LUCAS

Quality

EQUIPMENT

VOLUME 2

WORKSHOP INSTRUCTIONS

IGNITION COILS

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IGNITION COILS

1. GENERAL

An ignition coil includes primary and secondary windings wound concentrically about a laminated soft iron core—the secondary winding being next to the core. The primary usually consists of some 300 turns of enamel covered wire and the secondary some 17 to 26 thousand turns of much finer wire—also enamel covered. Each layer is paper-insulated from the next in both primary and secondary windings.

Internally, most ignition coils are so wound and connected that their primary and secondary windings constitute step-up transformers.

Irrespective of vehicle battery polarity, ignition coils are wound to give negative polarity at the high tension terminal, and hence to produce a negative spark at the sparking plug. Since sparks will jump a gap at a lower voltage if the negative electrode is made hotter, a negative central electrode ensures lower plug voltages, and therefore less stressing of the electrical system, and, due to metal transference, longer plug life.

To provide a return path for the magnetic flux, the core and windings are placed within a soft iron sheath, and the complete assembly is housed in a sealed container. Earlier coil windings were impregnated in high melting point wax and sealed inside the metal case with a pitch-based insulating compound. Present practice is to support the coil in an insulating fluid which permeates the windings and eliminates the need for wax-impregnation and sealing compound. These latter coils, known as fluid-cooled coils, can be recognised by their seamless canisters.

The terminal moulding on certain special purpose ignition coils is coated with anti-tracking paint and is identifiable by its dull-rust colour. Certain coils have, in addition to anti-tracking paint, a corrugated terminal moulding to increase the surface distance between the high-tension cable outlet and the earthed case.

2. MAINTENANCE

Occasionally, check the terminals for tightness and inspect the high tension cable for signs of wear. To fit a new high tension cable, thread the knurled terminal nut over the end of the cable and bare the end of the wire for $\frac{1}{4}$". Thread the wire through the brass washer removed from the old cable and bend back the strands. Finally, screw the nut into the terminal moulding.

The foregoing instructions do not, of course, apply to plug-in type H.T. connections.

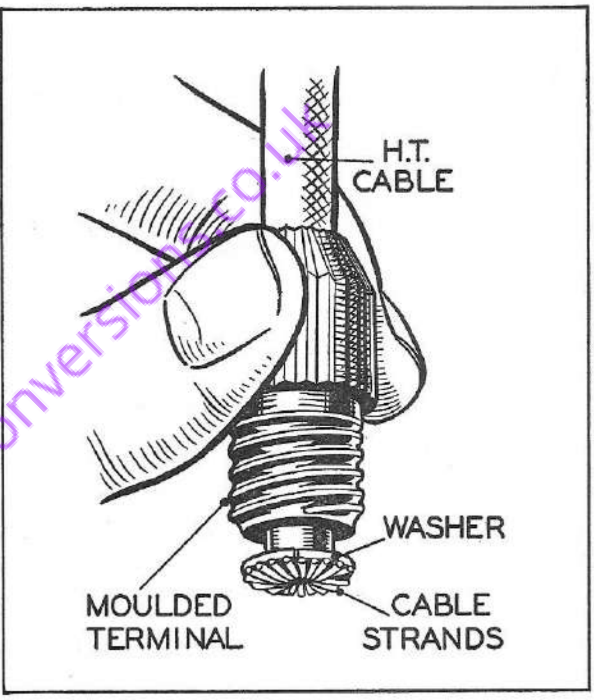

Fig 1.
Method of fitting terminal nut to cable

It is essential that the exterior of the coil is kept clean and dry. When necessary, reposition a coil so that these conditions can be obtained.

If a coil develops a 'tracked' moulding, and no replacement is available, the following repair may temporarily suffice:

> Scrape the terminal moulding where 'tracking' has occured and remove all carbon deposit. Paint with 'anti-track' varnish or, if this is not available, use a good quality water-resistant varnish. Keep the varnish well stirred both before and during use.

Never attempt to remove the screw located inside the high tension terminal socket of fluid-filled coils. This applies also to the knurled sealing ring of HE6 and HE12 coils.

3. PERFORMANCE DATA

Type	Primary resistance at 20°C. ohms.	Spark gap for slow-speed test mm.	ins.	Distributor speed for high-speed test r.p.m.	Maximum test voltage	Earth polarity of 'C.B.' terminal and canister for test	Notes
Ford 10	1.52—1.58	8	0.315	2300	6.5	—ve	
6Q6	1.4 —1.55	9	0.354	2300	6.5	+ve	
QL6	1.32—1.42	9	0.354	2300	6.5	+ve	
CQ6	2.75—3.15	7.5	0.295	1000	6.5	+ve	
4Q6	1.7 —1.9	8	0.315	2000	6.5	+ve	
AQ6	1.1 —1.25	11	0.433	2750	6.5	+ve	
*SQ6	1.5 —1.7	7.5	0.295	2100	6.5	+ve	Service Nos. 45041**A** and 45057**A**
	1.2 —1.4	8.5	0.334	2100	6.5	+ve	Service No. 45057**B** onwards
B6	1.4 —1.6	11	0.433	2500	6.5	—ve	
BR6	1.15—1.3	11	0.433	3500	6.5	+ve	
BD6	0.49—0.57	10	0.394	3000	6.5	+ve	Ballast resistor 0.6—0.7 ohms
R6	1.25—1.4	11	0.433	2500	6.5	+ve	
HE6	0.9 —1.1	13	0.512	3500	6.5	+ve	
HS6	1.15—1.3	11	0.433	3500	6.5	+ve	
Q12	4.3 —4.5	9	0.354	3000	12.5	+ve	
QI12	5.5 —6.0	8	0.315	1700	12.5	+ve	
QV12	4.4 —4.65	9	0.354	2400	12.5	—ve	
QL12	3.7 —4.3	9	0.354	3000	12.5	+ve	
OQ12	0.9 —1.1	8	0.315	3000	12.5	+ve	Ballast resistor 1.4—1.7 ohms
B12	4.0 —4.4	11	0.433	3500	12.5	+ve	
B12/1	3.4 —3.8	11	0.433	4250	12.5	+ve	
BR12	3.4 —3.8	11	0.433	4250	12.5	+ve	
BRS12	3.2 —3.6	10	0.394	3000	12.5	—ve	
BI12	3.85—4.1	11	0.433	2000	12.5	+ve	
BRV12	3.15—3.45	12	0.472	4200	12.5	—ve	
BRP12	3.2 —3.6	11	0.433	3000	12.5	—ve	
BW12	3.2 —3.6	10	0.394	3000	12.5	—ve	
BRW12	3.4 —3.8	11	0.433	4000	12.5	—ve	
HS12	4.0 —4.4	11	0.433	3500	12.5	+ve	Service No. 45038**A**,**B**
	3.4 —3.8	11	0.433	4250	12.5	+ve	Service No. 45038**D** onwards
HE12	3.1 —3.5	13	0.512	4200	12.5	+ve	
HV12	3.5 —3.8	12	0.472	3800	12.5	+ve	
LA12	3.2 —3.4	10	0.394	3000	12.5	+ve	
R12	4.0 —4.4	9	0.354	2900	12.5	+ve	
BW12	0.75—0.85	11	0.433	2100	4.5	—ve	
BRS10	2.65—3.0	12	0.472	3000	10.5	—ve	} 10-volt primary winding with
BRW10	2.65—3.0	12	0.472	3000	10.5	—ve	} ballast resistor† on 24-volt supply
BSW12	3.1 —3.4	11	0.433	3500	12.5	—ve	
SA6	0.9 —1.1	13	0.512	3500	6.5	+ve	Service No. 45065**A**, **B** and **D**
	0.8 —1.0	14	0.551	3500	6.5	+ve	Service No. 45065**E** onwards
SA12	2.35—2.65	13	0.512	4200	12.5	+ve	Service No. 45058**A**, **B** and **D**
	2.6 —2.9	14	0.551	3750	12.5	+ve	Service No. 45058**E** onwards
PA6	1.0 —1.1	11	0.433	2750	6.5	+ve	
PA12	3.0 —3.4	11	0.433	3750	12.5	+ve	
MA6	1.8 —2.4	8	0.315	2250	6.5	+ve	
MA12	3.0 —3.4	9	0.354	3000	12.5	+ve	
LA6	1.0 —1.1	11	0.433	2750	6.5	+ve	
LA12	3.0 —3.4	10	0.394	3000	12.5	+ve	
HA12	3.0 —3.5	11	0.433	3750	12.5	+ve	
	3.0 —3.4	11	0.433	3750	12.5	—ve	Service Nos. 45066, 45097, 45068, 45099
LH12	3.4 —3.6	11	0.433	3750	12.5	+ve	
LB12	3.8 —4.2	10	0.394	3000	12.5	+ve	
SH6	0.8 —1.0	14	0.551	3500	6.5	+ve	
SH12	2.6 —2.9	14	0.551	3750	12.5	+ve	
3C12	3.2 —3.6	12	0.472	3000	12.5	—ve	
	3.2 —3.6	12	0.472	3000	12.5	+ve	
4C12	3.1 —3.4	11	0.433	3500	12.5	—ve	
5C10	2.65—3.0	12	0.472	3000	10.5	—ve	
	2.65—3.0	12	0.472	3000	10.5	+ve	
7C12	3.8 —4.2	10	0.394	3000	12.5	+ve	
BA7	1.4 —1.54	10	0.394	4250	12.5	+ve	Ballast resistor 1.3—1.4 ohms
BA12	1.3 —1.5	See para. 4 (c) (i)		4500	12.5	+ve	Ballast resistor 0.9—1.1 ohms
	1.3 —1.5	,, ,,	,, ,, ,,	4500	12.5	—ve	Ballast resistor 0.9—1.1 ohms

*Check H.T. output from each end of the coil in turn, in each case earthing the H.T. terminal at the opposite end to that being checked.

† Ballast resistor 4.2 ohms (20°C.) or 5.5 ohms (100°C.).

LUCAS WORKSHOP INSTRUCTIONS

4. CHECKING PERFORMANCE

(a) **Special points to watch when testing Fluid-Cooled Ignition Coils**

(i) Canisters must be earthed.

(ii) When carrying out H.T. tests, canisters must be inclined at an angle of 45° with one of the L.T. terminals uppermost.

The appropriate terminal is the 'C.B.' (or '+') terminal with coils intended for the positive earth system.

Terminal 'SW' (or '—') must be uppermost with coils intended for the negative earth system.

Note: An exception is the negative-earth 4C12 coil which must be tested with its C.B. terminal uppermost.

Warning: An ignition coil designed for use with an associated ballast resistor must NEVER be used without this resistor. Apart from impairing performance, omission of the ballast resistor may result in an explosion.

(b) **Measurement of Primary Resistance**

Measure the primary winding resistance by connecting an accurate ohm meter across the two low tension terminals on the coil. Compare this resistance obtained with that shown in para. 3 column 2.

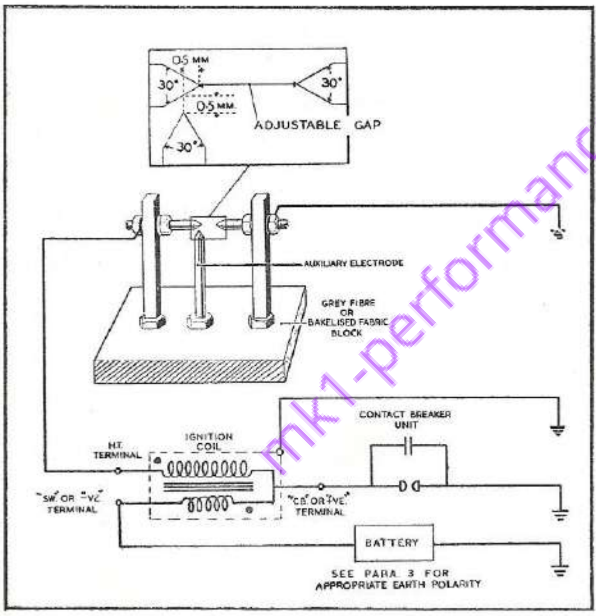

Fig. 2
Ignition coil test circuit and three-point spark gap

(c) **Running Tests**

The test equipment required for carrying out running tests is as follows:

Lucas six-cylinder distributor with contact breaker set to give a 38°—40° contacts closed period. The contact spring tension must be 18—24 oz. at the contacts and the capacitor to have a value of 0.18—0.25 microfarad.

Three-point spark gap, as illustrated in Fig. 2.

Rotary spark gap with point dimensions as shown in Fig. 2, for a stationary spark gap.

It is important, when making running tests, to maintain the test gap at the correct setting. An increased gap, due perhaps to burning at the points, will cause an excessively high induced voltage to occur with consequent inaccuracies in the test readings.

(i) Slow-speed test:

Connect the high tension output from the ignition coil to the three-point spark gap (see Fig. 2) and set the gap at the length detailed in para. 3 for the coil under test. With the distributor running at 100 r.p.m. and the coil in good condition, not more than 5% missing should occur at the spark gap over a period of 15 seconds.

Note: A special test is specified for all BA 12 coils, viz: with a speed of 500 r.p.m., no missing must occur across a 16 mm. (0.630") spark gap.

(ii) High-speed test:

Connect the high tension output from a slave coil known to be in good condition to the rotary spark gap and, whilst running the distributor at 500 r.p.m., connect a peak voltmeter to measure the coil secondary voltage. With the spark gap spinning, reduce the primary voltage until the sparking begins periodical missing. If necessary, stop the rotary gap and reset to obtain an 8 KV. reading on the peak voltmeter. Disconnect the slave coil and connect the coil to be tested. With the primary voltage restored to its nominal figure, no missing must occur when the distributor is accelerated slowly up to the speed quoted in para. 3.

Note: If a peak voltmeter is not available for measuring the rotary gap voltage setting, an approximate 8 KV. gap may be obtained by setting the points 4.75 mm. (0.187") apart.