Chapter 4

MISCELLANEOUS INSTRUMENTS

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

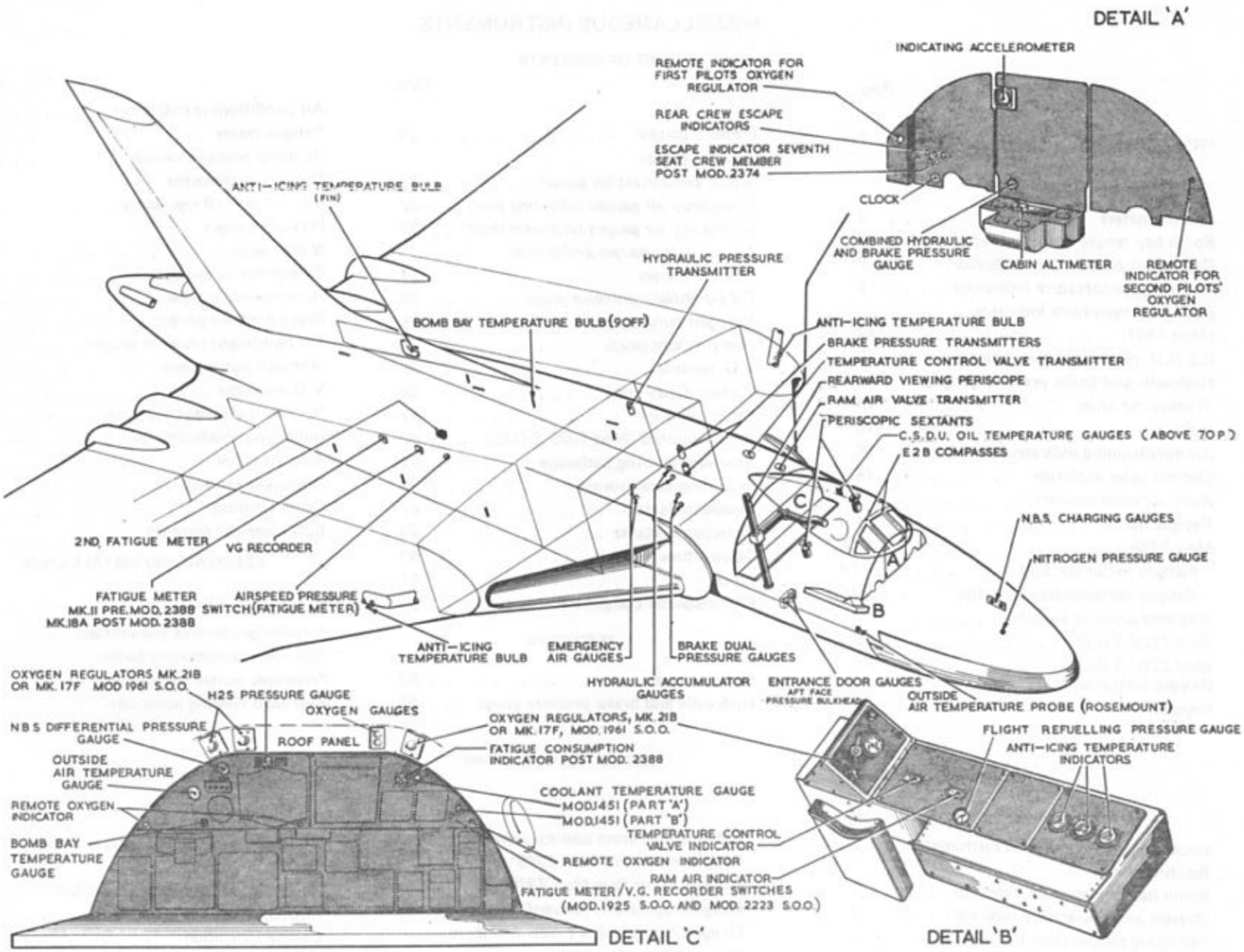

Fig. 1 Location of miscellaneous instruments.

▶ Mod. 2473 ◀

Introduction

1. This chapter contains descriptive and servicing information for those instruments which are not directly connected with a specific instrument installation. Routing charts for the electrical instruments will be found at the end of the text.

2. A complete description of all the instruments described in this chapter will be found in the relevant Air Publications. In the following paragraphs reference will be made to the appropriate publication for the instrument being described. The location of the various instruments is shown in fig.1.

3. The following modifications are included in this Chapter:-

Mod.912 Introduction of Mk.11 fatigue meter (in lieu of Mk.1B)

Mod.1378 Introduction of Mk.21B oxygen regulator (in lieu of Mk.21, 21A)

Mod.1451 Introduction of water/glycol temperature gauge for E.C.M. cooling

Mod.1696 Wiring changes on introduction of rear swivel seats

Mod.1801 Wiring changes on introduction of single connectors for A.V.S. oxygen and MIC/TEL system

Mod.1843 Wiring changes on repositioning of equipment at rear crew stations (S.O.O. only)

Mod.1925 Provision of second fatigue meter and introduction of switching facility for this meter and the V.G. recorder (S.O.O. only)

Mod.1961 Introduction of Mk.17F oxygen regulator in lieu of Mk.21B (S.O.O. only)

Mod.1969 Wiring changes on introduction of new temperature control valve and pressure ratio switch (cold air unit)

Mod.2020 Introduction of Rosemount outside air temperature probe

Mod.2223 Introduction of second fatigue meter (Mk.18) (S.O.O. only)

Mod.2374 Introduction of a seventh seat and services (Com.Mod/Vulcan/0134/STC) and an additional rear crew escape indicator for the seventh seat crew member (Com.Mod./Vulcan/0256/STC)

Mod.2388 Introduction of a transmitting fatigue meter Mk.18A in lieu of fatigue meter Mk.11 and a fatigue load consumption indicator Type M2372 to provide a read out of fatigue consumption. (Com. Mod/Vulcan/0265/STC)

▶ Mod.2439 Introduction of a pilots' directional indicator at Nav/radar station.

Mod.2473 Repositions the outside air temperature indicator at Nav/radar station. ◀

THERMOMETERS

4. The temperature indicators fitted in the aircraft are of the ratiometer type, each operated by a suitably positioned resistance bulb element. The indicators provide the pilots or crew with information regarding the temperature of the bomb bay, the outside air and the anti-icing ducts.

DESCRIPTION AND OPERATION

Bomb bay temperature indicator

5. A Type S63-5-668 indicator is installed on the radar operator's panel to provide a constant indication of the bomb bay temperature. The indicator has a scale calibrated over a range of -50 to +50 deg.C and is operated by nine resistance bulbs, Type S110G-4-505. The bulbs are connected in series-parallel and are situated at various points throughout the bomb bay to provide an average temperature reading of the entire bomb bay.

6. A 28-volt d.c. supply is fed to the indicator from panel 48P, via fuse 712, as shown in the routing chart fig.2. The position of the indicator and bulbs is shown in fig.1 and a detailed description of the instrument will be found in A.P.112G-0504-1.

Outside air temperature indicator

7. Mounted alongside the altimeter Mk.6 on the Nav/radar panel is a Type S63-5-530 air temperature indicator. The indicator provides the navigator with an accurate indication of the outside air temperature and has a temperature range from –80 to +80 deg. C. A Rosemount outside air temperature probe Type 102U2K, is mounted on the starboard side of the aircraft forward of the pilots' windscreen as shown in fig.1. The probe incorporates a resistance bulb and a de-icing heater element.

8. A 28-volt d.c. supply via fuse 698 in panel 48P is connected to the instrument as shown in fig.3. The de-icing heater element is switched on only during aircraft flight and is controlled from the starboard pitot head heater switch situated on the starboard console 7P. With reference to fig.3 it will be seen that a 115-volt, 400 c/s a.c. supply from fuse 740R in panel 75P is connected to the heater element via the closed contacts of relay 811 (energized). Relay 811 is energized via fuse 522 (panel 4P), the starboard pitot head heater switch and T.B.1524(C). Further details may be found in A.P.101B-1902-1B, Cover 2, Sect.6, Chap.13. Details concerning the temperature indicator and Rosemount probe will be found in A.P.112G-0504-1 and A.P.1275A, Vol.1, Sect.17, Chap.34 respectively

Anti-icing temperature indicators

9. To prevent the formation of ice along the leading edge of the fin and each wing, hot gasses from the engine are passed through ducting to raise the temperature of these surfaces. Located in each of the three ductings is a Type S110G-3-96 resistance bulb each of which is connected to one of three indicators on the anti-icing control panel on the starboard console. All three indicators are Type S63-4-591 with a temperature range of 0-200 deg.C.

10. The wing resistance bulbs are fitted in the air duct immediately outboard of each air intake whilst the bulb for the fin is located in the duct as it passes from the bomb bay into the fin between bomb arches 225.227 and 243.127.

11. The necessary 28-volt d.c. power supplies are provided from the starboard fuse and relay panel (4P) via three individual 2.5 amp. fuses as shown by the routing chart fig.4. The location of the various items is shown in fig.1 and for a complete description of the indicators refer to A.P.112G-0504-1. The resistance bulbs are described in A.P.112G-0601-1. The thermometers form part of the de-icing system controls described in A.P.101B-1902-1B, Cover 2, Sect.6, Chap.14.

Coolant temperature indicator (Mod.1451)

12. A temperature indicator, Ref.No.6A/3682, is fitted to the Nav/plotters' panel (fig.1). The indicator is supplied from the aircraft 28-volt d.c. system via fuse 717 in panel 48P. Further details may be found in A.P.101B-1902-1B, Cover 2, Sect.6, Chap.22. Details of the temperature indicator will be found in A.P.112G-0629-1.

C.S.D.U. oil temperature gauges

13. These four oil temperature gauges are fitted to a panel complete with pillar lighting above panel 70P. Further details will be found in A.P.101B-1902-1B, Cover 1, Sect.6, Chap.2.

HYDRAULIC AND BRAKE PRESSURE GAUGES

14. Mounted on the pilots' centre panel is a combined hydraulic and brake pressure gauge Type S214-1-11. The indicator has a maximum reading of 5,000 lb/in^2 and is operated by three transmitter units, Type S122-4-44.

Transmitter units

15. The two brake pressure transmitters are fitted in the nose wheel bay as shown in fig.1. The main hydraulic transmitter is fitted on the port side of the bomb bay. Each transmitter consists of a Bourdon tube assembly which operates a d.c. potentiometer. Signals to the indicator are passed by special connecting leads, Type FD766.

Indicator

16. This instrument is a triple-reading instrument designed to present the pilot with a quickly read indication of the brake and hydraulic pressures. The leads from the three transmitters are lead into the back of the indicator by a Cannon plug and socket and the information is presented by three individual pointer movements, each reading on a separate scale.

17. The indicator is fed with a 28-volt d.c. supply from the port fuse and relay panel (3P) via fuses 630, 631 and 632. A routing chart of the circuit is provided in fig.5. Further details of the indicator and transmitters will be found in A.P.112G-0557-1. Refer to A.P.101B-1902-1A, Cover 2, Sect.3, Chap.6 for details of the hydraulic system.

AIR CONDITIONING INDICATORS

18. Two Desynn Type indicators are fitted

on the starboard console to provide the pilot with a visual indication of the positions of the ram air valve actuator and the temperature control valve which are part of the air conditioning system. The air conditioning system is described in A.P 1G1B-1902-1B, Cover 1, Sect.6, Chap.12.

Control valve indicator

19. This indicator is a Type 423 FL instrument the scale of which is marked TEMP. CONTROL VALVE. The indicator is operated by a Type 135 FL Desynn transmitter which is mounted on the cabin air conditioning unit. The transmitter is mechanically linked to the control valve and will transmit all changes in its position to the indicator. A 28-volt d.c. supply is fed to the transmitter from fuse 793 in panel 16P as shown on the routing chart fig.6. Further details of the transmitter and indicator will be found in A.P.112G-0501-1.

Ram air valve indicator

20. The ram air valve indicator is a Type 231 FL instrument marked RAM AIR VALVE and mounted adjacent to the control valve indicator on the starboard console. The Type 135 FL transmitter which operates the indicator is mounted on the ram air valve actuator assembly and is fed with a 28-volt d.c. supply from fuse 826 in panel 19P. Further details of the transmitter and assembly will be found in A.P.112G-0603-1. Circuit details will be found in the air conditioning unit routing chart in A.P.101B-1902-1B, Cover 1, Sect.6, Chap.12.

FATIGUE METER

21. Mounted at the starboard side of the bomb bay at bomb arch 151.919 is a Type 11 fatigue meter. The purpose of the instrument which is of the counting accelerometer type, is to measure and record during flight the number and degree of vertical accelerations to which the aircraft has been subjected. Six electro-magnetic counter units on the face of the instrument indicate the number of times that a pre-determined acceleration has been exceeded and this presents information from which it is possible to calculate the remaining fatigue life of the aircraft. An hour meter is provided on the face of the instrument to record the number of hours which the meter has been functioning. More detailed information on the fatigue meter is contained in A.P.112G-0203-1.

Mod.2388

21A. On aircraft with Mod.2388 incorporated a transmitting fatigue meter Mk.18A, Ref.No. 6A/1105619 and a fatigue load consumption indicator, Type M2372, Ref.No. 6A/1105620, are fitted in lieu of the general fatigue meter Mk.11. A brief description of the units are given, and the relevant routing chart is contained in fig.7A. For further details reference should be made to A.P.112G-0203-1.

Fatigue meter Mk.18A

21B. The purpose and mounting of the fatigue meter Mk.18A is the same as that for the Mk.11 fatigue meter described in para.21 but in addition outputs from the electro magnetic counters are fed to a fatigue consumption indicator.

Fatigue consumption indicator

21C. The fatigue consumption indicator mounted at the AEO's panel (fig.1) is operated by signals from the transmitting fatigue meter Mk.18A to give an indication of the severity of any turbulance encountered and the consequent fatigue life consumption. The unit houses an electro magnetic counter, which shows the cumulative total of counts since take-off, a meter which shows the approximate mean excursion from 1g. during the preceding 30 seconds and a four position percentage load switch which varies the sensitivity of the meter to compensate for changes in fuselage load. A re-set switch labelled PUSH-TO-RESET is provided to enable the electro magnetic counters to be zeroed.

Airspeed pressure switch

22. To ensure that the fatigue meter operates only during actual flying time and not during take-off, landing and taxying periods the electrical supply to the meter is controlled by an airspeed pressure switch, Ref.No. 6A/8165. The switch is mounted in the starboard side of the bomb bay at bomb arch 95.967 and is fed with a pressure and static supply from the starboard pitot-static system as described in Chapter 1.

23. The switch is designed to operate at airspeeds ranging from 165 to 140 knots ± 5 knots and will remain closed at all speeds greater than this range, thus completing the supply circuit for the meter. Reduction of airspeed to a value less than 140 knots will open the switch to break the supply. The 28-volt d.c. supply is fed to the switch from fuse 761 in the 28-volt distribution panel as shown in the routing chart fig.7. Pre Mod.2388 or fig.7A Post Mod.2388. A complete description of the switch will be found in A.P.112G-1139-1.

Mod.1925 S.O.O.

24. Some aircraft are fitted with a second fatigue meter, Ref.No. 6A/6485, mounted on the aft face of bomb arch 123A. A switching facility for both the second fatigue meter and the existing V.G. recorder has been provided, the two switches being positioned on the nav/plotter's panel. The relevant routing chart is contained in fig.11.

Mod.2223 S.O.O.

25. This modification introduces a Mk.18 fatigue meter, Ref.No.6A/10214 as an alternative installation to that required by Mod.1925. The relevant routing chart is contained in fig.12.

OXYGEN INSTRUMENTS

Regulators

26. To supply the crew members with the correct ratio of oxygen and air in accordance with the cabin altitude, eight oxygen regulators Mk.21B (6D/2383) or Mk.17F (6D/2671 Post Mod.1961) are fitted in the aircraft at the following crew stations:-

Station	Location
1st. pilot	Port console
2nd pilot	Stbd. console
Air bomber	Prone bomb aimer's position
A.E.O.	Navigator's roof panel
Navigator	
Nav. bomber	
Sextant position port	Adjacent to port sextant
Sextant position stbd.	Adjacent to stbd. sextant

A dolls-eye indicator, mounted on the face of each regulator gives visual indication that the regulator is functioning correctly. No indication is given on the regulators at the port and stbd. sextant positions as these dolls-eye indicators are disconnected electrically. Post Mod.2374 a supply is connected to the indicator on the port sextant regulator to give an indication to the seventh seat crew member that the regulator is functioning correctly.

27. At the navigator, nav. bomber and A.E.O's positions, where the faces of the respective regulators are not always visible, remote indicators are provided (fig.1). The pilots each have a remote indicator on their respective panels, and the air bomber's remote indicator is mounted above his prone bomb aiming position.

28. Each regulator is fed with an individual 28-volt d.c. supply to operate the indicator circuit (fig.8 and 9). Post Mod.2374 the regulator at the port sextant position is supplied from fuse 613 in panel 3P, this fuse also supplies the nav. plotter's regulator. (fig.9). Further details of the regulators will be found in A.P.107D-0207-1. The oxygen system is described in Sect.3, Chap.10 of this publication.

Pressure gauges

29. Two Mk.4 pressure gauges mounted on the navigator's roof panel (fig.1), provide an indication of the supply pressure from the two oxygen supply sources. The gauges, Ref.No.6D/2237 are of the direct reading mechanical type and are described in A.P.107D-0305-1.

PRESSURE GAUGES

N.B.S. pressurization gauges

30. Certain items of N.B.C. and H2S equipment require to be pressurized as indicated in Chapter 5 and described in A.P.101B-1902-1A, Sect.3, Chap.7. The air is provided from two storage bottles fitted in the nose of the aircraft at the port side. Immediately above the bottles is a charging panel for the system which carries two Mk.14H direct reading pressure gauges. The gauges provide an indication of the pressure in the storage bottles.

31. Two further gauges are provided on the nav. bomber's panel. The first of these, the N.B.S. differential gauge, is a Type K.P.A.0102c twin pointer, direct reading pressure gauge with a range from -3 to +20 lb/in^2. The second instrument is a Type K.P.D./0103c direct reading, single pointer pressure gauge with a pressure range from -10 to +20 lb/in^2. A complete description of all the N.B.S. pressure gauges will be found in A.P.112G-0400-1.

Emergency air gauges (alighting gear)

32. Two Mk.14LL mechanical pressure gauges are installed on the air charging panel in the nose wheel bay. These gauges register the pressure of the two emergency air supplies to the alighting gear and have a pressure range from 0 to 4 000 lb/in^2.

Emergency air gauges (entrance door)

33. Two Mk.14KK direct reading pressure gauges are mounted on a panel located on the rear pressure bulkhead in the nose wheel bay. The gauges indicate the pressure of the normal and emergency air supplies to the entrance doors and have a pressure range from 0 to 3 000 lb/in^2.

Accumulator gauges and brakes pressure gauges

34. Two Mk.14LL pressure gauges are fitted on the hydraulic panel in the nose wheel bay. Each gauge has a range of pressure from 0-4 000 lb/in^2 and indicates the pressure within its associated accumulator. Immediately below these gauges on the same panel are two dual reading Type A.H.O.29130 brakes pressure gauges. The gauges have a maximum scale reading of 3 000 lb/in^2 and indicate the pressure in the individual brake lines.

T.4 bombsight pressure gauges (System inoperative Post Mod.2377)

35. An air storage bottle fitted beneath the pilot's floor is used to provide a pneumatic supply for the T.4 bombsight computer. An indication of the pressure available is provided by a direct reading gauge mounted immediately below the entrance door gauges on the rear pressure bulkhead in the nose wheel bay. The gauge is a Mk.14KK instrument with a pressure range from 0 to 3 000 lb/in^2. A second gauge is mounted beside the stop valve on the aft face of the pilot's floor. This gauge is a Mk.14B instrument with a lubber line set at 60 lb/in^2.

Nitrogen purge gauge

36. A nitrogen purge system is installed in the aircraft to rid the flight refuelling system of excess fuel after refuelling has been completed. A charging panel for the system is located in the nose of the aircraft at former 470. A Mk.14H pressure gauge is fitted on the panel to indicate the pressure of nitrogen available. The gauge is of the direct reading type and has a pressure range from 0 to 2 000 lb/in^2.

Fuel pressure gauge

37. A fuel pressure gauge, Ref.No.6A/6173, is mounted on the starboard console and shows the pressure in the fuel line when the aircraft is being flight refuelled. Further details may be found in A.P.101B-1902-1B, Cover 1, Sect.6, Chap.9.

V.G. RECORDER

38. Mounted on the aft face of bomb arch 123.015A is a V.G. recorder the purpose of which is to draw a graph of aircraft acceleration against airspeed. Basically the recorder consists of a moving weight accelerometer and an airspeed capsule. The resultant movement of these two mechanisms is transmitted to a stylus which records the movement on to a chalked glass slide. A special cap is provided on the face of the instrument to hold the glass slide.

39. A complete description of the recorder will be found in an instruction leaflet published by the Ministry of Defence. This leaflet is No.1.T.2031 (issue 2) entitled Routine Measurement of Flight Acceleration.

Vickers 4-way cock

40. Also mounted on bomb arch 123.015A, adjacent to the meter is a Vickers 4-way cock, Type D1885. This item controls the pressure and static supplies from the starboard pitot-static system to the recorder. Control is by means of a lever on the cock which should be locked in the OFF position whenever the V.G. recorder is removed from the aircraft.

Power supplies

41. A 28-volt d.c. supply is fed direct to the recorder from fuse 760 in panel 15P. A routing chart is provided in fig.10.

Power supplies (Mod.1925 S.O.O.)

42. When Mod.1925 is embodied the 28-volt d.c. supply to both the V.G. recorder and the second fatigue meter is fed from fuse 972 in panel 3P via the associated switch as shown in the routing chart fig.11.

REARWARD VIEWING PERISCOPE

43. To enable the crew to scan the areas to the rear, above and below the aircraft, a Kelvin Hughes rearward viewing periscope is installed at the navigator's station. The main tube of the instrument extends between the cabin roof and the cabin floor and is equipped with a periscopic head at each end. A viewing assembly is introduced into the tube where it passes the navigator's table. This assembly is constructed onthe telescopic principle which enables it to be closed-up and stowed in a recess on the navigator's table when not in use.

44. Each viewing head provides a viewing angle of 110 deg. and houses a rotatable reflecting mirror. Movement of the mirrors is effected by a teleflex control the handle of which is mounted on the underside of the navigator's table. When in use the handle is first moved up or down to select the upper or lower head and then moved in a lateral direction to give a sweeping rearward view.

45. De-misting of the periscope windows is provided by two electrical elements as described in A.P.101B-1902-1B, Cover 2, Sect.6, Chap.13. The complete instrument is described in A.P.1275B, Vol.1, Sect.17, Chap.2.

INDICATING ACCELEROMETER

46. An indicating accelerometer Mk.2A, Ref.No.6A/4825 is mounted on a bracket between the centre panel and the first pilot's panel. This instrument provides an indication of the acceleration forces imposed on the airframe during flight. These accelerations are recorded in positive and negative G units on the instrument dial which is calibrated over a range of -2G to +5G. Further details may be found in A.P.112G-0217-1.

ESCAPE INDICATORS

47. Four escape indicator lamps (five Post Mod.2374), suitably identified for each rear crew member, are fitted to the 1st. pilot's instrument panel (fig.1). As each rear crew member, on the call 'abandon aircraft,' leaves the aircraft, the parachute rip cord causes the static line to operate a micro switch, which in turn connects a supply to the appropriate indicator, thus informing the pilot that the indicated rear crew member has left the aircraft. A press-to-test facility is incorporated in each lamp assembly to check the serviceability of the lamp filament. The relevant routing charts are contained in fig.13.

THERMOMETERS

53. The bomb bay, outside air and anti-icing temperature gauges require little in the way of normal servicing. Where possible the indicators and bulbs should be checked for signs of external damage and all plugs and sockets examined for security and tightness of connections.

54. Items which are suspected of being unserviceable should be tested in accordance with the instructions given in the appendix to the appropriate chapter of A.P.112G-0504-1.

PERISCOPIC SEXTANTS

48. Two mountings are provided in the crews cabin for the installation of two periscopic sextants Mk.2, one port and one starboard. The sextants are used for position fixing and for course checking by observing the altitude and azimuth of celestial bodies. The equipment is specially designed for use in high speed, pressurized aircraft and obviates the need for the conventional astro dome.

49. Each sextant is fed with a 28-volt d.c. supply for heating and illumination, the port sextant from fuse 637 in panel 3P and the starboard sextant from fuse 541 in panel 4P. The supplies are controlled by toggle switches, mounted one on each of the respective fuse panels. A routing chart of the supplies will be found in A.P.101B-1902-1B, Cover 2, Sect.6, Chap.13 where the heating side of the circuit is described. Complete details of the sextants and their internal circuits will be found in A.P.1275B, Vol.1, Sect.13, Chap.6.

CABIN ALTIMETER

50. A Mk.21A cabin altimeter is installed in the well of the fuel contents gauge panel (2P). This instrument is used to indicate the cabin pressure in terms of altitude and so enable the crew to adjust their oxygen supply accordingly. The instrument operates on the aneroid principle and has a range from 8 000 to 50 000 ft. Further details of the altimeter will be found in A.P.112G-1022-1.

CLOCK

51. A Mk.4 aircraft clock is mounted on the first pilot's instrument panel. The clock has a conventional 8-day movement and is provided with a centre seconds sweep hand and a re-setting knob. The clock is fully described in A.P.112G-0811-1.

E2B MAGNETIC COMPASSES

52. Two E2B magnetic compasses are provided in the aircraft for emergency use. The compasses are fitted one at each pilot's station on the windscreen above the instrument panels. A full description of the compasses will be found in A.P.112G-0201-1. Before the compasses are used, the pilots' leg straps should be removed from their stowages and the windscreen wipers (if in use) switched off.

SERVICING

HYDRAULIC AND BRAKE PRESSURE GAUGE

55. During the normal inspection periods the three transmitters and the gauge should be examined for signs of damage and security of connections. Providing the gauge is functioning correctly nothing further need be done. Advantage should be taken of checks on the hydraulic and brake systems by other trades so that functioning of the gauge may be observed during actual pressure changes in the systems. Defective items should be removed and returned for repair. Replacement items should then be fitted.

AIR CONDITIONING INDICATORS

56. Servicing of the temperature control valve indicator and the ram air valve indicator is limited to visual examination for security and signs of damage. The operation of the

indicators should be checked during functioning of the air conditioning equipment as described in A.P.101B-1902-1B, Cover 1, Sect.6, Chap.12. A Desynn tester is available for checking the accuracy of the transmitters and indicator when necessary. A description of the tester, Ref.No.6C/470, together with the method of use is given in A.P.1275T, Vol.1, Sect.7, Chap.20.

FATIGUE METER

57. At the appropriate inspection periods the meter should be checked for security of connections and signs of external damage. After a specified number of flying hours check that the counter readings have altered since the last reading although differences may only be apparent on the counters nearest to 1g. If no difference is apparent reference should be made to the standard serviceability tests in A.P.112G-0203-1. Before doing this however the supply to the meter should be checked in accordance with the instructions given in para.59. At the same time ensure that the red transit screws have not inadvertently been left in the meter.

58. The hour meter readings should also be checked to ensure that they approximately tally with the Airframe Log. In the case of any discrepancy reference should again be made to the standard serviceability tests in A.P.112G-0203-1. The hour meter will not operate unless the polarity of the supply is correct i.e., Pole A-Ve, Pole B +Ve.

Airspeed pressure switch

59. The switch should be examined for security, external damage, and signs of leakage. The switch may be checked by disconnecting from the meter the two pin supply plug, which is fed via the switch. A suitable test lamp should then be connected across the supply plug. After introducing an A.S.I. calibrator into the pressure line of the starboard pitot-static system, pressure should be gradually applied to the switch and a note made of the airspeed at which the lamp lights. Pressure should be gradually increased until it approximately reaches the maximum speed of the aircraft. Reduce the pressure and note the airspeed at which the lamp goes out. The airspeeds noted should be within 165 to 140 knots ± 5 knots. Further tests on the switch will be found in A.P.112G-1139-1.

OXYGEN INSTRUMENTS

Mk.17F or 21B regulators

60. The regulators should be examined for security and signs of external damage. The regulators should also be exercised and checked as described in A.P.112G-0201-1 (Mk.17F) and A.P.112G-0207-1 (Mk.21B). If the serviceability of any regulator is suspect it should be removed from the aircraft and subjected to the Standard Serviceability Test which will be found in the aforementioned publications.

PRESSURE GAUGES

N.B.S. gauges

61. Little in the way of servicing is required by these instruments. A visual inspection of the gauges together with a check of the zero reading is all that is required. Gauges suspected of being unserviceable should be removed from the aircraft and subjected to the tests given in the Appendix to the appropriate chapter of A.P.112G-0400-1.

Emergency air gauges

62. The Mk.14 pressure gauges employed in these systems should be visually examined for security and signs of damage. During the normal inspection periods, or whenever their serviceability is suspect, the tests given in A.P.112G-0400-1 should be applied.

Accumulator gauges

63. These gauges should be examined for signs of external damage and tested during normal servicing periods in accordance with the instructions given in A.P.112G-0400-1.

Brakes pressure gauges

64. No repairs to these gauges are permissible and servicing is confined to a visual check for security and signs of damage. Whenever the serviceability of the gauges is suspect the tests outlined in A.P.1275A, Vol.1, Sect.15, Chap.10, App.1 should be applied.

T.4 bombsight pressure gauges

65. The gauges should be examined externally for signs of damage and security of mounting. Should any gauge appear to be unserviceable it should be subjected to tests laid down in A.P.112G-0400-1.

Nitrogen purge gauge

66. Apart from visual examinations little in the way of servicing can be done for this type of gauge. During the normal inspection periods or whenever the gauge is suspect the tests outlined in A.P.112G-0400-1 should be applied.

V.G. RECORDER

67. Complete information on the care and

handling of the V.G. recorder will be found in the Ministry of Aviation leaflet (para.39). It is essential that the Vickers 4-way cock be locked in the OFF position whenever the recorder is not fitted.

REARWARD VIEWING PERISCOPE

68. To ensure maximum viewing facilities the window for each head should be kept free from grease and dirt at all times. The controls should be manipulated periodically to check response to mirror rotation and the viewing change-over controls. Instructions for functioning the periscope heaters will be found in A.P.101B-1902-1B, Cover 2, Sect.6, Chap.13. Full servicing instructions for the periscope will be found in A.P.1275B, Vol.1.

INDICATING ACCELEROMETER

69. Under normal conditions the accelerometer requires very little servicing apart from regular visual checks for security and freedom from damage. More detailed instructions for static tests prior to installation will be found in A.P.112G-0217-1.

AIRCRAFT CLOCK

70. The 8-day clock should be wound regularly and occasionally checked for correct timekeeping. The chronometer watch (Ref.No.6B/60) is available for testing aircraft clocks and a serviceability check for clocks prior to installation is contained in A.P.112G-0811-1. After a period of twelve months service the clock should be returned to the appropriate maintenance unit for servicing.

PERISCOPIC SEXTANT

71. Servicing of the periscopic sextant is contained to a visual check of the optical system and a functioning check of the heating and lighting circuits. Any sextant considered suspect should be checked in accordance with the Standard Serviceability Test contained in the Appendix to Chap.6, A.P.1275B, Vol.1, Sect.13.

CABIN ALTIMETER

72. No routine servicing is required by the cabin altimeter. If it is suspected of being defective, it should be subjected to the Standard Serviceability Test contained in A.P.112G-1022-1.

E2B MAGNETIC COMPASSES

73. Apart from a visual examination for security, cleanliness and freedom from damage no servicing is required by the E2B compasses. Faulty or damaged compasses should be removed from the aircraft and replaced by serviceable items. During compass swinging operations or whenever the compasses are being adjusted, always ensure that the pilots' leg straps are removed from their stowage and that the windscreen wipers are not used. Information on compass correction is contained in A.P.112G-0201-1. The compass sighting rods are described in Chap.7.

REMOVAL AND INSTALLATION

General

74. Except for certain items detailed in the following paragraphs, removal of the miscellaneous instruments is straightforward and no special instructions are required. To remove instruments from the pilots' and navigator's panels it will first be necessary to remove or lower the actual panels; this is covered in Chapter 1 of this section. Console panels are easily unscrewed to permit removal of the attached instruments.

PRESSURE GAUGES AND TRANSMITTERS

WARNING . . .

No attempt must be made to remove any gauge or transmitter from pressure pipe lines until the pressure in the system has been relieved in the manner described in the appropriate section of Book 1A of this publication.

75. None of the gauges or transmitters described in paras.28 to 37 should present any difficulty when being removed providing the warning given above has been observed.

ANTI-ICING TEMPER ATURE BULBS

76. Two access panels are provided one in each wing for servicing the wing de-icing temperature bulbs. The panels are on the underside of each leading edge immediately outboard of the air intakes. A tab is provided in the heating duct for wire-locking the bulbs in place. When replacing a bulb always ensure that the new bulb is locked to the tab in a secure manner.

PERISCOPIC SEXTANT MOUNTINGS

77. Before attempting to remove the periscopic sextant mountings, reference should be made to A.P.101B-1902-1A, Cover 2, Sect.3, Chap.1 as this operation affects the sealing of the pressurized cabin.

REARWARD VIEWING PERISCOPE

78. The periscope tube must be dismantled and removed in sections. Instructions for the removal and replacement of viewing heads are given in A.P.101B-1902-1A, Cover 2, Sect.3, Chap.1.

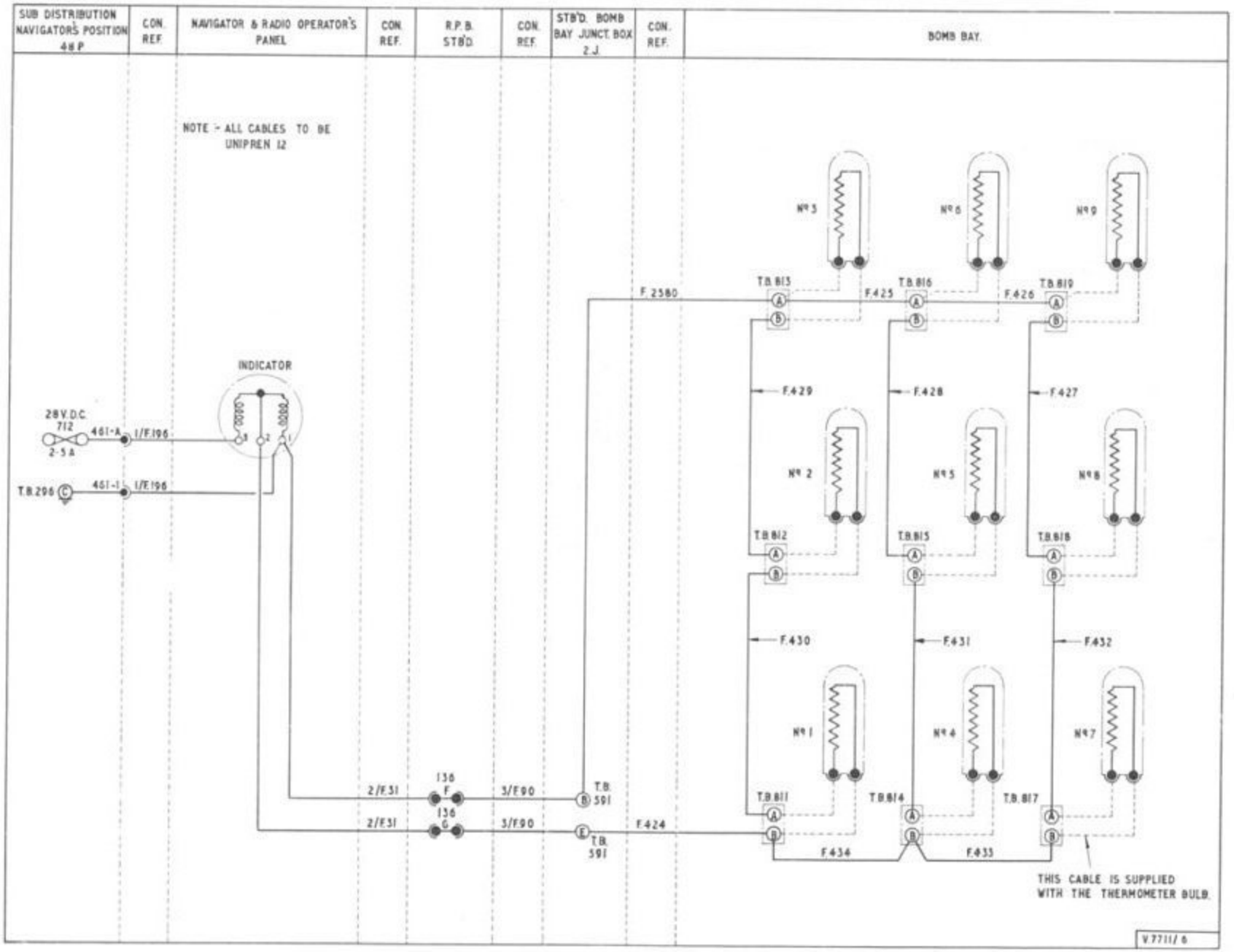

Fig. 2 Bomb bay temperature indicator

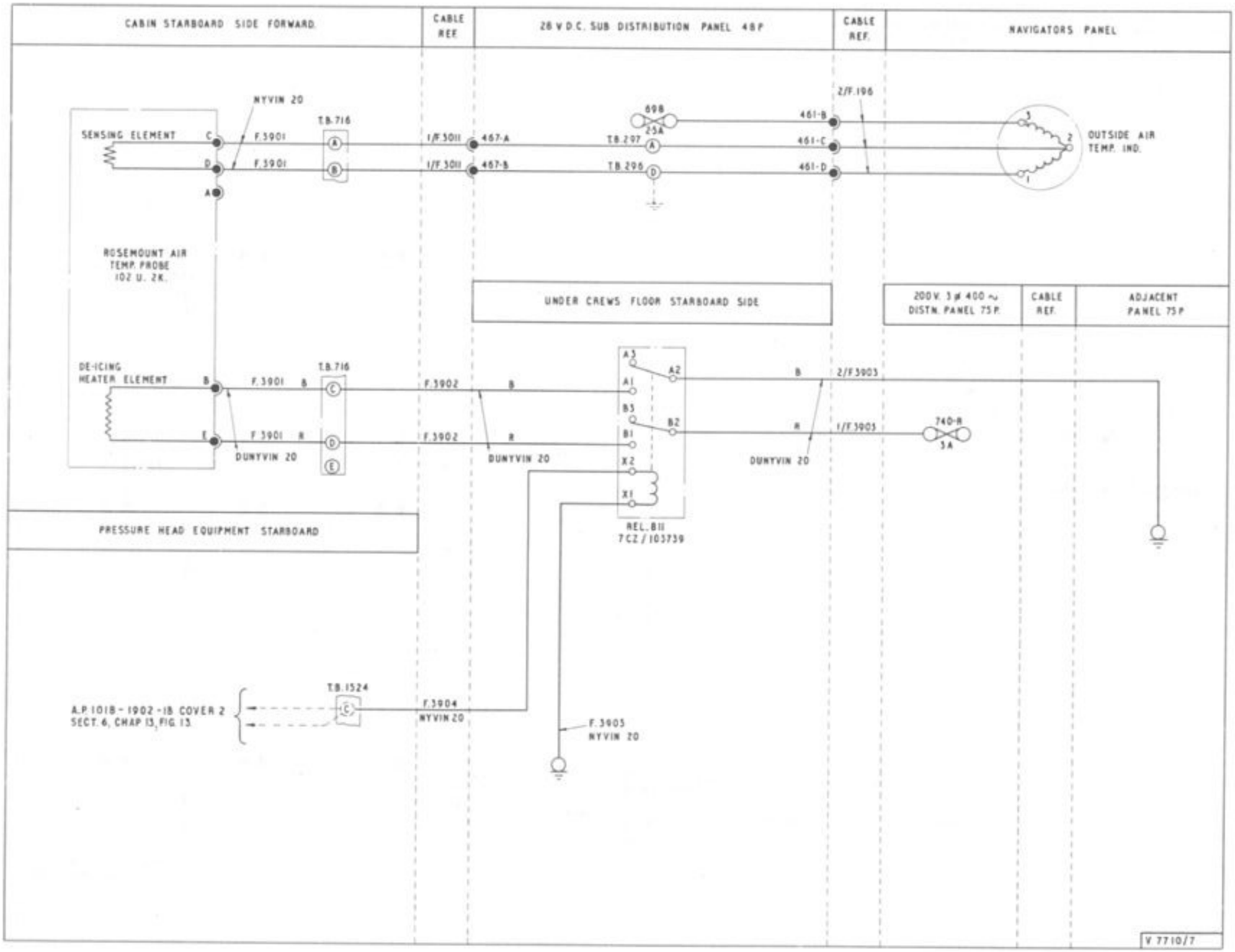

Fig. 3 Outside air temperature indicator

(◀ *Cross reference amended* ▶)

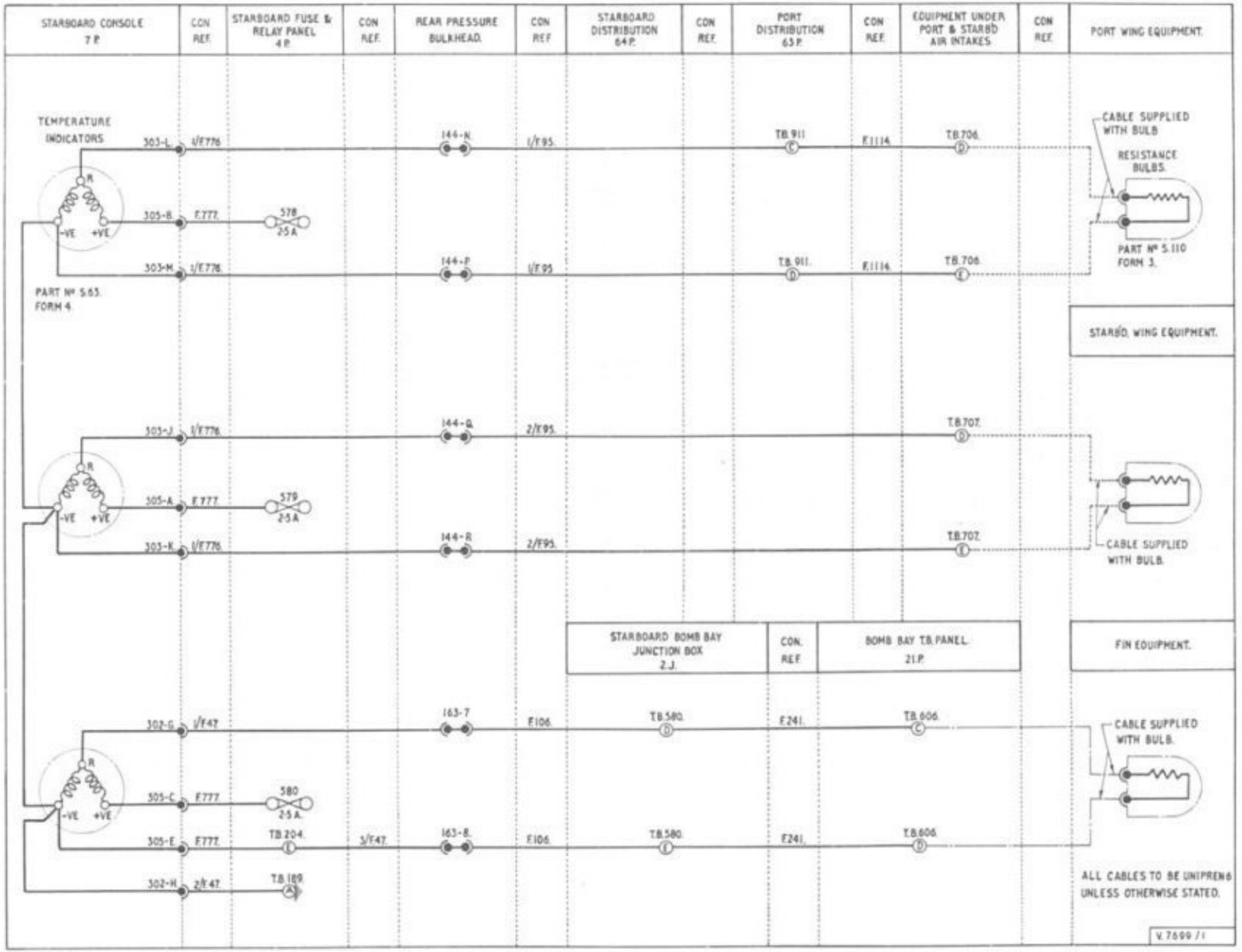

Fig.4 Anti-icing temperature indicator

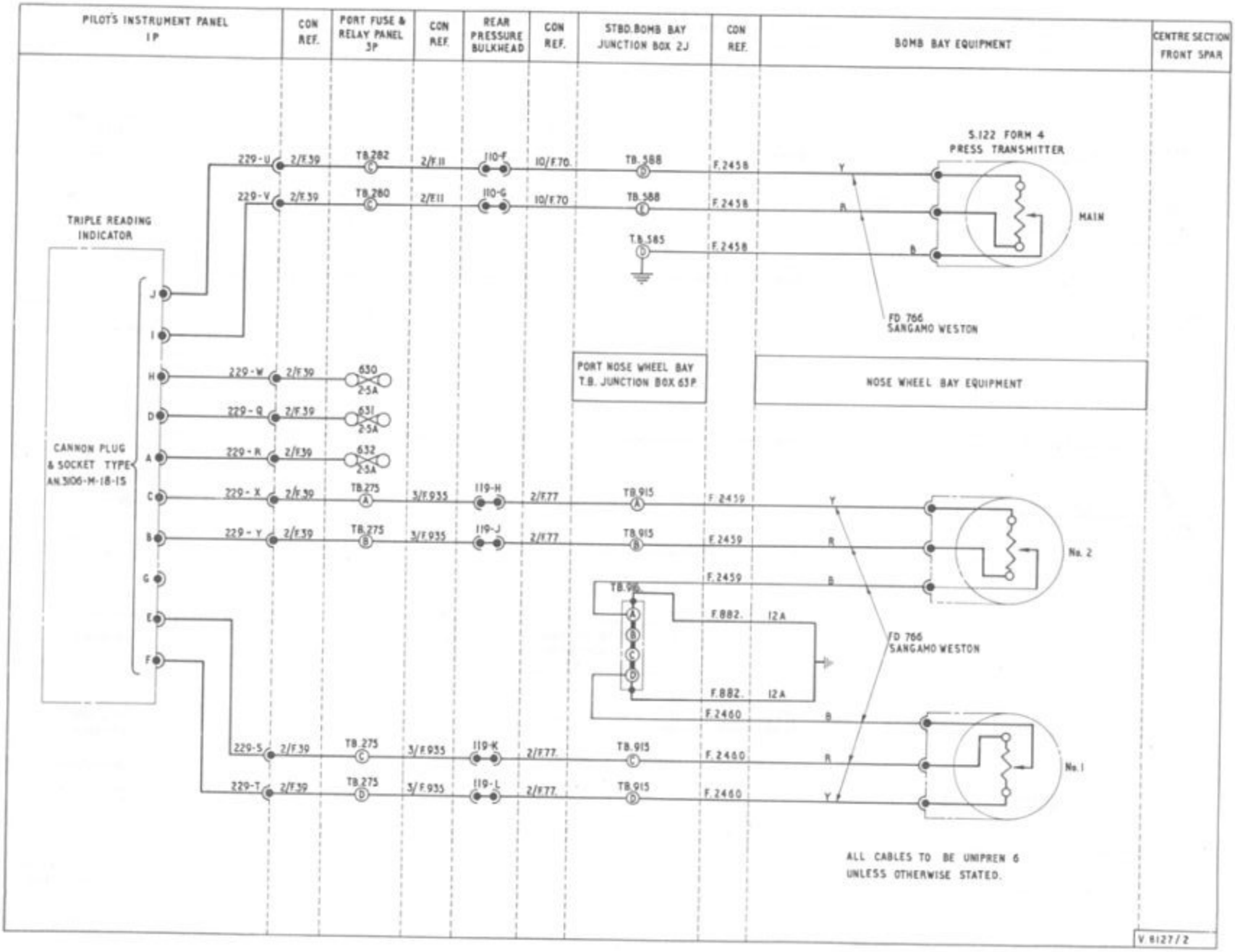

Fig 5 Hydraulic and brake pressure gauge

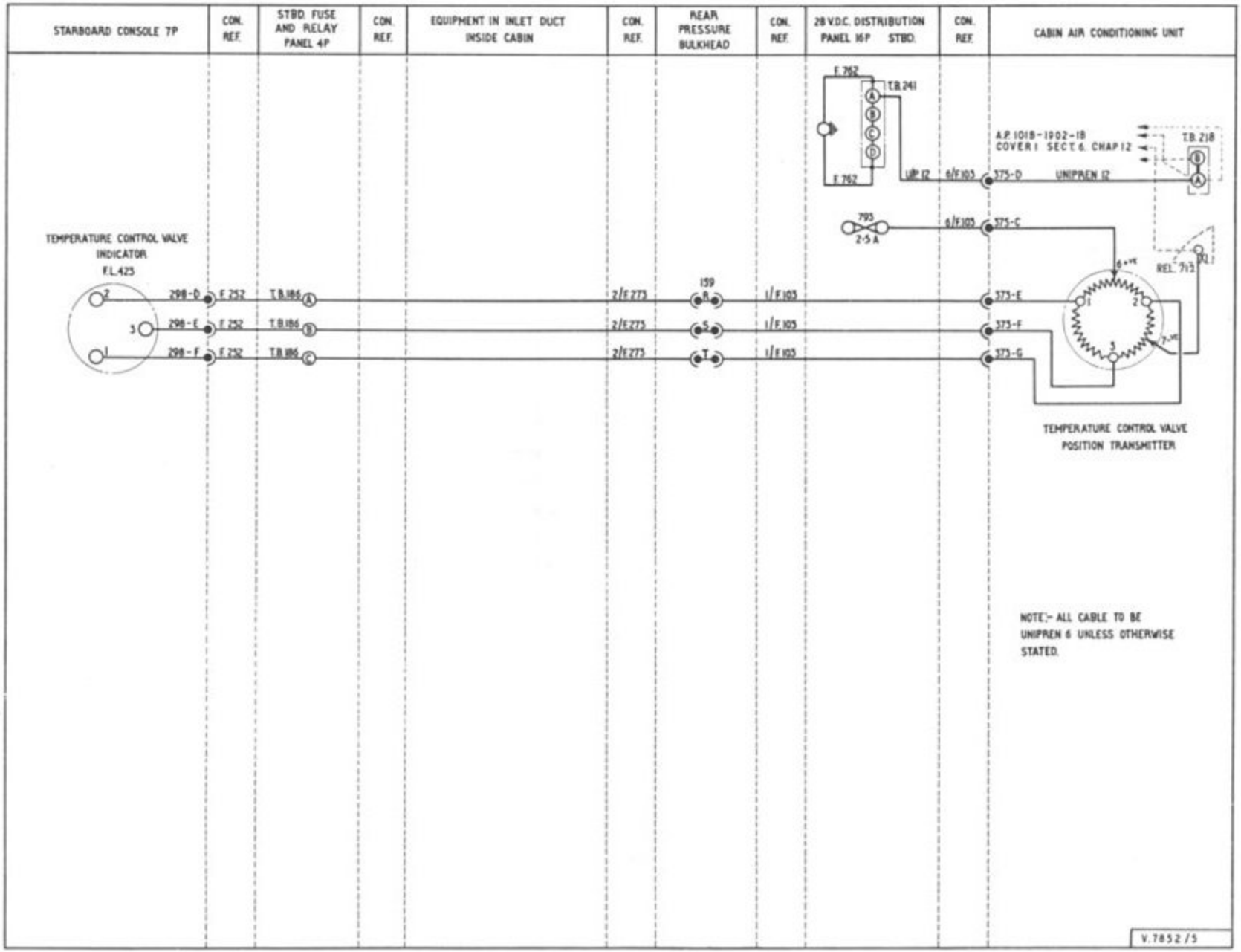

Fig.6 Cabin temperature control valve indicator

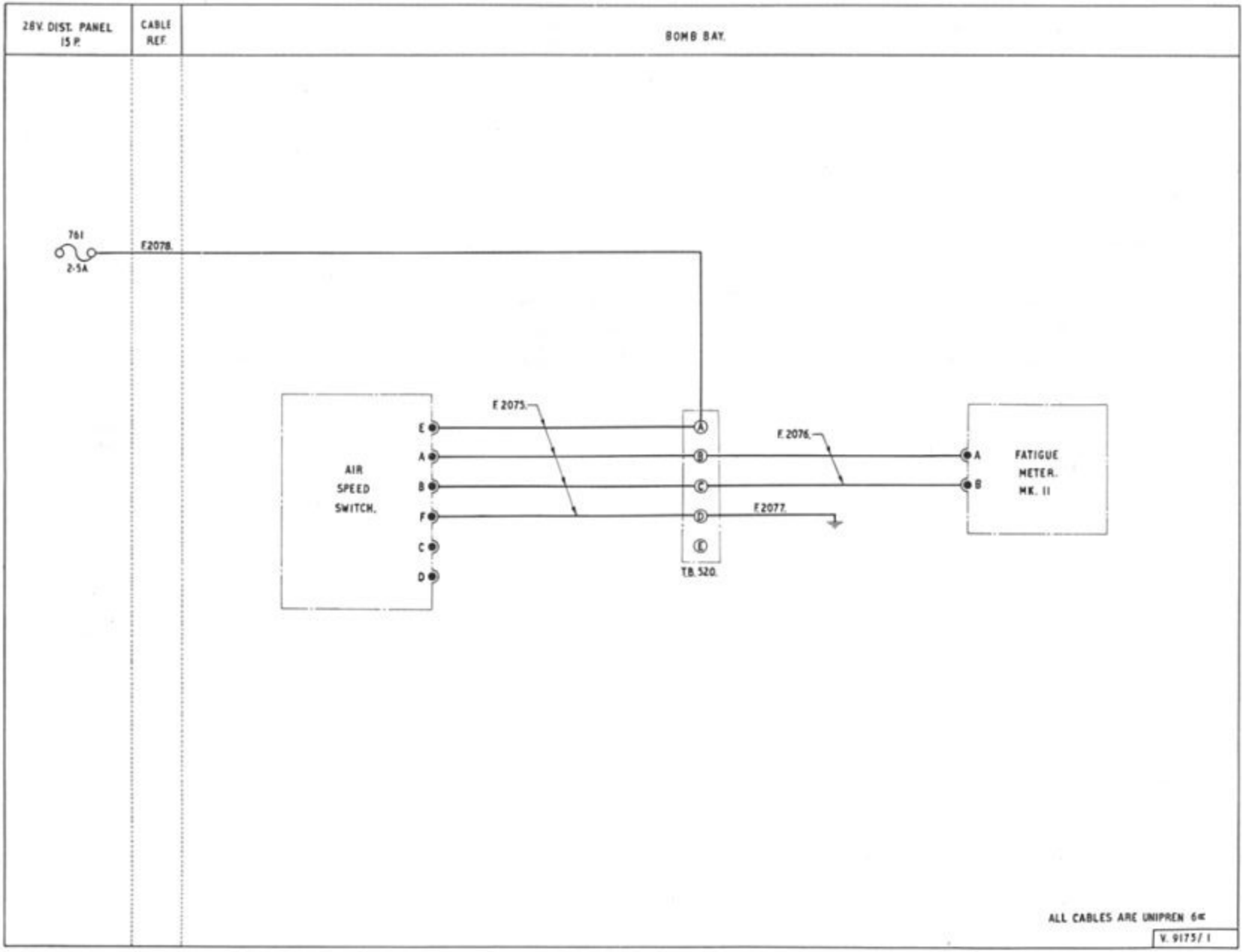

Fig. 7 Fatigue meter Pre Mod. 2388

Title changed

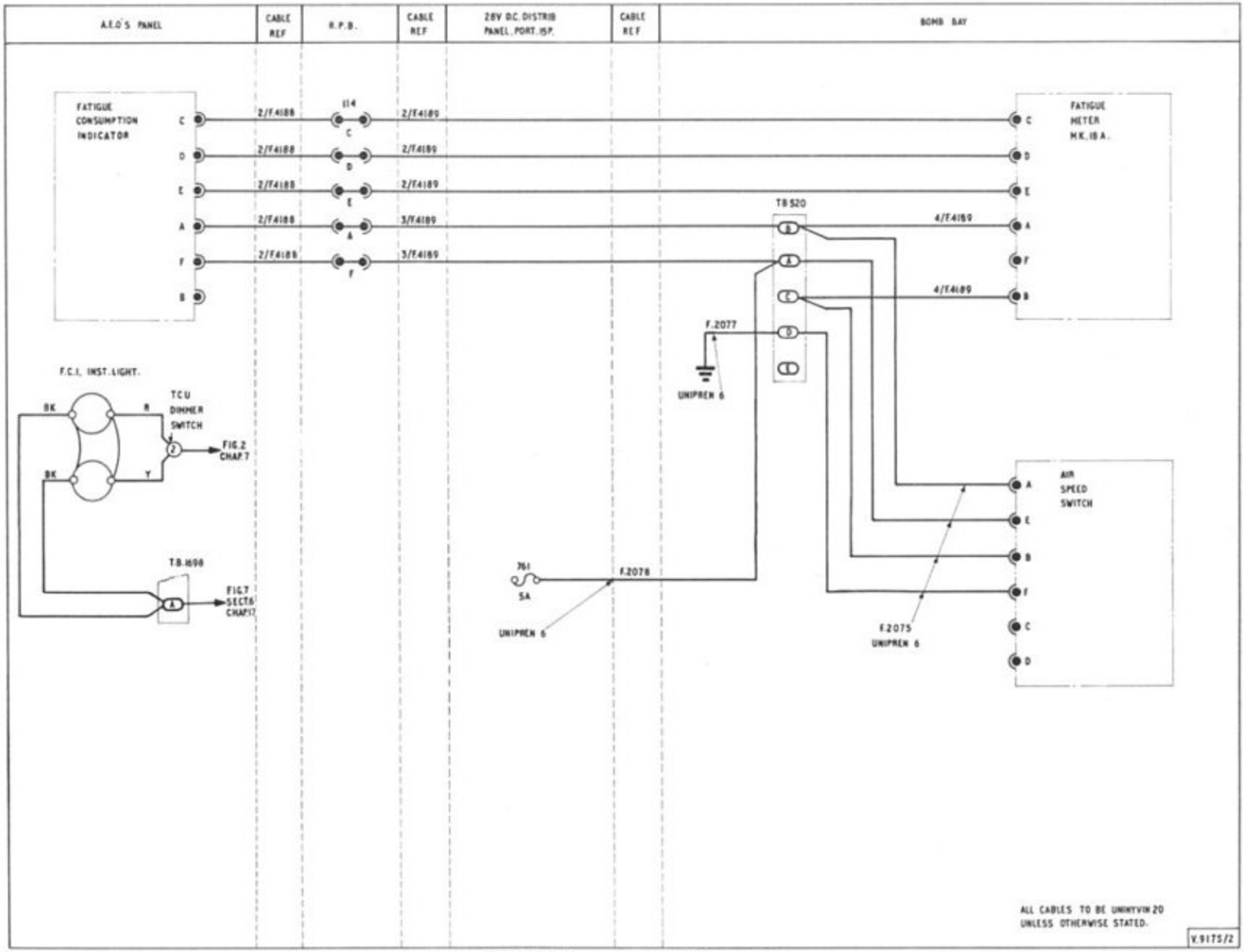

Fig.7A Fatigue meter Post Mod. 2388

◀ *Instrument light added* ▶

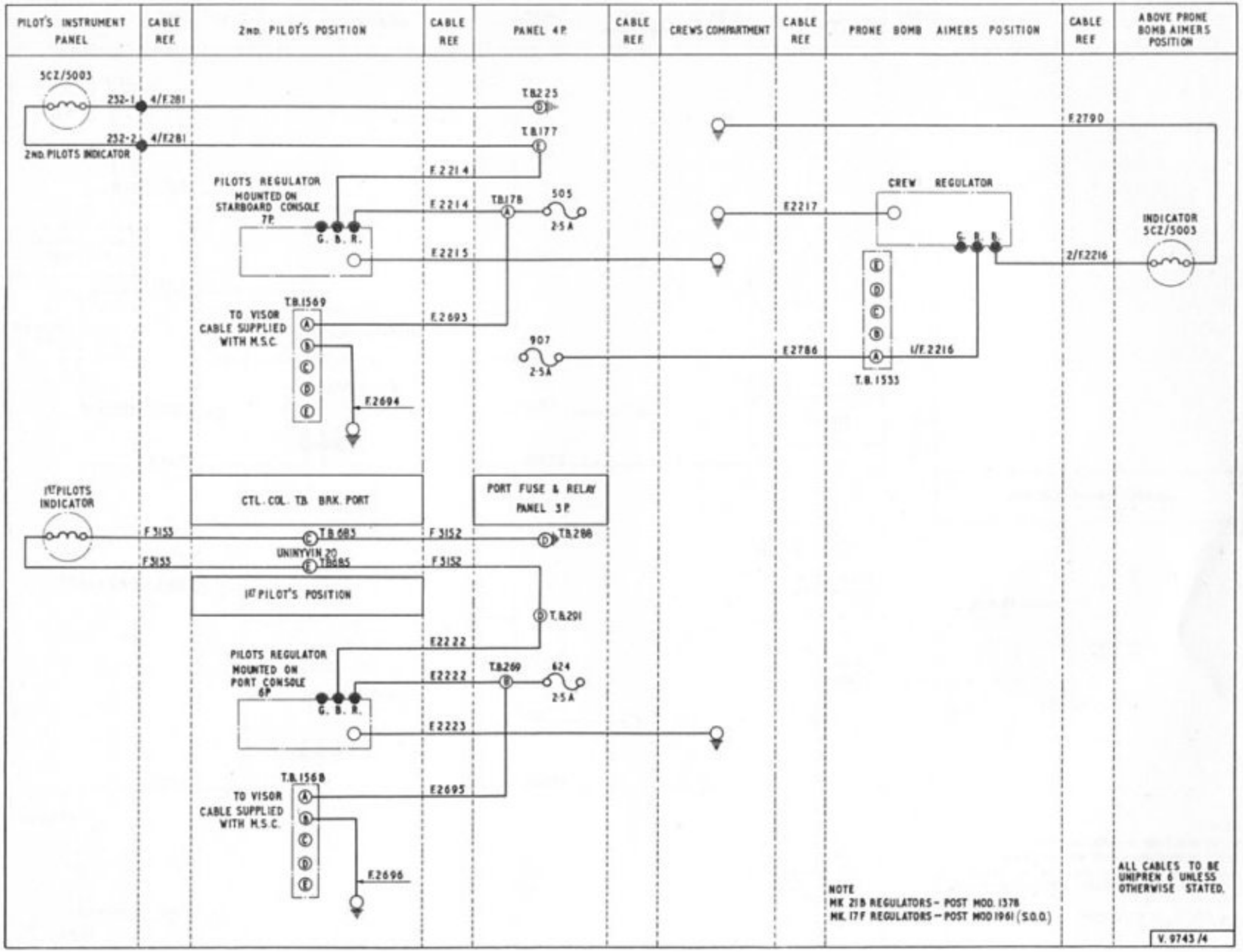

Fig. 8. Oxygen regulators, forward crew members

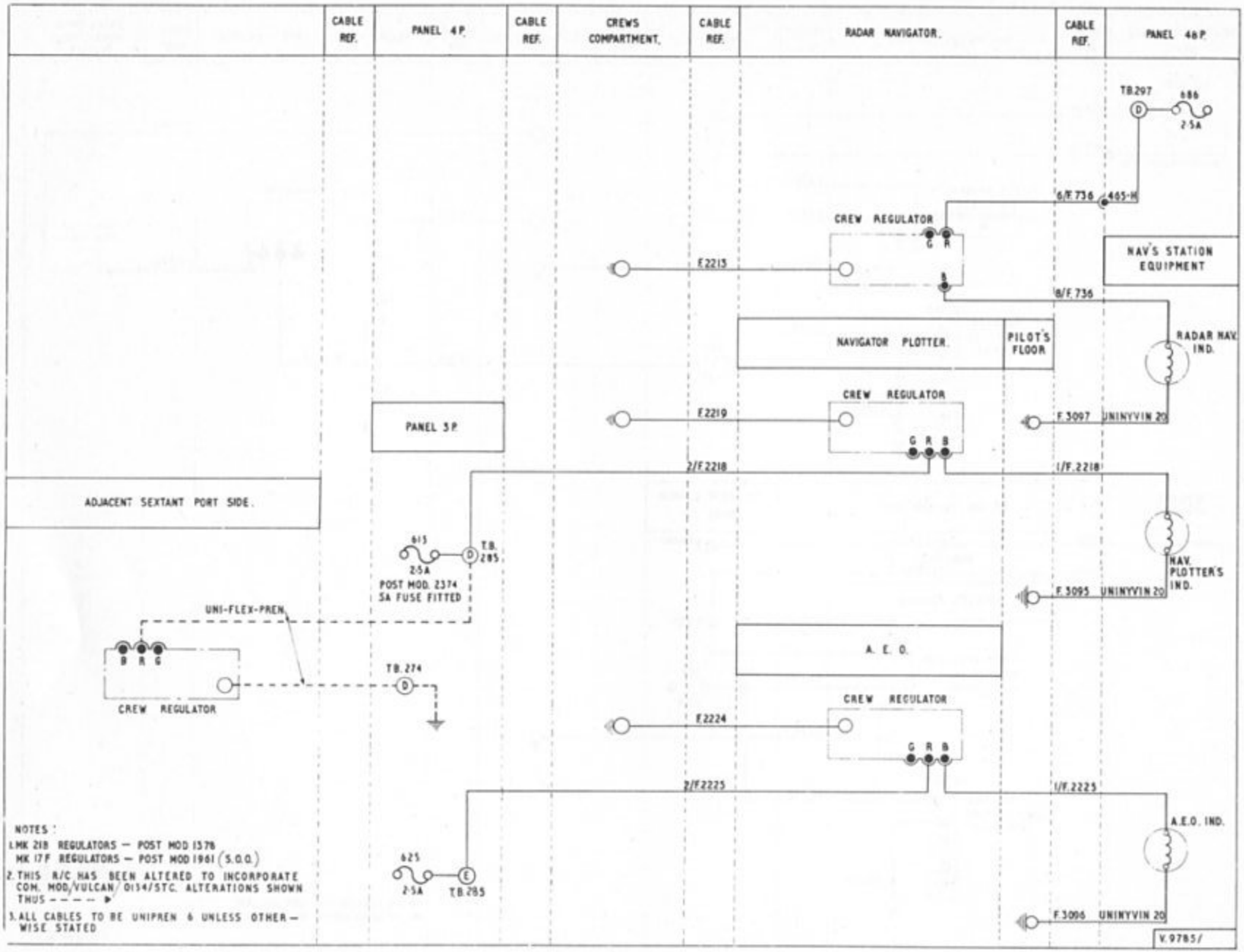

Fig. 9 Oxygen regulators - aft. crew members, Pre and Post Mod. 2374

(◀ Mod. 2374 incorporated ▶)

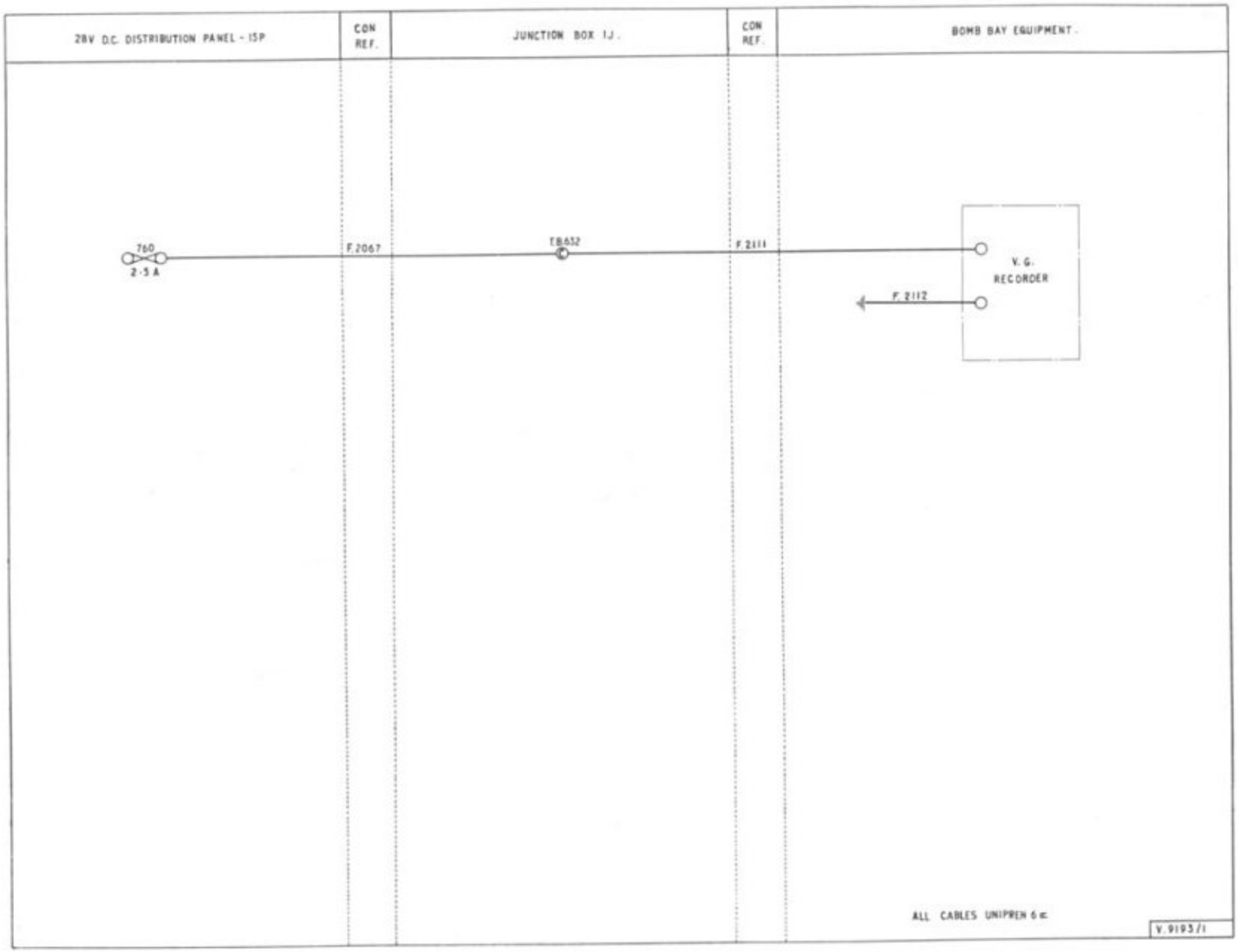

Fig. 10 V. G. recorder

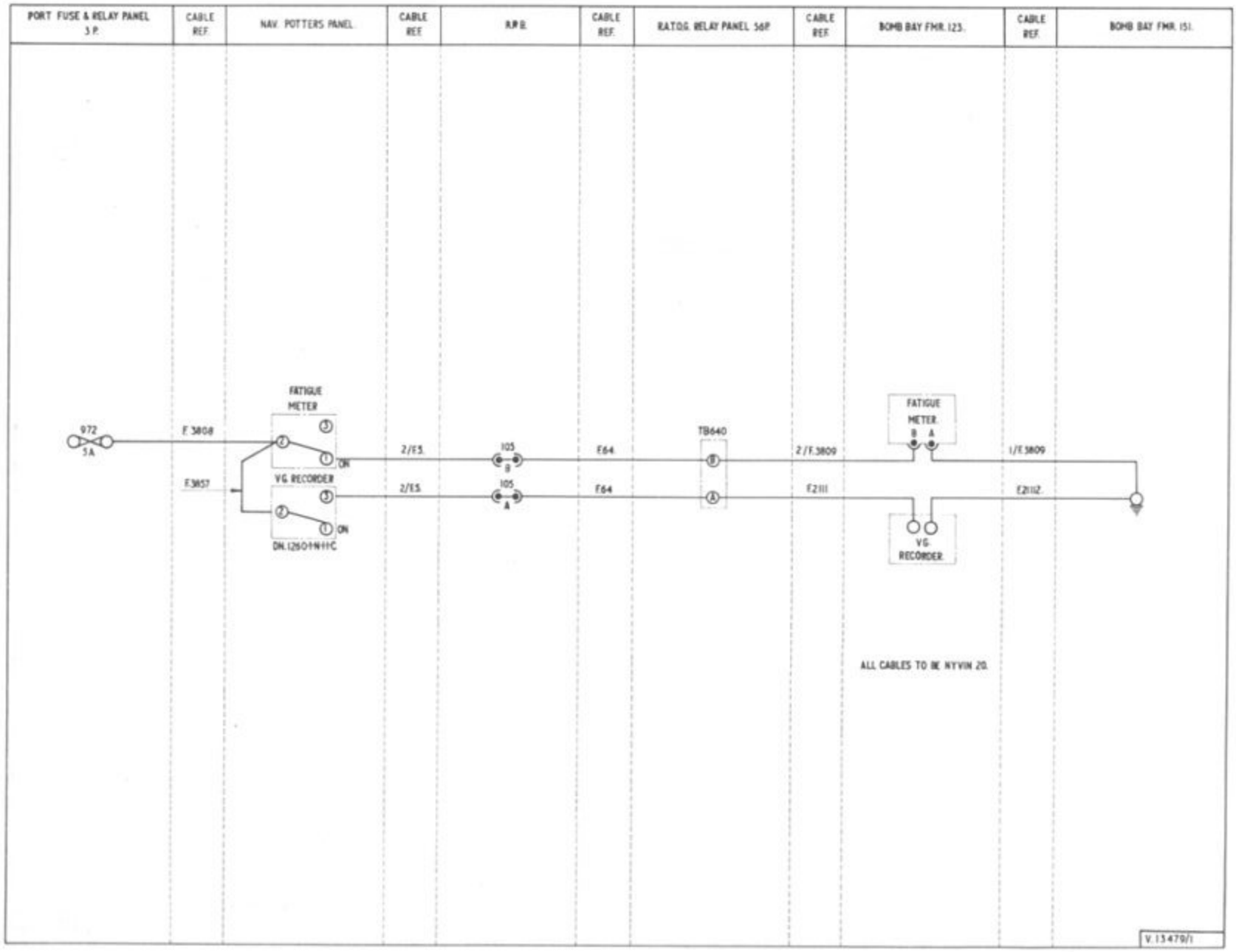

Fig. 11 2nd. Fatigue meter and V.G. recorder (Post Mod. 1925 S.O.O.)

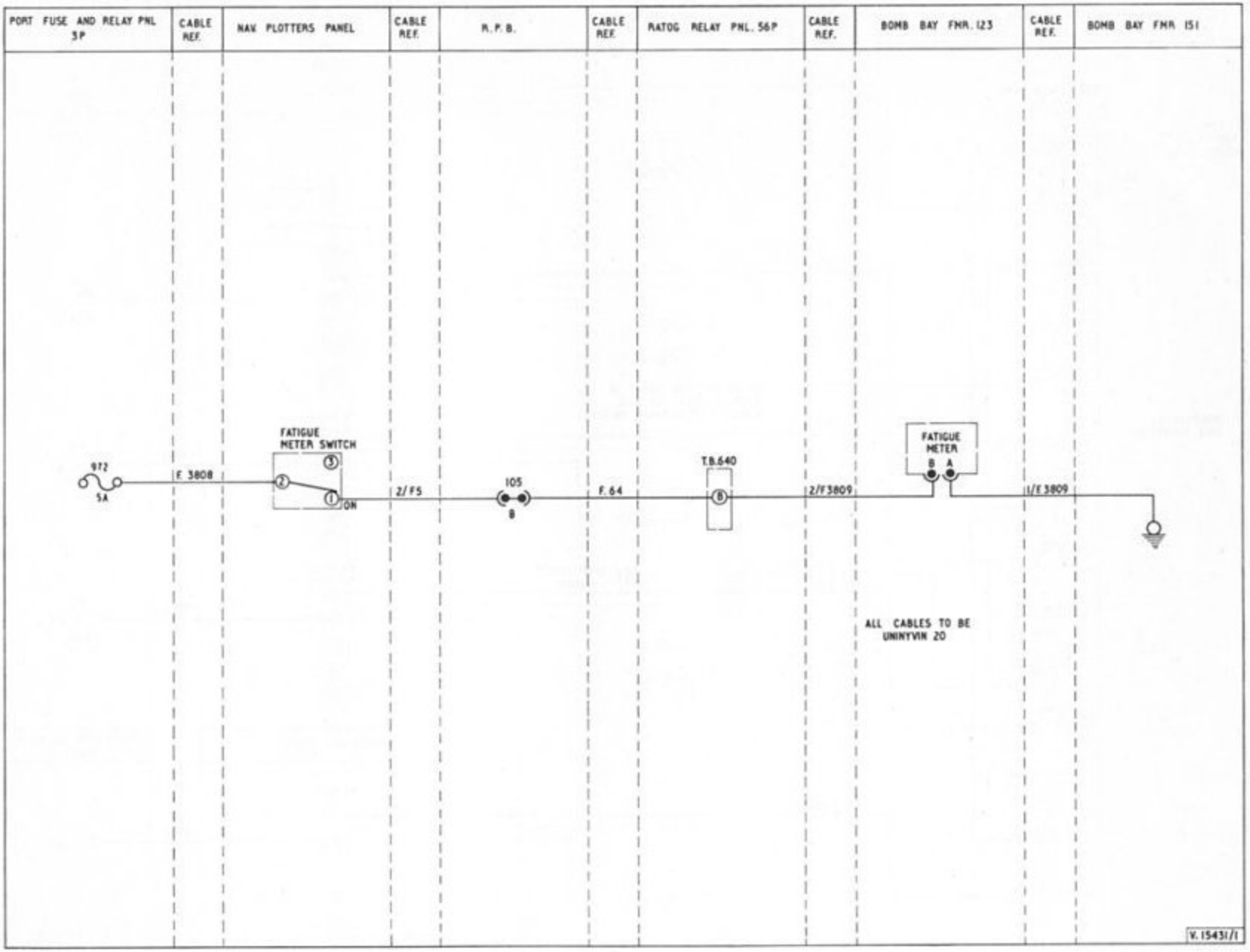

Fig. 12 2nd Fatigue meter Post Mod.2223 S.O.O.

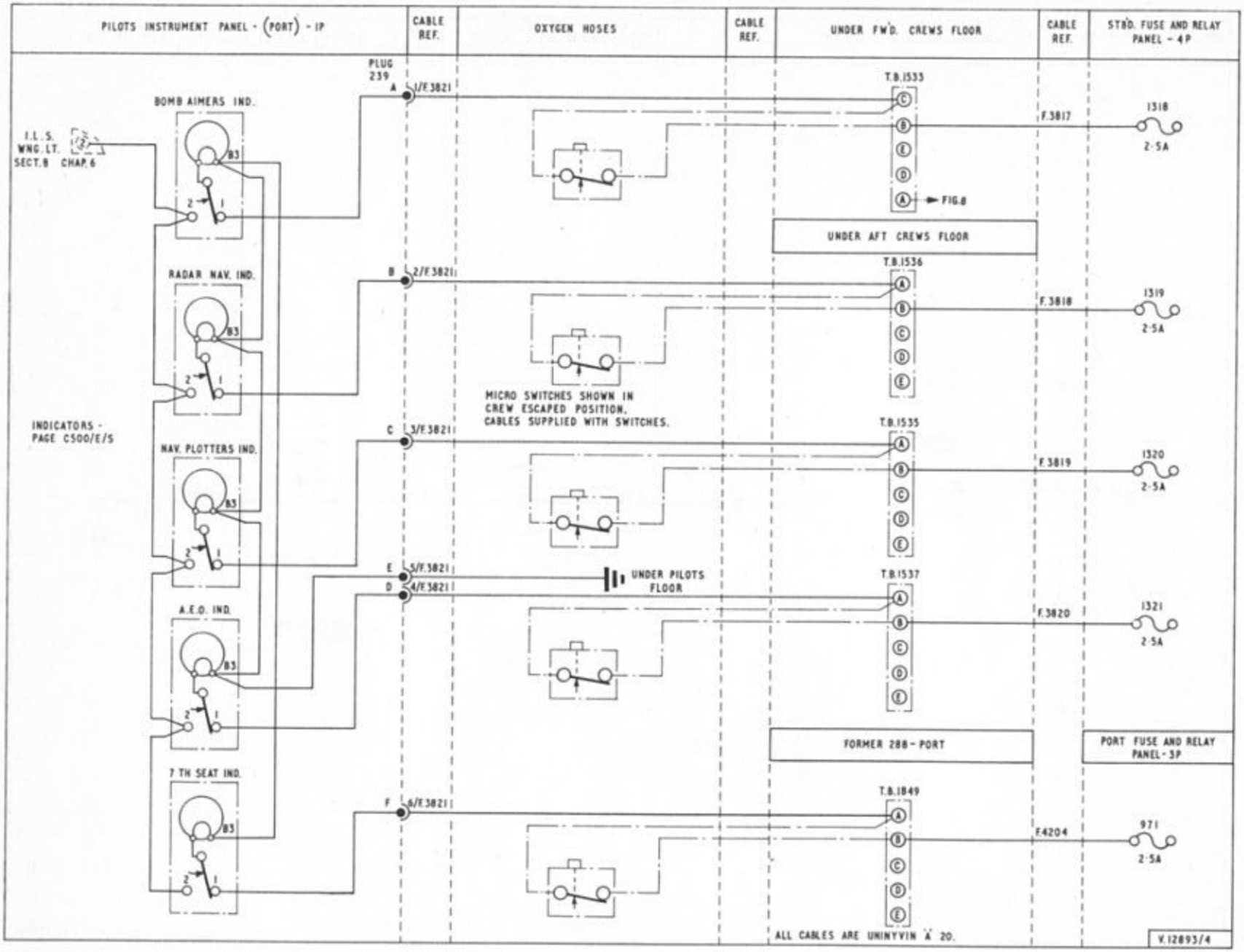

Fig.13 Escape Indication

Re-drawn to incorporate Mod 2374