

Appendix 2

MOD.1630 - INTRODUCTION OF A.R.I.18107/13

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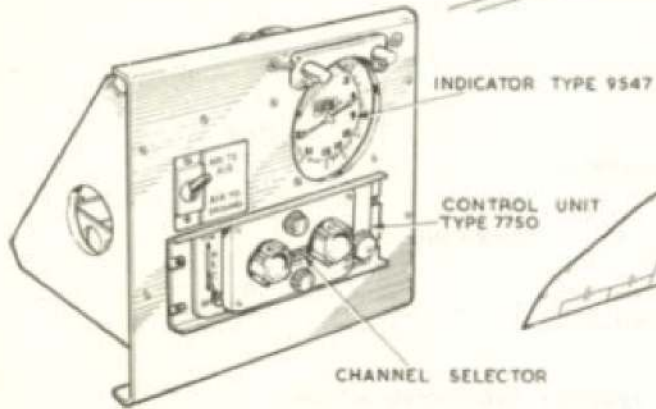
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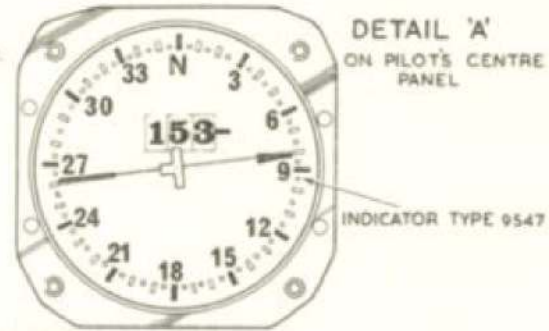
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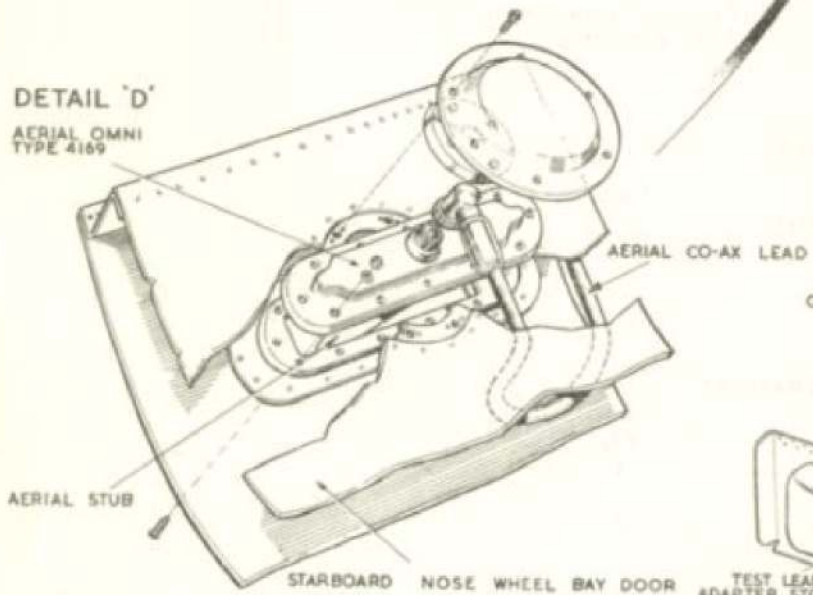
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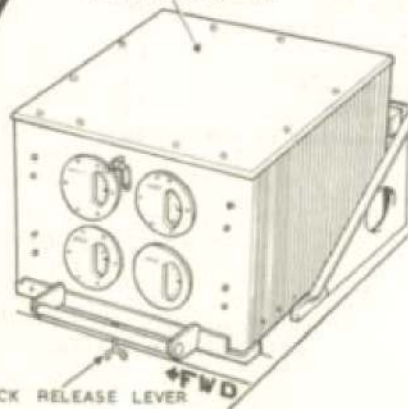
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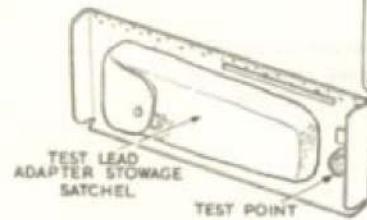


COUPLING UNIT TYPE 9546
MOUNTED IN STBD. SIDE
NOSE WHEEL BAY BETWEEN
FORMERS 135 AND 189



MOUNTING UNIT TYPE 9274

TRANSMITTER RECEIVER TYPE 636 ARN72
MOUNTED IN STBD. SIDE NOSE WHEEL BAY BETWEEN FORMERS 115 AND 130



DETAIL 'C'

Fig.1 Location of equipment

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Introduction

1. This appendix deals with the TACAN navigational system installation A.R.I. 18107/13, introduced by Mod.1630, which supercedes the A.R.I.5816 GEE navigational system on certain aircraft. The TACAN system provides distance and bearing information that will indicate the position of the aircraft relative to a surface beacon to which the equipment has been tuned. A facility for interrogating tanker aircraft is also provided.

2. The distance and bearing information is presented continuously to both the pilot and navigator by an indicator, Type 9547. A control unit, Type 7750, is positioned

below the navigator's indicator, Type 9547, thus enabling the navigator to control the entire system.

3. The transmitter-receiver, Type R.T.636-ARN/72, and coupling unit, Type 9546, are both fitted in the nose wheel bay, and the aerial omni, Type 4169, is fitted to the starboard nose wheel bay door. A location diagram of the equipment is contained in Fig.1 and a routing chart in Fig.2. Full descriptive and servicing information on the complete system can be found in A.P.2534N, Vol.1.

4. Any one of 126 crystal-controlled

channels in the 962 to 1214 Mc/s band can be selected by the navigator via control unit, Type 7750. Each channel comprises two frequencies 63 Mc/s apart, one for air-to-ground interrogation and the other for ground-to-air responses.

5. A morse-code recognition signal is transmitted by the surface beacon every 37.5 seconds, and can be heard on the crew's headsets via their respective intercomm. control panels, thus confirming the identity of the selected beacon. The signal level is controlled by a volume control fitted to the navigator's control unit, Type 7750.

DESCRIPTION AND OPERATION**Equipment details**

6. The TACAN installation, as stated previously, is under the control of the navigator and consists of the following equipment:-

Indicator (2)	Type 9547
Control unit	Type 7750
Coupling unit	Type 9546
Transmitter-receiver	Type R.T.636-ARN/72
Aerial omni	Type 4169
Transmitter-receiver mounting unit	Type 9274
Coupling unit mounting unit	Type 9545

The location of the above equipment in the aircraft can be seen in Fig.1. A full description of the individual units is contained in A.P.2534N, Vol.1 and should be read in conjunction with the following paragraphs.

Indicator, Type 9547

7. Two indicators are utilised in the

system and are positioned on the pilot's and navigator's centre panel respectively. The bearing pointer has a continuous 360 deg. travel. The bearing of the selected beacon from the aircraft is shown by the arrow head of the pointer and the bearing of the aircraft from the selected beacon is indicated by the tail of the pointer.

8. The distance of the aircraft from the selected beacon is shown in a window in the dial of the indicator. The right hand digit shows the 'unit' nautical miles and the centre digit shows the 'tens' nautical miles. When the aircraft is over 100 nautical miles from the selected beacon a 'one' appears to the left of the 'tens' digit.

9. When the system is not locked to the beacon transponding signal, the distance digits are partially masked by a flag across the distance window, the flag has a horizontal white line painted on it to improve visibility. When the aircraft is outside the range of the beacon, the

bearing pointer will be revolving round the bearing scale, also the distance numbers will be rotating rapidly behind the masking horizontal white line.

Control unit, Type 7750

10. This unit provides the main control for the complete system and is fitted to the navigator's centre panel below the indicator, Type 9547. The following controls are situated on the front of the control unit:-

- (1) Two channel selector rotary switches, a 10 way and 13 way, enable the navigator to select any channel from 1 to 126. The number of the selected channel appears in an illuminated window positioned between the two switch knobs. The left hand switch, when operated, will show numbers 0 to 12 and the right hand switch will show numbers 0 to 9.
- (2) A three position switch which is marked OFF, REC. and T/R is

used to energise the system in the two modes of either receive only or transmit and receive for distance measurements.

- (3) A control marked VOL. is used for adjusting the surface beacon identity tone to the required level. Note that all crew members can monitor the signal via the aircraft intercomm. system.

Coupling unit, Type 9546

11. This unit is located in the nose wheel bay and provides the servo links for operating the pilot's and navigator's indicators, Type 9547 (para.7). The unit is secured via rear fitting dowels to a horizontal mounting unit, Type 9545, which is fitted to the aircraft structure by four anti-vibration mountings. A spring-loaded quick release device at the front of the mounting unit enables the coupling unit to be easily released. Four dials on the front panel provide similar information to that displayed by the pilot's and navigator's indicators.

Mounting unit, Type 9545

12. The spring loaded quick release device is operated by a lever situated underneath the mounting unit. When the lever is pulled outwards and then to the right, the coupling unit is freed from the grip of four heavy gauge springs which hold the four plugs and sockets in their mating position.

Transmitter-receiver, Type R.T.636-ARN/72

13. The transmitter-receiver is positioned between formers 115 and 130 in the nose wheel bay, and is fitted into a mounting unit, Type 9274. The transmitter-receiver is secured to the mounting unit by means of two spring-loaded spigots at the rear, and two screw clamps

at the front. The mounting unit is installed as an integral part of the aircraft and uses four anti-vibration mountings to cushion movement.

Mounting unit, Type 9274

14. A housing across the rear of the mounting unit contains plugs and sockets and serves as a junction box for ingoing and outgoing supplies for the transmitter-receiver. In addition to the plugs and sockets, the housing contains four power control relays and a filter circuit for suppressing unwanted pick-up in the control unit and power supply cables respectively. Details of the plugs and sockets mounted on the housing are as follows:-

- (1) Plug (PL.1) is a 19 way connector and is used for carrying "distance" information between the coupling unit, Type 9546, and the mounting unit.
- (2) Socket (SK.3) is a 19 way connector and is used for carrying "bearing" information between the coupling unit, Type 9546, and the mounting unit.
- (3) Socket (SK.2) is a 10 way connector and is used for inter-connecting the control unit, Type 7750, to the mounting unit.
- (4) Plug (PL.2) is a 7 way connector and carries the aircraft supplies to the mounting unit.
- (5) Socket (SK.1) is a 45 way socket, which mates with a 45 way plug fitted to the rear end of the transmitter-receiver chassis. The 45 way plug and socket is used to connect all the ingoing and outgoing supplies from the trans-

mitter-receiver to the mounting unit housing.

Aerial omni, Type 4169

15. The aerial is a small metal blade in the shape of a shark fin, approximately 3 inches high from its base. It is mounted through the aircraft skin from the inside and positioned on the starboard side of the nose wheel bay door. The aerial is connected to the transmitter-receiver unit via a coaxial cable link and plug. The coaxial aerial socket is fitted to the front panel of the transmitter-receiver unit.

Air-to-air and air-to-ground switch

16. This switch is mounted on a panel together with an indicator, Type 9547, and control unit, Type 7750, on the Navigator's centre panel. The switch is used for changing over from normal TACAN operation to that of tanker aircraft interrogation and response. Further information on this mode of operation will be available in due course.

Power supplies

17. The power supplies for the TACAN installation are controlled by a switch labelled OFF/REC./T/R. positioned on the control unit, Type 7750, which is located on the navigator's centre panel. The switch operates relays, via a 28-volt d.c. supply from fuse 342 in distribution panel 16P, which in turn connects a 115-volt, 400 c/s supply to the transmitter-receiver unit from fuses 693R, 694B, 695R and 696B in distribution panel 22P. A 28-volt d.c. supply from fuse 79 in panel 3P is used to change the normal TACAN mode of operation to that of tanker aircraft interrogation via the air-to-air and air-to-ground switch. The control panel illumination lamps are fed from a 28-volt d.c. supply via fuse 78 in distribution panel 3P.

SERVICING

Precautions

18. Servicing personnel in particular are warned that a.c. and d.c. voltages in excess of 100-volt can be dangerous to the extent of causing personal injury, fatal or otherwise. It is essential that the utmost attention be given to servicing instructions where matters of safety are concerned, and that maximum co-

operation be maintained between trades mutually concerned in servicing operations.

Installation

19. The setting up, operating and servicing instructions for the TACAN

installation can be found in A.P.2534N, Vol.1. A test Plug is fitted below the transmitter-receiver unit in the nose wheel bay and provides a 115-volt, 400 c/s supply for the TACAN performance tester, Type 10166. A satchel fitted adjacent to the test plug contains the test lead adapter for use with the performance tester.

REMOVAL AND INSTALLATION

General

20. Access to all the individual units that make up the complete installation is straight forward, but the following points should be observed. When it is necessary to remove or replace a unit, secure all loose connectors to the adjacent aircraft structure to prevent damage.

rear arc located correctly and that the 45 way plug and socket has mated properly. Ensure also that the front screw clamps are tight and secure.

Equipment in the nose wheel bay.

21. When replacing the transmitter-receiver unit into its mounting unit, ensure that the two spring loaded spigots at the

22. When replacing the coupling unit into its mounting unit, ensure that the locating dowels are correctly aligned and the four plugs mated in their sockets. A spring loaded locking device is employed at the front of the unit, ensure that the locking device has operated and that the coupling unit is properly secured.

Navigator's equipment

23. The navigator's indicator and control unit together with the air-to-air/air-to-ground switch are all mounted on a panel fitted to the navigator's centre panel. The panel can be withdrawn by first removing four securing screws from the front of the panel.

Pilot's indicator

24. The pilots' indicator mounted on the pilot's centre panel is easily removed after the centre panel has been removed in accordance with the instructions given in Sect.7, Chap.1 of this publication.

TABLE 1
CONNECTORS FOR A.R.I. 18107/13

AVRO Item No.	Cableform	Connecting between
2/T5869	Miniature 12c	Indicator No.1 Type 9547 to R.P.B. plug 162
3/T5869	Miniature 12c	Indicator No.2 Type 9547 to R.P.B. plug 163
4/T5869	Miniature 12c	R.P.B. plug 162 to coupling unit (PL3)
5/T5869	Miniature 12c	R.P.B. plug 163 to coupling unit (PL1)
6/T5869	Uninyvin 20 10 cores	R.P.B. plug 1164 to T.R. unit (SK2)
7/T5869	Miniature 18H	T.R. unit (PL1) to coupling unit (PL2)
8/T5869	Uninyvin 20 4 cores	T.R. unit (PL2) to T.B.1352
9/T5869	Uniradio 67	Aerial to T.R. unit aerial socket
10/T5869	Miniature 18H	T.R. unit (SK3) to coupling unit (PL4)
	Twisted uninyvin 20	T.B.1353 to coupling unit (PL4)
11/T5869	Uninyvinmet sheath 20	Test point socket to T.B. 1353
12/T5808	Miniature 3a	Test point socket to test equipment (stowed in satchel)
824/T3434	Uninyvin 20	Fuse 79 in 3P to air-to-air switch pin 3
822/T3434	Uninyvin 20	See Table 2

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TABLE 2
CABLE FORM 822/T3434

AVRO Item No.	Cableform	Connecting between
1/FR822	Uninyvin 20	Control unit plug pins A - K to R.P.B. plug 1164 pins A - K (connected pin to pin) *
2/FR822	Uninyvin 20	Control unit plug pin K to air- to-air switch pin 2 *
3/FR822	Uninyvin 20	Control unit plug pin M to fuse 78 in panel 3P
4/FR822	Uninyvinmet sheath 20	Control unit plug pin N to panel 54P entry 12
5/FR822	Uninyvin 20	Air-to-air switch pin 1 to R.P.B. plug 1164 pin M

* Note pin K on control unit plug
is common to pin K on R.P.B.
plug 1164 and air-to-air switch
pin 2

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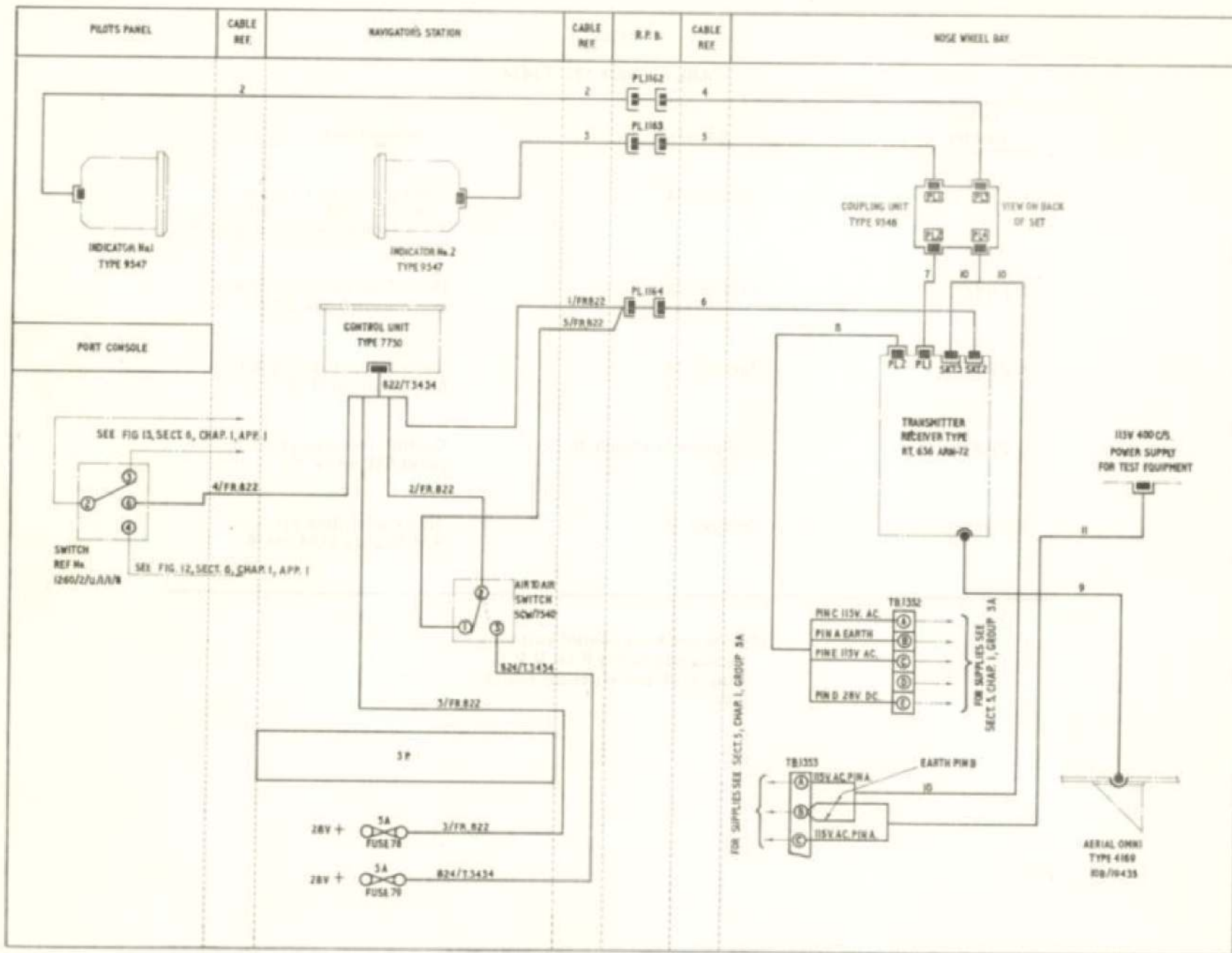


Fig. 2 A.R.I 18107/13

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