Chapter 1

ENGINE SYNCHRONIZING EQUIPMENT, ROTOL, TYPE (C) SN4/12

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Introduction

1. The synchronizing equipment, Rotol, Type (c) SN4/12 works in conjunction with the propeller control unit and is designed for use on four-engine aircraft. The control is automatic thus eliminating the necessity for constant manual adjustment to the engine controls to maintain synchronization.

2. The equipment consists of four similar a.c. generators, Type SNA/23, two corrector units, Type (c) SNC/19A/1 and one Type (c) SNC/19B/1, and also a control panel, Type SNP/2/2.

3. A description and the operation of the complete system is given in this chapter, and a full description of individual items

together with Leading Particulars are given in the appropriate appendix at the end of the chapter.

DESCRIPTION

A.c. generator

4. An a.c. generator is fitted to each of the four engine driven gearboxes, and produces a nominal 32 V a.c. 3-phase supply at 75 c/s at an engine speed of 4,500 rev/min.

5. The generator consists basically of a magnetic rotor operating within a 3-phase stator. The stator windings are connected to a Breeze type plug from which the connections are made to the corrector motors and control panel.

Corrector motor

6. A corrector motor is fitted to each of the 3 slave engines, namely : the port inner, the port outer and starboard outer engine. The starboard inner engine acts as the Master and is therefore not fitted with a corrector motor.

7. Each corrector motor unit consists basically of a squirrel cage rotor operating within two 3-phase wound stators. When the system is switched on, the bottom stator is connected with the a.c. generator of the master engine and the top stator is connected with its own engine generator.

8. A worm on the rotor shaft drives a worm wheel shaft, which is connected externally with the engine control linkage. Also mounted on the worm wheel shaft is a cam which operates a contact assembly.

Control panel

9. The control panel is incorporated in the aircraft electrical circuit to give ON-OFF control of the system.

PRINCIPLES OF OPERATION

10. The function of this equipment is to bring the engines to a common speed and maintain them at that speed. When the equipment is synchronizing, the speed of the three slave engines are synchronized to that of the starboard inner engine which acts as a master.

11. The speed of the Master engine is determined by its throttle setting, and maintains a constant speed. The equipment only exercises control over the speeds of the slave engines, and corrects relatively small speed discrepancies between the master and slave engines due to throttle setting errors.

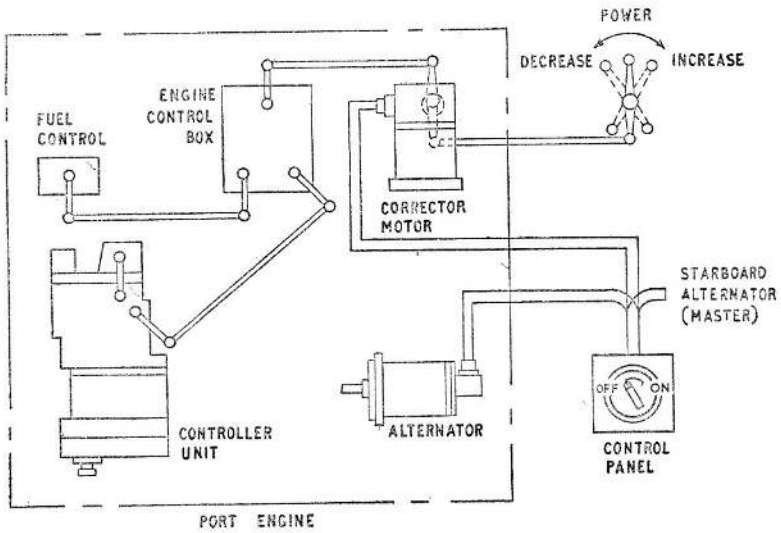

Fig. 1 Synchronizing system block diagram.

12. Synchronization is achieved by automatic movement of the power controls of the slave engines until their speeds equal that of the master engine. Movement is imparted to the power controls of each slave engine by a corrector motor.

13. Incorporated in the corrector motor is a worm wheel shaft, on the end of which is an eccentric spigot. This spigot receives an operating lever which is part of the engine power control linkage. On rotation

of the shaft, the eccentricity of the spigot imparts linear movement to the controls.

14. The movement of a slave engine power control by the corrector motor operates an engine control unit, which in turn operates the speed selection lever of the propeller controller unit. Dependent on the direction of power control movement, the controller unit either increases or decreases the propeller pitch which causes the engine speed to rise or fall until it equals that of the master engine.

15. Incorporated in the corrector motor is a stop peg which limits rotation of the shaft in both directions through an angular range of approximately 75 degrees.

16. When the equipment is not synchronizing, the corrector motor worm wheel shaft is in its datum position. From datum, the shaft can rotate in either direction to increase or decrease slave engine speeds.

17. Maximum rotation of the worm wheel shaft, in either direction from its datum results in maximum movement of the engine power controls. This in turn effects a change in engine speed of a certain rev/min value, which is the rev/min control range of the equipment. The control range is not of a constant value as it varies with the engine operating conditions. The control range is governed by the stop peg in the corrector motor.

18. When the equipment is brought into operation, the speed of any slave engine does not differ from that of the master in excess of the rev/min control range, for synchronization to be achieved. For the equipment to exercise control over the maximum increase or decrease in slave engine rev/min all engines should be operating as near as possible at the same speed when the equipment is brought into operation. In the event of the master engine failing whilst the equipment is operating, the slave engines will not follow the defective master beyond the rev/min control range.

19. When the pilot wishes to synchronize his engines, at cruising rev/min for example, he has merely to adjust the throttles to the desired setting and switch ON the equipment. Any slave engine running faster or slower than the master will automatically be brought into line.

20. The settings of the engines may be changed by operating the throttles in the normal manner. The eccentric spigot on each corrector motor worm wheel shaft serves as a fulcrum for the power controls during manual operation.

Synchronising equipment ON

21. The following circuits are made when the control panel is switched ON.

(1) The bottom stator in each slave engine corrector motor which is fed by the a.c. generator driven by the master engine.

(2) The top stator in each slave engine corrector motor which is fed by its associate engine generator.

22. The two stators in each corrector motor are now in phase opposition, that is, the phase rotation of the bottom stator in a clockwise direction, whilst that of the top stator is anti-clockwise, viewed from the terminal end.

23. As the generators are engine driven, the phase frequency of the current they generate is proportional to engine speed, therefore any difference between the speed of the master and a slave engine, results in one stator in a corrector motor receiving a higher phase input frequency than the other stator. The result is that the rotor of the corrector motor rotates in the phase direction of the stator receiving the higher input frequency and thus drives the worm wheel shaft in the appropriate direction to correct slave engine speed.

Higher slave engine speed

24. When the speed of a slave engine is greater than that of the master, the top stator receives the higher phase input frequency, and therefore causes the rotor to rotate in an anti-clockwise direction (when viewed from the worm wheel end). The drive of the worm wheel shaft is turned in a clockwise direction (viewed from the controls spigot end) and operate the power controls to decrease the speed of the slave engine. When the speed of the slave engine equals that of the master engine (i.e. when the input frequency of the top and bottom stators are equal) the rotor will stop.

Higher master engine speed

25. The action is similar to that explained in para. 24 but in this case the bottom

stator receives the highest input frequency and will therefore bring the slave engine speed up to the same as that of the master engine.

Synchronizing equipment OFF

26. When synchronizing, the worm wheel shafts of each corrector unit rotate the requisite amount in the appropriate direction to correct the speeds of the slave engines. When the equipment is switched OFF, each corrector motor worm wheel shaft is automatically returned to its datum position.

Returning to datum from increased speed position

27. From the datum position, the worm wheel shaft has rotated anti-clockwise to increase the slave engine speed. With the shaft in this position, the cam on the shaft allows two springs in the contact assembly to depress and close two pairs of contacts.

28. On switching to OFF, a circuit is completed to the top stator through the closed contacts the result is to cause the rotor to rotate in an anti-clockwise direction which in turn rotates the worm wheel shaft clockwise towards its datum position.

29. When the worm wheel reaches the datum position the cam lifts the two springs on the contact assembly and therefore opens the two contacts.

30. The shaft in returning to the datum position also moves the power controls to decrease the slave engine speed. The engine will now be unsynchronized with the slave engine running slower than the master.

Returning to datum from decreased speed position

31. When switching OFF the action is similar to that described in paras. 27 to 30, the direction of the rotor being in the opposite direction (clockwise) but in returning to datum the power controls will increase the slave engine, and at datum the slave engine will be running faster than the master.

INSTALLATION

32. A circuit diagram of the complete system is shown in Fig. 2 and a block diagram showing the operation of the system in Fig. 1.

33. For installation details of individual items in this system reference should be made to the appropriate appendix to this chapter.

SERVICING

34. In accordance with the relevant aircraft Servicing Schedule the condition of all leads between units should be checked, and all electrical connections examined to ensure that they are free from corrosion. After examination the connections should be securely tightened and wire locked.

35. Possible defects and their probable causes are given in Table 1. Other defects attributed to engine faults are beyond the scope of this chapter.

36. Details of servicing to individual items in this system are given in the appropriate appendix to this chapter.

TABLE 1

Possible Defects

Defect	*Probable Cause*	*Remedy*
One slave engine rev/min unstable.	Slave engine generator output voltage low.	Check generator output voltage. Renew generator if defective.
One slave engine fails to synchronize.	Malfunctioning of corrector unit.	Renew corrector unit.
One slave engine fails to return to pre-selected on switching OFF.	Associate wiring circuit defective.	Electrical checks of associated wiring circuit and rectification of fault.
One slave engine does not synchronize.	Defective engine controls or controls out of adjustment. Corrector unit defective.	Inspect and adjust controls. Renew corrector unit.
All slave engines unstable. Failure of all slave engines to synchronize.	Master engine generator output voltage low.	Check generator output voltage. Renew generator if defective.

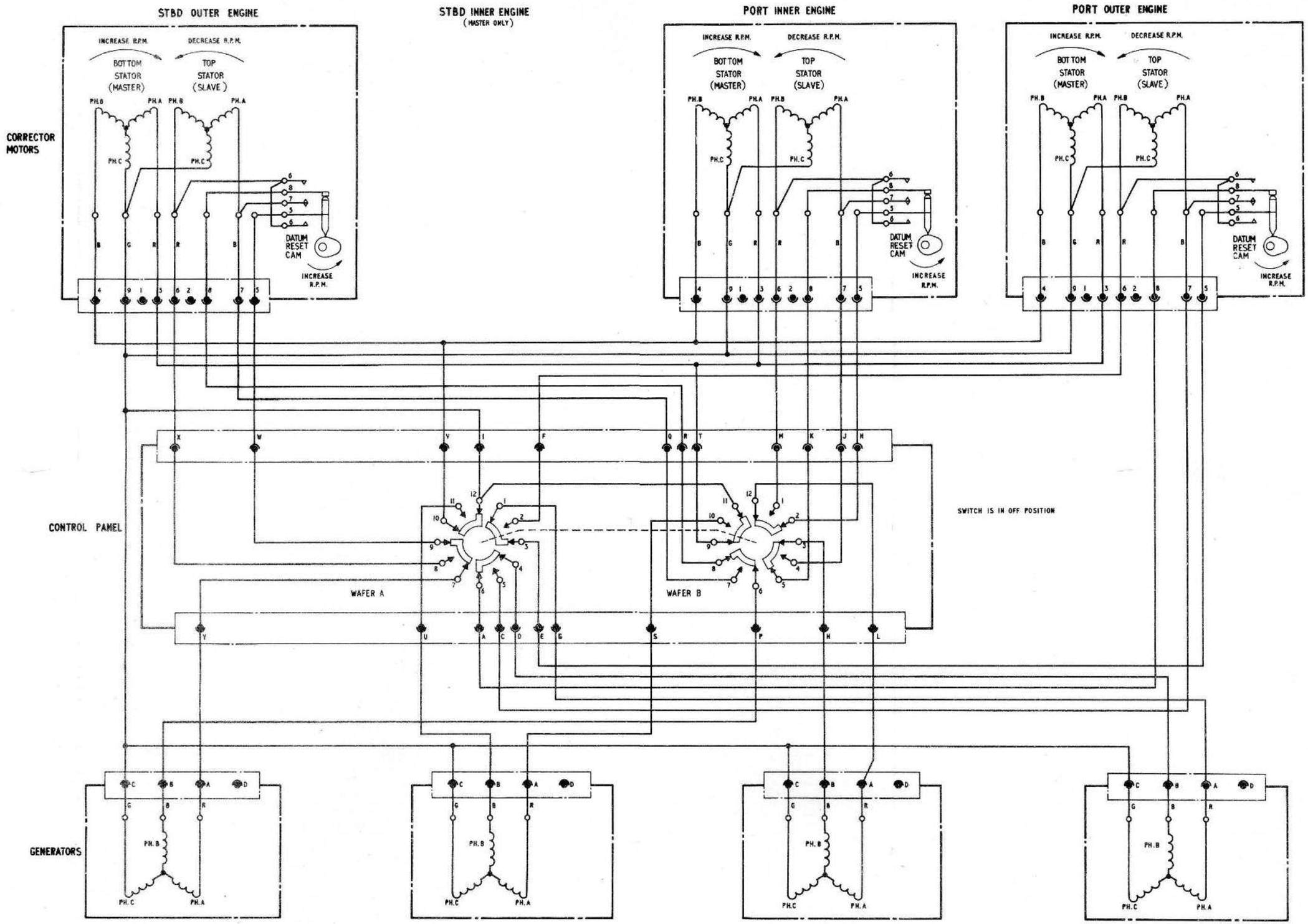

Fig. 2

Circuit diagram of complete system

R E S T R I C T E D

Fig. 2

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Appendix 1

A.C. GENERATOR, ROTOL, TYPE SNA/23

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Generator, Rotol, Type SNA/23	**Ref. No. 37M/137**
Line voltage at 4,500 *rev/min.*	32V. a.c. ± 1V
Frequency at 4,500 *rev/min.*	75 c/s
Line to line resistance	1·71 to 1·99 ohms.

Introduction

1. The generator Rotol, Type SNA/23 is of a special type and as explained in the main chapter is used on four engine aircraft, for engine synchronisation.

2. The generator is fitted to the engine driven gearbox and produces a varying 3-phase a.c. output which is fed into one of the stators of the corrector unit.

3. The generator fitted to the starboard inner engine in this installation is the master, to which all the engines are synchronised.

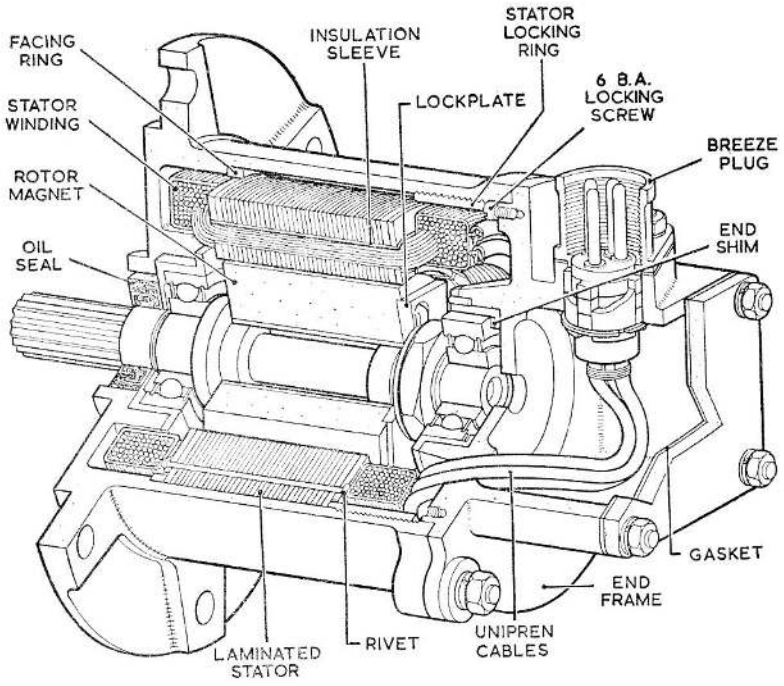

Fig. 1 Sectional view of generator, Rotol, Type SNA/23.

DESCRIPTION

General

4. A sectional view of the generator is shown in Fig. 1. It consists mainly of a two piece housing which encloses a magnetised rotor operating in a 3-phase star connected stator.

Case

5. The outer case is machined from a light alloy casting and incorporates an integral mounting flange. This flange is suitably machined, and drilled having six equally spaced $\frac{9}{32}$ in. diameter holes, which locate on the studs provided on the appropriate face of the engine driven gearbox.

6. The non-flanged end of the case is fitted with four studs to which an end frame is secured. Mounted on the end frame is a 4-pin Breeze plug to which the aircraft socket is attached.

Stator

7. The stator is located by the head of a rivet projecting into the bore of the case and secured in the case by a locking ring. This ring screws into the threaded bore of the case and is itself locked by a set-screw fitted in the base of the end frame. On assembly of the frame to the case, the head of the set screw locates in a slot provided in the end of the locking ring.

8. The 3-phase star connected winding pass through the slots of the laminated stack, and are connected by cables to the appropriate pins of the Breeze plug. An elongated hole in the end frame base provides a passage for the cables. The head of the end frame is detachable to facilitate inspection.

Rotor

9. The rotor is a permanent magnet and is keyed to the main shaft, by a locking plate. The rotor and locking plate are secured to the shaft by a $\frac{9}{16}$ in. B.S.F. nut and tab washer.

10. Two single row ball bearings are fitted to the rotor shaft and locate in the bearing liners of the case and end frame. The bearing at the driving end of the shaft locates against a shaft flange; this flange ensures correct positioning of the rotor. The bearing at the other end of the shaft locates against a shoulder on the shaft formed by a diameter reduction.

11. The shaft protrudes through the base of the case and is externally serrated to

engage with the engine drive shaft. An oil seal fitted on the shaft and housed in a recess in the base prevents the ingress of oil from the engine gear box.

End frame

12. The end frame is spigoted on to the main case and secured by 4 B.A. nuts (*para.* 7). A Ch. Hd. screw fitted in any one of the five tapped holes in the end frame enables the screw head to engage with one of the four slots in the stator locking ring.

13. A bearing liner is carried in this frame and locked in position by a peg. On assembly a laminated brass shim is fitted between the bearing and the inner end of the liner. The shim is important since it determines the correct amount of end float of the rotor shaft.

14. An access cover and gasket is secured to four 4BA studs in the end frame by nuts and washers. The Breeze plug is secured to the top end of the end frame by two 2BA studs, nuts and washers. The plug is pin offset to ensure that the aircraft socket is located correctly. A hole drilled in one of the Breeze plug locking studs is provided for wire-locking the aircraft socket.

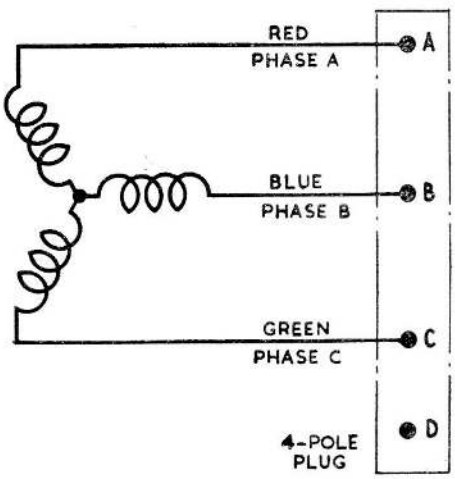

Fig. 2 Circuit diagram.

Electrical connections

15. The wiring diagram of the generator, is given in Fig. 2. It is important that the phase sequence is correct; red to A, blue to B, and green to C; pin D of the plug is not used.

INSTALLATION

16. The following instructions are of a general nature; for details of specific installations, reference should be made to the appropriate Aircraft Handbook.

Pre-mounting checks

17. Before mounting the generator, the following checks should be made:—

(1) The type number of the unit is correct.

(2) All blanks have been removed from the generator and the engine mounting face.

(3) The threads of the aircraft electrical socket and the thread and pins of the generator Breeze plug are undamaged.

(4) The threads of the engine studs and the serrations of the rotor shaft and engine drive quill are undamaged.

(5) The driving quill is a sliding fit on the rotor shaft serrations.

(6) The driving quill, lubricated with clean engine oil, is positioned in the engine drive.

(7) The mounting faces of the generator and the engine are dry, clean and free from burrs and scores.

(8) The gasket on the engine mounting face is serviceable.

(9) The oil seal is undamaged and correctly fitted on the rotor shaft.

Mounting

18. The generator may now be installed as follows:—

(1) Correctly locate the generator on the gearbox mounting face; ensuring that the rotor shaft serrations freely engage those over the quill, and firmly secure. Tighten the nuts evenly and firmly in diametrical sequence.

(2) Connect the aircraft harness socket to the generator Breeze plug, and wire lock.

Removal

19. When removing the generator from the engine gear box after releasing the six $\frac{1}{4}$ in. B.S.F. nuts and washers, care should be taken not to damage the mounting faces of the engine and generator. Application of an alternating side load to the generator should be sufficient to break the joint.

Note . . .

Do not use a screwdriver blade or a similar instrument to break the joint.

SERVICING

20. Whilst the generator is still mounted on the engine gearbox a check should be made for security of mounting.

21. The pins of the Breeze plug should be examined for condition and that the plug and socket connection is tightened and re-wire locked, after examination.

22. The joint between the generator and the engine should be inspected for signs of oil leakage. Seepage may be due to loose nuts, which should be tightened. If tightening of the nuts proves to be ineffective a new gasket should be fitted.

23. The cover of the end frame should be removed and the interior chamber inspected for signs of oil and the leads for serviceability. If there are signs of oil the generator should be removed for a more detailed examination.

Tests

24. The following tests should be applied to a generator before fitting it to an aircraft.

25. Run the generator in a clockwise direction (as viewed from the terminal box end) at a speed of 4,500 rev/min. and check that the phase rotation is in the sequence A—C—B.

26. Check that the open circuit line voltages are within the limits 32V ± 0·1V. The generator case temperature should not exceed 40°C. when this test is being made.

Insulation resistance test

27. The insulation resistance when measured with a 500 V insulation resistance tester between any phase and earth or between any two phases must not be less than 500,000 ohms.

Appendix 2

CORRECTOR UNITS, ROTOL, TYPES (C) SNC/19A/1 and 19B/1

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LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Corrector unit, Rotol, Type (c) SNC/19A/1	**Ref. No. 37M/138**
Corrector unit, Rotol, Type (c) SNC/19B/1	**Ref. No. 37M/139**
Voltage	*32V a.c. (nominal)*
Stators	*3-phase star connected*
Rotors	*Squirrel cage type*

Introduction

1. The corrector unit, a sectional view which is shown in Fig. 1 consists basically of a squirrel cage type rotor which rotates within two, 3-phase coil wound stators, positioned one above the other, plus an output shaft, clutch and cam assembly, a contact spring assembly and a Breeze plug to which the stator leads are connected.

2. The rotor and stator are housed in a cylindrical case having one end closed to form a mounting base for the corrector unit, whilst the open end of the case receives a flange mounted gear box containing the worm wheel output shaft assembly, the contact spring assembly, and the Breeze plug.

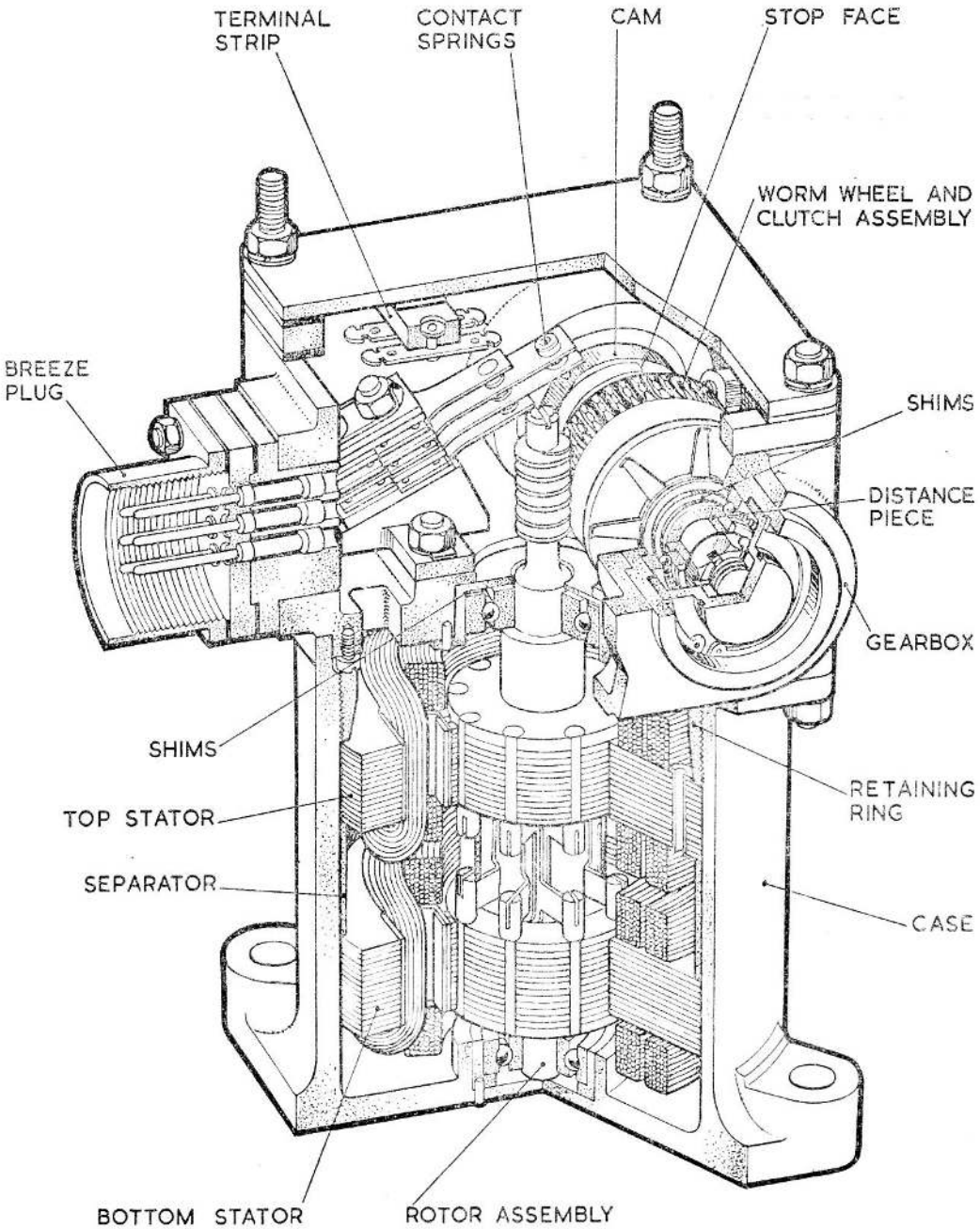

Fig. 1 Sectional view of corrector unit, Rotol, Type SNC/19

DESCRIPTION

Main Frame

3. The frame is cylindrical and is machined from a light alloy casting having a flange base which has four drilled holes by which the corrector unit is secured to its aircraft mounting. A step in the bore diameter of the lower half of the frame forms a shoulder abutment face against which the bottom stator rests. The base of the frame is centre-bored to house a bearing liner; this liner is a press fit and is locked in position by a peg. The upper bore of the case is threated to accommodate a retaining ring.

4. The retaining ring screws into the threaded upper portion of the case bore to secure the stators in position. The ring is itself locked by the head of a set-screw which fits into one of the four equi-distant slots machined in the end of the ring.

Stator

5. Both stators are 3-phase star connected and of similar construction. They are built up with steel laminations which are rivetted together with tubular rivets. The bore of the rivets of the top stator are enlarged to allow the leads from the windings of the bottom stator to pass through them. Slots machined in the outer periphery of the stator stack engage with the two rivet heads in the bore of the frame and thus locate the stator.

Rotor

6. The squirrel cake rotor comprises two laminated steel stacks separated by a tube and mounted on a shaft. On the outer end of each stack is a copper shorting ring. These rings are interconnected by copper conductor rods passing through slots in the stacks and copper connecting strips. Two diametrically opposite conductors are of sufficient length to pass directly from one shorting ring to the other (*fig.* 1). The remaining short conductors protrude from the inner ends of the stacks where they are interconnected, a conductor of one stack to a conductor of the other stack, by the connector strips.

7. The rotor shaft runs in two single row caged ball type bearings. The lower bearing locates against a distance piece fitted on the shaft and abuts the bottom of the rotor. The upper bearing is the larger of the two and it locates against a shoulder formed by a reduction on the shaft diameter. This upper bearing is fitted to a bearing liner in a recess at the base of the gear box; a laminated brass shim is interposed between the liner and the bearing end face to set the end float of the rotor shaft. The upper end of the shaft is machined to form a worm gear which drives the wormwheel in the gear box.

Gearbox

8. The gearbox is box-shaped and machined to fit the flanged head of the main unit frame. Incorporated in the base are four studs, by which the case is secured to the main frame by plain nuts locked by spring washers. Fitted into the underside of the base is a set screw, the head of which locks the stator retaining ring.

9. This screw may be fitted in any one of the five tapped holes which are spaced at equal intervals round the base, thus ensuring that the screw may be fitted in a position where its head will engage one of the four slots in the stator retaining ring.

10. The base of the gear box frame is centre-bored and counter bored to house a bearing liner and to give passage for the rotor shaft. A further slot in the base admits the stator leads. Two studs in the base provide attachment for the contact spring group which is secured by plain nut locked by a double tab-washer. Fitted in the head of the gear box case are four studs to which an insulated terminal board and lid are secured by nuts, and spring and plain washers. Gaskets are fitted between the gear box case and terminal board and between the terminal and lid.

11. Four studs which are mounted into a machined boss on the side of the gear box case carry the nine-pin Breeze plug which is secured by nuts and shakeproof washers.

Wormwheel shaft

12. The wormwheel shaft rotates in two bearings, both of which are of the same size, and are of the single row caged ball type. One of these bearings is fitted into a liner which houses in addition a seal holder in which is fitted an oil seal, a laminated brass shim, and a distance piece. An internal Seeger circlip secures the items in the bearing liner and abuts the seal

holder. The bearing locates against the flanged inner end of the liner, and the laminated shim fits between the seal holder and the distance piece which abuts the outer race of the bearing.

13. The other bearing also fits into a bearing liner which houses an end cover, and a laminated brass shim. An internal Seeger circlip secures the shim and the end cover in the liner. The circlip abuts the end cover, while the shim is fitted between the cover and the shoulder formed by the reduction in the bore of the liner. The position of this bearing is determined by the overall linear dimension of the component parts mounted on the worm wheel shaft.

14. The control lever operating end of the shaft passes through the liner housing the oil seal. The other end of the shaft terminates in the opposite bearing liner. The oil seal makes a seal between the shaft and the liner to exclude dust etc. from the bearing. The end cover performs a similar function in the other liner.

Wormwheel output shaft

15. One end of the shaft terminates in an integral flange, on the face of which is an eccentric spigot. A lever which forms part of the engine power controls, fits on this eccentric spigot where it is secured by a slotted nut locked by a split pin. The periphery of the shaft flange is slotted in two places, one slot being marked with the letter A and the other B.

16. The central length of the shaft is serrated to receive the similarly serrated clutch sub-assembly and the cam, while the end of the shaft is threaded to receive a split-pin locked slotted nut which secures the shaft in the gear box. Fitted on this end of the shaft is a flanged distance piece which locates in the bearing inner race.

Cam

17. The bore of the cam is serrated to fit the shaft serrations, and it locates against the inner race of the shaft operating end bearing. This cam operates the contact spring assembly. Movement of the cam in either direction is arrested by integral stop faces on the cam which abut the stop peg fitted in the gear box; this therefore limits the movement of the shaft in either direction.

Clutch assembly

18. Mounted on the centre of the shaft between the cam and the flanged distance piece is the clutch sub-assembly which consists of a worm wheel, a five plate clutch and spring, and a two piece drive sleeve. The worm wheel drives the shaft through the medium of the clutch and drive sleeve. A laminated brass shim is fitted between the cam and the drive sleeve to align the worm wheel with the rotor shaft worm gear.

19. The drive sleeve is constructed in two parts, a flanged inner member and a flanged outer member. The bore of the inner member is serrated to locate on the worm wheel shaft, whilst its flange is slotted to locate on the dogs on the end face of the outer member, thus transmitting the drive. The outer member is externally serrated over a third of its length to receive the clutch plates and is externally grooved at one end to receive a retaining plate.

20. The worm wheel is bored to fit on a plain portion of the drive sleeve and counter bored to house five-plate clutch. The counterbore of the worm wheel is serrated to receive the clutch plate. The centre and end plates are serrated over their outer peripheries to fit the worm wheel serration, whilst the bores of the intermediate plates are serrated to fit the serrated drive sleeve. The clutch is set to slip at the requisite torque by means of a seven-pronged dished spring.

21. The worm wheel clutch and spring are secured on the drive sleeve assembly by a retaining washer and a retaining plate. The plate fits in the groove of the outer drive sleeve and locates in the recessed face of the retaining washer. Laminated shims fitted between the washer and the dished spring provide for adjustment of the clutch torque.

Note . . .

A laminated brass shim may be found fitted on the shaft between the drive sleeve assembly and the distance piece. This shim ensures that the overall linear dimension of the cam, and drive sleeve assembly and the distance piece (as far as its shoulder) is sufficient to prevent the bearing abutting the flanged inner end of its bearing liner, when the shaft securing nut is tightened.

Datum setting variations

22. When the worm wheel shaft is in the datum position, angular relationship of the eccentric spigot to the scribed datum line is not the same on all three corrector units.

Due to installation requirements, that of the port inner engine corrector unit differs from the other two. The units are identified by the suffix letters A or B as follows :

Corrector unit type SNC/19A/1 ...	Port and Starboard outer engines.
Corrector unit type SNC/19B/1 ...	Port inner engine.

Contact spring assembly

23. The contact spring assembly is secured by a clamping plate and plain nuts locked by a double tab washer to two studs fitted in a mounting piece. The mounting is drilled to fit on the studs in the base of the gear box. The contact assembly consists of five connectors and five leaf springs fitted in pairs, and suitably insulated. Movement of the cam operates the contacts by means of a cam follower and a lifting pin which are fitted to the two longer spring contacts.

Terminal board

24. An insulated terminal board is fitted to the side of the gear box adjacent to the contact spring assembly, and provides for the internal connection to the Breeze plug, contact springs and stator windings.

REMOVAL AND INSTALLATION

Removing the corrector unit

25. The corrector unit should be removed in the following sequence where doubt exists reference should be made to the appropriate Aircraft Handbook.

(1) Disconnect the engine controls from the operating lever.

(2) Remove the operating lever, if necessary, by removing the split-pinned nut and washer securing it to the eccentric spigot. Refit the nut and washer to the spigot to avoid loss.

(3) Disconnect the electrical socket from the Breeze plug.

(4) Remove the clamp and the four nuts and bolts securing the unit to its mounting.

(5) Remove the corrector unit.

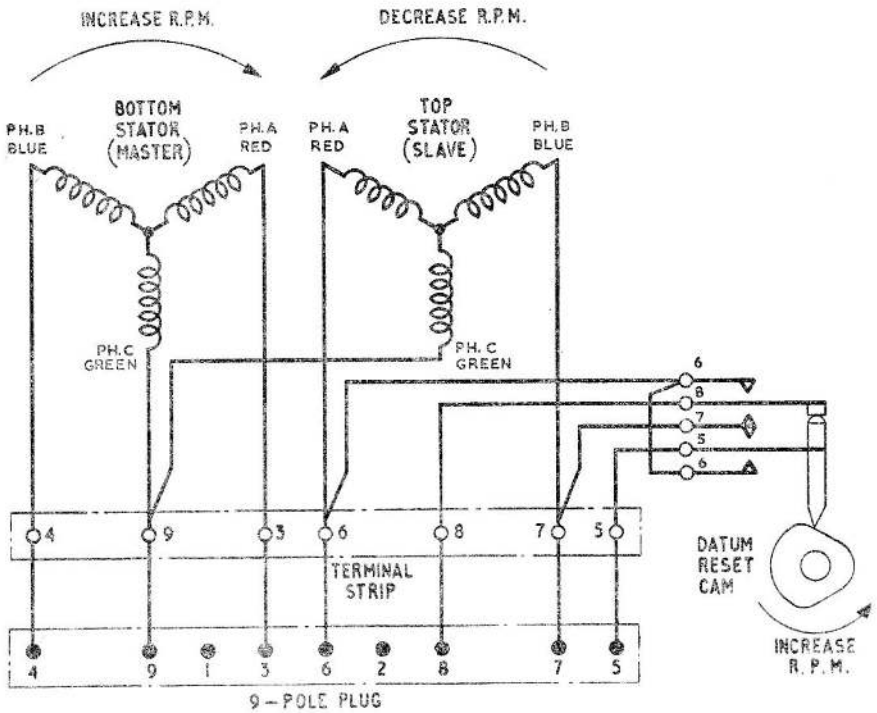

Fig. 2 Circuit diagram

(6) After removing the corrector unit, fit a blanking device to the Breeze plug.

Pre-installation checks

26. (1) Ensure that the type number is correct.

(2) Remove all relevant blanking devices.

(3) Check that the whole unit is damage free, especially threads, Breeze plug pins, and mounting faces.

Installation

27. (1) Position the unit on its mounting so that the eccentric spigot end of the shaft aligns with the engine controls.

(2) Secure the unit, using the four bolts nuts and washers and tighten each nut evenly in turn.

(3) Secure the clamp bracket around the unit.

(4) Connect the aircraft socket to the Breeze plug and wire lock.

(5) Using Slade nuts, temporarily secure the special locking plate on the two long studs of the unit so that its tongue engages in the appropriate datum slot of the worm wheel shaft.

(6) Fit the correct operating lever for the engine to the eccentric spigot and secure it with a slotted nut plain washer and split pin.

(7) Connect up the engine controls by reference to the aircraft handbook.

(8) When the controls have been set the locking plate must be removed. When removing do not disturb the nuts which secure the lid of the unit.

Note . . .

Reference to (5) *the locking plate holds the shaft at datum when the engine controls are being set. It must engage in the slot marked A of units SNC/19A/1, and in slot B of units SNC/19B/1. The spanner end of the locking plate should be used to turn the shaft to its correct datum position.*

SERVICING

28. In accordance with appropriate aircraft Servicing Schedule, examine the unit for security of mounting, and ensure that the control lever is secure on the output shaft.

29. Check the condition of the cables and examine the plug and socket for signs of corrosion. Ensure the connection is tight and wire locked after inspection.

30. Remove the terminal cover from the gearbox and inspect the visible components for damage and condition.

Note . . .

After replacing the terminal cover and tightening the securing nuts apply Endolac varnish to the stud threads.

31. Some of the defects attributable to the corrector unit are given in Table 1 of the main chapter. A suspect unit should be removed from the aircraft and a new or reconditioned one fitted. The unit removed from the aircraft should be returned to store and dealt with in accordance with current authorised procedure.

Appendix 3

CONTROL PANEL, ROTOL, TYPE SNP/2/2

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

LEADING PARTICULARS

Control panel, Rotol, Type SNP/2/2	**Ref. No. 5UC/6714**
Rating	30*V a.c.*
Switch	12-*pole* 4 *way*
Plug connection	26-pole Breeze

Introduction

1. The control panel, Rotol, Type SNP/2/2, is designed for use with the engine speed synchronizing equipment. It provides a 2-way ON/OFF control; the switch being operated manually.

DESCRIPTION

General

2. A sectional view of the control panel is shown in Fig. 1, and it consists mainly of a switch and a Breeze type plug, both of which are housed in a two piece casing.

Front panel

3. The front panel forms the main part of the casing and is fitted with four 2BA inserts for securing the case to the aircraft instrument panel. An engraved disc marked with the switch positions is carried on the front face of the panel.

4. The rear of the panel carries two shaped pillars which provide a fixing for the plug mounting plate, and two 5BA studs which provide a fixing for the wafer assembly of the switch.

5. The threads of both the pillars and studs are oversize to ensure a rigid fixture to the front panel.

Switch

6. The switch is of the 2 (double sided) wafer, 12-pole, 4 position type, but in this application uses only two positions.

7. The switch is mounted on the two 5BA studs and is secured by nuts and washers. The mounting bush provided on the switch is secured through the centre hole in the front panel by plain nuts and shakeproof washers. The engraving panel is also secured by this nut. The selector switch

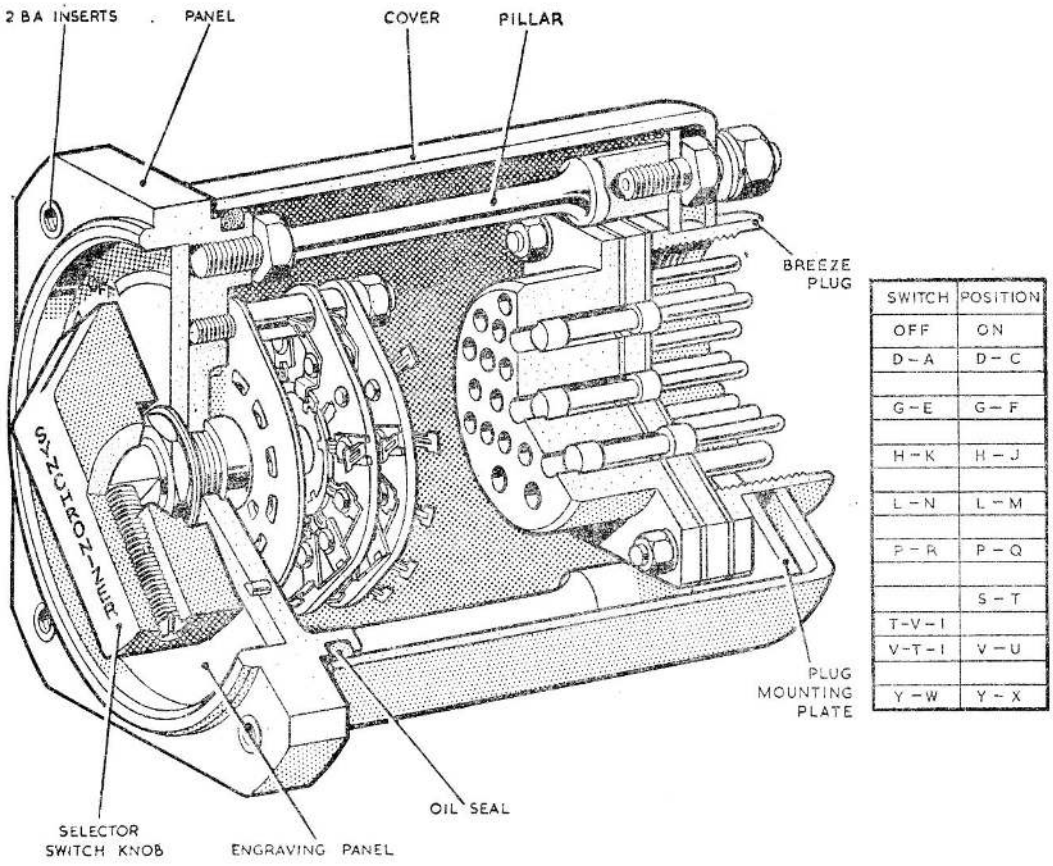

Fig. 1 Sectional view of control panel Type SNP/2/2

knob is secured to the switch spindle by a grub screw.

Plug mounting

8. A plug mounting plate is secured to the pillars at the rear end of the panel and is secured by two 2BA studs. These studs fit into the counterbored holes in the end of the pillars, and are slightly oversize to provide a rigid fixture.

9. A 26-pole Breeze type plug is secured to the mounting plate, by four 6BA nuts and bolts. Two of the pins of this plug are of larger diameter than of the remainder to ensure correct location of the socket.

Cover

10. A cover spun over at one end to form a flange, is fitted over the rear assembly and holes provided in the flange locate on the two 2BA studs where it is secured by nuts and washers. The front end of the cover abuts onto the rear face of the front panel and forms a seal with a rubber washer which is recessed into the outer periphery of a lip on the rear face of the panel.

INSTALLATION

11. A circuit diagram of the control panel is given in Fig. 2, and the switch connections in Fig. 1.

SERVICING

12. During routine inspections in accordance with the appropriate Servicing Schedule, ensure that the panel is secure in its mounting and that the selector knob is secure to its spindle.

13. Check the plug and socket connections and cables for serviceability, and ensure that the switch gives a positive action in both switch positions.

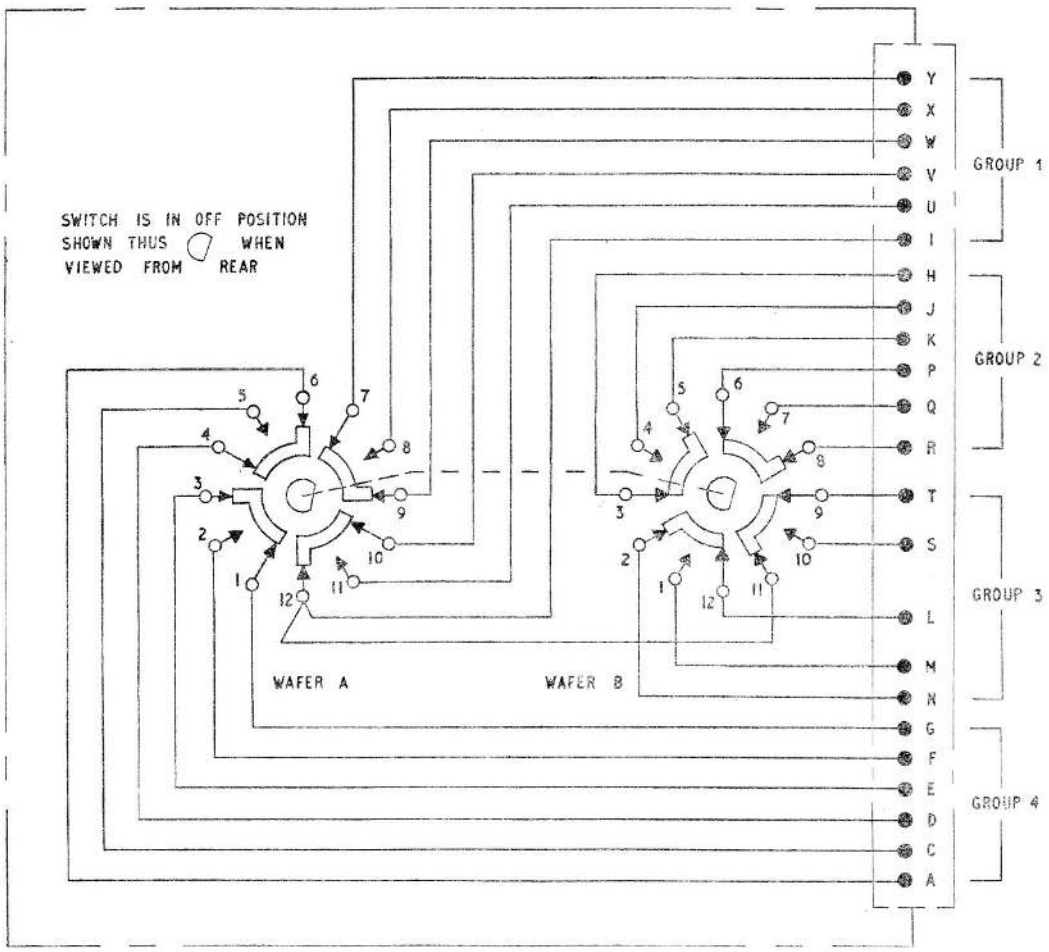

Fig. 2 Circuit diagram