

Group 1 NAVIGATION AIDS**LIST OF CONTENTS**

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Introduction

1. Details are given in this Group of the power supplies, controls, and the general purposes of each installation. The equipment is described in various Air Publications, references to which will be found in the relevant paragraph of this Group.

Power supplies and control

2. The generation of the power supplies

and their routing to the power distribution box are described in Sect. 5, Chap. 1 of this Air Publication.

Power distribution box

3. This box is mounted near the centre of the radio crate. The front panel is hinged at the bottom, and mounted on it are the inverter switches and failure warning neons and lamps together with the radar

installation control switches. Mounted inside the box are relays Nos. 1 to 7 and the fuse blocks; these are accessible when the front panel is hinged down. The outlet plugs and sockets are mounted on the rear of the box, each being colour-coded as indicated on the routing diagrams. Where items are double colour-coded, the first named colour appears on the left half of the locking ring.

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DESCRIPTION

A.R.I.5829, GEE-H Mk. 2

4. Gee is an aircraft navigational device used for general navigation; Gee-H is used when an accuracy of fix at long range, of an order sufficient for blind bombing, is required. To improve still further the accuracy of Gee-H an automatic computer, incorporated in the installation, operates the bomb release and takes account of the speed of the aircraft and of the time of bomb fall. Post Mod. 1957, part of the 'H' function is removed from the aircraft and post Mod. 2537 the complete 'H' function is removed.

5. For a full description of the principles involved, and the various items of equipment incorporated in the installation, reference should be made to A.P.2557G. A brief summary of the equipment is given in the following paragraphs.

6. The installation consists of the following items, located as stated:—

Equipment	Location
Receiver, R.3582A	Above crate, 2nd navigator's position
Transmitter, T.1629A (pre-Mod. 2537) ...	Under crate, 2nd navigator's position
Filter unit, Type 503 or 504	Secured to the front panel of the transmitter
Strobe unit, Type 61A	Under radio crate table
Junction box, Type 255	Under radio crate table
Junction box, Type 266	Under radio crate table
Filter unit, Type 190 (pre-Mod. 2537) ...	Under radio crate table
Drive unit, Type 114 (pre-Mod. 2537) ...	Under radio crate table
Control unit, Type 522 (pre-Mod. 1957) ...	Radio crate
Control unit, Type 426A	Radio crate
Control unit, Type 4817 (pre-Mod. 2537) ...	Radio crate
Junction box, Type 4816 (pre-Mod. 2537) ...	Radio crate
Indicating unit, Type 166A	Radio crate
Screened junction box	Radio crate
Transformer, Type 1562	Radio crate
R.F. units	Stowed under radio crate table at A.E.O's position
Press-to-transmit switch (pre-Mod. 2537) ...	Between 1st navigator's and A.E.O's position on radio crate

Receiver R.3582A

7. The receiver consists of four interchangeable R.F. units, the I.F. amplifier, second detector and video output stages and power supply. R.F. unit Type 139 is housed in the receiver case and secured to the receiver case panel. One of the remaining three R.F. units (Type 24B, 25B and 26B) is electrically connected to the R.F. unit Type 139 and is mounted adjacent to it. This arrangement of R.F. units was introduced by Mod. 1828 to permit remote electrical switching of the R.F. units. The R.F. units will be replaced at a later date by R.F. unit Type 6337, which will cover the whole Gee-H frequency band in five ranges. Electrically and mechanically it is interchangeable with any of the R.F. units.

Transmitter T.1629A (pre-Mod. 2537)

8. This unit is rack-mounted under the radio crate table at the 2nd navigator's

position and contains the modulator unit Type 172A and transmitter unit Type 116a; the latter is mounted rigidly to the back of the left-hand position of the front panel of the transmitter unit Type T.1629A and can be removed easily from the main unit. The frequency range covered by the transmitter is 21 to 86 Mc/s in three bands. The required frequency has to be set before the aircraft leaves the ground.

9. Included in the controls mounted on the main transmitter unit panel are the supply switch controlling the a.c. and d.c. supplies and a neon warning indicator for the main H.T. supply.

Filter units Type 503 and 504

10. In order that the Gee-H transmitter and receiver may be connected to the same aerial the necessary coupling is provided by one of these filter units which are identical in design and construction. The only differences are the values of the internal capacitors and hence the frequency band covered. Filter unit Type 503 is intended for 23 to 34 Mc/s working and Type 504 for 34 to 85 Mc/s working. The filter unit is secured to the front panel of the transmitter and the appropriate plug on the filter engages directly with the aerial socket on the transmitter.

Universal indicator, Type 2

11. The indicator unit Type 166A, control unit Type 426A and strobe unit Type 61A function in conjunction and are referred to as the Universal indicator Type 2. All the waveforms required are derived from the 150 Kc/s crystal oscillator in the control unit Type 426A. The power supplies for all the units comprising the universal indicator Type 2, with the exception of heater voltages, are derived from the strobe unit Type 61A.

Junction box, Type 255A

12. This box links the control unit Type 426A (through junction box Type 4816) and the receiver R.3582A to the indicating unit

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Type 166A and to the junction box Type 266A. Power supplies are connected to the receiver and control unit via this box whilst the receiver output, strobe triggering and calibration pips are fed to the indicating unit.

Junction box, Type 266A

13. This junction box links up the following units:—strobe unit Type 61A, transmitter T.1629A (via filter Type 190), indicating unit Type 166A, junction box Type 255A, and drive unit Type 114. In addition to its function as an interconnection unit, junction box Type 266A is provided with plugs for supplying power to a wavemeter and test set for servicing and setting up. Power to all the units is distributed through this junction box, and many of the waveforms and control voltages, including all those to the strobe unit, pass through it. Two relays are mounted in the box and assist in selecting the appropriate function of the installation.

Filter unit Type 190 (pre-Mod. 2537)

14. The filter unit, Type 190 is inserted between the transmitter and junction box Type 266A in the power supply lead. This prevents R.F. energy being fed back into the common power supply and thence into other units of the installation.

Computer, automatic

15. Mod. 1807 was introduced to provide a second warning point to facilitate blind bombing with the Gee-H installation, the following units being required:—

- (1) Control unit Type 522.
- (2) Drive unit Type 114.
- (3) Control unit Type 4817.
- (4) Junction box Type 4816.

A bomb release switch Type 220 is also required. A duplicate C-strobe enables the navigator to set up both first and second warning point co-ordinates before the commencement of the bombing run. By switch-

ing the appropriate control circuits, the second warning point settings can be obtained immediately the first warning point is cleared without interruption of the tracking information.

Control unit, Type 522 (pre-Mod. 1957)

16. This unit contains two uniselectors which are operated by the bomb release switch and the relays which ultimately operate the bomb release gear (*Sect. 5, Chap. 3*). It also embodies the control switches and four coloured signal lamps.

Drive unit, Type 114 (pre-Mod. 2537)

17. This unit, which must have RMC Mod. 3630/3 incorporated, contains the 25 c/s tuning fork controlled oscillator for driving the motor-operated relay contacts which are housed in control unit Type 522.

Indicator lamps

18. These three indicator lamps, coloured white, amber and red respectively, and mounted in the top left corner of the pilot's instrument panel, repeat the indications of the similarly coloured lamps in control unit Type 522.

Aerial

19. The tip section of the rudder is insulated from the main structure and forms the combined transmitting-receiving aerial for A.R.I.5829. The aerial co-axial feeder is connected to the aerial through a Type 745 plug and socket.

Power supplies

20. The power supplies required for the A.R.I.5829 installation, 28 volts d.c. and 115 volts 1,600 c/s single phase, are obtained from the power distribution box on the radio crate. When the supply switch on the power distribution box is turned on, the a.c. supply is connected via the red/white socket to the Gee-H Mk. 2 junction box. The 24-volt supply is fed to junction box Type 266A via the red-coloured socket.

The 115-volt 1,600 c/s supply is fed to a transformer Type 1562 (in the 1st navigator's radio crate). It is transformed to 80 volts a.c. and fed to junction box Type 266A via the black-coloured socket.

A.R.I.5851 OR A.R.I.5871, GREEN SATIN

21. Green satin is an aircraft navigational device not dependent upon any form of ground based equipment. Green Satin provides the crew with continuous indication of ground speed over a range of 100 to 700 knots, distance flown and an indication of drift angle from 0 to 20 deg. port and starboard. Used in conjunction with this equipment is a ground position indicator G.P.I. Mk. 4 and its amplifier. A.R.I.5851 is fitted to most aircraft but early aircraft may still have A.R.I.5871 which is basically the same equipment but in slightly 'cruder' form in order to make it available in time for fitment to early production aircraft.

22. Electro-magnetic waves transmitted from the aircraft strike the ground and are reflected; due to the relative motion of the aircraft to the ground, the reflected signal differs slightly from the transmitted one. This difference in frequency gives rise to a Doppler beat frequency.

23. The aircraft aerial system radiates two beams, one looking forward and one looking aft. The ground speed is found by measuring the Doppler beat frequency produced with the reflected ground signals received by the forward looking beam are mixed with those received by the backward looking beam.

24. One beam is displaced to starboard and the other to port, the positions being reversed twice a second. The drift angle measurement is found by comparing the Doppler frequency when the forward beam is displaced to starboard and the backward beam to port, to the frequency when the forward beam is displaced to port and the backward beam to starboard.

25. The information is displayed on the indicator giving ground speed, drift angle and distance flown. Information is also passed to the G.P.I. Mk. 4 via its amplifier.

26. A full description of the principles

involved, and of the various items of equipment incorporated in the installation is given in A.P.2890R, Vol. 1, Part I. A list of the equipment fitted to this aircraft and its location is given below:—

Equipment	Type for A.R.I.5851	Type for A.R.I.5871	Location
Transmitter-receiver	T.R.3710 (10D/18843)	T.R.4092 (10D/9037)	Rear fuselage — port
Back-plate assembly for T.R. unit	(10AR/1990)	(10AR/2194)	Rear fuselage — port
Tracking unit	Type 100 (10Q/16094)	Type 101 (10Q/16215)	Rear fuselage — port
Back-plate assembly for T.U.	(10AR/1991)	(10AR/2146)	Rear fuselage — port
Indicator, electrical	Type 101 (10Q/16095)	Type 4091 (10Q/16227)	Radio crate — centre
Back-plate assembly for indicator	(10AR/1992)	(10AR/2193)	Radio crate — centre
Aerial system	Type 501 (10B/16389)	Type 4093 (10B/17270)	Deflector bay
Waveguide	Type 585 (10B/17775)	Type 585 (10B/17775)	1st section, connected to transmitter-receiver
Waveguide (pre-Mod. 1409)	Type 586 (10B/17776)	Type 586 (10B/17776)	Middle section
Waveguide	Type 587 (10B/17777)	Type 587 (10AB/1777)	3rd section, connected to aerial
Waveguide (post Mod. 1409)	Vickers 70653 Sht. 59	Vickers 70653 Sht. 59	Upper piece of middle section (replacing Type 586)
Waveguide (post Mod. 1409)	Vickers 70653 Sht. 57	Vickers 70653 Sht. 57	Lower piece of middle section (replacing Type 586)
Mounting tray for T.U.	Vickers 67453 Sht. 37	Vickers 67453 Sht. 37	Rear fuselage — port
Mounting tray for T.R.	Vickers 67453 Sht. 39	Vickers 67453 Sht. 39	Rear fuselage — port
Mounting tray for indicator	Vickers 67453 Sht. 41	Vickers 67453 Sht. 41	Radio crate — centre

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27. The following units are used in conjunction with A.R.I.5851 and A.R.I.5871:—

Equipment	Reference	Location
G.P.I.	Mk. 4 (6B/541)	Radio crate—centre
Back-plate assembly	— (6B/657)	Radio crate—centre
Amplifier	— (6B/633)	Radio crate—centre
Amplifier mounting	— (6B/655)	Radio crate—centre
Suppressor	Type B5 (5C/4317)	Radio crate—centre
Junction box	Vickers 67399 Sht. 111	Radio crate—centre

Transmitter-receiver

28. This consists of two containers. One container houses the modulator, magnetron and first IF amplifier. The second container houses the HT and EHT power supplies. They are fitted on one base casting and are connected by a pressurized duct. Both containers are pressurized to 5 lb. above atmospheric pressure at ground level.

Tracking unit

29. This unit is self-contained with its own power supplies and contains the second IF amplifier and the frequency measuring circuits for the determination of ground speed and drift angle. It is pressurized to 5 lb. above atmospheric pressure at ground level.

Indicator, electrical

30. This unit is not pressurized. The ground speed is shown on an instrument calibrated from 100 to 700 knots at 5-knot intervals. The drift angle is shown on an instrument calibrated from 20 deg. port to 20 deg. starboard in 1-deg. intervals. A mileage counter is also provided and shows the distance flown in tenths of a nautical mile up to 9999.9 nautical miles.

Aerial system

31. The aerial system consists of four

slotted linear arrays lying parallel to each other in a directional horn assembly. The axis of the arrays is horizontal and they are arranged in phased and anti-phased pairs with a common feed at one end. The arrangement provides forward and backward looking beams. The aerial system is connected to the transmitter-receiver by a waveguide. The aerial system rotates to take up a position where its axis is in the true direction of flight when the aircraft is in yaw. THE AERIAL MUST NOT BE ACTUATED BY HAND.

Power supplies

32. The a.c. power supplies for the installation are obtained from a specially provided inverter, Type 153. A full description of the inverter installation and control is given in Book 2, Sect. 5, Chap. 1, Group 3 of this Air Publication. Two 3-phase power supplies at 115 volts, 400 c/s are provided, one known as NORMAL and the other as SPECIAL; the white phase of the NORMAL supply is earthed, the white phase of the SPECIAL supply MUST NOT be earthed. The supplies are obtained via five 10-amp fuses mounted in two 2-way and one single-way fuse blocks on inverter control panel mounting structure in the compartment above the nosewheel. The

white phase of the SPECIAL supply, not being earthed, is fused.

33. Pre-Mod. 2399 both the inverter and the equipment are switched ON and OFF by the one switch on the power distribution box on the radio crate. Post Mod. 2399, two switches are provided on the power distribution box, one labelled INVERTER and the other EQUIPMENT. The equipment cannot be switched ON until the inverter has been switched ON. The equipment switch is spring loaded to the 'off' position and is marked PRESS-TO-START. When the inverter switch is at ON, the equipment switch can be depressed, this connects a supply from the inverter switch to energize a Type S4 relay which closes the inverter output to the main equipment via the inverter control panel Type 25; contact 1 to 1a of the Type S4 relay to connect a hold-in supply to its coil so that the equipment switch may be released leaving the inverter switch as master. Selecting the inverter switch to OFF switch off both inverter and equipment.

A.R.I.5922, EUREKA Mk. 10

34. Eureka Mk. 10, introduced by Mod. 2741, is an airborne transponder beacon, operating in the frequency range of 420 to 460 Mc/s. It is installed in tanker aircraft to enable any other aircraft, fitted with A.R.I.5924 (Rebecca Mk. 10), to rendezvous with the tanker for refuelling purposes. The system is operative over a range of 100 nautical miles and, within this range, the Eureka equipment can respond safely to interrogating signals from up to 35 aircraft.

35. The Eureka Mk. 10 installation provides the following facilities:—

- (1) It responds to Rebecca Mk. 10 interrogations.
- (2) It transmits delayed reply pulses for purposes of line-of-sight distant measurements and direction finding.
- (3) It transmits further delayed and coded pulses for identification.

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36. For a full description of the principles involved, and the various items of equipment incorporated in the installation,

reference should be made to A.P.2914AP, Vol. 1. A brief summary of the equipment is given in the following paragraphs.

37. The installation is comprised of the following items, located as stated:—

Equipment	Location
Receiver-transmitter, Type X6645	Tail fuselage, port side
Coder-transponder, Type X6648	Tail fuselage, port side
Monitor, R.F., in flight, Type 12718	Tail fuselage, port side
Filter unit, Type 16439	Tail fuselage, port side
Switch unit (Aerial), Type 6850	Tail fuselage, port side
Upper aerial, Type X6647	Tail fin tip
Lower aerial, Type X6647	Tail cone, lower surface
Control unit, Type X6646	Radio crate

Receiver-transmitter, Type X6645

38. The receiver-transmitter consists of the following sub-units:—

- (1) Receiver, radio 12714.
- (2) Amplifier, I.F.16184.
- (3) Oscillator, R.F. 12716.
- (4) Generator, pulse 12713.
- (5) Power unit, 12712.

The sub-units are readily detachable and may be operated on extension cables for servicing purposes, although all alignment procedures can be effected with the sub-units in position. The transmitter assembly, Type 12715, constitutes the main framework of the unit, and mounted upon it are control relays, fuses and a delay unit, Type 18086.

Control unit, Type X6646

39. The control unit provides for selection of any one of seven predetermined code pulse sequences for transmission by the coder-transponder, Type X6648, for identification purposes, and permits manual keying of the coder-transponder for communication with an interrogator. The unit incorporates manual controls as follows:—

- (1) Function switch OFF/STAND BY/ON
- (2) Code selector 1 to 7 positions switch

- (3) Code control switch

AUTO/OFF/MAN.
In the MAN position the switch is spring biased to OFF.

Press-to-test indicator lamps, illuminated by the normal 28-volts d.c. supply, indicate correct functioning or otherwise of the transponder and coder units. Two panel lamps are fitted to the front panel of the unit and controlled by the radio port floodlamp dimmer switch (*Sect. 5, Chap. 2, Group 1*).

Coder-transponder, Type X6648

40. To provide a method of identifying beacons, the signals from the Eureka Mk. 10 transponder are coded by means of a second pulse in the normal response, delayed behind the main pulse. The coder-transponder is a mechanical device, comprised of a motor-driven drum operating contacts, to alternate the code pulse circuit. The coder also controls the operation of the aerial switch unit, Type 6850.

Monitor, R.F., in flight, Type 12718

41. The in-flight, R.F. monitor is comprised of a crystal-controlled signal generator having eight pre-set frequency channels selected by a switch accessible from the front

of the monitor. It is necessary to change the channel in this unit if the transponder receiver frequency is altered. Whilst correct operation of the equipment is indicated by the green press-to-test lamp on the control unit, Type X6646, the monitor has no connection with the amber lamp. The unit continuously checks the transponder parameters as follows:—

- (1) Trigger sensitivity
- (2) Transmitter power output
- (3) Code pulse delay
- (4) Receiver frequency.

Aerial system

42. The system is comprised of two aerials (upper and lower), Type X6647, and an aerial switch unit, Type 6850. The aerials are omni-directional unipoles employing swept back triangular blades, and are each used for both reception and transmission. They are selected alternatively by the aerial switch unit, which is synchronised to the coder-transponder to ensure a complete code cycle. The upper aerial is located beneath the di-electric fin tip, whilst the lower aerial is mounted to protrude through the lower fuselage skin between stn. 1249 and 1308.

Filter unit, Type 16439

43. The filter unit is fitted to aircraft embodying U.H.F. communications.

Power supplies (fig. 6)

44. The a.c. power supplies for the installation are obtained from an inverter, Type 153A, introduced by Mod. 2796. A full description of the inverter installation is given in *Sect. 5, Chap. 1, Group 3* of this publication. To facilitate connection of power supplies to the various equipments in the rear fuselage, three terminal blocks are provided, YC, YD and YE. Terminal blocks YC and YD are mounted, together with a three-way fuse block, on the rear face of the receiver-transmitter support structure, whilst terminal block YE is mounted on the forward face.

45. Two phases of a three-phase supply at 115-volts, 400 c/s are fed from the fuse and relay box to terminal block YD. From the terminal block the supply divides to feed the

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receiver-transmitter and the in-flight monitor. Phase A of the supply is connected to the monitor, via No. 1 fuse at the three-way fuse block.

A.R.I.5829, GEE-H Mk. 2

47. Before attempting to release any connectors during the removal of the units, ensure that all d.c. and a.c. power supplies to the installation have been switched off.

48. When a unit has been disconnected prior to its removal from the aircraft, the cables and connectors should be secured temporarily to the adjacent structure until the unit is refitted. They should be stowed in a position where they are not likely to be damaged.

Receiver R3582A

49. Unscrew the two knurled nuts on the front of the mounting tray, turn the catches, and withdraw the unit from the mounting tray.

R.F. units

50. Unscrew the four captive screws on the front panel and withdraw from the receiver case or the stowage panel as the case demands.

Transmitter (pre-Mod. 2537)

51. This may be removed in a manner similar to that of the receiver.

Junction boxes

52. To remove these remove the nuts and washers at each corner.

Control units

53. These are secured to their mounting trays by 6 B.A. screws.

46. A 28-volts d.c. supply is fed from a fuse at panel G to No. 2 and No. 3 fuses at the three-way fuse block, via the fuse and relay box. No. 2 fuse supplies the receiver-trans-

REMOVAL OF COMPONENTS

Aerial

54. Disconnect the aerial feeder from the plug connector Type 745; access is provided at the inspection holes in the port side of the aerial and in the rudder below the insulating strip. Remove the countersunk holding bolts in the lower edge of the di-electric strip.

55. When re-assembling, tighten the holding bolts in stages to avoid distortion. The plug and socket connector should be re-assembled on the main rudder structure, if it has been necessary to remove it, before the aerial is refitted.

A.R.I.5851 AND A.R.I.5871 GREEN SATIN

56. Before attempting to release any connectors during the removal of the units, ensure that all the d.c. and a.c. power supplies to the installation are switched off.

57. When a unit has been disconnected prior to its removal from the aircraft, the cables and connectors should be secured temporarily to the adjacent structure until the unit is refitted. They should be stowed in a position where they are not likely to damage. Care must be taken to protect disconnected wave-guides.

Transmitter-receiver

58. To remove this unit, proceed as follows:—

- (1) Attach the travelling hoist rail Ref. No. 26SR/95183 with the 'pip' pins provided to the brackets at fuselage frame stations 953, 973 and 993.

mitter via terminal block YC, whilst No. 3 fuse supplies the aerial switch unit, via terminal block YE.▶

- (2) Attach the $\frac{1}{2}$ -ton hoist to the hoist rail and attach the sling, green satin, Ref. No. 26SR/95184 to the hoist.

- (3) Attach the four sling cables to the outer spreader bars and their hooks to the four lifting handles of the transmitter-receiver unit.

- (4) Remove the top section (Type 785) pre-Mod. 1409 or top two sections (Type 785 and Vickers 70653 Sht. 59) post Mod. 1409 of the waveguide guard and the top section of the waveguide run.

- (5) Undo the fasteners securing the unit to its mounting tray and withdraw the unit towards the centre of the aircraft sufficiently to clear the connections and dowel pins at the back.

- (6) Hoist clear and slide the hoist aft on its rail.

- (7) Lower the unit down through the rear main access hatch on to a suitable trolley. Unhook the slings and wheel clear.

- (8) To replace the unit, reverse the above procedure.

Tracking unit

59. To remove this unit, proceed as follows:—

- (1) Attach the travelling hoist rail, Ref. No. 26SR/95183, with the 'pip' pins provided, to the brackets at stations 953, 973 and 993.

- (2) Attach the $\frac{1}{2}$ -ton hoist to the hoist rail and the sling, green satin, Ref. No. 26SR/95184, to the hoist.

- (3) Attach the four sling cables to the inner spreader bars and their hooks to the four lifting handles of the unit.

(4) Undo the fasteners securing the unit to the mounting tray and withdraw the unit towards the centre of the aircraft sufficiently to clear the connectors and the dowel pins at the back.

(5) Hoist the unit clear and slide the hoist aft on its rail.

(6) Lower the unit down through the rear main access hatch on to a suitable trolley. Unhook the slings and wheel clear.

(7) To replace the unit, reverse the above procedure.

Aerial system

60. To remove the aerial system, proceed as follows:—

(1) Remove the screws securing the dielectric panel in the deflector and remove the panel.

(2) Undo the waveguide and electrical connectors.

(3) Remove the nuts from the three dowel studs taking the weight of the aerial system whilst doing so.

(4) Lower the aerial.

Note . . .

Take care not to damage the dowel studs as these are jig fitted during construction of the aircraft to give an aerial alignment of $\frac{1}{4}$ degree.

(5) To replace the aerial, reverse the above procedure. Before refitting the dielectric panel to the deflector, the aerial should be checked for alignment as detailed in the following paragraphs.

Alignment of aerial system without jig

61. This is achieved by hanging plumb lines from the aerial 'V' notches and aligning these with the compass swing datum posts and then adjusting the indicator circuits once the aerial is in alignment. The aircraft must be on a horizontal plane, its tyre pressures must be correct and equal on both sides of the aircraft, the operation should be carried out in a hanger or in conditions of low surface wind.

62. The forward compass datum post Ref. No. 26SR/95472 is attached by its two wing bolts to the underside of the aircraft just aft of the nosewheel bay, at the forward jacking pad position. The rear compass datum post Ref. No. 26SR/95470 (upper section) and Ref. No. 26SR/95471 (lower section) is pushed into a tube underneath the aircraft just aft of the rear main access hatch and is held in position by a spring clip. Attach a length of fine string between the two posts, near the top, ensuring that the string is reasonably taut. The string must be centrally positioned between the datum posts to ensure that it lies on the correct centre-line of the aircraft. Both posts incorporate spirit levels and the posts should be adjusted until the bubble is central thus ensuring they are 'true' with the aircraft.

63. Plumb lines are to be attached to the aerial so that they hang freely through the V notches at each end. Adjust the plumb lines so that they are about 4 inches from the ground. Place a bucket of water under each plumb line; the plumb bobs should be immersed in the water thereby damping any movement. Power supplies should then be connected to the aircraft and the intercom. switched on. Connect up the headsets and extension lead to the sockets at the navigator's position in the cabin and run the extension lead out to the aerial position.

64. Check that the aerial locking bolt is clamped in the released position, switch on the Green Satin equipment leaving the H.T. switched OFF and the SIG./MEMORY switch at MEMORY. Adjust the aerial position gently until both plumb lines are parallel to the string between the datum posts.

65. The observer in the cabin now checks the reading on the drift meter. If this is not exactly zero degrees, then the two clamp levers for locking the drive synchro body on the port side of the aerial should be loosened, taking care that the adjacent wiring is not damaged. Adjust the synchro body to give zero degrees on the drift meter, the reading being monitored by the observer in the cabin.

When this has been achieved, tighten up the synchro clamping screws, check that the plumb lines are still parallel to the string between the datum posts and that the drift meter is still reading zero degrees. If not repeat the operation.

Note . . .

Access to the drift synchro is via a cover on the port side of the unit, the synchro body is adjusted by a 6 B.A. screw which is in turn locked by an 8 B.A. locking screw. Care must be taken to loosen the locking screw before adjustment and to ensure that the locking screw is re-tightened after adjustment.

66. If the indicator, electrical, has been removed from the aircraft, aerial alignment can be checked by taking voltage measurements at the aerial itself, proceed as follows:—

(1) Feed 115 volts, 400 c/s a.c. to pins G and J on the plug LB/B.

(2) Attach the datum posts (and the string between them) and the plumb lines as detailed in paras. 49 and 50.

(3) Using an Avometer on the 25 volt a.c. range, check that the voltage across the red and yellow phases of the drift synchro is zero. If not, the synchro body must be adjusted until the reading is zero as detailed in para. 52.

Note . . .

On aerials Type 501, this voltage is measured across the red and yellow terminals on the terminal block adjacent to the synchro. The terminal block is marked red and yellow for this check and the two points concerned are those furthest from the LB/B plug; there is no need to take the cover off the terminal block since the two probes can be used quite conveniently. On some aerials a jack point, connected across the red and yellow phases, is provided for measuring this voltage and is mounted on the aerial unit, aft of the synchro.

On aerials Type 4093, the voltage is measured across pin K (red) and L (yellow)

of the electrical connector on the starboard side of the aerial unit; the back of the connector being dismantled first to obtain access to the pins.

Alignment of aerial system using jig

67. The jig can only be used on aircraft embodying Mod. 974 which provides two datum points fitted fore and aft of the aerial unit. These datum points are aligned to the aircraft datum during the last stages of the aircraft's construction. The jig, Vickers Ref: T70627 Sht. 51/19 Sht. 1, is bolted to these datum points and the aerial itself is moved to centralize with the jig knife edges; the synchro is then adjusted to suit if necessary.

Note . . .

There is only one jig in existence and this is held at C.R.S.P. Bourne.

68. The jig is secured to the datum points by its two knurled captive screws. The jig incorporates a bar which moves in parallel with the aircraft centre line and which has a knife edge at each end. These knife edges can rotate from their normal position in the horizontal plane to a vertical position and are so rotated, when released by a spring.

69. The parallel bar is swung round until the knife edges are below the V notches on the aerial. The knife edges are then released so that they rotate in the vertical plane until they contact the ends of the aerial unit. After releasing the aerial clamping bolt and

A.R.I.5829, GEE-H Mk. 2

77. Check all connectors for continuity, soundness of insulation and security. Check that all units are securely mounted. Three fuse blocks are mounted on the forward face of the junction box, Type 266A; check that the fuses are serviceable.

locking it in the released position, the aerial can be rotated slightly until the two knife edges slip into the respective V notches.

70. The drift synchro transmitter can then be adjusted to give a zero drift reading on the indicator as described in paras. 52 or 53.

Checking alignment of datum points (Mod. 974)

71. The aerial alignment jig (*para.* 54) has a bracket at each end for securing datum posts. When these posts are fitted, they can be sighted against the compass swing datum posts. This should be carried out periodically to ensure that the aircraft datum points have not moved, due to whipping of the aircraft in flight, and that the jig in position is still in correct alignment.

72. If it is found that the aircraft datum points are out of alignment they can be adjusted as follows:—

- (1) Slacken, slightly, the 3 screws securing each datum point pad to its pedestal.
- (2) With the jig in position and its datum posts fitted, sight against the compass datum posts and correct the jig until perfect alignment is achieved.
- (3) Tighten the screws securing the pads to the pedestals.
- (4) Check the sighting to ensure that the jig has not moved whilst the screws were tightened.
- (5) Remove the jig datum posts.
- (6) Align the aerial, then remove the jig.

SERVICING

The fuse ratings are:—top fuse, marked DC, 5-amp; middle fuse, marked AC, 10-amp; bottom fuse, marked TX1629, 5-amp.

78. With the main switch on the radar power supplies panel in the OFF position, check continuity, as indicated in A.P.2557G, Vol. 2, Part 3, Chap. 1, fig. 2.

(7) Refit the di-electric panel to the deflector.

A.R.I.5922, EUREKA Mk. 10

73. Before attempting to release any connectors during the removal of the units, ensure that all d.c. and a.c. power supplies to the installation have been switched off.

74. When a unit has been disconnected prior to its removal from the aircraft, the cables and connectors should be secured, temporarily, to the adjacent structure until the unit is refitted. They should be stowed in a position where they are not likely to be damaged.

75. With the exception of the upper aerial, the units are readily removable and secured as follows:—

- (1) Receiver-transmitter: two knurled nuts on the front of the mounting tray.
- (2) Coder-transponder: one knurled nut on the front of the mounting tray.
- (3) R.F. monitor: two retaining straps.
- (4) Control unit: four 4 B.A. screws and stiffnuts.
- (5) Lower aerial: four $\frac{1}{4}$ in. B.S.F. bolts and stiffnuts.

Upper aerial, Type X6647

76. Release the 2 B.A. securing screws at the fin tip di-electric cover and remove the cover. Remove the four $\frac{1}{4}$ in. B.S.F. aerial securing bolts and stiffnuts, and withdraw the aerial from its mounting.▶

Transmitter Type 1629A

79. Set the function switch on the indicating unit to H and the transmitter main supply switch to ON. After 30 seconds the neon indicator on the transmitter panel should glow as the H.T. comes on.

80. If the delay is greater or less than this,

the setting of the potentiometer in the top right corner of the front panel requires adjustment. Clockwise rotation increases the delay time.

81. The transmitter unit is cooled by air blown through the manifold by the blower motor in the modulator unit. No safety devices are associated with this motor and its operation should be checked periodically, as failure of the blower may result in damage to the transmitting valve.

Aerial

82. Test the continuity and insulation with the aerial feeder disconnected at the filter Type 503 or 504. It is not necessary to disconnect the aerial.

83. Examine the plug and socket for corrosion, and the aerial feeder for stretch and damage to the insulation at the point where it enters the plug. The feeder enters the rudder through a grommet which, with the local covering, must be inspected for chafing.

84. If the insulating strip shows signs of deterioration, a new one should be fitted.

A.R.I.5851 AND A.R.I.5871 GREEN SATIN

85. Check the security of all items of equipment on their mountings and ensure that where anti-vibration mountings are used there is no obstruction to free movement. Check that all flexible bonding leads are undamaged.

86. Carry out pin-to-pin continuity and open circuit checks on each connector and check for short circuits between pins.

87. For detailed servicing instructions of the Green Satin system and units refer to A.P.2890R, Vol. 1.

Power supplies

88. Check fuse 10 on panel G, fuse 57 in the power distribution box and the 40 amp. H.R.C. fuse on panel J for the inverter Type 153. Select the GREEN SATIN switch on the front of the power distribution box to

ON (post Mod. 2399 select the INVERTER switch to ON and depress the EQUIPMENT switch momentarily and then release) and check that the inverter is running correctly. Check that the inverter outputs are steady at 115-volts, 400 c/s, 3-phase and trim if necessary. Remember that the white phase of the 'special' supply is NOT earthed. Check the supplies at the following units:—

- (1) Connector LN/A—transmitter-receiver
Pins 1 and 2—red phase }
Pins 3 and 4—white } 115-volts
phase—NOT } 400 c/s
EARTHED } 3-phase
Pins 5 and 6—blue phase }
- (2) Connector LM—transmitter-receiver
Pin 1—red phase }
Pin 2—white phase— } 115-volts
EARTHED } 400 c/s
Pin 3—blue phase } 3-phase
- (3) Check for 28-volts d.c. at connector LU in the G.P.I. Mk. 4.
Pin 1 positive.
Pin 2 negative.

Overall performance checks

89. These checks are described in full in A.P.2890R, Vol. 1. Overall performance checks can be made with the use of the following items:—

- Performance tester 4332
- Performance tester 4333
- Standard 18 db noise source echo box.

90. The performance tester 4332 is used to check the overall performance of the transmitter-receiver and aerial system. It is also used in conjunction with the performance tester 4333 to check the operation of the speed and drift measuring circuits in the tracking unit.

91. The 12-pole plug PL3 of the tester 4332 is connected to the test socket on the transmitter-receiver. The Pye plug PL1 on the tester is connected to the I.F. test point on the transmitter-receiver. The test set is switched on and time is allowed for the valves to warm up. The following checks are then carried out:—

Crystal current. Signal check (this requires that an echo box be set up beneath the aerial system).

Crystal resistance. Noise factor (this requires that use of the standard noise source; the waveguide guard and one section of waveguide have first to be removed).

92. The performance tester 4333 is used in conjunction with the tester 4332 and provide a means of checking the operation of the drift measuring circuits. A distance counter check is also provided.

93. The tester 4332 is connected to the transmitter-receiver as in para. 74 is connected to the 6-pole socket on the tester 4332. The test sets are switched on and time is allowed for them to warm up. The following checks are then carried out:—

- Speed checks
- Drift checks.

A.R.I.5922, EUREKA Mk. 10

94. Check the security of all items of equipment on their mounting and ensure that where anti-vibration mountings are used there is no obstruction to free movement. Check that all flexible bonding leads are undamaged.

95. Carry out pin-to-pin continuity and open circuit checks on each connector and check for short circuits between pins and to earth.

96. For detailed servicing instructions of the Eureka installation and equipment reference should be made to A.P.2914A, Vol. 1.

Power supplies

97. Check the circuit fuses at panel G, fuse and relay box and at the 3-way fuse block in the rear fuselage for correct rating and serviceability. Servicing instructions on the Eureka power supplies are fully described in Sect. 5, Chap. 1, Group 3.▶

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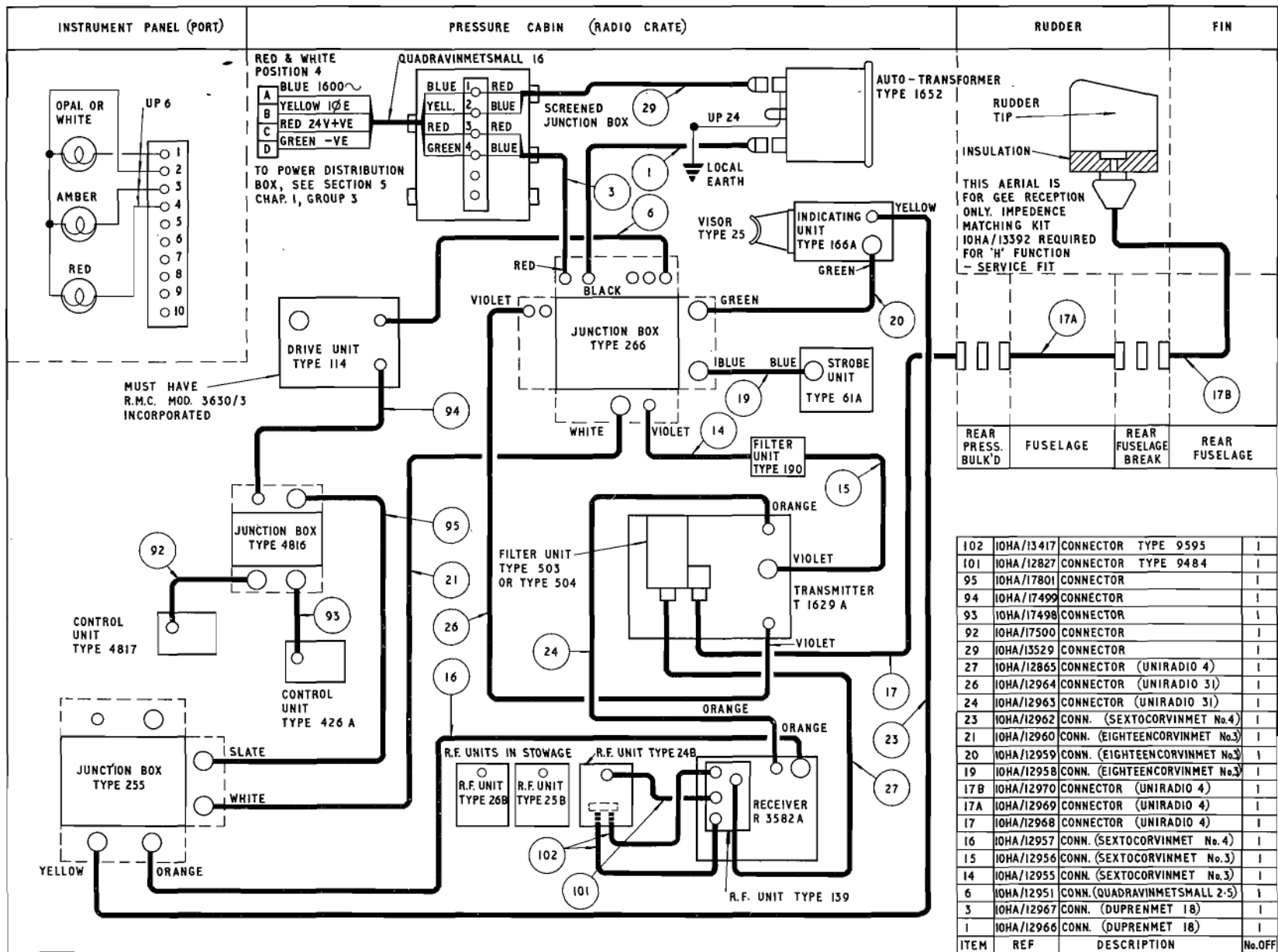


Fig. 2 A.R.I. 5829 (post Mod. 1957, pre Mod. 2537)

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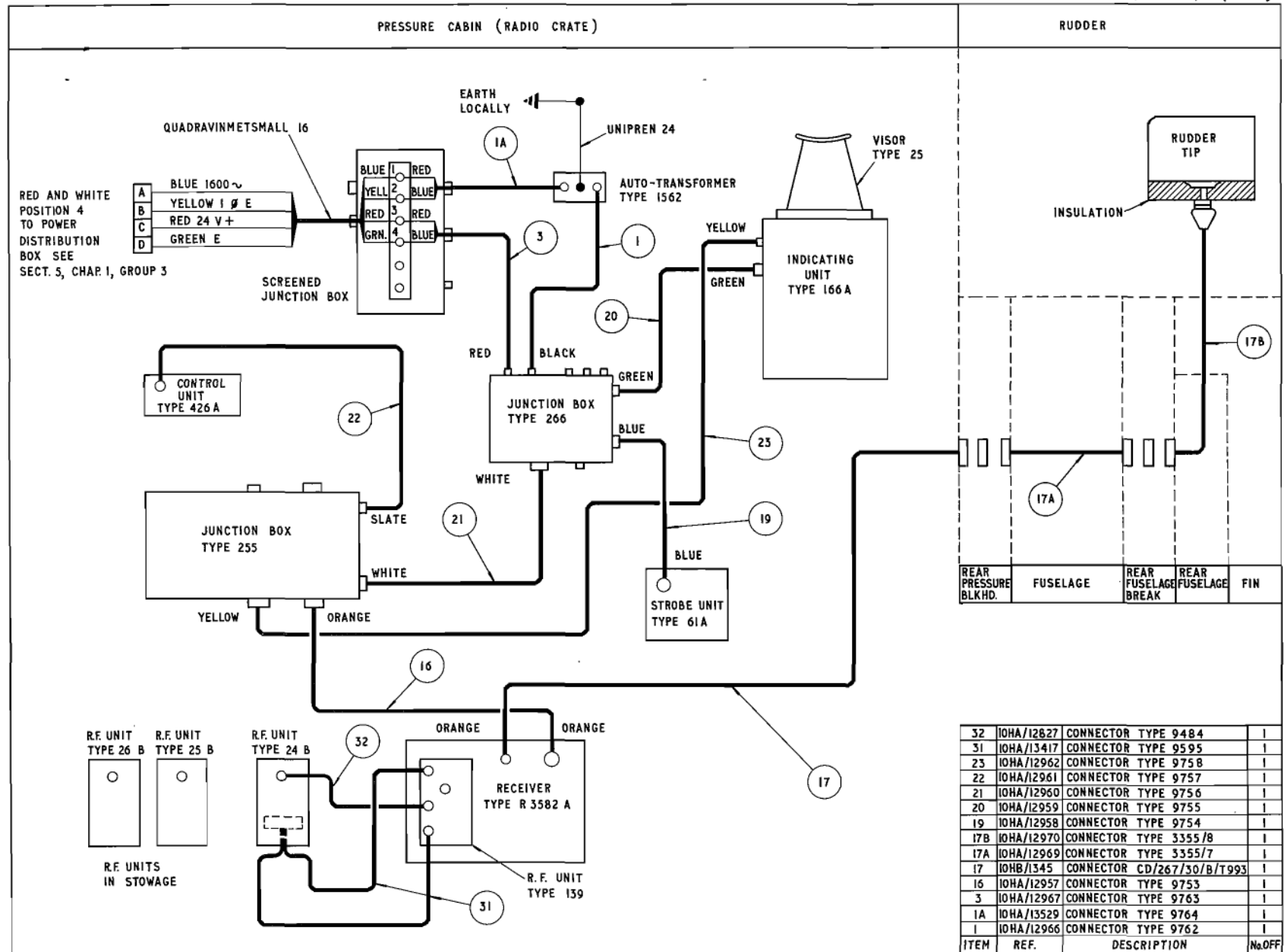


Fig. 3. A.R.I. 5829 (post Mod. 2537)

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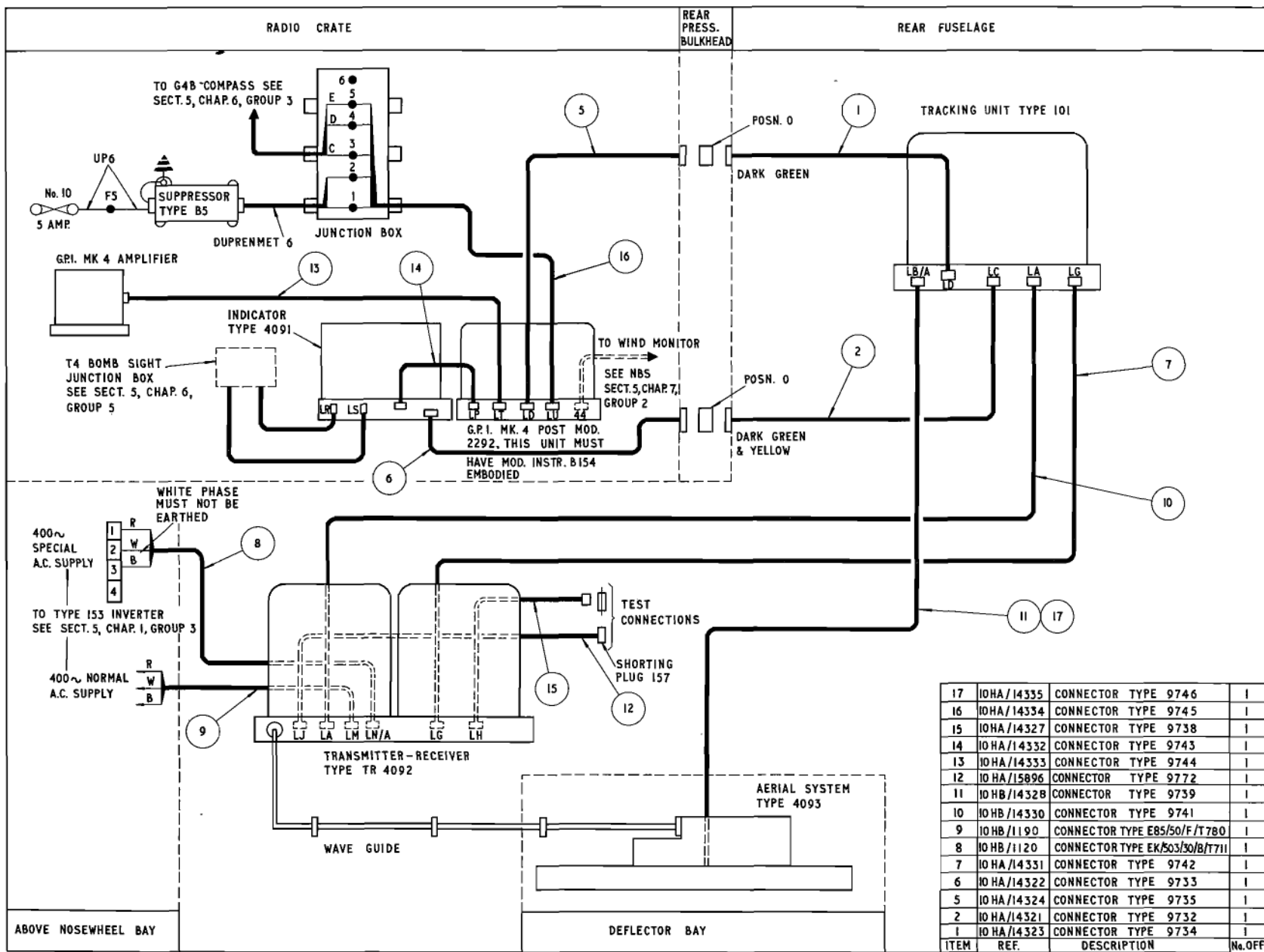


Fig. 4 A.R.I. 5871

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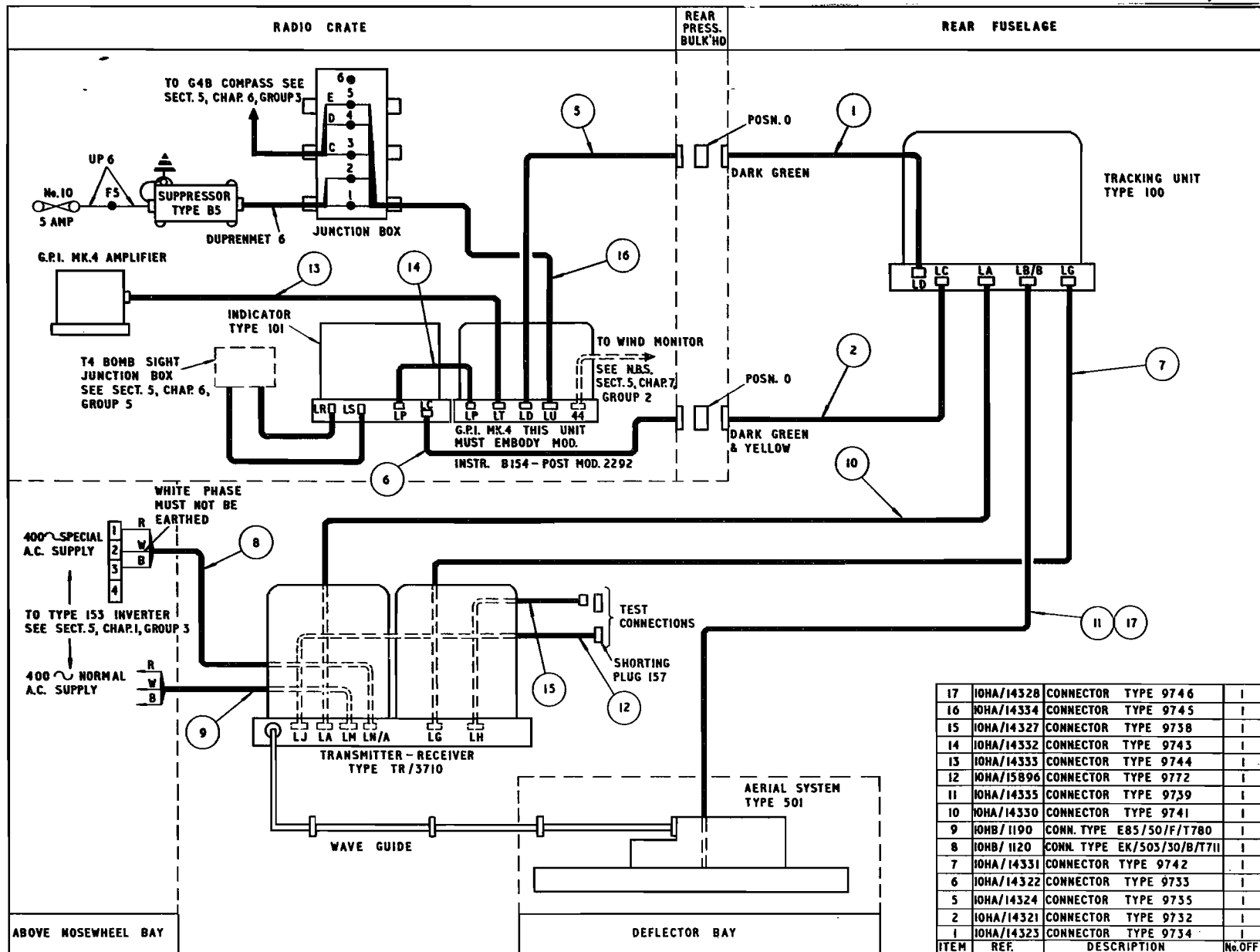


Fig. 5 A.R.I. 5851

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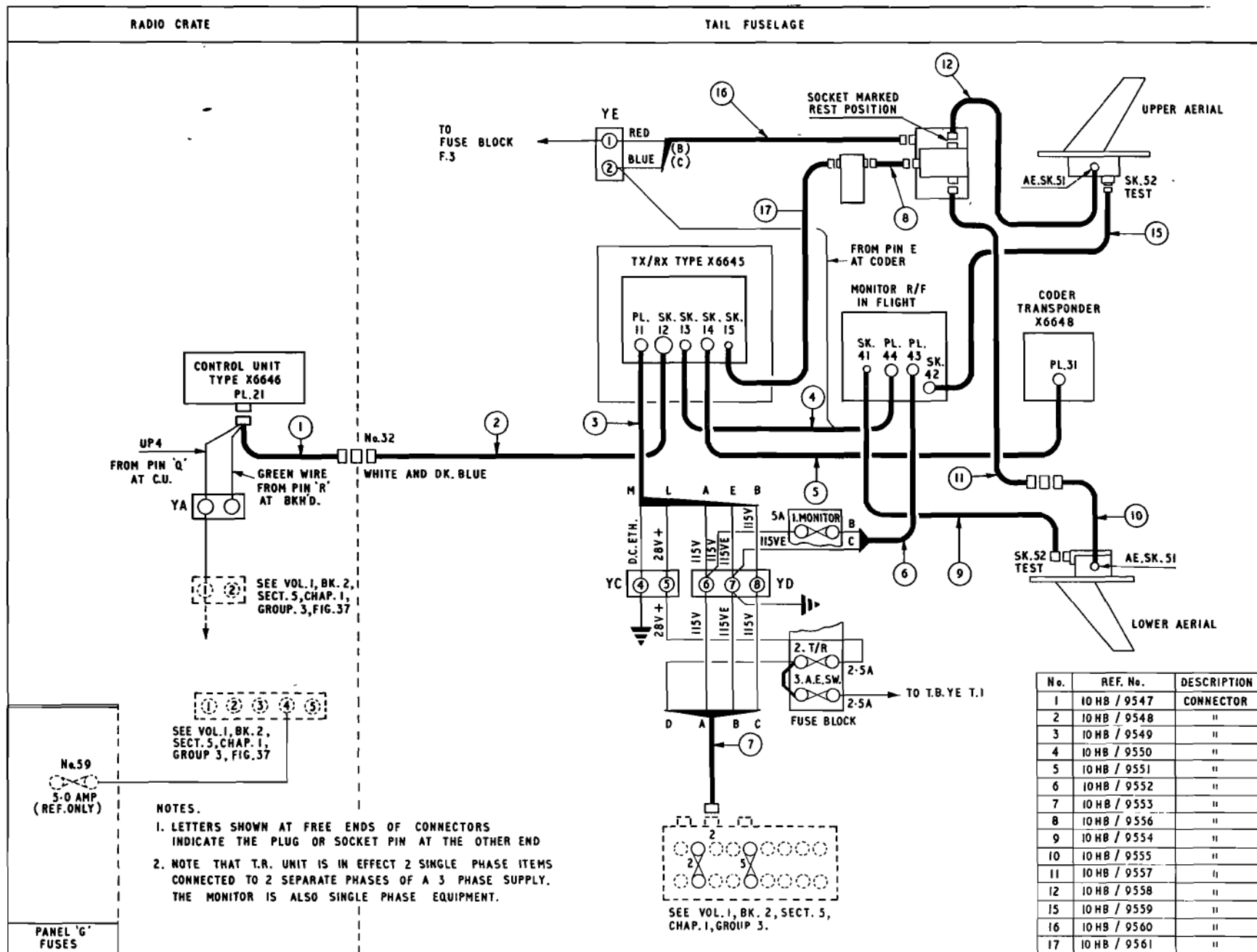


Fig. 6 A.R.I. 5922

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75853 SHT. 101-P
75853 SHT. 104-J

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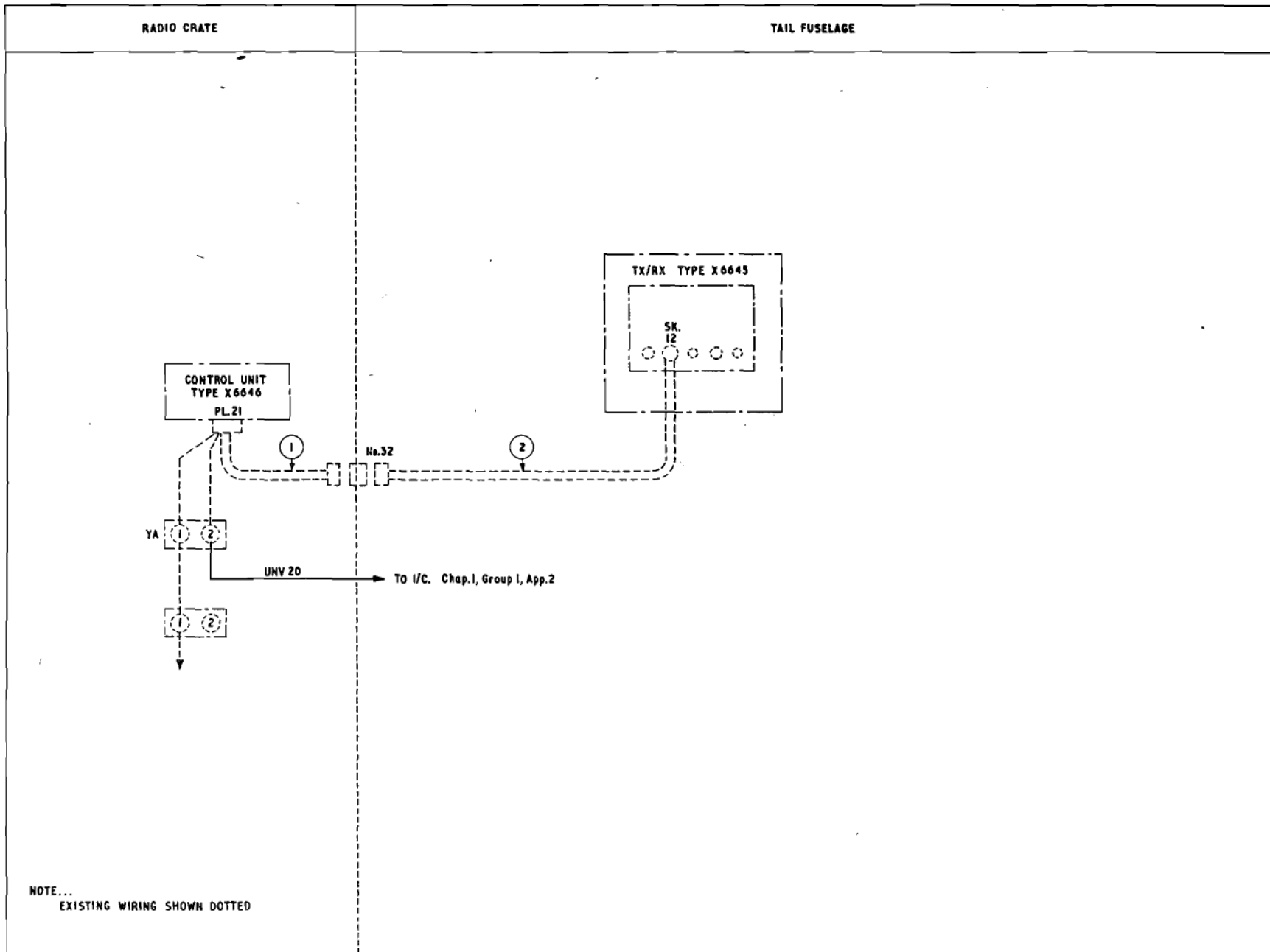
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Appendix 1

A.R.I.5922—EUREKA Mk. 10 (Post Mod. 3109)

1. Post Mod. 3109, audio output reception facilities are provided for the A.E.O., via the I/C system (*Chap. 1, Group 1, App. 2*).
2. The output signals are fed into the I/C telephone line from the control unit, Type 6646, as shown in the routing chart included in this Appendix (*fig. 1*).

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75855 SHI.101 155.R

Fig. 1. Alteration to Fig. 6 in Group 1

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Appendix 2

A.R.I.5829 (Post Mods. 3165 and 3166)

1. A.R.I.5829 installation shown on Figs. 1, 2 and 3 in the main group is deleted completely when Mod. 3165 or 3166 is embodied.

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Appendix 3

A.R.I.18107/4 and /13 T.A.C.A.N. and COLLINS D.F. SYSTEM (Mods. 3165, 3166 and 3168)

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DESCRIPTION AND OPERATION

Introduction

1. A.R.I.18107/4—T.A.C.A.N. installation is introduced by Mod. 3165 for non-tanker role aircraft. A.R.I.18107/13—T.A.C.A.N. and Collins D.F. system is introduced by Mod. 3166 for tanker role aircraft. Supplies for both installations are introduced by Mod. 3168. When T.A.C.A.N. is fitted the Gee and Gee H systems are deleted and Rebecca/Ureka installations, if fitted, are not required. The A.R.I.5800 tail warning indicator Type 27 is deleted by companion Mod. 3181. Location of the equipment is given in Group 3.

A.R.I.18107/4 and /13 T.A.C.A.N.

General

2. T.A.C.A.N. is an airborne navigational system operating over the frequency band 962 to 1213 Mc/s. It is used under pan-climatic conditions, up to 60,000 feet and function only with the complementary beacon systems S.R.I.18118 and F.G.R.I.18119. It operates over a range of nominally 0.1 to 195 nautical miles. An aircraft is outside the beacon coverage if it is lower than 28,000 feet at 195 nautical miles and correspondingly lower at shorter distances. The 1st pilot and 1st navigator are provided with the following:—

- (1) Continuous meter indication of the distance of the beacon.
- (2) Continuous meter indication of the bearing of the aircraft relative to the beacon.
- (3) Aural indication of the identity of the beacon to which the equipment is channelled (126 channels can be selected).
- (4) A flag alarm circuit which operates in the absence of correct distance signals.

3. For a full description of the principles involved, and the various items of equipment fitted in the installation, reference should be made to A.P.2534N, Vol. 1. A brief summary of the equipment is given in the following paragraphs.

Indicators Type 9547

4. These instruments are enclosed in 3½ in. cases fitted on anti-vibration panels. They provide bearing information from 0 to 360 deg. and distance information from 0 to 195 nautical miles. A failure or warning bar is also provided over the distance window to show when the distance circuits are non-operational.

Control unit Type 7750

5. The control unit contains the following controls:—

- (1) The main functional three position switch which has markings OFF, REC. and T/R. It is used to energise the equipment in the two modes of either receiver only, or transmit and receive for distance measurement.
- (2) Channel selection knobs coarse and fine. The right-hand fine control sets the "units" and the left-hand coarse control sets the "tens". The channel number selected appears in an illuminated window.
- (3) The identity tone level control marked VOL; this is used to adjust the level of the identity tone in the crew headsets.

Transmitter/receiver type RT636/ARN/72

6. The T/R unit is fitted into a mounting Type 9274 which holds the T/R unit at the rear by two spring-loaded locating spigots, and at the front by dual-purpose screws, which engage into fittings on the T/R unit. When the screws are undone, a split skirt on the screw collar engages under a claw on the front of the T/R unit and the unit can be gently withdrawn from the mounting. The rear of the mounting Type 9274 forms a junction box to connect with the aircraft cable harness, thus coupling to the power supplies both the coupling unit and the control unit. The aerial connection and the suppression pulse output are made at the front of the T/R unit. The mounting tray is provided with anti-vibration mounts. A dust cover encloses all equipment to the rear of the

T/R front panel and cooling air is drawn through by a fan in the T/R unit. A bank of four miniature primary power switching relays is contained in the mounting Type 9274 together with interference suppression filters.

7. The transmitter/receiver consists of the following sub-units:—

- (1) Rack, electrical equipment Type M31.
- (2) Frequency multiplier RF-98/ARN21C.
- (3) Power supply Type M52.
- (4) Video decoder KY-290/ARN 21C.
- (5) Gate, electronic (azimuth) Type M2.
- (6) Amplifier filter assembly, electrical Type M7.
- (7) Comparator-signal Type M9.
- (8) Gate electronic (range) Type M3.
- (9) Modulator, radar Type M9.
- (10) Amplifier detector Type M113.
- (11) Control frequency selector C2875/ARN 21C.
- (12) Crystal turret TG-68/ARN 21C.

Coupling unit Type 9546

8. This unit is secured in a mounting Type 9545 by dowels at the rear and a spring-loaded device at the front. The coupling unit comprises a case containing two complete servo links and their associated gear trains to operate the indicators Type 9547. It is electrically coupled to the transmitter/receiver unit. One servo link is used to provide bearing data while the other servo link provides distance information.

Aerial omni Type 100B and Type 4169

9. This is a small metal blade in the shape of a shark fin approximately 3 inches high from its mounting base. The insulation of the base is P.T.F.E. The Type 4169 aerial is a high temperature type.

Phase correction unit Type ZA.7601

10. This unit consists of two inductors and an 8.3 mfd. capacitor suitably interconnected

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and mounted within an aluminium case. The case has two mounting flanges and removable cover. A five-way terminal block is mounted on the case. The function of the unit, when connected to a 3-phase, 115-volt, 400 c/s supply is to balance a single-phase load of 540VA, 0.866 power factor lagging (468 watts), 115-volts, 400 c/s.

Intercommunication interconnection

11. The T.A.C.A.N. beacon identity signal is fed into the crew intercommunication system by connections from the T/R unit to REC 2 terminal block or the JB Type 154. The signal passes through the identity tone level control in the control unit Type 7750, and an AUDIO ON-OFF switch, fitted on the T.A.C.A.N. indicator and control panel at the 1st navigator's position. Refer to Chap. 1, Group 1, App. 4 for further details.

T.A.C.A.N. junction box

12. The junction box (tanker aircraft only Mod. 3166) is fitted in the tail fuselage on the structure below the coupling unit. It consists of a box approximately 14 ins. long on which is mounted two plugs and seven sockets; a hinged cover engraved T.A.C.A.N. FUSES is fitted towards the top. The box contains seven fuses, a five-way terminal block and a transformer type RD/7077/26V-28W-R132. The transformer output feeds the synchros in the D.F. loop aerial (para. 15). The fuses feed the following equipment:—

- (1) T/R unit 28-volt, d.c. (fuse No. 1).
- (2) T/R unit (115-volt, 400 c/s (fuse No. 3).
- (3) Test set 115-volt, 400 c/s (fuse No. 4).
- (4) Coupling unit 115-volt, 400 c/s (fuse No. 5).
- (5) Transformer 115-volt, 400 c/s (fuse No. 7).
- (6) Control amplifier 28-volt, d.c. (fuse No. 2).
- (7) Control amplifier 115-volt, 400 c/s (fuse No. 6).

The control amplifier is described in para. 15. The junction box is not fitted to aircraft in the non-tanker role, instead a plate on which are mounted four sockets is fitted to the phase corrector structure.

Control unit window illumination

13. The control unit window is illuminated by two lamps mounted behind the dials. The 28-volts, d.c. supply for the lamps is fed from the navigator's radio compass dimmer switch, mounted on the radio compass indicator panel. The wiring is shown in Sect. 5, Chap. 2, Group 1, App. 4.

Pilot's indicator lighting

14. A Thorn, Type C bridge light is fitted above the pilots indicator. The 28-volts, d.c. supply for the light is fed from the port dash lamps dimmer switch. The wiring is shown in Sect. 5, Chap. 2, Group 1, App. 3.

COLLINS D.F. SYSTEM

General

15. This system is fitted, with A.R.I. 18107/13 T.A.C.A.N., to aircraft in the tanker role only, by Mod. 3166. The description in the following paragraphs applies only to those aircraft.

16. Collins D.F. is a light-weight automatic direction-finding system operated in the U.H.F. range. The equipment is used in conjunction with A.R.I.18124 U.H.F. system (introduced by Mod. 2437) described in Chap. 1, Group 1. It provides the 1st navigator with continuous indication of the relative bearings of other aircraft, by displaying on a relative bearing indicator the direction of arrival of r.f. signals intercepted by the U.H.F. T/R unit, in the frequency range of 225 to 400 Mc/s. The system may also be used for course navigation. A brief summary of the equipment is given in the following paragraphs.

D.F. loop aerial Type 137D-1A

17. The loop aerial assembly consists of a directional receiving element, an antenna

drive motor, rate generator, a synchro generator, a lobing switch and the associated gear assembly. The antenna is a cavity-backed complementary slot radiator which is formed by the position of a rhomboidal metal plate located inside a conducting plane. The antenna element is terminated alternately at either end by use of the antenna lobing switch. This action allows the antenna field, which is cardioid, to be reversed 180 degrees 100 times each second. This switching of the cardioid from one end of the antenna element to the other causes the incoming r.f. signal to be square wave modulated. The degree of modulation is proportional to the angle at which the r.f. signal is received by the antenna element. The resulting modulated r.f. signal is fed to the U.H.F. receiver.

Control amplifier Type 198C-1

18. The control amplifier is mounted with the coaxial switch Type 68Z-2 on the shock-mount Type 390G-1; a dust cover enclosed both units. The amplifier consists of a twelve-transistor unit comprising a full-wave audio clipper, audio pre-amplifier, synchronous filter, a 4-stage audio amplifier, and a 100 c/s inverter circuit.

Coaxial switch Type 68Z-2

19. The coaxial switch contains four relays one of which facilitates the switching of the U.H.F. aerials and the D.F. aerial loop to the U.H.F. receiver. The operation of these relays is controlled by the D.F./COMM. selector switch. In addition one of the relays, when energised, delivers 27.5 volts, d.c. to the control amplifier and 115 volts, a.c. 400 c/s to the synchro generator in the loop aerial. The other two relays control the sensitivity and the audio signal of the V.H.F. receiver.

Indicator Type 331/E1/W

20. The indicator is housed in a 3½ in. dia. case and contains a circular card, engraved RADIO COMPASS and divided into 360 degrees. The needle indicates the direction of arrival of signals at the loop aerial. The card can be rotated manually by turning a knob marked

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E VAR W to line up the aircraft heading with a lubber mark on the case so that relative bearings can be read straight off the instrument.

U.H.F./D.F. junction box

21. This consists of a square box containing a tag strip; on the sides are mounted two sockets and a plug. The function of the junction box is to provide a junction in the connector between the U.H.F. T/R unit and the U.H.F. interconnector box so that three lines can be tapped in. These lines are taken to the control amplifier and ultimately to the relays in the coaxial switch; it is through these lines that the sensitivity and audio signals are controlled by the coaxial switch relays.

AIR/AIR, AIR/GROUND switch

22. This switch is fitted in the circuit so that, when operated, the T.A.C.A.N. equipment mode is changed to AIR/AIR or AIR/GROUND as required by the 1st navigator. The switch

is mounted on the T.A.C.A.N. indicator and control panel at the 1st navigator's position.

Intercommunication interconnections

23. Three relays type 102A are mounted on a panel engraved D.F. RELAY NO. 1, D.F. RELAY NO. 2 and D.F. RELAY NO. 3. The panel is fitted on the radio crate above and to the rear of the T.A.C.A.N. indicator and controller panel at the navigator/plotter position. One two-way, and one three-way terminal block are fitted adjacent to the relay mounting panel. Two switches are fitted at the bottom of the 1st navigator's T.A.C.A.N. panel and are idented D.F. P-TO-T and U.H.F. SELECT DF/COMM. Refer to Chap. 1, Group 1, App. 4 for details of the operation of the relays and switches.

U.H.F. interconnections

24. The Collins D.F. and U.H.F. systems are inter-connected, the signals received by the Collins loop aerial being fed to the

U.H.F. receiver. Refer to Chap. 1, Group 1, App. 5, for further details.

POWER SUPPLIES FOR A.R.I.18107/4 and /13, T.A.C.A.N. and COLLINS D.F. SYSTEM—

General

25. Power supplies are introduced by Mod. 3168, in two parts. Part A for aircraft with Mod. 2796 (which provides power supplies for A.R.I.5922 and 5924) and part B for aircraft without Mod. 2796. When T.A.C.A.N. and Collins D.F. system are fitted to aircraft post Mod. 2796 the A.R.I. 5922 and 5924 installations are not required, and the power supplies provided by Mod. 2796 are suitably changed (Mod. 3168 part A) and used for supplying T.A.C.A.N. and Collins D.F. systems. If, however, Mod. 2796 is not embodied, part B of Mod. 3168 introduces the equipment. Refer to Book 2, Sect. 5, Chap. 1, Group 3, App. 3 for a full description of the installation.

SERVICING

WARNING . . .

Voltages in excess of 100 volts, either a.c. or d.c. can be dangerous under certain circumstances. Personnel should therefore ensure that the electrical system is electrically safe before any servicing is attempted. Where it is essential that tests or adjustments are to be made with the electrical power switched on, the greatest care must be exercised.

Introduction

26. For detailed information on the servicing of items of equipment and the tests to be carried out on the installations, reference should be made to the relevant Air Publications.

27. Detailed descriptions of all the general tests to be applied to all aircraft electrical

circuits can be found in the General Information group contained in Book 2 immediately after Section 5 marker card.

A.R.I.18107/4 and /13 T.A.C.A.N.

28. Descriptions of all the tests to be carried out on the installation are contained in A.P.2534N, Vol. 1.

29. To check the power supply to the system, proceed as follows:—

(1) Check the circuit fuses at panel G, inverter output fuse box in the rear servicing bay, and in the T.A.C.A.N. junction box (Mod. 3166, tanker-role aircraft only) and connect 28-volt and 112 volt d.c. supplies to the aircraft external connections.

(2) Select the 24-volt battery switch ON.

(3) Disconnect the socket that mates with plug 2 on the mounting unit Type 9274.

(4) Connect a suitable voltmeter, positive lead to socket D, negative lead to socket A, check that the reading is approximately 28-volts d.c.

(5) Disconnect the voltmeter.

(6) Switch on the Type 153A inverter by operating the T.A.C.A.N. supplies control switch on the radio crate to NORMAL.

(7) Check that 115 volts a.c. is present at the socket by connecting a suitable voltmeter between sockets C-A and E-A (pin A is the earth pin).

(8) Disconnect the voltmeter.

(9) Switch on No. 3 Type 350 inverter

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by operating the control switch on the a.c./d.c. distribution box.

(10) Select the T.A.C.A.N. supplies control switch to EMERG. and repeat test (7).

(11) Disconnect the voltmeter.

(12) Select the No. 3 Type 350 inverter, and the T.A.C.A.N. supplies control switches to OFF.

(13) Reconnect the socket to plug 2 at the mounting Type 9274.

Phase correction unit Type ZA7601

30. A description of the servicing of this unit is given in A.P.4343B, Vol. 1, Book 2, Sect. 8. Special care must be taken when making connections at the unit to ensure the A.B.C. sequence of the input leads is connected to the terminals marked B, C-earth, and A respectively.

Collins D.F. system

31. For descriptions of the tests to be carried out and servicing of the equipment reference should be made to the relevant Air Publications.

TABLE 1
A.R.I.18107/4 and /13 T.A.C.A.N. equipment

Item	Type or Ref. No.	No. fitted	Location
Indicator	9547	2	1st Pilot's dash panel and 1st Navigator's position
Control unit	7750	1	1st Navigator position
Transmitter/receiver	RT636/ARN/72	1	Rear fuselage, starboard side at Stations 1013 to 1033 (Mod. 3165 non-tanker role aircraft); 813 to 833 (Mod. 3166 tanker-role aircraft)
Mounting for T/R unit	9274	1	
Coupling unit	9546	1	
Mounting for coupling unit	9545	1	
Backplate for coupling unit	9546	1	
Phase connection unit	ZA7601	1	
Aerial omni or	4169	1	Fuselage station 1023, lower surface of aircraft on centre line (Mod. 3165, non-tanker role aircraft)
Aerial omni	100B	1	Fuselage station 823 upper surface of aircraft on centre line (Mod. 3166, tanker role aircraft)
Junction box	—	1	Rear fuselage station 813 to 833 (Mod. 3166 tanker-role only)

TABLE 2
Collins D.F. System equipment

Item	Type or Ref. No.	No. fitted	Location
D.F. loop aerial	137D-1A	1	Fuselage station 702, under rear equipment bay access hatch
Control amplifier	198C-1	1	Radar crate, centre fuselage
Coaxial switch	68Z-2	1	
Shockmount for control amplifier and coaxial switch	390G-1	1	
Indicator	331/E1/W	1	1st Navigator position
U.H.F./D.F. junction box	—	1	Radar crate
AIR/AIR, AIR/GROUND switch	—	1	1st Navigator position

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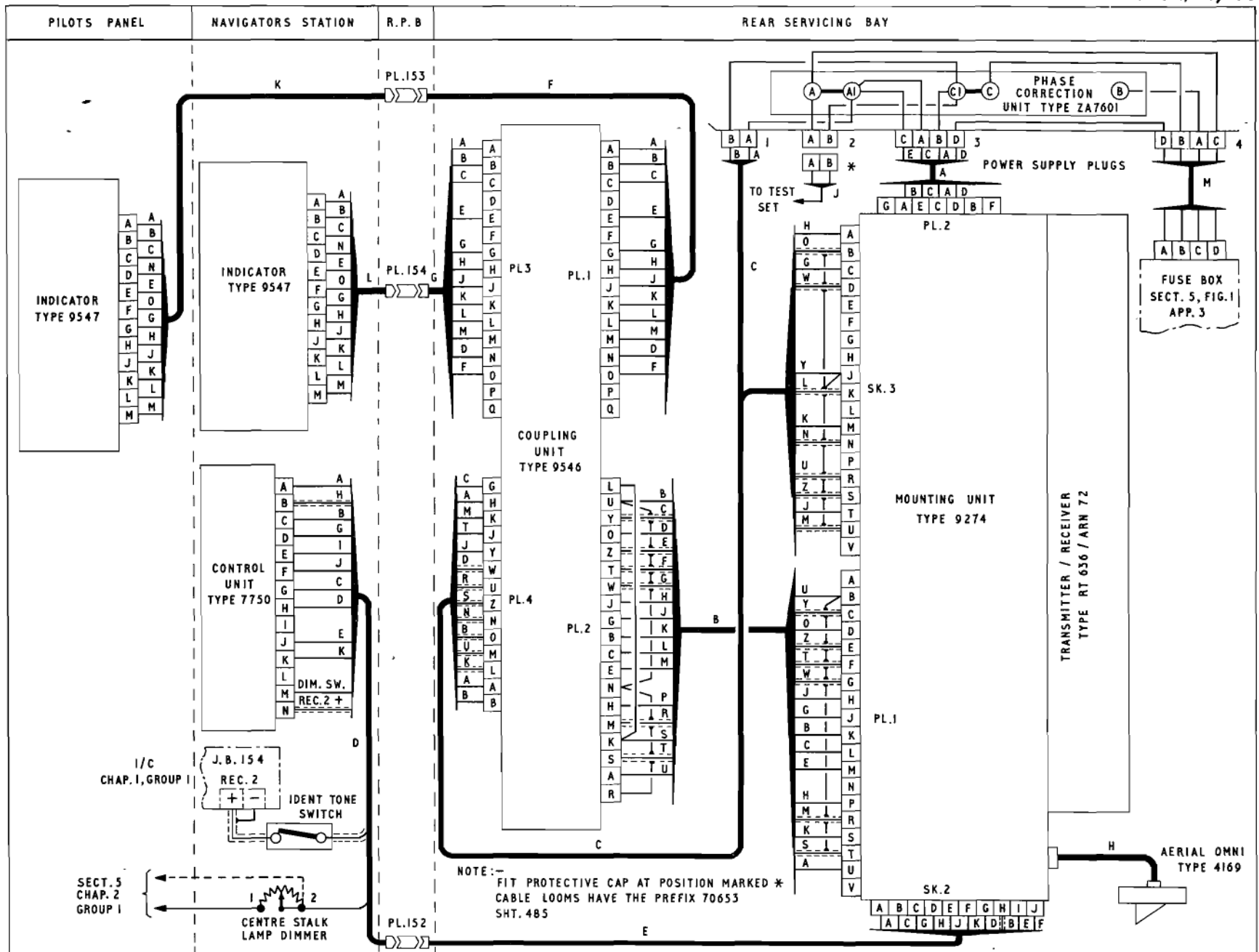
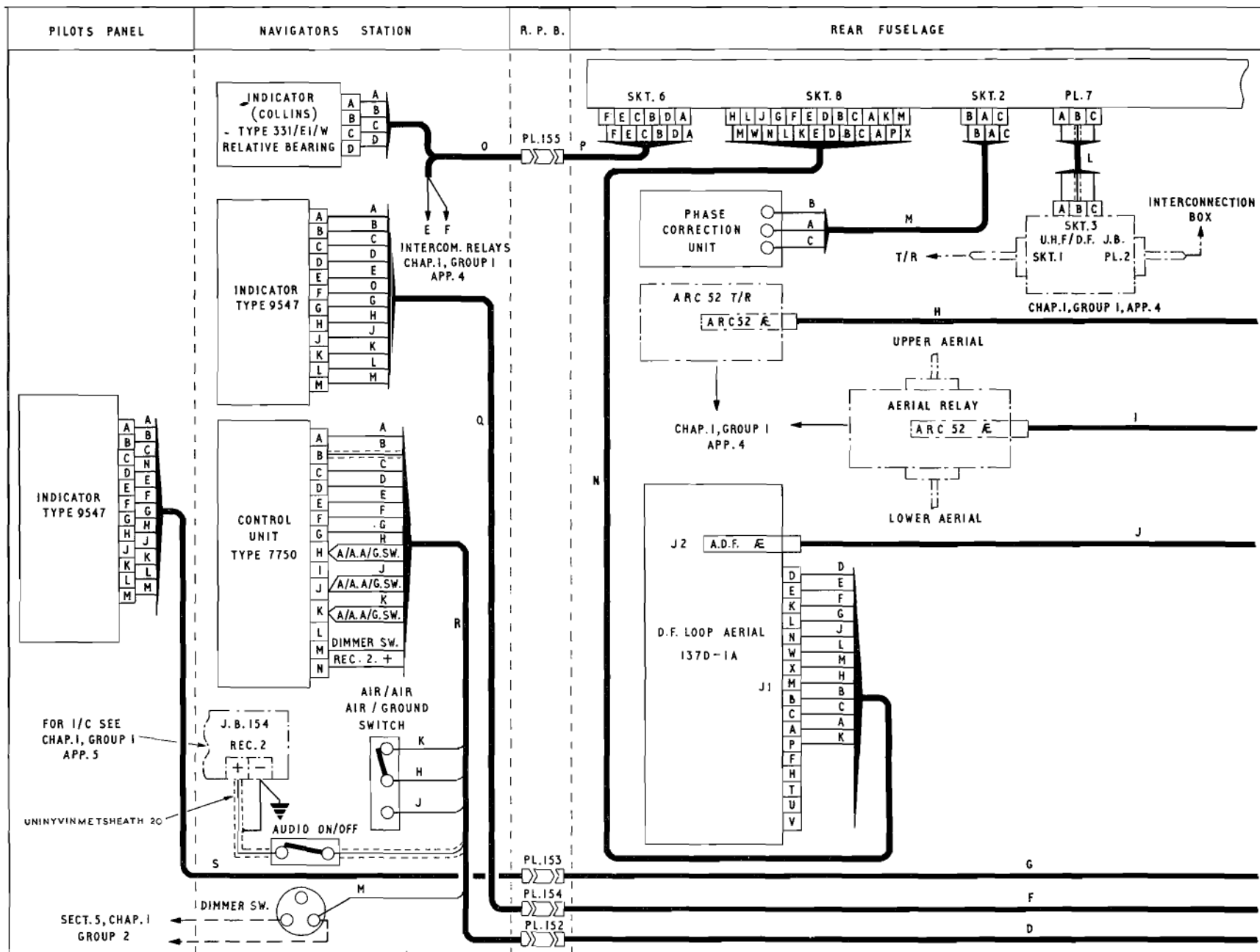


Fig.1. A.R.I. 18107/4 T.A.C.A.N. (B. MK.I and B./P.R. MK.I) (Mod.3165)

70653 SHT. 483 ISS.E

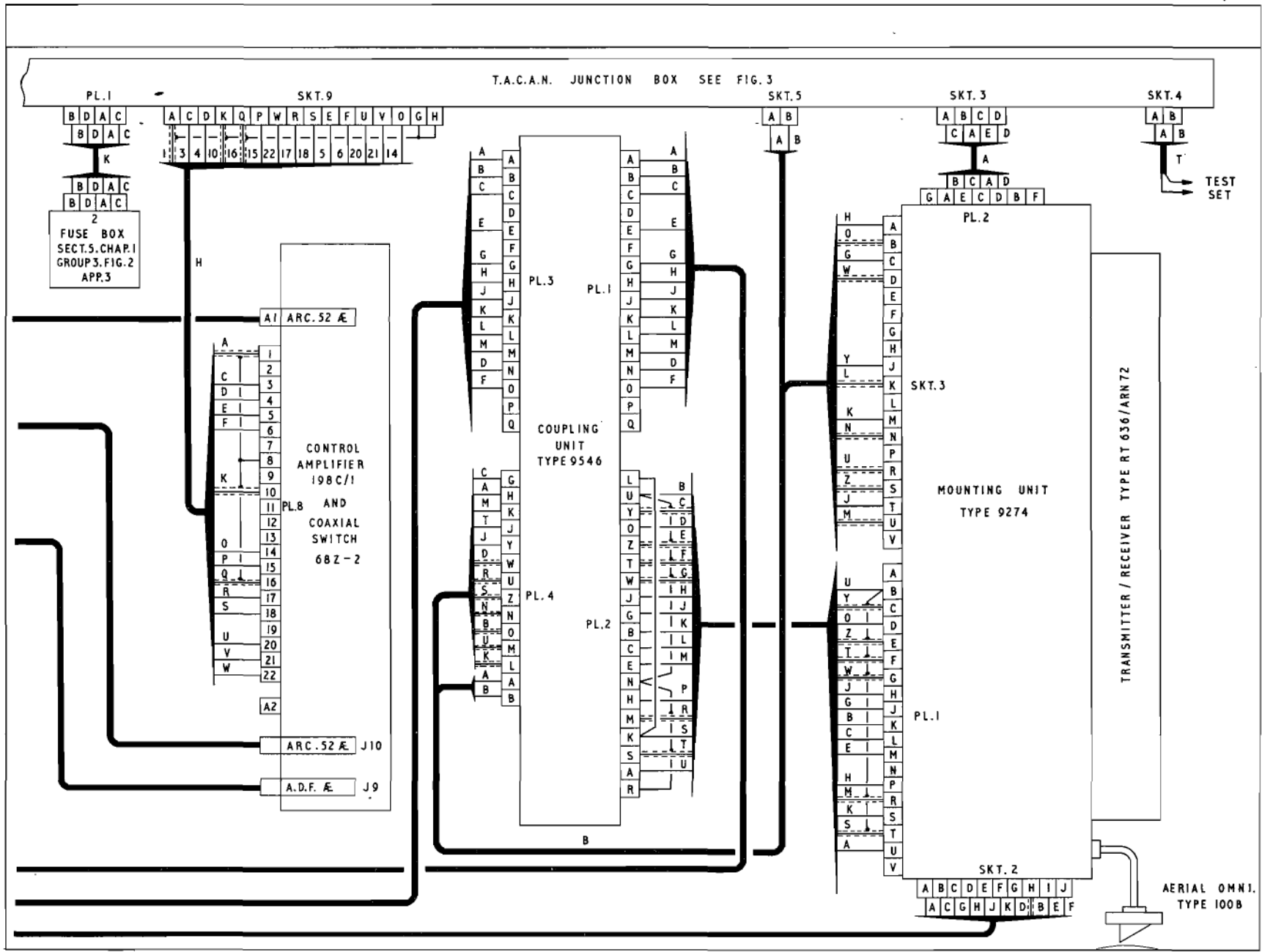
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75853 SHT. 87 ISS. F

Fig. 2(I) A.R.I. 18107/13 T.A.C.A.N and Collins D.F. system (B/K MK.I and B/P.R./K MK.I) (Mod. 3166)

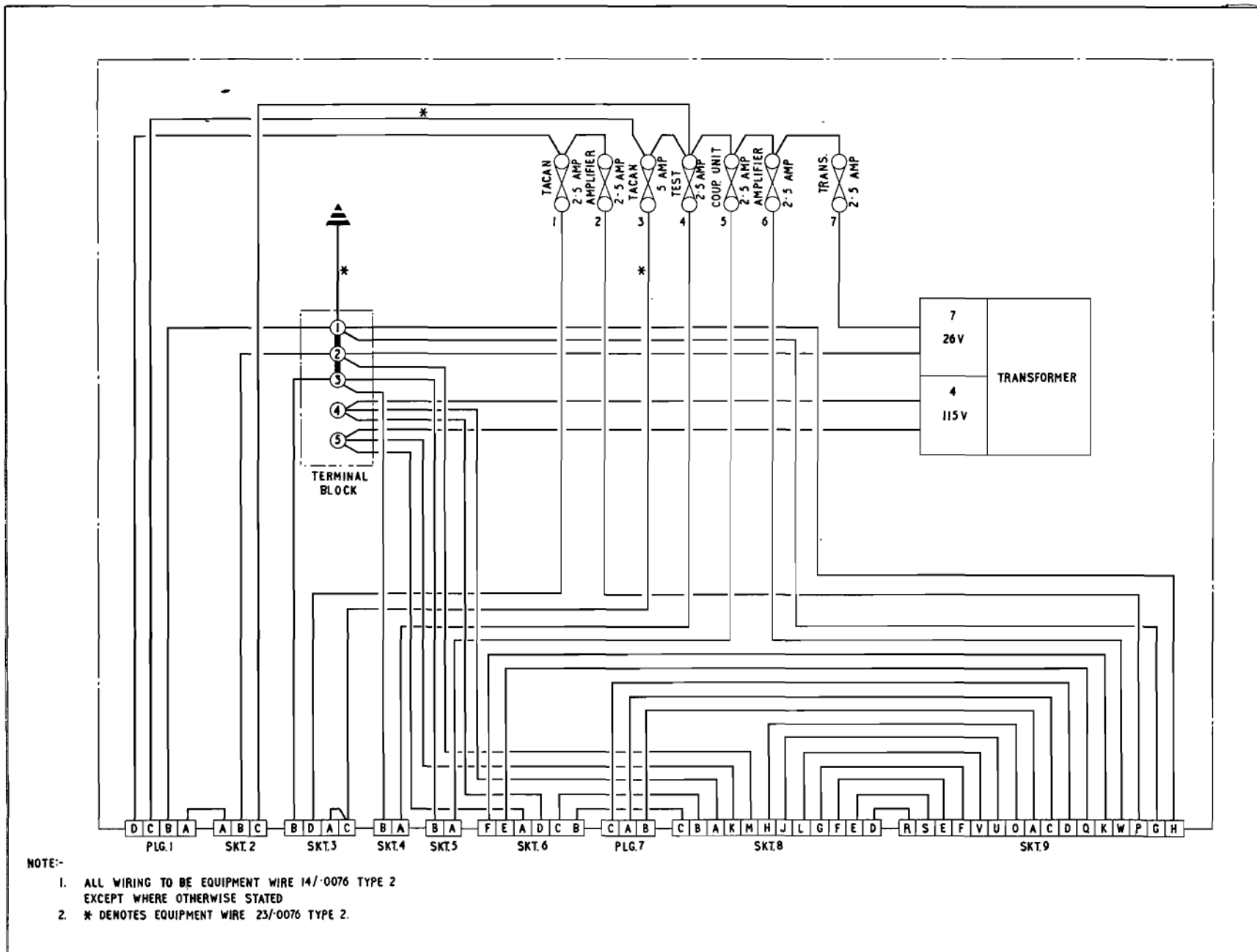
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75853 SHT. 87. 155. F

Fig. 2 (2) A.R.I. 18107/13 T.A.C.A.N. and Collins D.F. system (B/K.MK.1 and B/PR/K.MK.1) (Mod. 3166)

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75853.SHT.305-C

Fig.3. T.A.C.A.N. J.B. internal wiring diagram (Mod. 3166)

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