RUNNING INSTRUCTIONS FOR

LUCAS

DYNAMO LIGHTING AND COIL IGNITION EQUIPMENT

FOR MOTOR-CYCLES

JOSEPH LUCAS LTD., BIRMINGHAM.

Instruction Booklet No. 175C.

RUNNING INSTRUCTIONS FOR
LUCAS DYNAMO LIGHTING & COIL IGNITION EQUIPMENT
FOR MOTOR-CYCLES

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TO ENSURE THE BEST SERVICE FROM LUCAS DYNAMO LIGHTING & COIL IGNITION EQUIPMENT
THE MOST IMPORTANT POINTS ARE:

BATTERY. Inspect the battery regularly and keep acid level with the top of the plates, by adding distilled water. UNLESS YOU DO THIS YOUR BATTERY WILL QUICKLY DETERIORATE.

WIRING. Keep all connections and terminals tight. See that the cables are clear of moving parts.

Replace high-tension (ignition) cable if it becomes worn or perished.

DYNAMO. Keep brushes and commutator clean.

CONTACT BREAKER. Keep contact breaker clean. If necessary polish the contacts with fine carborundum stone and afterwards wipe with cloth moistened with petrol.

Occasionally check contact breaker gap.

HEADLAMP. Focus headlamp after fitting new bulb.

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TO PRINCIPAL SECTIONS.

RUNNING INSTRUCTIONS FOR LUCAS DYNAMO LIGHTING AND COIL IGNITION EQUIPMENT FOR MOTOR CYCLES.

The equipment comprises a dynamo and battery which supply the current for the lamps and ignition coil. The lighting and charging switch and ammeter are incorporated either in the headlamp or in the instrument panel along with the ignition switch and ignition warning lamp. With some equipments the ignition switch is combined with the lighting and charging switch and the warning light is fitted in the ammeter, while with other equipments the warning light and ignition switch are mounted as separate units in the headlamp or instrument panel.

The contact breaker is driven either from an extension of the crankshaft, or with some sets, it is combined with the dynamo and is driven off the dynamo shaft.

The dynamo is arranged so that when the combined lighting and charging switch is in the "OFF" position it gives an output which approximately balances the current taken by the ignition coil. When the switch is moved to the "C" position or when the lamps are switched on, the dynamo gives its full output.

The arrangement whereby the dynamo gives a reduced charge during daytime running and its full output when the lamps are switched on, keeps the battery in good condition without the possibility of overcharging. With headlamps fitted with a combined lighting, charging and ignition switch, the switch positions are as follows :—

OFF.—Ignition and lights off.
C.—Ignition on and dynamo giving half its normal output.
H.—Ignition and lights on, dynamo giving its maximum output.
L.—Ignition off and pilot light and tail lamp on.

The headlamp is fitted with a single filament main bulb, while a small pilot light is also provided. The change-over from the main bulb to the pilot bulb can be effected by means of the handlebar switch. Some lamps are fitted with a double filament bulb. One filament is approximately at the focus of the reflector and gives the main driving light whilst the second filament gives a dipped beam for use when meeting traffic or driving in fog.

MAINTENANCE IN SERVICE.

The equipment should receive regular attention, and where necessary, should be cleaned and adjusted in accordance with the instructions given below.

Before disconnecting any lead on the equipment or making any alteration to the wiring, disconnect the positive battery lead to avoid the possibility of short circuiting the battery.

BATTERY (Lead Acid Types).

Topping Up.

At least once a month, the vent plugs in the top of the battery should be removed, and the level of the acid solution examined. If necessary, distilled water, which can be obtained at all chemists and most garages, should be added to bring the level to the top of the plates. If acid solution has been spilled, it must be replaced by a diluted sulphuric acid solution of the same specific gravity as the electrolyte in the cell to which it is to be added. When examining the cells, do not hold a naked flame near the vents, as there is a danger of igniting the gas coming from the plates.

Storage.

If the equipment is laid by for several months, the battery must be given a small charge from a separate source of electrical energy about once a fortnight, in order to obviate any permanent sulphation of the plates. In no circumstances must the electrolyte be removed from the battery and the plates allowed to dry, as certain changes take place which result in loss of capacity.

Testing the Condition of the Battery.

It is advisable to complete the inspection by measuring the specific gravity of the acid, as this gives a very good indication of the state of charge of the battery.

An instrument known as a hydrometer is employed for this purpose, and these can be bought at any of our Service Depots.

The specific gravity figures are:

1.285—1.300 when fully charged, about 1.210 when half discharged, and about 1.150 when fully discharged.

The battery must never be left in a fully discharged condition, and unless some long runs are to be taken, it is advisable to have the battery removed from the machine and charged up from an independent electrical supply.

USE OF THE CHARGING SWITCH.

The conditions under which motor cycles are used vary very considerably, and obviously, the amount of charging a battery will require is dependent on the extent to which the lamps are used.

With equipments which give a small charge, to balance the ignition load in the "OFF" position, the switch should be moved to the "C" position for a short time after using the lights, but should not be left in this position for any length of time unless the period of night running is considerable or if the battery is found to be in a low state of charge (hydrometer readings of 1.210 or under).

LUCAS "NI-FE" STEEL-PLATE BATTERY.

For instructions on the latest Lucas "Ni-Fe" Steel-Plate Battery type C105 see Booklet No. 164, a copy of which can be obtained on application.

DYNAMO.

The only parts of the dynamo calling for occasional attention are the brushes and commutator which are readily accessible when the cover is removed. The brushes should slide freely in their holders. They should be clean, and the face in contact with the commutator should appear uniformly polished. Dirty brushes may be cleaned with a cloth moistened with petrol. The commutator surface must be kept clean and free from oil or brush dust.

Lubrication.

The bearings are packed with grease before leaving the Works, therefore lubricators are not provided, as the machine will run indefinitely without attention. When the motor-cycle is taken down for a general overhaul, the dynamo should be dismantled for cleaning, adjustment and repacking the bearings with high melting point grease.

CONTACT BREAKER.

Cleaning.

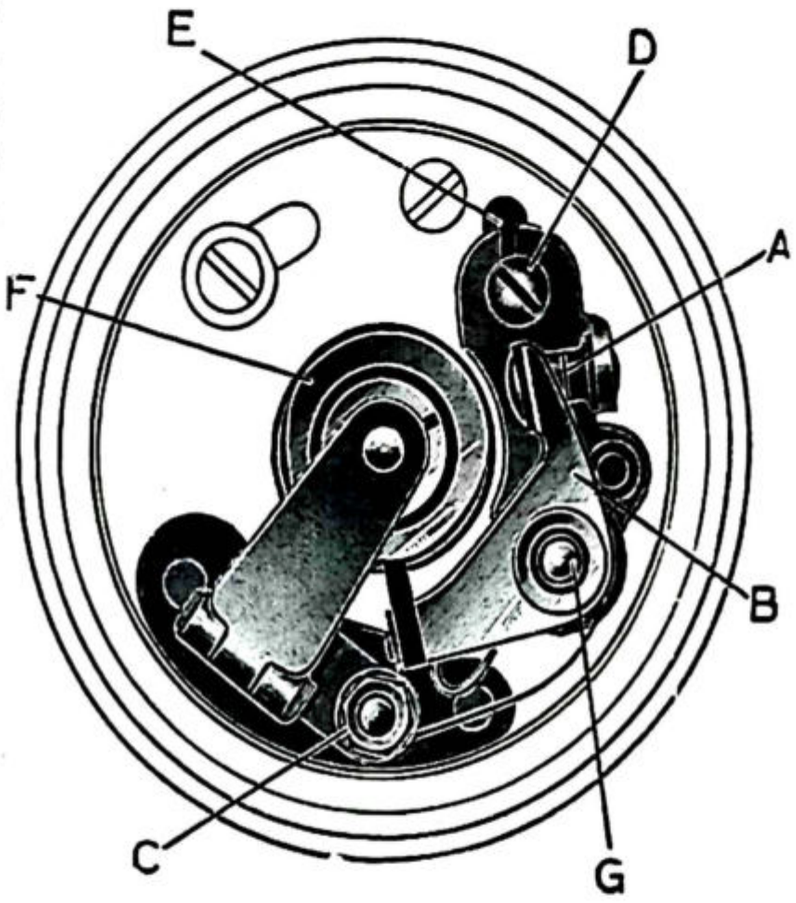
Occasionally remove the moulded cover and examine the contact breaker; it is important that the contacts "A" (Fig. 1) are kept clean and free from oil or grease. If they are burned or blackened, clean with fine carborundum stone, or if this is not available fine emery cloth may be used and afterwards wipe with a cloth moistened with petrol. If the contacts have been allowed to get into bad condition it is advisable to remove the rocker arm "B" from its housing in order to clean them properly. Remove the nut "C" and collar securing the spring, and then lift the rocker arm off its pin. After cleaning, fit the rocker arm, replace the collar and nut, and then check the contact breaker gap.

Adjustment.

The contact breaker gap is carefully set before leaving the Works and will only need adjustment at very long intervals. To test the contact breaker gap, slowly turn the engine over by hand until the contacts are seen to be fully opened. Now insert a gauge of 8-10 thousandths

of an inch thickness in the gap; if it is correct the gauge should be a sliding fit. It is not advisable to alter the setting unless the gap varies considerably from the gauge. If adjustment is necessary, proceed as follows: When the contacts are fully opened, slacken the locking screw "D" so that the plate carrying the stationary contact can just be moved by inserting a screwdriver in the slot "E" in the plate. Adjust its position until the gap is set to the thickness of the gauge. Tighten the locking screw and re-check the gap.

When replacing the moulded cover, it is essential to see that the hinged spring blade on the contact breaker makes good contact with the condenser case inside the cover. If the blade does not press firmly against the case, there will be excessive sparking and burning away of the contacts. Finally see that the metal ring round the contact breaker cover is clean and makes good contact with the contact breaker housing.



VIEW OF CONTACT BREAKER.

A—Contacts. D—Locking screw.
B—Rocker arm. E—Slot.
C—Nut. F—Rotating cam.
G—Pivot.

Lubrication.

About every 1,000 miles touch the surface of the steel cam "F" with a match previously dipped in oil. Do not give any excess.

Every 5,000 miles, place a single drop of oil on the pivot "G" on which the contact breaker works.

USE OF IGNITION CONTROL.

The ignition control should be retarded for starting, but advanced as soon as the engine is running at speed. For normal running the ignition should be kept in the advanced position, and should be retarded only when the engine is pulling slowly on full throttle, *e.g.*, when hill climbing.

RENEWING HIGH TENSION CABLE.

When fitting new high tension cable to the coil, the cable wire is threaded through the terminal nut and brass washer, and the ends of the wire bent over the washer. With some models, the cable end is fitted with a special clip and then pushed well home into the moulded terminal.

LAMPS.

Replacement of Bulbs and Focussing.

It is essential that correct replacement bulbs are used. Particulars of bulbs fitted in the lamps and instrument panel are as follows :—

For.	No.	Watts.	Remarks.
Headlamp (driving and dipped beam-light).	624 DVMC	24 & 24	Double filament bulb.
Headlamp (main bulb).	B.A.S.1.S.	12	Single filament bulb.
Headlamp (Pilot Light), Sidecar and Tail Lamps.	B.A.S.8.S.	3	Centre contact bulbs.
Panel & Ignition Warning Lamps.	353 M.E.S. or 252 M.E.S.	1.05 .5	Screw cap.

Headlamps Types DU42C and DU142C.

The lamp front and reflector can be withdrawn for bulb replacement when the fixing clip is pressed back. When re-fitting locate top of rim first.

To remove bulb holder, press back the two securing springs.

With some lamps the main bulb can be focussed by removing the lamp front and reflector and slackening the clamping screw which secures bulb holder. Move the bulb and holder until the best results are obtained and finally tighten the clamping screw.

Some headlamps house the cut-out which is carefully adjusted and set before leaving the works and which should not be interfered with.

Headlamps Types H52, H52CSL and S51.

To remove the lamp front, press the front rim evenly and then rotate to the left (looking at the front of the lamp).

When removing the main bulb for replacement, screw it out two or three turns in an anti-clockwise direction. This will enable the bulb to be withdrawn easily. Care should be taken that the bulb is fitted the correct way round, *i.e.*, with the dipped beam filament above the centre filament.

To enable the lamp to be focussed, the bulb holder is arranged so that it can be adjusted. By turning the bulb in a clockwise direction it is moved inwards, and by turning it in an anti-clockwise direction, it is moved outwards. The best position can be readily found by trial. The normal driving light should, of course, be switched on while focussing is being carried out.

In adjusting the bulb, it is important that it is given a complete turn at a time, so that the filaments are in the correct position; a spring stop is incorporated in the holder which indicates every time the bulb has been given a complete turn by a click action.

Headlamps Types M40C and M40CSL.

The lamp front is secured by a screw and can be removed together with reflector, leaving the bulbs readily accessible for replacement.

In order to focus the headlamp, the bulb-holder is arranged so that it can be adjusted. Remove the lamp front and reflector, and slacken the clamping lever which secures the bulb holder in position. Move the bulb and holder until the best results are obtained and finally tighten the clamping lever.

Headlamp Type MC140.

The lamp front is readily removed when the fixing screw is slackened. When replacing, locate top of rim first.

To focus the main bulb, remove reflector from its three supports and slacken the clamping clip on the bulb holder. This will enable the bulb holder to be moved backwards or forwards for the best adjustment. Tighten the clamping clip after adjustment.

Headlamp Type MP40.

The lamp front and reflector can be withdrawn for bulb replacement when the fixing screw is slackened.

To remove the bulb holder, press down the ends of the securing springs and withdraw them from the slots in which they locate.

To focus the headlamp, remove the lamp front and reflector, and slacken the clamping screw which secures the bulb holder. Move the bulb and holder until the best results are obtained, and finally tighten the clamping screw.

Sidecar Lamp Type R370.

The front together with the reflector can be removed by slackening the fixing screw. The bulb holder can be withdrawn from the back of the reflector for bulb replacement, and is provided with alternative locations for the bulb. Each position should be tried for the best result.

Tail Lamp Type MT210.

The rear portion of this lamp is removed for bulb replacement by depressing the spring catches.

Tail Lamp Type MT110.

The rear portion of this lamp is removed for a bulb replacement by giving it half a turn to the left when it becomes detached from its fixing.

Stop Tail Lamp Type ST20.

To remove the front of this lamp for a bulb replacement, move aside the spring catch which secures it, at the one end of the lamp. When refitting the front, first locate the slot with the tongue on the body, then secure it by means of the spring catch.

Ignition Warning Lamp.

The ignition warning lamp gives a red light when the engine is stationary and the ignition is switched on, in order to warn the rider to switch off. It will also light up when the engine is idling. After long service the bulb may burn out. However, this will not affect the ignition, but it should be replaced as soon as possible, so as to act as a safeguard to the battery.

When the lamp is mounted in an instrument panel, it is usually necessary to remove the panel front when the bulb may be unscrewed from its holder.

If the warning light is combined with the ammeter, remove the lamp front and reflector to render the bulb accessible.

When the warning light unit is mounted in the lamp, unscrew the cover carrying the red glass and remove the bulb.

Cleaning.

The lamp reflectors are protected by a transparent and colourless covering, which enables any accidental finger marks to be removed with a soft cloth or chamois leather, without affecting the surface of the reflector. On no account should any metal polishes be used on Lucas reflectors. Ebony black finishes can be polished with a good furniture or car polish. Chromium plated finishes only need wiping over with a damp cloth to remove dust or dirt.

HOW TO LOCATE AND REMEDY TROUBLE

TABLE No. 1 (LIGHTING).

CONDITION.	POSSIBLE CAUSES AND METHODS OF DETECTION.	REMEDY.
Lamps, give dim, flickering, or no light when the engine is not running.	Bulb filament broken.	Replace with new bulb.
	Bulb discoloured with use.	Replace with new bulb.
	Bulb out of focus.	Focus the bulb until the best illumination is obtained.
	Dirty reflector or bulb.	Clean dirty reflector with chamois leather or a soft cloth.
	Severed or worn cable, or loose connections at headlamp switch, dynamo or battery.	Tighten loose connections and replace faulty cables.
	Faulty earthing of headlamp. The cable from switch terminal "E" must be securely connected to the earthing bolt on the machine frame.	Tighten loose connections and replace faulty cables.
	Faulty earthing of battery. The cable from the negative battery terminal must be securely connected to a metal part of the machine.	Tighten loose connections and replace faulty cables.
	Battery exhausted. Take hydrometer readings when acid level is correct and after a run when electrolyte is thoroughly mixed. When half discharged, readings are about 1.210. When fully discharged, readings are about 1.150.	Machine should be taken on the road for a long daytime run with switch in "C" position, or battery charged from independent electrical supply.

TABLE No. 2 (DYNAMO).

CONDITION.	POSSIBLE CAUSES AND METHODS OF DETECTION.	REMEDY.
After carrying out examination on Table I, and lamps still give dim, flickering, or no light when the engine is running.	Dynamo not charging, or charging intermittently. Ammeter should give a reading on the charge side when the machine is running at say 20 m.p.h. with switch in "C" position. Possible causes of dynamo trouble are :—	
	Loose connections at headlamp switch, dynamo or battery.	Tighten loose connections.
	Faulty contacts in lighting and charging switch.	Examine spring triggers and see that they make good contact with terminals
	Worn or dirty brushes.	Clean dirty or greasy brushes with a cloth moistened with petrol. Badly worn brushes must be replaced.
	Dirty commutator.	To clean dirty commutator, remove one of the main brushes from its holder and insert a fine duster. holding it pressed against the commutator surface by means of a suitably shaped piece of wood, at the same time slowly turning the engine. If commutator has been badly neglected, clean with very fine glass paper.
	Reversed polarity of dynamo.	To correct polarity of machine, run engine slowly, with switch in "C" position, and then press cut-out contacts momentarily together.

HOW TO LOCATE AND REMEDY TROUBLE

TABLE No. 3 (IGNITION).

CONDITION.	POSSIBLE CAUSES AND METHODS OF DETECTION.	REMEDY.
Engine will not fire.	Battery discharged. Indicated if lamps do not light.	Recharge the battery from an independent electrical supply. In case of emergency, a start can be obtained with 2 flash lamp batteries connected in series (the short terminal strip of the one battery connected to the long strip of the second). Connect the positive battery terminal (usually the short strip) to the coil terminal marked "SW" and the other battery terminal to the frame. As soon as the dynamo begins to charge, the flash lamp battery can be removed.
	Controls not set correctly for starting.	See that ignition is switched on, petrol turned on and everything is in order for starting.
	Contact breaker cover not fitting correctly, preventing circuit from being complete.	The hinged spring blade on the contact breaker should press firmly against condenser body, and brass ring on contact breaker cover should make good contact with the contact breaker housing.
	Remove lead from plug terminal and hold it about ¼in. away from some metal part of the engine while engine is turned over. If sparks jump gap regularly, the coil and contact breaker are functioning correctly. If the coil does not spark, the trouble may be due to any of the following causes:—	Examine the sparking plugs, and if these are clean and the gaps correct, the trouble is due to carburetter, petrol supply, etc.
	Fault in low tension wiring. Indicated if no ammeter reading is shown when engine is slowly turned and ignition switch is on.	Examine all cables in ignition circuit, and see that all connections are tight. See that battery connections are secure.
	Dirty or pitted contact points.	Clean with fine carborundum stone and afterwards with a cloth moistened with petrol.
	Contact breaker points out of adjustment. Turn engine until contacts are fully opened and test gap with gauge of 8-10 thousandths of an inch thickness.	Adjust gap to gauge.

TABLE No. 4 (IGNITION contd.).

CONDITION.	POSSIBLE CAUSES AND METHODS OF DETECTION.	REMEDY.
Engine Misfires.	Contact breaker cover not fitting correctly, preventing circuit from being complete.	The hinged spring blade on the contact breaker should press firmly against condenser body, and brass ring round contact breaker cover should make good contact with the contact breaker housing.
	Dirty or pitted contact points.	Clean with fine carborundum stone and afterwards with a cloth moistened with petrol.
	Contact breaker points out of adjustment. Turn engine until contacts are fully opened and test gap with gauge.	Adjust gap to gauge.
	Remove sparking plug, rest it on top of the cylinder and observe whether a spark occurs at the points when the engine is turned. Irregular sparking may be due to a dirty plug, or defective high tension cable. If sparking is regular, the trouble is probably due to engine defects.	Clean plug and adjust the gap to about 20 thousandths of an inch. Replace high tension lead if the insulation shows signs of deterioration or cracking. Examine carburetter, petrol supply, etc.

LUCAS SERVICE DEPOTS

All owners of Lucas equipment are urged to take advantage of the facilities offered by Lucas Service.

For the benefit of the users of our equipment we have established Service Depots in all large towns, which are not only at your disposal for repairs, overhauls and adjustments, but to give free advice. If you experience any difficulty with any part of the equipment, do not hesitate to consult us, we shall be only too pleased to be of assistance. The best course to adopt is to call at our nearest Service Depot, the addresses of which are given below, when the equipment can be examined as a whole.

If it is necessary to replace any part, order Genuine Lucas Spares. It is obvious that only the designers and manufacturers of the equipment are in a position to make replacement parts which will give satisfactory and lasting service.

When corresponding with Depots or when ordering spare parts, give the name, model and year of the motor cycle, the unit of equipment and particular part in question. Units of equipment are identified by letters and numbers stamped or moulded on some part of the article. It is essential to quote this marking to ensure that correct replacements are sent.

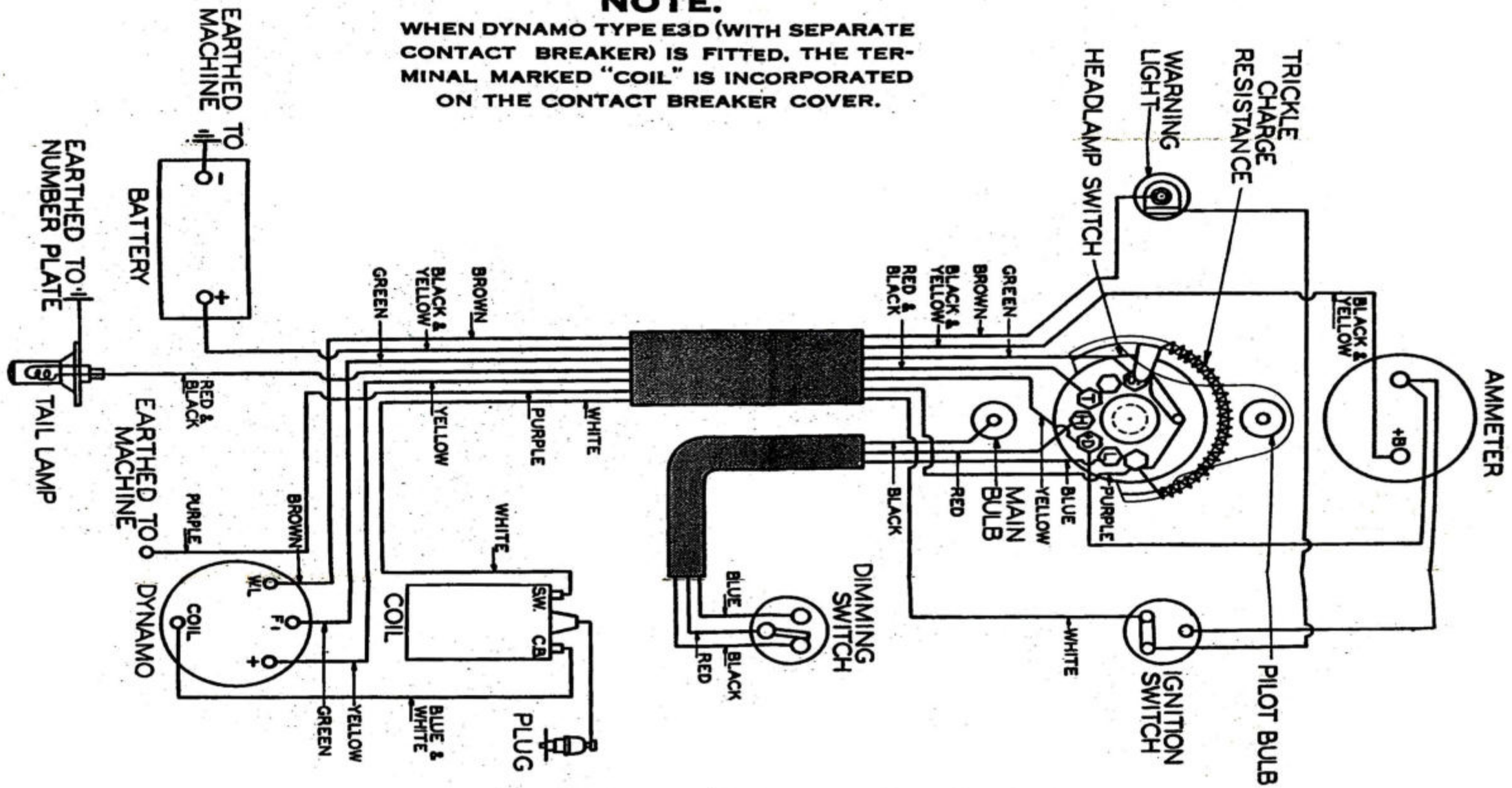
Illustrated spare parts lists are available on application. State year and make of motor cycle.

BELFAST	**3/5, Calvin Street, Mount Pottinger**
Telephone: BELFAST 7017	Telegrams: "SERVDEP, BELFAST"
BIRMINGHAM, 18	**Great Hampton Street**
Telephone: CENTRAL 8401 (10 lines)	Telegrams: "LUCAS, BIRMINGHAM"
BRIGHTON	**85, Old Shoreham Road, Hove**
Telephone: PRESTON 3001 (4 lines)	Telegrams: "LUSERV, BRIGHTON"
BRISTOL	**345, Bath Road**
Telephone: BRISTOL 76001 (4 lines)	Telegrams: "KINGLY, BRISTOL"
CARDIFF	**54a, Penarth Road**
Telephone: CARDIFF 4603 (4 lines)	Telegrams: "LUCAS, CARDIFF"
COVENTRY	**Priory Street**
Telephone: COVENTRY 3068	Telegrams: "LUCAS, COVENTRY"
DUBLIN	**Portland Street North, North Circular Road**
Telephone: DRUMCONDRA 434 (6 lines)	Telegrams: "LUSERV, DUBLIN"
EDINBURGH, 11	**32, Stevenson Road, Gorgie**
Telephone: EDINBURGH 62921 (4 lines)	Telegrams: "LUSERV, EDINBURGH"
GLASGOW	**227/229, St. George's Road**
Telephone: DOUGLAS 3075 (5 lines)	Telegrams: "LUCAS, GLASGOW"
LEEDS	**64, Roseville Road**
Telephone: LEEDS 28591 (5 lines)	Telegrams: "LUSERDEP, LEEDS"
LIVERPOOL, 13	**450/456, Edge Lane**
Telephone: OLD SWAN 1408 (4 lines)	Telegrams: "LUSERV, LIVERPOOL"
LONDON	**Dordrecht Road, Acton Vale, W.3**
Telephone: SHEPHERDS BUSH 3160 (10 lines)	Telegrams: "DYNOMAGNA, EALUX, LONDON"
LONDON	**757/759, High Road, Leyton, E.10**
Telephone: LEYTONSTONE 3361 (4 lines)	Telegrams: "LUSERDEP, WALT, LONDON"
LONDON	**155, Merton Road, Wandsworth, S.W.18**
Telephone: PUTNEY 5131 (6 lines) & 5501	Telegrams: "LUSERV, PUT, LONDON"
MANCHESTER	**Talbot Road, Stretford**
Telephone: LONGFORD 1101 (5 lines)	Telegrams: "LUCAS, STRETFORD"
NEWCASTLE-ON-TYNE, 2	**64/66, St. Mary's Place**
Telephone: CENTRAL 25571 (3 lines)	Telegrams: "MOTOLITE, NEWCASTLE-ON-TYNE"

SPECIFICATION	WIRING DIAGRAM FOR	DR'G. No. MA301
DYNAMO WITH CONTACT BREAKER TYPE E3B. HEADLAMP TYPE M40CSL.	**LUCAS DYNAMO LIGHTING & COIL IGNITION EQUIPMENT** (WITHOUT INSTRUMENT PANEL) AS FITTED TO MOTOR-CYCLES	

NOTE.

WHEN DYNAMO TYPE E3D (WITH SEPARATE CONTACT BREAKER) IS FITTED, THE TERMINAL MARKED "COIL" IS INCORPORATED ON THE CONTACT BREAKER COVER.



NOTE. *Shaded portions show where cables are braided together in a protective sheathing.*
Colours indicate coloured sleevings on ends of leads.