BSA SERVICE SHEET No. 816

March 1959

DANDY 70
LUCAS ELECTRICAL EQUIPMENT
(Fitted on and after Engine No. DSE14103
(FLYWHEEL MAGNETO-ALTERNATOR MODEL 8FI)

The flywheel magnèto-alternator model 8FI employs conventional ignition and lighting circuits, and therefore differs from model 6FI previously fitted to these machines. Maintenance and servicing are quite straight forward and will be helped by the following information:—

MAINTENANCE.

Every 5,000 miles or when the engine is removed for decarbonisation, check and clean the contact breaker.

The felt lubricating pad should be renewed or re-lubricated with clean engine oil (S.A.E. 40/50) every 5,000 miles. Also lightly oil the contact lever pivot.

Should it be necessary to renew the contact breaker, the toothed retaining ring which secures the lever to the pivot post must be prised off and a new ring fitted on re-assembly. The pivot post should first be smeared with Mobilgrease No. 2.

DATA.

Main bulb: Lucas 387 6 volt 18/18 watt (non-reversible).
Parking bulb: Lucas No. 974, 3.5 volt 0.15 amp.
Rear lamp bulb: Lucas No. 990, 6 volt 3 watt.
Ignition timing: 5/32 in. B.T.D.C.
Contact breaker gap: .014 — .016 in.

FAULT LOCATION.

Equipment Required:

(a) A good quality rectified moving coil voltmeter, scale 0—10 volts, with divisions enabling accurate readings of 0.2-volt to be made.
(b) A 1.2 ohm load resistor, non-inductively wound and capable of carrying 5-amp. without exceeding 5% variation in resistance at that current.
(c) A stationary three-point spark gap (as used for coil ignition testing) set to 4 mm. Alternatively, an approved two-point adjustable spark gap set to 4 mm. can be used for ignition tests carried out with the unit in situ on the engine.
(d) Fully charged 6-volt battery.
(e) Moving coil ammeter, scale 0—20 amp.

Note.—Under no circumstances must moving iron meters be used, or a D.C. current allowed to flow through the alternator with the rotor fitted.

TESTING.

1. Engine fails to start:

(i) Set lighting switch to OFF.
(ii) Disconnect H.T. lead at sparking plug and connect 4 mm. spark gap between H.T. lead and earth (i.e., frame of engine block). The gap should spark at normal "foot-start" speed. If it does, remove sparking plug, clean and reset. Also check fuel supply etc., and do not forget that ignition timing is a critical factor in starting.

(iii) If there is no spark, or if engine still cannot be started, check ignition system as follows:—

(a) Remove engine from frame.
(b) Check that contact breaker gap is correctly set.
(c) Remove flywheel using B.S.A. Extractor Tool No. 61-3540.
(d) Connect 4 mm. spark gap between end of H.T. lead and earth on stator.
(e) Connect positive terminal of 6-volt battery to stator earth nearest to ignition coil, using a jumper lead.
(f) Hold contact breaker open by means of a piece of thick card between contacts, then connect one end of a second jumper lead to moving contact arm (take care not to short it to stationary contact which is earthed).
(g) With free end of second jumper lead, quickly make and break circuit to battery negative terminal. (Make this test as short as possible to avoid overheating ignition coil primary winding). A spark should be obtained at two-point gap.

(iv) If only a weak spark, or no spark, is obtained, substitute a new condenser and retest. Since the condenser relies on its electrical connection with clip, outside case should be cleaned with a petrol-moistened cloth. Solvents must not be used for this purpose.

(v) If trouble persists, check coil. To do this, connect a 2-volt cell of battery between primary coil earth connection on stator, and primary coil connection at condenser or on the moving contact arm, with ammeter (item *e*) in series, and contacts remaining separated by the card. Since resistance of primary winding is approximately 1 ohm, a reading of 2 amp, should be given if coil is in order. If reading is zero or low, and cause is not due to faulty external connections at earth point or condenser, an indication is given of an open circuit in coil. A reading in excess of 2 amp. indicates short-circuited primary turns and in either event, a replacement stator will be necessary.

(vi) After any renewal of parts, adjust contact gap and refit flywheel, using B.S.A. Service Tool No. 61–3536. Check by spinning engine over by hand with H.T. lead connected to sparking plug which has been unscrewed and placed on engine block. If possible, bench test magneto-alternator before refitting engine (see para. 5).

2. **Engine difficult to start, or runs intermittently:**
If after checking as detailed in (i) to (iii), trouble persists it will be necessary to proceed as laid down in (iv) to (vi).

3. **No Lights with Lighting Switch in Head or Dip Position and Engine Running.**

(vii) Disconnect alternator main lead from wiring harness, and to it connect one side of voltmeter and also one side of 1.2-ohm load resistor. Connect other voltmeter lead, and that of resistor, to engine block. Voltmeter and resistor are now in parallel across lighting coils.

(viii) Start engine and increase speed slowly. Voltmeter should indicate rising volts with speed, increasing to between 3.5 and 7.5 volts.

(ix) If satisfactory, check headlamp and rear lamp bulbs, by substitution if necessary. Check wiring and connections between headlamp and switch, rear lamp and switch, and alternator and switch, rectifying as necessary. Fit new lighting switch if necessary.

Note.—Poor earth connections can be particularly troublesome, and will cause high voltages which reduce bulb life. Burnt-out or blackened bulbs often indicate the existence of bad earths, which should be rectified before fitting new bulbs.

(x) If rising voltage characteristic is not obtained see (viii), alternator will have to be removed from the machine and flywheel taken off. Using one 2-volt cell of test battery, connect positive battery terminal to earth on engine, negative battery terminal to one ammeter terminal, and second ammeter terminal to main output lead of alternator. Reading obtained on ammeter should be approximately 9.5 amp. (lighting coils are connected in parallel with a joint resistance of about 0.2 ohm). **DO NOT ALLOW THIS CURRENT TO FLOW FOR MORE THAN ONE SECOND.**

(xi) A higher reading, in region of 15—20 amp., will indicate short-circuited windings on one or both coils. A reading in the order of 5 amp. will indicate an open circuit in one of the coils and in either event, a replacement stator will be necessary. Zero reading indicates an open circuit, possibly in alternator lead, while a reading lower than 9.5 but exceeding 5 indicates faulty continuity. Check leads and coil earthing points.

Note.—This test must be done as quickly as possible to avoid damage to coils through over-heating, and misleading readings due to increase in coil resistance with temperature. It will be found that one second's duration gives ample time to observe the ammeter readings. **On no account must test be made with alternator assembled to a bench testing jig with flywheel fitted, otherwise partial de-magnetisation will result.**

(xii) After renewal of any necessary parts, refit flywheel. If possible, bench test alternator before refitting engine (see para. 4).

4. BENCH TESTING.

(a) Ignition Performance.

This test is made with H.T. lead connected to a stationary three-point spark gap set to 4 mm. Regular sparking should occur at all speeds above 1,000 r.p.m.

(b) Alternator Output Performance on Load.

Connect one voltmeter lead to alternator main output lead, and second voltmeter lead to stator. Similarly, connect 1.2-ohm load resistor across alternator between main output lead and stator. Run up alternator speed and check output voltages as follows:—

R.P.M.		*Voltmeter Reading.*
2,000	not **less** than	3.7
4,000	not **less** than	5.4
6,000	not **less** than	6.0
8,000	not **more** than	7.25

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Service Dept., Waverley Works, Birmingham 10.
Printed in England.