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BTH MAGNETOS
types AG4-6, AG4-10, AG4-10/1, AG4-12, AG4-12/1 and AG4-13

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AEI Instruction Book
IB.4508-62, Part 2
(Overhaul Manual)

This manual complies with British Civil Airworthiness Requirements,
Chapter A6-2. The technical accuracy of this manual has been verified
and is certified as correct.

Signed..... *A. R. B.*

Date *20th September 1965*

A. R. B. Design Approval No. AD/1120/47



OVERHAUL MANUAL

Record of Revisions

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MODIFICATION STATUS OF MANUAL

NOTE : These modification numbers are prefixed either CV or CM, designating a civil or a military modification, respectively.

Magneto, type AG4-6

Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.	
419	*										
1083	*										

Magneto, type AG4-10

Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.	
419	*										
1083	*										

Magneto, type AG4-10/1

Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.	
419	*	451	*								
443	*	1083	*								

Magneto, type AG4-12

Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.	
419	*										
1083	*										

Magneto, type AG4-12/1

Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.	
419	*	451	*								
443	*	1083	*								

Magneto, type AG4-13

Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.		Mod. No.	
419	*										
1083	*										

Fully covered in manual.
No cover required in manual.

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DESCRIPTION, OPERATION AND DATA.

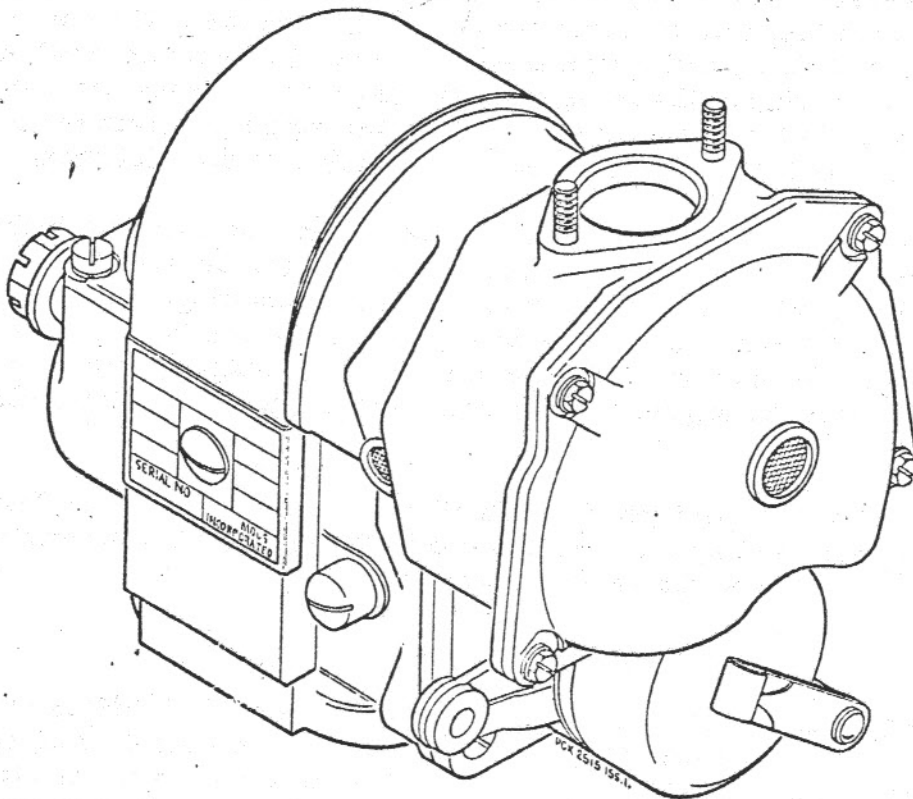
1. General.

This series of magneto are of the rotating armature type, they are base mounted and have variable ignition timing. They are for use on four-cylinder, four-stroke, piston engines, the armature being driven at crankshaft speed. They are fitted with a horseshoe permanent magnet and include a safety spark gap. The bearings are lubricated by grease which is included at manufacture.

Differences in the magneto types covered in this manual are as follows.

The AG4-6 magneto is unscreened. The AG4-13 magneto is the same magneto but with inclusion of a resistor in the brush-holder (distributor rotor).

The AG4-10 magneto is fully screened. Variations of this screened type of magneto are the AG4-10/1 which includes a safety cut-out; the AG4-12 which includes a brush-holder resistor; and the AG4-12/1 which includes both the resistor and the cut-out.



External view of magneto, type AG4-12/1
Figure 1.

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2. Magneto components.

A. Magneto housing.

The magneto housing is an aluminium die-casting with cast-in laminated poles. Cast into the housing base are two screw-threaded brass inserts for the magneto mounting bolts.

B. Armature.

The armature employs an H-type laminated medium resistance iron former on which are wound the primary and secondary windings. Two endcheeks are attached to the former to provide the armature spindles. A capacitor is contained within the base of the endcheek at the contact-breaker end whilst to the spindle is secured the full-speed wheel and the inner race of one of the supporting ball bearings. To the spindle of the endcheek at the driving end is secured a slipring and the inner race of the second supporting ball bearing.

C. Contact-breaker assembly.

The contact-breaker assembly has a brass base on which is mounted an insulated contact block which carries an adjustable contact. The second contact is carried on a pivoting bell-crank lever which is fitted with an insulated bush that forms the bearing of the lever and operates on a hardened and polished pivot pin located in the base. An oil-soaked wick within the pivot pin provides lubrication for the lever. The contact tips are 25% iridium-platinum.

The contact-breaker assembly rotates within a cam ring against which the bonded-fabric heel of the contact-breaker lever bears. Lubrication of the heel is provided by an oil-soaked wick contained in the cam ring. On the types AG4-10/1 and AG4-12/1 magnetos a safety cut-out spring is incorporated which earths the primary circuit when the contact-breaker cover is removed, thereby permitting the engine to be turned without any possibility of electrical ignition.

The cam ring itself is positioned inside a brass tube over which is fitted a brass timing lever and by which means the ignition timing can be varied some 25 degrees measured on the armature shaft.

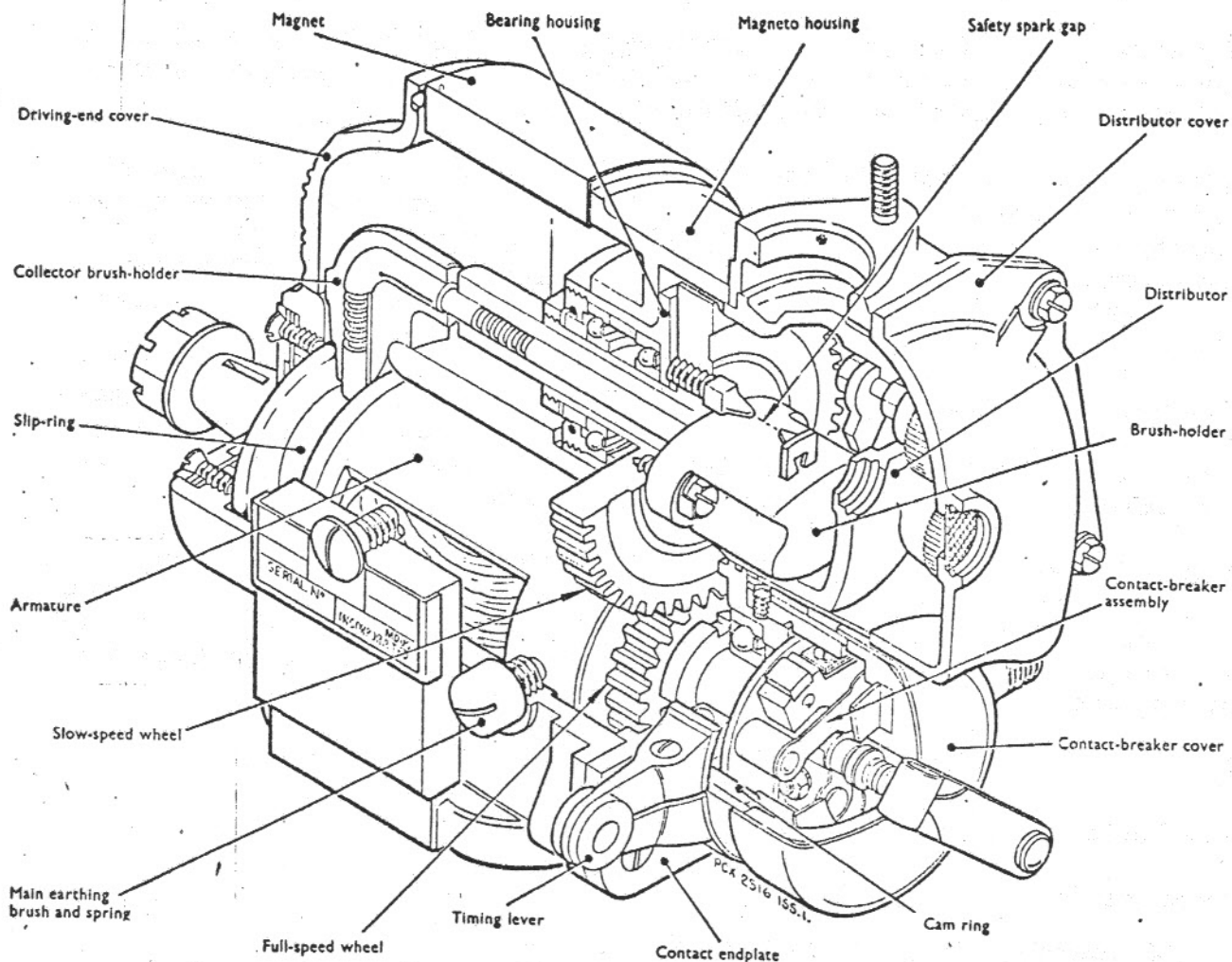
D. Distributor.

The distributor brush-holder is connected to the secondary winding of the armature by a collector moulding which is located within the driving end cover adjacent to the slipring. The brush-holder is revolved in the distributor moulding by the half-speed wheel, the assembly being supported by two ball-journal bearings which locate in a bearing housing secured to the magneto housing.

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Isometric sectional view of magneto, type AG4-12/1
Figure 2.

To prevent damage to the armature windings, should the external high-tension circuit be interrupted whilst the magneto is in operation, a safety gap is provided. This takes the form of a point gap, one electrode is located on the brush-holder and the second electrode is screwed into a metal boss located in the bonded-fabric half-speed wheel.

Magneto types AG4-13 and AG4-12 include a resistor in the brush-holder stem.

E. Rotation.

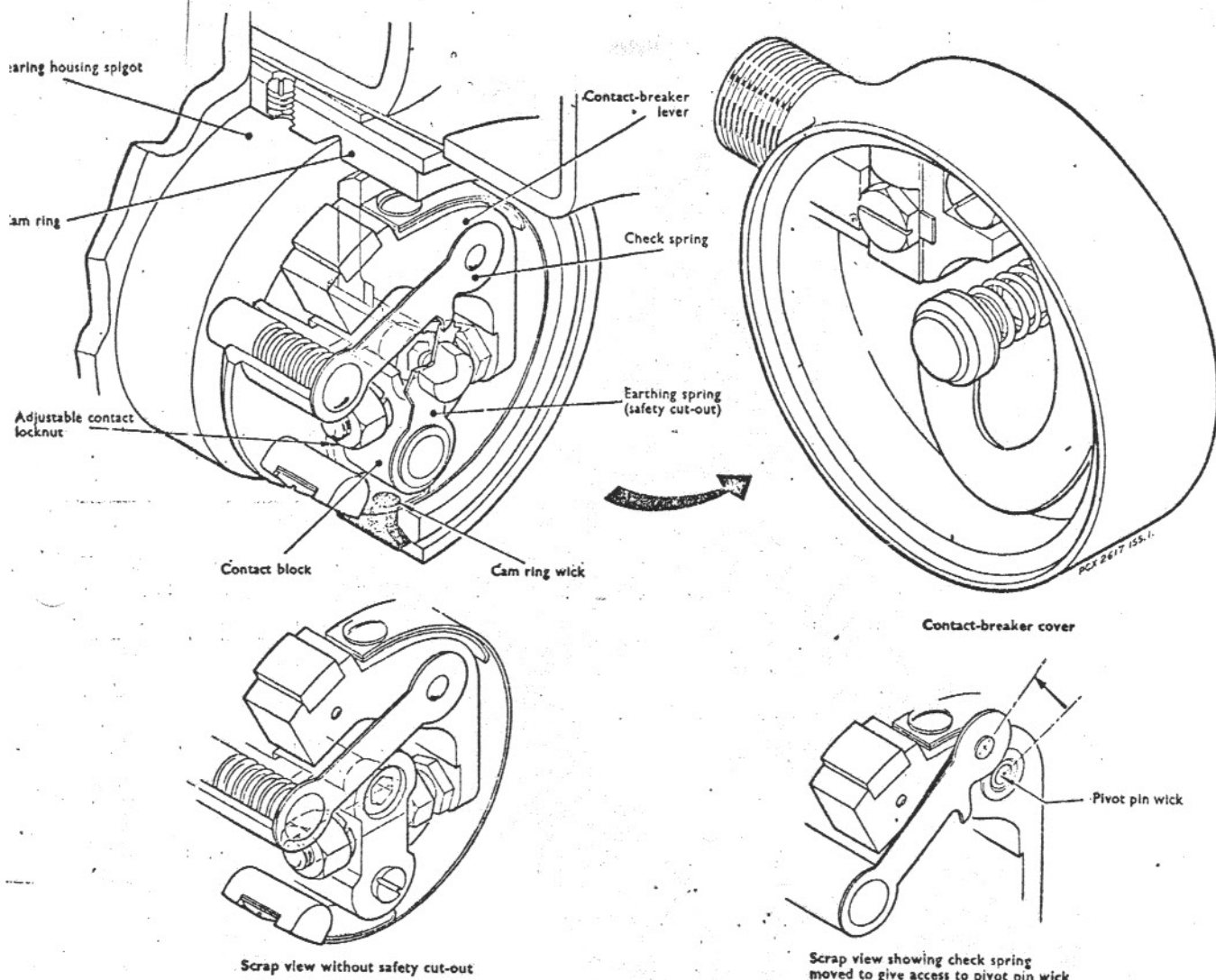
The magnetos are assembled for one direction of rotation only; the direction of rotation being indicated by an arrow stamped on the driving end.

Operation.

These magnetos are of the rotating armature type and employ a permanent U-shaped magnet which has two poles. Thus on rotation of the armature, the flux passing through the armature core, is reversed twice per revolution of the armature shaft and a current of alternative polarity is built up in the primary circuit.

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Contact-breaker and cover arrangement with and without safety cut-out.
Figure 3.

DISASSEMBLY.

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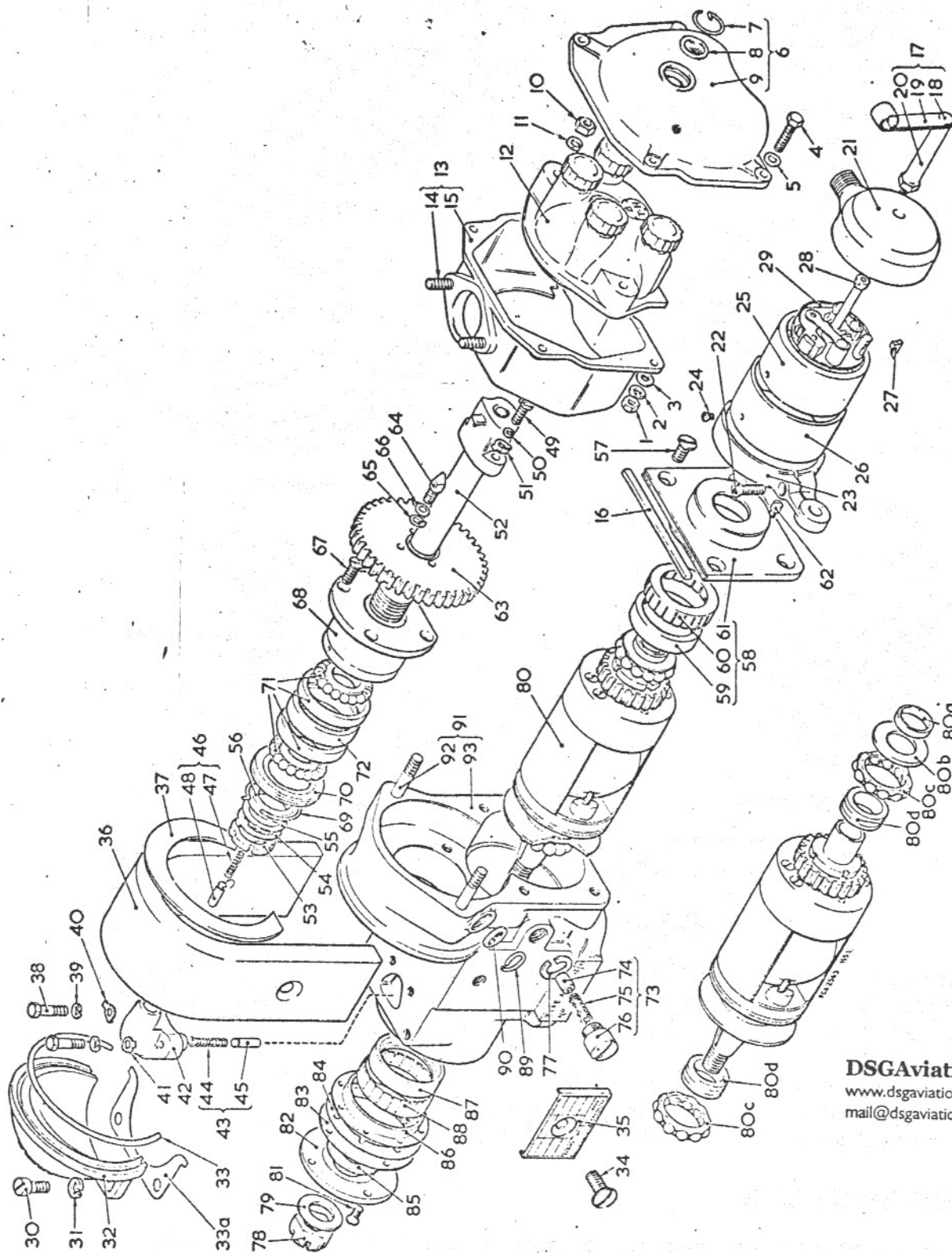
NOTE: The following is the dismantling procedure for the type AG4 12/1 magneto. This procedure is a satisfactory cover for all the listed types of magneto insofar that the type AG4 12/1 incorporates all the differential features.

Where reference is made to a part or component not incorporated in other magneto types, it should be ignored. Any ambiguity may be eliminated by reference to the usage code in the ILLUSTRATED PARTS LIST.

1. Checks before disassembly.

Check the history sheet of the magneto for details of defects encountered since previous overhaul.

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Exploded view of magneto type AG4-12/1.
Figure 4.

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2. Procedure.

A. General magneto dismantling (refer to fig 4).

- (1) Remove four nuts (1) and screws (4) securing distributor cover (6) and remove cover.
- (2) Remove two nuts (10) and lockwashers (11) securing distributor (12); withdraw distributor and also distributor screen (13). Remove contact endplate packing (16).
- (3) Remove cover pillar and spring (17), then withdraw contact-breaker cover (21).
- (4) Withdraw assembled timing lever (23), cover tube (26) and cam ring (25). Slacken screw (22) and withdraw lever from tube.
- (5) Remove grub screw (24) from cam ring then withdraw cam ring from cover tube. Remove cam wick (27) from cam ring.
- (6) Using spanner CX. 52733, remove contact-breaker fixing screw (28); withdraw contact-breaker unit (29) complete with earthing brush.
- (7) Remove two screws (30) and lockwashers (31) securing driving-end cover (32) and remove cover. Remove cover packing (33).
- (8) Using a press-type screwdriver, remove two screws (34) securing magnet (36) and withdraw magnet and modification plate (35); remove magnet packing (37). Place a keeper across the magnet poles.
- (9) Remove two screws (38) securing collector brush-holder (42) and remove brush-holder; withdraw brush and spring (43).
- (10) Withdraw brush and spring (46) from main brush-holder (52).
- (11) Remove two screws (49) securing brush-holder (52) to slow-speed wheel, then carefully withdraw brush-holder from slow-speed wheel spindle.
- (12) Disengage lockwasher (54) then, using spanner CX. 99539, remove locknut (53) from slow-speed wheel spindle; remove lockwasher - and shims (55) if fitted.
- (13) Using spanner CX. 99540, remove clamping nut (56) from slow-speed wheel spindle.
- (14) Remove three screws (57) securing contact endplate (58) and withdraw endplate; remove timing stop screw (62).
- (15) Using extractor CX. 79086, remove ball bearing outer race (59) from contact endplate; remove insulation (60).

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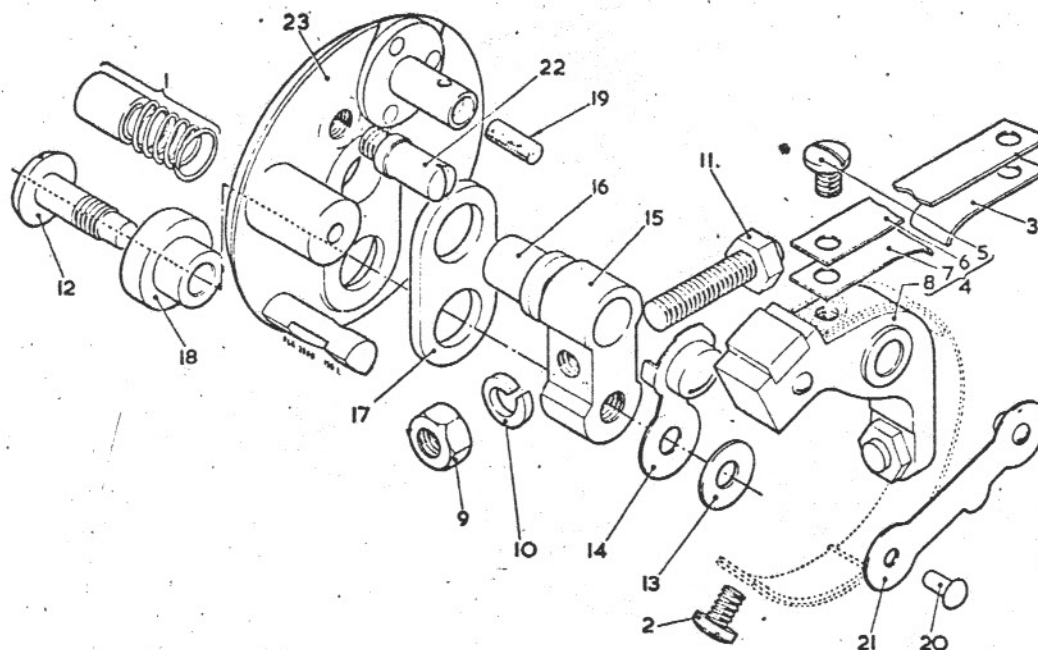
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- (16) Withdraw slow-speed wheel (63), and from wheel remove spark point (64), washers (65) and tabwasher (66).
- (17) Remove four screws (67) securing slow-speed wheel bearing housing (68) and withdraw housing.
- (18) Remove locking ring (69) from outer race locknut (70) then, using spanner CX. 99541 and support block CX. 99538 for bearing housing, remove locknut from bearing housing.
- (19) Remove two ball bearings (71) and distance piece (72) from bearing housing.
- (20) Remove main earthing brush (73) and lockwasher (77) from side of magneto housing.
- (21) Remove nut (78) and washer (79) from driving end of armature spindle.
- (22) Carefully withdraw armature (80) taking care not to damage slipping moulding.
- (23) Remove from armature: reinforcing ring (80a), felt washer (80b), two cage and balls (80c) and, using extractor CX. 79087, two inner races (80d).
Should further dismantling of armature be necessary refer to REPAIR 2.
- (24) Remove four screws (81) securing ball bearing cover plate (82) and withdraw plate, washer (83) and packing washer (84) remove dust washer (85) from cover plate.
- (25) Drift out bearing liner (86) from magneto housing, remove ball bearing outer race (87) from liner.

B. Dismantling contact-breaker unit (refer to fig 5).

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- (1) Remove earthing brush and spring (1) from base underside.
- (2) Remove screw (2) securing contact-breaker lever spring to base post; collect reinforcing spring (3).
- (3) Swing aside check spring (21) then withdraw contact-breaker lever (4).
- (4) Remove contact locknut (9), lockwasher (10) and contact screw (11).
- (5) Using a 3.30 metric drill, drill out the riveted head of the contact-block fixing screw (12); then remove screw; remove washer (13) and leaf spring contact (14).
- (6) Remove contact block (15), two insulating bushes (16 and 18), and insulation strip (17).
- (7) Remove wick (19) from pivot pin interior.



Exploded view of contact-breaker unit.
Figure 5.

C. Dismantling contact-breaker cover (refer to fig 6).

- (1) Remove screw (1) and tabwasher (2) securing earthing spring contact unit (3) and remove unit; collect auxiliary spring (4).
- (2) Remove terminal screw (5) and tabwasher (6).
- (3) If it is necessary to remove moulding (10), first remove semi-circular rivet (8) then withdraw moulding from screen (9).

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D. Dismantling armature.

- (1) Refer to REPAIR 2.

E. Dismantling distributor.

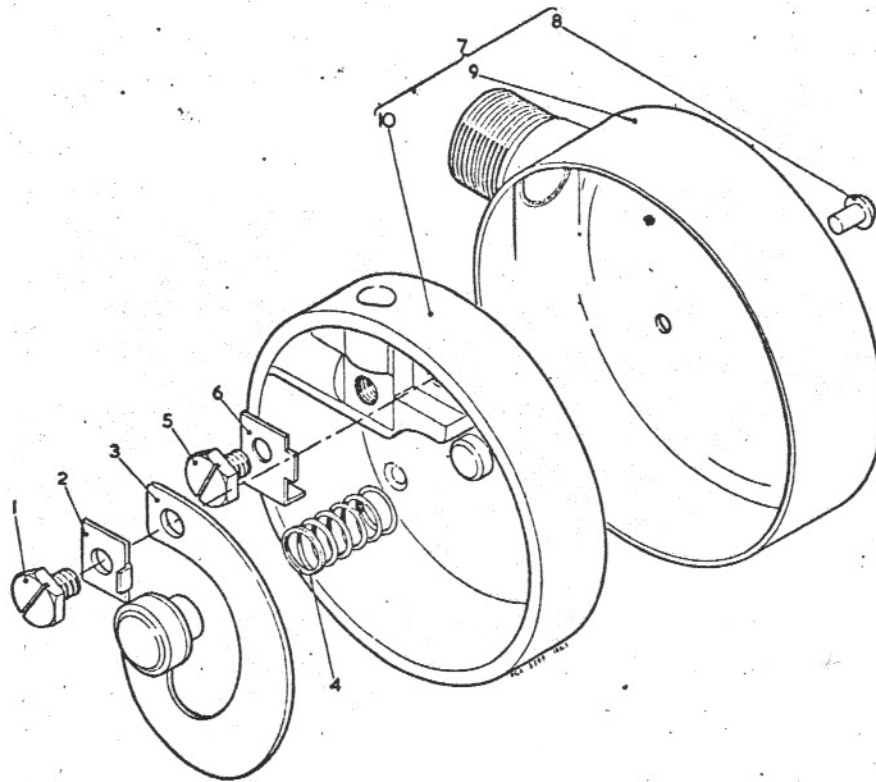
- (1) Refer to REPAIR 1.

CLEANING.

Cleaning agents.

Category	British Specification	Equivalent
A. Solvent	White spirit BS. 245	

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Exploded view of contact-breaker cover.

Figure 6.

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2. Procedure.

- A. All components may be brush-cleaned with a bristle brush moistened in solvent A.
- B. Metal components may, if desired, be immersed in a bath of solvent A. The magnet, however, is to be degreased (e. g. in trichlorethylene vapour).
- C. All cleaned components should be dried with a jet of clean, dry, compressed air; finally with a clean, dry, lint-free cloth.
- D. Blow out all apertures and passages with clean, dry, compressed air.

INSPECTION.

- NOTES: (1) Reference is to be made to Reconditioning Schedule CX. 252854 for magnetos in military service.
- (2) Where dimensional or loading checks are called for in the following inspection procedure, reference is to be made to FITS AND CLEARANCES to ascertain the dimensional or loading acceptability of the component.

OVERHAUL MANUALExamination of components.**A. Magneto housing.**

- (1) Generally examine for damage and corrosion. Rectify as necessary.
- (2) Gauge all screw-threads. Rectify damaged or oversize screw-threads by salvage A referred to in REPAIR 3.
- (3) Housings to pre-Mod. CV.990, i.e. housings not incorporating the bearing liner, are to be modified to salvage B referred to in REPAIR 3.
- (4) Check length of distributor fixing studs. Renew short or damaged studs. See salvage A.
- (5) Check that ventilation gauze is clean and unobstructed. Renew damaged gauze and corroded retaining rings.
- (6) Examine paint and varnish finishes; if necessary re-treat magneto housing as detailed in REPAIR 4.

B. Main earthing brush unit.

- (1) Renew this unit.

C. Magnet.

- (1) Check that magnet has been degreased and has been repainted with DTD.827 (black).

D. Armature.

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- (1) Generally examine for damage and corrosion. Rectify as necessary.
- (2) Test armature electrically as detailed in TESTING 11.
- (3) Should slipring have been removed, check length of insulation and conductor to drawing referred to in REPAIR 2.
- (4) Gauge: screw-threads, keyways, internal and external tapers, bearing diameters, capacitor endplate diameter and pole-piece diameter.
- (5) If necessary recondition armature to salvage C referred to in REPAIR 3, or renew armature.

- NOTES**
1. A driving endplate or a capacitor endplate may be renewed providing the core pole diameter is within new limits.
 2. Armature spindles may have a maximum of two split-pin holes providing the magneto is not to be used in conjunction with an impulse starter.

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- (6) Examine full-speed wheel for damage and check that it is of current standard; if it is not, rectify in accordance with salvage D referred to in REPAIR 3.
- (7) If full-speed wheel is removed from armature, gauge the four dowel holes and, if found to be oversize, renew wheel and dowels.
- (8) Should the dowel holes (for full-speed wheel) in the armature be oversize, the armature may be re-drilled in accordance with salvage D referred to in REPAIR 3.

NOTE: Should eight dowel holes already exist, the armature is to be renewed.

- (9) When the full-speed wheel is assembled to the armature, check the seating of the gear with the capacitor endplate and its correctness of fit on the shaft. Check that the armature centre-line passing through contact-breaker keyway also passes through spotted gear tooth on opposite side to keyway.
- (10) Gauge full-speed wheel locknut screw-threads and check for damage.
- (11) Should full-speed wheel locknut have been removed, ensure that it has been refitted in accordance with CX. 135575 (includes treatment CX. 187782) and re-marked with $\frac{1}{8}$ in. dia. red spot.

NOTE: Locknuts found not marked with red spot are to be removed and a locknut fitted in accordance with the foregoing.

E. Contact endplate.

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- (1) Generally examine for damage.
- (2) Gauge spigot for cam.
- (3) It is recommended that three lockings in any one fixing hole be the maximum acceptable.

F. Contact-breaker assembly.

- (1) Generally examine for wear and damage.
- (2) Gauge pivot pin and examine for cracks.
- (3) Renew contact-breaker lever and adjustable contact-screw.
- (4) Renew safety cut-out earthing spring (leaf contact).
- (5) Renew earthing brush and spring.

OVERHAUL MANUAL**G. Cam ring, cover tube and timing lever.**

- (1) Examine cam ring for wear, corrosion and cracks.
- (2) Check identity of cover tube, before assembly, by serial number stamped on underside of tube. Should serial number not correspond, renew cover tube.

NOTE: Should replacement of the magneto housing, cam ring, armature or contact-breaker base have been made; or repair to either of the latter two items be necessary in which their original alignment may be changed, then it will be necessary to renew the cover tube and the correct magneto timing subsequently re-established as detailed in ASSEMBLY 3. F.

- (3) Examine timing lever for damage; gauge connection bore for control link. Levers not nickel-plated are to be plated in accordance with treatment referred to in REPAIR 4.

- (4) Renew cam wick.

H. Contact-breaker cover.

- (1) Generally examine for damage, wear and corrosion.
- (2) Examine moulding for cracks.
- (3) Renew earthing contact. On assembly check that face of contact carbon is parallel and flush with moulding abutment face.

J. Cover pillar and spring.

- (1) Examine for damage and corrosion.
- (2) Check set of spring.
- (3) If only a moderate amount of corrosion is in evidence, remove it, then apply an approved rust preventative; re-blueing need not be carried out.

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K. Collector brush-holder moulding.

- (1) Examine for damage and cracks.

L. Collector brush and spring.

- (1) Renew.

M. Components in slow-speed wheel, bearing and brush-holder unit arrangement.

- (1) Renew slow-speed wheel (use only 'T' standard gears).
- (2) Renew both ball bearings.

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- (3) Examine bearing housing for damage; it is recommended that three lockings in any one fixing hole be the maximum acceptable.
- (4) Gauge locknut screw-threads and examine for damage.
- (5) Examine brush-holder for damage and erosion of electrode; generally examine for cracks.
- (6) Renew brush-holder brush and spring.

N. Distributor.

- (1) Check for erosion of segments; if necessary, re-skim to within limits given in FITS AND CLEARANCES.
- (2) If segments are eroded beyond the maximum worn limit, but the moulding is otherwise acceptable, fit and machine new segments as detailed in REPAIR 1.
- (3) Examine moulding, terminal nuts, ventilation gauze and retaining ring for damage and corrosion. Renew damaged gauze and corroded retaining rings.
- (4) Renew lockwashers. Renew other parts as necessary.

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- (1) Examine for cracks and other damage.
- (2) Check that ventilation gauze is clean and unobstructed. Renew damaged gauze and corroded retaining rings.

P. Slipring.

- (1) Examine for cracks, burns, wear, corrosion or other damage; if evident renew slipring.

Q. Armature bearings.

- (1) Renew both bearings.

R. Consumable items.

- (1) Renew all consumable (including sealing washers) and minor insulating items.

2. Checks to be carried out prior to assembly.

- A. Check all parts against the repair report to ensure that new parts requested have been supplied, and that salvage operations requested have been completed.

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- B. Check that components which have been salvaged carry the salvage drawing number and the necessary stamps of inspection.

Checks to be carried out during assembly.

- A. Check contact-breaker assembly as follows :-

- (1) Check correctness of pivot pin wick lubrication.
- (2) Check that before contact block is fitted to contact-breaker base, adjustable contact is set to give 8.5 mm between centre-line of fixing holes and contact face using fixture Y/CX.1883 (G1 for r.h. and G2 for l.h.).
- (3) Check that check spring is a stiff turning fit and retains contact-breaker lever in correct position on pivot pin.
- (4) Check that endfloat of contact-breaker lever is within correct limits.
- (5) Check that load required to deflect safety cut-out leaf spring flat onto contact-block is within correct limits.
- (6) Check correctness of contact-breaker lever spring loading.

- B. Check all bearings for correct lubrication.

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- C. Check that slow-speed wheel is to 'T' standard and that wheel batch number has been recorded.

- D. Check position of timing spots on slow-speed wheel using gauge CX.177330, and the correct engagement of slow-speed and full-speed wheels.

- E. Check assembly of slow-speed wheel bearings to ensure that an endfloat of 0.001 in. exists after the fitting of the initial ring-nut, and that nil endfloat exists after the second ring-nut (locknut) has been fitted and tightened to a suitable locking position. Then check for freedom of slow-speed wheel with the armature held to ensure that the bearings are not pre-loaded.

- F. Check safety spark gap using gauge CX.99510, also check locking of spark point.

- G. Check correctness of armature endfloat.

- H. Check correctness of backlash between gears using fixture CX.257358.

- J. Check contact-breaker gaps, also check for freedom of movement of cam ring on endplate.

- K. Check timing and position of brush-holder (ASSEMBLY 3. F.), also check sweep of electrode.

- L. Check height of armature from base using gauges CX.257359 and CX.257360.

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- M. Check cam accuracy (ASSEMBLY 3. G.).
- N. Check height of head of contact spring fixing screw in contact-breaker cover with gauge CX.257361.
- O. Ensure embodiment of all modifications required by the repair report.
- P. It is recommended that checks E, F, G, H and J are recorded.

4. Strip examination after TESTING 1 and 2.

- A. Examine internal mechanism on removal of all covers, and instruct for the removal of further parts for examination as deemed necessary.
- B. On assembly: check for freedom of rotation and endfloat; check contact-breaker gaps and contact-breaker lever spring loading; check loading of safety cut-out leaf spring.
- C. On completion of assembly, verify continuity between magneto housing and brush-holder electrode is in the order of 3500 to 4000 ohms; this will indicate fitment of the brush and spring assemblies.

5. Examination after TESTING 3, 4, 5, 6 and 7.

- A. Check the locking of cam ring to cover tube.
- B. Check clearance between cam tube and endplate.
- C. Examine brush-holder and collector mouldings for cracks at the fixing holes; check that fixing screws are tight and securely locked.

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6. Examination before despatch.

- A. Check that magnet screws are tight and that endplate screws are locked.
- B. Check that contact-breaker adjustable contact screw is tight.
- C. Check that parts for external connection (e. g. h. t. connection studs and l. t. connection screw-threads) are undamaged.
- D. Check that distributor terminals and lockwashers are satisfactory and securing nuts are tight.
- E. Check that where modifications have been incorporated, and it is required to record them, the relevant numbers have been stamped on the modification plate.
- F. Ensure fitment of all transportation parts.

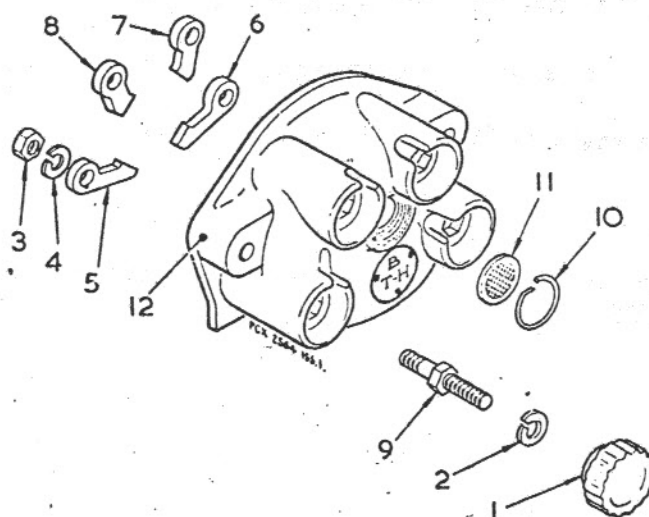
NOTE: On completion of overhaul, the magneto is to be prominently identified with the repairers stamp and the date of the overhaul in $\frac{3}{16}$ in. characters using heavy opaque drawing office marking ink.

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REPAIR.

NOTE: Salvage and other drawings referred to in this section will be supplied on request to:-

Associated Electrical Industries Ltd., Aircraft Equipment Group (Sales Dept.),
Raglan Street, Coventry.



Exploded view of distributor unit.
Figure 7.

Repair of distributor.

A. Dismantling (refer to fig 7).

- (1) Remove four terminal nuts (1) and lockwashers (2).
- (2) Remove four nuts (3) and lockwashers (4), then withdraw four segments (5, 6, 7 and 8).
- (3) Withdraw four terminals (9).
- (4) If it is necessary to remove ventilating gauze (11), first remove the retaining ring (10), then tap out ventilating gauze.

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B. Cleaning.

- (1) All components may be brush-cleaned with white spirit (BS 245).

C. Inspection.

- (1) Visually examine components for defects and renew as necessary.
- (2) Acceptability of rejection of segments with regard to erosion will have been determined in magneto INSPECTION.

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D. Assembly (refer to fig 7).

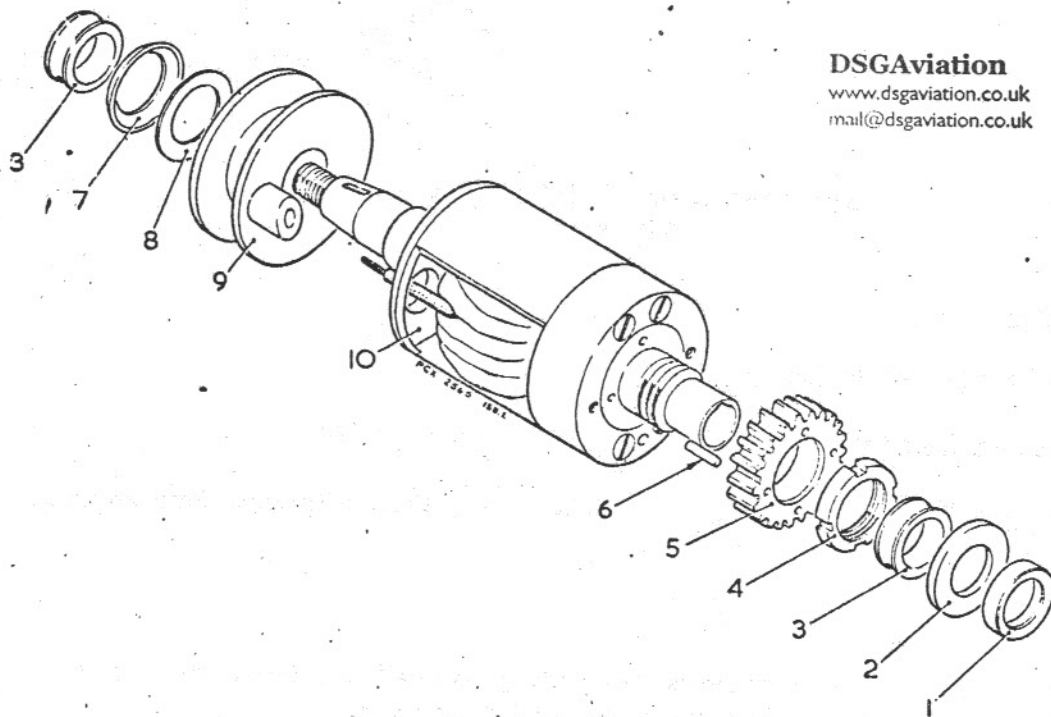
- (1) If new ventilating gauze (11) is to be fitted, select a gauze that is a good press fit into distributor, then fit new retaining ring (10).
- (2) Fit four terminals (9).
- (3) Fit four segments (5, 6, 7 and 8), all in their correct positions, and secure with four nuts (3) and lockwashers (4).

NOTE: It is imperative that these nuts (3) are absolutely tight.

- (4) Fit four lockwashers (2) and terminal nuts (1).

E. Machining.

- (1) Machine new segments to within new limits given in FITS AND CLEARANCES.



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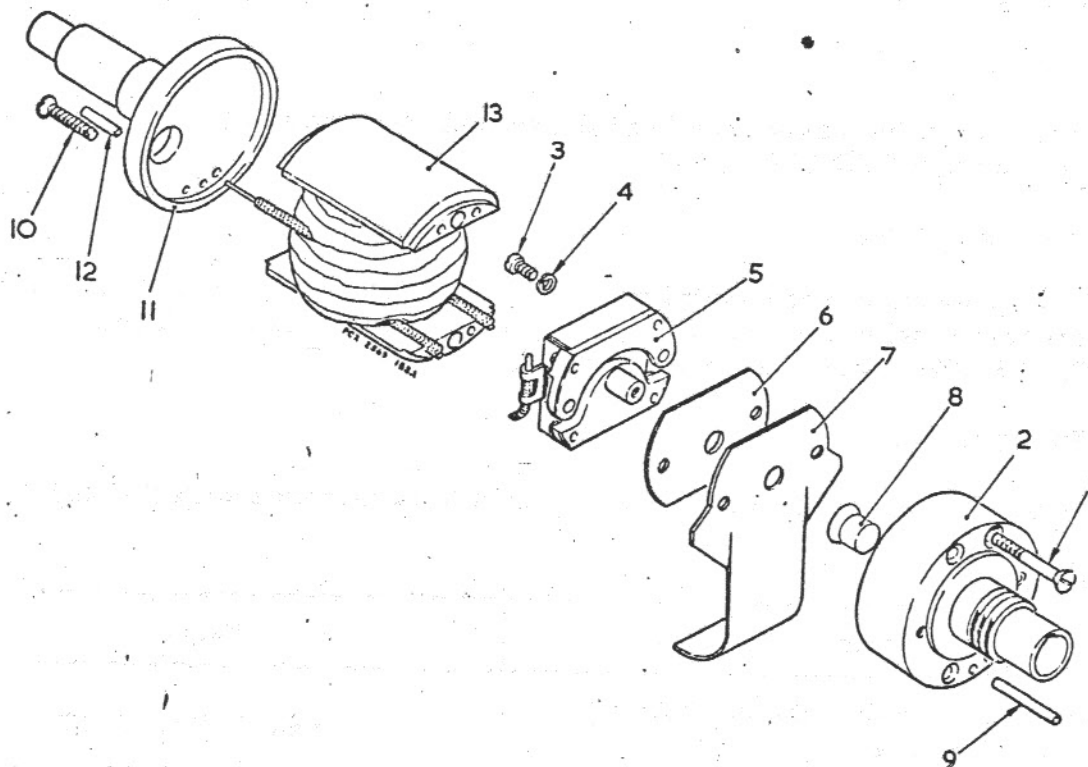
Exploded view of armature unit.
Figure 8.

2. Repair of armature.

- A. Any necessary dismantling and assembling should be carried out in conjunction with fig 8 and 9 and unit assembly drawings CX.135575 and CX. 70927.

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- B. Salvage C in REPAIR 3 is relevant in the repair of this unit, otherwise repair by replacement should be made in conjunction with the drawings referred to in 2. A. (i. e. CX. 135575 and CX. 70927).



Exploded view of basic armature unit.
Figure 9.

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Salvage drawings.

- A. CX. 186417 - Rectification of various damaged or oversize screw-threads in magneto housing.
- B. CX. 134385 - Rectification of magneto housings not incorporating bearing liner (pre-Mod. CV. 990).
- C. CX. 186418 - Re-conditioning of armature.
- D. CX. 139923 - Fitment of full-speed wheel to replace gear not of 1.5 module standard; or fitment of gear when armature dowel holes (for full-speed wheel) are oversize.

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4. Re-treatment of components.

When called for by Inspection.

A. Components.

(1) Magnet.

Ensure that the magnet has been degreased, then coat with black paint to Specification DTD 827.

(2) Magneto housing.

Treat previously red Glyptal paint-treated surfaces (CX.133407 refers) in accordance with Treatment B, and previously varnished surfaces (CX.133407 refers) in accordance with Treatment C.

(3) Timing lever.

Levers not nickel-plated are to be plated in accordance with CX.112499-1.

B. Treatment B.

Materials required	Vendor
Red Glyptal paint (Dulux) BTH 378 Thinner BTH 443	See PARTS LIST

- (1) Ensure previously treated surfaces are clean and free from dust, oil or grease.
- (2) Apply a thin coat of paint, well brushed out (or alternatively sprayed) and free from tears to the previously treated surfaces.
- (3) Allow component to air dry for 2 to 4 hours.
- (4) Bake component in a ventilated oven, either at :-
 - (a) 50 deg. C to 60 deg. C for 4 to 6 hours, or
 - (b) 70 deg. C to 80 deg. C for 3 to 4 hours.

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C. Treatment C.

Materials required	Vendor
Varnish BTH 92	See PARTS LIST

- (1) Ensure previously treated surfaces are clean and free from dust, oil or grease.

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- (2) Apply a thin coat of varnish, well brushed out (or alternatively sprayed) and free from tears to the previously treated surfaces.
- (3) Bake component in a ventilated oven at 95 deg. C to 110 deg. C for 5 hours.

ASSEMBLY.

NOTE: The following is the assembling procedure for the type AG4-12/1 magneto. This procedure is a satisfactory cover for all the listed types of magneto insofar that the type AG4-12/1 incorporates all the differential features.

Where reference is made to a part or component not incorporated in other magneto types, it should be ignored. Any ambiguity may be eliminated by reference to the usage code in the ILLUSTRATED PARTS LIST.

Items to be renewed.

Ensure the renewal of all items recommended for renewal in INSPECTION.

Materials required.

Category	Specification	Vendor
Varnish	BTH 92	
Varnish	BTH 93	
Solid carbon dioxide	Cardice	
Grease	DEF 2261	

Procedure.

A. Assembling distributor.

- (1) Refer to REPAIR 1.

B. Assembling armature.

- (1) Refer to REPAIR 2.

C. Assembling contact-breaker cover (refer to fig 6).

- (1) If moulding (10) has been removed, refit moulding to screen (9) and secure with rivet (8).
- (2) Fit earthing spring contact unit (3) together with auxiliary spring (4) and secure with screw (1) and tabwasher (2).

NOTE: Face of contact carbon must be parallel and flush with moulding abutment face.

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- (3) Fit terminal screw (5) and tabwasher (6); do not engage tabwasher.

D. Assembling contact-breaker unit (refer to fig 5).

- (1) Fit wick (19) to pivot pin, then to wick add two drops (0.032 cc) of engine oil (DATA).
- (2) Fit contact screw (11), lockwasher (10) and nut (9) to contact block and set contact to give 8.5 mm between centre-line of fixing holes and contact using fixture Y/CX.1883 (G1 for r.h. or G2 for l.h.).
- (3) Fit insulation strip (17) and two insulating bushes (18 and 16) to contact-breaker base (23), then fit contact block (15) and screw (12). Fit leaf spring contact (14) and washer (13) to screw, then rivet over screw-end to give leaf spring a stiff turning fit.
- (4) Should check spring (21) have been removed, secure check spring with rivet (20) to give spring a stiff turning fit.
- (5) Check fitment and locking (by prick punching) of stop screw (22), then fit contact-breaker lever (4) to pivot pin and retain with check spring.
- (6) Secure spring of contact-breaker lever, together with reinforcing spring (3), to base post with screw (2).
- (7) Check that endfloat of contact-breaker lever is within limits of 0.000 in. and 0.007 in. Check that loading required to deflect leaf spring contact (safety cut-out) flat onto contact block is within limits of 22 oz. and 18 oz.

NOTE: Check that minimum gap (FITS AND CLEARANCES) exists between lip of check spring and leaf spring (14) when leaf spring is depressed flat against contact block.

- (8) Fit earthing brush and spring (1) to contact-breaker base.

E. General magneto assembly (refer to fig 4).

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- (1) Assemble non driving-end ball bearing outer race (59) into contact endplate (61) as follows :-
 - (a) Varnish contact endplate recess for bearing outer race with BTH 92 varnish.
 - (b) Using assembly tackle CX.99535, press bearing outer race (thrust face showing) together with insulation (60) into contact endplate.
 - (c) Varnish the disc area of the contact endplate that surrounds the outer race up to the spigot with BTH 92 varnish.
 - (d) Ensure that no varnish is present on the ball race track, then bake the contact endplate in a ventilated oven at 68 deg. C for 8 hours.
 - (e) Using a 250-volt insulation tester, check that the insulation resistance is not less than 50 megohms.

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- (2) Freeze driving-end bearing outer race (87) in Cardice (solid carbon dioxide) for 10 minutes. Varnish both sides of insulation (88) with BTH 93 varnish then, using fixture CX.137472, press bearing liner (86) and insulation onto outer race (race thrust face, faces armature slipring). After fitment of outer race, spigot diameter of liner must be within limits of 37.27 mm and 37.25 mm.
- (3) Fit bearing liner, packing washers (84) as required, cover plate washer (83), cover plate (82) with assembled dust washer (85), to housing and secure with four screws (81). Lock screws by punching metal into screw-slots.
- (4) Half-fill the ball bearing inner races, balls and cages (80d and 80c) with grease (DEF.2261) then, using assembly tackle CX.99509, press races onto armature (80) shaft.
- (5) To gear end of armature shaft fit felt washer (80b) and reinforcing ring (80a).
- (6) Carefully fit armature (80) to magneto housing engaging armature shaft in driving-end.
- (7) Half-fill slow-speed wheel bearings (71) with grease (DEF.2261), then assemble bearings with interposed distance piece (72) into bearing housing (68). Use support block CX.99538 for bearing housing.

NOTE: Bearings are to be assembled so that: (a) outer race thrust faces, face away from one another and (b) inner race thrust faces, face towards one another.

- (8) Fit locknut (70) to bearing housing (still fitted to support block CX.99538), and tighten using spanner CX.99541. Using a No. 55 drill, and the hole in the bearing housing as a jig, drill through the locknut.

NOTE: If a new bearing housing has been fitted, it will be necessary to drill through both housing and locknut at the dimension given in **FITS AND CLEARANCES**.

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- (9) Fit locking ring (69) to locknut.
- (10) Fit bearing housing to magneto housing and secure with four screws (67); lock screws by punching metal into screw-slots.
- (11) Mark a new slow-speed wheel (63) with two timing dots as follows (see View A of fig 10):-
 - (a) Fit timing gauge CX.177330.
 - (b) Using an 0.030 in. dia. Archimedean drill, carefully spot the base of each gear tooth positioned at each side of the face L (for left-hand rotation) or R (for right-hand rotation) of the timing gauge.

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- (12) Fit slow-speed wheel to bearing housing, meshing the dot on the full-speed wheel between the two dots on the slow-speed wheel, as shown in View B of fig 10.
- (13) Fit first locknut (56) to slow-speed wheel spindle. Using spanner CX. 99540, tighten locknut until an endfloat of 0.001 in. is obtained on the slow-speed wheel.
- (14) Fit lockwasher (54) and second locknut (53) to slow-speed wheel spindle. Tighten locknut with spanner CX. 99539. Should locknut slot not align with lockwasher tab, when second locknut is fully tightened, shims (55), as required, must be fitted to precede the lockwasher to obtain the alignment without loosening the first locknut.

When correct alignment is obtained, check that wheel spins freely without endplay then engage lockwasher.

- (15) Fit spark point (64), tabwasher (66) and washers (65) as required to give a safety spark gap within the limits of 8.5 mm and 8.0 mm.
- (16) Fit brush-holder (52) and retain with two screws (49), lockwasher (50) and tabwashers (51). Check, and if necessary adjust, safety spark gap (see (15)).
- (17) Fit the magnet (36) and magnet packing (37). Fit modification plate (35) under one of two securing screws, then tighten screws (34) with a press-type screwdriver.
- (18) Place magneto on its base plate on a BTH type CL6 magnetiser with the magnet poles adjacent to the magnetiser coils, then magnetise.
- (19) Fit contact endplate (58) and secure with three screws (57) and pillar and spring (17); tighten the three screws with a press-type screwdriver.

NOTE: When looking on endplate, fit pillar and spring to bottom left-hand hole for r.h. rotation and bottom right-hand hole for l.h. rotation.

- (20) Check that armature endfloat is within the limits of 0.0005 in. and 0.002 in. Check gears for backlash which is to be within the limits of 0.002 in. and 0.013 in.
- (21) Fit brush and spring (46) to brush-holder.
- (22) Fit brush and spring (43) to collector brush-holder (42), then fit and secure collector brush-holder with two screws (38), lockwashers (39) and tabwashers (41 and 40).
- (23) Check that key of contact-breaker base is correctly raised, then fit contact-breaker unit (29) to armature and secure with fixing screw (28).

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- (24) Fit packing (16) to contact endplate, then fit distributor screen (13) together with distributor (12) and secure with two lockwashers (11) and nuts (10).

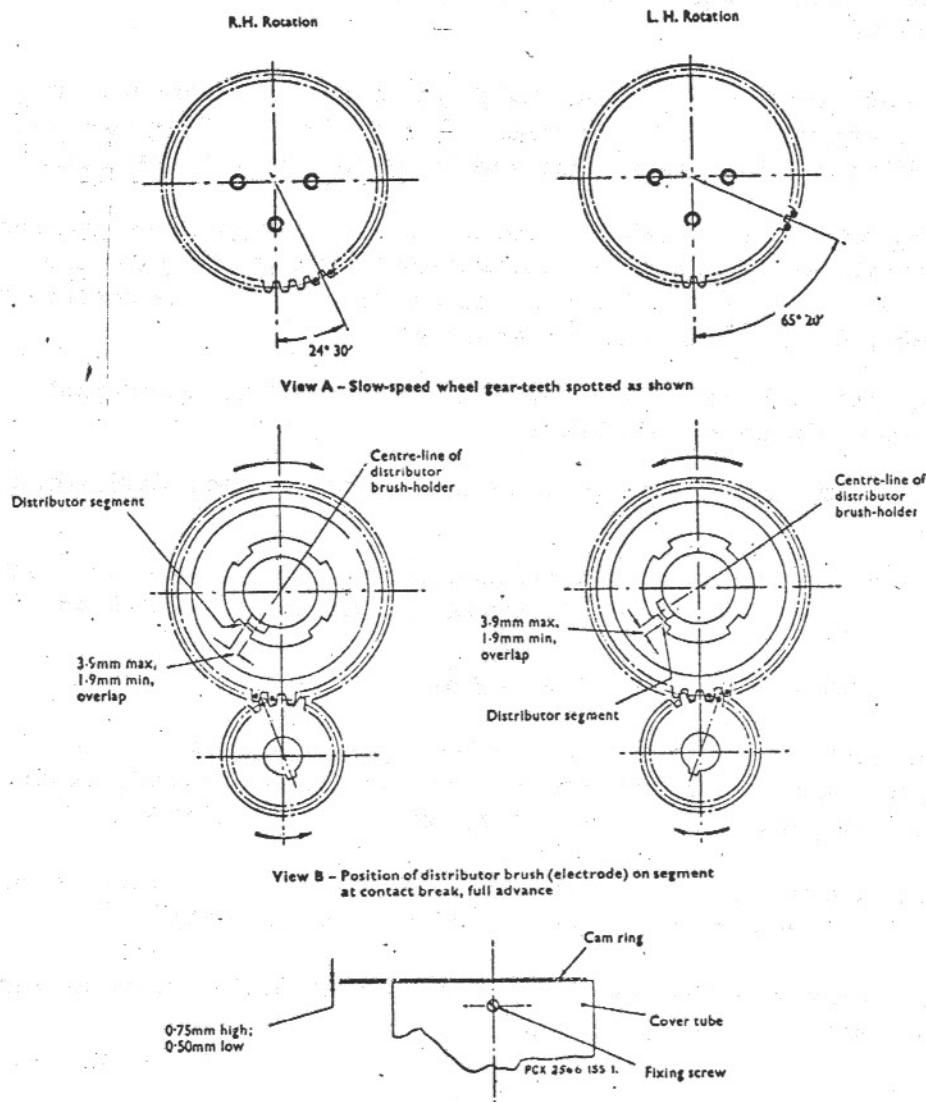
NOTE: Protrusion of distributor securing studs from magneto housing must be within the limits of 24.0 mm and 23.5 mm.

- (25) Fit packing (33) and driving-end cover (32); secure cover with two screws (30) and lockwashers (31).
- (26) Fit main earthing brush (73) and lockwasher (77) to magneto housing.
- (27) Fit timing stop screw (62) to contact endplate.
- (28) Fit cam wick (27) to cam ring (25).

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Timing diagram.
Figure 10.

OVERHAUL MANUAL**F. Timing magneto (see fig 10).**

NOTE: Should there have been no replacement of the magneto housing, cam ring, armature or contact-breaker base; nor repair to either of the latter two items insofar that their original relative alignment has been unchanged; nor magneto cannibalism practised, then it may be only necessary to verify the magneto timing using the originally drilled cover tube assembled to the cam ring and locked with the fixing screw. For magnetos in this category omit operations (1), (9), (10) and (11); should timing at (8) prove to be unsatisfactory, however, renew cover tube and re-commence at operation (1).

- (1) Position cam ring (25, fig 4) in a new cover tube (26, fig 4) so that cam-ring slot is midway in cover-tube slot, and that cam ring is proud of the cover tube as shown in View C of fig 10. Secure with timing lever (23, fig 4).
- (2) Apply two drops of engine oil (DATA) to cam wick, ensure that groove in cam ring bore is thoroughly clean, then well oil bearing surfaces of cam ring. Fit cam ring, cover tube and lever assembly to magneto.

NOTE: Looking on contact endplate, arm of timing lever is to be positioned horizontally to the left of the contact-breaker assembly for l. h. rotational machines, and horizontally to the right of the contact-breaker assembly for r. h. rotational machines.

- (3) Adjust contact-breaker gaps to $0.012 \text{ in.} \pm 0.001 \text{ in.}$ when contacts are fully open. Fit contact-breaker cover (21, fig 4).

NOTE: Safety cut-out leaf spring is to be flat against contact block when cover is fitted.

- (4) Place timing lever in fully-advanced position with cover tube against stop, then reference mark in pencil contact endplate and cover tube.
- (5) Remove timing stop screw (62, fig 4).
- (6) Run magneto at 2000 rev/min, with the magneto connected by $3\frac{1}{2}$ ft. lengths of metal braided cable of between 135 and 145 pico-farads capacity to ball gaps (A. M. EL. 12947, or similar) set to discharge at 9 kV.
- (7) Advance timing lever until spark commences to miss, then re-mark cover tube from reference mark on contact endplate (see (4)).
- (8) The two marks on the cover tube must be within the limits of 3 mm and 5 mm apart.

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(9) If the two marks on the cover tube are :-

- (i) More than 5 mm apart, rotate cam ring within cover tube to advance timing, or
- (ii) Less than 3 mm apart, rotate cam ring within cover tube to retard timing,

then repeat operations (6) and (7).

(10) When the condition in (8) is met, carefully together remove cam ring, cover tube and lever assembly from magneto, then remove lever from cover tube and cam ring.

NOTE: Care is to be taken that the relative positions of the cam ring within the cover tube are not altered in this and the subsequent drilling operation.

(11) Locate the screw-threaded hole in the bore of the cam onto the peg of fixture CWO SKC 6461 then, using an 1/8 in. dia. shallow-ground drill in the jig fixture, drill through the cover tube down to the cam ring. Remove cover tube from cam ring and complete the drill hole. Re-assemble cam ring to cover tube and fit the fixing screw (24, fig 4).

NOTE: Before the drilling operation, check that the cam ring is proud of the cover tube as shown in View C of fig 10.

(12) Refit timing lever to cover tube; then refit, to magneto, timing stop screw and cam ring assembly.

(13) Using dummy distributor CX. 80532, in conjunction with a BTH type CL4/1 timing indicator, check that position of distributor brush when contact-breaker contacts are just opening in full advance, are as shown in View B of fig 10.

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G. Checking cam accuracy.

(1) Using a protractor and pointer fixture, in conjunction with a BTH type CL4/1 timing indicator, check the cam accuracy by measuring the angles traversed by the armature between successive breaks of the contacts.

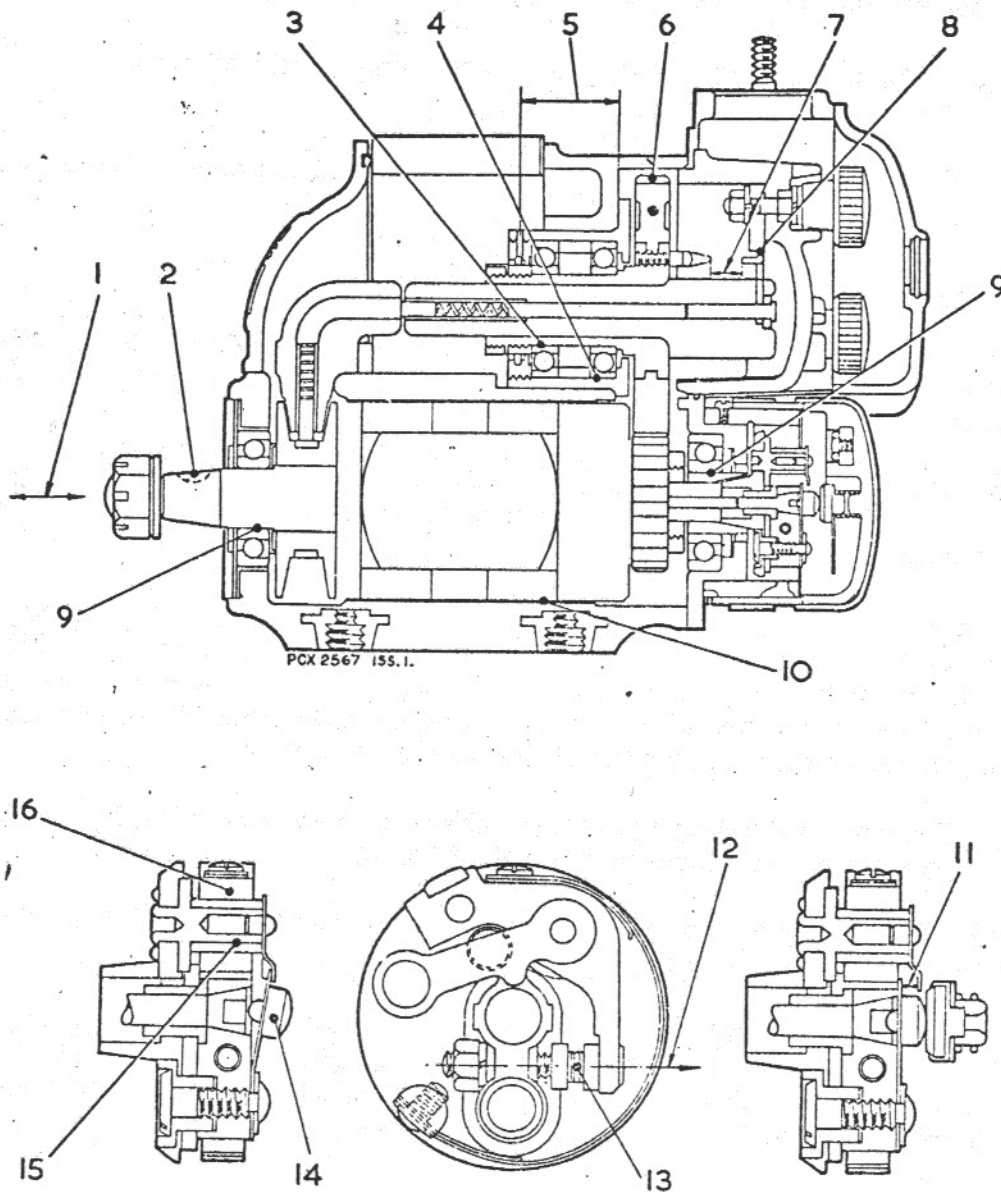
(2) The measured angle is to be within the limits of 181 degrees 30 minutes and 178 degrees 30 minutes; the optimum angle being 180 degrees.

H. Completion of magneto assembly (refer to fig 4).

(1) Fit and secure distributor cover (6) with four screws (4) and plain washers (5), and four plain washers (3), lockwashers (2) and nuts (1).

(2) Submit magneto to TESTING.

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Fits and clearances.
Figure 11.

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FITS AND CLEARANCES.1. Table 1 - Dimensions and loadings.NOTE : Dimensions are in millimetres unless stated otherwise.

Fig. 11	Description	Dimension new	Permissible worn dimension	Clearance new	Permissible worn clearance	Remarks
1	Armature endfloat	-	-	$\frac{0.0005 \text{ in.}}{0.0020 \text{ in.}}$	0.002 in.	
2	Armature keyway width	$\frac{0.126 \text{ in.}}{0.124 \text{ in.}}$	0.126 in.	-	-	
3	Ball bearing inner race on slow-speed wheel					
	Inner race - dia.	$\frac{17.000}{16.990}$	17.000	$\frac{-0.005}{-0.010}$	-0.005	
	Spindle dia.	$\frac{17.000}{16.995}$	16.995			
4	Ball bearing outer race in bearing housing					
	Housing dia.	$\frac{35.017}{34.992}$	35.017	$\frac{+0.032}{-0.008}$	0.032	
	Outer race - dia.	$\frac{35.000}{34.985}$	34.985			
5	Drilling dimension for bearing housing	23.25	-	-	-	Use No. 55 drill (0.0520 in. dia.) - new bearing housings only

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Fig. 11	Description	Dimension new	Permissible worn dimension	Clearance new	Permissible worn clearance	Remarks
6	Slow-speed wheel					
	Endfloat	-	-	Nil	*0.003 in.	* Acceptable only between overhauls, i.e. new figures pertain at overhaul
	Tilt	-	-	Nil	*0.004 in.	Measured on rim *see above
	Backlash with full-speed wheel	-	-	$\frac{0.002 \text{ in.}}{0.008 \text{ in.}}$	0.013 in.	
7	Safety spark gap	-	-	$\frac{8.5}{8.0}$	8.0	
8	Brush-holder electrode within distributor segments					
	Segments bore	$\frac{30.30}{30.20}$	30.62	$\frac{0.70}{0.50}$	1.02	Radial clearances = half of given values
	Electrode - sweep dia.	$\frac{29.70}{29.60}$	29.28			
9	Ball bearing inner races on armature					
	Inner race - dia.	$\frac{15.000}{14.990}$	15.000	$\frac{+0.005}{-0.013}$	0.005	
	Spindle dia.	$\frac{15.003}{14.995}$	14.995			

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Fig. 11	Description	Dimension new	Permissible worn dimension	Clearance new	Permissible worn clearance	Remarks
10	Armature in housing tunnel Tunnel dia. Armature dia.	$\frac{51.04}{51.00}$ $\frac{50.80}{50.78}$	51.14 50.68	$\frac{0.26}{0.20}$	0.356	No wear takes place. Worn columns indicate limits in machining when carried out to rectify scoring on brass end-plate or when armature is rewound.
11	Minimum gap between check spring lip and safety cut-out spring on fitment of contact-breaker cover	-	-	1.2 min.	-	Magneto types AG4-10/1 and AG4-12/1 only.
12	Contact-breaker lever spring loading	Within the limits of 22 oz. and 18 oz. to open contacts - measured through centre-line of contacts			DSG Aviation www.dsgaviation.co.uk mail@dsgaviation.co.uk	
13	Contact-breaker gaps	-	-	$\frac{0.011 \text{ in.}}{0.013 \text{ in.}}$		
14	Safety cut-out spring pressure	Within the limits of 22 oz. and 18 oz. - loading required to depress spring flat onto contact block			Magneto types AG4-10/1 and AG4-12/1 only.	
15	Contact-breaker lever (bush) on pivot pin Bush bore Pin dia.	$\frac{4.507}{4.498}$ $\frac{4.478}{4.468}$	- -	$\frac{0.039}{0.020}$		
16	Contact-breaker lever endfloat	-	-	$\frac{0.000 \text{ in.}}{0.007 \text{ in.}}$	0.007 in.	

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2. Table 2 - Capacitor values.

Item No. (fig 9)	Nominal capacitance (in micro-farad)	Flash voltage
5	0.15 max; 0.11 min	600 r. m. s.

3. Table 3 - Armature coil resistance.

Item No. (fig 9)	Resistance value in ohms at 0 deg. C
13	3200 high; 2600 low

TESTING.

NOTE: Dimensions and connection details are given in fig 12.

1. Endurance test.

- A. Connect the magneto by $3\frac{1}{2}$ ft. lengths of metal braided cable of between 135 and 145 pico-farads capacity to ball gaps (A. M. EL. 12947, or similar) set to discharge at 9 kV.
- B. Run the magneto at 2500 rev/min for 4 hours under the prevailing ground-level conditions of temperature and pressure.
- C. Short-circuit the primary winding for a period of 2 minutes at the beginning and end of the run. During these periods, no sparking at the ball gaps must occur.
- D. During the last hour of the run, measure the temperature of the magneto carcase adjacent to the driving-end bearing.
Recorded temperature must not exceed the ambient temperature by more than 45 deg. C.
- E. Apart from the test at C, regular sparking at all the gaps must have been maintained throughout the endurance test.

NOTE: No relubrication, adjustments or artificial cooling may be carried out during the endurance test.

2. Open-circuit test.

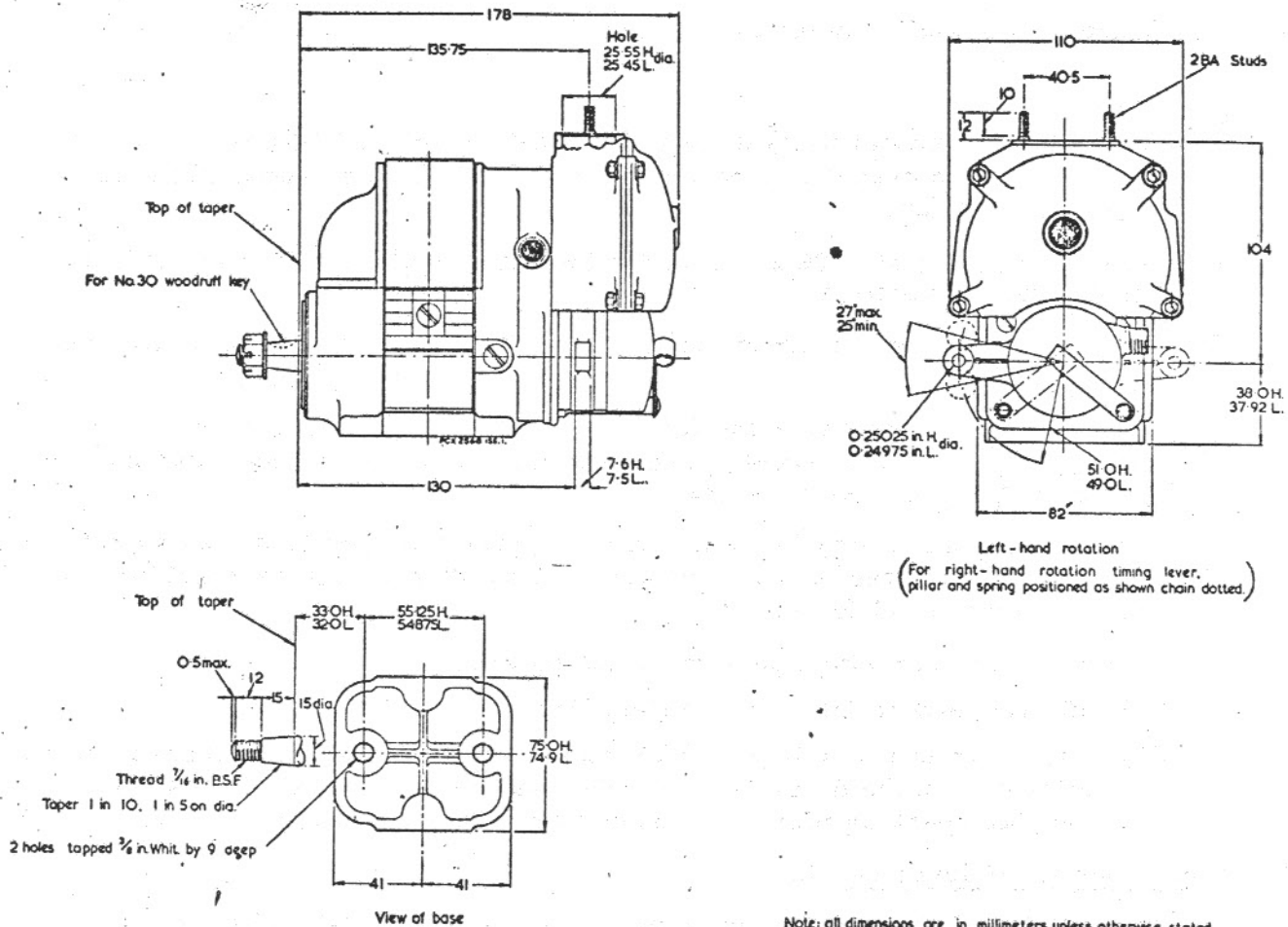
- A. Immediately following 1. Endurance test., whilst the magneto is still hot and running under the test conditions, remove, for one minute, one h.t. lead.

NOTE: Lead capacity is to be left connected to magneto.

- B. The insulation is not to fail during the test.

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Dimensions and connection details.
Figure 12.

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3. Examination.
 - A. On completion of the foregoing tests, the magneto is to be dismantled to an extent that will permit examination of all internal parts for wear, failure of insulation or other defects.
 - B. See INSPECTION 4.
4. Magnetic timing check.
 - A. During the re-assembly of the magneto the magnetic timing of the magneto is to be checked. See fig 10 and ASSEMBLY 3. F.
5. Cam accuracy test.
 - A. After the magneto has been re-assembled, check the angles transversed by the magneto drive shaft between successive 'breaks' of the contacts, as detailed in ASSEMBLY 3. G.
6. Primary open-circuit voltage test.
 - A. Run the magneto at 2000 rev/min and, using a calibrated moving-iron type voltmeter, measure the primary coil open-circuit voltage.

NOTE: The voltmeter should be calibrated against an AEI standard instrument for use on magneto waveform.

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B. Primary open-circuit voltage is not to be less than 11.5 volts.

7. Slow-speed test.

- A. Connect the magneto by $3\frac{1}{2}$ ft. lengths of metal-braided cable of between 135 and 145 pico-farads capacity to ball gaps (A.M. EL.12947, or similar) set to discharge at 9 kV.
- B. Run the magneto at 2500 rev/min for 15 minutes with the timing set in the fully advanced position.
- C. Slowly increase the magneto speed to 3000 rev/min and maintain this speed for one minute.
- D. Still with the timing set in the fully-advanced position, slowly decrease the magneto speed to the lowest speed consistent with regular sparking and maintain the speed for 1 minute.
- E. Slowly move the timing lever into the fully-retarded position then adjust the magneto speed to the lowest rev/min consistent with regular sparking and maintain this speed for 1 minute.
- F. The minimum sparking speed must not exceed :-
 - (1) 350 rev/min in full advance (test D).
 - (2) 500 rev/min in (25 degrees) full retard (test E). and, apart from incidental misfiring in the determination of these minimum sparking speeds, regular sparking must have been maintained throughout the test.

8. Contact-breaker lever check.

- A. Immediately following the slow-speed test, the contact-breaker lever is to be checked to ensure that it is seating against the pivot pin flange.

9. Final locking of parts.

- A. If the magneto has satisfactorily passed all the foregoing tests, final locking of parts is to be carried out. The magneto is then to be subjected to 10. Final test.

10. Final test.

NOTE : Magnetos are to be at ambient temperatures before commencement of the test.

- A. Connect the magneto by $3\frac{1}{2}$ ft. lengths of metal-braided cable of between 135 and 145 pico-farads capacity to ball gaps (A.M. EL. 12947, or similar) set to discharge at 9 kV.
- B. Run the magneto, slowly varying the speed, from 350 rev/min to 3000 rev/min with the timing lever in the fully-advanced position. Take approximately 3 minutes for the test.
No missing at the ball gaps is permissible.

11. Armature coil serviceability test.

On disassembly of the magneto and as called for in INSPECTION, test the coil as follows :-

- A. Using a high-voltage trembler set, test the armature coil for one minute with the secondary winding connected to a ball gap (A.M. EL.12947, or similar) set to discharge at 14.5 kV. Input current through primary winding is to be within the limits of 2.5 amperes and 3.0 amperes.



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TROUBLE SHOOTING.

Fault	Possible cause	Remedy
1. Magneto fails to spark	A. Defective armature. B. Contact-breaker defect.	Remove armature and test as detailed in • TESTING 11. Examine contact-breaker assembly.
2. Faulty sparking.	A. Moisture in magneto. B. Contact-breaker defect. C. Defective armature. D. Loose connections in magneto.	Dry out. Examine contact-breaker assembly. Remove armature and test as detailed in TESTING 11. Examine and rectify.
3. Poor slow-speed performance.	A. Small contact gap.	Adjust.
4. Poor high-speed performance.	A. Large contact gap.	Adjust.
5. Poor slow-speed performance possibly accompanied with misfiring at high speed.	A. Dirty contacts. B. Contact bounce.	Clean. Check contact-breaker lever spring pressure. Renew spring.

STORAGE INSTRUCTIONS.

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1. Packing.

- A. Fit all protectors (see TRANSPORTATION AND STORAGE PARTS in PARTS LIST).
- B. Pack unit as originally received.

2. Storage.

Store the packaged unit in a dry atmosphere well clear of such apparatus as accumulators which can emit corrosive fumes.

3. Storage limiting period.

After an elapsed period of 3 years, subject the unit to overhaul.

OVERHAUL MANUAL

SPECIAL TOOLS, FIXTURES AND EQUIPMENT.

1. The following special tools, fixtures and equipment are necessary for the overhaul of the magneto.

Item	Description	Application	AEI drawing reference
1	Spanner	Contact-breaker unit fixing screw	CX. 52733
2	Spanner	Slow-speed wheel spindle (outer) locknut	CX. 99539
3	Spanner	Slow-speed wheel spindle (inner) locknut	CX. 99540
4	Extractor	Outer race in contact endplate	CX. 79086
5	Spanner	Slow-speed wheel bearing housing nut	CX. 99541
6	Support block	For slow-speed wheel bearing housing	CX. 99538
7	Extractor	Armature ball bearing inner races	CX. 79087
8	Plug gauge	Distributor segments	CX. 99525
9	Fixture	Initial setting of contact-breaker adjustable contact (G1 for r. h. or G2 for l. h.)	Y/CX.1883F1 (G1 or G2)
10	Timing gauge	Slow-speed wheel timing dots	CX. 177330
11	Gauge	Safety-spark gap	CX. 99510
12	Clock fixture	Checking backlash between full- and slow-speed wheels	CX. 257358
13	Gauges	Checking height of armature from base	CX. 257359 CX. 257360
14	Gauge	Checking height of head of contact spring fixing screw in contact-breaker cover	CX. 257361
15	Gauge	Position of armature slipring	CX. 99502
16	Spanner	Full-speed wheel retaining nut	CX. 99524
17	Assembly tackle	Outer race in contact endplate	CX. 99535

AEI

OVERHAUL MANUAL

Item	Description	Application	AEI drawing reference
18	Fixture	Assembling armature bearing outer race with insulation into bearing liner	CX. 137472
19	Assembly tackle	Armature ball bearing inner races	CX. 99509
20	Fixture	Spotting and drilling cam cover tube	CWO SKC 6461
21	Dummy distributor	Checking magneto timing and sweep diameter of brush-holder	CX. 80532

Drawings of these special tools, fixtures and equipment will be supplied on request to:-

Associated Electrical Industries Ltd.,
Aircraft Equipment Group (Sales Dept.),
Raglan Street,
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OVERHAUL MANUAL

SCHEDULE OF OVERHAUL PERIODS.

Item	Manufacturer	Part No.	Period to overhaul
Magneto type AG4-6	Associated Electrical Industries Limited	CX. 70342	At engine overhaul periods approximating 1000 to 1200 hours.
Magneto type AG4-10		CX. 119900	
Magneto type AG4-10/1		CX. 133716	
Magneto type AG4-12		CX. 134334	
Magneto type AG4-12/1		CX. 134338	
Magneto type AG4-13		CX. 169813	
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OVERHAUL MANUAL ILLUSTRATED PARTS LIST

BTH Magnetos, types AG4-6, AG4-10, AG4-10/1, AG4-12, AG4-12/1 and AG4-13

MODIFICATION STATUS OF PARTS LIST

Note:- These modification numbers are prefixed either CV or CM, designating a civil or a military modification respectively.

Magnetos, type AG 4 - 6					
Mod No.		Mod No.		Mod No.	
419	*				
1083	*				
Magnetos, type AG 4 - 10					
Mod No.		Mod No.		Mod No.	
419	*				
1083	*				
Magnetos, type AG 4 - 10/1					
Mod No.		Mod No.		Mod No.	
419	*				
443	*				
451	*				
1083	*				

Magnetos, type AG 4 - 12					
Mod No.		Mod No.		Mod No.	
419	*				
1083	*				
Magnetos, type AG 4 - 12/1					
Mod No.		Mod No.		Mod No.	
419	*				
443	*				
451	*				
1083	*				
Magnetos, type AG 4 - 13					
Mod No.		Mod No.		Mod No.	
419	*				
1083	*				

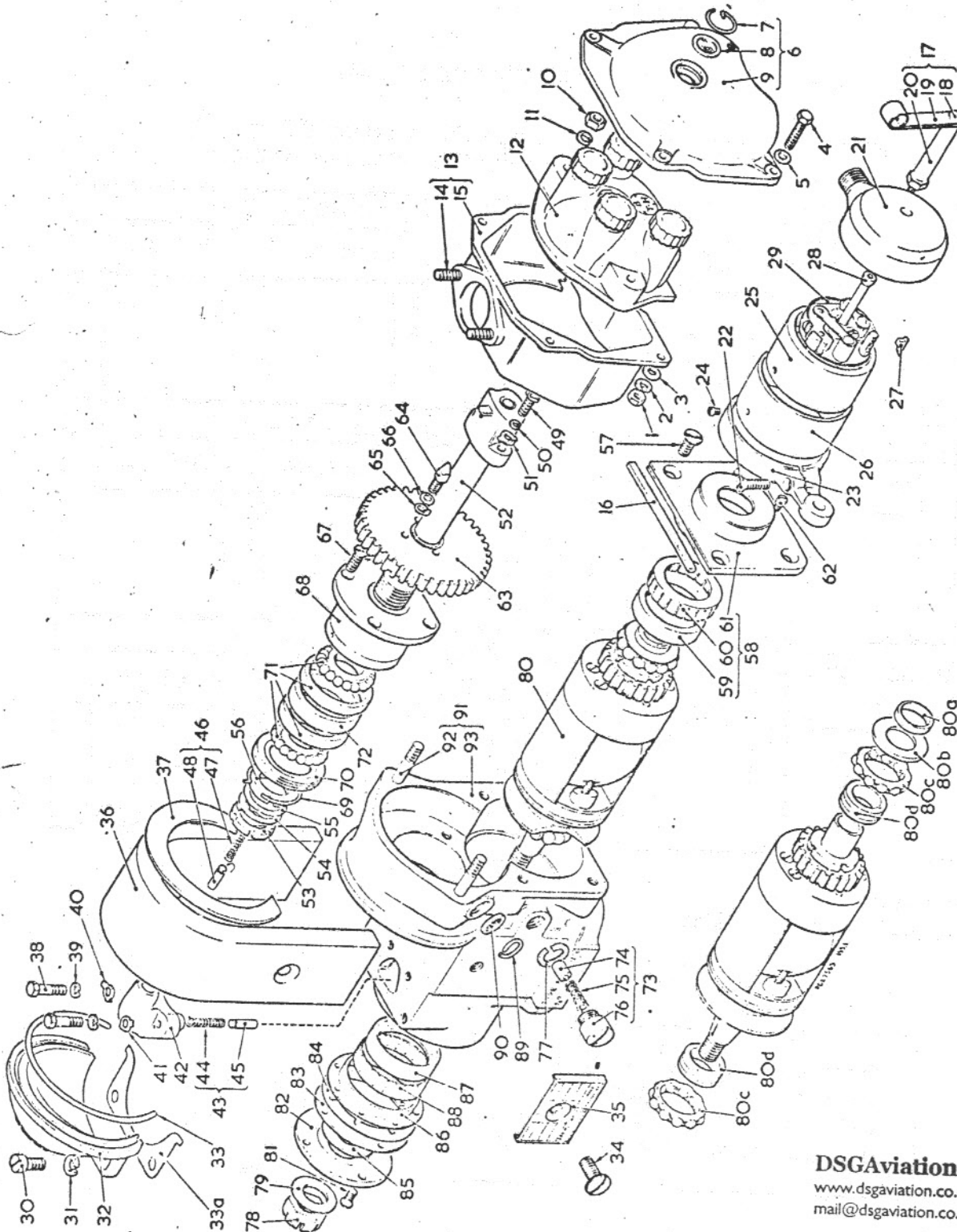
*Fully covered in parts list
-No cover required in parts list

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When ordering spare parts it is essential to refer to the nameplate and modification plate on the apparatus and to quote the type and form, also stroke number and modification standard where applicable.

OVERHAUL MANUAL ILLUSTRATED PARTS LIST

1. Parts list.



Exploded view of magneto
Figure 4 (repeated)

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OVERHAUL MANUAL ILLUSTRATED PARTS LIST.

1. Parts list (cont'd).

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
4 -	CX 70342	MAGNETO, type AG 4 - 6					A	1
	CX 119900	MAGNETO, type AG 4 - 10					B	1
	CX 133716	MAGNETO, type AG 4 - 10/1					C	1
	CX 134334	MAGNETO, type AG 4 - 12					D	1
	CX 134338	MAGNETO, type AG 4 - 12/1					E	1
	CX 169813	MAGNETO, type AG 4 - 13					F	1
		Items common to all the above listed types of magnetos are indicated in the usage code thus *						
- 1	CX 55612	NUT, 4BA, for distributor screen cover screws					BCDE	4
- 2	CX 52205	WASHER, locking, 4BA					BCDE	4
- 3	CX 53384	WASHER, plain, 4BA					BCDE	4
- 4	CX 78129	SCREW, 4BA, for distributor screen cover					BCDE	4
- 5	CX 53384	WASHER, plain, 4BA					BCDE	4
- 6	CX 119899	COVER ASSEMBLY, distributor screen					BCDE	1
- 7	CX 52838	RING, retaining, for ventilation gauze					BCDE	1
- 8	CX 52834	GAUZE, ventilation, for cover					BCDE	1
- 9	CX 118028	COVER, for distributor screen					BCDE	1
-10	CX 55525	NUT, 2BA, for distributor and screen					BCDE	2 or
	CX 52840	NUT, 2BA, for distributor					AF	2
-11	CX 52530	WASHER, locking, 2BA					*	2
-12	CX 91497	DISTRIBUTOR ASSEMBLY)					BCDE	1 or
	CX 52849	DISTRIBUTOR ASSEMBLY) (see fig 7)					AF	1
-13	CX 119902	DISTRIBUTOR SCREEN ASSEMBLY					BCDE	1
-14	CX 91485	STUD					BCDE	2
-15	CX 118027	SCREEN, distributor					BCDE	1
-16	CX 52781	PACKING, felt, for contact endplate					*	1
-17	CX 52776	PILLAR AND SPRING ASSEMBLY, for contact breaker cover					*	1
-18	CX 52173	WASHER, plain, for pillar					*	1
-19	CX 52778	SPRING, for pillar					*	1
-20	CX 52777	PILLAR					*	1

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OVERHAUL MANUAL ILLUSTRATED PARTS LIST.

1. Parts list (cont'd).

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
4 -		MAGNETOS, complete, (cont'd)						
-21	{ CX 137461	COVER ASSEMBLY, contact breaker					CE	1 or
	{ CX 52775	COVER ASSEMBLY, contact breaker					AF	1 or
	{ CX 91482	COVER ASSEMBLY, contact breaker, (see fig 6)					BD	1
-22	CX 52242	SCREW, 2BA, for timing lever					*	1
-23	CX 95644	TIMING LEVER					*	1
-24	CX 52218	SCREW, 6BA, for cam ring and cover tube					*	1
-25	CX 52773	CAM RING					*	1
-26	CX 75939	COVER TUBE, cam ring					*	1
	CX 52842	SCREW, locating, for contact breaker cover					AF	1
-27	CX 52249	WICK, for cam ring					*	1
-28	{ CX 133709	SCREW, 3BA, for contact breaker					CE	1 or
	{ CX 52772	SCREW, 3BA, for contact breaker					ABDF	1
	{ CX 138405 RH	CONTACT BREAKER ASSEMBLY, (right-hand rotation)					CE	1 or
	{ CX 138405 LH	CONTACT BREAKER ASSEMBLY, (left-hand rotation)					CE	1 or
-29	{ CX 55203 RH	CONTACT BREAKER ASSEMBLY, (right-hand rotation)					ABDF	1 or
	{ CX 55203 LH	CONTACT BREAKER ASSEMBLY, (left-hand rotation), (see fig 5)					ABDF	1
-30	CX 54614	SCREW, 2BA, for driving-end cover					*	2
-31	CX 52530	WASHER, locking, 2BA					*	2
-32	CX 52811	COVER, driving-end					*	1
-33	{ CX 95672	PACKING, for driving-end cover, top					BCDE	1 or
	{ CX 52841	PACKING, for driving-end cover, top					AF	1
-33a	CX 52812	PACKING, for driving-end cover, bottom					AF	1
-34	CX 52809	SCREW, 1/4 in BSF, for magnet and modification plate					*	2
-35	CX 134435	PLATE, modification					*	1
-36	CX 52807	MAGNET					*	1
-37	{ CX 95671	PACKING, magnet					BCDE	1 or
	{ CX 52808	PACKING, magnet					AF	1
-38	CX 53730	SCREW, 3BA, for collector brush holder					*	2
-39	CX 53310	WASHER, locking, 3BA					*	2
-40	CX 53729	WASHER, locking-tab					*	1
-41	CX 53731	WASHER, locking-tab					*	1
-42	CX 52783	BRUSH HOLDER, collector					*	1



OVERHAUL MANUAL ILLUSTRATED PARTS LIST.

1. Parts list (cont'd).

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
4 -		MAGNETOS, complete, (cont'd)						
-43	CX 70631	BRUSH AND SPRING ASSEMBLY, collector					*	1
-44	CX 70630	SPRING					*	1
-45	CX 52180	BRUSH					*	1
-46	CX 52802	BRUSH AND SPRING ASSEMBLY, distributor					*	1
-47	CX 52804	SPRING					*	1
-48	CX 52803	BRUSH					*	1
-49	CX 52800	SCREW, 4BA, for distributor brush holder					*	2
-50	CX 52205	WASHER, locking, 4BA					*	2
-51	CX 52801	WASHER, locking-tab					*	2
-52	CX 52795	BRUSH HOLDER, distributor					ABC	1 or
	CX 121293	BRUSH HOLDER, distributor					DEF	1
-53	CX 52874	NUT, circular, for slow speed wheel					*	1
-54	CX 52873	WASHER, locking-tab					*	1
-55	CX 53863-1	WASHER, shim, 0.002in thick					*	AR
	CX 53863-2	WASHER, shim, 0.003in thick					*	AR
	CX 53863-3	WASHER, shim, 0.005in thick					*	AR
	CX 53863-4	WASHER, shim, 0.010in thick					*	AR
	CX 53863-5	WASHER, shim, 0.015in thick					*	AR
	CX 53863-6	WASHER, shim, 0.020in thick					*	AR
-56	CX 52872	NUT, circular, for slow speed wheel					*	1
-57	CX 75837	SCREW, 1BA, for contact endplate					BCDE	3 or
	CX 52168	SCREW, 1BA, for contact endplate					AF	3
-58	CX 156068	CONTACT ENDPLATE ASSEMBLY					*	1
-59	CX 52118-4	OUTER RACE, part of A15, (V HOF), (see note)					*	1
-60	CX 52169-1	INSULATION, 0.0085in thick					*	1 or
	CX 52169-2	INSULATION, 0.015in thick					*	1
-61	CX 52770	ENDPLATE, contact					*	1
		Complete bearing to be supplied with assembly						
-62	CX 52243	SCREW, timing stop, for contact endplate					*	1
-63	CX 133241	SLOW SPEED WHEEL AND SPINDLE					*	1
-64	CX 52862	SPARK POINT					*	1
-65	CX 52227	WASHER, plain, for spark point					*	1
-66	CX 75560	WASHER, locking-tab, for spark point					*	1

OVERHAUL MANUAL ILLUSTRATED PARTS LIST.

1. Parts list (cont'd).

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
4 -		MAGNETOS, complete, (cont'd)						
-67	CX 52881	SCREW, 3BA, for slow speed wheel and brush holder					*	4
-68	CX 52867	HOUSING, bearing					*	1
-69	CX 52871	RING, locking, for circular nut					*	1
-70	CX 52870	NUT, circular, for bearing housing					*	1
-71	5808	BEARING, ball journal, (V HOF), CX 52868 * = HOPFMAN E15.					*	2
-72	CX 52869	DISTANCE PIECE, for bearings					*	1
-73	CX 52814	BRUSH AND HOLDER ASSEMBLY, main earth					*	1
-74	CX 52203	BRUSH					*	1
-75	CX 52817	SPRING					*	1
-76	CX 52815	HOLDER, brush					*	1
-77	CX 52816	WASHER, locking					*	1
-78	CX 52122	NUT, 7/16in BSF, for armature, driving-end					*	1
-79	CX 52123	WASHER, locking					*	1
-80	CX 139575	ARMATURE ASSEMBLY, (see fig 8)					*	1
-81	CX 52175	SCREW, 4BA, for bearing plate, driving-end					*	4
-82	CX 52779	PLATE, bearing, driving-end					*	1
-83	CX 52782	WASHER, for bearing plate					*	1
-84	CX 71201-1	WASHER, packing, 0.002in thick					*	AR
	CX 71201-2	WASHER, packing, 0.003in thick					*	AR
	CX 71201-3	WASHER, packing, 0.005in thick					*	AR
	CX 71201-4	WASHER, packing, 0.014in thick					*	AR
-85	CX 52780	WASHER, cork					*	1
-86	CX 117860	BEARING LINER, for driving-end bearing					*	1
-87	CX 52118-4	OUTER RACE, part of A15, (V HOF)					*	1
-88	CX 52169-1	INSULATION, 0.0085in thick, for outer race					*	1 or
	CX 52169-2	INSULATION, 0.015in thick, for outer race					*	1
-89	CX 52748	RING, retaining, for ventilation gauze					*	2
-90	CX 52747	GAUZE, ventilation, for main housing					*	2

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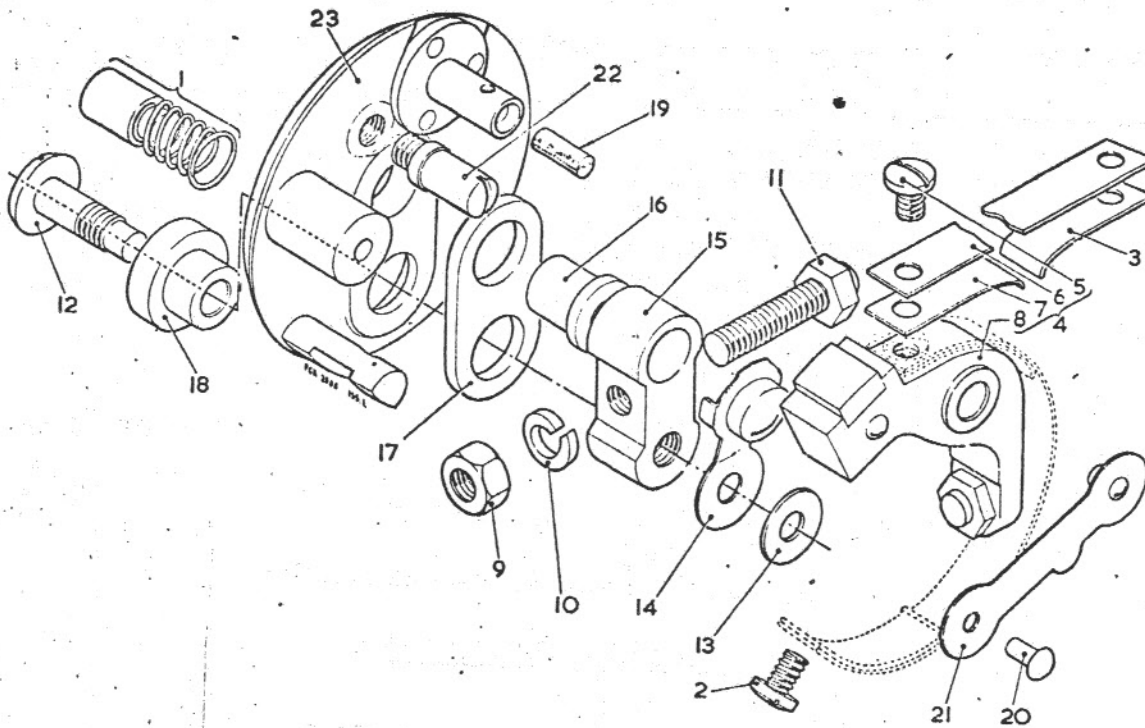
**OVERHAUL MANUAL
ILLUSTRATED PARTS LIST.**

1. Parts list (cont'd).

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
4 - -91 -92 -93	CX 157939 RH	MAGNETOS, complete, (cont'd) HOUSING ASSEMBLY, main, (right-hand rotation)					BCDE	1 or
	CX 157939 LH	HOUSING ASSEMBLY, main, (left-hand rotation)					BCDE	1 or
	CX 157932 RH	HOUSING ASSEMBLY, main, (right-hand rotation)					AF	1 or
	CX 157932 LH	HOUSING ASSEMBLY, main, (left-hand rotation)					AF	1
	CX 124883	STUD, 2BA					BCDE	2 or
	CX 52749	STUD, 2BA					AF	2
	CX 134407 RH	HOUSING, main, (right-hand rotation)					*	1 or
	CX 134407 LH	HOUSING, main, (left-hand rotation)					*	1
	<u>MISCELLANEOUS ITEMS</u>							
	GREASE, to DEF 2261, Esso aviation general purpose, (V ESSO) Caltex Regal Starfak Special, (V REG) Shell grease S 6266, (V SHELL) SEALANT, Loctite 'C', (V DKL or ASC) SEALANT, Loctite 'D', (V DKL or ASC) OIL, lubrication, to D Eng RD 2472 B/O, Esso aviation oil 100, (V ESSO) Caltex engine oil 100, (V REG) AeroShell oil 100, (V SHELL) OIL, lubrication, to DEF 2332 SOLDER, soft, to BS 219, grade 'K', (60% tin, 40% lead) FLUX, non-corrosive, DTD 599, (V FMF) "CARDICE", solidified carbon dioxide VARNISH, BTH 92, (V AEI) or PJ 420, (V PJC) VARNISH, BTH 93, (V AEI) or PJ 421, (V PJC) VARNISH, air-drying, BTH 3079, (V AEI), or PJ 714, (V PJC)							
	<u>TRANSPORTATION AND STORAGE PARTS</u>							
	CX 52997	SHIELD, wooden, for driving taper					*	1
	CX 137293	CAP, protection, for CB cover					C	1

OVERHAUL MANUAL ILLUSTRATED PARTS LIST

1. Parts list (cont'd).



Exploded view of contact-breaker assembly
Figure 5 (repeated)

Figure 5 (repeated)

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
5 -	CX 138405 RH	CONTACT-BREAKER ASSEMBLY, (right-hand rotation)					CE	1 or
	CX 138405 LH	CONTACT-BREAKER ASSEMBLY, (left-hand rotation)					CE	1 or
	CX 55203 RH	CONTACT-BREAKER ASSEMBLY, (right-hand rotation)					ABDF	1 or
	CX 55203 LH	CONTACT-BREAKER ASSEMBLY, (left-hand rotation) (see fig 4, item 29, for next higher assembly)					ABDF	1
- 1	CX 52202	BRUSH AND SPRING, earthing					*	1
- 2	CX 52210	SCREW, 6BA, for control and reinforcing springs					*	1
- 3	CX 52200	SPRING, reinforcing, for control spring					*	1
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OVERHAUL MANUAL ILLUSTRATED PARTS LIST.

1. Parts list (cont'd).

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
5 -		CONTACT-BREAKER ASSEMBLIES, complete, (cont'd)						
- 4	CX 55170	LEVER ASSEMBLY, contact-breaker					*	1
- 5	CX 52210	SCREW, 6BA, for control and reinforcing springs					*	1
- 6	CX 52211	SPRING, control					*	1
- 7	CX 52200	SPRING, reinforcing					*	1
- 8	CX 55167	LEVER, contact-breaker					*	1
- 9	CX 52190	NUT, 4BA, for contact screw					*	1
-10	CX 52205	WASHER, locking, 4BA					*	1
-11	CX 52214	SCREW, contact					*	1
-12	{ CX 117403	SCREW, 3BA, for contact block					CE	1 or
	{ CX 91648	SCREW, 3BA, for contact block					ABDF	1
-13	CX 122627	WASHER, plain					CE	1
-14	CX 138083	SPRING, leaf, contact					CE	1
-15	CX 52188	CONTACT BLOCK					*	1
-16	CX 52189	BUSH, insulation					*	1
-17	CX 52192	STRIP, insulation, for contact block					*	1
-18	CX 91649	BUSH, insulation					*	1
-19	CX 55201	WICK, lubrication, for pivot					*	1
-20	CX 52198	RIVET, for check spring					*	1
-21	{ CX 117408 RH	SPRING, check, (right-hand rotation)					CE	1 or
	{ CX 122626 LH	SPRING, check, (left-hand rotation)					CE	1
	CX 55197	SPRING, check					ABDF	1
-22	CX 52199	SCREW, stop, for lever					*	1
	CX 55202 RH	BASE AND PIVOT PIN, contact-breaker, (right-hand rotation)					*	1 or
-23	{ CX 55202 LH	BASE AND PIVOT PIN, contact-breaker, (left-hand rotation)					*	1

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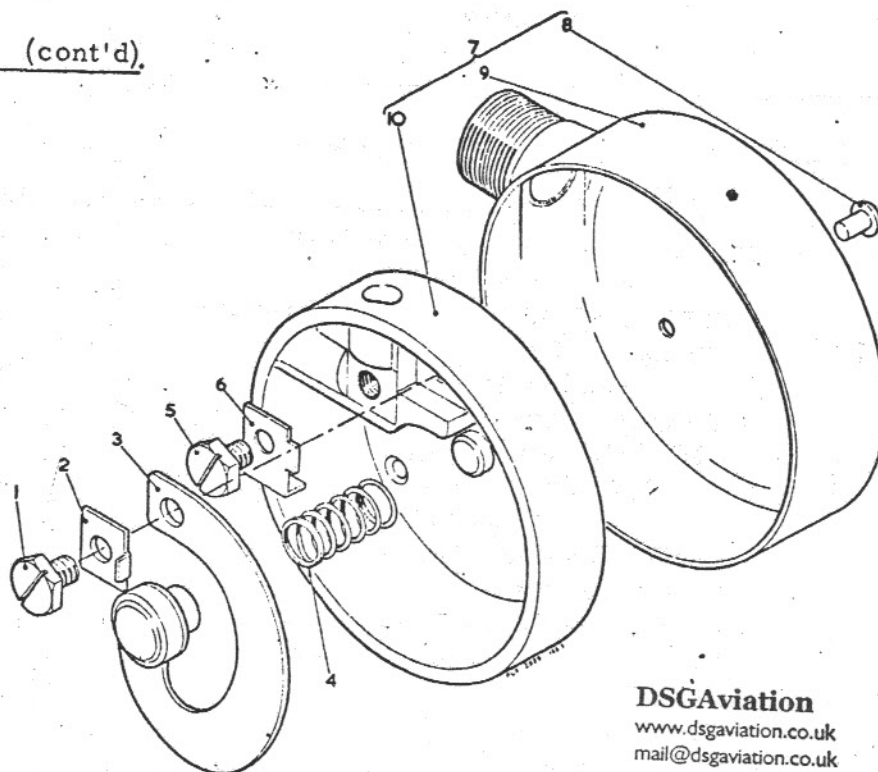
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OVERHAUL MANUAL ILLUSTRATED PARTS LIST

1. Parts list (cont'd).



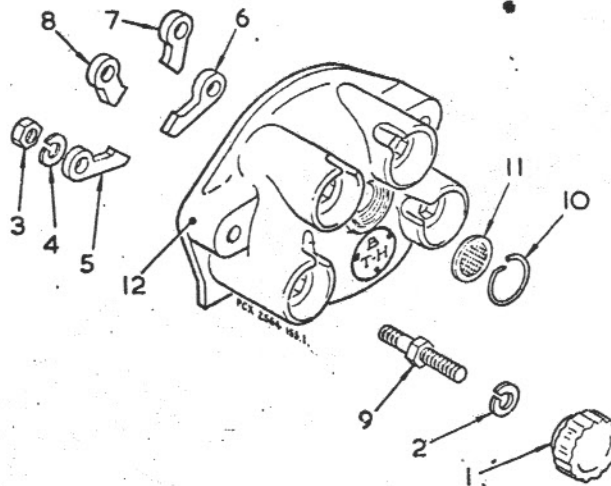
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Exploded view of contact-breaker cover assembly
Figure 6 (repeated)

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
5.-	CX 137461	COVER ASSEMBLY, contact-breaker					CE	1 or
	CX 52775	COVER ASSEMBLY, contact-breaker					AF	1 or
	CX 91482	COVER ASSEMBLY, contact-breaker (see fig 4, item 21, for next higher assembly)					BD	1
- 1	CX 77197	SCREW, 4BA, for earthing spring					*	1
- 2	CX 77198	WASHER, locking-tab					*	1
- 3	CX 52972	SPRING, earthing					CE	1 or
- 4	CX 52224	SPRING, earthing					ABDF	1
- 5	CX 138081	SPRING, for earthing spring					CE	1
- 6	CX 77197	SCREW, 4BA					BCDE	1
- 7	CX 78272	WASHER, locking-tab					BCDE	1
- 8	CX 91473	COVER AND SCREEN ASSEMBLY					BCDE	1
- 9	CX 116975-3	RIVET					BCDE	2
- 10	CX 91472	SCREEN					BCDE	1
	CX 91470	COVER, contact-breaker					BCDE	1
	CX 52999	COVER, contact-breaker					AF	1
	CX 52233	NUT, terminal, 4BA, for cover					AF	1
	CX 52205	WASHER, locking, 4BA, for terminal nut					AF	1

OVERHAUL MANUAL ILLUSTRATED PARTS LIST

1. Parts list (cont'd).



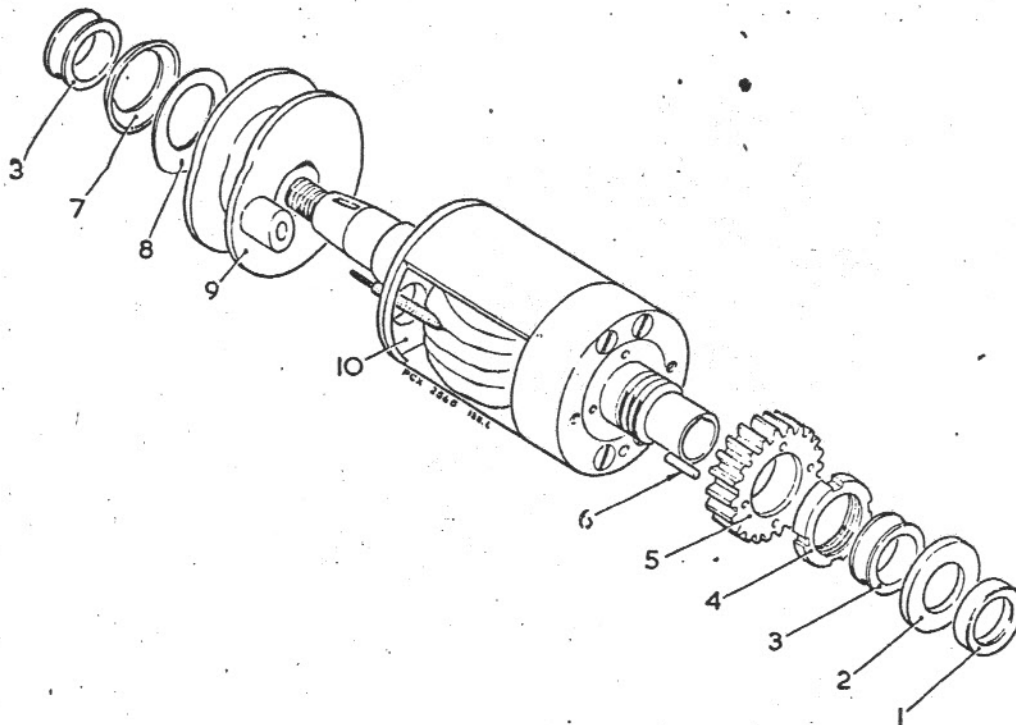
Exploded view of distributor assembly
Figure 7 (repeated)

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
7 -	{ CX 91497 CX 52849	DISTRIBUTOR ASSEMBLY DISTRIBUTOR ASSEMBLY (see fig 4, item 12, for next higher assembly)					BCDE AF	1 or 1
- 1	CX 52824	NUT, 2BA, terminal					*	4
- 2	CX 52530	WASHER, locking, 2BA					*	4
- 3	CX 53171	NUT, 2BA, for segments					*	4
- 4	CX 52530	WASHER, locking, 2BA					*	4
- 5	CX 52833	SEGMENT					*	1
- 6	CX 52831	SEGMENT					*	1
- 7	CX 52832	SEGMENT					*	1
- 8	CX 52830	SEGMENT					*	1
- 9	CX 52828	TERMINAL					*	4
-10	CX 52838	RING, retaining, for ventilation gauze					*	1
-11	CX 52834	GAUZE, ventilation, for distributor					*	1
-12	{ CX 91483 CX 52850	DISTRIBUTOR DISTRIBUTOR					BCDE AF	1 or 1

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OVERHAUL MANUAL ILLUSTRATED PARTS LIST

1. Parts list (cont'd).

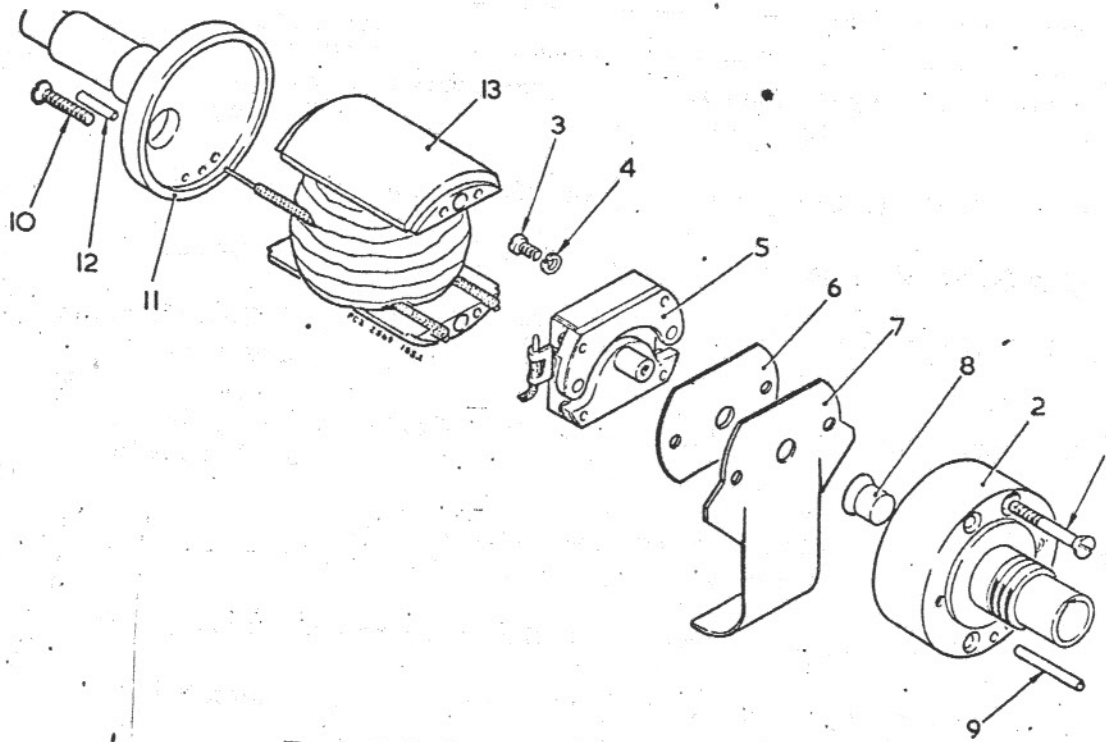


Exploded view of armature assembly
Figure 8 (repeated)

Fig. & Item No.	Part No.						Nomenclature	Usage Code	Units per Assy.
		1	2	3	4	5			
8--	CX 135575						ARMATURE ASSEMBLY, (see fig 4, item 80, for next higher assembly)	*	1
- 1	CX 52756						RING, reinforcing	*	1
- 2	CX 52237						WASHER, felt	*	1
- 3	CX 52118-2						INNER RACE, part of A15, (V HOF), (see note)	*	2
- 4	CX 52759						NUT, circular, for full speed wheel	*	1
- 5	CX 133240						FULL SPEED WHEEL	*	1
- 6	CX 133239						DRIVING PEG	*	1
- 7	CX 52120						WASHER, spring, for slip ring	*	4
- 8	CX 52326						WASHER, plain	*	1
- 9	CX 52755						SLIP RING	*	1
- 10	CX 70927						ARMATURE SUB-ASSEMBLY, (see fig 9) Complete bearing to be supplied with assembly	*	1

OVERHAUL MANUAL ILLUSTRATED PARTS LIST

1. Parts list (cont'd).



Exploded view of armature sub-assembly
Figure 9 (repeated)

Fig. & Item No.	Part No.	Nomenclature					Usage Code	Units per Assy.
		1	2	3	4	5		
9 -	CX 70927	ARMATURE SUB-ASSEMBLY, (see fig 8, item 10, for next higher assembly)					*	1
- 1	CX 187485	SCREW, 4BA, for capacitor endplate					*	4
- 2	CX 52763	PLATE, capacitor end					*	1
- 3	CX 56237	SCREW, 4BA, for capacitor					*	2
- 4	CX 52205	WASHER, locking, 4BA					*	2
- 5	CX 52765	CAPACITOR, 0.13 microfarad					*	1
- 6	CX 52135	INSULATION, for capacitor					*	2
- 7	CX 52325	INSULATION, for capacitor					*	2
- 8	CX 52134	BUSH, insulation					*	1
- 9	CX 52130	DOWEL, for capacitor endplate					*	1
-10	CX 52129	SCREW, 4BA, for driving endplate					*	4
-11	CX 70928	PLATE, driving end					*	1
-12	CX 52131	DOWEL, for driving endplate					*	2
-13	CX 56901	CORE					*	1

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OVERHAUL MANUAL
ILLUSTRATED PARTS LIST.

2. Vendors' codes.

Code	Name	Address
AEI	Associated Electrical Industries Limited	Raglan Street, Coventry, Warwickshire
ASC	American Sealants Company	Hartford 6, Connecticut, USA
DKL	Douglas Kane Limited	5 New Quebec Street, London W1
ESSO	Esso Petroleum Company Limited	Esso House, 76/118 Victoria Street, London SW1
MF	Fry's Metal Foundries Limited	Tandem Works, Merton Abbey, London SW19
HOF	Hoffmann Manufacturing Company Limited	Chelmsford, Essex
PJC	Pinchin, Johnson and Company	4 Charlton Gardens, London SW1
REG	Regent Oil Company Limited	117 Park Street, London W1
SHELL	Shell-Mex and B P Limited	Shell-Mex House, Strand, London WC2

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