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# Chapter 4 **GENERAL SERVICING** LIST OF CONTENTS

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Bonding, locking and sealing ...

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Assembly panels - upper surfaces

This chapter gives a description of servicing operations of a general nature

related to the aircraft as a whole. Parts

of these operations are carried out in

conjunction with servicing and removal

operations in other chapters in this volume

and suitable references are made to these

notes on the electrical and instrument

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1.

#### DISMANTLING THE AIRCRAFT

	ASSEMBLING THE AIRCRAFT
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Jacking and trestling complete	Sequence of assembly
aircraft 5	Assembly panels

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#### DESCRIPTION

similar notes on the radio and radar installations in Sect.6.

### List of references

2. For servicing notes and information not dealt with in this chapter, reference should be made to the relevant Air Publications, a list of which is given at the beginning of this book.

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### LIST OF SERVICING EQUIPMENT AND TOOLS

Particulars of all special and stan-3. dard equipment and tools required for servicing the aircraft are contained in Table 1, and a list of items in the flight tools kit in Table 2. These tables do not refer to any items listed in Vol.3, Part 3 (Appendix "A") excepting item 32 in Table 2 which is listed for reference only.

F.S./1



Fig. I. Sections of aircraft

F.S./2

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# TABLE 1 LIST OF GROUND SERVICING EQUIPMENT

ltem	Ref.No.	Part No.	Description	Application	
		TOW	ING AND STEERING EQUIPMENT (CHAP.1)		
Standard	equipment				
1	4G/4139	GS.2151	Bridle, forward towing	At main wheels	
Special e	quipment				
2 4 5 6	26FP/333 26FP/353 26FP/301 26FP/352	1/U939 1/U1010 1/U813 U1007	Arms, towing Arms, steering, tail wheel Cables, towing bogged aircraft Adapter, towing arm, Mk.2	At tail wheel For use with bridle. At main wheel	
Standard	equipment		JACKING EQUIPMENT (FIG.2)		
10 11 13 14 15 16 17	4Q/1309 4Q/2320 4Q/2610 4Q/2612 4Q/2616 4Q/2614 4Q/2615	-	Jack, 8 ton pillar Type B Adapter, Mk.26 Jack body, hydraulic, 25 ton. Trestle Mk.2, 25 ton Adapter,head, Mk.45 Units, fixed leg Units, trailing leg	Post Mod.272 tail-wheel jacking Used with item 10 and 19 At main plane Used with item 13 and 15 Used with item 13 and 14 Wheel transportation Wheel transportation	
Special e	quipment				
18 19 19a	26EA/33069 26FP/372 26FP/381	2/U <b>796</b> U1087 U1083	Jacking pads, main plane Stand, jacking Clamp, jury	Used with item 13, 14 and 15 Used with item 10 and 11 Tail-wheel leg	
Standard	equipment		TRESTLING EQUIPMENT (FIG.2)		
20 21 22 23 24	4G/- 4G/- 4G/- 4G/- 4G/-	-	Trestle U.J. No.9A Trestle U.J. No.11 Trestle U.J. No.12 Trestle U.J. No.15 Trestle U.J. No.17	Former E Former 33 and tail plane Former 29 Former 41, rigging position Former 41 scanner testing	

NOTE ...

All the above to be completed with brackets Type A and used with items overleaf (26 to 38)



Fig. 2. Jacking and trestling

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Rear centre section less turret

Tail lifting to rigging position

Intermediate plane section

Outer plane section

Rear section

Fin or rudder

For scanner unit

Scanner Type 85

Tail plane

			TABLE 1 cont.		
Item	Ref.No.	Part No.	Description	Application	
25	-	-	Gantry lifting heavy Consisting of:-		
	40/2309	-	(a) Uprights, Type A	Used with items 30 to 37	
	40/2310	-	(b) Beams, Type A	Used with items 30 to 37	
	4Q/2311	-	(c) Beams, Type B	Used with items 30 to 37	
Special e	equipment				
26	26FP/314	U900	Beam, former E	Used with item 20	
27	26FP/304	U891	Beam, former 33	Used with item 21	
28	26FP/332	U896	Beam, former 29	Used with item 22	
29	26FP/303	0890	Beam, former 41	Used with item 23 and 24	
30	26EA/32091	1/0/39	Beam, wing rib 3, port	Used with item 25	
31	26EA/32108	1/11765	Beam, wing nD 3, starboard	Used with item 25	
32	26EA/32109	2/11765	Beam, wing rib 16, starboard	Used with item 25	
34	26FA/32111	1/1766	Beam, wing rib 21, port	Used with item 25	
35	26EA/32112	2/U766	Beam, wing rib 21, starboard	Used with item 25	
36	26EA/32113	1/U767	Beam, wing rib 36, port	Used with item 25	
37	26EA/32114	2/U767	Beam, wing rib 36 starboard	Used with item 25	
38	26FP/330	U921	Beam, tail plane	Used with item 21	
			SLINGING FOUIPMENT		
Special e	equipment				
39	26FP/493	U1578	Beam, scanner slinging	Used with item 52 and 53	
1-40	26FP/305 ·	5/U883	Eyebolt, slinging	Used with item 46 and 47	
1.41	26FP/306.	U882	Sling	Centre section	
V42	26FP/355.	U991	Sling	Nose and front centre section wi	ith
40	0000 /004	TIOOF	01:	guns and mountings	
43	26FP/354	U995	Sling	Nose section	
44	20r P/ 309	0870	ormg	Nose and front centre section le	22
				guns and mountings. Rear cen	tre
				section with turret.	

F.S./3

45 46

-

+47 +48 ×49

- 50

¥ 51 52

53

26FP/356

26FP/357

26FP/312 '

26EA/32088 '

26EA/32089 ·

26FP/315~

26FP/316 -

26FP/351

26FP/375

U994

U992

**U887** 

U760

**U907** 

**U918** 

---

U1091

2/U760

Eyebolt, slinging

Sling

Sling

Sling

Sling

Sling

Sling

Sling

Sling



Fig.3. Jacking one main wheel

F.S./4

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TABLE 1 cont.

em	Ref.No.	Part No.	Description	Application
			POWER PLANT CHANGING EQUIPMENT	
andard	equipment			
60 61 62 63 64 65 66 67 68 69	4L/2015 4G/4170 4G/2350 4G/1 4G/2421 4G/4349 40B/1014 40B/475 40B/337 40B/1059	2001/47	Block, pulley, 2 ton Sling Stand engine erecting Type A Sets, modification Adapter, Type B Stand, power plant, Type D modified Backplate, Type A, No.1 Adapter, Type 1 (top) Adapter, Type 1A (bottom)	Power plant Griffon engine Used with item 63 and 65 Used with item 63 and 64 Used with item 66 and 68 Used with item 66 and 67 Used with item 66 and 67
pecial e	equipment			
70 71 72 73 74 75	26EA/32084 → 26FP/344 × 26FP/345 × 26FP/317 × 26FP/318 × 26FP/319 ×	U746 U969 U970 U916 U908 U906	Gantry Strut extension, outer Strut extension, inner Platform Mat, inboard nacelle Mat, outboard nacelle	Power plant changing For propeller changing,used with item For propeller changing,used with item Gantry erecting
			INSTALLATION EQUIPMENT	
tandard	equipment			
80	4G/4230 ×	-	Trolley, basic chassis	Auxiliary fuel tank
pecial	equipment			
82	26FP/348	U956	Frame support	Used with item 80
		COMPO	DNENT HANDLING AND STORAGE EQUIPMENT	
Special	equipment			
85 86 87 88 89	40E/400 40E/401 26FP/346 26FP/347 26FP/331	J D2545 J D2546 U923	Cradle, transport Cradle, transport Cradle, lifting Cradle, lifting Frame, storage	Port radiator Starboard radiator Port radiator Starboard radiator Mid turret fairing



Fig.4. Slinging aircraft sections

			COLL CONT.	
Item	Ref.No.	Part No.	Description	Application
			RIGGING EQUIPMENT	
90	26EA/3848	Z1275	Gauge, incidence	Main plane centre section
91	26EA/32093	Z2750	Gauge incidence	Main plane, rib 3
92	26EA/32094	Z2751	Gauge, incidence	Main plane, rib 16
93	26EA/32095	Z2752	Gauge, incidence	Main plane, rib 21
94	26EA/32096	Z2753	Gauge, incidence	Main plane, rib 36
95	26EA/32098	Z2754	Gauge, wing tip setting	Main plane, rib 39
96	26EA/32097	Z2765	Gauge, dihedral	Main plane, rear spar
97	26FP/320	7.4899	Gauge, incidence	Tail plane, rib 3
98	26FP/321	7,4900	Gauge, incidence	Tail plane, rib 11
99	26FP/322	7,4906	Pegs, rigging check	Fuselage rear centre section
100	26FP/323	Z4902	Straight edge, transverse check	Fuselage former 37
101	26FP/324	Z4901	Straight edge, transverse check	Fuselage former 14
102	26FA/4319	7.1427	Straight edge, longitudinal check	Fuselage, rear centre section
103	26FP/325	74911	Gauge setting	Elevator rib 4
104	26FP/326	74903	Gauge checking	Fin
105	26FP/327	74910	Gauge setting	Rudder
		м	ISCELLANEOUS SERVICING EQUIPMENT	
Standar	d equipment			
110	4G/6246	-	Adapter, inflation Mk.2	Used with item 114
111	4G/3026	-	Gauge, 0-600 lb./sq.in.	Used with item 110
112	4G/3027	-	Gauge, 0-1,500 lb./sq.in.	Used with item 110
113	4G/3029	-	Gauge, 0-3,500 lb./sq.in.	Used with item 110
114	4G/257	-	Pump, oleo, Type A	Shock-absorber strut inflation
115	4G/4269	-	Primer, oil Mk.2	
116	4G/4243	-	Ladder, servicing, Mk.2	
121	4G/4342	-	Mats, main plane, Type C	
122	4G/2596	-	Platform, inspection, Type M	
124	4G/2604	-	Platform, inspection, Type N	
128	33C/1115	-	Outfit, engine coolant	
129	46/4042	-	Trolley, stowage	For engine and P/P cowlings
130	4G/4200	-	Trolley, engine coolant	For replenishing
131	4G/4422	-	Trolley, water/methanol	1
132	4G/4423	-	Trolley, de-icing fluid	
133	4G/4221	-	Trolley, H.P. air charging Mk.2	
100	or 5888			
134	4F/1718	-	Trolley, starting, Mk.5	
135	4F/1603	-	Trolley, compressor air Type I. Mk 2	
100	or 1783		or Mk.2A	
136	4F/1913	-	Trolley, electrical servicing and testing	
1.00	11/2010		Mk.4	

## TABLE 1 cont.

İtem	Ref.No.	Part No.		Description		Application
137	4F/1796	-		Trolley servicing, hydraulic Mk.2A		
138	4F/1715	-		Trolley, instrument and auto-pilot testing		
	or 1856			Mk.1A		
139	4F/1805	-		Trolley, servicing, pneumatic L.P. Mk.1B		
140	4A/1757	-		Tank, aircraft cowling washing, large		
141	4G/4169	-	)	Cleaners, vacuum, aircraft, heavy duty	1	Mk.1A petrol engine
142	4G/4519	-	Ĩ	Mk.1A and 1B respectively	1	Mk.1B - 400/440v.3 ph - 50 cycles
Special e	equipment		-	r y	)	interest interest interest interest
150	26EA/32107	AH.8364		Extractor wheel		
152	26EA/4274	U575		Ladder, maintenance		
153	26FP/313	U314		Struts, main wheel		
154	26FP/433	U1159		Adapter		Front and rear air conditioning
				raupter		intake No 1
155	26FP/328	U889		Struts, bomb doors, jury		Intake NO.1
				SALVAGE FOURPMENT		
160	26FP/430	111127		Tooling pode front	1	
161	26FD / 431	111100		Jacking pads, mont	ţ	Aircraft salvage
101	201 1/431	01128		Jacking pads, rear	1	Aircraft salvage

## TABLE 1 cont.

TABLE 2 FLIGHT TOOL KIT

Item	Ref.No.	Part No.	Description	Application
Special	tools			• •
1 2 3 4 5 7	26EA/32635 26EA/32636 26EA/16996 26EA/3819 26EA/33015 26EA/33017 26EA/33017	Z2877 Z2878 Z2501 Z1268 Z3847 Z3956	Spanner, wing attachment Spanner, wing attachment Spanner, wing attachment C-spanner Extractor Spanner	Front spar - inboard joint. Rear spar - inboard joint. Both spars - outboard joint Flap operating system ball joint connectors Flap link pins Aileron hinge bolts
10	26FP/363	Z6053 Z6130	Pop rivet drill Claw spanner, 1/8 in. B.S.F.	Hydraulic connections at wing root
11 12	26FP/364 26FP/365	Z6131 Z6312	Claw spanner, 1/4 in. B.S.F. Claw spanner, 3/8 in. B.S.F.	Hydraulic connections at wing root panels on front centre section Hydraulic connections at wing root
13 14	26FP/366	Z6133	Claw spanner, 5/8 in. B.S.F.	panels on front centre section Hydraulic connections at wing root panels on front centre section
15 16 17 18 19 20	26FP/367 26FP/369 26FP/368 26FP/371	29/03453 18/03453 Z6880 Z6887 Z6888 Z6925 Z7341	Shaft assembly Box key Spanner Spanner Extractor Box spanner	For engine turning Spark plug nut on cabin heaters. Starter motor connections Spark plug lead on cabin heaters Rudder hinge bracket bushes Tail plane centre joint

Item	Ref.No.	Part No.	Description	Application
21		77100	Spanner	Aircraft botton, attachment puts
22		77266	Tubular peg spanner	Spindle stop nut in oil filter
23	26EA/32641	17/3245	Spanner 1.7 in A/F 71/ deg	Spindle stop nut in on inter
24	26FA/32642	27/3245	Spanner, 1.7 in A/F 221/ deg.	
25	26FA /32642	1/73245	Spanner, $17$ m. $A/F$ , $22/2$ deg.	
26	26FA/32644	27/3246	Spanner, 2 00 m. A/F, 7/2 deg.	
20	20EA/ 32044	72254	Spanner, 2.00 m. A/F, 2272 deg.	
28	20EA/32030	7224	Spanner, 2.24 m. A/F, straight	
20	20EA/32043	73251	Spanner, 1-9 In. A/F, Straight	
30	26EA/32637	11770	Spanner, 2 R A universal jointed	
31	26FP/362	76063	Spanner, 2 B.R. universal jointed	
32	* 26FA/4306	71436	Spanner	Radiator drain plug
34	26FA/32107	AH8364	Fytractor	Wheels
Standard	items	110504	Extractor	WHEELS
40	IL./10	-	Ratchet handle 3/8 in sa drive	
41	1A/4105	-	Tommy bar	Used with item 42
42	1C/2229	-	Box spanner 1/8 in x 3/16 in Whit	Obed with item 42
43	11./48	-	Extension bar 1/2 in sa drive x 9 in	
44	18/4467	-	Universal lubricating oun	
45	11./50	-	Ratchet handle 1/2 in sa drive	
46	11./137	_	Ratchet handle 9/32 in sq. drive	
47	11./9	-	Swivel handle $9/32$ in sq. drive x 6 in	
48	18/4463	-	Miniature nozzle	Used with item 44
49	1B/4468	-	Pull-on nozzle	Used with item 44
50	3A/1854	-	Riveters, Type P.G.O.3	Hydraulically operated
51	1L/45	-	Bi-hexagonal socket, 11/16 in. Whit.	
52	1L/136	-	Hexagon socket, 7/16 in, A/F.	
=0	This ite	em is included in the appen	dix 'A', but is included in this list for convenien	ce of reference.
53	1L/59	-	Open jaw spanner 9/16 in. x 5/8 in.	
-	4 - /		Whitworth. 11 in. long.	
54	1L/73	-	Open jaw spanner 11/16 in. x 3/4 in.	
	10/0100		Whitworth. 12½ in. long.	
55	1C/6436	-	Single ended spanner 1½ in. A/F	
56	1C/229		Box spanner 1/8 in. x 3/16 in. Whitworth	
57	1C/6452	-	Automatic spiral screwdriver	
58	1C/2167	-	Common screwdriver 18 in. long.	
59	3A/1855	-	Tools for servicing item 50.	
60	1B/4428	-	Circlip pliers, flap links	
61	3A/1854		Pop riveter and pump	
62	1C/6182	-	Adjustable C-spanner	

### TABLE 2 cont.

### SECTIONS OF AIRCRAFT (fig.1)

4. The illustration shows the sections into which the aircraft can be dismantled and is keyed with references to the chapters in this volume in which relevant DISMANTLING THE AIRCRAFT

information is to be found.

### JACKING AND TRESTLING COMPLETE AIRCRAFT (fig.2)

5. Equipment used to support the

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complete aircraft is indicated on the illustration, and the item numbers refer to the equipment listed in Table 1 under the same numbers. When dismantling the aircraft to a stage where the rear or front



Fig. 5. Weights and packing dimensions of components

### **KEY TO FIG.5**

### (WEIGHTS AND PACKING DIMENSIONS OF COMPONENTS)

ltem	Component	Weight	Height	Length	Width
1	Nose with equipment and gun	(10)	(11.)	(11.)	(11)
	mounting	1635	8.0	11-75	7.5
2	Front centre section with			**	
	equipment	3873	11.66	. 13.5	8.0
3	Intermediate centre section with				
	equipment	6726*	9.5	28.75	7.75
4	Rear centre section with equip-				
	ment and turret	4857	13.25	27.1	8.0
5	Rear section with equipment	1100*	8.5	27.75	6-25
6	Bomb door	355	1.33	33.25	5.0
7	Centre plane trailing edge	230	3.0	10.5	6.5
8	Inner flap	25	0.5	5.66	3.5
9	Dummy flap	14	0.5	4.75	3.5
10	Inboard rear nacelle fairing	51	3.5	10.5	4-75
11	Valance	20	0.5	9.75	2.0
12	Undercarriage door	36	1.0	9.0	3-0
13	Outer wing section	393	1.5	17.0	7-5
14	Intermediate wing section	2728	3.0	29.0	9.75
15	Intermediate trailing edge	428	2.75	29.0	6.5
16	Inboard aileron section	89	0.75	12.0	3-33
17	Outboard aileron section	69	0.75	13.5	2.5
18	Outer flap	53	0.5	12.33	3.5
19	Outer flap extension	28	0.5	7.0	3-5
20	Tail plane	327	1.5	17.0	7.5
21	Elevator	165	0-75	13.25	4-0
22	Outboard sub-frame	206	3.5	8-0	3-25
23	Outboard rear nacelle fairing	33	4.0	7.0	5.0
24	Detachable wing tip	11	0.5	3.25	2-5
25	Fin	165	1.0	14-5	6.0
26	Rudder	155	1.0	14.5	5.25
27	Power plant (refer to				
	A.P.4275A, Vol.1)	3940	5.0	8.5	13.25

\* NOTE:- Weight given for component less undercarriage units.

centre section is to be parted from the intermediate centre section, or a new nose is to be fitted, reference to fig.4 will indicate the slings to be used and it should be realised that it is impracticable to employ jacking trestles along the bomb compartment. When any of the above components are removed, support must be provided for the remainder as follows:-

 Removal of nose: support the rear end of the fuselage at former 41, or 29 if the rear fuselage has been removed. Normally this section is removed with the front centre section.

- (2) Removal of front centre section with or without nose: support as in (1) above.
- (3) Removal of rear centre section: this must be effected only when the two previous sections are attached to the intermediate centre

## RESTRICTED

section. Steady these three sections, by using a nose steadying trestle as indicated in the illustration, before removing the rear centre section.

### DISMANTLING

6. Complete dismantling of an aircraft for packing and transport is done in the reverse order to that given in para.11. The slings, to be used on the various major sections of the aircraft, are indicated in fig.4, on which the item numbers given against the slinging equipment used, refer to correspondingly numbered items in Table 1. Packing sizes and weights of components are given in fig.5 and its associated key.

#### Bonding, locking and sealing

7. Details of bonding, locking and sealing should be carefully noted, especially the arrangement of locking wire to ensure correct restoration when affected components are reassembled or reinstalled. A description of bonding will be found in A.P.1464D, Chap.1.

### Hydraulic system components

8. Before disconnecting any union, other than self-sealing couplings, the system must be depressurised by operating the appropriate valve at the top of the reservoir. (Sect.3, Chap.6).

### Pop-riveted panels (fig.6 and 7)

9. Pop rivets securing assembly panels must be drilled out before the panels can be removed, using drill, Ref.No. 26EA/ 19842, which is constructed to prevent the rivets turning whilst being drilled. After drilling, the rivets should be punched out.

### Trim tab cables

10. When disconnecting a cable, weights or some system of tying should be used to prevent the cable unwinding from the control box and from the aileron trim gear drums.





Fig.6. Assembly panels - upper surfaces

ltem	Description and Purpose	Screws	Bolts	Pop Rivets				
1	No. I fuel tanks assembly panel	26EA/33049(20)						
		26EA/33050(42)						
		26EA/18720(54)						
		26EA/18721(43)						
		26EA/19276(57)						
		26EA/19277(55)						
	Note.—Fit screws until 1-3 in. proud, apply Plastic Hermatite, Stores Ref. 33C/1093, to exposed shanks and underside of heads, and tighten							
2	Inner wing joint assembly panels, nose and top surface	26EA/51						
3	Inner wing joint assembly panel, bottom surface	5/55 3158						
4	Assembly panel, No. 2, 3 and 4 fuel tanks	5/55.5156	280/9326 & 10084					
5	Outer wing joint assembly panels-Nose		280/8300					
	Тор	5/55.3158	280/8341					
	Bottom	5/55 3158	280/8306					
6	Assembly panels, fuselage to trailing edge	5/55 3158	200/0300					
7	Assembly panels, attaching centre plane trailing edge	5/55.5155	280/8484	380/9517 (Ferringed				
	, ,		200/0101	adge) and 9374				
				(Poor edge and ribe)				
8	Assembly panels, nuts securing wing tips to rear spar	26EA/50		(Rear edge and FIDS)				
9	Assembly panels, fins to tail plane	20211/00		3 4 and 7/55 2790				
10	Access panel, engine controls and services, front spar			3, 4 and 7,55.5770				
11	Assembly panels (4) tail plane to fuselage	26EA/576		200/12/5				
12	Nose fairing, tail plane to fuselage	26EA/766						
13	Joint fairing pieces, tail plane to fuselage	26EA/12511	28D/9588					
			28D/9353					
14	Assembly panels (4), transport joint bolts at longerons		200,7555	280/9192 9266 9970				
15	Assembly panels (4), attaching intermediate trailing edge			200/0374				
16	Assembly panels, rudder control bell cranks			5/55 3159				
17	Assembly cover, aileron control linkage		280/9853	5/55.3156				
18	Assembly panel, services on front spar	Secured by nuts to fr	ont spar					

## KEY TO FIG 6 and 7 (ASSEMBLY PANELS)





A.P.4267B, Vol. 1, Sect. 2, Chap. 4





1

### SEQUENCE OF ASSEMBLY

11. The following sequence of operations is recommended:-

- Undercarriage to undercarriage beams and main plane centre sections (Sect. 3, Chap. 5).
- (2) Fuselage nose to front centre section (if not already assembled)these are rarely separated (Sect. 3, Chap.1).
- (3) Rear fuselage section (with retractable tail-wheel unit fitted) to rear centre section. The transparent rear fairing and the portion of the fuselage between formers 44 and 48 are sub-components of this section and the joints between them are manufacturing joints (Sect.3, Chap.1).
- (4) Rear fuselage assembly (3) to fuselage intermediate centre section (Sect. 3, Chap. 1).
- (5) Front fuselage assembly (2) to fuselage intermediate centre section (Sect.3, Chap.1).
- (6) Tail plane to fuselage (Sect.3, Chap.1).
- (7) Fins, rudders and elevators to tail plane (Sect.3, Chap.3).
- (8) Intermediate plane sections, without trailing edges, to centre plane (Sect.3, Chap.2).
- (9) Outer plane sections to intermediate plane sections.
- (10) Centre plane trailing edges, including flaps, to centre plane (Sect.3, Chap.2).
- (11) Intermediate plane trailing edges, including outboard flaps, to intermediate plane sections (Sect.3, Chap.2).

### ASSEMBLING THE AIRCRAFT

- (12) Wing tip trailing edges to wing tips (Sect. 3, Chap. 2).
- (13) Ailerons to main plane (Sect.3, Chap.2).
- (14) Engine sub-frames, valances, undercarriage doors and nacelle fairings to main plane (Sect.4, Chap.1).
- (15) Firewalls to sub-frames (Sect.4, Chap.1).
- (16) Power plants to sub-frames (Sect. 4, Chap.1).
- (17) Propellers to power plants (A.P. 1538K, Vol.1).
- (18) Bomb doors to fuselage (Sect.3, Chap.1).

### Assembly panels (fig.6 and 7)

12. Refer to the illustrations. Particulars of the methods employed for securing these panels are given in the relevant keys.

### GENERAL SERVICING INFORMATION

### FORMER AND RIB POSITIONS (fig. 8 and 9)

13. The two illustrations show the former and rib positions of all major portions of the airframe. In addition, the positions of the transport joints in the fuselage and main planes are indicated.

#### ACCESS PANELS

14. The positions and purpose of the access panels on the aircraft are indicated in the illustrations. Mod.444 introduces a panel in the bomb compartment rear bulkhead to provide access to the ground supply socket connections.

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### JACKING AND SLINGING FOR SERVICING (fig.2 and 4)

15. Equipment required to prepare the aircraft for servicing operations involving jacking or slinging, and the method of using it, is detailed in the following subparagraphs. Item numbers quoted refer to equipment listed in Table 1.

- Jacking both main wheels; use two each of items 13, 14 and 15. Securely chock the tail wheel. Clearance required at the main wheels for removal is 5 in.
- (2) Jacking one main wheel; use one each of items 13, 14 and 15. Securely chock the tail wheel. The method for using the jack is shown in fig.3, and the instructions given on this illustration must be followed.

### WARNING ...

Failure to carry out the proper drill for raising one side of the aircraft only, can result in a serious accident.

- (3) Jacking all three wheels; use two each of items 13, 14 and 15 for the main wheels and 10, 11 and 19 for the tail wheels. It should be noted that the only steadying influence is the bases of the jacks, therefore, firm standing must be used under these circumstances.
- (4) Jacking in the rigging position; use two each of items 13, 14 and 15, one each of items 20 and 26, and one each of items 23 and 29. First chock the main wheels and, using a suitable crane and sling item 47, carefully lift the tail to enable trestle item 23, with item 29, to be placed under former 41. Place item 20, with item 26, under the nose at former E to steady the aircraft. Then raise the mainwheels 2 in. clear of the ground,

following up with beam item 26, on trestle item 20. The attitude of the aircraft can then be adjusted by differential alteration by the adjustment provided on items 20 and 23.

Hydraulic system operation testing; refer to Sect.3, Chap.6. The aircraft is to be jacked in accordance with para.15(4), substituting a No.17 universal jacking trestle (item 24) fitted with item 29 in place of items 23 and 29. Whilst there is no definite tendency for the aircraft to tip forward if the tail is raised high enough to place a No.17 trestle under former 41 (introduced from aft), the trestle item 20 with item 26 should be used when the aircraft tail is being raised above approximate rigging position. The beam on the trestle must be kept very near the skin at former E and gradually lowered as the tail is raised.

### WARNING ....

Under no circumstances must the tail be lifted quickly, otherwise damage may result owing to inability to lower the nose steadying beam quickly enough. Before the scanner is lowered to the 'attack' position, the mainwheels must be raised 5 in. clear of the ground, then the screws on the No.17 trestle extended to raise the beam 12 in. from its initial bottom setting.

- (6) Main plane sections; the method of using the gantries employed, is indicated in the illustration.
- (7) Tail plane; it is essential, when one half of the tail plane is being removed, that the other half is supported by one each of item 21 with item 38, and the half to be removed properly slung, before any of the fuselage attachment or centre joint bolts are loosened or removed.



Fig. 10. Wing tip, tail plane and fin checks

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Fig. 11. Rigging position and main incidence checks

#### KEY TO FIG. 12

I VENT PIPE CONNECTION 2 UNDERCARRIAGE UP-LOCK CATCH PINS 3 FIRE PROTECTION SYSTEM (fuel tanks) 4 INBOARD OIL TANK FILLER 5 NO. 2 TANK FILLER 6 VENT PIPE CONNECTION 7 VENT PIPE AND CABLE CLIPS 8 VENT PIPE CONNECTION 9 TANK SUPPORT STRAPS 10 VENT PIPE CONNECTION II VENT PIPE CLIP 12 NO. 4 TANK FILLER 13 REBECCA AERIAL 14 VENT PIPE AND FIRE PROTECTION SYSTEM 15 FLUX DETECTOR (port wing only) 16 FIRE DETECTOR SWITCHES 17 FUEL GAUGE TRANSMITTER 18 TANK ASSEMBLY PANEL LIFTING HANDLES

- 19 FUEL GAUGE TRANSMITTER 20 FIRE PROTECTION SYSTEM 21 WING JOINT SHACKLE BOLTS 22 DINGHY COVER MANUAL RELEASE LEVER 23 DINGHY RELEASE CABLE PULLEY 24 WATER TANK FILLER 25 DE-ICING PIPE CONNECTION 26 BELL CRANK BEARING 27 TRIM CONTROL CABLES 28 TRIM CONTROL CABLES 29 TAPER BOLTS 30 FUEL GAUGE TRANSMITTER 31 TANK FILLER DRAIN PIPE CONNECTION 32 NO. I TANK FILLER 33 AUXILIARY FUEL PIPE CONNECTION 34 AUXILIARY FUEL PIPE COUPLING 35 MAIN ENGINE FUEL FILTERS
  - 36 OUTBOARD OIL TANK FILLER



Fig. 12. Access panels - upper surface

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### **KEY TO FIG. 13**

- VIGATION LIGHT TERMINALS NDUIT CLIP AND CABLE FAIR-AD. -NDUIT CLIP AND CABLE FAIR-AD. NDUIT CLIP AND CABLE FAIR-AD. NDUIT CLIP, CABLE FAIRLEAD DE-ICING CONNECTION. D NDUIT CLIP, CABLE FAIRLEAD D T.B.88 NDUIT CLIP AND CABLE FAIR-LAD. NDUIT CLIP, CABLE FAIRLEAD ID DE-ICING CONNECTION DNDUIT CLIP AND CABLE FAIR-LAD. DNDUIT CLIP AND CABLE FAIR-LAD. DNDUIT CLIP, CABLE CONNEC-DN AND T.B. 51, 52 AND 59. CKETING ATTACHMENT REDUCING TROGEN SYSTEM LVES. DNDUIT CLIP, CABLE FAIRLEAD D DE-ICING CONNECTION DNDUIT CLIP AND CABLE FAIR-CAD. ⊃.4 TANK DRAIN COCK. DNDUIT CLIP, CABLE FAIRLEAD D DE-ICING CONNECTION NDUIT CLIP, CABLE FAIRLEAD, RE PROTECTION AND PRIMING STEM VENT PIPES BLE FAIRLEAD AND DE-ICING NNECTIONS
- 20 OIL FILTER, TANK DRAIN VALVE AND FEATHERING WELL DRAIN COCK. **21 ENGINE FUEL FILTER** 22 OUTBOARD OIL TANK FILLER 23 WATER/METHANOL TANK FILTER 24 FUEL TANK REMOVAL PROCEDURE 25 OIL FILTER AND FEATHERING WELL DRAIN COCK. **26 PICKETING ATTACHMENT 27 ENGINE FUEL FILTER** 28 VISION DE-ICING FLUID TANK DRAIN. 29 JACKING POINT COCK **30 MASTER** ENGINE FUEL INDICATOR SUMP 31 FUEL DRAIN GAUGE 32 NO.1 FUEL PUMP 33 NO.1 TANK DRAIN COCK PIPE 34 DE-ICING AND AILERON CONTROL CONNECTION 35 FUEL SYSTEM MANIFOLD, NO.1 FUEL COCK AND MAIN FUEL DRAIN VALVE. 36 DE-ICING SYSTEM PUMP AND FILTER **37 OIL TANK DRAIN VALVE** 38 NO.2 TANK DRAIN COCK **39 AILERON CONTROL RODS** 40 NO.2 FUEL PUMP **41 FUEL TANK REMOVAL PROCEDURE** 42 NO.3 FUEL COCK 43 NO.3 FUEL PUMP **44 FIRE PROTECTION SYSTEM** 45 WATER/METHANOL FLUID PUMPS 46 WATER/METHANOL FLUID FILLER
- 47 TRIM CONTROLS FAIRLEAD
- 48 HINGE BOLTS (INBOARD AILERONS)
- 49 NITROGEN SYSTEM VENT VALVES
- 50 TORQUE TUBE ATTACHMENT BOLTS
- 51 HINGE BOLTS (OUTBOARD AIL-ERONS)
- 52 AILERON CONTROLS AND TORQUE TUBE
- 53 AILERON CONTROLS
- 54 T.B.325
- 55 HINGE BOLTS (OUTBOARD AIL-ERONS)
- 56 DETACHABLE WING TIP TRAILING EDGE ATTACHMENT
- 57 STATIC VENT DRAINS
- 58 RUDDER CONTROLS AND FIN DE-ICING PIPE
- 59 TRIM CABLE FAIRLEAD
- 60 DE-ICING PIPE CONNECTIONS AND AERIAL TENSIONING DEVICE
- 61 RUDDER LOCKING SYSTEM BELL-CRANK
- 62 RUDDER LOCKING BOLT OPER-ATING LEVER
- 63 RUDDER HINGE BOLTS
- 64 RUDDER SPRING TAB CONTROL LINKAGE
- 65 ELEVATOR HINGE BOLT
- 66 HINGE BOLTS
- 67 ELEVATOR TRIM OPERATING JACK
- 68 TORQUE TUBE ATTACHMENT TAPER BOLTS
- 69 DE-ICING CONNECTION
- 70 RUDDER CONTROL BELLCRANK SHAFT BEARING
- 71 RUDDER CONTROLS



Fig. 13. Access panels - undersurface

### **RIGGING OF FIXED SURFACES**

16. The main plane and tail plane are fixed cantilever structures and their attitude is determined during assembly of the component sections. No adjustments can be made to the attitude of the tail plane or fins, but the incidence of the intermediate and outer sections of the main plane can be predetermined during assembly (Sect.3, Chap.4). The normal rigging operations are those of checking the incidence and dihedral of the main and tail planes and the attitude of the fins.

### Rigging position (fig.11)

17. Jack and trestle the aircraft (para.15, sub-para.4) and level the aircraft as follows:-

- Level longitudinally by fitting two pegs, Table 1, item 99, into the two slinging points at the rear end of one of the rear centre section longerons (at floor level). Place a straight edge, item 102, across the pegs and check with a spirit level.
- (2) Level laterally by placing the straight edges, item 100 and 101 across the datum blocks attached to formers 37 and 14 respectively, inside the fuselage, and check each with a spirit level.

Main plane (fig.10 and 11)

18. The normal incidence of the main plane is 4 deg.  $\pm$  15 min., but the following points should be noted:-

(1) The incidence of the port wing must be increased by 3 min. and that of the starboard wing decreased by 3 min. from the nominal setting to give a differential setting of 6 min. when initially rigging the main plane or on replacement.

NOTE . . .

This initial differential setting may be modified by any final adjustments made after flight testing (Sect.3, Chap.4).

(2) This incidence variation of the complete span from tip to tip may not exceed 0 deg. 20 min.

- (3) The incidence variation in the centre section may not exceed 0 deg. 4 min. from end to end.
- (4) The variation in each intermediate section may not exceed 0 deg. 3 min.

# KEY TO FIG.14 (WEATHERPROOFING)

- Fuselage joints are to be made with Bostik jointing compound, Ref.No.33H/185 both inside and outside line of bolts before bolting up. Cover joints with 3 in. strip (serrated-edge fabric).
- (2) Joints between centre section leading and trailing edge and fuselage are to be made with Bostik Ref.No.33H/185. Apply 4 in. fabric strip (detail F).
- (3) Apply Bostik, Ref.No.33H/185, between all aerial lead-in insulators and fuselage skin.
- (4) 3 in. fabric strip around edge of dinghy stowage covers.
- (5) Use Bostik Ref.No.33H/185, around outside of clamping ring and insulator.
- (6) Apply Bostik Ref.No.33H/185, to ice guard of sonobuoy aerial.
- (7) Use Bostik, Ref.No.33H/185, between edges of detachable panels, fairings and tail plane or fuselage skin. Apply 3 in. fabric strip in angle, 4 in. strip at edges of fairing and a madapollam patch, D.T.D.343A (Ref.No.32B/556), opposite leading edge (Detail A and B).
- (8) 1½ in. strip at edges and 3 in. strip over expansion gap (wing joint assembly panels)
- (9) 1<sup>1</sup>/<sub>2</sub> in. strip over wing tip detachable trailing edge.
- (10) 11/2 in. strip around transparent panel over taxying lamps.
- (11) 2 in. strip along edge of wing joint panels.
- (12) 5 in. strip around No.4 tank filler assembly and vent connection access panel.
- (13) 5 in. strip along trailing edge joint (detail E) and tank assembly panel.
- (14) 5 in. strip, cut to shape, at mounting flange of aerial masts (detail D).
- (15) When fitting gun turret, use Celloseel chromated sealing compound Ref.No.33H/113 between turret base and dished mounting.
- (16) 1<sup>3</sup>/<sub>4</sub> in. strip around bomb aimer's window.





DETAIL B

ALL METAL-TO-METAL FACE JOINTS ARE MADE WITH CHROMATED SEALING COM-POUND REF.NO.33H/113. JOINTS ARE TO BE ASSEMBLED 'WET' AFTER APPLI-CATION OF SUFFICIENT SEALING COMPOUND TO PRODUCE A FILLET AT EACH JOINT.

IN ALL FUSELAGE TRANSPORT JOINTS A BEAD OF BOSTIK (REF.NO.33H/185) IS TO BE INSERTED BEFORE BOLTING UP.









Fig.14. Weatherproofing

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F.S. /13

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### (5) The variation in each outer section may not exceed 0 deg. 5 min.

Check the incidence of the main plane at the centre-line of the inboard engine and at ribs 3, 16, 21, 36 and 39, as shown in the illustrations on which the Table 1 item numbers of the gauge to be used are indicated. Check also the main plane dihedral as shown in the illustration.

#### NOTE ....

When using an inclinometer, readings should be 0 deg.  $\pm$  15 min.

### Tail plane (fig. 10 and 11)

19. The tail plane incidence is 1 deg. 15 min. ± 15 min. and is checked as shown in either illustration (inclinometer readings should be 0 deg. ± 15 min.). The horizontal level is checked by using a spirit level. A tolerance of ± 15 min. is permissible.

### Fins (fig.10)

20. The hinge line should be vertical in the lateral plane, and have a 1 deg. 15 min. ± 15 min. forward inclination from vertical in the fore and aft plane. These checks are made as indicated in the illustration, using a spirit level and inclinometer respectively on the angle brackets provided on the gauge.

## SETTING THE FLYING CONTROLS

21. Refer to Sect.3, Chap.4.

## WEATHERPROOFING (fig.14)

22. Sealing of joints in the aircraft is accomplished by fabric strips of varying widths, attached with Titanine adhesive F.1. To prepare the adhesive mix 10





parts by volume of adhesive F.1 (Ref.No. 33H/19), with an approximate equal volume of thinners F.T.1. (Ref.No.33H/21). Add one part by volume of catalyst F.C.1. (Ref.No.33H/20), and mix thoroughly. The adhesive has an approximate "pot life" of 4 hours. Before application of fabric, the aircraft finish should be removed down to the primer.

23. To apply fabric to aircraft joint, proceed as follows:-

- Apply one brushcoat of adhesive (as previously prepared in para.22) on area to be covered with fabric. Allow 30 minutes drying.
- (2) Apply a second coat of adhesive

and allow 10 minutes drying.

- (3) Lay fabric over the prepared area, stretching it as much as possible, at the same time removing creases and wrinkles.
- NOTE ...

It is essential that the fabric be applied correctly at this stage, corrections at a later stage are very difficult, as the adhesive when dry does not soften back with solvent.

(4) Brush one coat of adhesive through the fabric, and allow 20 minutes drying. Use a wooden scraper to pull out any imperfections and to A.P.4267B, Vol.I, Book I, Sect.2, Chap.4 A.L.133, Feb.63

press adhesive through the weave.

- (5) Allow 24 hours to dry before applying the appropriate finishing scheme.
- (6) All tooling and routing holes are to be sealed with doped canvas patches to prevent ingress of water.
- NOTE ...

To achieve a better finish, the fabric may be smoothed out by lightly dry scuffing with 320 grade abrasive paper.

### WALKWAYS

24. The permitted walkways and restricted areas are shown in fig.15.

