Chapter 25

◄GENERATOR, TYPE 165C (PLESSEY TYPE A 5030A/5)►

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LEADING PARTICULARS

Generator, Type 165C	◄*Ref. No. 5UA/8344*►
Rotation	*Clockwise*
Output	3-*phase*, 28*V* ± 1·5% *a.c.*
Frequency	400 *c/s* ± 1·5%
Power factor	0·8 *lagging to unity*
Input speed range	4700 *to* 8000 *rev/min*
Normal maximum continuous speed	8000 *rev/min*
Rated load, 4700 *to* 8000 *rev/min*	4*kVA*
Overload, 2 *min. at* 5750 *rev/min*	5*kVA*
Input torque (max)	10 *lb. ft.*
Ambient temperature	−40° *C to* +45° *C*
Cooling required	*Forced draught*, 17·5 *lb/min at* 45° *C*
Weight	38 *lb.*

Brushes, Type PEG 11	*Ref. No. 5UA/7762*
New length (approx. after bedding)	0·63 *in.*
Minimum length	0·35 *in.*
Brush spring tension	$4\frac{3}{4}$ *to* $6\frac{1}{4}$ *oz.* (135 *to* 175 *gm*)
Sliprings diameter, new (max)	2·208 *in.*
minimum	2·18 *in.*
maximum eccentricity to shaft journal	·001 *in.*

Introduction

1. The Type 165C 3-phase generator assembly is of the rotating field separately excited type with a star connected stator; the performance of the generator is detailed in the Leading Particulars. It is designed to be used in an aircraft system to provide constant voltage and frequency within the load limitations set out in the Leading Particulars. The generator assembly must be used in conjunction with the external control panels and units, detailed in the appropriate Air Publications, to obtain the designed performance.

2. Air cooling of the generator is an essential requirement. The cooling air must be provided from a source capable of meeting the minimum machine demands detailed in the Leading Particulars.

DESCRIPTION

General

3. The generator assembly is designed to be operated over a wide speed range. This feature has been effected by interposing a differential (termed the constant speed unit) between the primary drive and the generator. Hence, the machine is a composite assembly comprising a constant speed generator and a constant speed unit. A general view of the machine is shown in fig. 1 and a sectioned view in fig. 2.

Generator

4. The generator is of simple construction comprising, essentially, the rotor, stator and sliprings, brushgear and attaching parts.

Rotor

5. The rotor carries the field windings which comprise six coils wound round six salient poles on the rotor hub and connected together in series. The coils are held in position on the poles by a retainer which is secured by the pole shoes capping each pole; each pole shoe is secured to its pole by three countersunk head screws. The hub is keyed and locked on the rotor shaft which is bored throughout its length and externally splined at one end (for coupling to the constant speed unit). The sliprings are mounted on the shaft, remote from the splined end, and are connected to the ends of the field windings.

6. The rotor is supported in two ball bearings, one located in the slipring end frame and the other in the generator end frame.

Stator

7. The stator is interposed between the slipring end frame and the generator end frame; it consists of laminations with wave-wound and star-connected windings and encircles the rotor. A terminal block is mounted on the stator; it is secured by two screws and provides the main terminal connections of the generator assembly. The schematic wiring diagram of the generator assembly is shown in fig. 3.

Brushgear

8. The brushgear is secured over an insulating disc to the slipring end frame; by three screws and tabwashers. It consists of a mounting plate to which two twin-brush holders are attached. The two brushes in each holder are held in the aperatures by spring-tensioned levers, mounted on the holders. The brush tags are secured to each holder, over a commoning link, by screws and washers.

Slipring end frame

9. The slipring end frame is secured to the stator by eight hexagon head screws and tabwashers. It supports the rotor shaft bearing in a shrunk-in liner fitted in a central aperture in the frame. A grease retainer is fitted over the aperture and secured to the end frame by three screws and tabwashers.

Covers

10. One rubber and three metal covers are fitted to the generator to exclude foreign matter and to protect exposed parts. The rubber cover, which is stretched over the

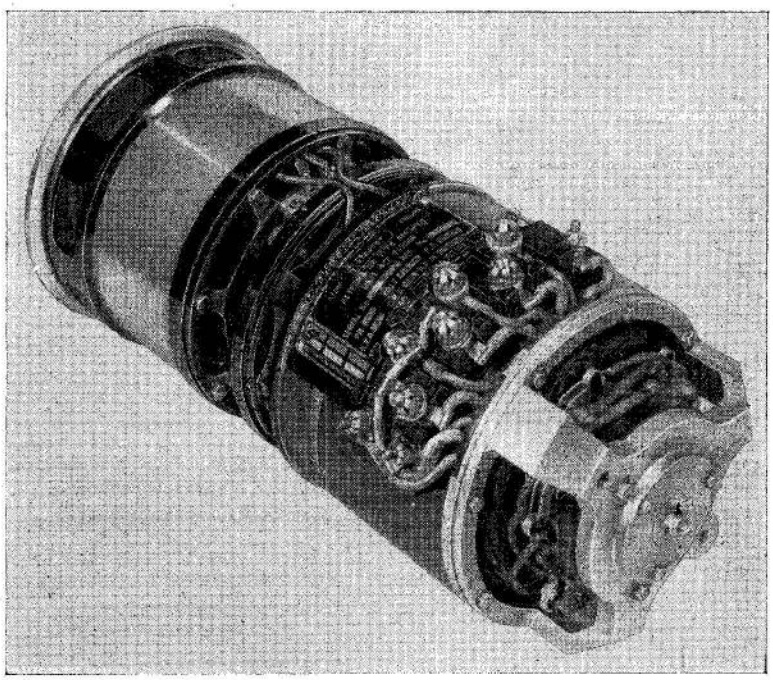

Fig. 1. General view of generator assembly

terminal block, protects the terminals in service. The metal covers which encircle the slipring end frame, the differential housing assembly and the apertures in the mounting flange, are for transport only.

Constant speed unit

11. The generator is mounted on, and coupled to, the constant speed unit which comprises the differential housing assembly, differential and brake units.

Differential unit and housing assembly

12. The differential unit is an epicyclic type gearbox enclosed in a housing. The differential housing assembly and differential unit are interposed between the generator and the brake unit, the housing assembly being bolted to the stators of both generator and brake. The differential unit is free to rotate within the housing assembly and is cantilevered at the generator end on a double row ball bearing.

13. The differential unit comprises two compound planetary spur gears, the larger diameter gears of which are in constant mesh, two sun gears which are driven by the smaller diameter spur gears and two counterweights used for static balancing of the unit. The whole arrangement is contained in the planet carrier assembly which is splined-coupled through a quill shaft to the prime mover. The sun gears are coupled to the generator and brake respectively.

14. Each planetary gear rotates on two in-line needle roller bearings, spaced apart on a layshaft. The layshafts are supported by the planet carrier assembly; thrust pads, fitted between the adjacent faces of the planet carrier and the gears and bearings control end float.

15. The planet carrier assembly is built up of two sections bolted together. The double-row ball bearing that supports the differential unit is housed in an aperture in the inner section and locates on the rotor shaft adjacent to the rotor bearing in the generator end frame; the bearings are separated by a spacer. The planetary gear layshafts and the counterweight journals are locked at the outer face of the bearing

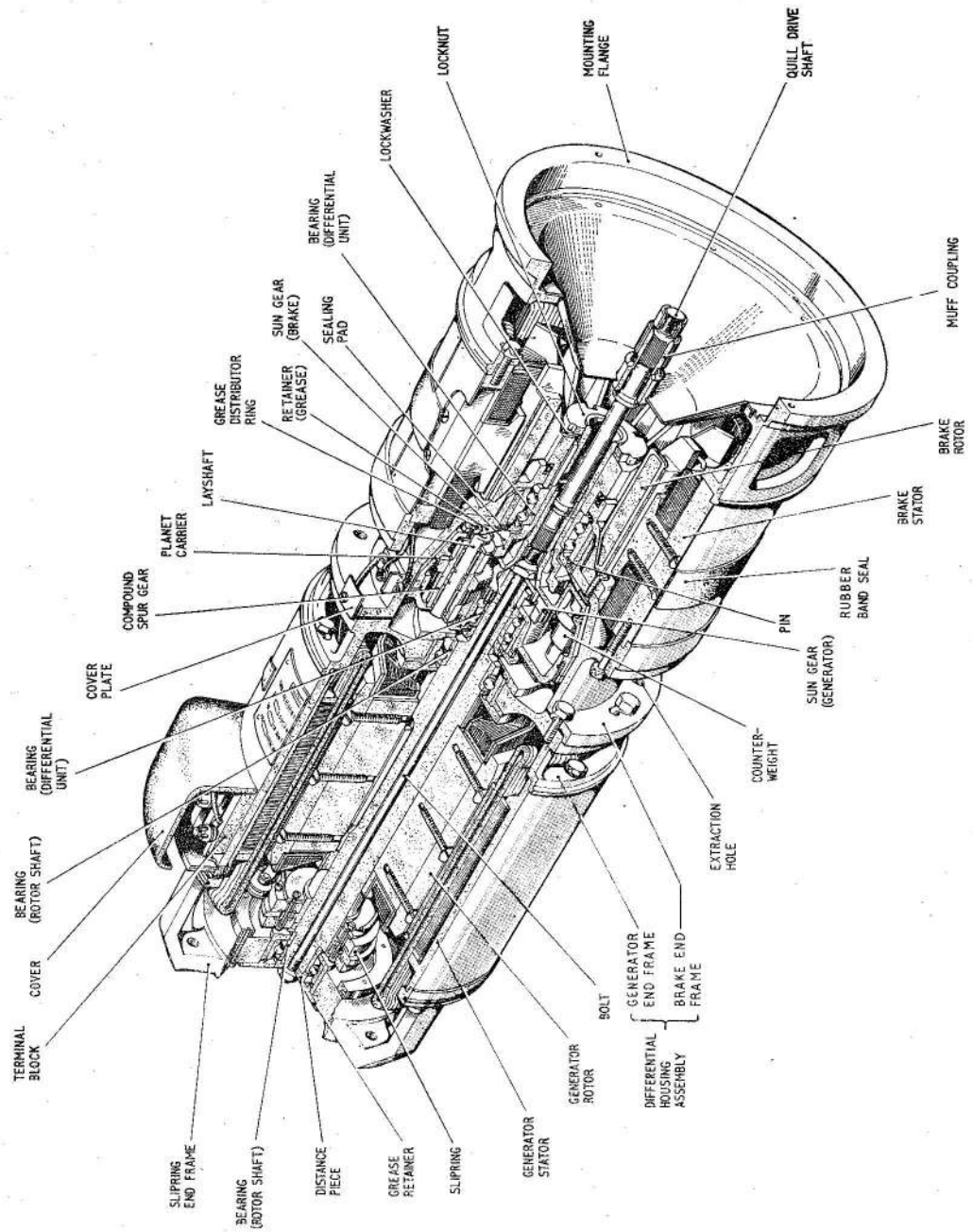

Fig. 2. Sectional view

section by a ring which is itself located by a plate secured to the planet carrier by screws. The other section of the planet carrier assembly has a hollow stem extending from its outer face which is internally splined for coupling to the quill drive shaft.

16. The differential unit sun gear, at the generator end, is splined on to the rotor shaft adjacent to the double-row ball bearing, thus providing the differential coupling to the generator. The sun gear is locked to the rotor by a long bolt which extends through the hollow shaft and holds the two rotor bearings and the differential bearing in place. This bolt is secured at the outside

of the slipring end frame by a locknut; a cap type distance piece which fits over the rotor shaft is interposed between the inner face of the bearing in the end frame and the locknut.

17. The other sun gear is integral with a stub shaft which carries the brake rotor. This shaft is hollow and the stem of the planet carrier and the quill shaft are free to rotate within it. The double-row ball bearing, which supports the stub shaft is fitted in a recess in the differential housing assembly. A cover, which clamps this bearing, is secured to the differential housing assembly by screws.

18. The differential housing assembly is in two sections comprising the generator end frame and the brake end frame. These sections are bolted together to form a sealed cell within which the differential unit rotates. Shims interposed between the mating faces of the two sections provide for adjustment of the clearance required between the housing and rear face of the differential unit. The housing assembly, which is encircled by the air inlet manifold, is louvred to provide ingress of cooling air to the generator and brake assemblies but not to the differential unit itself.

Brake unit

19. The brake unit comprises a stator assembly and a rotor assembly. The stator assembly, which consists of a yoke and four field coils wound round centrally divided pole pieces, is bolted at one end to the brake end frame and at the other end to the mounting flange. The coils are series connected, the ends of the windings being taken to the two terminal posts of a junction block attached to the differential housing assembly. A rubber band seal is fitted around the stator; the aircraft ducting is clamped over this seal.

20. The rotor is a cylindrical, soft iron mass with integral fins extending from one face; closed loop conductors of heavy gauge copper forming short-circuited turns, are embedded in the rotor cylinder. The rotor is keyed to the sun gear shaft and locked on it by a washer and nut.

Mounting flange

21. This assembly is bolted to the yoke of the brake unit, the flange providing the coupling arrangement of the generator. Rectangular apertures in the periphery of the mid-section wall provide exits for air exhausted through the brake unit; a bell-shaped section extending from the flange inwards towards the centre of the assembly deflects air through the apertures. A detachable cover with wire-meshed apertures is installed over the mid-section to prevent foreign matter entering the brake unit. The cover is for transport purposes only and is secured by a fitted screw and threaded block.

Quill drive shaft

22. This shaft is splined and threaded at both ends and couples the planet carrier to the driving mechanism. It is secured in the stem of the planet carrier by a round nut which seats in a recess inside the carrier; the nut is locked by a cupwasher. A muff coupling is fitted to the splines at the other end of the quill shaft and is retained by a cupwasher and round nut. An 'O' ring is interposed between the muff coupling and a shoulder on the shaft and a second 'O' ring encircles the muff coupling to provide effective oil sealing.

Lubrication

23. The differential unit is entirely grease lubricated. It is filled with a measured quantity of grease during assembly, distribution being effected during operation by a ring attached to the planet carrier at the input side, and by passages drilled in the layshafts and the gears. All bearings are pre-packed with the same grease. Lubricant leakage is prevented by seals and retainers installed at appropriate points.

OPERATION

24. The output of the generator is controlled by external units which ensure that a constant frequency of 400 c/s is maintained (at 800 rev/min rotor speed). As the frequency is a direct function of speed, control is effected by governing the speed of the generator rotor.

25. In practice, when the planet carrier is rotated by the quill drive shaft, the input

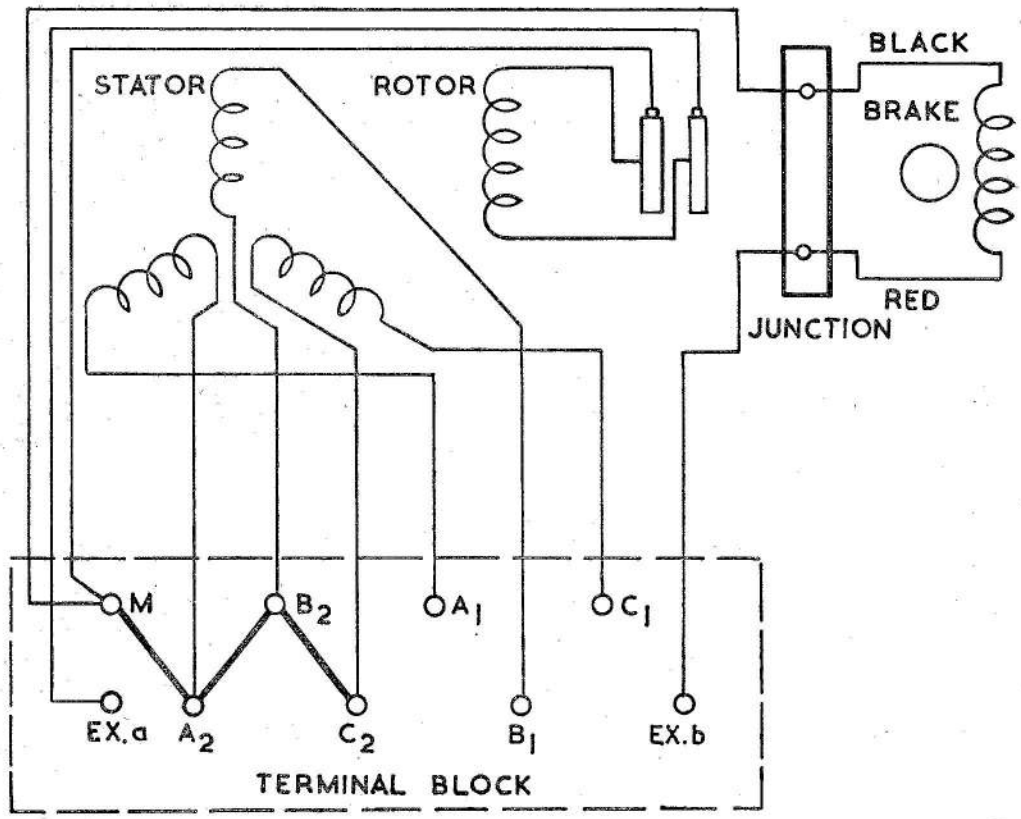

Fig. 3. Schematic wiring diagram

torque is transmitted through the compound planetary gears to the generator and the brake sun gears. The division of power between the generator and the brake is dependent upon the generator loading and both the excitation and speed of the brake. The correct ratio of power is controlled by the frequency regulator output and the brake field to achieve a constant generator speed of 8000 rev/min.

INSTALLATION

26. The generator is mounted on the two-speed gearbox and is secured to it by a manacle type clamp; the gearbox is bolted to the engine pad. Cooling air is supplied to the generator through a duct secured to the mid-section of the generator around the differential housing assembly. External electrical leads are crimped to tags provided with the generator; connections are made by securing the tags to the appropriate terminals in the terminal block, by nuts and washers. The terminal block is protected by a rubber cover.

SERVICING

General

◀**27.** During routine inspection, performed in accordance with the appropriate aircraft servicing schedule, the a.c. generator should be examined for damage. All connections must be checked for security. If the functioning of the unit is suspect, the tests detailed in Appendix A may be performed to establish that its performance is satisfactory.▶

Routine servicing

28. The security of the air inlet and outlet manifolds, the electrical leads and the terminal cover should be checked. The slip-rings should be examined for scoring, pitting, etc., and the brushes for damage or excessive wear. Brushes must be a smooth, sliding fit in the holders and their lengths must not be less than the minimum stated in the Leading Particulars. The generator and brake unit air outlets should be visually inspected for leakage of oil from the gearbox. If oil is found in the

brake unit, the generator must be returned for overhaul.

Caution . . .

The faulty oil seal, which may be in the generator or the gearbox, must be identified and replaced. The replacement of oil seals in the Two-speed Gearbox, Plessey Part No. 4CZ95880, is described in Chapter 26 of this Publication.

◀Procedure

29. Dismantling of the generator assembly will be necessary to effect some of the routine servicing operations detailed in the preceding and subsequent paragraphs. Parts can be identified by reference to fig. 4 and its key. The dismantling sequence is shown in the following paragraphs pertinent to the phase of servicing required. Reference must be made to the appropriate Air Publication for instructions on the removal of the generator assembly from the aircraft.

Note . . .

Servicing techniques are given in A.P.4343, Vol. 4, Part 6, Section 9.►

Brushes

30. Expose the brushgear by removing the aircraft ducting or cover. To examine the brushes, lift the brush lever and withdraw the brush from its holder. Carefully lower the lever. If the brush requires renewal, remove the appropriate screw (62) securing the brush tag, to permit removal of the brush (61) from the machine.

31. New brushes must be bedded in by operating the generator on no load until at least 50% of the brush contact face has been bedded; normal air cooling must be maintained during the bedding-in run. An adapted Mk. 5D Test Bench may be used to provide the drive to the generator.

32. The brush spring tension should be checked, using a standard spring balance; the tension should be within the limits given in the Leading Particulars.

33. When re-fitting the cover or ducting, ensure that the slipring end frame seal (5) is correctly seated.

Differential unit and bearings

34. Extreme cleanliness of tools and bench surfaces is of the utmost importance when dismantling, greasing and re-assembling the unit. Cleaning and lubricating procedures must be strictly adhered to and only the specified lubricant may be used.

◀*Special tools*

35. The following special tools are required:

1 Spline muff spanner,
Plessey Part No. T.381326
1 Slotted screwdriver►

Procedure

36. Remove the air inlet manifold. Prise out the punched-in section of the cup washer (34). Hold the muff (33) using the special tool and remove the slotted nut securing the muff to the quill drive shaft (30) using the slotted screw driver. Remove the cup washer and withdraw the muff.

37. Remove the locking wire and undo the two screws (19) securing the brake terminal cover plate (20); remove the cover plate. Disconnect the brake leads from the terminal block (21) on the brake end frame (24).

38. Unlock the six tabwashers locking the bolts (22) and remove the bolts. Separate the two sections of the differential housing assembly by screwing two of the bolts into the threaded extraction holes in the flange of the brake end frame (24); these holes do not mate with holes in the generator end frame (10). The bolts should be tightened alternately, half a turn at a time, until the two end frames separate.

39. Withdraw the brake unit comprising the rotor (27) and stator (29) together with the sun gear (39), the mounting flange (31) and the brake end frame (24). Reclaim the shims (12) fitted between the mating faces of the generator and brake end frames (10, 24).

40. Remove the nut (65) at the brushgear end of the generator shaft. Using suitable levers, taking care that damage to parts is avoided by locating on firm surfaces, withdraw the planet carrier assembly with the through bolt (54) trapped in it.

41. Release the eight tabwashers at the rear of the planet carrier assembly and remove the eight hex. head bolts (13) securing the two sections (42, 47) of the planet carrier assembly.

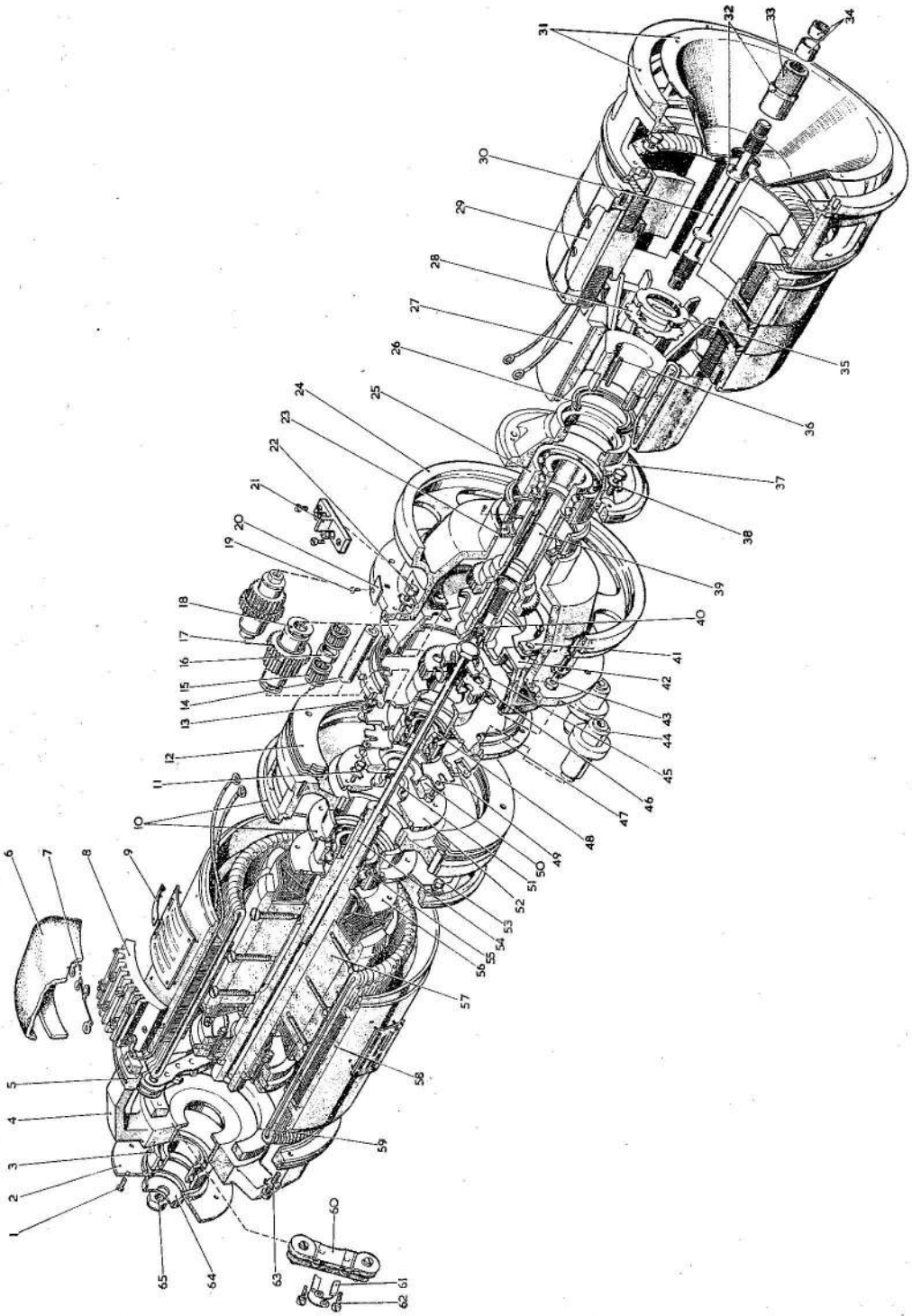

Fig. 4. Exploded view

KEY TO FIG. 4

1 SCREW
2 GREASE RETAINER
3 BALL BEARING
4 SLIPRING END FRAME
5 SEAL
6 COVER (TERMINAL BLOCK)
7 COMMONING LINK
8 TERMINAL BLOCK
9 ARROW (DIRECTION OF ROTATION)
10 BAND FRAME AND BEARING LINER
11 BOLT
12 SHIMS
13 BOLT
14 LAYSHAFT
15 NEEDLE ROLLER BEARING
16 SPACER
17 COMPOUND SPUR GEAR
18 SLOTTED WASHER
19 SCREW
20 COVER PLATE
21 JUNCTION BOX
22 BOLT
◀ 23 SEALING PAD ▶
24 DIFFERENTIAL HOUSING
25 DOUBLE ROW BALL BEARING
26 SEAL
27 BRAKE ROTOR
28 LOCKWASHER
29 BRAKE STATOR
30 QUILL SHAFT
31 MOUNTING FLANGE ASSEMBLY
◀ 32 'O' RINGS ▶
33 MUFF COUPLING
34 SLOTTED NUT AND CUPWASHER
35 LOCKNUT
36 KEY
37 BEARING COVER
38 BOLT
39 SUN GEAR (BRAKE)
40 SLOTTED NUT AND CUPWASHER
41 GREASE DISTRIBUTOR
42 PLANET CARRIER HALF-SECTION
43 BOLT
44 COUNTERWEIGHT
45 LOCKWASHER
46 SUN GEAR (GENERATOR)
47 PLANET CARRIER HALF-SECTION AND SEAL
48 DOUBLE-ROW BALL BEARING
49 LAYSHAFT LOCKING RING AND PLATE
50 LOCKNUT
51 BEARING SPACER
52 BEARING RETAINING PLATE
53 BOLT
54 BOLT
55 BALLBEARING
56 BEARING RETAINING PLATE
57 GENERATOR ROTOR
58 GENERATOR STATOR
59 BRUSHGEAR MOUNTING PLATE
60 BRUSH HOLDER
61 BRUSH
62 SCREW
63 SCREW
64 DISTANCE PIECE
65 NUT

42. Split the planet carrier assembly into its two sections by screwing two of the bolts into the extraction holes provided in the flange of one section; these two holes do not mate with holes in the other flange. Tighten the bolts alternately, half a turn at a time, until the two sections of the planet carrier assembly separate.

43. Remove the generator through-bolt (54) and the generator sun-gear locking plate (45).

44. The differential unit is statically and dynamically balanced. It is essential, therefore, to identify the position and relation of all its parts in order to maintain the balance of the unit after re-assembly. To assist in identification and correct re-assembly, the dismantled parts should be laid out as indicated in fig. 5. Do not attempt to remove the quill shaft from the front section of the planet carrier.

45. Lay the rear section of the planet carrier on the bench with the planet gears at 11 o'clock and 1 o'clock, noting the position of the spigot slot in the flange. Remove the gears, bearings, thrust-pads, spacers, layshafts and counter-weights placing them on the bench as shown in fig. 5.

46. Wipe the rear sections of the planet carrier to remove all grease, but do not wash in solvent. Wash the front planet carrier section, gears, spacers, bearings, thrust-pads, layshafts and counterweights in white spirit or non-leaded petrol and wipe dry.

◀End frame bearings

47. If bearings are to be replaced, remove them from end frames using a rack press. Heat end frames in oven to 90 deg. C. (194 deg. F.); fit new bearings in end frames and lubricate using Grease, XG-277.

Assembly

48. Weigh out 90 grammes of Regent Caltex High Temperature Grease (D.T.D. 878A).▶

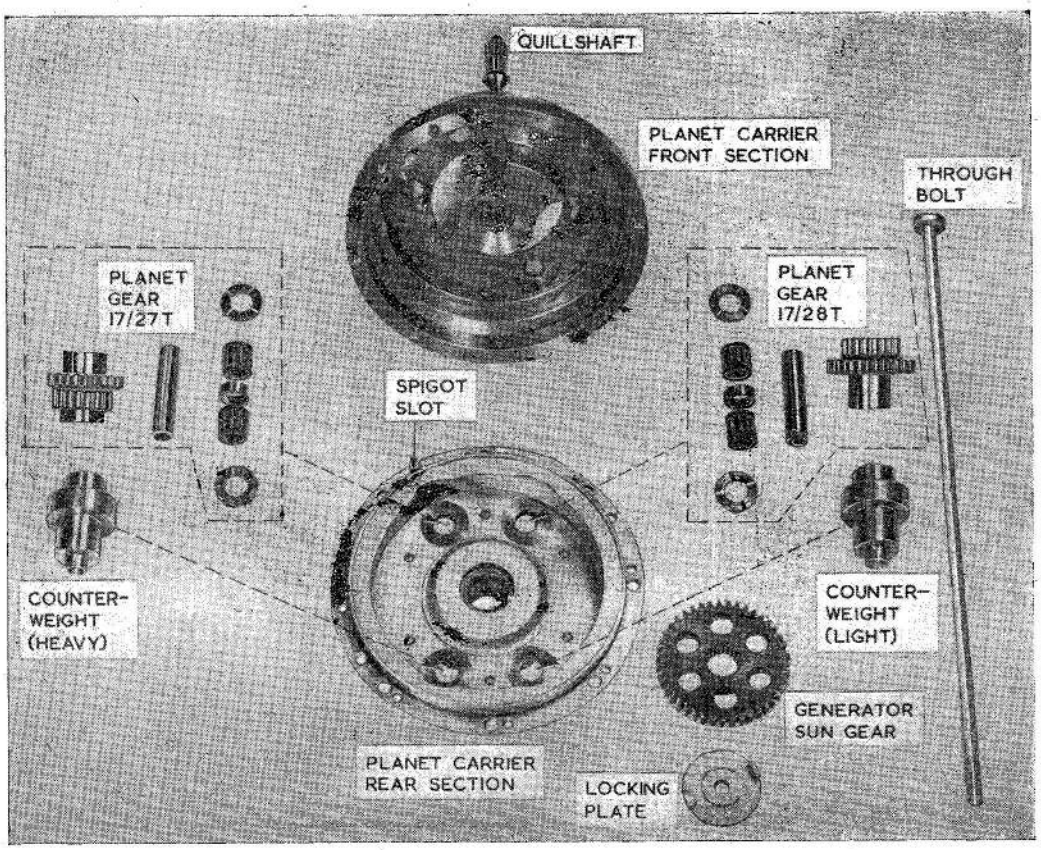

Fig. 5. Dismantled planet carrier assembly

Caution . . .

It is essential that only the specified Regent Caltex grease is used. No other grease will provide satisfactory lubrication, even though it conforms to Spec. D.T.D. 878A.

49. Fill the two hollow layshafts with grease and smear grease over the outside of each layshaft. Insert each shaft into the correct socket in the rear section of the planet carrier. Note that the flat of each layshaft locates against the locking plate on the back of the carrier section.

50. With a clean spatula, introduce grease into the rear housing. Fit thrust pad, bearing, spacer and bearing in their original positions on each layshaft. Place the generator sun gear in position.

51. Fit the planet gears on their respective layshafts, noting that the 27/17T planet gear meshes with the generator sun gear and the 28/17T planet gear meshes with the brake sun gear. Fit the remaining thrust pads in their original positions on the layshafts.

52. Fit the counterweights, the heavier being diametrically opposite to the 28/17T planet gear. Fill the assembled planet carrier section with grease, using the spatula to work the grease well into the gears.

53. Fit the generator sun gear locking plate over the sun gear and insert the through bolt. Spread the remaining grease of the original 90 grammes as a fillet round the inside of the other section of the planet carrier.

54. Mate both sections of the planet carrier together ensuring that the alignment dowel hole is in line with the dowel slot in the flange of the opposite housing.

55. Insert the eight bolts securing the two

sections of the planet carrier together, using a new tabwasher under each bolt head. Draw the two sections of the planet carrier assembly together, by carefully tightening diametrically opposite bolts. When all bolts are tight, set the locking tabs.

56. Wipe away all grease from the exterior of the planet carrier assembly and from the interior of the generator and brake end frames. Fit the planet carrier assembly to the generator, picking up the sun gear (46) on the splines at the end of the rotor shaft. Fit the nut at the slipring end of the generator. Pass a suitable bar through one of the holes in the sun gear (46) nearest to the counterbalance weights to give purchase, and then tighten the nut.

57. Re-assemble the differential housing by mating together the generator and brake end housings with the original shims between the two faces, turning the brake rotor until the brake sun gear is felt to mesh with the planet gear. Check that the slot engages with the spigot adjacent to the brake junction block. Fit new tabwashers to the six bolts. Tighten the bolts securely and set the tabwashers.

58. Fit the muff to the quill drive shaft, ensuring that both 'O' rings are serviceable and in place. Fit a new cup washer, tighten the round nut and set the cup washer. Reconnect the brake leads to the brake junction block and secure the cover plate.

59. Turn the quillshaft slowly, using the muff holding tool ◄Plessey Part No. T381326► and prove that the differential gears are meshing correctly by stalling first the alternator rotor and then the brake rotor. The rotors can be stalled by inserting a finger through the aperture in the relevant end housing.

60. The lubricant in the differential unit must be properly distributed before the machine is serviceable; proceed as follows.

61. Fit the generator assembly to the test bench and connect the generator to a voltage and frequency regulator. Omit the protection control unit from the circuit and disconnect the lead from the field current meter I_f to terminal EX_a on the generator (fig. 1, App. A).

62. Drive the generator at 1000 rev/min for one minute and increase the speed in steps of 1000 rev/min at one minute intervals up to 8000 rev/min. Run the generator for one minute at 8000 rev/min.

63. With the generator still driven at 8000 rev/min, connect the lead from the field current meter to terminal EX_a. Reduce the speed in steps of 500 rev/min at $\frac{1}{2}$ minute intervals down to 4500 rev/min.

64. Switch off the drive and remove the generator from the test rig. Check that the six bolts securing the generator and brake end frames together are tight and properly locked with the tabwashers. Check that the cup washer and round nut securing the muff to the quill drive shaft, are properly locked. Wire lock the screws securing the brake junction block cover plate.

Appendix 'A

STANDARD SERVICEABILITY TEST

for

◄GENERATOR, TYPE 165C►

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

1. The tests detailed in this appendix may be applied to ◄Type 165C► generators when the serviceability of a machine is required to be determined or when the functioning of a generator is suspect.

Test equipment

2. (1) An adapted Mk. 5D test bench, with dummy gear box.

(2) 3-phase, four wire load bank capable of absorbing 6kW at 200V, 400 c/s; variable in 1kW steps.

(3) Air supply capable of delivering 228 ft³/min via 3 in. ducting to the generator.

(4) Two potentiometers of approximately 18 ohms capable of carrying 8A.

(5) Wedge for brake rotor, Plessey Part No. T393430.

3. The following instruments, all of precision grade to BS89/1954, except where stated, will be necessary:—

Quantity required	Instrument	Min. full scale deflection	Function
3	Voltmeter Vp 400 c/s	220V	3 ph. voltages
1	Voltmeter V_L 400 c/s	250V	Comparison of line voltages
1	Ammeter d.c.	10A	Generator field current
1	Voltmeter d.c.	30A	Generator field voltage
1	Frequency meter (120V operating)	300/500 c/s	Generator frequency
1	Ammeter d.c.	15A	C.S.U. field current
1	Voltmeter d.c.	50V	C.S.U. field voltage
1	Current transformer ratio 25A/5A	—	Short circuit current
1	Tester Megger, Bridge Type B		
1	Stroboscope	10,000 rev/min	Generator rotor shaft speed
1	Three phase sequence indicator	—	Phase rotation

Note . . .

Voltmeter Vp should be of precision grade as defined in BS. 89:54. Voltmeter V_L need not be of precision grade as its use is for comparison of line voltages only.

Tests

General conditions

4. The following conditions must be observed for all running tests.

(1) The generator must be driven in

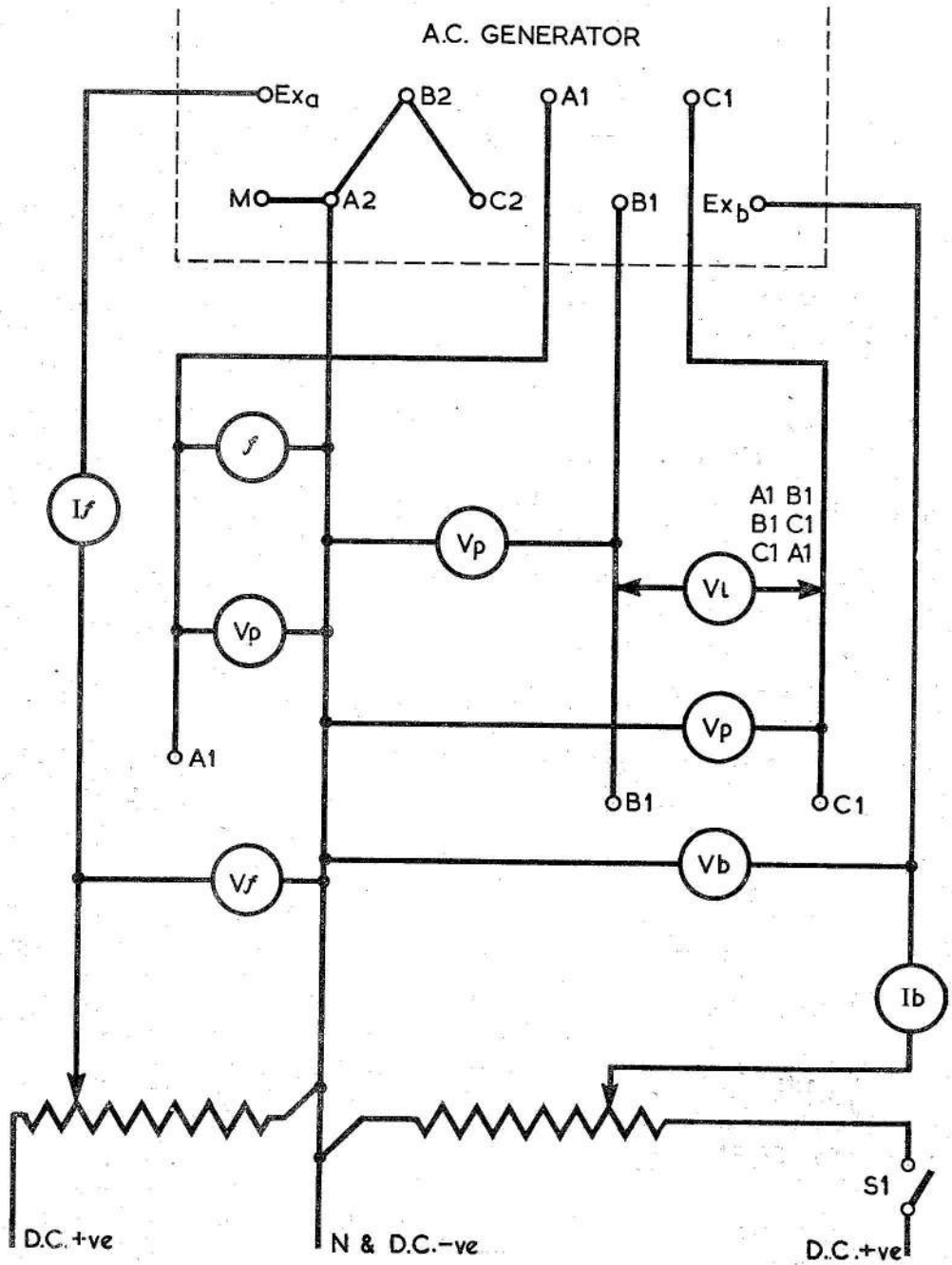

Fig. 1. Open circuit characteristcs test circuit

(669) Demand 90016 2000 6/65 T.T.P. Ltd., 3334-2

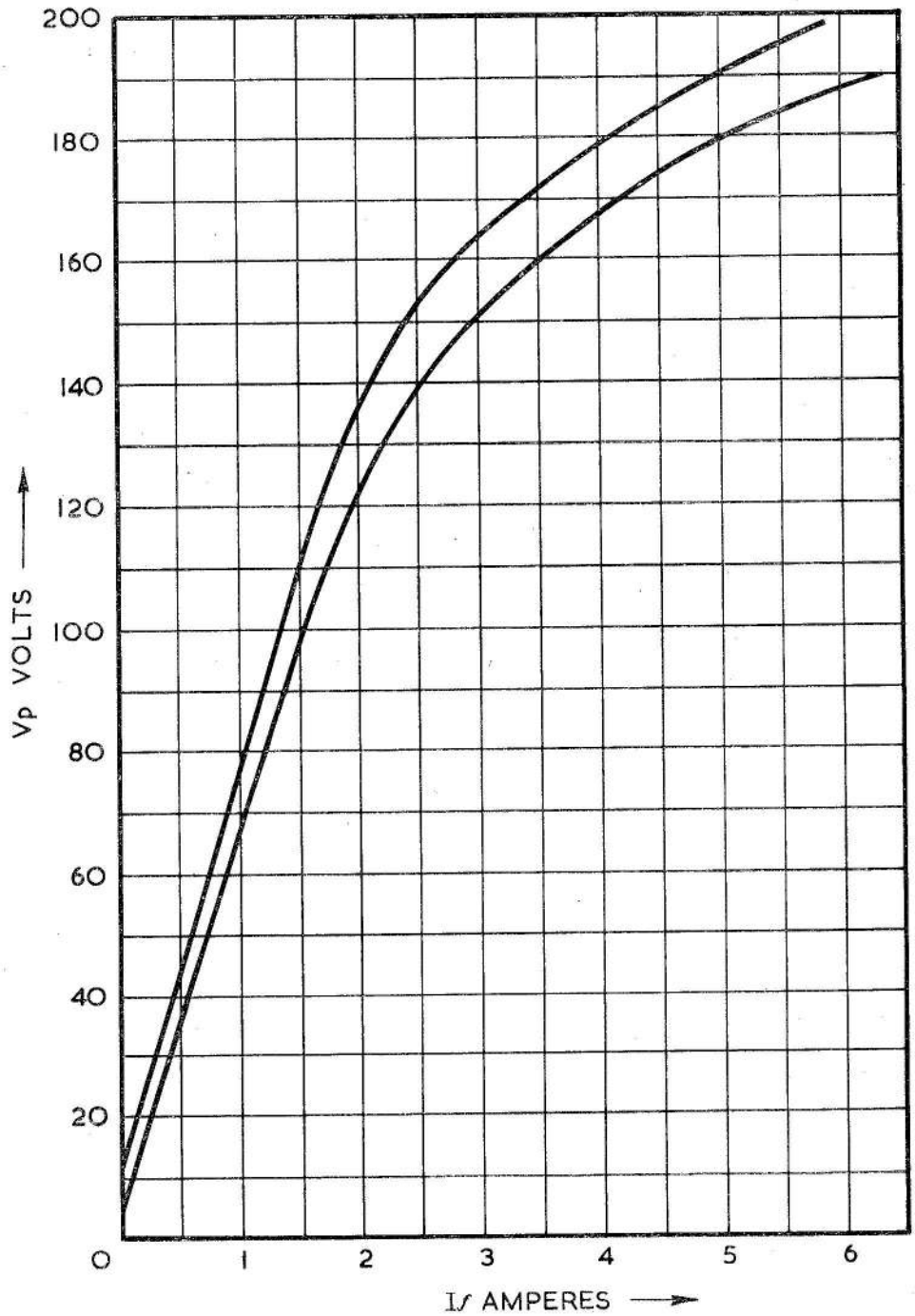

Fig. 2. Open circuit characteristics

a clockwise direction when viewed from the drive end.

(2) Cooling air must be continuously supplied to the generator at the rate of 228 ft^3/min. during all tests.

(3) The machine must not be driven at a speed in excess of 8000 rev/min.

Winding resistances

5. Resistance of windings at 20 deg. C shall be within the limits stated below.

Winding	*Terminals*	*Resistance (Ohms)*
Alternator phases	A_1—A_2; B_1—B_2;	0·49—0·55
Alternator rotor	*Sliprings (direct contact)	2·50—3·00
C.S.U. field	m—EX_b	2·35—2·65

Note . . .

To avoid damaging the working surface of the sliprings, the meter leads should contact the slipring outside the brush track.

Open circuit characteristics

6. The machine and instruments must be electrically connected as shown in fig. 1, for this and the two following tests.

(1) Open Switch S1.

(2) Set $I_f = O$.

(3) Adjust the speed of the prime mover to 8000 rev/min. Verify with a stroboscope that the generator rotor shaft is revolving at 8000 rev/min. (This shaft is exposed when the cover assembly is removed.)

(4) Increase the field current of the generator (I_f) in small increments up to 7A, by means of the field potentiometer, recording both current (I_f) and the generator phase terminal voltage (V_p), at each step. The curve plotted from these figures must lie between the limits shown in the graph, fig. 2 (5 test points minimum). Check the rotor speed at the completion of test recordings.

Phase rotation

7. With I_f adjusted to give a suitable voltage, check that the phases are correctly sequenced, i.e. A—B—C, with a phase sequence indicator.

Voltage balance

8. With the average of the three line to line voltages at 200 volts, the maximum deviation between the individual line to line voltages, and individual lines to neutral voltages, using the same instrument, shall not exceed 4 volts.

Short-circuit characteristics

9. The machine and instruments must be connected as shown in fig. 3 for this test.

(1) Mechanically lock the C.S.U. brake rotor to the frame, using the wedge, Plessey Part No. T393430.

(2) Adjust field current (I_f) to zero.

(3) Adjust speed of prime mover to 3980 rev/min, and verify that the rotor speed is 8000 rev/min.

(4) Adjust the field current (I_f) in increments of 2A up to 8A, recording alternator load current (I) at each increment. The curve plotted from these figures must lie between the limits shown in the graph, fig. 4.

(5) Remove the wedge.

Constant speed unit

10. The generator must be re-connected as shown in fig. 1.

(1) Set $I_f = O$.

(2) Close switch S1 and adjust $I_b = O$.

(3) Set drive speed to 4700 rev/min.

(4) Increase I_b to 0·9A.

(5) Check that the rotor speed is 8000 rev/min; if necessary adjust I_b. Ensure that I_b max. is less than 1·1A.

(6) Increase I_f to 2·5A and I_b to 4·5A and apply a 2kW load. Re-adjust I_f and I_b, if necessary, to obtain the correct output voltage and frequency. Under these conditions, I_f must not exceed 2·75A and I_b 5·5A. Increase I_f to 3·5A and I_b to 7·75A and apply a 4kW load. Re-adjust I_f and I_b, if necessary, to obtain the correct output voltage and frequency. Under these conditions, I_f must not exceed 3·75A and I_b 8·25A.

Insulation resistance

11. Whilst the machine is still hot after

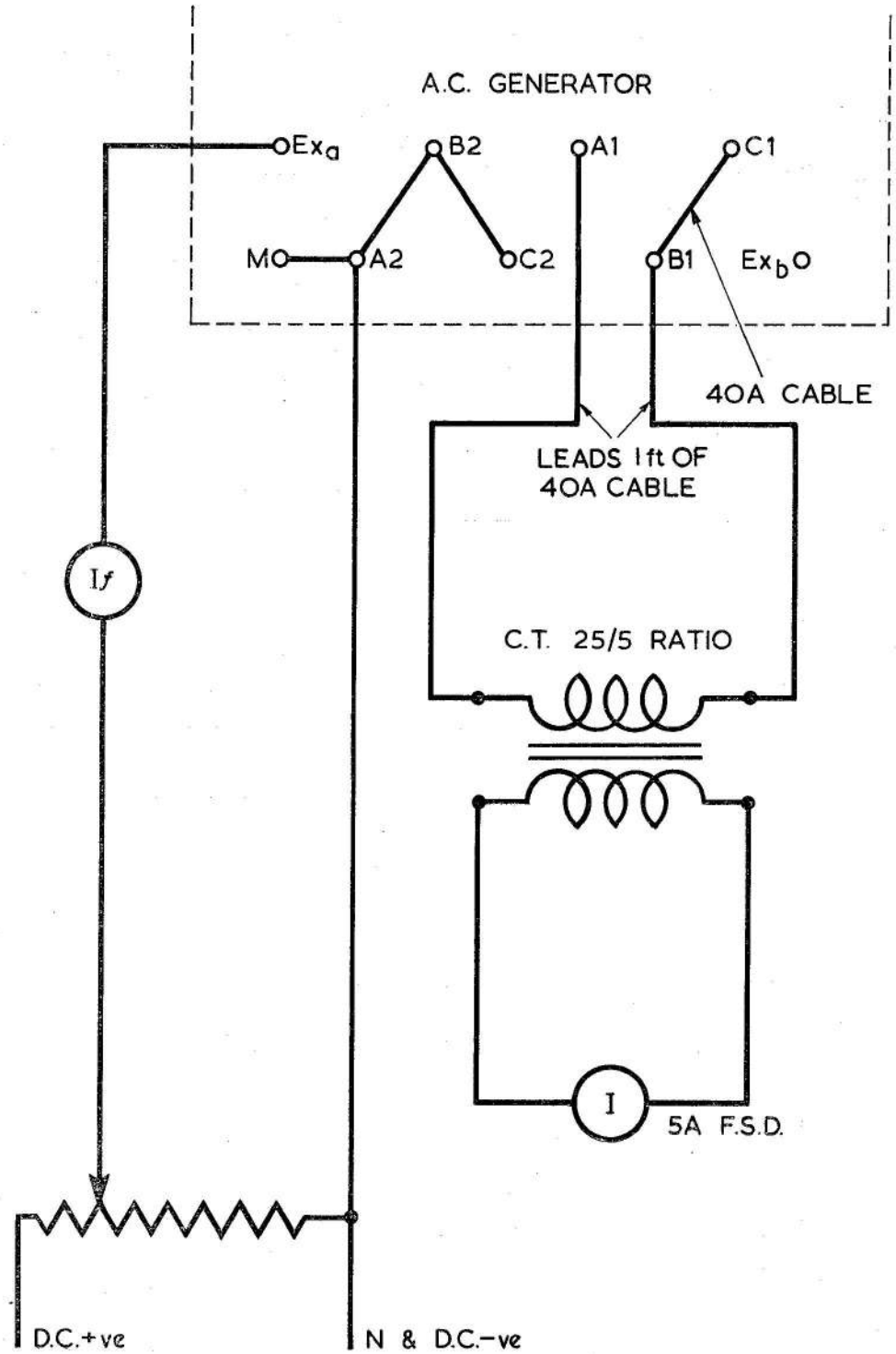

Fig. 3. Short circuit characteristics test circuit

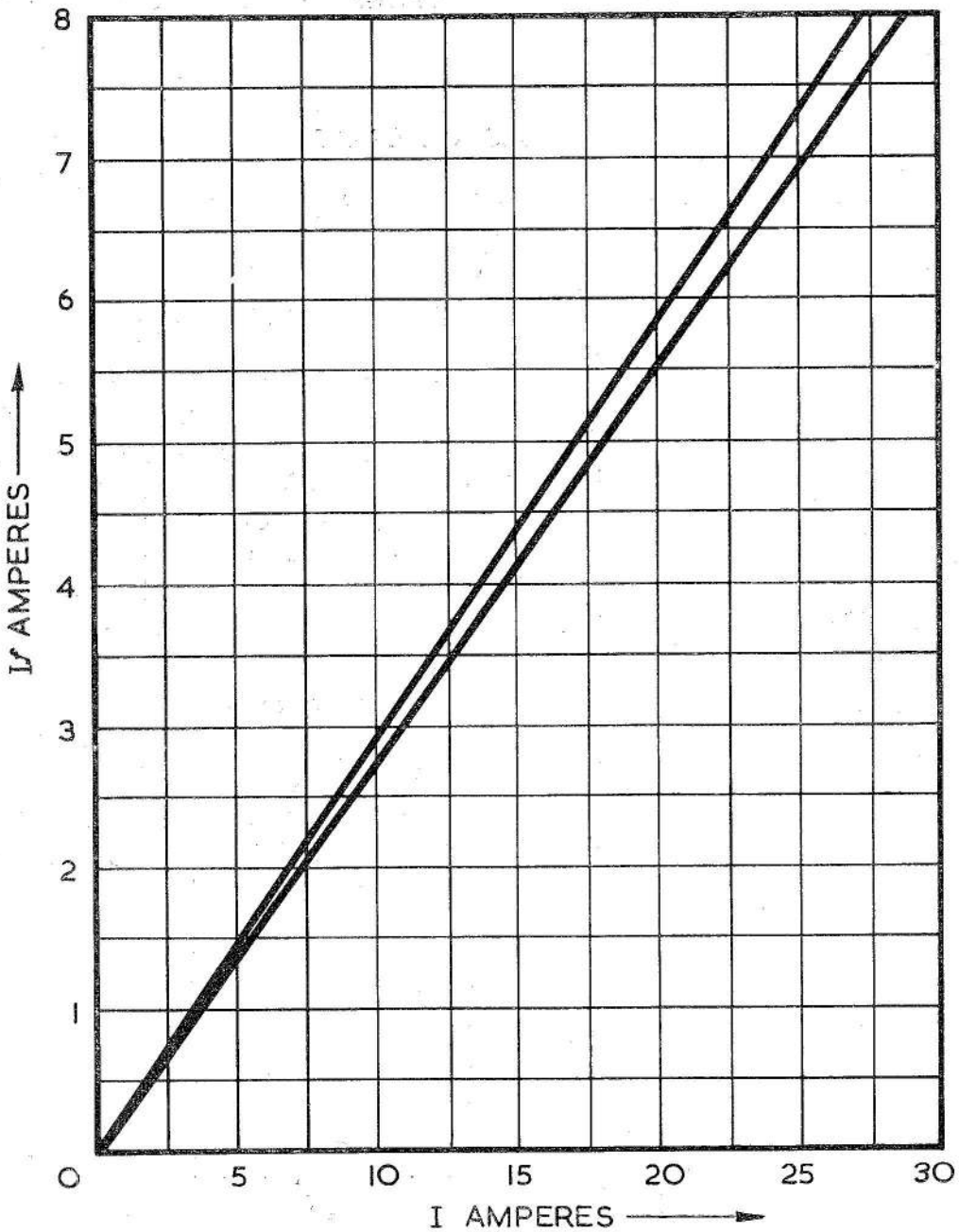

Fig. 4. Short circuit characteristics

the foregoing tests, the insulation resistance must be measured; the minimum recorded value shall be 50000 ohms at 500V d.c. The points between which the tests are to be performed are as follows:—

(1) Between each of the terminals A_1, B_1 and C_1 (A_2, B_2 and C_2 being open circuit) and between each of these terminals and the frame.

(2) Between EX_a and the frame with the leads at M disconnected.

(3) Between EX and the frame with the leads at M disconnected.