

LUCAS

Quality

EQUIPMENT

VOLUME 2

WORKSHOP INSTRUCTIONS

DISTRIBUTORS

MODELS

DULF8A and DULFH8A



JOSEPH LUCAS LTD • BIRMINGHAM 19 • ENGLAND

LUCAS WORKSHOP INSTRUCTIONS

DISTRIBUTORS

MODELS DULF8A AND DULFH8A

1. GENERAL

The coil ignition equipment comprises a high tension induction coil and a combined distributor, contact breakers and automatic timing control assembly driven at half engine speed via the camshaft. Current flowing through the primary or low tension winding of the coil sets up a strong magnetic field about it. This current is periodically interrupted by cam-operated contact breakers, driven from the engine, and the subsequent collapse of the magnetic field across the secondary winding of the coil induces a high voltage in it. At the same time, a rotor arm in the distributor connects the secondary winding of the coil with one of a number of metal electrodes, from which cables lead to the sparking plugs in the engine cylinders.

Thus, a spark is arranged to occur in the cylinder under compression at the exact moment required to produce combustion of the mixture.

This distributor is of double lever type and is designed for use with eight cylinder engines, each contact breaker operating for half the cylinders. The distributor is flange-mounted and will usually be found mounted horizontally.

Mounted on the distributor driving shaft, immediately beneath the contact breakers, is an automatic timing control mechanism. It consists of a pair of spring-loaded governor weights, linked by lever action to the contact breaker. At low engine speeds, the spring force maintains the contact breaker cam in a position in which the spark is slightly retarded. Under the centrifugal force imparted by high engine speeds, the

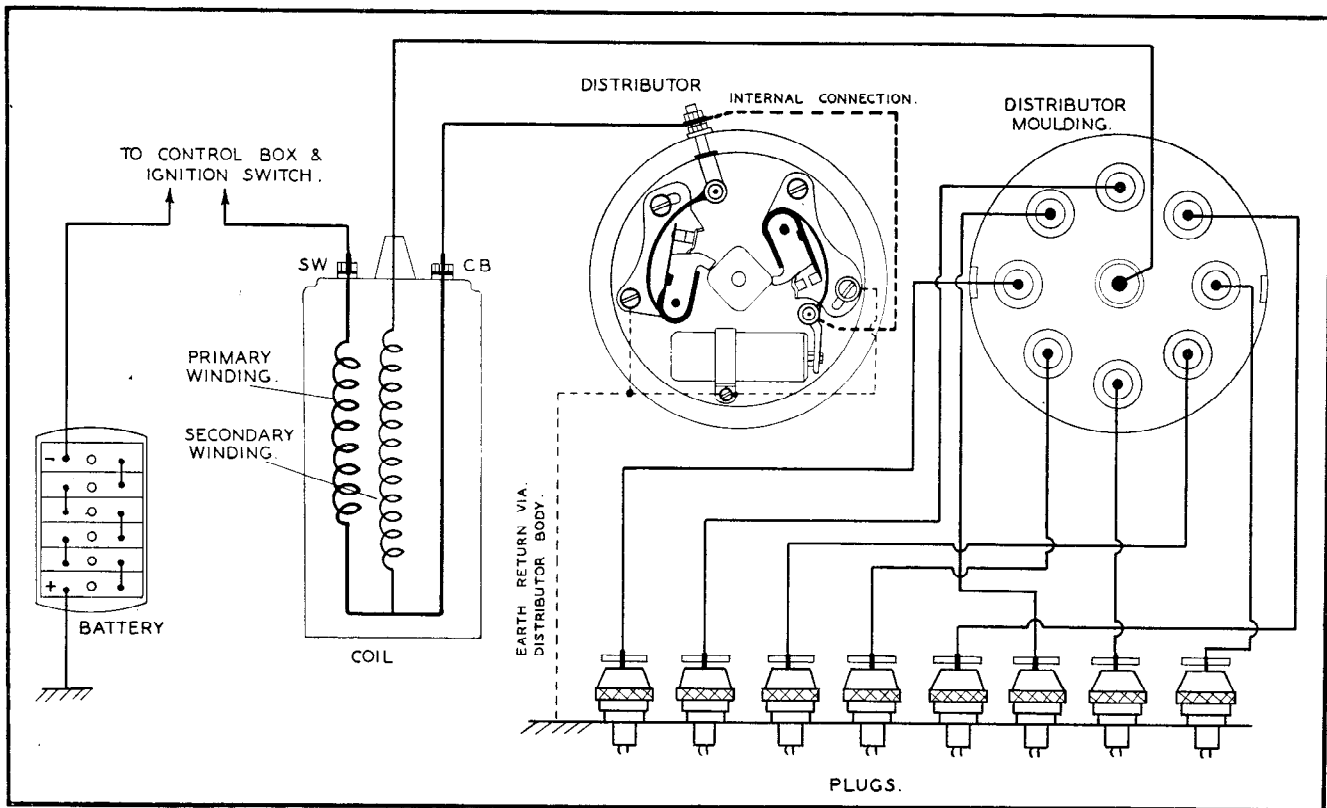


Fig. 1.
Typical coil ignition circuit



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governor weights swing out, against the spring pressure, to advance the cam and thereby the spark, to suit engine conditions at the greater speed.

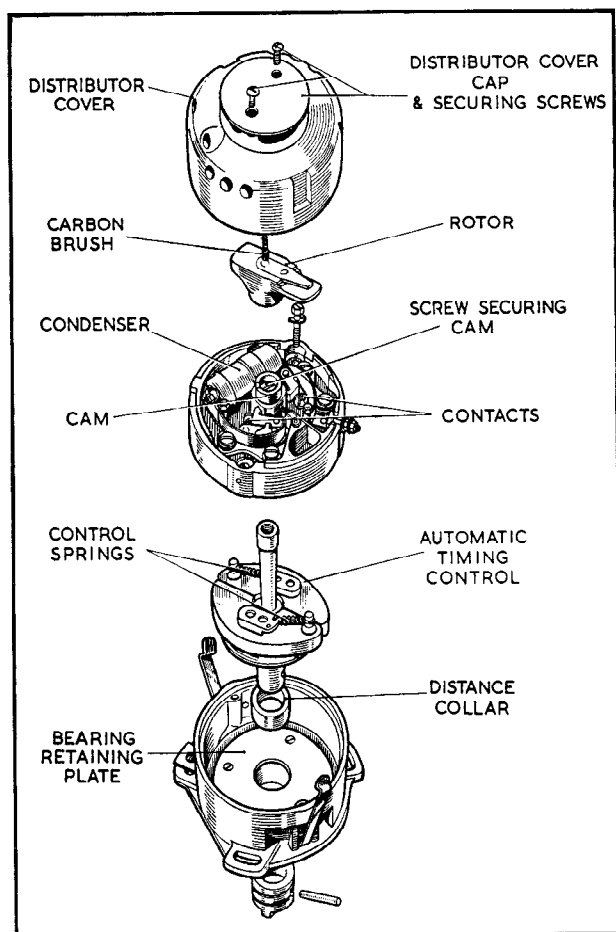


Fig. 2.
Distributor, dismantled

2. ROUTINE MAINTENANCE

In general, lubrication and cleaning constitute normal maintenance procedure.

(a) LUBRICATION — EVERY 3,000 MILES

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

Add a few drops of thin machine oil through the lubricator fitted on the distributor body, and also place a spot of clean engine oil on the felt cam lubricator. Lightly smear the contact breaker pivot with a little Mobilgrease No. 2, or with thin engine oil.

(b) CLEANING — EVERY 6,000 MILES

Thoroughly clean the moulded distributor cap, inside and out, with a soft dry cloth, paying particular attention to the spaces between the metal electrodes. Ensure that the small carbon brush moves freely in its holder.

Examine the contact breakers. 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 facilitated by removing the contact breaker levers. To do this, unscrew the nut securing the end of each contact breaker spring, remove the spring washer and plain steel washer and lift off the contact breaker lever.

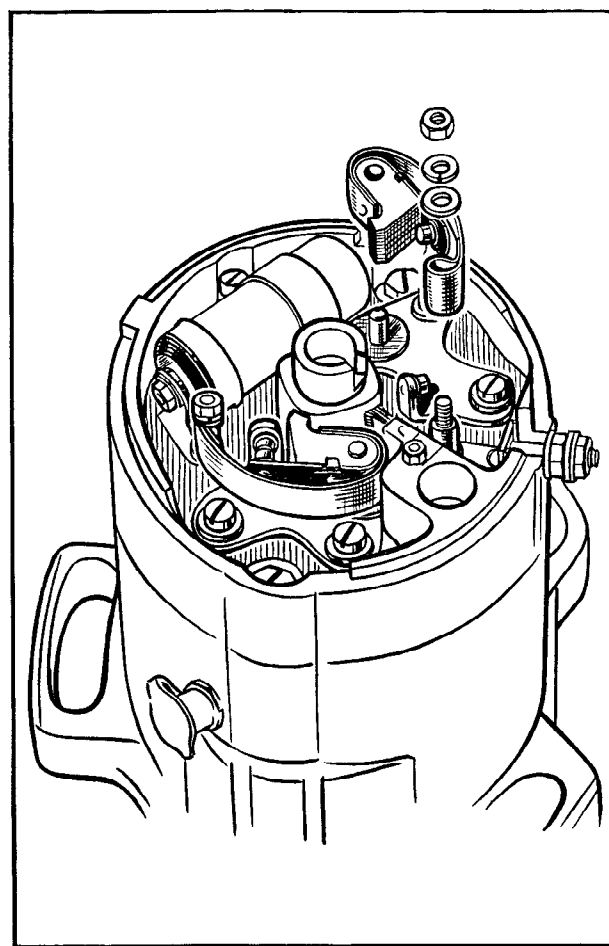


Fig. 3.
Removal of moving contacts



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After cleaning, check the contact breaker settings. Turn the engine by hand until one pair of contacts shows 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 two screws securing the fixed contact plate and adjust its position to give the required gap. Tighten the screws. Recheck the setting for other positions of the engine giving maximum opening, and repeat the sequence of operations to check the other set of contacts.

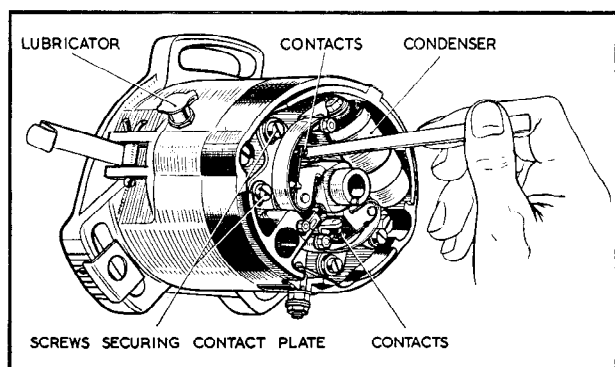


Fig. 4.
Checking the contacts

3. DESIGN DATA

- (a) Contact breaker gap : 0.014" to 0.016".
- (b) Firing angles : 0°, 45°, 90°, etc., $\pm 1^\circ$
- (c) Open period : $13^\circ \pm 2^\circ$. Closed period : $32^\circ \pm 2^\circ$.
- (d) Contact breaker spring tension, measured at the contacts : 20 to 24 ozs.
- (e) Condenser capacity : 0.2 microfarad.
- (f) Automatic timing control : the operating range of the mechanism varies with each car model, and is given in the Test Data section of the appropriate C.E. list. The performance of the control may be checked against these figures if the requisite equipment is available.
- (g) For current consumption, etc., of ignition coils, see SECTION C-8.

4. SERVICING

Before starting to test, make sure that the battery is not fully discharged, as this will often produce the same symptoms as a fault in the ignition circuit.

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

Run the engine at a fairly fast idling speed.

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

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 for deterioration of the insulation, renewing the cable if the rubber is cracked or perished.

Clean and examine the distributor moulded cap for free movement of the carbon brush. If tracking has occurred, indicated by a thin black line, usually between two or more electrodes, a replacement distributor cap must be fitted.

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

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

Check the contacts for cleanliness and correct gap setting as described in Para. 2(b).

If an ammeter is fitted, switch on the ignition and turn the engine. Observe the reading, which should rise and fall with the closing and opening of the contacts if the low tension wiring is in order. When the reading does not fluctuate, a short circuit, or contacts remaining closed, is indicated. No reading indicates a broken or loose connection in the low tension wiring or badly adjusted or dirty contacts.

(c) LOW TENSION CIRCUIT — FAULT LOCATION

If it is determined that the fault lies in the low tension circuit, by the eliminating check (b) above, switch on the ignition and turn the engine until both sets of contact breaker points are separated.

Refer to the wiring diagram (published in the appropriate C.E. list) and check the circuit with a voltmeter (0—20 volts) between the following points (which refer to a normal ignition layout) AND A GOOD EARTH.



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If the circuit is in order, the voltage reading should be approximately 6 or 12 volts, according to the system. No reading indicates a damaged cable or loose connections, or a breakdown in the section under test.

(i) BATTERY TO AMMETER

Connect the voltmeter between the ammeter terminal "B" and a good earth on the chassis. In some systems this section of the circuit is made by way of the starter switch, in which case a voltage check should also be made at the battery connection to the switch. No reading indicates a faulty lead or loose connection.

(ii) AMMETER

Check the voltage to earth at the other ammeter terminal "A". No reading indicates a faulty ammeter.

(iii) AMMETER TO CONTROL BOX

Connect the voltmeter between the control box terminal "A" and earth. No reading indicates a faulty lead or loose connection.

(iv) CONTROL BOX

Check the voltage to earth at the control box terminal "A1". No reading indicates a broken connection in the series winding.

(v) CONTROL BOX TO IGNITION SWITCH

Connect the voltmeter between the ignition switch terminal, to which the lead from the control box is connected, and a good earth. No reading indicates a faulty lead or loose connection.

(vi) IGNITION SWITCH

Check the voltage between the other terminal of the ignition switch and earth. No reading indicates a fault in the switch.

(vii) IGNITION SWITCH TO IGNITION COIL

Remove the lead from the ignition coil "SW" terminal, and connect the voltmeter between the free end of the cable and earth.

On systems incorporating control boxes models RF91 and RF95, this portion of the circuit is made by way of the control box "A3" terminal, and a voltage check should be made at this point also.

Remake the connection to the coil.

(viii) IGNITION COIL

Disconnect the lead from the "CB" terminal of the coil and connect the voltmeter between the "CB" terminal and a good earth. No reading indicates a fault in the primary winding of the coil, necessitating coil replacement. If, however, the correct reading is obtained, remake the cable connection to the coil terminal.

(ix) IGNITION COIL TO DISTRIBUTOR

Disconnect the low tension cable to the distributor and connect the voltmeter between the end of the cable removed and earth. No reading indicates a faulty lead or loose connection. Reconnect the cable to the distributor.

(x) CONTACT BREAKER AND CONDENSER

Connect the voltmeter across one pair of contact points. If no reading is obtained, re-check with the condenser removed. If a reading is now given, the condenser is faulty and must be replaced. Measure the contact breaker spring tension. This should be 20 - 24 oz. measured at the contacts.

(d) HIGH TENSION CIRCUIT

If, after carrying out these tests, the fault has not been located, remove the high tension lead from the centre terminal of the distributor. Switch on the ignition and turn the engine until one pair of contacts close.

Flick open the contact breaker lever while the high tension lead 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.

The high tension cables must be carefully examined, and replaced if the rubber insulation is cracked or perished, using 7 m.m. rubber covered ignition cable. To fit cables to ignition coils and distributors with vertical outlets, pass the cable through the knurled,

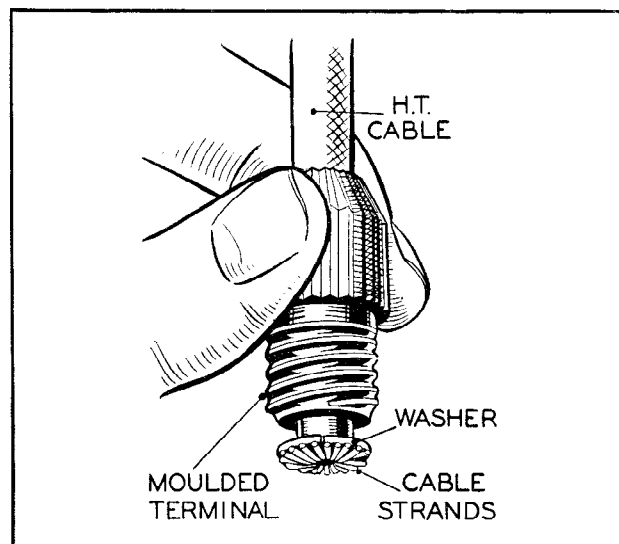


Fig. 5.
Fitting terminal nut to high tension cable
(ignition coil, and distributor with vertical outlets)



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moulded nut, bare the end of it for about $\frac{1}{4}$ " and thread the wire through the brass washer. Bend back the strands over the washer and finally screw the nut into its terminal.

To make connections to the terminals in distributor caps having horizontal outlets, remove the cap 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.

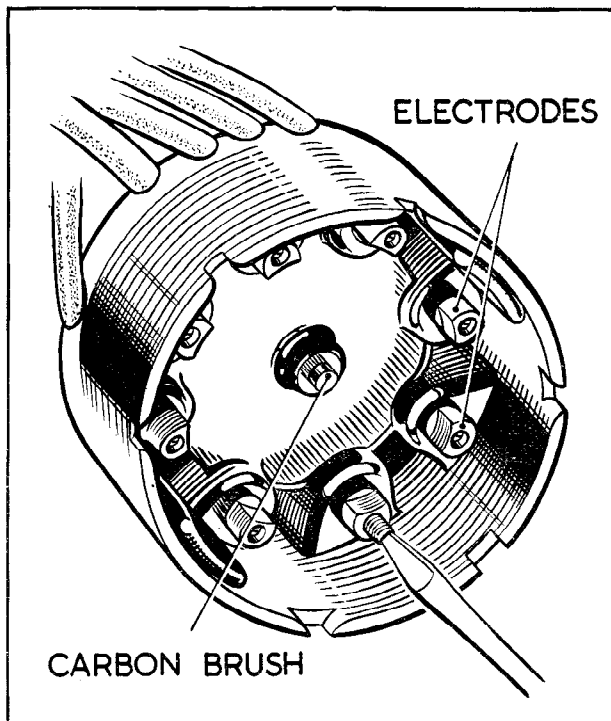


Fig. 6.

Making connections to distributor with horizontal high tension cable outlets

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

(e) CONTACT BREAKER MECHANISM

Check and adjust as described in Para. 2 above. Ensure that the moving arms move freely on the pivots. If sluggish, remove the arms and polish the pivot pins with a strip of fine emery cloth. Replace the arms and lubricate with a spot of clean engine oil.

(f) DISMANTLING

(i) Spring back the securing clips and remove the moulded distributor cap.

(ii) Lift the rotor off the top of the spindle. If tight, it may be levered off with a screwdriver.

(iii) To remove each moving contact, unscrew the nut securing the end of the spring, lift off the spring and plain steel washers and remove the contact breaker lever. Lift the insulating washer from the post on the fixed contact plate. Take out the two screws together with spring and plain steel washers from each of the plates carrying the fixed contacts and remove the plates.

(iv) Take out the screw from the condenser band clip, unscrew the terminal nut, lift off the spring and plain washers and remove the condenser.

(v) Unscrew the two screws fitted at the edge of the contact breaker base and remove together with their spring washers. The contact breaker base can then be removed from the body of the distributor. The ball race forms an integral part of the contact breaker base and cannot be separated from it.

(vi) Remove the screw from the top of the cam and lift the cam off its bearings. Remove the timing control weights with toggle arms and springs from the pins on the action plate. Lift the toggles off their pivots and detach the springs from their anchorage.

(vii) Drive out the pin securing the driving dog and remove the dog by means of an extractor, or alternatively drive out the shaft from the dog and bearing using a brass or copper drift. Support the body of the distributor while removing the shaft. Lift the distance collar off the shaft.

(viii) To remove the lower bearing, take out the three bolts from the bearing retaining plate, lift out the plate and press the bearing from its housing, using a shouldered mandrel which locates on the inner journal of the bearing.

(g) REASSEMBLY

(i) Ensure that all components are clean. Pack the bearings with high-melting-point grease.

(ii) Press the ball bearing into its housing in the distributor base. A tool should be used which locates on the inner and outer bearing journals. Replace the bearing retaining plate, securing with the three bolts.

(iii) Place the distance collar over the shaft, locating it against the underside of the action plate. Press the driving shaft into the bearing until the distance collar contacts the inner journal.

(iv) Assemble the timing control mechanism in its original position, making sure the springs are not stretched. Two holes are provided in each toggle: the springs must be fitted to the inner hole in each case. Place the cam on the spindle and secure by tightening the locking screw. Ensure that the cam spigots engage correctly in the holes in the toggle levers.

(v) Replace the contact breaker base. Secure by means of the attachment screws, which should be tightened firmly on to their spring washers.



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NOTE.—If it is necessary to renew the contact breaker base, be sure that the bearing is of the correct size. Identification is made by checking a coloured mark on the underside of the base, so it is of importance to see that the replacement contact breaker base is marked similarly to the contact breaker base removed.

(vi) Place the end of the connector strip over the condenser terminal post, refit the plain and spring washers and tighten the terminal nut. Insert the securing screw with its spring washer through the hole in the condenser band clip, to fasten it to the contact breaker base.

(vii) Replace the fixed contact plates, lightly tightening the screws on to their plain and spring washers.

Place insulating washers over the pivot pins and position the contact breaker levers on the pins.

(viii) Fit the spring ends, washers and nuts on the fixing posts and tighten the nuts.

(ix) Adjust the contact breaker gap, as described in Para. 2 above.

NOTE.—If it is necessary to renew contacts, a replacement set comprising both fixed and moving contacts must be fitted.

(x) Place the rotor on top of the spindle and push fully home.

(xi) Fit the distributor cover moulding and secure by means of the spring clips.

