



SERVICE SHEETS

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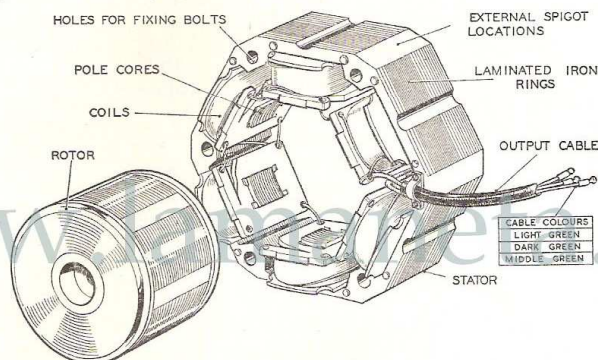
# BSA SERVICE SHEET No. 813

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## Model C11G LUCAS LIGHTING

The electrical system used on these models provides D.C. for the battery, ignition coil and lights, by passing the A.C. output of the generator through a bridge type rectifier.

The alternator is connected to a section of the headlamp switch so that the output is automatically matched to the demands of the lighting circuit and the characteristics of the alternator prevent overcharging.



STATOR & ROTOR OF LUCAS RM14 MOTOR CYCLE ALTERNATOR

Fig. Y43 Lucas Alternator

### Output Control

The standard circuit has the output wires from the generator connected by their snap connectors to similarly coloured wires on the wiring harness and provides the following output control.

#### Lighting Switch in "OFF" position

The output is taken from one pair of coils by means of the Light Green and Dark Green Wires, and the remaining coils (Light Green and Middle Green wires) are shorted out.

#### Lighting Switch in "PILOT" position

Output taken from one pair of coils by Light Green and Dark Green wires as before and the remaining coils are on open circuit.

#### Lighting Switch in "HEAD" position

All three pairs of coils are connected in parallel and the maximum output is obtained.

**Note:** To provide an increased charging rate with the lighting switch in the "OFF" position, some models will be found to have the wire joining terminals 5 and 6 of the headlamp switch removed. This means that no coils are shorted out in this switch position and the charging rate is slightly increased.



**B.S.A. Service Sheet No. 813 (cont.)**

In circumstances where a considerable amount of low speed running is necessary or there are long periods of parking with the lights on, it is possible to increase the charging rate with the lighting switch in the "OFF" and "PILOT" positions by connecting the Medium Green Alternator Cable by its snap connector to the Dark Green Harness Cable and the Dark Green Alternator Cable to the Medium Green Harness Cable. The Light Green Cables should not be disturbed. These alternative connections considerably increase the charging rate in these switch positions, and the connections should be returned to standard for normal conditions of use or long runs.

Owing to the effects of the above modifications it is essential that the wiring circuit is returned to standard before checking the charging rates during fault finding.

**Emergency Starting**

With the ignition switch in the "EMG" position, the battery is not isolated from the alternator and will, in fact, receive a charge whilst the machine is being run.

This arrangement is also a safeguard against continuous running in the "EMG" position. The back pressure of the battery will increase as it is charged, until it is sufficiently strong to affect the working of the ignition system. When this happens misfiring will occur, resulting in poor engine performance. In view of this, always check that the machine is not being run with the ignition switch continually in the "EMG" position, before testing the system for other faults.

**Motor Cycle Trials Events, etc.**

When using the machine for trials riding, the alternator can be used continuously in the "EMG" position without a battery, providing the lead from the main harness to the battery negative terminal is earthed to the machine.

**Test Procedure**

As the lights and other equipment are operated on a normal D.C. circuit they can be checked by normal continuity tests with a battery and bulb.

The following equipment is required to satisfactorily test the charging circuit. The meters used should be accurate moving coil instruments.

- A.C. voltmeter scale 0-15 volts
- D.C. ammeter scale 0-15 volts
- 1 ohm. load resistance
- 12 volt battery and 36 watt bulb

When checking the alternator output the engine should be run at approximately 2,000 r.p.m.

If the performance of the alternator has proved unsatisfactory, it is advisable to first check the wiring to make sure that good contact is being made at the various connections and that none of the wiring or alternator coils are shorting to the frame.

B.S.A. Service Sheet No. 813 (cont.)

**Test 1**

Connect a suitable D.C. ammeter in series with the battery. Make sure that the battery connections are sound and that the alternator and switch wiring are standard. The charging rate should be as listed in the table below:

|                            |                                       |
|----------------------------|---------------------------------------|
| Switch in "OFF" position   | $1\frac{1}{2}$ — $2\frac{1}{2}$ amps. |
| Switch in "PILOT" position | $\frac{1}{2}$ — $1\frac{1}{2}$ amps.  |
| Switch in "HEAD" position  | $\frac{1}{4}$ — $\frac{3}{4}$ amps.   |

If the battery is in poor condition or a low state of charge, this may affect the charging rate slightly, and if it is suspect, it should be replaced by a battery in good condition.

Reduced charge or no charge with the switch in the "OFF" and "PILOT" positions may indicate that this pair of coils are shorted or on open circuit.

Reduced charge or no charge with the switch in the "HEAD" position only, may indicate that the remaining two pairs of coils are shorted or on open circuit.

Reduced charge in all switch positions is likely to be due to a damaged rectifier, but may be caused by any of the faults listed above.

If Test 1 indicates that a fault may lie with either the generator or rectifier, then they should be individually checked by Tests 2 and 3.

**Test 2**

Disconnect the alternator by means of the snap connections and connect a 1 ohm resistance across each set of the alternator output leads in turn. The resistance must be accurate and capable of taking a current of 8 amps without overheating. An A.C. voltmeter across the resistance should give the following readings:

|  |               |           |
|--|---------------|-----------|
| Between Light Green and Dark Green Leads                           | .. .. .       | 3—4 volts |
| Between Light Green and Middle Green Leads                         | .. .. .       | 6—7 volts |
| Between Light Green and combined Middle Green and Dark Green Leads | 8.5—9.5 volts |           |

If the readings are low or zero the alternator has been demagnetised or otherwise damaged.

**Note:** If current from the battery passes through the alternator when the engine is running the rotor can become partly de-magnetised. This may happen if the rectifier breaks down or if the battery connections are reversed. Always make sure that the positive terminal of the battery is connected to the frame of the machine.

If a faulty alternator is detected, the rectifier and remainder of the circuit must still be tested as a damaged alternator is likely to be caused by another fault in the circuit.

### Test 3

The rectifier must be disconnected before it is tested.

Connect the negative side of the 12v. battery, in series with the 6w. bulb, to the earth terminal of the rectifier. Connect the positive side of the battery to each of the rectifier A.C. terminals in turn. The bulb should light in both positions.

Reverse the battery leads and repeat the tests. The bulb should not light in either position.

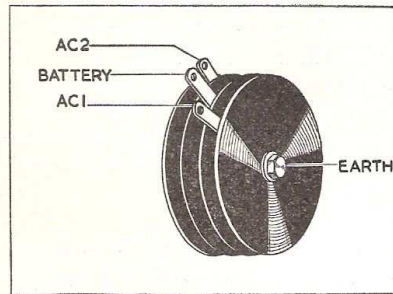


Fig. Y44 Rectifier Terminals

Connect the positive terminal of the battery, in series with the bulb, to the central D.C. battery terminal of the rectifier. Connect the negative terminal of the battery to each of the rectifier A.C. terminals in turn. The bulb should light in both positions.

Reverse the battery connections and repeat the tests. The bulb should not light in either position.

If the rectifier fails to comply with any of the above tests it is faulty and must be replaced.

### Headlamp Switch

If both the rectifier and alternator appear satisfactory the wiring and switch contacts must be checked most carefully to eliminate any possible faults. The correct headlamp switch connections are shown in Service Sheet 808A.

### Alternator Removal and Replacement

The procedure for removing and replacing the alternator is described in Service Sheet 409 on Primary Transmission. Note that the stator should be assembled with the clip retaining the output cables on the side of the stator facing the engine.

