

Group 2 ALTIMETERS

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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.

DESCRIPTION

Introduction

1. This group contains brief descriptive notes on the operation of the items of equipment used in the altimeter installations and the functioning of the systems. The servicing notes, in this group, consist only of the checking of the power supplies to the installations as all necessary information on the testing and servicing of the installations, together with detailed descriptions of the operation of the items of equipment used in the installations, is given in the relevant Air Publications. The Air Publication applicable to each system is given in the appropriate paragraphs.

A.R.I.5378—LOW LEVEL RADIO ALTIMETER Mk. 5

Introduction

2. The low level radio altimeter is provided to measure the height of the aircraft above the terrain directly beneath it. The working range is 0 to 5,000 ft. calibrated at 20-ft. intervals. The accuracy of the indicated height is ± 5 ft. and ± 3 per cent. The former figure is the accuracy limit to which the indicator pointer can be read and 3 per cent is the accuracy of the electrical and mechanical circuits in the equipment.

3. Two identical circuits are employed, a transmitter aerial and a receiver aerial. The transmitter transmits a signal which is picked up by the receiver aerial. The receiver aerial picks up the signal twice, direct from the transmitter aerial and again after the signal has reached the ground. Each signal is fed into the receiver where they are correlated, the altitude of the aircraft being determined by the time lag between the reception of the signals. Signals are then fed to the altitude indicators and the indicator lamps which indicate to the pilot his altitude and the error between the

altitude recording and the altitude set on the switch unit.

4. For detailed information on the operation of the items of equipment used in the system reference should be made to A.P. 2533H, Vol. 1.

Transmitter-receiver Type TR.1576

5. This unit mounted in the rear fuselage, is pressurized in a container so that the unit is unaffected by pressure differences at varying altitudes. It is a frequency modulated unit working in a frequency range of 1605 to 1655 Mc/s.

Power unit Type T.814

6. The power unit, mounted in the rear fuselage, obtains its supply from the aircraft 24-volt supply. A carbon pile voltage regulator incorporated in the unit supplies the required 19.5 volt stabilized supply for the valve heaters while a rotary transformer inside the unit provides the 250 volts for the system. The power unit is enclosed in an unpressurized container fitted with air filters. The H.T. circuits are protected by a 250mA fuse which is accessible through the front panel of the unit. The SET REGULATOR control is also accessible through the front panel of the unit.

Indicators, Type 10

7. Two indicators are fitted, one on each of the pilots instrument panels. The indicators are sealed units and indicate height, in multiples of 1,000 ft. on a counter mechanism and sub-divisions of 1,000 ft. by means of a pointer, on a graduated circular scale.

Indicators, Type 7230

8. Two indicators are fitted, one on each of the pilots instruments panels. The indicator, known as the limit height indicator,

indicates by the lighting of an amber, green or red lamp whether the height, indicated on the altimeter indicator, is above, below or at the pre-selected height set on the height limit selector switch unit Type 7231. The lamps when operating indicate the following:

RED	—Below height (more than 15 ft).
AMBER	—Above height (more than 15 ft).
GREEN	—At height (within ± 15 ft).
RED and AMBER	—Power failure

Each lamp filament can be tested by pressing on the coloured cap.

Switch unit, Type 7231

9. The switch unit mounted on the starboard console, is a sealed unit and comprises a selector switch which can select independently ten different height settings between 0 and 1,000 ft.

Aerials, Type 7059

10. The aerials, mounted one on the port side and the other on the starboard side of the rear fuselage are identical dipoles, one being used for transmitting and the other for receiving.

Power supply

11. Pre Mod. 2362 or 2446 the 28 volts d.c. supply for the power unit, Type T814, is fed from the 80 amp. H.R.C. NAV. fuse on panel Z, via the LOW LEVEL RADIO ALTIMETER control switch, mounted on the ◀pilot's port coaming panel (control pedestal pre Mod. 2437).▶

12. Post Mod. 2362 or 2446 the 28 volts d.c. supply for the power unit, Type T814,

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is fed from the 20 amp. H.R.C. W/T No. 5 fuse on panel-Z, via the LOW LEVEL RADIO ALTIMETER control switch, mounted on the port pilot's coaming panel (control pedestal, pre Mod. 2437).▶

A.R.I.5380—HIGH LEVEL RADIO ALTIMETER Mk. 6 (pre. Mod. 2037)

Introduction

Note . . .

Mod. 2037 introduces A.R.I.18090. High level radio altimeter Mk. 6A. The system functions the same as the Mk. 6 the only difference between the two systems being that Transmitter receiver Type TR.7923 and Indicator Type 7921 are introduced in lieu of Transmitter receiver Type TR.1579 and Indicator Type 7209.

The transmitter receiver Type TR.7923 is fitted with a motor, which is controlled by a double pole C/O switch, to enable fast and slow tuning of the oscillator.

13. The high level radio altimeter is designed to measure, with a pulsed radar technique, the terrain clearance in the range of 500 to 50,000 ft. The principle of the system is the same as the low level altimeter system except that the height information is presented on a cathode ray tube display, consisting of two concentric circles on which pulses appear as outward deflections. For

detailed descriptions of the operation of items of equipment used in the installation reference should be made to A.P.2533G, Vol. 1.

Transmitter receiver, Type TR.1579

14. This unit, mounted in the battery bay, is enclosed in a metal can which fits over the front cover and is secured by a constricting steel strap. A rubber O ring between the front cover and the can makes an airtight pan climatic seal. A blower is mounted on the rear end of the unit under a cowl which directs the air stream over the surface of the can.

15. All plugs and sockets for external connection are mounted on the front cover, which also mounts a desiccator and two Schrader valves for the introduction of dry air into the unit. The unit operates in a frequency band of 1600 to 1660 Mc/s.

Indicator, Type 7209

16. The indicator unit, mounted on the radio crate, is enclosed in a metal can in the same manner as the transmitter receiver. It houses the display tube and manual controls are also mounted on the front cover, which may after removal of the radial securing screws inside the pressure seal, be pulled away sufficiently to allow access to the components or for the display tube to be

changed. Below the display screen is a threaded hole into which a desiccator is fitted.

Aerials, Type T7284

17. The dipole and reflector elements of the Mk. 6 radio altimeter aerials are contained in parabolic dishes of 18 inches in diameter. The aerials, transmitter starboard and receiver port, are mounted in the underside of the fuselage forward of the bomb bay deflector. Post Mod. 2307 the aerials are mounted each side of the air mileage unit. The dishes are each covered with a di-electric.

Power supplies (pre-Mod. 2037)

18. The supplies for the system are taken from the power distribution box, mounted in the radio crate. Both the 24 volts d.c. supply and the 115 volts, 1,600 c.p.s., a.c. supply are connected to the system via the RADIO ALTIMETER switch, mounted on the front of the power distribution box, and thence to the transmitter receiver.

Note . . .

Post Mod. 2037 there is an OSCILLATOR TUNING switch, mounted on the radio crate. The supplies are the same as pre-Mod. 2037 except that the 24 volts d.c. supply is paralleled, from the RADIO ALTIMETER switch to the transmitter receiver and OSCILLATOR TUNING switch.

Table 1
A.R.I.5378—Low level radio altimeter Mk. 5 equipment

Item	Type or Ref. No.	No. off	Location
Transmitter receiver	TR.1576	1	Rear fuselage
Mounting	1032	1	Rear fuselage
Mounting assembly	1033/1	1	Rear fuselage
Aerial	7059	2	Rear fuselage
Reflector	37	2	Rear fuselage
Switch unit	T.7231	1	Starboard console
Power unit	T.814	1	Rear fuselage
Indicator	10	2	Port and starboard instrument panels
Indicator	7230	2	Port and starboard instrument panels
◀Switch	5C/4184	1	Pilots port coaming panel (pre. Mod. 2437 control pedestal)▶

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Table 2
A.R.I.5380—High level radio altimeter Mk. 6 equipment

Item -	Type or Ref. No.	No. Off	Location
Indicator	7209	1	Radio crate
Mounting (cradle)	1038	1	Radio crate
Mounting	1040	1	Radio crate
Aerial	T.7284	2	Rear fuselage
Transmitter-receiver	TR.1579	1	Battery bay
Mounting	1032	1	Battery bay
Mounting assembly	1033/2	1	Battery bay

Table 3
A.R.I.18090—High level radio altimeter Mk. 6A equipment

Item	Type or Ref. No.	No. Off	Location
Indicator	7921	1	Radio crate
Mounting (cradle)	1038	1	Radio crate
Mounting	1040	1	Radio crate
Aerial	T.7284	2	Under battery bay
Transmitter-receiver	TR.7923	1	Battery bay
Mounting	1032	1	Battery bay
Mounting assembly	1033/2	1	Battery bay
Switch		1	Radio crate

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 system is electrically safe before any servicing is attempted. When it is essential that tests or adjustments are to be made with the electrical power switched on the greatest care must be exercised.

Introduction

19. For detailed information, on the servicing

of items of equipment used in the various installations and the tests to be carried out on the installation, reference should be made to the relevant Air Publications.

20. Detailed descriptions of the general tests to be applied to all aircraft circuits can be found in the General Information group contained in Book 2 immediately after Section 5 marker card.

A.R.I.5378—Low level radio altimeter Mk. 5

21. Descriptions of all the tests to be

carried out on the installation can be found in A.P.2533H, Vol. 1.

22. To check the power supply to the installation proceed as follows:—

- (1) Check the circuit fuse and connect a 28-volt d.c. supply to the aircraft external supply socket.
- (2) Select the 24-VOLT BATTERY switch to ON.
- (3) Connect a voltmeter between connection AD5, on the port console panel C and earth.

R E S T R I C T E D

(4) Select the LOW LEVEL RADIO ALTIMETER switch to ON then OFF a few times and check that when selected to ON the voltmeter reading is approximately 24 volts.

(5) Select the LOW LEVEL RADIO ALTIMETER switch to OFF and disconnect the voltmeter.

A.R.I.5380 and A.R.I.18090—High level radio altimeters Mk. 6 and 6A

23. Detailed descriptions of all the tests to be applied to the installation can be found in A.P.2533G, Vol. 1.

24. To check the power supplies to the installation pre-Mod. 2037 proceed as follows:—

(1) Check the circuit fuses in the power distribution box.

(2) Connect 112-volt and 28-volt d.c. supplies to the aircraft external connection.

(3) Disconnect the plug identified RED

and BLACK from the power distribution box.

(4) Switch on No. 2 radar inverter, Type 350.

(5) Select the RAD. ALT. switch on the power distribution box to ON.

(6) Connect a suitable voltmeter between pin D of the RED and BLACK socket; on the power distribution box, and earth and check that the voltmeter reading is 24 volts approx.

(7) Connect a suitable voltmeter between pin A of the RED and BLACK socket, on the power distribution box, and earth and check that the voltmeter reads 115 volts.

(8) Disconnect the voltmeter. Select the RAD. ALT. and NO. 2 RADAR INVERTER switches to OFF and reconnect the plug to the power distribution box.

25. To check the power supplies to the installation post Mod. 2037 proceed as follows:—

(1) Repeat items 1 to 7 as for pre-Mod. 2037.

(2) Connect a suitable voltmeter between pin B of the RED and BLACK socket on the power distribution box and earth.

(3) Select TUNE 1 on the OSCILLATOR TUNING switch and check that the voltmeter reads 24 volts approx.

(4) Connect a suitable voltmeter between pin F of the RED and BLACK socket on the power distribution box and earth.

(5) Select TUNE 2 on the OSCILLATOR TUNING switch and check that the voltmeter reading is 24 volts approx.

(6) Disconnect the voltmeter. Select the OSCILLATOR TUNING switch to OFF. Select the RAD. ALT. and NO. 2 RADAR INVERTER switches to OFF. Reconnect the RED and BLACK plug to the power distribution box.

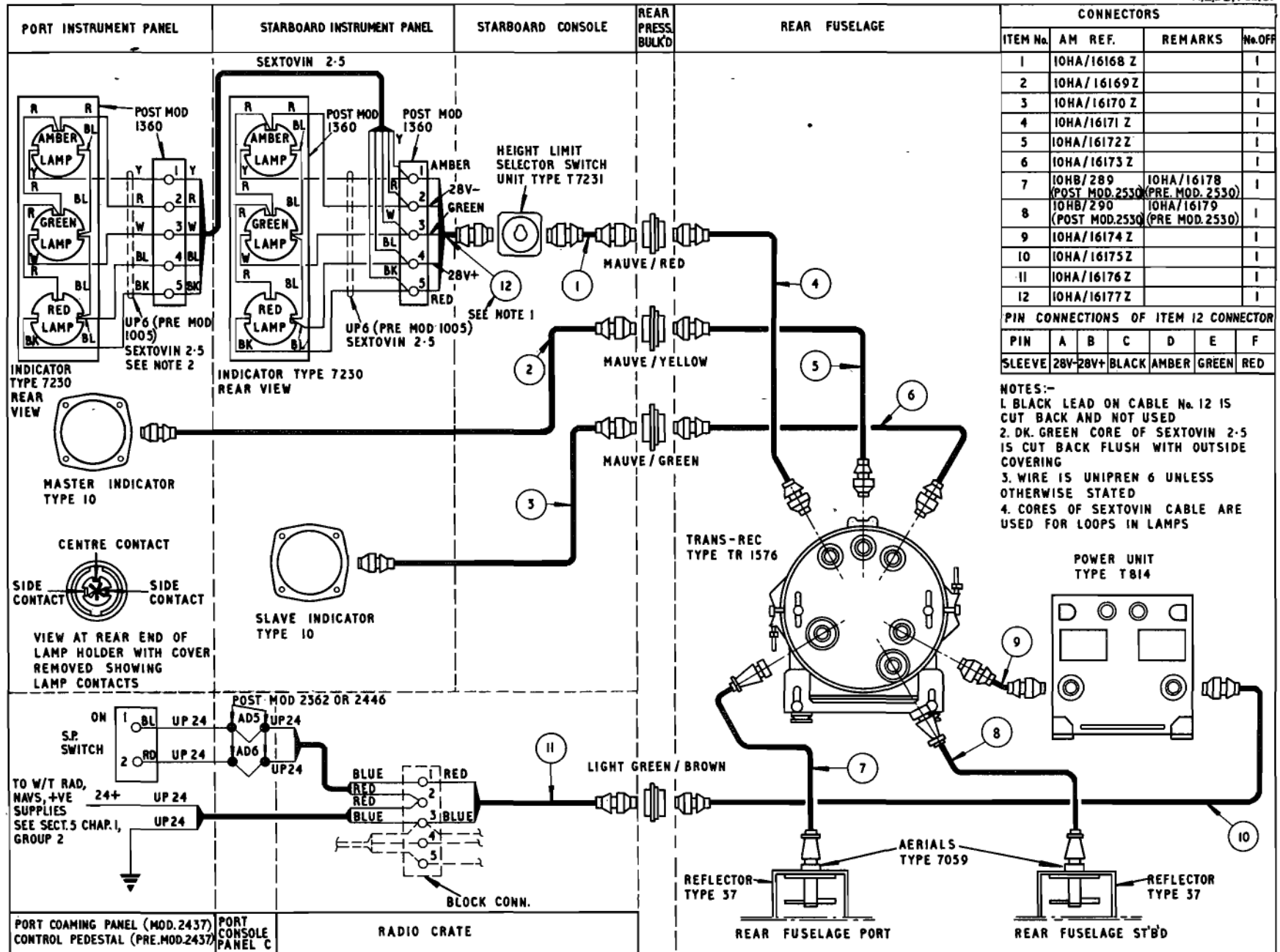


Fig. 1 A.R.I. 5378 Low level radio altimeter MK.5 (post Mod 2372)

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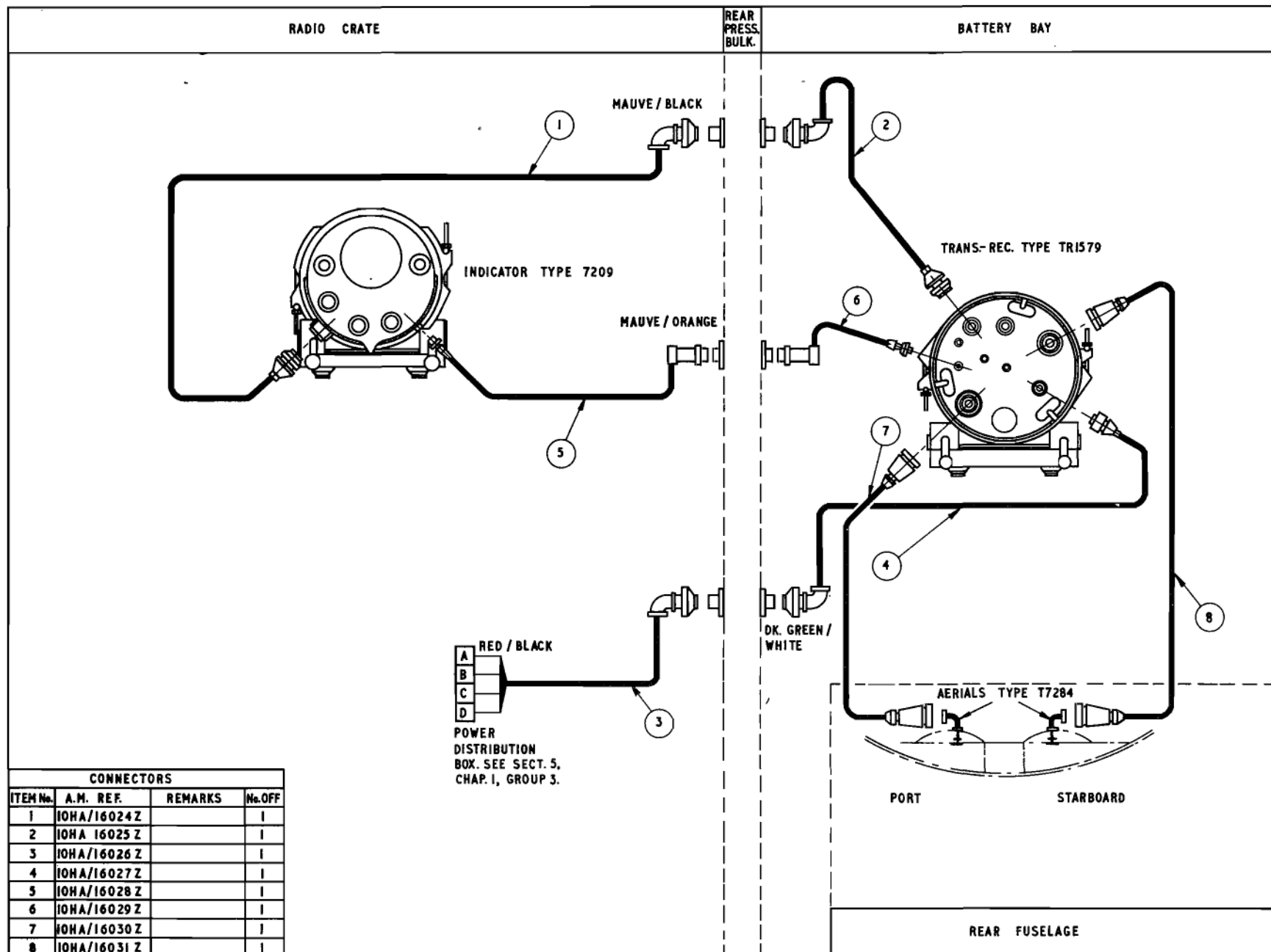


Fig. 2. A.R.I. 5380. High level radio altimeter Mk. 6 (pre Mod. 2037)
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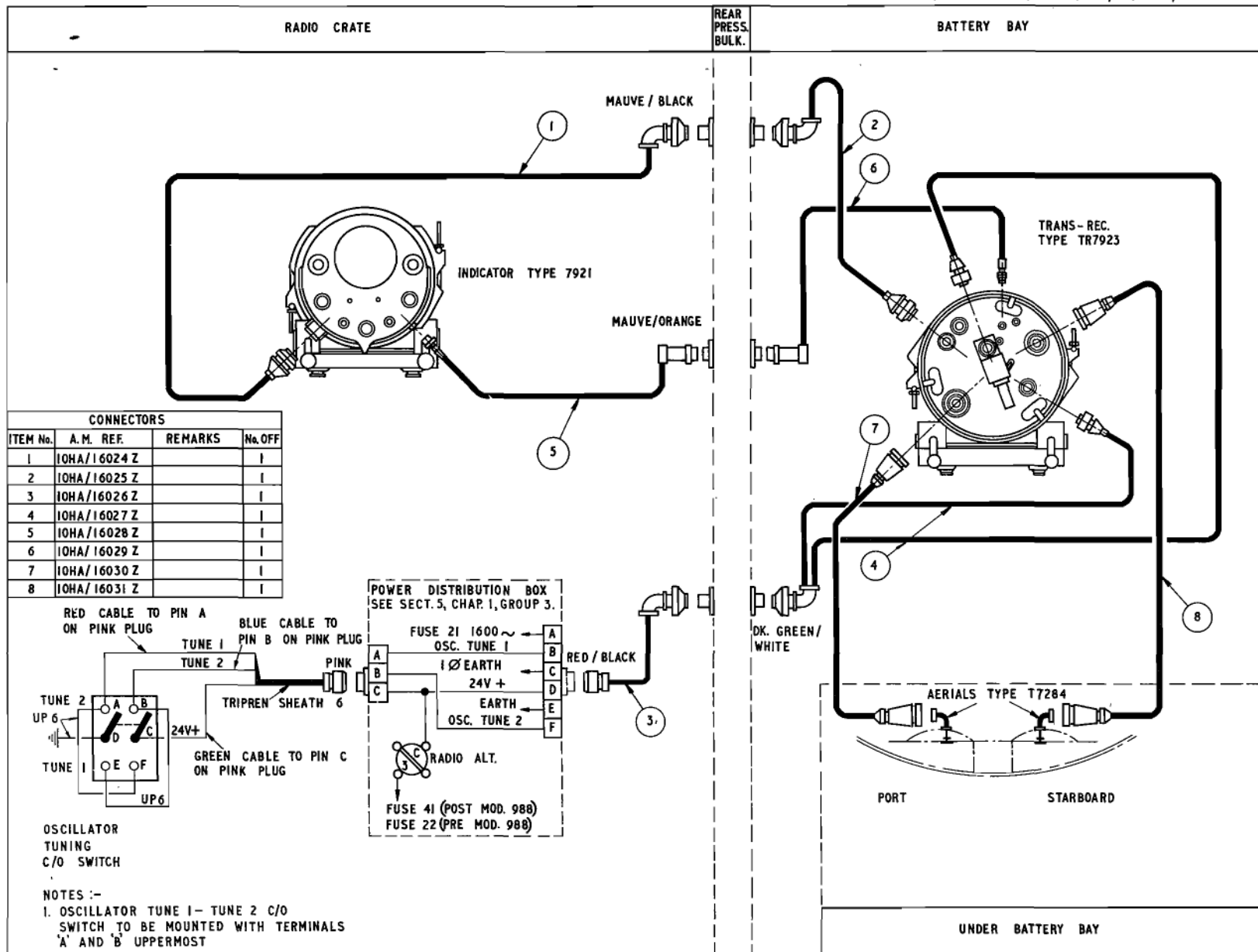


Fig. 3 A.R.I. 18090. High level radio altimeter Mk. 6A (post Mod. 2037)

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