### Chapter 8

### A.R.I. 18011

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Introduction

The A.R.I.18011 (I.L.S.) receiving 1. equipment is installed to provide a landing approach aid. Details of the installation are illustrated in fig.1. The aerials are illustrated in fig.2 and 3. A routeing chart is contained in fig.4. Table 1 lists the principle items of equipment and Table 2 lists the connector assemblies.

2. The installation provides a radio guide along a prescribed approach path to a runway and enables the aircraft to

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descend to a low altitude without sight of the ground. Use of the system is of particular value in conditions of bad visibility when a successful approach can be made to a point at which sight of the ground or landing lights will permit a landing to be made.



### DESCRIPTION AND OPERATION

### Receiver equipment

3. The receiver equipment operates on transmissions from ground beacons and visual indication of the aircraft's position relative to the runway touchdown point is given by the pilot's indicator, Type 7. The approximate distance to the touchdown position at three fixed positions along the approach is heard in the pilot's headset or by code blinking of the marker lamps.

The localizer receiver operates at 4. any one of twelve spot frequencies in the range from 108 Mc/s. to 112 Mc/s. The glidepath receiver operates at any one of twelve spot frequencies in the range from 329 Mc/s. to 335 Mc/s. The marker receiver is fixed at 75 Mc/s. Separation between adjacent localizer channels is 300 Kc/s; a total of forty localizer channels and twenty glidepath channels are thus available. Selection of both the glidepath and localizer channels is made from the control unit, Type 705, on the pilot's canopy control panel.

5. Audio signals from the I.L.S. are connected to the 1st pilots' intercomm. headset and connection is made direct to the tel. circuit from the i/c. J.B.7684, plug L (Chap.2).

6. To enable an automatic let-down to be made the I.L.S. is coupled from the junction box, Type 164, to the approach coupling unit of the automatic pilot, Mk.10 (Sect.7, Chap.7).

### Equipment details

#### Receivers

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7. The receiver units, Type R.1964

and R.1965, are mounted side by side on a double rack positioned on a mounting tray at the tactical navigator's station. Connections to both units are provided by the junction box, Type 157, which is fitted at the rear end of the mounting (fig.1). Each receiver slides into the rack and is positioned accurately by locating pins which project from the front of the junction box. A spring loaded carrying handle at the front of each receiver is held by a spring-loaded clamp on the front member of the rack to secure the receiver.

#### Indicator

8. The I.L.S. signals are displayed on an indicator, Type 7, fitted on the 1st pilots' instrument panel (Sect.7, The indicator is a crossed Chap.1). pointer instrument; the vertical pointer is operated by an output from the localizer receiver, the horizontal pointer is operated by an output from the glidepath receiver. The pointers will move to the opposite quadrant as the aircraft deviates from the lateral or longitudinal path of the runway, so that in order to meet the correct approach path the aircraft must fly towards the When the aircraft is on the pointers. correct approach, the pointers are crossed at the centre.

#### Junction box

9. The junction box, Type 164, is fitted at former E on the port side of the aircraft. The box provides a connecting point for the receivers, indicator, marker lamp, auto-pilot and zero reader.

#### Aerials

10. Three aerials are fitted. The

localizer and glidepath aerials are combined in a single unit, Type 236, and a suppressed aerial, Type 237, is used for marker operation.

11. The aerial, Type 236, consists of a streamlined metal tube supporting the aerial assembly at the end. The glidepath aerial takes the form of an horizontal dipole at the front, and a swept back aerial at the rear forms the localizer aerial. The assembly is fitted on the aircraft centre line under the nose section.

12. The suppressed marker aerial, Type 237, is fitted in the rear section of the fuselage between formers 29 and 30. A plastic cover is fitted over the aperture. A screwed plug is fitted in the plastic cover to provide access to a trimmer on a loading capacitor.

#### Power supplies

13. Power at 28-volt, d.c. is supplied to the equipment from fuse BT8 at the signaller's station and is controlled by a single-pole switch, labelled I.L.S. MASTER - ON, fitted on the pilot's canopy panel. The supply is fed to a rotary transformer within each receiver to provide H.T. and also to a voltage control panel, Type 60. The voltage control panel which is of the carbon pile type, is fitted aft of the receivers. The output is stabilized at 19 volts for valve heater supplies.



### SERVICING

Precautions

14. Before any servicing is attempted the precautions outlined in Chapter 1 should be noted.

#### General

15. The various units of the installa-

tion should be checked at the appropriate inspection periods for security of attachment, damage, corrosion and the correct bonding of the mountings. Cable assemblies should be checked for tightness of connection at the units and any signs of damage.



Fig.3 Assembly of aerial, Type 237

16. Servicing instructions, including information on testing and the setting up procedure is contained in A.P.2434E, Vol.1.

#### Test gear

17. Several items of test gear are available for servicing the equipment. These items are as follows:-

(1) Test set, Type 391

(2) Test rig (installation), Type 5

(3) Signal generator, Type 69

18. First line servicing requirements are satisfied by the test set, Type 391, which is used for in situ testing of the installation. For second and third line servicing, a bench assembly is provided in the test rig, Type 5, used in conjunction with the signal generator, Type 69. The test equipment, including the necessary operating instructions, is dealt with in A.P.2534G, Vol.1.

#### Voltage control

19. The 19-volt output may be conveniently checked, using a suitable voltmeter, across terminals C and E of T.B.710 when the power supply switch on the pilot's canopy panel is placed to ON. The terminal block is located near the voltage control panel on the tactical navigator's shelf. Full details for servicing the voltage control panel will be found in A.P.4343B, Vol.1, Book 1, Sect.1.

Aerials

20. The aerials, Type 236 and 237, should be inspected at the appropriate intervals for security, cleanliness and signs of damage.

### Receiver removal

21. The receivers can be easily removed by releasing the retaining catch which grips the case at the front of the mounting and withdrawing the receiver out and away from the mounting tray.

### **Receiver** fitting

22. When refitting the two'receivers make sure that the plugs and sockets on the mounting tray junction box align with their counterparts on the receivers and that the units are secure in the mounting tray.

### Control unit, Type 705

23. The control unit can be released from the pilot's canopy by lowering the panel to the full extent of the check cord and removing the securing screws attaching the unit to the panel.

### Indicator, Type 7

24. The indicator can be removed from the pilot's instrument panel by first releasing the quick release fasteners securing the panel and removing the fixing screws attaching the indicator to the panel. Care should be taken when lifting the instrument panel away that electrical connectors or rubber tubes connected to other instruments are not strained or damaged.

### TABLE 1

### Major items of equipment

Item	Туре	Ref. No.	A.P. reference
			An interence
Marker receiver	R1964	100/17819	
Glide path receiver	R1965	10D/17810	
Junction box	157	10D/17815	
Junction box	164	10D/17021	
Control unit	705	101/263	A.P.2534E, Vol.1
Indicator	7	100/61	
Localizer aerial	236	100/01	
Voltage control panel	60	5UC/5418	A.P.4343B. Vol 1 Book 1 Soot

## TABLE 2

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### Connectors for A.R.I.18011

Item No.	Cable form	Connecting
2/T5666	Uniradio 67	Socket 346 to localiser marker receiver (1P5)
3/T5666	Uniradio 67	Socket 347 to glide path receiver
4/T5666	Uniradio 67	Localizer marker receiver (1P4) to marker aerial
5/T5666	Uniradio 43	Control unit to junction box, Type 157 (12P6)
6/T5666	Uniradio 43	Control unit to junction box, Type 157 (12J2)
7/T5666	Miniature 6C (Spec.D.E.F.10)	Control unit to junction box, Type 157 (12P5)
8/T5666	Miniature 12C (Spec.D.E.F.10)	Junction box, Type 164 (J.B.) to junction box Type 157 (12
9/T5666	Miniature 4C (Spec.D.E.F.10)	T.B.710 (B,C,D,E) to junction box, Type 157 (12P1)
10/T5666	Miniature 4R (Spec.D.E.F.10)	T.B.710 (B,C,D,E) to junction box, Type 157 (12P8)
11/T5666	Miniature 2C (Spec.D.E.F.10)	T.B.477 (A) - T.B.479 (E) to junction box, Type 157 (12P3
12/T5666	Miniature 12C (Spec.D.E.F.10)	Junction box, Type 164 (indicator) to indicator, Type 7
13/T5666	Miniature 2C (Spec.D.E.F.10)	T.B.196 (A.B) to junction box, Type 164 (marker lamp)
21/T3756	Uniradio 43	Localizer glide path aerial to socket 346
22/T3756	Uniradio 43	Localizer glide path aerial to socket 347

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Fig.4 A.R.I. 18011 TOAL 2

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