GROUP B — FLYING INSTRUMENTS (ELECTRICAL AND MAGNETIC)

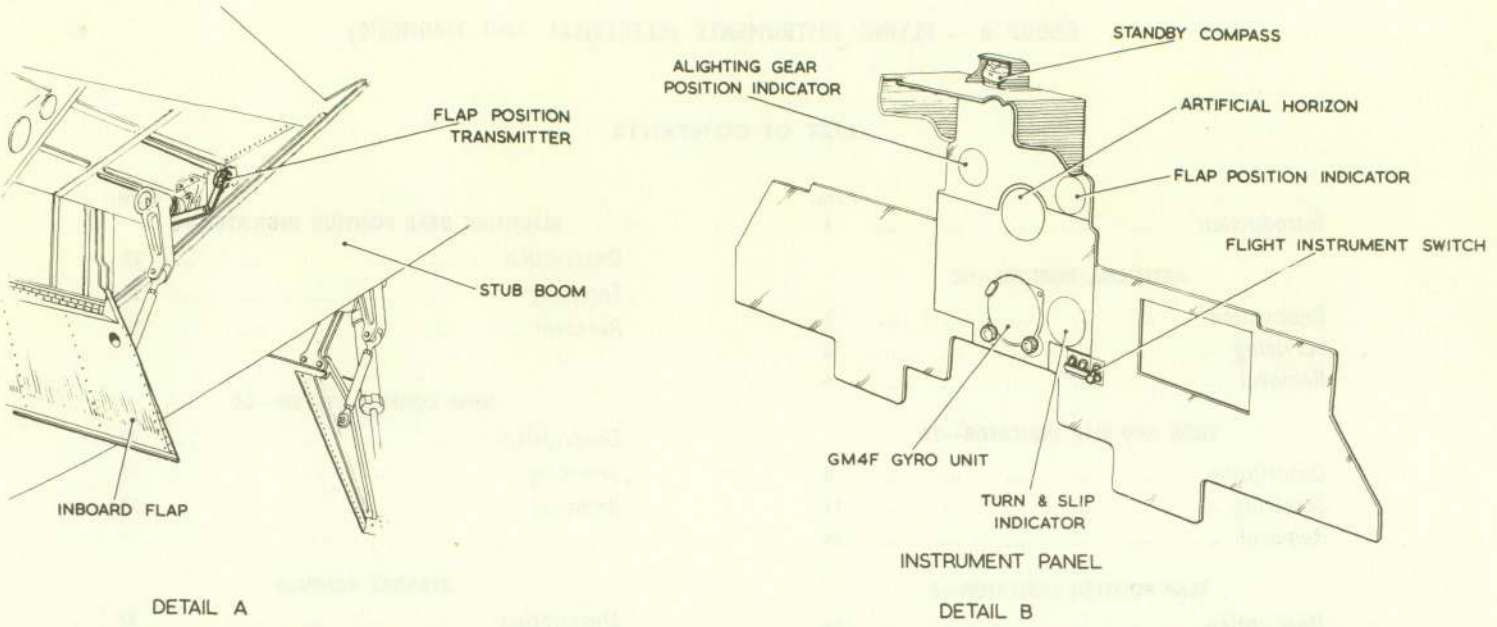
LIST OF CONTENTS

LIST OF ILLUSTRATIONS

Introduction

1. The information contained in this group relates to those flying instruments which are electrically and/or magnetically operated. The electrical power supplies are dealt with in Chap. 1, App. 1, Group A of this Section. The components used are described in the specialist Air Publications listed below.

Equipment	Air Publication
Artificial horizon Mk.3C	1275A, Vol.1, Sect.13, Chap.12
Turn and slip indicator Mk.3 (Pullin Type)	1275A, Vol.1, Sect.13, Chap.14
Desynn transmitter Type D Desynn indicator Type A	1275A, Vol.1, Sect.16, Chap.12
Alighting gear position indicator Type D	4343E, Vol.1, Sect.18, Chap.4
GM4F gyro unit Type A GM4F detector unit Type A GM4F amplifier Type A GM4F corrector control box Type A	1275B, Vol.1, Sect.11, Chap.6
Standby compass Type E2A	1275A, Vol.1, Sect.10, Chap.8



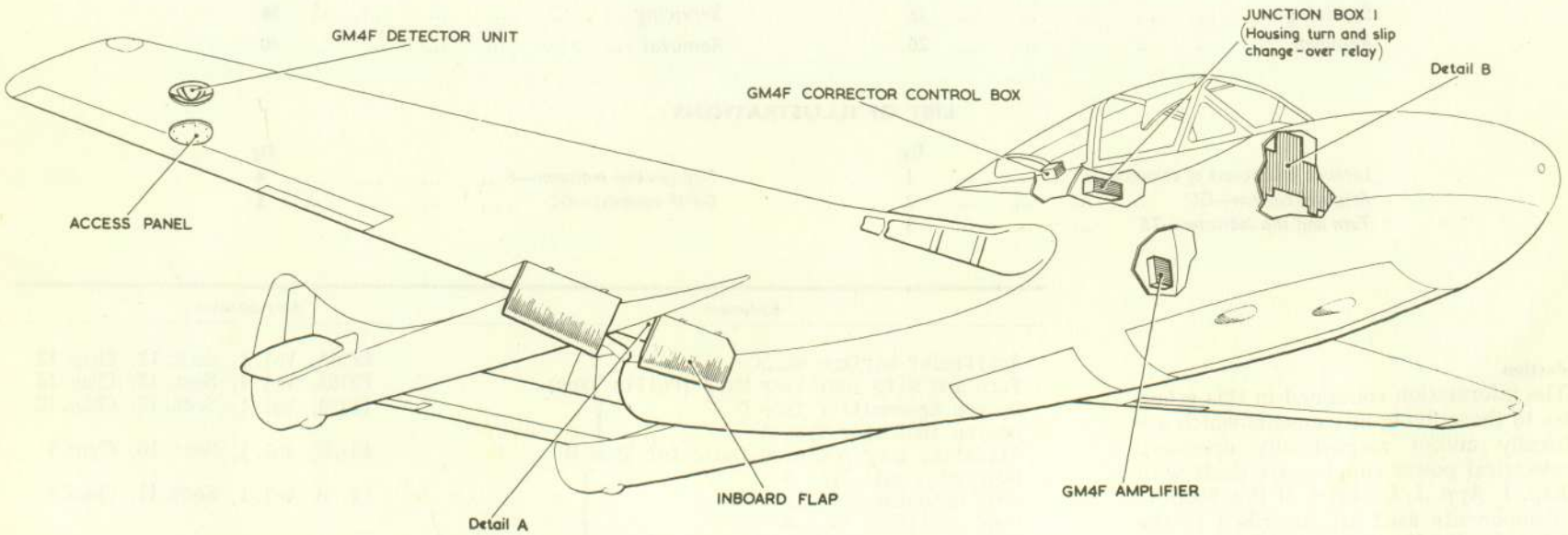


Fig.1. Location and access of components

ARTIFICIAL HORIZON

Description

2. This instrument, fitted to the centre of the instrument panel, provides a continuous indication of the attitude of the aircraft in pitch and roll relative to the natural horizon.

3. The instrument incorporates an horizon bar and a roll indicator, coloured white, which move over a black background. On the face of the instrument is the symbol of an aeroplane to indicate the aircraft's attitude above or below the natural horizon, represented by the horizon bar. The roll indicator reads against two graduations either side of a lubber line.

3A. A power failure indicator is embodied in the form of a flag which shows OFF through an aperture in the instrument face whenever the a.c. supply is off, or whenever there is a failure of one or more phases. A fast erection push-switch is located at the lower left-hand face of the instrument to accomplish rapid erection of the gyro.

Warning . . .

Fast erection should not be applied during the first fifteen seconds after selecting the flight instrument switch ON, or the gyro will hunt violently as it runs up to speed.

4. The electrical gyro is supplied with 115 volts, three phase, 400 c.p.s., a.c., this supply being dealt with in Sect. 5, Chap. 1, App. 1, Group A. The circuit is controlled by the flight instrument switch fitted to the instrument panel.

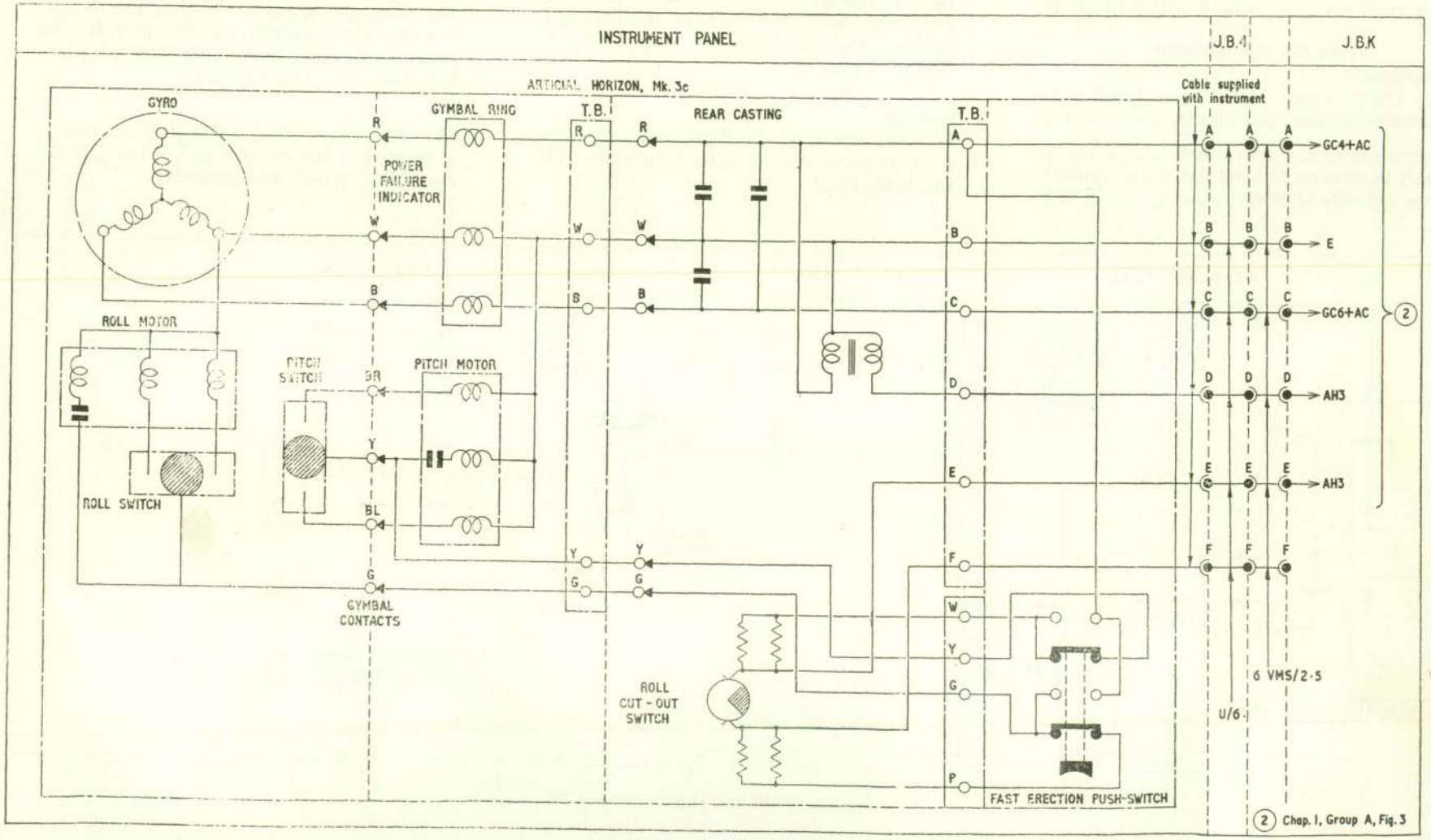


Fig. 2. Artificial horizon—GC

Servicing

5. The instrument is described, together with all servicing data, in the specialist Air Publication listed in para. 1. The same A.P. contains the standard serviceability test for the instrument.

Removal

6. The method of removing the instrument will be self-evident when viewed on the aircraft.

7. The instrument panel must first be lowered (Gen. Inf., para. 8 of this Chapter).

TURN AND SLIP INDICATOR

Description

8. The turn and slip indicator, fitted to the instrument panel, provides the pilots with an indication of the lateral attitude of the aircraft in relation to level flight, and indicates yaw, side-slip or correct banking during turns.

9. The amount of side-slip of the aircraft is shown by a fluorescent pointer bob at the bottom of the dial, whilst the rate of turn is indicated by a pointer over a fixed scale at the top of the dial. A power failure indicator is provided in the left centre of the dial; it indicates 'OFF' when the rotor speed drops below approximately 2,000 r.p.m.

10. As the aircraft can be safely flown on this instrument alone, the electrical supply has been duplicated; Sect. 5, Chap. 1, App. 1, Group D, para. 2.

Servicing

11. The specialist Air Publication, listed in para. 1, gives the servicing information for this instrument.

12. The Appendix 1 to the aforementioned specialist Publication contains the instrument's standard serviceability test.

13. Periodically, the instrument should be functionally tested as described in Sect. 5, Chap. 1, App. 1, Group D, para. 4.

Removal

14. Removal of the instrument will be self-evident when viewed on the aircraft, the instrument panel first being lowered (Gen. Inf., para. 8 of this Chapter).

15. The relay, fitted inside junction box 1, is secured to the inboard end of the J.B. by two 4 B.A. screws and stiffnuts.

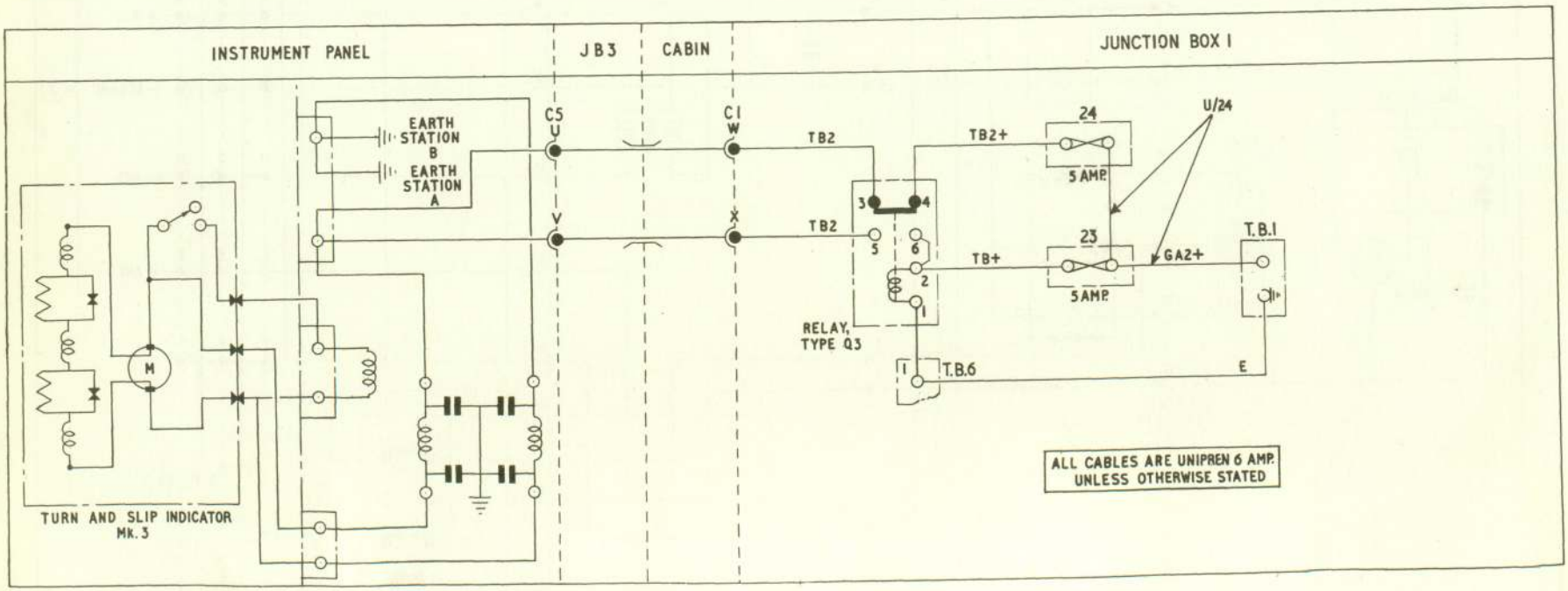


Fig. 3. Turn and slip indicator—TB

FLAP POSITION INDICATOR

Description

16. A conventional desynn indicator system is employed to convey to the pilots, the position of the flaps relative to the aircraft longitudinal datum.

17. A transmitter, located in the starboard inboard flap shroud, is linked to the flap torque tube assembly as described in Sect. 3, Chap. 4. The signal from this transmitter is conducted to the indicator fitted to the instrument panel, a single pointer indicating the position of the flaps. The pointer, when at the bottom, centre position, indicates flaps down and, when at the top centre position, indicates flaps up.

Servicing

18. The components in this instrument system are described in the specialist Air Publication listed in para. 1.

19. In situ testing of the individual system components is described, using the desynn test set, in A.P.1275T, Vol. 1, Sect. 5, Chap. 1. The setting up procedure for synchronising the transmitter with the flap is described in Sect. 3, Chap. 4 of this book.

Removal

20. The method of removing the indicator will be self-evident when viewed, the instrument panel first being lowered (Gen. Inf., para. 8 of this Chapter).

21. To remove the transmitter, it is first necessary to disconnect the transmitter link from the operating link (Sect. 3, Chap. 4, fig. 9). The transmitter bracket may now be removed, the transmitter afterwards being removed from the bracket complete with its link.

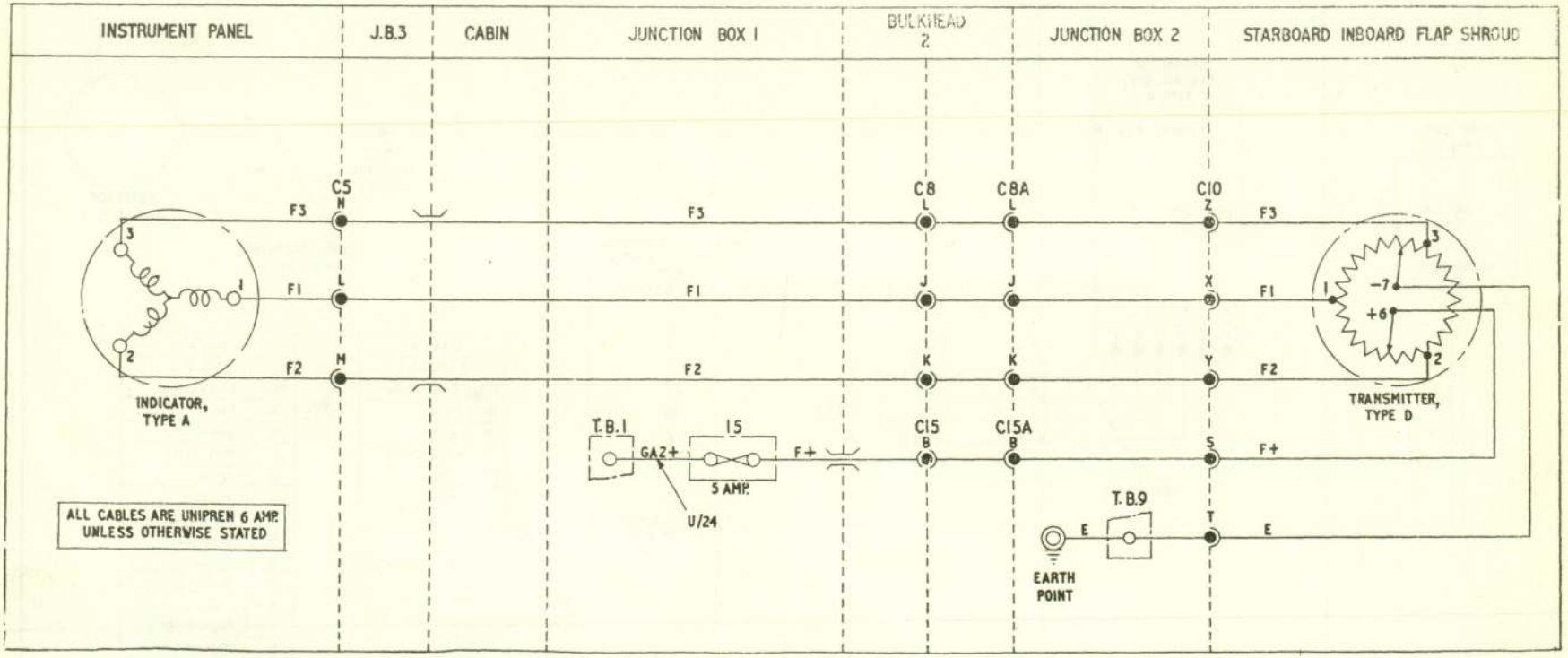


Fig. 4. Flap position indicator—F

ALIGHTING GEAR POSITION INDICATOR

Description

22. The indicator is fitted to the instrument panel as described in Chap. 1, App. 1, Group F of this Section. The indicator incorporates nine lamps, three of which are covered by red windows while the remainder are covered by green windows.

23. Of the six green lamps, three only are used at a time, the remaining lamps constituting a spare set. Each set is divided to signify port, nose and starboard undercarriage legs.

24. When the alighting gear is down and locked, the selected set of green lamps light. With the alighting gear unlocked, or in a travelling state, the green lamps circuit is disconnected and the red lamps light. With the alighting gear locked up, both red and green lamps circuits are disconnected. The lamps are controlled by micro switches, as described in Chap. 1, App. 1, Group F of this Section.

25. In the event of any of the selected set of green lamps failing, the spare set may be switched into circuit by pulling out the centre button of the indicator. Rotating this button clockwise causes a night screen to cover the lamps, thereby eliminating glare.

Servicing

26. The indicator is described in the specialist Air Publication listed in para. 1.

27. When it is necessary to renew any lamp in the indicator, the complete lamp assembly may be withdrawn from the casing by unscrewing the knurled knob at the centre of the dial.

Note . . .

When refitting the lamp assembly, ensure that the assembly keys engage with the keyways in the casing. Under no circumstances must force be applied.

Removal

28. The method of removal of the indicator will be self-evident when viewed on the aircraft. The instrument panel must first be lowered (Gen. Inf., para. 8 of this Chapter).

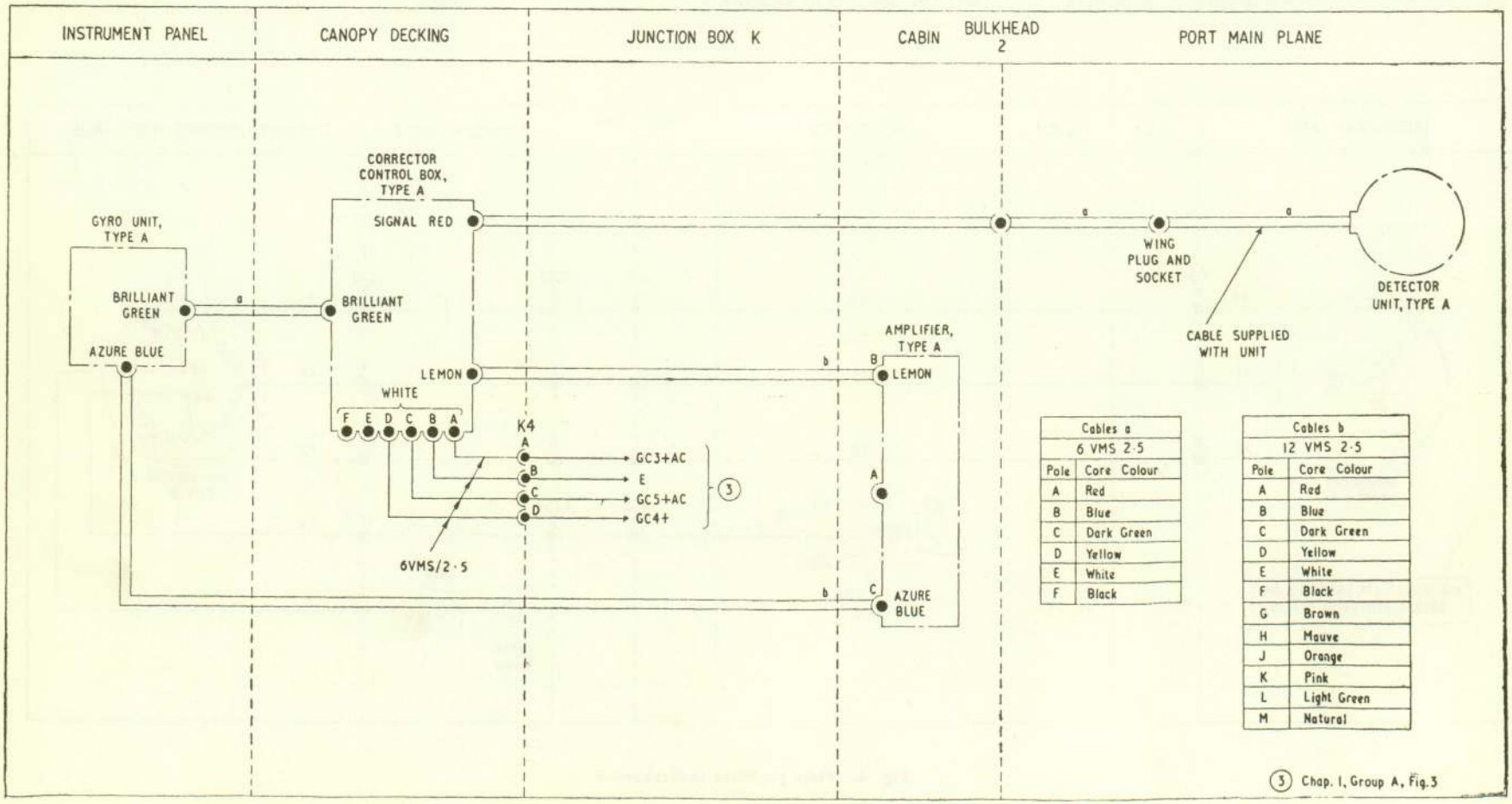


Fig. 5. GM4F compass—GC

GM4F COMPASS SYSTEM

Description

29. This compass system is essentially a gyro compass which is synchronized to the earth's magnetic field, being controlled by a magnetic flux valve known as the detector unit. This control eliminates gyro wander.

30. The detector unit is fitted in the outboard tip of the starboard main plane, this being the position in the aircraft least subject to magnetic effects set up by the other aircraft electrical system.

31. The signal from the detector unit is amplified and conducted to the gyro unit, this unit being the pilots' compass indicator and consequently fitted in the centre of the instrument panel. It may be found that the gyro unit has a shield fitted to obviate any interference to the standby compass.

32. The system comprises, in addition to the detector unit, amplifier and gyro unit already mentioned, a corrector control box which is supplied with three-phase a.c. at 115 volts, 400 c.p.s. and 24 volts d.c. (Chap. 1, App. 1, Group A, fig. 3 of this Section).

Servicing

33. The compass system is described, and the servicing given, in the specialist Air Publication listed in para. 1.

34. Appendix 1 to the aforementioned specialist Publication contains the standard serviceability test, while A.P.1275B, Vol. 1, Sect. 3, Chap. 14 contains, in Appendix 3, the method of adjusting and calibrating the compass system.

Removal

35. All the equipment in the compass system, except the detector unit, is accessible in the cabin, the method of removal being self-evident when viewed on the aircraft. The pupil pilot's ejection seat must be removed to gain access to the amplifier.

Note . . .

The instrument panel must first be lowered (Gen. Inf., para. 8 of this Chapter) before the gyro unit may be removed.

36. The detector unit is accessible through an access panel in the lower skinning of the starboard wing tip, and is secured to a bracket by three bolts.

STANDBY COMPASS

Description

37. A miniature magnetic compass is fitted to a bracket above the centre of the instrument panel, its function being that of a standby compass should the GM4F compass system fail. It is shrouded on either side by a metal screen, so that the luminous compass card markings will not confuse the pilots during night time gyro gun sight usage.

Servicing

38. The compass is described in the specialist Air Publication listed in para. 1.

39. A.P.1275B, Vol. 1, Sect. 3, Chap. 11 details the calibration procedure necessary for magnetic compasses, the correctors for co-efficients B and C only being incorporated in the top of the E2A compass.

Removal

40. The compass is fitted to its bracket by two 4 B.A. bolts, the compass being lined up with the aircraft's lubber line.