

**CHAPTER 6**

**ENGINE NACELLE**

**RESTRICTED**

## Chapter 6 ENGINE NACELLE - AVON MK.1

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## Introduction

1. A method of pictorial indexing is employed in this chapter to locate and categorize damage and to illustrate repair schemes by step-to-step progression from the main component key diagram, through detailed structural illustrations and negligible damage charts, to repair schemes designed for particular structural items. Figure 1 - Key diagram, illustrates the cowling assembly and gives the figure numbers of the individual cowling structure illustrations. The structure illustrations simplify the identification of structural items and, in the key, give details of these items together with negligible damage definitions and repair figure numbers.

## Fitting a new front cowling

2. When fitting a new engine air intake front cowling a new service panel must also be fitted.

## Front cowling

(1) Remove the engine service panel, front, and upper rear cowling as detailed in A.P.4326, Vol.1, Sect.4, Chap.1.

(2) Remove and retain any items from the unserviceable cowling which are required for refitment to the new cowling.

(3) Remove the cowling support hoop and the flame-proof bulkhead panels above the engine.

(4) Refit the cowling support hoop.

(5) Mark on the wing skin at the in-board and outboard engine ribs a reference line parallel with, and one inch from, the edge of the wing skin.

(6) Remove the turbo starter exhaust connections from the new cowling.

(7) Offer up the cowling to the engine and centralize it about the engine compressor casing, and ensure that the centre of the top attachment hole in the support hoop coincides with the centre of the corresponding 1/8 in. dia. pilot hole in the rear of the cowling. Check that the turbo starter exhaust connection

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will align with the turbo starter exhaust pipe.

(8) Using a clamp on the highest point of the rear support hoop and on the rear frame of the cowling, draw it down into position.

(9) Mark off the cut line on the cowling port and starboard edges by marking back 1 in. from the reference line.

(10) Remove the cowling and trim it to the cut line. Offer up the cowling to seat on the wing leading edge attachment angle, press it back on to the engine and clamp it to the support hoop.

(11) Open up the 1/8 in. dia. pilot hole at the centre of the cowling rear edge to 1/4 in. dia. and fit a 1/4 in. dia. service bolt.

(12) Using clamps, progressively pull the cowling down on to the support hoop. If fouling at the trimmed edge occurs, remove the cowling and trim as necessary, and continue this method until the cowling is correctly seated.

(13) Ensure that the forward pilot hole in each cowling attachment flange coincides with the relevant attachment hole in the leading edge of the wing and open up both of them to a 1/4 in. dia. Slacken the service bolt securing the cowling to the support hoop and fit two bolts in the enlarged holes.

(14) Slacken off the bolts at the cowling support hoop and tighten the bolts at the cowling attachment flanges. This will seat the cowling at the wing leading edge attachment points.

(15) Retighten the clamps at the cowling rear support hoop to reseat the cowling on the hoop. Open up the alternate pilot holes in the cowling at the support hoop

to 1/4 in. dia. and fit 1/4 in. dia. service bolts.

(16) Remove the clamps and drill the remaining holes in the rear of the cowling to 9.80 mm. Countersink these holes and fit the cowling securing bolts. Remove the 1/4 in. dia. service bolts, enlarge the holes to 0.3860 in. dia., countersink them and fit the remainder of the securing bolts at the support hoop position.

(17) Without the use of clamps proceed as in paragraphs (15) and (16) for the attachment holes in the front cowling wing contour attachment flange.

(18) Offer up the upper rear cowling and from it mark a cut line on the rear of the front cowling.

(19) Remove the front and upper rear cowlings and trim the rear of the front cowling to the cut line.

(20) Refit the flame-proof bulkhead panels, the front cowling, the upper rear cowling, and the turbo starter exhaust connection. Check that there is an even gap of 0.030 in. at the front cowling edges.

### Note...

*It is permissible to use Langite packing, to a maximum thickness of 0.200 in., beneath the tubular section rubber seal to effect good contact between the engine cowling nose ring seal and the engine compressor casing metal seal.*

### Service panel

(21) Fit the bottom rear cowling and mark off a reference line 1 in. from the skin edge around the service panel aperture.

(22) Offer up the service panel so that

the toggle fasteners hold the panel firmly in position without distortion.

(23) Note the best position of the panel to suit the general contour and mark a cut line 1 in. from the reference line. Remove the service panel and trim to the cut line.

(24) Refit the service panel and adjust the toggle fastener rods to ensure a good fit.

(25) Check that there is an even gap of 0.030 in. maximum and ensure that all toggle rods snap back firmly.

### Cracked jet pipe cone

3. Cracking of the front inner cone of the jet pipe cowling (*fig.5, item 5*) may occur quite early in the life of the aircraft. This failure has no adverse effect, either structurally, or on performance. The cracks are to be repaired by stainless steel welding. Dents are to be left.

### Fitting a new lower rear engine cowling

4. (1) Remove the cowling (A.P. 4326, Vol.1, Sect.4, Chap.1).

(2) Transfer from the unserviceable cowling any items which are required for the new one.

(3) Mark on the engine nacelle skins around the cowling aperture a reference line parallel with, and one inch from, the edge of each skin.

(4) Offer up the cowling and centralize it in relation to the engine nacelle general contour and cowling aperture. Ensure that the centre attachment pilot hole on the cowling rear edge coincides with the centre attachment hole in the engine nacelle cowling attachment hoop. Fasten the toggle fasteners to hold the

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cowling firmly in position without distortion.

(5) Clamp the cowling in close contact with the engine nacelle cowling attachment hoop.

(6) Mark a cut line on the cowling skin edges one inch from the reference line previously marked.

(7) Remove the cowling and trim its edges to the cut line. Re-offer up the cowling and reclamp it to the engine nacelle cowling attachment hoop.

(8) With a No.11 drill (4.850 mm) enlarge the 1/8 in. dia. pilot hole at the centre of the cowling rear edge to 4.850 mm dia. and fit a 2 B.A. service bolt.

(9) Progressively pull the cowling into close contact with the attachment hoop by means of the clamp.

Note...

1. If the trimmed edges foul, remove the cowling and trim it as necessary. Repeat this procedure until the cowling is correctly seated.

2. Ensure that the inboard end of intermediate frame 3A of the cowling has a clearance of 0.100 in. between itself and the forward pivot lug on the main undercarriage pivot bracket.

(10) Fasten the DZUS fasteners, and adjust the cowling toggle fastener rods to ensure a good fit.

(11) Drill alternate 4.850 mm dia. (Drill No.11) pilot holes in the cowling

at the engine nacelle attachment hoop and fit 2 B.A. service bolts.

(12) Remove the clamps and complete the drilling of the holes 4.850 mm dia. (Drill No.11). Countersink all holes to suit the cowling securing bolt heads. Fit 2 B.A. cowling securing bolts at these positions.

(13) Remove the service bolts from the rear cowling hoop position and countersink the holes to suit the cowling securing bolt heads. Fit 2 B.A. cowling securing bolts.

#### ◀ Front cowling, loose rivets

5. Renewal of loose rivets in the air intake front spinning, or in any area of the engine air intake where there is a possibility of rivet shanks or swarf being ingested by the engine, must not be attempted. ▶

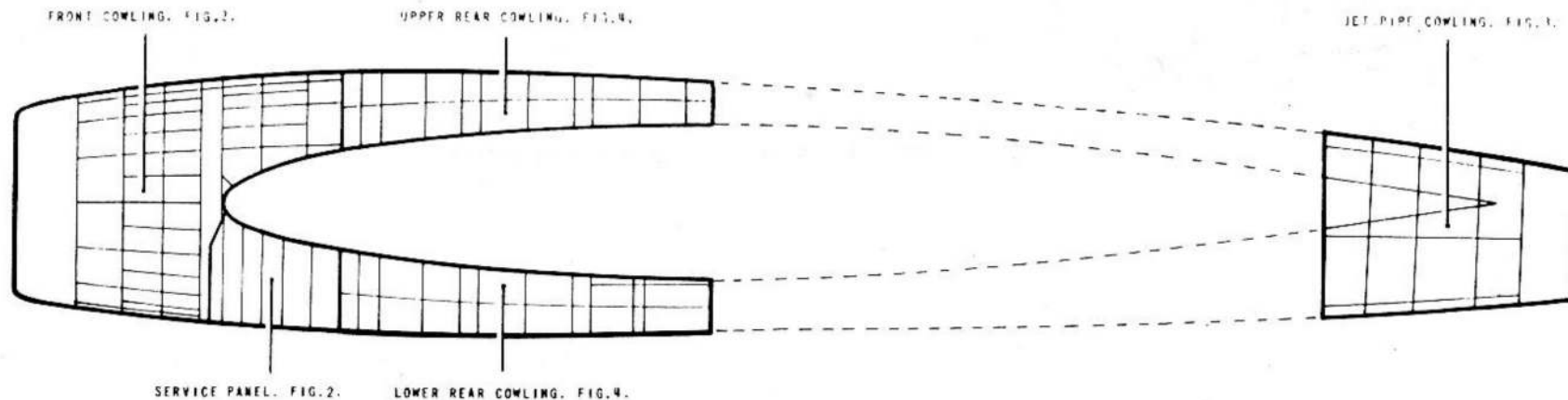


Fig.1 Key diagram

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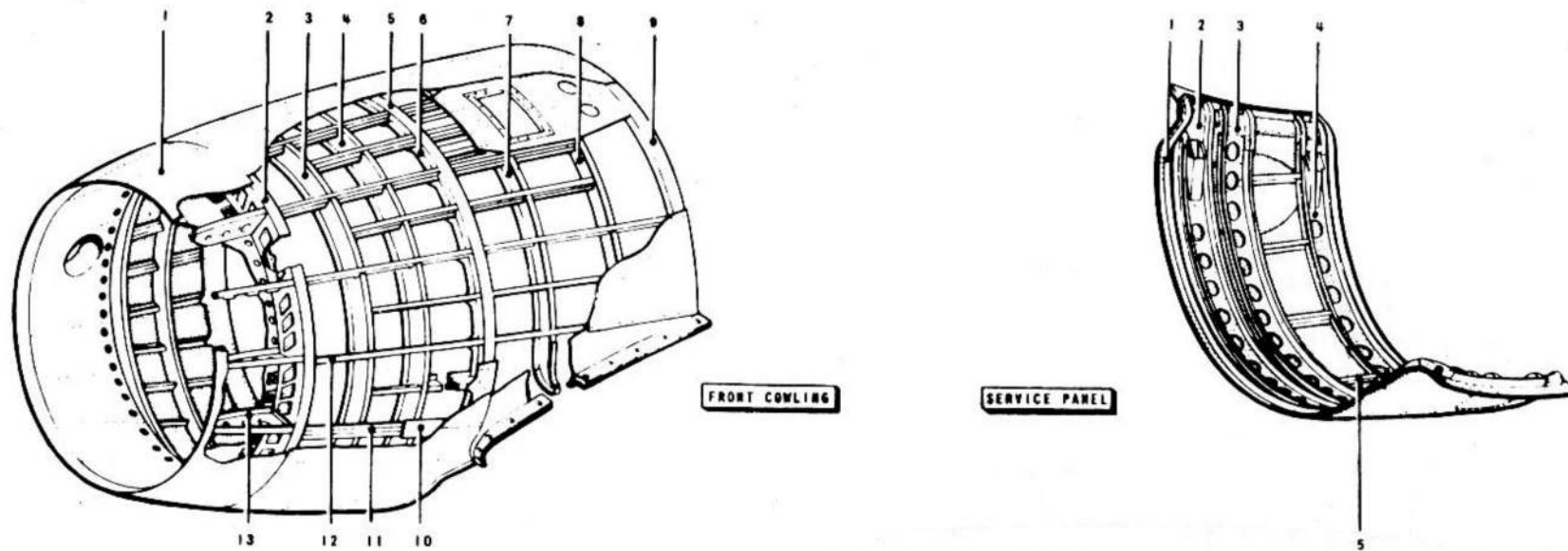


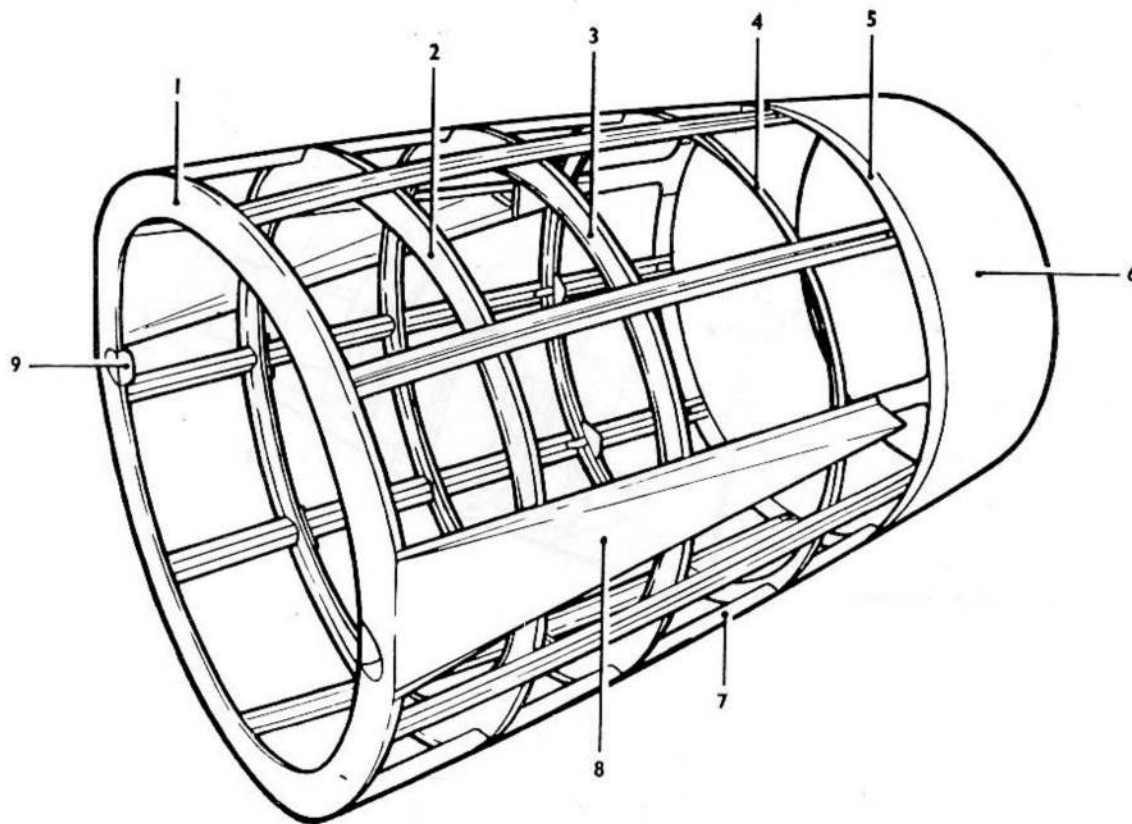
Fig. 2. Front cowling and service panel structure

KEY TO FIG. 2 (FRONT COWLING AND SERVICE PANEL STRUCTURE)

Item	Material		Part No.	Description	Negligible damage						Repairable damage	Repair fig. No.
	Spec.	S.W.G.			Dents		Scratches		Holes			
					Max. depth	Min. dia.	Depth	Spacing	Max. dia.	Pitch ratio		
<b>FRONT COWLING</b>					(To be added later)							
1	D.T.D.213	18	E.A1.50.843	Air-intake	For details of negligible and repairable damage refer to fig. 5						7	
2		20	E.A1.50.1565	Frame 1	0.05	1.00	0.005	1.00				
3		22	E.A1.50.1231	Intermediate frame 1A	0.05	1.00	0.005	1.00	0.20	15:1	8	
4		22	E.A1.50.1233	Intermediate frame 1B	0.05	1.00	0.005	1.00	0.20	15:1	8	
5		14	E.A1.50.257 (port)									
				E.A1.50.258 (starb.)								
				(E.E.J.147)								
6		14	E.A1.50.1273	Support hoop frame 2	0.05	1.50	0.010	3.00	0.125	32:1	11	
7		22	E.A1.50.259 (port)	Capping strip	0.05	1.50	0.010	3.00	0.125	32:1	10	
				E.A1.50.260 (starb.)								
8		D.T.D.610	22	E.A1.50.261 (port)	Intermediate frame 2A	0.05	1.00	0.005	1.00	0.20	15:1	8
					E.A1.50.262 (starb.)							
9			16	E.A1.50.263 (port)	Intermediate frame 2B	0.05	1.00	0.005	1.00	0.20	15:1	8
				E.A1.50.264 (starb.)								
				(E.E.J.264)								
10	22		E.A1.50.1265 (port)	Aft seating stiffener	0.04	1.00	0.010	1.00	0.125	24:1	9	
				E.A1.50.1267 (starb.)								
11	18		E.A1.50.1243 (port)	Butt strap	0.05	1.00	0.005	1.00			12	
				E.A1.50.1245 (starb.)								
12	20		E.A1.50.1249	Channel-section stiffener	0.05	1.00	0.010	1.00	0.125	32:1	12	
13	22	E.A1.50.889	Stringer	0.05	0.75	0.005	1.00	0.125	16:1	13		
			Diaphragm	0.04	0.75	0.005	1.00	0.20	20:1			
<b>SERVICE PANEL</b>												
1	D.T.D.610	16	E.A1.50.1571 (port)	Front seating stiffener	0.05	1.00	0.010	1.00	0.125	24:1		
2		18	E.A1.50.1573 (starb.)									
				E.A1.50.293 (port)								
				E.A1.50.294 (starb.)								
				(E.E.J.150)								
3		22	E.A1.50.1019 (port)	Frame 2A	0.10	1.00	0.010	1.00	0.20	15:1		
				E.A1.50.417 (starb.)								
				(E.E.J.150)								
4		18	E.A1.50.297 (port)	Frame 2B	0.10	1.00	0.005	1.00	0.20	15:1		
				E.A1.50.298 (starb.)								
			(E.E.J.233)									
5	20	E.A1.50.1157 (port)	Frame 2C	0.10	1.00	0.010	1.00	0.20	15:1			
			E.A1.50.1158 (starb.)	Stringer	0.10	1.00	0.010	1.00	0.125	16:1		

Note.—All dimensions are in inches.



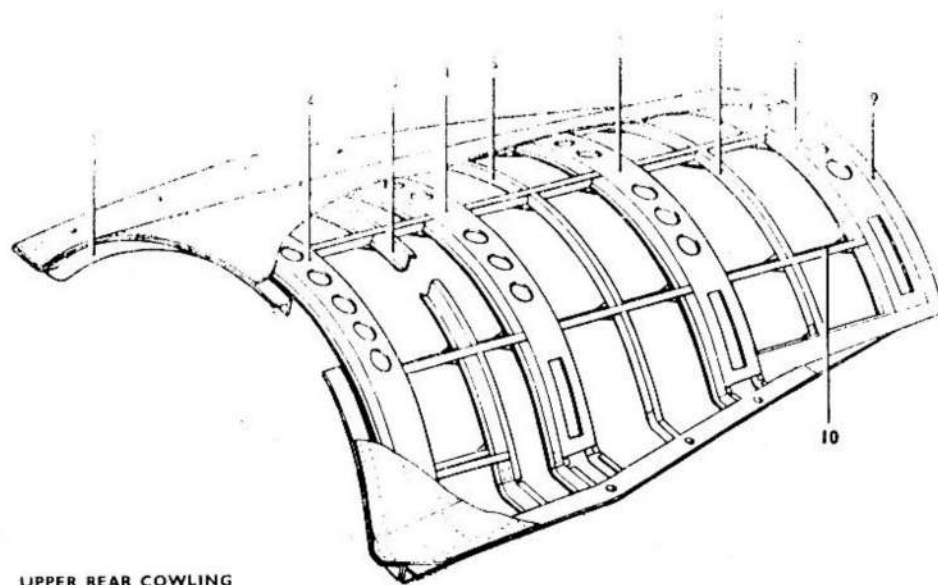


Item	Material		Part No.	Description	Negligible damage						Repairable damage	Repair fig. No.
	Spec.	S.W.G.			Dents		Scratches		Holes			
					Max. depth	Min. dia.	Depth	Spacing	Max. dia.	Pitch ratio		
1	D.T.D.610	20	E.A1.20.10319	Frame 1	0.04	1.00	0.005	1.00	0.20	20:1	(To be added later)	16
2			E.A1.20.10321	Frame 2	0.05	0.75	0.010	1.00	0.20	15:1		
3			E.A1.20.10323	Frame 3	0.05	0.75	0.010	1.00	0.20	15:1		
4			E.A1.20.3127	Frame 4 segment	0.05	0.75	0.010	1.00	0.20	15:1		
5			E.A1.20.10337	Rear ring	0.05	1.00	0.005	1.00	0.125	32:1		
6	D.T.D.171	18	E.A1.20.8261	Cone	For details of negligible and repairable damage refer to fig. 5							
7	D.T.D.610	22	E.A1.20.10349	Stringer	0.10	1.00	0.010	1.00	0.125	16:1	For details of negligible and repairable damage refer to fig. 5	
8	D.T.D.213	20	E.A1.20.10335	Side panel	0.03	0.75	0.005	2.00				
9	D.T.D.124	22	E.A1.20.1193	Reinforcing cowl								

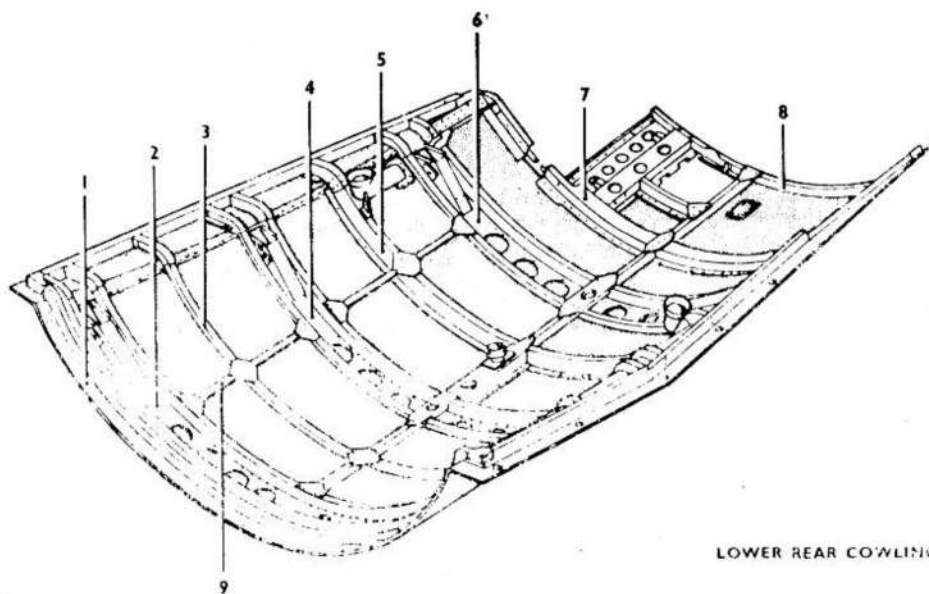
Note.— All dimensions are in inches.

Fig 3. Jet pipe cowling structure

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UPPER REAR COWLING



LOWER REAR COWLING

Fig. 4 Upper and lower rear cowling structure

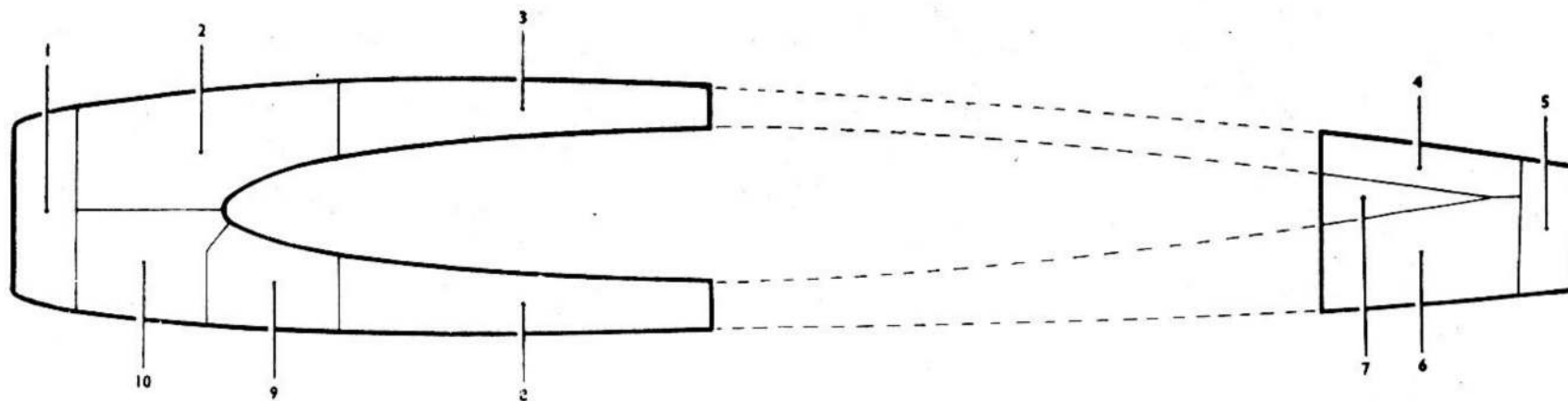
## KEY TO FIG. 4 (UPPER AND LOWER REAR COWLING STRUCTURE)

Item	Material		Part No.	Description	Negligible damage						Repairable damage	Repair fig. No.																											
	Spec.	S.W.G.			Dents		Scratches		Holes																														
					Max. depth	Min. dia.	Depth	Spacing	Max. dia.	Pitch ratio																													
UPPER REAR COWLING																																							
1	D.T.D.610	16	E.A1.50.1293 (E.E.J.268)	Front seating stiffener	0.04	1.00	0.010	1.00	0.125	32:1	(To be added later)																												
2			E.A1.50.785 (port)																																				
3			E.A1.50.786 (starb.)	Frame 1								0.10	1.00	0.010	1.00	0.20	15:1	15																					
3			E.A1.50.755 (port)																																				
4			E.A1.50.756 (starb.)	Frame 1A															0.10	1.00	0.005	1.00	0.125	16:1	14														
			4																							E.A1.50.711 (E.E.J.71)													
5			E.A1.50.205 (port)	Frame 2																						0.10	1.00	0.010	1.00	0.20	15:1								
			5																														E.A1.50.206 (starb.)						
6			E.A1.50.70 (E.E.J.70)	Frame 2A																													0.10	1.00	0.005	1.00	0.125	16:1	14
			6																																				
7	E.A1.50.203 (E.E.J.70)	Frame 3	0.10	1.00	0.010	1.00	0.20	15:1	15																														
	7									E.A1.50.209 (E.E.J.71)																													
8	E.A1.50.201 (E.E.J.71)	Frame 3A								0.10	1.00	0.005	1.00	0.125	16:1	14																							
	8																E.A1.50.201 (E.E.J.266)																						
9	E.A1.50.769 (port)	Frame 4															0.10	1.00	0.010	1.00	0.20	15:1	15																
	9																							E.A1.50.770 (starb.)															
10	E.A1.50.778 (E.E.J.71)	Rear seating stiffener																						0.04	1.00	0.010	1.00	0.125	32:1										
	10																														E.A1.50.778 (E.E.J.71)								
																															Stringer	0.10	1.00	0.005	1.00	0.125	16:1	14	
LOWER REAR COWLING																																							
1	D.T.D.610	16	E.A1.50.837 (E.E.J.72)	Front seating stiffener	0.04	1.00	0.010	1.00	0.125																						24:1								
2			E.A1.50.787 (port)																																				
3			E.A1.50.788 (starb.)	Frame 1						0.10	1.00	0.005	1.00	0.20	15:1	15																							
			3																														E.A1.50.763 (port)						
4			E.A1.50.764 (starb.)	Frame 1A													0.10	1.00	0.005	1.00	0.125	16:1	14																
			4																														E.A1.50.231 (port)						
5			E.A1.50.232 (starb.)	Frame 2																				0.10	1.00	0.010	1.00	0.20	15:1	15									
			5																														E.A1.50.237 (port)						
6			E.A1.50.238 (starb.)	Frame 2A																													0.10	1.00	0.005	1.00	0.125	16:1	14
			6																																				
7	E.A1.50.230 (starb.)	Frame 3	0.10	1.00	0.010	1.00	0.20	15:1	15																														
	7																														E.A1.50.235 (port)								
8	E.A1.50.236 (starb.)	Frame 3A								0.05	1.00	0.005	1.00	0.125	24:1																								
	8																														E.A1.50.237 (E.E.J.73)								
9	E.A1.50.1647 (port)	Rear seating stiffener															0.05	1.00	0.005	1.00	0.125	24:1																	
	9																														E.A1.50.1648 (starb.)								
																								Stringer	0.10	1.00	0.005	1.00	0.125	16:1	14								

Note.—All dimensions are in inches.

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(A.L.31, Feb. 56)



Item	Material		Part No.	Description	Negligible damage						Repairable damage	Repair fig. No.	
	Spec.	S.W.G.			Scratches		Dents		Min. spacing				
					Depth	Min. spacing	Max. depth	Max. width		Min. width			
1	D.T.D.213	18	E.A1.50.843	Air-intake skin	0.005	3	0.05	4	1.00	6W	Holes. Oil canning effect. Painting and damage in excess of negligible.	7	
2			E.A1.50.1261 (port)	Front cowling upper panel									
3	D.T.D.610	22	E.A1.50.1262 (starb.)		0.003	2	0.03	4	0.50	4W			6
			E.A1.50.425 (port)										
4	D.T.D.171 or D.T.D.571	24	E.A1.50.426 (starb.)		Upper rear cowling panel	0.002	2	0.025	3	0.50			4W
			E.A1.20.10329		Jet pipe cowling upper panel								
5	D.T.D.610	22	E.A1.20.8261A		Rear inner cone	0.003	2	0.03	4	0.50			4W
6			E.A1.20.8261B		Rear outer cone								
7	D.T.D.213	20	E.A1.20.8261C		Front inner cone	0.004	3	0.04	4	0.70			6W
8	E.A1.20.10331	Jet-pipe cowling lower panel											
9	D.T.D.610	22	E.A1.20.10335		Side panel	0.003	2	0.03	4	0.50	4W	6	
			E.A1.50.427 (port)	Lower rear cowling panel									
10	D.T.D.213	20	E.A1.50.428 (starb.)		Service panel skin	0.003	2	0.03	4	0.50	4W	6	
			E.A1.50.1163 (port)										
			E.A1.50.1164 (starb.)	Front cowling lower panel	0.003	2	0.03	4	0.50	4W	6		
			E.A1.50.1263 (port)										
			E.A1.50.1264 (starb.)										

Notes: All dimensions given for negligible damage are in inches. W, in min. spacing column—the least dimension of the damage.

Fig. 5. Engine cowling skinning

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ALL DIMENSIONS ARE IN INCHES

- |   |             |
|---|-------------|
| 1 BUTT-STRAP, 18 S.W.G., D.T.D.610      | 4 OFF       |
| 2 INSERTION PATCH, 22 S.W.G., D.T.D.610 | 1 OFF       |
| 3 RIVETS, AS2230/403                    | AS REQUIRED |
| 4 RIVETS, AS2230/303                    | AS REQUIRED |

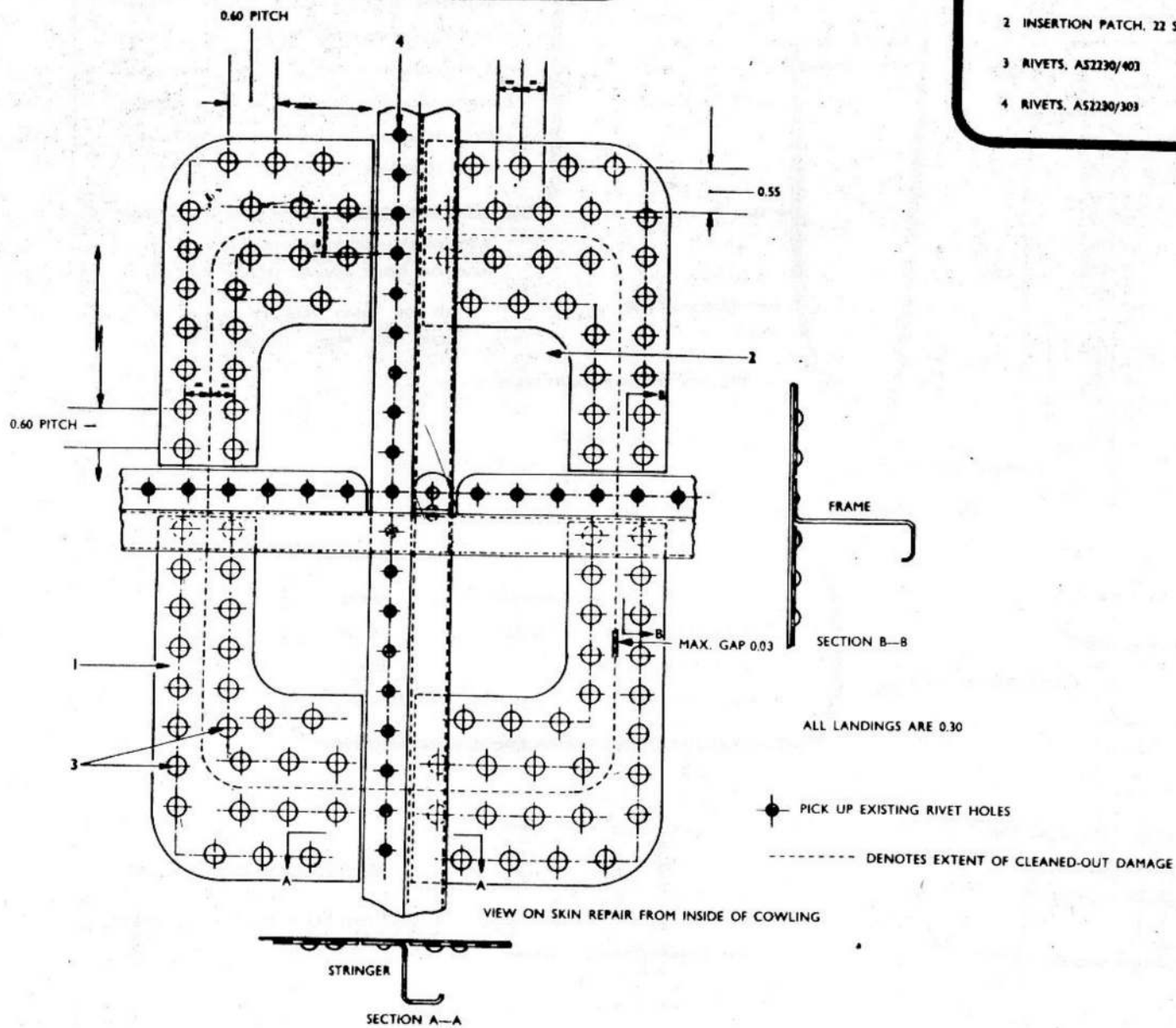


Fig. 6. Flush skin patch crossing a stringer and frame—front cowling

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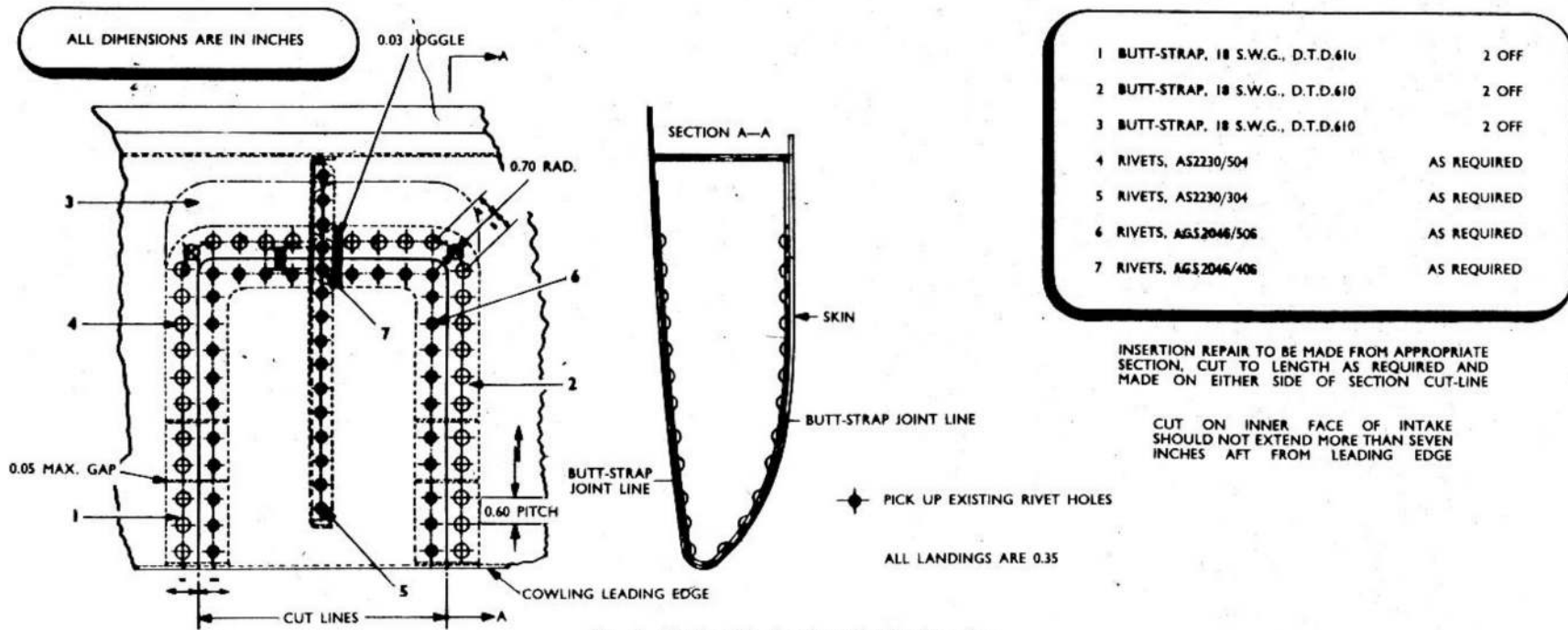


Fig. 7. Flush patch—front cowling leading edge

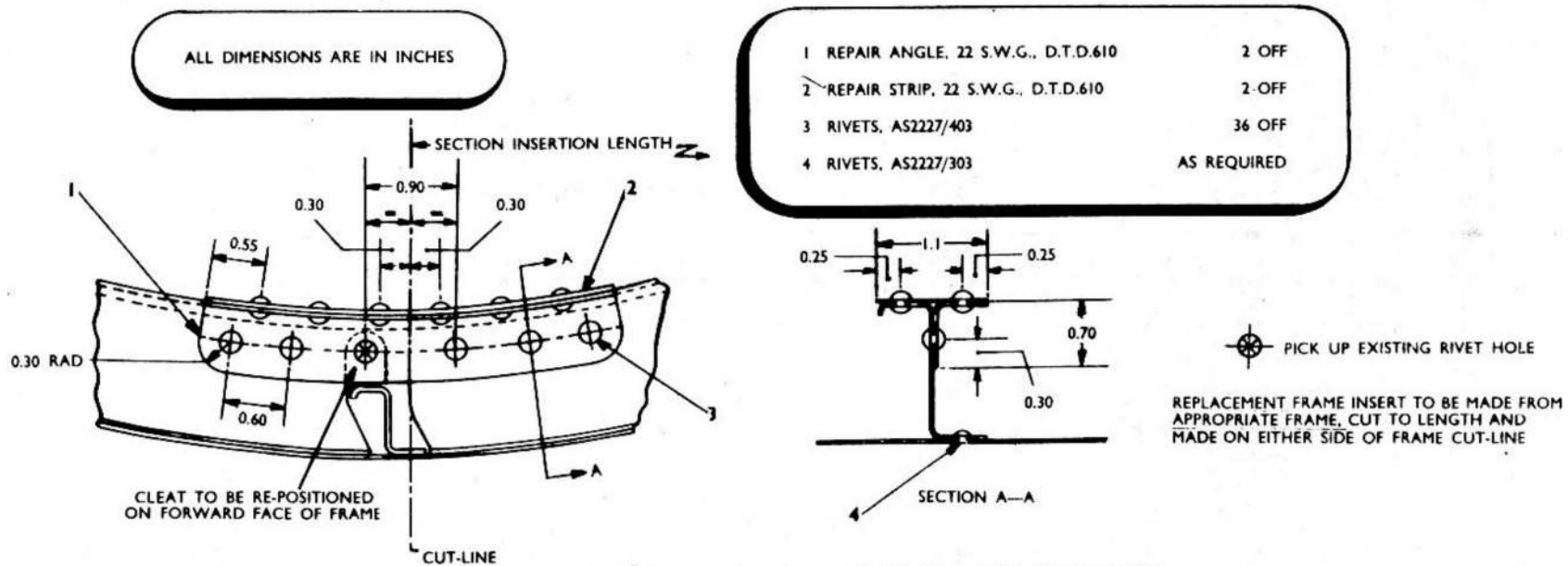


Fig. 8. Insertion repair to intermediate frames IA, IB, 2A and 2B—front cowling

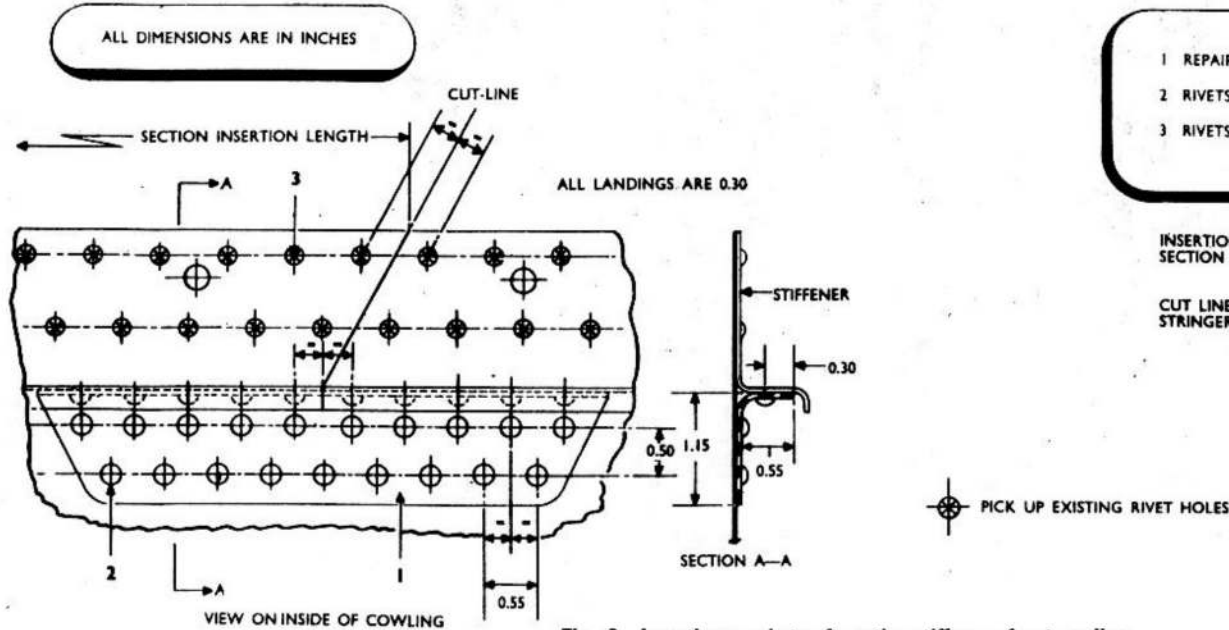


Fig. 9. Insertion repair to aft seating stiffener—front cowling

- |   |             |
|---|-------------|
| 1 REPAIR ANGLE, 16 S.W.G., D.T.D.610          | 2 OFF       |
| 2 RIVETS, AS2230/404                          | 58 OFF      |
| 3 RIVETS, AS2230/304 (COUNTERSUNK BOTH SIDES) | AS REQUIRED |

INSERTION REPLACEMENT TO BE CUT FROM APPROPRIATE SECTION AND MADE ON EITHER SIDE OF SECTION CUT-LINE

CUT LINES MUST BE MADE MIDWAY BETWEEN EXISTING STRINGERS

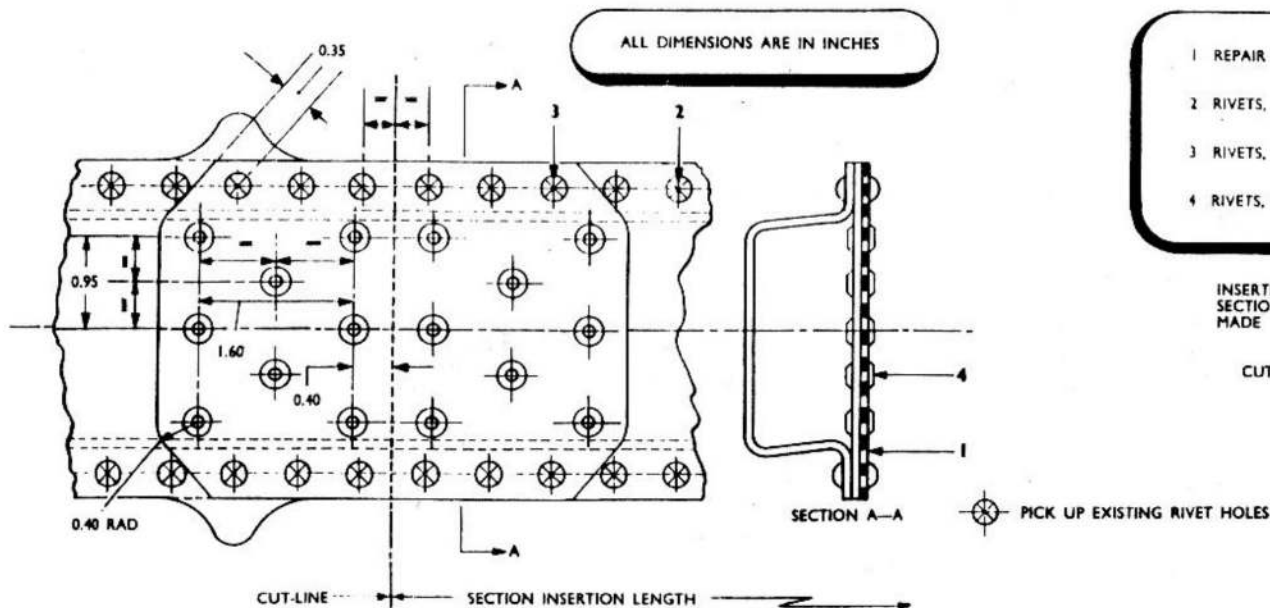


Fig. 10. Insertion repair to ring capping strip—front cowling

- |   |             |
|---|-------------|
| 1 REPAIR BUTT-STRAP, 14 S.W.G., D.T.D.610 | 2 OFF       |
| 2 RIVETS, AS2227/506                      | AS REQUIRED |
| 3 RIVETS, AS2227/507                      | 24 OFF      |
| 4 RIVETS, TLP/D/BS630                     | 32 OFF      |

INSERTION REPAIR TO BE MADE FROM APPROPRIATE SECTION, CUT TO LENGTH AS REQUIRED AND MADE ON EITHER SIDE OF SECTION CUT-LINE

CUT LINE TO BE MADE CLEAR OF STRINGERS

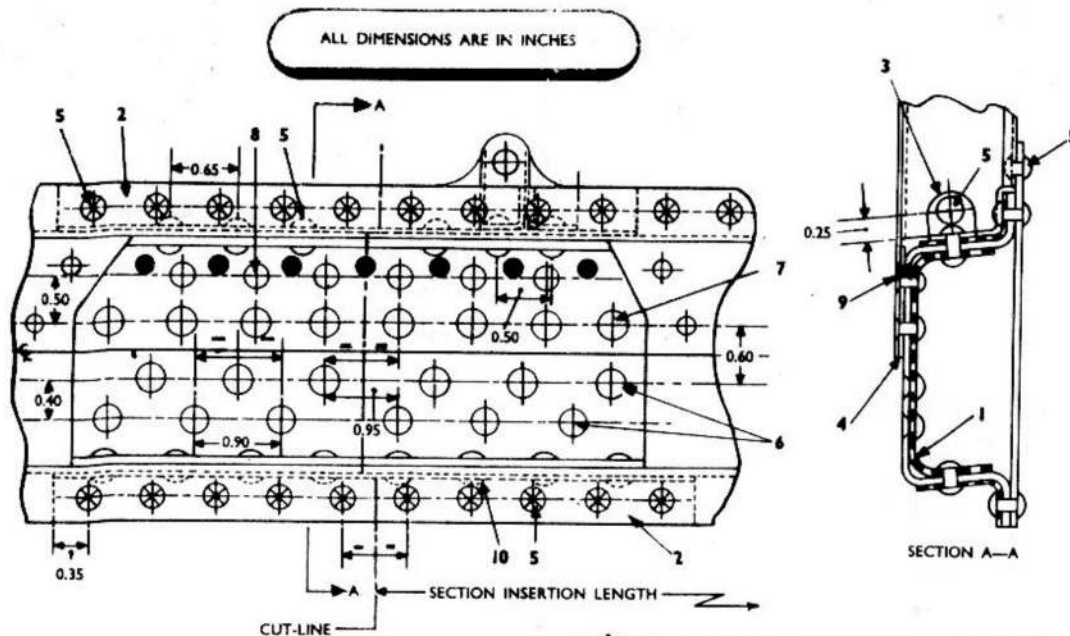


Fig. 11. Insertion repair to support hoop, frame 2, lower half

1 REPAIR ANGLE, 14 S.W.G., D.T.D.610	2 OFF
2 REPAIR ANGLE, 20 S.W.G., D.T.D.166	4 OFF
3 STRINGER CLEAT, E.A1.50.267	4 OFF
4 PACKING STRIP	2 OFF
5 RIVETS, AS2227/504	56 OFF
6 RIVETS, AS2229/504	24 OFF
7 RIVETS, AS2230/507	16 OFF
8 RIVETS, AS2230/407	12 OFF
9 RIVETS, AS160/305	14 OFF
10 RIVETS, AS2228/504	16 OFF

REPLACEMENT FRAME INSERT TO BE MADE FROM APPROPRIATE FRAME, CUT TO LENGTH AND MADE ON EITHER SIDE OF FRAME CUT-LINE

- PICK UP EXISTING RIVET HOLES
- RIVET HOLES FILLED IN

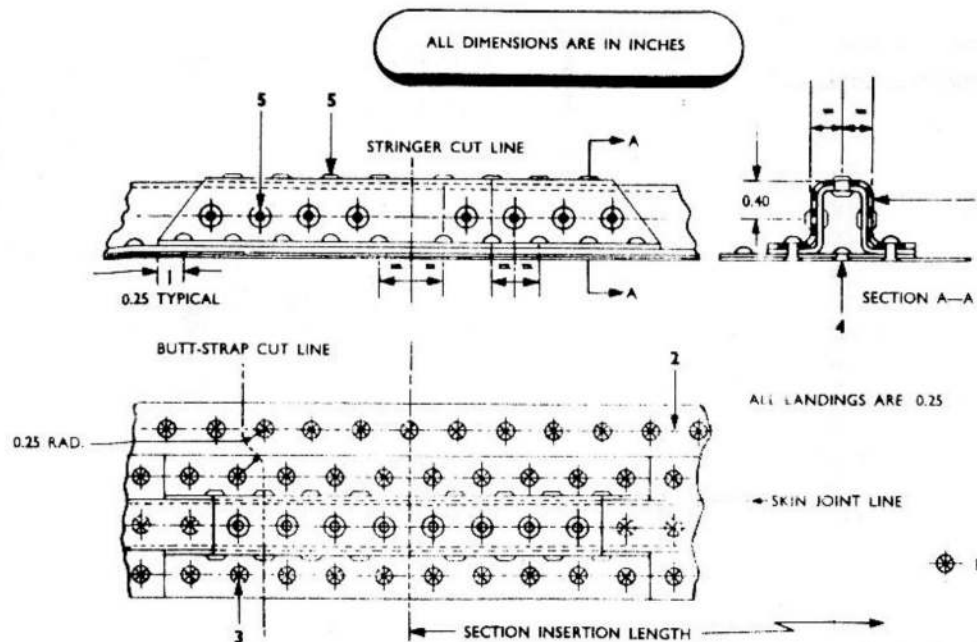


Fig. 12. Insertion repair to skin joint butt-strap and channel-section stringer—front cowling

1 TOP-HAT REPAIR PIECE, 18 S.W.G., D.T.D.610	2 OFF
2 BUTT-STRAP INSERTION LENGTH, 22 S.W.G., D.T.D.610	2 OFF
3 RIVETS, AS2230/304	40 OFF
4 RIVETS, AS2230/303	AS REQUIRED
5 RIVETS, TLP/D/BS419	48 OFF

INSERTION REPLACEMENT TO BE MADE FROM APPROPRIATE SECTION, CUT TO LENGTH AND MADE ON EITHER SIDE OF SECTION CUT-LINE

BUTT-STRAP CUT-LINE NEED NOT NECESSARILY LIE UNDER THE TOP-HAT REPAIR MATERIAL

- PICK UP EXISTING RIVET HOLES

ALL DIMENSIONS ARE IN INCHES

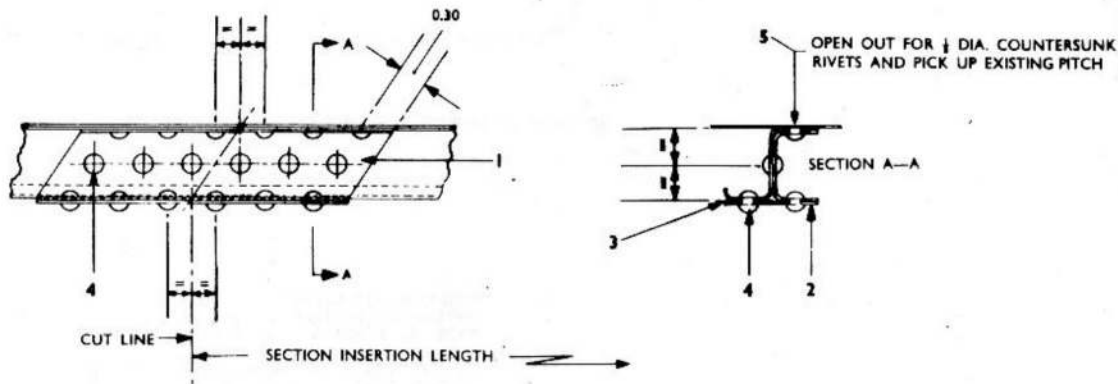


Fig. 13. Insertion repair to typical stringer—front cowling

1 REPAIR CHANNEL, E.E.J.176	2 OFF
2 REPAIR JOINT-STRAP, 20 S.W.G., D.T.D.610	2 OFF
3 PACKING STRIP, 24 S.W.G., D.T.D.610	2 OFF
4 RIVETS, AS2227/404 OR TLP/D/BS419	36 OFF
5 RIVETS, AS2230/404 OR TLP/K/BS419	2 OFF

INSERTION REPAIR TO BE MADE FROM APPROPRIATE SECTION, CUT TO LENGTH AS REQUIRED AND MADE ON EITHER SIDE OF SECTION CUT-LINE

NOTE.—THIS REPAIR IS ONLY APPLICABLE TO THE CONSTANT-DEPTH PORTION OF THE STRINGER

ALL DIMENSIONS ARE IN INCHES

ALL LANDINGS ARE 0.25

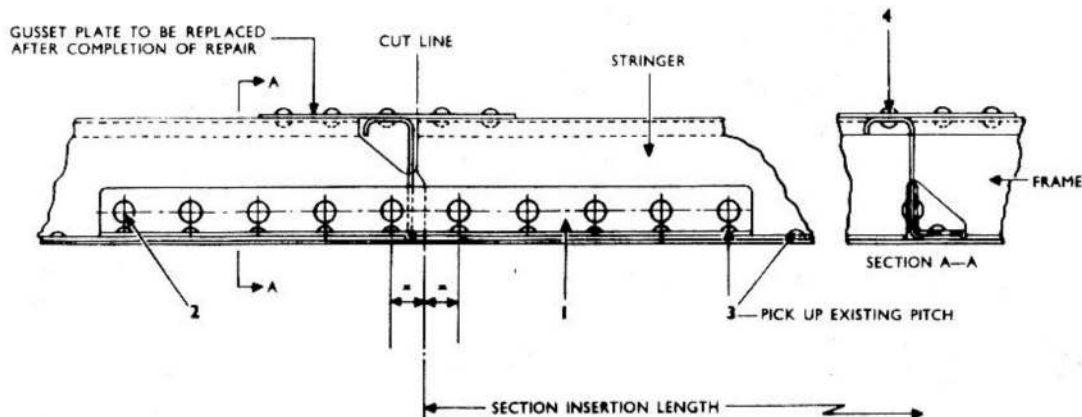


Fig. 14. Insertion repair to E.E.J.71 section

1 REPAIR ANGLE, E.E.J.99, 22 S.W.G	2 OFF
2 RIVETS, AS2227/403	20 OFF
3 RIVETS, AS2230/303	AS REQUIRED
4 RIVETS, AS2227/303	AS REQUIRED

INSERTION REPAIR TO BE MADE FROM APPROPRIATE SECTION, CUT TO LENGTH AS REQUIRED AND MADE ON EITHER SIDE OF SECTION CUT-LINE

RESTRICTED

ALL DIMENSIONS ARE IN INCHES

- |   |   |             |
|---|---|-------------|
| 1 | REPAIR SECTION, 20 S.W.G., D.T.D.610<br>OR 16 S.W.G., D.T.D.610 | 4 OFF       |
| 2 | RIVETS, AS2227/403  | 88 OFF      |
| 3 | RIVETS, AS2230/303  | AS REQUIRED |

◆ PICK UP EXISTING RIVET HOLES

INSERTION REPLACEMENT TO BE MADE FROM APPROPRIATE SECTION, CUT TO LENGTH AND MADE ON EITHER SIDE OF SECTION CUT-LINE

ALL CUT LINES TO BE TAKEN MIDWAY BETWEEN EXISTING RIVET HOLES AND, WHERE POSSIBLE, THROUGH THE CENTRE OF LIGHTENING HOLES

THIS REPAIR IS NOT APPLICABLE TO FRAME 2, UPPER COWLING

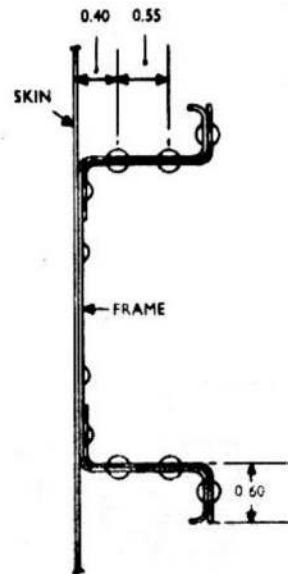
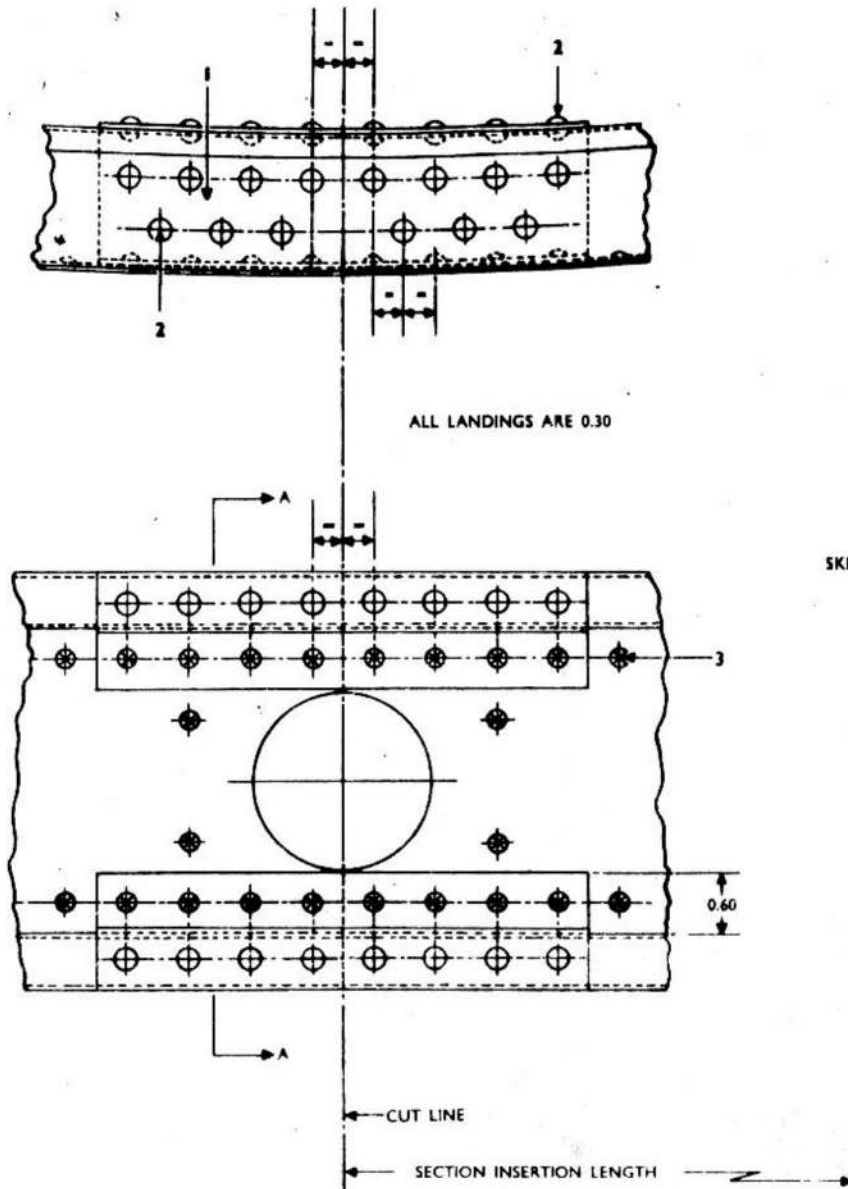
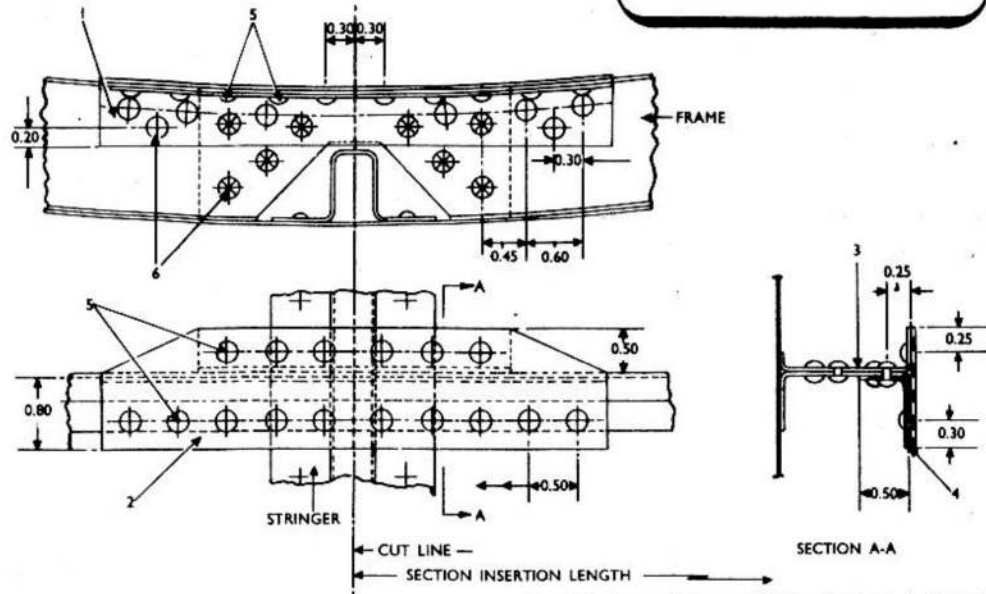


Fig. 15. Insertion repair to frames 1, 2, 3 and 4—upper and lower rear cowlings

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ALL DIMENSIONS ARE IN INCHES



1 REPAIR ANGLE, 20 S.W.G., D.T.D.610	2 OFF
2 BUTT STRAP, 18 S.W.G., D.T.D.610	2 OFF
3 DOUBLING PLATE, 22 S.W.G., D.T.D.610	2 OFF
4 PACKING PIECE, 20 S.W.G., D.T.D.610	2 OFF
5 RIVETS, AS2230/404	32 OFF
6 RIVETS, AS2227/404	32 OFF

PICK UP EXISTING RIVET HOLES

ITEM 3 TO BE COMED FROM THE REDUNDANT DOUBLING PLATE BUT WITH 0.50 FLANGE AS SHOWN, AND CURVED TO SUIT FRAME

SECTION REPLACEMENT TO BE MADE FROM APPROPRIATE SECTION, CUT TO LENGTH AND MADE ON EITHER SIDE OF SECTION CUT-LINE

Fig. 16. Insertion repair to frames 1, 2 and 3-jet pipe cowling



**APPENDIX I**

**ENGINE NACELLE - AVON Mk. 109**

RESTRICTED

(A.L. 47, Feb. 58)

## Appendix I ENGINE NACELLE - Avon Mk.109

## LIST OF CONTENTS

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**Introduction**

1. This appendix illustrates the engine nacelle of aircraft fitted with Avon Mk.109 engines in the same manner as the main chapter illustrates the nacelles of aircraft fitted with Avon Mk.1 engines. Information which is common to both types of nacelle, being already given in the main chapter, is not repeated here.

2. The figure numbers of all illustrations and repair schemes in this appendix range from 601 upwards to distinguish them from similar illustrations and repair schemes peculiar to other types of nacelle.

**Fitting a new air intake assembly to an engine front cowling assembly**

3. When necessary a new air intake assembly Part No.EA3.00.957 (port) or EA3.00.963 (starboard) may be fitted to an engine front cowling assembly, Part No.EA6.50.493 (port) or EA6.50.495 (starboard) by the following procedure:-

(1) Place the engine front cowling nose downwards on a flat surface.

(2) Working within the engine front cowling measure the distance between the forward face of Frame 2 and the aft face of Frame 1 taking the measurements from points mid-way between stringers at eight positions. To ensure accurate

repeat measurements, mark the positions on Frame 2 from which the measurements have been made. Record the measurements for subsequent comparison.

**Note...**

*Ensure that the measurements are made parallel to the longitudinal axis of the engine front cowling.*

(3) Carefully drill out the rivets securing the air intake attachment cleats to the sides of each stringer.

(4) Carefully drill out the rivets securing the engine front cowling skin to the skin attachment flange of Frame 1 of the air intake.

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(5) Place the engine front cowling assembly on a suitable horizontal stand to facilitate subsequent operations.

(6) Remove the unserviceable air intake assembly, Part No.EA1.50.557 (port) or EA1.50.861 (starboard).

(7) Obtain a new spare air intake Part No.EA3.00.957 (port) Ref.26FZ/38671 or Part No.EA3.00.963 (starboard) Ref. 26FZ/38672. Clean and degrease.

**Note...**

*The new spare air intake is supplied undrilled in the attachment areas. A trim allowance of 0.100 in. is provided on the abutting edge of the air intake outer skin edge. The cleat-to-*

*stringer attachment lugs are pilot drilled.*

(8) Temporarily fit the new air intake and push fully home onto the engine front cowling.

(9) Repeat the procedure of operation (2) and obtain a second set of measurements.

(10) Assess the amount to be trimmed from the air intake edges by comparison of the measurements obtained at operations (2) and (9).

**Note...**

*1. Allowance must be made for the provision of a 0.030 in. max. gap at*

*the joint line between the air intake outer skin and the front engine cowling.*

*2. Any unevenness of the measurements obtained may indicate that the air intake has not been pushed fully home.*

(11) Remove the air intake and trim as necessary until the measurements recorded at operation (2) are obtained.

(12) Refit the air intake and push fully home. Check that a gap exists at the joint line between the air intake outer skin and the front engine cowling outer skin. The gap must not exceed 0.030 in. max.

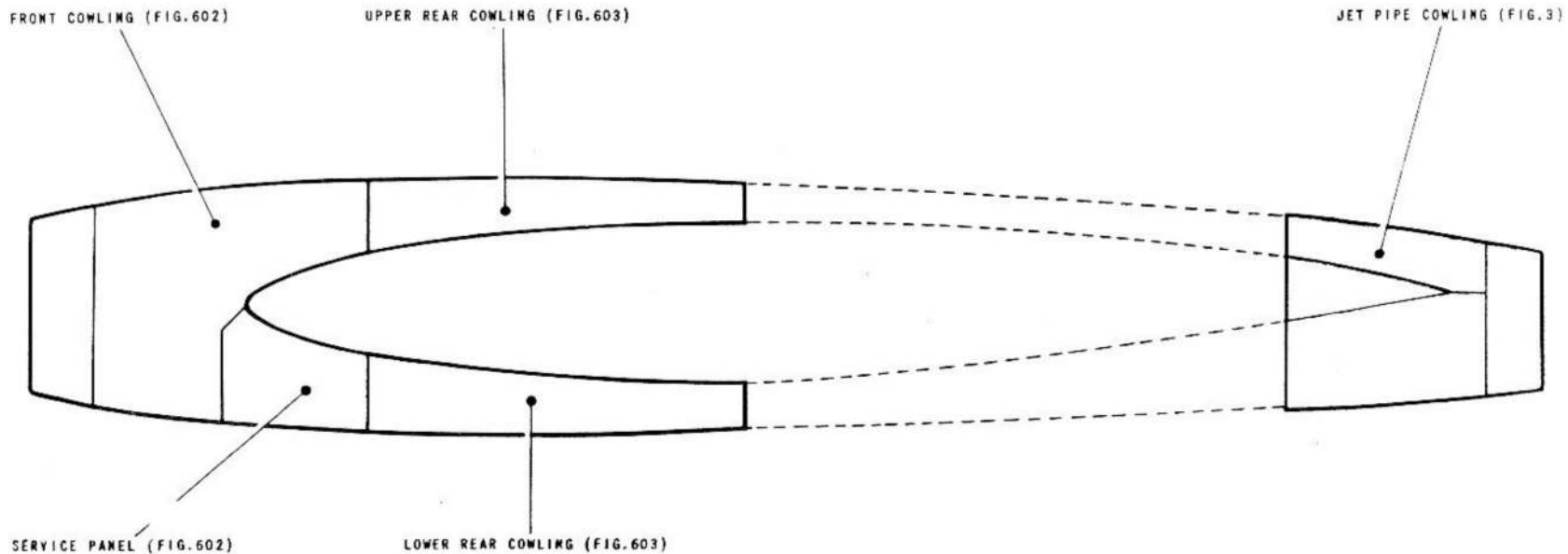


Fig.601. Key diagram

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A.P.101B-0400-6, Part 1, Chap.6, App.1  
A.L.116, Oct.74

(13) Drill the lug of each attachment-to-stringer cleat with two 0.125 in. dia. holes to mate with the existing holes in the stringer.

(14) Drill the air intake Frame 1 skin attachment flange with 0.125 in. dia. holes to mate with the holes in the engine front cowling skin.

(15) Remove the air intake assembly and remove all swarf and burrs. Very care-

fully examine the air intake assembly for any residual debris.

(16) Treat all dressed edges with self-etch primer.

(17) Apply Celloseel QH to the engaging surfaces of the air intake and the engine front cowling. Finally fit the air intake and push fully home.

(18) Secure the engine air intake with rivets, Part No.AGS.2051/429 at the cleat-to-stringer positions and rivets

Part No.AS.2230/404 at the Frame 1 flange to engine front cowling skin positions.

**Note...**

*Distorted rivet holes may be enlarged to 5/32 in. dia. and the appropriate oversize rivet fitted.*

(19) After completion of the work alter the existing Part No. on the engine air intake to read EA1.50.557 (port) or EA1.50.861 (starboard).

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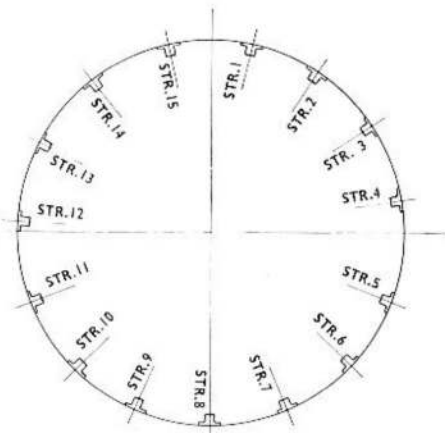
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KEY TO FIG.602 (FRONT COWLING AND SERVICE PANEL STRUCTURE)

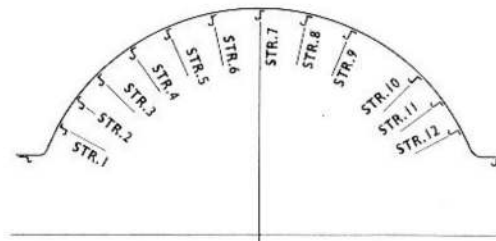
Item	Material		Part No.	Description	Negligible Damage					
	Spec.	S.W.G.			Dents		Scratches		Holes	
					Max. Depth	Min. dia.	Depth	Spacing	Max. dia.	Pitch ratio
◀ FRONT COWLING										
1	L.59	18	EA6.50.559	Assembly, spinning outer	0.05	0.75	0.005	1.00	0.125	16:1
2	L.59	20	EA6.50.561	Assembly, spinning inner	0.04	0.75	0.005	3.00	-	-
3	L.72	20	EA6.50.783	Skin, top	0.04	0.75	0.004	2.00	-	-
4	L.72	16	EA6.50.959	Plate, reinforcing	0.04	1.00	0.010	1.00	0.125	24:1
5	L.73	12	EA6.50.801	Plate, capping	0.05	2.00	0.010	3.00	0.125	32:1
6	L.72	16	EA6.50.969	Plate doubling, external	0.04	1.00	0.010	1.00	0.125	24:1
7	L.72	20	EA6.50.719	Plate, doubling	0.04	1.00	0.005	2.00	0.125	32:1
8	L.72	18	EA6.50.707	Frame, No.1A	0.05	1.00	0.005	1.00	0.200	20:1
9	L.59	18	EA6.50.897	Throat, duct	0.05	0.75	0.005	1.00	-	-
10	L.72	12	EA6.50.645	Frame No.2	0.05	1.00	0.005	1.00	0.200	20:1
11	L.72	20	EA6.50.727	Stringer No.8, rear	0.05	0.75	0.005	1.00	0.125	16:1
12	L.59	18	EA6.50.897	Body, duct	0.05	0.75	0.005	1.00	-	-
13	L.72	20	EA6.50.743	Frame No.2A	0.05	0.75	0.005	1.00	-	-
14	L.72	16	EA6.50.723	Plate, doubling	0.04	1.00	0.010	1.00	0.125	20:1
15	L.72	16	EA6.50.807	Stiffener, at frame 8	0.10	1.00	0.010	1.00	0.125	24:1
16	L.73	18	EA6.50.735	Door, access	0.05	0.75	0.010	1.50	0.125	4:1
17	L.72	20	EA6.50.747	Piece, end	0.02	0.50	0.020	0.50	0.125	-
18	L.72	16	EA6.50.134	Stiffener, edge	0.05	1.00	0.010	1.00	0.100	24:1
19	L.72	16	EA6.50.623	Stringer, No.2 forward	0.15	0.75	0.010	1.00	0.125	10:1
20	L.72	20	EA6.50.795	Buttstrap	0.10	1.00	0.010	1.50	0.25	10:1
21	L.72	20	EA6.50.799	Plate, doubling	0.02	1.00	0.010	1.00	0.20	4:1
22	L.72	20	EA6.50.785	Skin, bottom	0.04	0.70	0.005	2.00	-	-
23	L.72	20	EA6.50.523	Land, exhaust	0.020	0.50	0.010	1.00	-	-
SERVICE PANEL										
1	L.72	18	EA6.50.58	Member, frame 2A	0.10	1.00	0.005	1.00	0.157	20:1
2	L.72	20	EA6.50.93	Aft stiffener, frame 2A	0.10	1.00	0.005	1.00	0.157	25:1
3	L.72	20	EA6.50.71	Stiffener, forward	0.10	1.00	0.005	1.00	0.157	25:1
4	L.72	18	EA6.50.59	Stiffener, aft	0.10	1.00	0.005	1.00	0.157	20:1
5	L.72	20	EA6.50.63	Stringer	0.05	0.75	0.005	1.00	0.125	16:1
6	D.T.D.213	20	EA6.50.283	Ventilation duct	0.04	0.75	0.004	3.00	-	-
7	L.59	16	EA9.50.39A	Base plate	-	-	-	-	-	-

Note...

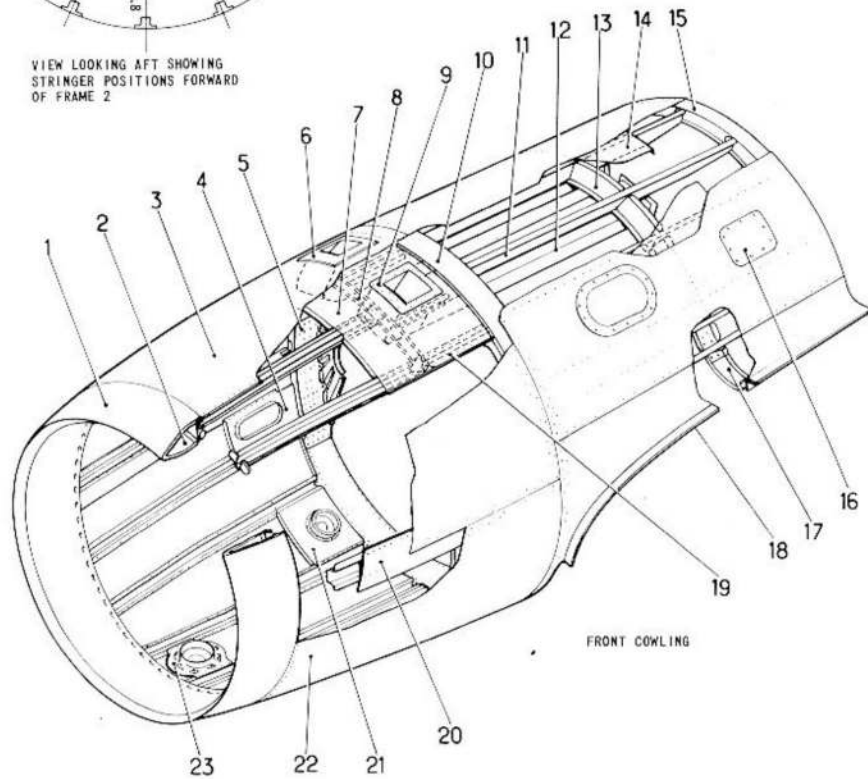
All dimensions are in inches. Skin dents must not exceed 4 inches in dia. and must be separated by not less than 5 times the least dimension of damage.



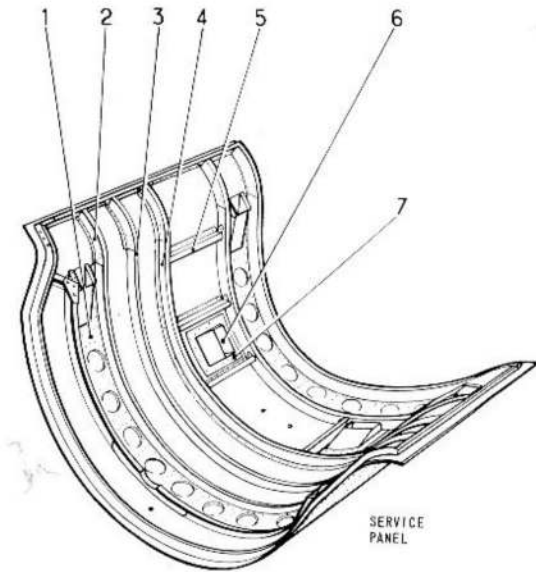
VIEW LOOKING AFT SHOWING  
STRINGER POSITIONS FORWARD  
OF FRAME 2



VIEW LOOKING AFT SHOWING STRINGER POSITIONS  
AFT OF FRAME 2



FRONT COWLING



SERVICE  
PANEL

FIG.602 FRONT COWLING AND SERVICE PANEL STRUCTURE

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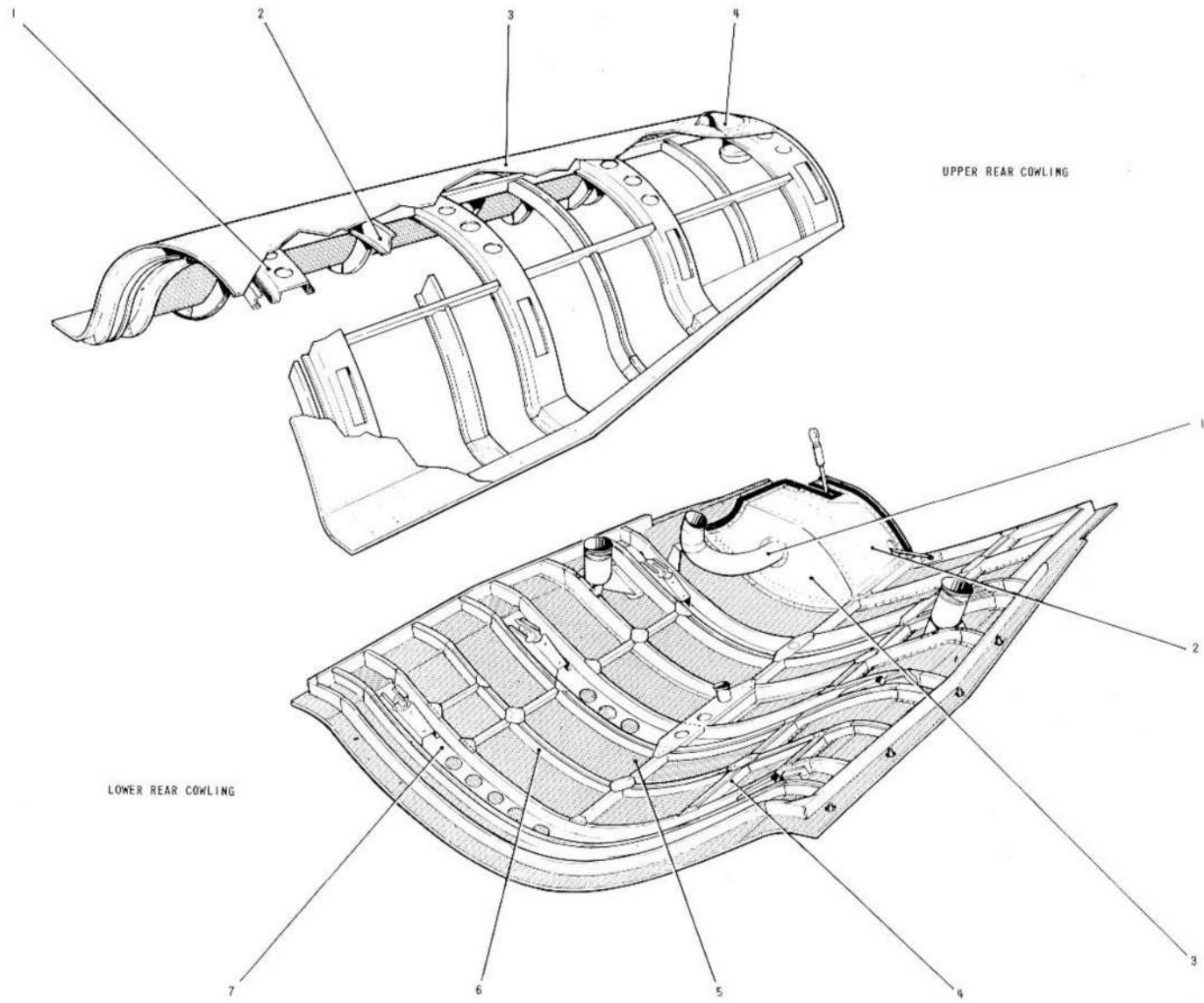


FIG. 603. UPPER AND LOWER REAR COWLING STRUCTURE

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## KEY TO FIG.603 (UPPER AND LOWER REAR COWLING STRUCTURE)

Item	Material		Part No.	Description	Negligible Damage					
	Spec.	S.W.G.			Dents		Scratches		Holes	
					Max. Depth	Min. Dia.	Depth	Spacing	Max. Dia.	Pitch Ratio
UPPER REAR COWLING										
1	L.72	22	E.A6.50.475 (port) E.A6.50.476 (starb.) (EEJ.70)	Frame 1.....	0.10	1.0	0.010	1.0	0.200	15:1
2	L.72	22	E.A6.50.473 (port) E.A6.50.474 (starb.) (EEJ.71)	Frame 1A.....	0.10	1.0	0.005	1.0	0.125	16:1
3	L.72	22	E.A6.50.471 (port) E.A6.50.472 (starb.)	Cowl skin.....	0.03	0.5	0.003	2.0	-	-
4	L.59	-	E.B6.50.95	Spar cooling intake assembly..	-	-	-	-	-	-
LOWER REAR COWLING										
1	L.59	20	E.B6.50.55 (port) E.B6.50.56 (starb.)	Pipe.....	0.04	0.7	0.005	1.5	-	-
2	L.72	20	E.B6.50.33 (port) E.B6.50.34 (starb.)	Top plate.....	0.05	1.0	0.005	2.0	-	-
3	L.72	20	E.B6.50.35 (port) E.B6.50.36 (starb.)	End plate.....	0.05	1.0	0.005	2.0	-	-
4	L.72	22	E.A6.50.491 (port) E.A6.50.492 (starb.) (EEJ.191)	Stringer.....	0.10	1.0	0.005	1.0	0.200	15:1
5	L.72	22	E.A6.50.485 (port) E.A6.50.486 (starb.)	cowl skin.....	0.03	0.5	0.003	2.0	-	-
6	L.72	22	E.A6.50.489 (port) E.A6.50.490 (starb.) (EEJ.71)	Intermediate frame 1A.....	0.10	1.0	0.005	1.0	0.125	16:1
7	L.72	22	E.A6.50.487 (port) E.A6.50.488 (starb.) (EEJ.70)	Frame 1.....	0.10	1.0	0.005	1.0	0.200	15:1

Note: - All dimensions are in inches. Skin dents must not exceed 4 inches in dia. and must be separated by not less than 5 times the least dimension of damage.



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A.L. 111, Dec. 73

APPENDIX 2

**ENGINE NACELLE - AVON MK. 206**

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## Appendix 2 ENGINE NACELLE - AVON MK.206

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Engine cowling skinning ... ..	902	Jet pipe cowling structure ... .. 905
Front cowling and service-panel structure ... ..	903	Deletion of air-intake securing cleats from frame 1 of the engine cowl 906

**Introduction**

1. A method of pictorial indexing is employed in this chapter to simplify the identification of structural items, and in the key, give details of these items together with negligible damage definitions, repair figure numbers and repair recommendations.

2. The figure numbers of all illustrations and repair schemes in this appendix range from 901 upwards to distinguish them from similar illustrations and repair schemes peculiar to other nacelles on other makes of aircraft. The negligible damage key to each of the figures 902 to 905 inclusive contains a column headed 'Repair Fig.No.' The figure numbers quoted are those from the basic chapter which caters for

repair to Avon Mk.1 Engine Nacelle. The information is applicable in principal to the Avon Mk.206 Engine Nacelle and is given as a broad guide line. If any doubt exists as to the applicability of an Avon Mk.1 Engine Nacelle repair to an Avon Mk.206 Engine Nacelle reference must be made to the Contractor.

**Deletion of air intake securing cleats from frame 1 of the engine cowl (fig.906)**

3. Whenever an engine cowl assembly air intake assembly is replaced, the cleats securing frame 1 to the stringers at the positions indicated in the illustration must be removed by carefully drilling out the securing rivets and filling the redundant rivet holes with

Tucker 'Imex' rivets Part No.AD42 (2 off) and AD54 (53 off).

**Note...**

*The removal of cleats from the air intake assembly prior to fitting must be carried out with the greatest care to avoid debris entering the space between the inner and outer spinings of the assembly.*

**Fitting a new air intake assembly to an engine front cowl assembly**

4. A new air intake assembly, Part No. EB8.50.467/8, must be fitted to an engine front cowl assembly by the following procedure:-

(1) Place the engine front cowl assembly nose downwards on a flat surface.

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(2) Working within the front cowl assembly, measure the distance between the aft face of frame 1 and the forward face of frame 1A at eight positions midway between stringers and record the measurements.

**Note...**

*The positions from which the measurements are made on frame 1A must be marked to ensure that measurements in a subsequent operation are accurately repeated.*

(3) Drill out all the rivets securing frame 1 attachment cleats to the front cowl stringers.

(4) Very carefully drill out the rivets securing frame 1 skin flange to the front cowl skin and stringers.

(5) Place the engine front cowl assembly in a horizontal position on a stand, to facilitate access for subsequent operations.

(6) Remove the unserviceable air intake assembly, Part No. EB8.50.155, from the engine front cowl assembly, Part No. EB8.50.5/7.

**Note...**

*The frame 1-to-stringer attachment cleats remain attached to the air intake assembly as they are not required for re-assembly.*

(7) Clean the new air intake assembly Part No. EB8.50.467/8.

**Note...**

*The air intake assembly is supplied as a spare Ref. No. 26FZ/13708, with a*

*0.100 in. trim allowance, undrilled in attachment areas, and with the frame 1-to-stringer attachment cleats riveted in position.*

(8) Before fitting the new air intake assembly carefully drill out the rivets securing the frame 1-to-stringer attachment cleats. Remove and discard the attachment cleats.

(9) Remove any swarf or debris from the air intake assembly.

(10) Fill the redundant cleat attachment rivet holes using Imex 'pop' rivets:-

Two 1/8 in. dia. AD42 at stringer H cleat position and 5/32 in. dia. AD54 at all other stringer positions.

(11) Temporarily fit the air intake assembly to the engine front cowl assembly and push fully home.

(12) Repeat operation (2) compare the measurements now obtained with the first measurements obtained at operation (2) and from this comparison assess the amount to be trimmed from the new air intake assembly and mark the cut-line.

**Note...**

*Any uneven measurements may indicate that the air intake has not been pushed fully home on one side or the other.*

(13) Remove the engine air intake assembly and trim as necessary, repeating the trial fitting and trimming until the dimensions obtained in operation (2) are achieved.

(14) With the air intake assembly in the correct position drill the new frame 1 flange to mate with the existing rivet holes in the engine front cowl.

**Note...**

*The standard rivet is 1/8 in., but if the original hole sizes in a few places have elongated it is permissible to fit 5/32 in. oversize rivets.*

(15) Remove the engine air intake assembly and remove all swarf and burrs.

(16) Treat all dressed edges with self-etch primer.

(17) Apply Celloseel QH to the flange edge of frame 1 and finally assemble the air intake assembly to the engine front cowl, pushing well home until the securing rivet holes are aligned.

(18) Secure the engine air intake assembly to the engine front cowl assembly using rivets A.S.2230/405 or 404 as necessary.

**CAUTION**

**If an engine front cowl assembly is to be immediately fitted on to the aircraft from which it was removed ensure that the flexible tubular seal on frame 1 makes full contact with the metal seal surface on the engine compression casing, Chap.6, para.2, sub-para.(20) Note, refers.**

**Note...**

*The air intake assembly, Part No. EB8.50.467/8, must be renumbered as EB8.50.155, after completion of fitting to the engine front cowl assembly.*

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A.P.101B-0400-6, Part 1, Chap.6, App.2  
A.L.111, Dec.73

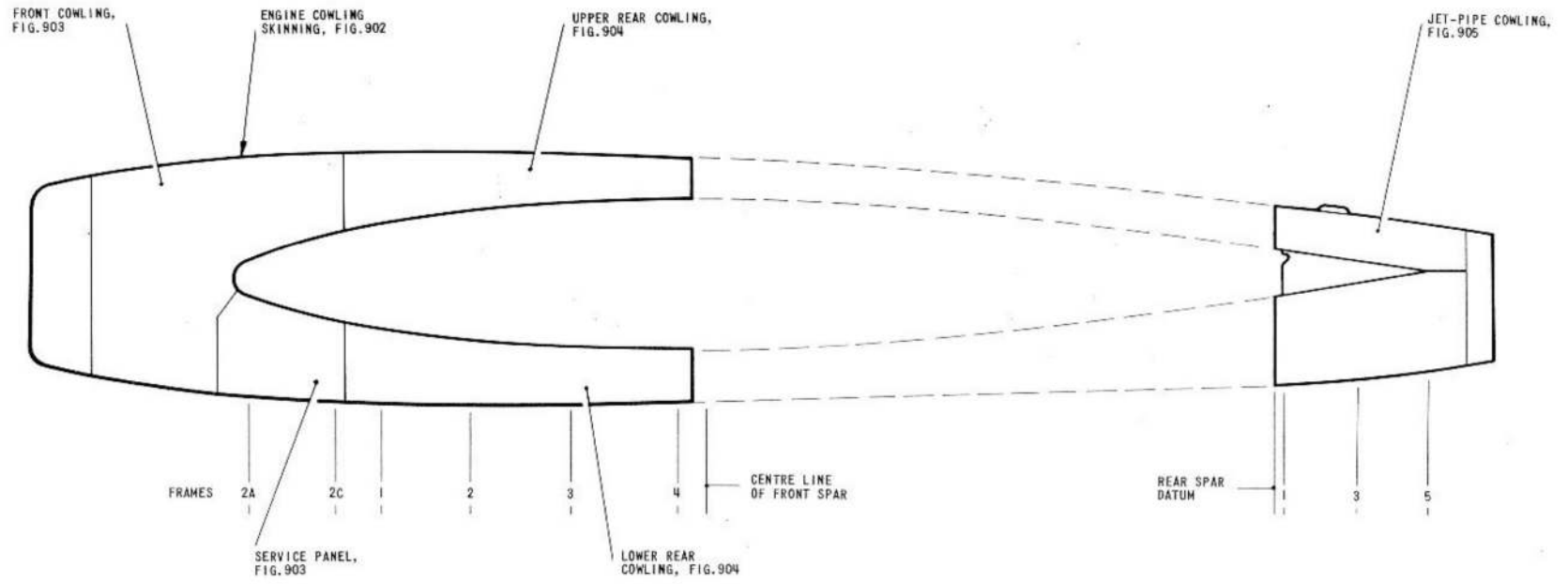


FIG.901 KEY DIAGRAM

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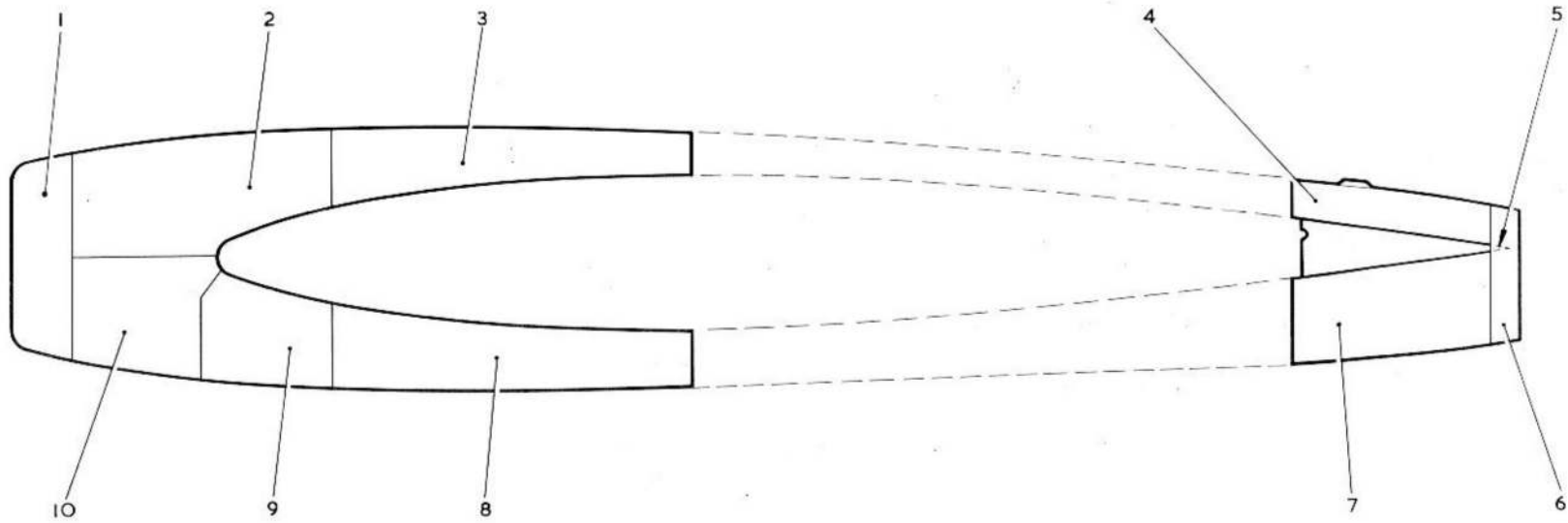


FIG . 902 ENGINE COWLING SKINNING

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## KEY TO FIG. 902 (ENGINE COWLING SKINNING)

Item	Description	Part No.	Material		Negligible damage						Repairable Damage	Repair Fig.No.
					Dents		Scratches		Holes			
					Spec.	S.W.G.	Max. Depth	Min. Dia.	Depth	Spacing		
1	Spinning outer, air intake	EB8.50.179	L.59	18	0.05	1.00	0.005	3.00	-	-	Dents, cracks and holes in excess of negligible	Chapter 6, 7
2	Skin, upper, front cowl	EB8.50.1113	L.72	20	0.04	0.75	0.004	2.00	-	-	Holes, dents and cracks lose rivets skin painting	Chapter 6, 6
3	Skin, upper, rear cowl	EB8.50.1617	L.72	20	0.05	0.80	0.006	2.00	-	-		
4	Skin, top	EB8.50.1407	L.72	22	0.03	0.50	0.003	2.00	-	-		
5	Skin, wing stub	EB8.50.1243D	D.T.D.171	24	0.02	0.60	0.002	2.00	-	-		
6	Skin, outer cone	EB8.50.1243A	D.T.D.171	24	0.05	0.70	0.004	2.00	-	-		
7	Skin, bottom	EB8.50.1409	L.72	22	0.03	0.50	0.003	2.00	-	-		
8	Skin, lower, rear cowl	EB8.50.1201	L.72	20	0.05	0.80	0.006	2.00	-	-		
9	Skin, service panel	EB8.50.953	L.72	20	0.05	0.80	0.006	2.00	-	-		
10	Skin, lower, front cowl	EB8.50.1115	L.72	20	0.05	0.80	0.006	2.00	-	-		

Note...

All dimensions are in inches

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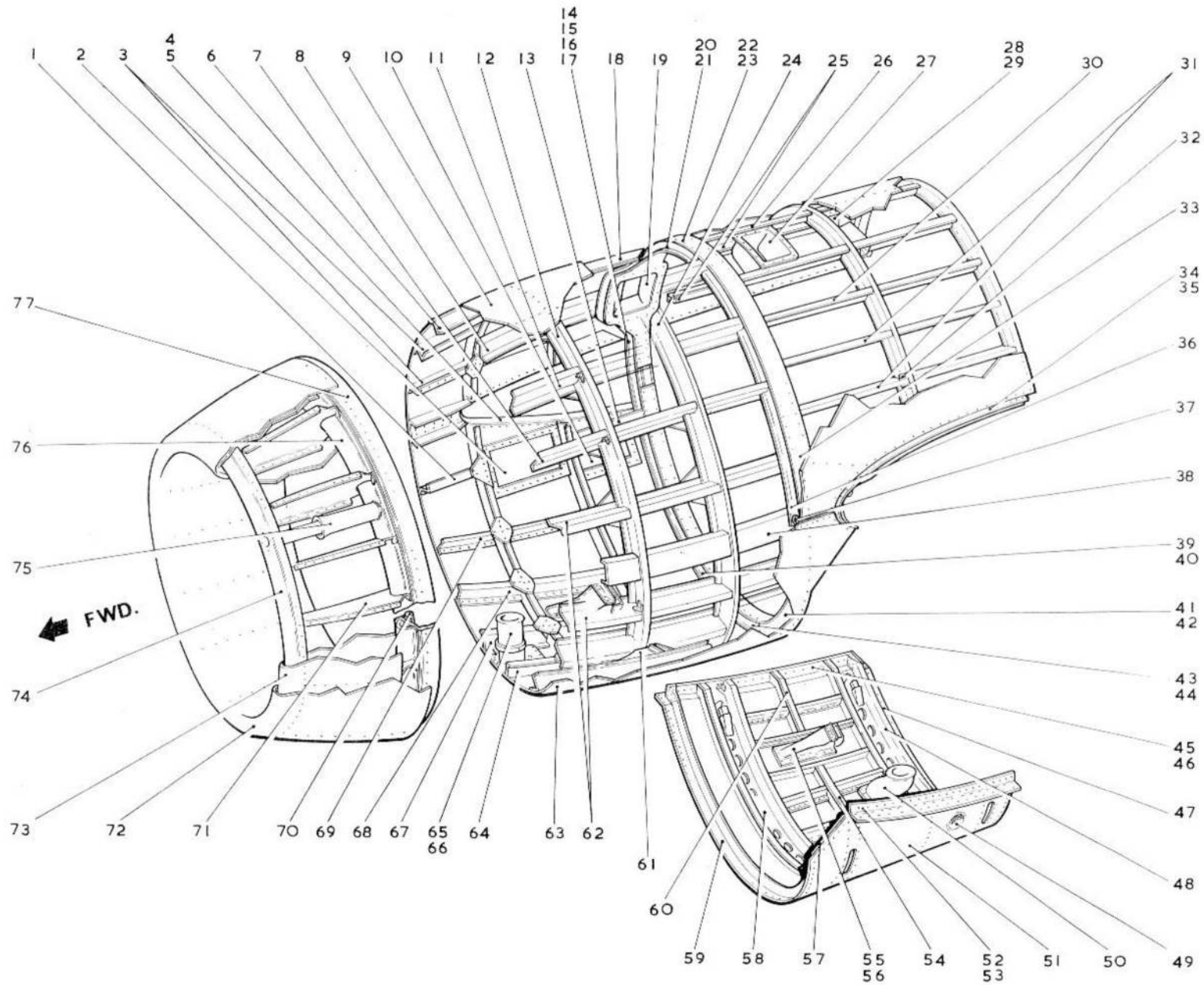


FIG. 903. FRONT COWLING AND SERVICE-PANEL STRUCTURE

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KEY TO FIG.903 (FRONT COWLING AND SERVICE - PANEL STRUCTURE)

Item	Description	Part No.	Material		Dents		Negligible Damage		Holes		Repairable Damage	Repair Fig.No.
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Scratches		Max. Dia.	Pitch Ratio		
							Depth	Spacing				
1	Stringer R	EB8.50.887	E.E.J.336	18	0.06	0.75	0.006	0.125	0.130	15:1	Dents, holes and cracks in excess of negligible	Chapter 6, 19 use E.E.J.336 18 s.w.g.
2	Land door access	EB8.50.1521	L.72	18	0.02	0.80	-	-	0.100	20:1		
3	Stringer, A and B	EB8.50.829	E.E.J.336	18	0.06	0.75	0.006	0.125	0.130	15:1	Refer to item 1	Refer to item 1
4	Skin inboard edge	EB8.50.301	L.72	20	0.04	0.75	0.005	2.00	-	-	Dents, holes and cracks in excess of negligible	Chapter 6, 6
5	Member edge, inboard	EB8.50.253	E.E.J.297	16	0.05	1.00	0.010	1.00	0.125	24:1	Refer to item 1	Chapter 6, 9 use EEJ297, 16 s.w.g.
6	Stringer C	EB8.50.831	E.E.J.336	18	0.06	0.75	0.006	0.125	0.130	15:1	Refer to item 1	Refer to item 1
7	Stringer, F and K	EB8.50.907	E.E.J.336	18	0.06	0.75	0.006	0.125			Refer to item 1	Refer to item 1
8	Stringer, D	EB8.50.895	E.E.J.336	18	0.06	0.75	0.006	0.125	0.130	15:1	Refer to item 1	Refer to item 1
9	Skin upper, front cowl	EB8.50.1113	L.72	20	0.04	0.75	0.005	2.00	-	-	Refer to item 4	Refer to item 4
10	Seating, panel	EB8.50.1119	L.72	18	0.02	1.00	0.003	0.150	0.125	30:1	Dents, holes and cracks in excess of negligible	
11	Stringer, E and L	EB8.50.899	E.E.J.336	18	0.06	0.75	0.006	0.125	0.130	15:1	Refer to item 1	Refer to item 1
12	Frame 1A	EB8.50.217	L.72	16	0.10	1.00	0.010	1.00	0.020	16:1	Dents, holes and cracks in excess of negligible	
13	Stringer, R frame 2 to 1B	EB8.50.903	E.E.J.336	18	0.06	0.75	0.006	0.125	0.130	15:1	Refer to item 1	Refer to item 1
14	Doubling, forward channel	EB8.50.787	L.73	14	0.030	1.00	0.008	1.00	-	-	Dents in excess of negligible holes, fractures and tears	Renewal recommended
15	Doubling, aft channel	EB8.50.797	L.73	14	0.030	1.00	0.008	1.00	-	-		
16	Doubler outer frame 2	EB8.50.803	L.73	14	0.030	1.00	0.008	1.00	-	-		
17	Doubler, flanged, inboard	EB8.50.811	L.73	16	0.005	1.00	0.005	3.00	0.125	15:1		
18	Stringer, stub C	EB8.50.977	L.72	18	0.06	0.75	0.006	1.125	0.130	15:1	Refer to item 1	Refer to item 1

continued...

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KEY TO FIG. 903 (FRONT COWLING AND SERVICE - PANEL STRUCTURE) - (continued)

Item	Description	Part No.	Negligible Damage								Repairable Damage	Repair Fig.No.
			Material		Dents		Scratches		Holes			
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Depth	Spacing	Max. Dia.	Pitch Ratio		
19	Duct assembly	EB8.50.1569	D.T.D.171	22	0.06	0.80	0.006	1.00	-	-	Dents, holes and cracks in excess of negligible	Renewal recommended
20	Doubler inner, frame 2	EB8.50.821	D.T.D.124	18	0.05	1.00	0.005	0.150	0.30	20:1	Refer to items 14 to 17, inclusive	Refer to items 14 to 17, inclusive
21	Doubler, inner	EB8.50.823	L.73	14	0.03	1.00	0.008	1.125	-	-		
22	Doubler outer, frame 2	EB8.50.801	D.T.D.124	18	0.05	1.00	0.005	0.150	0.30	20:1		
23	Doubler, top	EB8.50.805	L.73	16	0.005	1.00	0.005	3.00	0.125	15:1		
24	Frame 1B	EB8.50.219	L.72	16	0.10	1.00	0.010	1.00	0.20	15:1	Refer to item 12	
25	Stringer 5 and T	EB8.50.833	E.E.J.336	16	0.07	0.70	0.007	1.00	0.125	20:1	Refer to item 1	Refer to item 1
26	Stringer V	EB8.50.891	E.E.J.336	16	0.07	0.70	0.007	1.00	0.125	20:1	Refer to item 1	Refer to item 1
27	Plate, doubling	EB8.50.1323	L.72	16	0.050	1.00	0.006	3.00	0.125	20:1	Dents, holes and cracks in excess of negligible	Renewal recommended
28	Plate, slide	EB8.50.1327	L.72	16	-	-	0.006	2.00	-	-	-	Renewal recommended
29	Plate, shim 0.24 thick	EB8.50.1329	-	-	-	-	-	-	-	-	-	-
30	Stringer X	EB8.50.893	E.E.J.336	16	0.07	0.70	0.007	1.00	0.125	20:1	Refer to item 1	Refer to item 1
31	Stringer Y and Z	EB8.50.909	E.E.J.336	16	0.07	0.70	0.007	1.00	0.125	20:1	Refer to item 1	Refer to item 1
32	Cleat (typical)	EB8.50.981	D.T.D.683 or E.E.D.X.25		-	-	-	-	-	-	Cracks dents and holes	Renew
33	Doubler, outboard	EB8.50.809	L.73	16	0.05	1.00	0.005	3.00	0.125	15:1	Refer to item 14	Refer to item 14
34	Skin, outboard edge	EB8.50.303	L.72	20	0.040	0.75	0.004	2.00	-	-	Refer to item 4	Refer to item 4
35	Member, edge, outboard	EB8.50.819	E.E.J.297	16	0.05	1.00	0.010	1.00	0.125	24:1	Refer to item 5	Refer to item 5
36	Strap reinforcing, frame 2	EB8.50.825	L.73	20	0.05	1.00	0.010	1.50	0.125	32:1	Dents, holes and cracks in excess of negligible	Chapter 1, 9

continued...

KEY TO FIG.903 (FRONT COWLING AND SERVICE - PANEL STRUCTURE) - (continued)

Item	Description	Part No.	Negligible Damage								Repairable Damage	Repair Fig.No.
			Material		Dents		Scratches		Holes			
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Depth	Spacing	Max. Dia.	Pitch Ratio		
37	Doubler, internal	EB8.50.245	L.73	14	0.030	1.00	0.008	1.00	-	-	Refer to item 14	Refer to item 14
38	Stringer H	EB8.50.911	E.E.J.337	16	0.07	0.70	0.007	1.00	0.125	20:1	Refer to item 1	Refer to item 1
39	Web inboard, frame 2 forward	EB8.50.785	L.73	14	0.040	1.00	0.010	2.00	0.125	32:1	Cracks, dents and holes in excess of negligible	Use the principle of repair shown in Chapter 2, 88, use material L.73 s.w.g.14
40	Web, inboard aft	EB8.50.791	L.73	14	0.040	1.00	0.010	2.00	0.125	32:1		
41	Web, outboard forward	EB8.50.781	L.73	14	0.040	1.00	0.010	2.00	0.125	32:1		
42	Web, outboard aft	EB8.50.783	L.73	14	0.040	1.00	0.010	2.00	0.125	32:1		
43	Jointing channel forward	EB8.50.797	L.73	14	0.040	1.125	0.010	1.50	-	-		
44	Jointing channel frame 2	EB8.50.799	L.73	14	0.040	1.125	0.010	1.50	-	-		
45	Member, edge, outboard	EB8.50.431	L.72	16	0.05	1.00	0.010	1.00	0.125	24:1	Refer to item 5	
46	Member, edge, inboard	EB8.50.433	L.72	16	0.05	1.00	0.010	1.00	0.125	24:1	Refer to item 5	
47	Stiffener, edge sealing	EB8.50.4061	L.72	16	0.05	1.00	0.007	2.00	0.15	40:1		
48	Frame 2C	EB8.50.1069	L.72	22	0.10	1.00	0.010		0.20	15:1		
49	Plate, reinforcing	EB8.50.947	L.73	18	0.020	0.50	0.020	1.00	-			
50	Plate, doubling	EB8.50.485	L.72	20	0.04	0.75	0.01	1.00	0.125	10:1		
51	Skin	EB8.50.353	L.72	20	0.04	0.75	0.004	2.00	-	-	Dents, holes and cracks in excess of negligible	Refer to item 4
52	Strap, skin edge, outboard	EB8.50.427	L.72	16	0.05	1.00	0.007	2.00	-	-	Dents, cracks and holes in excess of negligible	Renewal recommended
53	Strap, skin edge, inboard	EB8.50.429	L.72	16	0.05	1.00	0.007	2.00	-	-		
54	Frame 2B, intermediate, outboard	EB8.50.1065	L.72	16	0.10	1.00	0.010	1.00	0.20	20:1		
55	Plate doubling	EB8.50.487	L.72	18	0.05	1.00	0.005	1.50	0.30	20:1	Dents, holes and cracks in excess of negligible	Renewal recommended

continued...

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KEY TO FIG. 903 (FRONT COWLING AND SERVICE - PANEL STRUCTURE) - (continued)

Item	Description	Part No.	Material		Dents		Negligible Damage		Repairable Damage	Repair Fig.No.		
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Scratches				Holes	
							Depth	Spacing			Max. Dia.	Pitch Ratio
56	Baffle	EB8.50.133	L.72	20	0.40	0.75	0.004	2.00	-	-		
57	Stiffener, end	EB8.50.447	L.72	16	0.05	1.00	0.007	2.00	0.15	40:1	Dents, holes and cracks in excess of negligible	Renewal recommended
58	Frame 2A	EB8.50.1063	L.72	22	0.10	0.00	0.010		0.20	15:1		
59	Stiffener, edge sealing	EB8.50.1071	L.72	16	0.05	1.00	0.007	2.00	0.15	40:1	Dents, holes and cracks in excess of negligible	Chapter 9, 9
60	Frame 2B, intermediate, inboard	EB8.50.1067	L.72	22	0.10	1.00	0.010		0.20	15:1		
61	Plate, doubling, air intake	EB8.50.345	L.72	18	0.05	1.00	0.005	1.50	0.30	20:1	Refer to item 55	Refer to item 55
62	Stringer G and J	EB8.50.896	E.E.J.336	18	0.006	0.75	0.006	1.125	1.130	15:1	Refer to item 1	Refer to item 1
63	Skin, lower, front cowl	EB8.50.1115	L.72	20	0.004	0.75	0.004	2.00	-	-	Refer to item 4	Refer to item 4
64	Stringer, M	EB8.50.897	E.E.J.336	18	0.006	0.75	0.006	1.125	1.130	15:1	Refer to item 1	Refer to item 1
65	Plate reinforcing, starboard	EB8.50.967	L.72	16	0.050	1.00	0.006	2.00	0.350	25:1	Dents, holes and cracks in excess of negligible	Renewal recommended
66	Plate, sealing	EB8.50.319	L.72	20	0.04	0.75	0.004	2.00	-	-		
67	Stringer, M	EB8.50.898	E.E.J.336	16	0.07	0.70	0.007	1.00	0.125	20:1	Refer to item 1	Refer to item 1
68	Stringer	EB8.50.900	E.E.J.336	18	0.06	0.75	0.006	0.125	0.130	15:1	Refer to item 1	Refer to item 1
69	Stringer, O	EB8.50.985	E.E.J.336	18	0.06	0.75	0.006	0.125	0.130	15:1	Refer to item 1	Refer to item 1
70	Ring, seal retaining	EB8.50.191	L.72	20	0.07	1.00	0.007	0.130	-	-	Dents, cracks and holes in excess of negligible	Renewal recommended

continued...

## KEY TO FIG.903 (FRONT COWLING AND SERVICE - PANEL STRUCTURE) - (continued)

Item	Description	Part No.	Negligible Damage								Repairable Damage	Repair Fig.No.
			Material		Dents		Scratches		Holes			
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Depth	Spacing	Max. Dia.	Pitch Ratio		
71	Diaphragm (typical)	EB8.50.189	L.72	18	0.05	1.00	0.005	2.00	-	-	Dents and cracks in excess of negligible	Renewal recommended
72	Spinning, outer	EB8.50.179	L.59	18	0.05	1.00	0.005	3.00	-	-	Dents, holes and cracks in excess of negligible	Chapter 6, 7
73	Spinning, inner	EB8.50.177	L.59	20	0.05	1.00	0.005	3.00	-	-		
74	Frame, nose	EB8.50.167	L.72	20	0.05	1.00	0.005	3.00	-	-	Dents, holes and cracks in excess of negligible	
75	Spinning, channel air duct	EB8.50.163	L.59	20	0.04	1.00	0.004	3.00	-	-	Cracks and holes in excess of negligible	Renewal recommended
76	Spinning, frame 1	EB8.50.159	L.72	18	0.05	1.00	0.005	3.00	-	-	Cracks, holes and dents in excess of negligible	Chapter 6, 7
77	Assembly, frame 1	EB8.50.157	L.72	20	0.05	1.00	0.005	1.00	-	-	Cracks, holes and dents	

**Note...***All dimensions are in inches*

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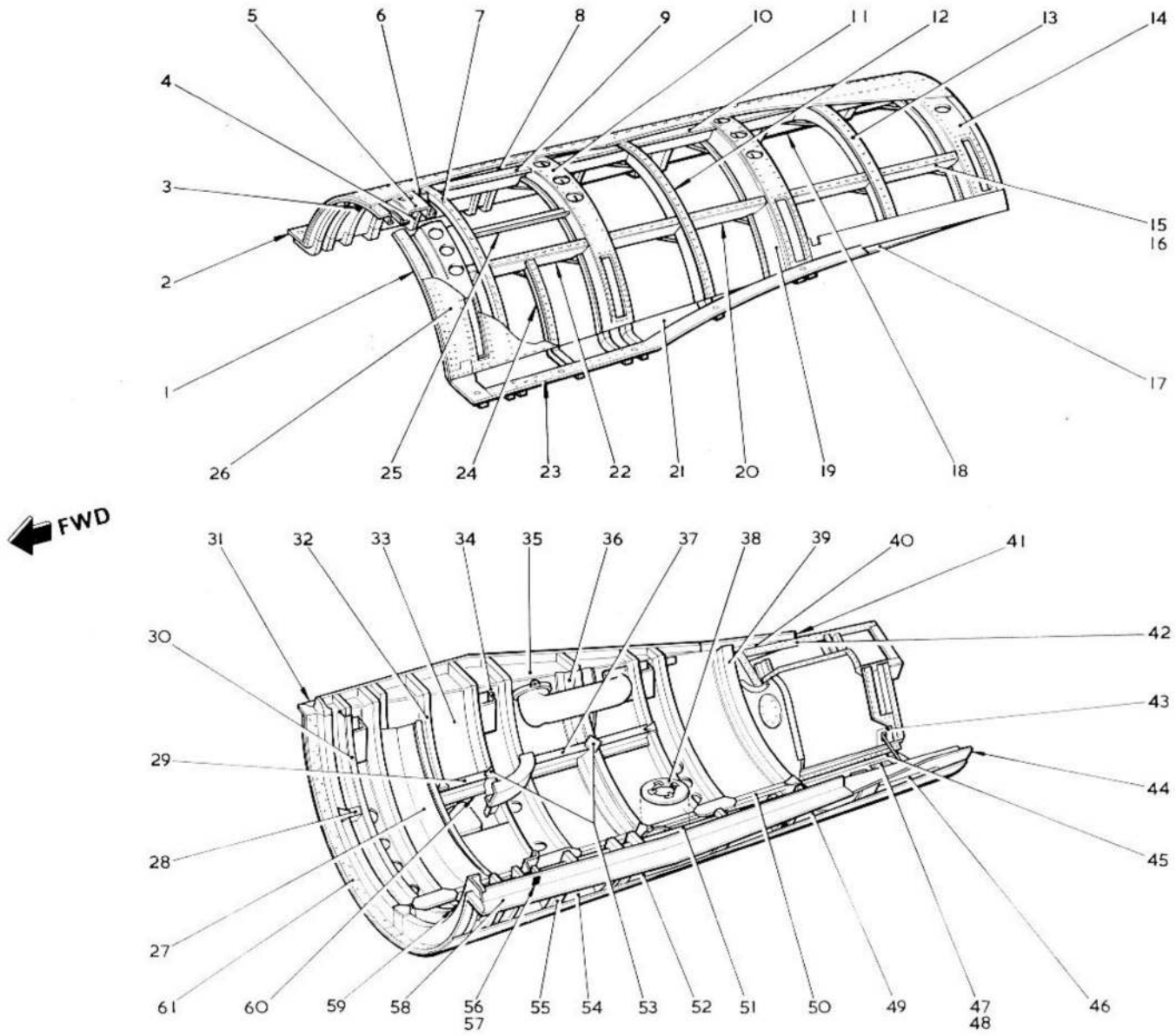


FIG. 904. UPPER AND LOWER REAR COWLING STRUCTURE

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KEY TO FIG.904 (UPPER AND LOWER REAR COWLING STRUCTURE)

Item	Description	Part No.	Negligible Damage								Repairable Damage	Repair Fig.No.
			Material		Dents		Scratches		Holes			
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Depth	Spacing	Max. Dia.	Pitch Ratio		
1	Stiffener, edge, forward	EB8.50.1019	E.E.J.353	16	0.04	1.00	0.010	1.00	0.125	32:1	Dents, holes and cracks in excess of negligible	Renewal recommended
2	Stiffener, edge, outboard port	EB8.50.41	E.E.J.297	16	0.04	1.00	0.010	1.00	0.125	32:1		
3	Stringer, 1 to 2	EB8.50.63	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Dents, holes and cracks	Chapter 6, 11
4	Frame 1A	EB8.50.1043	L.72	16	0.10	1.00	0.010	1.00	0.20	15:1	Dents, holes and cracks in excess of negligible	Renewal recommended Chapter 6, 15, use E.E.J.70
5	Frame 1, port	EB8.50.1045	L.72	16	0.10	1.00	0.010	1.00	0.20	15:1		
6	Stringer, stub	EB8.50.69	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3
7	Sealing, frame	EB8.50.1033	D.T.D.171	22	0.10	0.75	0.005	1.00	0.125	15:1	Dents, holes cracks in excess of negligible	-
8	Stringer	EB8.50.1206	L.72	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3
9	Stringer	EB8.50.135	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1		
10	Frame 2, port	EB8.50.1073	L.72	16	0.10	1.00	0.010	1.00	0.20	15:1	Refer to item 5	Refer to item 5
11	Stringer, 2 to 3	EB8.50.65	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3
12	Frame 2A, port	EB8.50.1049	L.72	16	0.10	1.00	0.010	1.00	0.20	15:1	Dents, holes and cracks in excess of negligible	Chapter 6, 15, use E.E.J.71
13	Frame 3A, port	EB8.50.1081	L.72	16	0.10	1.00	0.010	1.00	0.20	15:1		
14	Frame 4, port	EB8.50.1815	L.72	16	0.10	1.00	0.010	1.00	0.20	15:1	Dents, holes and cracks in excess of negligible	Renewal recommended
15	Stringer 3 to 4	EB8.50.68	L.72	22	0.10	1.00	0.005	1.00	0.125	16:1	Dents, holes and cracks in excess of negligible	Refer to item 3
16	Stringer, 3 to 4	EB8.50.67	L.72	22	0.10	1.00	0.005	1.00	0.125	16:1		

continued...

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KEY TO FIG. 904 (UPPER AND LOWER REAR COWLING STRUCTURE) - (continued)

Item	Description	Part No.	Negligible Damage									Repairable Damage	Repair Fig.No.
			Material		Dents		Scratches		Holes				
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Depth	Spacing	Max. Dia.	Pitch Ratio			
17	Stiffener, rear seating	EB8.50.78	L.72	16	0.05	1.00	0.005	1.00	0.125	24:1	Dents, holes and cracks in excess of negligible	Renewal recommended	
18	Stiffener, rear seating	EB8.50.77	L.72	16	0.05	1.00	0.005	1.00	0.125	24:1			
19	Frame 3	EB8.50.1081	L.72	16	0.10	1.00	0.010	1.00	0.20	15:1	Refer to item 12	Refer to item 12	
20	Stringer 2 to 3	EB8.50.66	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3	
21	Strap, skin edge inboard	EB8.50.39	L.72	22	0.03	0.50	0.003	2.00	0.125	15:1			
22	Stringer	EB8.50.1273	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3	
23	Stiffener, edge, inboard	EB8.50.43	E.E.J.297	16	0.04	1.00	0.010	1.00	0.125	32:1			
24	Frame 1A	EB8.50.1038	L.72	22	0.10	1.00	0.010	1.00	0.20	15:1	Dents, holes and cracks in excess of negligible	Renewal recommended	
25	Stringer	EB8.50.1205	L.72	20	0.05	0.75	0.005	1.00	0.125	16:1			
26	Skin, port cowl	EB8.50.1617	L.72	22	0.03	0.50	0.003	2.00	-	-	Dents, holes and cracks in excess of negligible	Chapter 6, 6	
27	Frame, sealing	EB8.50.1035	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3	
28	Stringer, stub	EB8.50.70	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3	
29	Stringer, 1 to 2	EB8.50.64	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3	
30	Frame 1	EB8.50.1047	L.72	22	0.10	1.00	0.010	1.00	0.20	15:1	Refer to item 5	Refer to item 5	
31	Stiffener, edge, inboard	EB8.50.551	E.E.J.297	22	0.05	1.00	0.005	1.00	0.125	24:1			
32	Frame, toggle No.2	EB8.50.559	L.72	16	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 5	Refer to item 5	
33	Skin, cowl	EB8.50.1201	L.72	22	0.03	0.50	0.003	2.00	-	-	Refer to item 26	Refer to item 26	
34	Frame 2	EB8.50.1075	L.72	16	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 5	Refer to item 5	
35	Strap, skin edge	EB8.50.547	L.72	22	0.03	0.50	0.003	2.00	0.125	15:1			
36	Frame 2A, intermediate	EB8.50.1051	L.72	22	0.10	1.00	0.010	1.00	0.20	15:1	Refer to item 12	Refer to item 12	
37	Stringer, 2 to 3	EB8.50.66	E.E.J.71	22	0.10	1.00	0.005	1.00	1.125	16:1	Refer to item 3	Refer to item 3	
38	Plate, reinforcing	EB8.50.947	L.73	18	-	-	0.006	-	-	-	Dents, cracks and holes in excess of negligible	Renewal recommended	

continued...

RESTRICTED

## KEY TO FIG. 904 (UPPER AND LOWER REAR COWLING STRUCTURE) - (continued)

Item	Description	Part No.	Negligible Damage								Repairable Damage	Repair Fig.No.	
			Material		Dents		Scratches		Holes				
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Depth	Spacing	Max. Dia.	Pitch Ratio			
39	Frame 3A, intermediate	EB8.50.1083	L.72	22	0.10	1.00	0.010	1.00	0.20	15:1	Dents, holes and cracks in excess of negligible	-	
40	Stiffener, outboard	EB8.50.579	L.72	16	0.04	1.00	0.010	1.00	0.125	32:1		}	
41	Stiffener, rear inboard	EB8.50.581	L.72	16	0.04	1.00	0.010	1.00	0.125	32:1			
42	Door, cowl	EB8.50.1263	L.72	20	0.05	0.80	0.006	2.00	-	-			
43	Plate, reinforcing	EB8.50.149	L.73	10	-	-	0.006	-	-	-		Renewal Recommended	
44	Stiffener, edge, rear	EB8.50.1313	E.E.J.353	16	0.04	1.00	0.010	1.00	0.125	30:1			
45	Stringer, 3A, rear	EB8.50.576	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125		Refer to item 3	Refer to item 3	
46	Stringer, 3A, rear	EB8.50.575	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125		Refer to item 3	Refer to item 3	
47	Doubler	EB8.50.1511	L.72	22	0.025	1.00	0.003	2.00	-				
48	Bracket	EB8.50.1517	S.514	20	-	-	0.005	-	-				
49	Stringer, 3 to 3A	EB8.50.574	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125		Refer to item 3	Refer to item 3	
50	Stringer, 3 to 3A	EB8.50.573	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125		Refer to item 3	Refer to item 3	
51	Strap, skin edge outboard	EB8.50.545	L.72	22	0.03	0.50	0.003	2.00	0.125	15:1			
52	Stringer, 2 to 3	EB8.50.65	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125		Refer to item 3	Refer to item 3	
53	Diaphragm	EB8.50.189	L.72	18	0.05	1.00	0.005	2.00	-	-			
54	Stringer, 1 to 22	EB8.50.63	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3	
55	Frame 1A, intermediate	EB8.50.1037	L.72	16	0.10	1.00	0.005	1.00	0.125	16:1	Dents, holes and cracks in excess of negligible	Renewal recommended	
56	Piece, sealing	EB8.50.631	L.1	3	-	-	-	-	-	-			
57	Piece, sealing	EB8.50.125	L.64	4	-	-	-	-	-	-			
58	Stiffener edge, outboard	EB8.50.549	E.E.J.297	16	0.04	1.00	0.010	1.00	0.125	32:1			
59	Stringer, stub	EB8.50.69	E.E.J.71	22	0.10	1.00	0.005	1.00	0.125	16:1	Refer to item 3	Refer to item 3	
60	Plate, doubling	EB8.50.131	L.72	18	-	-	0.006	-	-	-			
61	Stiffener, edge forward	EB8.50.1023	E.E.J.353	16	0.04	1.00	0.010	1.00	0.125	30:1			

Note...

All dimensions are in inches

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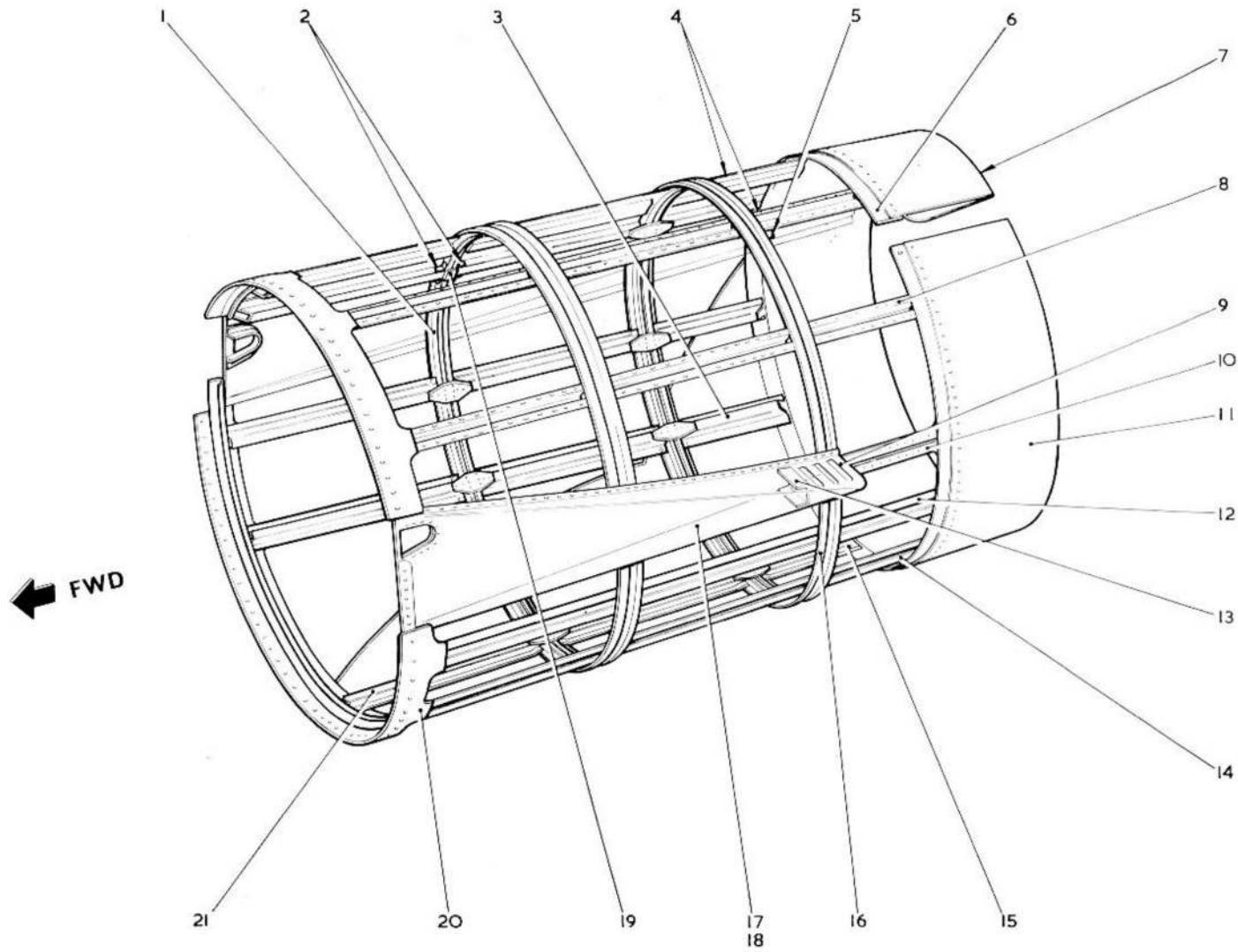


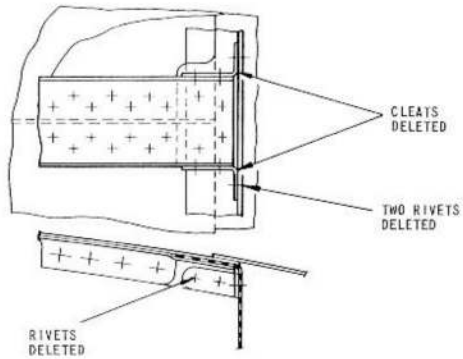
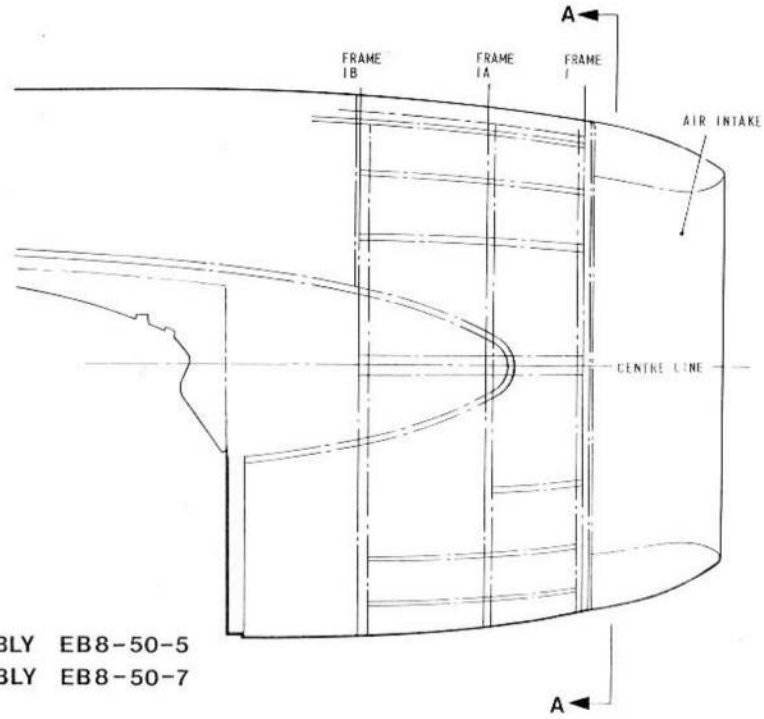
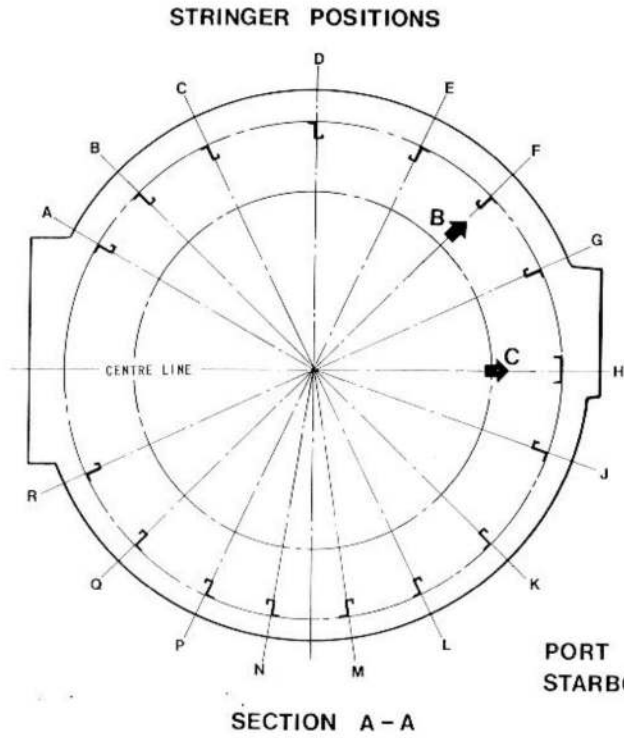
FIG. 905. JET PIPE COWLING STRUCTURE

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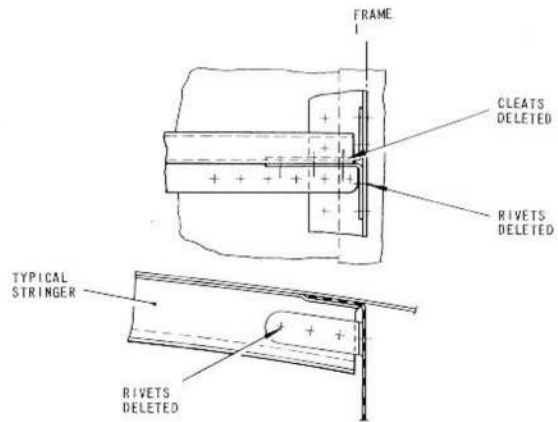
KEY TO FIG.905 (JET PIPE COWLING STRUCTURE)

Item	Description	Part No.	Negligible Damage								Repairable Damage	Repair Fig.No.
			Material		Dents		Scratches		Holes			
			Spec.	S.W.G.	Max. Depth	Min. Dia.	Depth	Spacing	Max. Dia.	Pitch Ratio		
1	Frame 2	EB8.50.1340	E.E.J.373	18	0.05	0.75	0.010	1.00	0.20	15:1		Chapter 6, 16
2	Cleat	EB8.50.1355	L.72	18	-	-	0.015	-	-	-	Renewal recommended	
3	Stringer, rear, lower	EB8.50.686	E.E.J.373	18	0.10	1.00	0.010	1.00	0.125	16:1	None	Renewal recommended
4	Stringer, rear, upper	EB8.50.1253	E.E.J.373	18	0.10	1.00	0.010	1.00	0.125	16:1		
5	Riblet	EB8.50.1244E	D.T.D.171	24	0.025	0.50	0.005	1.00	-	-	None	Renewal recommended
6	Cone, inner, forward	EB8.50.1243B	D.T.D.171	24	0.05	0.70	0.005	1.00	-	-		
7	Cone, outer	EB8.50.1243A	D.T.D.171	24	0.05	0.70	0.005	1.00	-	-		
8	Stringer, rear, upper	EB8.50.1252	E.E.J.373	18	0.10	1.00	0.010	1.00	0.125	16:1	None	Renewal recommended
9	Skin, wing stub	EB8.50.1244D	D.T.D.171	24	0.04	0.75	0.006	1.00	0.25	10:1		
10	Buttstrap, port	EB8.50.675	L.72	18	0.03	1.00	0.010	3.00	-	-	None	Renewal recommended
11	Piece end	EB8.50.1243F	D.T.D.171	24	0.05	0.70	0.005	1.00	-	-	None	Refer to items 5 to 9 inclusive
12	Stringer, rear, lower	EB8.50.687	E.E.J.373	18	0.10	1.00	0.010	1.00	0.125	16:1	Refer to item 3	Refer to item 3
13	Riblet	EB8.50.671	L.72	20	0.03	0.75	0.006	1.00	-	-	None	Renewal recommended
14	Stringer, rear lower	EB8.50.685	E.E.J.373	18	0.10	1.00	0.010	1.00	0.125	16:1	Refer to item 3	Refer to item 3
15	Stringer, rear, lower	EB8.50.683	E.E.J.373	18	0.10	1.00	0.010	1.00	0.125	16:1	Refer to item 3	Refer to item 3
16	Frame 4	EB8.50.13443	L.72	18	0.05	1.00	0.005	1.00	1.125	32:1		Chapter 6, 16
17	Panel wing, outboard port	EB8.50.669	L.59	20	0.04	0.75	0.005	3.00	-	-	Dents, holes and cracks in excess of negligible	Repair by Argon arc welding is permissible
18	Panel wing, outboard, sthd.	EB8.50.670	L.59	20	0.04	0.75	0.005	3.00	-	-		
19	Plate, gusset	EB8.50.715	L.72	18	-	-	0.006	1.00	-	-	Renewal recommended	
20	Frame 1	EB8.50.1337	L.72	18	0.04	1.00	0.005	1.00	0.20	20:1		Chapter 6, 16
21	Stringer, forward	EB8.50.677	E.E.J.373	18	0.10	1.00	0.010	1.00	0.125	16:1	Refer to item 3	Refer to item 3

Note...  
All dimensions are in inches



**VIEW ON ARROW C**  
DETAIL AT STRINGER H



**VIEW ON ARROW B**  
TYPICAL DETAIL OF LOCATIONS  
AFFECTED EXCEPTING STRINGER H

**FIG. 906 DELETION OF AIR INTAKE SECURING CLEATS FROM FRAME 1 OF THE ENGINE COWL**

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