SERVICE BULLETIN

FOR

Royal Enfield

MOTORCYCLES

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LUCAS SERVICE TESTING PROCEDURES for MOTOR CYCLE A.C. SYSTEMS

TEST EQUIPMENT REQUIRED:

A.C. (Moving Coil) Voltmeter - Scale 0-15v
D.C. (Moving Coil) Voltmeter - Scale 0-15v
D.C. (Moving Coil) Ammeter - Scale 5-0-15A
Load resistor (1 ohm) capable of carrying 15 amps. without overheating, and a length of cable for use as a jumper lead.

TEST #1. CHECKING D.C. INPUT TO BATTERY:

(a) Connect D.C. ammeter between battery negative terminal and battery main lead.
(b) Start engine and run at 3,000 r.p.m.
(c) Operate the light switch, and check ammeter readings, as follows:

Switch Position	MINIMUM CURRENT READINGS		
	RM13, RM13/15 5AF (6 volt)	RM14 RM15	5AF (12 volt)
OFF	1.5	2.5	2.5
PILOT	0.5	1.5	1.5
HEAD	0.25	2.5	3.25

The above readings will be obtained if battery is in good condition and more than half charged. The battery can be eliminated by carrying out the following alternative test:

(d) Disconnect main lead from battery.
(e) Connect D.C. voltmeter (1-ohm load resistor in parallel). Red lead to ground, black lead to main battery lead.
(f) Remove existing feed wire from "SW"(-ve) terminal of ignition coil, or coils when two are fitted.
(g) Connect jumper lead from battery (negative terminal) to ignition coil ("SW" or "-ve") terminal.(To both coils when two are fitted.)
(h) Turn ignition switch to "IGN" position.
(i) Start engine,& run at approximately 3,000 r.p.m.
(j) Operate lighting switch & check voltmeter readings as follows:

Switch Position	MINIMUM VOLTAGE READINGS		
	RM13, RM13/15 5AF (6 volt)	RM14 RM15	5AF (12 volt)
OFF	1.5	2.5	3.75
PILOT	1.5	2.0	3.25
HEAD	3.0	3.0	6.0

CONCLUSIONS: If the readings in either test are equal to, or better than the values quoted, then it indicates alternator, battery & charging circuits are satisfactory. If readings on D.C. voltmeter test are low, proceed to test the alternator itself, Test #2, as follows:

(Continued.....)

TEST #2. CHECKING ALTERNATOR OUTPUT:

(a) Disconnect the three alternator leads. Note change of colors;

EARLIER COLORS:		LATER COLORS:
Light Green	- - - - -	Green & White
Medium Green	- - - - -	Green & Yellow
Dark Green	- - - - -	Green & Black

(b) Connect A.C. voltmeter (with 1-ohm resistor in parallel), as detailed in table below.

(c) Start engine & run at approximately 3,000 r.p.m.

Voltmeter & Resistor Across:	MINIMUM VOLTAGE READINGS		
	RM13, RM13/15 5AF (6 volts)	RM14 RM15	5AF (12 volts)
Green/Black & Green/White	3.0	4.0	3.5
Green/White & Green/Yellow	6.0	6.5	5.5
Green/White & Green/Black Connected to Green/Yellow	8.5	9.0	7.0
Any one lead & stator (ground)	No reading	No Reading	No Reading

CONCLUSIONS: If all readings are low it indicates a demagnetized rotor. A low reading across any coil, when remainder are satisfactory, indicates a short-circuited coil. A zero reading indicates open-circuited coil(s). A reading between any lead and stator laminations indicates grounded coil(s).

TEST #3. CHECKING THE RECTIFIER:

With Green/White & Green/Black alternator leads correctly connected to main harness;

(a) Disconnect lead from center terminal at rectifier.

(b) Disconnect Green/Yellow harness lead at alternator snap connector.

(c) Connect alternator Green/Yellow lead to Green/Black at rectifier terminal.

(d) Connect D.C. voltmeter (with 1-ohm resistor in parallel). Red lead to ground (frame), Black lead to rectifier center terminal.

(e) Start engine & run up to 3,000 r.p.m.

Voltmeter and Resistor Across:	MODEL	VOLTAGE
Rectifier (center terminal) and ground (frame)	RM13 5AF (12 volt)	6.5
	RM13/15 5AF (6 volt)	7.0
	RM14	7.5
	RM15	7.75

CONCLUSIONS: If meter reading is equal to, or higher than the value stated, it indicates rectifier elements in the forward direction are satisfactory. If meter readings are excessively high, check rectifier ground bolt connection to frame of the machine. If ground connection is satisfactory, aged or high resistance elements in the rectifier are the cause. A very low reading indicates a faulty rectifier.

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TEST #5. CONCLUSIONS: If in each test the meter reading is not more than 0.5 volts less than battery voltage, then charging circuit continuity and connections are satisfactory. If zero or low readings are obtained, wiring and switch connections, etc., will have to be checked.

TEST #6. CHECKING THE IGNITION COIL:
A battery with a 6-watt bulb in series with one of its leads can be used to check for continuity of the ignition primary winding. If the primary winding is satisfactory and the H.T.,or secondary winding is suspect, then only a special bench test will confirm this. Therefore, substitutiom is probably the easiest and quickest way of testing initially for a faulty coil.

FAULT DIAGNOSIS PROCEDURES

Set out below is the recommended procedure for a systematic examination to locate and remedy some of the more probable faults. The sources of many troubles are obvious when a small amount of deduction from symptoms is made. But if in doubt about the cause of the trouble, and to save time, always apply a systematic testing procedure.

IGNITION CIRCUIT:
1. Engine will not start ("IGN" position):
   (a) Ensure timing,contact breaker, plug gaps,etc.,are satisfactory.
   (b) Apply tests 1, 2 and 6.
2. Engine difficult to start:
   (a) Check as for (1) above.
3. Engine misfires:
   (a) Check as for (1) above.
   (b) Check that ignition switch is in "IGN" position.
4. Engine will not start ("EMG" position):
   (a) Ensure timing,contact breaker,plug gaps,etc.,are satisfactory.
   (b) Apply tests 2, 4 and 6.
5. Engine difficult to start:
   (a) Check as for (4) above.
6. Engine misfires:
   (a) Check as for (4) above.

CHARGING CIRCUIT:
1. Battery in low state of charge:
   (a) Apply test 1.
   (b) If charge rate low,proceed with tests 2,3 and 5.
2. Excess circuit voltage. Indicated by burnt-out or blackened bulbs, burned ignition contacts (coil ignition machines):
   (a) Check battery and rectifier grounds. Also battery for sulphation.
   (b) Check all wiring for loose connections. Apply tests 2,3 and 5.
3. No charge:
   (a) Check alternator, test 2.
   (b) If alternator satisfactory, apply tests 1,3 and 5.

LIGHTING CIRCUITS:
1. Failure of lights (engine stationary):
   (a) Check bulbs, battery, switch connections and all wiring.

(Continued.....)

LIGHTING CIRCUITS: (Continued)

2. Lamps light at first-then fade:
   (a) Check battery.
3. Brilliance varies with engine speed:
   (a) Check battery.
4. Lights flicker:
   (a) Check wiring & battery connections.
5. Headlamp illumination insufficient:
   (a) Check bulb for discoloration or sagging filament.
   (b) Check for cleanliness of reflector and lamp setting.

ALTERNATIVE BATTERY CHARGING RATES

A.C. lighting-ignition units are connected to ensure that the battery is maintained fully charged under all normal running conditions. Although alternator models RM13 and RM15 are very similiar in outward appearance, the performance of the RM15 is considerably higher than that of the RM13. On some earlier machines fitted with the smaller model RM13 alternator, the charge rate may not always be found quite sufficient to meet the requirements of low-speed town work, short winter runs, and similiar conditions.

In this event, the charge rate can be increased by interchanging two of the three alternator cables where these are joined by means of snap connectors to the main harness.

To do this, switch off the light and ignition switches, and disconnect the Green/Black (formerly Dark Green) and Green/Yellow (formerly Medium Green) cables by pulling these cables from their snap-connectors.

The Green/Black alternator cable must now be connected to the Green/Yellow harness cable, and the Green/Yellow alternator cable to the Green/Black harness cable. It should be noted, however, that with these modified connections, emergency starting may be adversely affected. If this form of starting is required but found difficult, the cables should be re-connected, color-to-color.

If, due to a change in running conditions, the battery is found to be overcharged, as indicated by excessive gassing of the electrolyte and a frequent need for topping-up, the original connections must be restored, color-to-color.

Service Dept.