# Chapter 4

# A.R.I. 5885

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**Introduction**

1. A.R.I. 5885 is an airborne navigational system, under the control of the navigator, which measures the ground speed and drift angle of the aircraft in flight; continuous indication is given on "clock face" type instruments. The system also gives indication of ground miles flown and feeds ground speed and drift information to the ground position indicator, Mk.4C. Should the received signal strength fall below a pre-determined level, a red light will appear on the indicator, Type 4366. The system may then be set to operate using the memory of the last received signals.

2. The main items of equipment are listed in Table 1, whilst the connector assemblies are detailed in Table 2. For full details of the system, reference should be made to A.P. 2890S, Vol. 1 but a brief description of the various units is given in the following paragraphs.

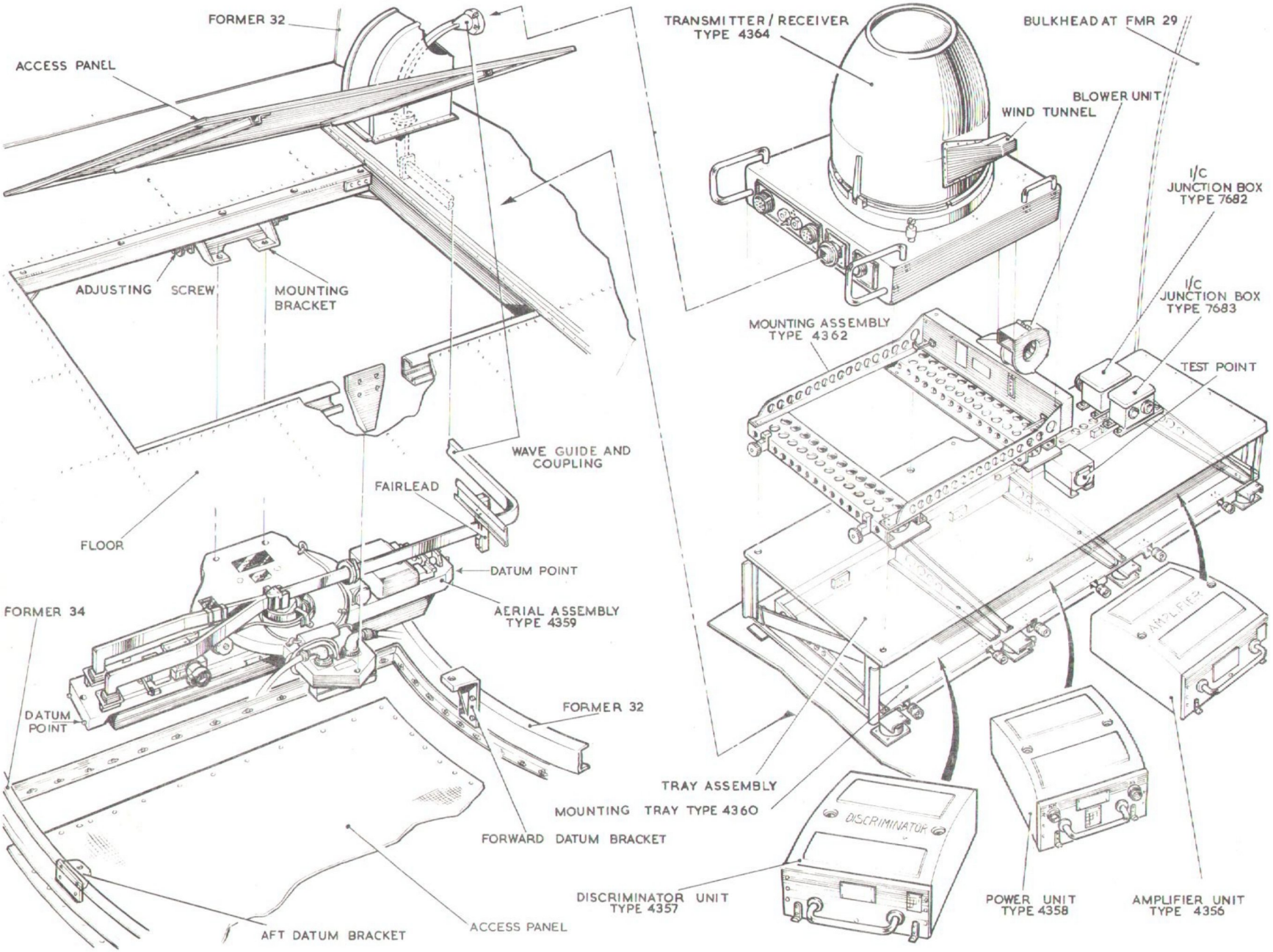


Fig. 1. A.R.I. 5885 installation.

*'Access panel' was plastic window*

## DESCRIPTION AND OPERATION

### Power supplies

3. The system is supplied with 115-volt, 400 c/s, 3-phase a.c. from No. 8 inverter, Type 103B. Due to the heavy pulse loading of the transmitter circuit however, the inverter output is fed (via a control panel, Type 24) to the system as a 'normal' and 'special' supply, the latter being used for the pulse loading circuits.

4. The supply is controlled from the radar power panel (master sonics station), and is connected to the system only when the No.8 inverter is running. Full details of the supply and control circuits are given in Sect.6, Chap.2B and C of this publication.

### Transmitter/receiver

5. This unit, mounted adjacent to bulkhead 29 (port), contains the circuits for transmitting the pulsed R.F. power, and for receiving, detecting and amplifying the return signals. Due to the high peak power of the transmitter, its operation is limited to bursts of 40 milli/secs. at two per second. The unit is cooled by two 3-phase blowers, one external and the other internal. The internal blower circulates the air inside the pressure cover, whilst the external blower fitted to the mounting tray circulates air around the outside of the pressure cover in a wind tunnel assembly which surrounds it. The air enters through a small duct and leaves through a vent at the top of the tunnel.

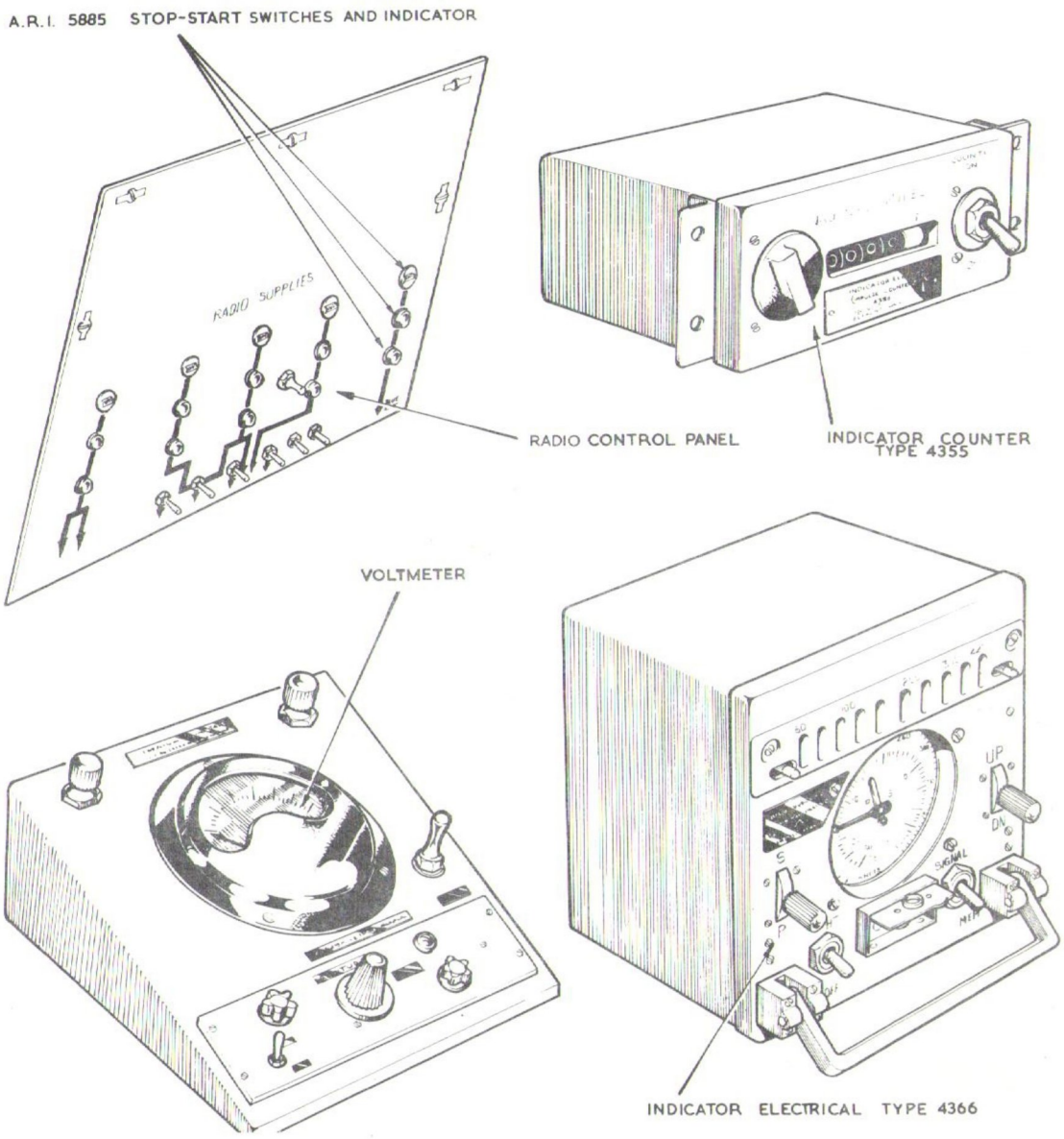


Fig.2 - A.R.I. 5885 indicators

6. The unit also contains two desiccators and is pressurized to 5 p.s.i. above atmospheric pressure at sea level. Coupling to the common T. and R. aerial is via waveguides. Other connections are made by plugs and sockets.

**Tracking units**

7. These two units, together with the power unit, are in a common mounting assembly beneath the trans-receiver (aft of bulkhead 29), and contain the circuitry for measuring the ground speed and drift angle of the aircraft. Ground speed information is provided in the form of synchro-transmission for the indicator, an M - type transmission to the G.P.I. Mk.4C, and as electrical impulses to the ground mileage indicator.

8. All connections to the units are via the mounting assembly back plate plugs.

**Power unit**

9. The power unit is fitted in the same mounting assembly as the tracking units and provides various H.T. supplies for the trans-receiver. Connections to the unit are made via a plug in the back plate and two sockets on the front panel.

**Aerial system**

10. The aerial system is mounted on the centre of the lower fuselage at formers 32-34, with the longitudinal axis of the arrays along the fore and aft line of the aircraft. Two linear arrays, in a moveable horn assembly, are used to radiate the transmitter energy and to receive the returned energy from the ground. For alignment checks, datum brackets are fitted to the aircraft and to the aerial.

**Indicators**

11. The two indicators are mounted at the navigator's station and give continuous indication of ground speed and drift angle. The information is displayed on a "clock face" type of indicator, whilst approximate speed indication is also given by neons forming part of a spectrum analyser. A small "cyclometer" type of indicator shows the ground miles flown.

**Voltmeter**

12. A 0-10 voltmeter, mounted on the navigator's table leg, measures the a.g.c. voltage produced, this being an indication of signal strength.

## SERVICING

**Precautions**

13. Before any servicing is attempted, reference should be made to the general precautions outlined in Chapter 1 of this section.

**General instructions**

14. At the appropriate servicing periods the equipment should be checked for security, damage, corrosion and correct bonding of mountings. The cables should be examined for security and damage, special attention being given to the waveguides connecting the trans-receiver to the aerial. In order to check the couplings the protective guard will have to be removed from the point where the waveguide passes through the aircraft main floor.

15. The pressurization of the trans-receiver should be checked and if low should be brought up to 5 p.s.i. above atmospheric pressure. Also on this unit check that the white lines on the wind tunnel and pressure cover are in alignment.

**Power supplies**

16. The 3-phase a.c. power supply to the equipment may be conveniently checked at the No.8 inverter test socket at the forward end of the wardroom shelf at former 30 (port). For the routeing chart of the supply circuit reference should be made to Sect.6, Chap.2C of this publication.

**Test equipment**

17. Full details of the equipment required for testing the installation, together with operating instructions, are given in AP2890 S, Vol. 1, Part 2.

*NOTE . . .*

*After the test equipment has been disconnected, ensure that the shorting plug is re-fitted to the test point.*

18. A special jig is available for aligning the aerial assembly to the fore and aft axis of the aircraft. Details will be found in para. 29 of this chapter and in AP2890 S, Vol. 1.

## REMOVAL AND INSTALLATION

**Precautions**

19. The precautions and general instructions outlined in Chapter 1 of this Section should be noted before any attempt is made to remove or disconnect equipment.

**Transmitter - receiver**

20. The guard protecting the waveguide at the trans-receiver must be removed to gain access to the coupling at the front of the unit. Special waveguide spanners are available and should be used when uncoupling the waveguide. To prevent ingress of foreign matter, the ends of the uncoupled waveguides should be suitably blanked, the blanks only being removed immediately before connection. After the cable plugs have been disconnected from the trans-receiver, loosen the two knurled nuts at the base of the mounting assembly. It should now be possible to lift the unit slightly and then withdraw it from its mounting, taking care that the joint between the blower motor and the wind tunnel assembly is not damaged. Four transport handles are provided for carrying the unit out of the aircraft. Particular care will also be necessary at this stage due to the weight of the trans-receiver (78 lbs).

21. When refitting the trans-receiver, ensure that the locating spigots are fully home and that the blower ducting is not damaged.

**Aerial**

22. Uncouple the waveguide with the special spanners and disconnect the cable plugs. The exposed ends of waveguide should be suitably blanked to prevent ingress of foreign matter.

23. Carefully remove and lower the flush plastic aerial window after withdrawing the fixing screws.

24. With the transit lock in position on the aerial, and the assembly suitably supported, remove the three bolts securing the main casting to the aircraft structure. Extreme care should be exercised during the whole of the removal procedure as the aerial can be easily damaged by careless handling.

25. Two datum brackets are fitted on the centre line of the lower fuselage, as shown in fig.1, to assist in alignment when refitting an aerial. An aerial alignment jig, Ref. No. 10AF/600 and a datum compass, Ref. No. 6C/1265, are available for use in conjunction with the datum brackets; their method of use when aligning an aerial is as follows:-

(1) Line the aircraft up on the compass base, using the compass sighting rods as described in Sect. 7, Chap. 3.

(2) Set up the alignment jig, including the two sighting rods provided, on the datum brackets at formers 32 and 34. The two sighting rods protrude below the aircraft skin line.

(3) Set up the datum compass on a position marked on the compass base, in line with the compass sighting rods on the aircraft. The alignment jig is then adjusted until these sighting rods are in line with the compass sighting rods.

26. For further details of the alignment jig and the method of aerial adjustment, reference should be made to A.P.2890 S, Vol. 1, Part 2, Sect. 1.

## TABLE 1

Major items of equipment

| Equipment | Type | Ref.No. | A.P. Reference |
|---|---|---|---|
| Transmitter-receiver | 4364 | 10D/19653 | ◀ A.P.114E-0500-1 & 6 ▶ |
| Indicator electrical | 4366 | 10Q/16246 | |
| Indicator electrical (impulse counter) | 4355 | 10Q/16249 | |
| Tracking unit (amplifier) | 4356 | 10Q/16248 | |
| Tracking unit (discriminator) | 4357 | 10Q/16247 | |
| Power unit | 4358 | 10K/18356 | |
| Aerial system | 4359 | 10B/17409 | |
| Junction box | 4832 | 10D/19963 | |
| Mounting assembly | 4360 | 10AJ/590 | |
| Shorting plug | | 10H/20596 | |
| Voltmeter | | 5Q/25708 | |
| Waveguide (flexible) | WGD/1127/18 | - | - |
| Waveguide | 16/T3889 | - | - |

## TABLE 2

### Connectors for A.R.I. 5885

| Part No. | Cable form | Connecting |
|---|---|---|
| 4/T3760 | Equipment wire (Spec. DEF. 12)<br>Type 25 - 7/.0076 - 11 off<br>Type 2 - 7/.0076 - 9 off<br>Type 2 - 14/.0076 - 1 off | Aerial "NB" to amplifier "NB" |
| 11/T3760 | Unihighten No.1 | Power unit "NK" to transmitter-receiver "NK" |
| 17/T3760 | **Uniradio** 70 - 1 off<br>Equipment wire (Spec. DEF. 12)<br>Type 2 - 7/.0076 - 3 off<br>Type 2S - 7/.0076 - 6 off | Amplifier 4356 "NJ" to test point |
| 18/T3760 | Equipment wire (Spec. DEF. 12)<br>Type 4 - 14/.0076 - 4 off | Power unit "NL" to transmitter-receiver "NL" |
| 20/T3760 | Uniradio 70 - 1 off<br>Equipment wire (Spec. DEF. 12)<br>Type 2 - 23/.0076 - 6 off<br>Type 2 - 7/.0076 - 6 off<br>Type 2S - 7/.0076 - 8 off | Transmitter-receiver "NA" to amplifier "NA" |
| 3/T5678 | Equipment wire (Spec. DEF. 12 - B)<br>Type 2 - 7/.0076 - 6. off<br>Type 2S - 7/.0076 - 15. off | Mounting **assembly** "ND" to junction box 4832 "ND" |
| 4/T5678 | Equipment wire (Spec. DEF. 12 - B)<br>Type 3 - 7/.0076 - 3. off | Mounting assembly "NNA" to T.B.669 |
| 5/T5678 | Equipment wire (Spec. DEF. 12 - B)<br>Type 2 - 23/.0076 - 3. off | Mounting assembly "NM" to T.B.668 |
| 8/T5678 | Equipment wire (Spec. DEF. 12 - B)<br>Type 2 - 7/.0076 - 1. off<br>Type 2S - 7/.0076 - 1. off | Indicator Elect. 4366 "NQ" to Ind. Elect. 4355 and voltmeter |
| | Miniature cable Type 2A (Spec.DEF.10) | |

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TABLE 2 (Cont'd)

| Part No. | Cable form | Connecting |
|---|---|---|
| 9/T5678 | Equipment wire (Spec. DEF. 12 - B)<br>Type 2 - 7/.0076 - 17. off<br>Type 2S - 7/.0076 - 3. off | Mounting Assy. "NC" to Indicator Elect. 4366 "NC" |
| 2/T5962 | Equipment wire (Spec. DEF. 12 - B)<br>Type 2 - 7/.0076 - 1. off<br>Type 2S - 7/.0076 - 5. off | G.P.I. Mk.4C "LD" to junction box 4832 "NS" |
| 3/T5962 | Equipment wire (Spec. DEF. 12 - B)<br>Type 2 - 7/.0076 - 3. off<br>Type 2S - 7/.0076 - 3. off | G.P.I. Mk.4C "LP" to junction box 4832 "NR" |
| 4/T5962 | Miniature cable, Type 3C (Spec. DEF.10) | Junction box 4832 "NH" to A.D.R.I.S. J.B."8" |
| 5/T5962 | Equipment wire (Spec. DEF. 12 - B)<br>Type 2 - 7/.0076 - 5. off<br>Type 2S - 7/.0076 - 6. off | Aerial "NP" to junction box 4832 "NP" |

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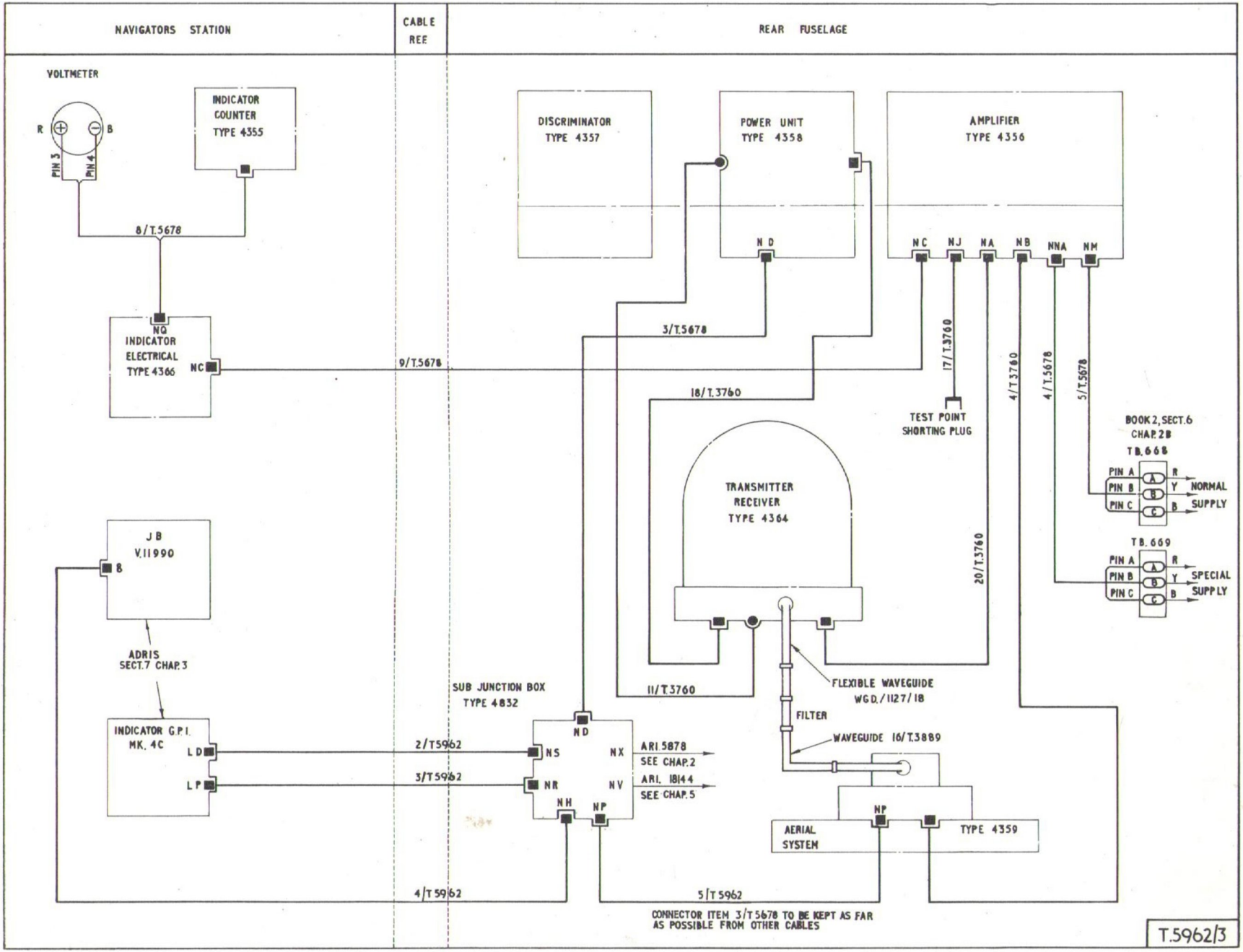


Fig.3 - A.R.I. 5885