

CHAPTER 1

WIRELESS INSTALLATION

◀ (Including Mods. 1106 1028 and 1226) ▶

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Introduction

1. This chapter contains a description of the wireless installation of this aircraft including the servicing information necessary to maintain the installation in an

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efficient condition. Information on the removal of the various components, together with illustrations showing the location and interconnection of the equipment are also

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included. For technical information and a detailed description of the standard equipment used, reference should be made to the Air Publications listed in Table 1. ▶

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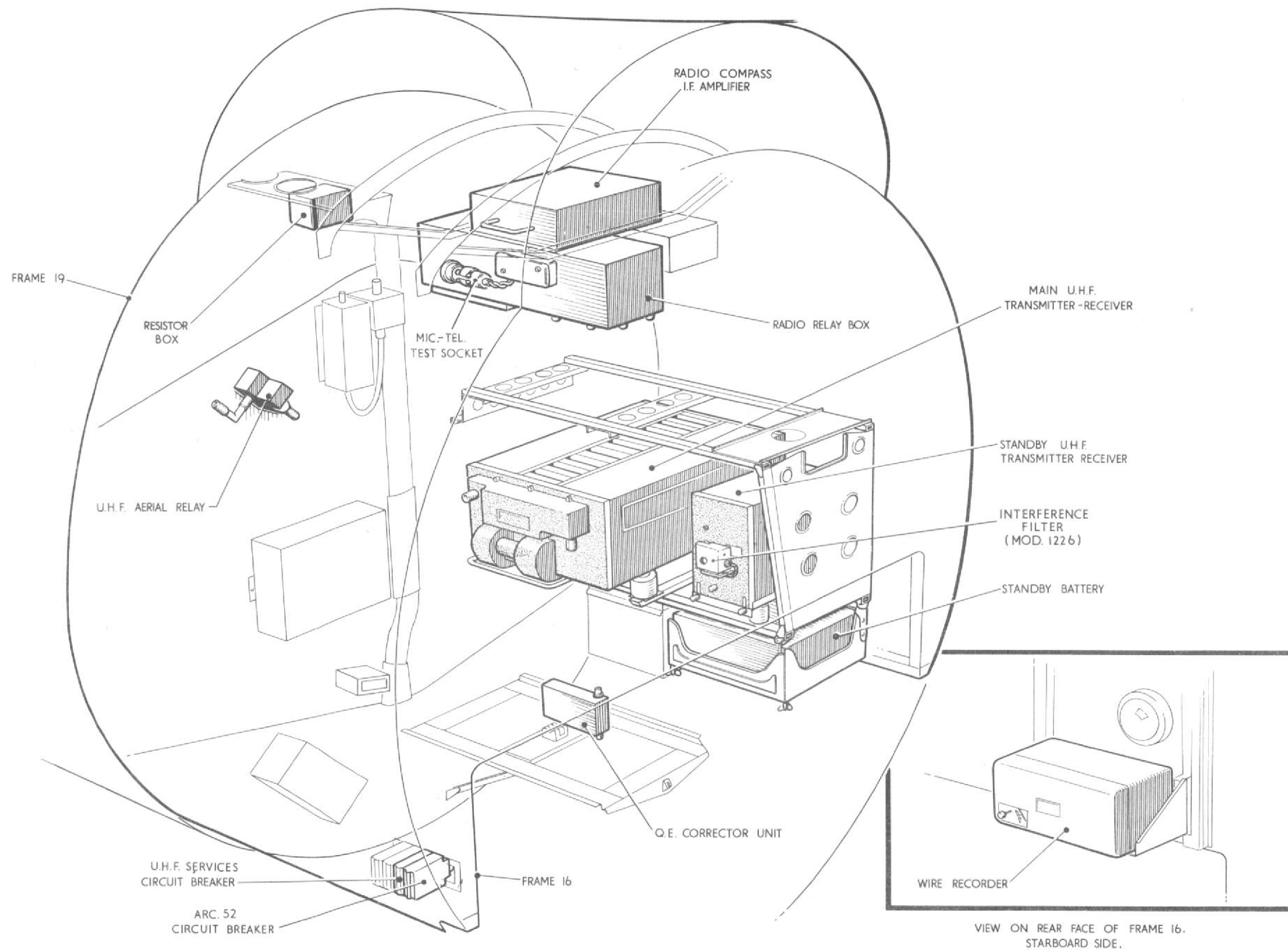


Fig.1 Wireless installation - location (1)

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TABLE 1

Equipment type and Air Publication reference

Equipment Type	Air Publication
◀ A.R.I.18124/1	
Transceiver Type 5 ARC 52	} A.P.116D-0133-1
Mounting tray, Type MT1477/AR52	
Aerial - McMichael (blade type)	
Mic.tel. socket, Type 359	
Control unit, Type C1607/2	
Aerial relay unit, Type 1741	
A.R.I. 23057	
Transceiver, Type M4 or M6	} A.P.116D-0110-16
Mounting tray, Type 103	
Whip aerial, Type 11789	
Interference filter, Ref.5919-99-970-0362 (Mod.1226)	
Standby battery (24V), Type Voltabloc Ref.No.19-VO-7 A.P.113C-0202-1
A.R.I.18012	
Telebriefing system A.P.116N-0301-1
A.R.I.5877	
Radio compass, Type AD772	} A.P.116B-0102-16
R.F. amplifier, Type 8281	
Mounting rack, Type 8288	
I.F. amplifier, Type 8282	
Mounting rack, Type 8289	
Bearing indicator, Type 8284	
Control unit, Type 8283	
Loop aerial, Type 8280	
Sense aerial array, Type 402	
Q.E. corrector unit, Ref.10D.20169	
Sense aerial filter unit (Mod.1028) Type M.162	
Voice recorder	A.P.2487L, Vol.1 ▶

DESCRIPTION

General

2. The wireless equipment consists of an A.R.I.18124/1 U.H.F. communication installation, with which is associated an A.R.I.23057 U.H.F. standby installation and an A.R.I.18012 tele-briefing system. A system to give the pilot audio warning of loss of hydraulic pressure is linked with the U.H.F. installation. An A.R.I.5877 radio compass installation and a voice recorder are also installed. Most of the wireless equipment is carried in the radio bay in the front fuselage, being remotely controlled by switches and control units situated in the cabin. The location of all the wireless equipment is illustrated in fig. 1, 2 and 3.

Radio bay and mounting structure

3. The radio bay is located in the front fuselage and extends aft from frame 16 to the forward transport joint. Apart from the radio sets and their associated equipment, this bay also contains various electrical components, notably, the electrical supply panel, generator control panel and the batteries. Access to the bay may be obtained by opening the access doors in the undersurface of the front fuselage immediately in front of the forward transport joint.

4. The radio mounting structure is in two main parts, each carrying mounting plates and bearers for the transmitter-receivers and their associated equipment. The upper structure consists of two angle-sectioned beams with a platform carried between them. The complete assembly extends across the radio bay and is bolted

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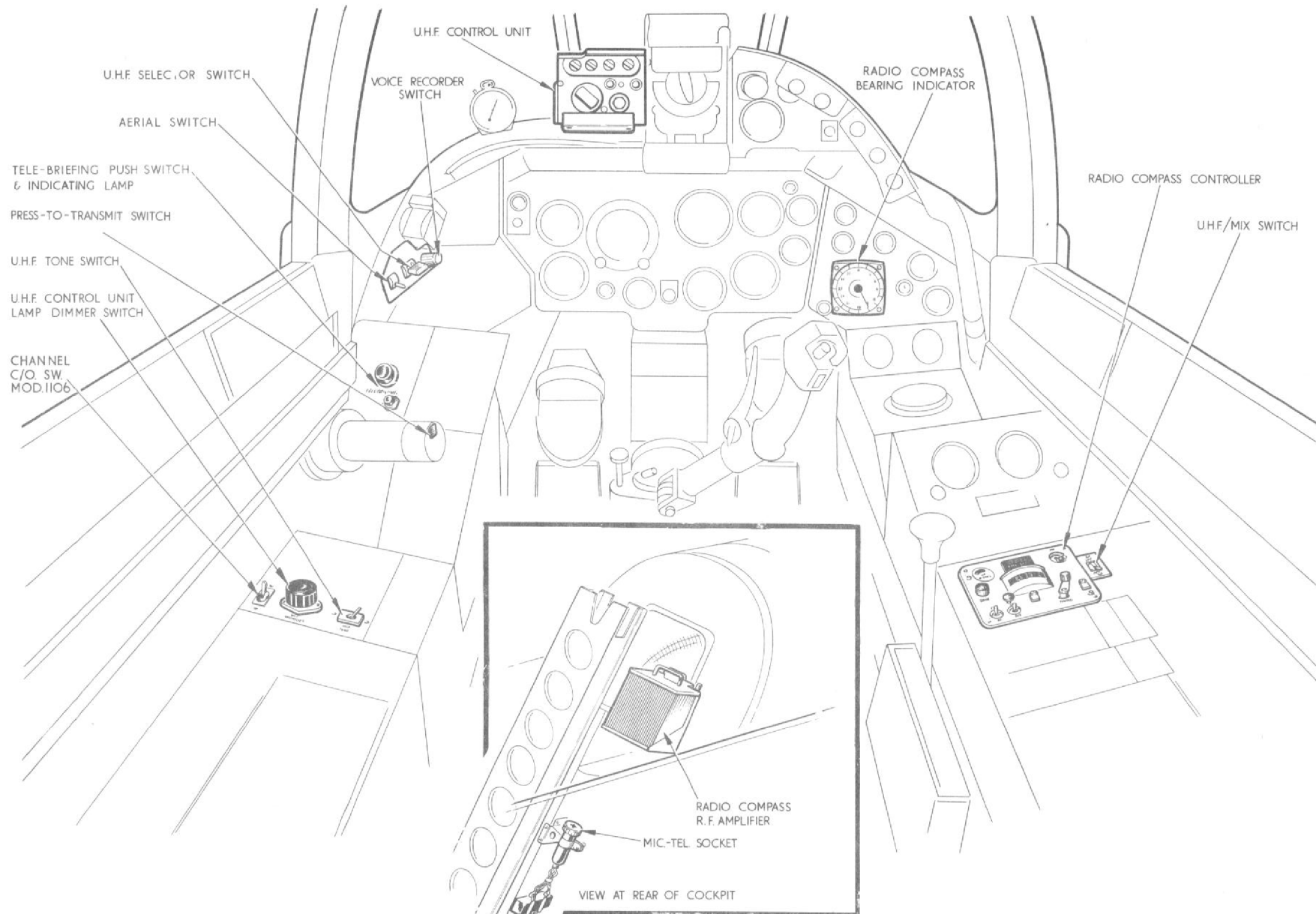


Fig.2 Wireless installation - location (2)

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to frames 17A and 17B. Another platform is attached to the starboard side of the beam bolted to frame 17B and extends aft to brackets on frame 19. The lower structure extends along the port side of the radio bay and consists of a number of square tubes, bolted together through gusset plates, and arranged so as to form two platforms, one above the other. The forward end of the structure is in the form of a diaphragm and the complete assembly is bolted to brackets on frames 16 and 19.

A.R.I.18124/1

5. The A.R.I.18124/1 is a multi-channel U.H.F. communication, installation which uses a Type TR.5/ARC.52 transmitter-receiver carried in a Type MT.1477/ARC.52 mounting tray situated at the aft end of the bottom platform of the lower radio mounting structure described in paragraph 4. The installation employs two Mc.Michael wideband, blade type aeriels, but only one is in use at any given time, being switched to the transmitter-receiver by a Type 1741 aerial relay controlled by an aerial change-over switch located in the cabin. These aeriels are known as No.1 and No.2. Aerial No.1 projects upwards from the starboard side of the hood fairing above the radio bay and aerial No.2 projects downwards from the engine access door in the under-surface of the centre fuselage. The aerial relay is bolted to the starboard fuel tank access door on frame 19. A Type 359 mic.-tel. pull-out socket for the pilot's ejector seat connection is located on the port side of the flying control casing.

6. The installation is remotely controlled

by a Type C.1607/2 control unit, a press-to-transmit push-switch, a tone transmit ON/OFF switch, an aerial change-over switch and a Normal/Standby set selector switch. The control unit, which incorporates two panel lamps to provide diffused illumination of the controls, is situated on the left hand side of the gun sight above the instrument panels. The unit is attached by four Dzus fasteners to a mounting fitted with a spring-loaded glare shield to prevent reflection into the windscreen. The press-to-transmit push-switch is incorporated in the throttle twist grip, and the ON/OFF tone transmission switch is situated on the cabin port shelf, just forward of the cabin pressurization controls. The aerial change-over switch, labelled AERIAL-1 and 2 and the Normal/Standby set selector switch, labelled U.H.F. - ARC.52 NORMAL, S'BY NORMAL and S'BY EMERGENCY - are both situated on a mounting bracket attached to the windscreen platform on the port side of the cabin. A dimmer switch for the control of the control unit's panel lamps is mounted on the cabin port shelf just forward of the cabin pressurization controls.

7. The installation is supplied through a circuit breaker, which is marked U.H.F. SERVICES and situated below the electrical supply panel in the radio bay. This circuit breaker is fed from the aircraft's d.c. electrical system and feeds the main transmitter-receiver, via a further circuit breaker which is marked ARC.52 and located adjacent to the U.H.F. services circuit breaker. Normal/Standby set selection, mic.-tel. and press-to-transmit switch

is accomplished by a number of relays contained together with the circuit fuses, in a readily detachable box, known as the U.H.F. radio relay box. This box is mounted to the underside of the top radio mounting structure, described in paragraph 4. The box is used to integrate all the radio installations and carries the control relays and fuses for the U.H.F. standby set, tele-briefing, hydraulic pressure failure audio warning and voice recorder installations, together with a resistor network for the radio compass output. The voice recorder's recording level pre-set potentiometer and two test sockets, one for the main and the other for the standby U.H.F. transmitter-receiver are also attached to this box. A type 359 mic.-tel. socket for use when adjusting the sets, is stowed in a spring clip on the U.H.F. radio relay box.

A.R.I.23057

8. The A.R.I.23057 is a U.H.F. standby communication system for use should the aircraft's normal transmitter-receiver fail. It employs a Type TR.10056 pre-set, two channel transmitter-receiver, which is carried in a Type 103 mounting tray situated just forward of the main U.H.F. transmitter-receiver on the bottom platform of the lower radio mounting structure. The installation uses a Type 11789 whip aerial, which projects downwards from between frames 9 and 10 on the starboard underside of the front fuselage.

9. The installation is supplied with power from the aircraft's main d.c. electrical system, but should this source fail,

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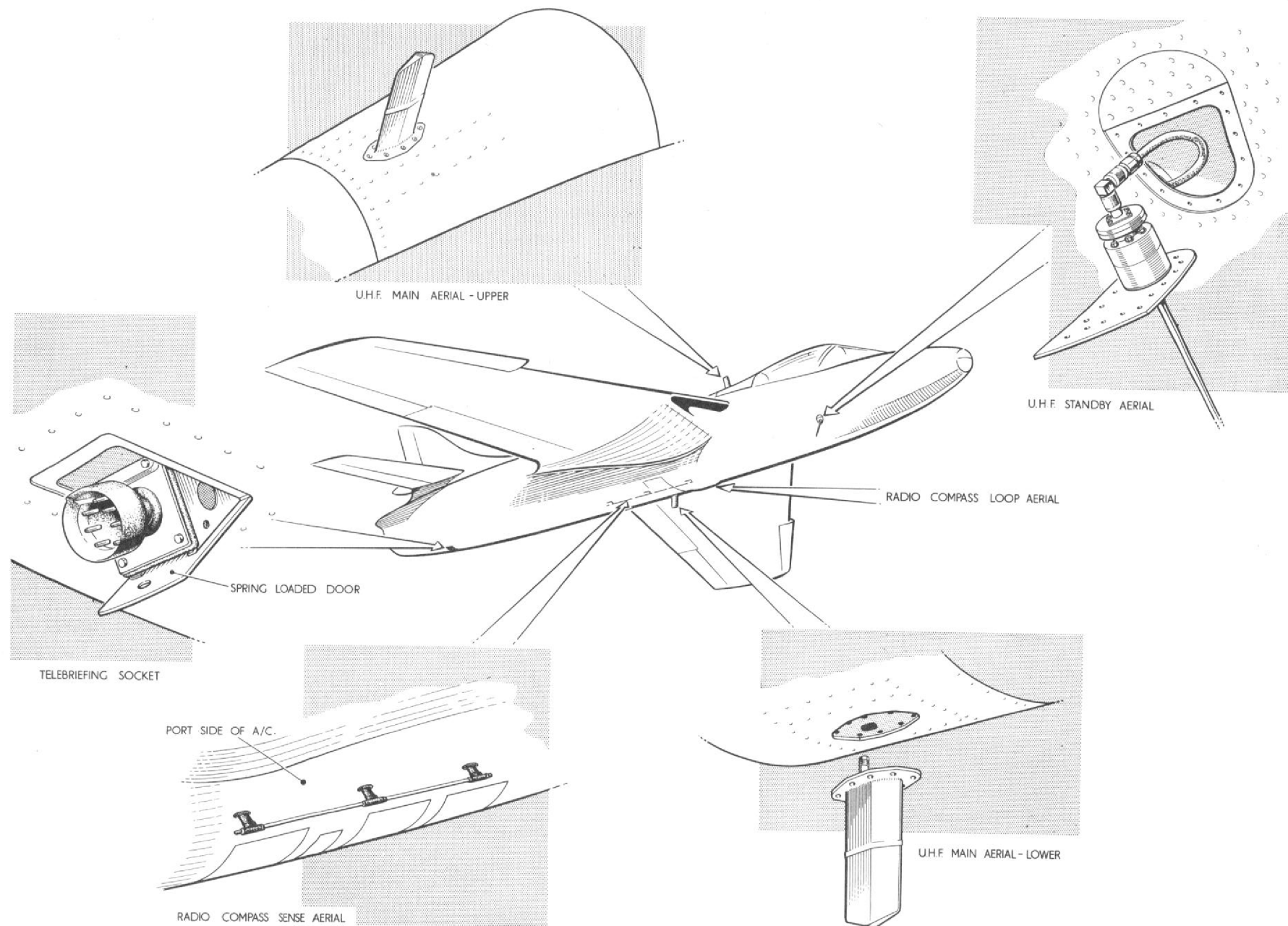


Fig.3 Wireless installation - location (3)

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a Voltabloc or Varley 24-volt standby battery may be brought into service. The main d.c. supply is taken from a fuse in the U.H.F. radio relay box and is reduced to the value required by the installation by a resistor carried in a box attached to the platform on the starboard side of the upper radio mounting structure (*para.4*). The standby battery is carried in a readily detachable mounting crate attached to the forward undersurface of the lower radio mounting structure. Modification 1226 introduces an interference filter for use when a Type M.6 transmitter-receiver is fitted. With this type of transceiver fitted, the supply is taken through this filter to eliminate radio interference. The filter is attached to the front face of the transceiver by spring tension clips. ►

10. Switching from the main transmitter-receiver to the standby set and from the main d.c. supply to the standby battery is accomplished by operation of the Normal/Standby switch (*para.6*). This switch also controls relays within the U.H.F. radio relay box (*para.7*), which switch the pilot's mic.tel. socket and the press-to-transmit push-switch to the standby set. Two channel selection is provided by means of a selector switch marked GUARD and ALTVE. Modification 1106 introduces this switch so that the standby set may be tested on a frequency of 243.8c/s as an alternative to the guard frequency of 243.0c/s. The switch is positioned on the cabin port shelf adjacent to the U.H.F. TONE switch. ►

A.R.I.18012

11. A push-switch and an indicator lamp for the tele-briefing installation are mounted on the forward end of the cabin port shelf. Provision for the connection of the tele-briefing cable, is made by a plug mounted on a spring-loaded access door in the undersurface of the rear fuselage, between frames 53 and 54. The control relays and a fuse for this installation are contained in the U.H.F. radio relay box located in the radio bay.

Voice recorder

12. The voice recorder installation is provided to enable the pilot to record his observations during flight. The installation incorporates a Type 16606 airborne wire recorder, incorporating R.M.C. Modification 5352 (*side tone*). The recorder, which is supplied and fitted by the Service, is remotely controlled by a three-pole, four-position rotary switch labelled VOICE RECORDER/OFF, S'BY, SORTIE and ALL. The recorder is carried on two quick-release mounting brackets attached to mounting plates on the starboard rear face of frame 16 in the radio bay. The control switch is situated on the port side of the cabin, being mounted on the bracket carrying the U.H.F. aerial change-over and normal/standby set selector switches (*para.6*).

13. The installation obtains its electrical supply from a fuse in the U.H.F. radio relay box and the audio input to the recorder is controlled by relays within this box.

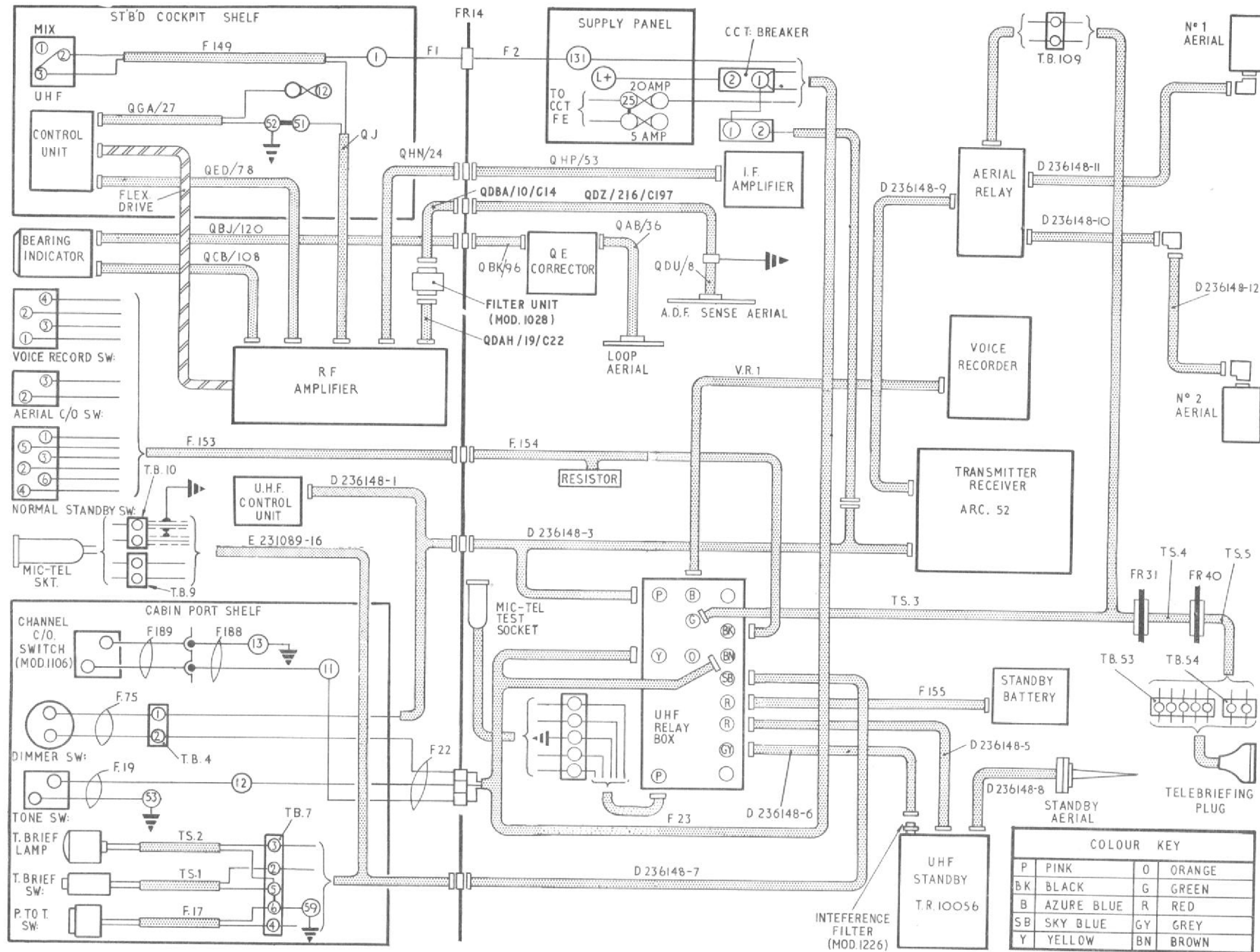
The recording level is adjustable to suit the U.H.F. transmitter's side tone output by a potentiometer, which is also situated in the U.H.F. relay box with its spindle projecting externally.

A.R.I.5877

14. The A.R.I.5877 is a sub-miniature radio compass employed for automatic direction finding, the bearing of the selected signal being given on an indicator in the cabin. The installation incorporates a R.F. amplifier and an I.F. amplifier, which together form a radio receiver. This receiver employs loop and sense aerials, the loop aerial being provided with a Q.E. corrector unit. The installation is remotely controlled by a control unit and a U.H.F./MIX switch situated in the cabin. The audio signal from the receiver is fed to the pilot's mic.tel. socket via an interconnection with the U.H.F. installation.

15. The Type 8281 R.F. amplifier is carried in a Type 8288 mounting rack bolted to the tie member extending between the flying control casing and the port top longeron. The Type 8282 I.F. amplifier is supported in a Type 8289 mounting rack, which is bolted to the upper radio mounting structure between frames 17A and 17B at the top of the radio bay. The Type 8284 bearing indicator is situated on the starboard instrument panel, just below the camera film indicators and the Type 8283 control unit, together with the U.H.F./MIX switch, is located on the cabin starboard shelf. ►

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16. The Type 8280 loop aerial is situated in a fairing attached to the fuel pump access door located between frames 19 and 21 at the bottom of the centre fuselage. The Type 402 sense aerial array, which is supported on three stub masts, extends lengthwise, from just aft of frame 26 to frame 35, along the lower port side of the centre fuselage. The loop aerial's Q.E. corrector unit is situated in the radio bay, being attached to a mounting bracket bolted to the port side of the aircraft's main battery mounting structure. The sense aerial R.F. filter unit Type M.162, introduced on a S.O.O. basis by Mod.1028, is fitted to a mounting bracket on the port side front face of frame 14.

17. The installation is supplied from the aircraft's normal d.c. electrical system, via a fuse located in the cabin starboard shelf. The audio signal output from the receiver is fed to the pilot's mic.tel. socket via a resistor network and the control relays within the U.H.F. radio relay box (para.7).

Power supplies and operating frequencies

18. The electrical supply circuits for the radio installations and the operation of the control relays in the U.H.F. radio relay box are described in Group H.1 of Section 5, Chapter 1. Information on the hydraulic pressure failure audio warning system is given in Group 5.A of Section 5, Chapter 2. The frequency range of the main U.H.F. transmitter-receiver extends from 225.0 to

399.9 Mc/s and the installation provides for the automatic selection of any one of 19 pre-set frequency channels (*including the guard frequency*), and manual selection of any one of 1,750 frequency channels spaced 100 kc/s apart. The U.H.F. standby transmitter-receiver operates on a frequency of 243.0 Mc/s or an alternative channel spaced by 0.8Mc/s above this channel. The radio compass receiver will operate on any frequency within the range of 200 Kc/s to 1,700 Kc/s in three switched bands.

Interconnection

19. The various components of the wireless installations are interconnected as shown in fig.4 by connectors, strapped and clipped to the aircraft's structure. These connectors are metal-braided and non-braided types fitted with standard and miniature plugs and sockets; the metal braided connectors being bonded where necessary by the clips holding them in position. A wiring diagram of the U.H.F. radio relay box is given in fig.5.

OPERATION

General

20. For the guidance of servicing personnel, a brief description of the operating procedure for the various radio installations will be found in the following paragraphs.

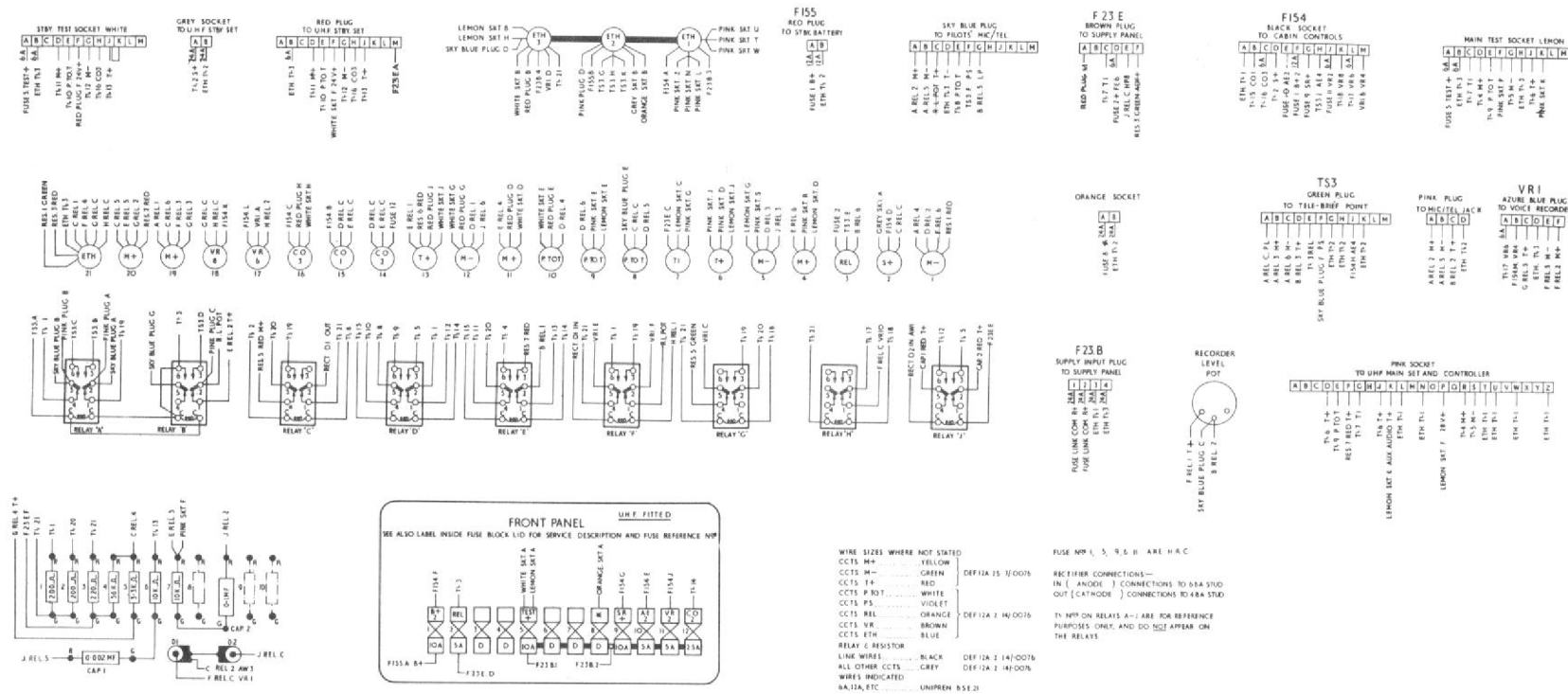
A.R.I.18124/1

21. The setting-up and operating instructions for the A.R.I.18124/1 installation are given in detail in A.P.116D-0133-1

All control of the installation is achieved by the use of the U.H.F. control unit, Normal/Standby set selector switch, tone switch, aerial change-over switch and the press-to-transmit push-switch. The installation is supplied from the aircraft's main d.c. electrical system and may be used whenever the aircraft's battery master switch is placed in the ON position.

22. The U.H.F. control unit incorporates all the operational controls and provides the following facilities:-

- (1) *Function switch.* This is a four-position rotary switch engraved OFF, T/R, T/R + G and ADF. In the OFF position, the installation is inoperative, as the power supply relay within the transmitter-receiver is not energized. In the T/R position, the power supply relay is energized and the main transmitter-receiver is switched on for operational purposes. With the switch in the T/R + G position, the guard receiver in addition to the main transmitter-receiver is available. In the ADF position, the transmitter-receiver is switched for automatic direction finding operations with the appropriate airborne equipment and also permits normal communication facilities.
- (2) *Channel selector switch.* This is engraved CHAN and has 20 positions. Those positions numbered 1 to 18 are used to select the required pre-set frequency channels. The two remaining



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Fig. 5 Wiring of U.H.F. radio relay box

positions are annotated M and G. The M position is used to switch the frequency selection to manual control and the G position is normally set to the guard frequency, thus enabling the main transmitter-receiver to be used on the guard frequency independently of the guard receiver. The frequencies of the pre-set channels are marked on an ivory tablet below the channel selector switch.

- (3) *Manual frequency control.* The MANUAL control consists of four control knobs, each of which is associated with numbers appearing in an aperture above each knob. The controls are manipulated to set the numbers to correspond with the required frequency channel, thus enabling any one of the 1,750 channels to be selected as required. This selection is overridden whenever the channel selector switch is moved from the M position.
- (4) *Volume control.* This is a potentiometer, engraved VOLUME, and is used to adjust the level of the audio signal to the telephones.

23. The Normal/Standby set selector switch is a three-position toggle switch labelled U.H.F. - ARC.52 NORMAL, S'BY NORMAL and S'BY EMERGENCY. The switch controls the change-over from the main transmitter-receiver to the standby set and also the switching of the standby set's power supply as follows:-

- (1) When the switch is in the ARC.52 NORMAL position, the pilot's mic.-tel. socket and press-to-transmit push-switch are connected to the main transmitter-receiver via the relays in the U.H.F. radio relay box.
- (2) When the switch is in the S'BY NORMAL position, the relays in the U.H.F. radio box switch the pilot's mic.-tel. socket and press-to-transmit push-switch to the standby transmitter-receiver. In this position of the switch the standby set is supplied from the aircraft's main d.c. electrical system.
- (3) When the switch is in the S'BY EMERGENCY position, the pilot's mic.-tel. socket and the press-to-transmit push-switch are still connected to the standby transmitter-receiver, but the aircraft's main d.c. supply is isolated and the standby battery brought into service to supply the set.

24. The tone switch is a single-pole, two-position toggle switch labelled TONE-OFF and ON. When this switch is in the ON position, the main transmitter is automatically tone modulated at between 920 c/s and 1120 c/s for direction finding or emergency purposes.

25. The aerial change-over switch is a single-pole, two-position toggle switch labelled AERIAL - 1 and 2. It is used to

control the aerial relay unit, which switches either the upper or lower aerial to the transmitter-receiver. When the switch is in position 1, the aerial relay is de-energized and the upper (No.1) aerial is connected to the main transmitter-receiver. In position 2, the aerial relay is energized and the lower (No.2) aerial is connected to the set.

26. The press-to-transmit push-switch is a push-button incorporated in the throttle twist grip and is engraved PRESS TO TRANSMIT. It must not be confused with the air brake control switch, which is also fitted in the twist grip. The push-switch is used for both the main and standby transmitters, being switched to the set in use by relays within the U.H.F. radio relay box. When pressed, the switch makes the earth return for a switching relay within the transmitter-receiver in use, and this relay, when energized, switches the set from receiver to transmit.

27. By rotating the function switch from OFF to any one of the other three positions, the transmitter-receiver is switched on and warms up ready for operation. When switched on, the transmitter-receiver is automatically in the "receive" condition, thus signals on the frequency selected by the channel selector switch will be heard. The audio level of these signals may be adjusted by use of the volume control. To transmit on the selected channel, it is necessary

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for the operator to press the press-to-transmit push-switch for as long as transmission is required. Release of the press-to-transmit push-switch automatically restores the transmitter-receiver to the "receive" condition.

28. When the function switch is rotated to the T/R + G position, the guard receiver is brought into operation, and, if the channel selector switch is set to any channel other than G, watch can be maintained on both the guard and the frequency at which the main transmitter-receiver is being operated. Should it be necessary to operate the main receiver at the guard frequency, the function switch should be set to T/R and the channel selector switch set to G. The guard receiver is thereby cut off and the installation operated as described in paragraph 27.

A.R.I.23057

29. Operating and setting-up instructions for the A.R.I.23057 installation are given in detail in A.P.116D-0110-16. The installation may be supplied either from the aircraft's main d.c. electrical system, or from the standby battery. The standby transmitter-receiver is brought into use and its power supply selected by operation of the U.H.F. Normal/Standby set selector switch (para.23), and is switched from the "receive" to transmit condition by operation of the press-to-transmit push-switch (para. 26).

30. Selection of either the GUARD or ALTVE channel on the U.H.F. standby set is made by use of the channel selector switch on the rear port shelf. The ALTVE channel is provided for functional testing of the set. To prevent unnecessary discharge, the standby battery should only be brought into operation if the aircraft main d.c. electrical system fails. ►

A.R.I.18012

31. The operation of the A.R.I.18012 system is described in detail in A.P.116N-0301-1. The system is brought into operation automatically, by relays within the U.H.F. radio relay box, whenever the external cable is connected with the aircraft's tele-briefing plug. These relays transfer the pilot's mic.-tel. socket from the U.H.F. installation to the tele-briefing cable, and, at the same time, the aircraft's tele-briefing lamp is lit to indicate that briefing information may be received over the system.

32. When it is required to speak back over the system, the aircraft's tele-briefing push-switch must be pressed. This action energizes a relay in the tele-briefing building and connects the pilot's microphone to the landline, via an amplifier also located in this building. At the same time, a lamp lights in the building to indicate that the microphone is in circuit.

Voice recorder

33. The voice recorder is supplied from

the aircraft's main d.c. system, via a fuse in the U.H.F. radio relay box. It is switched on and controlled by a three-pole four-way rotary switch labelled VOICE RECORDER-OFF, S'BY, SORTIE and ALL. A potentiometer, situated in the U.H.F. radio relay box, with its spindle projecting externally, is used to pre-set the recording level. The control switch provides the following facilities.

- (1) OFF - power supply switched off: the microphone input is isolated at the control relays in the U.H.F. radio relay box.
- (2) S'BY - standby position, power is applied to the valve heater and d.c. bias current flows in the recording head. When warmed-up, the recorder is in a state of readiness.
- (3) SORTIE - first operating position; power is applied to the recorder's motor circuit and the motor rotates the take-up spool to draw wire through the recording head. The pilot's microphone is switched to the recorder by relays within the U.H.F. radio relay box, and, to indicate that the recorder is in use, side tone is provided by a feed-back loop between the recording head and the pilot's telephones.
- (4) ALL - second operating position; the audio output from the U.H.F. transmitter-receiver in use is connected to the recorder, via the relays in the U.H.F. radio relay box. These relays also isolate the direct link between the pilot's microphone and the recorder, but his conversation is

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still recorded via the audio stages of the transmitter-receiver. The pilot's transmission is also recorded when the switch is in the SORTIE position.

A.R.I.5877

34. Operating and setting-up instructions for the A.R.I.5877 radio compass are described in A.P.116B-0102-16. The installation obtains its electrical supply from the aircraft's main d.c. system, and may be brought into operation when the aircraft's battery master switch is placed in the ON position. The installation is operated from a control unit, and an U.H.F./MIX switch situated in the cabin.

35. The radio compass control unit provides the following facilities:-

- (1) *Equipment on/off switch.* This is a single-pole, two-position toggle switch, engraved ON. It controls the d.c. supply to the equipment, and when the switch is moved to the ON position, the equipment warms-up ready for operation.
- (2) *ADF/Receiver switch.* This is a double-pole, two-position toggle switch engraved ADF and REC. It controls the R.F. amplifier and I.F. amplifier circuit as follows:-

- (a) ADF position - the equipment is connected for fully automatic

direction finding.

- (b) REC position - the automatic direction finding facility is in-operative, and the equipment functions only as a conventional receiver.
- (3) *Frequency band selector.* This is a three-position, lever-operated rotary switch which projects through a slot adjacent to the tuning dial on the control unit. Operation of this switch selects the required frequency band, and also causes the appropriate scale on the tuning dial to be illuminated. The frequency bands are as follows:-

Band 1.....200 to 415 kc/s.
Band 2.....415 to 840 kc/s.
Band 3.....840 to 1700 kc/s.

- (4) *Tuning control and indicator.* The tuning control is a cranked handle labelled TUNING. It is geared to a flexible drive shaft connecting the control unit with the tuning mechanism in the R.F. amplifier. Indication of the signal frequency is given by the scale on the tuning dial drum. The tuning indicator is a moving coil meter engraved TUNE. Signal strength is indicated by clockwise deflection of the meter needle.
- (5) *Gain control.* This consists of two ganged potentiometers engraved GAIN. It controls the R.F., I.F. and A.F. stages of the receiver and is used to regulate the output level of the received signals as fed to the pilot's telephones.

- (6) *BFO switch.* This is a single-pole, two-position toggle switch engraved C.W. and R.T. When the switch is in the C.W. position, the beat frequency oscillator valve in the I.F. amplifier is energized to enable keyed continuous wave stations to be received. For the reception of radio telephony signals, the switch should be kept in the R.T. position.

- (7) *Panel illumination control.* This is a small knob marked DIM PUSH. It operates a shutter device which controls the brightness of the tuning scale and panel illumination. The knob is pushed inwards to decrease the brightness.

Note . . .

A spare dial lamp, screwed into a dummy holder marked SPARE, is provided on the front panel of the control unit.

36. The U.H.F./MIX switch is a single-pole, two-position toggle switch employed to switch the audio output of the radio compass to the pilot's telephones. When the switch is in the U.H.F. position, the audio output from the radio compass is isolated, and signals from the U.H.F. transmitter-receiver only are fed to the pilot's telephones. When the switch is placed in the MIX position, the audio output from the radio compass receiver is fed to the U.H.F. transmitter-receiver, via a resistor network within the U.H.F. radio relay box, and mixed with the U.H.F. signals, thus both the radio compass and U.H.F. signals are fed to the pilot's telephones.

SERVICING

General

37. Servicing of the wireless equipment is covered in the appropriate Air Publications listed in Table 1, but any unit suspected of being unserviceable should be carefully checked in-situ, and, if found to be faulty, removed from the aircraft and taken into the workshop for rectification action as necessary. The location of the components as illustrated in fig.1,2 and 3, the interconnection is given in fig.4, and a wiring diagram of the power supplies will be found in Sect.5, Chap.1, Group H.1. ▶

Power supplies

38. If a fault is reported in the wireless installation, the power supplies should first be checked, in conjunction with the appropriate routeing and theoretical diagram in Section 5, Chapter 1, to ensure that the trouble is not in the aircraft's electrical system. The voltage, both on and off load, must be tested, and a check made to ensure that the connectors carrying the supply to the equipment are correctly assembled.

Cables and connectors

39. Servicing of the cables and connectors consists of the standard continuity and insulation resistance tests, together with a periodical examination throughout their entire length for signs of damage to, or deterioration of the insulation. If any defects are found, the complete cable or connector must be replaced. The Part num-

ber references of the connectors are given in fig.4. All the clips securing the cables and connectors to the aircraft's structure must be examined for signs of looseness, and any insecure clips tightened as necessary to prevent chafing. Plug and socket connections must be checked to ensure that they are fitting properly, and that the fixings are screwed fully home.

Security check

40. The following security checks must be made to ensure that all the wireless equipment is properly installed and secure:-

- (1) Ensure that all the units are secure in their mounting racks and that the clamping devices are tightened sufficiently to prevent movement or vibration. Check that locking wire is fitted where necessary.
- (2) Inspect all mounting bolts for security, ensure that the anti-vibration mounts are undamaged, and check that the fixed mounting structure is secure.
- (3) Check that all the control units and switches are securely mounted. With electrical power switched off, operate all the controls and ensure that they are undamaged and serviceable.
- (4) Check the security of all the aerials.
- (5) Ensure that the U.H.F. radio relay box, and the standby battery crate are securely mounted.

- (6) Examine all the plugs and sockets for correct mating and security.
- (7) Check that any strain on the pilot's mic.-tel. socket is taken up by the check-cord, and not by the cable attached to the socket.

Functional check

41. To ensure that the wireless installation is set up and operating correctly, the functional checks given in the appropriate Air Publications listed in Table 1. ▶ must be made, using the test sets and equipment provided. To enable the U.H.F. installation to be ground tested and adjusted in-situ, two test sockets, one for the main and the other for the standby transmitter-receiver, are provided on the U.H.F. radio relay box in the radio bay. These test sockets are used in conjunction with the U.H.F. test set as described in the appropriate Air Publication. A mic.-tel. socket, wired in parallel with the pilot's socket, is provided for intercommunication use when adjusting the installation. This socket, which is used in conjunction with a standard headset, is stowed in a spring clip attached to the U.H.F. radio relay box.

Fault finding

42. If a fault is reported, an attempt should be made, in-situ, to locate the faulty unit. Before any other tests are made, the low tension source should be checked, the voltage, both on and off load, tested, and the tightness of the connectors en-

sured. Any unit found to be faulty should be taken to the workshop for testing and repair. For full details of the fault finding and testing procedure, reference should be made to the Air Publications listed in Table 1.

43. If the U.H.F. radio relay box is found to be faulty, it should be removed from the aircraft for Bay servicing and replaced by a fully serviceable item. When the aircraft is undergoing its Minor Servicing, this box should be removed from the aircraft for a thorough check and adjustment to ensure that it is fully serviceable.

Final check

44. After servicing the wireless installation, ensure that all the equipment is switched off, and that all access doors removed to give access to the equipment, are correctly replaced and secured.

REMOVAL AND ASSEMBLY

General

45. The recommended procedure for removing the main components of the wireless installation is given in the following paragraphs. The method of assembly is, in general, a reversal of the removal sequence, but when there is any special assembly feature it is covered by a note in the appropriate paragraph. Before removing or replacing any component, the aircraft must be rendered electrically safe, as described in Group A.1 of Section 5, Chapter 1.

U.H.F. main transmitter-receiver

46. The recommended method of removing this transmitter-receiver is as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Disconnect the two connectors from the transmitter-receiver, fit approved caps and covers to the plugs and sockets, and stow the connectors clear of the set.
- (3) Remove the locking wire from the two wing-nuts at the front of the mounting tray and unscrew these nuts until they drop clear of the retaining catches on the set.
- (4) Disengage the rear of the transmitter-receiver from the spring loaded dowels on the mounting tray by using the handle to withdraw the set along the tray. Still using the handle, carefully remove the set from the aircraft.

U.H.F. main aerial (upper)

47. The method of removing this aerial is as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Remove the hood fairing sufficiently to gain access to the aerial connector, and, after disengaging the retaining spring from the aerial connector plug,

disconnect the aerial connector from the aerial socket. Fit an approved cap and cover to the plug and socket.

- (3) The aerial may now be removed from the hood fairing by removing the eight bolts, nuts and washers securing the aerial base to the mounting plate. The lugs holding the aerial connector plug retaining spring are also secured by two of these bolts; care must be taken to retain these with the hood fairing when the aerial is removed.

Note . . .

When re-assembling the aerial, ensure good electrical bonding by checking that all mating surfaces are absolutely clean and making perfect contact. Ensure that the aerial connector retaining spring is re-fitted and seal the aperture around the aerial base with Bostik compound to prevent the entry of water.

U.H.F. main aerial (lower)

48. To remove this aerial proceed as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Open the engine starter access door and gain access to the aerial connector by removing the cover plate from the aerial box on the inside of the door.
- (3) Disconnect the aerial connector from the socket at the top of the aerial.

- (4) The aerial may now be removed from the access door by removing the eight nuts and washers from the bolts securing the aerial base to the mounting plate.

Note . . .

When re-assembling the aerial, ensure good electrical bonding by checking that all mating surfaces and the door hinge fittings are absolutely clean. Seal the aperture around the aerial base with Bostik compound to prevent the entry of water.

Aerial relay unit

49. The method of removing this relay unit is as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Disconnect the three connectors from the co-axial sockets on the relay unit and fit approved caps and covers to the plugs and sockets. Stow the connectors clear of the unit.
- (3) Disconnect the two leads attached to the unit from terminal block 109 situated in the underside of the top radio mounting structure. Coil these leads back to the relay unit, removing any clips as found necessary.
- (4) Remove the relay unit from the aircraft's structure by withdrawing the two attachment bolts.

U.H.F. control unit

50. The U.H.F. control unit is carried in

a mounting which is readily removable from the aircraft and should be removed complete with mounting as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Slacken off the two screws passing through the slotted holes in the cover plate below the control unit and slide this plate aft to facilitate removal of the control unit.
- (3) Gain access to the spring-loaded pinch-bolts which secure the control unit's mounting to the fixed structure. Withdraw these bolts from the lugs on the bottom of the mounting, and manoeuvre the mounting aft to disengage the spools at the forward end of the mounting from the attachment hooks.
- (4) Disconnect the connector from the forward face of the control unit, and remove the control unit and its mounting from the aircraft.

Note . . .

The control unit may be removed from its mounting after disengaging the four Dzus fasteners.

U.H.F. radio relay box

51. This box is designed for easy removal, being supported on quick-release mountings. The recommended method of removing the box is as follows:-

- (1) Render the aircraft electrically safe

as described in Section 5, Chapter 1, Group A.1.

- (2) Disconnect all the connectors from the relay box, fit approved caps and covers to the plugs and sockets and stow the connectors clear of the box.
- (3) Remove the two bolts passing through the mounting lugs on the right hand side of the box casing. Release the box from its attachment brackets by swinging it downwards and to starboard to disengage the locating hooks.
- (4) Remove the box from the aircraft.

U.H.F. standby transmitter-receiver

52. To remove the standby transmitter-receiver, proceed as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Disconnect the two connectors from the transmitter-receiver, fit approved caps and covers to the plugs and sockets and stow the connectors clear of the set.
- (3) Unscrew the two knurled nut fasteners at the front of the mounting tray and allow them to drop clear of the retaining catches on the set.
- (4) Disengage the spring-loaded spigots at the rear of the transmitter-receiver from the mounting tray by using the

handle to withdraw the set along the tray. Still using the handle, carefully remove the set from the aircraft.

U.H.F. standby aerial

53. The recommended method of removing this aerial is as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Remove the fourteen countersunk headed bolts from around the periphery of the aerial access panel in the starboard skin of the front fuselage.
- (3) Withdraw the aerial and access panel sufficiently to gain access to the aerial connector and disconnect this connector from the aerial socket. Fit an approved cap and cover to the plug and socket.
- (4) Remove the aerial from the access panel by unscrewing the five nuts from the bolts securing the aerial base to the access panel, taking care to retain the washers.

Note . . .

When re-assembling the aerial, ensure good electrical bonding by checking that all mating surfaces are absolutely clean. Pay particular attention to the door landing.

U.H.F. standby battery

54. The standby battery is carried in a crate, which is readily detachable from the

aircraft, and should be removed in its crate as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Disconnect the two leads of cable assembly F.155 from the terminals on the standby battery. Insulate the bare ends of these leads and stow clear of the battery.
- (3) Remove the locking wire from the wing-nuts below the battery crate, and, supporting the crate, slacken off the wing-nuts until the tie-rods clear the locating pads on the bottom of the crate.
- (4) Swing the crate downwards and in-board to disengage the retaining hooks. Remove the crate and battery from the aircraft.

Note . . .

After re-assembly of the battery and crate, lock the wing-nuts to the lugs on the mounting crate with 22 s.w.g. stainless steel wire to Spec.189 or 161.

Voice recorder

55. The voice recorder is carried on two readily removable support brackets. To remove the recorder proceed as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.

- (2) Disconnect cable assembly VR.1 from the voice recorder, fit an approved cap and cover to the plug and socket and stow the cable clear of the recorder.
- (3) Support the weight of the recorder, and remove the pip pins which pass through the support brackets and mounting channels located at each end of the recorder.
- (4) The recorder may now be removed from the aircraft by withdrawing it downwards to disengage the upper attachments.
- (5) To release the recorder from its support brackets, it is only necessary to remove the four nuts and washers from the bolts securing the brackets to the recorder's mounting lugs.

Note . . .

When re-fitting the support brackets to the recorder, tighten the fixings sufficiently to lightly compress the grommets on the support brackets. If the recorder is not to be re-installed, the brackets must be attached to two small wooden beams to Pt. No. C.237899/1, using the existing fixings, and this assembly installed in the aircraft in readiness for the re-assembly of the recorder.

Radio compass R.F. amplifier

56. To remove this R.F. amplifier proceed as follows:-

- (1) Render the aircraft electrically safe

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as described in Section 5, Chapter 1, Group A.1.

- (2) Unscrew the two knurled nut fasteners, securing the R.F. amplifier in its mounting tray, until they clear the retaining catches on the amplifier.
- (3) Using the handle on the amplifier unit, carefully withdraw the unit from the aircraft.

Radio compass I.F. amplifier

57. To remove this I.F. amplifier proceed as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Unscrew the two knurled nut fasteners, securing the I.F. amplifier in its mounting tray, until they drop clear of the retaining catches.
- (3) Using the handle on the amplifier unit, carefully withdraw the unit from its mounting tray and remove it from the aircraft.

Radio compass loop aerial

58. This aerial is mounted in a fairing on the fuel pump access door in the undersurface of the centre fuselage. To remove the aerial proceed as follows:-

- (1) Render the aircraft electrically safe

as described in Section 5, Chapter 1, Group A.1.

- (2) Remove the screws securing the fuel pump access door to the undersurface of the centre fuselage and lower the door sufficiently to gain access to the aerial connector. Disconnect the aerial connector and remove the access door from the aircraft.
- (3) The fairing, complete with aerial, may now be removed by unscrewing the four special bolts securing the fairing to the door.

Note . . .

These are the four outer bolts, which pass through the fairing to engage with anchor nuts on the door and should not be confused with the aerial attachments.

- (4) To remove the aerial from the fairing it is necessary to unscrew the four special nuts from the bolts securing the aerial in position. These nuts are locked with shellac.

Note . . .

When re-assembling the loop aerial ensure that the aerial connector is locked with 22 s.w.g. stainless steel wire.

Radio compass sense aerial

59. To remove this aerial array proceed as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.

- (2) Gain access to the aerial connector via the engine access door, disengage the terminal cover from the terminal post at the top of the central stub mast, and disconnect the aerial connector.

- (3) Support the aerial array to prevent distortion, and unscrew the six screws securing each stub mast to the nut plates on the fuselage skin. Remove the aerial from the aircraft.

Note . . .

When re-assembling the aerial, ensure that the aerial terminal cover is replaced, and that the earth wire is intact and bolted to frame 31.

Radio compass Q.E. corrector unit

60. The method of removing the Q.E. corrector unit is as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Disconnect the two connectors from the Q.E. corrector unit, fit approved caps and covers to the plugs and sockets and stow the connectors clear of the unit.
- (3) Remove the main cover assembly from the Q.E. corrector unit by dis-engaging the two fasteners.
- (4) The Q.E. corrector unit may now be removed by unscrewing the four captive screws securing the unit to its mounting plate. Replace the cover assembly.

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Note . . .

When re-assembling the Q.E. corrector unit ensure that the connectors are locked with 22 s.w.g. stainless steel wire.

Radio compass bearing indicator

61. To remove this bearing indicator proceed as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Gain access to the forward face of the indicator and disconnect the two connectors. Fit approved caps and covers to the plugs and sockets.
- (3) Remove the indicator by unscrewing the four screws passing through its mounting flange. When unscrewing the two lower attachments take care to retain the distance tubes.

Note . . .

When re-assembling the indicator ensure that its connectors are locked with 22 s.w.g. stainless steel wire.

Radio compass control unit

62. The method of removing this control unit is as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Release the control unit from its backplate by unscrewing the two large knurled screws located adjacent to the tuning meter and tuning crank.
- (3) Lift the unit from the backplate to disengage the locating spigots, tuning drive and electrical connections. Remove the control unit from the aircraft.
- (4) If it is required to remove the backplate, it is first necessary to remove the cabin starboard shelf (Sect.5, Chap.1, Group A.2) after which the removal of the backplate will be self-evident.

Filter unit Type M.162 (Mod.1028)

63. The method of removing this filter unit is as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Disconnect the two connectors from the filter unit. Fit approved caps and covers to the plugs and sockets and stow the connectors clear of the unit.
- (3) The filter unit may now be removed by unscrewing the four screws se-

curing the unit to its mounting bracket. ►

Radio mounting structure

64. The lower radio mounting structure extends from frame 16 to frame 19, being bolted to these two frames, thus, when breaking down the aircraft at the front transport joint as described in Section 3, Chapter 1, it is necessary to remove this structure. The recommended procedure is as follows:-

- (1) Render the aircraft electrically safe as described in Section 5, Chapter 1, Group A.1.
- (2) Remove the standby battery (para.54).
- (3) Remove the gun firing panel and the type 200 inverter (Sect.5, Chap.1, Group A.2).
- (4) Remove the U.H.F. transmitter-receivers (para.46 and 52).
- (5) Remove the I.F.F. transmitter-receiver and coder unit (Sect.6, Chap.2).
- (6) Stow all the disconnected cables clear of the mounting structure, releasing any clips and strapping as found necessary.
- (7) Release all clips and strapping from the cables attached to the mounting structure to ensure that the removal

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of the structure will be unobstructed.

- (8) Release the mounting structure from frames 16 and 19 by removing the nuts, bolts and washers securing it to the brackets on these frames.

- (9) Remove the lower radio mounting structure from the aircraft.

- (10) The aft platform of the upper radio mounting structure, which supports terminal block No.109 is also attached to brackets on frame 19, thus the cables to this terminal block must be disconnected and the platform released from frame 19 when breaking down the aircraft. It is not, however, necessary to remove the upper radio mounting structure.

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