BSA SERVICE SHEET No. 813

Revised, September 1959

"C" AND "B" GROUP MODELS (EXCEPT C15 COMPETITION)

FITTED WITH CRANKSHAFT MOUNTED ALTERNATORS

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.

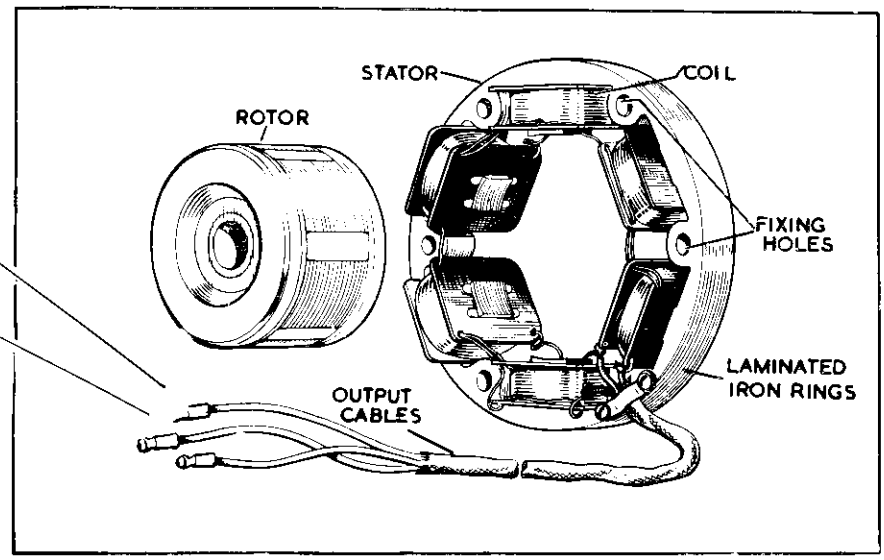
The alternator is connected to a section of the headlamp switch so that the output is automatically matched to the demands of the lighting circuit and the characteristics of the alternator prevent overcharging.

"C" Group except C15

Cable Colours
Light Green
Dark Green
Middle Green or Green/Yellow

"B" Group & C15

Cable Colours
Green/Black or Dark Green
Green/Yellow
Green/White or Light Green



Stator and Rotor of Lucas Motor Cycle Alternator
(RM 13 on C11G and C15, RM 13/15 on C12, and RM 15 on new series "B" group machines)

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) (Light Green and Green/Yellow on "B" group) are open-circuited.

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.

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 (Green/Yellow for C15) by its snap connector to the Dark Green harness cable and the Dark Green alternator cable to the Medium Green harness cable (Green/Yellow for C15).

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, but contact breaker points are liable to become badly burned.

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.

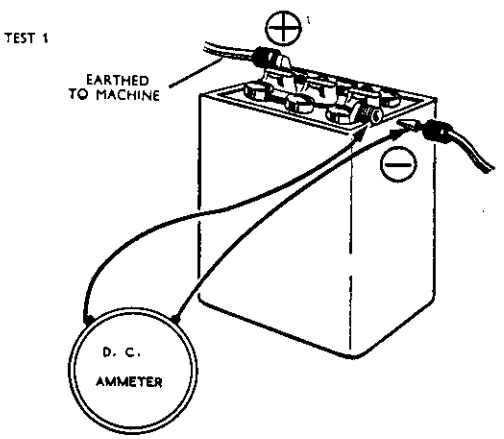
A.C voltmeter scale 0–15 volts.
D.C. ammeter scale 0–15 amps.
D.C. voltmeter scale 0- 15 volts.
1 ohm. load resistance.
12 volt battery and 36 watt bulbs.

When checking the alternator output the engine should be run at approximately 3,000 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 of alternator coils are shorting to the frame.

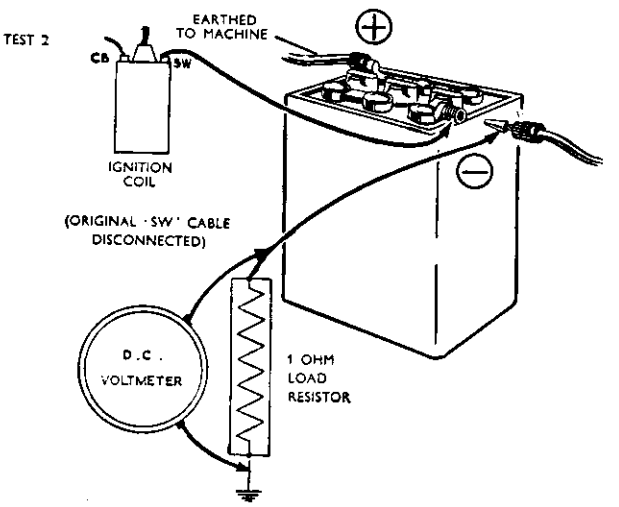
CHECKING D.C. INPUT TO BATTERY

Test 1. Ammeter connected in series with main lead and battery.



If the battery is in poor condition or low state of charge use Test 2.

Test 2. Disconnect main lead from battery. Connect 1 ohm resistor in place of battery. Feed ignition coil separately from battery. Turn ignition switch to IGN position.



Test	Switch Position	Reading Amps. at 3,000 r.p.m.		
		RM13	RM13/15	RM15
1	OFF	1.5 (min.)	1.75 (min.)	2.5 (min.)
	PILOT	0.5 (min.)	0.75 (min.)	1.5 (min.)
	HEAD	0.25 (min.)	0.5 (min.)	2.5 (min.)

Test	Switch Position	Reading Volts at 3,000 r.p.m.		
		RM13	RM13/15	RM15
2	OFF	1.5 (min.)	1.75 (min.)	2.5 (min.)
	PILOT	1.5 (min.)	1.75 (min.)	2.0 (min.)
	HEAD	3.0 (min.)	3.25 (min.)	3.0 (min.)

Conclusion from these Tests

Test 1. If meter readings are as stated, the charging circuit and alternator are satisfactory.
No reading; check the generator.
A low reading can be caused by a faulty battery.
Proceed with Test 2. If readings still low check battery with hydrometer and discharge tester.

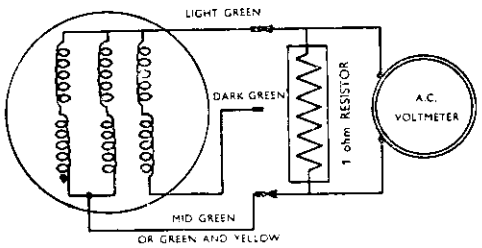
Test 2. If meter readings are lower or higher than values stated, check the generator.
No reading on meter; check the rectifier.

Important

Inaccurate readings can be due to faulty wiring, bad connections at the snap connectors or poor earths. Make a quick visual check of all connections before proceeding with the tests.

Remember it is no use carrying out Test 1 if the battery is faulty or in a low state of charge; if in doubt proceed with Test 2.

Testing the RM13 Alternator on the Machine, using an A.C. Voltmeter and 1 Ohm Load Resistor



Test	Voltmeter and Resistor Connected Across	Reading Volts at 3,000 r.p.m.		
		RM13	RM13/15	RM15
1	Dark Green and Light Green	3.0 (min.)	3.25 (min.)	4.25 (min.)
2	Light Green and Mid Green or Green/Yellow	6.0 (min.)	6.25 (min.)	6.75 (min.)
3	Dark Green and Light Green (with Mid Green or Green/Yellow connected to Dark Green).	8.5 (min.)	8.75 (min.)	9.25 (min.)
4	Any one lead and Generator Stator (Earth)	No Reading	No Reading	No Reading

Conclusions from these Tests

Low reading on any group of coils indicates shorted turns.

Zero reading will indicate open-circuit coil.

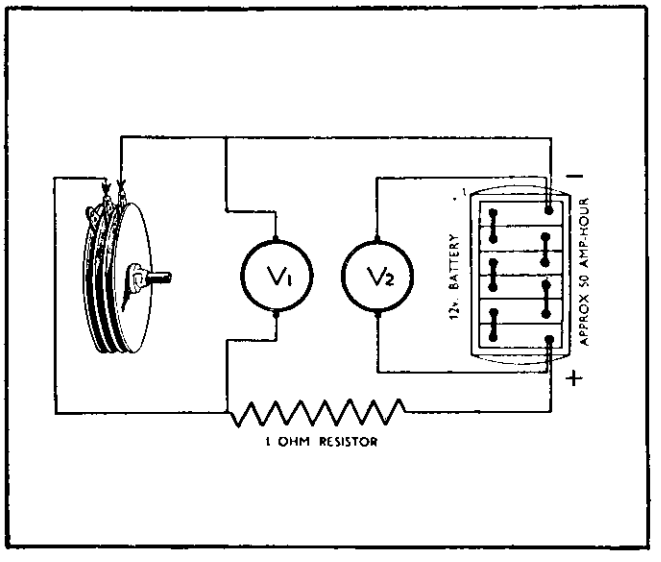
If all coils read low, partial de-magnetisation of rotor may have occurred as a result of faulty rectifier. Check rectifier, and battery earth polarity before replacing rotor.

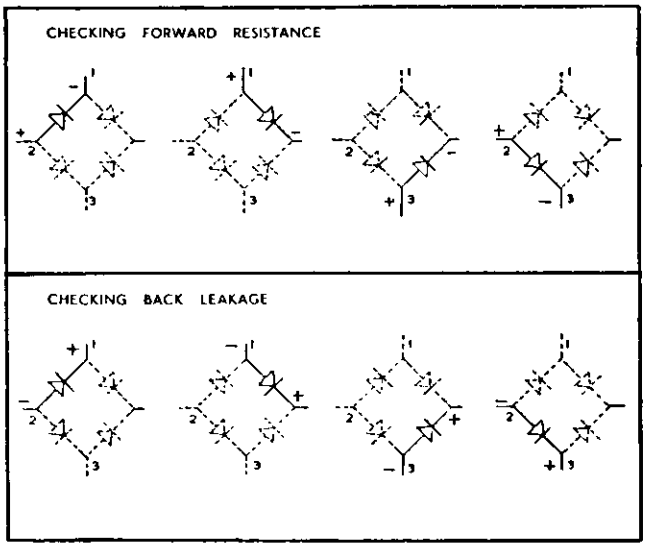
A reading between any one lead and the generator stator indicates an earthed coil. Replace stator or locate earth by isolating and testing individual coils.

Note

With the engine running at 3,000 r.p.m. (approx.) the output voltages are steady, and even if the engine is running a few r.p.m. faster or slower the values stated will be obtained from a good generator.

Rectifier—Bench Testing





V1—will measure the volt drop across the rectifier plate.

V2—must be checked when testing the rectifier plate, to make certain the supply voltage is the recommended 12 volts on load.

It is essential that the supply is kept at 12 volts for these Tests.

Forward Resistance Test

Test 1. Connect test leads in turn to terminals 2 and 1, bolt and 1, bolt and 3, 2 and 3. Reading in all positions should not be greater than 2.5 volts. Keep the testing time as short as possible to avoid overheating the rectifier cell. **Note.**—If the later type of rectifier, which has no terminal markings, is fitted, the same test procedure is followed. The same voltage values also apply.

Back Leakage Test

Test 2. Proceed as for Test 1, and test each cell in turn, but reverse the test leads. Reading on V1 should not be less than 2 volts below the open-circuit reading on voltmeter No. 2, i.e., 10 volts.

Conclusion from these Tests

Test 1. If the voltage reading on V1 is more than 2.5 volts, on any cell, it is aged and the rectifier should be replaced.

Test 2. If the voltage reading on V1 is less than 10 volts, on any cell, the rectifier is shorted and should be replaced.

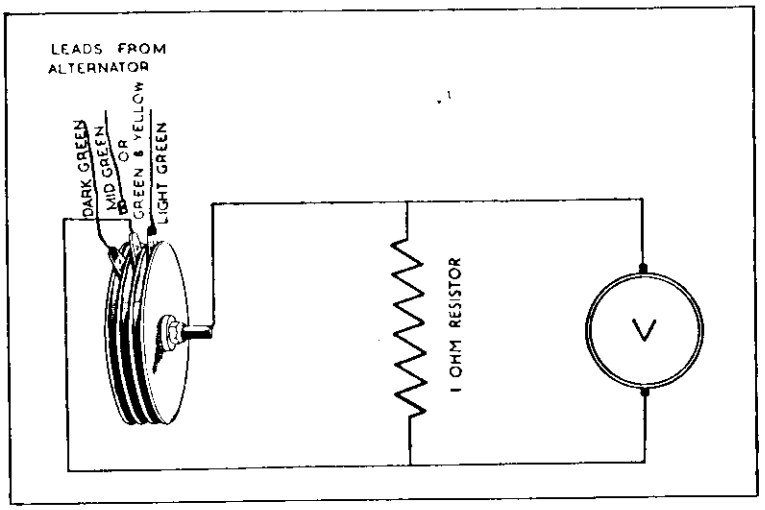
Important

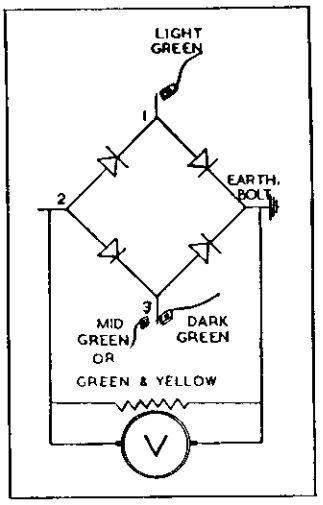
Before fitting a replacement rectifier check the following points:—

1. Check that battery is correctly connected, **Positive** to **Earth.**
2. Check rectifier visually for signs of damage.

Never disturb the tension of the nut which holds the elements together on the through bolt. The efficiency of the rectifier depends upon the correct tension of the plates. The tension of the nut is set before leaving the works, and cannot be adjusted correctly in service.

Checking Rectifier in Position on Machine





Voltmeter and Resistor Connected Across	Reading with Leads Connected as Shown
Terminal No. 2 (or centre terminal on latest type) and frame of machine	6.5 (min.) RM13 7.0 (min.) RM13/15 7.75 (min.) RM15

Procedure

Connect the alternator leads as detailed direct to the rectifier terminals No. 1 and No. 3.

(**Note.**—On the latest type rectifiers the terminals are not numbered, so connect the alternator leads to the outer cranked terminals).

Connect the test leads which must have a D.C. voltmeter with 1 ohm load shunted across, between earth (frame of machine) and terminal No. 2 (centre terminal on latest type rectifier) when the values stated should be obtained with engine running at 3,000 r.p.m.

Conclusions from these Tests

If the alternator passes its individual test, but it fails on this test it indicates that either the rectifier is faulty or it is not properly earthed.

Connecting the test leads to the centre bolt will eliminate the possibility of faulty earth connection.

Testing the External Wiring Circuit

Using D.C. Voltmeter only

1. All cables, including battery, to be connected as normal.
2. Connect voltmeter Red test lead to earth.

Testing Charging Circuit through Ignition Switch

3. Connect Black test lead to No. 2 terminal on rectifier.
4. Switch ignition to IGN position.
5. Battery volts, i.e., six, should register on voltmeter.
6. If there is zero reading on voltmeter in the above condition, check circuit back through ignition switch, ammeter, etc., to the battery.

Testing Emergency Start Circuit (Single Cylinder Machine)

7. Connect Red test lead to earth.
8. Connect Black test lead to C.B. terminal on ignition contact breaker.
9. Open ignition contacts.
10. Switch ignition seitch to EMG position.
11. Battery volts should register on voltmeter.
12. Transfer Black test lead to alternator Mid-Green lead.
13. Battery volts should register on voltmeter.

Note

These tests are to be carried out in the case of "No Charge" or "No Emergency Start" if previous tests have been carried out and all is in order.

It is important that both the ignition timing and the rotor timing is correct for efficient operation of Emergency Start.

Testing the 'Low,' 'Medium' and 'High' Charge Positions

Using D.C. Voltmeter only

1. Connect Red test lead to earth.
2. The set, including battery connected as normal, with the exception of the alternator Middle Green cable which should be disconnected at the snap connector under the saddle
3. Connect Black test lead to Mid-Green cable coming from headlamp (i.e., not coming from alternator).
4. With ignition switch in IGN position and lighting switch OFF.
5. A low voltage (i.e., 1—2) should register on voltmeter.
6. With lighting switch in PILOT, zero voltage should register on voltmeter.
7. With lighting switch in HEAD position a low voltage should register on voltmeter.

Note

Incorrect switching of these cables will cause incorrect charging rates, i.e., failure of Mid-Green and Dark Green linking together in HEAD position will result in a low charge rate with headlight switched on.

In the case of incorrect switching it is necessary to check the wiring and the switch for correct connections, etc.

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 Sheets

No. 808D	... ...	C12.
No. 808C	... ...	C11G.
No. 808H	... ...	"B" models.
No. 808J	... ...	C15.

Alternator Removal and Replacement

The procedure for removing and replacing the alternator is described in Service Sheets No. 314 for "B" group machines and 409 for C11G and C12, and No. 422 for C15. Note that the stator should be assembled with the clip retaining the output cables on the side of the stator next to the engine on C11G and C12 but on C15 and "B" group machines the clip should be on the side away from the engine.

BSA SERVICE SHEET No. 813A

Reprinted March 1960

C12, A Group and M21 Models

ADJUSTING THE CHARGING RATE OF LUCAS ALTERNATORS ON RADIO EQUIPPED MACHINES.

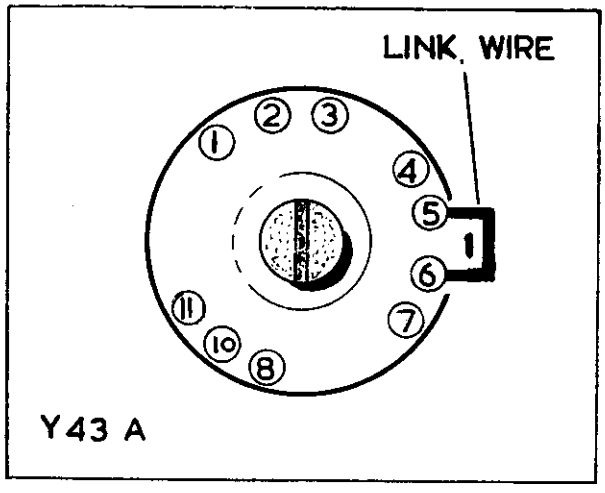
GENERAL.

The running conditions of radio equipped machines vary from long distance daylight patrol work with occasional use of the radio, to slow running convoy or short distance local work involving considerable use of the radio and possibly of the lights as well. There is a heavy load on the battery while transmitting, and the receiver may be left switched on for long periods representing a constant drain on the battery.

Obviously, the charging rates necessary to balance these varying loads must differ widely. Lucas alternators are designed to provide three alternative charge-rates which are selected by inter-changing the wiring connections.

The adjustments are simple to perform but the responsibility for making them should rest with the Maintenance Personnel who, being familiar with the running conditions and the state of charge of the batteries, are best placed to judge when any alteration is necessary. In the event of doubt, advice should be sought from Lucas Service Organisation.

It must be emphasised that battery charging from an external source may become necessary if a large proportion of night riding with the radio in use, or transmitting for long periods with the engine stopped is involved.



The C12 is fitted with a Model RM 13/15 Alternator in conjunction with a PRS 8 Lighting and Ignition Switch.

By connecting or removing a wire link between switch terminals 5 and 6, two intermediate charge-rates can be obtained in addition to the three already mentioned.

With the link in place the switch automatically increases the alternator output in the "Pilot" and "Head" positions. When the link is removed, the output increases only in the "Head" position.

If the alternator wiring is connected as in Stage 3 maximum output is developed in all switch positions.

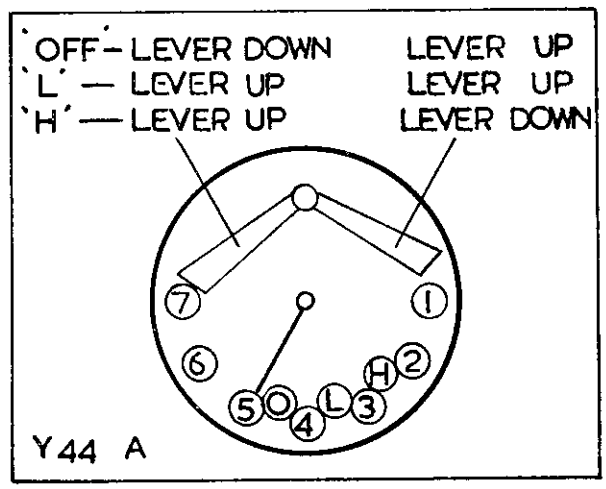
A GROUP and M21 MODELS.

These machines are fitted with a Model RM 15 Alternator as well as the normal 60w., E3L Dynamo, and have a Model U39 Lighting Switch. This is similar to the switch fitted to standard models, but it is provided with two toggle arms to control the alternator output in the various switch positions.

As on C12, Stage 3, connections give maximum alternator output in all switch positions.

Current for all normal purposes is supplied by the alternator. This is supplemented by the dynamo as necessary when a heavy load is placed on the system. For servicing and testing purposes the two instruments should be dealt with separately, one being disconnected while testing the other.

When the radio is out of use for a prolonged period, it is important that the light green wire from the alternator is disconnected and the end taped up, otherwise the battery will become over-charged.

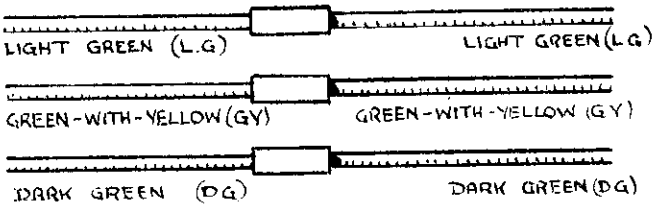


TESTING.

As the radio is connected directly across the battery, the current taken will not be shown on the ammeter. To check whether the charging ouput is sufficient to balance the load, a second ammeter must be inserted in the cable between battery and radio. The reading on this ammeter must then be deducted from the charge shown on the ammeter fitted to the machine.

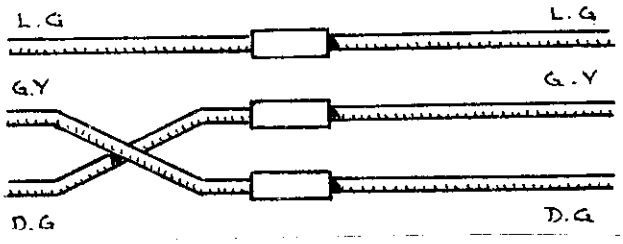
DAYTIME CHARGING RATES.

Alternator Cable Connections—Stage 1.



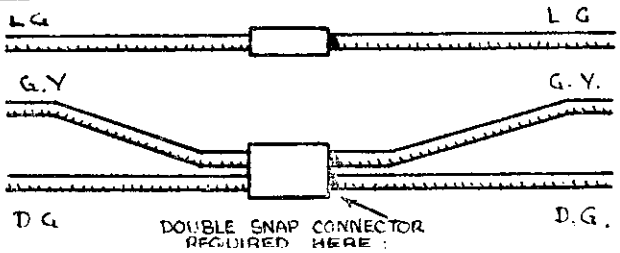
	OUTPUT IN AMPERES	
	2,000 r.p.m.	5,000 r.p.m.
C12 (with terminals 5 and 6 linked)	2.4 min.	2.75 min.
C12 (with terminals 5 and 6 not linked)	3.75 min.	4.5 min.
A Group and M21	3.75 min.	4.5 min.

Alternator Cable Connections—Stage 2.

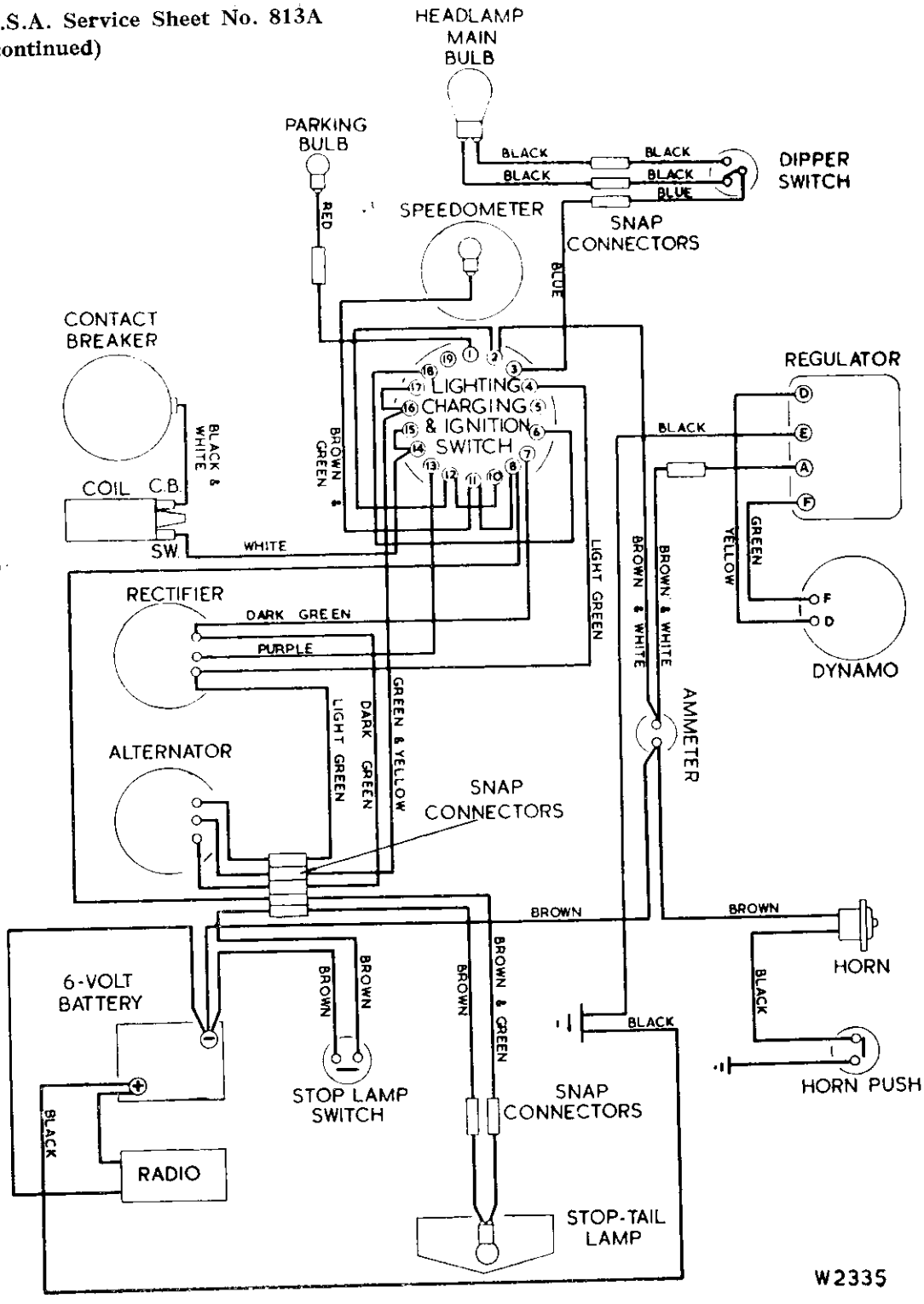


	OUTPUT IN AMPERES	
	2,000 r.p.m.	5,000 r.p.m.
C12 (with terminals 5 and 6 linked)	5.25 min.	6.25 min.
C12 (with terminals 5 and 6 not linked)	6.5 min.	7.5 min.
A Group and M21	6.5 min.	7.5 min.

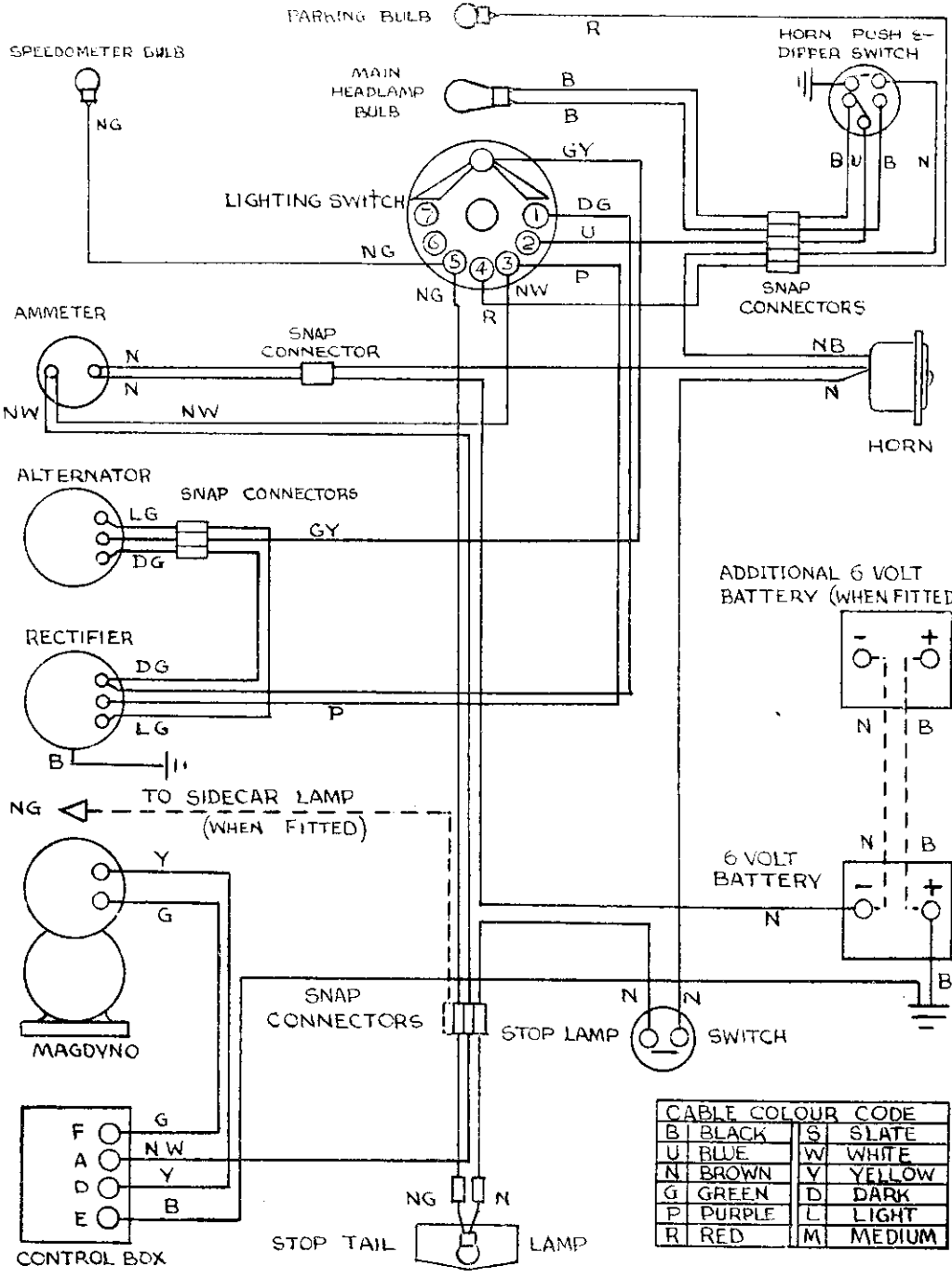
Alternator Cable Connections—Stage 3.



	OUTPUT IN AMPERES	
	2,000 r.p.m.	5,000 r.p.m.
C12 (with terminals 5 and 6 not linked)	8.5 min.	9.5 min.
A Group and M21	8.5 min.	9.5 min.

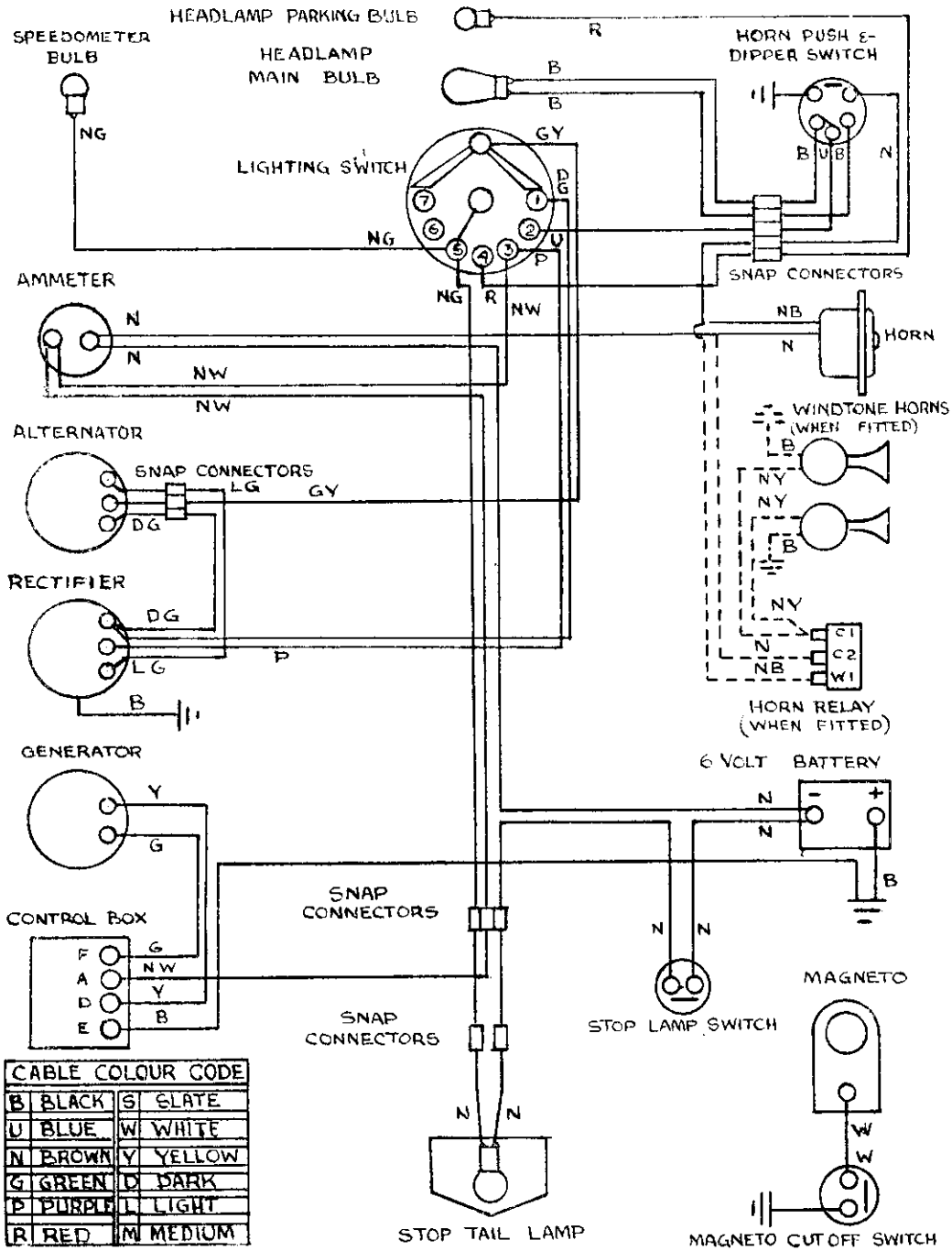


C12 WIRING DIAGRAM



M21 WIRING DIAGRAM

B.S.A. MOTOR CYCLES LTD., Service Dept., Waverley Works, Birmingham, 10.
Printed in England



CABLE COLOUR CODE			
B	BLACK	S	SLATE
U	BLUE	W	WHITE
N	BROWN	Y	YELLOW
G	GREEN	D	DARK
P	PURPLE	L	LIGHT
R	RED	M	MEDIUM

A GROUP WIRING DIAGRAM

BSA SERVICE SHEET No. 813B

Printed March 1960

C15 COMPETITION MODEL

ALTERNATOR AND "ENERGY TRANSFER" SYSTEM INTRODUCTION AND SERVICE TESTING PROCEDURE.

INTRODUCTION

To cater for special machines such as the C15 Competition, which is a high-performance competition and trials machine, Lucas engineers have developed a special RM13 type alternator and " energy transfer " ignition coil. The alternator windings comprise of two sets of series connected coils, one set for direct lighting when this is required, the other set of coils being connected purely for ignition purposes. The alternator and ignition coil are similar in operation to a magneto whilst retaining the physical characteristics of the conventional coil ignition system namely, separate ignition coil and contact-breaker, and are designed for continuous use without a battery in circuit; this is particularly advantageous in competition work.

• " ENERGY TRANSFER " IGNITION

Working Principles. The main feature of an " energy transfer " ignition system is that the ignition coil primary is connected **in parallel** with the contact-breaker points, whereas in the conventional coil ignition circuit the primary winding and contact-breaker are connected in series. In practice this means that the current generated in the alternator ignition coils can flow direct to earth through the contact points, when these are closed, but when they are open its alternative path to earth is *via* the ignition coil primary. The sequence of events which, of course, takes place at high speeds, due to the action of the contact-breaker, is as follows.

With the contact-breaker points closed, the ignition generating coils of the alternator, one end of which is permanently connected to the frame of the machine, are in effect short-circuited causing heavy currents to circulate in them. When the contact-breaker points open the short-circuit effect is removed and the built-up energy circulated in the generating coils is rapidly transferred to the primary of the ignition coil. The effect of this " high energy " pulse in the ignition primary is to induce a high voltage in the secondary winding which, in turn, is transmitted through the H.T. cable to the sparking plug. The contact-breaker is arranged to open only at peak instants in the A.C. generating cycle, to ensure that maximum energy is available for ignition purposes.

Another feature worth noting is that the " energy transfer " system operates on a rising current in the ignition coil primary, and not as in the conventional coil ignition system, on a falling current in the primary winding.

GENERAL DESCRIPTION

Stator. Wound with 4 coils only. Two series connected coils are used for ignition purposes being permanently connected across an " energy transfer " coil model 2 E.T. Diametrically opposite are two coils, similarly connected, of a slightly heavier gauge wire, for use when direct lighting is required; these will supply sufficient current for a 6v 24/24w headlamp bulb together with a 6v 3w or 6v 6w tail lamp bulb, i.e., 27/30w.

As with previous models of the RM13, three wires are brought out from the stator for connecting to the external circuit. One end of the LIGHT GREEN or RED lead is earthed to the frame of the machine, the other end is connected to both the lighting and ignition coils. The DARK

GREEN or BROWN BLUE lead is connected to the lighting switch, when lighting is used, and the GREEN YELLOW or BLACK WHITE lead is connected to the contact-breaker and primary of the " energy transfer " coil.

Rotor. The rotor is a standard RM13 unit, but when keyed onto the model C15 Competition crankshaft the magneto timing differs from that of the standard C15.

Contact-Breaker Cam. A special short open-period (30°) cam has been designed for use with this alternator to ensure that the maximum of efficiency is obtained from the 2 E.T. "energy transfer" ignition coil to give the high performance characteristic required with this type of competition machine.

2 E.T. " Energy Transfer " Ignition Coil. The 2 E.T. has been specially designed for use in " energy transfer " ignition systems. It employs a closed iron circuit and a primary winding whose impedance is closely matched with that of the alternator ignition generating coils, resulting in a high performance characteristic, particularly for starting.

SERVICE NOTES

Converting from Standard to Competition Engine. The model C15 Competition machine has several engine features which differ from those of the standard machine. A special cylinder head and camshaft, etc., are incorporated in the design. Merely fitting a competition alternator and " energy transfer " ignition coil to a standard machine, and advancing the ignition timing will not bring it up to the competition specification. To achieve this the necessary engine parts will also have to be replaced. Also, advancing the ignition in trying to reach competition performance may seriously damage a standard engine.

If a conversion is contemplated a B.S.A. Agent should be approached for the relevant engine conversion details.

Timing. It is very important that care is taken when timing, for ignition purposes, a machine fitted with this special RM13 and " energy transfer " ignition system. The C15 Competition has been designed as a high performance machine, for use in competition and trials work and therefore the ignition timing, on which the high performance is very dependant, must be accurately set. Remember, it is not only the piston/spark timing relationship which is involved but also the " magneto " performance (spark energy) of the alternator. This will be appreciated more fully when it is remembered that, as the rotor of the alternator is keyed to the engine crankshaft, which in turn is coupled through the connecting rod to the piston, any movement of the piston during the timing procedure will affect the position of the crankshaft and hence the magnetic timing position of the rotor.

In other words the maximum alternator " magneto " performance can only be obtained when the piston is accurately set to the timing position recommended by the manufacturer (12° B.T.D.C.), engine fully retarded.

SYSTEMATIC FAULT LOCATION

The following notes recommend the procedure to be adopted in the event of trouble developing with the equipment.

1. Engine Fails to Start

1. Remove the H.T. lead connected to the sparking plug and hold it approximately $\frac{1}{8}$" from the engine cylinder block. The gap should spark at normal " kick-start " speed. If it does check that plug gap is correct to manufacturers recommendation, if plug electrodes are worn or insulation cracked, plug should be replaced. Re-connect H.T. lead to plug and again check for sparking with plug resting on cylinder head. If plug gap sparks refit and proceed to check fuel supply, carburation, etc.

   NOTE:—It is essential that the correct plug gap is maintained—a wider gap will cause difficult starting or perhaps failure to start. Accurate timing is also a critical factor in starting, the correct setting is 12° B.T.D.C., engine fully retarded.

NOTE.—This test must be done as quickly as possible to avoid damage to coils through overheating, and misleading readings due to increase in coil resistance with temperature rise. It will be found that 2 to 3 seconds duration gives ample time to observe the ammeter readings.

On no account should this test be made with the rotor in position, otherwise partial demagnetisation will result.

4. **Bench Testing—Alternator and 2 E.T. Ignition Coil.**

2 E.T. Ignition Coil

The 2.E.T. ignition coil should be tested similarly to the procedure detailed for the S.R. magneto coils except for the test voltage which must be 12 volts, and no ammeter is required.

A four lobe D.K. type contact-breaker having closed periods of not less than 42° and having an operating range up to 750 r.p.m. is required. Also, a 12 volt battery, a 3 point rotary spark gap and 1 ohm resistor approximately 15 watt.

Proceed to test as follows:—

7. Connect the 12 volt battery, contact-breaker, resistor in series with the coil primary winding. Battery polarity should be such that the negative side of battery is connected to the earthed end of the primary.

   Also connect with a jumper lead, the spark gap point that is farthest from the ionising electrode, to the negative side of the circuit.

   Connect the H.T. cable from coil to the 3 point spark gap to the electrode nearest the ionising point.

   Run the contact-breaker at 750 r.p.m. Regular sparking should occur at the spark gap which should be set to 8 m/m (approximately 14 Kv). This test should not be continued for more than 30 seconds because the arcing of the contacts will be fairly heavy, due to the slow running speed and low primary resistance.

Alternator—Lighting and Ignition Coils.

Lighting Coils—D.C. Output Test.

The lighting coil output can be checked by feeding it through a bridge rectifier standard type—into a 6 volt battery. The battery should have a *rheostat connected across it which should be adjusted as necessary to maintain the 6 volt potential during testing.

Also in parallel with battery, connect voltmeter to measure potential.

The battery and ammeter should then be connected in series with the lighting coils and readings taken at the following alternator speeds.

Alternator R.P.M.	*Output in Amps into 6 volt Battery*
2,000	2.8 (Minimum)
5,000	5.3 (Maximum)

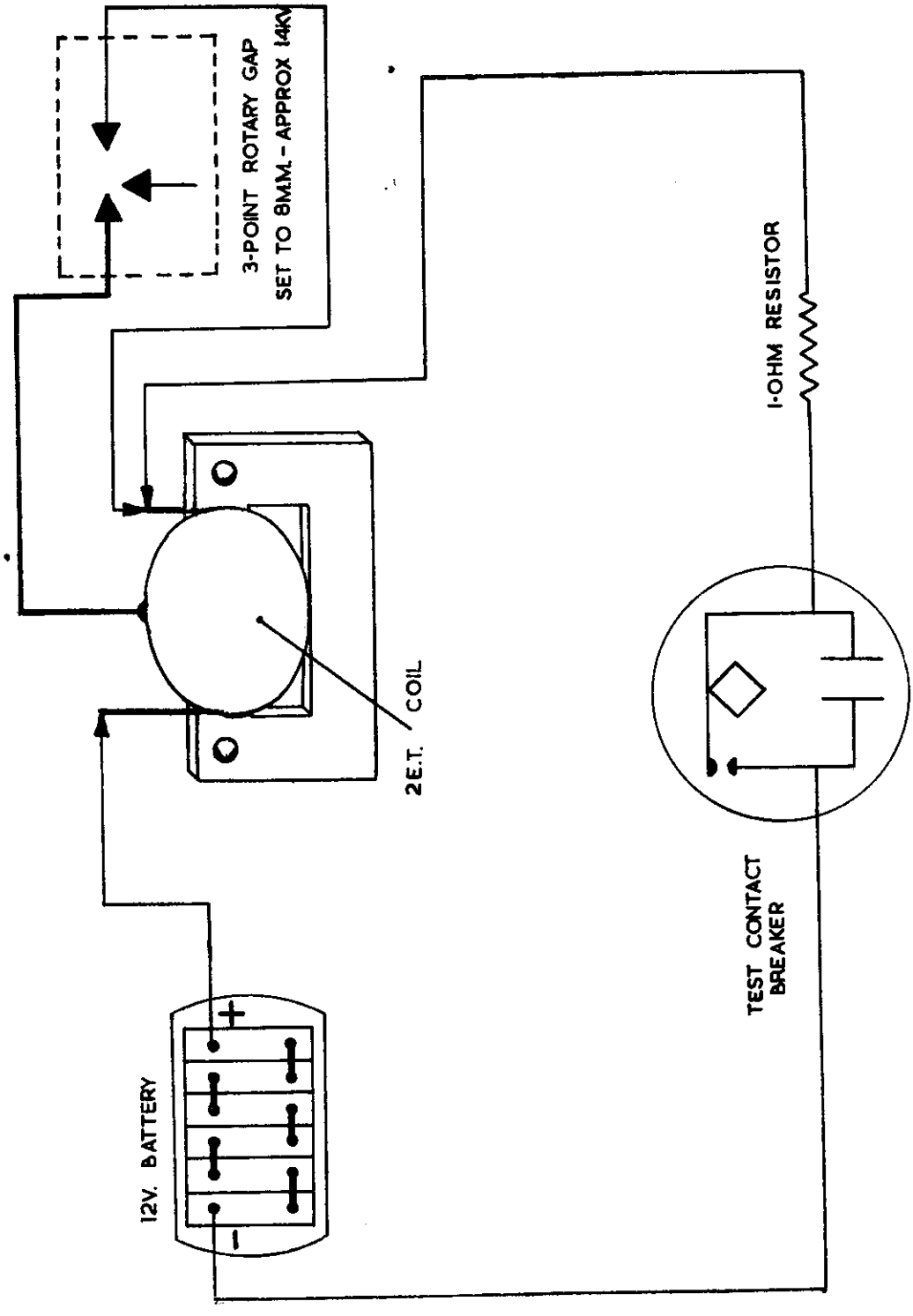
Ignition Coils—D.C. Output Test.

Using the same test gear and procedure as detailed for the lighting coil tests, the ignition coil output readings are as follows:—

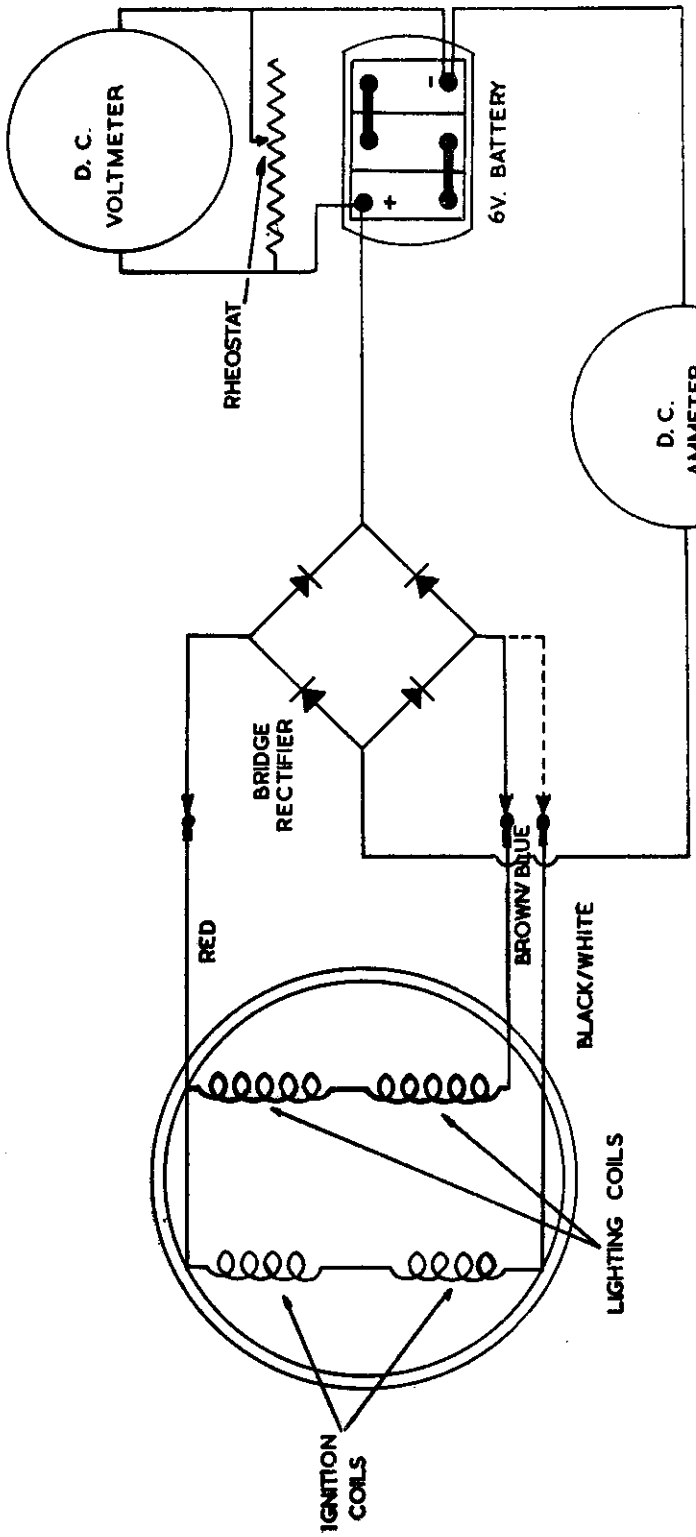
Alternator R.P.M.	*Output in Amps into 6 volt Battery*
2,000	1.4 (Minimum)
5,000	1.8 (Maximum)

The stator complete, or individual coils should be replaced if the output readings for either or both the ignition and lighting coils are outside the figures quoted.

* Capable of carrying 10 amps without overheating.



2 E.T. "ENERGY TRANSFER" IGNITION COIL
SPARK PERFORMANCE TEST CIRCUIT



RM 13 (COMPETITION) ALTERNATOR
D.C. OUTPUT TEST CIRCUIT

LIGHTING COILS		IGNITION COILS	
ALTERNATOR R.P.M.	OUTPUT IN AMPS.	ALTERNATOR R.P.M.	OUTPUT IN AMPS.
2000	2.8 (min)	2000	1.4 (min)
5000	5.3 (max)	5000	1.8 (max)

CIRCUIT DIAGRAM OF RM 13 (COMPETITION) ALTERNATOR AND "ENERGY TRANSFER" IGNITION SYSTEM AS FITTED TO **C15. COMPETION MODEL**