

INTRODUCTION

PLANNING AND INITIAL SET

SECTION 1 - CONTROLS AND EXTER

SECTION 2 - GROUND HANDLING AND PREPARATION FOR FLIGHT

SECTION 3 - AIRFRAME

SECTION 4 - POWER UNIT INSTALLATION

Chapter 1 - Introduction
Chapter 2 - Controls and Exter

Chapter 1 - Introduction
Chapter 2 - Ground Handling and Preparation for Flight

Chapter 1 - Introduction
Chapter 2 - Airframe
Chapter 3 - Landing Gear
Chapter 4 - Wings
Chapter 5 - Tail Section
Chapter 6 - Cabin
Chapter 7 - Cargo
Chapter 8 - Fuel System
Chapter 9 - Electrical System

Chapter 1 - Power Unit
Chapter 2 - Fuel System
Chapter 3 - (Not applicable to this aircraft)
Chapter 4 - (Not applicable to this aircraft)
Chapter 5 - Electrical System

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LUBRICATION - OILS AND GREASES

THE LUBRICATION DIAGRAMS THROUGHOUT THIS PUBLICATION REFER TO OILS AND GREASES BY SYMBOLS. REFERENCE MUST ALWAYS BE MADE TO THIS MARKER CARD FOR INTERPRETATION OF THE LUBRICANT REQUIRED AND THE METHOD OF APPLICATION.

SYMBOL	NOMENCLATURE	REFERENCE NO.	N.A.T.O. CODE NO.
	Oil OEP-71	34B/9100540	G-138
	Oil OM-15	(1 gal.) 34B/9100572 (45 gal.) 34B/2202291	H-515
	Oil OM-150	34B/9100550	O-140
	Oil OX-14	(2 oz) 34B/9100589 (1/2 pint) 34B/9100590	O-147
	Oil OX-38	(1 gal.) 34B/9100591 (45 gal.) 34B/2201841	O-149
	Grease XG-238	34B/9440586	G-363
	Grease XG-271	34B/9100610	G-362
	Grease XG-273	34B/9423151	G-357
	Grease XG-276	34B/9425139	G-363
	Grease XG-287	(2 oz.) 34B/2241978 (25 lb.) 34B/2241981	G-354
	Grease XG-290	34B/2241797	G-365
	Grease XG-315	(4 pk.) 34B/2204138 (225 gm.) 34B/2294486	G-364
	Grease SP-5	34B/2247686	
	Grease ZX-39	34B/9437518	S-722
	Grease ZX-32	34B/2202430	S-717

METHOD OF APPLICATION SYMBOLS

GUN

OILCAN

HAND

LUBRICATED ON ASSEMBLY ONLY

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AMENDMENT RECORD SHEET

Incorporation of an Amendment List in this publication is to be recorded by signing in the appropriate column and inserting the date of making the amendments

A.L. No.	Amended by	Date
1	INCORPORATED	FEB. 73
2	J.A. Kowalchuk	7/
3		7/
4		7/75
5		7/75
6		6/5/75
7	J.A. Kowalchuk	9/5/75
8	J.A. Kowalchuk	6/8/75
9	J.A. Kowalchuk	11/11/75
10	J.A. Kowalchuk	11/11/75
11	J.A. Kowalchuk	9/2/76
12	J.A. Kowalchuk	19-5-76
13	Elisabeth Brotherton	22-6-76
14	J.A. Kowalchuk	29-11-76
15	J.A. Kowalchuk	29-11-76
16	J.A. Kowalchuk	12/6/78
17	J. Evans	24-8-78
18	J. Evans	19-10-78
19	J. Evans	12-12-78
20	M. J. Kowalchuk	17-9-79
21	M. J. Kowalchuk	11-12-79
22	M. J. Kowalchuk	7/11/80
23	M. J. Kowalchuk	8/9/81
24	M. J. Kowalchuk	12/1/82

A.L. No.	Amended by	Date
25	[Signature]	18-2-82
26	[Signature]	15/3/82
27	[Signature]	18-2-82
28	[Signature]	1-4-82
29	[Signature]	15-6-82
30	[Signature]	15/9/82
31	[Signature]	21/10/82
32	[Signature]	10/3/83
33	[Signature]	30/7/83
34	[Signature]	27/4/83
35	[Signature]	10/7/83
36	[Signature]	10/7/83
37	[Signature]	10/7/83
38	[Signature]	2/6/83
39	[Signature]	1/6/83
40	[Signature]	1/10/83
41	[Signature]	7/11/83
42	[Signature]	7/11/83
43	[Signature]	24/1/84
44	[Signature]	26/1/84
45	Angus C.S.	26-3-84
46	Angus C.S.	18-9-84
47	[Signature]	26-7-84
48	[Signature]	22-1-85

A.L. No.	Amended by	Date
49	[Signature]	16-7-85
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51	[Signature]	17-9-85
52	[Signature]	10/3/86
53	[Signature]	29/10/86
54	[Signature]	28/12/86
55	I. Richards	19/1/87
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NOTE TO READERS

The subject matter of this publication may be affected by Defence Council Instructions, by Servicing schedules or 'General Orders and Modifications' leaflets in this A.P., in the associated publications listed below, or even in some others. If possible, Amendment Lists are issued to correct this publication accordingly, but it is not always practicable to do so. When an Instruction, Servicing schedule or leaflet contradicts any portion of this publication, the Instruction, Servicing schedule or leaflet is to be taken as the overriding authority.

The inclusion of references to items of equipment does not constitute authority for demanding the items.

Each leaf bears the date of issue and the number of the Amendment List with which it was issued. New or amended technical matter will be indicated by triangles positioned in the text thus: ◀ ▶ to show the extent of amended text, and thus: ▶ ◀ to show where text has been deleted. When a Section or Chapter is issued in a completely revised form, the triangles will not appear.

LIST OF ASSOCIATED AIR PUBLICATIONS

	A.P.		A.P.
Accessories gearboxes and drives, Rotol	2240A & B	Cartridges, miscellaneous power	1661F
◀ Aero engine, Avon Mk.109 . . . . .	.102C-1512 to 1517-1 ▶	Ejection seats, Type 2CA2 series . . . . .	.109B-0107-1
Aircraft painting	119A-0601-1 series	Electrical manual	113D series and 4343 series
Aircraft wheels, tyres and brakes	104 series and 2337	Hydraulic equipment	104B/105B series and 1803 series
Aircraft cameras and accessories	112P series and 1355C	Instrument manuals	112G series and 1275A series
Aircraft rigid tanks	4117A	Navigation instruments	112G series and 1275B series
Aircraft flexible tanks	107B series	Oxygen equipment	112G series and 1275G
A.R.I.5877 radio compass A.D.722	116B-0102-1	◀ Photographic planning	112P-0003-1 ▶
A.R.I.5930 radar system	114P series	Prefabricated constructional equipment (Basic)	
A.R.I.18089 intercomm. equipment	116N series	-- Canberra access structures	4549A Book 3
A.R.I.18107/13 Tacan . . . . .	.116B-0304-1	Pressurizing and air conditioning equipment	107B series and 4340
A.R.I.23057 U.H.F. stand-by - D303 . . . . .	.116D series	Pyrotechnics	110E series and 1661E
A.R.I.23118 I.L.S./V.O.R. - A.D.260 . . . . .	.116B-0407-1	Starting systems for aero-engines	103D series
A.R.I.23134/3 I.F.F./S.S.R. . . . .	.114J series	Turbine driven accessory drives	2240C
A.R.I.23143 U/V.H.F. - P.T.R.175 . . . . .	.116D series		

LAYOUT OF A.P.101B-0422

CANBERRA T MK.22 AIRCRAFT

101B-0422-1A and 1B	General and Technical Information
101B-0422-2	General Orders and Modifications
101B-0422-3A	Schedule of Spare Parts
101B-0422-3B	Appendix 'A'
101B-0422-3C	Scales of Unit Equipment
101B-0422-3D	Scales of Servicing Spares
101B-0422-5	Servicing Schedules
101B-0400-6	Repair and Reconditioning Instructions
◀ 101B-0422-10	Servicing Diagrams Manual ▶
101B-0422-12	Ground Handling Notes
101B-0400-13	Modification Lists
101B-0422-15	Aircrew Manual (Pilot's Notes)
101B-0422-16	Operating Data Manual

PREFACE

Because of the volume of the information given, A.P.101B-0422-1 is issued as two books, the breakdown is as follows :-

A.P.101B-0422-1A

Introduction

Leading particulars

Section 1 – Controls and exits

Section 2 – Ground handling and preparation for flight

Section 3 – Airframe

Section 4 – Power unit installation

A.P.101B-0422-1B

Introduction

Leading particulars

Section 5 – Electrical systems and instrument installation

Section 6 – Radio and radar installations

Section 7 – Armament installation

MODIFICATION STANDARD

This publication has been written to the Canberra T Mk.22 modification standard, Leaflet Y1 (Mod.4931). Modifications introduced subsequently are listed, and their effect upon the publication recorded, in the following list:-

Modification Number	Effect upon Publication	Incorporated by A.L. Number
5015	Sect.2, Chap.4	6
5033	Sect.1, Chap.1	6
5037	Sect.1, Chap.2	6
5058	Sect.2, Chap.4	12
5066	Sect.2, Chap.4	27
5118	Sect.3, Chap.6	27
5245	Sect.3, Chap.8A	27
5408	Sect.1, Chap.1	27
5340	Sect.4, Chap.2	32
5442	Sect.3, Chap.11	35
5209	Leading Particulars	36
5224	Sect.3, Chap.2	
5238	Sect.3, Chap.8B	
5245	Sect.3, Chap.8A	
◀ 5505	Leading Particulars	52 ▶

INTRODUCTION

1. The Canberra T Mk.22 is a twin-engined jet-propelled, high speed, training aircraft. It is a mid-wing monoplane with retractable alighting gear. The aircraft is powered by two Rolls Royce Avon Mk.109 engines mounted in the main planes. It carries a crew of two, each of whom is provided with an ejection seat.

2. The all-metal fuselage is of monocoque construction consisting of a stressed skin covering supported on a framework of transverse frames connected by longitudinal stringers; it is built in two sections -- front and rear fuselage. To facilitate assembly of the complete aircraft and to provide for dismantling into main units, junctions are provided in all controls, hydraulic pipes, electrical wiring, etc., at the ends of the units into which they are built.

3. The front fuselage comprises a forward radome containing a scanner unit and radar equipment, a pressurized cabin, equipment compartments and the alighting gear nose wheel unit. The pressurized cabin is sealed off from the remainder of the aircraft by two pressure bulkheads; one located between the radome and the front of the cockpit, the other placed diagonally across the aircraft, aft of the cockpit. A door, jettisonable in an emergency, is provided on the starboard side of the cabin for normal entry and exit. The pilot's canopy and a hatch above the navigator's position provide emergency escape exits for the crew. The pilot's seat is

offset, to improve visibility, to port of the centre-line of the aircraft and the navigator's seat is at the rear of the cabin, backed on to the port side of the aft pressure bulkhead. Both seats are mounted on separate support structures, raising them above the level of the main cabin floor.

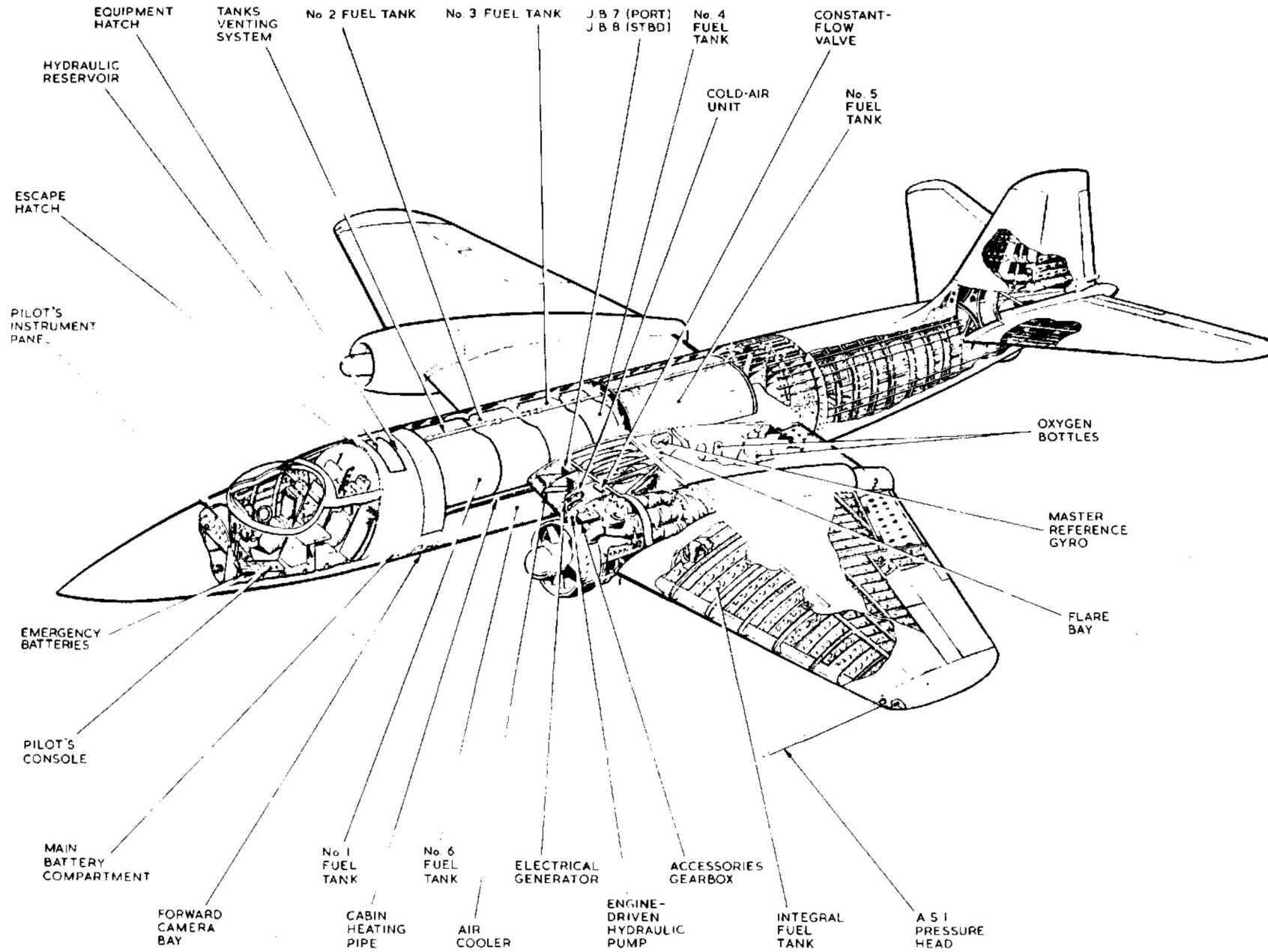
4. Behind the aft pressure bulkhead are three equipment compartments, the alighting gear nose-undercarriage unit, and the forward camera bay. The remainder of the front fuselage is divided by a metal floor supported by arched diaphragm members. The upper half serves as the fuel bay and contains five crash-proof collapsible fuel bags. The lower half is subdivided into No.6 fuel tank bay, the flare bay and the rear camera bay. The flare bay is of full fuselage width and is closed by two hydraulically operated, retracting doors. Bulkheads at each end carry the door jacks and operating linkage. The main plane centre-section frame is an integral part of the fuselage.

5. The rear fuselage carries the tail unit, which comprises a metal rudder and tail plane, and a wood-and-metal fin. The tail plane is fitted with an incidence adjustment unit designed to give positive control at high Mach numbers. The incidence is varied by an electric actuator which ensures irreversibility of control under any condition of flight and enables quick changes to be made in fore-and-aft trim during take-off, flight

and landing. The elevators are of conventional design and incorporate a spring tab in the port and a geared, fixed-movement, balance tab in the starboard elevator. Forward of the spar, the fin is of wooden construction, while aft of the spar, the rudder shroud is of metal with the aerofoil section maintained by flanged plate ribs. The rudder is all-metal and incorporates a spring tab, which, through an electric actuator, acts also as a trim tab; it is so arranged that full travel is available for either function.

6. The main planes are all-metal cantilever structures of symmetrical section, with a main spar and a sectional rear wall, with the power units mounted mid-wing. The main spar has a single web with machined booms, the web being cut away and reinforced by ring plates for the accommodation of the engine jet-pipe. Four main and seven shear bolts attach the spar root to the main spar centre-section frame in the fuselage. The rear wall consists of three pressed sections, the inner and centre sections being attached to a forged ring through which the engine jet-pipe passes; at the main plane root the inner section is attached by one bolt to a fuselage pick-up point. The outer section has a curved web and carries the aileron centre hinge. The inner leading-edge section of the main plane, into which the main undercarriage unit retracts, is divided transversely by a diaphragm which forms the front wall of the wheel well; extending from the inboard engine-rib to the fuselage, the diaphragm is attached by one

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CANBERRA T. MK. 22

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bolt to the fuselage. Outboard of each engine, the leading-edge section of the main plane forms an integral fuel tank. The main plane and fuselage skins intersect smoothly without fillet, the skin at the main-plane root fitting over a joint angle riveted to the fuselage. Each main plane is fitted with air brakes, aileron and split trailing-edge flaps.

7. The flying controls are conventional, pedals operating the rudder, and a horn-type control operating the ailerons and elevators. All control runs consist of push-pull tubes and levers.

8. The fully retractable tricycle alighting gear is operated hydraulically through electrically-actuated selectors, the main undercarriage retracting inwards into the main planes and the nose undercarriage retracting rearwards into the front fuselage. The main undercarriage struts are oleo-pneumatic with single wheels mounted

in cantilever and with hydraulic disc-type brakes. The nose undercarriage is liquid sprung, the unit is fully castering and self-centring with twin wheels keyed together to eliminate shimmy.

9. The engines are attached to ribs immediately forward of the main spar. Each is slung on four attachments, three of which are designed to take up expansion. All auxiliaries are mounted on gearboxes inboard of the engines. Triple-breech turbo-starters are fitted, the units being faired into the engine air-intakes. Oil is carried in the engine sumps only and is cooled by fuel-cooled oil coolers mounted on the engines.

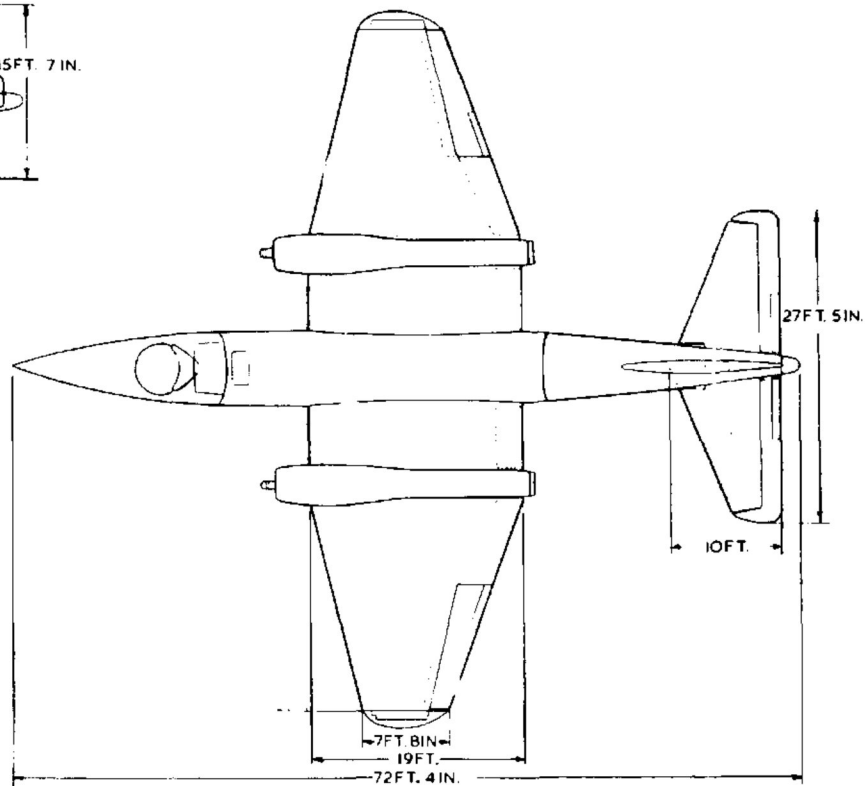
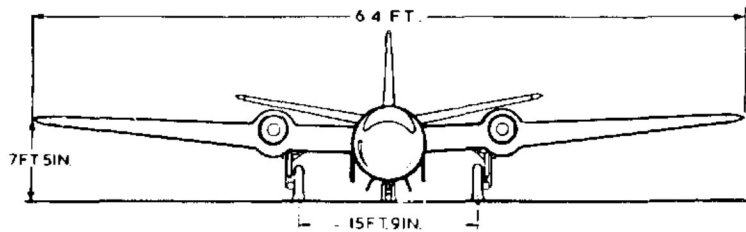
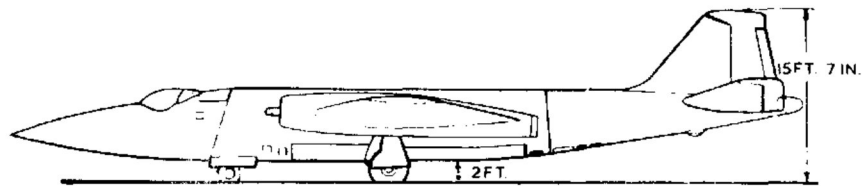
10. Fuel is delivered from No.1, 2, 3, 4 and 6 tanks into a collector box at the rear of No.6 tank. No.5 tank and the collector box are each fitted with two submerged fuel pumps and are connected to galleries delivering fuel to the engines. A submerged fuel pump is

fitted in each integral wing-tank and low-pressure cocks permit fuel from these tanks to be fed direct to the engines or transferred to No.5 tank. Separate switches operate the fuel pumps and low-pressure cocks. Electrostatic fuel contents gauges are fitted in all fuselage tanks and the integral wing tanks. A fuel tank venting system is also embodied. Flame detectors and spray pipes are installed in the tank bay in the fuselage and in the engine bays.

11. All electrical power is drawn from two 30-volt, 9-kilowatt generators and from one 24-volt accumulator with appropriate inverters for radar equipment.

12. Radio and radar equipment suitable to the role of the aircraft is installed; controls and associated equipment are installed in positions convenient to the crew member concerned.

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EXS. 00 1-155 1

GENERAL ARRANGEMENT

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NOSE UNDERCARRIAGE

Type Twin wheel, non-steerable, castoring,
rearward retracting, Dowty
◀ 2.0039.6040 (pre Mod.5505) or 2.0039.6041 (post Mod.5505) ▶
Shock absorber Levered suspension, liquid spring, Dowty
Type A7307Y
Pressure (with wheels off ground) 1500 lb/in²
Fluid OM-15
Capacity – fluid 1½ pints
Wheels
Type Dunlop AH.9590
Tyres Dunlop K.K.E.N.14.N
Tubes Dunlop K.K.2
Tyre pressure Refer to A.P.101B-0400-5A2

HYDRAULIC SYSTEM

Pumps Lockheed Mk.9 (Ref.No.37J/266)
Fluid OM-15
Capacity of system 33 pints (approx.)
Pressure settings
Cut-out valve Cut out 2700⁺⁵⁰₀ lb/in²
Cut in 2200 lb/in²
Thermal relief valves Open 3450 ± 100 lb/in²
Re-seat 3100 lb/in² (min.)
Flap relief valve Open 2850⁺⁵⁰₀ lb/in²
Accumulator inflation pressure
(main and wheel brakes) 1350⁺⁵⁰₀ lb/in² at 40° F,
and 1400⁺⁵⁰₀ lb/in² at 60° F,
when exhausted of hydraulic pressure
Reservoir pressure relief valve open, 12-17 lb/in²
reseat, 8 lb/in²

ELECTRICAL SYSTEM

Wiring Plessey
Voltage 28 volt d.c.

ELECTRICAL SYSTEM – continued

Generators Two 9kW, Type 519 (Ref.No.SUA/6446)
Voltage regulators Two Type 114
Batteries
Main battery One 24V, 35 Ah, Type K
Emergency batteries Two 12V, 4 Ah

ENGINES

Name Avon, Mk.109 (E.C.U. Mk.10901)
Type Pure jet, gas turbine
Starter Rolls Royce, turbo starter, Type T.B.S.720, Mk.3
Cartridge No.10 Mk.1 (720 grammes)
Fuel
Avtur (Ref.No.34A/9431771) D.Eng.R.D.2494, N.A.T.O. Code F35
◀ Avcat (Ref.No.0722/2202148) D.Eng.R.D.2498, N.A.T.O. Code F43 ▶
Avtag (Ref.No.34A/9100448) D.Eng.R.D.2486, N.A.T.O. Code F45

WARNING . . .

Aircraft serial number, WH780 which is pre Mod.517 is not cleared to accept fuel to Spec.D.Eng.R.D.2486.

In cases of emergency only, the following alternative substitute fuels may be used:-

Avtur (Ref.No.34A/2201036) D.Eng.R.D.2453, N.A.T.O. Code F34
Avtag (Ref.No.34A/2201037) D.Eng.R.D.2454, N.A.T.O. Code F40
French Navy Fuel, Air 3404A N.A.T.O. Code F42
Fuel pressure warning lamps Illuminated when pressure falls
below 6⁺₀ lb/in²
Oil OX-38
Accessories gearboxes
No.1 engine Rotol, Type P.T.G.3/25 (Ref.No.37L/189)
No.2 engine Rotol, Type P.T.G.3/26 (Ref.No.37L/190)
Oil OX-38

Should oil other than OX-38 have been used, the gearbox must be flushed out with oil OX-38, emptied, and then refilled with new oil OX-38.

TANK CAPACITIES

Fuel tanks		Capacity	Weight (lb)	
			Avtur	Avtag
No.1	} Forward Group	260 gal	2080	2028
No.2		260 gal	2080	2028
No.3		220 gal	1760	1716
No.4		220 gal	1760	1716
No.5 (aft)		540 gal	4320	4212
No.6 (belly) (including collector box — 45 gal NOT including 30 gal unusable)		417 gal	3336	3223
Main plane integral tanks (port and starboard)		856 gal	6848	6677
Total fuel (usable)		2773 gal	22184	21600

Oil

System capacity (each engine)	19 pints
◀ Sump capacity (each engine)	16 pints ▶
Accessories gearboxes (each gearbox)	3.125 pints
Hydraulic tank	16 pints

PRESSURE HEAD SETTING

Position	On port wing tip
Type	Mk.8T (Ref.No.6A/381)
Angular setting	Minus 2 deg to wing chord line

OXYGEN SYSTEM

Normal system	
10 storage cylinders	750 litres each
Emergency system	
Ejection seats	One Mk. 7J set each ▶

Note . . . The lubricant Reference numbers and N.A.T.O. code numbers are printed on the reverse of the List of Contents marker card.