Chapter 2

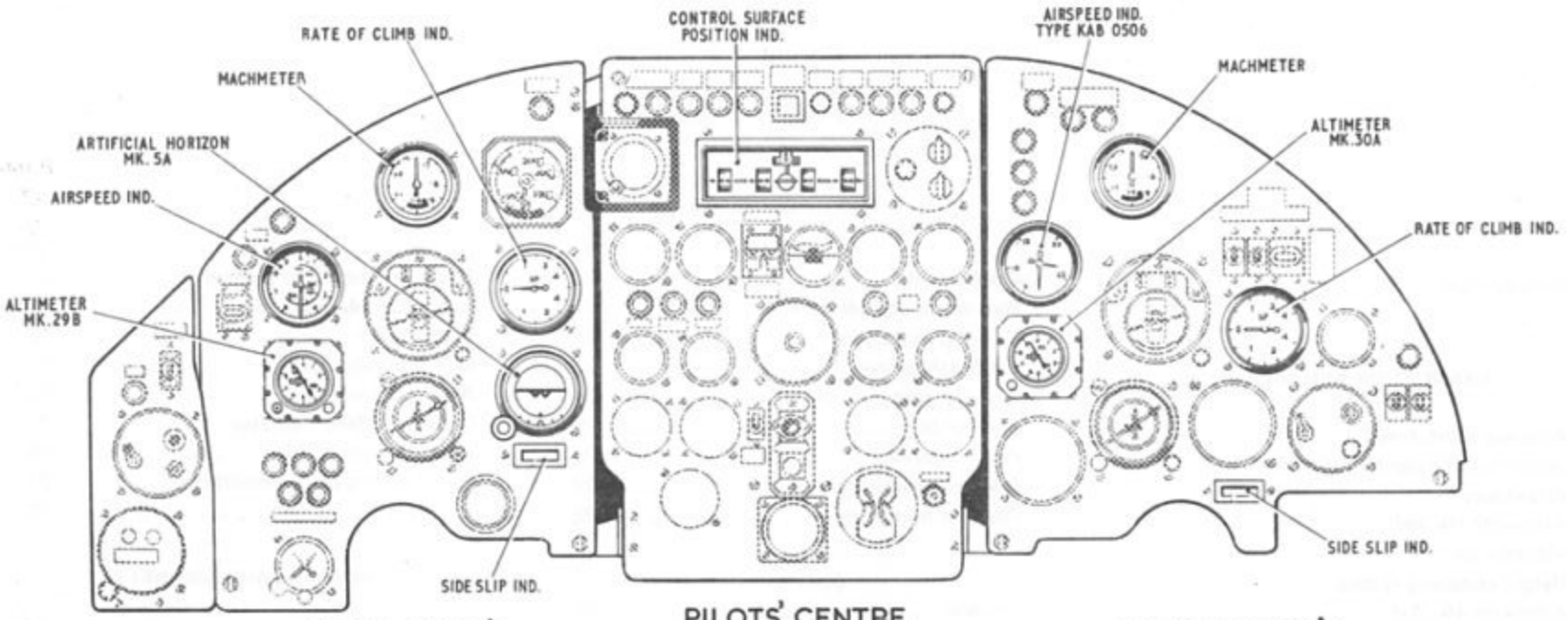
FLYING INSTRUMENTS

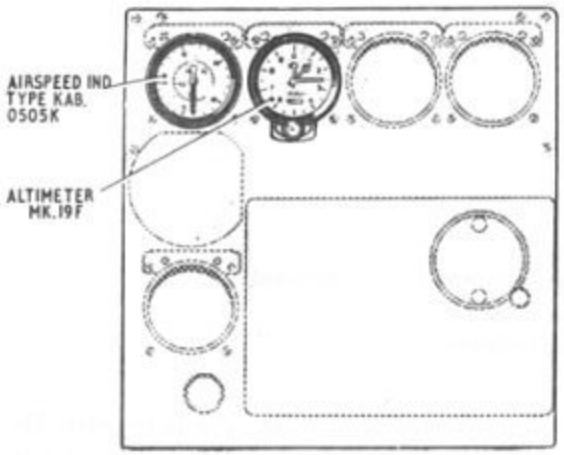
Completely revised

LIST OF CONTENTS

Introduction

1. This chapter contains descriptive and servicing information for the aircraft flying instruments and associated controls. These instruments provide indication of the aircraft's performance and attitude in flight and are installed on the pilot's panels and the plotter's instrument panel at the navigation station. The instruments used are of the fluorescent type and include the following:-





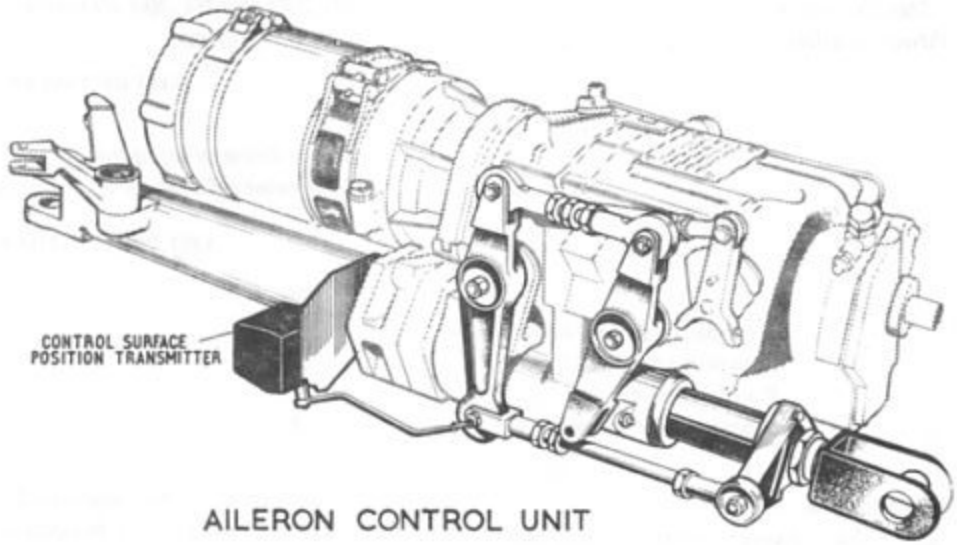


Fig.1 Arrangement of flying instruments

(1) Airspeed indicators

(2) Altimeters

(3) Rate-of-climb indicators

(4) Machmeters

(5) Slip indicators

(6) Artificial horizon indicator

(7) Control surface indicator

The panels bearing the instruments are anti-vibration mounted and the instruments are arranged as shown in fig.1.

2. Short lengths of Maricon tubing, Type H, secured at each end by Type AGS606E clips, connect the pitot-static instruments to the pitot-static supply lines. The pitot-static system is described in Chap.1.

3. A brief outline of the power supplies for the electrically operated instruments is provided together with the relevant routing charts. For more detailed information on the power supplies, reference should be made to Sect.6 of this publication.

4. Complete information on the instruments, including operating and servicing instructions will be found in the associated A.P's listed in Table 1. The following modifications are included in this chapter:-

Mod.1888 - To reposition the combined radio altimeter and phase indicator, and the associated limit lights at the pilots' station and to introduce an additional radio altimeter indicator, Type 16094, Ref.No. 10Q/16459 at the Nav/Plotter's panel.

Mod.2017 - To introduce A.R.I.5952 in lieu of A.R.I.5919.

Mod.2105 - To introduce horizon gyro Mk.5A, Ref.No. 6A/11139 in lieu of horizon gyro Mk.6B, Type F.H.7B, Ref.No. 6A/6004 and deletion of relay, Ref.No. 5CW/6098.

Mod.2182 - To introduce a transformer to provide an alternative source of supply for the standby artificial horizon.

Mod.2214 - To transfer the power supplies for the standby artificial horizon from No.1 to No.2 transformer.

Mod.2292 - Automatic height encoding facilities
To introduce a Mk.29B servo encoding altimeter Ref.No. 6A/6201976 in lieu of the Mk.19F altimeter with vibrator unit at the first pilots station and a Mk.30A servo controlled altimeter Ref.No. 6A/1146374 in lieu of the Mk.22 altimeter with Mk.1 amplifier and Mk.2 tray at the second pilots station. To introduce a pressure error correction unit Ref.No. 6A/6203321 complete with correction module.

DESCRIPTION AND OPERATION

AIR SPEED INDICATORS

5. Three air speed indicators are fitted in the aircraft, one on each pilots' panel and one on the plotter's panel at the navigation station. The first pilot's indicator, Type AS/PC, is a sensitive instrument with a two pointer presentation and a range of 50-600 knots.

6. The second pilot's and plotter's instruments, Type KAB.0506 and KAB.0505K respectively are essentially the same except that the second pilot's, Type KAB.0506, indicator is fitted with a magnetic flag. The flag is used to warn the pilot to lower the alighting gear when the aircraft is approaching the normal landing speed. The range of both instruments is from 50 to 490 knots.

Second pilot's warning indicator

7. This warning indicator is controlled by an air speed switch fitted in the back of the instrument case, the electrical connections being made via a 2-pole plug. The switch works in conjunction with the main and nose wheel DOWN micro switches and forms part of the alighting gear indication circuit (Sec.6, Chap.11). When the speed of the aircraft has

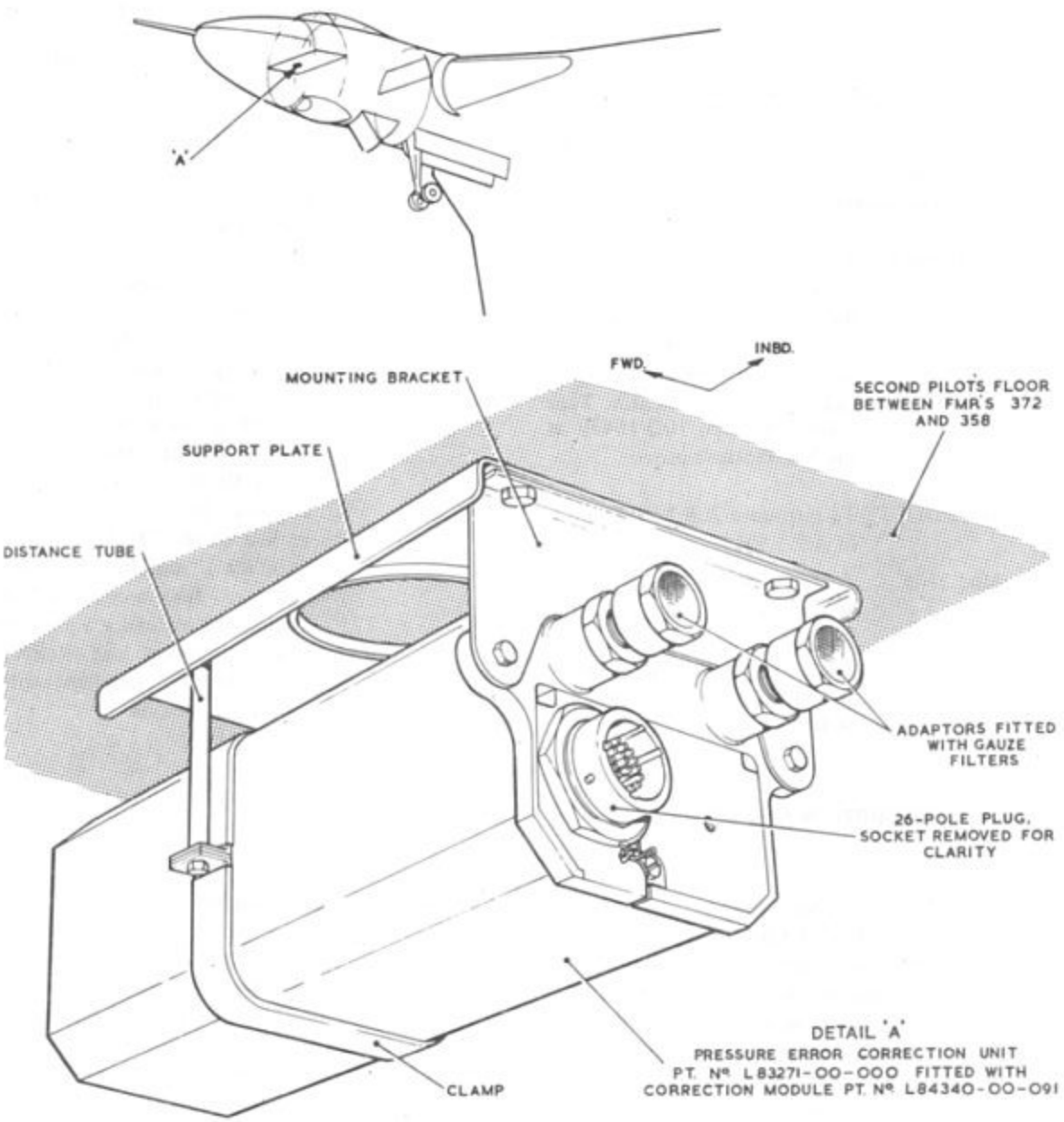


Fig. 2 Location of P.E.C.U.

dropped to 160 knots the contacts of the airspeed pressure switch will close. Should the main wheel units then be at any position other than locked down, the warning flag will appear in the upper part of the instrument scale.

ALTIMETERS

8. Three altimeters are fitted in the aircraft, one on each pilot's panel, and one on the plotter's instrument panel. The one on the plotter's panel is a Mk.19F sensitive altimeter. The ones fitted to the first and second pilot's panels are Mk.29B and Mk.30A servo encoding altimeters respectively and form part of the height encoding system. A radio altimeter, also fitted to the first pilot's panel is fully described in Sect.8, Chap.8 of this publication.

Altimeter Mk.19F

9. The Mk.19F sensitive altimeter, fitted with a vibrator unit clamped to the rear end of the case, is conventional in operation and supplied with static air from the stbd. pitot static system. The working range of the altimeter is from 0-60 00 ft.

Vibrator unit

10. This vibrator unit is used to improve the sensitivity of the altimeter, especially at the higher altitude ranges, by imparting vibrations to the altimeter mechanism. The vibrator is fed with a 115-volt, 400 Hz single-phase a.c. from fuse 327-R in the port fuse and relay box 71P (fig.2) and vibrates at a frequency of 3 200 Hz.

HEIGHT ENCODING SYSTEM

Altimeter Mk.30A

11. The Mk.30A servo controlled encoding altimeter, fitted at the second pilot's panel

displays altitude over a calibrated range of –900 to +60 500 ft. The altimeter operates in conjunction with a pressure error correction unit (P.E.C.U.) mounted on the pilot's floor (stbd. side). The P.E.C.U. feeds corrections (which vary with height only) into the altimeter to give a more accurate 'read out' of height. Electrical outputs from the altimeter are fed to a Mk.29B servo encoding altimeter. An encoded height output, for altitude reporting is automatically transmitted on interrogation through the I.F.F./S.S.R. transponder (A.R.I.23134/5/4, Sect.9, Chap.2A). Electrical connections to the altimeter are made via a 41-pole plug and flying lead. The instrument case is connected to the static air of the starboard pitot system via a 1/2 inch threaded insert on the rear case.

12. Indication of altitude is given by a pointer moving over a scale calibrated in 100 ft. intervals and a five digit counter indicating height in tens of thousands, thousands and hundreds of feet. The tens of thousand feet counter is marked with diagonal black and white stripes to give an indication of altitudes below 10 000 ft. At negative altitudes the counter is marked with diagonal red and white stripes.

13. A setting knob, fitted on the front face of the instrument, enables the altimeter to be set to a selected barometric pressure, which is displayed on a four digit counter. In the event of a power failure, or servo-malfunction, a red and black diagonal striped failure flag drops into view to obscure the pointer and counter display. A warning flag labelled P.E. in the upper part of the instrument face drops into view in the event of failure or malfunction of the P.E.C.U.

Pressure error correction unit

13A. The P.E.C.U., Part No. L.83271-00-000, fitted with correction module, Part No. L.84340-00-091, is mounted on a bracket under the 2nd pilot's floor between formers 358 and 372 (fig.2). The basic unit consists of a servoed differential pressure transducer, which drives a potentiometer, to provide correction outputs (which vary with height only) in the form of voltages, to the Mk.30A altimeter. The correction module computes a height correction factor from outputs derived from the Mk.30A altimeter and converts them electronically into a synchro signal output which is fed back into the servo loop of the Mk.30A altimeter to give a more accurate read out of height. Electrical connections to the unit are made via a 26-pole plug on the front case. The two inlets for pitot and static, also on the front face of the unit, are not used in this system and are protected by two adaptors fitted with gauze filters. For further details of the P.E.C.U., refer to the associated A.P. listed in Table 1.

Altimeter Mk.29B

14. The Mk.29B servo encoding altimeter, fitted at the first pilots' panel, is a servo operated instrument with automatic reversion to capsule operation in the event of a power failure, or by manual selection. Electrical connections are made via a 19-pole plug and flying lead, the instrument case is connected to the port-static system via a ½ inch threaded insert on the rear case (Chap.1).

15. Indication of altitude is provided by a pointer moving over a calibrated scale and a drum, both calibrated in 100 ft. intervals, and a two digit counter, showing tens of thousands and thousands of feet. The range of the instrument is from –1 000 to +60 000 ft. To bring attention to altitudes below 10 000 ft. the ten thousand feet counter is marked with diagonal white stripes instead of the figure 0, and for negative altitudes the counter is marked with diagonal red stripes instead of the figure 9.

16. A setting knob on the front bezel is used for setting the barometric pressure which is displayed on a four digit counter. A further setting knob labelled 'S' and 'R' (standby and rest) is used for selecting the standby mode of operation or to reset the instrument to the servo mode. In the standby mode a flag labelled STBY appears in a window on the dial face.

Servo mode

17. In the servo mode of operation, a height corrected altitude signal is fed from the Mk.30A altimeter to the Mk.29B altimeter to give an accurate indication of altitude. A fail safe detection circuit automatically reverts the instrument to the standby mode in the event of failure of one of the following:-

(1) Power supplies

(2) Servo amplifier

(3) Servo motor

(4) Detector circuit

(5) If there is a difference greater than 4 500 ft. between servo and standby indicated altitude.

(6) P.E.C.U.

Standby mode

18. In the standby mode, the instrument operates as a conventional precision altimeter. An interval vibrator is brought into operation to reduce friction in the mechanism.

Power supplies

19. The altimeters are fed with 115-volt, single-phase 400 Hz a.c. from fuse 738R in panel 75P, and 28-volt d.c. from fuse 977 in the port fuse and relay panel 3P. The d.c. supply for the vibrator unit in the Mk.29B altimeter is also fed from fuse 977 (fig.3).

MACHMETERS

20. A Mk.3A machmeter is fitted on each pilot's panel. Pressure and static supplies are fed to each instrument from their respective pitot-static systems i.e., first pilot's instrument from the port system, second pilot's instrument from the starboard system. Both meters operate to give a continuous indication of the ratio of true air speed to the speed of sound and function over a range of 0.7 to 1.3 Mach. Further details will be found in the associated A.P. listed in Table 1.

RATE OF CLIMB INDICATORS

21. Two Mk.3Q rate of climb indicators are fitted in the aircraft, one on each pilots' panel. The indicators are connected to the static air from the main pitot-static systems and operate on the rate of change of pressure principle. Both indicators have a range of up to 4 000 ft. per minute and are fully described in the associated A.P. listed in Table 1.

SIDE SLIP INDICATORS

22. Two side slip indicators, Type B, are fitted in the aircraft, one on each pilots panel (fig.1). Further details of these indicators will be found in the associated A.P. listed in Table 1.

ARTIFICIAL HORIZON

23, A Mk.5A artificial horizon, mounted on the first pilot's panel (fig.1) is used as a standby instrument to the M.F.S. director horizon (Chap.7). The instrument is a conventional electrically driven gyroscope indicating the aircraft's attitude in pitch and roll relative to the vertical axis. A fast erection push-switch on the front flange of the instrument can be used to restore the presentation to normal if the gyro topples. Two potentiometers within the instrument, in turn provide pitch and roll signal outputs which are fed to the A.R.I.5952 (Sect.9, Chap.8) via a 6-pole socket at the rear of the instrument. Electrical supplies to the instrument are fed via a control box to a 12-pole plug at the rear of the instrument (fig.4). In the event of a power failure, an orange and black diagonal striped indicator flag appears in a window in the upper edge of the instrument face. Further details will be found in the associated A.P. listed in Table 1.

Fast erection push-switch

24. The fast erection push-switch should only be used when the gyro has toppled and fails to settle after being switched on.

NOTE . . .
Fast erection should not be applied during the first 15 secs. after switching on the power supply, and the push-switch must not be pressed for longer than 60 secs.

Control box

25. The control box, mounted on the first pilot's floor at former 372, operates and controls the supplies to the artificial horizon. The unit provides automatic levelling of the horizon gimbals on start up, and automatic lock-in of fast erection when the fast erection push-switch is pressed. A rectification circuit within the unit provides a 24-volt d.c. output to operate internal relays and the artificial horizon power failure indicator. For further details of the control box reference should be made to the associated A.P. listed in Table 1.

Power supplies

26. The control box is supplied with 115-volt, 3-phase, 400 Hz a.c. from fuses 322 R and B in the starboard fuse and relay box 72P. Fuses 322R and B are supplied from a transformer mounted adjacent to panel 75P, the supply for the transformer being fed from fuses 742R, Y and B in the 200-volt sub-distribution panel 75P (fig.4).

CONTROL SURFACE INDICATOR

27. To provide an indication of the position of the aircraft's powered flying control surfaces, a Type 167-1 ratiometer indicator is fitted on the pilots' centre panel. Two datum lines, one vertical and one horizontal, are marked on the face of the instrument to represent a rear view of the aircraft. The horizontal datum is marked TAKE OFF but the vertical datum is unmarked. Three Mk.4

plugs fitted to the back of the instrument provide electrical connections and are colour coded to mate with the aircraft socket connections.

28. Each control surface is represented on the face of the instrument by one of nine fluorescent arms. These arms move across the datum lines to simulate movement of their respective control surfaces, the direction of movement being governed by a control coil. The surfaces represented are the rudder, the inner and outer inboard elevons and the inner and outer outboard elevons.

Position transmitters

29. A Type S132 position transmitter is connected by a mechanical linkage to each control surface. Each transmitter takes the form of a toroidal resistance winding connected to three terminals. Within the assembly a wiper arm, connected to the No.3 terminal positive supply, is driven across one side of the winding by an operating shaft.

30. A further two adjustable arms make contact on the other side of the potentiometer and are controlled by two knurled knobs, B and C, which project from the transmitter housing. A locknut is provided to lock the arms in any selected position. The arms are electrically connected to terminals 1 and 2 which in turn are connected to the pilots' indicator.

31. The operating shaft of each transmitter is mechanically linked by an operating rod and lever to it's respective control surface. Movement of the control surface will cause a corresponding movement of the operating shaft of the transmitter and thus vary the current flow through the operating coil of the indicator. This change of current flow will cause the indicating arm to take up a new position and thus indicate the new position of the control surface. The indicator arms representing the elevons will move up or down from the TAKE OFF position while the indicator arm representing the rudder will move to the left or right of the vertical datum. A routing chart of the circuit is provided in fig.5.

SERVICING

General

32. It is essential that complete co-operation be maintained between instrument and electrical tradesman during the servicing and circuit functioning of electrically operated instruments. Power supplies to any instrument suspected of being unserviceable must be checked prior to the removal of the instrument.

AIR SPEED INDICATORS

33. The Standard Serviceability Test for each type of airspeed indicator will be found in the associated A.P. listed in Table 1.

Airspeed pressure switch

34. The airspeed pressure switch can be tested to operate the magnetic warning flag, using a suitable manometer connected into the pitot-static system. Opportunity should be taken to carry out these tests during retraction tests of the alighting gear by other trades. The procedure for checking the switch is as follows:-

(1) Connect a suitable manometer into the starboard pressure line.

(2) Apply pressure equivalent to an indicated airspeed of 170 knots and check that there is no movement of the flag throughout the full range of alighting gear movement.

(3) Decrease the pressure to 160 ± 4 knots and check that the flag operates to show U/C at all positions other than fully locked down.

(4) In the fully locked down position check that the flag has returned to its original position and is no longer in view.

(5) Remove the manometer from the pitot-static system.

ALTIMETERS

35. At suitable intervals the altimeters should be checked for accuracy. If any instrument should require adjusting by more than 50 ft. it is probable that the mechanism has been damaged in some way. In this case further checks should be made in accordance with the instructions given in the associated A.P. listed in Table 1.

Mk.29B and Mk.30A altimeter functional checks

36. The following functional checks should be carried out wherever the system is suspect or has been disturbed.

Test equipment and procedure

37. The following test equipment is required:-

(1) Pitot-static test set Mk.5

(2) Pressure head adaptors, static vent plugs and adaptors.

NOTE . . .
When applying changes of pressure to the aircraft pitot-static system, the rate of change of pressure must NOT exceed 5 000 ft. per minute.

38. Connect up the 200-volt a.c. and 28-volt d.c. ground supplies to the aircraft and carry out the following tests:-

(1) Couple the port and starboard pitot heads and the static vents to the 'STATIC OUTLET' on the test set.

(2) Connect a 28-volt d.c supply to the test set.

(3) Set the ground pressure setting to 1013.25 m.b. on the Mk.29B, Mk.30A and test set altimeters.

(4) Switch on the 200-volt a.c. and 28-volt d.c. ground supplies and check that the Mk.30A altimeter power failure shutter has cleared from view. The Mk.30A altimeter 'P.E.' fail warning flag should clear from view within 75 seconds.

(5) Set the Mk.29B altimeter to RESET mode and check that the STBY flag has cleared from view.

(6) Switch on the pitot-static test set and adjust the static pressure to make the test set altimeter indicate, in turn, the altitudes given in Table 2 column A, taking into account instrument error.

NOTE . . .
Due to local ambient pressure conditions it may be impracticable to check at zero feet.

(7) Record the readings of the Mk.29B and Mk.30A altimeters. The Mk.30A altimeter should indicate the altitudes given in column B within the tolerances given in column C. The Mk.29B altimeter should indicate the same altitude as the Mk.30A altimeter (column B) within the tolerances given in column E.

Power failure test

(1) Check that the Mk.29B altimeter is in the RESET mode.

(2) Adjust the static pressure to obtain a reading of 10 000 ft. on the Mk.29B altimeter.

(3) Remove fuse 738R in panel 75P (altimeter supply fuse).

(4) Note that the power failure shutter drops into view on the Mk.30A altimeter, obscuring the altitude counters and the 'P.E.' fail warning flag comes into view. Note also that the Mk.29B altimeter reverts to the 'STANDBY' mode indicated by the 'STBY' flag coming into view, and the vibrator commencing to operate. (The reading on the Mk.29B altimeter may change from 10 000 ft by ± 100 ft.).

(5) Reduce the static pressure from the test set, to atmospheric pressure and observe that the Mk.29B altimeter display follows.

(6) Replace fuse 738R (removed in sub-para 3) and check that the Mk.30A altimeter aligns to the ambient pressure altitude and the power failure shutter clears from view. The 'P.E.' fail warning flag should clear from view within 75 seconds. The Mk.29B altimeter should remain in the STANDBY mode.

(7) Engage the 'RESET' mode and note that the STBY flag clears from view and the vibrator stops.

(8) Switch OFF the pitot-static test set and disconnect from the aircraft.

(9) Switch off and disconnect the aircraft ground supplies.

RATE OF CLIMB INDICATORS

39. The indicators should be examined for

security of fitting and for signs of damage to the casings or cover glasses. Complete instructions for servicing the instruments will be found in the appropriate chapter of the associated A.P. listed in Table 1. The Standard Serviceability Test will be found in Appendix 1 to the same chapter.

MACHMETERS

40. Instructions for servicing the machmeter Mk.3A will be found in the associated A.P. listed in Table 1. The Standard Serviceability Tests will be found in Appendix 1 to the same chapter.

SIDE SLIP INDICATORS

41. Instructions for servicing the side-slip indicators will be found in the associated A.P. listed in Table 1.

ARTIFICIAL HORIZON

42. The artificial horizon Mk.5A has been specially designed to operate for long periods without attention. In addition to this, a power failure warning flag is fitted to provide indication of a breakdown of any of the supply phases. Whenever the serviceability of the instrument is suspect, it is essential that the a.c. supply to the instrument be first checked for correct voltage and frequency by means of a suitable testmeter. Details for testing the a.c. supplies for the instrument will be found in Sect.6, Chap.4. Complete servicing instructions for the artificial horizon will be found in the associated A.P. listed in Table 1.

CONTROL SURFACE INDICATOR

43. This indicator should be checked periodically for security of fixing and freedom from damage. The plug and socket connections at the back of the instrument should also be checked for tightness. No other servicing of this instrument is permitted.

44. Whenever ground tests of the powered flying controls are being carried out by the airframe and electrical tradesmen, the instrument should be checked for correct functioning. Failure of any of the nine indicating arms to respond to movement of its associated control surface may be due to an unserviceable fuse. The fuses for the transmitter are located in the 28-volt distribution panel (26P) and are numbered 469 to 477 consecutively.

45. Whenever a defective indicator is being replaced by a serviceable one, care should be taken to ensure that the plugs and sockets are matched in accordance with their identifying colours. If, when a new indicator is fitted, the control surface movement is not accurately shown, it will be necessary to calibrate the instrument in accordance with the instructions given in paragraphs 48 to 50.

Position transmitter

46. The position transmitter, Type S132, is designed to operate without routine servicing. Correct functioning of the transmitter will be shown during normal testing of the flying control movements. Should failure of any control surface indicating circuit occur, the fuse supplying the respective transmitter should be checked and replaced if unserviceable.

Initial setting of transmitters

47. When it is necessary to fit a new transmitter, the associated control surface should be in the TAKE OFF position (para.49). The operating rod and lever should then be connected to the transmitter shaft so that the pointer on the shaft is in line with the engraved markings on the transmitter body. Part of the operating rod is threaded to allow for adjustment of the lever. The calibration instructions outlined in the following paragraphs should then be carried out. It will also be necessary to follow these instructions whenever adjustment of the indicating system is required.

Calibration

48. The calibration instructions that follow should be carried out in conjunction with the airframe and electrical tradesmen. Since it will be necessary to operate the powered flying controls, power supplies of 200-volt a.c. and 28-volt d.c. should be available at the aircraft ground supply plugs (Sect.6, Chap.6).

49. The transmitters should be set so that the position of the flying control surfaces will be indicated on the pilots' instrument as follows:-

(1) Rudder at neutral showing neutral.

(2) Elevons at take-off position showing TAKE-OFF.

50. The following instructions for calibration are applicable to all nine position transmitters.

(1) Switch on the motors for the required set of flying controls.

(2) Ensure that the control surfaces are trimmed to the TAKE-OFF position by using the elevator trim. At the same time ensure that the aileron trim is at neutral. This will be done by the airframe tradesman as described in Sect.3, Chap.4 of this publication.

(3) Ensure that the transmitter shaft is connected as detailed in para.47.

(4) Loosen locknut A on the transmitter. Rotate knob B fully clockwise and knob C fully anti-clockwise.

(5) Operate the flying control surface to one end of its travel, check that the associated indicating arm in the pilots' instrument moves in the desired direction.

(6) With the control surface at the end of its travel, rotate knob B or C to bring the indicating arm to the end scale position.

(7) Move the control surface to the opposite end of travel and rotate the other knob to bring the indicating arm to the opposite end scale position.

(8) Repeat operations (6) and (7) until correct readings are obtained.

(9) Lock the adjusting device by means of lock-nut A.

(10) Switch off the flying control motors.

REMOVAL AND ASSEMBLY

General

51. Removal of the flight instruments and the control surface indicators is straightforward and no special instructions are required. During removal it is essential that the instruments be handled with care, gyroscopic instruments in particular being extremely susceptible to damage from jarring and rough handling. Before any electrically operated instrument is removed, its circuit must be made safe and the cable assemblies safely stowed.

NOTE . . .
Whenever any part of the pitot-static system is disturbed or when any instrument panel or instrument is removed, the instructions laid down in A.P.1275A, Vol.2, Part 2, leaflet A9 and A.P.3158, 2nd Edn., Vol.2, leaflet B42 must be carried out.

PILOTS' INSTRUMENTS

52. The pilots' instruments can all be easily disconnected and removed once the panels have been detached as detailed in Chap.1.

NAVIGATOR'S INSTRUMENTS

53. The altimeter and airspeed indicator can be disconnected and removed when the plotter's instrument panel has been disconnected and lowered from the plotter's main panel.

POSITION TRANSMITTERS

54. The position transmitters are mounted on the powered flying control units adjacent to the motors and are readily accessible when the hinged panels covering the units are lowered.

TABLE 1

Major items of equipment

Item	Type/Mk.	Ref.No.	No. off	A.P. Reference
Air speed indicator	AS/PC	-	1	112G-0916-13A6
Air speed indicator	KAB/0506	-	1	112G-0903-1
Air speed indicator	KAB/0505K	-	1	
Sensitive altimeter	Mk.19F	-	1	112G-0111-16
Servo controlled altimeter	Mk.30A	6A/1146374	1	112G-1031-1
Servo controlled altimeter	Mk.29B	6A/6201976	1	112G-1028-1
P.E.C.U.	L83271-00-000	6A/6203321	1	112G-1031-1
Correction module	L8430-00-091		1	
Machmeter	Mk.3A	-	2	112G-0923-1
Rate of climb indicator	Mk.3Q	6A/5845	1	112G-1007-1
Side slip indicator	Type B	6A/6762	2	
Artificial horizon	Mk.5A	-	1	112G-0306-1
Control box	Type A	6A/5526	1	112G-0304-1
Control surface position indicator	Type 167-1	-	1	

TABLE 2

Altimeter calibration test readings

A Test set (feet)	B Mk.30A (feet)	C Mk.30A Tolerance ± (feet)	D Mk.29B (feet)	E Mk.29B Tolerance ± (feet)
0	0	39	As per	20
1 000	994	39	Mk.30A	20
5 000	4 974	◀ 39	altimeter	20
10 000	9 948	50		20
20 000	19 888	66		20
25 000	24 837	74		20
30 000	29 767	92		20
40 000	39 552	112		20
45 000	44 429	122 ▶		20

◀ NOTE . . .
Due to local ambient pressure conditions it may be impracticable to check at zero feet. ▶

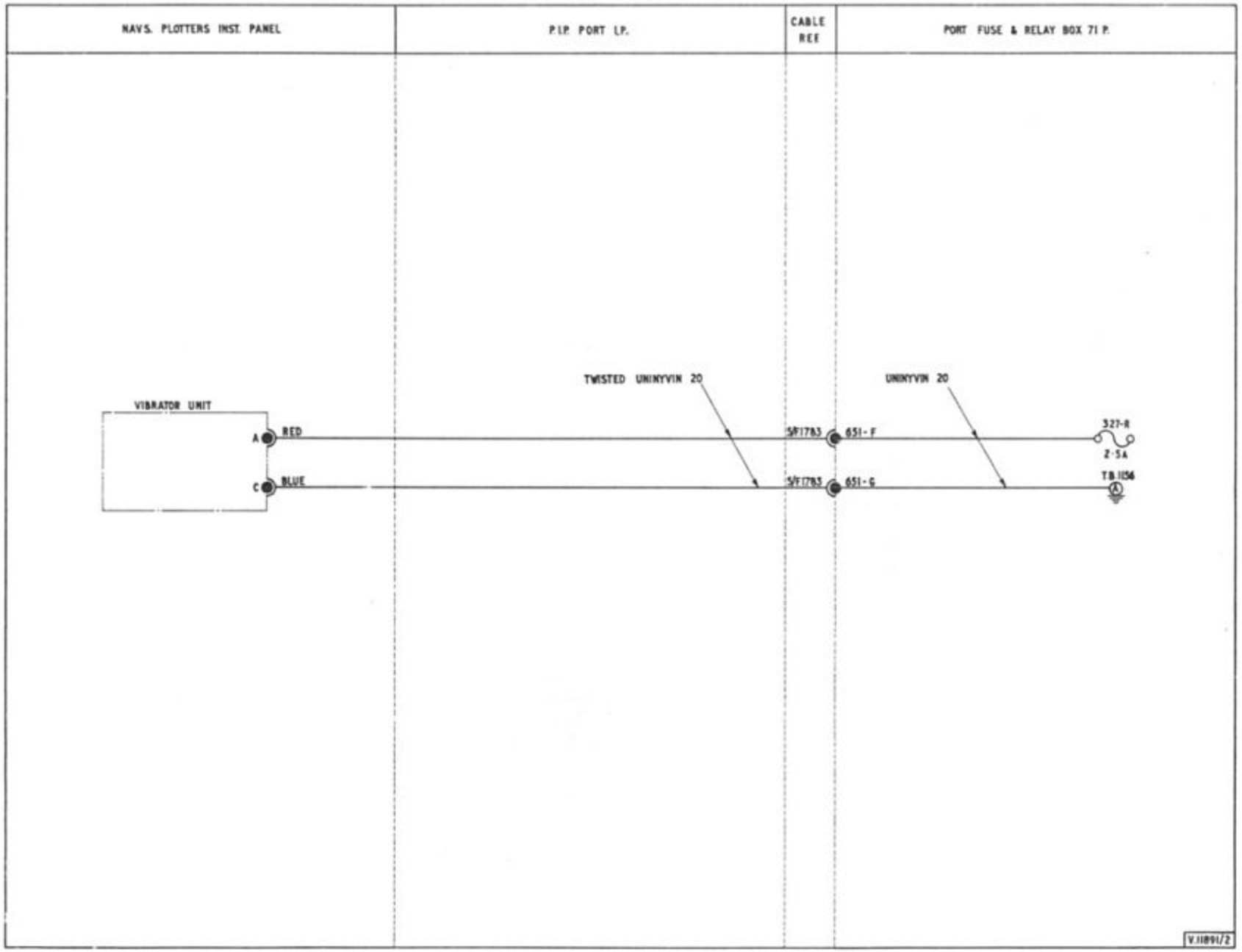


Fig. 3 Vibrator unit control

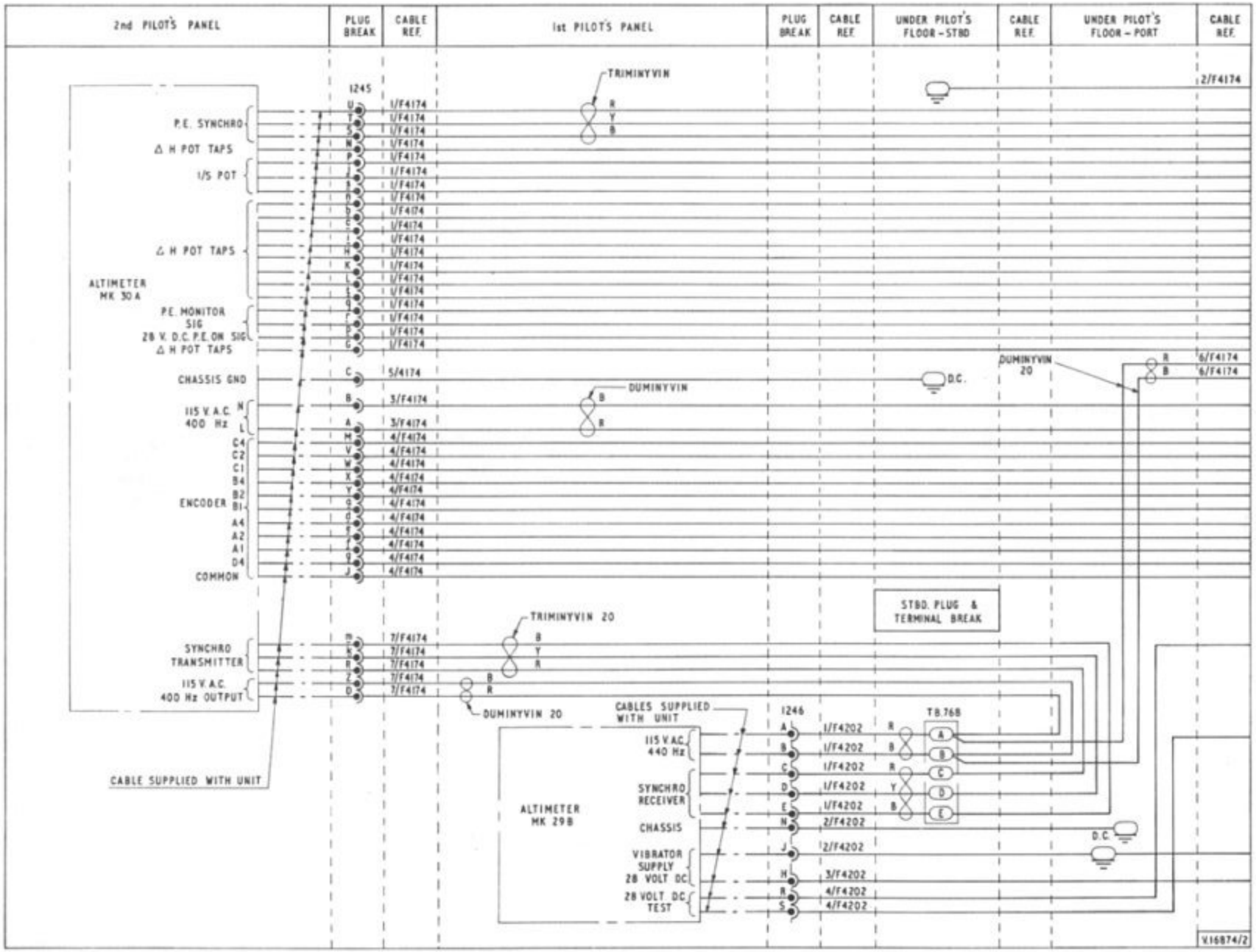


Fig. 4 (1) Height encoding altimeters

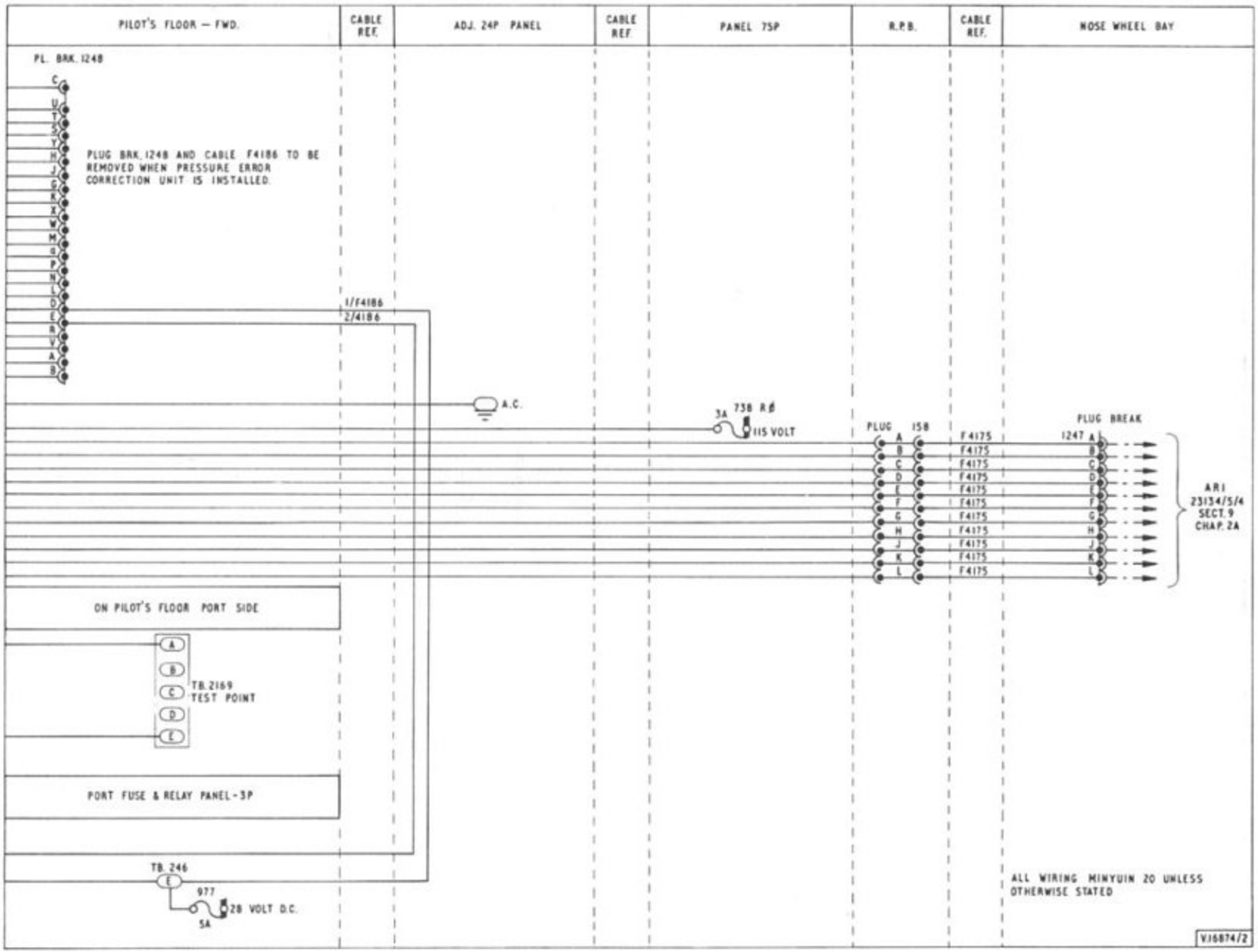


Fig. 4 (2) Height encoding altimeters

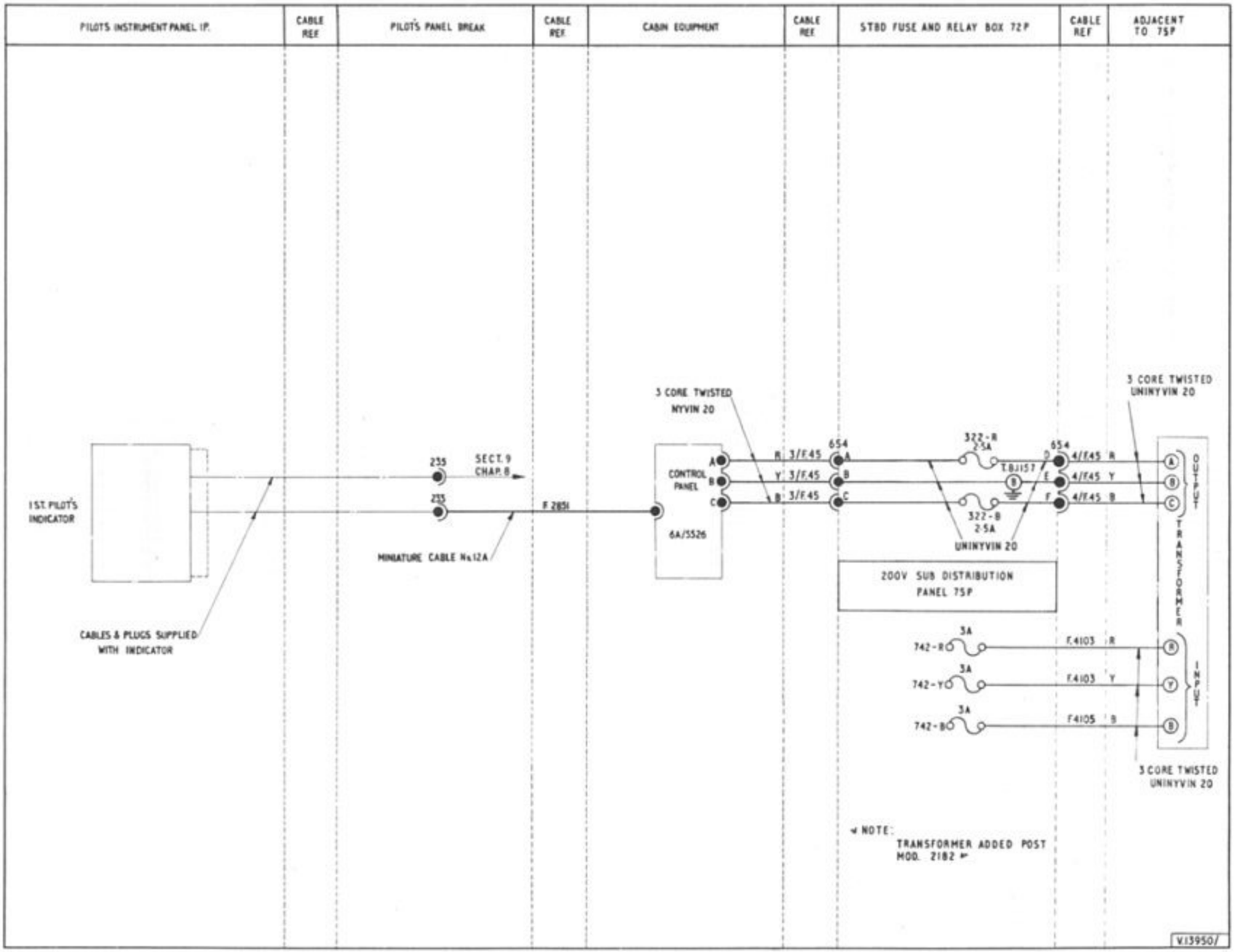


Fig. 5 Artificial horizon MK. 5A

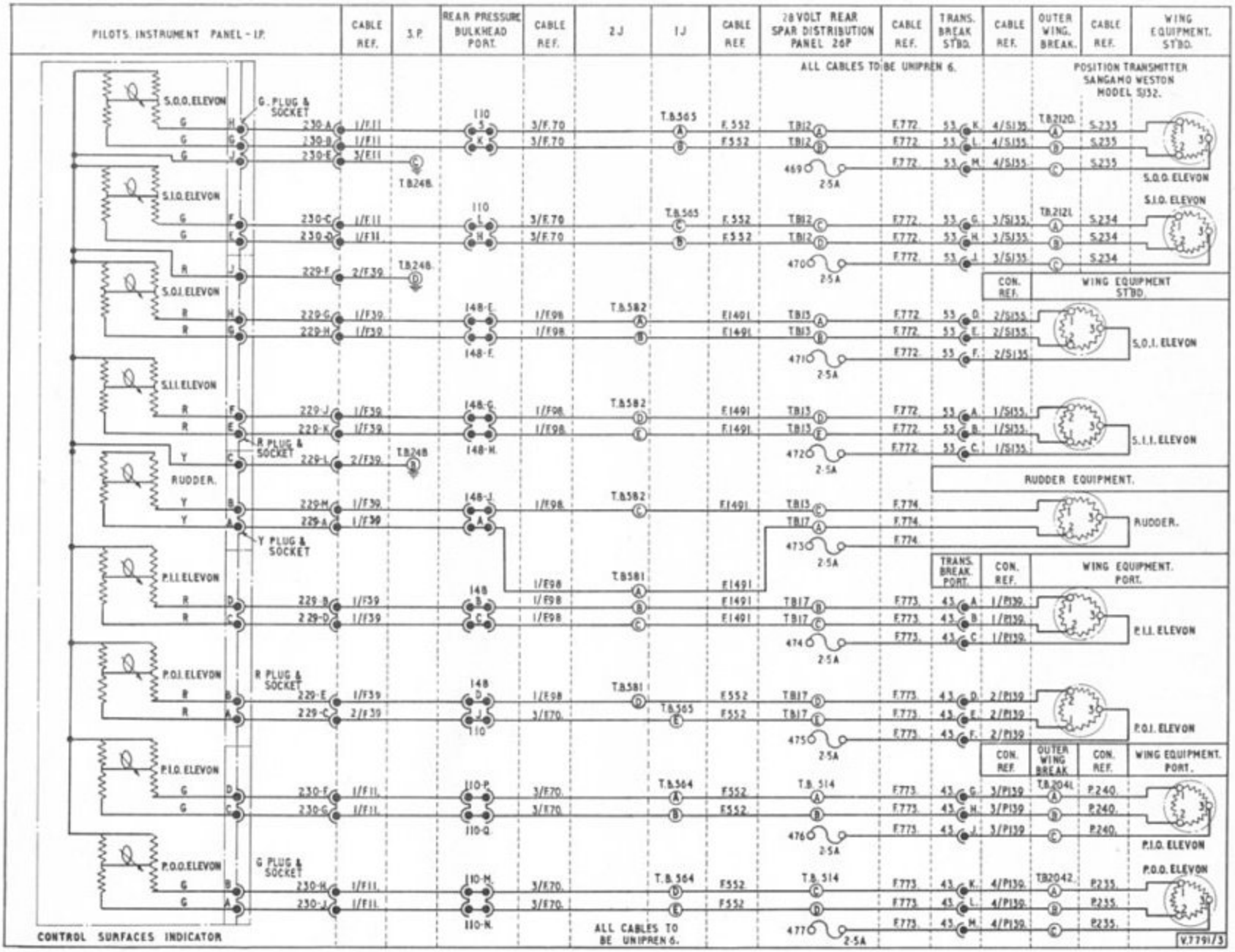


Fig. 6 Control surface indicator