BSA - SECTION G

D14/4 ELECTRICAL SYSTEM G1

INDEX

Page

D14/4 ELECTRICAL SYSTEM G2

INTRODUCTION

The lighting and ignition systems of the Wipac alternator equipped model Bantam consists of a simple six-pole alternator generating set which supplies current through a metal plate rectifier to a battery, which then feeds the ignition system, lights, horn etc. The alternator ring carries six coils which are connected in three sets of two in series, as illustrated in the schematic diagram Fig. G2.

By using one set of two coils in series, a certain output is obtained for daylight running and when the pilot or parking lights are switched on. When the headlight is brought into circuit, all six coils are connected as three pairs in series

parallel as shown in Fig. G2, giving maximum output, most of which is absorbed by the headlamp bulb but still leaving sufficient current for maintaining the state of charge of the battery.
Alternating current supplied by the generator is converted to direct current by means of the rectifier which is of the very efficient full wave bridge connected type.
The main connections in the wiring system are made by rubber socket connectors to the lighting and ignition switches and by individual rubber covered bullet-type push-in connectors. The latter are found most useful when making wiring checks or re-installing new cables. These connectors are not intended as plugs and sockets for frequent manipulation and should only be used when testing or fault-finding. It is important that they are making perfect contact as should all other connection points throughout the system.
BATTERY
The battery used on Bantam machines (with the exception of the Bushman Pastoral), is a Lucas six volt unit type PUZ5E/11.
FIG. G1. Cut-away view of battery.
Charging the Battery
The battery leaves the factory in a fully "dry-charged" condition, but during storage some of the charge may be lost. In view of this, the following filling instructions must be carefully observed.
With the acid, battery and room temperature between 60°F., and 100°F. (15·537·7°C.), remove the vent plugs and fill each cell to the top of the separator guard.
Measure the temperature and specific gravity of the electrolyte in each of the cells.
Allow to stand for twenty minutes and then re-check the temperature and specific gravity of the electrolyte in each cell.
The battery is then ready for service unless the above checks show the electrolyte temperature to have risen by more than 10°F. (5·5°C.) or the specific gravity to have fallen by more than ten 'points', i.e., by more than 0·010 specific gravity. In this event, it will be necessary to re-charge the battery at the appropriate charge rate (0·8 amperes) until the specific gravity values remain constant for three successive hourly readings and all cells are gassing freely.

D14/4 ELECTRICAL SYSTEM G3
Remember that a positive earth wiring system is employed on the bantam series and ensure that the battery is connected correctly, i.e., with the positive (+) side of the battery connected to earth.
The coloured lead must be connected to the battery negative () terminal and the translucent (earth) lead to the battery positive (+) terminal.
Table A
Specific Gravity of Electrolyte for Filling the Battery
U.K. and Climates normally below 80°F. (26·6°C.) Tropical Climates over 80°F. (26·6°C.)
Filling Fully charged Filling Fully charged
1·260 1·2701·290 1·210 1·2101·230
To obtain a specific gravity strength of 1·260 at 60°F. (15·5°C.), add one part by volume of 1·840 specific acid to 3·2 parts of distilled water.
To obtain a specific gravity strength of 1·210 at 60°F. (15·5°C.), add one part by volume of 1·840 specific acid to 4·3 parts of distilled water.
Table B
Maximum Permissible Electrolyte Temperature During Charge
Climates normally below 80°F. (26·6°C.) Climates normally above 80°F. (26·6°C.)
During charging, keep the electrolyte in each cell level with the top of the separator guard by adding distilled water not acid.
Routine Maintenance

Every 1,000 miles (1,600 km.) or monthly, or more regularly in hot climates, the battery should be cleaned as follows.
To gain access to the battery first take off the dualseat as detailed on page D8.
Remove the battery cover and clean the battery top. Examine the terminals: if they are corroded scrape them clean and smear them with a film of petroleum jelly, or with a silicone grease. Remove the vent plugs and check that the vent holes are clear and that the rubber washer fitted under each plug is in good condition.
The level of the electrolyte in each cell should be checked weekly or every 250 miles. Add distilled water until the electrolyte level reaches the top of the separator guard.
Great care should be taken when carrying out these operations not to spill any acid or allow a naked flame near the electrolyte. The mixture of oxygen and hydrogen given off by a battery on charge, and to a lesser extent when standing idle, can be dangerously explosive.
The readings obtained from the battery electrolyte should be compared with those given in table A opposite. If a battery is suspected to be faulty it is advisable to have it checked by a Lucas depot or agent.
A lead-acid battery slowly loses its charge whilst standing the rate of loss being greater in hot climates. If a battery is not being used, it is important to give it freshening charges at the appropriate re-charge rate. These should be given fortnightly in temperate climates and weekly in the tropics.
100°F. (38°C.) 120°F. (49°C.)

D14/4 ELECTRICAL SYSTEM G4
If a Wilkson test set is not readily available, then the additional equipment listed below can be used as an alternative.
(1) A good quality moving coil A.C. voltmeter to be used in conjunction with a 1 ohm load resistor.
(2) 10010 D.C. ammeter.
(3) 012 volts D.C. voltmeter.
Details of constructing a suitable 1 ohm load resistor will be found on page G8, but it is most essential that the resistor is accurate in order to obtain correct readings.
Charging Circuit
(1) Before commencing any tests, check the voltage of the battery and if completely exhausted, substitute one which is known to be capable of accepting a charge.
(2) Connect in series with the battery (easily done by disconnecting the brown negative lead from the double connector), the D.C. ammeter and check that the charge rates are as detailed below.

Ignition Switch Lights Switch Min. Charge Rates R.p.m.
Ignition Ignition Min.
Emergency Off 2·5 a. 3,000
Off Low ·5 a. 3,000
Off High 1·0 a. 3,000
Off 4·5 a. 3,000

Notes: The specific gravity of the electrolyte varies with the temperature. For convenience in comparing specific gravities, they are always corrected to 60°F., which is adopted as a reference temperature. This method of correction is as follows.
For every 5°F. below 60°F. deduct ·002 from the observed reading to obtain the true specific gravity at 60°F. For every 5°F. above 60°F. add ·002 to the observed reading to obtain the true specific gravity at 60°F.
The temperature must be indicated by a thermometer having its bulb actually immersed in the electrolyte and not the ambient temperature. To take a temperature reading tilt the battery sideways and then insert the thermometer.
EMERGENCY STARTING

The alternator equipment provides an emergency starting system which, when the ignition switch is put into the emergency position, connects all the six coils together and, providing the lighting switch is in the "off" position, gives full output in order to raise the voltage of a discharged battery and is effective in obtaining an immediate start under these conditions.

The maximum charging current in the emergency position is very high as there is no drain against it by the lighting system. Therefore, the engine should not be run with the ignition switch in this position for more than 1015 minutes. This type of emergency starting being entirely D.C. enables the machine to be run through the complete operational range of the engine.

FAULT FINDING

Before commencing the fault finding tests, it should be noted that the following equipment will be required.

(1) Wilkson test set.

(2) 6 volt, 3 watt bulb with holder and test leads, about 24" long.

(3) A well charged 6 volt battery.

These figures should be checked when the engine is running at approximately 3,000 r.p.m. Charge rates will, of course, vary with engine speed and the state of battery charge, but