SEA VENOM FAW Mk.21 AIRCRAFT

ADVANCE INFORMATION LEAFLETS

This marker card is to be inserted immediately in front of the Amendment Record Sheet at the beginning of the book. Advance Information Leaflets are to be inserted, as received, in numerical order following this card.

The information contained in Advance Information Leaflets will be incorporated by normal amendment list action in due course. In the meantime, appropriate action is to be taken in accordance with any instruction contained therein.

If, after the receipt of a leaflet, an Amendment List with a prior date and conflicting information is received, the information in the leaflet is to take precedence.

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		
2		
3		
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5		
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7		
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9	B Drake (Mrs)	14/9/55
10	B. Drake (Mrs)	19-9-55
11		
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13		
14	B. Drake (Mrs)	14/9/55
15	H L Burtchell	11-11-55
16		
17	B Drake (Mrs)	14/9/55
18	B. Drake (Mrs)	19-9-55
19	R G Carpenter	12/10/55
20		
21	B. Drake (Mrs)	14/9/55
22	B. Drake (Mrs)	19/9/55
23	[illegible]	24/10/55
24	H L Burtchell	11-11-56

A.L. No.	Amended by	Date
25	B Drake (Mrs)	19/9/55
26		
27	[illegible]	10/3/56
28		
29	G U Taylor	26-6-56
30	[illegible]	10/3/56
31	G. U Taylor.	19.6.56.
32	G U Taylor	26-6-56
33		
34	G U Taylor.	9-7-56
35		
36	[illegible]	8/10/56
37	[illegible]	13-9-56
38	[illegible]	8/10/56
39		
40	[illegible]	13-9-56
41	G Taylor	12-11-56
42	[illegible]	6/10/56
43		
44	H. Toms	13.5.57.
45	W Meade	9/4/57.
46	W Meade	18/4/56
47	H. Toms.	13.5.57.
48	B Dundale	24.7.57

A.L. No.	Amended by	Date
49	W Meade	28/4/57
50	B Dundale.	24.7.57
51	H. Toms	4-1-58
52	[illegible]	13.8.57.
53	H. Toms	4/1/58.
54		
55	R G. Jelley	20/2/58
56	R. G. Jelley	31/1/59
57		
58	J Wallis	10.7.58
59	J Wallis	20.5.58
60	R G Jelley	19/12/58
61	(Found INCORPORATED)	19/12/58
62		
63	R. G. Jelley	19/12/58
64	[illegible]	
65	[illegible]	
66	[illegible]	
67	[illegible]	
68	[illegible]	
69	[illegible]	
70	R G Jelley	22/8/59
71	R G Jelley	9/9/59
72	R G Jelley	25/1/60

(Continued overleaf)

A.L. No.	Amended by	Date
73	R. L. Jelley	25/1/60
74		
75		
76		28/6/61
77		
78		
79		
80	H. Stewart.	7.3.62
81		9.10.61
82	R. L. Jelley	15/11/61
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LETHAL WARNING

EJECTION SEATS AND CANOPY JETTISON MECHANISMS

1. Ejection seats and canopy jettison mechanisms are sources of potential danger to personnel and of damage to the aircraft. Serious injury (possibly fatal) may result if any firing mechanisms are inadvertently operated whilst the aircraft is on the ground.

2. The following instructions are to be obeyed:—

R.N. **Safety precautions contained in A.P.(N.)140—Naval Aircraft Maintenance Manual.**

R.A.F. **ALL PERSONNEL before entering the cockpit or cabin of an aircraft fitted with an ejection seat are to report to the N.C.O. immediately in charge of airframe servicing who is to ensure that all safety pins (or other safety devices) are correctly positioned to render the seat and canopy jettison firing mechanisms safe. On completion of servicing, tradesmen are to report to the N.C.O.**

3. Full instructions for rendering the firing mechanisms safe are contained in the A.P.4288 and A.P.(N.)1023 series, in Aircraft Servicing Schedules and in the A.D.5037 series.

AILERONS

4. Personnel must take special care to keep their hands away from the vicinity of the ailerons when these are being power-operated.

PAINT REMOVERS

5. Paint removers which contain either ethylene dichloride or methylene dichloride must not be used for paint stripping or cleaning any part of the aircraft as they have an adverse effect on reduxed joints.

ARMAMENT

6. Ensure that the armament master switch and the battery isolation switch are placed to the "off" positions before commencing arming operations. No electrical equipment is to be switched "on" or tested while this operation is being carried out.

METHYL BROMIDE

7. Odourless non-irritant vapour, highly poisonous. The effects may not be apparent at once and may be fatal if a large amount is inhaled before signs develop.

HIGH ENERGY IGNITERS

8. The energy stored in the capacitors of the high energy igniter units can, under certain circumstances, be of a lethal nature. No servicing should be attempted until at least one minute has elapsed after disconnection of the L.T. supply to the input plug.

Dmd. 6318 267172 750 8/58 AB539/3 1771

NOTE TO READERS

The subject matter of this publication may be affected by Admiralty Fleet Orders, or by "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 Order, or leaflet contradicts any portion of this publication, the Order, 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, when applicable, the number of the Amendment List with which it was issued. New or amended technical information on new leaves which are inserted when this publication is amended will be indicated by solid triangles positioned in the text. The triangles are placed thus ◄.....► to show the extent of amended text, and thus ►◄ to show where text has been deleted. The triangles merely denote a change and are not marks of emphasis. When a Section or Chapter is issued in a completely revised form, the triangles will not appear.

★ ★ ★

LIST OF ASSOCIATED AIR PUBLICATIONS

	A.P.
Aircraft flexible tanks	4117*B*
Aircraft hydraulic equipment, Lockheed	1803*B*
Aircraft hydraulic and undercarriage equipment, miscellaneous	1803*P*
Aircraft undercarriage equipment, Lockheed ...	1803*C*
Cine camera and accessories	1355 *Series*
Dinghies and associated equipment	1182*C*
Ejection seats, R.N. aircraft	4288*N*
Electrical equipment manual	1095 *Series* 4343 *Series*
Ghost Mk. 10400 *series, Engine change unit* ...	4320*B*
Gun sights	1275*E*
Hispano 20 *mm. guns*	1641*F*
Instrument manual	1275 *Series*
Miscellaneous power cartridges	1661*F*
Parachutes and parachute harness	1182*A*
Pneumatic equipment, aircraft, Hymatic	4303*C*
Powered flying control units and equipment, Lockheed	4602*A*
Pressurizing and air conditioning equipment, aircraft	4340
Pressure-cabin testing trolleys	2306*G*
Safety harness	1182*B*
Starting systems for aero-engines	1181 *Series*

LIST OF ASSOCIATED AIR DIAGRAMS

	A.D.
Fuel system	6082
Lubrication	6083
Flying controls and lubrication	6084
Hydraulic system (2 *sheets*)	6085
Cabin pressure, heating and ventilating system	6086
Wing folding	6087
Slinging and jacking	6088
Picketing and lashing	6089
Hood jettison and lubrication	6090
Electrical installation	6091
Electrical installation (*with ejector seats, Mod.* 600) ...	6573
Ghost 10400 E.C.U. removal and installation	6376

LAYOUT OF A.P.4360B

SEA VENOM FAW Mk. 21 AIRCRAFT

*Volumes and Parts printed below are being issued as separate books and, when issued, will be listed in A.P.*113 *and A.P.(N)*1.

VOLUME 1	... ...	**... General and technical information**
VOLUME 2	... ...	**... General Orders and Modifications**
VOLUME 3, Part 1	... ...	**Schedule of spare parts**
Part 2	... ...	**Appendix "A"**
Part 3	... ...	**Scales of unit equipment**
Part 4	... ...	**Scales of servicing spares**
VOLUME 4	... ...	**... Planned servicing schedules**
VOLUME 5	... ...	**Basic servicing schedules**
Part 2	... ...	**Daily servicing schedule**
Part 2 (*supplement*)	... ...	———
Part 3	... ...	**Minor servicing schedule**
VOLUME 6	... ...	**Repair and reconditioning instructions**

Ground Handling Notes A.P.4360B—G.H.N.

Pilot's Notes A.P.4360B—P.N.

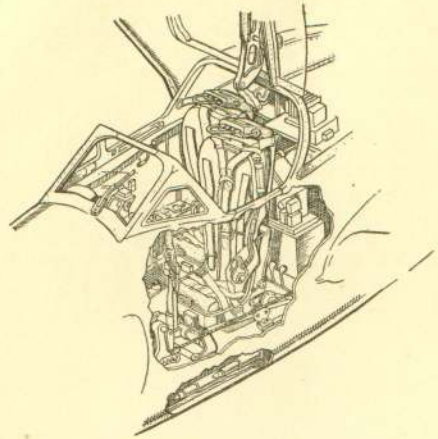
CONTENTS

LUBRICATION DETAILS

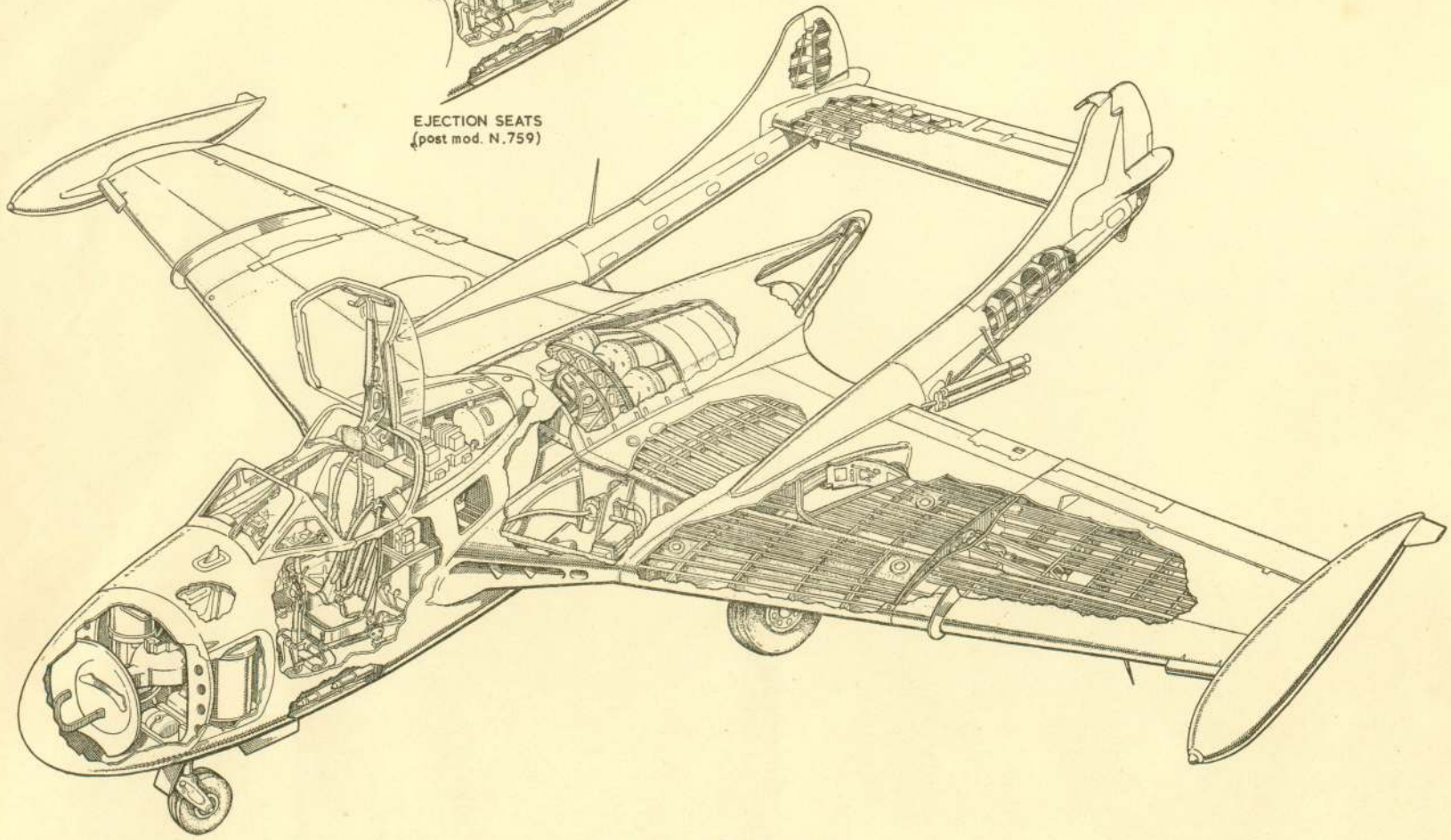
In order to avoid repeating Reference Numbers and N.A.T.O. Code Numbers throughout the book, details of the lubricants used in routine servicing are given below.

Nomenclature	*Ref. Nos.*	*N.A.T.O. Code No.*
Grease, XG-270	34B/9100509	—
Grease, XG-273	34B/9423151	—
Grease, XG-275	34B/9100512 (4 oz.)	G-350
	34B/9100513 (1 lb.)	G-350
Grease, XG-315	34B/9100519	G-394
	► ◄	
Oil, OM-150	34B/9100550	O-140
Oil, OX-14	34B/9100589 (2 oz.)	O-147
	34B/9100590 (½ pint)	O-147

P29345 361555/8986 5/59 625 C & P Gp 375



EJECTION SEATS
(post mod. N.759)



Sea Venom FAW Mk. 21

INTRODUCTION

1. The Sea Venom FAW Mk. 21 is a naval, carrier-borne, all-weather fighter, accommodating a crew of two and A.I. radar equipment. It is powered by a Ghost engine and the cabin is pressurised from the engine impeller casing, the air conditioning being regulated by a differential pressure control valve and a cold air unit.

◀**2.** Early aircraft are fitted with standard S.B.A.C. seats; later aircraft, however, are fitted with Martin Baker lightweight ejection seats introduced under the following modifications:—

Mod. N.600	Provision for ejection seats.
Mod. N.758	Introduction of S.B.A.C. pilot's seat with suitable attachments pending availability of lightweight ejection seats.
Mod. N.759	Introduction of lightweight ejection seats.
Mod. N.810	Introduction of interconnection between ejection seat and canopy hatch, and attachment on floor for emergency oxygen operation▶

3. The nacelle, oval in cross-section, is of balsa-plywood sandwich construction. The nose radome, the engine cowling and the jet pipe fairing are separate assemblies. The radar operator's seat is on the starboard side and slightly to the rear of the pilot's seat, and both are enclosed in the pressurised cockpit by a metal frame perspex canopy. The hatch can be jettisoned in a emergency by a cartridge fired gun. An arresting hook, hinged at the trailing edge of the wing root ribs, is housed in the UP position in an extension of the top of the rear cone fairing. A hold-back strop is fitted below the lower rear cone fairing.

4. The gas turbine engine is mounted on tubular steel bearers at the rear of the nacelle behind a fireproof bulkhead. The fuel is carried in a single fuselage tank, four flexible bag tanks in each wing and wing tip tanks. The wing tip tanks are fixed but the fuel can be jettisoned if necessary.

5. The main planes, the outboard portions of which can be folded upwards hydraulically, are of metal cantilever construction attached to the fuselage at three points and swept back at the leading edge. Flaps and dive brakes are hinged at the false spar of the inboard portion of the main planes. A ciné camera is fitted on a pylon underneath the port inboard main plane. Catapulting hooks are fitted below the main spar outboard of both No. 2 ribs.

6. Extending aft from the inboard portion of the main planes are twin tail booms, the forward portions of which are integral with the main planes. Mounted between the aft ends of the boom is a light-alloy tail plane and elevator assembly, and each boom carries a single fin and rudder assembly. Provision is made for the installation of R.A.T.O. gear on the forward end of each boom.

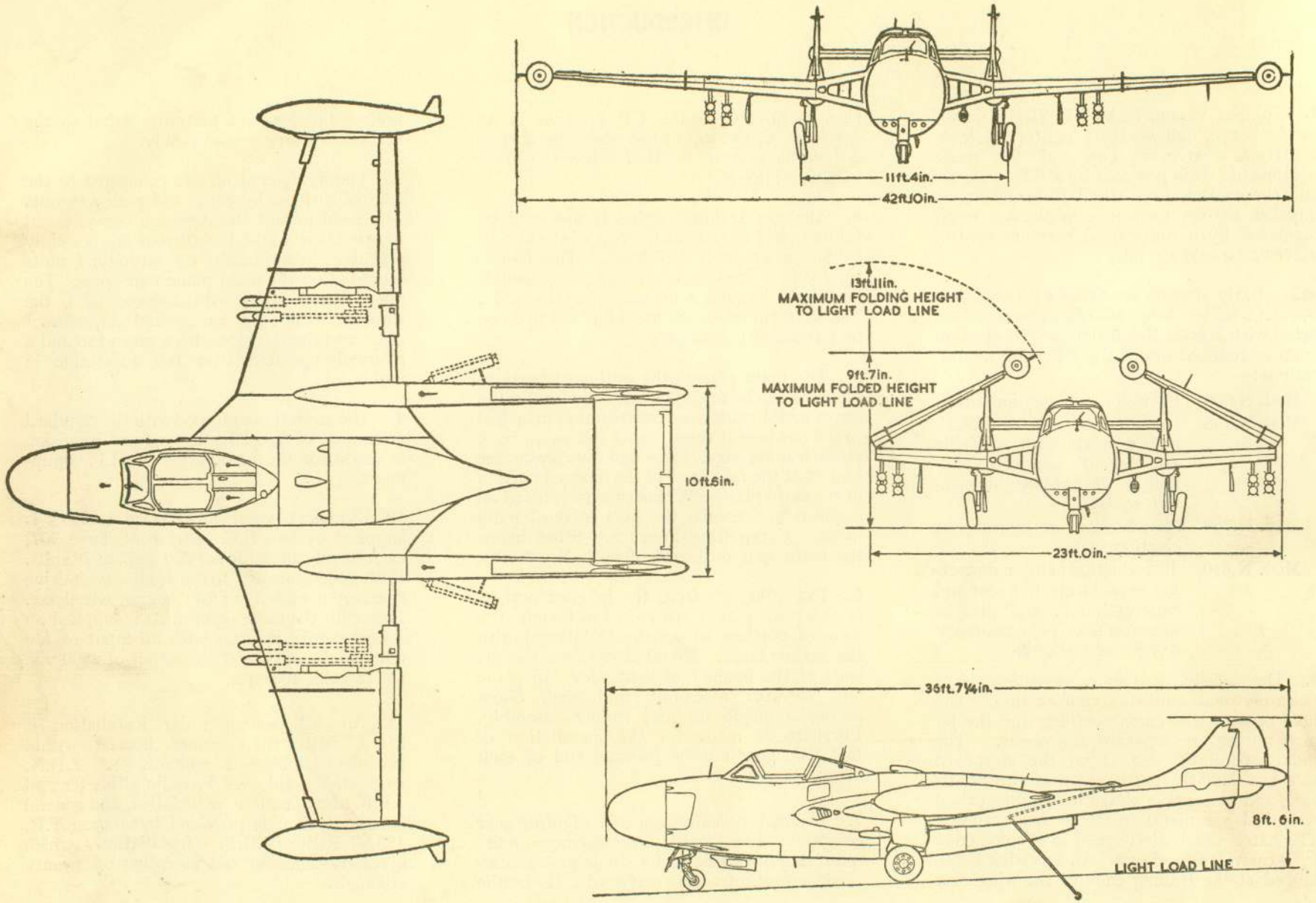
7. The hydraulically-operated alighting gear comprises two main undercarriage units retracting outwards and a single nose undercarriage unit retracting rearwards. Hydraulic brakes and Maxaret units are fitted to the main undercarriage wheels only.

8. The flying controls are connected to the control surfaces by cable and pulley circuits The rudders and elevators are conventional in operation, whilst the ailerons are normally operated hydraulically by servodyne units mounted on the main plane rear spars. The ailerons are fitted with balance tabs, the rudders with tabs for ground adjustment only, and the elevator with a servo tab and a manually-operated trim tab adjustable in flight.

9. The aircraft is equipped with the standard armament of four 20mm. guns and provision is made for the installation of R.P. equipment.

10. Electrical power for general services is supplied by two D.C. generators, Type 507, each having an output of 200 amp. at 28 volts. Both generators are driven from a twin-drive gearbox mounted on the engine wheelcase. Power for the radar equipment is supplied by a heavy-duty inverter with an input of 150 amp. at 28 volts, and an output of 2500 v.a. at 115 volts, 400 c.p.s.

11. An A.I. search radar installation is fitted with the scanner housed within the detachable nose radome. A Z.B.X. navigational aid, A.Y.F. radio altimeter and I.F.F. identification are installed, and general communication is provided by a twin T.R. 1934-T.R.1935/V.H.F. installation which gives transmission and reception on twenty channels.



General arrangement

LEADING PARTICULARS

Name ... ... **Sea Venom FAW Mk. 21**
Type ... ... **Two-seater, single-engined, Jet-propelled, mid-wing monoplane**
Duty ... ... **Carrier-borne, all-weather fighter**
Maximum all up weight ... ... (Refer to Sect. 2, Chap. 3)

Note . . . For principal dimensions refer to the General Arrangement illustration on the opposite page.

Main plane data

Aerofoil section	*Symmetrical section*, 10 *per cent T.C. ratio. Maximum thickness at* 0·4*C*
Incidence	*Zero to fuselage datum*
Dihedral	3 *deg. at chord datum*
Sweep back (at leading edge)	17 *deg.* 6 *min.*

Tail plane data

Chord	4·08 *ft.*
Incidence	0 *deg.*

Areas

Main plane with aileron, each	116·2 *sq. ft.*
Total wing area	279 *sq. ft.*
Aileron, each (without tab)	7·05 *sq. ft.*
Aileron tab, each	0·77 *sq. ft.*
Flaps, total	20 *sq. ft.*
Dive brake, each	3 *sq. ft.*
Tail plane	35·38 *sq. ft.*
Elevator (without tabs)	9·72 *sq. ft.*
Elevator trim tab	1·09 *sq. ft.*
Elevator spring tab	1·09 *sq. ft.*
Fin, each	3·95 *sq. ft.*
Rudder, each	3·99 *sq. ft.*
Rudder tab, each	0·06 *sq. ft.*

Main undercarriage

Type ...	*Two interchangeable single wheel units, sideways retraction*
Shock-absorber struts	*D. H.* 12.20.*U* 103/104
Fluid ...	*OM*-15 (*Ref. No.* 34*B*/9100572, *N.A.T.O. Code No. H*-515)
Air-pressure	*Refer to Sect.* 2, *Chap.* 2
Wheels	*Dunlop A.H.*50116
Tyres	*D.R.*0924
Tubes	*Dunlop DT.*0905
Pressure	*Refer to Vol.* 4
Maxaret brake unit, port	*Dunlop A.H.*50396
Maxaret brake unit, starboard	*Dunlop A.H.*50397

Nose undercarriage

Type	*Fully castering, self-centering, rearward retraction*
Shock absorber strut	*Lockheed AIR* 70212
Fluid ... *OM*-15	(*Ref. No.* 34*B*/9100572, *N.A.T.O. Code No. H*-515)
Air pressure	*Refer to Sect.* 2, *Chap.* 2
Wheel	*Dunlop A.H.*9912
Tyre	*Dunlop L.B.N.*32
Tube	*Dunlop L.B.*9
Pressure	*Refer to Vol.* 4

Hydraulic system

Services operated	*Alighting gear, brakes, flaps, dive brakes, arresting hook, windscreen wiper, wing fold and powered ailerons*	
Pumps (two)	*Lockheed Mk.* 7, (*Ref. No.* 37*J*/264)	
Fluid ... *OM*-15	(*Ref. No.* 34*B*/9100572, *N.A.T.O. Code No. H*-515)	
Reservoir capacity	1·75 *gall.*	
Accumulator initial air pressure:		
Main and aileron power	1250 $^{+0}_{-10}$	*p.s.i.*
Arresting hook	1700 $^{+0}_{-10}$	*p.s.i.*
Brake accumulator	1800 $^{+0}_{-10}$	*p.s.i.*
Main operating pressure (cut-out valve) ...	2400 *to* 2500	*p.s.i.*
Main thermal relief valve	3000	*p.s.i.*

Pneumatic system

Services operated	*Canopy seal, R.A.T.O. equipment*
Compressor	*Hymatic S.H.6/2A (Ref. No. 37G/505)*
Safety relief valve	*Hymatic R.V.10 (Ref. No. 27VB/3179)*
Oil-and-water trap	*OWT 46/1 (Ref. No. 27VB/2960)*
Pressure reducing valve	*Hymatic P.S.29 (Ref. No. 27VB/3777) or Hymatic P.S.29/19 (Ref. No. 27VB/4569)*
Canopy seal air valve	*D.H.12, 20.S.729*
Pressures:—	
In air reservoirs	450 *p.s.i.*
Hatch seal	*Type P.S.29,* 10 *p.s.i.* / *Type P.S.29/19,* 6 *p.s.i.*
R.A.T.O. equipment (jettison)	400 *p.s.i.*

Oxygen system

Cylinders, two	*(Ref. No. 6D/1383)*
Regulators, two	*(Ref. No. 6D/1700 and 1710)*

De-icing (windscreen only)

Fluid	*AL-8 (Ref. No. 34B/9100475, N.A.T.O. Code No. S-738)*
Reservoir capacity	*3 pints*
Pump (hand-operated)	*Rotax M.2601*

Engine

Name	*Ghost Mk.* 104 *(Engine change unit Ghost Mk.* 10400*)*
Type	*Single stage centrifugal compressor, single-stage axial-flow turbine*
Thrust	4850 *lb.*
Starter	*Twin breech, cordite turbine*
Type	*Rotax C.T.0104L (Ref. No. 37F/10002)*
Cartridges	*No.* 8 *Mk.* 1 *(Ref. No. 12K/1198)*
Accessories	*Refer to A.P.4320B, Vol.* 1
Fuel	*Aviation turbine gasoline, AVTAG (Ref. No. 34A/9100448, N.A.T.O. Code No. F-40)* *or* *Aviation turbine fuel* 100, *AVTUR (Ref. No. 34A/9100449, N.A.T.O. Code No. F-30)* *or* *Aviation carrier turbine fuel* 140, *AVCAT, Spec. D.Eng.R.D.2488 (N.A.T.O. Code No. F-42)* *or* *Aviation gasoline* 100/130 *grade, AVGAS (Ref. No. 34A/9100444, N.A.T.O. Code No. F-18)* *For emergency use only, refer to Sect.* 2, *Chap.* 3.
Oil	*OEP-71 (Ref. No. 34A/9100540, N.A.T.O. Code No. O-136)* *OX-38 (Ref. No. 34A/9100591, N.A.T.O. Code No. O-149).* *Refer to A.P.4320B, Vol.* 1

Fuel and oil capacities

	(*pre-Mod. N.*833)	(*post-Mod. N.*833)
Fuel tanks		
Fuselage tank	90 *gall.*	90 *gall.*
Wing tank No. 1 *(two off)*	110 *gall.*	108 *gall.*
Wing tank No. 2 *(two off)*	55 *gall.*	54 *gall.*
Wing tank No. 3 *(two off)*	38 *gall.*	37 *gall.*
Wing tank No. 4 *(two off)*	18 *gall.*	17 *gall.*
Wing-tip tank (two off)	150 *gall.*	
Totals	456	
Oil (in engine sump only)	*Refer to A.P.4320B, Vol.*	

Pressure cabin

Control valve	*Normalair No.* 512360 *(Ref. No. 27KD/613)*
Cold air unit	*Acre* 8, *Mk.* 1*A, (Ref. No. 27U/272) (pre-Mod. N.*584*)* *Acre* 9, *Mk.* 6*EA, (Ref. No. 27UA/579) (post-Mod. N.*584*)*
Non-return valve	*(Ref. No. 27DV/3968)*
Heat exchanger	*(Ref. No. 27U/284)*
Differential pressures (maximum)	3 *p.s.i.*

Seats (later aircraft)

Ejection type	*Martin Baker, lightweight, Mk.* 4*A*

Electrical installation

D.C. Generators (two)	28 *volt,* 200 *amp., B.T.H. Type* 507
Voltage regulators (two)	*B.T.H. Type* 94
Control units (two)	*B.T.H. Type LKF, Form B2*
Main contactors (two)	*B.T.H. Type LDA200, Form B4*
Circuit breaker (heavy-duty 200 *amp.) (two)*	*B.T.H. Type LEA300*
Shunt resistors (two)	*B.T.H. Type LJC200, Form E2*
Battery	24 *volt, Varley, Type A24/19/25,* 25 *amp. hr.*

Radio installation

General purposes V.H.F.	*A.R.I.*5491
Intercommunication	*A.*1961
Search radar	*A.R.I.*5860
Navigational aid (Z.B.X.)	*A.R.I.*5307
A.Y.F. (radio altimeter)	*A.R.I.*5284
I.F.F. identification (early aircraft)	*A.R.I.*5679
I.F.F. identification (later aircraft)	*A.R.I.*5848

Armament installation

Guns	*Hispano* 20 *mm. Mk.* 5*, No.* 3 *(Ref. No. 7G/1034)*
Belt feed mechanism (Mk. 5*)*	*Left-hand (Ref. No. 7G/924)* *Right-hand, (Ref. No. 7G/925)*
Firing unit	*Maxiflux* 24*v (Ref. No.* 5*D/1489)*
Ammunition (600 *rounds*)	20 *mm. Hispano (Ref. No.* 12*C/2862)*
Gun-sight	*Mk.* 5 *(Ref. No.* 8*B/2966)*
Ciné Camera	*G.*45 *(Ref. No.* 14A/1380*)*
Rocket projectors	*Mk.* 8
Cartridge, canopy hatch jettison	*No.* 1*, Mk.* 1 *(Naval Ref. KJ.*560*, Ref. No.* 12*K/1260)*

Pressure head settings

Refer to Sect. 5, *Chap.* 2.