

Chapter 3 EMERGENCY CONTROLS, EQUIPMENT, AND EXIT - METHOD OF OPERATION

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**WARNING**

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cockpit or performing any operations upon the aircraft.

**EMERGENCY CONTROLS AND EQUIPMENT**

**Alighting gear**

*Emergency raising*

1. An electrically-operated, pitot-

pressure-controlled, locking device in the UP section of the alighting gear selector switch prevents the selector lever being raised at air speeds below 165 knots. In emergency the locking device may be overridden by twisting the lever knob clockwise as far as it will go, then selecting UP in the normal manner.

*Emergency lowering*

2. Emergency lowering of the alighting

gear is controlled by a T-handle which protrudes through the port console. After depressing the release button marked U/C, the handle must be pulled to its full extent to operate the emergency lowering system. Just prior to full travel the handle will leave its guide and be free to lie horizontally so that it causes no obstruction. If the handle has been disturbed, inspection (and resetting, if necessary) of the emergency lowering mechanism (Sect.3, Chap.6) before flight is essential.

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### Ventral tank jettisoning

3. The ventral tank release unit is operated, and the tank jettisoned, by pulling the T-shaped handle, labelled TANK JETN. PULL, positioned below the port instrument panel. The operation can be combined with guided-weapon jettisoning (*para.4*).

### Guided-weapon jettisoning

4. The guided weapons are jettisoned by sideways ejection from their pylons. This operation is initiated by lifting a small flap, labelled WEPN JETN LIFT & PRESS on the ventral tank jettison handle (*para.3*), and depressing the uncovered switch. The operation can be combined with ventral tank jettisoning (*para.3*).

### Cockpit emergency air supply

5. Should a failure occur in the main air supply, or the air in the cockpit become contaminated, fresh air can be introduced under ram pressure through a manually-operated valve fitted in the port side of the fuselage. The valve operating handle marked RAM AIR moves in a gate on the port console; forward for OPEN, backward for CLOSED.

### Warning indicators

6. Indicators which give warning of fire (*para.7*), or of critical failure in the various aircraft systems, are grouped on the standard warning system indicator unit mounted below the port windscreen. Each individual warning is accompanied by the flashing of an attention light and of a light inside the attention cancel switch (C), also by an audio warning in the pilot's head-

set; the attention light is at the side of the light fighter sight and the attention cancel switch is on the indicator unit. Indications of less critical occurrences are grouped on the auxiliary warnings panel mounted below the starboard windscreen. Normally, the auxiliary warnings are not accompanied by the flashing attention light but in certain circumstances this does occur. For details refer to Sect.6, Chap.12.

### Fire warnings and fire extinguishers

7. Warnings of fire or excessive temperature in the engine bays or reheat zones (*Sect.4, Chap.5*) are given by four red indicators, labelled FIRE 1, FIRE 2, RHT.1, and RHT.2 on the standard warning system indicator unit. If a FIRE 1 or FIRE 2 warning appears, the lamp in the associated indicator-switch unit at the aft end of the indicator unit will also be illuminated. Pressing the indicator switch unit push-button discharges the contents of both fire extinguishers into both fire zones of the affected engine bay and, if this extinguishes the fire, the warnings will disappear. There is no fire-extinguishing equipment in the reheat zones and if RHT.1 or RHT.2 appears, reheat must be cancelled immediately on both engines; if the warning persists following this action, the associated engine must be shut down.

### Emergency oxygen

8. The emergency oxygen cylinder is mounted on the rear of the ejection seat, and is connected to the pilot's mask through the personal equipment connector. Pulling up the yellow-and-

black striped knob, on the front of the seat pan at the starboard side, makes the emergency supply available. Transfer to the emergency supply is automatic when the seat leaves the aircraft during ejection.

### Emergency lighting

9. In the event of a d.c. power supply failure, amber floodlights provide illumination for the instrument panels, and integral lamps illuminate the emergency compass and the stand-by direction indicator. The lights are supplied from the emergency battery and are controlled by the EMERGENCY LIGHTS switch on the port coaming panel.

### Emergency compass

10. A Type E2B compass is mounted on the windscreen starboard frame member.

### Ejection seat

11. A Mk.4 BSC ejection seat, incorporating a back-type parachute and a survival pack, is fitted in the cockpit. The ejection sequence, which includes jettisoning of the canopy, is initiated by pulling down the face-screen firing handle or by pulling the alternative firing handle in the seat pan. The safety pins, with red warning discs attached, must remain fitted in the head rest and seat pan at all times other than immediately prior to, and during, flight.

### Pressure-head heaters emergency power supply

12. The main and the stand-by pressure-head heaters are controlled by a guarded three-position PITOT HEATER switch on

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the starboard leg panel. When NORMAL is selected the heaters are supplied from the a.c. system, but should this supply fail they are supplied from the d.c. system by tripping the guard and selecting STANDBY.

### EMERGENCY EXIT

#### Canopy jettisoning

13. The canopy can be jettisoned without actuating the seat-ejecting mechanism by pulling either of two handles, one a

spade-grip type mounted on the cockpit floor to the left of the pilot's seat and the other, a T-shaped handle connected to a lever on the external jettisoning control panel (*fig.1*). After depressing the section marked PRESS the external handle must be pulled outboard.

#### Canopy opening in power failure conditions

14. If electrical or hydraulic failure prevents the canopy being opened norm-

ally when the aircraft is on the ground, it can be opened manually. While the canopy remains locked, the jack-end-fitting is released by operating either of two EMERGENCY CANOPY JACK RELEASE levers, one mounted below the top longeron forward of the windscreen arch, and the other near the external canopy-locking handle; then, after unlocking in the normal manner, the canopy can be pushed or lifted open.

#### Partial opening

15. If an attempt is made to open the canopy in the normal way in conditions of hydraulic or electrical failure, it may open slightly and render the standby and canopy jettisoning systems ineffective. In this case:-

- (1) If the failure is hydraulic, close it (manual assistance may be necessary) by selecting, and holding CLOSED, the OPEN-CLOSED switch. If the failure is electrical, close it by manual means.
- (2) Lock it by pushing down the CANOPY control handle.
- (3) Operate the EMERGENCY CANOPY JACK RELEASE handle.
- (4) Pull the CANOPY control handle upwards, but do not operate the OPEN-CLOSED switch.
- (5) With external assistance, manually raise the canopy.

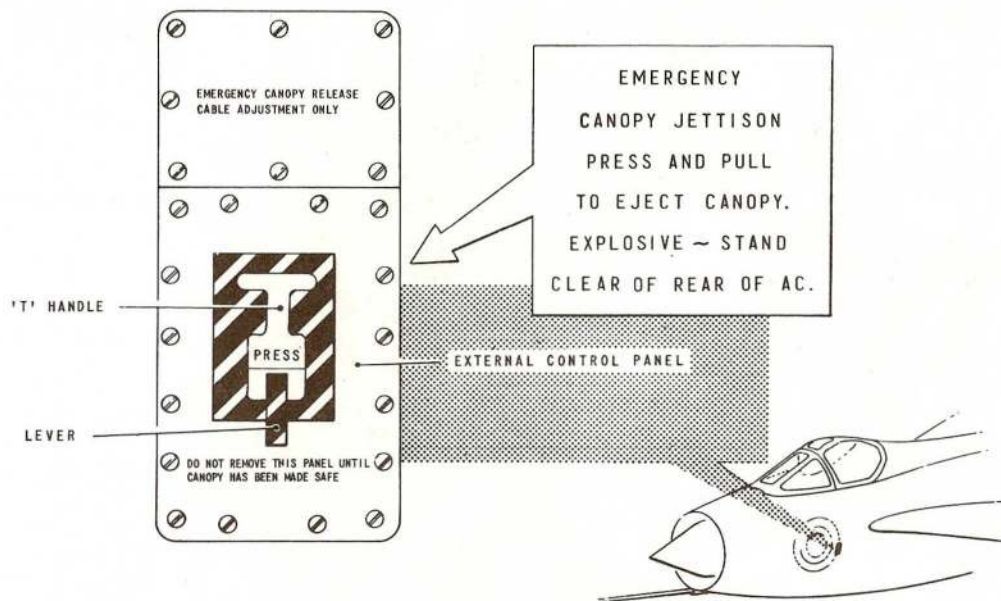


Fig.1. Canopy external jettisoning control

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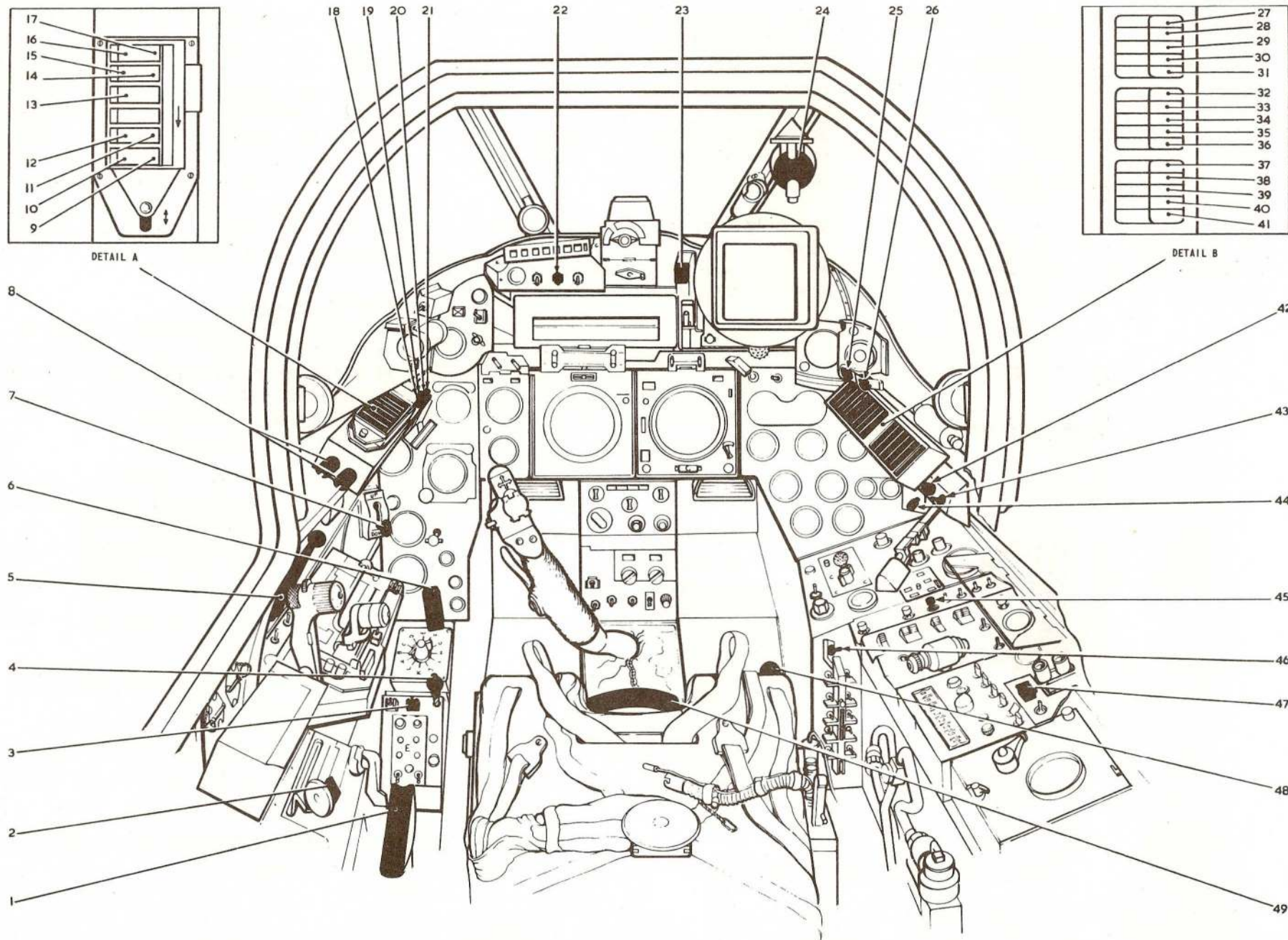


FIG. 2. EMERGENCY CONTROLS AND EQUIPMENT

## KEY TO FIG.2. (EMERGENCY CONTROLS AND EQUIPMENT)

- |      |  |      |  |
|------|--|------|--|
| 1    | CANOPY JETTISONING HANDLE<br>Pull upward to jettison canopy  | 23   | ATTENTION LIGHT  |
| 2    | RAM-AIR VALVE CONTROL<br>Forward OPEN, aft CLOSED  | 24   | E2B COMPASS  |
| 3    | VENTRAL-TANK FUEL EMERGENCY TRANSFER SWITCH<br>Lift flap and select EMERGENCY TRANSFER to transfer fuel to main tanks  | 25   | MUTE INDICATOR/SWITCH<br>Pull to cancel captions; indicator illuminates when pulled  |
| 4    | ALIGHTING GEAR EMERGENCY LOWERING HANDLE<br>Press button marked U/C and pull handle upward   | ▶ 26 | A.C. RESET PUSH SWITCH   |
| 5    | EMERGENCY CANOPY JACK-RELEASE HANDLE<br>Pull aft to release jack end-fitting, then push canopy upward  | 27   | D.C. RESET PUSH SWITCH   |
| 6    | VENTRAL TANK JETTISONING HANDLE AND GUIDED WEAPONS JETTISONING SWITCH<br>Pull handle to jettison tank; Lift flap and press switch to jettison guided weapons |      | AUXILIARY WARNINGS PANEL CAPTIONS:-  |
| 7    | ALIGHTING GEAR EMERGENCY RAISING CONTROL<br>Turn selector knob clockwise as far as it will go, then select UP  | 28   | CANOPY CANOPY UNLOCKED WARNING INDICATOR   |
| 8    | FIRE EXTINGUISHER INDICATOR/SWITCH UNITS (No.1 AND No.2 ENGINE)<br>STANDARD WARNING PANEL CAPTIONS:-   | 29   | ICE Caption not used   |
| 9    | FIRE 2 FIRE WARNING INDICATOR (No.2 ENGINE)<br>Indicates fire in No.2 engine bay; press associated item 8 to operate extinguishers                           | 30   | PUMP P PORT D.C. FUEL PUMP FAILURE INDICATOR   |
| 10   | FIRE 1 FIRE WARNING INDICATOR (No.1 ENGINE)<br>Indicates fire in No.1 engine bay; press associated item 8 to operate extinguishers                           | 31   | PUMP S STBD. D.C. FUEL PUMP FAILURE INDICATOR  |
| 11   | RHT 2 REHEAT WARNING INDICATOR (No.2 ENGINE)<br>Indicates excessive temperature in vicinity of jet pipe  | 32   | GEN MAIN D.C. GENERATOR FAILURE INDICATOR  |
| 12   | RHT 1 REHEAT WARNING INDICATOR (No.1 ENGINE)<br>Refer to item 11   | 33   | FUEL 1 FUEL LOW-PRESSURE WARNING INDICATOR (No.1 ENGINE)   |
| 13   | GEN D.C. GENERATOR FAILURE WARNING INDICATOR<br>Indicates main and stand-by generators off line  | 34   | FUEL 2 FUEL LOW-PRESSURE WARNING INDICATOR (No.2 ENGINE)   |
| ▶ 14 | TRIM AP AUTO-PILOT AUTOMATIC TRIP WARNING INDICATOR  | 35   | OIL 1 OIL LOW-PRESSURE WARNING INDICATOR (No.1 ENGINE)   |
| 15   | HYD HYDRAULIC PRESSURE FAILURE WARNING INDICATOR<br>Indicates both controls hydraulic systems failed   | 36   | OIL 2 OIL LOW-PRESSURE WARNING INDICATOR (No.2 ENGINE)   |
| 16   | OXY OXYGEN LOW-PRESSURE WARNING INDICATOR  | 37   | AC A.C. SUPPLY FAILURE INDICATOR   |
| 17   | CPR COCKPIT PRESSURE FAILURE WARNING INDICATOR   | 38   | TURB MAIN AIR-TURBINE STALL INDICATOR  |
| 18   | CANCEL INDICATOR/SWITCH<br>Cancels attention lights, audio warning and indicator light when depressed  | 39   | HYD 1 HYDRAULIC PRESSURE FAILURE WARNING INDICATOR (No.1 CONTROLS)   |
| 19   | MUTE INDICATOR/SWITCH<br>Pull to cancel all warnings except FIRE and RHT; indicator illuminates when pulled  | 40   | HYD 2 HYDRAULIC PRESSURE FAILURE WARNING INDICATOR (No.2 CONTROLS)   |
| 20   | STANDARD WARNING SYSTEM TEST SWITCH<br>Press to test all warning indicators, audio warning and attention lights  | 41   | TTC 1 TOP-TEMPERATURE CONTROL INDICATOR (No.1 ENGINE)<br>Illuminates when reheat has been automatically cancelled, (refer to Sect.6, Chap.7)                     |
| 21   | AUDIO-WARNING MUTE SWITCH<br>Pull to reduce volume   | 42   | TTC 2 TOP-TEMPERATURE CONTROL INDICATOR (No.2 ENGINE)<br>Refer to item 40  |
| 22   | EMERGENCY LIGHTING SWITCH  | 43   | AUXILIARY WARNINGS PANEL TEST SWITCH<br>Press to test all indicator lamps  |
|      |  | 44   | AUXILIARY WARNINGS PANEL DAY/NIGHT SELECTOR SWITCH<br>When set to DAY indicator windows are illuminated;<br>When set to NIGHT indicator captions are illuminated |
|      |  | 45   | E2B COMPASS AND STAND-BY DIRECTION INDICATOR EMERGENCY LIGHTING DIMMER SWITCH<br>Turn clockwise to increase brilliance   |
|      |  | 46   | ROCKET LAUNCHER EMERGENCY RETRACT SWITCH<br>Inoperative  |
|      |  | 47   | PITOT HEATER SWITCH<br>If a.c. supply fails move guard and select STANDBY  |
|      |  | 48   | GENERATOR SWITCH<br>NORMAL for main d.c. generator; ST'BY for stand-by d.c. generator; EMERGENCY for stand-by d.c. generator in emergency conditions             |
|      |  | 49   | EMERGENCY OXYGEN SUPPLY CONTROL<br>Pull to open supply   |
|      |  | 50   | EJECTION SEAT ALTERNATIVE FIRING HANDLE<br>Pull to jettison and eject seat   |

**General information**

1. This chapter deals with the effect of different and varying loads on the c.g. position. Take-off c.g. data has been calculated with the fuselage horizontal datum level and the alighting gear down.

**C.G. datum**

2. The c.g. datum is 0.354 ft aft of frame 25 (fuselage transport joint), on the fuselage longitudinal datum. It is indicated by a screw hole marked C.G. DATUM, on the port side of the fuselage. This screw hole is used to suspend a plumbline, enabling dimensional checks to be made during weighing operations.

**C.G. take-off limits**

3. Fig.1 and 2 specify take-off limits with the aircraft in a variety of conditions. If these limits are observed, the flight handling limits, for aircraft with all-up weights as quoted, will not be exceeded due to the expending of armament stores.

**Effect of alighting gear retraction**

4. The retraction of the alighting

gear introduces a moment + 4900 lb ft which must be taken into account when making calculations which assume flight conditions.

**Basic weight and c.g.**

5. Tables 3, 4 and 5, and fig.1 and 2, refer to a basic weight of 25,699 lb, and a basic c.g. of +8.504 ft aft of the datum point. These figures are based on the mean corrected basic weight of aircraft No. XP 697 to XP 701 inclusive. For weight of individual aircraft refer to Form 4908 of the aircraft concerned.

**Engine and jet pipe weight and c.g.**

6. The basic weight tolerances of these components affect the aircraft moment whenever such components are changed; when this occurs the aircraft moment must be re-assessed. To assist in calculating the component moment, for inclusion in the aircraft moment, fig.3 relates the component c.g. data, and c.g. positions relative to component data, to the aircraft c.g. datum; it also gives an equation to be used for the calculation. Fig.4 shows a specimen R.A.F. Form 4908 in which hypothetical

figures are used to illustrate the method of recording the change.

**Maximum all-up weight**

7. The aircraft is cleared for operational flying at the following maximum all-up weight:-

Take-off	36,000 lb
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**Weighing the aircraft**

8. Details of the application of hydrostatic weighing units to this aircraft are given in Chap.3B. For the method of weighing an aircraft refer to A.P.101A-1101-1. ▶

**Modifications**

9. The basic weight (*Tables 3 and 4*) is in accordance with Modification Standard No. Lightning Mk.3/Y/1 - Mod. 138, 255, 288, 439, 477, 1819, 1851, 1873, 1937, 1974, 1979, 2030, 2230, 2259, 2301, 2307, 2320, 2331, 2352, 2356, 2408, 2446.

**Flight refuelling configuration**

10. The effect of fitting the flight refuelling probe and the associated removable fittings gives a weight and moment change of +217 lb and +401 lb ft.

TABLE 1  
Removable load items

FIG.5 ITEM NO.	REF. OR PART NO.	QTY.	DESCRIPTION	WEIGHT (lb)	ARM (FT)		MOMENT (LB FT)	
					POSITIVE	NEGATIVE	POSITIVE	NEGATIVE
30	5J/3336	1	Battery, Type 25 A/H.....	35.02		0.880		30.82
44	5J/3340	1	Emergency battery, 0.4 A/H.....	3.24		5.710		18.50
11	8B/4230	1	L.F.S. sighting head, Type 2, Mk.1.....	7.75		9.450		73.24
4	8B/4506	1	L.F.S. control unit, Type L, Mk.4.....	1.80		12.940		23.29
23	5UB/4938	1	Inverter, Type 100A.....	6.00		4.496		26.98
42	6G/36	1	M.R.G., Type E, Mk.1.....	37.00		5.000		185.00
5	6D/2159	1	Liquid oxygen container, 3½ litre, Mk.6....	17.82		12.792		227.95
2	14A 4929	1	Camera, G90, Mk.1.....	4.25		14.000		59.50
17	6D/2284	1	Emergency oxygen set.....	2.80		6.990		19.57
43	6TD/616	1	Flight control computer.....	31.25		5.640		176.25
13	6T/620	1	Pilot's controller.....	8.00		8.600		68.80
27	6T/605	3	Gyro unit, Type B.....	5.52		2.820		15.57
21	6A/6825	1	Air data computer, Type 'A'.....	26.00		5.760		149.76
8	6A/6827	1	Pitot-static transducer, Type A.....	5.00		10.283		51.42
7	6A/6826	1	Static transducer, Type A.....	5.00		10.320		51.60
			<b>A.R.I.18124/1 (U.H.F.)</b>					
10	10L/932-2267	1	Control unit C1607/1.....	3.00		9.750		29.25
29	10D/942-8542	1	Transmitter-receiver, Type 5.....	48.50		1.980		96.03
25	10D/20773	1	Transmitter-receiver, standby (A.R.I.23057)	10.85		3.800		41.23
38	10D/20572	1	A.F.unit, Type 9635, Homer (A.R.I.18124/4).	5.75		3.450		19.84
24	10D/20571	1	R.F.unit, Type 11037, Homer (A.R.I.18124/4)	10.25		3.950		40.49
			<b>A.R.I.18107/2 (TACAN)</b>					
22	10AJ/251	1	Mounting, Type 9274.....	6.00		4.600		27.60
47	10L/16867	1	Control unit, Type 9273A.....	1.00		8.720		8.72
39	10D/23349	1	Coupling unit, Type 13555.....	4.35		3.550		15.44
41	10D/22927	1	Transmitter-receiver, Type RT 220C.....	53.00		4.600		243.80
			<b>A.R.I.18011 (I.L.S.)</b>					
48	10L/16749	1	Control unit, Type 705A.....	1.75		9.280		16.24
33	10D/21517	1	Localizer marker receiver R 1964B.....	18.02	14.210		256.06	
35	10D/21518	1	Glide path receiver T 1965B.....	16.58	17.820		295.46	

continued...

TABLE 1 Removable load items - continued

FIG.5 ITEM NO.	REF. OR PART NO.	QTY.	DESCRIPTION	WEIGHT (lb)	ARM (FT)		MOMENT (LB FT)	
					POSITIVE	NEGATIVE	POSITIVE	NEGATIVE
<b>A.R.I.5897/7 (A.I.23D)</b>								
18	10D/9134930	1	Computer, external Type X 16020.....	9.75		6.880		67.08
16	10L/9134929	1	Hand controller, Type X 16016.....	4.50		7.810		35.15
12	10L/9134926	1	External receiver control unit, Type X 16891	0.60		9.400		5.64
20	10D/9134947	1	Gyro unit, Type X 16868.....	16.75		5.810		97.32
6	27UA/1052	1	Heat exchanger, D.603/1A.....	4.98		11.600		57.77
9	10Q/9134909	1	C.R.T. indicator, Type 16017.....	12.00		10.010		120.12
19	10D/6434770	1	Marker unit, Type X 16009.....	17.50		5.890		103.08
1	10D/6434760	1	Radar unit, Type X 12982.....	225.00		14.130		3179.25
45	10D/9134916	1	Receiver, external, Type X 16015.....	23.5		5.890		138.42
31	10D/6434774	1	Visual recorder, Type X 12730.....	20.00	11.060		221.00	
3	10U/17574	1	Line amplifier, Type X 16007.....	1.37		13.940		19.10
<b>A.R.I.18168 (DATA LINK)</b>								
26	10D/9131185	1	* Converter signal data G.E.C., Type X 11673.	80.50		3.610		290.60
28		1	* Head sound reproducer, Type X 11974.....	6.00		2.450		14.70
40	10D/9131186	1	* Address unit, Type X 11941.....	4.00		3.610		14.44
<b>A.R.I.5848/E/3/Q/9 (I.F.F.)</b>								
36	10D/21270	1	* Coder unit, Type 6466.....	10.50	17.920		188.16	
34	10D/20334	1	* Transmitter-receiver, Type 4585.....	34.50	16.520		569.90	
32	10F/19511	1	* Switch unit, Type 6850.....	2.17	13.950		30.27	
46	10L/16706	1	* I.F.F. control unit, Type 5883.....	1.00		8.190		8.19
14	10L/16478	1	* S.I.F. control unit, Type 6465.....	1.09		8.390		9.15
<b>OTHER ITEMS</b>								
Ballast.....					REFER TO LOADING SHEETS			
37	15D/508	1	Brake parachute, Type LB2, Mk.1.....	34.00	27.790		944.86	
15	27C/2395	1	Personal survival pack, Type V.....	21.00		8.330		174.93
37A	26DK/138	1	* Ventral tank assembly.....	354.00	12.667		4484.00	

Note:- The items marked \* are not included in the basic weight referred to in para.5.

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