014" to 0.016". This procedure allows for the initial "bedding-in" of the heel.

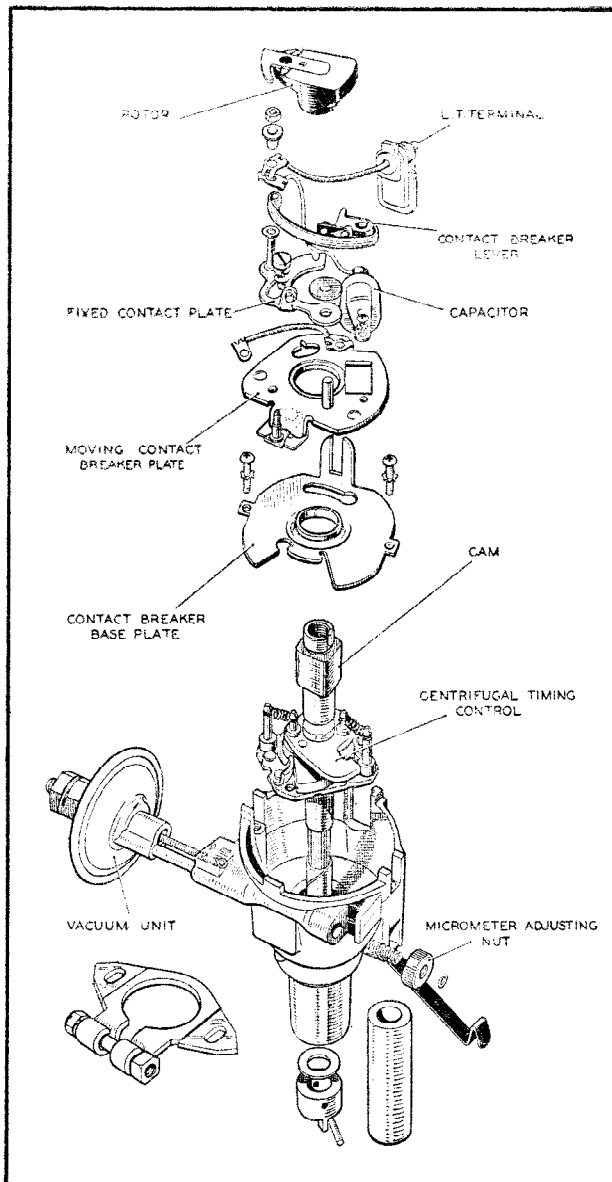


Fig. 5
Distributor, dismantled



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(i) REPLACEMENT LOW TENSION TERMINAL BLOCKS

Replacement terminal blocks comprise a grooved neoprene or nylon block having a terminal stud moulded into it.

When renewing earlier low tension terminal blocks it is necessary to draw out the existing bearing plate into a slot as shown in Fig. 6. The grooves of the new block will then engage with the sides of this slot.

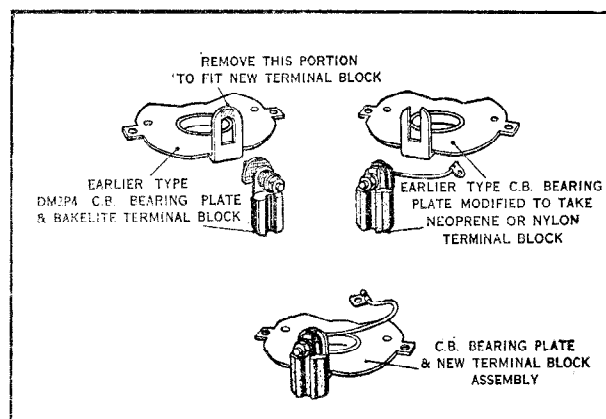


Fig. 6
Fitting neoprene or nylon low tension terminal blocks

