

# LUCAS

*Quality*

## EQUIPMENT

VOLUME 2

### WORKSHOP INSTRUCTIONS

MOTOR CYCLE  
CONTROL BOX

MODEL RB107



JOSEPH LUCAS LTD · BIRMINGHAM 19 · ENGLAND

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# LUCAS WORKSHOP INSTRUCTIONS

## CONTROL BOX

### MODEL RB107

#### 1. GENERAL

In model RB107 control box, the regulator and cut-out contacts are positioned, for ease of access, above their respective armatures. It will be noticed that some of the internal electrical joints are resistance brazed.

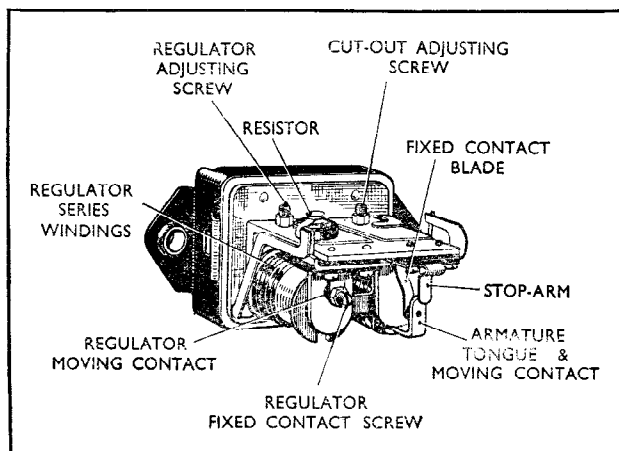


Fig. 1  
Control box with cover removed

#### 2. SETTING DATA

##### (a) CUT-OUT

Cut-in voltage ...	...	6.3—6.7 volts
Drop-off voltage ...	...	4.8—5.3 volts
Reverse Current ...	...	3.0—5.0 amp.

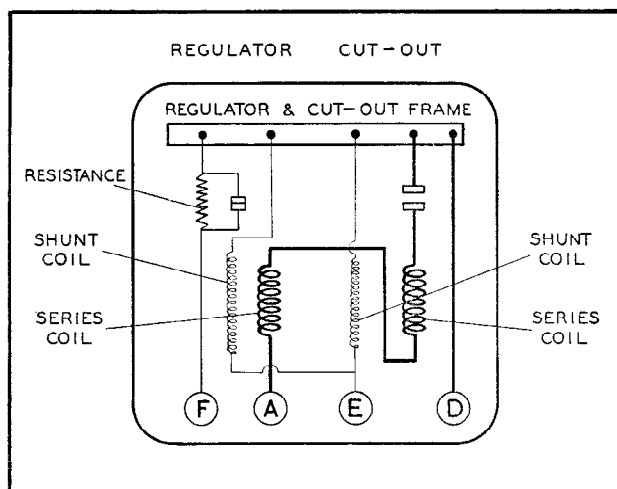


Fig. 2  
internal connections of control box

##### (b) REGULATOR

Setting on open circuit relative to ambient temperature:

10°C. (50°F.) ...	...	7.7—8.1 volts
20°C. (68°F.) ...	...	7.6—8.0 volts
30°C. (86°F.) ...	...	7.5—7.9 volts
40°C. (104°F.) ...	...	7.4—7.8 volts

#### 3. SERVICING

Before making any adjustment to the regulator, ensure that the dynamo, dynamo drive and battery are in order. When a sound battery does not keep in a charged condition, or if the dynamo output does not fall when the battery is fully charged, the following procedure should be adopted:

##### (a) CHECKING THE WIRING BETWEEN BATTERY AND CONTROL BOX.

Remove the control box from its mountings and withdraw the cable from terminal 'A' and connect it to the negative terminal of a voltmeter.

Connect the positive terminal of the voltmeter to an earthing point on the machine. If a voltmeter reading is given, the circuit from the battery to terminal 'A' is in order.

If there is no voltmeter reading, examine the wiring between the battery and the control box for defective cables or loose connections. Re-connect the cable to terminal 'A'.

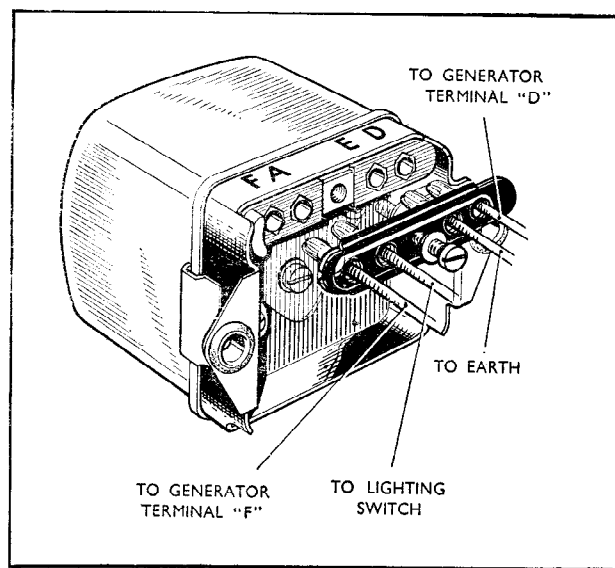


Fig. 3  
External connections to control box



# LUCAS WORKSHOP INSTRUCTIONS

Check that the dynamo terminal 'D' is connected to control box terminal 'D' and that the cable is in good condition. Similarly, check the cable between terminals 'F' at the dynamo and control box.

## (b) REGULATOR ADJUSTMENT

### (i) Checking the electrical setting.

The regulator is carefully set during manufacture and, in general, it should not be necessary to make further adjustment. If, however, the charging system is suspected it is important that only a good quality MOVING COIL VOLTMETER (0—20 volts) is used to check the system. The electrical setting of the regulator can be checked without removing the cover from the control box.

Withdraw the plug-in connectors a small distance so that a voltmeter connection can be made to terminals 'D' and 'E'.

Connect the negative lead of the voltmeter to control box terminal 'D' and the positive lead to terminal 'E'. Remove the negative terminal from the battery. If coil ignition is fitted, run a temporary connection from the negative terminal of the battery to the 'SW' terminal of the coil.

With the ignition switch in the 'OFF' position start the engine. Slowly increase the speed of the engine until the voltmeter needle 'flicks' and then steadies. Note the reading and stop the engine. If the voltage lies outside the limits given in para. 2 (b), the regulator setting must be adjusted.

If the voltage is within the limits, examine the cut-out as described in para. 3 (c).

### (ii) Adjusting the electrical setting.

Adjustment of the regulator requires removal of the control box cover. This is facilitated by removing the control box from the machine and providing temporary connections. Loosen the control box cover securing clips by slackening the securing screws set in the base of the control box and lift off the cover.

It is important that regulator adjustments are carried out with the control box supported in a similar position to that on the machine.

Restart the engine.

Slacken the locknut of the regulator adjusting screw (see Fig. 1) and turn the screw in a clockwise direction to raise the setting or an anti-clockwise direction to lower the setting. Turn the screw only a fraction of a turn at a time and then tighten the locknut. Repeat as above until the correct setting is obtained.

Adjustment of regulator open-circuit voltage should be completed within 30 seconds, otherwise heating of the shunt winding will cause false settings to be made. Stop the engine.

Remake the original connections and replace the cover. Ensure that the cover seats correctly on the sealing washer.

**Note:** A dynamo run at high speed on open circuit will build up a high voltage. Therefore, when adjusting the regulator, do not run the engine up to more than half throttle or a false setting will be made.

### (iii) Adjusting the mechanical setting.

The mechanical or air-gap settings of the regulator, shown in Fig. 4, are accurately adjusted before leaving the works and, provided that the armature carrying the moving contact is not removed, these settings should not be tampered with. If, however, the armature has been removed, the regulator will have to be reset. To do this proceed as follows:

Slacken the fixed contact locking nut and unscrew the contact screw until it is well clear of the armature moving contact.

Slacken the locking nut on the voltage adjusting screw and unscrew the adjuster until it is well clear of the armature tension spring.

Slacken the two armature assembly securing screws.

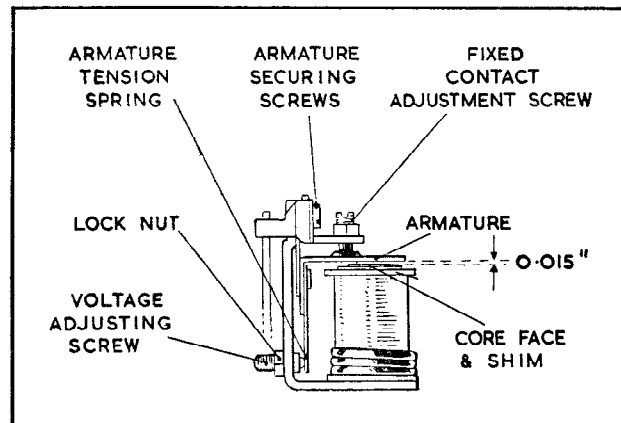


Fig. 4  
Mechanical settings of regulator

Using a 0.015" thick feeler gauge, wide enough to cover completely the core face, insert the gauge between the armature and core shim, taking care not to turn up or damage the edge of the shim.

Press the armature **squarely** down against the gauge and re-tighten the two armature assembly securing screws.

With the gauge still in position, screw the adjustable contact down until it just touches the armature contact. Re-tighten the locking nut.

Re-set the voltage adjusting screw as described under para. 3 (b) (ii).



# LUCAS WORKSHOP INSTRUCTIONS

## (iv) Cleaning contacts.

After long periods of service it may be found necessary to clean the regulator contacts. Clean the contacts using fine carborundum stone or fine emery cloth.

Carefully wipe away all traces of dust or other foreign matter with methylated spirits (de-natured alcohol).

## (c) CUT-OUT ADJUSTMENT

### (i) Checking the electrical setting.

If the regulator is correctly set but the battery is still not being charged, the cut-out may be out of adjustment.

Replace the control box in the testing position, remake the temporary connections and remove the control box cover. Connect a voltmeter between terminals 'D' and 'E'.

Start the engine and slowly increase the speed until the cut-out contacts close. Note the voltage at which this occurs and stop the engine.

This should be 6.3—6.7 volts. If the operation of the cut-out takes place outside these limits, it will be necessary to adjust.

### (ii) Adjusting the electrical setting.

Restart the engine.

Slacken the locknut securing the cut-out adjusting screw and turn the adjusting screw in a clockwise direction to raise the voltage setting or in an anti-clockwise direction to reduce the setting.

Turn the screw only a fraction of a turn at a time and then tighten the locknut. Test after each adjustment by increasing the engine speed and noting the voltmeter reading at the instant of contact closure.

Stop the engine.

Electrical setting of the cut-out like the regulator, must be made as quickly as possible because of temperature-rise effects.

**Note:** If the cut-out does not operate, there may be an open circuit in the wiring of the cut-out and regulator unit, in which case the unit should be removed for examination or replacement.

### (iii) Adjusting the mechanical setting.

If for any reason the cut-out armature has to be removed from the frame, care must be taken to obtain the correct air-gap settings on re-assembly. These can be obtained as follows:

Slacken the adjusting screw locking nut and unscrew the cut-out adjusting screw until it is well clear of the tension spring.

Slacken the two armature securing screws.

Press the armature **squarely** down against the copper-sprayed core face and re-tighten the armature securing screws.

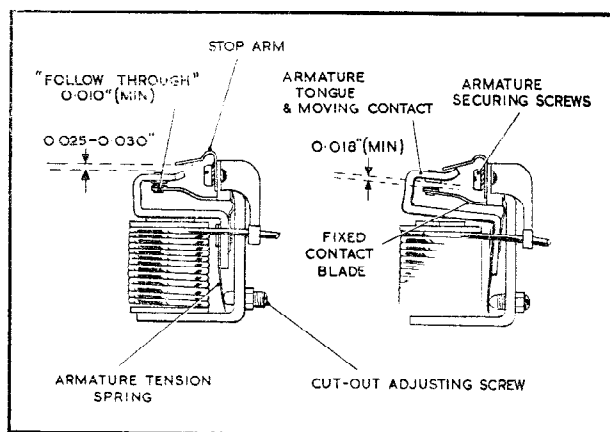


Fig. 5  
Mechanical settings of cut-out

Using a pair of suitable pliers, adjust the gap between the armature stop arm and the armature tongue by bending the stop-arm. The gap must be 0.025"—0.030" when the armature is pressed squarely down against the core face. Similarly, the fixed contact blade must be bent so that when the armature is pressed **squarely** down against the core face there is a **minimum** 'follow-through', or blade deflection, of 0.010".

The contact gap, when the armature is in the free position, must be 0.018" minimum.

Re-set the cut-out adjusting screw as described under para. 3 (c) (ii).

### (iv) Cleaning contacts.

If the cut-out contacts appear rough or burnt, place a strip of fine glass paper between the contacts—then, with the contacts closed by hand, draw the paper through. This should be done two or three times with the rough side towards each contact. Wipe away all dust or other foreign matter, using a clean fluffless cloth moistened with methylated spirits (de-natured alcohol).

Do not use emery cloth or a carborundum stone for cleaning cut-out contacts.

