Chapter 2A
A.R.I.23134/5/4

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Completely revised

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Introduction

1. This chapter provides descriptive and servicing information on the A.R.I.23134/5/4. A location diagram of the main units and a routing chart of the installation are included.

The following modifications are incorporated:-

Mod.2155 - To introduce A.R.I.23134/5/4, I.F.F./SSR (Cossor 1520) in lieu of A.R.I.5848.

Mod.2292 - To introduce automatic height encoding facilities.

Mod.2304 - To introduce A.R.I.18228/1 in lieu of A.R.I.18105.

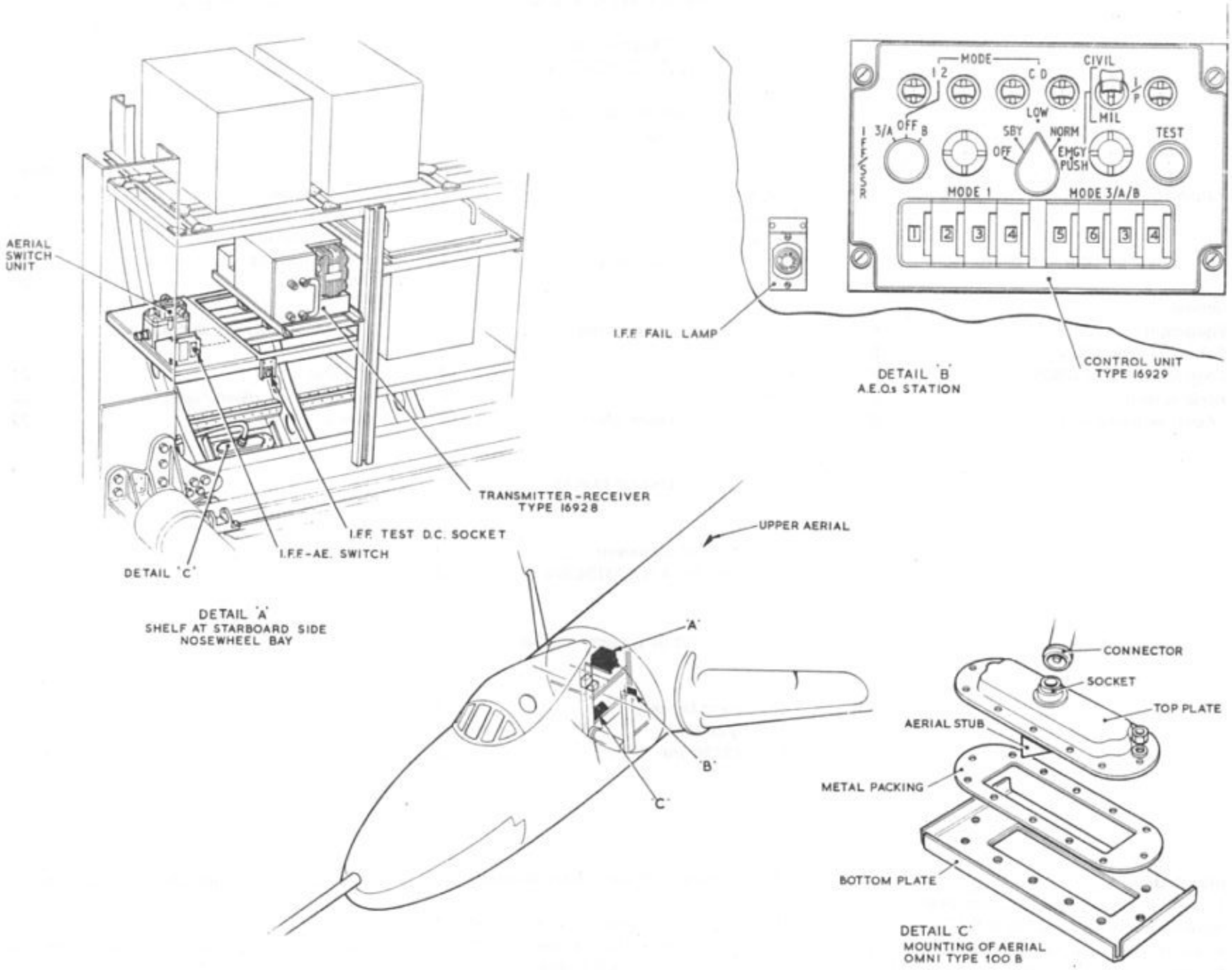

Fig. 1 Component location

◄ *Mod. 2304 incorporated* ►

DESCRIPTION AND OPERATION

General

2. A.R.I.23134/5/4 is the airborne part of an I.F.F. Mk.10 secondary surveillance radar system (I.F.F./S.S.R.) which identifies targets detected by a ground based primary radar.

3. The equipment receives and decodes any one of six channels (modes) of interrogation pulses from a ground radar and automatically transmits a pre-selected coded signal to the ground radar. The ground radar decodes the reply signal and ascertains if it is the correct answer to the mode of interrogation, thus identifying the target aircraft.

EQUIPMENT

4. The equipment consists of a transmitter/receiver unit (transponder), two aerials, an aerial switching unit and a control unit as shown in fig.1. In addition there are associated switches, cables and a T.R. mounting tray. The units are described briefly in the following paragraphs. Full details are in A.P.114J-0101-16.

T.R.unit, Type 16928

5. The T.R. unit, Type 16928, is a pressurized airborne transponder. Pressurization to 4 lb/in^2 with dry nitrogen is via either of the two Schrader valves on the unit front panel. The r.f. connection to the unit is via a co-axial AERIAL socket also on the front panel. Electrical connections to the transponder are via a 98-pole plug fitted to the rear of the unit.

6. The transponder receives an encoded height output from the Mk.30A altimeter, for altitude reporting when Mode C is selected on the control unit. Connections are made via a 19-pole plug break fitted under the I.F.F. transmitter/receiver shelf (fig.2). For further details of the height encoding system reference should be made to Sect.7, Chap.2.

Control unit, Type 16929

7. The control unit, Type 16929, contains switches and selectors which control the operation of the transponder. The front panel of the unit, which is illuminated by two red lamps, is illustrated in fig.1. Electrical connections are via a rear mounted 55-pole plug. The control unit incorporates a self-test facility to check the transponder.

Aerial system

8. This system consists of two Omni, Type 100B, aerials fitted one to the upper surface and one to the lower surface of the aircraft. The upper aerial is on the bomb bay roof forward of the A.D.F. loop and the lower aerial is on the under surface of the fuselage, starboard of the nose wheel bay. In addition, an aerial switching unit is provided.

Aerial switching unit

9. The aerial switching unit, Type 5895-99-107-1521, is a solid state co-axial switch which connects the transponder alternately to the upper and lower aerials. The switching rate is 40 ± 4 Hz. The r.f. connections to the unit are via three Type C sockets. The 28-volt d.c. supplies to operate the unit are via a six-pole plug on the side of the unit.

Aerial test switch

10. A three-position switch labelled I.F.F. AE-UPPER/FLIGHT/LOWER is secured to a bracket in front of the aerial switching unit and is used to couple either the upper or lower aerial to the transponder when testing the installation. The switch must be locked in the FLIGHT position for normal operation

POWER SUPPLIES

11. The installation power supplies are:-

(1) 28-volt d.c. via fuse 693 (panel 48P) and relay 337.

(2) 28-volt d.c. via fuse 828 (panel 19P)

(3) 115-volt, 400 Hz single-phase, via fuse 233B (panel 28P) and relay 337.

NOTE . . .
Relay 337 is energized when the control unit function switch is set to STBY, NORM or EMGY.

For further details of the supplies reference should be made to Sect.6, Chap.7.

Test socket

12. An I.F.F. TEST (d.c.) six-pole socket is secured to a bracket below the transponder

shelf. A 28-volt d.c. supply via fuse 836 (Panel 19P) is fed to pole F and the earth return cable is connected to pole E. (Sect.6, Chap.7).

I.F.F. FAIL indicator lamp

13. An amber I.F.F. FAIL indicator lamp fitted at the navigation panel (A.E.O's station) lights in the event of equipment failure. A built-in press-to-test facility checks the serviceability of the lamp filament, dimming of the lamp is achieved by turning the lamp cover.

TABLE 1

Major items of equipment

Item	Type	Ref. No.	Location
Transmitter-receiver	16928	5895-99-956-3378	Nose wheel bay
Control unit	16929	5895-99-956-3379	Navigator's panel
Aerial switch unit	-	5895-99-107-1521	Nose wheel bay
Aerial Omni	100B	10B/20275	A/C. top skin
Aerial Omni	100B	10B/20275	A/C. lower skin
IFF FAIL indicator lamp	Page C1101/C/7	-	Navigator's panel
IFF AE switch	Rotax D13033	-	Nose wheel bay

TABLE 2

Connectors for A.R.I.23134/5/4

Part No.	Cable form	Connecting		
2T7774	Minyvin 22	Transmitter/receiver	to	(a) Mode C plug break (b) T.B's 646 and 676 (c) R.P.B.1232
4T7774	Minyvin 22	Aerial switching unit	to	(a) Aerial test switch (b) T.B. 646
5T7774	Minyvin 22	Aerial test switch	to	T.B. 646
6T7774	Uniradio 67	Transmitter/receiver	to	Aerial switching unit
7T7774	Uniradio 67	Aerial switching unit	to	I.F.F. lower aerial
8T7774	Uniradio 67	Aerial switching unit	to	I.F.F. upper aerial
10T7774	Minyvin 22	I.F.F. FAIL lamp indicator	to	T.B. 1846
11T7774	Minyvin 22	Control unit	to	(a) R.P.B. PL 1232 (b) I.F.F. FAIL lamp ind. (c) T.B. 1200 (d) Earth

SERVICING

Precautions

14. Servicing personnel are warned that a.c. and d.c. voltages in excess of 100-volts can cause fatal personal injury. It is essential that the utmost attention be given to safety and servicing instructions and that maximum co-operation be maintained between servicing trades.

NOTE . . .
Before carrying out functional checks it is essential to ensure that both upper and lower aerials are correctly connected to the aerial switching unit otherwise a failure of the internal switching diode may result.

General

15. Full information on servicing, functional tests and test equipment is contained in A.P.114J-0101-16. The various units of the installation are to be checked at the appropriate servicing periods for security of attachment, signs of corrosion, damage and correct bonding of the mountings. Cable assembly plugs and sockets are to be checked for security and ingress of moisture. The aerial test switch should be checked to ensure that it is locked in the FLIGHT position.

Transponder pressure check

16. At each inspection, check the transponder pressure and if it is below 4 lb/in.^{2} repressurize, using kit, nitrogen-charging (Ref.No. 4GD/10671) until this value is reached.

Power supplies

17. The supplies to the installation can be checked using a test set Multirange No.1 (Ref.No. 5QP/1057049), at T.B.646 and T.B.676. The terminal blocks are located on a shelf behind the aerial switching unit.

Altimeter encoder/I.F.F. transponder system test

18. The following test will check the encoded output from the altimeter, through the transponder and aerials of the I.F.F./S.S.R. system to a test set simulating the ground station.

Test equipment

19. The following test equipment is required:-

(1) Pitot-static test set Mk.5

(2) Pressure head adaptors, static vent plugs and adaptors

(3) I.F.F. test set, Type CRM 544

Procedure

20. Connect up the 200-volt a.c. and 28-volt d.c. ground supplies to the aircraft and carry out the following tests:-

(1) Couple the port and stbd. pitot heads and the static vents to the STATIC OUTLET on the pitot-static test set.

(2) Connect a 28-volt d.c. supply to the pitot-static test set.

(3) Position the I.F.F. test set so it has an unobstructed view of the I.F.F. aerials.

(4) Connect a 28-volt d.c. supply to the test set.

(5) Erect the aerial on the test set and couple the lead.

(6) Check that the Mk.30A altimeter power failure shutter has cleared from view. The Mk.30 altimeter 'P.F.' fail warning flag should clear from view within 75 seconds.

(7) Switch 'ON' the test set and check that the power lamp lights.

(8) Select the test set 'FUNCTION' switch to 'SELF TEST' and check that the meter reading is within the green band on the upper scale.

(9) Select the 'FUNCTION' switch to 'REPLY-3-P-SLS' and the 'MODE' switch to 'C'.

(10) Set the ground pressure setting to 1013.25 mb on the Mk.30A and test set altimeters.

(11) Select the I.F.F. control unit 'FUNCTION' switch to 'STANDBY'. Wait one minute, then select to 'NORM'.

(12) Select the I.F.F. control unit MODE switch 'C' to ON.

(13) Adjust the code selectors on the I.F.F. test set to read:-

A	B	C	D
6	7	3	0

(14) Switch on the pitot-static test set and slowly reduce the static pressure until the Mk.30A altimeter reads 9 400 ft. Check that the test set meter indicates within the green band on the upper scale.

(15) Adjust the code selectors on the test set to read:-

A	B	C	D
1	0	4	4

(16) Reduce the static pressure on the pitot-static test set until the Mk.30A altimeter reads 30 800 ft. and check that the I.F.F. test set meter indicates within the green band on the upper scale.

(17) Return the static pressure to atmospheric and switch off the pitot-static test set.

(18) Switch off the I.F.F. test set.

(19) Disconnect the pitot-static and I.F.F. test sets from the aircraft and disconnect the ground supplies.

REMOVAL AND INSTALLATION

General

21. Removal of the main units is straightforward and no special instructions are required.

I.F.F. FAIL indicator lamp

22. When replacing the I.F.F. FAIL indicator lamp filament it is essential that only a 28-volt 0.4 amp filament Ref.No. 5L/6420-99-9959118 is fitted, otherwise damage will be caused to the transponder.

Aerials

23. When fitting replacement aerials, the surplus alkathene on the aerial body must be trimmed flush with the contour of the aircraft skin. The gap between the aerial and the aircraft skin is to be filled with rubber resin cement to Spec. C.S.2558 (Ref.No. 33C/1173). A good electrical contact between the aerial base and the aircraft skin is essential.

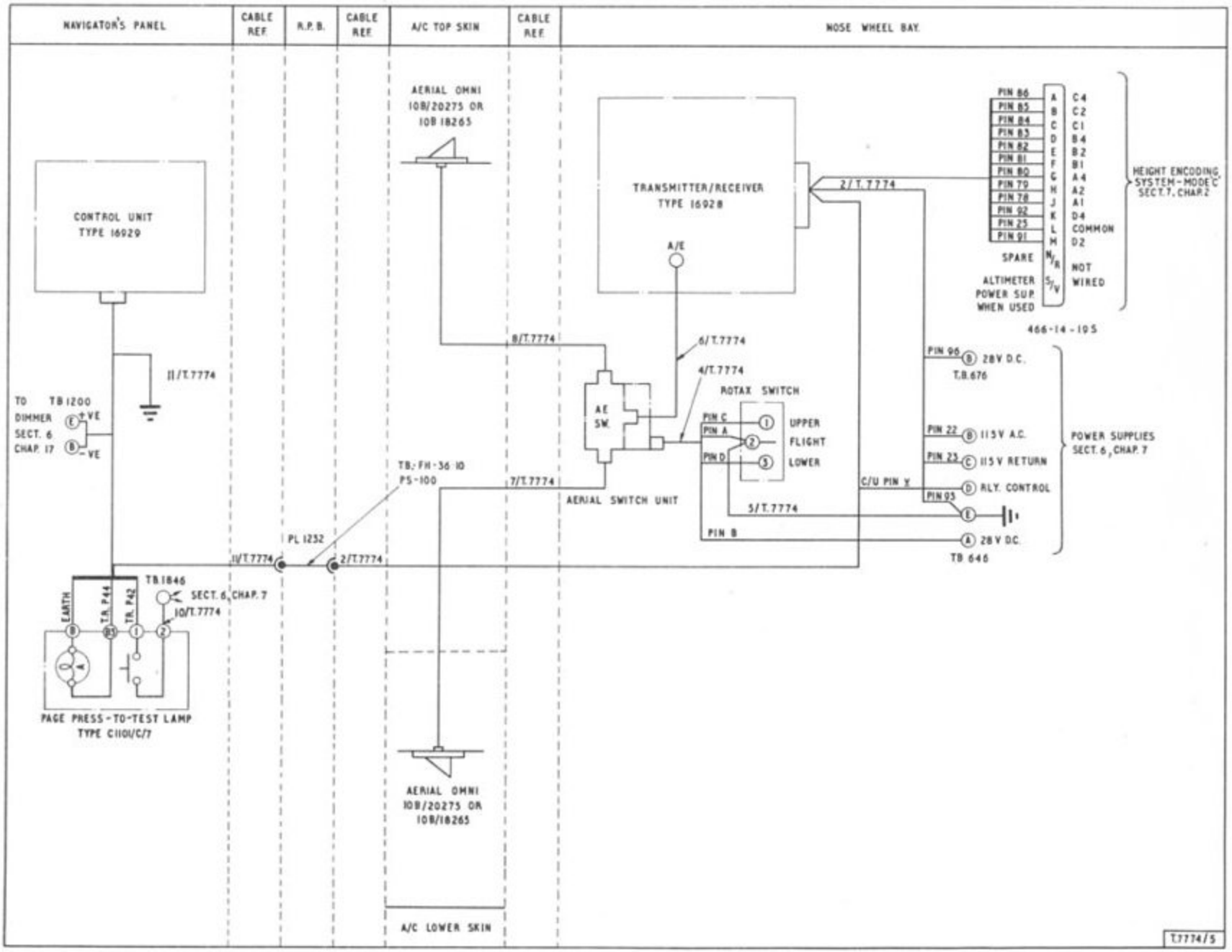

Fig. 2 A.R.I. 23134/5/4
◀Mod 2292▶

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