SECTION 6

# RADIO INSTALLATION

## LIST OF CHAPTERS

***Note***—*A list of contents appears at the beginning of each chapter*

# Chapter 1 WIRELESS INSTALLATION

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### Introduction

**1.** This chapter describes the installation, operation, and functioning of the wireless systems namely, I/C, V.H.F., U.H.F., and Sub-Miniature Radio Compass. To cater for the modification standards of various aircraft the U.H.F. installation is introduced by two separate Modifications *(Mod.3524, to aircraft embodying Mods.2706 and 2707. Mod.3578, to aircraft embodying Mod.1025)*. The system as introduced by the two modifications is basically the same, the differences occur mainly in the power supplies which are described and illustrated in Sect. 5, Chap.1, Group R and S. The servicing instructions for the wireless equipment consist only of investigating wiring faults, as all necessary information on the testing and servicing of items of equipment, together with a detailed description of their operation, is given in the relevant Air Publication for each system. A schematic diagram accompanies the relevant text, whilst the disposition of major items of equipment is shown in the general location diagrams at the end of this chapter. A master key is provided to facilitate reference to these diagrams.

### Radio junction box

**2.** The radio junction box, located at the starboard side of the navigator's station, facilitates interconnection and distribution of the various services. A diagram showing the internal wiring is included in the chapter.

### Power supplies

**3.** The d.c. power supplies required to operate the wireless equipment are fully described in Sect.5, Chap.1, Group R and S.

## INTERCOMMUNICATION

### General

**4.** Normal intercommunication between the pilot and navigator is provided by a Type A1961 amplifier. Microphone and telephone circuits are extended from the amplifier, via an I/C relay panel, to the headset connecting sockets situated at the pilot's and navigator's stations. Provision is also made to use the V.H.F. or U.H.F. sets for intercommunication purposes if the Type A1961 amplifier should become unserviceable.

### Amplifier, Type A1961

**5.** This unit is carried by a tray, equipped with anti-vibration mountings, situated on a platform mounted above the Radio Compass R.F. amplifier on the starboard wall at the navigator's rear station. The unit is a three-stage audio-frequency amplifier operating directly from the aircraft 28-volt supply. A Type 103 rotary transformer is incorporated to supply H.T. voltage for the anodes of the valves. The valve heaters are fed from a stabilized supply at 19-volts; this is also derived from the aircraft 28-volt supply, a Type 40 carbon pile regulator being used to stabilize the heater voltage. All the connections to the amplifier unit are made by miniature plugs and sockets.

### Intercommunication relay panel

**6.** This panel assembly is situated above the Type A1961 amplifier at the navigator's

rear station and is the distribution point for the I/C wiring. Mounted on the panel is a Type 154 junction box, a Type S1 relay, and a number of terminal blocks.

**Audible warning** *(A.R.I.5800)*

7. Provision is made in the I/C system to give audible warning in the crew telephones of signals received by the Rear Warning system. A signal received by the Rear Warning system produces an oscillating note, which is clearly audible in the telephones.

**Control switch**

8. The control switch for the amplifier, labelled I/C ON-OFF, is mounted on the radio panel located above the console at the port side of the pilot's seat.

**Emergency operation**

9. Provision is made for the emergency operation of the intercomm. system in the event of the Type A1961 amplifier becoming unserviceable. The emergency service is provided by the V.H.F. or U.H.F. set then in use, and is controlled by the NORMAL/EMERGENCY switch on the radio panel in association with the Type 154 junction box on the I/C relay panel.

**Socket locations**

10. Intercomm. sockets are fitted to the pilot's and navigator's seats and an additional socket is installed at the prone position in the nose of the aircraft. Also as an aid to servicing an external socket is mounted on the V.H.F. relay panel in the upper equipment compartment. All the sockets are connected to the common circuits served by the Type A1961 amplifier. The cables connected to the intercomm. sockets on the pilot's and navigator's seats, are provided with an extra plug and socket fitted in the cable runs adjacent to the seat structures to permit free ejection of the seats in an emergency.

**Servicing**

11. Wiring faults should be investigated by referring to the diagrams in this chapter and the routeing diagrams in Sect.5, Chap.1, Group R and S. Servicing information on the system is contained in A.P.2876E, Vol.1.

## V.H.F. COMMUNICATION (A.R.I.18064)

**General**

12. The V.H.F. communication system comprises twin transmitter/receivers, operating over the frequency range of 100 Mc/s to 150 Mc/s. Connection of the V.H.F. system to the I/C installation is via the radio junction box *(para.2)*. For detailed information on the operation and description of the equipment used in the installation, reference should be made to A.P.2528P, Vol.1.

**Transmitter/receivers, Types T.R.1985 and T.R.1986**

13. The two V.H.F. sets Types T.R.1985 (No.1) and T.R.1986 (No.2) are 10 channel transmitter/receivers having a frequency coverage of 100 Mc/s to 125 Mc/s and 124.5 Mc/s to 150 Mc/s respectively. The sets are mounted on anti-vibration trays in the upper equipment compartment.

**V.H.F. relay panel**

14. This panel is located below the transmitter/receivers in the upper equipment compartment. Fitted on the panel is a Type 102 relay unit, a number of terminal blocks, a press-to-transmit push switch, and two mic./tel. sockets, one of which is used when servicing the V.H.F. sets and the other for external intercommunication. The press-to-transmit switch and the V.H.F. headset socket on the relay panel, are used when checking the operation of the V.H.F. transmitter/receivers on the ground.

**Intercomm. standby**

15. The amplifier section of each V.H.F. set may be used for emergency intercomm. purposes by selection of the I/C NORMAL-EMERGENCY switch *(para.9)*.

**V.H.F. control panel**

16. This panel is located on the instrument flying panel immediately forward of the control column. Mounted on it are two Type 382 control units *(No.1/No.2)*, a Type 11 volume control, and a Type B switch. Each control unit is a channel selector, having ten switch positions corresponding to ten spot frequencies to which the associated transmitter/receiver is tuned. Each channel selector tuning scale is provided with illumination, both units having an internal lamp controlled by a dimmer switch on the front of the unit. The Type B switch, labelled No.1/No.2 selects the V.H.F. set required for use. The Type 11 volume control is only effective on reception of the V.H.F. set then in operation.

**Suppressed aerials**

17. Each V.H.F. set uses an aerial manufactured from thin copper strip sandwiched between the inner and outer skins of the perspex canopy. The two aerials are positioned at the port and starboard sides of the canopy and are used for No.2 and No.1 sets respectively. Connection to each aerial is made via a terminal bolt projecting through the inner skin of the canopy into the cockpit. To each terminal bolt is connected a beryllium copper strip. At the other end of each strip is fitted a plug which is arranged to mate with a Type 684 socket bracketed to the canopy coaming tube. At the lower end of the socket assembly is a Type 359

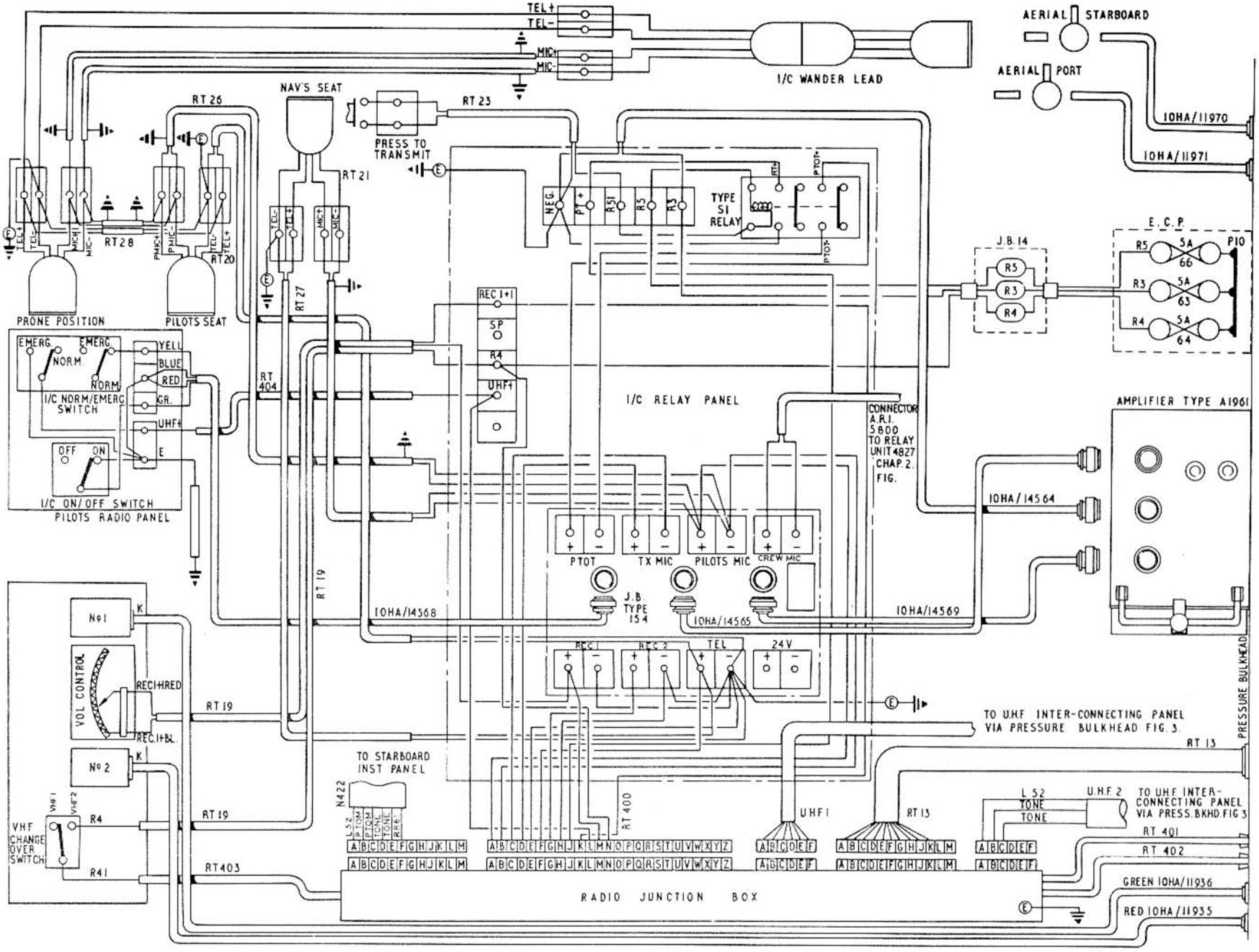


Fig.1. Intercommunication and V.H.F. communication system (A.R.I. 18064)

◀ *(Wiring correction)* ▶

801B

**RESTRICTED**

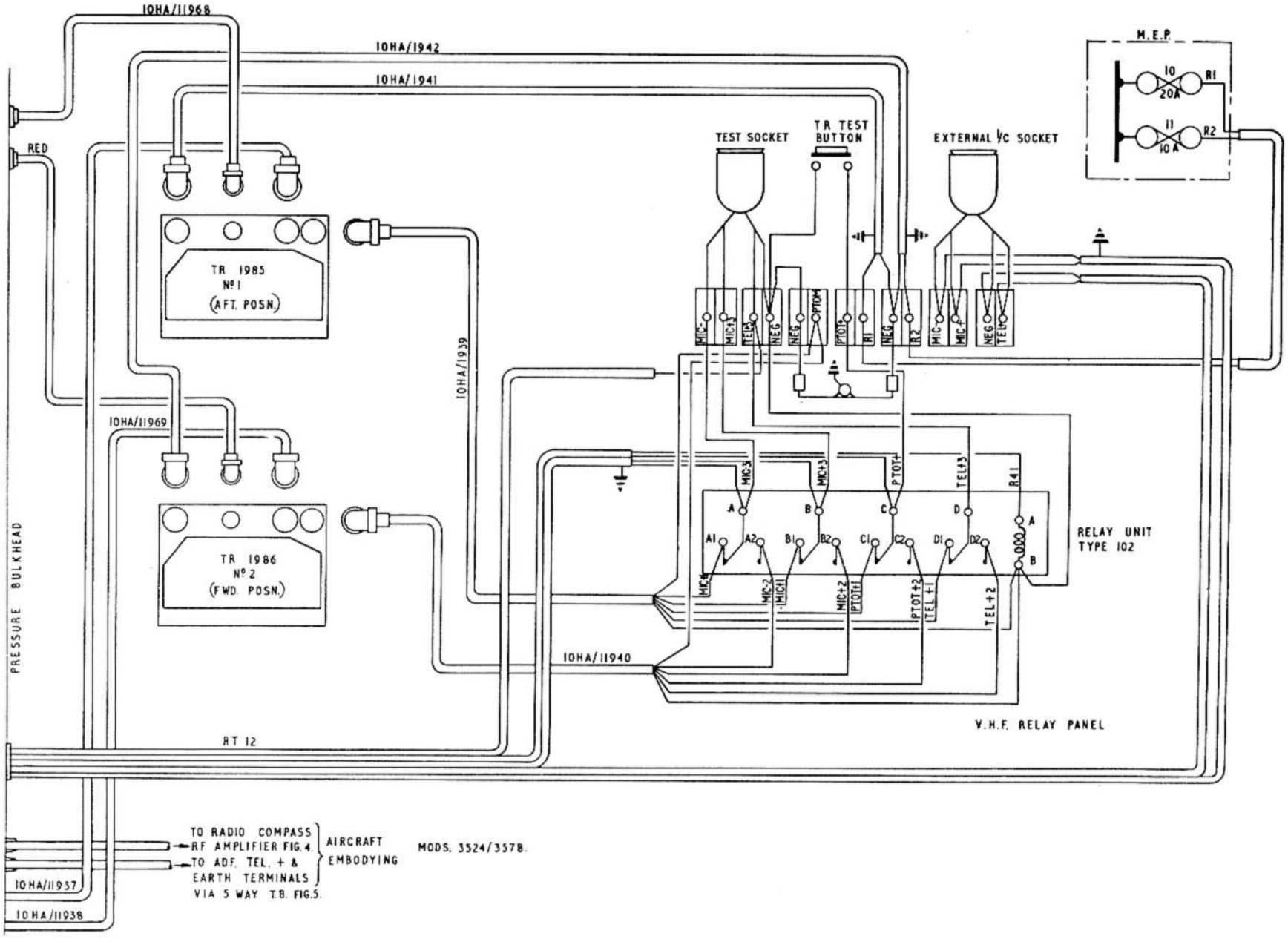


Fig. 1A. Intercommunication and V.H.F. communication system (A.R.I.18064)

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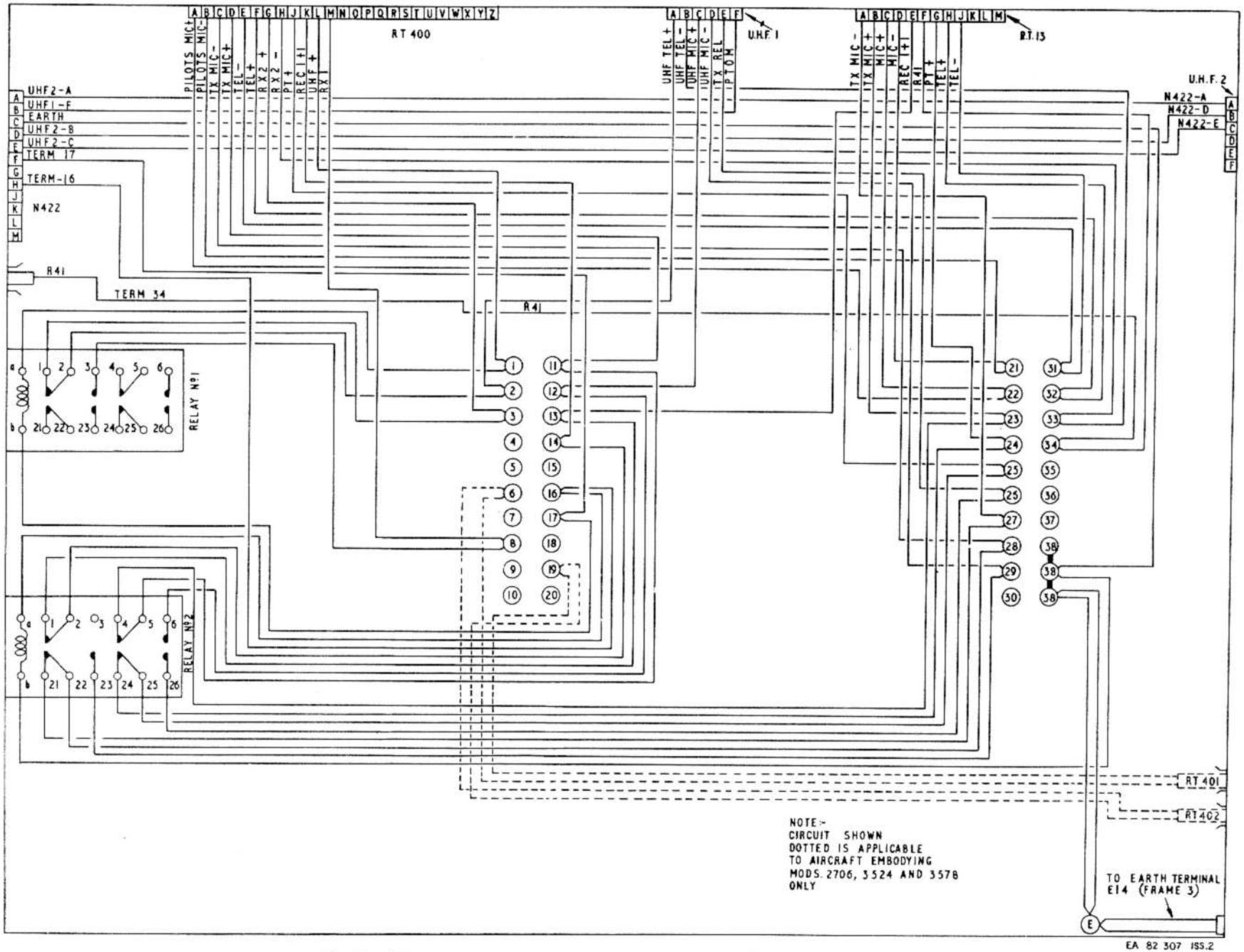



Fig.2. Radio junction box wiring diagram (Post Mod.4312)

tee-piece, to the forward end of which is connected an aerial matching stub. From the aft end of each tee-piece a co-axial cable is run to the appropriate V.H.F. set, via plugs and sockets on the pressure bulkhead.

**V.H.F./U.H.F. changeover switch**

**18.** This switch, located on the starboard instrument panel, labelled V.H.F./U.H.F. is provided to change from the V.H.F. to the U.H.F. system. When the switch is selected to U.H.F., the transmitting circuits and the mic./tel. circuits are connected via the relays in the radio junction box to the U.H.F. system.

**Press-to-transmit switch**

**19.** The pilot's Press-to-transmit push switch is located in the control column right handgrip. When the switch is pressed, a supply is fed from a fuse in the E.C.P. to energize a Type S1 relay on the I/C relay panel. This action completes the transmitter circuit of the V.H.F. or U.H.F. transmitter/receiver, then in use, and also transfers the microphone circuits from the Type A1961 amplifier to the transmitter.

**Servicing**

**20.** Wiring faults should be investigated by referring to the schematic diagrams in this chapter and the routeing diagrams in Sect.5, Chap.1, Group R and S. Servicing information on the system is contained in A.P.2528P, Vol.1.

## SUB-MINIATURE RADIO COMPASS-AD.722 (A.R.I.5877)

*(Aircraft embodying Mods.2706 and 3578)*

**Introduction**

**21.** The Marconi Automatic Direction Finder Type A.D.722, introduced by S.R.I.M. 2265 and re-engineered by Mods.2706 and 3578, is a lightweight sub-miniature airborne MF receiving equipment. Automatic relative bearing indication of the source of radio signals is provided by a panel mounted indicator. The installation basically comprises an IF amplifier and an RF amplifier, operating over a frequency range of 200 kc/s to 1700 kc/s, served by loop and sense aerials.

**RF amplifier, Type A8281**

**22.** The RF amplifier unit, installed on a Type 8288 mounting tray located at the starboard side of the cabin, houses the RF circuits and balanced modulator section of the DF receiver. Receiver tuning is effected by a flexible mechanical drive. The drive cable and all plugs and sockets are mounted on a backplate to enable the unit to be withdrawn from its mounting tray.

**IF amplifier, Type A8282**

**23.** The IF amplifier unit, installed on a Type 8289 mounting tray located adjacent to the Type A8281 amplifier *(para.22)*, contains all the fixed frequency stages of the ADF receiver.

**Control unit, Type 8283**

**24.** All controls for radio reception and DF operation are situated on the front panel of this unit, mounted at the port side of the navigator's seat. An illuminated tuning scale is incorporated, tuning being effected by means of a cranked handle which operates the inductance tuning mechanism in the RF amplifier *(para.22)*. The remaining controls are all electrical and comprise the following:–

(1) ADF receiver switch.
(2) Frequency band selector.
(3) Tuning control.
(4) RT/CW switch
(5) Gain control
(6) Panel illumination control.
(7) Equipment ON/OFF switch.

**Loop aerial, Type 8280**

**25.** This aerial is located in the upper equipment compartment hatch, and comprises a ferrite-cored crossed loop.

**Quadrantal error corrector unit**

**26.** This unit, located on the underside of the upper equipment compartment hatch, compensates for quadrantal error in the Type 8280 loop aerial.

**Sense aerial**

**27.** A centre fed T aerial supported on insulators is mounted on the outer surface of the forward camera bay hatch, and is connected to the Type A8281 amplifier.

**Relative bearing indicator, Type 8721**

**28.** This indicator, fitted on the navigator's instrument panel, provides indication of the relative bearing of the station being received.

**ADF audio facility**

**29.** Audio signals are fed from the Type A8281 amplifier to the I/C sustem, via the radio junction box, an I/C-ADF changeover switch, and J.B.154 on the I/C relay panel.

**I/C-ADF changeover switch**

**30.** This switch, located at the port side of the navigator's seat and labelled I/C-ADF changes over the I/C system to the ADF audio facility for the reception of audio signals, when the switch is selected to ADF.

**Press-to-call switches**

**31.** A switch, labelled PRESS-TO-CALL-NAVIGATOR, mounted above the console at the pilot's station and a switch, labelled

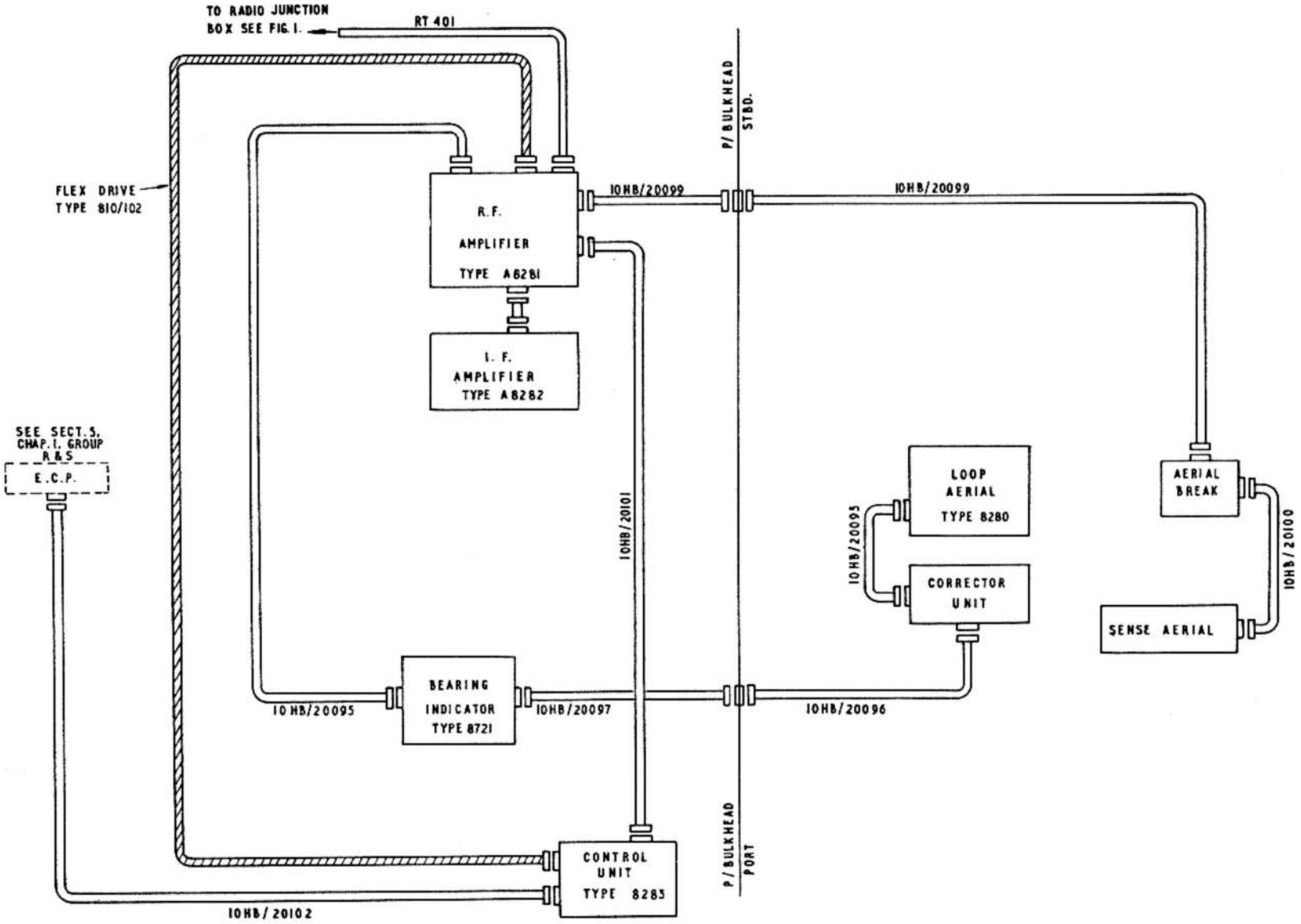



Fig.3. Marconi sub-miniature radio compass (A.R.I.5877)

PRESS-TO-CALL-PILOT, on the port wall at the navigator's station; provide a call system between the two crew members when the ADF audio facility is being used.

### Power supplies

**32.** The 28-volt d.c. supply for the system is fed from a fuse in the E.C.P. *(Sect.5, Chap.1, Group R and S)* to the Type 8283 control unit.

### Servicing

**33.** It is important that detailed servicing is carried out only by authorised personnel. Wiring faults should be investigated by referring to the diagrams in this chapter and the routeing diagrams in Sect.5, Chap.1, Group R and S. Full servicing and operational instructions on the system are contained in A.P.2530M, Vol.1.

## U.H.F. COMMUNICATION (A.R.I.18124/1)

### Introduction

**34.** The U.H.F. communication system incorporates a pressurized multi-channel transmitter/receiver operating over the frequency range of 225 Mc/s to 399.9 Mc/s. Connection of the U.H.F. system to the intercomm. installation is via the radio junction box *(para.2)*. For detailed information on the operation and description of the equipment used in the installation, reference should be made to A.P.2531J, Vol.1.

### Transmitter/receiver, Type TR5/ARC.52

**35.** The crystal controlled transmitter/receiver, in conjunction with a Type C1607/ARC.52 control unit, can be selected to operate at any one of eighteen automatically pre-set frequencies, 1,750 manually selected channel frequencies, and one guard channel frequency between 238 and 248 Mc/s.

**36.** The transmitter/receiver is mounted on a tray located at the starboard side in the rear fuselage between frames 36 and 37. The unit is pressurized to between 4 to 5 lb/in². air being introduced, when necessary, through a Schrader valve on the outer casing.

### Muting-bias unit

**37.** The muting-bias unit, located on a panel at the starboard side in the rear fuselage between frames 32 and 33, is controlled by a PRESS-TO-MUTE switch on the starboard instrument panel.

### Interconnecting box, Type ARC.52

**38.** Located with the muting-bias unit *(para.37)*, the interconnecting box facilitates connection of the microphone input and audio output circuits from the transmitter/receiver to the intercomm. system, via the radio junction box *(para.2)*.

### Control unit, Type C1607/ARC.52

**39.** The control unit, mounted on the starboard instrument panel, incorporates all the operational controls and provides the following facilities:—

(1) Function switch. This has four positions which provide one of the following services:—

OFF — In this position the equipment is inoperative.

T/R — In this position the equipment is switched on for operational purposes.

T/R+G — In this position the guard receiver is available in addition to the transmitter/receiver.

ADF — In this position an automatic direction facility is provided.

(2) CHANel selector switch. This has 20 positions; those numbered 1 to 18 are for selecting the required pre-set frequency chanel. The two remaining positions are labelled M and G.

M — This position is used to switch the selection of frequency to manual control.

G — This position enables the transmitter/receiver to be used on the guard frequency independent of the guard receiver.

(3) MANUAL. Four controls are incorporated in the manual service. Each control is provided with an aperture in which a series of numbers appear, the controls being used to select any one of 1,750 channels as required.

(4) VOLume. This control is used to vary the level of audio in the telephones.

Two panel lamps integral with the unit are controlled by the pilot's starboard red lamps dimmer switch *(Sect.5, Chap.1, Group L)*.

### Aerial

**40.** The aerial used in the installation is a broad band type having a characteristic impedance of 50 ohms., it is installed on the upper surface of the fuselage between frames 12A and 13.

### Power supplies

**41.** The d.c. power supplies required to operate the system are fully described in Sect.5, Chap.1, Group R and S.

### Servicing

**42.** Wiring faults should be investigated by referring to the schematic diagram in this chapter and the routeing diagrams in Sect.5, Chap.1, Group R and S. Servicing information on the system is contained in A.P. 2531J, Vol.1.

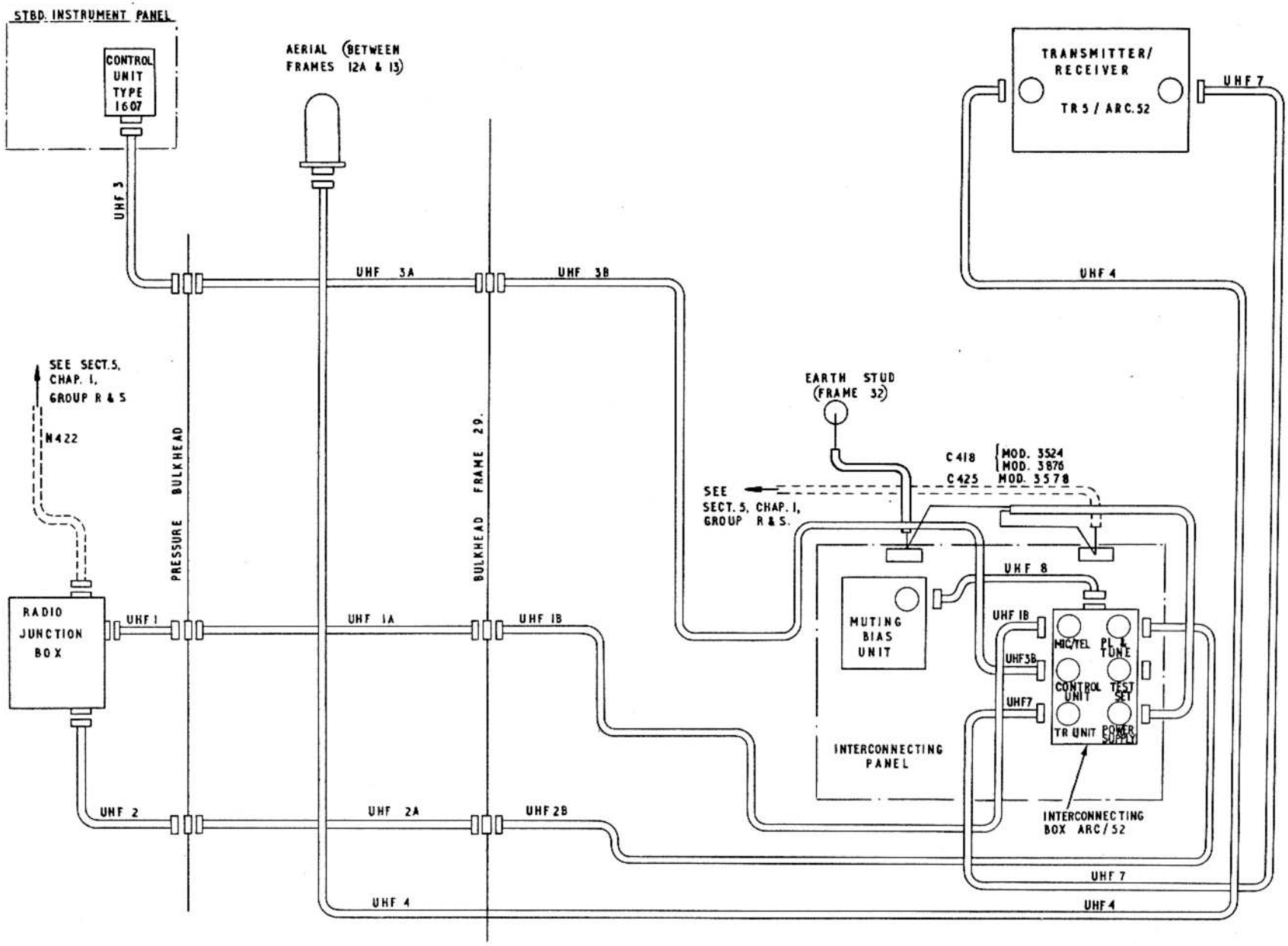



Fig.4. U.H.F. communication (A.R.I.18124/1)

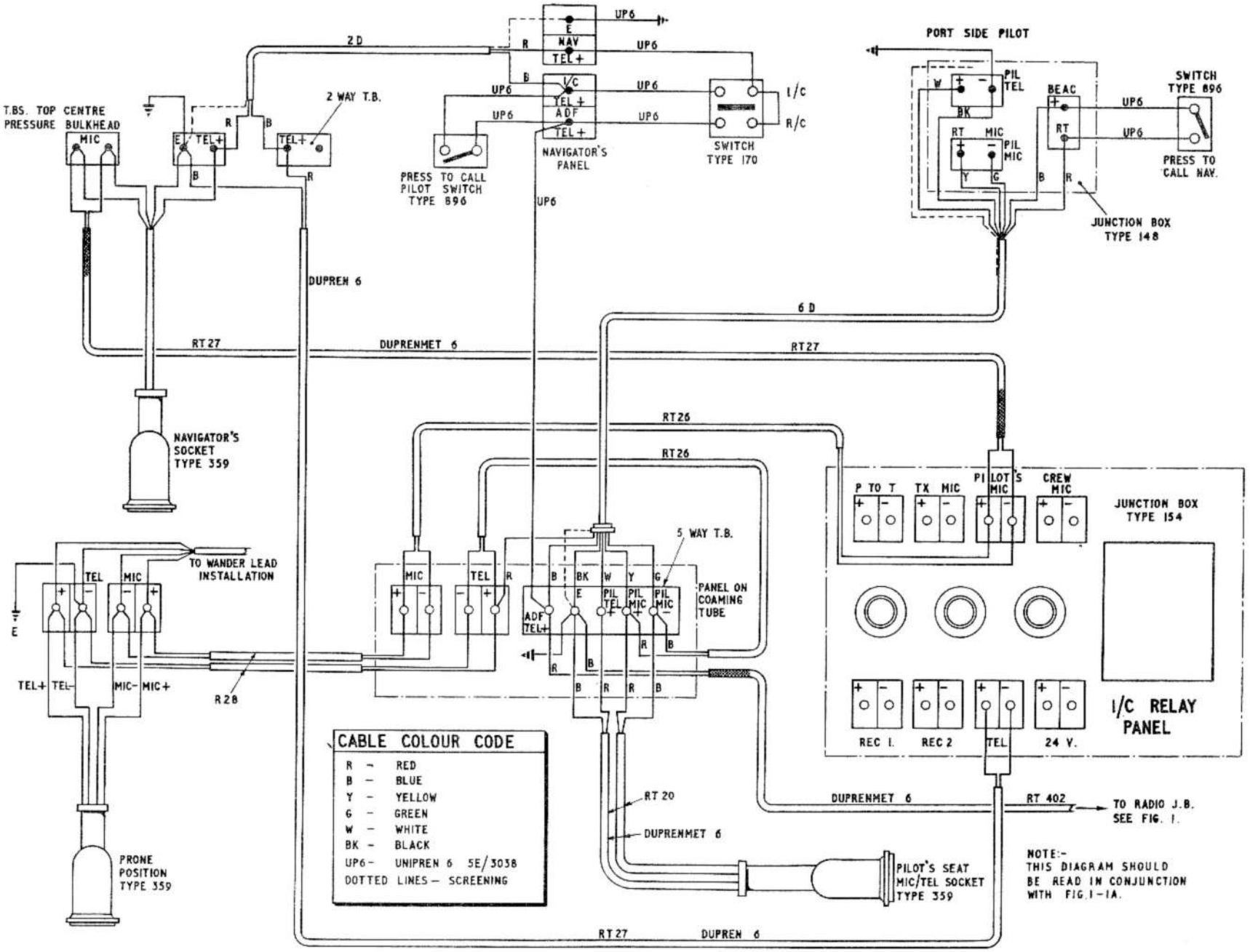



Fig. 5. Audio wiring diagram – Marconi sub-miniature radio compass

## TABLE 1

### Master key to location diagrams

| Equipment | Location | | Access | |
|---|---|---|---|---|
| | Fig. | Item | Fig. | Item |
| Intercommunication system | | | | |
| Amplifier, Type A.1961 | ◀ 10 | 1 | 13 | 1 |
| Intercomm. relay panel | 10 | 1 | 13 | 1 |
| I/C ON/OFF switch | 8 | 2 | 13 | 1 |
| Normal/emergency switch | 8 | 3 | 13 | 1 |
| Pilot's mic/tel. socket | 6 | 3 | 13 | 1 |
| Navigator's mic/tel. socket | 6 | 2 | 13 | 1 |
| Forward station mic/tel. socket | 6 | 5 | 13 | 1 |
| External mic/tel. socket | 11 | 2 | 12 | 1 |
| V.H.F. communication system (A.R.I.18064) | | | | |
| No.1 transmitter/receiver, Type T.R.1985 | 11 | 3 | 12 | 1 |
| No.2 transmitter/receiver, Type T.R.1986 | 11 | 6 | 12 | 1 |
| V.H.F. relay panel | 11 | 1 | 12 | 1 |
| V.H.F. control panel | 8 | 9 | 13 | 1 |
| Port canopy aerial No.2 set | 6 | 4 | 13 | 1 |
| Starboard canopy aerial No.1 set | 7 | 1 | 13 | 1 |
| Pilot's press-to-transmit switch | 8 | 8 | 13 | 1 |
| V.H.F./U.H.F. changeover switch | 8 | 7 | 13 | 1 |
| Marconi sub-miniature radio compass (A.R.I.5877) | | | | |
| R.F. amplifier, Type A.8281 | 10 | 4 | 13 | 1 |
| I.F. amplifier, Type A.8282 | 10 | 3 | 13 | 1 |
| Control unit, Type 8283 | 9 | 3 | 13 | 1 |
| Loop aerial, Type 8280 | 11 | 4 | 12 | 1 |
| Quadrantial error corrector unit | 11 | 5 | 12 | 1 |
| Sense aerial | 6 | 6 | 13 | 3 |
| Relative bearing indicator | 9 | 4 | 13 | 1 |
| I/C – A.D.F. changeover switch | 9 | 2 | 13 | 1 |
| Press-to-call-navigator switch | 8 | 1 | 13 | 1 |
| Press-to-call-pilot switch | 9 | 1 | 13 | 1 ▶ |

**TABLE 1** *(continued)*

| Equipment | Location | | Access | |
|---|---|---|---|---|
| | Fig. | Item | Fig. | Item |
| U.H.F. communication (A.R.I.18124/1) | | | | |
| Transmitter/receiver, Type TR5/ARC.52 | ◀ 7A | 3 | 13 | 4 |
| Muting-bias unit | 7A | 1 | 13 | 4 |
| Interconnecting box, Type ARC.52 | 7A | 2 | 13 | 4 |
| Control unit, Type C1607/ARC.52 | 8 | 4 | 13 | 1 |
| Aerial | 6 | 1 | 13 | 2 |
| Radio junction box | 10 | 2 | 13 | 1 |
| Tone switch | 8 | 6 | 13 | 1 |
| Press-to-mute switch | 8 | 5 | 13 | 1 ▶ |

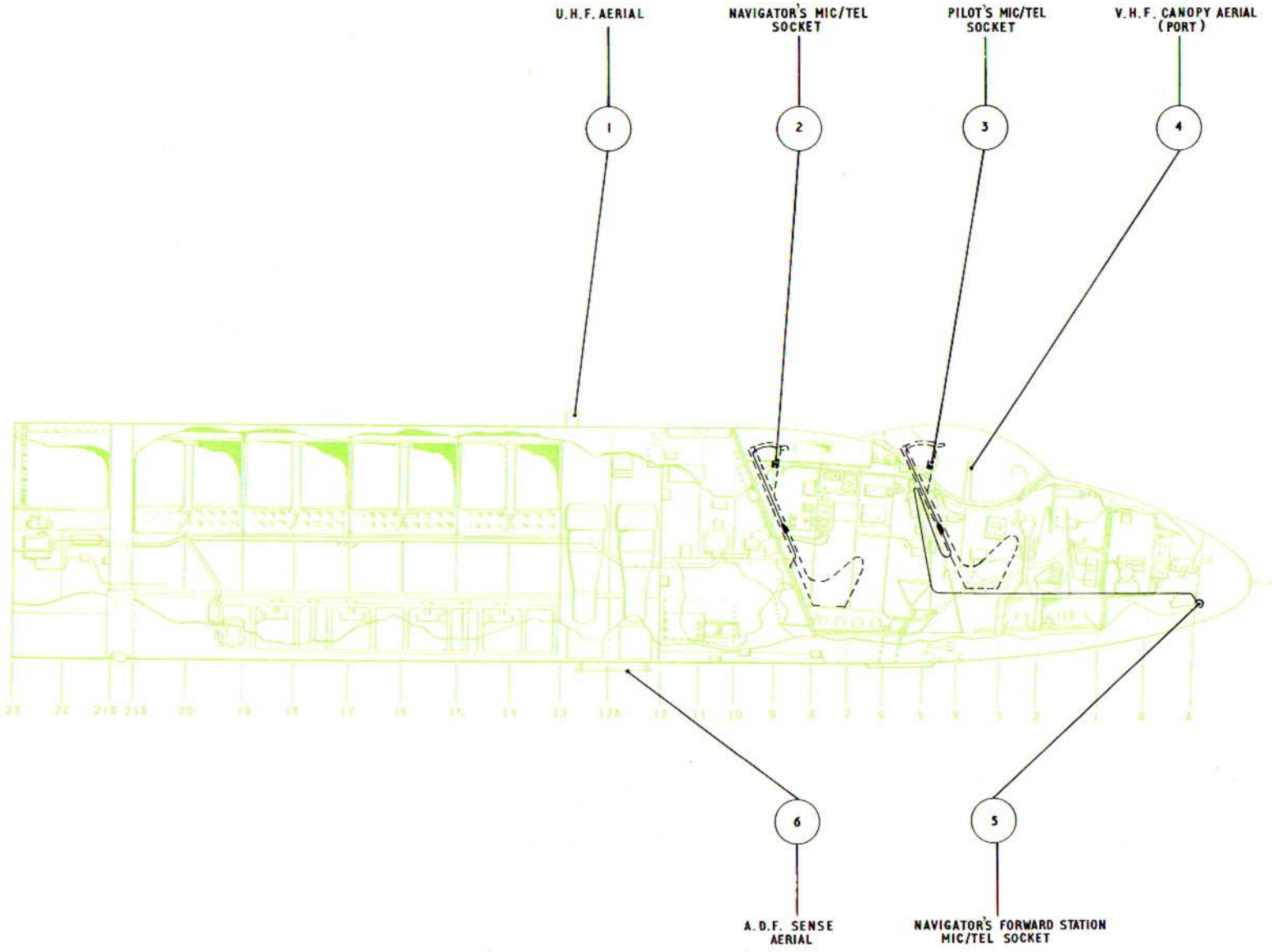



Fig. 6. Wireless installation – port fuselage


Fig. 7. Wireless installation – starboard fuselage

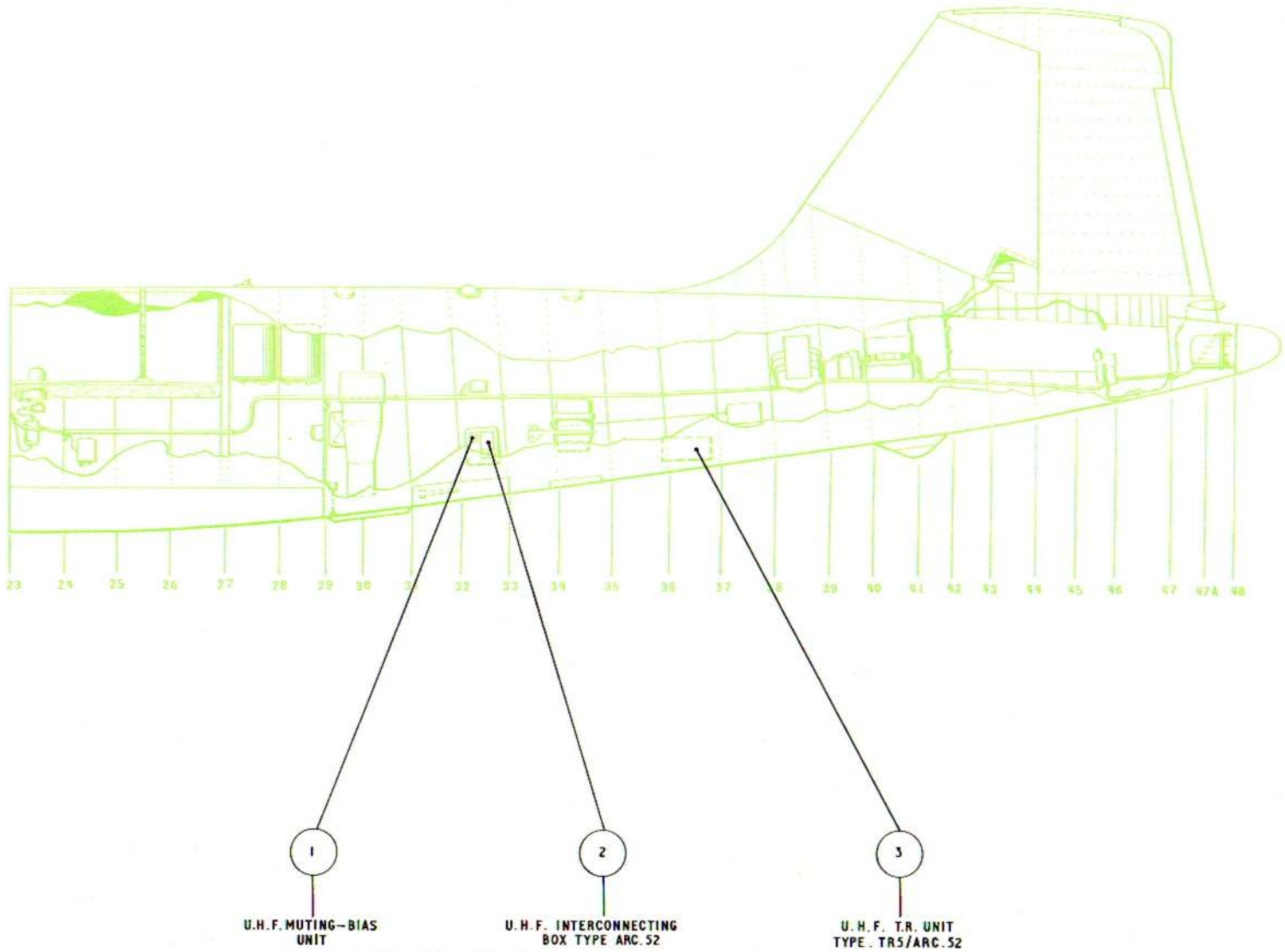
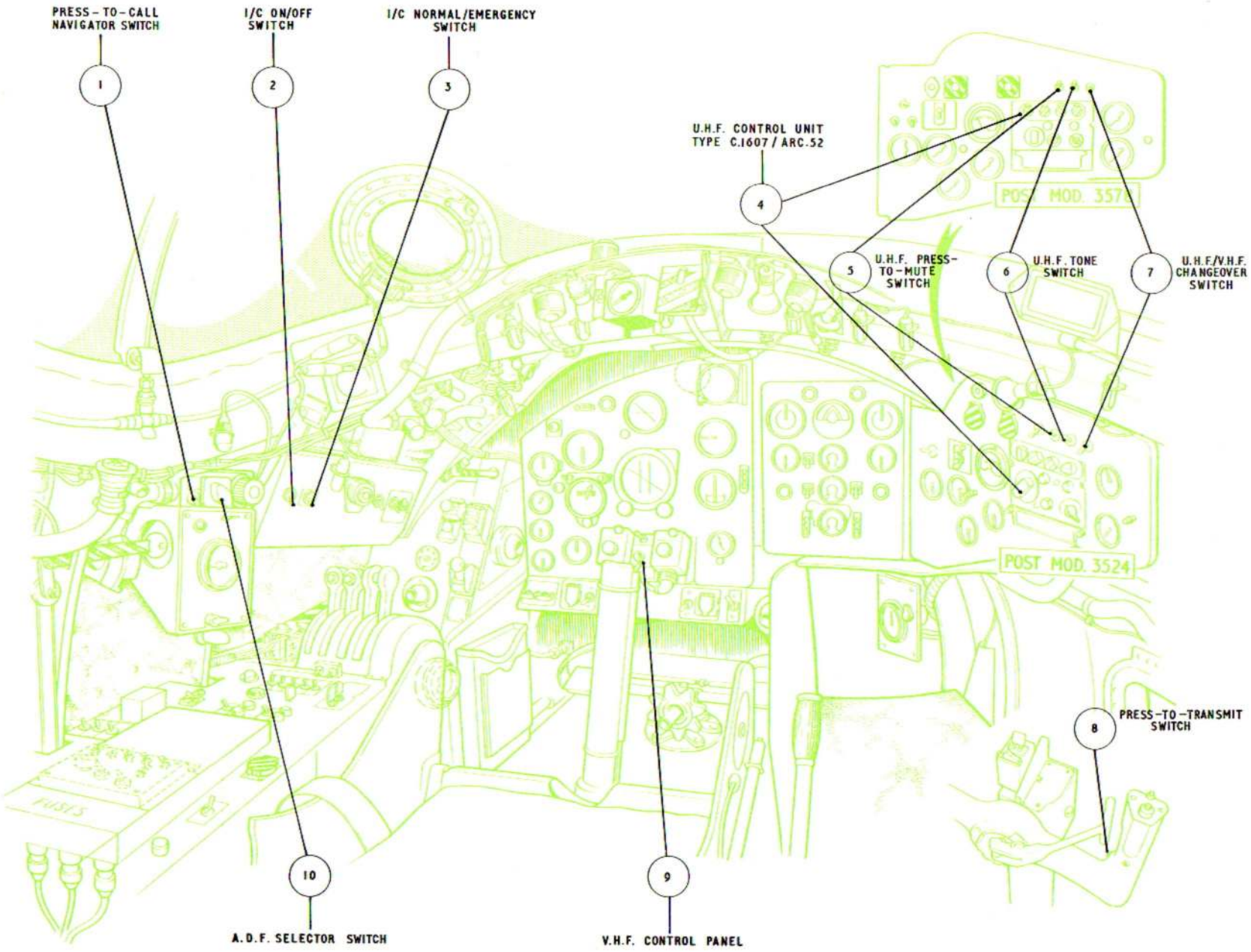
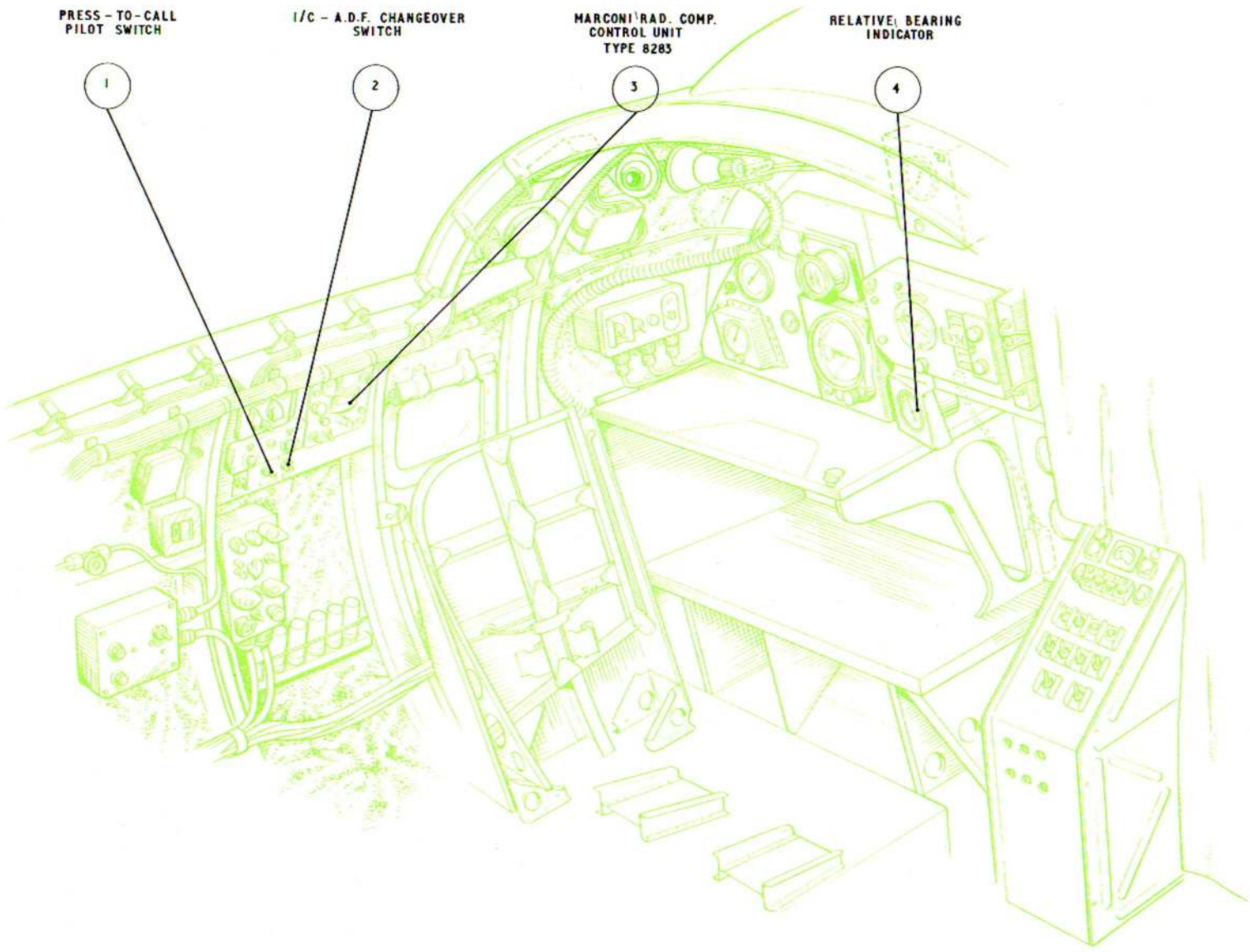



Fig.7A. Wireless installation – starboard fuselage

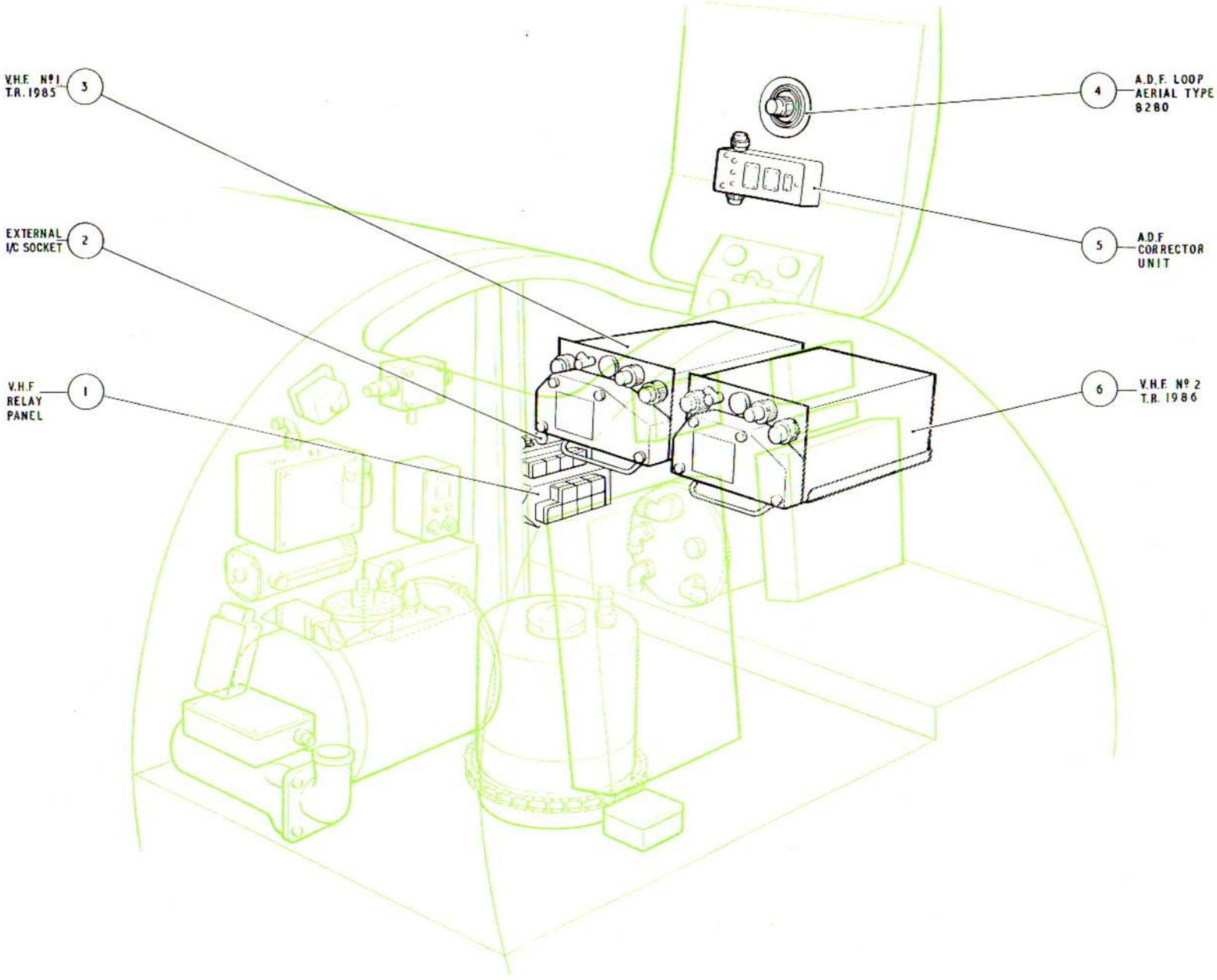



◀ Fig. 8. Wireless installation – cockpit ▶



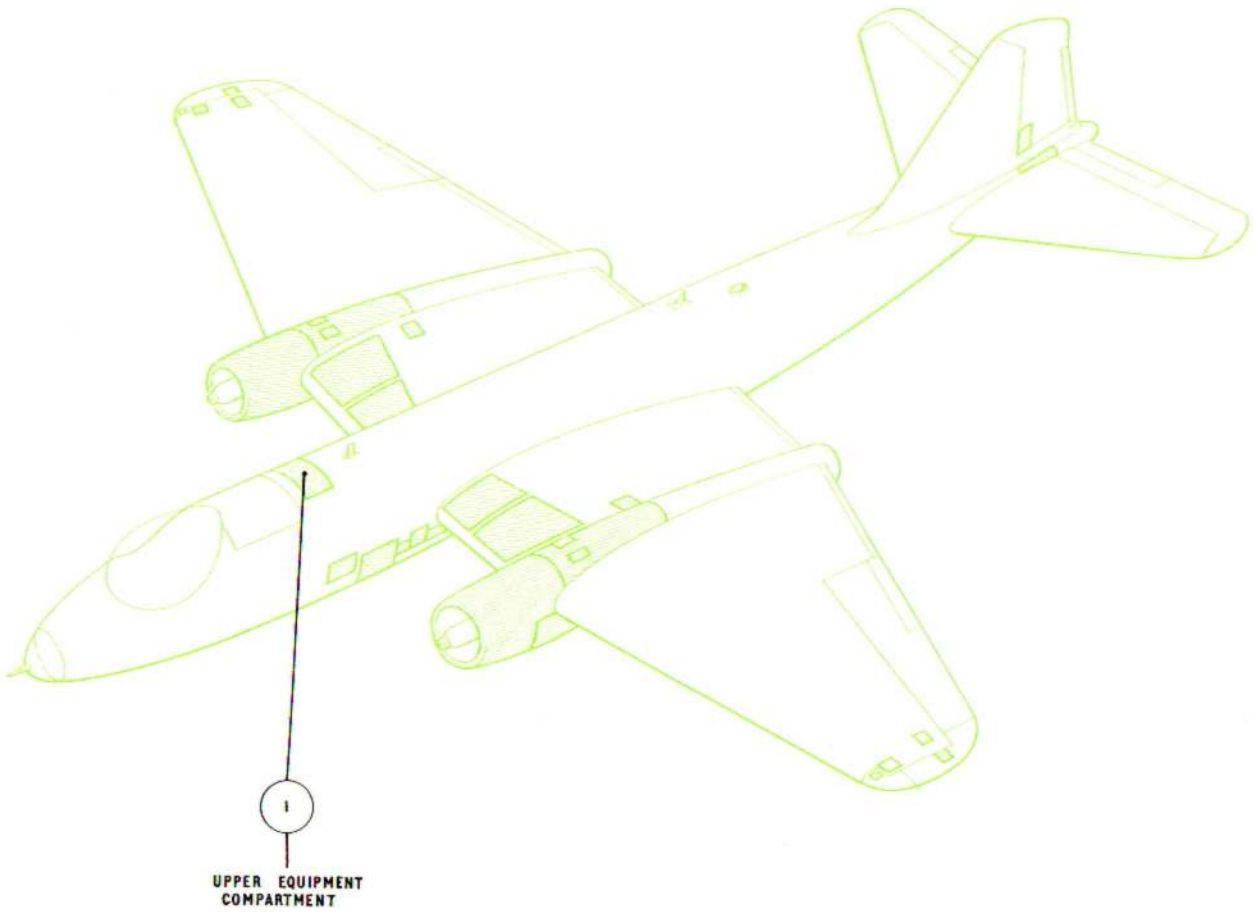

◀ Fig. 9. Wireless installation – navigator's rear station – port ▶


◀ Fig. 10. Wireless installation – navigator's rear station – starboard ▶

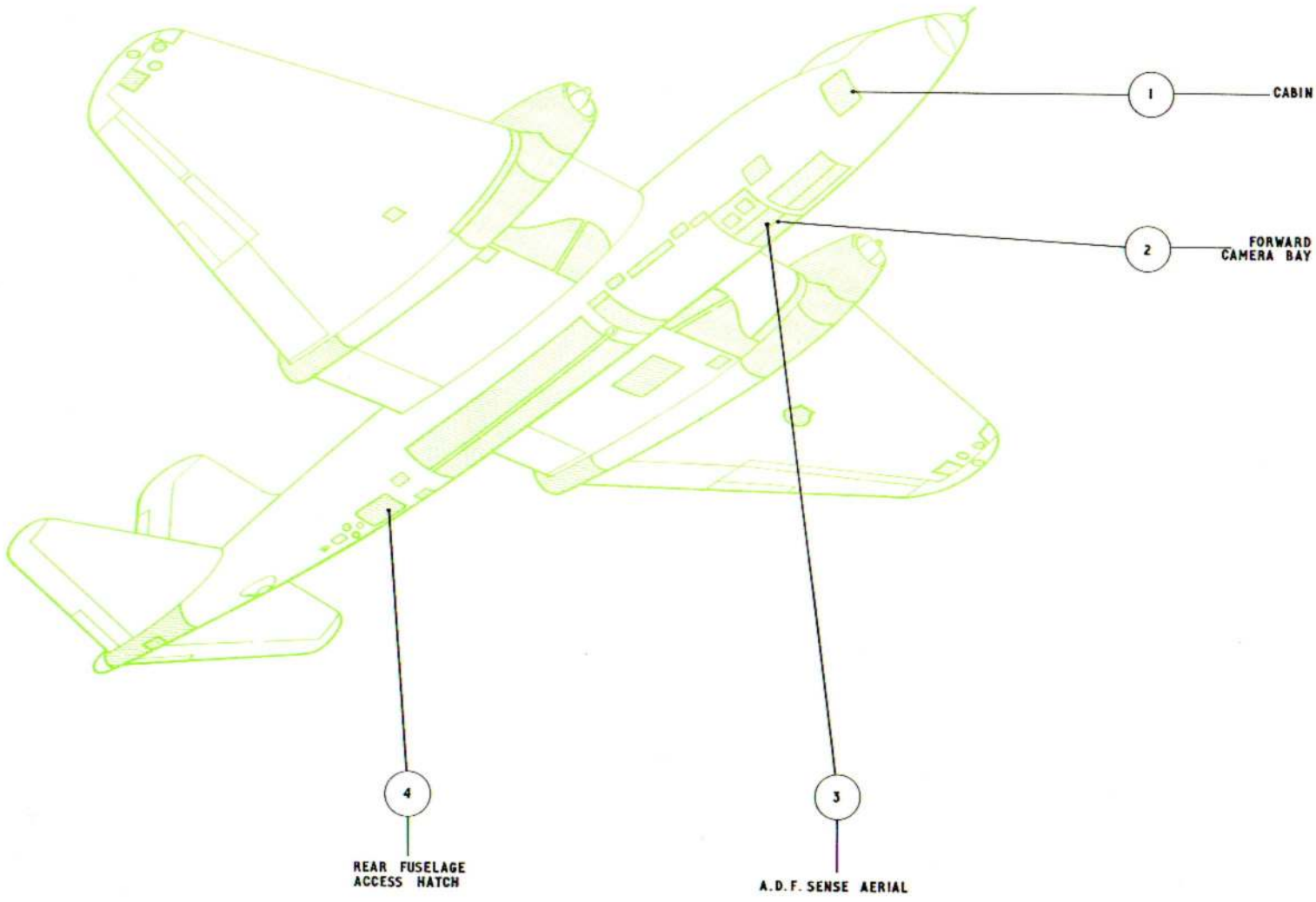



◀ **Fig. 11. Wireless installation – upper equipment compartment** ▶

*(illustration amended)*




◀ Fig. 12. Wireless installation – access panels – upper surface and port side ▶




◀ Fig. 13. Wireless installation – access panels – lower surface and starboard side ▶

# Chapter 2 RADAR INSTALLATION

*(Completely revised)*

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## LIST OF TABLES



## LIST OF ILLUSTRATIONS

**General**

**1.** This chapter describes the installation, operation and functioning of the radar systems namely Rear Warning, Rebecca Mk.4, I.F.F. Mk.10 and Green Satin. To cater for the modification standard of various aircraft the Green Satin installation is introduced by Mod.1025, to aircraft embodying Mod.3578, and Mods.2706 and 2707 to aircraft embodying Mods.2681 and 3524. The system as introduced by the variant modifications is basically the same, the differences occuring mainly in the power supplies which are described and illustrated in Sect.5, Chap.1, Group R & S. The servicing instructions for the radar equipment consist only of investigating wiring faults, as all necessary information on the testing and servicing of items of equipment, together with a detailed description of their operation, is given in the relevant Air Publication for each system. A schematic diagram accompanies the relevant text, whilst the disposition of major items of equipment is shown in the general location diagrams at the end of this chapter. A master key is provided to facilitate reference to these diagrams.

## REAR WARNING SYSTEM (A.R.I.5800)

**Introduction**

**2.** A.R.I.5800 is fitted to aircraft embodying Mod.1025, and is an X-band automatic tail warning primary radar installation designed to provide the pilot with aural and visual warning of the approach of aircraft from the rear. The zone covered by the equipment is ± 60 deg. in azimuth and + 15 to - 60 deg. in elevation with a range of approximately 1½ nautical miles. Range is measured from the tail of the aircraft, azimuth and elevation being measured relative to the longitudinal axis of the aircraft. The presence of an aircraft within the prescribed zone is indicated aurally by a warning note sounded in the I/C system *(Chap.1)*. In addition, a cathode ray tube *(C.R.T.)* presentation of the approximate position of the aircraft is given by a dot produced on the C.R.T. screen, its position corresponding to the elevation and azimuth of the approaching aircraft.

**3.** The main items of equipment used in the system are a Type 1 radar head, a Type 76 waveform generator, a Type 611 control unit, a Type 912 auxiliary control unit, a Type 27 C.R.T. indicator, and a Type 398 junction box.

**Radar head, Type 1**

**4.** This unit is installed at the rearmost point of the fuselage and houses a scanner which is the initial detector of the system. A blower motor operated from the aircraft 400 c/s three-phase a.c. supply is embodied in the head for cooling purposes.

**Waveform generator, Type 76**

**5.** This unit contains the counting and pulse-forming circuits which analyse the information received by the radar head and supply it to the C.R.T. indicator. It is carried by a Type 212B tray on resilient mountings attached to the floor at the starboard side in the upper equipment compartment. A 400 c/s three-phase a.c. operated blower motor is incorporated in the unit for cooling purposes.

**Junction box, Type 398**

**6.** This junction box, installed on the starboard side of the aft wall in the upper equipment compartment, is connected to the radar head, waveform generator and, via a plug and socket break at the pressure bulkhead, to the Type 912 auxiliary control unit in the cabin.

**Auxiliary control unit, Type 912**

**7.** The Type 912 auxiliary control unit is fitted at the starboard side of the cabin aft of the entrance door.

**Control unit, Type 611**

**8.** The normal operation of the system is controlled by a Type 611 control unit mounted on a bracket above the pilot's console. Four cables are connected to it, one from the Type 27 C.R.T. indicator, and another connected in the audible warning circuit via a false warning suppressor and a Type 4827 relay unit. The two remaining cables are connected to the waveform generator via plugs and sockets on the pressure bulkhead.

**False warning suppressor**

**9.** This unit, situated on the port wall at the navigator's station, ensures that extraneous signals are not relayed to the warning circuit.

**Indicator, Type 27**

**10.** Indication of the functioning of the installation is shown on the screen of a Type 27 C.R.T. indicator which is mounted on the pilot's main instrument panel.

**Servicing**

*General*

**11.** Wiring faults should be investigated by referring to the diagrams in this chapter and the routeing diagrams in Sect.5, Chap. 1, Group R & S. Servicing information on the system is contained in A.P.2891H, Vol.1.

*Radar head removal*

**12.** The radar head and the rear fuselage

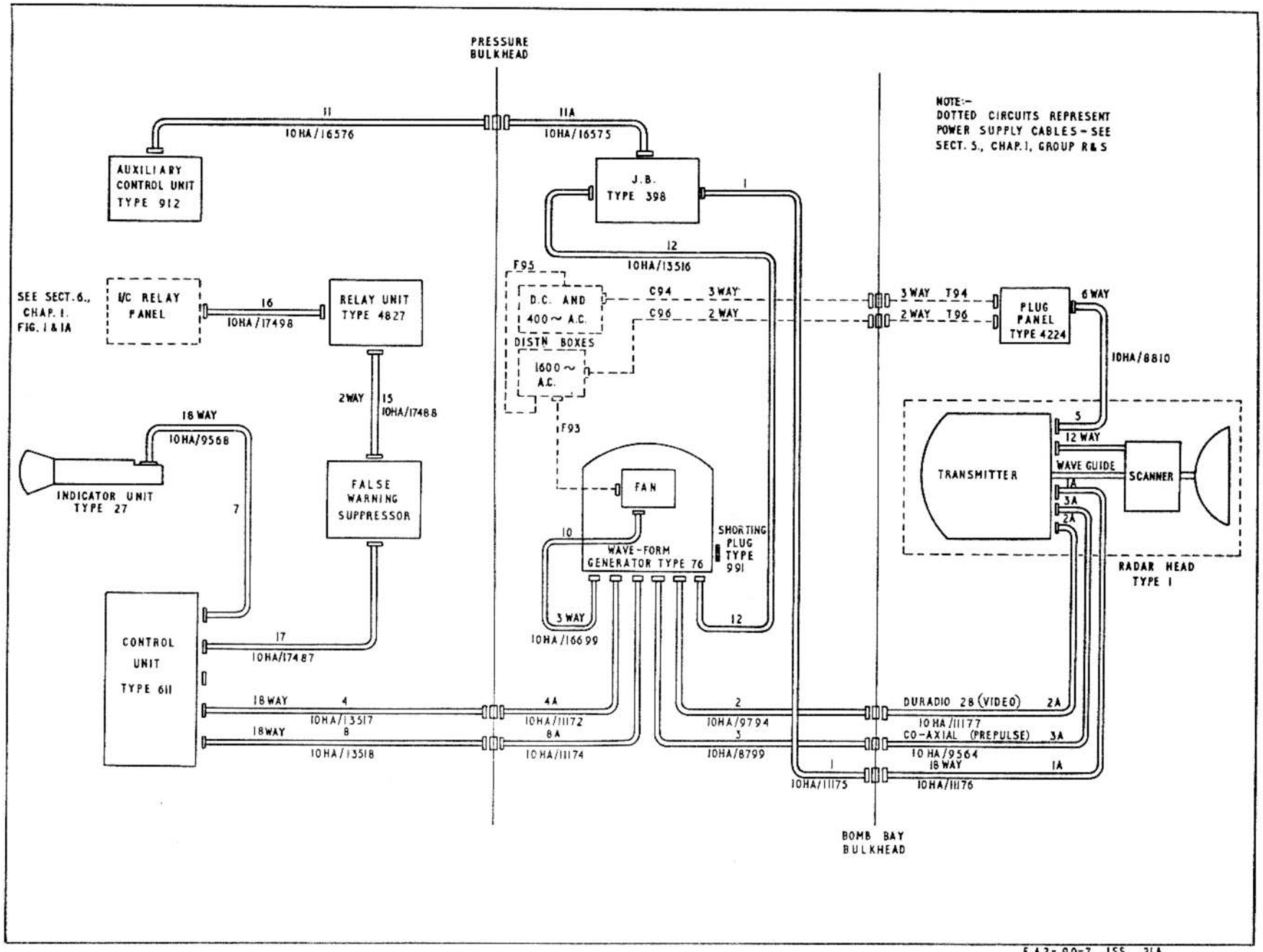


Fig. 1. Rear warning system (A.R.I.5800) – (aircraft embodying Mod.1025 only)

fairings are interchangeable. The removal of the rear fairing is covered in Sect.3, Chap.1, and is also applicable to the radar head with the exception that the removal of the head also involves the disconnection of the cables connected to it.

## REBECCA Mk.4 (A.R.I.5610)

### General

**13.** Rebecca is a pulse-operated interrogation system used for homing, and, when working with B.A.B.S., for blind approach. It operates in the frequency band 174 to 240 Mc/s in conjunction with ground beacons. The main items of equipment comprise a transmitter/receiver, control unit, indicator, aerial switch unit, and four aerials. The Rebecca Mk.4 system is fully described in A.P.2914Y, Vol.1.

### Transmitter/receiver, Type 3624

**14.** This unit is cylindrical in shape and divided into sections housings the transmitter, receiver, time base and waveform generator. It is carried by resilient mountings and installed at the port side on the floor in the upper equipment compartment aft of the pressure bulkhead. Two d.c. operated blowers, one fitted internally to circulate air round the components and the other on top of the unit, are provided to effect cooling. With the exception of those to the external blower motor, all connections to the unit are made at its circular front panel. The joint between the front panel and the housing is provided with a special means of sealing which permits the unit to be lightly pressurized for high altitude operation. A Schrader valve is fitted on the front panel for connecting a handpump when it is necessary to introduce air for pressurization. The air is maintained in a dry condition by a desiccator on the face of the unit. A small window for viewing the desiccator crystals is fitted at the centre of the front panel.

### Control unit, Type 526

**15.** The manual and preset controls for operating the system in the air and for servicing on the ground are incorporated in a Type 526 control unit, mounted on the port wall at the navigator's station.

### Indicator, Type 208

**16.** Indications of the operation of the Rebecca system are shown on the C.R.T. screen of a Type 208 indicator fitted at the port side of the navigator's instrument panel. The indicator can be fitted with a visor and magnifier to facilitate easy reading.

### Aerials

*General*

**17.** The four aerials installed consist of two receiving aerials, one each side of the nose fuselage, a transmitter aerial below the pilot's floor, and a B.A.B.S. aerial in the rear fuselage.

*Transmitter aerial*

**18.** This aerial positioned on the underside of the fuselage below the pilot's floor consists of a straight slot athwart the aircraft and behind it another slot shaped like an arrow head pointing forward. The section of the aircraft in the vicinity of the slots forms a cavity which is energized by an internal probe mounted on the rear face of frame 4 diaphragm. The feeder cable to the probe is taken through a grommet where it passes through the cabin floor. An access panel is fitted on frame 4 for servicing the connection to the probe.

*Receiving aerials*

**19.** The receiver aerials consist of two longitudinal slots, one at each side of the nose, backed by two cavities which form part of the prone position ramp. The aerials are fed by two coaxial cables which connect to coaxial sockets mounted on the top surface of the cavities near the fuselage skin. The feeder cables run aft to the pressure bulkhead where each terminates at a pressurized coaxial plug. From the aft face of the bulkhead the cable run continues to the Type 3624 transmitter/receiver, via a Type 78A switch unit. A tee junction is inserted in each cable run a few inches above the cavities in the nose. To each of these is fitted a matching stub consisting of a short length of coaxial cable in which the insulated conductor is shorted to the cable screening at the remote end.

*B.A.B.S. aerial*

**20.** The B.A.B.S. aerial is a slotted-type aerial similar in shape to the transmitter aerial *(para.18)*. It is fitted in the rear camera bay door located on the underside of the rear fuselage between frames 31 and 33. The door forms a cavity which is energized by an internal probe.

### Aerial switch unit, Type 78A

**21.** The changeover of the aerial system from Rebecca to B.A.B.S. is effected by a Type 78A aerial switch unit installed in the upper equipment compartment. The switch unit is electrically operated and controlled by the function switch on the Type 526 control unit. Setting the function switch to B.A. causes the nose receiver aerials to be isolated and the B.A.B.S. aerial to be connected into the circuit.

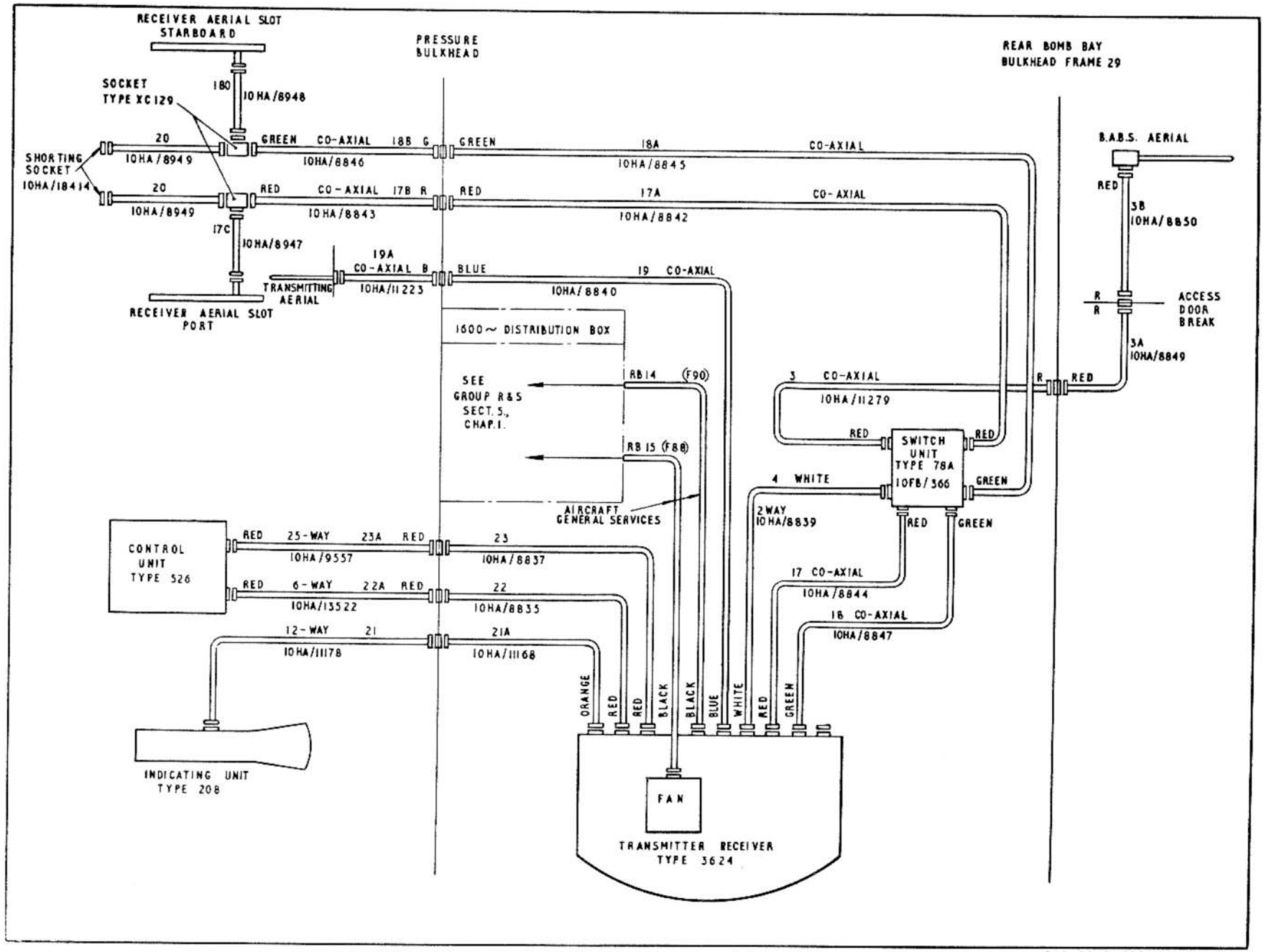


Fig. 2. Rebecca Mk.4 (A.R.I.5610)

**Servicing**

*General*

**22.** Wiring faults should be investigated by referring to the diagrams in this chapter and the routeing diagrams in Sect.5, Chap.1, Group R & S. Servicing information on the system is contained in A.P.2914Y, Vol.1.

## I.F.F. Mk.10 (S.I.F.) – (A.R.I.5848)

**General**

**23.** This installation as fitted to aircraft by Mod.1436, is further modified by Mods. 2371, 2544 and 2593. The I.F.F. Mk.10 (S.I.F.) system serves as an airborne transponder, used in conjunction with a ground or airborne interrogator-responder installation for identification purposes.

**24.** Pulse signals from the interrogator are received by the transponder which in turn transmits a signal to the responder.

**25.** The installation provides four different modes of operation and these are as follows:–

Mode 1: Mode 1 is used for general identification. In consequence, it will normally employ a fixed common code to be used by all aircraft, the code being changed only rarely.

Mode 2: Mode 2 is a personal identification mode and certain aircraft are each allotted an individual code which is preset before flight.

Mode 3: Mode 3 is used for traffic identification, i.e. it indicates the classification of an aircraft. Normally the mode is preset before flight but may be changed in flight on instructions from the ground.

Mode 4: Mode 4 is used in an emergency and indicates that the aircraft is in distress and requires assistance. The emergency reply is transmitted to all interrogations regardless of the mode in use.

**26.** An additional facility known as identification of position (I/P) is provided for rapid identification of a particular aircraft. It is selected by a switch labelled I/P mounted adjacent to the Type 927 control unit *(para.28)* at the port side of the navigator's seat.

**Transmitter/receiver, Type 4585**

**27.** This unit is secured to a support structure at the port side of the fuselage between frames 35 and 36. It is connected to the I.F.F. junction box, aerial switch unit, Type 927 control unit and the coder unit. The control and coder units are connected via a plug and socket break on the pressure bulkhead. The transmitter/receiver is internally pressurized slightly above normal ground level atmosphere pressure. For maintaining this pressure a Schrader valve is fitted on the front panel for connection of a hand pump.

**Control unit, Type 927**

**28.** The Type 927 control unit, mounted between frames 7 and 8 at the port side of the navigator's seat, incorporates three switches.

**Omni aerials, Type 100**

**29.** Two aerials of this type are fitted; one projects through the upper fuselage skin slightly to starboard of the aircraft centre line between frames 27 and 28, and the other projects through the lower fuselage skin slightly to port of the aircraft centre line between frames 35 and 36. The Type 100 omni aerial is an omni-directional vertically-polarized unipole closely matched to 52 ohms and designed for use over a frequency range of 950-1250 Mc/s.

**Aerial switch unit, Type 6850**

**30.** This switch unit is positioned with the I.F.F. junction box at the port side in the fuselage between frames 33 and 34. It is solenoid-operated and controlled by a three-position switch, labelled UPPER-LOWER-FLIGHT, mounted on the I.F.F. junction box. The switch is locked in the FLIGHT position.

**I.F.F. junction box**

**31.** The junction box is positioned on the same mountings as the aerial switch unit *(para.30)*, and serves as a connecting point for the d.c. and a.c. supply circuits to the transmitter/receiver and the aerial switch circuit.

**Coder unit, Type 6466 and coder control unit, Type 6465**

**32.** The coder unit is fitted to a mounting tray fitted on the transmitter/receiver support structure between frames 34 and 35. It is electrically connected to the coder control unit which is mounted immediately below the Type 927 control unit at the port side of the navigator's seat.

**Servicing**

**33.** Wiring faults should be investigated by referring to the diagrams in this chapter and the routeing diagrams in Sect.5, Chap. 1, Group R & S. Servicing information on the system is contained in A.P.2887N, Vol.1.

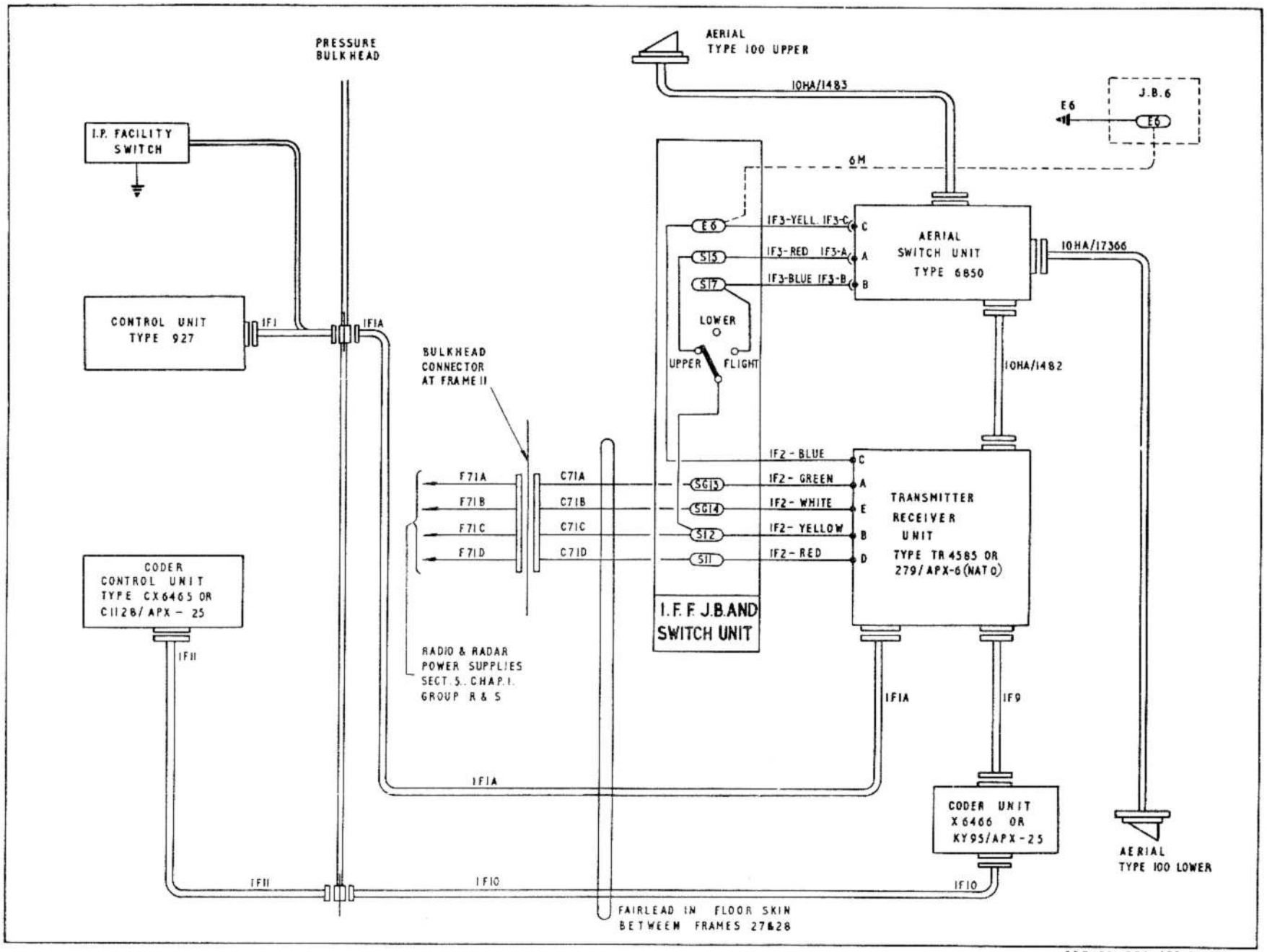


Fig.3. I.F.F. Mk.10 (S.I.F.) – (A.R.I.5848)

## GREEN SATIN (A.R.I.5851)

### General

**34.** The A.R.I.5851 system is installed by either one of two Modifications *(Mod.1025 or Mod.2706/7)*. It is a navigational aid which measures the ground speed and drift angle of the aircraft in flight at altitudes between 400 and 60,000 ft.

**35.** It operates on the Doppler principle and provides a continuous indication of ground speed over the range of 100 to 700 knots, and drift angle from 0 to 17 degrees port and starboard. The equipment also incorporates a mileage counter and shows the distance flown to within a tenth of a nautical mile. Used in conjunction with A.R.I.5851 are a Mk.4A ground position indicator and an amplifier.

### Transmitter/receiver, Type T.R.3710

**36.** The transmitter/receiver, mounted at the starboard side in the fuselage between frames 27 and 29, consists of two containers. One container houses the modulator, magnetron, and first I.F. amplifier, while the second container houses the H.T. and E.H.T. power supplies. The containers, fitted on one base casting, are connected by a pressurized duct. Both containers are pressurized to 5 lb/in² above atmospheric pressure at ground level and for this purpose a Schrader valve is provided on the base casting. Two blower motors, one on the mounting and one inside the unit, effect the necessary cooling.

### Tracking unit, Type 100

**37.** This unit, mounted in the fuselage at the port side between frames 28 and 29, is self-contained with its own power supplies. The second I.F. amplifier, and the frequency measuring circuits for the determination of ground speed and drift angle, are contained within the unit. The container is pressurized to 5 lb/in² above atmospheric pressure at ground level, and for this purpose a Schrader valve is provided on the base casting. A blower motor on the mounting provides the necessary cooling.

### Aerial system, Type 501

**38.** The aerial system is situated in the port inner wing and consists of four slotted linear arrays lying parallel to each other in a directional horn assembly, the axis of the aerials being horizontal. The linear arrays are arranged in phased and anti-phased pairs with a common feed at one end, thus providing forward and backward looking beams. To determine drift the aerials can be rotated through 17 degrees either side of the fore-and-aft line of the aircraft.

### Indicator electrical, Type 101

**39.** This indicator is mounted at the starboard side of the navigator's station in the cabin. The following indicators are provided on the front panel of the unit.

| | |
|---|---|
| Ground speed indicator: | Speed is indicated on an instrument calibrated from 100 to 700 knots at 5 knot, intervals. |
| Drift angle | Drift angle is indicated on an instrument calibrated from 17 deg. port to 17 deg. starboard. |
| Distance flown indicator: | Distance flown is indicated on a counter to within a tenth of a nautical mile. |

**40.** Also on the front are inching and neon indicator controls. The neons provide a supplementary approximate indication of ground speed, and are used in conjunction with the inching controls in locking the equipment for correct operation. They are also used to indicate when the equipment is locked on signal.

### G.P.I. Mk.4A and amplifier

**41.** These two items are located at the starboard side of the navigator's station in the cabin, and are connected to the Type 101 electrical indicator and the Type 100 tracking unit. They are also connected to the A.D.R.I.S. system *(Sect.5, Chap.2, Group F)* via the G M4B junction box.

### Servicing

**42.** Wiring faults should be investigated by referring to the schematic diagrams in this chapter and the routeing diagrams in Sect.5, Chap.1, Group R & S. Servicing information on the system is contained in A.P.2890R, Vol.1.

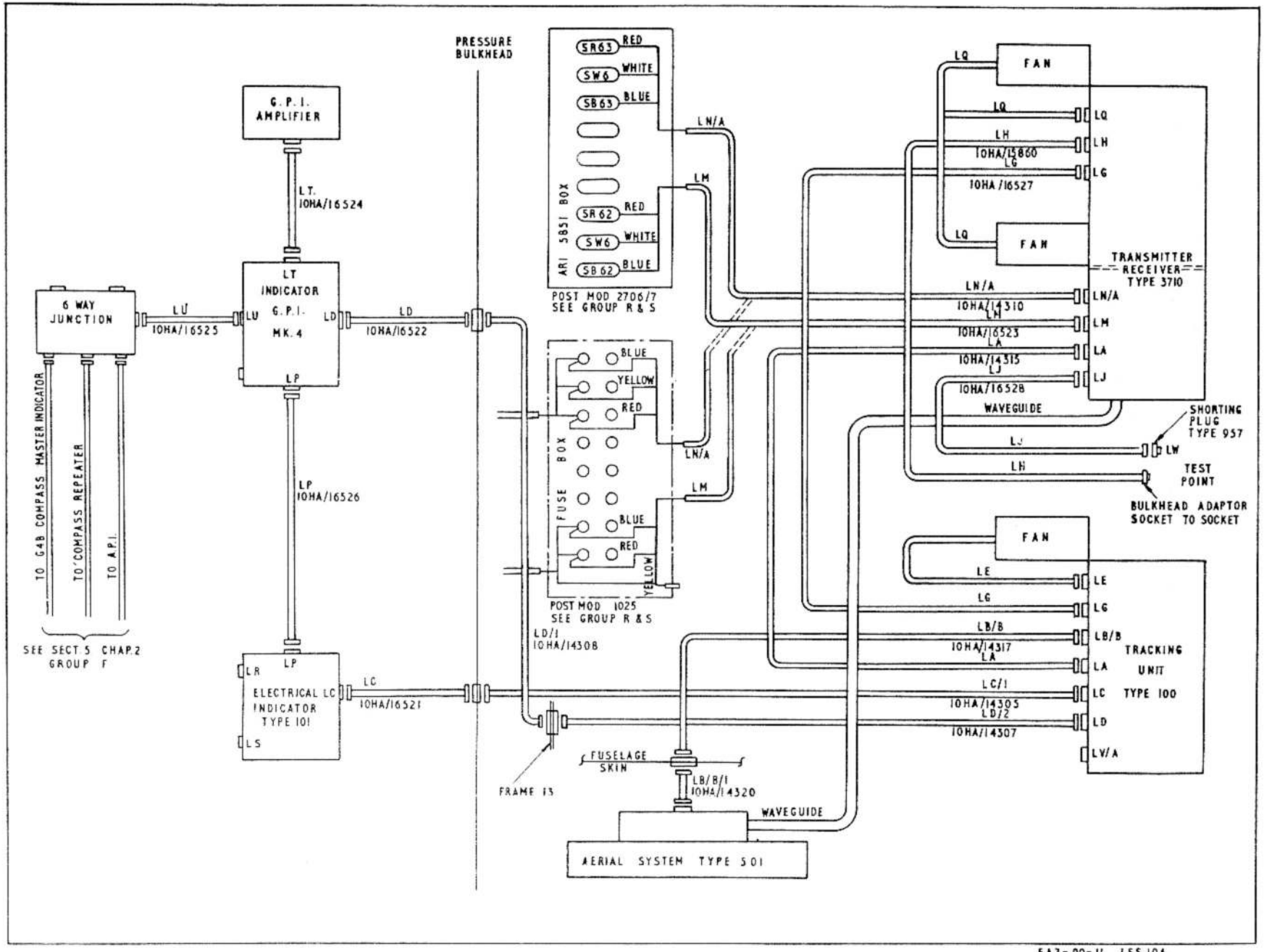


Fig. 4. Green satin (A.R.I.5851)

EA2-90-11. 155.10A.
EA2-04-5427. 155.1.

**RESTRICTED**

## TABLE 1

### Master key to location diagrams

| Equipment | Location | | Access | |
|---|---|---|---|---|
| | Fig. | Item | Fig. | Item |
| **Rear warning system (A.R.I.5800)** | | | | |
| Radar head, Type 1 | 6A | 2 | 13 | 3 |
| Waveform generator, Type 76 | 10 | 1 | 12 | 1 |
| Junction box, Type 398 | 10 | 3 | 12 | 1 |
| Auxiliary control unit, Type 912 | 9 | 1 | 13 | 1 |
| Control unit, Type 611 | 7 | 1 | 13 | 1 |
| False warning suppressor | 8 | 2 | 13 | 1 |
| Indicator, Type 27 | 7 | 2 | 13 | 1 |
| Relay unit, Type 4827 | 9 | 2 | 13 | 1 |
| **Rebecca Mk.4 (A.R.I.5610)** | | | | |
| Transmitter/receiver, Type 3624 | 10 | 2 | 12 | 1 |
| Control unit, Type 526 | 8 | 1 | 13 | 1 |
| Indicator, Type 208 | 8 | 7 | 13 | 1 |
| Receiving aerial (port) | 5A | 1 | 13 | 1 |
| Receiving aerial (starboard) | 6 | 1 | 13 | 1 |
| Transmitter aerial | 5A | 2 | 13 | 1 |
| B.A.B.S. aerial | 5 | 5 | 13 | 2 |
| **I.F.F. Mk.10 (S.I.F.) (A.R.I.5848)** | | | | |
| Transmitter/receiver, Type 4585 | 5 | 2 | 13 | 2 |
| Control unit, Type 927 | 8 | 6 | 13 | 1 |
| Omni aerial, Type 100 (upper) | 5 | 4 | 13 | 2 |
| Omni aerial, Type 100 (lower) | 5 | 7 | 13 | 2 |
| Aerial switch unit, Type 6850 | 5 | 6 | 13 | 2 |
| I.F.F. Junction box | 5 | 6 | 13 | 2 |
| Coder unit, Type 6466 | 5 | 1 | 13 | 2 |
| Coder control unit, Type 6465 | 8 | 4 | 13 | 1 |
| I/P switch | 8 | 5 | 13 | 1 |
| **Green Satin (A.R.I.5851)** | | | | |
| Transmitter/receiver, Type T.R.3710 | 6A | 1 | 13 | 2 |
| Tracking unit, Type 100 | 5 | 3 | 13 | 2 |
| Aerial system, Type 501 | 11 | 1 | 12 | 2 |
| Indicator electrical, Type 101 | 9 | 4 | 13 | 1 |
| G.P.I. Mk.4A | 9 | 3 | 13 | 1 |
| G.P.I. amplifier | 9 | 5 | 13 | 1 |

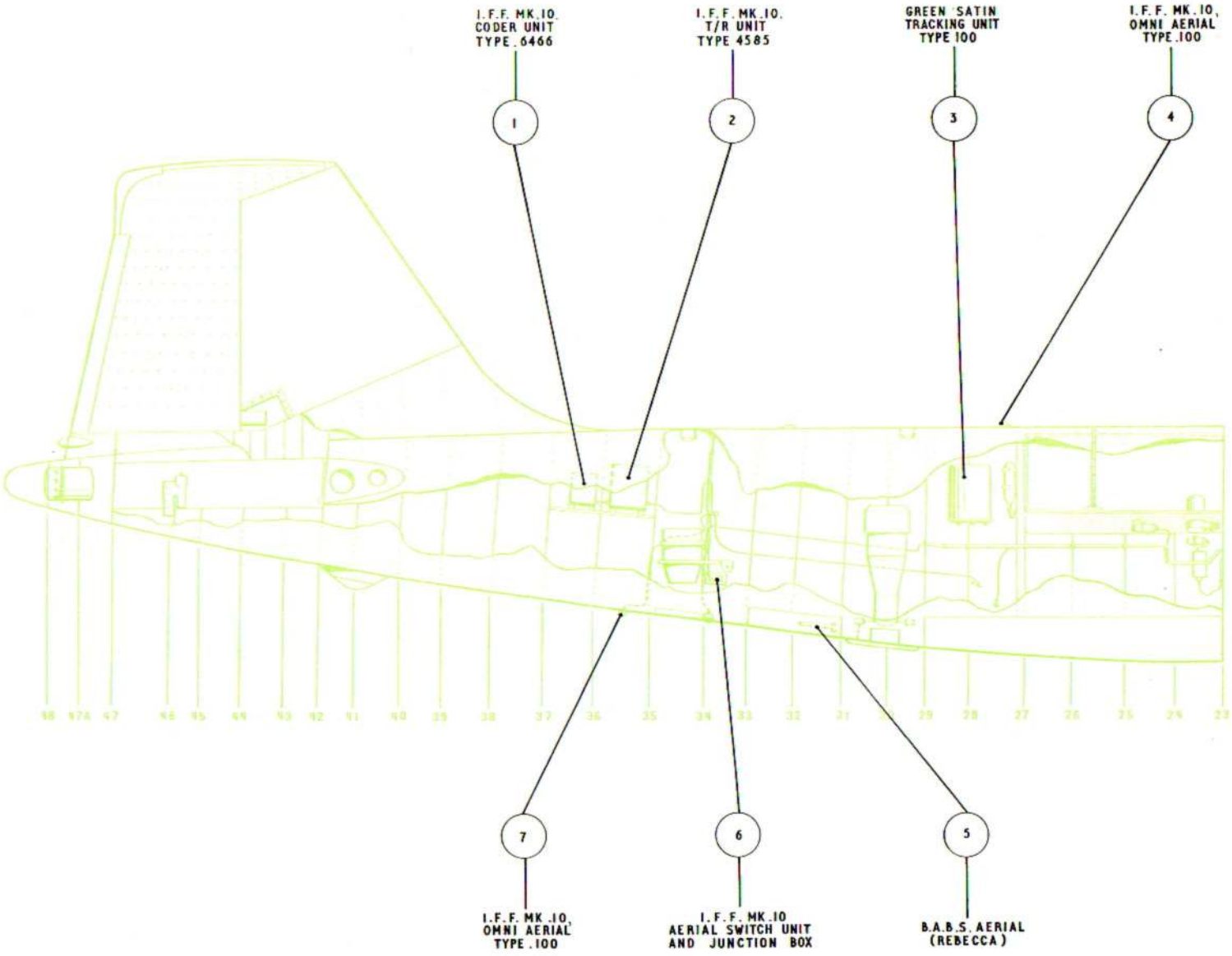


Fig. 5. Radar installation – port fuselage

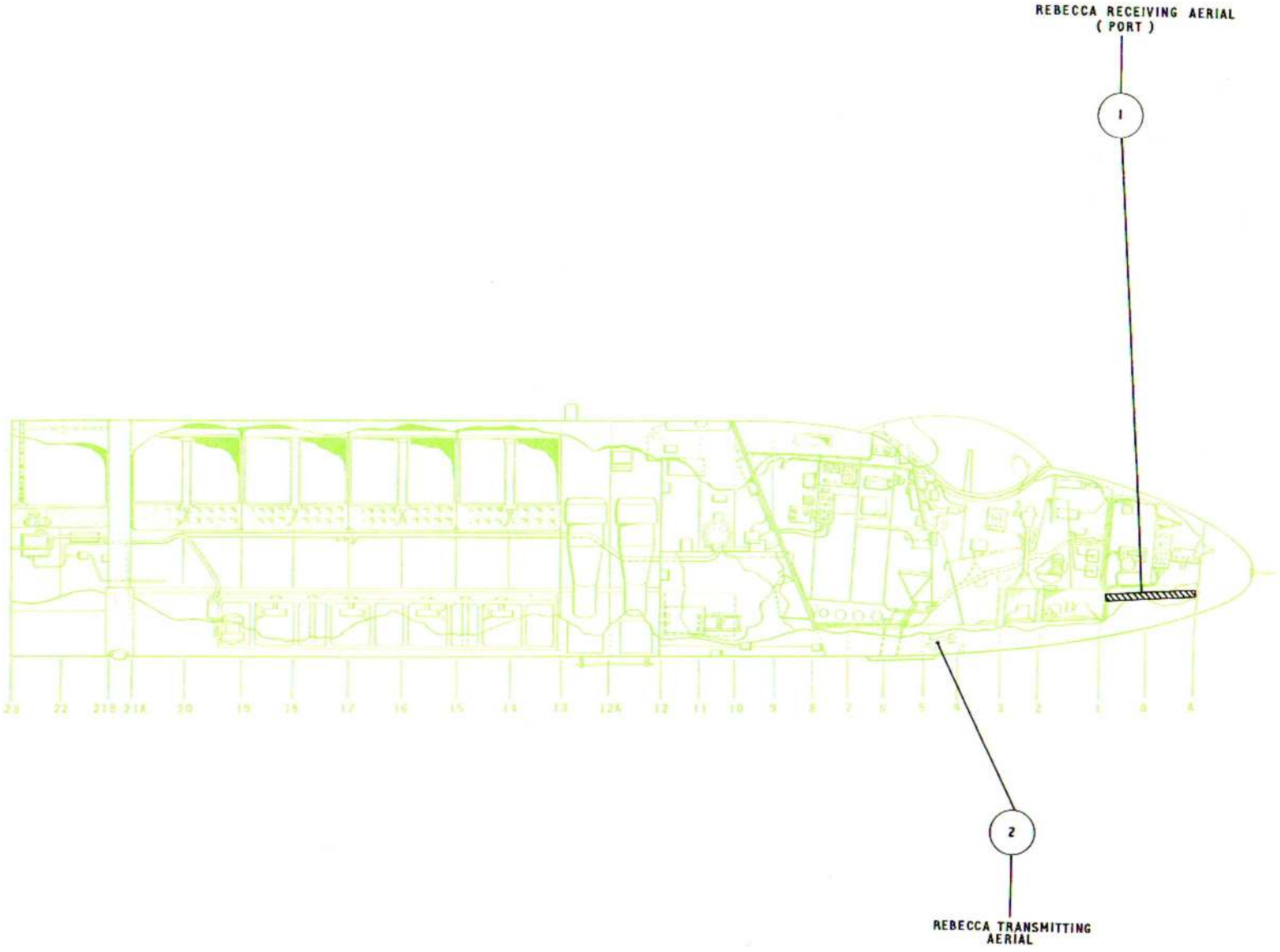


Fig. 5A. Radar installation – port fuselage


Fig. 6. Radar installation – starboard fuselage

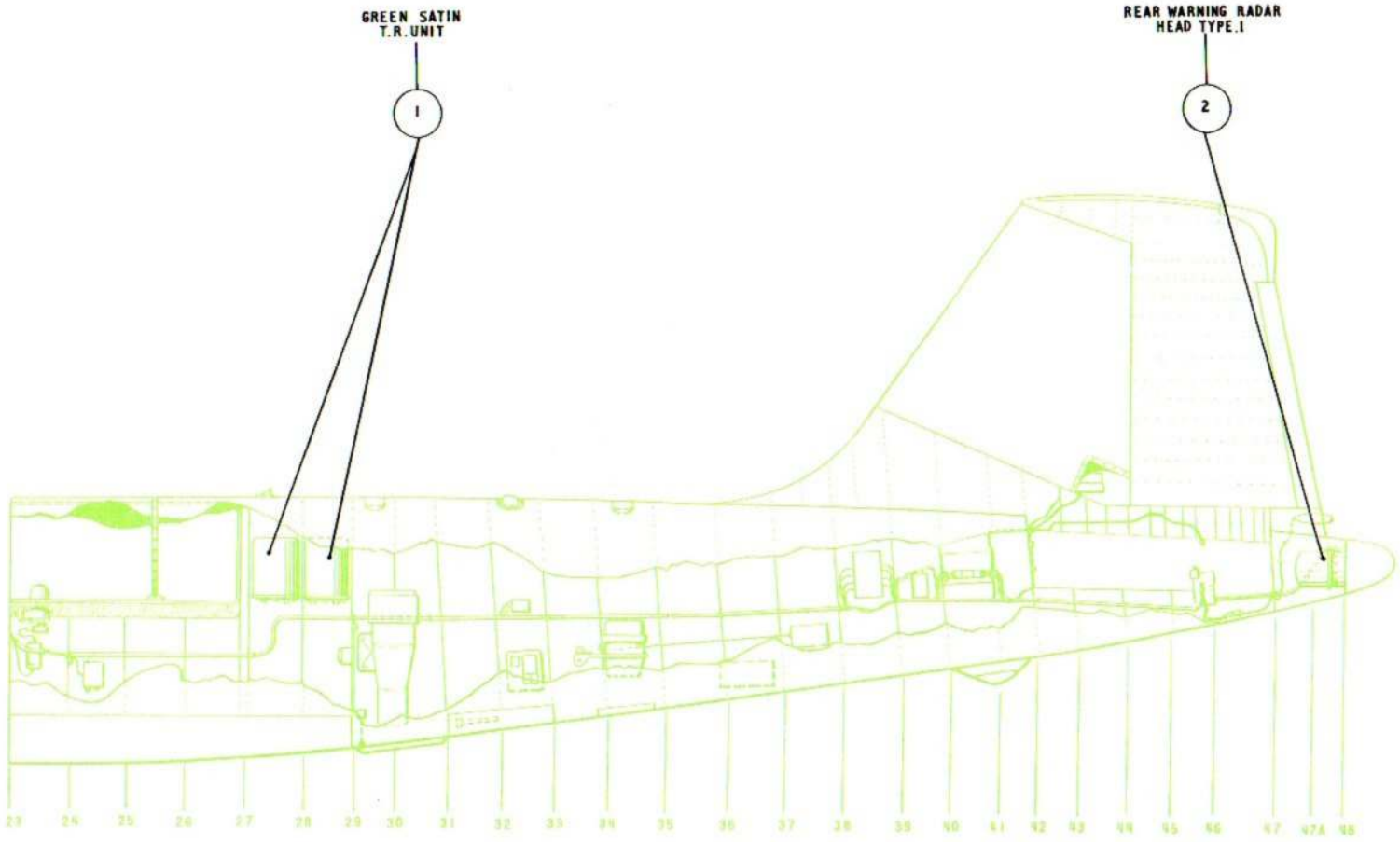


**Fig. 6A. Radar installation – starboard fuselage**

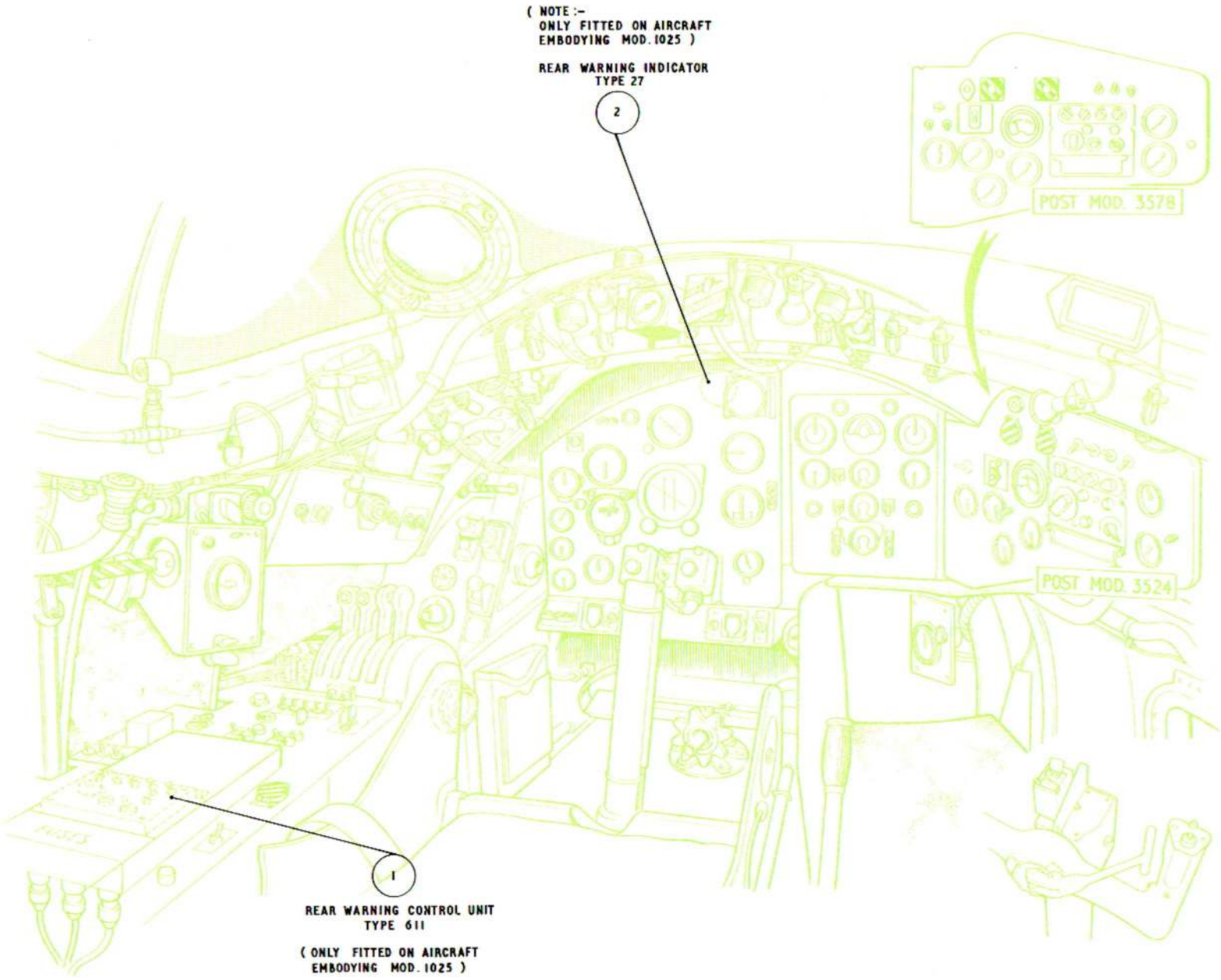


Fig. 7. Radar installation – cockpit

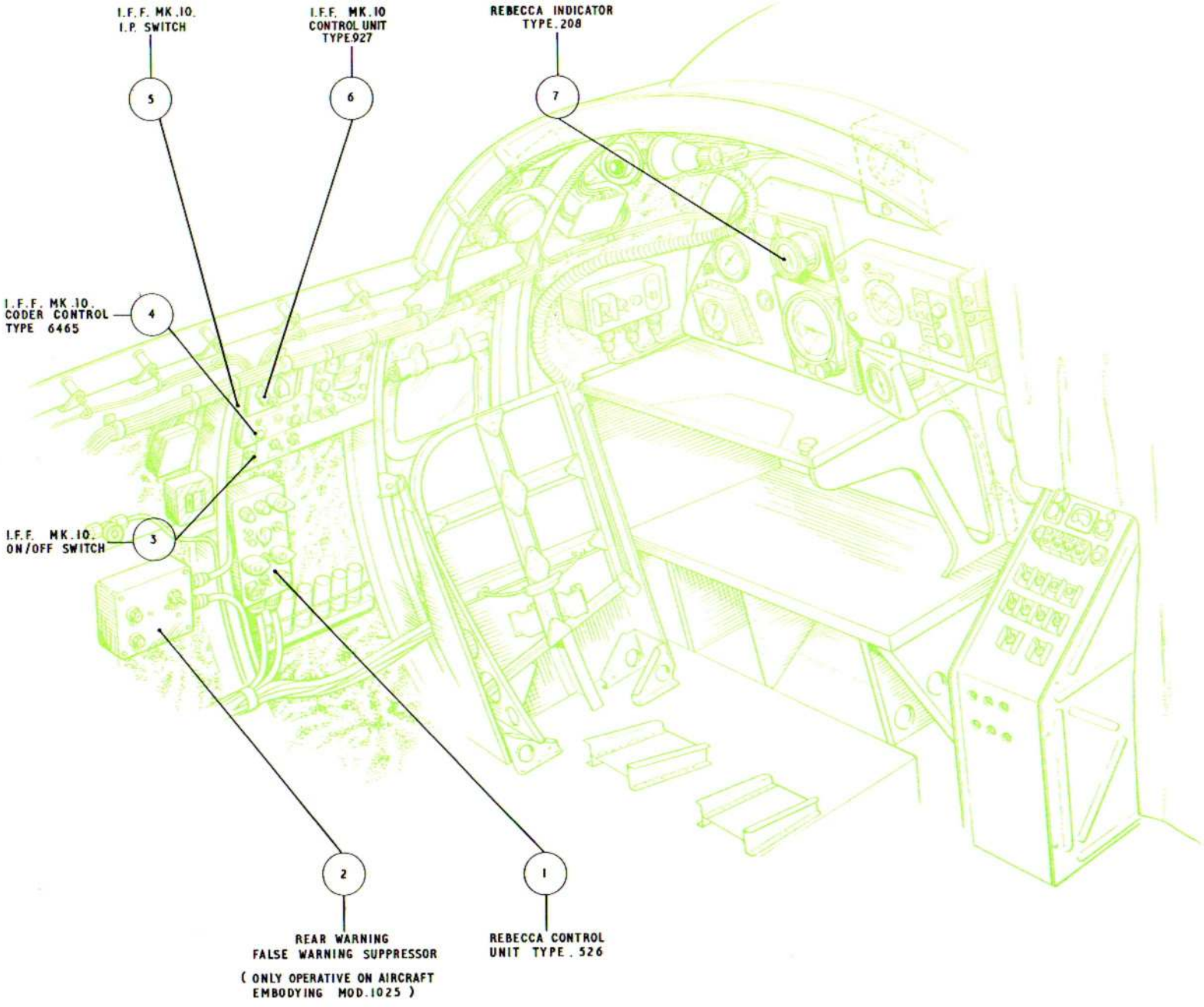


Fig. 8. Radar installation – navigator's rear station – port

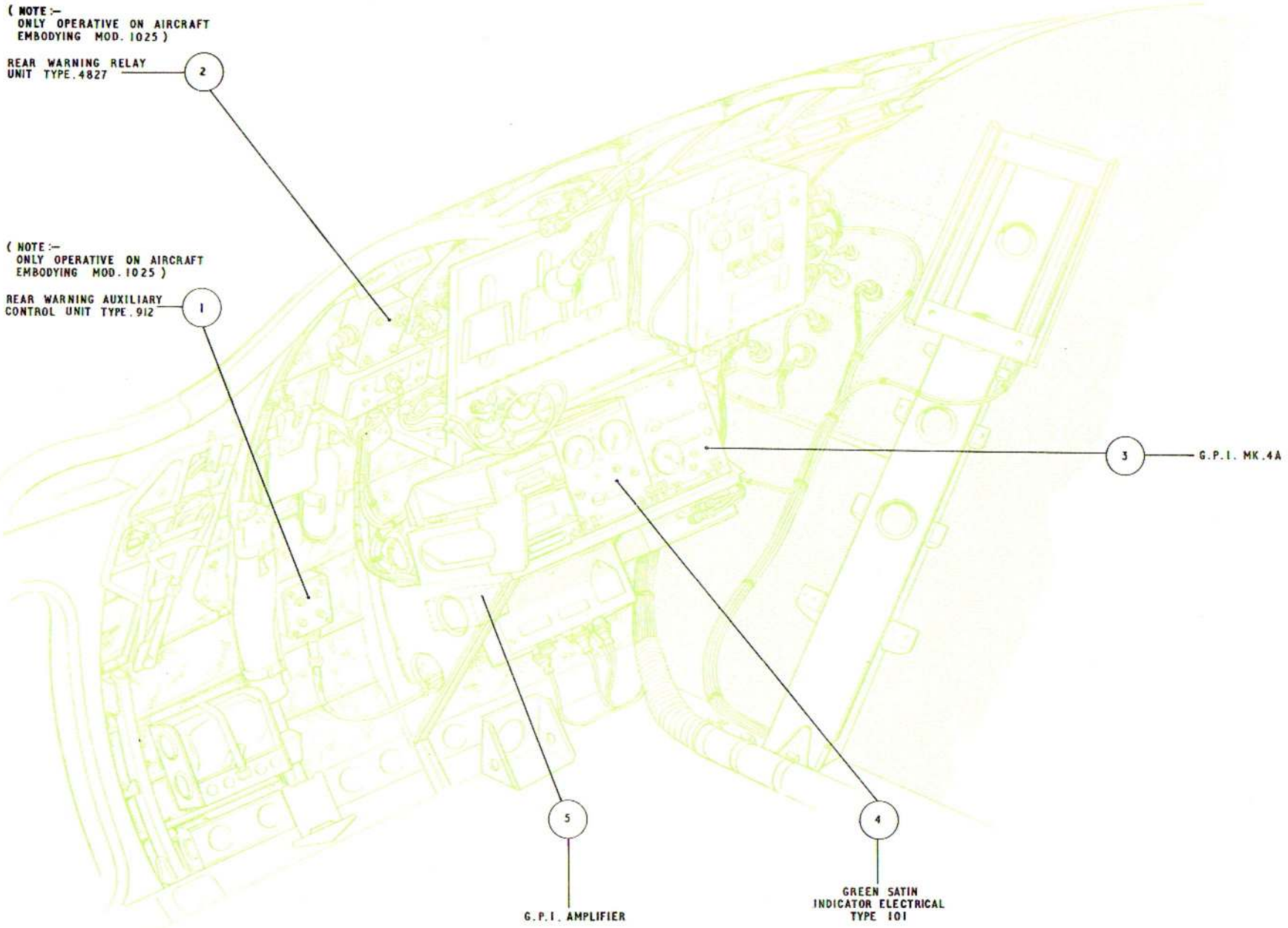


Fig. 9. Radar installation – navigator's rear station – starboard

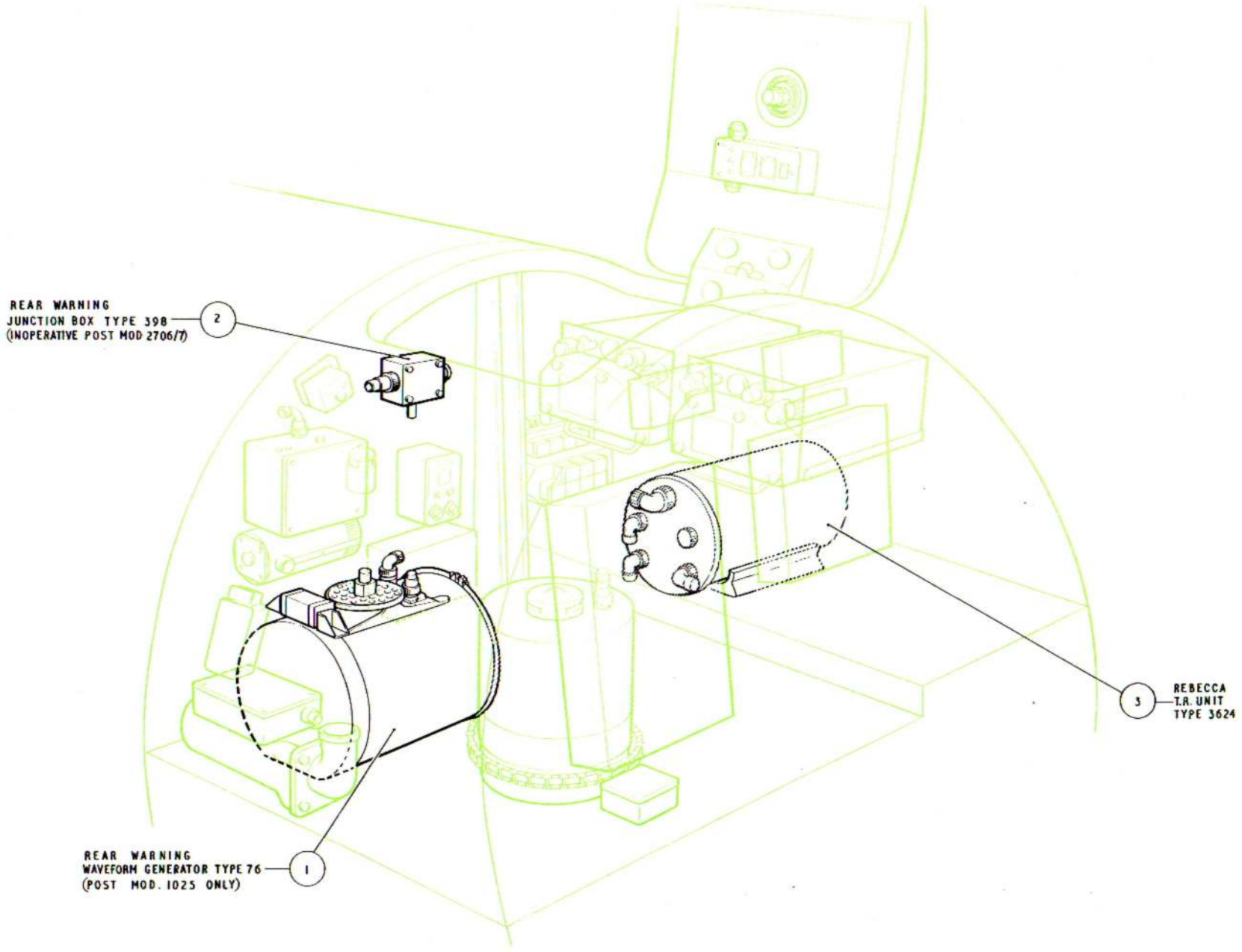


**Fig. 10. Radar installation – upper equipment compartment**

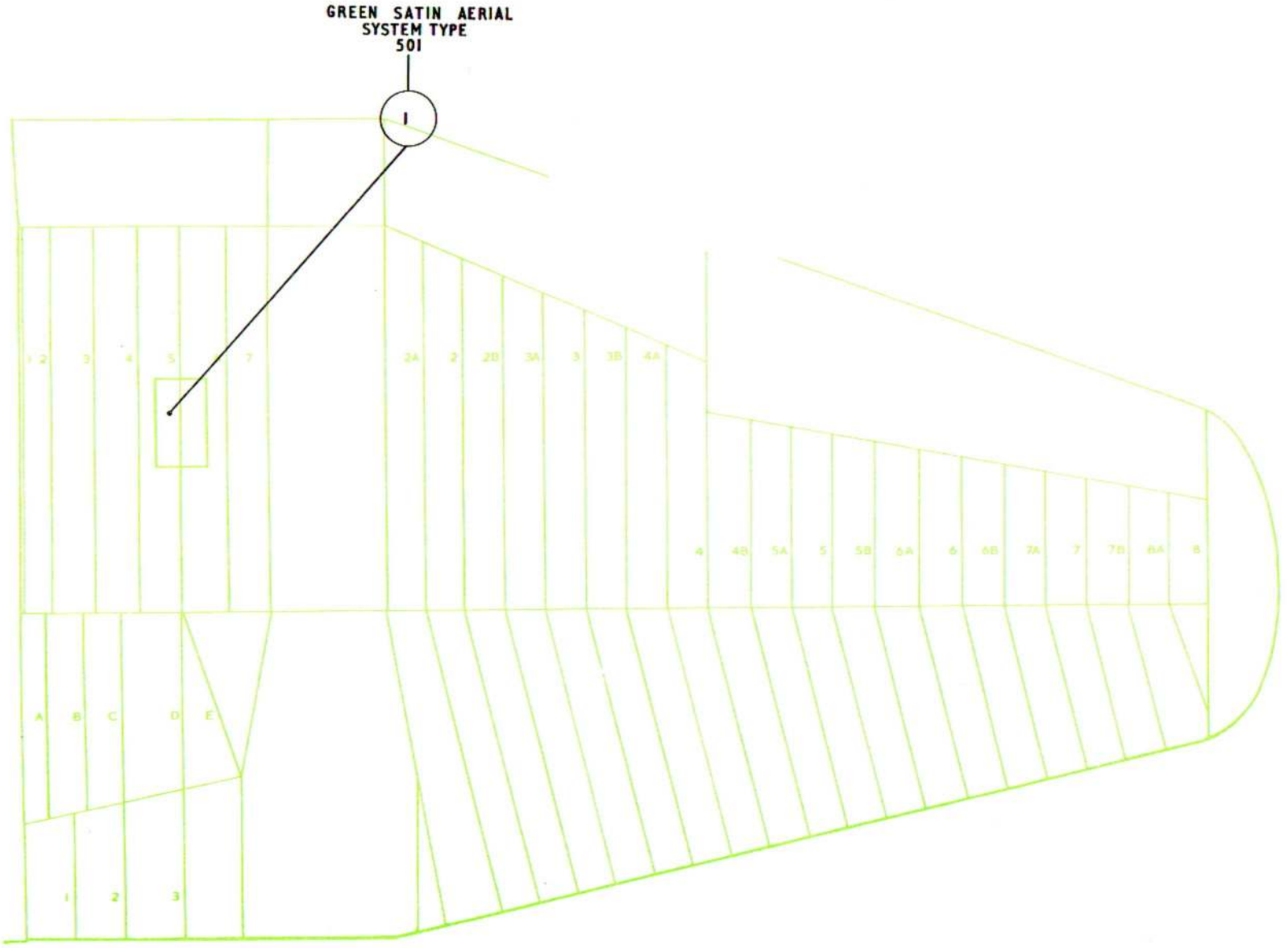


Fig. 11. Radar installation – port mainplane

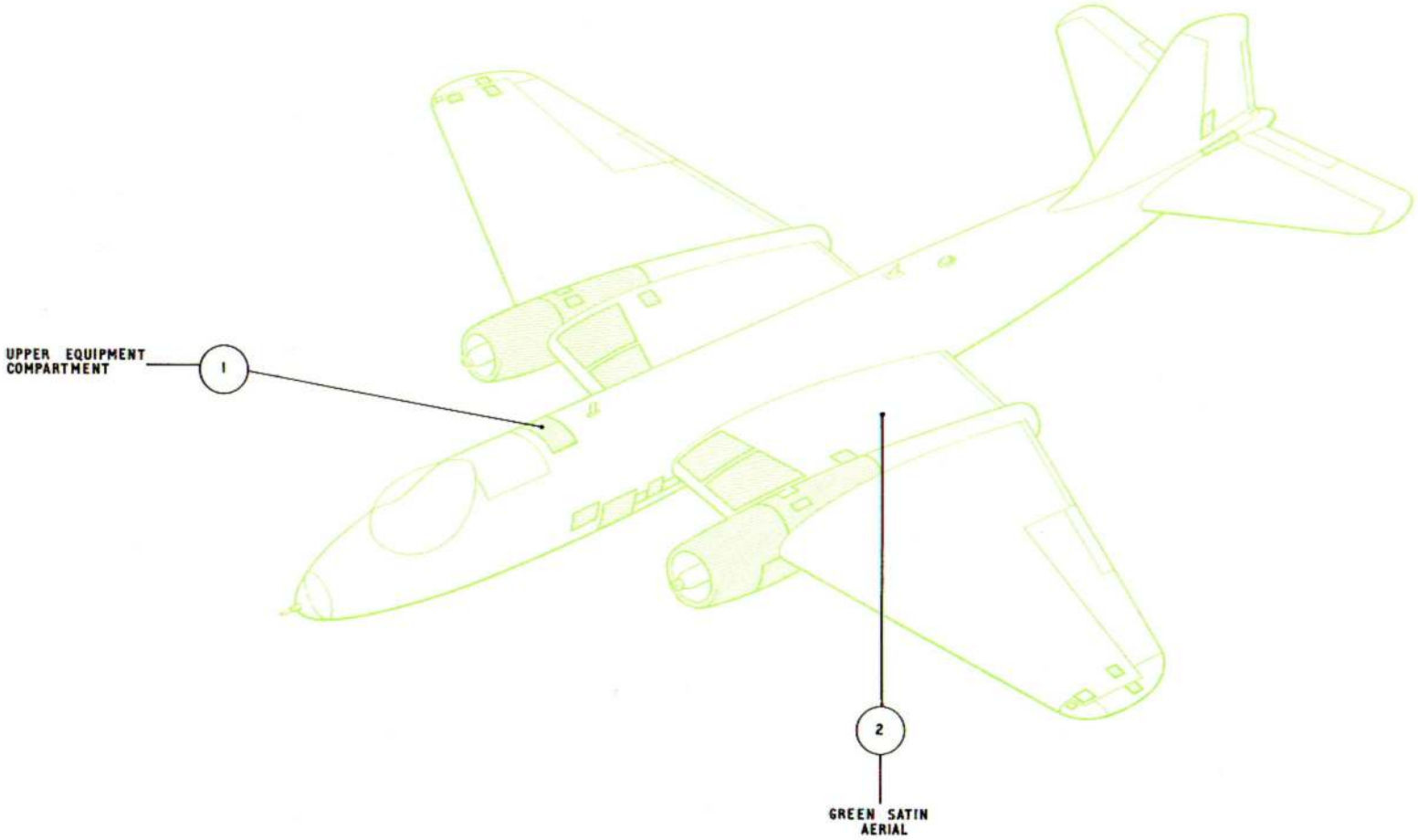


Fig. 12. Radar installation – access panels – upper surface and port side

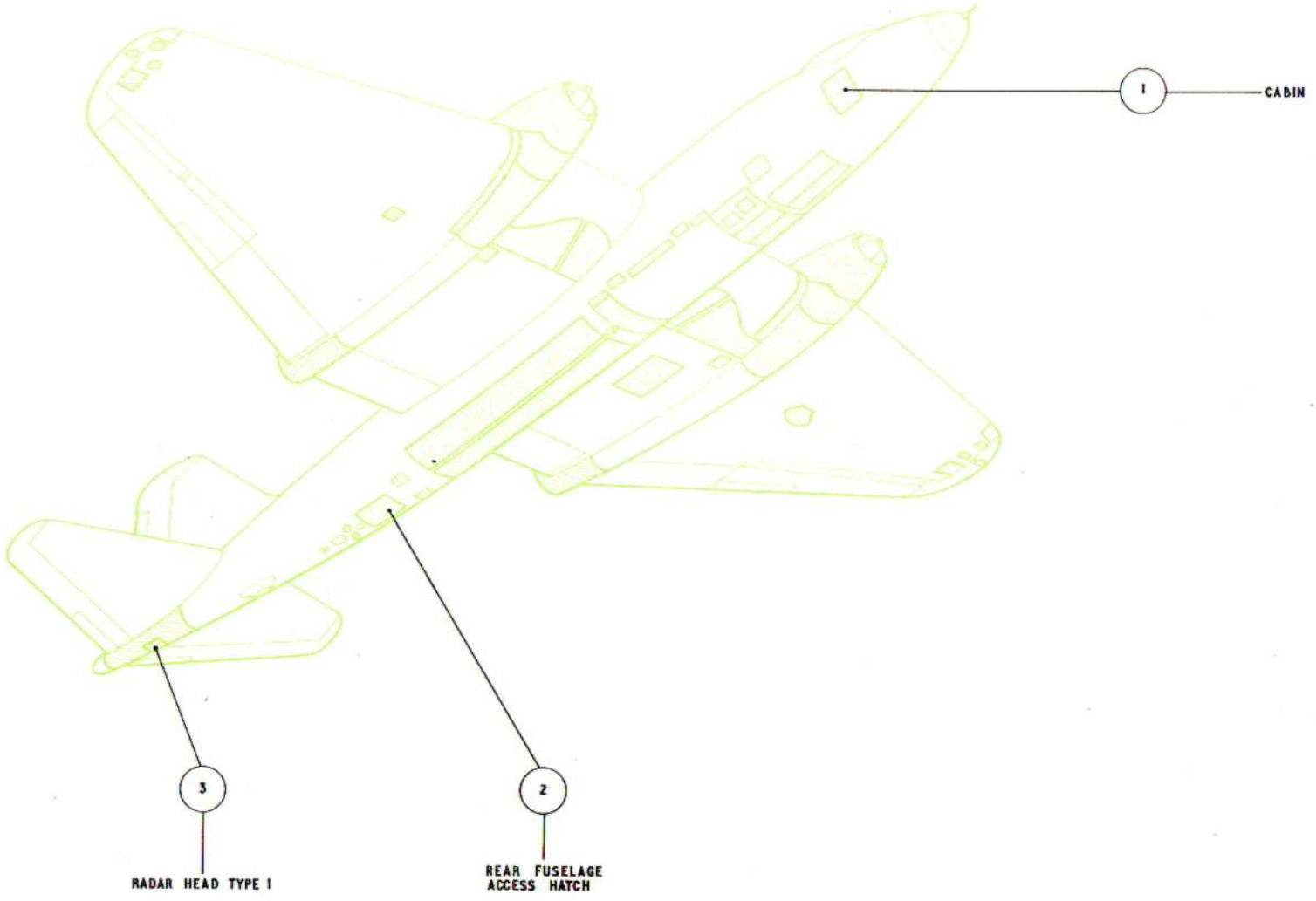


Fig. 13. Radar installation – access panels – upper surface and starboard side