

Scandinavian Airlines System

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NUMBER OF PAGES			208	APR 22/01	01	950	AUG 22/06	04
21-CONTENTS			209	APR 22/01	01	951	AUG 22/06	04
1	APR 22/02	SAS	R 210	AUG 22/09	02.1	952	AUG 22/06	04
2	DEC 22/06	SAS	211	APR 22/02	01	953	AUG 22/06	04
3	AUG 22/06	SAS	212	APR 22/02	01	954	AUG 22/06	04
4	AUG 22/06	SAS	213	APR 22/02	01	955	AUG 22/06	04
5	DEC 22/08	SAS	214	BLANK		956	AUG 22/06	04
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7	APR 22/09	SAS	901	AUG 22/01	02	958	AUG 22/06	04
8	APR 22/06	SAS	902	AUG 22/01	02	959	AUG 22/06	04
R 9	AUG 22/09	SAS.101	903	AUG 22/01	02	960	AUG 22/06	04
R 10	AUG 22/09	SAS.1	904	AUG 22/01	02	961	AUG 22/06	04
R 11	AUG 22/09	SAS.1	905	APR 22/03	02	962	AUG 22/06	04
12	DEC 22/08	SAS	906	AUG 22/06	02	963	AUG 22/06	04
13	DEC 22/08	SAS	907	AUG 22/06	03	964	AUG 22/06	04
R 14	AUG 22/09	SAS.1	908	APR 22/03	03	965	AUG 22/06	04
R 15	AUG 22/09	SAS.1	909	APR 22/03	02	966	AUG 22/06	04
R 16	AUG 22/09	SAS.101	910	AUG 22/06	01	967	AUG 22/06	04
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18	APR 22/06	SAS	912	AUG 22/06	03	969	AUG 22/06	04
19	APR 22/08	SAS	913	AUG 22/06	03	970	AUG 22/06	04
20	DEC 22/08	SAS	914	AUG 22/06	03	971	AUG 22/06	04
21	DEC 22/08	SAS	915	AUG 22/06	03	972	AUG 22/06	04
R 22	AUG 22/09	SAS.1	916	AUG 22/06	03	973	AUG 22/06	04
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24	DEC 22/08	SAS	918	AUG 22/06	03	975	AUG 22/06	04
25	DEC 22/08	SAS	919	AUG 22/06	03	976	AUG 22/06	04
26	APR 22/09	SAS	920	AUG 22/06	02	977	AUG 22/06	04
27	DEC 22/08	SAS	921	AUG 22/06	02	978	AUG 22/06	04
R 28	AUG 22/09	SAS.1	922	AUG 22/06	02	979	AUG 22/06	04
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3	DEC 22/01	09	928	AUG 22/06	03	980E	AUG 22/06	04
4	DEC 22/01	14	929	AUG 22/06	03	980F	AUG 22/06	04
5	DEC 22/01	15	930	AUG 22/06	03	980G	AUG 22/06	04
6	DEC 22/01	16	931	AUG 22/06	03	980H	AUG 22/06	04
7	AUG 22/01	07	932	AUG 22/06	03	980I	AUG 22/06	04
8	NOV 01/82	02	933	AUG 22/06	03	980J	AUG 22/06	04
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202	MAY 01/84	03	938	AUG 22/06	03	980O	AUG 22/06	04
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			943	AUG 22/06	03	980T	AUG 22/06	04
			944	AUG 22/06	03	980U	AUG 22/06	04
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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
21-00-00		CONT.	21-21-02			21-23-06		
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982	AUG 22/06	03	R 404	AUG 22/09	06A.1	404	AUG 10/93	01
982A	AUG 22/06	03	R 405	AUG 22/09	16A.1			
982B	AUG 22/06	03	R 406	AUG 22/09	04A.1	21-23-07		
982C	AUG 22/06	03	407	AUG 22/02	04A	801	APR 22/09	02A
982D	AUG 22/06	03	408	BLANK		802	DEC 22/06	01A
982E	APR 22/09	02				803	DEC 22/06	01A
982F	APR 22/09	02	21-22-00			804	APR 22/07	02A
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			3	NOV 10/90	16	807	APR 22/07	02A
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21-00-21						809	APR 22/07	02A
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203	DEC 22/99	03	402	MAY 01/85	05	812	APR 22/07	02A
204	AUG 10/96	02	403	MAY 01/82	01	813	DEC 22/01	01A
205	AUG 10/96	02	404	FEB 10/95	01	814	DEC 22/01	01A
206	AUG 10/96	02	405	NOV 10/95	01	815	APR 22/07	02A
207	AUG 10/96	02	406	NOV 10/95	01	816	APR 22/07	02A
208	AUG 10/96	02				817	APR 22/07	02A
209	APR 22/99	07	21-22-02			818	APR 22/07	02A
210	APR 22/99	01	401	APR 22/08	11	819	APR 22/07	02A
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			406	APR 22/08	05	824	APR 22/07	02A
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						6	MAY 10/92	05
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			206	AUG 10/98	04			

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
21-24-01			21-25-01		CONT.	21-26-00		CONT.
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404	FEB 10/94	04	21-25-02	CONFIG 3		18	BLANK	
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402	AUG 10/89	02	405	AUG 22/07	04	504	MAY 10/96	04
403	FEB 10/95	02	406	AUG 22/07	04	505	MAY 10/89	08
404	MAY 10/90	02	407	AUG 22/07	04	506	DEC 22/00	04
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402	AUG 10/89	02	410	AUG 22/03	02	509	AUG 10/98	07
403	MAY 10/90	02	21-25-02	CONFIG 4		510	AUG 10/92	11
404	MAY 10/90	02	401	AUG 22/07	01	511	AUG 10/98	20
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2	DEC 22/01	09	406	AUG 22/03	03	516	AUG 22/03	13
3	APR 22/06	07	407	AUG 22/07	03	517	AUG 22/03	11
4	APR 22/06	01	408	AUG 22/07	03	518	AUG 22/03	09
5	DEC 22/01	01	409	AUG 22/07	01	519	FEB 10/94	02
6	DEC 22/01	06	410	AUG 22/03	01	520	FEB 10/94	03
21-25-00			21-25-03			521	FEB 10/92	01
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503	AUG 10/90	04	403	AUG 10/90	02	524	FEB 10/94	02
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401	DEC 22/00	17	401	FEB 10/94	02	1	NOV 10/90	01
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403	AUG 10/90	01	404	AUG 10/96	01	9	DEC 22/01	02
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15	APR 22/09	03	209	DEC 22/07	07	401	DEC 10/98	01
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202	AUG 22/07	01	501	AUG 22/99	01	R 404	AUG 22/09	01.1
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204	AUG 22/07	05	R 503	AUG 22/09	02.1	21-40-00		
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206	DEC 22/08	05	R 505	AUG 22/09	02.1	D 102	DELETED	23
207	DEC 22/08	02	R 506	AUG 22/09	01.1	D 103	DELETED	16
208	DEC 22/08	02				D 104	DELETED	04

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
21-40-00		CONT.	21-43-01			21-44-00		
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D 107	DELETED	34	403	AUG 22/06	06	503	NOV 10/97	04
D 108	DELETED	16	404	AUG 22/06	07	504	AUG 10/96	01
						505	NOV 10/96	14
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203	APR 22/05	01	403	AUG 22/06	07	509	APR 10/98	01
204	DEC 22/08	02	404	AUG 22/06	09	510	AUG 10/96	06
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			401	AUG 22/03	03	513	APR 22/02	05
21-43-00			402	FEB 10/89	01	514	APR 22/02	07
1	AUG 22/04	05	403	AUG 22/03	02	515	APR 22/02	07
2	DEC 22/00	02	404	AUG 22/03	02	516	APR 22/02	07
3	DEC 22/00	05	405	AUG 22/03	03	517	DEC 22/99	03
4	DEC 22/00	06	406	BLANK		518	APR 22/02	08
5	AUG 22/04	05				519	APR 22/02	08
6	DEC 22/01	05	21-43-05			520	APR 22/99	18
7	AUG 22/04	04	401	AUG 22/04	05	521	NOV 10/94	01
8	DEC 22/00	04	402	AUG 22/02	01	522	APR 22/99	09
9	DEC 22/00	03	403	APR 22/01	01			
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21-43-00			406	AUG 22/03	01	402	NOV 10/97	01
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A 103	AUG 22/01	01						
A 104	AUG 22/01	01	21-43-07			21-44-02		
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A 106	AUG 22/01	01	602	BLANK		402	NOV 10/97	01
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A 108	BLANK		21-43-07			404	AUG 22/04	13
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21-43-00			802	AUG 10/90	01	406	BLANK	
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503	AUG 22/01	02				401	FEB 10/96	01
504	AUG 22/01	04	21-44-00			402	NOV 10/97	01
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						403	APR 22/01	01A
						404	AUG 22/03	01A

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
21-44-05		CONT.	21-45-20			21-45-51		
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402	DEC 22/05	01	5	DEC 22/00	06	405	AUG 22/04	03
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405	DEC 22/05	02	101	APR 22/01	15	408	BLANK	
406	AUG 22/03	01	102	APR 22/01	15	21-45-52		
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408	AUG 22/03	02	501	APR 22/02	24	402	AUG 22/99	01
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3	DEC 22/99	01	508	DEC 22/00	03	2	APR 22/06	02
4	DEC 22/99	01	21-45-21			3	APR 22/06	02
5	DEC 22/99	01	401	DEC 22/00	04	4	BLANK	
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21-45-10			406	APR 22/02	18	501	APR 22/06	02
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502	AUG 22/99	01	408	BLANK		503	APR 22/06	02
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						10	FEB 10/89	11

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
21-51-00		CONT.	21-51-00			21-51-02		CONT.
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12	AUG 10/88	04	502	NOV 10/87	03	406	AUG 22/06	01
13	DEC 22/04	01	503	NOV 10/87	02	407	AUG 22/06	04
14	AUG 10/88	04	504	DEC 22/01	01	408	AUG 22/06	01
15	DEC 22/04	02	505	DEC 22/01	01	409	AUG 22/06	04
16	DEC 22/04	02	506	AUG 22/04	01	410	AUG 22/06	04
17	MAY 01/86	05	507	AUG 22/01	02	411	AUG 22/06	05
18	FEB 10/89	06	508	DEC 22/01	01	412	AUG 22/05	07
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23	APR 22/08	02	513	AUG 22/04	11	603	AUG 22/05	01
24	APR 22/08	02	514	AUG 22/04	12	604	AUG 22/05	01
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26	APR 22/08	04	516	AUG 22/06	20	21-51-02		
27	APR 22/08	14	517	AUG 22/06	14	701	AUG 22/05	01
28	APR 22/08	16	518	AUG 22/06	12	702	AUG 22/04	01
29	APR 22/08	20	519	AUG 22/06	12	703	AUG 10/95	01
30	APR 22/08	23	520	AUG 22/06	15	704	DEC 22/07	01
31	APR 22/08	20	521	AUG 22/06	18	705	AUG 22/04	01
32	APR 22/08	13	522	AUG 22/06	16	706	APR 22/04	01
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40	APR 22/08	14	21-51-00			404	DEC 22/04	01
41	APR 22/08	14	601	AUG 10/93	01	405	DEC 22/04	01
42	APR 22/08	06	602	AUG 22/04	01	406	DEC 22/04	01
43	APR 22/08	11	603	AUG 10/93	01	407	DEC 22/04	01
44	APR 22/08	10	604	AUG 10/93	01	408	DEC 22/04	01
45	APR 22/08	11				409	DEC 22/04	01
46	APR 22/08	11	21-51-01			410	AUG 22/07	03
47	APR 22/08	13	401	DEC 22/00	01	411	AUG 22/07	03
48	APR 22/08	15	402	AUG 22/07	01	412	AUG 22/07	03
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103	AUG 22/04	01	701	APR 22/03	04	405	AUG 22/04	01
104	MAY 01/85	01	702	APR 22/03	04	406	AUG 22/04	04
105	MAY 01/85	03						
106	MAY 01/85	01	21-51-02			21-51-06		
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			403	AUG 22/04	01	403	DEC 22/08	02
			404	AUG 22/06	01	404	DEC 22/08	02

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21-51-07			21-51-12		CONT.	21-51-19		CONT.
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403	APR 22/02	01	503	AUG 22/04	03	403	APR 22/06	01
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209	DEC 22/06	02	403	AUG 22/04	01	7	AUG 22/99	01
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21-52-00		CONT.	21-52-08			21-53-03		CONT.
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R 403	AUG 22/09	20.1	104	NOV 10/92	01	603	MAY 10/94	01
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402	DEC 10/98	27	403	APR 22/99	02	404	NOV 10/94	01
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R 404	AUG 22/09	07.101	401	AUG 10/93	01	404	NOV 10/94	01
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R 403	AUG 22/09	02.1	21-53-02			803	DEC 22/01	01
R 404	AUG 22/09	03.1	501	AUG 22/04	01	804	DEC 22/01	01
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21-52-07			504	AUG 22/04	01	2	DEC 22/01	04A
401	AUG 10/98	02	505	FEB 10/91	01	3	APR 22/07	02A
402	MAY 01/84	01	506	BLANK		4	DEC 22/01	04A
R 403	AUG 22/09	01.1	21-53-03			5	APR 22/07	01A
R 404	AUG 22/09	01.101	401	FEB 10/91	01	6	NOV 01/86	01A
			402	NOV 10/90	01	7	FEB 10/88	01A
			403	DEC 22/99	01	8	APR 22/07	01A
			404	AUG 22/06	03	9	AUG 10/94	04A
			405	APR 22/05	01	10	DEC 22/01	03A
			406	APR 22/05	01	11	DEC 22/99	05A
						12	APR 22/07	01A
						13	DEC 22/01	03A
						14	APR 22/07	01A
						15	APR 22/07	02A
						16	DEC 22/01	01A
						17	DEC 22/01	03A
						18	APR 22/07	01A

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
21-58-00		CONT.	21-58-00		CONT.	21-58-05		
19	DEC 22/01	03A	519	AUG 22/08	05A	401	AUG 22/04	07
20	DEC 22/01	03A	520	AUG 22/08	05A	402	APR 22/01	01
21	DEC 22/01	08A	521	AUG 22/08	04A	403	APR 22/01	01
22	DEC 22/01	06A	522	AUG 22/08	04A	404	AUG 22/04	04
23	APR 22/07	01A	523	AUG 22/08	04A	405	AUG 22/04	03
24	DEC 22/01	11A	524	AUG 22/08	04A	406	AUG 22/06	07
25	APR 22/07	04A	525	AUG 22/08	01A	407	AUG 22/06	06
26	AUG 22/02	13A	526	AUG 22/08	01A	408	AUG 22/06	07
27	DEC 22/01	03A	527	AUG 22/08	02A	409	AUG 22/06	05
28	DEC 22/01	10A	528	AUG 22/08	05A	410	AUG 22/06	04
29	DEC 22/01	12A	529	AUG 22/08	04A			
30	DEC 22/01	12A	530	APR 22/09	05A	21-58-06		
31	APR 22/07	03A	531	APR 22/09	07A	401	AUG 22/08	04
32	DEC 22/01	12A	532	APR 22/09	05A	402	AUG 22/07	13
33	DEC 22/01	11A	533	APR 22/09	04A	403	AUG 22/07	13
34	APR 22/07	03A	534	AUG 22/08	02A	404	AUG 22/07	12
35	AUG 22/02	15A	535	AUG 22/08	02A	405	AUG 22/07	14
36	APR 22/07	03A	536	BLANK		406	AUG 22/07	13
37	AUG 22/00	03A				407	AUG 22/07	13
38	APR 22/07	03A	21-58-00			408	AUG 22/08	05
39	DEC 22/01	02A	601	AUG 22/06	03	409	AUG 22/07	01
40	APR 22/07	04A	602	AUG 22/06	01	410	AUG 22/07	01
			603	AUG 22/06	01	411	AUG 22/07	04
			604	AUG 22/06	03	412	AUG 22/08	13
21-58-00						413	AUG 22/07	04
101	FEB 10/95	08A	21-58-00			414	AUG 22/08	04
102	AUG 22/00	06A	701	APR 22/08	01	415	AUG 22/08	08
103	FEB 10/95	06A	702	APR 22/08	03	416	AUG 22/07	04
104	NOV 10/92	01A	703	APR 22/08	03	417	AUG 22/08	05
105	MAY 10/96	01A	704	APR 22/08	02	418	AUG 22/08	05
106	NOV 10/92	01A	705	DEC 22/08	03	419	AUG 22/07	04
107	FEB 10/95	03A	706	DEC 22/08	01	420	AUG 22/07	03
108	FEB 10/95	03A	707	DEC 22/08	01	421	AUG 22/08	03
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110	NOV 10/92	01A				423	AUG 22/07	06
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202	DEC 10/98	02	402	APR 22/99	01	702	APR 22/08	02
			403	APR 22/99	01	703	APR 22/08	02
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505	AUG 22/08	01A	401	AUG 22/04	03	402	FEB 01/82	01
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507	AUG 22/08	01A	403	AUG 22/99	03	404	AUG 22/04	16
508	AUG 22/08	01A	404	AUG 22/99	01			
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510	AUG 22/08	01A	406	AUG 22/05	06	21-58-09		
511	AUG 22/08	01A				401	DEC 22/05	05
512	AUG 22/08	02A	21-58-02			402	DEC 22/05	01
513	AUG 22/08	01A	601	DEC 22/08	02	403	DEC 22/05	01
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515	AUG 22/08	02A	603	APR 22/05	02	405	DEC 22/05	03
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518	AUG 22/08	05A						

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PAGE	DATE	CODE	PAGE	DATE	CODE	PAGE	DATE	CODE
21-58-10			21-58-21		CONT.	21-58-34		
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202	APR 22/99	01	406	BLANK		202	APR 22/00	08
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204	AUG 22/04	05	21-58-21			204	AUG 22/04	18
205	AUG 22/04	05	501	DEC 22/04	01A	205	APR 10/98	16
206	BLANK		502	DEC 22/04	01A	206	APR 22/09	18
						207	AUG 22/04	18
21-58-11			21-58-22			208	APR 22/00	09
401	AUG 22/04	01	201	DEC 22/03	01	209	AUG 22/00	18
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404	AUG 22/04	02	204	DEC 22/04	06	21-60-00		
405	AUG 22/04	02	205	DEC 22/04	07	101	FEB 10/91	22
406	BLANK		206	DEC 22/04	05	102	MAY 10/92	14
			207	DEC 22/04	07	103	MAY 10/92	03
21-58-13			208	DEC 22/04	07	104	FEB 10/91	15
401	AUG 22/04	05	209	DEC 22/04	09	105	FEB 10/91	16
402	FEB 10/95	01	210	DEC 22/04	09	106	FEB 10/91	14
403	AUG 22/04	17	211	DEC 22/04	05	107	FEB 10/91	14
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406	BLANK		21-58-24			110	FEB 10/91	13
			401	MAY 10/96	01	111	FEB 10/91	11
21-58-17			402	MAY 10/96	01	112	FEB 10/91	11
201	AUG 22/04	06	403	MAY 10/96	01	113	FEB 10/91	11
202	NOV 01/86	01	404	MAY 10/96	01	114	FEB 10/91	10
203	NOV 01/86	01				115	FEB 10/91	11
204	APR 22/06	05	21-58-26			116	FEB 10/91	11
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			203	DEC 22/04	03			
21-58-19			204	FEB 10/91	01	21-61-00		
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204	APR 22/07	03	402	NOV 10/95	10A	4	MAY 10/89	04
205	APR 22/07	02	403	NOV 10/95	10A	5	MAY 10/97	11
206	APR 22/09	10	404	AUG 22/01	10A	6	AUG 10/95	09
207	DEC 22/01	01	405	NOV 10/95	10A	7	DEC 22/01	06
208	BLANK		406	AUG 22/01	10A	8	DEC 22/01	02
			407	AUG 22/01	10A	9	MAY 01/87	07
21-58-20			408	AUG 22/01	05A	10	MAY 10/89	07
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402	APR 22/01	01	21-58-29			12	DEC 22/01	11
403	APR 22/01	01	401	DEC 10/98	01	13	DEC 22/01	13
404	AUG 22/04	03	402	DEC 10/98	01	14	DEC 22/01	12
405	AUG 22/06	05	403	DEC 22/04	01	15	MAY 10/89	14
406	DEC 22/04	04	404	DEC 22/04	01	16	AUG 10/95	19
407	AUG 22/06	11				17	DEC 22/01	16
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21-58-21			204	DEC 22/04	09	22	DEC 22/01	19
401	APR 22/07	16	205	DEC 22/04	01	23	DEC 22/01	14
402	FEB 01/86	01	206	DEC 22/04	18	24	DEC 22/01	06
403	DEC 22/04	12	207	DEC 22/04	09	25	AUG 10/95	16
404	APR 22/00	11	208	APR 10/98	01	26	MAY 10/89	11

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21-61-00		CONT.	21-61-00		CONT.	21-61-03		
27	MAY 10/89	09	545	APR 22/09	06	401	AUG 22/04	01
28	MAY 10/89	07	546	APR 22/09	05	402	DEC 22/06	03
29	MAY 10/97	11	547	APR 22/09	04	403	AUG 22/04	03
30	AUG 10/94	05	548	APR 22/09	03	404	BLANK	
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32	AUG 10/98	08	550	APR 22/09	01	21-61-03		
33	AUG 10/98	01	551	APR 22/09	01	501	AUG 22/04	16
34	AUG 10/98	09	552	APR 22/09	01	502	DEC 22/06	03
35	AUG 10/98	07	553	APR 22/09	01	503	AUG 10/98	14
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21-61-00			558	APR 22/09	02	21-61-04		
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502	APR 22/09	03	560	APR 22/09	02	402	APR 22/99	02
503	MAY 10/89	06	561	APR 22/09	02	403	APR 22/99	02
504	APR 22/09	13	562	APR 22/09	02	404	AUG 22/04	16
505	APR 22/09	15	563	APR 22/09	02	405	APR 22/99	23
506	APR 22/09	16	564	APR 22/09	01	406	AUG 22/04	14
507	APR 22/09	14	565	APR 22/09	01	407	AUG 22/04	06
508	APR 22/09	12	566	APR 22/09	01	408	AUG 22/04	02
509	APR 22/09	14	567	APR 22/09	01	409	AUG 22/04	02
510	APR 22/09	13	568	APR 22/09	01	410	AUG 22/04	02
511	APR 22/09	13	569	APR 22/09	01			
R 512	AUG 22/09	25.1	570	APR 22/09	01	21-61-05		
R 513	AUG 22/09	13.1	571	APR 22/09	01	401	APR 22/09	08
R 514	AUG 22/09	24.101	572	APR 22/09	01	402	APR 22/09	08
R 515	AUG 22/09	25.101				403	APR 22/09	08
R 516	AUG 22/09	20.101	21-61-00			404	APR 22/09	09
R 517	AUG 22/09	24.101	701	DEC 22/99	01	405	APR 22/09	07
R 518	AUG 22/09	19.101	702	AUG 22/04	01	406	APR 22/09	06
R 519	AUG 22/09	17.101				407	APR 22/09	11
520	APR 22/09	05	21-61-01			408	APR 22/09	07
521	APR 22/09	13	401	AUG 22/08	17			
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523	APR 22/09	04	403	AUG 22/08	18	601	MAY 10/96	03
524	APR 22/09	04	404	AUG 10/90	24	602	MAY 10/96	03
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527	APR 22/09	05	407	AUG 22/08	13			
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534	APR 22/09	10	402	AUG 10/90	01	406	AUG 22/06	06
535	APR 22/09	07	403	AUG 10/90	14			
536	APR 22/09	06	404	AUG 10/90	20	21-61-07		
537	APR 22/09	06	405	AUG 10/95	22	401	AUG 22/06	11
538	APR 22/09	06	406	AUG 22/04	07	402	AUG 22/06	22
539	APR 22/09	05	407	MAY 10/94	01	403	AUG 22/06	24
540	APR 22/09	05	408	MAY 10/94	20	404	AUG 22/06	24
541	APR 22/09	06	409	AUG 22/04	15	405	AUG 22/06	21
542	APR 22/09	08	410	AUG 22/04	13	406	DEC 22/06	14
543	APR 22/09	06	411	AUG 10/93	08	407	AUG 22/06	21
544	APR 22/09	08	412	AUG 22/04	09	408	AUG 22/06	12

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21-61-07		CONT.	21-64-01			21-66-00		
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412	AUG 22/04	03	404	APR 22/99	01	4	NOV 10/90	01
			405	APR 22/99	01	5	DEC 22/01	01
21-61-08			406	APR 22/99	01	6	DEC 22/01	01
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404	FEB 10/89	14	21-65-00			10	NOV 10/95	01
405	AUG 10/98	16	1	DEC 10/98	19	11	MAY 10/90	01
406	AUG 10/98	21	2	FEB 10/94	06	12	MAY 10/90	01
407	AUG 10/98	13	3	AUG 22/99	27	13	AUG 10/90	01
408	AUG 10/98	10	4	NOV 10/89	12	14	MAY 10/90	01
409	AUG 10/98	14	5	NOV 10/89	15			
410	AUG 10/98	07	6	FEB 10/90	12	21-66-00		
411	AUG 10/98	07	7	FEB 10/89	02	501	APR 10/98	01
412	AUG 10/98	02	8	NOV 10/97	17	502	MAY 10/94	01
413	AUG 22/04	01	9	DEC 22/01	12	503	APR 10/98	01
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403	NOV 10/97	01	403	AUG 10/90	01	509	APR 10/98	01
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404	AUG 22/04	13	404	MAY 10/96	08	516	APR 10/98	01
			405	MAY 10/96	06	517	NOV 10/96	01
21-61-12			406	MAY 10/96	06	518	APR 10/98	01
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402	FEB 10/89	01	408	MAY 10/96	05	520	NOV 10/96	01
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			401	FEB 10/94	13			
21-64-00			402	MAY 10/89	07	21-66-02		
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4	FEB 10/89	04	406	FEB 10/94	13	404	FEB 10/94	01
5	FEB 10/89	02	407	FEB 10/94	11	405	FEB 10/94	01
6	FEB 10/89	01	408	AUG 10/93	08	406	FEB 10/94	01
7	APR 22/02	13						
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21-66-03			21-74-00		CONT.	21-74-05		
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402	MAY 10/94	01	506	APR 10/98	SAS	402	APR 10/98	SAS
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404	MAY 10/94	01	508	APR 10/98	SAS	404	APR 10/98	SAS
405	MAY 10/94	01	509	APR 10/98	SAS	405	APR 10/98	SAS
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403	MAY 10/90	01	403	APR 10/98	SAS	703	APR 10/98	SAS
404	MAY 10/94	01	404	APR 10/98	SAS	704	APR 10/98	SAS
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			408	APR 10/98	SAS			
			409	APR 22/01	SAS			
			410	APR 22/01	SAS			
			411	APR 22/01	SAS			
			412	DEC 22/99	SAS			
			413	DEC 22/99	SAS			
			414	DEC 22/99	SAS			
			415	DEC 22/99	SAS			
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21-66-05			21-74-02					
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404	MAY 10/90	01	404	DEC 22/99	SAS			
			405	DEC 22/99	SAS			
			406	DEC 22/99	SAS			
			407	DEC 22/99	SAS			
			408	APR 10/98	SAS			
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[*] 767-200/300 AIRPLANES WITH AFT DOOR HEAT (POST-SB 21-111, POST-SB 21-119, OR POST-SB 21-120; POST-PRR B12139)			
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[*] AIRPLANES WITH TYPE III OVERWING ESCAPE HATCH HEATING SYSTEM (POST-SB 25-113 OR POST-PRR B11886)			
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AIR CONDITIONING - GENERAL - DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The air conditioning system maintains airplane environmental control for the comfort of passengers and crew. The total system is made up of the conditioned air distribution system, pressurization control system, cargo compartment heating system, cooling system and temperature control system.
- B. Distribution
- (1) The distribution system supplies temperature controlled air to the flight deck, the passenger cabin, and the forward cargo compartment. The main mix manifold (AMM 21-21-00) mixes cold air from the air cooling packs (AMM 21-51-00) with recirculation air (AMM 21-25-00) from the passenger cabin. Then the air flows to the flight deck through ducts (AMM 21-22-00), to the passenger compartment through risers, overhead ducting, and outlets (AMM 21-23-00), and to the forward cargo compartment through valves, fans, and ducts (AMM 21-28-00). A gasper air distribution system (AMM 21-24-00) blows air through ducts to each passenger service unit. Separate exhaust ducts supply ventilation for all the lavatory and galley areas (AMM 21-26-00).
- C. Pressurization Control
- (1) The air conditioning system provides pressurization control by regulating the amount of air discharged from the airplane (AMM 21-31-00). Backup positive and negative pressurization relief systems prevent the cabin pressure from exceeding established limits (AMM 21-32-00). Pressurization indication and warning systems (AMM 21-33-00) allow the operator to monitor the pressurization control system.
- D. Heating
- (1) Independent cargo compartment heating systems provide temperature control for the forward (AMM 21-43-00), aft and bulk (AMM 21-44-00) cargo compartments.
- (2) The supplemental heating system channels heated air to the captain's and first officer's foot and shoulder areas (AMM 21-45-00).
- E. Cooling
- (1) Cooled air is supplied to the distribution system by two air cooling packs (AMM 21-51-00). The pneumatic system (AMM 36-00-00) provides source air to the packs. The ram air system (AMM 21-53-00) assures pack temperature control. The pack indicating system allows flight deck monitoring of pack operation (AMM 21-52-00).

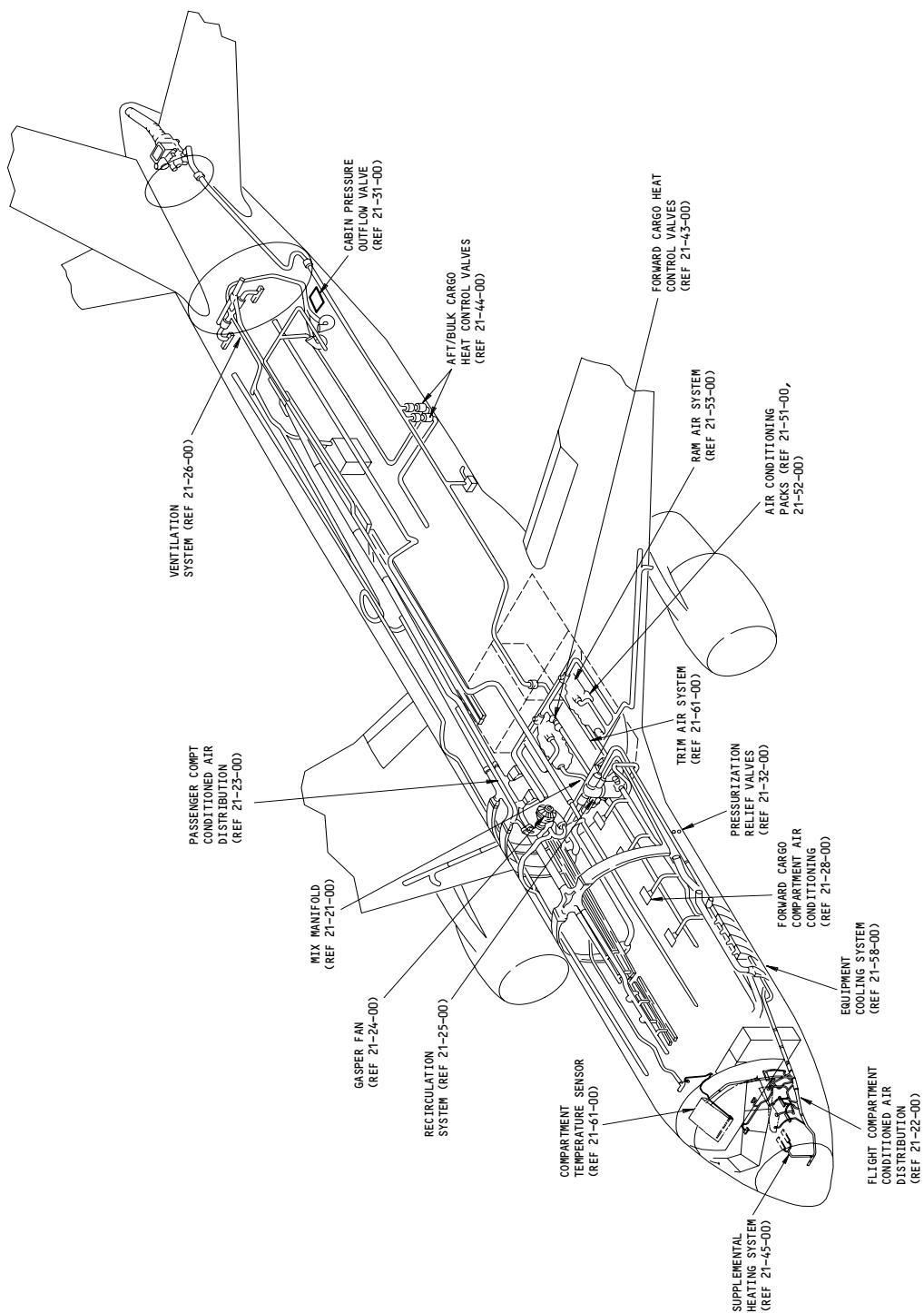
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Environmental Control Systems
Figure 1

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- (2) The equipment cooling system removes heat generated by electrical and electronic equipment in the flight compartment, forward equipment area, main equipment racks (AMM 21-58-00), and aft equipment area (AMM 21-26-00).

F. Temperature Control

- (1) The temperature control system regulates the environment within each airplane temperature zone (AMM 21-61-00). Cooled air mixes with hot "trim" air to obtain the desired temperature at each zone. Monitoring of the system is provided by valve position indication (AMM 21-64-00) and the zone temperature indication system (AMM 21-65-00).

G. Environmental Control System (ECS) Supply (Fig. 2)

- (1) The pneumatic system (AMM 36-00-00) supplies hot air to the air conditioning system. The air cooling packs take the incoming air, cool it and discharge it to the main distribution manifold. The cooled air mixes with conditioned recirculation air and hot "trim" air to obtain the desired air temperature for each of the airplane's temperature zones. The temperature control system assures efficient air cooling pack operation and provides zone temperature control for passenger and crew comfort.

H. ECS Distribution (Fig. 3)

- (1) A network of risers, ducts, and outlets distribute the ECS supply air throughout the airplane. Air enters the flight deck and passenger cabin, through overhead and sidewall outlets. It then passes through return air grills into the cargo compartment. The air is then drawn into the recirculation system or exhausted overboard by the pressurization system.
- (2) A gasper air distribution systems draws air from the main overhead conditioned air duct. A gasper fan then blows air through gasper air distribution ducts to be exhausted at each passenger service unit. Gasper air outlet valves at each passenger service unit provide individual passenger control of airflow to each seat.
- (3) A separate ventilation system provides positive exhaust ventilation for all lavatories and galleys. Ventilation fans draw air from the lavatories and galleys through check valves and exhaust it overboard through the pressurization outflow valve.
- (4) Conditioned air is supplied to the forward cargo compartment through valves, fans, and ducts. Air from the forward cargo compartment is exhausted overboard of the airplane.

I. Heating

- (1) Each cargo compartment contains an independent heating system. Pneumatic supply air enters the compartments through temperature sensor controlled valves. Perforated ducts disperse the air through each compartment.

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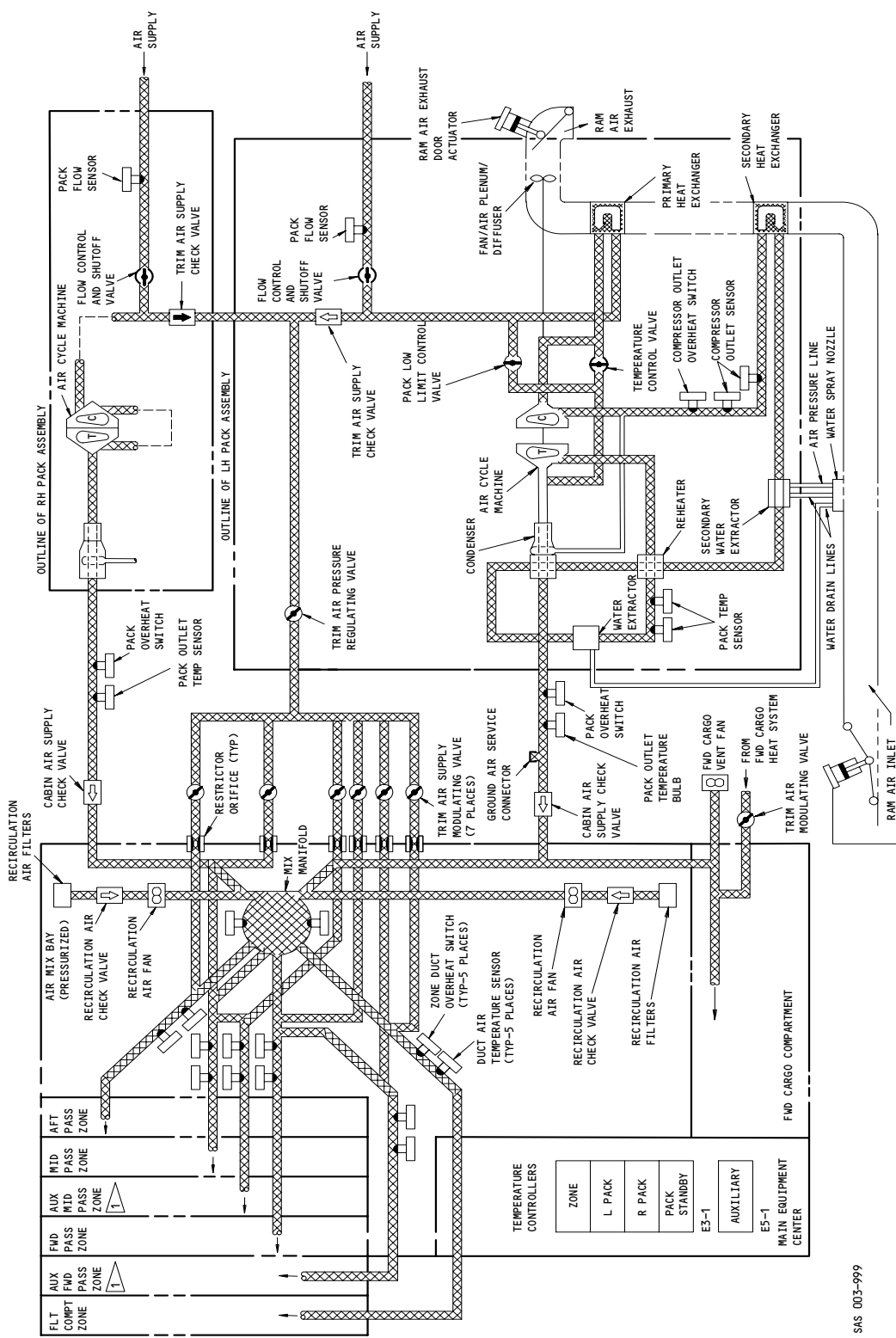
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ECS Supply
Figure 2

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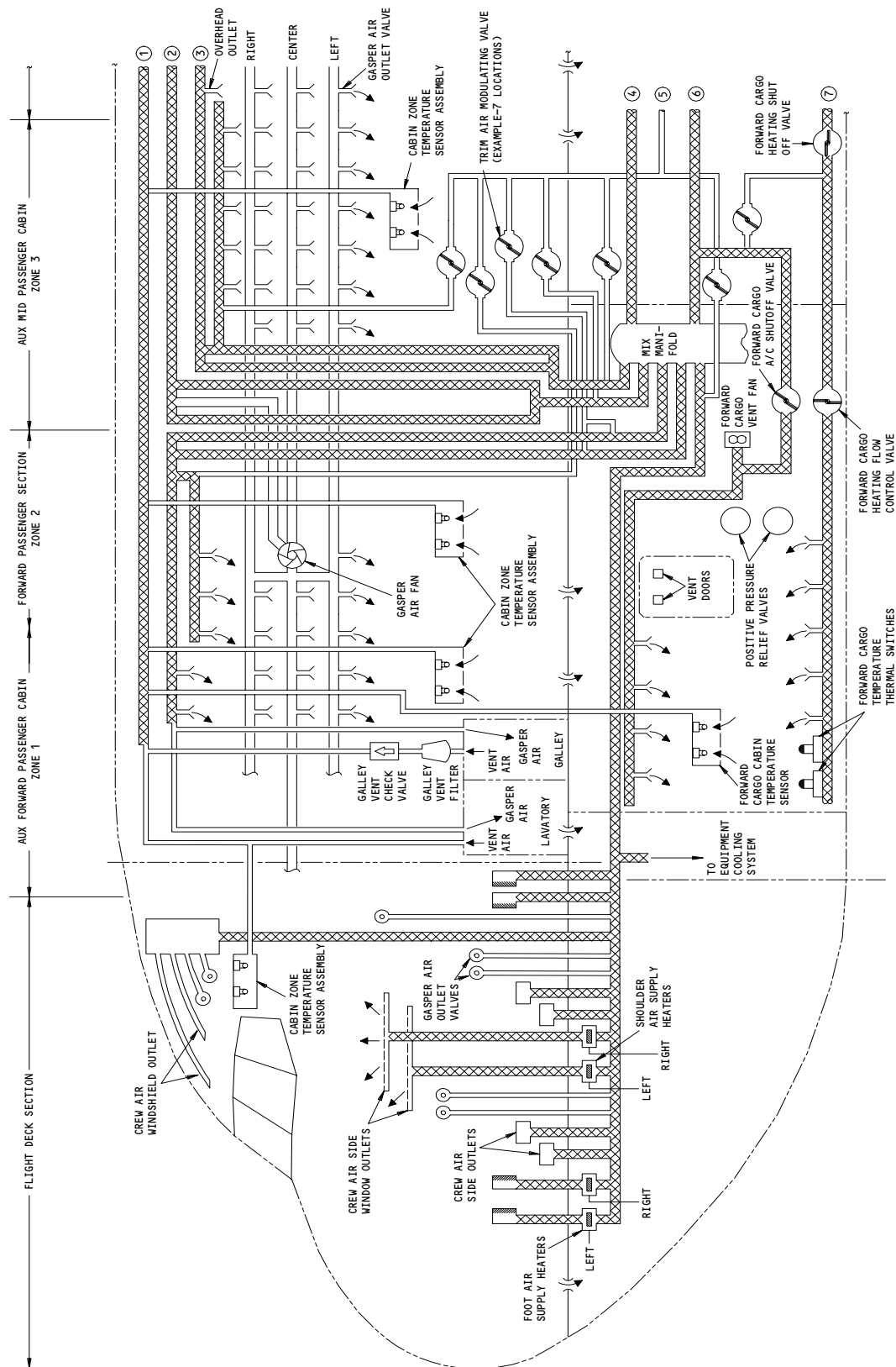


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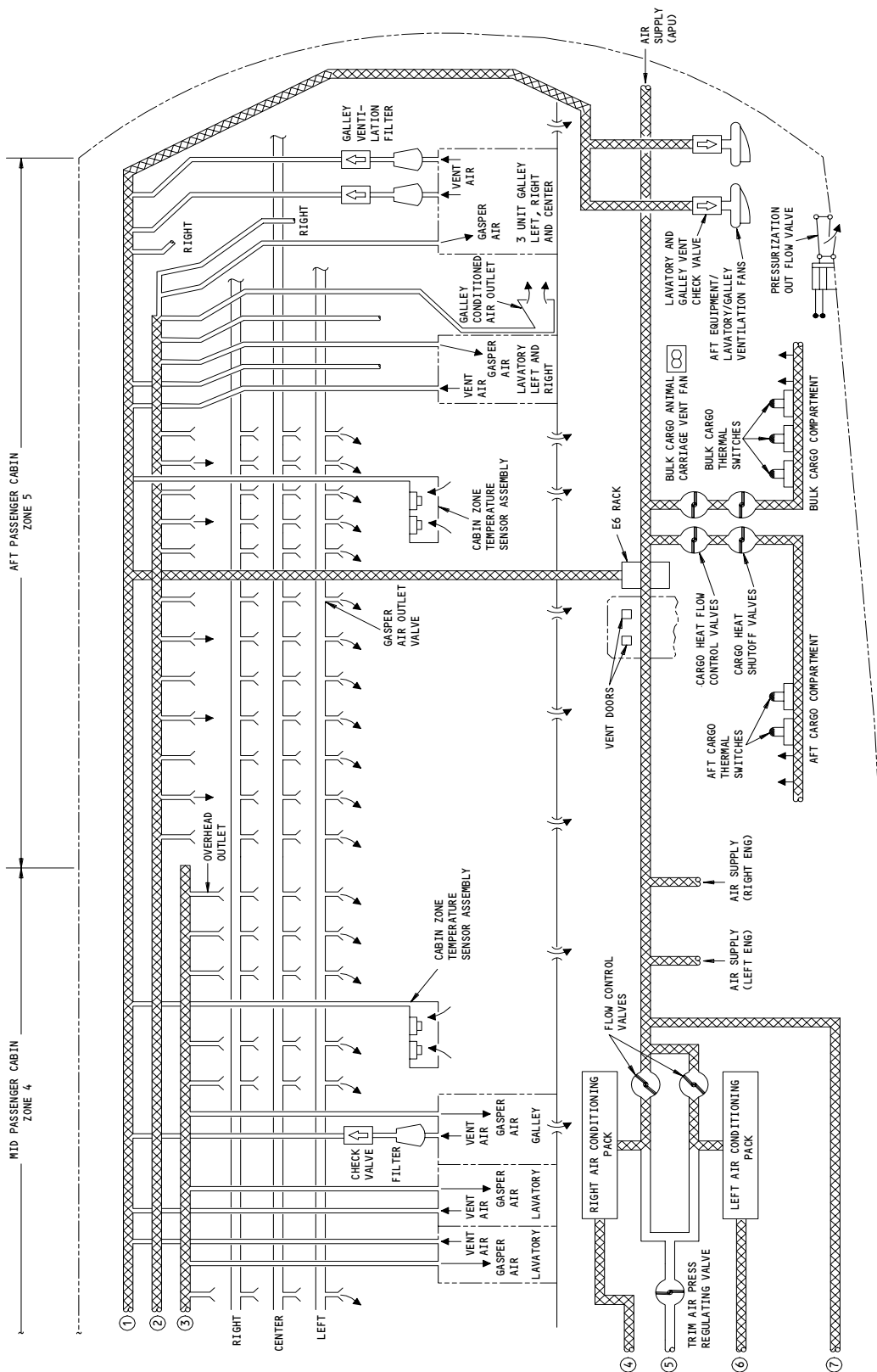


ECS Distribution
Figure 3 (Sheet 1)

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ECS Distribution
Figure 3 (Sheet 2)

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(2) A separate fan system provides increased ventilation in the bulk cargo compartment for carrying live animals.

J. E/E Cooling

(1) A series of fans and ducts provide electrical/electronic equipment cooling to the flight deck, forward equipment area, main and mid E/E racks and aft equipment center. The system uses either overboard or cabin air for cooling and exhausts the air overboard or into the cargo compartment.

K. Pressurization

(1) The pressurization control system provides airplane pressurization by regulating the amount of air exhausted from the airplane. Two automatic controllers and a manual backup system vary the cabin pressure according to airplane altitude. Backup protection is provided for both positive and negative pressure relief.

L. Control and Indication (Fig. 4)

(1) Control selectors and switchlights, on the pilots' overhead panel P5, and one control selector on the right side panel P61 allow control of all air conditioning systems. Warning lights, position indicators and other gages on the P5 panel provide partial indication of system operation. The Engine Indication and Crew Alerting System (EICAS), AMM 31-41-00, provides the remaining indication for the air conditioning system.

(2) EICAS provisions include two cathode-ray tube (CRT) display screens on the pilots' center instrument panel P2, a display select panel on the forward electrical control stand P9, and an EICAS maintenance panel on the right side panel P61. EICAS displays information needed for normal operation on the upper CRT. Warning, caution, and advisory messages also appear on the upper CRT during certain system malfunctions. Aural tones occur in the flight deck with each of the above types of messages. Two other types of messages may also appear; status or maintenance. These two types of messages both appear on the lower CRT only when called upon by an operator. Status messages display data on the current status of operation and may be called upon by selecting the STATUS switch on the display select panel. The airplane may be either inflight or on the ground. Maintenance messages are available only on the ground by selecting the ECS/MSG switch on the EICAS MAINT panel. Current maintenance information is usually displayed unless a recorded page is called up. A recorded page is a page with information about the status of the system inflight when certain failures occurred. These are called AUTO EVENTS and are called up by selecting the AUTO EVENT READ switch on the EICAS MAINT panel.

EFFECTIVITY

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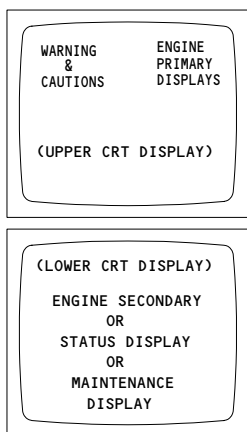
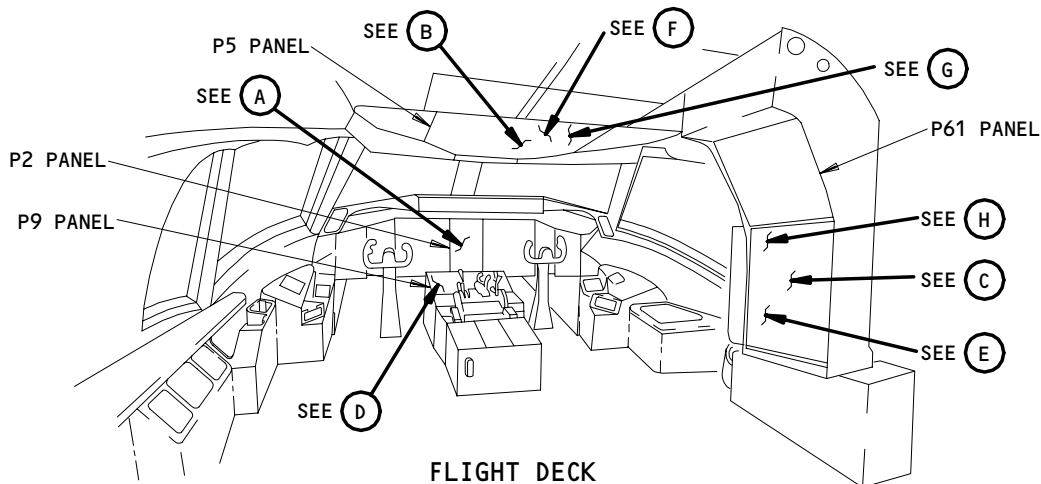
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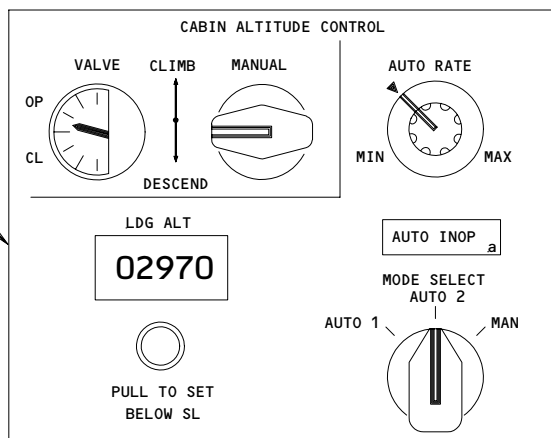
BOEING

767 MAINTENANCE MANUAL

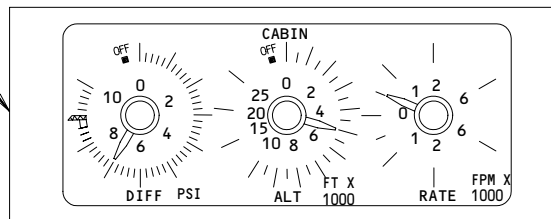


EICAS DISPLAY SCREENS (REF)

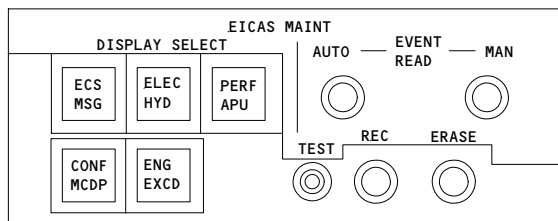
(A)



PRESSURIZATION CONTROL PANEL



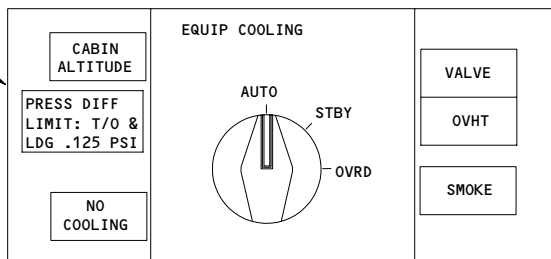
PRESSURIZATION INDICATION PANEL



EICAS MAINTENANCE PANEL (REF)

(C)

EQUIPMENT COOLING PANEL



(B)

**ECS Control and Indication
Figure 4 (Sheet 1)**

EFFECTIVITY

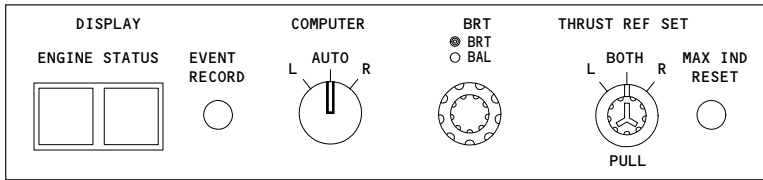
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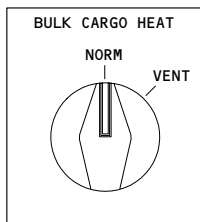
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**EICAS DISPLAY SELECT PANEL
(FORWARD ELECTRICAL CONTROL STAND P9)**

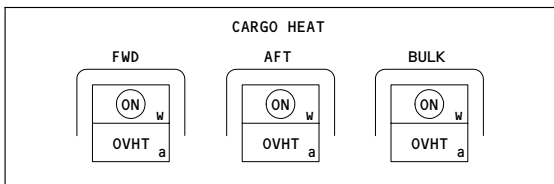
D

FORWARD CARGO
A/C PANEL



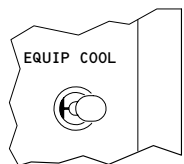
**BULK CARGO HEAT SELECTOR
(RIGHT SIDE PANEL P61)**

E



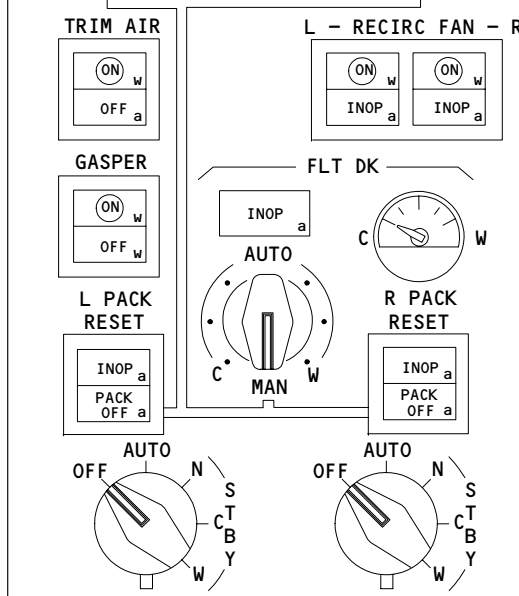
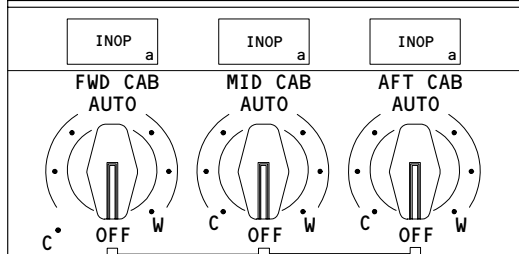
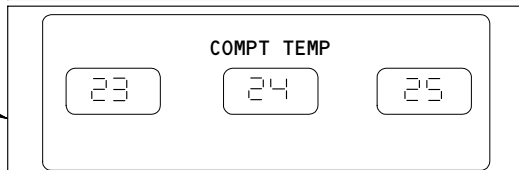
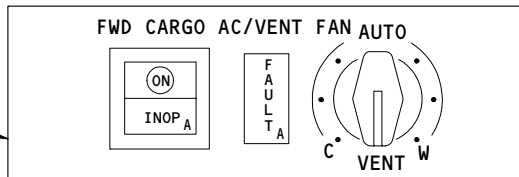
**CARGO HEATING SWITCHLIGHTS
(PILOT'S OVERHEAD PANEL P5)**

F



**EQUIPMENT COOLING TEST SWITCH
(RIGHT SIDE PANEL P61)**

H



**AIR CONDITIONING CONTROL PANEL
(PILOT'S OVERHEAD PANEL P5)**

G

ECS Control and Indication
Figure 4 (Sheet 2)

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AIR CONDITIONING - GENERAL - MAINTENANCE/PRACTICES

1. General

- A. This procedure provides instructions for supplying conditioned air to the airplane during ground operation and maintenance activity.
- B. This procedure has these tasks:
 - (1) Supply Conditioned Air to the Airplane
 - (2) Remove Conditioned Air from the Airplane
 - (3) Supply Conditioned Air with a Ground Air Source
 - (4) Remove Conditioned Air Supplied by a Ground Air Source
 - (5) Supply Conditioned Air with a Cooling Pack
 - (6) Supply Conditioned Air with a Cooling Pack During Hot Weather Conditions
 - (7) Supply Conditioned Air with a Cooling Pack During Cold Weather Conditions
 - (8) Remove Conditioned Air Supplied by a Cooling Pack.

TASK 21-00-00-862-047

2. Supply Conditioned Air to the Airplane

A. General

- (1) Conditioned air can be supplied by a ground air source or by the cooling packs.
- (2) A ground air source can be used to supply conditioned air directly to the airplane. It is not necessary to operate a cooling pack or to supply electric or pneumatic power when conditioned air is supplied with a ground air source.
- (3) It is recommended that the conditioned air to cool the airplane on the ground be supplied from a ground air source, when practical, as an alternative to operating the cooling packs (SL 767-21-065).
- (4) Electric power and a pneumatic air source are required to operate the cooling packs.

B. References

- (1) AMM 21-00-00/201, Supply Conditioned Air with a Ground Air Source
- (2) AMM 21-00-00/201, Supply Conditioned Air with a Cooling Pack
- (3) AMM 21-00-00/201, Supply Conditioned Air with a Cooling Pack During Hot Weather Conditions.

C. Procedure

S 862-048

- (1) Do one of these tasks to supply conditioned air to the airplane:

NOTE: It is recommended that the conditioned air to cool the airplane on the ground be supplied from a ground air source, when practical, as an alternative to operating the cooling packs (SL 767-21-065).

- (a) Do this task: Supply Conditioned Air with a Ground Air Source (AMM 21-00-00/201).

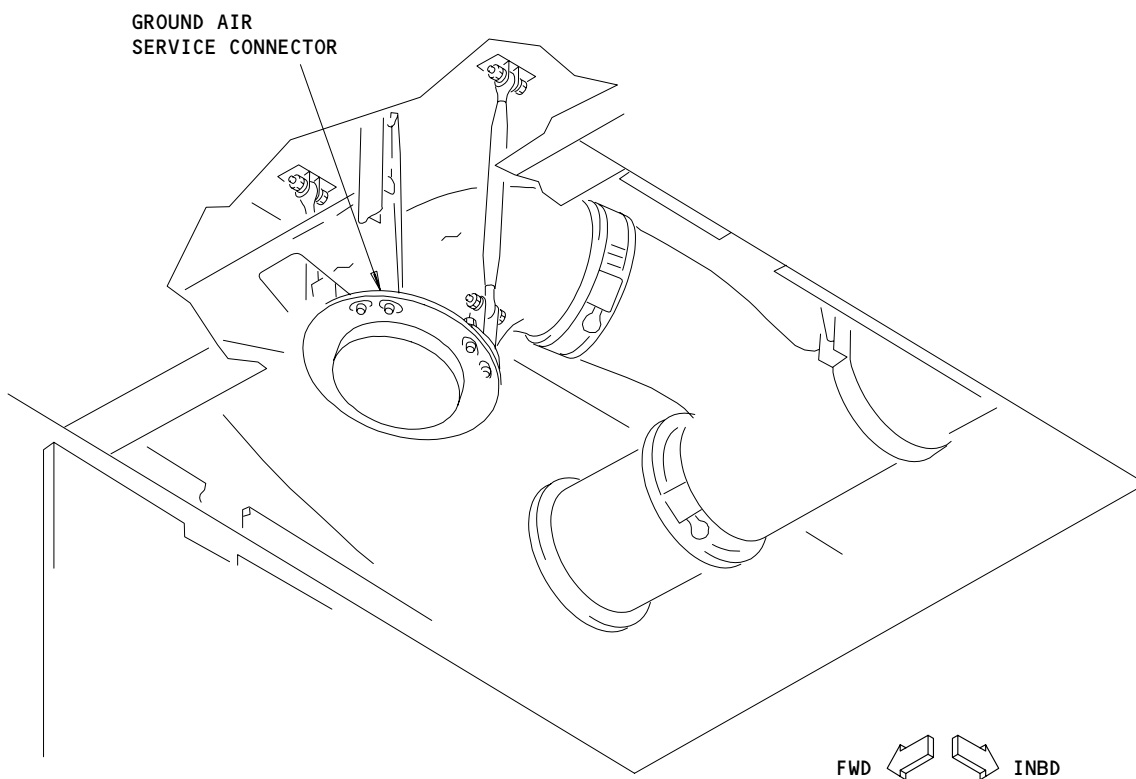
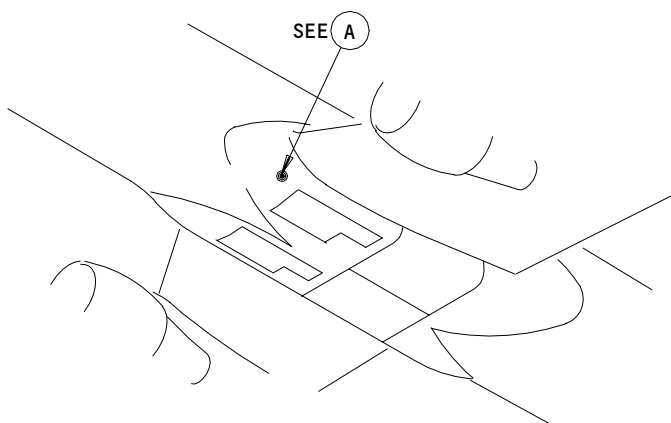
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Ground Air Service Connector Installation
Figure 201

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- (b) Do this task: Supply Conditioned Air with a Cooling Pack (AMM 21-00-00/201).
- (c) Do this task: Supply Conditioned Air with a Cooling Pack During Hot Weather Conditions (AMM 21-00-00/201).

TASK 21-00-00-862-049

3. Remove Conditioned Air from the Airplane

A. References

- (1) AMM 21-00-00/201, Remove Conditioned Air Supplied by a Ground Air Source
- (2) AMM 21-00-00/201, Remove Conditioned Air Supplied by a Cooling Pack.

B. Procedure

S 862-050

- (1) Do one of these tasks to remove conditioned air from the airplane:
 - (a) Do this task: Remove Conditioned Air Supplied by a Ground Air Source (AMM 21-00-00/201).
 - (b) Do this task: Remove Conditioned Air Supplied by a Cooling Pack (AMM 21-00-00/201).

TASK 21-00-00-862-051

4. Supply Conditioned Air with a Ground Air Source

A. General

- (1) Conditioned air from a ground air source is supplied to the aircraft through the low pressure ground service connector. The low pressure ground service connector is located behind the ECS components door, 193GL, near the outlet of the left cooling pack.
- (2) When a ground air source is used, the lower lobe typically stays at the ambient temperature. When the recirculation fans are turned on, the air in the lower lobe is mixed with the conditioned air and can change the passenger cabin temperature. It is recommended that on hot days you operate the recirculation fans for 10 to 15 minutes to allow the passenger cabin temperature to become stable before the passengers are boarded.
- (3) Additional information about the requirements to supply conditioned air to the airplane from a ground conditioned air source can be found in the 767 Facility and Equipment Planning Document, D6-48646.

B. Access

- (1) Location Zone
135 Left Environmental Control System Bay
- (2) Access Panel
193GL ECS Components Conditioned Air Connection Pressure Relief Door

C. Procedure

S 012-052

- (1) Open the ECS components door, 193GL, to get access to the conditioned air ground service connector.

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S 422-053

- (2) Connect the conditioned air supply duct to the conditioned air ground service connector.
 - (a) Put the fasteners on the air supply duct flange into the slots in the ground service connector flange.
 - (b) Turn the air supply duct flange to lock it into position.

S 212-055

WARNING: MAKE SURE THERE IS AN EXIT IN THE AIRPLANE FUSELAGE FOR THE CONDITIONED AIR. IF THERE IS NOT AN EXIT FOR THE CONDITIONED AIR, PRESSURIZATION OF THE CABIN WILL OCCUR. ACCIDENTAL PRESSURIZATION CAN CAUSE INJURY TO PERSONS.

- (3) Make sure that the cabin pressurization outflow valve is open or a minimum of one airplane door is open.

S 862-056

CAUTION: DO NOT OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME. THE COOLING PACK CAN NOT CONTROL THE AIR TEMPERATURE IF YOU ALSO OPERATE A GROUND AIR SOURCE AT THE SAME TIME. YOU CAN CAUSE DAMAGE TO EQUIPMENT IF YOU OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME.

- (4) Make sure the cooling packs are off.

S 862-057

- (5) Start the ground air source.

TASK 21-00-00-862-058

5. Remove Conditioned Air Supplied by a Ground Air Source

A. Access

- (1) Location Zone
135 Left Environmental Control System Bay
- (2) Access Panel
193GL ECS Components Conditioned Air Connection Pressure Relief Door

B. Procedure

S 862-059

- (1) Stop the ground air source.

S 022-061

- (2) Disconnect the conditioned air supply duct from the conditioned air ground service connector.
 - (a) Turn the air supply duct flange until the fasteners are loose.

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- (b) Remove the air supply duct flange from the ground service connector flange.

S 412-062

- (3) Close the ECS components door, 193GL.

TASK 21-00-00-862-024

6. Supply Conditioned Air with a Cooling Pack

A. General

CAUTION: DO NOT USE COLD HANGAR AIR TO OPERATE A COOLING PACK. COLD HANGAR AIR CAN CAUSE ICE TO FORM IN THE PACK. IF ICE FORMS IN THE PACK, THE AIR CYCLE MACHINE CAN BE DAMAGED.

- (1) Electric power and a pneumatic air source are required to operate the cooling packs. Pneumatic air can be supplied by the engines, a pneumatic ground cart, or the APU.

NOTE: It is recommended that the conditioned air to cool the airplane on the ground be supplied from a ground air source, when practical, as an alternative to operating the cooling packs (SL 767-21-065).

- (2) The cooling packs are operated by switches in the flight compartment on the P5 overhead panel.
- (3) Air from a pneumatic ground cart is supplied to the aircraft through the high pressure ground service connectors. The high pressure ground service connectors are located behind the ground air service connection access panel, 193LL.
- (4) If a pneumatic ground cart is used to supply the pneumatic power, it must operate within these limits:
 - (a) The temperature of the air supplied by the ground cart must be between 250°F (121°C) and 450°F (232°C).
 - 1) If the temperature is too low, then the cooling pack will not be able to keep a comfortable cabin temperature on cold days and ice can form in the pack.
 - 2) If the temperature is too high, then the cooling pack will detect an overheat condition and either operate in the fully cold mode or stop operating and indicate a fault.
 - (b) The pressure of the air supplied by the ground cart must be between 27.5 psig and 45.0 psig.
 - 1) If the pressure is too low, then the cooling pack will not be able to keep a comfortable cabin temperature or it can stop operating and indicate a fault.

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- 2) If the pressure is too high, then the bleed air system ducts can be damaged.

B. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
 - 135 Left Environmental Control System Bay
 - 211 Control Cabin - Sect 41 (Left)
 - 212 Control Cabin - Sect 41 (Right)

D. Procedure

S 212-063

WARNING: MAKE SURE THERE IS AN EXIT IN THE AIRPLANE FUSELAGE FOR THE CONDITIONED AIR. IF THERE IS NOT AN EXIT FOR THE CONDITIONED AIR, PRESSURIZATION OF THE CABIN WILL OCCUR. ACCIDENTAL PRESSURIZATION CAN CAUSE INJURY TO PERSONS.

- (1) Make sure that the cabin pressurization outflow valve is open or a minimum of one airplane door is open.

S 212-064

CAUTION: DO NOT OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME. THE COOLING PACK CAN NOT CONTROL THE AIR TEMPERATURE IF YOU ALSO OPERATE A GROUND AIR SOURCE AT THE SAME TIME. YOU CAN CAUSE DAMAGE TO EQUIPMENT IF YOU OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME.

- (2) Make sure that the conditioned air ground service connector (low pressure) is disconnected.

S 862-065

- (3) Supply electrical power (AMM 24-22-00/201).

S 862-066

- (4) Supply pneumatic power (AMM 36-00-00/201).

S 862-076

- (5) Put the TRIM AIR switches on the pilot's overhead panel, P5, in the ON position.

S 862-067

- (6) Turn the L and R PACK selectors, on the pilots' overhead panel P5, to AUTO or STBY-N.
 - (a) Make sure that the PACK OFF lights and the INOP lights are off.

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TASK 21-00-00-862-068

7. Supply Conditioned Air with a Cooling Pack During Hot Weather Conditions

A. General

- (1) This task provides instructions to minimize condensation in the flight deck when you operate the packs in hot weather conditions.
- (2) Hot weather conditions are defined as the point where the outside ambient temperature (OAT) is more than 70°F (21°C) and the ambient relative humidity (RH) is more than 50%. Care must be taken when operating the cooling packs during hot/high humid environments, as the flight deck display units may experience 'cold soaking' and form condensation which can cause the displays to become blank or blink.
- (3) Condensation can form in the flight deck when hot, high humidity ambient air mixes with the cold, conditioned pack air.
- (4) Condensation can be minimized by preventing the entry of ambient air into the flight deck and by selecting a warmer temperature for the flight deck conditioned air.

CAUTION: DO NOT USE COLD HANGAR AIR TO OPERATE A COOLING PACK. COLD HANGAR AIR CAN CAUSE ICE TO FORM IN THE PACK. IF ICE FORMS IN THE PACK, THE AIR CYCLE MACHINE CAN BE DAMAGED.

- (5) Electric power and a pneumatic air source are required to operate the cooling packs. Pneumatic air can be supplied by the engines, a pneumatic ground cart, or the APU.

NOTE: It is recommended that the conditioned air to cool the airplane on the ground be supplied from a ground air source, when practical, as an alternative to operating the cooling packs (Service Letter 767-SL-21-065).

- (6) The air conditioning packs are operated by switches in the flight compartment on the P5 overhead panel.
- (7) Air from a pneumatic ground cart is supplied to the aircraft through the high pressure ground service connectors. The high pressure ground service connectors are located behind the ground air service connection access panel, 193LL.
- (8) If a pneumatic ground cart is used to supply the pneumatic power, it must operate within these limits:
 - (a) The temperature of the air supplied by the ground cart must be between 250°F (121°C) and 450°F (232°C).
 - 1) If the temperature is too low, then the cooling pack will not be able to keep a comfortable cabin temperature on cold days and ice can form in the pack.

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- 2) If the temperature is too high, then the cooling pack will detect an overheat condition and either operate in the fully cold mode or stop operating and indicate a fault.
- (b) The pressure of the air supplied by the ground cart must be between 27.5 psig and 45.0 psig.
 - 1) If the pressure is too low, then the cooling pack will not be able to keep a comfortable cabin temperature or it can stop operating and indicate a fault.
 - 2) If the pressure is too high, then the bleed air system ducts can be damaged.

B. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
 - 135 Left Environmental Control System Bay
 - 211 Control Cabin - Sect 41 (Left)
 - 212 Control Cabin - Sect 41 (Right)

D. Procedure

S 212-074

WARNING: MAKE SURE THERE IS AN EXIT IN THE AIRPLANE FUSELAGE FOR THE CONDITIONED AIR. IF THERE IS NOT AN EXIT FOR THE CONDITIONED AIR, PRESSURIZATION OF THE CABIN WILL OCCUR. ACCIDENTAL PRESSURIZATION CAN CAUSE INJURY TO PERSONS.

- (1) Make sure that the cabin pressurization outflow valve is open or a minimum of one airplane door is open.

S 212-075

CAUTION: DO NOT OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME. THE COOLING PACK CAN NOT CONTROL THE AIR TEMPERATURE IF YOU ALSO OPERATE A GROUND AIR SOURCE AT THE SAME TIME. YOU CAN CAUSE DAMAGE TO EQUIPMENT IF YOU OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME.

- (2) Make sure that the ground air service connector (low pressure) is disconnected.

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- S 862-034
- (3) Supply electrical power (AMM 24-22-00/201).
- S 862-035
- (4) Supply pneumatic power (AMM 36-00-00/201).
- S 862-036
- (5) Make sure the entry doors, the flight deck access door, and the flight deck windshield side windows are kept closed when you operate the cooling packs.

NOTE: To minimize or eliminate the formation of condensation in the flight deck, keep the doors and windows closed as much as possible when you operate the cooling packs. Condensation is the result of high humidity ambient air being mixed with the cold conditioned pack air.

- S 862-077
- (6) Put the TRIM AIR switches on the pilot's overhead panel, P5, in the ON position.
- S 862-038
- (7) Turn the L PACK and R PACK selectors, on the P5 pilot's overhead panel, to the AUTO or STBY-N position.
- S 862-039
- (8) Turn the FLT DK zone temperature selector, on the P5 pilot's overhead panel, to the MAN (6 o'clock) position.
- S 862-040
- (9) Push the ECS/MSG switch, on the P61 right side panel, to view the EICAS "ECS/MSG" Maintenance page which will be used to monitor the FLT DK TRIM VALVE and FLT DK DUCT TEMP indications.

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S 862-041

- (10) Turn the FLT DK zone temperature selector to the MAN W (warm) or MAN C (cool) position until the FLT DK TRIM VALVE indication is at least 0.10 (10% open) and the FLT DK DUCT TEMP indication is 50-59°F (10-15°C).

NOTE: This will increase the temperature of the air outlets to be above the dew point and help to prevent condensation in the flight deck, but still provide sufficient cooling.

S 862-091

- (11) Let the air conditioning packs operate for at least 10 minutes to permit the flight deck environment to stabilize.

S 862-042

- (12) When the internal flight deck environment (temperature and humidity) has stabilized (at least 10 minutes), set the FLT DK zone temperature selector to the AUTO-Warm 1:00 o'clock position (or warmer).

TASK 21-00-00-862-078

8. Supply Conditioned Air with a Cooling Pack During Cold Weather Conditions

A. General

- (1) This task provides instructions to maximize the startup performance of the packs when you operate the packs in cold weather conditions.
- (2) The cooling packs can fail to start during cold weather conditions or when the pneumatic air supply pressure is low.
- (3) Cooling pack startup can be improved by putting the temperature controls to full cold and starting the cooling packs one at a time.

CAUTION: DO NOT USE COLD HANGAR AIR TO OPERATE A COOLING PACK. COLD HANGAR AIR CAN CAUSE ICE TO FORM IN THE PACK. IF ICE FORMS IN THE PACK, THE AIR CYCLE MACHINE CAN BE DAMAGED.

- (4) Electric power and a pneumatic air source are required to operate the cooling packs. Pneumatic air can be supplied by the engines, a pneumatic ground cart, or the APU.

NOTE: It is recommended that the conditioned air to cool the airplane on the ground be supplied from a ground air source, when practical, as an alternative to operating the cooling packs (SL 767-21-065).

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- (5) The air conditioning packs are operated by switches in the flight compartment on the P5 overhead panel.
- (6) Air from a pneumatic ground cart is supplied to the aircraft through the high pressure ground service connectors. The high pressure ground service connectors are located behind the ground air service connection access panel, 193LL.
- (7) If a pneumatic ground cart is used to supply the pneumatic power, it must operate within these limits:
 - (a) The temperature of the air supplied by the ground cart must be between 250°F (121°C) and 450°F (232°C).
 - 1) If the temperature is too low, then the cooling pack will not be able to keep a comfortable cabin temperature on cold days and ice can form in the pack.
 - 2) If the temperature is too high, then the cooling pack will detect an overheat condition and either operate in the fully cold mode or stop operating and indicate a fault.
 - (b) The pressure of the air supplied by the ground cart must be between 27.5 psig and 45.0 psig.
 - 1) If the pressure is too low, then the cooling pack will not be able to keep a comfortable cabin temperature or it can stop operating and indicate a fault.
 - 2) If the pressure is too high, then the bleed air system ducts can be damaged.

B. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
 - 135 Left Environmental Control System Bay
 - 211 Control Cabin - Sect 41 (Left)
 - 212 Control Cabin - Sect 41 (Right)

D. Procedure

S 212-079

WARNING: MAKE SURE THERE IS AN EXIT IN THE AIRPLANE FUSELAGE FOR THE CONDITIONED AIR. IF THERE IS NOT AN EXIT FOR THE CONDITIONED AIR, PRESSURIZATION OF THE CABIN WILL OCCUR. ACCIDENTAL PRESSURIZATION CAN CAUSE INJURY TO PERSONS.

- (1) Make sure that the cabin pressurization outflow valve is open or a minimum of one airplane door is open.

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S 212-080

CAUTION: DO NOT OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME. THE COOLING PACK CAN NOT CONTROL THE AIR TEMPERATURE IF YOU ALSO OPERATE A GROUND AIR SOURCE AT THE SAME TIME. YOU CAN CAUSE DAMAGE TO EQUIPMENT IF YOU OPERATE A COOLING PACK AND A GROUND AIR SOURCE AT THE SAME TIME.

- (2) Make sure that the ground air service connector (low pressure) is disconnected.

S 862-081

- (3) Supply electrical power (AMM 24-22-00/201).

S 862-082

- (4) Supply pneumatic power (AMM 36-00-00/201).

S 862-083

- (5) Put all of the zone temperature selectors on the pilot's overhead panel, P5, to the full cold position.

NOTE: The pneumatic air supply pressure will be higher if less air is used for cabin heating.

S 862-084

- (6) Put the TRIM AIR switches on the pilot's overhead panel, P5, to the ON position.

S 862-085

- (7) Put the L PACK selector, on the pilot's overhead panel, P5, to the AUTO or STBY-N position.

S 862-086

- (8) Wait 30 seconds for the left pack to reach normal operating speed.

S 862-087

- (9) Put the R PACK selector, on the pilot's overhead panel, P5, to the AUTO or STBY-N position.

S 862-088

- (10) Wait 30 seconds for the right pack to reach normal operating speed.

S 862-089

- (11) Put the zone temperature selectors on the pilot's overhead panel, P5, to the desired temperature setting.

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TASK 21-00-00-862-069

9. Remove Conditioned Air supplied by a Cooling Pack

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 36-00-00/201, Pneumatic - General

B. Access

(1) Location Zones

- 211 Control Cabin - Sect 41 (Left)
- 212 Control Cabin - Sect 41 (Right)

C. Procedure

S 862-070

- (1) Turn the L PACK and R PACK selector switches, on the pilot's overhead panel P5, to the OFF position.

S 862-071

- (2) Push the TRIM AIR switches, on the pilot's overhead panel P5, to the OFF position.

S 862-072

- (3) Remove the pneumatic power, if it is not needed (AMM 36-00-00/201).

S 862-073

- (4) Remove the electrical power, if it is not needed (AMM 24-22-00/201).

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AIR CONDITIONING – GENERAL – DDG MAINTENANCE PROCEDURES

1. General

- A. This procedure has the following maintenance tasks which prepare the airplane for flight operations with inoperative air conditioning system components, and maintenance tasks which restore the airplane back to its usual condition:
- (1) Air Distribution Systems (ATA 21-20)
 - (a) DDG 21-28-1, Preparation – Forward Cargo Air Conditioning System Inoperative
 - (b) DDG 21-28-1, Restoration – Forward Cargo Air Conditioning System Inoperative
 - (2) Pressurization Systems (ATA 21-30)
 - (a) DDG 21-31-1, Preparation – AUTO Cabin Pressure Control System Inoperative
 - (b) DDG 21-31-1, Restoration – AUTO Cabin Pressure Control System Inoperative
 - (c) DDG 21-31-2, Preparation – MANUAL Cabin Pressure Control System Inoperative
 - (d) DDG 21-31-2, Restoration – MANUAL Cabin Pressure Control System Inoperative
 - (e) DDG 21-31-3, Preparation – Outflow Valve Inoperative
 - (f) DDG 21-31-3, Restoration – Outflow Valve Inoperative
 - (g) DDG 21-32-1, Preparation – Positive Pressure Relief Valves Inoperative
 - (h) DDG 21-32-1, Restoration – Positive Pressure Relief Valves Inoperative
 - (i) DDG 21-33-1, Preparation – Cabin Rate of Climb Indicator Inoperative
 - (j) DDG 21-33-1, Restoration – Cabin Rate of Climb Indicator Inoperative
 - (k) DDG 21-33-2, Preparation – Cabin Differential Pressure Indicator Inoperative
 - (l) DDG 21-33-2, Restoration – Cabin Differential Pressure Indicator Inoperative
 - (m) DDG 21-33-3, Preparation – Cabin Altitude Indicator Inoperative

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- (n) DDG 21-33-3, Restoration - Cabin Altitude Indicator Inoperative
- (3) Heating Systems (ATA 21-40)
 - (a) DDG 21-40-1, Preparation - Cargo Heating Systems Inoperative
 - (b) DDG 21-40-1, Restoration - Cargo Heating Systems Inoperative
 - (c) DDG 21-40-2, Preparation - Forward/Aft/Bulk Cargo Heat Indication Systems Inoperative
 - (d) DDG 21-40-2, Restoration - Forward/Aft/Bulk Cargo Heat Indication Systems Inoperative
- (4) Pack Cooling System (ATA 21-50)
 - (a) DDG 21-51-1, Preparation - Air Conditioning Packs Inoperative
 - (b) DDG 21-51-1, Restoration - Air Conditioning Packs Inoperative
 - (c) DDG 21-51-2, Preparation - Pack Flow Control/Shutoff Valves Inoperative
 - (d) DDG 21-51-2, Restoration - Pack Flow Control/Shutoff Valves Inoperative
 - (e) DDG 21-51-4, Preparation - Pack Temperature Control Valves Inoperative
 - (f) DDG 21-51-4, Restoration - Pack Temperature Control Valves Inoperative
 - (g) DDG 21-51-7, Preparation - Air Cycle Machine Inoperative
 - (h) DDG 21-51-7, Restoration - Air Cycle Machine Inoperative
 - (i) DDG 21-52-3, Preparation - Air Conditioning PACK OFF Lights Inoperative
 - (j) DDG 21-52-3, Restoration - Air Conditioning PACK OFF Lights Inoperative
 - (k) DDG 21-53-1, Preparation - Ram Air Inlet/Exit Door Systems Inoperative
 - (l) DDG 21-53-1, Restoration - Ram Air Inlet/Exit Door Systems Inoperative
- (5) Equipment Cooling System (ATA 21-58)
 - (a) DDG 21-58-7, Preparation - Forward Equipment Cooling Overboard Exhaust Valve Inoperative
 - (b) DDG 21-58-7, Restoration - Forward Equipment Cooling Overboard Exhaust Valve Inoperative
 - (c) DDG 21-58-8, Preparation - Forward Equipment Cooling Inboard Supply Valve Inoperative
(1 Supply Fan System Only)

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- (d) DDG 21-58-8, Restoration - Forward Equipment Cooling Inboard Supply Valve Inoperative (1 Supply Fan System Only)
- (e) DDG 21-58-12, Preparation - Instrument Cooling Monitor System Inoperative (ETOPS)
- (f) DDG 21-58-12, Restoration - Instrument Cooling Monitor System Inoperative (ETOPS)
- (6) Temperature Control System (ATA 21-60)
 - (a) DDG 21-61-1, Preparation - Compartment Temperature Control Systems Inoperative
 - (b) DDG 21-61-1, Restoration - Compartment Temperature Control Systems Inoperative
 - (c) DDG 21-61-2, Preparation - Flight Deck Temperature Control System Inoperative
 - (d) DDG 21-61-2, Restoration - Flight Deck Temperature Control System Inoperative
 - (e) DDG 21-61-3, Preparation - Trim Air Pressure Regulating/Shutoff Valve Inoperative
 - (f) DDG 21-61-3, Restoration - Trim Air Pressure Regulating/Shutoff Valve Inoperative
 - (g) DDG 21-61-4, Preparation - Zone Trim Air Modulating Valves Inoperative
 - (h) DDG 21-61-4, Restoration - Zone Trim Air Modulating Valves Inoperative
 - (i) DDG 21-61-6, Preparation - Compartment Temperature INOP Lights Inoperative
 - (j) DDG 21-61-6, Restoration - Compartment Temperature INOP Lights Inoperative
 - (k) DDG 21-61-7, Preparation - Trim Air Check Valves Inoperative
 - (l) DDG 21-61-7, Restoration - Trim Air Check Valves Inoperative

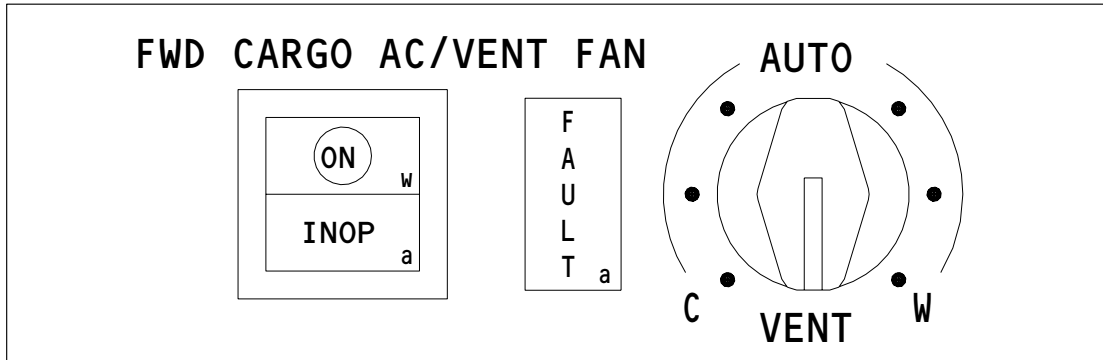
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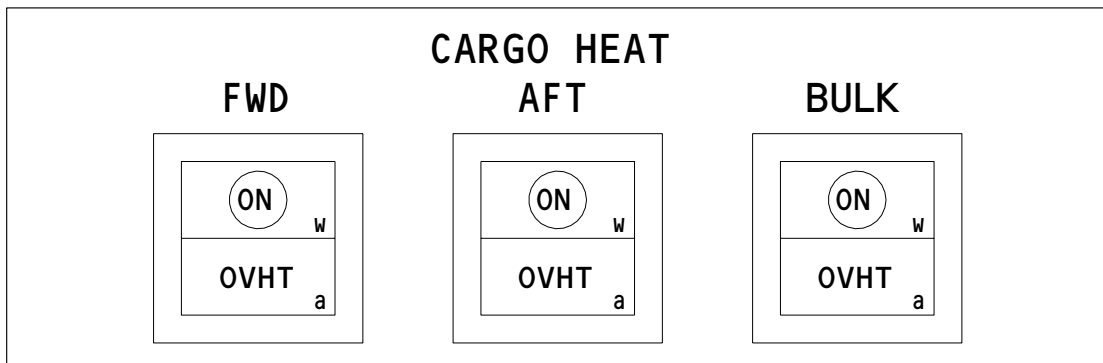
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FORWARD CARGO A/C PANEL
AIR CONDITIONING CONTROL PANEL
(OVERHEAD CIRCUIT BREAKER PANEL, P5)



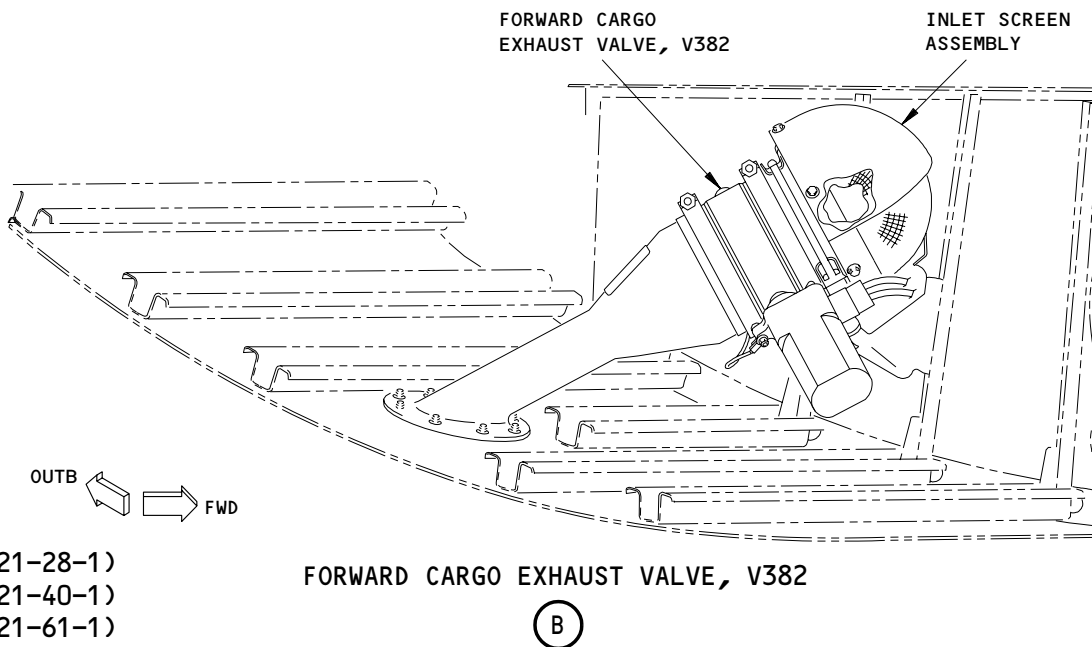
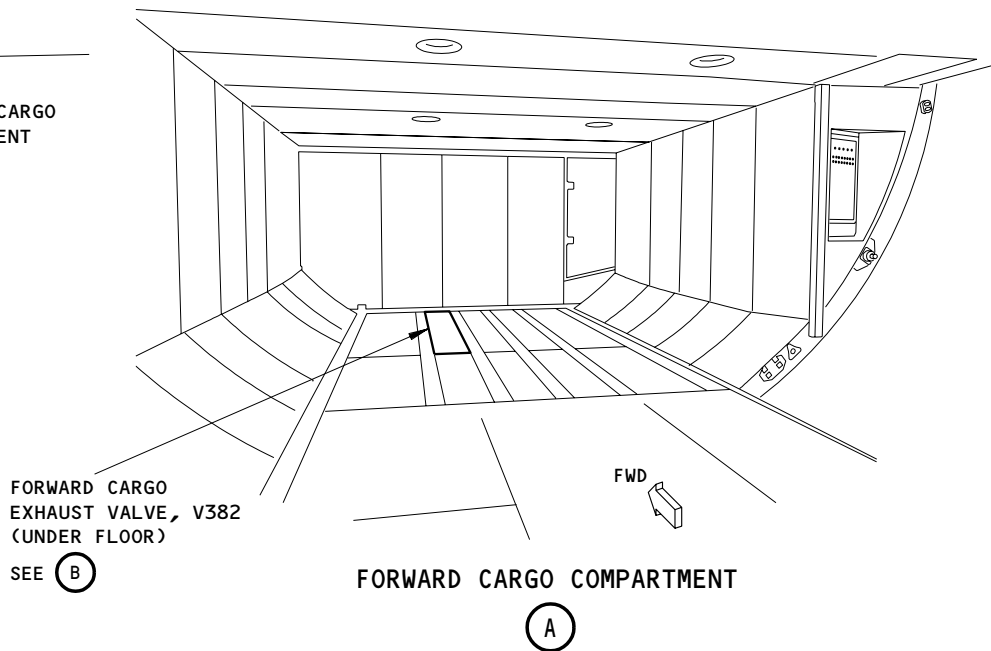
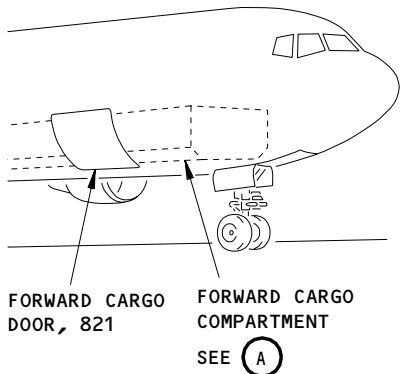
CARGO HEATING SWITCHLIGHTS
(OVERHEAD CIRCUIT BREAKER PANEL, P5)

(DDG 21-28-1)
(DDG 21-40-1)
(DDG 21-61-1)

Forward Cargo Air Conditioning System
Figure 901 (Sheet 1)

EFFECTIVITY	ALL
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(DDG 21-28-1)
(DDG 21-40-1)
(DDG 21-61-1)

Forward Cargo Air Conditioning System
Figure 901 (Sheet 2)

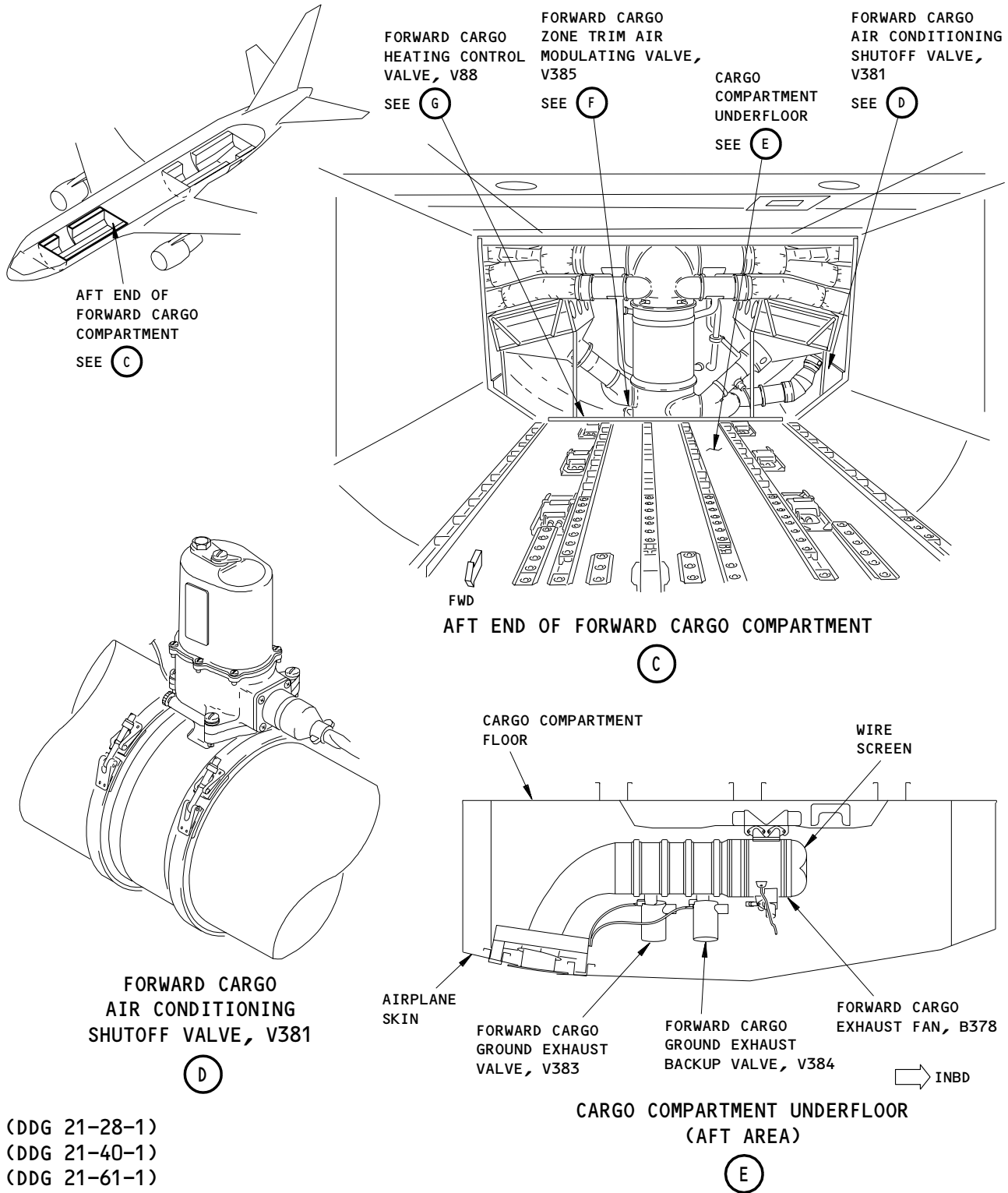
EFFECTIVITY

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(DDG 21-28-1)
(DDG 21-40-1)
(DDG 21-61-1)

Forward Cargo Air Conditioning System
Figure 901 (Sheet 3)

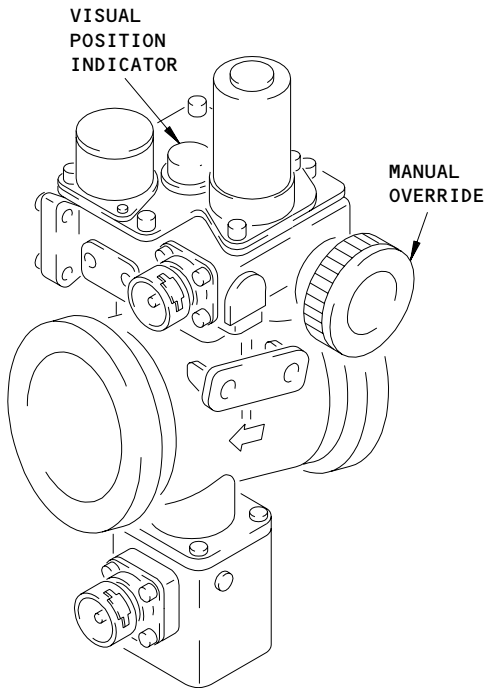
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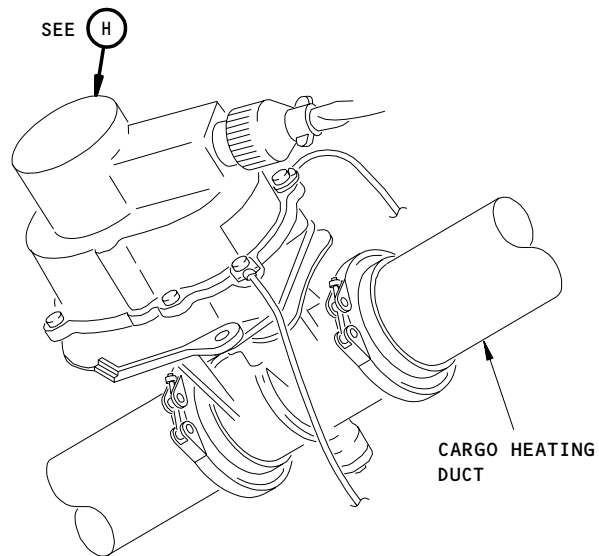
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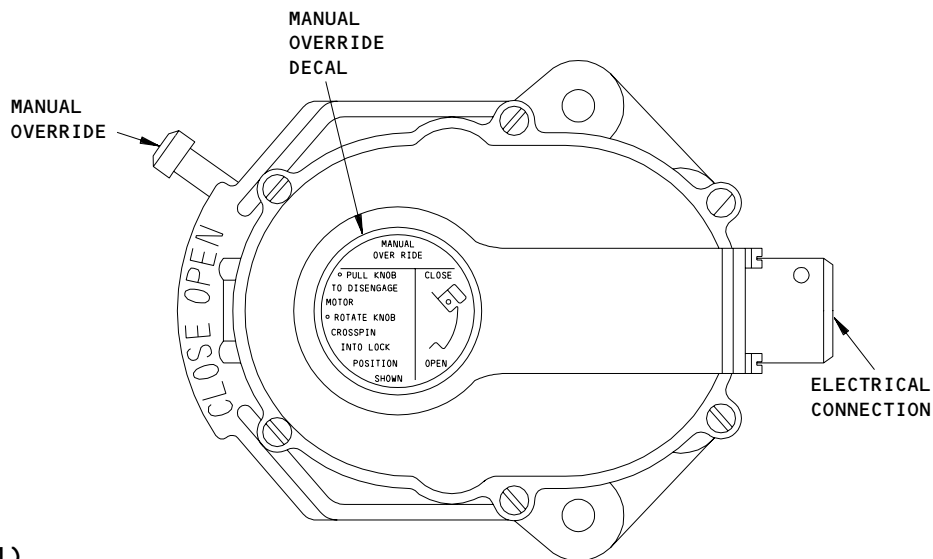
FORWARD CARGO ZONE
TRIM AIR MODULATING VALVE, V385

(F)



FORWARD CARGO HEATING
CONTROL VALVE, V88

(G)



(DDG 21-28-1)
(DDG 21-40-1)
(DDG 21-61-1)

(H)

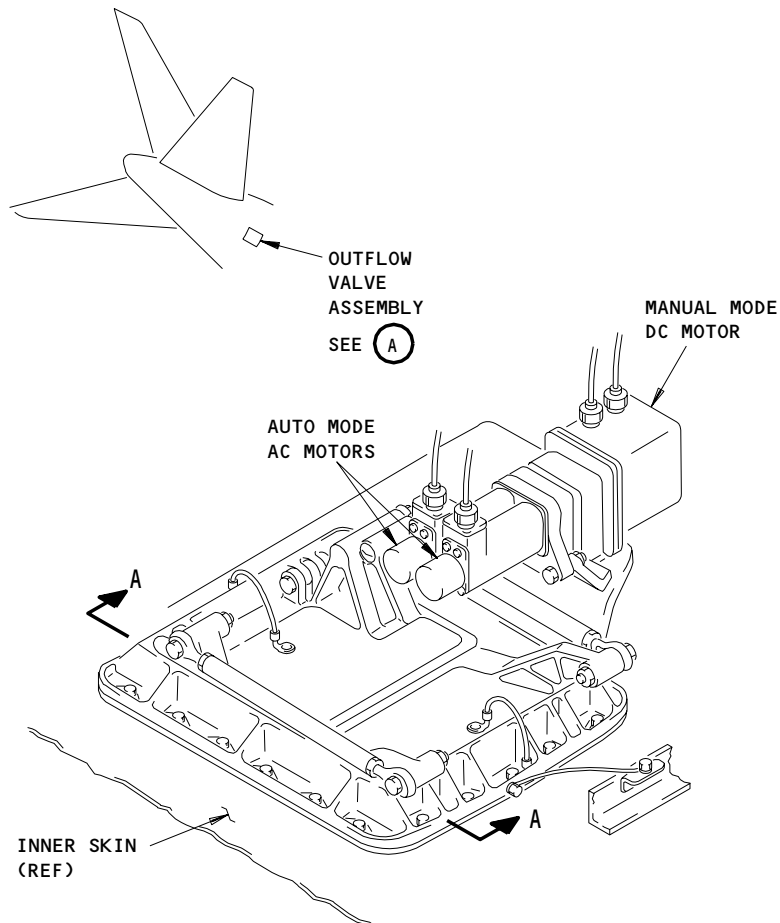
Forward Cargo Air Conditioning System
Figure 901 (Sheet 4)

EFFECTIVITY	ALL
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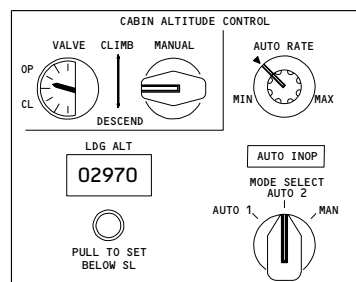
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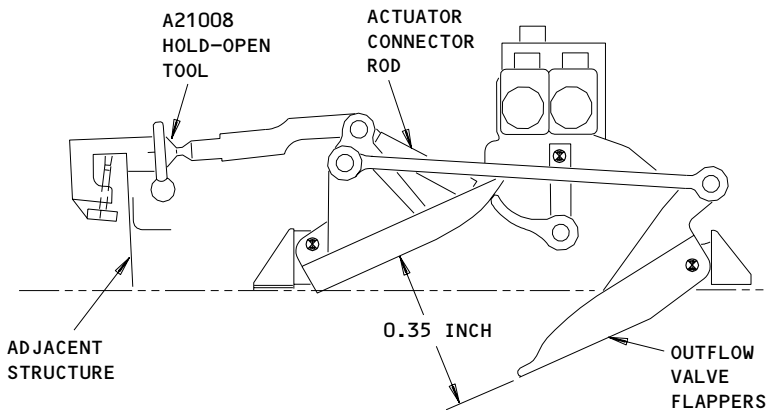


OUTFLOW VALVE ASSEMBLY

(A)



CABIN PRESSURE SELECTOR



INSTALLATION OF THE A21008 HOLD-OPEN TOOL FOR THE OUTFLOW VALVE
A-A

(DDG 21-31-1,-3)

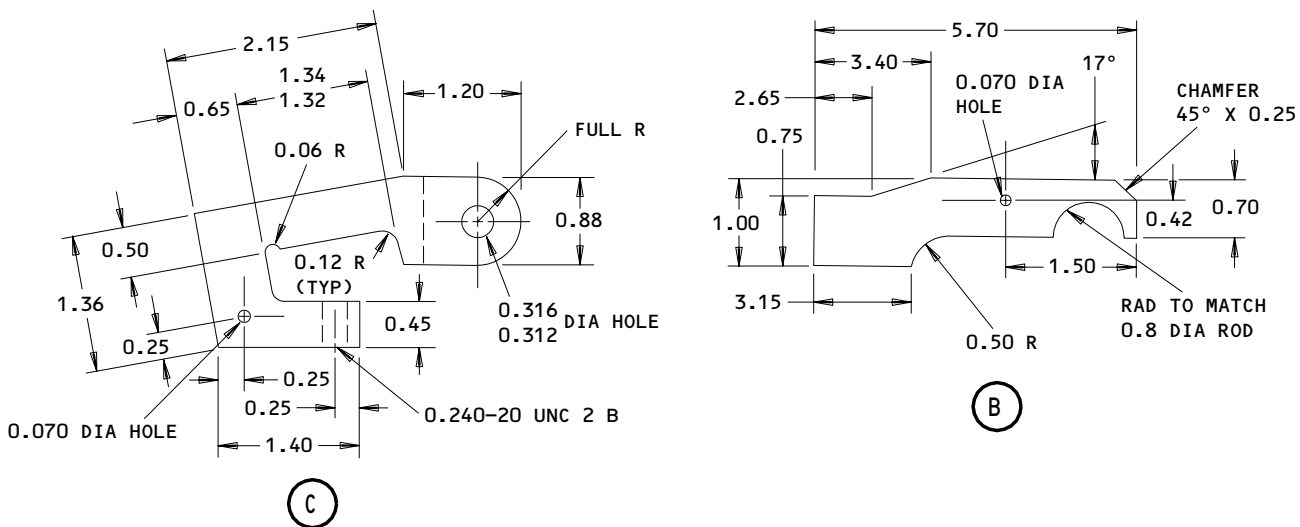
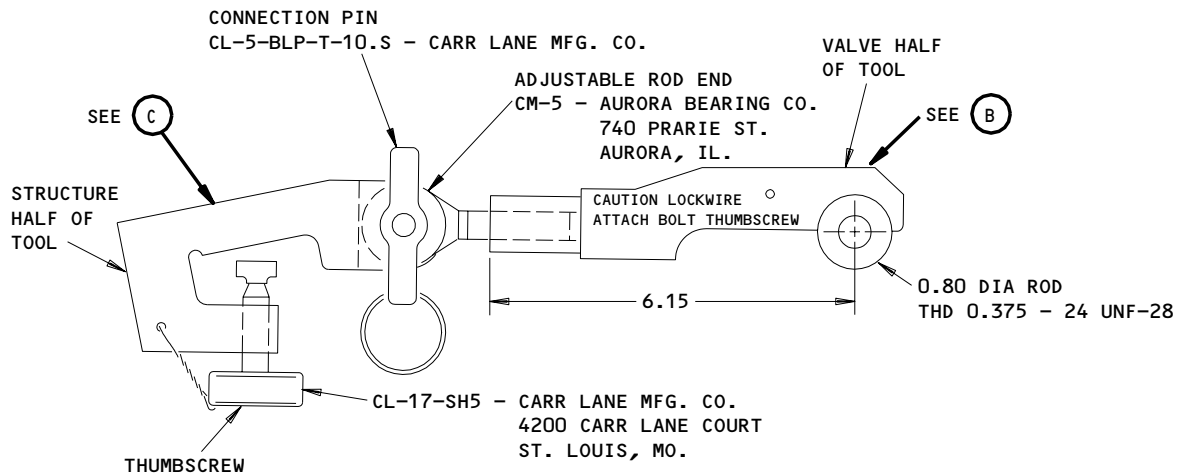
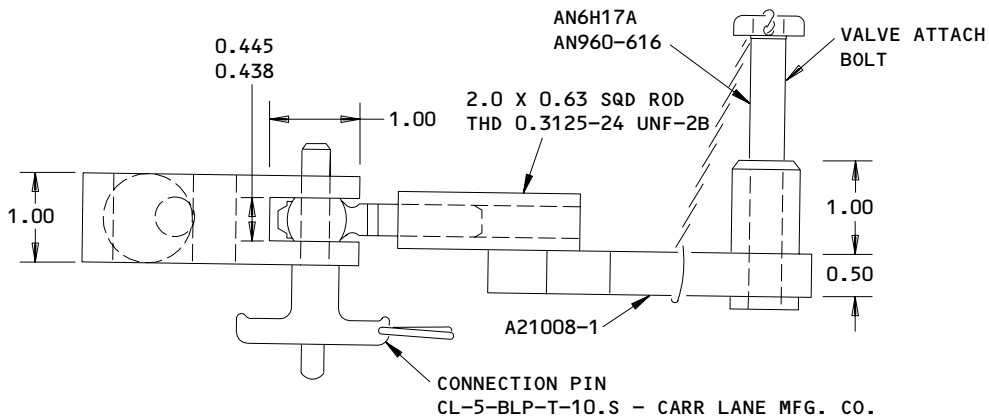
Cabin Pressure Control System
Figure 902 (Sheet 1)

EFFECTIVITY	ALL
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**SIMPLIFIED DRAWING OF TOOL A21008-1
(FOR ADDITIONAL INFORMATION SEE BOEING DRAWING A21008)**

(DDG 21-31-1,-3)

NOTE: ALL DIMENSIONS ARE IN INCHES.
MATERIAL: 1010-1024 OR A36 STEEL

Cabin Pressure Control System
Figure 902 (Sheet 2)

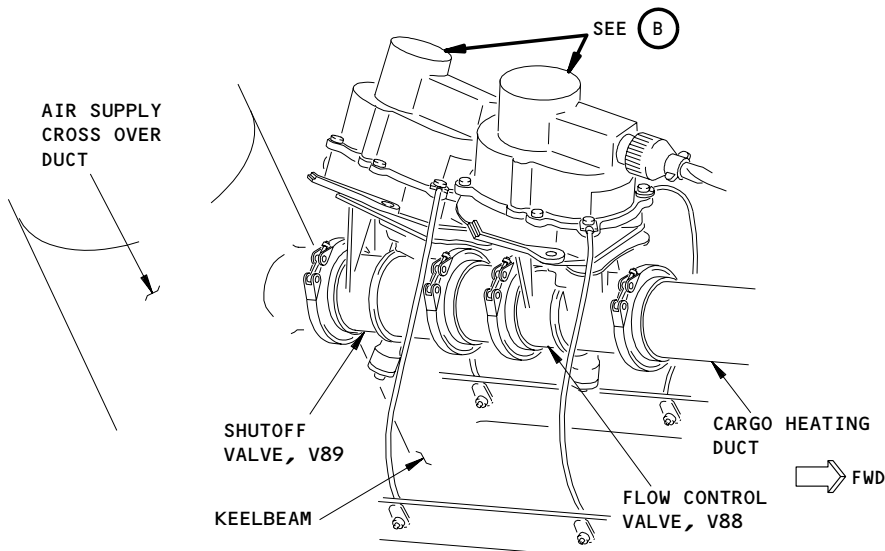
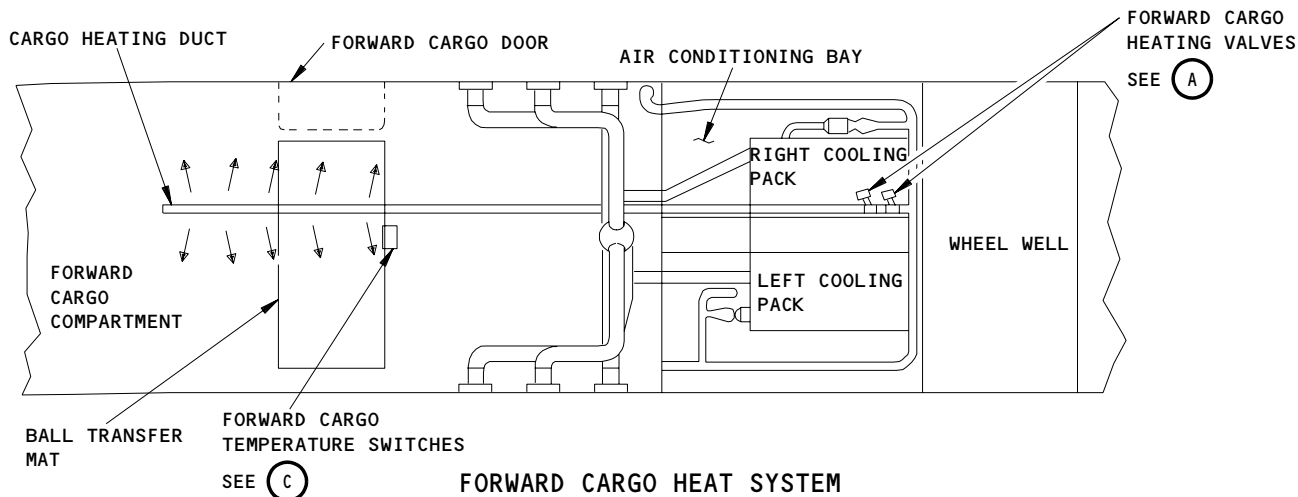
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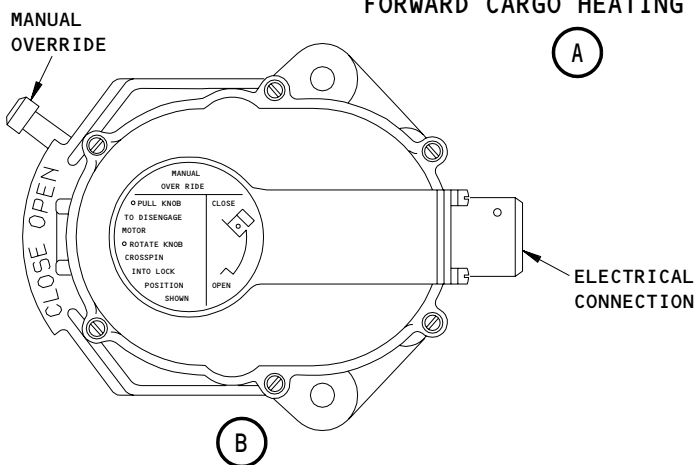
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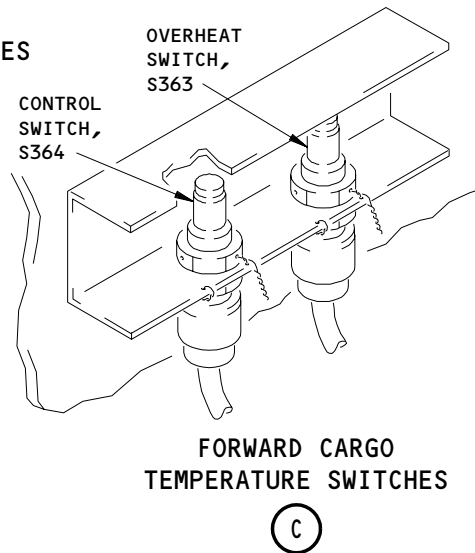
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FORWARD CARGO HEATING VALVES



(DDG 21-40-1,-2)



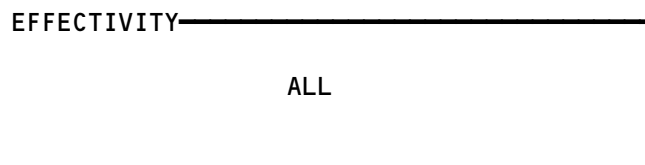
**Cargo Compartment Heating Systems
Figure 903**

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Figure 903A

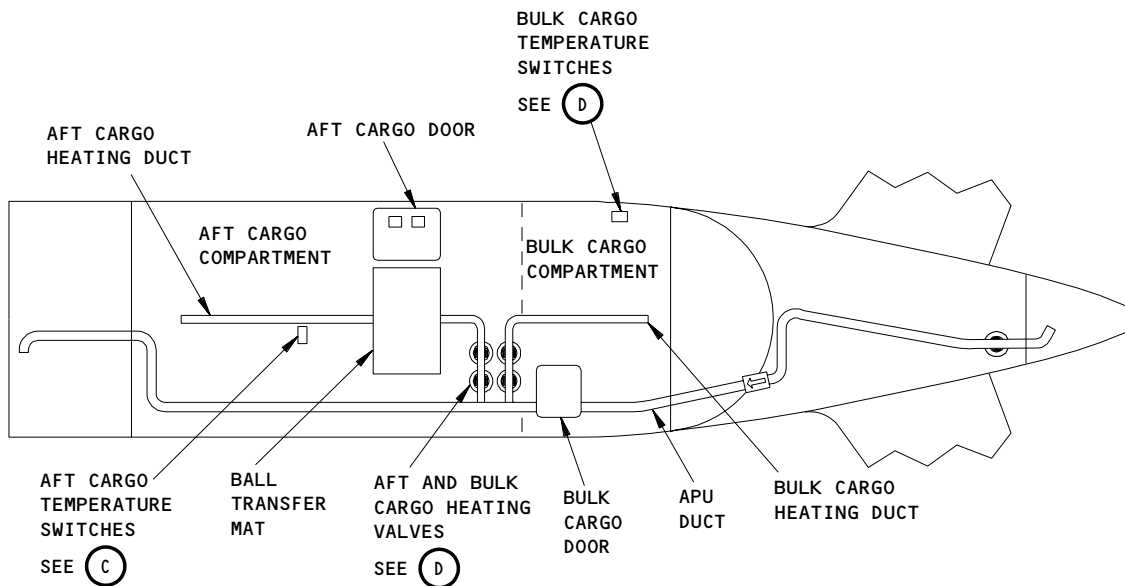


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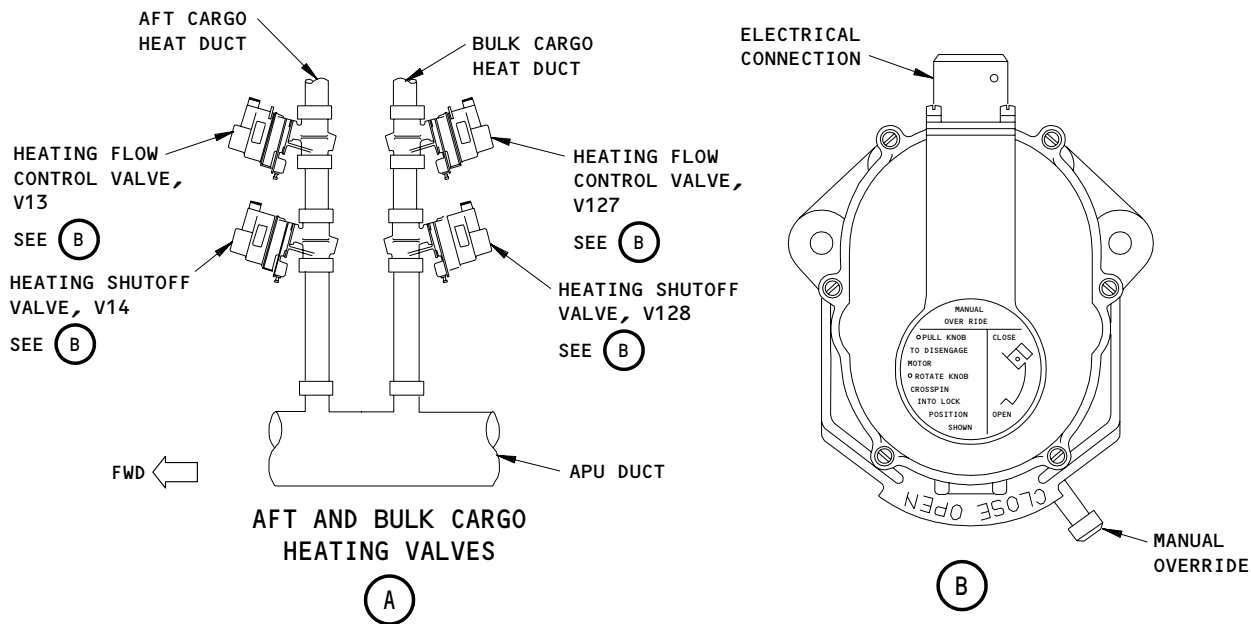
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AFT/BULK CARGO HEAT SYSTEMS

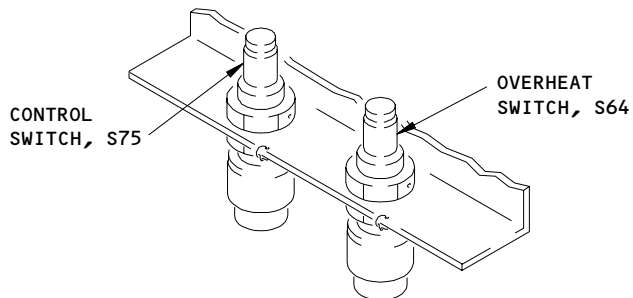


(DDG 21-40-1,-2)

Cargo Compartment Heating Systems
Figure 903B (Sheet 1)

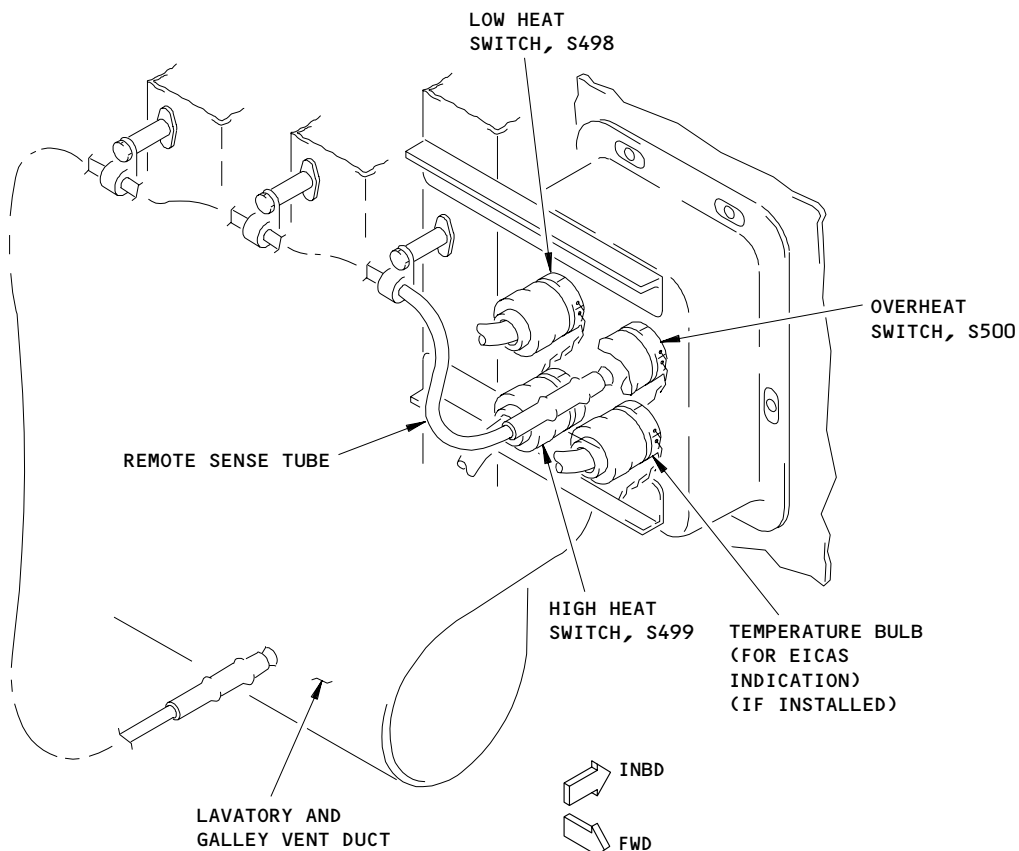
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AFT CARGO
TEMPERATURE SWITCHES

(C)



BULK CARGO TEMPERATURE SWITCHES

(D)

(DDG 21-40-1,-2)

Cargo Compartment Heating Systems
Figure 903B (Sheet 2)

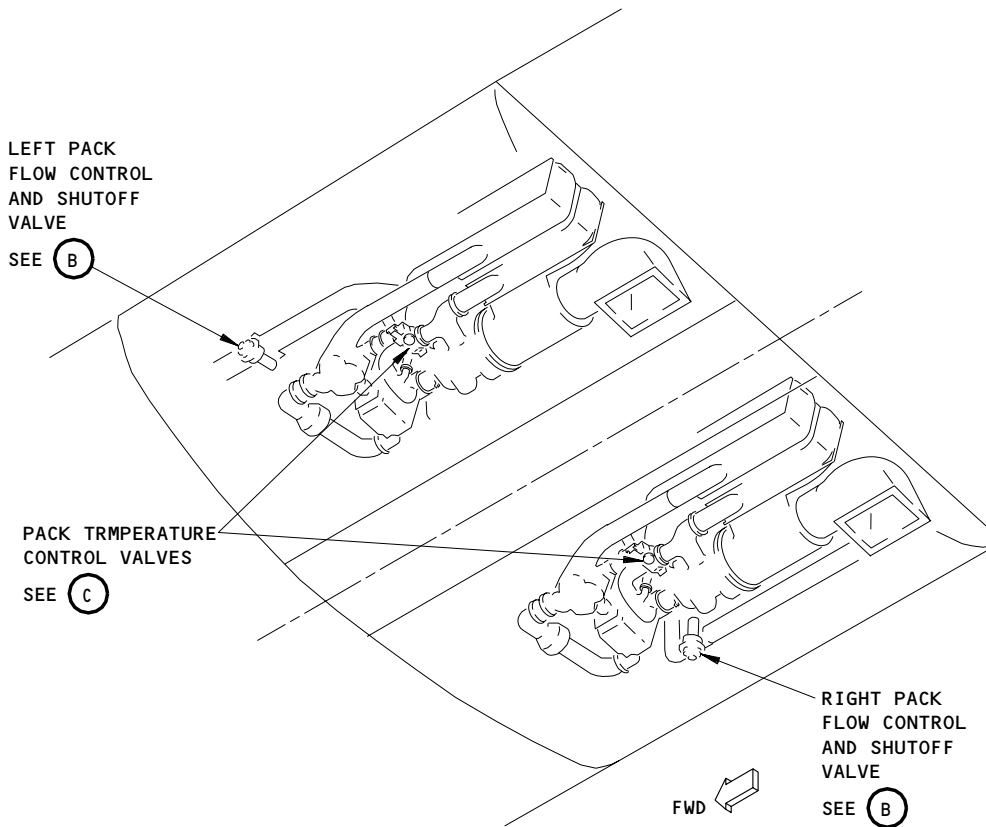
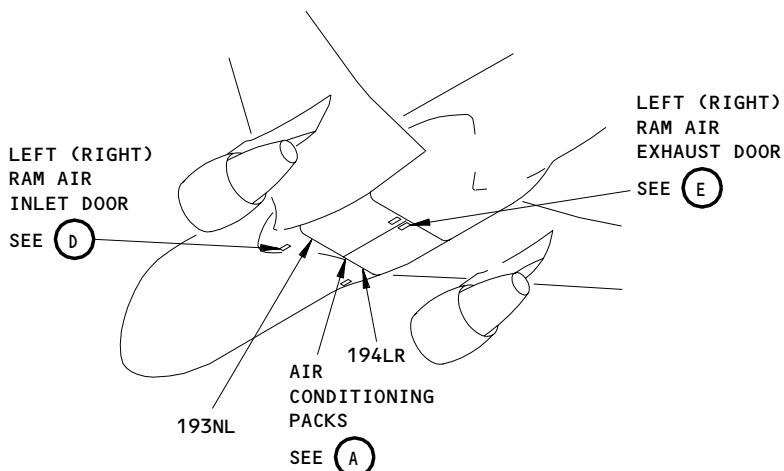
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AIR CONDITIONING PACKS

(A)

(DDG 21-51-1,-2,-4)
(DDG 21-53-1)

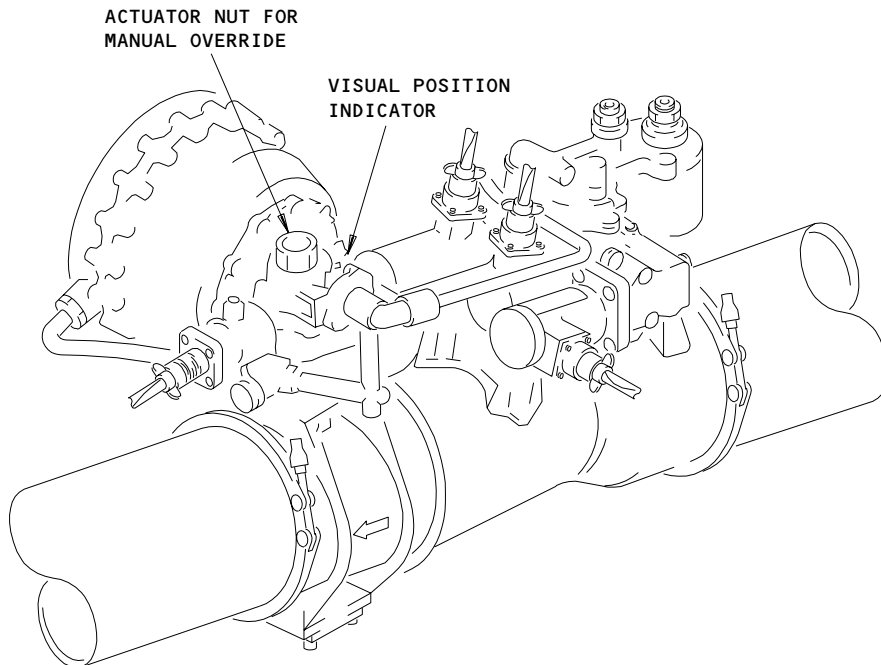
Cooling Pack System and Ram Air Inlet/Exhaust Door Systems
Figure 904 (Sheet 1)

EFFECTIVITY	ALL
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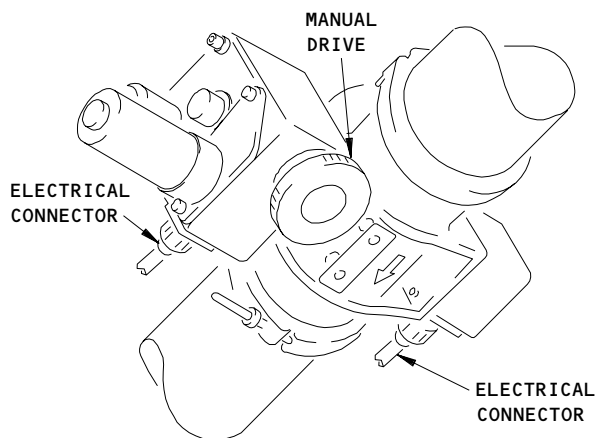
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FLOW CONTROL AND SHUTOFF VALVE

(B)



PACK TEMPERATURE CONTROL VALVE

(C)

(DDG 21-51-1,-4)
(DDG 21-53-1)

Cooling Pack System and Ram Air Inlet/Exhaust Door Systems
Figure 904 (Sheet 2)

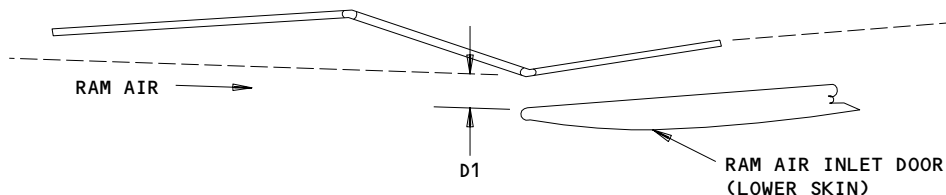
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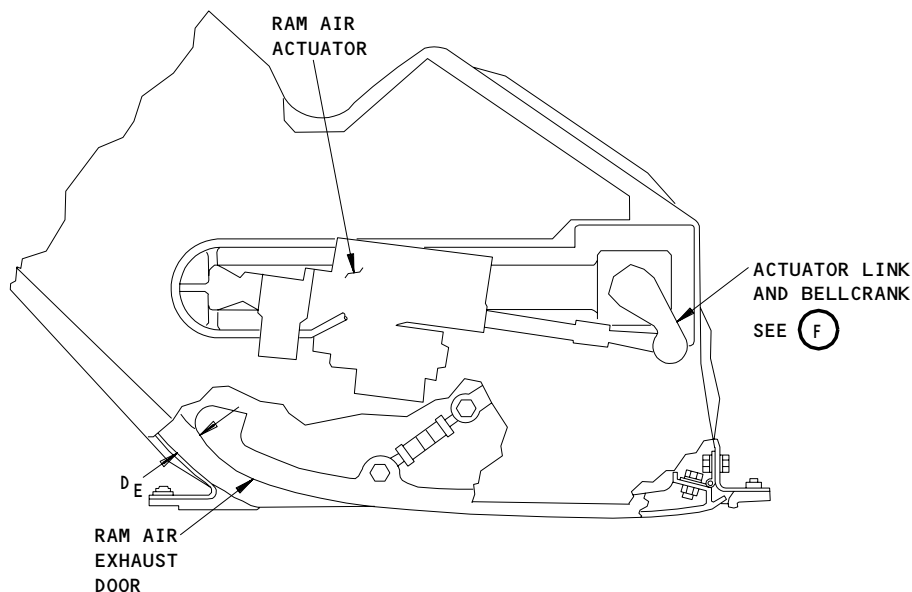
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**THROAT GAP MEASUREMENT
AT THE INLET DOOR
(SIDE VIEW)**

(D)



**THROAT GAP MEASUREMENT
AT THE EXHAUST DOOR
(SIDE VIEW)**

(E)

(DDG 21-51-1,-4)
(DDG 21-53-1)

**Cooling Pack System and Ram Air Inlet/Exhaust Door Systems
Figure 904 (Sheet 3)**

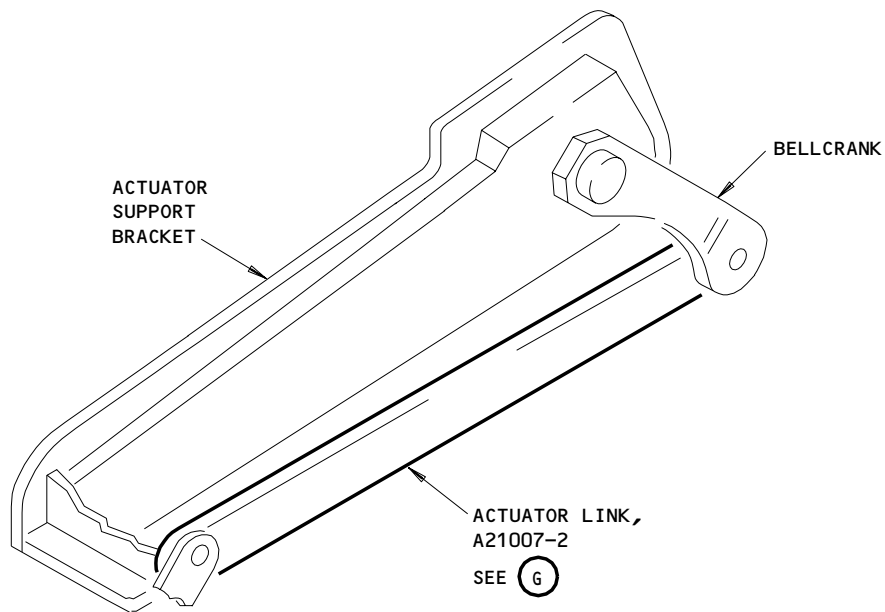
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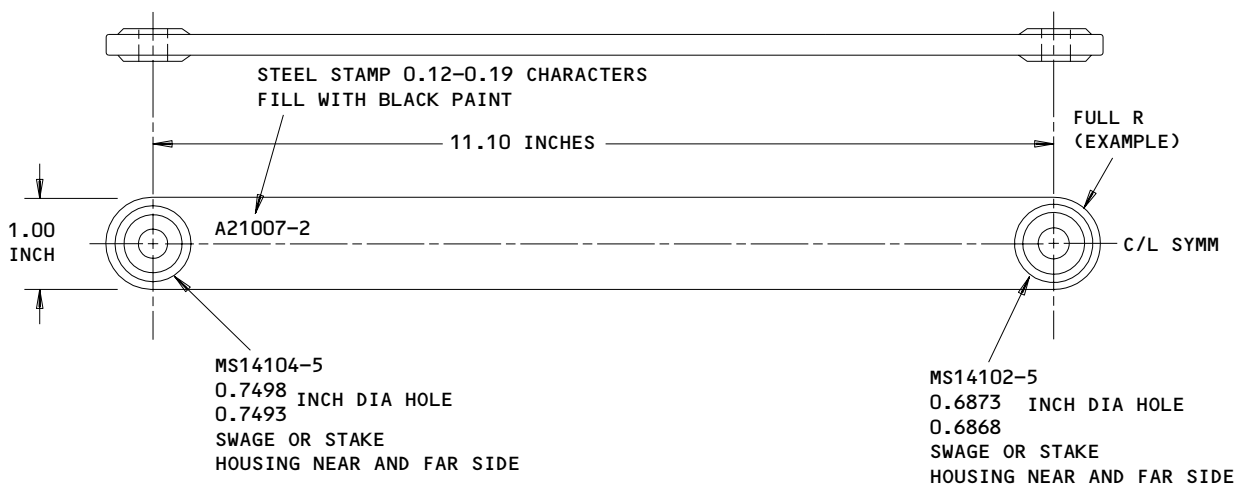
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ACTUATOR LINK AND BELLCRANK

(F)



ACTUATOR LINK

(G)

(DDG 21-51-1,-4)
(DDG 21-53-1)

Cooling Pack System and Ram Air Inlet/Exhaust Door Systems
Figure 904 (Sheet 4)

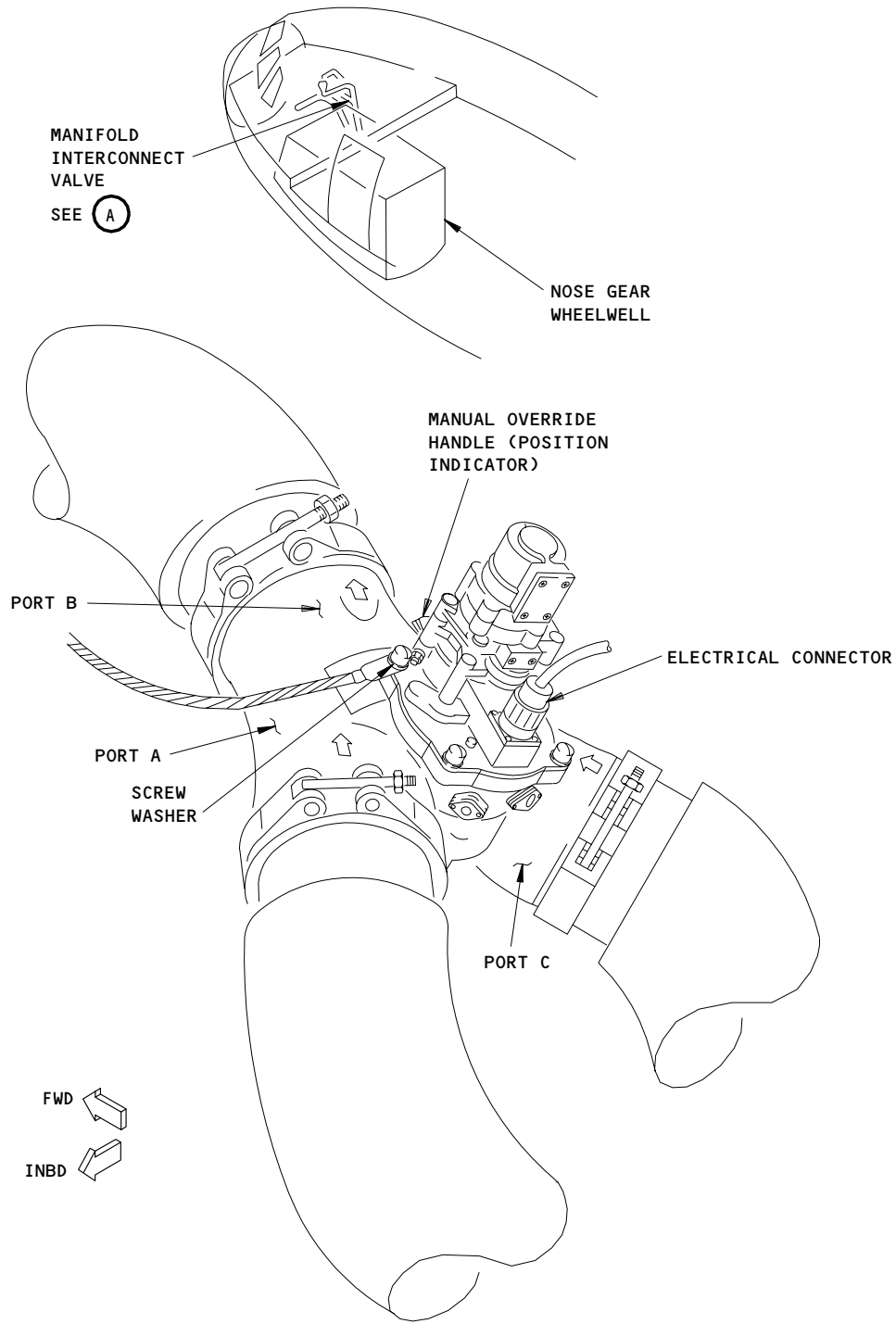
EFFECTIVITY	
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MANIFOLD INTERCONNECT VALVE

(A)

(DDG 21-31-1)
(DDG 21-58-7,-8)

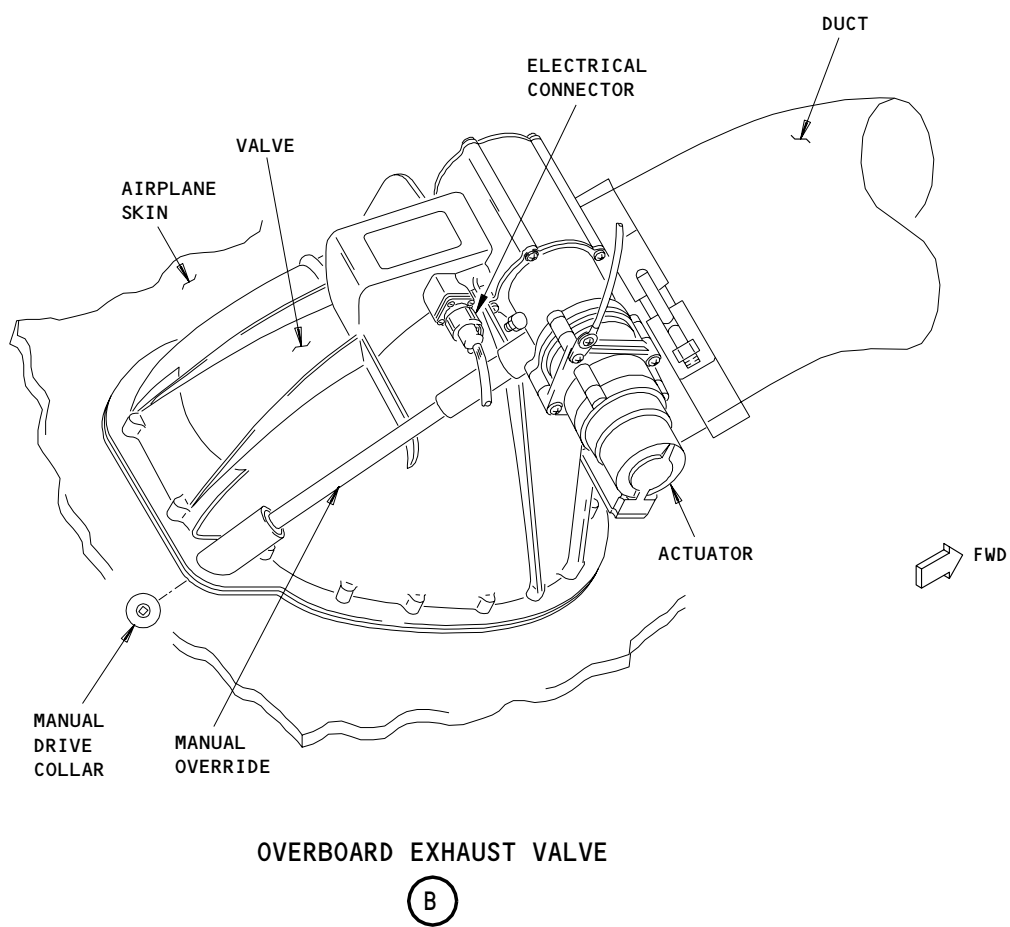
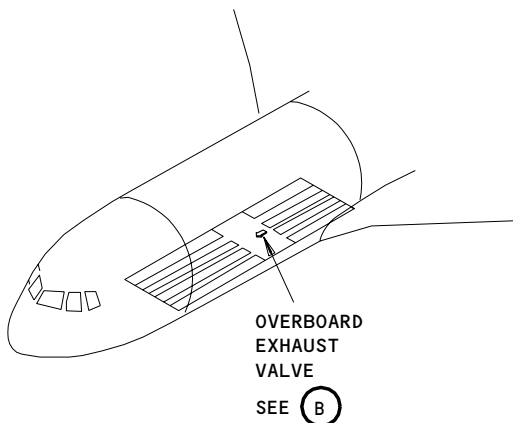
Forward Equipment Cooling System
Figure 905 (Sheet 1)

EFFECTIVITY	
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(DDG 21-31-1)
(DDG 21-58-7,-8)

Forward Equipment Cooling System
Figure 905 (Sheet 2)

EFFECTIVITY	
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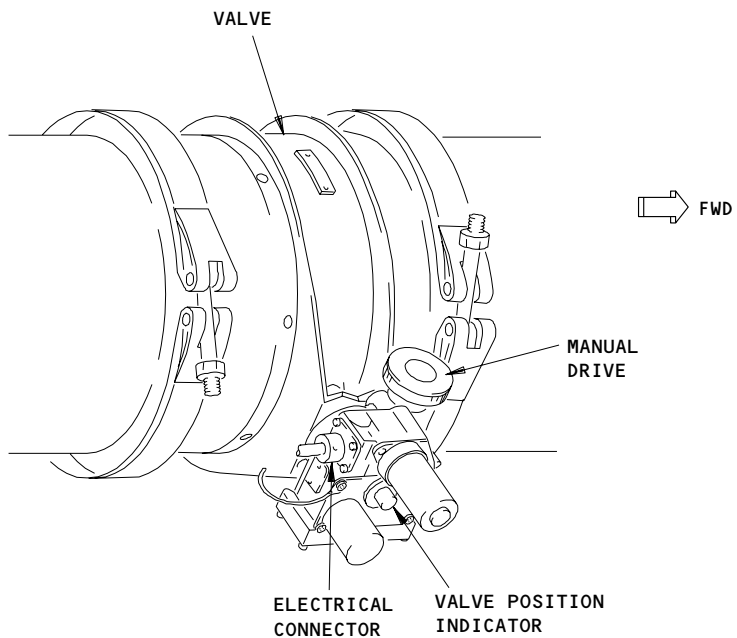
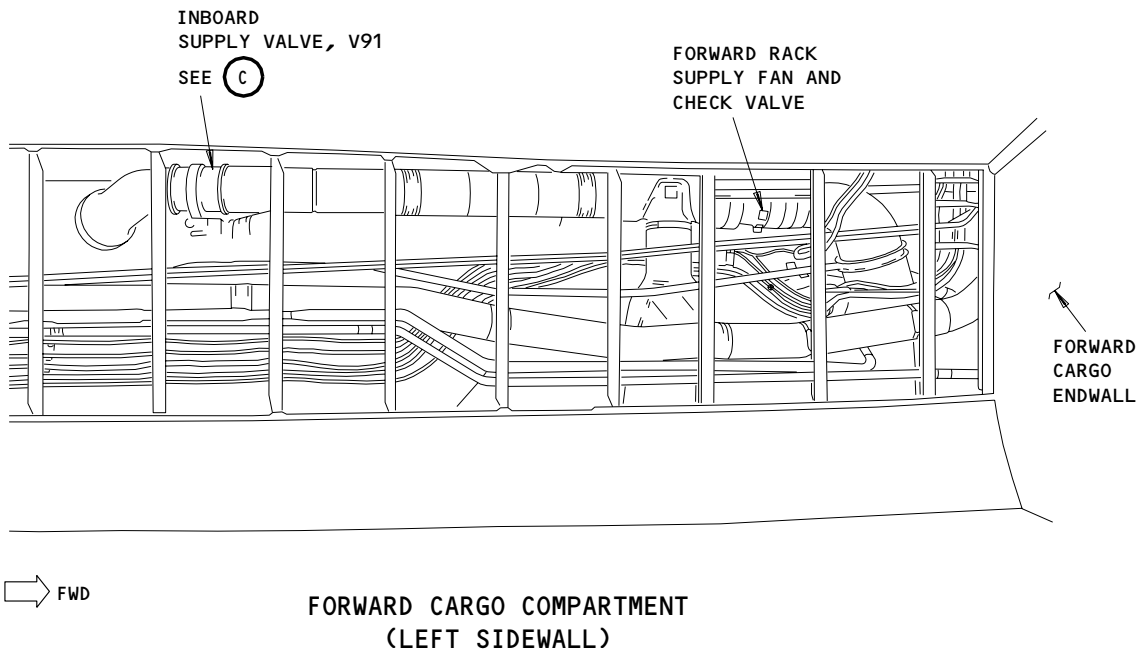
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INBOARD SUPPLY VALVE, V91

(C)

(DDG 21-31-1)
(DDG 21-58-7,-8)

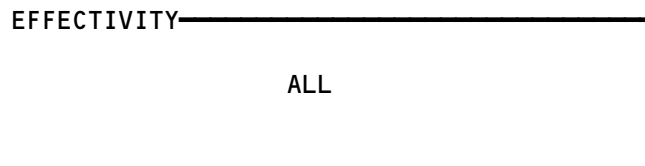
Forward Equipment Cooling System
Figure 905 (Sheet 3)

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Figure 906

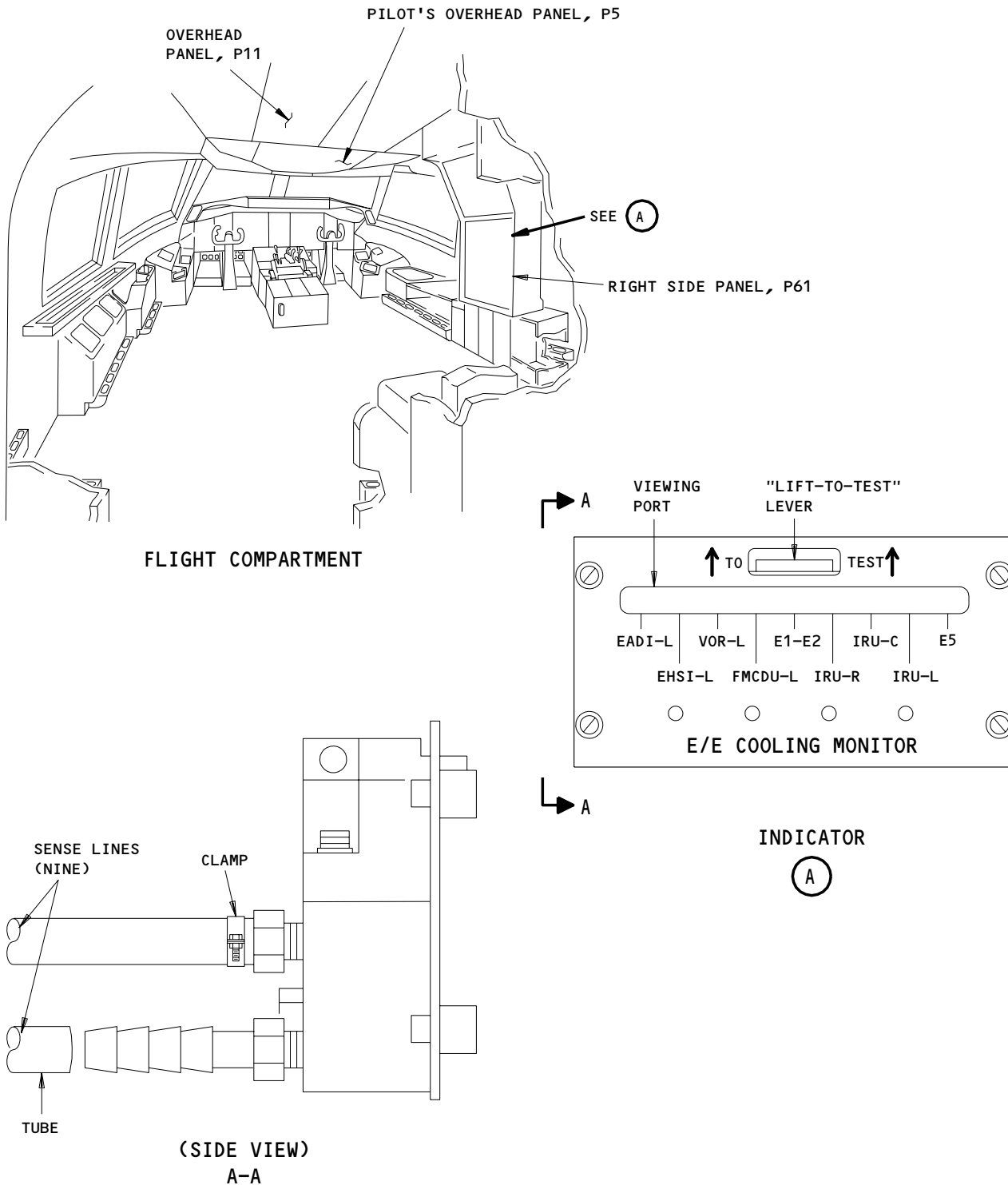


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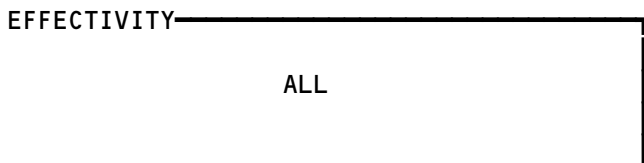
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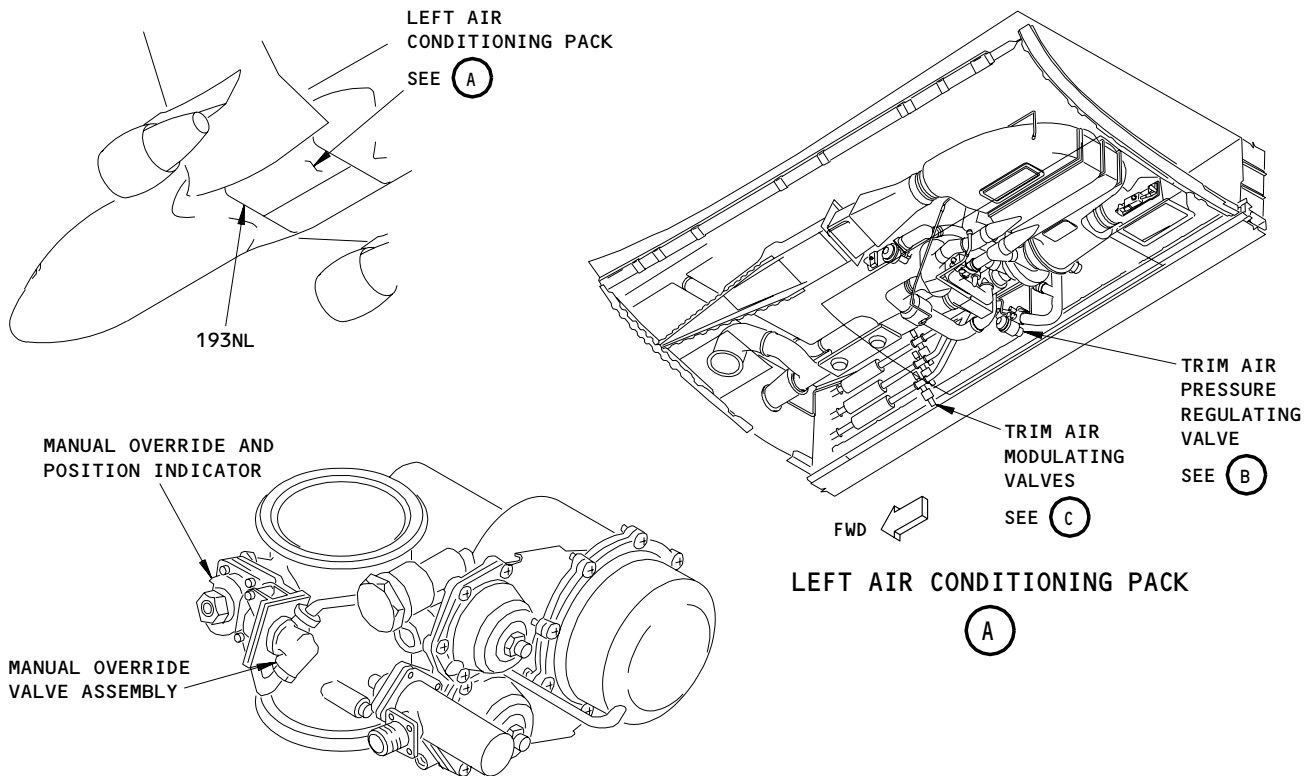


(DDG 21-58-12)

E/E Cooling Monitor Indicator
Figure 907

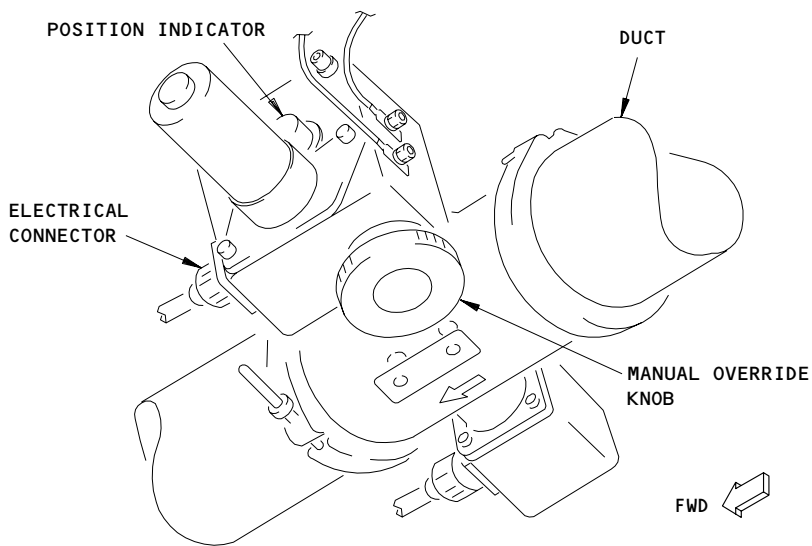


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TRIM AIR PRESSURE REGULATING VALVE

(B)



TRIM AIR MODULATING VALVE

(C)

(DDG 21-61-1,-2,-3,-4)

Temperature Control System
Figure 908

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TASK 21-00-00-049-040

2. DDG 21-28-1, Preparation - Forward Cargo Air Conditioning System (Fig. 901)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the forward cargo air conditioning system is inoperative.
- (2) The following components may be inoperative:
 - (a) Forward Cargo Ventilation Fan (B377)
 - (b) Forward Cargo A/C Ground Exhaust Fan (B378)
 - (c) Forward Cargo A/C Temperature Bulb (TS497) - provided the Forward Cargo A/C Normal mode operates normally.
 - (d) Forward Cargo Heat switch (P5 panel) - provided the Forward Cargo Heat system remains selected OFF, the Forward Cargo Heat switch on P5 panel is placarded FWD CARGO HEAT INOP, and the Forward Cargo Heating Flow Control Valve is deactivated closed.
 - (e) Forward Cargo A/C Exhaust Valve (V382) - provided the valve is deactivated closed.
- (3) The following components may be inoperative provided the Forward Cargo A/C system is verified to be operating in the BACKUP mode:

NOTE: The Level C EICAS message FWD CARGO BACKUP will appear when Forward Cargo A/C switch is selected ON. Adjustment of the Forward Cargo A/C Temperature Selector (P5 panel) will be necessary to maintain appropriate Forward Cargo temperature. Forward cargo temperature indication is available for display on the EICAS Status page.

- (a) Either or both Forward Cargo A/C Temperature Sensors (TS495, TS496).
 - (b) Forward Cargo A/C Zone Trim Air Modulating Valve (V385) - provided the valve is deactivated closed, the Forward Cargo A/C Trim/Heat Shutoff Valve (V89) operates normally, and Forward Cargo Heating Flow Control Valve (V88) operates normally.
 - (c) Forward Cargo A/C Ground Exhaust Valves (primary and/or backup) (V383, V384) - provided the valves are deactivated closed.
 - (d) Any or all Forward Cargo A/C Duct/Compartment Overheat Switches (S363, S793, S794) - provided the Forward Cargo A/C Zone Trim Air Modulating Valve (V385) is deactivated closed, or the Forward Cargo A/C Trim/Heat Shutoff Valve (V89) is deactivated closed.
 - (e) Forward Cargo A/C Trim/Heat Shutoff Valve (V89) - provided the valve is deactivated closed.
- (4) If the following components are inoperative, the Forward Cargo A/C will be unavailable and should be placarded FWD CARGO A/C INOP:
- (a) Forward Cargo A/C Shutoff Valve (V381) - provided the valve is deactivated closed.
 - (b) Forward Cargo A/C Temperature Selector (R634 on M1619).
 - (c) Pack Flow and Cargo Air Conditioning Controller/PFCAC (M1610) (except for Extended-Range/ER operations) - provided:
 - 1) Altitude is limited to FL350 or below.

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- 2) The left pack flow control valve (V16) is secured closed (see DDG 21-51-2)
 - 3) Forward Cargo A/C Shutoff Valve (V381) is deactivated closed.
 - 4) Forward Cargo A/C Trim/Heat Shutoff Valve (V89) is deactivated closed.
 - 5) Forward Cargo A/C Zone Trim Air Modulating Valve (V385) is deactivated closed.
 - 6) Forward Cargo A/C Exhaust Valve (V382) is deactivated closed.
 - 7) Forward Cargo A/C Ground Exhaust Fan (B378) is deactivated.
- (5) Instructions for deactivation of the inoperative components are provided below:
- (a) Forward Cargo A/C Exhaust Valve (V382) Deactivation
 - (b) Forward Cargo A/C Ground Exhaust Valve (V383) Deactivation
 - (c) Forward Cargo A/C Ground Exhaust Backup Valve (V384) Deactivation
 - (d) Forward Cargo A/C Zone Trim Air Modulating Valve (V385) Deactivation
 - (e) Forward Cargo A/C Shutoff Valve (V381) Deactivation
 - (f) Forward Cargo A/C Trim/Heat Shutoff Valve (V89) Deactivation
 - (g) Forward Cargo Heating Flow Control Valve (V88) Deactivation
 - (h) Forward Cargo A/C Ground Exhaust Fan (B378) Deactivation

B. References

- (1) AMM 06-41-00/201, Fuselage (Major Zones 100 and 200) Access Doors and Panels
- (2) AMM 06-46-00/201, Passenger and Cargo Compartment Doors (Major Zone 800) Access Doors and Panels
- (3) AMM 21-28-00/501, Forward Cargo Air Conditioning Distribution
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 32-09-02/201, Air/Ground Relay System

C. Access

(1) Location Zones

- | | |
|-----|---|
| 119 | Main Equipment Center, Left |
| 123 | Area below the forward cargo compartment, Left |
| 124 | Area below the forward cargo compartment, Right |
| 126 | Area Aft of Fwd Cargo Compt, Right |
| 136 | Environmental Control System Bay, Right |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|-----------------------------------|
| 119AL | Main Equipment Center Access Door |
| 194LR | ECS Access Door, Right |
| 821 | Forward Cargo Door |

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D. Forward Cargo A/C Exhaust Valve (V382) Deactivation

NOTE: This maintenance task provides the instructions to deactivate the forward cargo A/C exhaust valve (V382) in the closed position.

S 869-651

- (1) Open this circuit breaker on the pilot's overhead panel, P11, and attach a lockout collar and DO-NOT-CLOSE tag:
 - (a) 11C20, CGO EXH VLV

S 019-652

- (2) Open the forward cargo door, 821 (AMM 06-46-00/201).

S 019-653

- (3) Remove the floor panels, to get access to the valve, which are 4 feet aft of the forward bulkhead near the center line of the cargo compartment.

S 219-654

- (4) Make sure the valve is in the CLOSED position.

S 029-655

- (5) Disconnect, cap and stow the electrical connector from the exhaust valve.

S 419-656

- (6) Install the floor panels.

S 419-657

- (7) Close the forward cargo door, 821 (AMM 06-46-00/201).

S 869-658

- (8) Tell the dispatch person that the forward cargo A/C exhaust valve is in operative.

E. Forward Cargo A/C Ground Exhaust Valve (V383) Deactivation

NOTE: This maintenance task provides the instructions to deactivate the forward cargo A/C ground exhaust valve (V383) in the closed position.

S 869-659

- (1) Push the FWD CARGO A/C switchlight (P5 panel) to the OFF position.
 - (a) Make sure the ON light goes off.
 - (b) Attach a DO-NOT-OPERATE tag to the FWD CARGO A/C panel.

S 019-660

- (2) Open the access door, 119AL, for the main equipment center (AMM 06-41-00/201).

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- S 869-661
- (3) Open this circuit breaker on the miscellaneous equipment panel, P37, and attach a lockout collar and a DO-NOT-CLOSE tag:
- (a) 37E3, CGO GND EXH VLV
- S 019-662
- (4) Open the forward cargo door, 821 (AMM 06-46-00/201).
- S 019-663
- (5) Remove the floor panels, to get access to the valve, which are 6 feet aft of the forward cargo door near the center line of the cargo compartment.
- NOTE:** The ground exhaust valve is the valve which is nearest to the overboard outlets. The ground exhaust backup valve is the valve that is nearest to the ground exhaust fan.
- S 219-666
- (6) Make sure the ground exhaust valve is in the CLOSED position.
- S 029-667
- (7) Disconnect, cap and stow the electrical connector from the ground exhaust valve.
- S 419-668
- (8) Install the floor panels in the forward cargo compartment.
- S 419-669
- (9) Close the forward cargo door, 821 (AMM 06-46-00/201).
- S 419-671
- (10) Close the access door, 119AL, for the main equipment center (AMM 06-41-00/201).
- S 029-672
- (11) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C switchlight on the pilot's overhead panel, P5.
- S 869-673
- (12) Tell the dispatch person that the forward cargo A/C ground exhaust valve is inoperative.

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F. Forward Cargo A/C Ground Exhaust Backup Valve (V384) Deactivation

NOTE: This maintenance task provides the instructions to deactivate the forward cargo A/C ground exhaust backup valve (V384) in the closed position.

S 869-674

- (1) Push the FWD CARGO A/C switchlight (P5 panel) to the OFF position.
 - (a) Make sure the ON light goes off.
 - (b) Attach a DO-NOT-OPERATE tag to the FWD CARGO A/C panel.

S 019-675

- (2) Open the forward cargo door, 821 (AMM 06-46-00/201).

S 019-676

- (3) Remove the floor panels, to get access to the valve, which are are 6 feet aft of the forward cargo door near the center line of the cargo compartment.

NOTE: The ground exhaust valve is the valve that is nearest to the overboard outlets. The ground exhaust backup valve is the valve that is nearest to the ground exhaust fan.

S 989-677

- (4) Use the manual override actuator (which is also the position indicator) to close the ground exhaust backup valve, or do the steps that follow:
 - (a) Open the access door, 119AL, for the main equipment center.
 - (b) Close this circuit breaker on the miscellaneous equipment panel, P36:
 - 1) 36E4, CGO EXH B/U VLV

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (c) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.
- (d) Do the procedure for the flight mode simulation for the No. 1 air/ground system (AMM 32-09-02/201).
- (e) Open this circuit breaker on the right miscellaneous equipment panel, P36, and attach a lockout collar and DO-NOT-CLOSE tag:
 - 1) 36E4, CGO EXH B/U VLV
- (f) Make sure the ground exhaust backup valve is in the CLOSED position.
- (g) Disconnect, cap and stow the electrical connector from the ground exhaust backup valve.

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- S 419-678
- (5) Install the floor panels in the forward cargo compartment.
- S 419-679
- (6) Close the access door, 119AL, for the main equipment center (AMM 06-41-00/201).
- S 029-680
- (7) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C panel.
- S 419-681
- (8) Close the forward cargo door, 821 (AMM 06-46-00/201).
- S 869-682
- (9) Put the plane back to the ground mode (AMM 32-09-02/201).
- S 869-683
- (10) Do the deactivation procedure for the spoilers if you did the deactivation procedure (AMM 27-61-00/201).
- S 869-684
- (11) Tell the dispatch person that the forward cargo A/C ground exhaust backup valve is in operative.
- G. Forward Cargo A/C Zone Trim Air Modulating Valve (V385) Deactivation
- NOTE:** This maintenance task provides the instructions to deactivate the forward cargo A/C zone trim air modulating valve (V385) in the closed position.
- S 869-685
- (1) Set the FWD CARGO A/C select switch (P5 panel) to the OFF position.
(a) Make sure the ON light goes off.
(b) Attach a DO-NOT-OPERATE tag to the FWD CARGO A/C panel.
- S 869-686
- (2) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11N21, FWD CARGO TEMP CONT VLV CLOSE
(b) 11N22, FWD CARGO DUCT OVHT/INOP
- S 019-687
- (3) Open the forward cargo door, 821.
- S 019-688
- (4) Remove the aft bulkhead lining in the forward cargo compartment to get access to the valve.

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- S 219-689
- (5) Make sure the forward cargo trim air modulating valve is in the CLOSED position.
- S 029-690
- (6) Disconnect, cap and stow the electrical connector from the trim air modulating valve.
- S 419-691
- (7) Install the aft bulkhead lining in the forward cargo compartment.
- S 419-692
- (8) Close the forward cargo door, 821.
- S 869-693
- (9) Close these circuit breakers on the P11 overhead circuit breaker panel:
- (a) 11N21, FWD CARGO TEMP CONT VLV CLOSE
 - (b) 11N22, FWD CARGO DUCT OVHT/INOP
- S 029-694
- (10) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C panel.
- S 869-732
- (11) Tell the dispatch person that the forward cargo A/C zone trim air modulating valve is inoperative
- H. Forward Cargo A/C Shutoff Valve (V381) Deactivation

NOTE: This maintenance task provides the instructions to deactivate the forward cargo A/C shutoff valve (V381) in the closed position.

- S 869-695
- (1) Set the FWD CARGO A/C select switch (P5 panel) to the OFF position.
- (a) Make sure the ON light goes off.
 - (b) Attach a DO-NOT-OPERATE tag to the FWD CARGO A/C panel.
- S 019-696
- (2) Open the access door, 119AL, for the main equipment center (AMM 06-41-00/201).
- S 869-697
- (3) Open this circuit breaker, on the right miscellaneous equipment panel, P37, and attach a lockout collar and a DO-NOT-CLOSE tag:
- (a) 37E4, CGO A/C SOV CONT
- S 019-698
- (4) Open the forward cargo door, 821 (AMM 06-46-00/201).

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- S 019-699
- (5) Remove the aft bulkhead lining for the forward cargo compartment to get access to the valve.
- S 219-700
- (6) Make sure the forward cargo A/C shutoff valve is in the CLOSED position.
- S 029-701
- (7) Disconnect, cap and stow the electrical connector from the valve.
- S 419-702
- (8) Install the aft bulkhead lining for the forward cargo compartment.
- S 419-703
- (9) Close the forward cargo door, 821 (AMM 06-46-00/201).
- S 419-704
- (10) Close the access door, 119AL, for the main equipment center (AMM 06-41-00/201).
- S 869-706
- (11) Tell the dispatch person that the forward cargo A/C shutoff valve is inoperative.
- I. Forward Cargo A/C Trim/Heat Shutoff Valve (V89) Deactivation

NOTE: This maintenance task provides the instructions to deactivate the forward cargo A/C trim/heat shutoff valve (V89) in the closed position.

- S 869-707
- (1) Set the FWD CARGO A/C select switch (P5 panel) to the OFF position.
- (a) Make sure the ON light goes off.
- (b) Attach a DO-NOT-OPERATE tag to the FWD CARGO A/C panel.
- S 869-708
- (2) Push the FWD CARGO HEAT switchlight (P5 panel) to the OFF position.
- (a) Make sure the ON light goes off.
- (b) Attach a DO-NOT-OPERATE tag on the FWD CARGO HEAT switchlight.
- S 869-709
- (3) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a lockout collar and a DO-NOT-CLOSE tag:
- (a) 11R21, FWD CARGO HEAT OVERRIDE

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S 419-710

- (4) Open the right ECS access door, 194LR, to get access to the valve (AMM 06-41-00/201).

S 219-711

- (5) Make sure the forward cargo trim/heat shutoff valve is in the CLOSED position.

S 029-712

- (6) Disconnect, cap and stow the electrical connector from the valve.

S 419-713

- (7) Close the right ECS access door, 194RL (AMM 06-41-00/201).

S 029-714

- (8) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C panel.

S 869-715

- (9) Tell the dispatch person that the forward cargo A/C trim/heat shutoff valve is inoperative.

J. Forward Cargo Heating Flow Control Valve (V88) Deactivation

NOTE: This maintenance task provides the instructions to deactivate the forward cargo heating flow control valve (V88) in the closed position.

S 869-716

- (1) Set the FWD CARGO A/C select switch (P5 panel) to the OFF position.
(a) Make sure the ON light goes off.
(b) Attach a DO-NOT-OPERATE tag to the FWD CARGO A/C panel.

S 869-717

- (2) Push the FWD CARGO HEAT switchlight (P5 panel) to the OFF position.
(a) Make sure the ON light goes off.

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(b) Attach a DO-NOT-OPERATE tag on the FWD CARGO HEAT switchlight.

S 869-718

- (3) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a lockout collar and a DO-NOT-CLOSE tag:
(a) 11R19, CARGO HEAT VALVE FWD CONT

S 019-737

- (4) Open the forward cargo door, 821 (AMM 06-41-00/201).

S 019-719

- (5) Remove the aft bulkhead lining of the forward cargo compartment to get access to the valve.

S 219-738

- (6) Make sure the forward cargo heating flow control valve is in the CLOSED position.

S 039-739

- (7) Disconnect, cap and stow the electrical connector from the valve.

S 419-720

- (8) Install the aft bulkhead lining in the forward cargo compartment.

S 419-721

- (9) Close the forward cargo door, 821 (AMM 06-41-00/201).

S 039-740

- (10) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C panel.

S 869-741

- (11) Tell the dispatch person that the forward cargo heating flow control valve is inoperative.

K. Forward Cargo A/C Ground Exhaust Fan (B378) Deactivation

NOTE: This maintenance task provides the instructions to deactivate the forward cargo A/C ground exhaust fan (B378).

S 869-722

- (1) Push the FWD CARGO A/C switchlight (P5 panel) to the OFF position.
(a) Make sure the ON light goes off.
(b) Attach a DO-NOT-OPERATE tag to the FWD CARGO A/C panel.

S 019-723

- (2) Open the access door, 119AL, for the main equipment center (AMM 06-41-00/201).

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- S 869-724
- (3) Open this circuit breaker on the miscellaneous equipment panel, P37, and attach a lockout collar and a DO-NOT-CLOSE tag:
- (a) 37J6, GND EXH FAN
- S 019-725
- (4) Open the forward cargo door, 821 (AMM 06-46-00/201).
- S 019-726
- (5) Remove the floor panel, to get access to the fan, which are 6 feet aft of the forward cargo door near the center line of the cargo compartment.
- S 029-727
- (6) Disconnect, cap and stow the electrical connector from the ground exhaust fan.
- S 419-728
- (7) Install the floor panels in the forward cargo compartment.
- S 419-729
- (8) Close the forward cargo door, 821 (AMM 06-46-00/201).
- S 419-730
- (9) Close the access door, 119AL, for the main equipment center (AMM 06-41-00/201).
- S 029-731
- (10) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C panel.

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TASK 21-00-00-449-528

3. DDG 21-28-1, Restoration - Forward Cargo Air Conditioning System (Fig. 901)

A. General

- (1) This procedure has instructions to restore the airplane back to its usual condition after flight operations with inoperative component(s) of the forward cargo air conditioning system.
- (2) Instructions for reactivation of the inoperative components are provided below:
 - (a) Forward Cargo A/C Exhaust Valve (V382) Reactivation
 - (b) Forward Cargo A/C Ground Exhaust Valve (V383) Reactivation
 - (c) Forward Cargo A/C Ground Exhaust Backup Valve (V384) Reactivation
 - (d) Forward Cargo A/C Zone Trim Air Modulating Valve (V385) Reactivation
 - (e) Forward Cargo A/C Shutoff Valve (V381) Reactivation
 - (f) Forward Cargo A/C Trim/Heat Shutoff Valve (V89) Reactivation
 - (g) Forward Cargo Heating Flow Control Valve (V88) Reactivation
 - (h) Forward Cargo A/C Ground Exhaust Fan (B378) Reactivation

B. Forward Cargo A/C Exhaust Valve (V382) Reactivation

S 449-529

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P11 overhead circuit breaker panel:
 - (a) 11C20, CGO EXH VLV

S 449-530

- (2) Replace the inoperative forward cargo exhaust valve (AMM 21-26-10/401).

C. Forward Cargo A/C Ground Exhaust Valve (V383) Reactivation

S 449-531

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P37 right miscellaneous electrical equipment panel:
 - (a) 37E3, CGO GND EXH VLV

S 449-532

- (2) Replace the inoperative forward cargo ground exhaust valve (AMM 21-26-11/401).

D. Forward Cargo A/C Ground Exhaust Backup Valve (V384) Reactivation

S 449-533

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P36 left miscellaneous electrical equipment panel:
 - (a) 36E4, CGO EXH B/U VLV

S 449-534

- (2) Replace the inoperative forward cargo ground exhaust backup valve (AMM 21-26-11/401).

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E. Forward Cargo A/C Zone Trim Air Modulating Valve (V385) Reactivation

S 449-535

- (1) Replace the inoperative forward cargo trim air modulating valve (AMM 21-61-07/401).

F. Forward Cargo A/C Shutoff Valve (V381) Reactivation

S 449-536

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P37 right miscellaneous electrical equipment panel:
 - (a) 37E4, CGO A/C SOV CONT

S 449-537

- (2) Replace the inoperative forward cargo a/c shutoff valve (AMM 21-28-01/401).

G. Forward Cargo A/C Trim/Heat Shutoff Valve (V89) Reactivation

S 449-539

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P11 overhead circuit breaker panel:
 - (a) 11R21, FWD CARGO HEAT OVERRIDE

S 449-538

- (2) Replace the inoperative forward cargo trim/heat shutoff valve (AMM 21-43-01/401).

H. Forward Cargo Heating Flow Control Valve (V88) Reactivation

S 449-733

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P11 overhead circuit breaker panel:
 - (a) 11R19, CARGO HEAT VALVE FWD CONT

S 429-734

- (2) Reconnect the electrical connector to the forward cargo heat flow control valve (V88).

I. Forward Cargo A/C Ground Exhaust Fan (B378) Reactivation

S 449-540

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P37 left miscellaneous electrical equipment panel:
 - (a) 37J6, GND EXH FAN

S 449-541

- (2) Replace the inoperative forward cargo ground exhaust fan (AMM 21-26-12/401).

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TASK 21-00-00-049-015

4. DDG 21-31-1, Preparation - AUTO Cabin Pressure Control System (Fig. 902)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the AUTO 1 and/or AUTO 2 mode is inoperative for the cabin pressure control system.

B. Equipment

- (1) A21008-1, Outflow Valve Hold-Open Tool

C. References

- (1) AMM 21-31-00/501, Cabin Pressure Control System

D. Access

- (1) Location Zones
211 Control Cabin, Left
212 Control Cabin, Right

E. Procedure 1 - AUTO 1 or AUTO 2 Inoperative

S 049-510

- (1) Install an "AUTO 1(2) INOP" placard adjacent to the MODE SELECT switch on the cabin pressure selector panel on the P5 overhead panel

S 049-509

- (2) Do a test of the MANUAL cabin pressure control system to make sure that the manual control function of the outflow valve is operational (AMM 21-31-00/501).

S 049-511

- (3) Move the MODE SELECT switch to the AUTO 1 or AUTO 2 position which is still operational.

F. Procedure 2 - Both AUTO 1 and AUTO 2 Inoperative

S 049-512

- (1) Install an "AUTO 1/2 INOP" and "UNPRESSURIZED FLIGHT ONLY" placards to the cabin pressure selector panel on the P5 overhead panel.

S 049-513

- (2) Do the "Required Maintenance Procedure for Unpressurized Flight".

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G. Required Maintenance Procedure for Unpressurized Flight

NOTE: This procedure makes sure that the E/E equipment center can become sufficiently clear of smoke and that sufficient fire suppression capability exists in the cargo compartments during unpressurized flight operations. The cargo compartments are to stay empty during unpressurized flights.

S 049-515

- (1) Set the position of the cabin pressure outflow valve for unpressurized flight:
 - (a) If the MANUAL mode operates normally, manually set the outflow valve at a 25-percent OPEN position:
 - 1) Move the MODE SELECT switch on the cabin pressure selector panel (P5) to the MAN position.
 - 2) Turn the MANUAL selector switch toward CLIMB to open the outflow valve or toward DESCEND to close the outflow valve, until the VALVE indication moves to the 25-percent OPEN position.
 - (b) If the MANUAL mode is inoperative, install the A21008-1 Outflow Valve Hold-Open tool:

NOTE: ETOPS operations (extended overwater flights) are prohibited if the A21008-1 outflow valve hold-open tool is installed or the outflow valve is inoperative. Advise dispatch.

- 1) Open this circuit breaker on the P11 overhead circuit breaker panel, and install a circuit breaker lock (collar):
 - a) 11B14, CABIN ALTITUDE CONT MANUAL
- 2) Open the bulk cargo door, 811, to get access to the bulk cargo compartment.
- 3) Remove the aft endwall liner to get access to the outflow valve.
- 4) Remove the debris screen which surrounds the outflow valve and stow the debris screen.
- 5) Disconnect the outflow valve actuator connector rod from the actuator drive arm and the valve linkage.
 - a) Stow the actuator connector rod.
- 6) Remove the connection pin from the hold-open tool A21008-1.

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- 7) Install the A21008-1 tool halves to the outflow valve linkage and to the adjacent airplane structure.
- 8) Adjust the rod end of the hold-open tool A21008-1 until the distance between the outflow valve flapper doors is 0.35-inches with the hold-open tool in the installed position.
- 9) Install the connection pin to the hold-open tool A21008-1.
- 10) Install a lockwire from the outflow valve attach bolt to the hold-open tool, and from the thumbscrew to the hold-open tool.
- 11) Install the aft endwall liner in the bulk cargo compartment.
- 12) Close the bulk cargo door, 811.

S 869-022

- (2) Determine the number of air conditioning cooling packs and air recirculation fans to be operated during unpressurized flight:

NOTE: When the airplane is configured for unpressurized flight, both the left and right air conditioning packs must not be in operation at the same time.

- (a) If both the left and right air conditioning cooling packs are off, then both the left and right recirculation fans must be on.
- (b) If either the left or right air conditioning cooling pack is on, then either the left or right recirculation fan must be on.

S 869-305

- (3) Set the configuration of the E/E equipment cooling system for unpressurized flight:

NOTE: With this procedure, the equipment cooling system STBY and OVRD mode of operation will not be available. If there is a failure of an E/E cooling fan, or a combination failure of the air conditioning packs and recirculation fans, a loss of E/E equipment cooling capability can occur.

- (a) Move the EQUIP COOLING selector, on the pilot's overhead panel, P5, to AUTO position.

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- (b) Open these circuit breakers on the pilot's overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
 - 1) 11B8, STBY EQUIP COOL
 - 2) 11P13, EQUIPMENT COOLING OUTBD VLVS
 - 3) 11P15, CABIN ALT CONTROL AUTO 1
 - 4) 11P23, CABIN ALT CONTROL AUTO 2
- (c) If you could not manually move the outflow valve with the cabin pressure MODE SELECT switch in MAN position (MANUAL mode inoperative), then open these circuit breakers on the pilot's overhead panel, P11, and install circuit breaker locks and DO-NOT-CLOSE tags:
 - 1) 11B14, CABIN ALTITUDE CONT MANUAL
 - 2) 11B15, CABIN ALTITUDE CONT SELECT
- (d) Do these steps to manually open the overboard exhaust valve for the E/E equipment cooling system:
 - 1) From outside of the airplane, install a 3/8-inch drive wrench into the manual drive collar located by the overboard exhaust valve port then push in to engage the manual override.
 - 2) Turn the 3/8-inch drive wrench through the point of initial resistance to the full open stop position.
 - 3) Do a visual check to confirm that the overboard exhaust valve is fully open.
 - 4) Remove the 3/8-inch drive wrench from the manual drive collar.
- (e) Do these steps to manually change the position of the manifold interconnect valve for the E/E equipment cooling system:
 - 1) Open the main equipment center access door, 119AL, to get access to the manifold interconnect valve which is on the right sidewall and outboard of the nose gear wheel well.
 - 2) Disconnect the electrical connector, D3058, from the manifold interconnect valve, then install protective caps and secure the connector.
 - 3) Operate the manual override to manually move the manifold interconnect valve to the fully open (C to B) position.

NOTE: This will permit conditioned air to be supplied to the flight deck.
- (f) Do these steps to confirm that the inboard supply valve is in the open position and that shutoff valve for the skin heat exchanger is in the closed position:
 - 1) Open the forward cargo door, 821, to get access to the forward cargo compartment.
 - 2) Remove the left sidewall lining that is located approximately 11 feet (3.35 meters) aft of the forward bulkhead to get access to the inboard supply valve.
 - 3) Do a visual check of the inboard supply valve position indicator to confirm that it is in the open position.
 - 4) Reinstall the left sidewall lining.

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- 5) Remove the floor panel that is located approximately 7 feet (2.13 meters) aft of the forward bulkhead and to the left of the airplane centerline to get access to the shutoff valve.
 - 6) Do a visual check of the shutoff valve position indicator to confirm that the shutoff valve is closed.
 - 7) Reinstall the floor panel.
 - (g) Get access to the right miscellaneous electrical equipment panel, P37, in the main equipment center, then do these steps:
 - 1) Remove and stow the wire from the terminal block, TB274 (XC12), and which is connected to the equipment cool standby relay, K629, at pin 4 on connector, D10078 (WDM 21-58-14).
 - 2) Make a jumper wire with 10 feet of 20 gauge wire, a pin connector BACC47DE7, and a pin connector MS39029/11-145 (SWPM 20-90-11).
 - 3) Install the jumper wire between the terminal block, TB274 (XC12) and the DC ground connection, GDX9 (WDM 21-58-14).
 - (h) If both (left/right) air conditioning packs are inoperative, disable the ground crew call horn:
 - 1) Open this circuit breaker on the P6 circuit breaker panel, and install a circuit breaker lock (collar):
 - a) 6D6, EQUIP COOL GND WARN
 - 2) If any Inertial Reference Unit (IRU) is on, make sure the Right AC Bus is powered to prevent battery discharge.
- S 869-025
- (4) Tell the dispatch persons that the subsequent flight must be done unpressurized.
- S 419-026
- (5) Close the forward cargo door, 821.
- S 419-027
- (6) Close the main equipment center access door, 119AL.

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TASK 21-00-00-449-516

5. DDG 21-31-1, Restoration - AUTO Cabin Pressure Control System (Fig. 902)
- A. General
- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with inoperative (AUTO 1/AUTO 2) cabin pressure control systems.
- B. Restoration Procedure 1 - AUTO 1 or AUTO 2 Inoperative
- S 449-517
- (1) Remove the "INOP" placard from the cabin pressure selector panel on the P5 overhead panel.
- S 449-518
- (2) Use the 21-FAULT CODE INDEX procedure to identify the FIM task associated with an inoperative AUTO 1(2) cabin pressure control system, then do the specified FIM task.
- C. Restoration Procedure 2 - Both AUTO 1 and AUTO 2 Inoperative
- S 449-520
- (1) Do the "Required Maintenance Procedure for Pressurized Flight".
- S 449-519
- (2) Use the 21-FAULT CODE INDEX procedure to identify the FIM task associated with inoperative (AUTO 1/AUTO 2) cabin pressure control systems, then do the specified FIM task.
- D. Required Maintenance Procedure for Pressurized Flight
- S 449-521
- (1) Remove the "AUTO 1/2 INOP" and "UNPRESSURIZED FLIGHT ONLY" placards from the cabin pressure selector panel on the P5 overhead panel.
- S 449-525
- (2) Remove the A21008-1 Outflow Valve Hold-Open tool (if installed).
- S 449-522
- (3) Remove the circuit breaker locks (collars) and close these circuit breakers:
- (a) P6 Power Distribution Panel:
- 1) 6D6, EQUIP COOL GND WARN
- (b) P11 Overhead Circuit Breaker Panel:
- 1) 11B14, CABIN ALTITUDE CONT MANUAL
- 2) 11B15, CABIN ALTITUDE CONT SELECT
- 3) 11P13, EQUIPMENT COOLING OUTBD VLVS
- 4) 11P15, CABIN ALT CONTROL AUTO 1
- 5) 11P23, CABIN ALT CONTROL AUTO 2
- S 019-524
- (4) Open the main equipment center access door, 119AL.

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- S 449-523
- (5) Reconnect the electrical connector, D3058, to the manifold interconnect valve for the E/E equipment cooling system.
- S 449-526
- (6) AIRPLANES WITH 1 SUPPLY FAN SYSTEM;
Do these steps at the P37 right miscellaneous electrical equipment panel:
- (a) Remove the jumper wire installed between the terminal block TB274 (XC12) and the DC ground connection GDX9 (WDM 21-58-14).
 - (b) Reconnect the wire to the terminal block TB274 (XC12) for pin 4 of connector D10078 at the equip cool standby relay, K629 (WDM 21-58-14).
- S 449-527
- (7) Set the EQUIP COOL selector to the AUTO position on the P5 overhead panel.

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TASK 21-00-00-049-028

6. DDG 21-31-2, Preparation - MANUAL Cabin Pressure Control System

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the MANUAL mode is inoperative for the cabin pressure control system.

B. Access

(1) Location Zones

- | | |
|-----|----------------------|
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Procedure

S 939-209

- (1) Install a placard "MANUAL MODE INOP" adjacent to the MODE SELECT switch on the cabin pressure selector panel which is located on the pilot's overhead panel, P5.

S 049-210

- (2) Do the required maintenance procedure for unpressurized flight in the DDG 21-31-1 Preparation task.

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TASK 21-00-00-449-324

7. DDG 21-31-2, Restoration - MANUAL Cabin Pressure Control System

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with the cabin pressure control system inoperative in the MANUAL mode.

B. References

- (1) AMM 21-31-00/501, Cabin Pressure Control System

C. Procedure

S 449-326

- (1) Use the FIM 21-FAULT CODE INDEX procedure to identify the fault isolation task for an inoperative MANUAL mode, then do the specified FIM task.

S 449-327

- (2) Do an operational test of the MANUAL mode (AMM 21-31-00/501).

S 049-328

- (3) Remove the "MANUAL MODE INOP" placard on Cabin Pressure Selector panel (P5).

S 449-325

- (4) Do the required maintenance procedure for pressurized flight per the DDG 21-31-1 Restoration task.

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TASK 21-00-00-049-029

8. DDG 21-31-3, Preparation - Outflow Valve (Fig. 902)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the outflow valve is inoperative for the cabin pressure control system.

B. Access

(1) Location Zones

- | | |
|-----|----------------------|
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Procedure

S 939-211

- (1) Install a placard "OUTFLOW VLV INOP" adjacent to the MODE SELECT switch on the cabin pressure selector panel which is located on the pilot's overhead panel, P5.

S 049-212

- (2) Do the required maintenance procedure for unpressurized flight in the maintenance task for DDG 21-31-1.

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TASK 21-00-00-449-329

9. DDG 21-31-3, Restoration - Outflow Valve (Fig. 902)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative outflow valve.

B. References

- (1) AMM 21-31-03/201, Cabin Pressure Outflow Valve

C. Procedure

S 449-330

- (1) Replace the inoperative outflow valve (AMM 21-31-03/201).

S 049-331

- (2) Remove the "OUTFLOW VLV INOP" placard on Cabin Pressure Selector panel (P5).

S 449-332

- (3) Do the required maintenance procedure for pressurized flight per the DDG 21-31-1 Restoration task.

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TASK 21-00-00-049-030

10. DDG 21-32-1, Preparation - Positive Pressure Relief Valves

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one positive pressure relief valve is inoperative and is deactivated in the closed position.
- (2) This maintenance task also provides the instructions to prepare the airplane for dispatch when both positive pressure relief valves are inoperative.

B. Access

(1) Location Zones

- | | |
|-----|---------------------------------|
| 121 | Forward Cargo Compartment, Left |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Positive Pressure Relief Valve Deactivation - Closed Position (One valve)

S 019-219

- (1) Open the forward cargo door, 821, to get access to the forward cargo compartment.

S 019-220

- (2) Remove the left sidewall lining(s) aft of the cargo door opening to get access to the positive pressure relief valves.

S 029-222

- (3) Disconnect the static sense lines from both the primary and secondary metering ports on the positive pressure relief valve which is inoperative, then install protective caps.

S 219-223

- (4) Do a visual check of the positive pressure relief valve from the inside and outside of the airplane to confirm that it is fully closed.

NOTE: From the outside of the airplane, you will have to open the valve's flapper doors to view the valve's position. Make sure you remember to close the flapper doors.

S 419-224

- (5) Reinstall the left sidewall lining.

S 419-225

- (6) Close the forward cargo door, 821.

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S 939-226

- (7) Install a placard "POS PRESS RELIEF VLV INOP" adjacent to the cabin pressure selector panel which is located on the pilot's overhead panel, P5.

D. Positive Pressure Relief Valves Inoperative (Both)

S 939-227

- (1) Install a placard "POS PRESS RELIEF VLVS INOP" adjacent to the cabin pressure selector panel which is located on the pilot's overhead panel, P5.

S 049-228

- (2) Do the required maintenance procedure for unpressurized flight in the maintenance task for DDG 21-31-1.

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TASK 21-00-00-449-333

11. DDG 21-32-1, Restoration - Positive Pressure Relief Valves

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with (one/both) positive pressure relief valves inoperative.

B. References

- (1) AMM 21-32-01/201, Positive Pressure Relief Valves

C. Restoration Procedure (One Valve Inoperative)

S 449-338

- (1) Replace the inoperative positive pressure relief valve (AMM 21-32-01/201).
 - (a) Make sure the static sense lines are reconnected to the primary and secondary metering ports on the new positive pressure relief valve.

S 049-339

- (2) Remove the "POS PRESS RELIEF VALVE(S) INOP" placard from the Cabin Pressure Selector panel.

D. Restoration Procedure (Both Valves Inoperative)

S 449-334

- (1) Replace both positive pressure relief valves (AMM 21-32-01/201).

S 049-335

- (2) Remove the "POS PRESS RELIEF VALVE(S) INOP" placard from the Cabin Pressure Selector panel.

S 449-336

- (3) Do the required maintenance procedure for pressurized flight per the DDG 21-31-1 Restoration task.

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TASK 21-00-00-049-031

12. DDG 21-33-1, Preparation - Cabin Rate of Climb Indicator

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the cabin rate of climb indicator is inoperative for the cabin pressure control system.

B. Access

(1) Location Zones

- | | |
|-----|----------------------|
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Procedure

S 939-213

- (1) Install a placard "INOP" adjacent to the cabin rate of climb indicator which is located on the pilot's overhead panel, P5.

S 049-214

- (2) Do the required maintenance procedure for unpressurized flight in the maintenance task for DDG 21-31-1.

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TASK 21-00-00-449-337

13. DDG 21-33-1, Restoration - Cabin Rate of Climb Indicator

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative CABIN RATE of climb indicator.

B. References

- (1) AMM 21-33-01/401, Cabin Pressurization Indicator

C. Procedure

S 449-341

- (1) Replace the cabin pressurization indicator (P5) with the inoperative CABIN RATE of climb indicator (AMM 21-33-01/401).

S 049-342

- (2) Remove the "CABIN RATE INOP" placard from the cabin pressurization indicator (P5).

S 449-340

- (3) Do the required maintenance procedure for pressurized flight per the DDG 21-31-1 Restoration task.

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TASK 21-00-00-049-032

14. DDG 21-33-2, Preparation - Cabin Differential Pressure Indicator

A. General

- (1) This maintenance task provides the instructions to prepare the airplanes for dispatch when the cabin differential pressure indicator is inoperative for the cabin pressure control system.

B. Access

(1) Location Zones

- | | |
|-----|----------------------|
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Procedure

S 939-215

- (1) Install a placard "INOP" adjacent to the cabin differential pressure indicator which is located on the pilot's overhead panel, P5.

S 049-216

- (2) Do the required maintenance procedure for unpressurized flight in the maintenance task for DDG 21-31-1.

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TASK 21-00-00-449-343

15. DDG 21-33-2, Restoration - Cabin Differential Pressure Indicator

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative CABIN DIFF pressure indicator.

B. References

- (1) AMM 21-33-01/401, Cabin Pressurization Indicator

C. Procedure

S 449-344

- (1) Replace the cabin pressurization indicator (P5) with the inoperative CABIN DIFF pressure indicator (AMM 21-33-01/401).

S 049-345

- (2) Remove the "CABIN DIFF INOP" placard from the cabin pressurization indicator (P5).

S 449-346

- (3) Do the required maintenance procedure for pressurized flight per the DDG 21-31-1 Restoration task.

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TASK 21-00-00-049-033

16. DDG 21-33-3, Preparation - Cabin Altitude Indicator

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the cabin altitude indicator is inoperative for the cabin pressure control system.

B. Access

(1) Location Zones

- | | |
|-----|----------------------|
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Procedure

S 939-217

- (1) Install a placard "INOP" adjacent to the cabin altitude indicator which is located on the pilot's overhead panel, P5.

S 049-218

- (2) Do the required maintenance procedure for unpressurized flight in the maintenance task for DDG 21-31-1.

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TASK 21-00-00-449-347

17. DDG 21-33-3, Restoration - Cabin Altitude Indicator

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative CABIN ALT indicator.

B. References

- (1) AMM 21-33-01/401, Cabin Pressurization Indicator

C. Procedure

S 449-348

- (1) Replace the cabin pressurization indicator (P5) with the inoperative CABIN ALT indicator (AMM 21-33-01/401).

S 049-349

- (2) Remove the "CABIN ALT INOP" placard from the cabin pressurization indicator (P5).

S 449-350

- (3) Do the required maintenance procedure for pressurized flight per the DDG 21-31-1 Restoration task.

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TASK 21-00-00-049-034

18. DDG 21-40-1, Preparation - Cargo Heating Systems (Fig. 903)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one of the cargo compartment heat systems (forward, aft or bulk) is inoperative.

B. Access

(1) Location Zones

- | | |
|-----|--|
| 153 | Aft Cargo Compartment, Left |
| 194 | Wing to Body - Forward Lower Half, Right |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|----------------------------|
| 194LR | ECS Bay Access Door, Right |
|-------|----------------------------|

C. Forward Cargo Heat System Deactivation

S 019-735

- (1) Get access to the forward cargo heating valves:
 - (a) For the forward cargo heating shutoff valve (V89), open the right ECS bay access door 194LR.
 - (b) For the forward cargo heating flow control valve (V88), open the right ECS bay access door 194LR.

S 029-230

- (2) Disconnect the electrical connector from either the shutoff or control valve, then install protective caps and stow the electrical connector.

S 989-231

- (3) Manually close the same shutoff or control valve which had it's electrical connector disconnected in the previous step.
 - (a) Pull the manual override knob to disengage the valve motor, then move the knob to the fully locked closed position.

S 419-232

- (4) Close the right ECS bay access door, 194LR.

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S 049-354

- (5) Do one of these steps to inhibit the EICAS message FWD CARGO OVHT (Advisory) and the FWD OVHT light (P5) when the forward cargo heat control valve is closed:
 - (a) Disconnect, cap, and stow the electrical connector from the forward cargo overheat temperature switch (S363).
 - (b) Remove the fwd cargo overheat relay (K231) in the P37 right miscellaneous electrical equipment panel.

S 939-233

- (6) Install a placard "FWD CARGO HEAT INOP" adjacent to the cargo heat selector panel which is located on the pilot's overhead panel, P5.

S 869-234

- (7) Tell the dispatch persons that the forward cargo heat system is inoperative.

D. Aft Cargo Heat System Deactivation

S 019-235

- (1) Open the aft cargo door, 822, to get access to the aft cargo compartment.

S 019-236

- (2) Remove the left sidewall lining(s) just forward of the bulk cargo door to get access to the aft cargo heat shutoff valve and control valve.

S 029-237

- (3) Disconnect the electrical connector from either the shutoff or control valve, then install protective caps and stow the electrical connector.

S 989-238

- (4) Manually close the same shutoff or control valve which had it's electrical connector disconnected in the previous step.
 - (a) Pull the manual override knob to disengage the valve motor, then move the knob to the fully locked closed position.

S 419-239

- (5) Install the left sidewall lining(s).

S 419-240

- (6) Close the aft cargo door, 822.

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S 939-241

- (7) Install a placard "AFT CARGO HEAT INOP" adjacent to the cargo heat selector panel which is located on the pilot's overhead panel, P5.

S 869-242

- (8) Tell the dispatch persons that the aft cargo heat system is inoperative.

E. Bulk Cargo Heat System Deactivation

S 019-243

- (1) Open the aft cargo door, 822, to get access to the aft cargo compartment.

S 019-244

- (2) Remove the left sidewall lining(s) just forward of the bulk cargo door to get access to the bulk cargo heat shutoff valve and control valve.

S 029-245

- (3) Disconnect the electrical connector from either the shutoff or control valve, then install protective caps and stow the electrical connector.

S 989-246

- (4) Manually close the same shutoff or control valve which had it's electrical connector disconnected in the previous step.
 - (a) Pull the manual override knob to disengage the valve motor, then move the knob to the fully locked closed position.

S 419-247

- (5) Install the left sidewall lining(s).

S 419-248

- (6) Close the aft cargo door, 822.

S 939-249

- (7) Install a placard "BULK CARGO HEAT INOP" adjacent to the cargo heat selector panel which is located on the pilot's overhead panel, P5.

S 869-250

- (8) Tell the dispatch persons that the bulk cargo heat system is inoperative.

S 869-251

- (9) Make sure that the BULK CARGO HEAT selector on the right side panel, P61, is in the NORM position.

S 939-252

- (10) Install an "INOP" placard adjacent to the VENT or ANIMAL switch position of the BULK CARGO HEAT selector found on the P61 panel.

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S 869-253

- (11) Tell the dispatch persons that the bulk cargo ventilation fan is inoperative.

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TASK 21-00-00-449-351

19. DDG 21-40-1, Restoration - Cargo Heating Systems (Fig. 903)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (fwd/aft/bulk) cargo heating system.

B. References

- (1) AMM 21-43-00/501, Forward Cargo Compartment Heating System
- (2) AMM 21-44-00/501, Aft/Bulk Cargo Compartment Heating System

C. Restoration Procedure 1 - Forward Cargo Heating System Inoperative

S 019-736

- (1) Get access to the forward cargo heating valves:
 - (a) For the forward cargo heating shutoff valve (V89), open the right ECS bay access door 194LR.
 - (b) For the forward cargo heating flow control valve (V88), open the right ECS bay access door 194LR.

S 449-356

- (2) Connect the electrical connector for the forward cargo heat shutoff valve and/or control valve.

S 449-357

- (3) Do one of these steps to activate the EICAS message FWD CARGO OVHT (Advisory) and the FWD OVHT light (P5) if the forward cargo heat control valve was closed:
 - (a) Connect the electrical connector for the forward cargo overheat temperature switch (S363).
 - (b) Install the fwd cargo overheat relay (K231) in the P37 right miscellaneous electrical equipment panel.

S 049-358

- (4) Remove the "FWD CARGO HEAT INOP" placard from the Cargo Heat control panel (P5).

S 449-352

- (5) Use the FIM 21-FAULT CODE INDEX procedure to identify the fault isolation task for an inoperative forward cargo heating system, then do the specified FIM task.

S 449-353

- (6) Do an operational test of the forward cargo heating system (AMM 21-43-00/501).

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D. Restoration Procedure 2 - Aft Cargo Heating System Inoperative

S 019-359

- (1) Get access to the aft cargo heat shutoff valve and/or control valve behind the left sidewall across from the aft cargo door.

S 449-360

- (2) Connect the electrical connector for the aft cargo heat shutoff valve and/or control valve.

S 049-361

- (3) Remove the "AFT CARGO HEAT INOP" placard from the Cargo Heat control panel (P5).

S 449-362

- (4) Use the FIM 21-FAULT CODE INDEX procedure to identify the fault isolation task for an inoperative aft cargo heating system, then do the specified FIM task.

S 449-363

- (5) Do an operational test of the aft cargo heating system (AMM 21-44-00/501).

E. Restoration Procedure 3 - Bulk Cargo Heating System Inoperative

S 019-364

- (1) Get access to the bulk cargo heat shutoff valve and/or control valve behind the left sidewall across from the aft cargo door.

S 449-365

- (2) Connect the electrical connector for the bulk cargo heat shutoff valve and/or control valve.

S 049-366

- (3) Remove the "BULK CARGO HEAT INOP" placard from the Cargo Heat control panel (P5).

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- S 049-650
- (4) Remove the 'INOP' placard from the BULK CARGO HEAT selector on the P61 panel.
- S 449-367
- (5) Use the FIM 21-FAULT CODE INDEX procedure to identify the fault isolation task for an inoperative bulk cargo heating system, then do the specified FIM task.
- S 449-368
- (6) Do an operational test of the bulk cargo heating system (AMM 21-44-00/501).

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TASK 21-00-00-049-035

20. DDG 21-40-2, Preparation - Cargo Heat Indication Systems (Fig. 903)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one of the cargo compartment (forward, aft or bulk) heat indication systems (OVHT and/or ON switch-lights) is inoperative.

B. Access

(1) Location Zones

121	Forward Cargo Compartment, Left
122	Forward Cargo Compartment, Right
153	Aft Cargo Compartment, Left
154	Aft Cargo Compartment, Right
161	Bulk Cargo Compartment, Left
162	Bulk Cargo Compartment, Right
211	Control Cabin, Left
212	Control Cabin, Right

C. Forward Cargo Heat Indication System Deactivation

S 869-272

- (1) If the forward cargo heat system will not be used during flight, do these steps:
 - (a) Make sure the FWD CARGO HEAT switch-light, on the pilot's overhead panel, P5, is off.
 - (b) Install a placard "FWD HEAT INOP" adjacent to the cargo heat selector panel.

S 719-273

- (2) If the forward cargo heat system will be used during the flight, do these steps to make sure the overheat protection system operates properly with no OVHT indication:
 - (a) Push the FWD CARGO HEAT switch-light, on the pilot's overhead panel, P5, to the ON position.

NOTE: If the ON light does not come on, you will need to get access to the forward cargo heat shutoff valve in the right ECS bay to confirm that the valve is in the open position.

- (b) Open the right ECS bay access door, 194LR, to get access to the forward cargo heat shutoff valve.
- (c) Make sure the valve position indicator on the shutoff valve has moved to the open position.
- (d) Open the forward cargo door, 821, to get access to the forward cargo compartment.
- (e) Remove the cargo hardware and floor panel in the center of the cargo compartment and just aft of the cargo doorway to get access to the cargo heat temperature switches.

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- (f) Hold a thermometer adjacent to the overheat temperature switch, S363.
- (g) Apply a heat source to the overheat temperature switch which is sufficient to heat the switch to 90-degrees Fahrenheit (32-degrees Celsius).
- (h) Make sure when the thermometer reads 90 (+/-5) degrees Fahrenheit that the valve position indicator on the shutoff valve moves to the closed position.
- (i) Remove the heat source from the overheat temperature switch and allow the switch to become cool (less than 80-degrees Fahrenheit).
- (j) Make sure when the thermometer reads less than 80 (+/-5) degrees Fahrenheit, that the valve position indicator on the shutoff valve moves to the open position.
- (k) Remove the thermometer from the overheat temperature switch.
- (l) Install the floor panel and cargo hardware in the forward cargo compartment.
- (m) Close the forward cargo door, 821.
- (n) Close the right ECS bay access door, 194LR.
- (o) Push the FWD CARGO HEAT switch-light to the off position.
- (p) Install a placard "FWD HEAT INDICATION INOP" adjacent to the cargo heat selector panel.

D. Aft Cargo Heat Indication System Deactivation

S 869-274

- (1) If the aft cargo heat system will not be used during flight, do these steps:
 - (a) Make sure the AFT CARGO HEAT switch-light, on the pilot's overhead panel, P5, is off.
 - (b) Install a placard "AFT HEAT INOP" adjacent to the cargo heat selector panel.

S 719-275

- (2) If the aft cargo heat system will be used during the flight, do these steps to make sure the overheat protection system operates properly with no OVHT indication:
 - (a) Push the AFT CARGO HEAT switch-light, on the pilot's overhead panel, P5, to the ON position.

NOTE: If the ON light does not come on, you will need to get access to the aft cargo heat shutoff valve in the aft cargo compartment to confirm that the valve is in the open position.

- (b) Open the aft cargo door, 822, to get access to the aft cargo compartment.
- (c) Remove the left sidewall lining(s) just forward of the bulk cargo door to get access to the aft cargo heat shutoff valve.
- (d) Make sure the valve position indicator on the shutoff valve has moved to the open position.

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- (e) Remove the cargo hardware and floor panel in the center of the cargo compartment and forward of the cargo doorway to get access to the cargo heat temperature switches.
- (f) Hold a thermometer adjacent to the overheat temperature switch, S64.
- (g) Apply a heat source to the overheat temperature switch which is sufficient to heat the switch to 90-degrees Fahrenheit (32-degrees Celsius).
- (h) Make sure when the thermometer reads 90 (+/-5) degrees Fahrenheit that the valve position indicator on the shutoff valve moves to the closed position.
- (i) Remove the heat source from the overheat temperature switch and allow the switch to become cool (less than 80-degrees Fahrenheit).
- (j) Make sure when the thermometer reads less than 80 (+/-5) degrees Fahrenheit, that the valve position indicator on the shutoff valve moves to the open position.
- (k) Remove the thermometer from the overheat temperature switch.
- (l) Install the floor panel and cargo hardware in the aft cargo compartment.
- (m) Install the left sidewall lining(s) just forward of the bulk cargo door.
- (n) Close the aft cargo door, 822.
- (o) Push the AFT CARGO HEAT switch-light to the off position.
- (p) Install a placard "AFT HEAT INDICATION INOP" adjacent to the cargo heat selector panel.

E. Bulk Cargo Heat Indication System Deactivation

S 869-277

- (1) If the bulk cargo heat system will not be used during flight, do these steps:
 - (a) Make sure the BULK CARGO HEAT switch-light, on the pilot's overhead panel, P5, is off.
 - (b) Install a placard "BULK HEAT INOP" adjacent to the cargo heat selector panel.

S 719-276

- (2) If the bulk cargo heat system will be used during the flight, do these steps to make sure the overheat protection system operates properly with no OVHT indication:
 - (a) Push the BULK CARGO HEAT switch-light, on the pilot's overhead panel, P5, to the ON position.

NOTE: If the ON light does not come on, you will need to get access to the bulk cargo heat shutoff valve in the aft cargo compartment to confirm that the valve is in the open position.

- (b) Open the aft cargo door, 822, to get access to the aft cargo compartment.

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- (c) Remove the left sidewall lining(s) just forward of the bulk cargo door to get access to the bulk cargo heat shutoff valve.
- (d) Make sure the valve position indicator on the shutoff valve has moved to the open position.
- (e) Open the bulk cargo door, 811, to get access to the bulk cargo compartment.
- (f) Remove the air inlet grille from right sidewall lining aft of the cargo doorway to get access to the cargo heat temperature switches.
- (g) Hold a thermometer adjacent to the overheat temperature switch, S500.
- (h) Apply a heat source to the overheat temperature switch which is sufficient to heat the switch to 90-degrees Fahrenheit (32-degrees Celsius).
- (i) Make sure when the thermometer reads 90 (+/-5) degrees Fahrenheit that the valve position indicator on the shutoff valve moves to the closed position.
- (j) Remove the heat source from the overheat temperature switch and allow the switch to become cool (less than 80-degrees Fahrenheit).
- (k) Make sure when the thermometer reads less than 80 (+/-5) degrees Fahrenheit, that the valve position indicator on the shutoff valve moves to the open position.
- (l) Remove the thermometer from the overheat temperature switch.
- (m) Install the air inlet grille to right sidewall lining in the bulk cargo compartment.
- (n) Install the left sidewall lining(s).
- (o) Close the aft cargo door, 822, and the bulk cargo door, 811.
- (p) Push the BULK CARGO HEAT switch-light to the off position.
- (q) Install a placard "BULK HEAT INDICATION INOP" adjacent to the cargo heat selector panel.

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TASK 21-00-00-449-505

21. DDG 21-40-2, Restoration - Cargo Heat Indication Systems (Fig. 903)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (FWD/AFT/BULK) cargo compartment temperature indication system (OVHT/ON lights) on the P5 overhead panel.

B. Procedure

S 049-506

- (1) Remove the "INOP" placard from the (FWD/AFT/BULK) CARGO HEAT switch on the P5 overhead panel.

S 449-507

- (2) Replace the (FWD/AFT/BULK) CARGO HEAT switch-light with the inoperative (OVHT/ON) light on the P5 overhead panel.

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TASK 21-00-00-049-037

22. DDG 21-51-1, Preparation - Air Conditioning Packs (Fig. 904)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one or both air conditioning packs are inoperative.

B. Access

- (1) Location Zones
 - 211 Control Cabin, Left
 - 212 Control Cabin, Right

C. Procedure for One Pack Inoperative

NOTE: This procedure is not applicable for ETOPS operations.

S 869-121

- (1) Move the L or R PACK selector, on the pilot's overhead panel, P5, to the OFF position for the air conditioning pack which is inoperative.

S 939-120

- (2) Install a placard "INOP" adjacent to the L or R PACK selector.

D. Procedure for Both Packs Inoperative

S 869-116

- (1) Move the L and R PACK selectors, on the pilot's overhead panel, P5, to the OFF position.

S 939-117

- (2) Install a placard "INOP" adjacent to the L and R PACK selectors.

S 869-119

- (3) Push the L and R RECIRC FAN switch-lights, on the pilot's overhead panel, P5, to the ON position.
 - (a) Make sure the EICAS messages, L and R RECIR FAN, do not show on the EICAS display.
 - (b) Make sure you can hear that the left and right recirculation fans are in operation.

S 049-118

- (4) Do the required maintenance procedure for unpressurized flight in the maintenance task for DDG 21-31-1.

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TASK 21-00-00-449-370

23. DDG 21-51-1, Restoration - Air Conditioning Packs (Fig. 904)

A. General

- (1) This task has instructions to restor the airplane back to its usual condition after flight operations with (one/both) air conditioning packs inoperative.

B. References

- (1) AMM 21-51-00/501, Cooling Pack System

C. Restoration Procedure 1 - One Air Conditioning Pack Inoperative

S 049-372

- (1) Remove the "INOP" placard from the (L/R) PACK selector on the P5 overhead panel.

S 449-373

- (2) Use the FIM 21-FAULT CODE INDEX procedure to identify the fault isolation task for an inoperative air conditioning pack, then do the specified FIM task.

S 449-374

- (3) Do the operational BITE tests for the (left/right) air conditioning pack (AMM 21-51-00/501).

D. Restoration Procedure 2 - Both Air Conditioning Packs Inoperative

S 449-371

- (1) Do the required maintenance procedure for pressurized flight per the DDG 21-31-1 Restoration task.

S 049-375

- (2) Remove the "INOP" placards from the (L/R) PACK selectors on the P5 overhead panel.

S 449-376

- (3) Use the FIM 21-FAULT CODE INDEX procedure to identify the fault isolation task for an inoperative air conditioning pack, then do the specified FIM task.

S 449-377

- (4) Do the operational BITE tests for the (left/right) air conditioning packs (AMM 21-51-00/501).

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TASK 21-00-00-049-038

24. DDG 21-51-2, Preparation - Pack Flow Control/Shutoff Valves (Fig. 904)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one of the pack flow control/shutoff valves is inoperative in low or hi flow mode.

B. References

- (1) AMM 36-00-00/201, Pneumatic - General

C. Access

(1) Location Zones

- | | |
|-----|---|
| 135 | Environmental Control System (ECS) Bay, Left |
| 136 | Environmental Control System (ECS) Bay, Right |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|----------------------------|
| 193NL | ECS Bay Access Door, Left |
| 194LR | ECS Bay Access Door, Right |

D. Preparation

S 869-124

- (1) Remove all pneumatic pressure (AMM 36-00-00/201).

S 869-122

- (2) Make sure the L (R) PACK selector, on the pilot's overhead panel, P5, is in the OFF position, and attach a DO-NOT-OPERATE tag.

S 019-123

- (3) Open the left (right) ECS bay access door, 193NL (194LR), to get access to the left (right) pack flow control/shutoff valve.

E. Pack Flow Control/Shutoff Valve Deactivation - Closed Position

S 989-126

CAUTION: DO NOT USE TOO MUCH FORCE ON THE MANUAL OVERRIDE ACTUATOR NUT WHEN YOU MANUALLY CLOSE THE VALVE. DAMAGE CAN OCCUR TO THE VALVE ACTUATOR.

- (1) Turn the manual override actuator nut on the pack flow control/shutoff valve in the clockwise direction to the fully closed position.

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S 939-127

- (2) Install a placard "INOP" or "HI FLOW MODE INOP" adjacent to the L (R) PACK selector for the pack flow control/shutoff valve which is inoperative.

S 049-129

- (3) Do the maintenance task for DDG 21-51-1.
- F. Put the Airplane Back to Its Usual Condition

S 419-128

- (1) Close the left (right) ECS bay access door, 193NL (194LR).

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TASK 21-00-00-449-378

25. DDG 21-51-2, Restoration - Pack Flow Control/Shutoff Valves (Fig. 904)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with a (left/right) pack flow control and shutoff valve inoperative in low flow mode or high flow mode.

B. References

- (1) AMM 21-51-01/401, Flow Control and Shutoff Valve

C. Procedure

S 449-379

- (1) Replace the inoperative (left/right) pack flow control and shutoff valve (AMM 21-51-01/401).

S 049-380

- (2) Remove the "INOP" placard from the (L/R) PACK selector on the P5 overhead panel.

S 449-381

- (3) Do the required maintenance procedure for pressurized flight per the DDG 21-31-1 Restoration task (if both pack flow control and shutoff valves were inoperative).

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TASK 21-00-00-049-039

26. DDG 21-51-4, Preparation - Pack Temperature Control Valves (Fig. 904)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one of the pack temperature control valves is inoperative.

B. Access

(1) Location Zones

- | | |
|-----|---|
| 135 | Environmental Control System (ECS) Bay, Left |
| 136 | Environmental Control System (ECS) Bay, Right |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|------------------------|
| 193NL | ECS Access Door, Left |
| 194LR | ECS Access Door, Right |

C. Preparation

S 869-061

- (1) Make sure that the L (R) PACK selector, on the pilot's overhead panel, P5, is in the OFF position.

S 019-058

- (2) Open the left (right) ECS bay access door, 193NL (194LR), to get access to the left (right) pack temperature control valve.

D. Pack Temperature Control Valve Deactivation - Mid Position

S 989-059

- (1) Turn the manual override knob on the pack temperature control valve until the valve position indicator is midway between the full open and full closed positions.

S 029-060

- (2) Disconnect the two electrical connectors, D676 and D678 (D722 and D724), from the pack temperature control valve, and install protective caps then stow the electrical connectors.

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E. Pack Temperature Control Valve Deactivation - Closed Position

S 219-062

- (1) Do a visual check of the valve position indicator on the pack temperature control valve to confirm that it is in the full closed position.
 - (a) If the valve is not in the full closed position, turn the manual override knob until the valve position indicator is in the full closed position.

S 869-063

- (2) Move the L (R) PACK selector to the STBY-N position, then do these steps:
 - (a) Do a visual check of the left (right) ram air inlet and exit doors to confirm that they are in the full open position.
 - (b) Do a visual check of the valve position indicator on the pack temperature control valve to confirm that it is in the full closed position.

S 869-065

- (3) Move the L (R) PACK selector to the OFF position.

F. Put the Airplane Back to Its Usual Condition

S 419-064

- (1) Close the left (right) ECS bay access door, 193NL (194LR).

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TASK 21-00-00-449-382

27. DDG 21-51-4, Restoration - Pack Temperature Control Valves (Fig. 904)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (left/right) pack temperature control valve.

B. References

- (1) AMM 21-51-12/401, Pack Temperature Control Valve

C. Procedure

S 449-383

- (1) Replace the inoperative (left/right) pack temperature control valve (AMM 21-51-12/401).

S 049-384

- (2) Remove the "INOP" placard from the (L/R) PACK selector on the P5 overhead panel.

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TASK 21-00-00-049-042

28. DDG 21-51-7, Preparation - Air Cycle Machine

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one of the air cycle machines is inoperative.

B. References

- (1) AMM 21-51-00/501, Cooling Pack System

C. Access

(1) Location Zones

- | | |
|-----|---|
| 135 | Environmental Control System (ECS) Bay, Left |
| 136 | Environmental Control System (ECS) Bay, Right |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

D. Procedure

S 719-130

- (1) Do the maintenance task "Operational Test - Pack High Flow Inhibit" (AMM 21-51-00/501), to make sure both the low flow and hi flow modes for the pack flow control/shutoff valve operate normally.

S 869-131

- (2) Move the L (R) PACK selector, on the pilot 's overhead panel, P5, to the STBY-W position for the pack with the inoperative air cycle machine.

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TASK 21-00-00-449-386

29. DDG 21-51-7, Restoration - Air Cycle Machine

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (left/right) air cycle machine.

B. References

- (1) AMM 21-51-03/401, Air Cycle Machine

C. Procedure

S 449-387

- (1) Replace the inoperative (left/right) air cycle machine (AMM 21-51-03/401).

S 049-388

- (2) Remove the "INOP" placard from the (L/R) PACK selector on the P5 overhead panel.

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TASK 21-00-00-049-043

30. DDG 21-52-3, Preparation - Air Conditioning PACK OFF Lights

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one of the L (R) PACK OFF lights is inoperative.

B. Access

(1) Location Zones

- | | |
|-----|----------------------|
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Procedure

S 869-066

- (1) Make sure the L (R) PACK selector, on the pilot's overhead panel, P5, is in the OFF position.

S 219-067

- (2) Make sure the EICAS message L (R) PACK OFF shows on the EICAS upper display.

S 939-068

- (3) Install a placard "PACK OFF LIGHT INOP" adjacent to the L (R) PACK OFF light which is inoperative.

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TASK 21-00-00-449-389

31. DDG 21-52-3, Restoration - Air Conditioning PACK OFF Lights

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (L/R) PACK OFF light on the P5 overhead panel.

B. Procedure

S 449-390

- (1) Replace the inoperative (L/R) PACK OFF switch-light on the P5 overhead panel.

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TASK 21-00-00-049-044

32. DDG 21-53-1, Preparation - Ram Air Inlet/Exit Door Systems (Fig. 904)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one of the ram air inlet/exit door systems is inoperative.

B. Equipment

- (1) A21007-2, Hold-Open Rod - Ram Air Door, Flight Dispatch

C. References

- (1) AMM 21-53-03/401, Ram Air Inlet Door Actuator
(2) AMM 21-53-04/401, Ram Air Exhaust Door Actuator

D. Access

(1) Location Zones

- | | |
|-----|---|
| 135 | Environmental Control System (ECS) Bay, Left |
| 136 | Environmental Control System (ECS) Bay, Right |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|----------------------------|
| 193NL | ECS Bay Access Door, Left |
| 194LR | ECS Bay Access Door, Right |

E. Preparation

S 019-149

- (1) Open the left (right) ECS bay access door, 193NL (194LR), to get access to the ram air inlet/exit door actuators.

F. Ram Air Inlet/Exit Door Deactivation - Open Position

S 869-148

- (1) Move the L (R) PACK selector, on the pilot's overhead panel, P5, to the STBY-N position.

S 219-150

- (2) Make sure the ram air inlet/exit doors move to the fully open position.

(a) If the ram air inlet/exit door is not in its fully open position, do these steps:

- 1) Remove the actuator for the ram air inlet/exit door which is not in the fully open position:

NOTE: Keep the bolts, washers and nuts used to install the actuator for later installation of the ram air door hold-open rod, A21007-2.

- a) Ram Air Inlet Door Actuator (AMM 21-53-03/401)

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- b) Ram Air Exhaust Door Actuator (AMM 21-53-04/401)
- 2) If the ram air door hold-open rod tool, A21007-2, is not available, fabricate an actuator link, 11.1 inches long, with rod ends that will attach to the door actuator fittings.
- 3) Move and hold the inlet/exit door to the fully open position.
- 4) Install the ram air door hold-open rod, A21007-2, in the actuator's position between the bell crank and support bracket.

NOTE: Use the same bolts, washers and nuts from the actuator to install the hold-open rod, A21007-2.

S 869-151

- (3) Do one of these procedures to configure the temperature control system performance based on the ambient temperature:
 - (a) If the ambient temperature is less than 90-degrees Fahrenheit (32.2-degrees Celsius), do these steps:
 - 1) Disconnect the electrical connector from the inlet door actuator and the exit door actuator, then install protective caps and stow the electrical connectors.
 - (b) If the ambient temperature is 90-degrees Fahrenheit (32.2-degrees Celsius) or greater, do these steps:
 - 1) Open these circuit breakers on the pilot's overhead panel, P11, and attach a DO-NOT-CLOSE tag:
 - a) 11N15, RIGHT PACK STANDBY PWR
 - b) 11N24, LEFT PACK STANDBY PWR
 - 2) Get or make a shorting plug which has these specifications:
 - a) Shorting wire - 3.5(+/-0.5) inches long, 20 gauge, Type UA (BMS 13-48, type VIII, class 1)
 - b) Sockets - 20 gauge, p/n BACC47CP1A (qty=2)
 - c) Connector - p/n BACC63BP16R24SNL
 - d) Install the shorting wire into pin 13 and pin 15 of the connector, and install spare contacts and filler rods into all unused holes of the connector (SWPM 20-60-08).

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- 3) Disconnect the electrical connector from the inlet door actuator.
- 4) Install the shorting plug to the electrical connector for the inlet door actuator, then install a protective cap and stow the electrical connector and shorting plug
- 5) Disconnect the electrical connector from the exit door actuator, then install protective caps and stow the electrical connector.
- 6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the pilot's overhead panel, P11:
 - a) 11N15, RIGHT PACK STANDBY PWR
 - b) 11N24, LEFT PACK STANDBY PWR

S 939-152

- (4) Install a placard "INLET/EXIT DOORS INOP" and "AUTO MODE INOP" adjacent to the L (R) PACK selector, on the pilot's overhead panel, P5, for the ram air inlet/exit doors which are inoperative.

S 869-153

- (5) Tell the dispatch persons whether or not a shorting plug was installed to the inlet door actuator electrical connector.

G. Ram Air Inlet/Exit Door Deactivation - Any Position

S 869-155

- (1) Move the L (R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.

S 869-156

- (2) Open this circuit breaker on the pilot's overhead panel, P11, and install a circuit breaker lock and DO-NOT-CLOSE tag:
 - (a) 11A13 or 11N13, LEFT PACK FLOW CONT
 - (b) 11A26 or 11N22, RIGHT PACK FLOW CONT

S 229-157

- (3) Measure the throat gap between the bottom of the ram air inlet door and the top of the ram air inlet lip.

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S 229-158

- (4) Measure the throat gap between the ram air exit door and the inside of the ram air exit duct housing.

S 229-159

- (5) Make sure that the throat gap for exit door (DE) is more than 1.15 times the throat gap for the inlet door (DI).

NOTE: This requirement is to prevent noise and vibration due to the possible occurrence of an adverse pressure gradient.

S 939-160

- (6) Install a placard "PACK INOP" adjacent to the L (R) PACK selector for the ram air inlet/exit door system which is inoperative.

H. Put the Airplane Back to Its Usual Condition

S 419-154

- (1) Close the left (right) ECS bay access door, 193NL (194LR).

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TASK 21-00-00-449-391

33. DDG 21-53-1, Restoration - Ram Air Inlet/Exit Door Systems (Fig. 904)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative (left/right) ram air (inlet/exit) door system.

B. Equipment

- (1) A21007-2, Hold-Open Rod - Ram Air Door, Flight Dispatch

C. References

- (1) AMM 21-53-03/401, Ram Air Inlet Door Actuator
- (2) AMM 21-53-04/401, Ram Air Exhaust Door Actuator

D. Access

(1) Location Zones

- | | |
|-----|---|
| 135 | Environmental Control System (ECS) Bay, Left |
| 136 | Environmental Control System (ECS) Bay, Right |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|----------------------------|
| 193NL | ECS Bay Access Door, Left |
| 194LR | ECS Bay Access Door, Right |

E. Procedure

S 019-400

- (1) Open the left (right) ECS bay access door, 193NL (194LR), to get access to the ram air inlet/exit door actuators.

S 049-393

- (2) Remove the A21007-2 hold-open rod/actuator link (if installed).

S 049-394

- (3) Remove the shorting plug from the electrical connector for the ram air inlet door actuator (if installed).

S 049-395

- (4) Remove the circuit breaker lock (collar) and close the associated (left/right) circuit breaker on P11 overhead circuit breaker panel:
 - (a) 11A13 or 11N13, LEFT PACK FLOW CONT
 - (b) 11A26 or 11N22, RIGHT PACK FLOW CONT

S 449-396

- (5) Replace the inoperative ram air (inlet/exit) door actuator (AMM 21-53-03/401, AMM 21-53-04/401).

S 449-397

- (6) Make sure to connect the electrical connectors for the ram air inlet door actuator and the ram air exit door actuator (if disconnected).

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- S 049-398
- (7) Remove the "INOP" placard from the (L/R) PACK selector on the P5 overhead panel.

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TASK 21-00-00-049-047

34. DDG 21-58-7, Preparation - Forward Equipment Cooling Overboard Exhaust Valve Inoperative (Fig. 905)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the overboard exhaust valve is inoperative and is deactivated in the closed position.

B. Access

(1) Location Zones

- | | |
|-----|---------------------------------|
| 121 | Forward Cargo Compartment, Left |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Procedure 1 - Overboard Exhaust Valve Deactivation (Closed Position)

NOTE: Use this procedure when it is convenient to get access to the overboard exhaust valve in the forward cargo compartment.

S 869-185

- (1) Open this circuit breaker on the pilot's overhead panel, P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11P13, EQUIPMENT COOLING OUTBD VLVS

S 019-186

- (2) Open the forward cargo door, 821, to get access to the forward cargo compartment.

S 019-187

- (3) Remove the floor panel(s) approximately 9 feet (2.74 meters) aft of the forward bulkhead in the center of the cargo compartment to get access to the overboard exhaust valve.

S 029-188

- (4) Disconnect the electrical connector, D654, from the overboard exhaust valve, then install a protective cap to the connector on the valve.

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S 869-189

- (5) Get or make a shorting plug which has these specifications:
- (a) Shorting wire - 3.0(+/-1.0) inches long, 20 gauge, type 6A
 - (b) Pins - 20 gauge, p/n BACC47CP-1T (qty=2)
 - (c) Connector - p/n BACC47CN1, BACC47CN1S, or BACC47CN1A
 - (d) Install the shorting wire into pin 1 and pin 2 of the connector (SWPM 20-60-08).

NOTE: The installation of the shorting wire will prevent the illumination of the VALVE light on the EQUIP COOLING selector panel and the illumination of the EICAS message FWD EQPT VAL when the engines are in operation on the ground or in the air.

- (e) As an option, install a second shorting wire into pin 5 and pin 6 of the connector (SWPM 20-60-08).

NOTE: The installation of this shorting wire will prevent the illumination of the VALVE light on the EQUIP COOLING selector panel and the illumination of the EICAS message FWD EQPT VAL when the engines are not in operation on the ground.

S 489-190

- (6) Install the shorting plug to the electrical connector, D654, then stow the electrical connector.

S 869-191

- (7) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the pilot's overhead panel, P11:
- (a) 11P13, EQUIPMENT COOLING OUTBD VLVS

S 219-192

- (8) Do a visual check of the position of the overboard exhaust valve from the outside of the airplane.
- (a) Make sure that the overboard exhaust valve is in the closed position.

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- (b) If the valve is not closed, do these steps:
- 1) From outside of the airplane, install a 3/8-inch drive wrench into the manual drive collar located by the valve discharge port then push in to engage the manual override.
 - 2) Turn the 3/8-inch drive wrench through the overcenter lock to the fully closed position.
 - 3) Do a visual check to confirm that the valve is fully closed.
 - 4) Remove the 3/8-inch drive wrench from the manual drive collar.

S 419-193

- (9) Reinstall the floor panel(s).

S 419-194

- (10) Close the forward cargo door, 821.

S 939-195

- (11) Install a placard "OVBD EXH VLV INOP" adjacent to the EQUIP COOLING selector.

D. Procedure 2 - Overboard Exhaust Valve Deactivation (Closed Position)

NOTE: Use this procedure when it is not convenient to get access to overboard exhaust valve in the forward cargo compartment. All maintenance activities are done from the outside of the airplane.

S 869-179

- (1) Move the EQUIP COOLING selector, on the pilot's overhead panel, P5, to the STBY position.

S 049-481

- (2) Open this circuit breaker on the P11 overhead circuit breaker panel, and install a circuit breaker lock (collar):
- (a) 11P13, EQUIPMENT COOLING OUTBD VLVS

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S 219-484

- (3) Do a visual check of these equipment cooling valve(s) from the outside of the airplane, to make sure they are closed:
- (a) Overboard Exhaust Valve

S 049-483

- (4) If a valve is not closed, manually close the valve:
- (a) From outside of the airplane, install a 3/8-inch drive wrench into the manual drive collar located by the valve discharge port then push in to engage the manual override.
 - (b) Turn the 3/8-inch drive wrench through the overcenter lock to the fully closed position.
 - (c) Do a visual check to confirm that the valve is fully closed.
 - (d) Remove the 3/8-inch drive wrench from the manual drive collar.

S 869-182

- (5) Keep the EQUIP COOLING selector in the STBY position.

S 939-183

- (6) Install a placard "OVBD EXH VLV INOP" adjacent to the EQUIP COOLING selector.

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TASK 21-00-00-449-485

35. DDG 21-58-7, Restoration - Forward Equipment Cooling Overboard Exhaust Valve Inoperative (Fig. 905)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative overboard exhaust valve.

B. References

- (1) AMM 21-58-05/401, Overboard Exhaust Valve

C. Access

- (1) Location Zones
 - 121 Forward Cargo Compartment, Left
 - 211 Control Cabin, Left
 - 212 Control Cabin, Right

D. Restoration Procedure 1

NOTE: Use this procedure if a shorting plug was installed to deactivate the overboard exhaust valve.

S 869-491

- (1) Open this circuit breaker on the P11 overhead circuit breaker panel, and attach a DO-NOT-CLOSE tag:
 - (a) 11P13, EQUIPMENT COOLING OUTBD VLVS

S 019-490

- (2) Open the forward cargo door, 821.

S 019-489

- (3) Remove the floor panel(s) to get access to the overboard exhaust valve under the floor of the forward cargo compartment.

S 449-492

- (4) Remove the shorting plug from the electrical connector, D654, for the overboard exhaust valve.

S 869-493

- (5) Close this circuit breaker on the P11 overhead circuit breaker panel:
 - (a) 11P13, EQUIPMENT COOLING OUTBD VLVS

S 449-494

- (6) Replace the inoperative overboard exhaust valve (AMM 21-58-05/401).

S 049-495

- (7) Remove the "INOP" placard from the EQUIP COOLING control panel on the P5 overhead panel.

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S 419-496

- (8) Reinstall the floor panels.

S 419-497

- (9) Close the forward cargo door, 821.

E. Restoration Procedure 2

NOTE: Use this procedure if no shorting plug was installed to deactivate overboard exhaust valve.

S 449-486

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P11 overhead circuit breaker panel:
(a) 11P13, EQUIPMENT COOLING OUTBD VLVS

S 449-487

- (2) Replace the inoperative overboard exhaust valve (AMM 21-58-05/401).

S 049-488

- (3) Remove the "INOP" placard from the EQUIP COOLING control panel on the P5 overhead panel.

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TASK 21-00-00-049-048

36. DDG 21-58-8, Preparation - Forward Equipment Cooling Inboard Supply Valve Inoperative (1 SUPPLY FAN SYSTEM ONLY) (Fig. 905)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the inboard supply valve is inoperative and is deactivated in the closed position.

B. Access

(1) Location Zones

- | | |
|-----|---------------------------------|
| 121 | Forward Cargo Compartment, Left |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Preparation

S 869-140

- (1) Move the EQUIP COOLING selector, on the pilot's overhead panel, P5, to STBY position.

S 939-141

- (2) Install a placard "INBD SUP VLV INOP" adjacent to the EQUIP COOLING selector.

S 019-142

- (3) Open the forward cargo door, 821, to get access to the forward cargo compartment.

S 019-143

- (4) Remove the left sidewall lining that is located approximately 11 feet (3.35 meters) aft of the forward bulkhead to get access to the inboard supply valve.

D. Inboard Supply Valve Deactivation - Closed Position

S 219-144

- (1) Do a visual check of the inboard supply valve position indicator to confirm that it is in the closed position.
 - (a) If the valve position indicator is not in the closed position, turn the manual override knob on the inboard supply valve to the closed position.

S 029-145

- (2) Disconnect the electrical connector, D3076, from the inboard supply valve, then install protective caps and stow the electrical connector.

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E. Put the Airplane Back to Its Usual Condition

S 419-146

- (1) Reinstall the left sidewall lining.

S 419-147

- (2) Close the forward cargo door, 821.

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TASK 21-00-00-449-408

37. DDG 21-58-8, Restoration - Forward Equipment Cooling Inboard Supply Valve Inoperative (1 SUPPLY FAN SYSTEM ONLY) (Fig. 905)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative inboard supply valve (closed).

B. References

- (1) AMM 21-58-07/401, Inboard Supply Valve

C. Procedure

S 449-409

- (1) Replace the inoperative inboard supply valve (AMM 21-58-07/401).

S 049-410

- (2) Remove the "INOP" placard from the EQUIP COOL selector on the P5 overhead panel.

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TASK 21-00-00-049-051

38. AIRPLANES EQUIPPED FOR EXTENDED-RANGE OPERATIONS;

DDG 21-58-12, Preparation - Instrument Cooling Monitor System (Fig. 907)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the E/E cooling monitor indicator (9-ball indicator) is inoperative.

B. Access

(1) Location Zones

- | | |
|-----|----------------------|
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

C. Preparation

S 869-197

- (1) Make sure these circuit breakers on the pilot's overhead panel, P11, are closed:
 - (a) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
 - (b) 11P22, EQUIPMENT COOLING EXH FAN FWD

S 869-200

- (2) Make sure the EQUIP COOLING selector, on the pilot's overhead panel, P5, is set to the AUTO or STBY position.

D. Procedure

S 029-198

- (1) Loosen the four quarter-turn fasteners on the E/E equipment cooling monitor which is located on the right side panel, P61, in the flight compartment.

S 029-199

- (2) Carefully pull the monitor out of the P61 panel until you have access to the sense tubes connected to the back side of the monitor.

S 789-207

- (3) For each sense tube connected to the back side of the monitor, do these steps to make sure that a minimum static pressure exists for sufficient airflow to the E/E equipment:
 - (a) Disconnect the sense tube from the back side of the monitor.

NOTE: To prevent the possibility of cross-tube connection, do not disconnect more than one sense tube at a time.

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- (b) Connect a static pressure gauge to the sense tube and make sure that the end of sense tube is sealed properly.
- (c) Measure the static pressure at the sense tube.
- (d) Make sure that the static pressure is more than 0.80-inches of water.

NOTE: Do not dispatch the airplane if the static pressure is less than 0.80-inches of water. Equipment cooling airflow is not sufficient.

- (e) Remove the static pressure gauge from the sense tube.
- (f) Reconnect the sense tube to the back side of the monitor.

S 429-208

- (4) Carefully put the monitor back into it's position in the P61 panel, then tighten the four quarter-turn fasteners.

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TASK 21-00-00-449-414

39. AIRPLANES EQUIPPED FOR EXTENDED-RANGE OPERATIONS;

DDG 21-58-12, Restoration - Instrument Cooling Monitor System (Fig. 907)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative instrument cooling monitor system.

B. References

- (1) FIM 21-58-00/101, Equipment Cooling System

C. Procedure

S 449-415

- (1) Do the procedure for E/E Cooling Monitor Problems to isolate a fault in instrument cooling monitor system (FIM 21-58-00/101, Fig. 118).

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TASK 21-00-00-049-052

40. DDG 21-61-1, Preparation - Compartment Temperature Control Systems (Fig. 908)

A. General

- (1) This task has instructions to prepare the airplane for flight operations with an inoperative compartment temperature control system (AUX-FWD/FWD/AUX-MID/MID/AFT zone).

B. Access

(1) Location Zones

- | | |
|-----|--|
| 135 | Environmental Control System (ECS) Bay, Left |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|---------------------------|
| 193NL | ECS Bay Access Door, Left |
|-------|---------------------------|

C. Preparation

S 869-075

- (1) Make sure the FWD CAB, MID CAB, and AFT CAB temperature selectors, on the pilot's overhead panel, P5, are in the OFF position.
 - (a) Install a "DO-NOT-OPERATE" placard to the associated (FWD CAB/MID CAB/AFT CAB) temperature selector on the P5 overhead panel.

S 869-077

- (2) Push the ECS/MSG switch, on the EICAS MAINT panel which is located on the right side panel, P61, to view the TRIM VALVE position indications on the ECS/MSG maintenance page.

S 219-079

- (3) Make sure the TRIM VALVE position indication for the associated temperature control zone shows 0.00 (full closed).
 - (a) If the TRIM VALVE position indication does not show 0.00 (full closed), then continue with the instructions to deactivate the associated zone trim air modulating valve in the closed position.

D. Trim Air Modulating Valve Deactivation - Closed Position

S 869-086

- (1) Open these circuit breakers on the P11 overhead circuit breaker panel and install circuit breaker locks (collars) for the associated temperature control zone:
 - (a) AUX-FWD temperature control zone:
 - 1) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD

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- 2) 11H5, ZONE DUCT OVHT AUX FWD
- (b) FWD temperature control zone:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - 2) 11R25, ZONE DUCT OVHT FWD
- (c) AUX-MID temperature control zone:
 - 1) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
- (d) MID temperature control zone:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID
- (e) AFT temperature control zone:
 - 1) 11P27, ZONE TEMP CONT VLV AFT
 - 2) 11R27, ZONE DUCT OVHT AFT

S 019-076

- (2) Open the left ECS bay access door, 193NL, to get access to the trim air modulating valves.

S 219-080

- (3) Do a visual check of the valve position indicator on the trim air modulating valve to confirm that it is in the full closed position.
 - (a) If the valve position indicator is not in the full closed position, turn the manual override knob to move the valve position indicator to the full closed position.
 - (b) If the trim air modulating valve cannot be moved to the full closed position, then continue with these instructions and do the procedure to deactivate the trim air pressure regulating/shutoff valve in the closed position.

S 029-081

- (4) Disconnect the electrical connector from the associated zone trim air modulating valve, and install protective caps then stow the electrical connector.

E. Trim Air Pressure Regulating/Shutoff Valve Deactivation - Closed Position

NOTE: Use this procedure only if the specified zone trim air modulating valve will not stay closed with the above procedure.

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S 869-083

- (1) Make sure the TRIM AIR switch-light, on the pilot's overhead panel, P5, is in the OFF position.

S 869-084

- (2) Open this circuit breaker on the pilot's overhead panel, P11, and install a circuit breaker lock and DO-NOT-CLOSE tag:
 - (a) 11C33, TRIM AIR

S 939-087

- (3) Install a placard "TRIM AIR INOP" adjacent to the TRIM AIR switch-light.

F. Put the Airplane Back to Its Usual Condition

S 419-085

- (1) Close the left ECS bay access door, 193NL.

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TASK 21-00-00-449-418

41. DDG 21-61-1, Restoration - Compartment Temperature Control Systems (Fig. 908)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative compartment temperature control system (AUX-FWD/FWD/AUX-MID/MID/AFT zones).

B. Access

(1) Location Zones

- 135 Environmental Control System (ECS) Bay, Left
- 211 Control Cabin, Left
- 212 Control Cabin, Right

(2) Access Panels

- 193NL ECS Bay Access Door, Left

C. Procedure

S 449-419

- (1) Remove the circuit breaker locks (collars) and close the circuit breakers on the P11 overhead circuit breaker panel for the applicable temperature control zone that was deactivated:

- (a) AUX-FWD temperature control zone:
 - 1) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
- (b) FWD temperature control zone:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - 2) 11R25, ZONE DUCT OVHT FWD
- (c) AUX-MID temperature control zone:
 - 1) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
- (d) MID temperature control zone:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID
- (e) AFT temperature control zone:
 - 1) 11P27, ZONE TEMP CONT VLV AFT
 - 2) 11R27, ZONE DUCT OVHT AFT

S 449-420

- (2) Remove the circuit breaker lock (collar) and close this circuit breaker on the P11 overhead circuit breaker panel if trim air system was deactivated:

- (a) 11C33, TRIM AIR

S 019-421

- (3) Open the left ECS bay access door, 193NL, to get access to the trim air modulating valves.

S 449-425

- (4) Reconnect the electrical connector to the trim air modulating valve for the associated temperature control zone.

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- S 419-434
- (5) Close the left ECS bay access door, 193NL.
- S 049-423
- (6) Remove the "INOP" and "DO-NOT-OPERATE" placards from the TRIM AIR switch and (FWD CAB/MID CAB/AFT CAB) temperature selector on the P5 overhead panel.
- S 449-422
- (7) Do the Zone Temperature Controller BITE Procedure to isolate a fault in the (FWD/MID/AFT zone) temperature control system (FIM 21-60-00/101, Fig. 103 or FIM 21-61-00/101, Fig. 103).
- S 449-443
- (8) Do the Auxiliary Zone Temperature Controller BITE Procedure to isolate a fault in the (AUX-FWD/AUX-MID zone) temperature control system (FIM 21-60-00/101, Fig. 104 or FIM 21-61-00/101, Fig. 104).

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TASK 21-00-00-049-053

42. DDG 21-61-2, Preparation - Flight Deck Temperature Control System (Fig. 908)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the temperature control system for the FLT DK zone is inoperative in AUTO or MAN mode.

B. Access

(1) Location Zones

- | | |
|-----|--|
| 135 | Environmental Control System (ECS) Bay, Left |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|---------------------------|
| 193NL | ECS Bay Access Door, Left |
|-------|---------------------------|

C. Preparation

S 869-091

- (1) Move and hold the FLT DK temperature selector, on the pilot's overhead panel, P5, to the MAN-C (8 o'clock) position.

S 869-092

- (2) Push the ECS/MSG switch, on the EICAS MAINT panel which is located on the right side panel, P61, to view the TRIM VALVE position indications on the ECS/MSG maintenance page.

S 219-093

- (3) Make sure the TRIM VALVE position indication for the FLT DK temperature control zone shows 0.00 (full closed).
 - (a) If the TRIM VALVE position indication does not show 0.00 (full closed), then continue with these instructions and do the procedure to deactivate the FLT DK trim air modulating valve in the closed position.

S 939-103

- (4) Install a placard "AUTO INOP" or "MAN INOP" adjacent to the FLT DK temperature selector for the inoperative mode.

D. Trim Air Modulating Valve Deactivation - Closed Position

S 869-094

- (1) Open these circuit breakers on the pilot's overhead panel, P11, for the FLT DK temperature control zone and install circuit breaker locks and DO-NOT-CLOSE tags:
 - (a) 11P24, ZONE TEMP CONT MAN FLT DK
 - (b) 11R24, ZONE DUCT OVHT FLT DK

S 019-095

- (2) Open the left ECS bay access door, 193NL, to get access to the trim air modulating valves.

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S 219-096

- (3) Do a visual check of the valve position indicator on the trim air modulating valve to confirm that it is in the full closed position.
 - (a) If the valve position indicator is not in the full closed position, turn the manual override knob to move the valve position indicator to the full closed position.
 - (b) If the trim air modulating valve cannot be moved to the full closed position, then continue with these instructions and do the procedure to deactivate the trim air pressure regulating/shutoff valve in the closed position.

S 029-097

- (4) Disconnect the electrical connector, D698, from the trim air modulating valve, and install protective caps then stow the electrical connector.

E. Trim Air Pressure Regulating/Shutoff Valve Deactivation – Closed Position

S 869-099

- (1) Make sure the TRIM AIR switch-light, on the pilot's overhead panel, P5, is in the OFF position.

S 869-100

- (2) Open this circuit breaker on the pilot's overhead panel, P11, and install a circuit breaker lock and DO-NOT-CLOSE tag:
 - (a) 11C33, TRIM AIR

S 939-101

- (3) Install a placard "TRIM AIR INOP" adjacent to the TRIM AIR switch-light.

F. Put the Airplane Back to Its Usual Condition

S 939-098

- (1) Move the FLT DK temperature selector to the AUTO or MAN mode position which is not inoperative.

S 419-102

- (2) Close the left ECS bay access door, 193NL.

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TASK 21-00-00-449-426

43. DDG 21-61-2, Restoration - Flight Deck Temperature Control System (Fig. 908)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative flight deck temperature control system (FLT DK Zone).

B. Access

(1) Location Zones

- | | |
|-----|--|
| 135 | Environmental Control System (ECS) Bay, Left |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|---------------------------|
| 193NL | ECS Bay Access Door, Left |
|-------|---------------------------|

C. Procedure

S 449-427

- (1) Remove the circuit breaker locks (collars) and close the circuit breakers on the P11 overhead circuit breaker panel for the temperature control zone that was deactivated:
 - (a) FLT DK temperature control zone:
 - 1) 11P24, ZONE TEMP CONT MAN FLT DK
 - 2) 11R24, ZONE DUCT OVHT FLT DK

S 449-428

- (2) Remove the circuit breaker lock (collar) and close this circuit breaker on the P11 overhead circuit breaker panel if trim air system was deactivated:
 - (a) 11C33, TRIM AIR

S 019-429

- (3) Open the left ECS bay access door, 193NL, to get access to the trim air modulating valves.

S 449-436

- (4) Reconnect the electrical connector to the associated trim air modulating valve for the (FLT DK) temperature control zone.

S 419-433

- (5) Close the left ECS bay access door, 193NL.

S 049-435

- (6) Remove the "INOP" and "DO-NOT-OPERATE" placards from the TRIM AIR switch and (FLT DK) temperature selector on the P5 overhead panel.

S 449-432

- (7) Do the Zone Temperature Controller BITE Procedure to isolate a fault in the (FLT DK zone) temperature control system (FIM 21-60-00/101, Fig. 103 or FIM 21-61-00/101, Fig. 103).

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TASK 21-00-00-049-054

44. DDG 21-61-3, Preparation-Trim Air Pressure Regulating/Shutoff Valve (Fig.908)

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when the trim air pressure regulating/shutoff valve is inoperative and is deactivated in the closed position.

B. Access

(1) Location Zones

- | | |
|-----|--|
| 135 | Environmental Control System (ECS) Bay, Left |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|---------------------------|
| 193NL | ECS Bay Access Door, Left |
|-------|---------------------------|

C. Preparation

S 869-069

- (1) Make sure the TRIM AIR switch-light, on the pilot's overhead panel, P5, is in the OFF position.

S 019-070

- (2) Open the left ECS bay access door, 193NL, to get access to the trim air pressure regulating/shutoff valve.

D. Trim Air Pressure Regulating/Shutoff Valve Deactivation - Closed Position

S 049-441

- (1) Open this circuit breaker on the P11 overhead circuit breaker panel, and install a circuit breaker lock (collar):
 - (a) 11C33, TRIM AIR

S 989-072

- (2) Turn the manual override on the trim air pressure regulating/shutoff valve until the valve position indicator moves to the fully closed position.

S 029-071

- (3) Disconnect the electrical connector, D702, from the trim air pressure regulating/shutoff valve, and install protective caps then stow the electrical connector.

S 939-074

- (4) Install a placard "TRIM AIR INOP" adjacent to the TRIM AIR switch-light.

E. Put the Airplane Back to Its Usual Condition

S 419-073

- (1) Close the left ECS bay access door, 193NL.

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TASK 21-00-00-449-437

45. DDG 21-61-3, Restoration-Trim Air Pressure Regulating/Shutoff Valve (Fig.908)

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative trim air pressure regulating and shutoff valve (PRSOV).

B. References

- (1) AMM 21-61-06/401, Trim Air Pressure Regulating and Shutoff Valve

C. Procedure

S 449-442

- (1) Remove the circuit breaker lock (collar) and close this circuit breaker on the P11 overhead circuit breaker panel:
 - (a) 11C33, TRIM AIR

S 049-439

- (2) Remove the "INOP" placard from the TRIM AIR switch on the P5 overhead panel.

S 449-438

- (3) Replace the inoperative trim air pressure regulating and shutoff valve (PRSOV) (AMM 21-61-06/401).

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TASK 21-00-00-049-055

46. DDG 21-61-4, Preparation - Zone Trim Air Modulating Valves (Fig. 908)

A. General

(1) This task has instructions to prepare the airplane for flight operations with an inoperative zone trim air modulating valve.

B. Procedure 1 (AUX-FWD/FWD/AUX-MID/MID/AFT Zone)

S 049-302

(1) Do the DDG 21-61-1 Preparation task.

C. Procedure 2 (FLT DK Zone)

S 049-444

(1) Do the DDG 21-61-2 Preparation task.

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TASK 21-00-00-449-440

47. DDG 21-61-4, Restoration - Zone Trim Air Modulating Valves (Fig. 908)

A. General

(1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative zone trim air modulating valve.

B. Restoration Procedure 1 (AUX-FWD/FWD/AUX-MID/MID/AFT Zone)

S 449-445

(1) Do the DDG 21-61-1 Restoration task.

C. Restoration Procedure 2 (FLT DK Zone)

S 449-446

(1) Do the DDG 21-61-2 Restoration task.

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TASK 21-00-00-049-056

48. DDG 21-61-6, Preparation - Compartment Temperature INOP Lights

A. General

- (1) This task has instructions to prepare the airplane for flight operations with an inoperative compartment temperature "INOP" light on the P5 overhead panel for these temperature control zones:
- (a) FLT DK
 - (b) FWD CAB
 - (c) MID CAB
 - (d) AFT CAB

B. Procedure

S 449-447

- (1) Install an "INOP" placard to the compartment temperature "INOP" light on the P5 overhead panel for the associated temperature control zone.

S 049-303

- (2) Do the DDG 21-61-1 Preparation task for the associated temperature control zone.

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TASK 21-00-00-449-448

49. DDG 21-61-6, Restoration - Compartment Temperature INOP Lights

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative compartment temperature "INOP" light on the P5 overhead panel for these temperature control zones:
 - (a) FLT DK
 - (b) FWD CAB
 - (c) MID CAB
 - (d) AFT CAB

B. Procedure

S 449-449

- (1) Do the DDG 21-61-1 Restoration task for the associated temperature control zone with the inoperative compartment temperature "INOP" light.

S 049-450

- (2) Remove the "INOP" placard from the "INOP" light on the P5 overhead panel.

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TASK 21-00-00-049-057

50. DDG 21-61-7, Preparation - Trim Air Check Valves

A. General

- (1) This maintenance task provides the instructions to prepare the airplane for dispatch when one the trim air check valves is inoperative.

B. Equipment

- (1) A21015-1. Blank-Off Plate, Trim Air Check Valve - Dispatch Eqpt

C. References

- (1) AMM 36-00-00/201, Pneumatic - General

D. Access

(1) Location Zones

- | | |
|-----|---|
| 135 | Environmental Control System (ECS) Bay, Left |
| 136 | Environmental Control System (ECS) Bay, Right |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|----------------------------|
| 193NL | ECS Bay Access Door, Left |
| 194LR | ECS Bay Access Door, Right |

E. Preparation

S 869-104

- (1) Remove all pneumatic pressure (AMM 36-00-00/201).

S 869-105

- (2) Make sure the L and R PACK selectors, on the pilot's overhead panel, P5, are in the OFF position, and attach DO-NOT-OPERATE tags.

S 869-111

- (3) Push the TRIM AIR switch-light, on the pilot's overhead panel, P5, momentarily to ON then push the switch to OFF and attach a DO-NOT-OPERATE tag.

NOTE: This will release any pneumatic pressure trapped between the trim air pressure regulating/shutoff valve and the trim air check valves.

S 019-106

- (4) Open the left or right ECS bay access door, 193NL or 194LR, to get access to the trim air check valves.

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F. Trim Air Check Valve Deactivation - Blanking Plate Installation

S 869-107

- (1) Use the blank-off plate A21015-1 for installation in the trim air supply duct on the downstream side of the trim air check valve, or fabricate a blanking plate which has these specifications:
 - (a) Allowable materials:
 - 1) Titanium 6AL-4V per MIL-T-9046 Type 3 Comp C
 - 2) Inconel 718 per AMS 5596
 - 3) 301 CRES per MIL-S-5059 1/2, 3/4, or Fullhard
 - (b) Dimensions:
 - 1) Diameter - 3.10 (+0.10 or -0.00) inches
 - 2) Thickness - 0.040 inch

S 029-108

- (2) Loosen the clamp which is located on the downstream side of the trim air check valve and move it away from the check valve.

S 489-109

- (3) Install the blanking plate between the duct and the trim air check valve.

S 429-110

- (4) Move the clamp into its initial position and tighten the clamp nut to 45 inch-pounds.

S 799-112

- (5) Do a leak check of the trim air check valve and blanking plate:
 - (a) Supply pneumatic pressure (AMM 36-00-00/201).
 - (b) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, and move both selectors to the AUTO position.
 - (c) Remove the DO-NOT-OPERATE tag from the TRIM AIR switch-light, and make sure it is set to OFF.
 - (d) Make sure there is no jet blast air leakage at the check valve/blanking plate joint.
 - 1) If there is jet blast air leakage, remove and release all the pneumatic pressure in the system then adjust the clamp, duct, and blanking plate as necessary to decrease the air leakage.

G. Put the Airplane Back to Its Usual Condition

S 939-115

- (1) Install a placard "L or R TRIM AIR INOP" adjacent to the TRIM AIR switch-light.

S 869-114

- (2) Move the L and R PACK selectors to OFF.

S 869-113

- (3) Remove the pneumatic pressure (AMM 36-00-00/201).

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TASK 21-00-00-449-451

51. DDG 21-61-7, Restoration - Trim Air Check Valves

A. General

- (1) This task has instructions to restore the airplane back to its usual condition after flight operations with an inoperative trim air supply check valve and a blanking plate installed.

B. References

- (1) AMM 21-61-05/401, Trim Air Supply Check Valve
- (2) AMM 36-00-00/201, Pneumatic - General

C. Access

(1) Location Zones

- | | |
|-----|---|
| 135 | Environmental Control System (ECS) Bay, Left |
| 136 | Environmental Control System (ECS) Bay, Right |
| 211 | Control Cabin, Left |
| 212 | Control Cabin, Right |

(2) Access Panels

- | | |
|-------|----------------------------|
| 193NL | ECS Bay Access Door, Left |
| 194LR | ECS Bay Access Door, Right |

D. Procedure

S 869-452

- (1) Remove all pneumatic pressure (AMM 36-00-00/201).

S 019-454

- (2) Open the (left/right) ECS bay access door, 193NL or 194LR, to get access to the associated trim air supply check valve.

S 449-455

- (3) Remove the blanking plate adjacent to the inoperative trim air supply check valve.

S 449-453

- (4) Replace the inoperative trim air supply check valve (AMM 21-61-05/401).

S 049-456

- (5) Remove the "INOP" placard from the TRIM AIR switch on the P5 overhead panel.

S 419-457

- (6) Close the (left/right) ECS bay access door, 193NL and 194LR.

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AIR CONDITIONING SYSTEM OIL CONTAMINATION (REMOVAL) – MAINTENANCE PRACTICES

1. General

- A. The oil fumes and the smoke from an APU/engine failure can get into the airplane cabin and cause contamination of the conditioned air. This procedure gives instructions to remove the oil contamination from the air conditioning and pneumatic systems. You must first isolate the cause of the oil contamination and repair the problem before you do this procedure.
- B. The APU is the most likely source of the smoke or odors and is due either to an internal APU failure which can release oil into the air conditioning system or oil, glycol, hydraulic fluid, etc. being ingested into the inlet of the APU.
- C. Once oil has entered the pneumatic and/or air conditioning system, it tends to accumulate in the heat exchangers or precoolers. The oil, hydraulic fluid, etc. vaporizes at higher temperatures and enters the cabin.
- D. Do not do this procedure with persons in the airplane cabin, since this procedure can generate a high concentration of smoke and odor.

TASK 21-00-21-102-030

2. Removal of Oil Contamination from the Air Conditioning and Pneumatic Systems

A. References

- (1) AMM 21-25-02/401, Recirculation Air Filter
- (2) AMM 21-31-00/001, Pressurization Control System
- (3) AMM 21-51-02/401, Heat Exchangers
- (4) AMM 21-51-04/401, Water Extractor
- (5) AMM 24-22-00/201, Manual Control
- (6) AMM 36-00-00/201, Pneumatic – General
- (7) AMM 36-11-03/401, Pneumatic Ground Connection Check Valve
- (8) AMM 49-11-00/201, Auxiliary Power Unit
- (9) AMM 52-11-00/201, Entry/Service Doors
- (10) AMM 52-33-00/201, Large Forward Cargo Door
- (11) AMM 52-35-00/201, Aft Cargo Door

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- (12) AMM 56-11-00/001, Flight Compartment Windows
- (13) AMM 71-00-00/201, Power Plant

B. Access

(1) Location Zones

- 135/136 Environment Control Systems (ECS) Bay
- 211/212 Control Cabin

(2) Access Panels

- 193NL/194LR ECS Access Doors

C. Procedure

S 012-031

- (1) Open the access doors to the air conditioning bays.

S 162-032

- (2) Clean the pneumatic ducts and the components where you can see the oil contamination.

S 022-033

- (3) Replace the components if they have oil contamination.

S 862-034

- (4) Supply electrical power (AMM 24-22-00/201).

S 862-053

- (5) Make sure the position of the switch-lights and selectors, on the P5 panel, are set to the positions which follow:

(a) Air Conditioning Temperature Control Panel:

- 1) L and R RECIRC FAN ON and INOP switch-lights are off
- 2) L and R PACK selectors are set to OFF position
- 3) L and R PACK RESET-PACK OFF switch-lights are on
- 4) L and R PACK RESET-INOP switch-lights are off
- 5) TRIM AIR OFF switch-light is on
- 6) GASPER OFF switch-light is on (if installed)

(b) Cargo Heat Control Panel:

- 1) CARGO HEAT FWD ON and OVHT switch-lights are off
- 2) CARGO HEAT AFT ON and OVHT switch-lights are off
- 3) CARGO HEAT BULK ON and OVHT switch-lights are off

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- (c) Forward Cargo Air Conditioning Control Panel.
 - 1) FWD CARGO A/C ON and INOP switch-lights are off
 - 2) FWD CARGO A/C FAULT light is off
- (d) Bleed Air Supply Control Panel:
 - 1) L, C and R ISLN VALVE switch-lights and white flow bar lights are off
 - 2) APU VALVE switch-light and white flow bar light are off
 - 3) L and R ENG OFF switch-lights are on and white flow bar lights are off
- (e) Engine Ignition and Start Control Panel:
 - 1) L and R ENG START selectors are set to OFF position
 - 2) L and R ENG START VALVE lights are off
- (f) Thermal Anti-Ice Control Panel:
 - 1) ANTI-ICE WING ON switch-light or ANTI-ICE WING ON switch is off
 - 2) L and R ANTI-ICE WING VALVE lights are off
 - 3) L and R ANTI-ICE ENGINE ON and VALVE switch-lights are off
- (g) Hydraulic System Control Panel:
 - 1) HYD PUMPS AIR selector is set to OFF position

S 862-052

- (6) Do these steps to remove the oil contamination from the APU bleed air:

NOTE: During this procedure the APU bleed air will go out through one of the check valve duct openings at the pneumatic ground air connectors.

- (a) Use an interphone for communication between the crew on the ground and the crew in the flight compartment during this pressurization procedure.

WARNING: MAKE SURE THE "DUCT PRESS" INDICATORS SHOW ZERO PSI, ON THE BLEED AIR SUPPLY CONTROL PANEL, BEFORE YOU REMOVE ONE OF THE CHECK VALVES AT THE PNEUMATIC GROUND AIR CONNECTORS. YOU MUST MAKE SURE THERE IS NO PNEUMATIC PRESSURE UPSTREAM OF THE CHECK VALVES. FAILURE TO DO THIS CAN CAUSE INJURY TO PERSONS.

- (b) Make sure that the L and R DUCT PRESS indicators show zero psi, on the Bleed Air Supply Control Panel, before you remove one of the check valves at the pneumatic ground air connectors.

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- (c) Have the flight compartment crew notify the ground crew that the pneumatic pressure is zero and that the ground crew can remove one of the check valves at the pneumatic ground air connectors.
- (d) Remove one of the check valves at the pneumatic ground air connectors (AMM 36-11-03/401).

NOTE: This will permit the initial bleed air, which has more oil contamination, to go out through the check valve duct opening.

- (e) Have the ground crew notify the flight compartment crew that the check valve at the pneumatic ground air connectors has been removed.
- (f) Start the APU and let the operation of the APU become stable (AMM 49-11-00/201).
- (g) Push the L and C ISLN VALVE switch-lights to the open position.
 - 1) Make sure the white flow bar lights come on and the amber VALVE lights come on and then go off.

WARNING: DO NOT GO NEAR THE CHECK VALVE DUCT OPENING AT THE PNEUMATIC GROUND AIR CONNECTORS WHEN YOU SUPPLY PNEUMATIC PRESSURE DURING THIS PROCEDURE. INJURY TO PERSONS CAN OCCUR WHEN THE HIGH TEMPERATURE/HIGH PRESSURE BLEED AIR GOES OUT THROUGH THE CHECK VALVE DUCT OPENING.

- (h) Have the ground crew move at least twenty feet away from the check valve duct opening at the pneumatic ground air connectors before you supply pneumatic pressure.
- (i) Push the APU VALVE switch-light to the open position.

NOTE: The APU bleed air shutoff valve opens which permits the APU bleed air to then go out through the check valve duct opening.

- 1) Make sure the white flow bar light comes on and the amber VALVE light comes on and then goes off.
- (j) Let the APU operate until the APU bleed air has no smoke and odor of the oil contamination.
- (k) Push the APU VALVE switch-light to the closed position.
 - 1) Make sure the white flow bar light goes off and the amber VALVE light is off.
- (l) Stop the APU (AMM 49-11-00/201).
- (m) Push the L and C ISLN VALVE switch-lights to the closed position.
 - 1) Make sure the white flow bar lights go off and the amber VALVE lights are off.
- (n) Depressurize the pneumatic system (AMM 36-00-00/201).
- (o) Install the check valve for the pneumatic ground air connector (AMM 36-11-03/401).

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S 862-046

- (7) Do these steps to remove the oil contamination from the left engine bleed air:

NOTE: During this procedure the left engine bleed air will go out through one of the check valve duct openings at the pneumatic ground air connectors.

- (a) Push the L and C ISLN VALVE switch-lights to the open position.
 - 1) Make sure the white flow bar lights come on and the amber VALVE lights come on and then go off.
- (b) Start the APU and let the operation of the APU become stable (AMM 49-11-00/201).
- (c) Push the APU VALVE switch-light to the open position.
 - 1) Make sure the white flow bar light comes on and the amber VALVE light comes on and then goes off.
- (d) Do this task: Engine ground safety precautions (AMM 71-00-00/201).
- (e) Use an interphone for communication between the crew on the ground and the crew in the flight compartment during this pressurization procedure.
- (f) Start the left engine and let the engine operate at ground idle speed (AMM 71-00-00/201).
- (g) Push the APU VALVE switch-light to the closed position.
 - 1) Make sure the white flow bar light goes off and the amber VALVE light is off.
- (h) Stop the APU (AMM 49-11-00/201).

WARNING: DO NOT GO NEAR THE WING LEADING EDGES WHEN YOU RELEASE THE PNEUMATIC PRESSURE IN THE WING ANTI-ICE SYSTEM. INJURY TO PERSONS CAN OCCUR WHEN THE HIGH TEMPERATURE/HIGH PRESSURE BLEED AIR GOES OUT THROUGH THE WING LEADING EDGES.

- (i) Do these steps to release the pneumatic pressure in the wing anti-ice system:
 - 1) Hold the WING ANTI-ICE WINDOW/PROBE HEAT TEST switch, on the P61 panel, to the WING ANTI-ICE position.
 - 2) Make sure that the L and R DUCT PRESS indicators show zero psi, on the Bleed Air Supply Control Panel.

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- 3) Release the WING ANTI-ICE WINDOW/PROBE HEAT TEST switch.
- (j) Push the L and C ISLN VALVE switch-lights to the closed position.
 - 1) Make sure the white flow bar lights go off and the amber VALVE lights are off.
- (k) Make sure the L ENG OFF switch-light is on and the white flow bar light is off.

WARNING: MAKE SURE THE "DUCT PRESS" INDICATORS SHOW ZERO PSI, ON THE BLEED AIR SUPPLY CONTROL PANEL, BEFORE YOU REMOVE ONE OF THE CHECK VALVES AT THE PNEUMATIC GROUND AIR CONNECTORS. YOU MUST MAKE SURE THERE IS NO PNEUMATIC PRESSURE UPSTREAM OF THE CHECK VALVES. FAILURE TO DO THIS CAN CAUSE INJURY TO PERSONS.

- (l) Make sure that the L and R DUCT PRESS indicators show zero psi, on the Bleed Air Supply Control Panel, before you remove one of the check valves at the pneumatic ground air connectors.
- (m) Have the flight compartment crew notify the ground crew that the pneumatic pressure is zero and that the ground crew can remove one of the check valves at the pneumatic ground air connectors.
- (n) Remove one of the check valves at the pneumatic ground air connectors (AMM 36-11-03/401).
- (o) Have the ground crew notify the flight compartment crew that the check valve at the pneumatic ground air connectors has been removed.

WARNING: DO NOT GO NEAR THE CHECK VALVE DUCT OPENING AT THE PNEUMATIC GROUND AIR CONNECTORS WHEN YOU SUPPLY PNEUMATIC PRESSURE DURING THIS PROCEDURE. INJURY TO PERSONS CAN OCCUR WHEN THE HIGH TEMPERATURE/HIGH PRESSURE BLEED AIR GOES OUT THROUGH THE CHECK VALVE DUCT OPENING.

- (p) Have the ground crew move at least twenty feet away from the check valve duct opening at the pneumatic ground air connectors before you release the pneumatic pressure.
- (q) Push the L ENG OFF switch-light to the open position.

NOTE: The left engine bleed air shutoff valve opens which permits the left engine bleed air to then go out through the check valve duct opening.

- 1) Make sure the white flow bar light comes on and the amber OFF light goes off.
- (r) Let the engine operate until the engine bleed air has no smoke and odor of the oil contamination.
- (s) Push the L ENG OFF switch-light to the closed position.
 - 1) Make sure the white flow bar light goes off and the amber OFF light comes on.
- (t) Stop the left engine (AMM 71-00-00/201).

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- (u) Depressurize the pneumatic system (AMM 36-00-00/201).
- (v) Install the check valve for the pneumatic ground air connector (AMM 36-11-03/401).

S 862-047

- (8) Do these steps to remove the oil contamination from the right engine bleed air:

NOTE: During this procedure the right engine bleed air will go out through one of the check valve duct openings at the pneumatic ground air connectors.

- (a) Make sure the L ENG OFF switch-light is on and the white flow bar light is off.
- (b) Make sure the L ISLN VALVE switch-light and the white flow bar light are off.
- (c) Push the R and C ISLN VALVE switch-lights to the open position.
 - 1) Make sure the white flow bar lights come on and the amber VALVE lights come on and then go off.
- (d) Start the APU and let the operation of the APU become stable (AMM 49-11-00/201).
- (e) Push the APU VALVE switch-light to the open position.
 - 1) Make sure the white flow bar light comes on and the amber VALVE light comes on and then goes off.
- (f) Start the right engine and let the engine operate at ground idle speed (AMM 71-00-00/201).
- (g) Push the APU VALVE switch-light to the closed position.
 - 1) Make sure the white flow bar light goes off and the amber VALVE light is off.
- (h) Stop the APU (AMM 49-11-00/201).

WARNING: DO NOT GO NEAR THE WING LEADING EDGES WHEN YOU RELEASE PNEUMATIC PRESSURE IN THE WING ANTI-ICE SYSTEM. INJURY TO PERSONS CAN OCCUR WHEN THE HIGH TEMPERATURE/HIGH PRESSURE BLEED AIR GOES OUT THROUGH THE WING LEADING EDGES.

- (i) Do these steps to release the pneumatic pressure in the wing anti-ice system:
 - 1) Hold the WING ANTI-ICE WINDOW/PROBE HEAT TEST switch, on the P61 panel, to the WING ANTI-ICE position.
 - 2) Make sure that the L and R DUCT PRESS indicators show zero psi, on the Bleed Air Supply Control Panel.

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3) Release the WING ANTI-ICE WINDOW/PROBE HEAT TEST switch.

WARNING: MAKE SURE THE "DUCT PRESS" INDICATORS SHOW ZERO PSI, ON THE BLEED AIR SUPPLY CONTROL PANEL, BEFORE YOU REMOVE ONE OF THE CHECK VALVES AT THE PNEUMATIC GROUND AIR CONNECTORS. YOU MUST MAKE SURE THERE IS NO PNEUMATIC PRESSURE UPSTREAM OF THE CHECK VALVES. FAILURE TO DO THIS CAN CAUSE INJURY TO PERSONS.

- (j) Make sure that the L and R DUCT PRESS indicators show zero psi, on the Bleed Air Supply Control Panel, before you remove one of the check valves at the pneumatic ground air connectors.
- (k) Have the flight compartment crew notify the ground crew that the pneumatic pressure is zero and that the ground crew can remove one of the check valves at the pneumatic ground air connectors.
- (l) Remove one of the check valves at the pneumatic ground air connectors (AMM 36-11-03/401).
- (m) Have the ground crew notify the flight compartment crew that the check valve at the pneumatic ground air connectors has been removed.
- (n) Push the C ISLN VALVE switch-light to the closed position.
 - 1) Make sure the white flow bar light goes off and the amber VALVE light is off.
- (o) Push the L ISLN VALVE switch-light to the open position.
 - 1) Make sure the white flow bar light comes on and the amber VALVE light comes on and then goes off.

WARNING: DO NOT GO NEAR THE CHECK VALVE DUCT OPENING AT THE PNEUMATIC GROUND AIR CONNECTORS WHEN YOU SUPPLY PNEUMATIC PRESSURE DURING THIS PROCEDURE. INJURY TO PERSONS CAN OCCUR WHEN THE HIGH TEMPERATURE/HIGH PRESSURE BLEED AIR GOES OUT THROUGH THE CHECK VALVE DUCT OPENING.

- (p) Have the ground crew move at least twenty feet away from the check valve duct opening at the pneumatic ground air connectors before you release the pneumatic pressure.
- (q) Push the R ENG OFF switch-light to the open position.

NOTE: The right engine bleed air shutoff valve opens which permits the bleed air to then go out through the check valve duct opening.

- 1) Make sure the white flow bar light comes on and the amber OFF light goes off.
- (r) Let the engine operate until the engine bleed air has no smoke and odor of the oil contamination.
- (s) Push the R ENG OFF switch-light to the closed position.
 - 1) Make sure the white flow bar light goes off and the amber OFF light comes on.
- (t) Stop the right engine (AMM 71-00-00/201).

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- (u) Push the L and R ISLN VALVE switch-lights to the closed position.
 - 1) Make sure the white flow bar lights go off and the amber VALVE lights are off.
- (v) Depressurize the pneumatic system (AMM 36-00-00/201).
- (w) Install the check valve for the pneumatic ground air connector (AMM 36-11-03/401).

S 862-042

- (9) Do these steps to remove the oil contamination from the air conditioning systems:

WARNING: MAKE SURE THERE IS AN EXIT FOR THE CONDITIONED AIR IN THE AIRPLANE. ACCIDENTAL CABIN PRESSURIZATION CAN CAUSE INJURY TO PERSONS.

- (a) Do these steps to make sure there will be an exit for the conditioned air in the airplane:
 - 1) Make sure the cabin pressurization outflow valves are open (AMM 21-31-00/001).
 - 2) Open the windows in the flight compartment (AMM 56-11-00/001).
 - 3) Open each entry door and cargo door:
 - a) Entry/Service Doors (AMM 52-11-00/201)
 - b) Large Forward Cargo Door (AMM 52-33-00/201)
 - c) Aft Cargo Door (AMM 52-35-00/201)
- (b) Do these steps to supply pneumatic pressure with the APU:
 - 1) Start the APU and let the operation of the APU become stable (AMM 49-11-00/201).
 - 2) Push the APU VALVE switch-light to the open position.
 - a) Make sure the white flow bar light comes on and the amber VALVE light comes on and then goes off.
 - 3) Push the L, C and R ISLN VALVE switch-lights to the open position.
 - a) Make sure the white flow bar lights come on and the amber VALVE lights come on and then go off.
- (c) Do these steps to operate the air conditioning systems:
 - 1) Turn the L and R PACK selectors to the STBY-N (or STBY-C) position.

NOTE: Pack operation in STBY-N (or STBY-C) mode causes the temperature control valve to close and routes the bleed air through the ACM compressor, secondary heat exchanger, reheater, condenser, and the ACM turbine. This mode results in hotter internal ACM temperatures from the compressor to the turbine to burn out the oil contamination.

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- 2) Push the TRIM AIR switch-light to the ON position.
- 3) Turn each cabin temperature selector (FLT DK, FWD CAB, MID CAB and AFT CAB) to AUTO-W (5 o'clock) position.
- 4) Push the L and R RECIRC FAN switch-lights to the ON position.
- 5) Push each CARGO HEAT (FWD, AFT and BULK) switch-light to the ON position.
- 6) Push the GASPER switch-light to the ON position (if installed)
- 7) Push the FWD CARGO AC switch-light to the ON position (if installed)
- 8) Turn the FWD CARGO AC temperature selector to the AUTO-W (5 o'clock) position (if installed)
- 9) Let the air conditioning systems operate until the conditioned air in the airplane has no smoke and odor of the oil contamination.
- 10) Turn the L and R PACK selectors to the STBY-W position.

NOTE: Pack operation in STBY-W mode causes the temperature control valve to fully open and routes the greatest amount of bleed air around the ACM. This mode results in the warmest available bleed air to burn out the oil contamination since the bleed air is only cooled by the primary heat exchanger.

- 11) Let the air conditioning systems operate until the conditioned air in the airplane has no smoke and odor of the oil contamination.
- (d) Do these steps to stop the operation of these air conditioning systems:
- 1) Turn the L and R PACK selectors to the OFF position.
 - 2) Push the TRIM AIR switch-light to the OFF position.
 - 3) Push each CARGO HEAT (FWD, AFT and BULK) switch-light to the off position (ON and OVHT switch-lights are off).
 - 4) Push the FWD CARGO A/C switch-light to the off position (ON and INOP switch-lights are off) (if installed).
- (e) Do these steps to supply pneumatic pressure with the engines:
- 1) Use the APU to start the engines and let the engines operate at ground idle speed (AMM 71-00-00/201).
 - 2) Push the APU VALVE switch-light to the closed position.
 - a) Make sure the white flow bar light goes off and the amber VALVE light is off.
 - 3) Stop the APU (AMM 49-11-00/201).
- (f) Do these steps to operate the air conditioning systems:
- 1) Turn the L and R PACK selectors to the STBY-N (or STBY-C) position.
 - 2) Push the TRIM AIR switch-light to the ON position.
 - 3) Push each CARGO HEAT (FWD, AFT and BULK) switch-light to the ON position.

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- 4) Push the FWD CARGO A/C switch-light to the ON position (if installed).
 - 5) Let the air conditioning systems operate until the conditioned air in the airplane has no smoke and odor of the oil contamination.
 - 6) Turn the L and R PACK selectors to the STBY-W position.
 - 7) Let the air conditioning systems operate until the conditioned air in the airplane has no smoke and odor of the oil contamination.
- (g) Do these steps to stop the operation of the air conditioning systems:
- 1) Turn the L and R PACK selectors to the OFF position.
 - 2) Push the TRIM AIR switch-light to the OFF position.
 - 3) Push each CARGO HEAT (FWD, AFT and BULK) switch-light to the off position (ON and OVHT switch-lights are off).
 - 4) Push the L and R RECIRC FAN switch-lights to the off position (ON and INOP switch-lights are off).
 - 5) Push the GASPER switch-light to the OFF position (if installed).
 - 6) Push the FWD CARGO A/C switch-light to the off position (ON and INOP switch-lights are off) (if installed).
- (h) Stop the engines (AMM 71-00-00/201).
- (i) Depressurize the pneumatic system (AMM 36-00-00/201).

S 162-051

- (10) Remove and examine these components for oil contamination:
- (a) Heat exchangers (AMM 21-51-02/401)
 - (b) Water Extractor (AMM 21-51-04/401)
 - (c) Ozone Converter (AMM 21-51-22/401)
 - (d) Recirculation fan filters (AMM 21-25-02/401)

S 162-052

- (11) Clean the components or replace them if they have oil contamination.

S 162-053

- (12) Do the procedure again until the conditioned air in the airplane has no smoke and odor of the oil contamination.
- D. Put the Airplane Back to Its Usual Condition

S 412-054

- (1) Close the access doors to the air conditioning bays.

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- S 412-049
- (2) Close the flight compartment windows, entry doors and cargo doors.
- S 862-057
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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DISTRIBUTION

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
CARD - L ECS FAN CONTROL, M861	2	1	119AL, MAIN EQUIP CTR, P50	21-26-05
CARD - R ECS FAN CONTROL, M862	2	1	119AL, MAIN EQUIP CTR, P50	21-26-05
CIRCUIT BREAKERS -	1		FLT COMPT, P11	
CONT, BULK CARGO HEAT, C689		1	11N26	*
CONT, FWD CARGO A/C & VENT, C693		1	11P20	*
FAN, EQUIPMENT COOLING AFT 1, C706		1	11P19	*
FAN, EQUIPMENT COOLING AFT 2, C705		1	11P10	*
FAN, L RECIRC, C660		1	11R14	*
FAN, R RECIRC, C661		1	11R23	*
FAN - GASPER CONT, C677 1		1	11R17	*
VALVE, CARGO EXHAUST, C694		1	11C20	*
CIRCUIT BREAKERS -	2		119AL, MAIN EQUIP CTR, P33	
FAN, AFT EXH AC AVAIL 1, C676 6		1	33D6	*
FAN, EQUIP COOL AFT 1, C333		1	33B1	*
CIRCUIT BREAKERS -	2		119AL, MAIN EQUIP CTR, P34	
FAN, AFT EQUIP COOL 1, C707		1	34L8	*
CIRCUIT BREAKERS -	2		119AL, MAIN EQUIP CTR, P36	
FAN, AFT LH CBN CREW REST AREA, C406 3		1	36B2	*
FAN, AFT LH CBN CREW REST AREA CONT, C922 3		1	36D5	*
FAN, EQUIP COOL AFT 2, C334		1	36G4	*
FAN, FLT DK CREW REST AREA, C401 3		1	36C6	*
FAN, FLT DK CREW REST AREA CONT, C917 3		1	36D4	*
FAN, GASPER, C342		1	36F2	*
FAN, L RECIRC, C336		1	36F1	*
VALVE, CARGO GND EXHAUST B/U, C664		1	36E4	*
VALVE, FLT DK CREW REST AREA CONT, C915 3		1	36D2	*
CIRCUIT BREAKERS -	2		119AL, MAIN EQUIP CTR, P37	
FAN, AFT RH CBN CREW REST AREA, C407 3		1	37C6	*
FAN, AFT RH CBN CREW REST AREA CONT, C923 3		1	37D7	*
CONT, CARGO A/C SOV, C666		1	37E4	*
FAN, BULK CARGO VENT, C344		1	37E6	*
FAN, FWD CARGO VENT, C358		1	37J3	*
FAN, FWD CBN CREW REST AREA, C405 3		1	37C4	*
FAN, FWD CBN CREW REST AREA CONT, C921 3		1	37D6	*
FAN, GND EXHAUST, C359		1	37J6	*
FAN, R RECIRC, C337		1	37G4	*
VALVE, CARGO GND EXHAUST, C665		1	37E3	*
COMPUTERS - (31-41-00/101)				
L EICAS, M10181				
R EICAS, M10182				
CONNECTOR - GROUND AIR SERVICE	3	1	193GL, FAIRING	21-21-02
CONTROLLER - (21-51-00/101)				
PACK FLOW (CARGO AIR CONDITIONING), M1610				

* SEE THE WDM EQUIPMENT LIST

- 1 ALL SAS AIRPLANES
- 2 SAS 150-152;
THREE MUFFLERS
- SAS 050-149,153-999;
FIVE MUFFLERS
- ALL MTH AIRPLANES

- 3 AIRPLANES WITH CREW REST AREAS
- 4 SAS 150-154 WITH SB 21-86;
MTH 275 WITH SB 21-86
- 5 SAS 050-144,155-999; MTH 276-999
- 6 SAS 050,051,150-155,162-165 WITH SB 21-82;
MTH 275,276 WITH SB 21-82, AND SAS 156-161,
166-999; MTH 277-999












Distribution - Component Index
Figure 101 (Sheet 1)

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FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
DIFFUSER - WINDSHIELD DIODES - (31-01-50/101) L RECIRC FAN/CARGO FIRE, R112 R RECIRC FAN/CARGO FIRE, R113 FLT DK CREW REST AREA, R462,R463,R464,R465, R466  FWD CBN CREW REST AREA, R467,R468,R469, R272 	1	1	FLT COMPT	21-22-00
DIODE - (31-01-37/101) CARGO GROUND EXH BLOCKING, R478 				
EXCHANGER - FLT DK CRA HEAT 	11	1	821, FWD CARGO COMPT	21-29-00
FAN - AFT EQUIP/LAV/GALLEY VENT 1, B15	6	1	811, BULK CARGO COMPT	21-26-01
FAN - AFT EQUIP/LAV/GALLEY VENT 2, B16	6	1	811, BULK CARGO COMPT	21-26-01
FAN - AFT LH CABIN CRA SUPPLY, B433 	10	1	AFT PASS. COMPT CEILING	21-29-02
FAN - AFT RH CABIN CRA SUPPLY, B431 	10	1	AFT PASS. COMPT CEILING	21-29-02
FAN - BULK CARGO VENTILATION, B123	6	1	811, BULK CARGO COMPT	21-26-06
FAN - FLT DECK CRA SUPPLY, B426 	10	1	821, FWD CARGO COMPT	21-29-02
FAN - FWD CABIN CRA SUPPLY, B432 	10	1	FWD PASS. COMPT CEILING	21-29-02
FAN - FWD CARGO GND EXHAUST, B378	9	1	821, FWD CARGO COMPT	21-26-12
FAN - FWD CARGO VENT, B377	8	1	821, FWD CARGO COMPT	21-28-02
FAN - GASPER, B128 	7	1	FWD PASS. COMP	21-24-00
FAN - L RECIRCULATION AIR, B13	3	1	821, FWD CARGO COMPT	21-25-01
FAN - R RECIRCULATION AIR, B14	3	1	821, FWD CARGO COMPT	21-25-01
FILTER - GALLEY VENTILATION	4	5	GALLEY	21-26-03
FILTER - RECIRCULATION AIR	3	6	821, FWD CARGO COMPT	21-25-02
GASPERS - FLIGHT DECK	1	4	FLT COMPT	21-22-00
GASPERS - PASSENGER CABIN	7		PASSENGER COMPT	21-24-00
GRILLE - RETURN AIR	3	96	PASSENGER CABIN	21-25-00
MANIFOLD - MAIN DISTRIBUTION	3	1	821, FWD CARGO COMPT	21-21-00
MUFFLER - GALLEY VENTILATION	4	4	ABOVE AFT GALLEY CEILING PANELS	21-26-08
MUFFLER - PASSENGER CABIN DISTRIBUTION	5		ABOVE PASSENGER CEILING PANEL	21-23-06
OUTLETS - CREW REST AREA A/C 	11	4	PASS. COMPT,	21-29-00
OUTLETS - FLOOR	1	11	113AL AND FLT COMPT	21-22-01
OUTLET - OVERHEAD	1	1	FLT COMPT	21-22-03
PANEL - FWD CARGO A/C, M1619	1	1	FLT COMPT, P5	*
PANELS - (21-40-00/101) BULK CARGO HEAT CONTROL, M912 CARGO HEAT CONTROL, M29				
PANEL - (21-51-00/101) TEMP CONTROL, M14				
PANEL - (21-58-00/101) EQUIP COOLING CONTROL, M17				
PANEL - (26-23-00/101) APU/CARGO FIRE CONTROL, M10444				

* SEE THE WDM EQUIPMENT LIST

















Distribution - Component Index
Figure 101 (Sheet 2)

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FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAY - (31-01-19/101) AFT ATTEND SMK INDIC, K2129 				
RELAYS - (31-01-36/101) AFT EQUIP/LAV/GALLEY VENT FAN 2, K347 AFT LH CBN CREW REST FAN CONT, K1270  CARGO FIRE/FLT DK CREW REST SMK, K1268  CONT, CARGO GND EXH B/U VALVE, K1215 FLT DK CREW REST FAN CONT, K1267  FLT DK SMOKE, K1266  FLT DK SMK EVAC VAL CONT, K1264  FLT DK SUPPLY VLV CONT, K1263  GASPER FAN, K525  L RECIRC FAN, K415				
RELAYS - (31-01-37/101) AFT EQUIP/LAV/GALLEY VENT FAN 1, K346 AFT EXH FAN 1 AC AVAIL, K835 AFT EXH FAN 1 BUS TRANSFER, K368 AFT RH CBN CREW REST FAN CONT, K1271  BULK CARGO VENT FAN CONTROL, K504 CONT, CARGO A/C SOV, K1212 CONT, CARGO EXHAUST VALVE, K1213 CONT, CARGO GND EXH FAN, K1211 CONT, CARGO GND EXHAUST VALVE, K1214 CONT, FWD CARGO VENT FAN, K1210 FWD LBN CREW REST FAN CONT, K1269  FWD/AFT CGO FIRE DISCON, K2119 R FUEL JETTISON FAN SHED NO. 1, K2126  R RECIRC FAN, K416				
SELECTOR - BULK CARGO HEAT MODE SELECTOR, YDUS1	1	1	FLT COMPT, P61, BULK CARGO HEAT CONT PNL, M912	*
SENSORS, CURRENT - (31-01-36/101) AFT EQUIP/LAV/GALLEY VENT FAN 2, TS246 AFT LH CREW REST FAN, TS526  CARGO GND EXHAUST FAN, TS494 FLT DK CREW REST FAN, TS524  FWD CARGO VENT FAN, TS493 GASPER FAN, TS289  LEFT RECIRC FAN, TS192				21-26-04 21-29-00
SENSORS, CURRENT - (31-01-37/101) AFT EQUIP/LAV/GALLEY VENT FAN 1, TS245 AFT RH CREW REST FAN, TS527  BULK CARGO VENT FAN, K614 FWD CREW REST FAN, TS525  RIGHT RECIRC FAN, TS193				21-29-00 21-25-04

* SEE THE WDM EQUIPMENT LIST




Distribution - Component Index
Figure 101 (Sheet 3)

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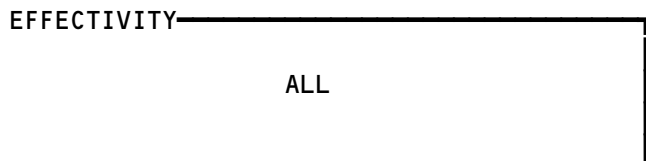
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FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
SWITCH/LIGHT - BULK CARGO HEAT, YDBS3	1	1	FLT COMPT, P5, CARGO HEAT CONTROL PNL, M29	*
SWITCH/LIGHT - FWD CARGO A/C, YGPS1	1	1	FLT COMPT, P5, FWD CARGO A/C PANEL, M1619	*
SWITCH/LIGHT - GASPER FAN, YBFS8 	1	1	FLT COMPT, P5, TEMP CONT PNL, M14	*
SWITCH/LIGHT - L, R RECIRC FAN, YBFS2, YBFS3	1	2	FLT COMPT, P5, TEMP CONT PNL, M14	*
VALVE - AFT EQUIPMENT/LAVATORY VENTILATION CHECK	6	2	811, BULK CARGO COMPT	21-26-02
VALVE - FLT DK CRA SMOKE EVACUATION, V161 	11	1		21-29-03
VALVE - FLT DK CRA SHUTOFF, V162 	11	1		21-29-01
VALVE - FWD CARGO AIR CONDITIONING SHUTOFF, V381	8	1	821, FWD CARGO COMPT	21-28-01
VALVE - FWD CARGO EXHAUST, V382	9	1	821, FWD CARGO COMPT	21-26-10
VALVE - FWD CARGO GND EXHAUST, V383	9	1	821, FWD CARGO COMPT	21-26-11
VALVE - FWD CARGO GND EXH BACKUP, V384	9	1	821, FWD CARGO COMPT	21-26-11
VALVE - GALLEY VENTILATION CHECK	4	5	ABOVE GALLEY CEILING PANELS	21-26-07
VALVE - RECIRCULATION AIR CHECK	3	2	821, FWD CARGO COMPT	21-25-03

* SEE THE WDM EQUIPMENT LIST

Distribution - Component Index
Figure 101 (Sheet 4)

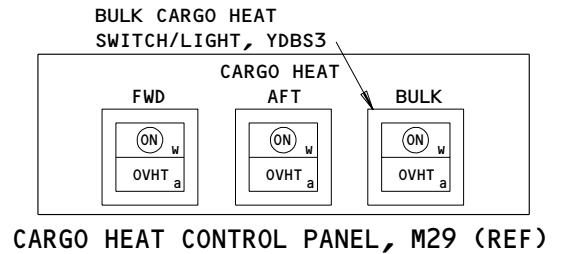
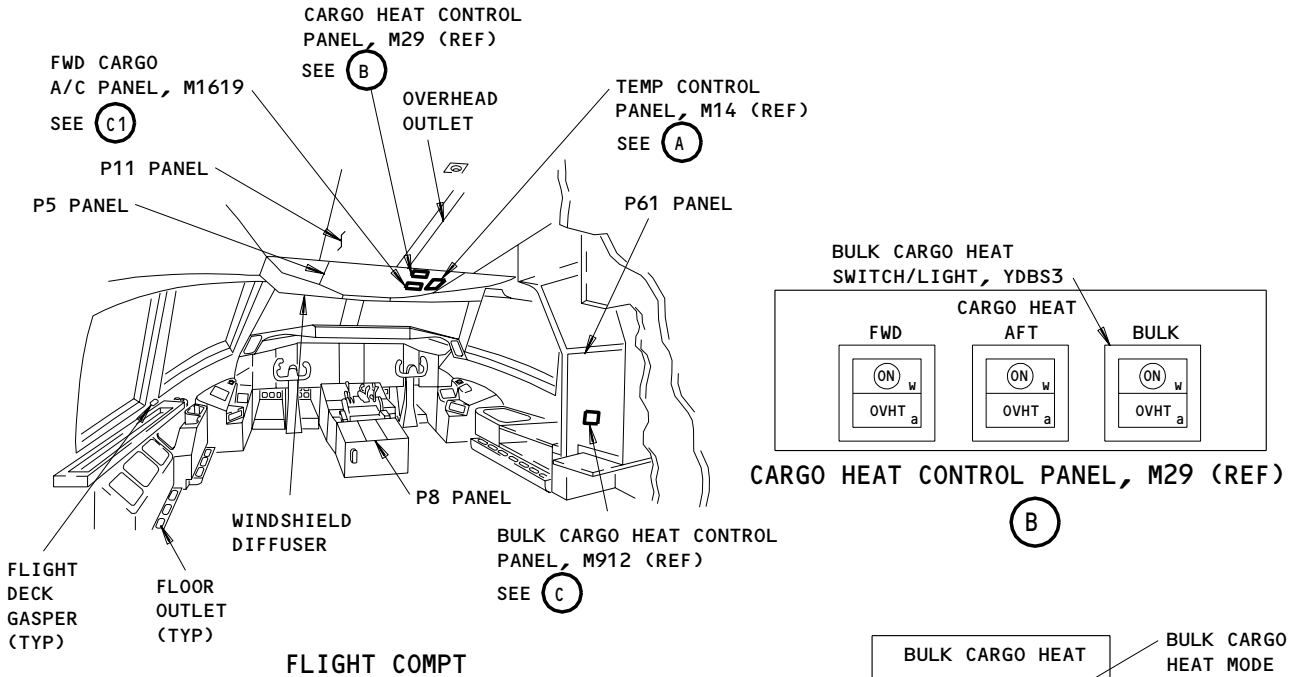


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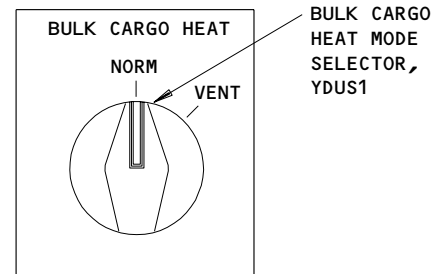
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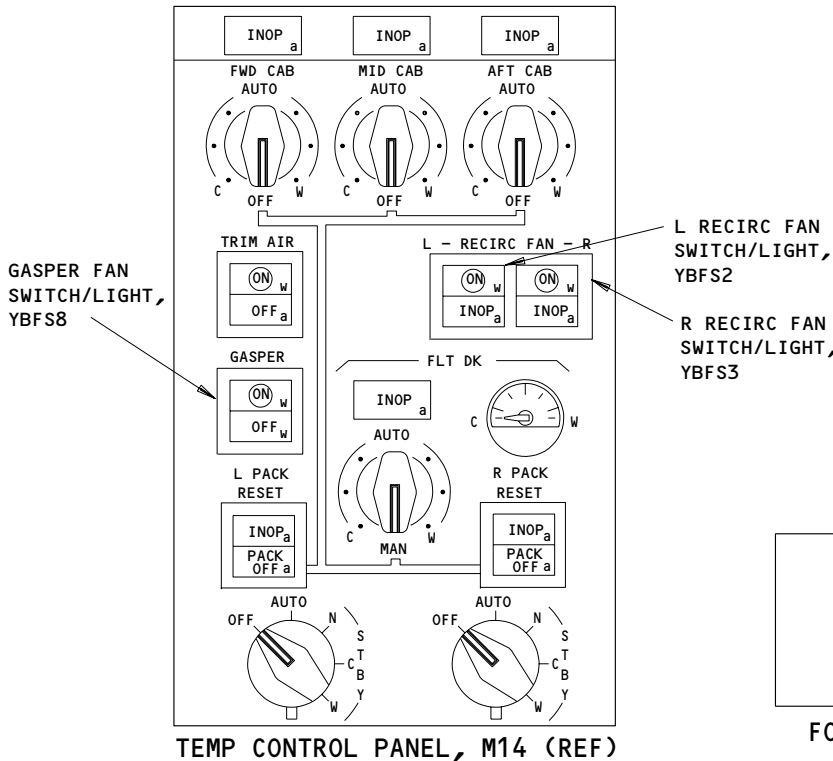
FAULT ISOLATION/MAINT MANUAL



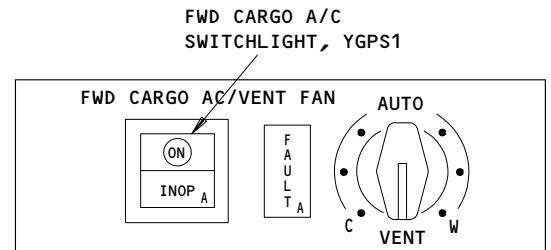
(B)



(C)



(A)



(C1)

Component Location
Figure 102 (Sheet 1)

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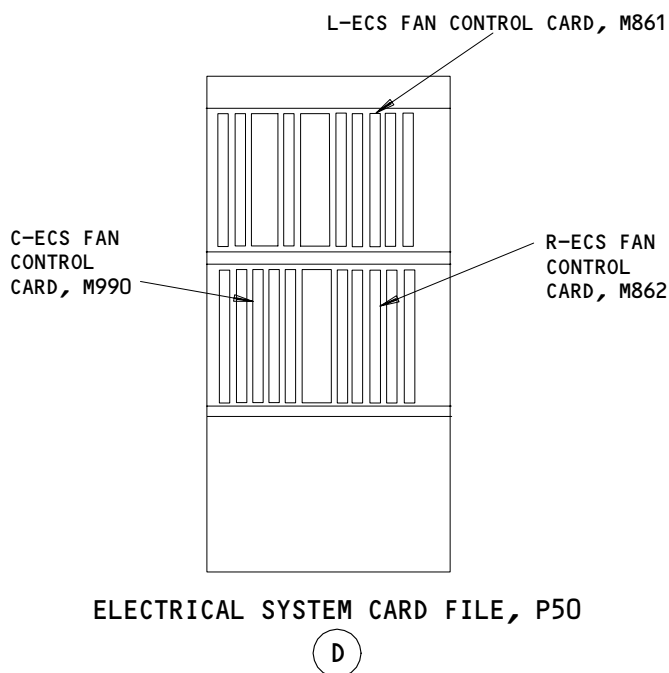
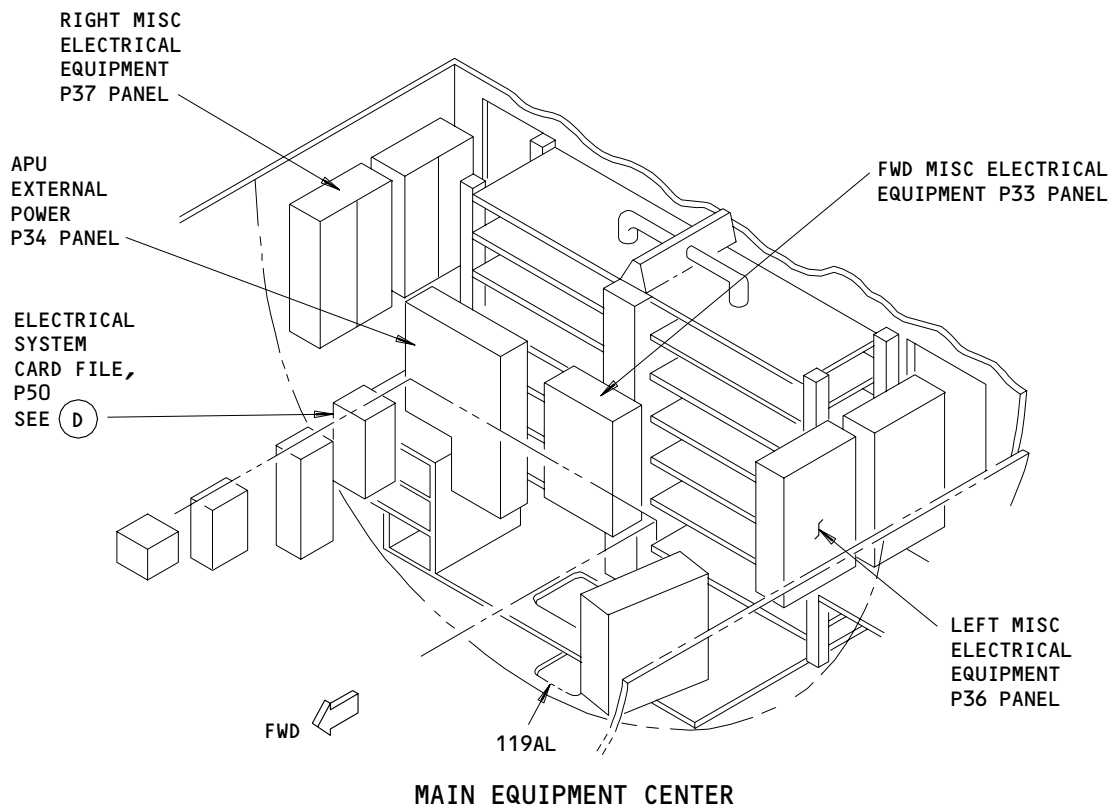
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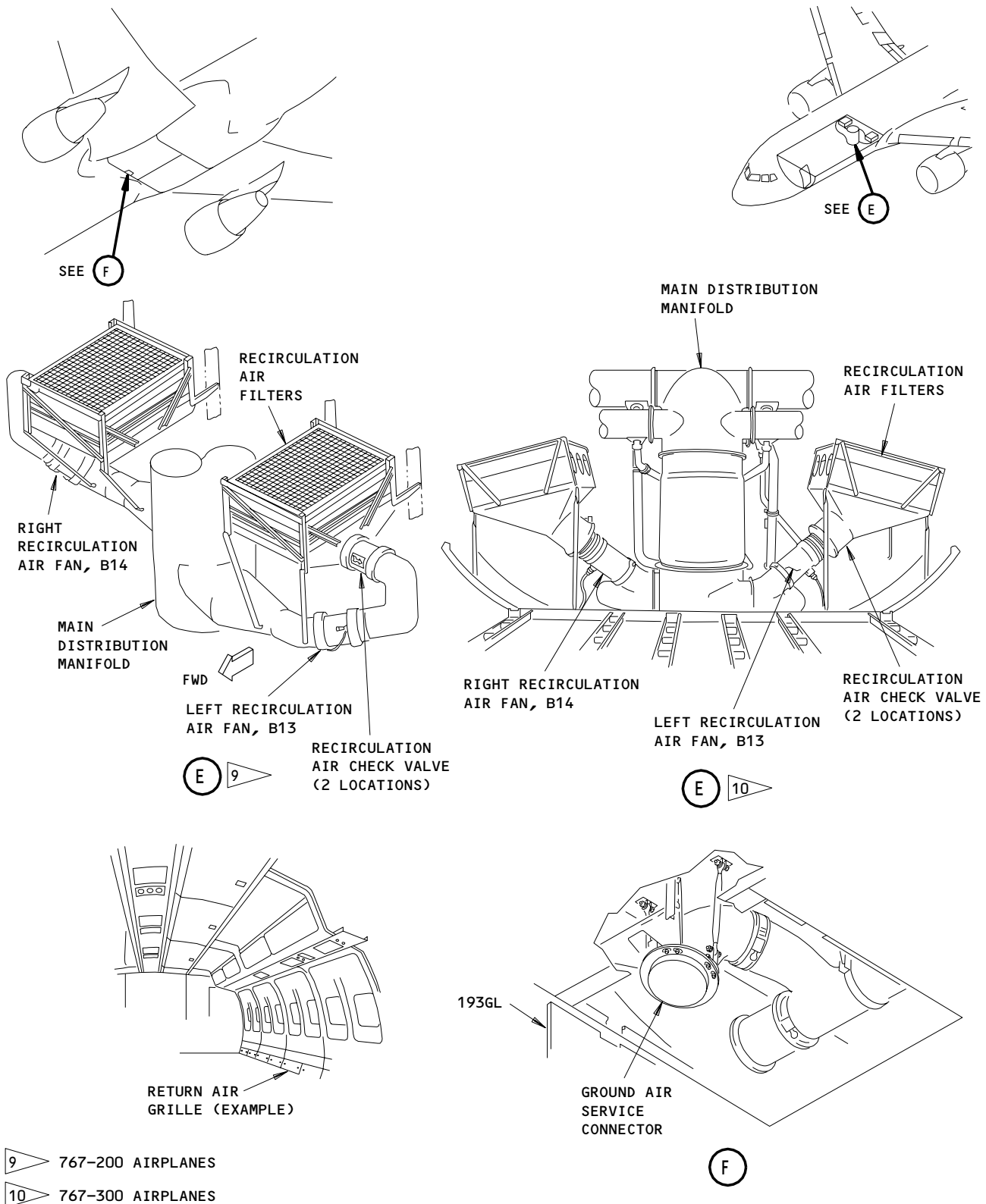
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FAULT ISOLATION/MAINT MANUAL



Component Location
Figure 102 (Sheet 2)

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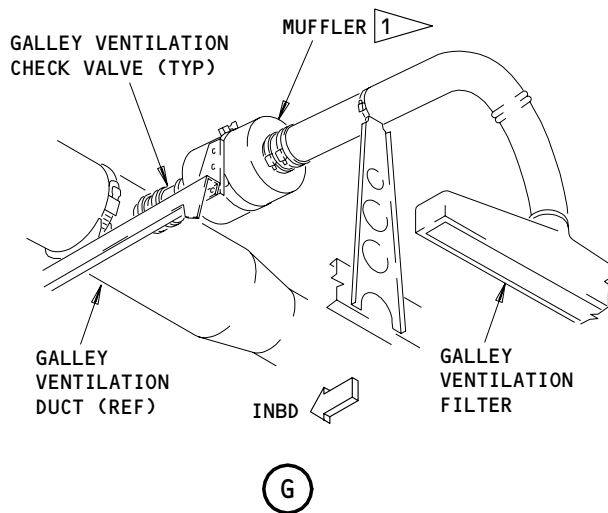
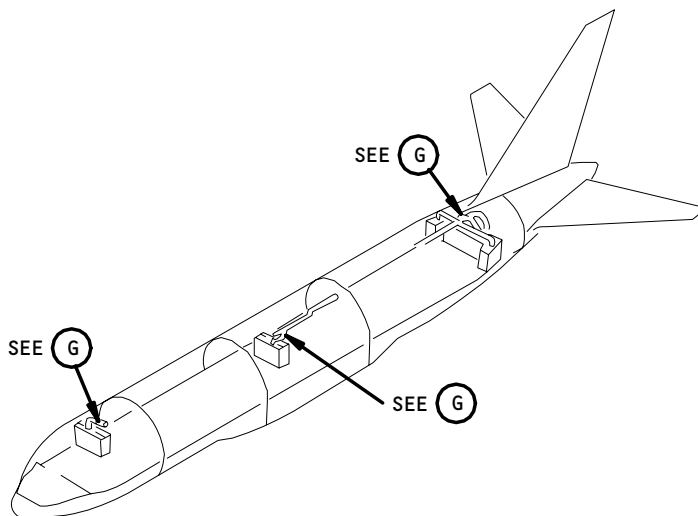
- 9 767-200 AIRPLANES
- 10 767-300 AIRPLANES

Component Location
Figure 102 (Sheet 3)

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 FAULT ISOLATION/MAINT MANUAL



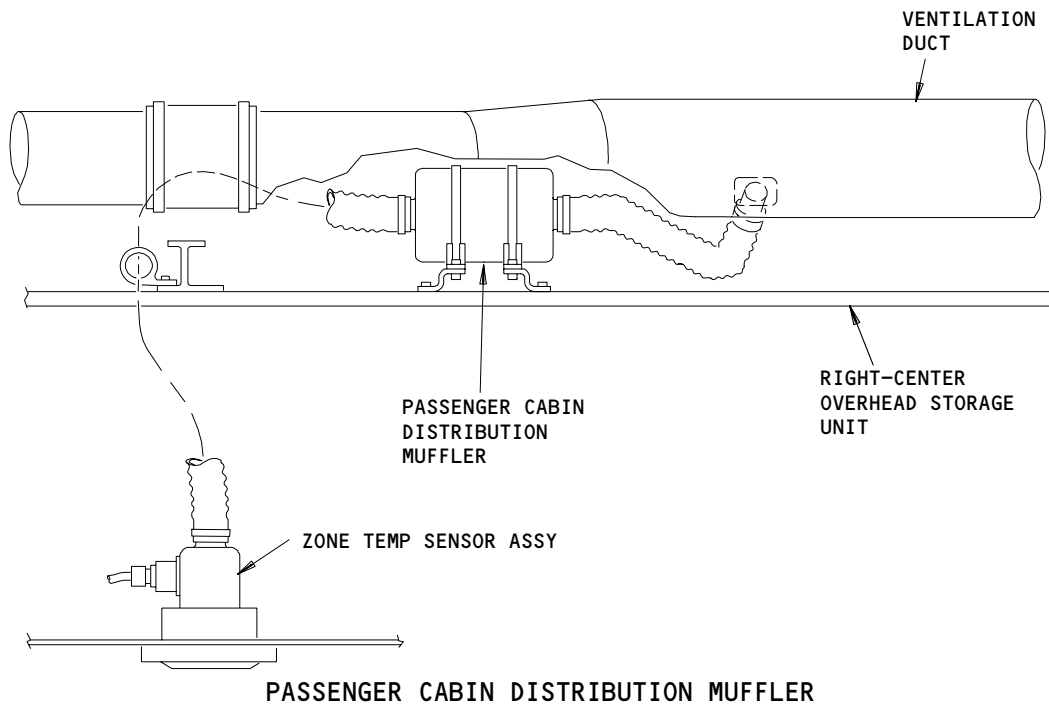
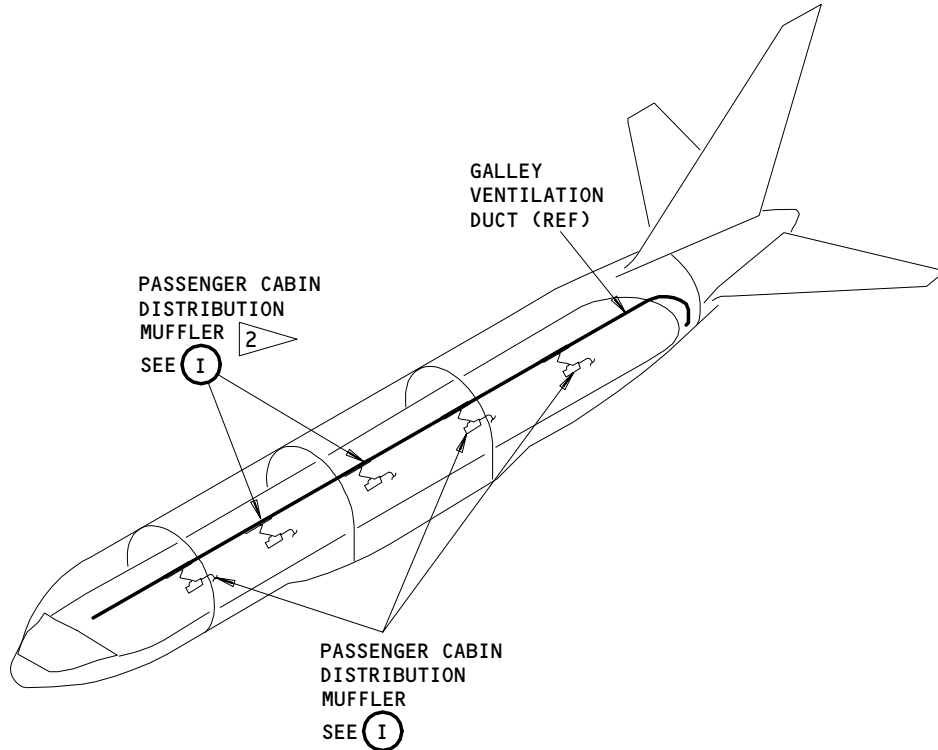
NOTE: (H) NOT USED

1 AFT GALLEY AREAS ONLY

Component Location
Figure 102 (Sheet 4)

EFFECTIVITY	ALL

21-20-00



3 SAS 050-149,153-999
AND ALL MTH AIRPLANES

I

Component Location
Figure 102 (Sheet 5)

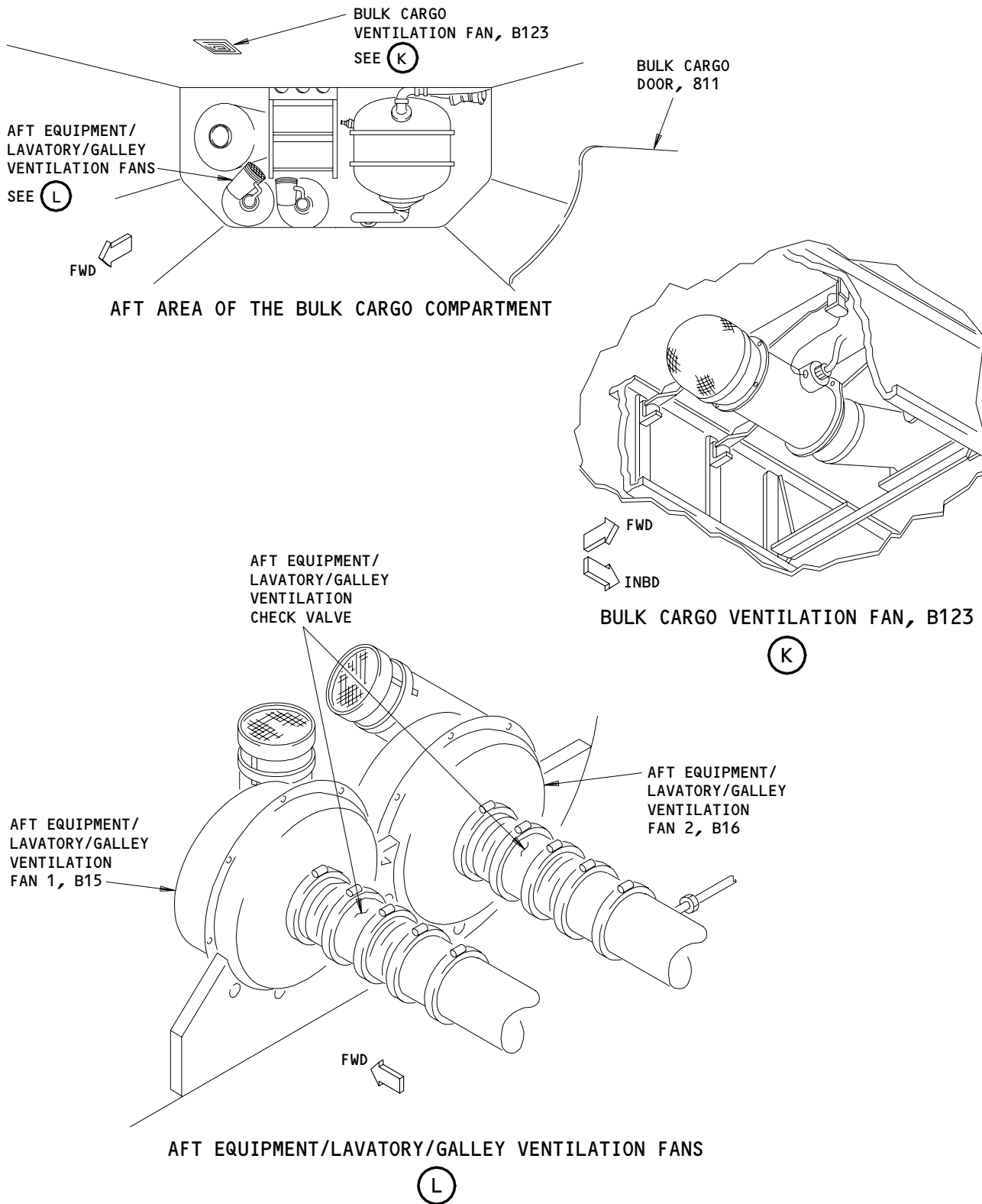
EFFECTIVITY	ALL

21-20-00

05

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BOEING
767
FAULT ISOLATION/MAINT MANUAL

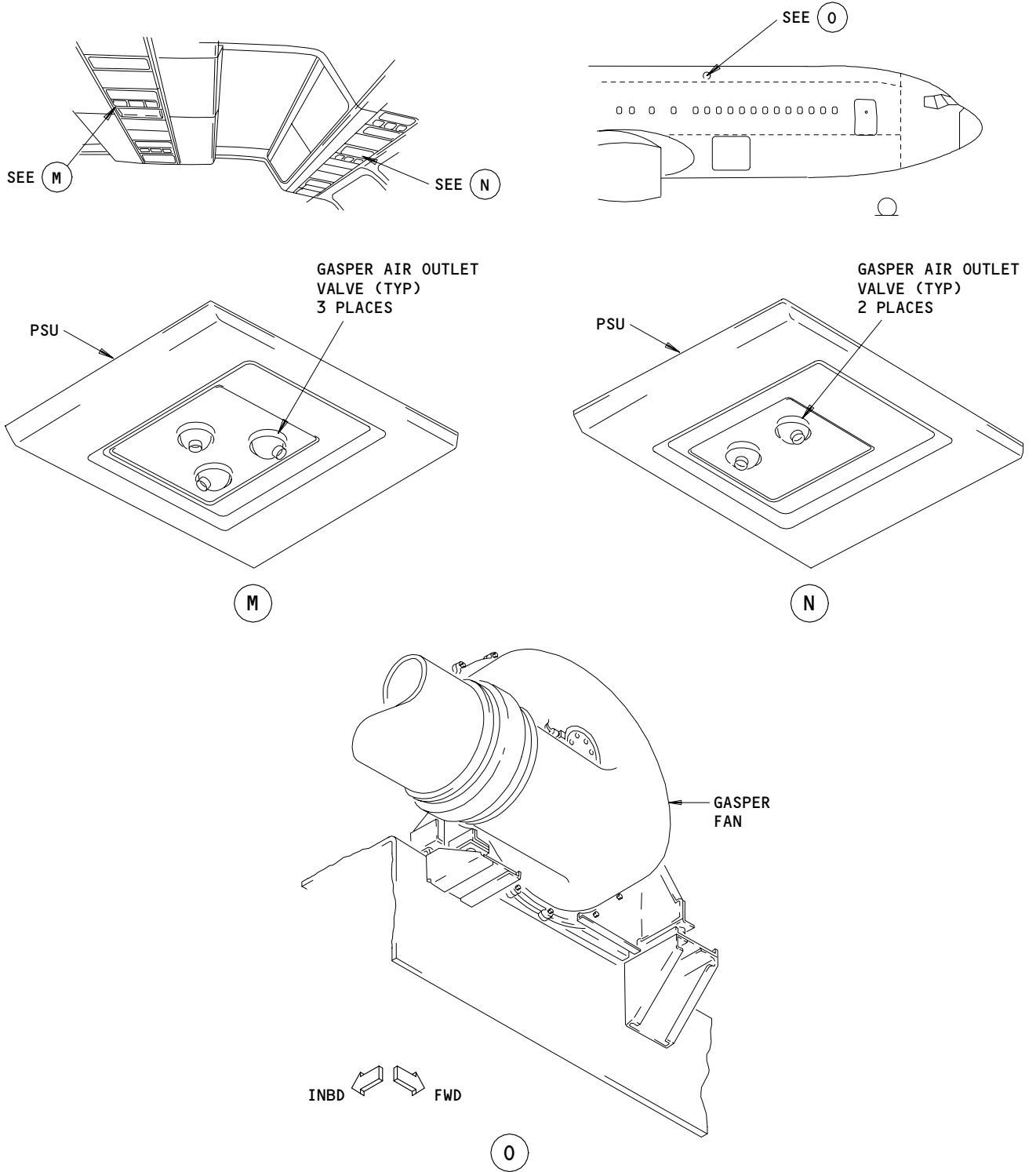


Component Location
Figure 102 (Sheet 6)

EFFECTIVITY	ALL
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21-20-00

BOEING
767
FAULT ISOLATION/MAINT MANUAL



Component Location
Figure 102 (Sheet 7)

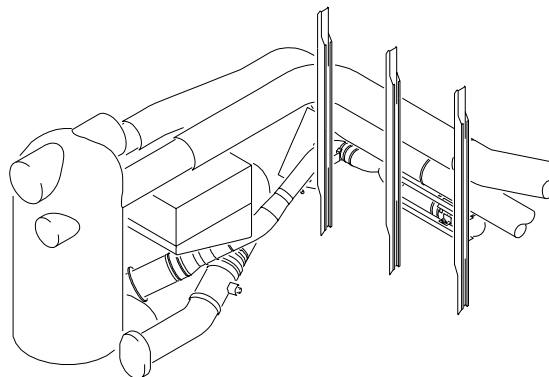
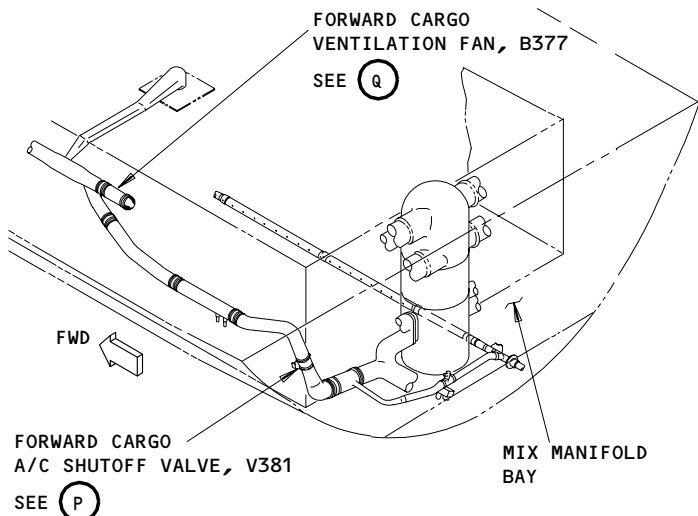
EFFECTIVITY	
	ALL

21-20-00

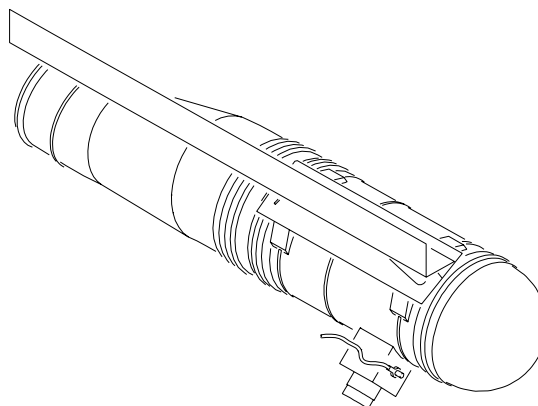
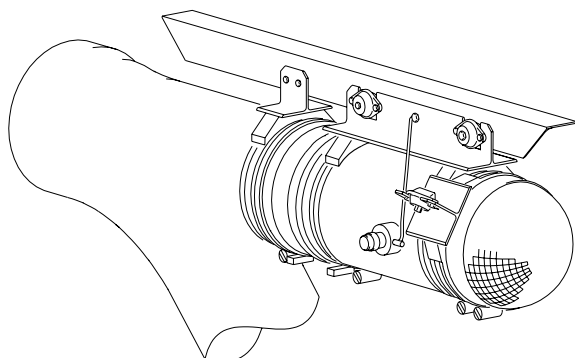
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FAULT ISOLATION/MAINT MANUAL



MIX MANIFOLD BAY AND FORWARD CARGO COMPARTMENT 4

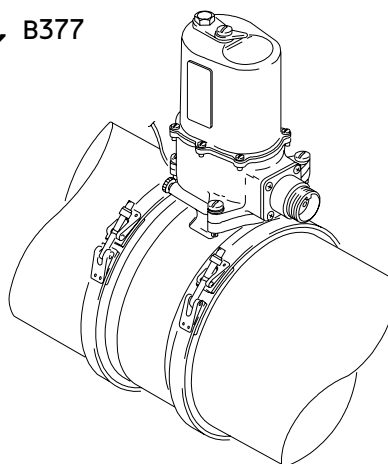


FORWARD CARGO VENTILATION FAN, B377

FORWARD CARGO VENTILATION FAN, B377

(Q) 4

(Q) 5



FORWARD CARGO A/C SHUTOFF VALVE, V381

(P)

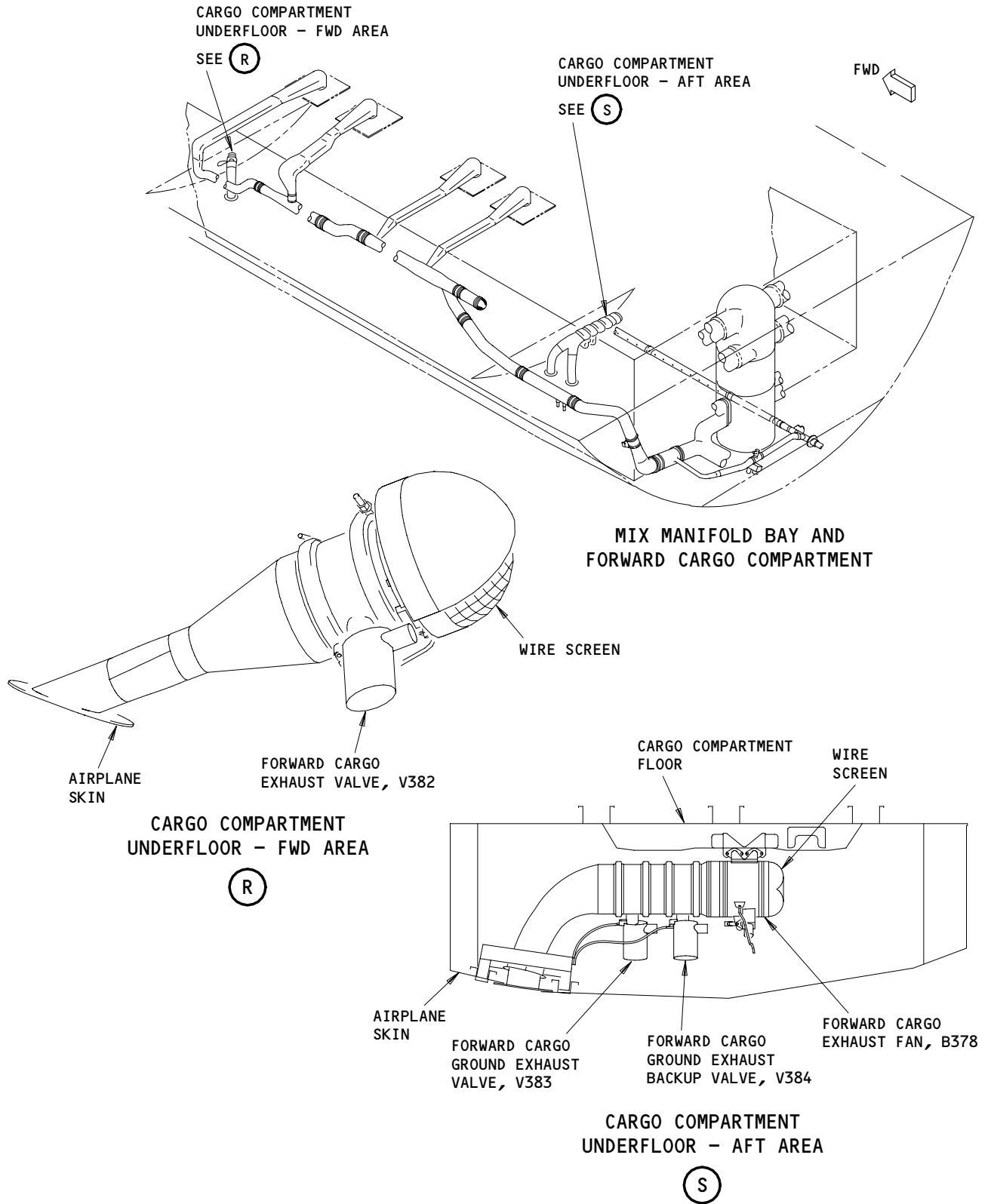
- 4 SAS 150-999; MTH AIRPLANES
- 5 SAS 050-149

Component Location
Figure 102 (Sheet 8)

EFFECTIVITY	ALL
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21-20-00

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767
FAULT ISOLATION/MAINT MANUAL



Component Location
Figure 102 (Sheet 9)

EFFECTIVITY	ALL
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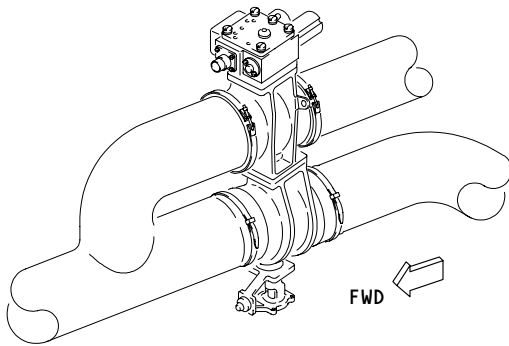
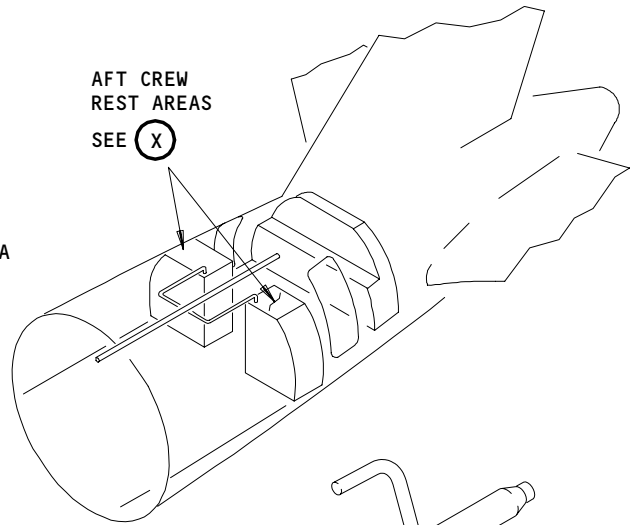
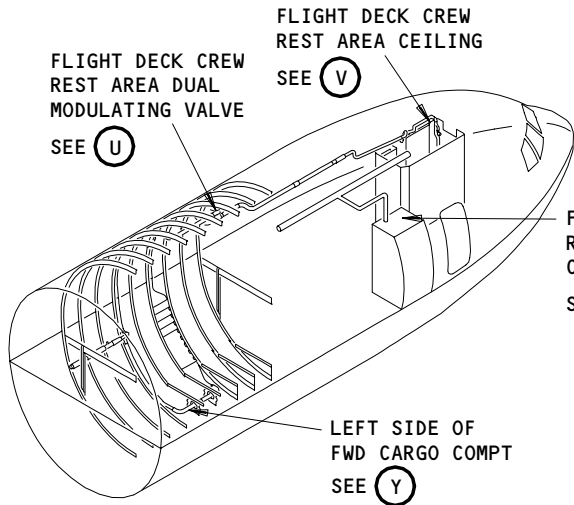
21-20-00

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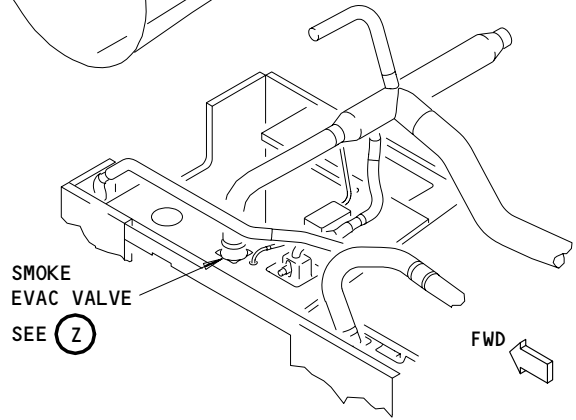
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BOEING
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FAULT ISOLATION/MAINT MANUAL



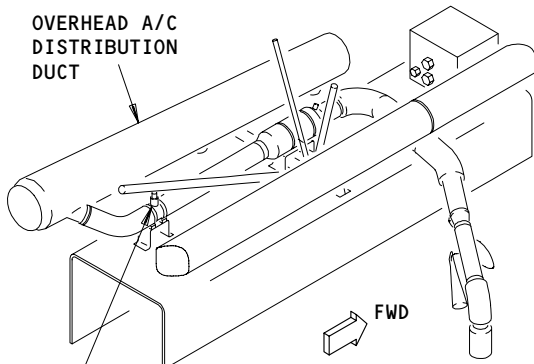
FLIGHT DECK CREW REST AREA DUAL MODULATING VALVE

(U)



FLIGHT DECK CREW REST AREA CEILING

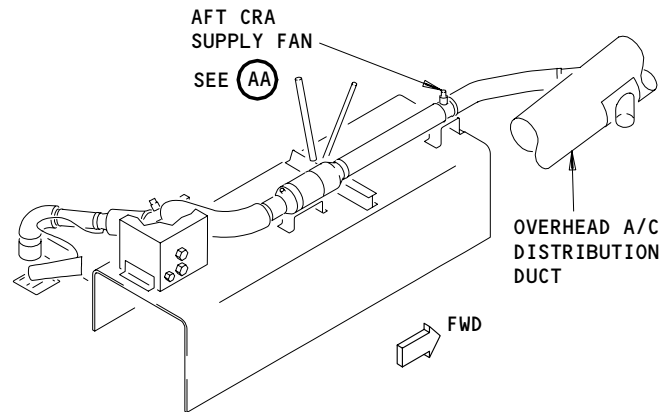
(V)



FWD CRA SUPPLY FAN SEE (AA)

FWD CREW REST AREA CEILING

(W)



AFT CREW REST AREA CEILING (LEFT CRA SHOWN, RIGHT CRA SIMILAR)

(X)

Component Location
Figure 102 (Sheet 10)

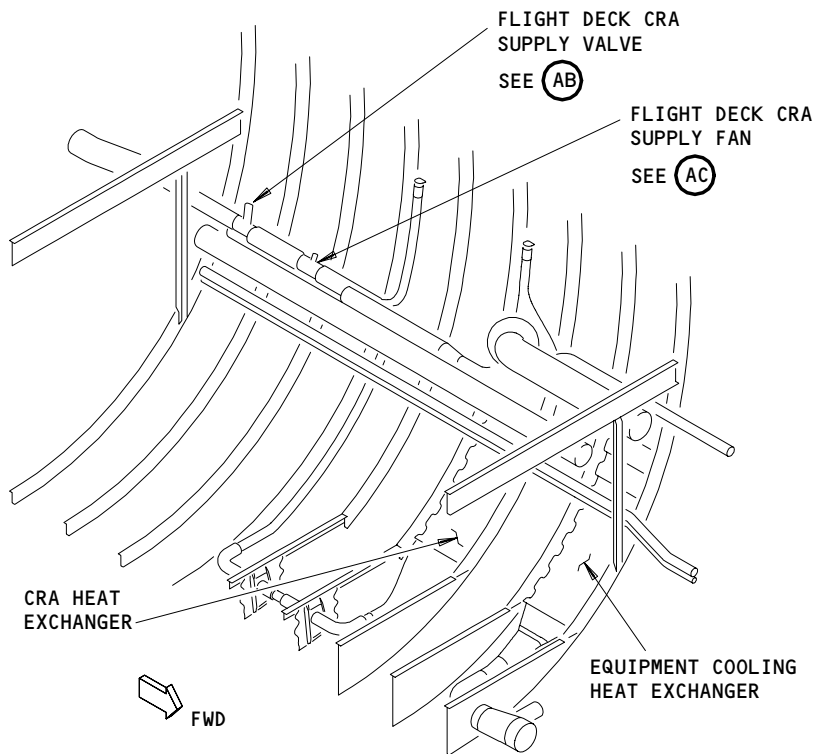
EFFECTIVITY	ALL
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21-20-00

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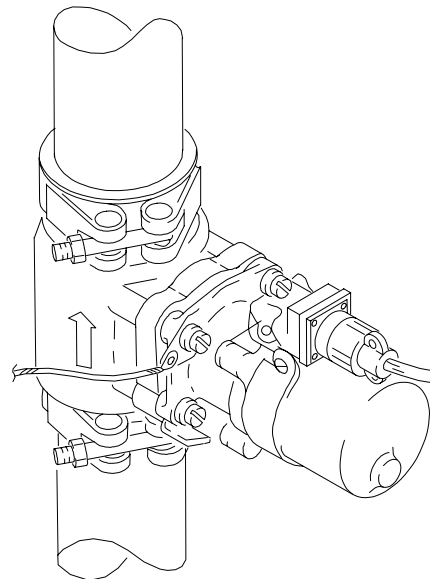
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746203



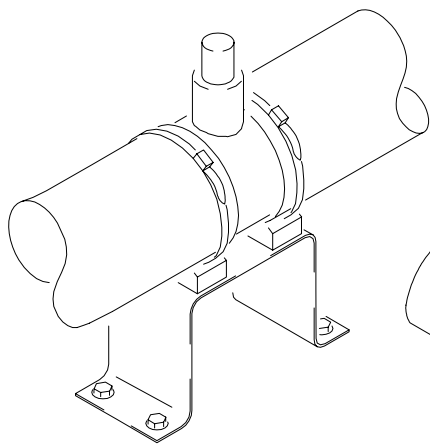
LEFT SIDE OF FORWARD CARGO COMPARTMENT

(Y)



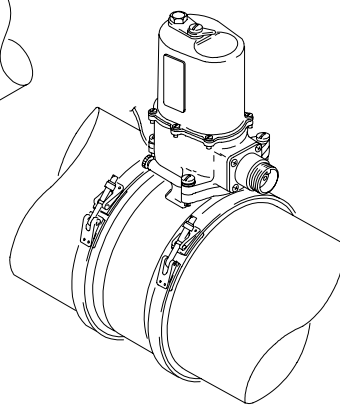
SMOKE EVAC VALVE

(Z)



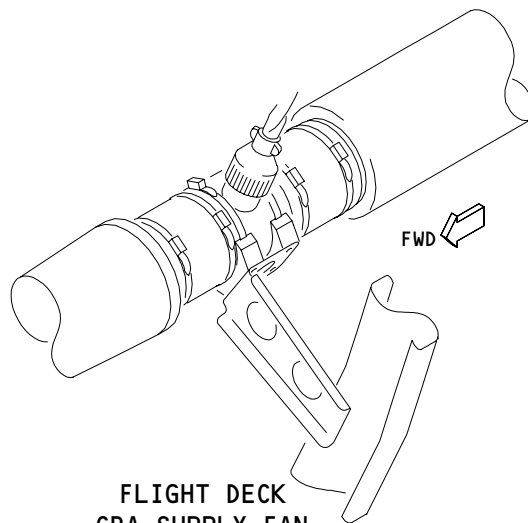
FWD/AFT CRA SUPPLY FAN

(AA)



FLIGHT DECK CRA SUPPLY VALVE

(AB)



FLIGHT DECK CRA SUPPLY FAN

(AC)

Component Location
Figure 102 (Sheet 11)

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AIR CONDITIONING DUCTS - INSPECTION/CHECK

1. General

- A. This procedure has instructions to inspect the overhead air conditioning ducts for loose clamps and straps, damage to ducts or sleeves, interferences, misconfiguration (such as control cables bound by clamps or straps), and air leaks.
- B. There are several distribution and ventilation ducts in the crown area of the main deck. The ducts consist of many duct sections and branches joined by sleeves, clamps and straps, or by tape.
- C. Flight control cables and wiring harnesses are routed adjacent to some of the air conditioning duct joints and careful inspection of the duct clamps and straps must be taken to ensure they are installed only around the air conditioning ducts and do 'not' interfere with the flight control cables and wiring harnesses.

TASK 21-20-11-206-001

2. Overhead Air Conditioning Duct Inspection/Check (Fig. 601)

A. References

- (1) AMM 20-20-02/601, Control Cables
- (2) AMM 21-00-00/201, Air Conditioning-General
- (3) AMM 21-23-07/801, Air Conditioning System Ducts
- (4) AMM 24-22-00/201, Control (Supply Power)
- (5) AMM 25-22-02/401, Lowered Ceiling Panels
- (6) SWPM 20-10-13

B. Access

- (1) Location Zones
 - 223/224 Area Above Passenger Cabin Ceiling - Section 41
 - 233/234 Area Above Passenger Cabin Ceiling - Section 43
 - 243/244 Area Above Passenger Cabin Ceiling - Section 45
 - 253/254 Area Above Passenger Cabin Ceiling - Section 46

C. Prepare for the Inspection/Check

S 866-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 866-016

- (2) Supply air conditioning (AMM 21-00-00/201).

S 016-023

- (3) Get access to the area above the ceiling (AMM 25-22-02/401).

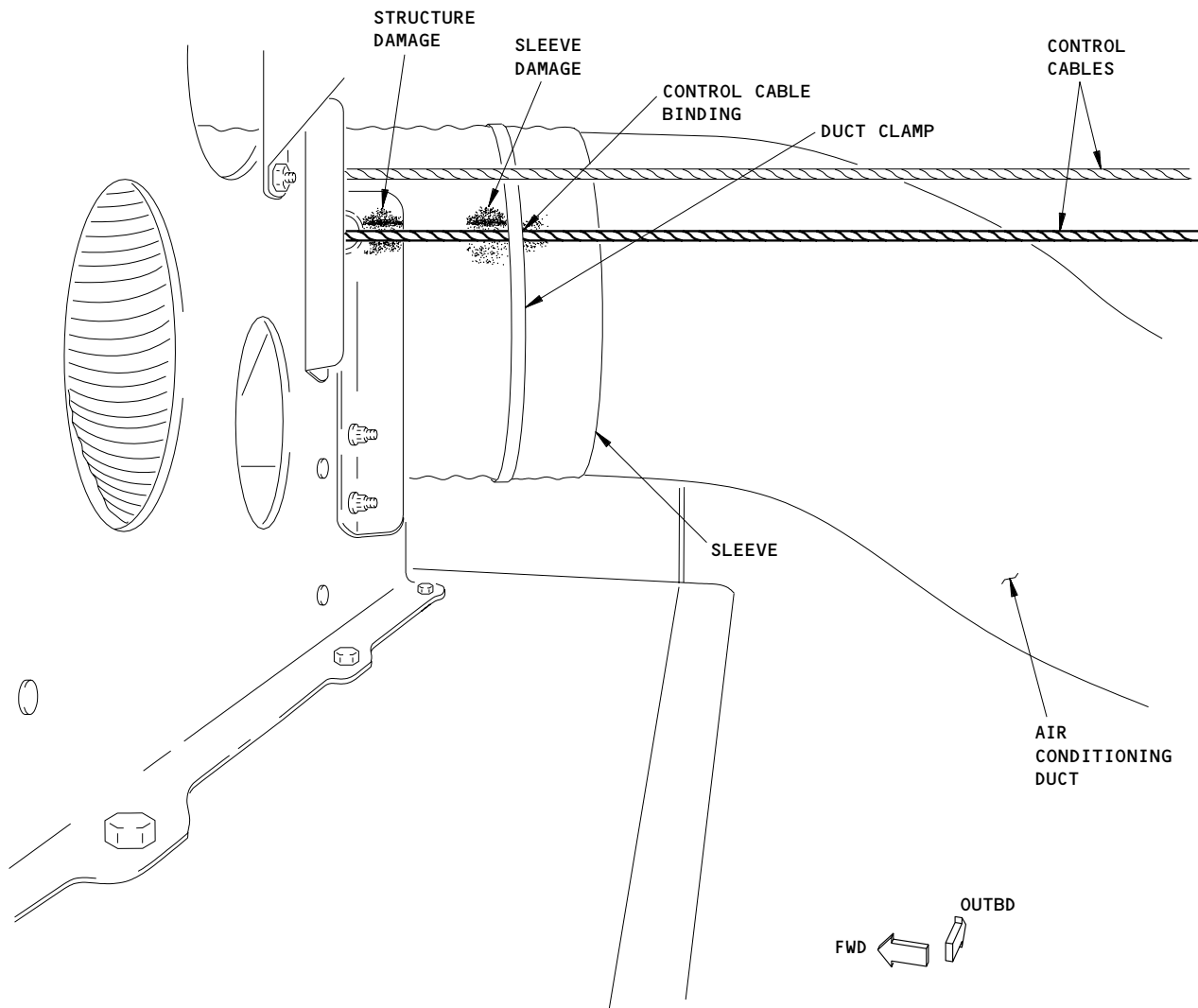
EFFECTIVITY

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**INCORRECT DUCT CLAMP INSTALLATION
ADJACENT TO CONTROL CABLE ROUTING**

**Inspection of Duct Clamp Installation
Figure 601**

EFFECTIVITY	
	ALL

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D. Air Conditioning Duct Inspection/Check

S 216-013

- (1) Inspect the air conditioning ducts for damage.
 - (a) Make sure there is no interference between the ducts and adjacent structure.
 - (b) Make sure there are no cracks or holes on the duct surface, loose or missing tape at joints, or damaged insulation.
 - (c) If damage is found, repair the air conditioning duct (AMM 21-23-07/801).

S 216-017

CAUTION: BINDING OF CONTROL CABLES BY DUCT CLAMPS OR STRAPS CAN CAUSE DAMAGE TO THE CONTROL CABLES OR AIRPLANE CONTROL PROBLEMS.

- (2) Inspect the air conditioning ducts for control cables or wiring harnesses bound by duct clamps or straps.
 - (a) If control cable binding is found, do the following:
 - 1) Repair or replace any structure damaged by the control cable binding.
 - 2) Remove and replace any damaged clamp, strap, or sleeve at the location of the control cable binding.
 - 3) Inspect the control cable (AMM 20-20-02/601).
 - 4) If the binding caused damage to the air conditioning duct, repair it (AMM 21-23-07/801).
 - (b) If wiring harness binding is found, do the following:
 - 1) Repair or replace any structural damage caused by the wiring harness binding.
 - 2) Repair any wiring harness damage (SWPM 20-10-13).

S 216-015

- (3) Inspect the air conditioning ducts for leaks caused by loose clamps, loose straps, or damaged sleeves at the duct joints.
 - (a) Feel for airflow around the duct joint.
 - 1) Small leaks are permitted.
 - 2) Large leaks must be repaired.
 - (b) If a loose clamp or strap is found, tighten it.
 - (c) If a damaged sleeve is found, replace it.
- E. Put the airplane back to its usual condition.

S 416-018

- (1) Close any ceiling panels that were opened to get access to areas above the ceiling (AMM 25-22-02/401).

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- S 866-019
- (2) Remove air conditioning (AMM 21-00-00/201).
- S 866-012
- (3) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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MAIN AIR DISTRIBUTION - DESCRIPTION AND OPERATION

1. General (Fig. 1)

A. The main air distribution system combines the conditioned air from the air cooling packs (AMM 21-51-00/001) with the air supplied by the recirculation system (AMM 21-25-00/001) into a mix manifold located in the aft end of the forward cargo compartment. This mix manifold supplies the temperature controlled air to the flight deck (AMM 21-22-00/001), passenger compartment (AMM 21-23-00/001), and the lavatories and galleys (AMM 21-26-00/001).

- (1) The main air distribution system consists of a mix manifold with attached ducting and a ground air service connector. The mix manifold combines cooled air from the air conditioning packs with recirculation air extracted from the passenger cabin. The manifold also provides humidity control by extracting water from the combined airflow.
- (2) Whenever the airplane is parked, the ground air service connector allows direct input of conditioned air into the airplane's conditioned air distribution system. The conditioned air can be supplied by any standard conditioned air ground cart.

2. Component Details

A. Mix Manifold

- (1) The mix manifold sits immediately aft of the forward cargo compartment aft bulkhead. Cylindrical in shape with domed ends, the manifold stands about 60 inches high and 20 inches in diameter. The manifold has a fiberglass honeycomb mid section with fiberglass end sections.
- (2) Two 8.0 by 11.5 inch oval inlet ducts enter the mix manifold's lower section. The inlet ducts allow only tangential airflow into the manifold. Five outlet ducts (two 7.5-inch diameter, two 10.5-inch diameter, and one 6.5-inch diameter) exit the manifold from the upper section and channel the airflow to the conditioned air distribution ducts. A 0.5-inch diameter water drain tube mounts to the manifold's lower section. The tube removes condensed water from the manifold.
- (3) Two aluminum angles called water separator angles spiral up the inside of the mix manifold. Set at 90° to the inside surface, the 1.25 inch wide angles start at a point opposite of each other and make approximately one revolution up the manifold from the bottom to just below the water ring. The water separator angles spiral upward in a direction opposite to the normal airflow.

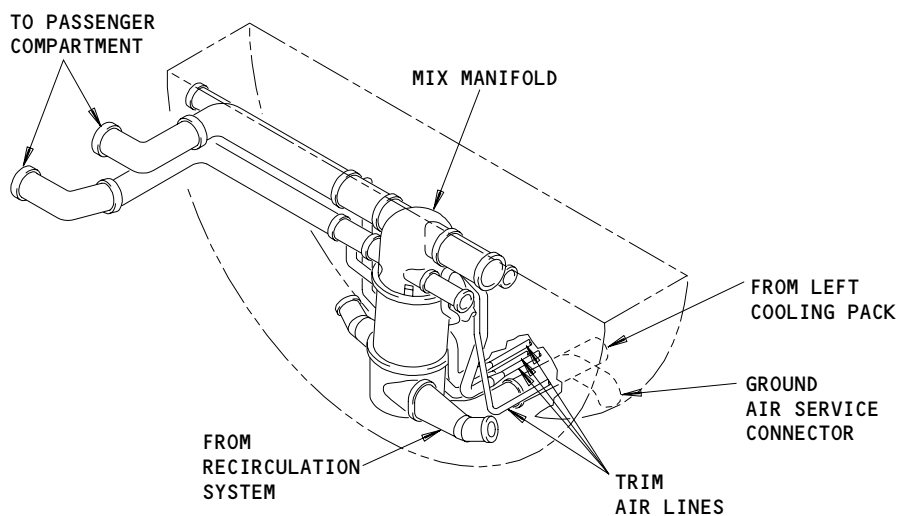
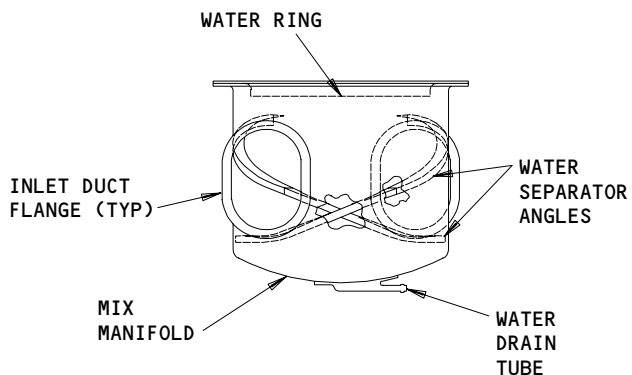
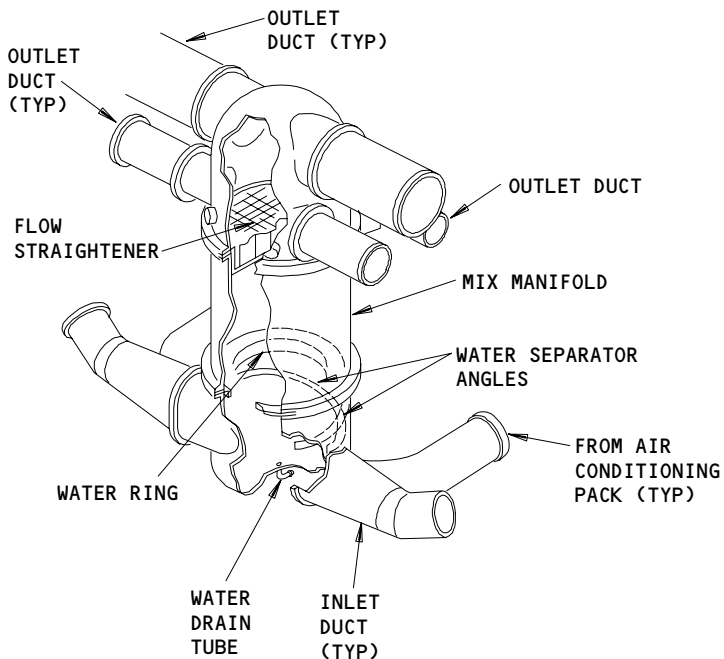
EFFECTIVITY

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Main Distribution Manifold
Figure 1

EFFECTIVITY

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- (4) A 2-inch wide channel called a water ring is mounted around the inside and near the top of the manifold's lower section. The water ring extends perpendicular from the wall with a downward turned end flange.
- (5) A flow straightener completes the manifold's interior. The 6-inch thick aluminum grid mounts above the water ring and below the outlet ducts.
- (6) Air enters the mix manifold tangentially from one or both inlet ducts. This tangential entrance creates a centrifugal flow within the manifold. The water separator angles inhibit this flow, creating turbulence. The turbulence causes water to separate from the air and collect on the manifold's inner wall.

The air continues to spiral up the manifold approaching the water ring. The ring creates additional turbulence, removing any remaining water carried by the airflow. The air passes through the water ring and enters the flow straightener. The straightener breaks up the swirling motion of the air, and allows an even pressure and volume distribution to each outlet duct.

- (7) The water removed at the water separator angles and at the water ring runs down the manifold's inside wall. The water collects at the bottom and is drawn off through the water drain tube and leaves the airplane through a drain port.

B. Ground Air Service Connector

- (1) The ground air service connector permits conditioned air to be supplied to the airplane's distribution system from a ground air cart. The 8-inch diameter connector has a check valve which is spring-loaded to allow air into the distribution system but will not allow air to go out of the system. The connector is on the bottom of the fuselage, forward of the left air conditioning pack.
- (2) Conditioned air from the ground cart forces the check valve to open. The check valve automatically closes, but does not seat, whenever pressurized ground air is not available. The check valve seats whenever the air conditioning packs operate (i.e. a pressurized system).

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02

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CONDITIONED AIR GROUND CONNECTOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has the following tasks:
 - (1) Conditioned air ground connector removal
 - (2) Conditioned air ground connector installation.
- B. The air that is conditioned by a ground cart (low pressure) is supplied to the airplane's main air distribution system through a conditioned air ground connector. The connector is installed immediately forward of the left ECS cooling pack and behind the ECS components pressure relief access door, 193GL.
- C. The conditioned air ground connector is an assembly which consists of an adapter and seat assembly mounted to a duct assembly with an internal check valve (flapper). The conditioned air ground connector is connected to the main air distribution system via a tee duct mounted between the left ECS cooling pack outlet duct and the associated conditioned air check valve (upstream of the mix manifold).

TASK 21-21-02-004-001

2. Conditioned Air Ground Connector Removal (Fig. 401)

A. General

- (1) This task has these instructions:
 - (a) Adapter and Seat Assembly Removal
 - (b) Duct Assembly Removal
 - (c) Check Valve Removal
- (2) Removal of the adapter and seat assembly does not require the removal of the duct assembly from the tee duct.
- (3) Removal of the duct assembly does not require the removal of the adapter and seat assembly, unless the duct assembly is being repaired or replaced.
- (4) Removal of the check valve (flapper) does require the removal of the the duct assembly from the tee duct.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

C. Access

- (1) Location Zones
 - 125/126 Area aft of forward cargo compartment
 - 211/212 Control Cabin
- (2) Access Panel
 - 193GL ECS Components, Conditioned Air Connection, Pressure Relief Door

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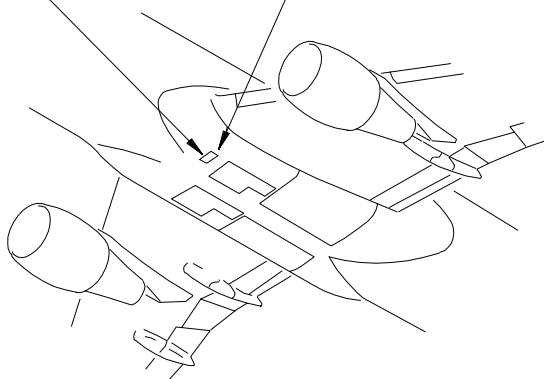
02A

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ECS COMPONENTS
CONDITIONED AIR
CONNECTION PRESSURE
RELIEF DOOR, 193GL

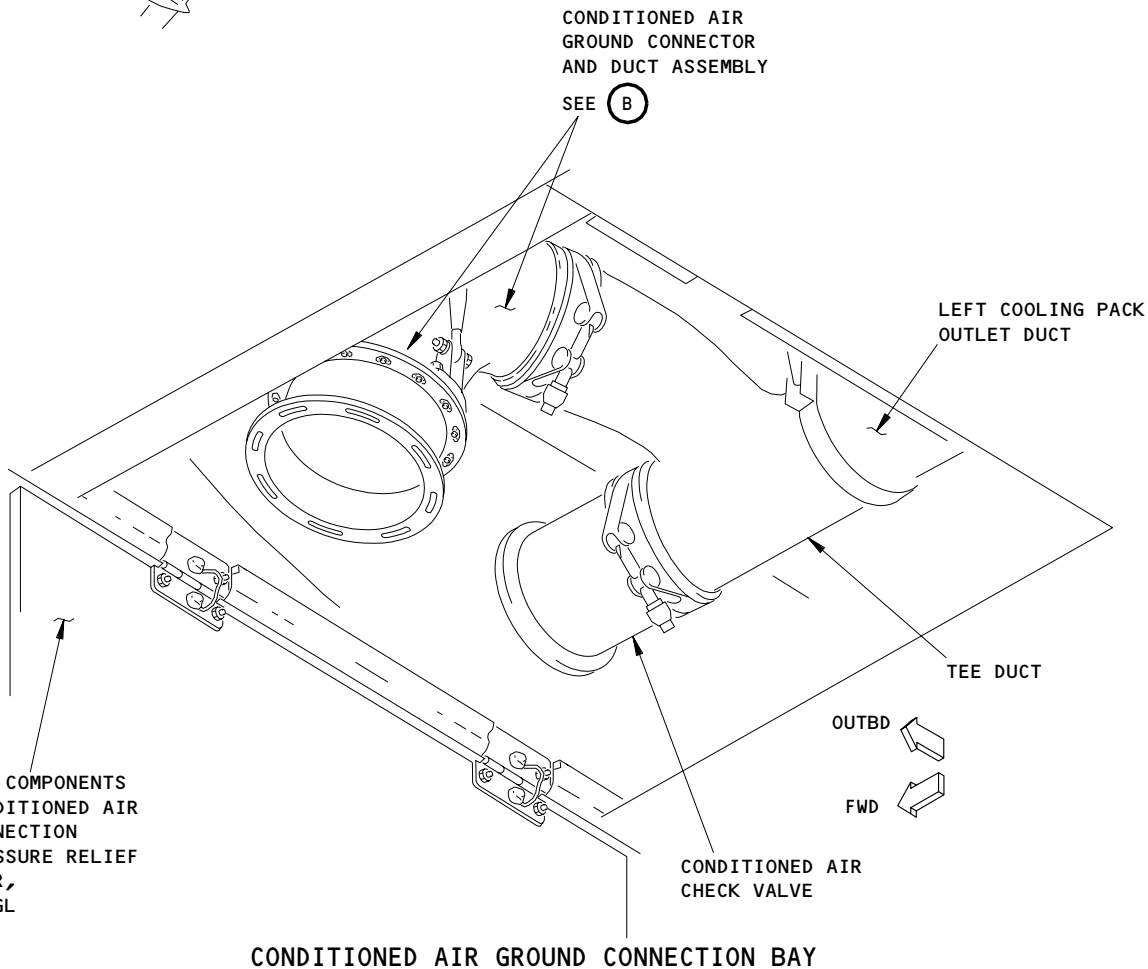
CONDITIONED AIR
GROUND CONNECTION BAY

SEE (A)



CONDITIONED AIR
GROUND CONNECTOR
AND DUCT ASSEMBLY

SEE (B)



ECS COMPONENTS
CONDITIONED AIR
CONNECTION
PRESSURE RELIEF
DOOR,
193GL

CONDITIONED AIR GROUND CONNECTION BAY

(A)

Conditioned Air Ground Connector Installation
Figure 401 (Sheet 1)

EFFECTIVITY

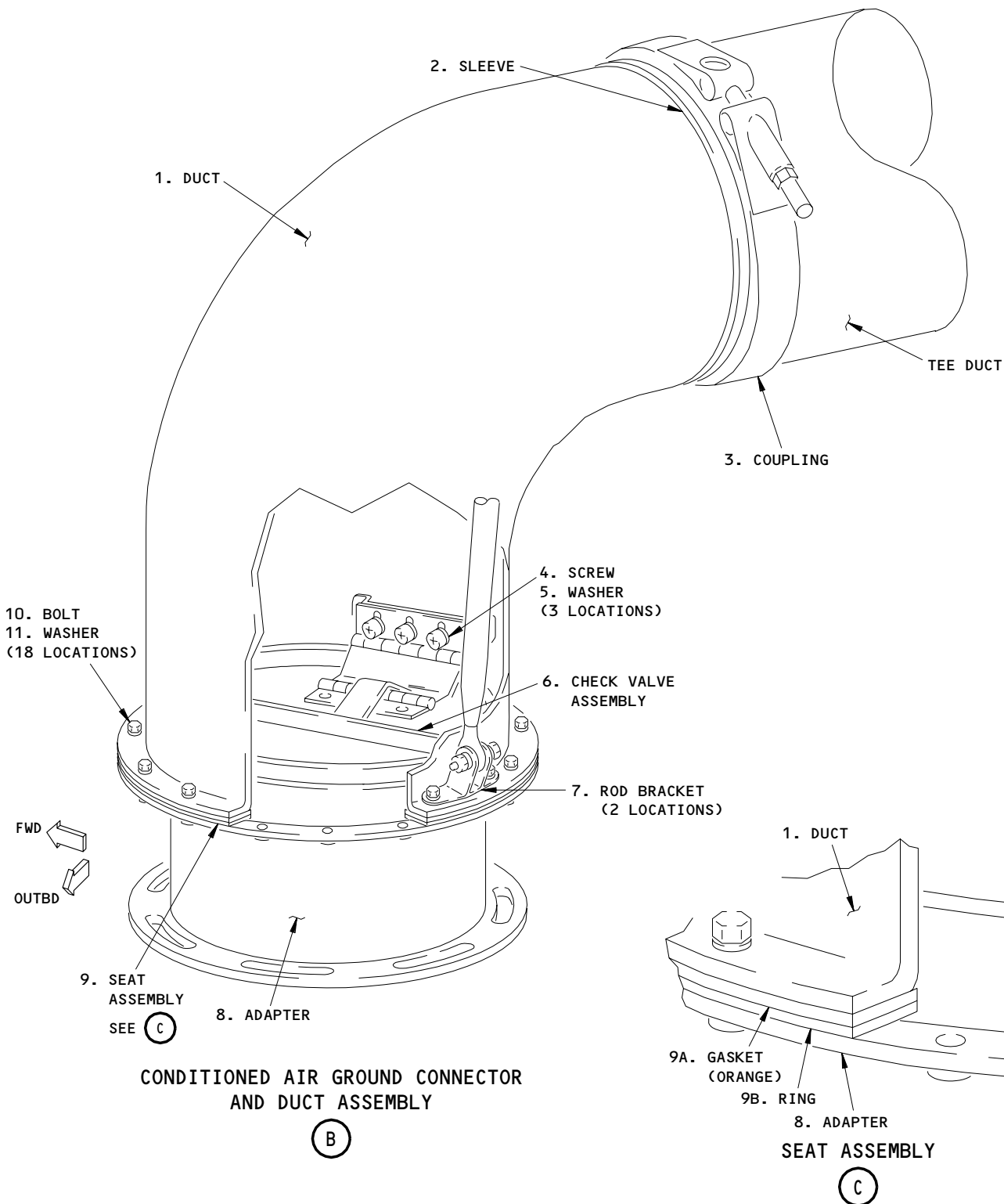
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01A

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M14122



Conditioned Air Ground Connector Installation
Figure 401 (Sheet 2)

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02A

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M14147

D. Prepare for the Removal

S 864-002

- (1) Turn the L PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the L PACK OFF light comes on.
 - (b) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the access panel for the conditioned air connection, 193GL (AMM 06-41-00/201).

E. Adapter and Seat Assembly Removal

S 024-073

- (1) Remove the bolts [10] and washers [11] holding the adapter [8] and seat assembly [9] to the duct [1] and the rod brackets [7].

S 024-074

- (2) Remove the adapter [8] and seat assembly [9].

F. Duct Assembly Removal

S 024-075

- (1) Loosen the coupling [3] at the top of the duct [1]. Move the coupling off the sleeve [2].

S 024-111

- (2) Remove the duct [1] from the sleeve [2].

S 414-077

- (3) Put a cover on the duct opening to keep out the unwanted material.

G. Check Valve Removal

S 024-029

- (1) Remove the screws [4] and washers [5] that attach the check valve assembly [6] to the duct [1].

S 024-030

- (2) Remove the check valve assembly [6].

TASK 21-21-02-404-032

3. Conditioned Air Ground Connector Installation (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control

B. Consumable Materials

- (1) D00548, Lubricant (grease) - Fluorolube GR 660
 - (a) Lubricant (grease) - Fluorolube GR 544 (alternate)

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06A.1

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- (b) Lubricant (grease) - Fluorolube GR 470 (alternate)
- (2) G00033, Gauze Sponges (AMM 20-30-07/201)
- C. Access
 - (1) Location Zones
 - 125/126 Area aft of forward cargo compartment
 - 211/212 Control Cabin
 - (2) Access Panel
 - 193GL Conditioned Air Connection
- D. Check Valve Assembly Installation

S 424-078

- (1) Install the check valve assembly [6] in the duct [1] with the screws [4] and washers [5].

NOTE: Do not fully tighten the screws.

S 824-113

- (2) Adjust the position of the check valve assembly [6] so that it can fall to the closed position freely and will seat correctly.

NOTE: The check valve is spring-loaded to unseat except when the cabin is pressurized.

S 424-036

- (3) Tighten the screws [4].
- E. Duct Assembly Installation

S 014-079

- (1) Remove the cover from the duct opening.
 - (a) Make sure there is no unwanted material in the duct.

S 164-086

- (2) Wipe the sleeve [2] with a dry, lint-free gauze sponge until there is no visible contamination.

S 644-080

- (3) Apply a thin film of the fluorolube lubricant (grease) to the faying surfaces of the sleeve [2] and coupling [3].

NOTE: The lubricant (grease) is only to help facilitate installation and its use is optional.

S 424-040

- (4) Put the duct [1] into position against the tee duct.
 - (a) Make sure the holes in the rod brackets [7] align with the holes on the flange at the bottom of the duct [1].

EFFECTIVITY

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16A.1

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S 424-081

- (5) Move part of the sleeve [2] on to the top end of the duct [1].

S 424-082

- (6) Install the coupling [3] on the top of the duct [1].
(a) Tighten the coupling [3] to 40-50 pound-inches
(4.52-5.65 newton-meters).

F. Adapter and Seat Installation

S 214-083

- (1) Examine the seat assembly [9] and make sure the gasket [9A] and the ring [9B] are not damaged.
(a) Replace the seat assembly [9] if it is damaged.

S 424-037

- (2) Put the seat assembly [9] in its position on the adapter [8] with the gasket [9A] up and the flat edge inboard.

S 424-038

- (3) Put the adapter [8] and seat assembly [9] on the duct [1] and rod brackets [7].
(a) Make sure the short side of the adapter [8] is forward and the flat edge of the seat assembly [9] is inboard.

S 424-112

- (4) Install the bolts [10] and washers [11] that hold the adapter [8] and seat assembly [9] to the duct [1].
(a) Install the clamp [13] on the sense line [14].

G. Conditioned Air Ground Connector Installation Test

S 864-065

- (1) Remove the DO-NOT-OPERATE tag from the L PACK selector, on the P5 panel.

S 864-064

- (2) Supply conditioned air with the left cooling pack (AMM 21-00-00/201).

S 794-067

- (3) Feel for the airflow around the adapter flanges and in the adapter opening.
(a) Small leaks are permitted.
(b) You must repair a large leak.
1) If there is a leak around the adapter flanges, make sure the bolts and washers are tight.

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04A.1

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- 2) If there is a leak around the check valve, do the steps that follow:
 - a) Turn the L PACK selector to the OFF position.
 - b) Put a DO-NOT-OPERATE tag on the selector.
 - c) Adjust the check valve assembly hinge until the check valve will close and seal correctly when the cabin is pressurized.

NOTE: The check valve is spring-loaded to unseat except when the cabin is pressurized.

- d) Do the Conditioned Air Ground Connector Installation Test again.

H. Put the airplane back to its usual condition

S 414-068

- (1) Close the access panel for the conditioned air connection, 193GL (AMM 06-46-00/201).

S 864-070

- (2) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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04A

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FLIGHT COMPARTMENT AIR DISTRIBUTION – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The air distribution system supplies conditioned air from the mix manifold (Ref 21-21-00) to the flight deck. The air in the mix manifold enters the flight-deck-conditioned-air-distribution duct to flow to the flight deck. A controlled amount of trim air (Ref 21-61-00) is added to the conditioned air to keep the temperature of the flight compartment comfortable for the flight crew. The system has restrictors, floor outlets, gaspers, windshield diffusers, and an overhead outlet.
- B. The floor outlets and the overhead outlet supply the air to all areas of the flight deck. Gasper outlets supply the air to each crew station. The windshield diffuser supplies air over all of the window area to prevent window fogging.

2. Component Details

A. Restrictors

- (1) Restrictors are installed for each outlet in the flight compartment and in the ventilation duct for the temperature sensor assembly. Different types of restrictors are used to make sure that all areas of the flight compartment get the necessary quantity of air. The restrictors are made of thin aluminum with different numbers and sizes of holes. The restrictors have their identification number on the tabs.

B. Floor Outlets (Fig. 1)

- (1) The flight deck floor perimeter locates ten floor outlets. The floor outlets consist of a housing enclosing an air grille, a flow straightener, and in some floor outlets, a distributor. A gasket and cover cap the housing on both ends and a perforated aluminum sheet with a staggered hole pattern makes up the air grille. A flow straightener, constructed of nomex honeycomb, mounts adjacent to the air grille. The distributor is constructed of a perforated polycarbonate sheet.
- (2) Four of the floor outlets, two at the captain's station and two at the first officer's station, are constructed differently than the other floor outlets. The outlet housing consists of a top cover attached to a pan with a corrugated core between. A polyurathane foam pad and block support the housing.
- (3) The floor outlet located behind the main power distribution P6 panel is a single piece, Kevlar nozzle.
- (4) All outlets attach to flexible ducting. Air flows through the flexible ducting into the outlets. The outlets then disperse the air throughout the flight deck.

C. Overhead Outlet (Fig. 1)

- (1) The overhead outlet consists of a plenum enclosing an acoustic baffle and a nozzle. The baffle, made of perforated needle nomex felt, bonds to the top of the nozzle. The baffle prevents excess noise by restricting the airflow through the nozzle. The nozzle, made of formed plastic, attaches to the plenum flanges. The nozzle directs airflow in four different directions within the flight deck. Rubber seals between the plenum and the nozzle ensure an air tight assembly.

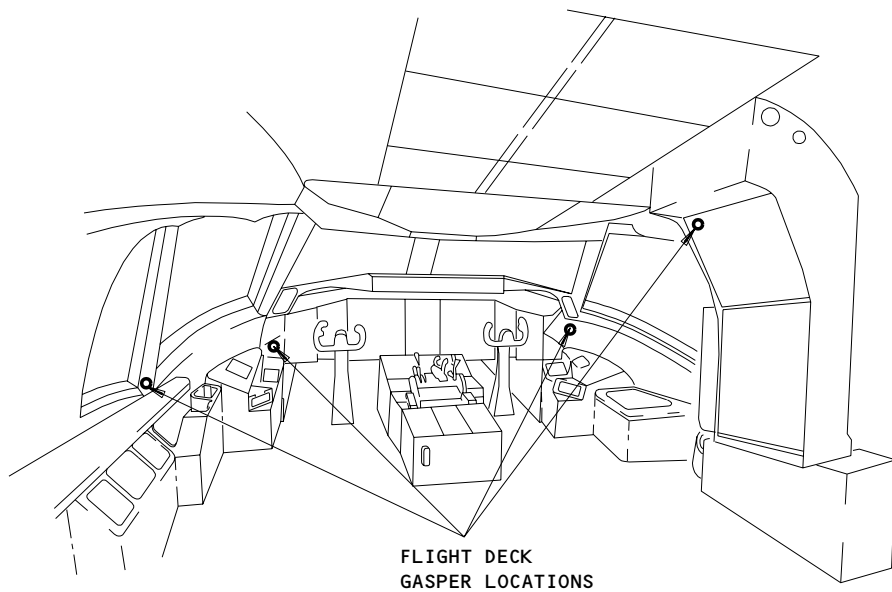
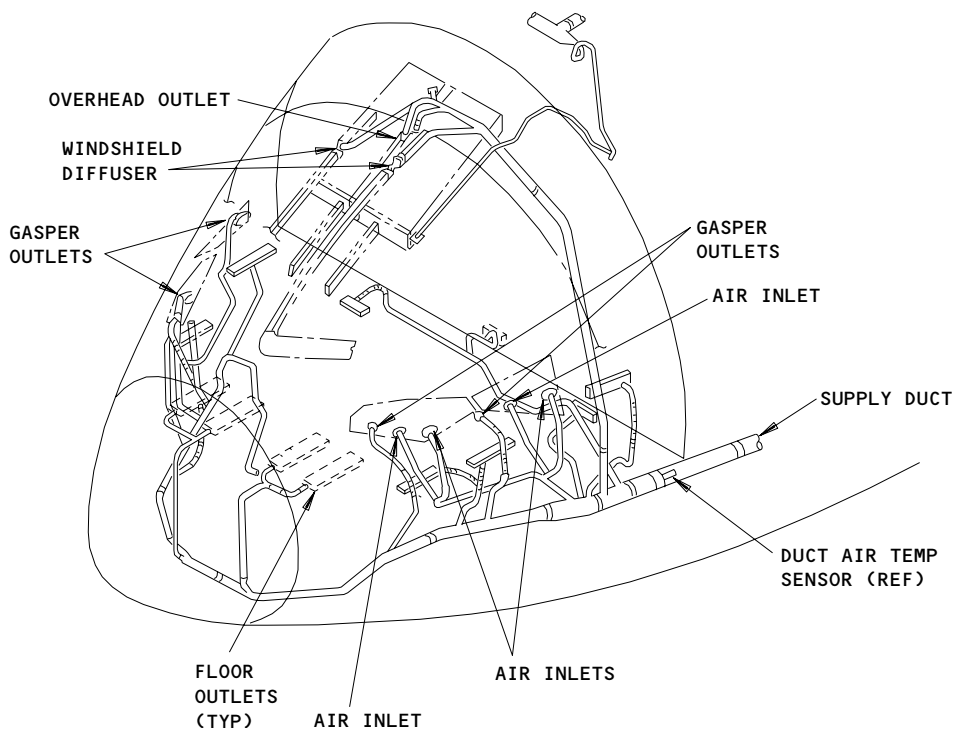
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BOEING

767 MAINTENANCE MANUAL



Flight Compartment Conditioned Air Distribution
Figure 1

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- (2) Conditioned air enters the overhead outlet from two inlet ducts on the top side of the plenum. Air then flows through the baffle and the nozzle disperses the air to the flight deck.
- D. Windshield Diffuser (Fig. 1)
- (1) The overhead dripshield contains the forward windshield diffusers. The diffusers incorporate an airflow straightener and a baffle plate to ensure uniform distribution of air over the windshield.
- (2) The sidewall panels contain the side window diffusers. The diffusers consist of a nomex honeycomb air grille.
- E. Gaspers (Fig. 1)
- (1) The flight deck has four adjustable gaspers. One gasper mounts on the outboard side of the captain's station and one mounts on the outboard side of the first officer's station. A third gasper mounts on the left side aft window post, to the left of the first observer's seat. The fourth gasper mounts on the upper P61 panel.
- F. Air Inlets (Fig. 1)
- (1) Air inlets on each side of the flight deck provide supplemental heated air to the flight deck. The inlets, made of fire resistant injection molded nylon, bond to the inside surface of the skin panels.

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FLIGHT COMPARTMENT FLOOR OUTLETS – REMOVAL/INSTALLATION

1. General

- A. Eleven floor outlets are used to supply conditioned air to the flight compartment. Ten outlets are installed on all sides of the flight compartment, approximately 1-3 inches above the floor. The other floor outlet is installed on the left sidewall of the flight compartment, approximately 2 feet above the floor.
- B. This procedure has instructions to remove and install all of the floor outlets in the flight compartment.

TASK 21-22-01-004-001

2. Remove the Flight Compartment Floor Outlets (Fig. 401, 402)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels

B. Access

(1) Location Zones

- 211/212 Control Cabin
- 113/114 Area forward of NLG wheel well

(2) Access Panel

- 113AL Forward Equipment Bay

C. Prepare for the Removal

S 864-003

- (1) Push the L and R RECIRC FAN switch-lights, on the pilot's overhead panel P5, to the off position.
 - (a) Make sure the ON light is not on
 - (b) Put a DO-NOT-OPERATE tag on the switch-lights

S 864-005

- (2) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.
 - (a) Make sure the PACK OFF lights come on.
 - (b) Put a DO NOT OPERATE tag on the selectors.

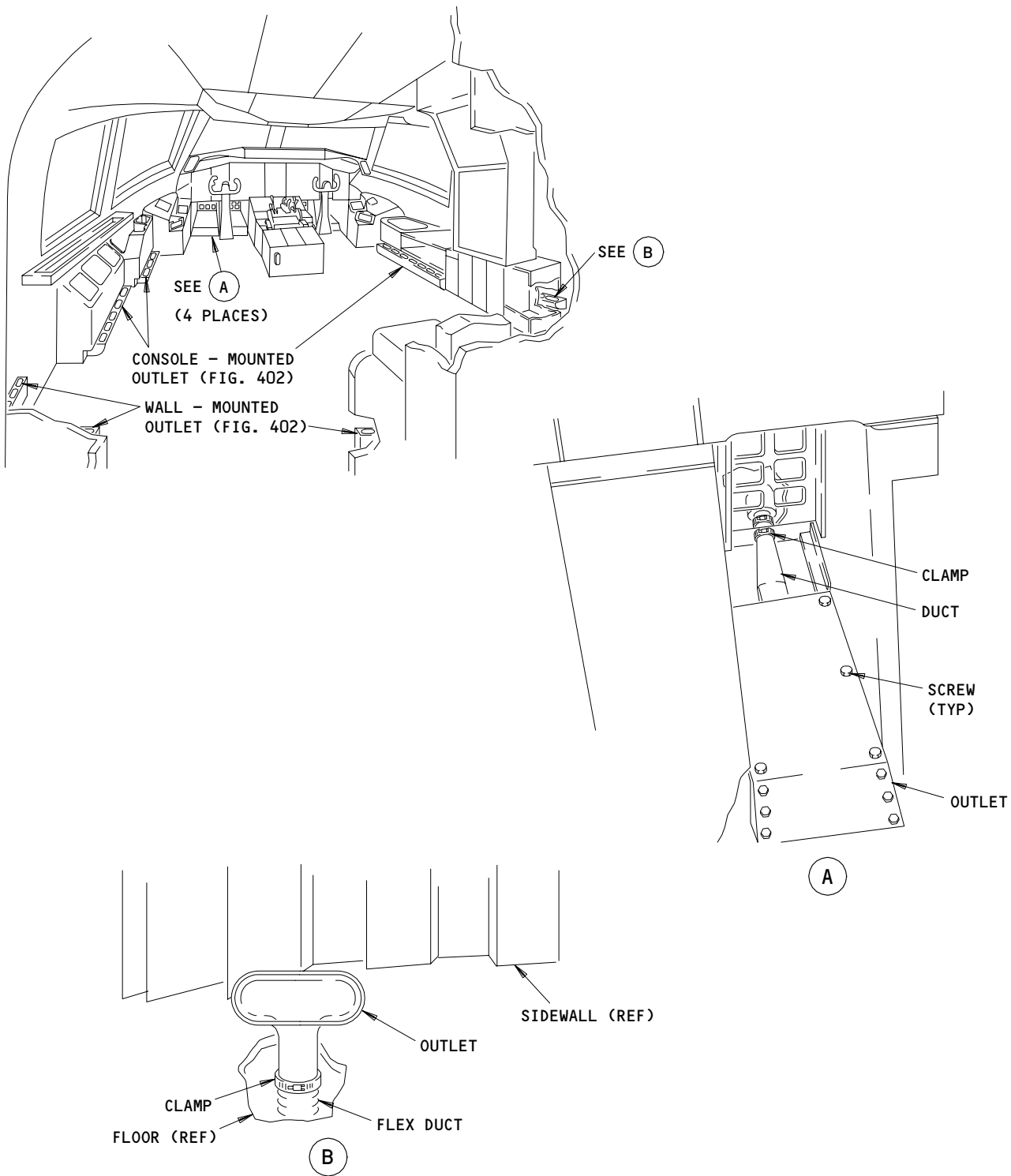
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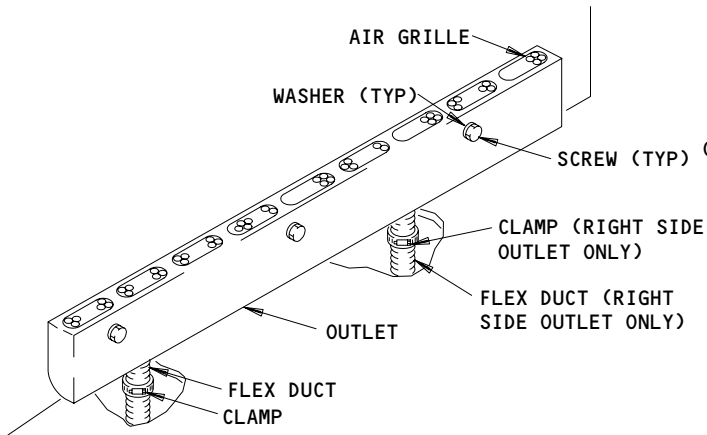
Page 401
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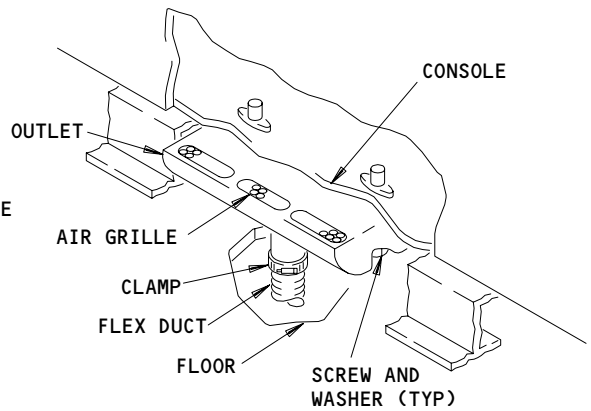
Flight Deck Floor-Mounted Outlets Installation
Figure 401

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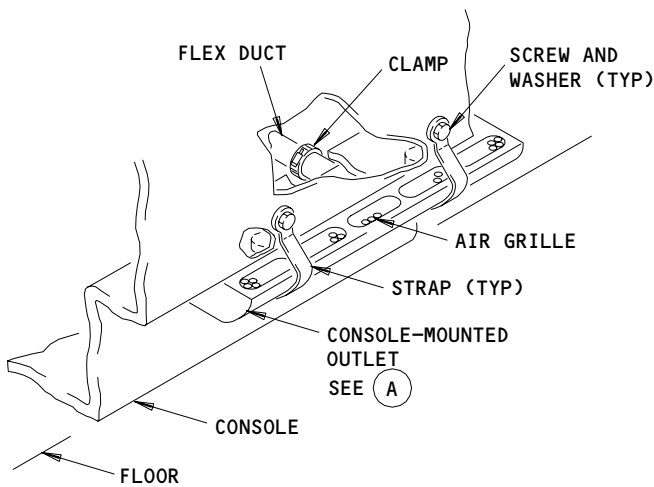
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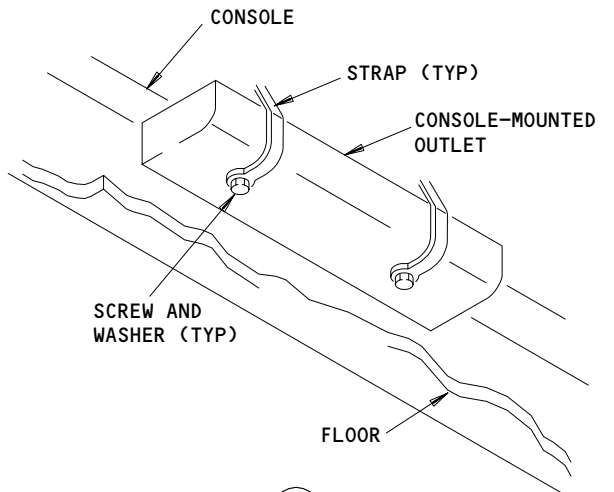
RIGHT SIDE WALL - MOUNTED OUTLET
(LEFT SIDE WALL - MOUNTED OUTLET SIMILAR)
(LEFT SIDE UPPER OUTLET OPPOSITE)



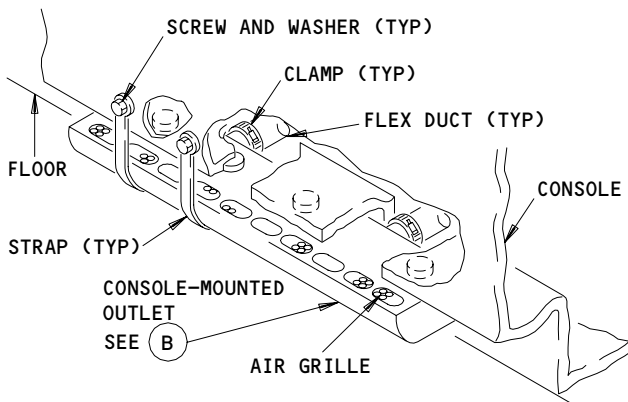
CONSOLE-MOUNTED OUTLET



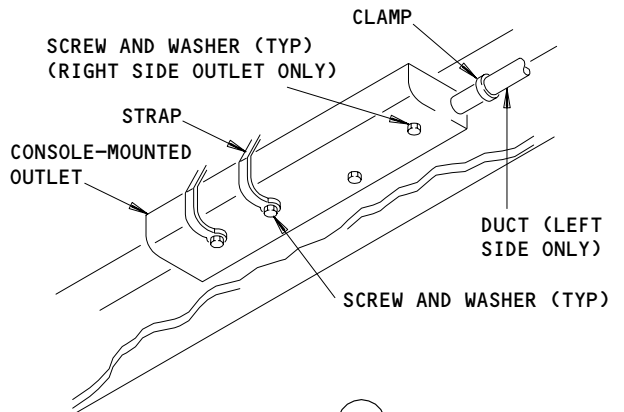
CONSOLE-MOUNTED OUTLET



(A)



CONSOLE-MOUNTED OUTLET



(B)

Flight Deck Wall and Console-Mounted Outlets Installation
Figure 402

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D. Remove the Floor Outlets

S 024-007

- (1) Remove the floor outlets that have the attach points below the floor.
 - (a) Open the access door for the forward equipment bay, 113AL (Ref 06-41-00) to find the floor outlet ducts.
 - (b) Remove the screws that attach the floor outlet to the floor or the wall.
 - (c) Disconnect the flexible duct from the floor outlet.

NOTE: The floor outlet is attached to the flexible duct by a retaining clamp or by a friction fit.

- (d) Go into the flight compartment and remove the floor outlet.

S 024-008

- (2) Remove the floor outlets that have the attach points above the floor.
 - (a) Remove the screws that attach the floor outlet to the wall, the floor panel, or the housing assembly.
 - (b) Remove the screws that attach the straps to the wall.
 - (c) Pull on the floor outlet so that some of the flexible duct is above the floor.
 - (d) Use a string to tie the flexible duct to a structure in the flight compartment, so that the flexible duct will not fall below the floor.
 - (e) Disconnect the flexible duct from the floor outlet.

NOTE: The floor outlet is attached to the flexible duct by a retaining clamp or by a friction fit.

- (f) Remove the floor outlet.

TASK 21-22-01-404-009

3. Install the Flight Compartment Floor Outlets (Fig. 401, 402)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zones
 - 211/212 Control Cabin
 - 113/114 Area forward of NLG wheel well
- (2) Access Panel
 - 113AL Forward Equipment Bay

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C. Install the Floor Outlets

S 424-010

- (1) Install the floor outlets that have the attach points below the floor.
 - (a) Put the floor outlet into position in the flight compartment.
 - (b) Align the attach holes with the holes in the floor or the wall.
 - (c) Open the access door for the forward equipment bay, 113AL (Ref 06-41-00) and find the applicable floor outlet duct.
 - (d) Install the screws and washers into the floor outlet.
 - (e) Attach the flexible duct to the floor outlet.

NOTE: The floor outlet is attached to the flexible duct by a retaining clamp or by a friction fit.

S 424-011

- (2) Install the floor outlets that have the attach points above the floor:
 - (a) Put the floor outlet in position in the flight compartment.
 - (b) Attach the flexible duct to the floor outlet.

NOTE: The floor outlet is attached to the flexible duct by a retaining clamp or by a friction fit.

- (c) Untie the string that held the flexible duct above the floor.
- (d) Align the attach holes of the floor outlet with the holes in the wall, the floor, or the housing assembly.
- (e) Install the screws and washers into the floor outlet.
- (f) Install the screws and washers to hold the straps to the wall.

D. Do the floor outlet installation test.

S 864-012

- (1) Supply electrical power (Ref 24-22-00).

S 864-013

- (2) Remove the DO-NOT-OPERATE tag from the L and R RECIRC FAN switch-lights, on the P5 panel.

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S 864-026

- (3) Put the L and R RECIRC FAN switch-light on the P5 panel to the ON position.

S 214-015

- (4) Feel for the airflow from the floor outlet.
- E. Put the airplane back to its usual condition.

S 864-016

- (1) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 414-018

- (2) If necessary, close the access door to the forward equipment bay, 113AL (Ref 06-41-00).

S 864-019

- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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AIR CONDITIONING RESTRICTOR (FLOW CONTROL ORIFICE) - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Air Conditioning Restrictor (Flow Control Orifice) Removal
 - (2) Air Conditioning Restrictor (Flow Control Orifice) Installation
 - (3) Air Conditioning Restrictor (Flow Control Orifice) Inspection and Cleaning
- B. A restrictor (flow control orifice) is a thin circular disk which can have either a single-hole or multi-hole perforations to control the flow of air thru the ducting. The restrictor also has four (4) tags (tape) that attach to the edges of the restrictor to provide part number and orifice diameter (total area in square inches) information.
- C. Restrictors (flow control orifices) are installed inside the ducting of the air conditioning sub-systems to control and balance the supply of the airflow throughout the airplane. Restrictors can be found installed inside the ducting of these air conditioning sub-systems:
 - (1) Flight compartment air distribution system (AMM 21-22-00/001)
 - (2) Main cabin air distribution system (AMM 21-23-00/001)
 - (3) Individual gasper air distribution system (AMM 21-24-00/001)
 - (4) Ventilation system (AMM 21-26-00/001)
 - (5) Forward cargo air conditioning system (AMM 21-28-00/001)
 - (6) Crew rest air distribution system (AMM 21-29-00/001)
 - (7) E/E equipment cooling system (AMM 21-58-00/001)
- D. Most restrictors are bonded to the ducting with an adhesive. Other restrictors are installed with fasteners.
- E. Multi-hole restrictors can become blocked with airborne dust and lint which reduces the airflow and cooling capability for the equipment and systems installed downstream of the restrictor. Periodic inspection and cleaning of the restrictors can help prevent potential equipment/systems from overheating or failure.

TASK 21-22-02-004-056

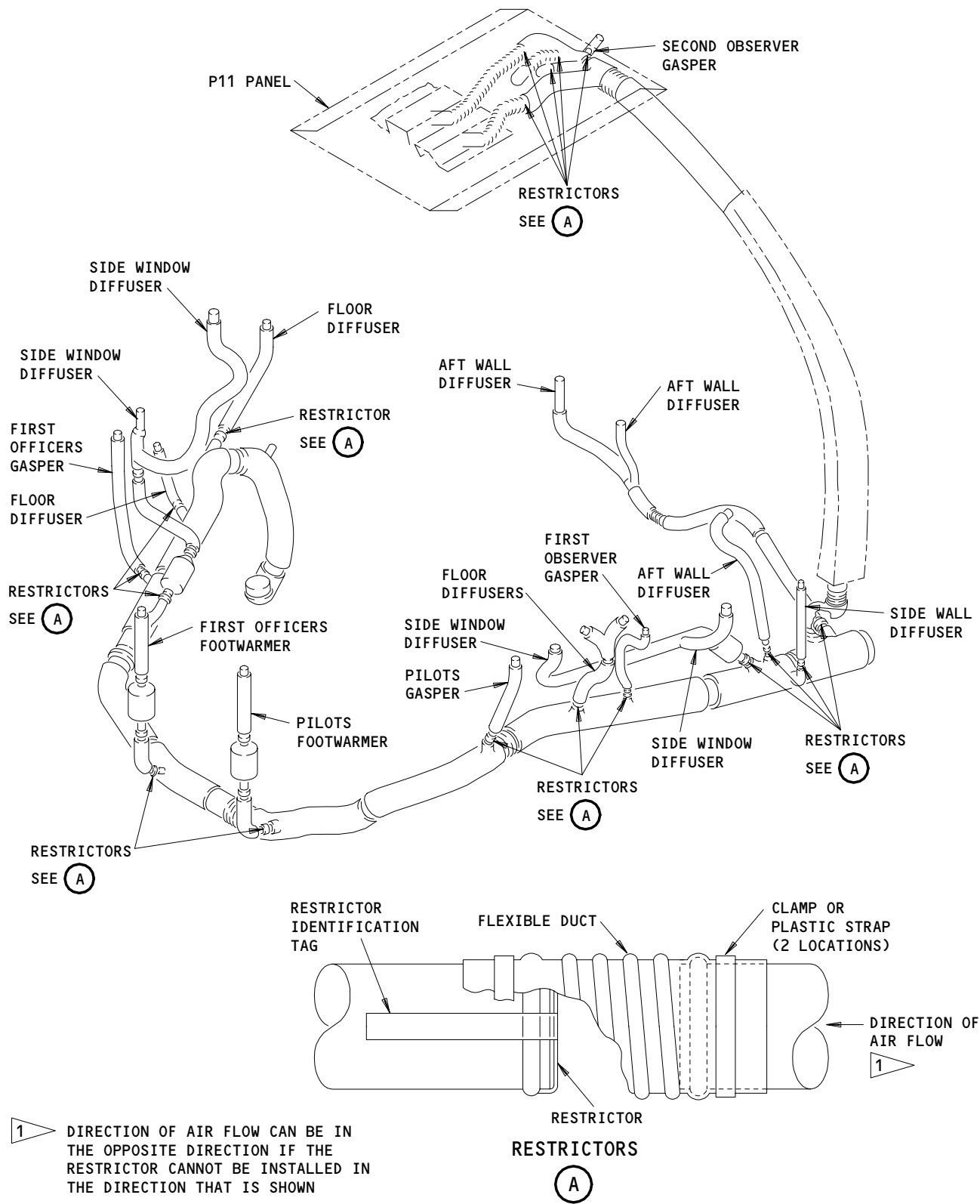
2. Air Conditioning Restrictor (Flow Control Orifice) Removal (Fig. 401,402)

- A. References
 - (1) 24-22-00/201, Electric Power Control
 - (2) 25-52-01/401, Sidewall Panels
 - (3) 36-00-00/201, Pneumatic - General
- B. Access
 - (1) Location Zones
 - 233/234 Area above passenger cabin ceiling - section 43
 - 243/244 Area above passenger cabin ceiling - section 45
- C. Prepare for the Removal
 - S 864-002
 - (1) Supply electrical power (Ref 24-22-00).
 - S 864-003
 - (2) Push the L and R RECIRC FAN switch-lights, on the pilot's overhead panel, P5, to the off position.
 - (a) Make sure the ON light goes off.

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1 DIRECTION OF AIR FLOW CAN BE IN THE OPPOSITE DIRECTION IF THE RESTRICTOR CANNOT BE INSTALLED IN THE DIRECTION THAT IS SHOWN

Flight Compartment Air Conditioning Restrictor Installation
Figure 401

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(b) Put a DO-NOT-OPERATE tag on the switch-lights.

S 864-005

(3) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.

(a) Make sure the PACK OFF lights come on.

(b) Put a DO-NOT-OPERATE tag on the selectors.

S 014-007

(4) Remove the applicable ceiling or sidewall panel.

D. Remove the Restrictor

S 034-053

(1) Remove the clamp from the flexible duct that is on the restrictor.

S 034-054

(2) Move the flexible hose away from the restrictor.

S 024-055

(3) Remove the restrictor from the end of the duct.

TASK 21-22-02-404-057

3. Air Conditioning Restrictor (Flow Control Orifice) Installation (Fig.401,402)

A. Consumable Materials

(1) A00032 - Adhesive - BAC5010 Type 72

(2) A00153 - Adhesive - BMS 5-30

(3) G00251 - Abrasive - Aluminum Oxide (60 grit or finer)

(4) Abrasive - Aluminum Wool (Ref 20-30-02)

(5) B00148 - Solvent - Methyl Ethyl Ketone, TT-M-261

B. References

(1) 24-22-00/201, Electric Power Control

(2) 36-00-00/201, Pneumatic - General

C. Access

(1) Location Zones

233/234 Area above passenger cabin ceiling - section 43

243/244 Area above passenger cabin ceiling - section 45

D. Install the Restrictor

S 214-027

(1) Make sure that, for each position, the restrictor you install is the same as the restrictor that you removed.

S 424-028

(2) Do the steps that follow:

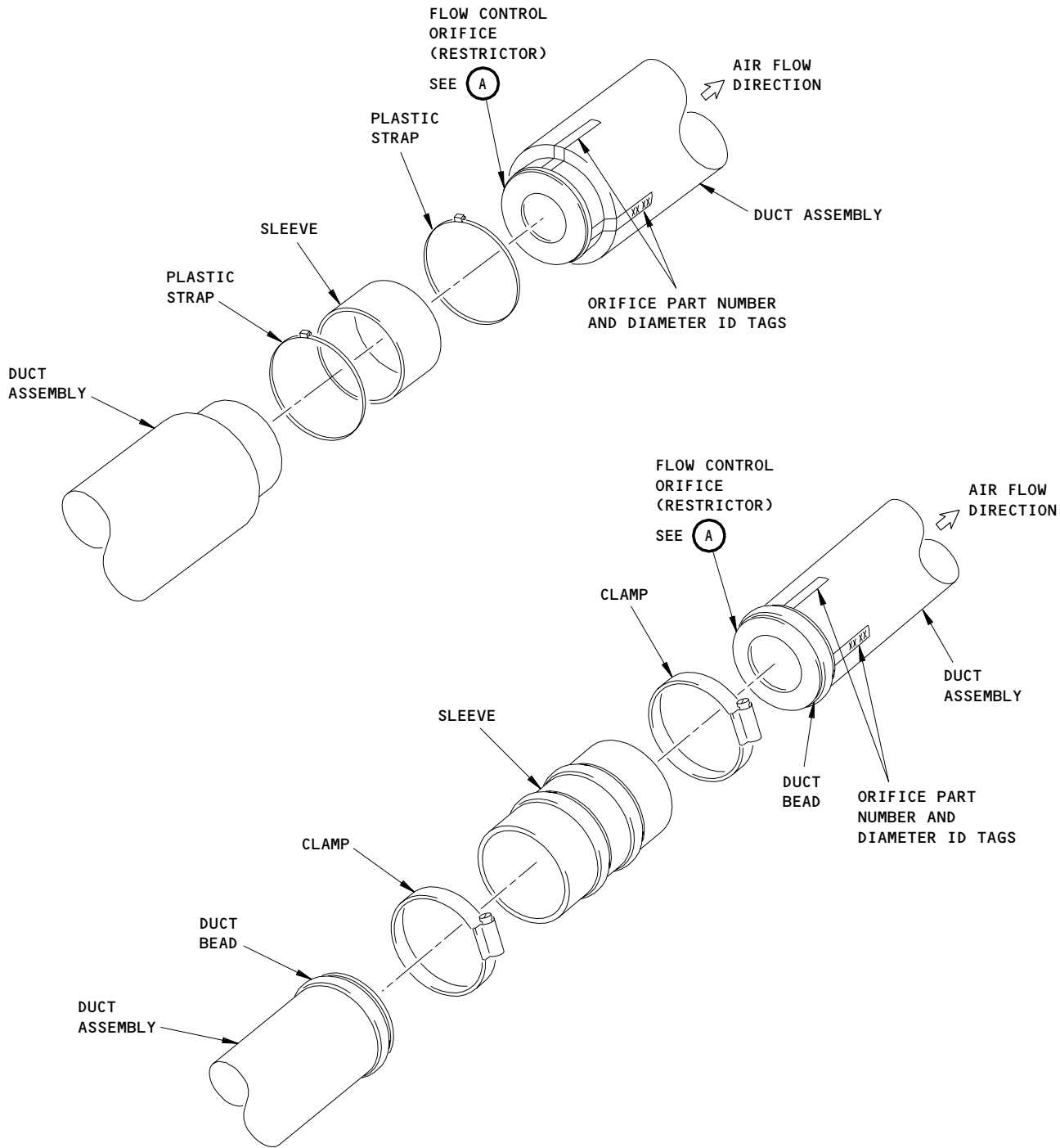
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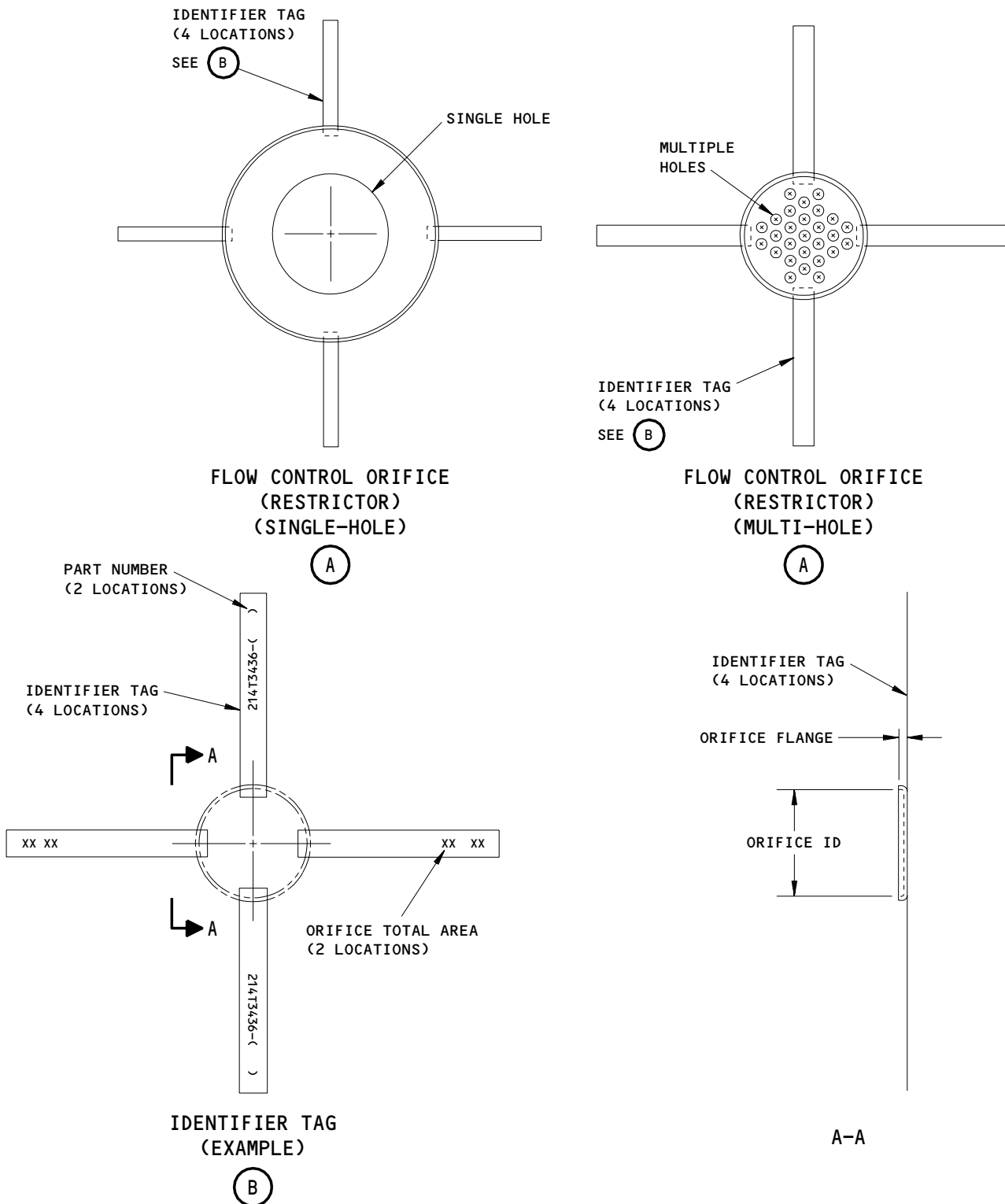
Flow Control Orifice (Restrictor) Installation
Figure 402 (Sheet 1)

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Flow Control Orifice (Restrictor) Installation
Figure 402 (Sheet 2)

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WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (a) Clean the new restrictor with the solvent, Series 89 (AMM 20-30-89/201).
 - (b) Clean the end of the applicable duct.
 - 1) Clean the adhesive off of the duct with solvent, Series 89 (AMM 20-30-89/201).
 - 2) Rub the cleaned areas with a dry, clean wiper.
 - 3) Rub the duct with one of the abrasives.
 - 4) Rub the duct with a wiper soaked with solvent, Series 89 (AMM 20-30-89/201).
 - 5) Rub the duct with a dry, clean wiper.
 - (c) Bend the restrictor identification tags into the shape of the end of the distribution duct.
 - (d) Attach the restrictor to the end of the applicable duct.
 - 1) Apply one of the adhesives to the mating surfaces of the restrictor and the duct.
 - 2) When the adhesive is tacky, put the restrictor into position on the duct.
 - 3) Make sure the restrictor is tightly attached to the duct.
 - 4) Use the solvent, Series 89 (AMM 20-30-89/201) to remove the adhesive that is not necessary.
 - 5) Rub the area with a dry, clean wiper.
 - (e) Move the flexible duct on to the duct joint.
 - 1) Make sure you can see the restrictor identification tags.
 - (f) Install the clamp to hold the flexible duct in its position.
- E. Do the Installation Test for the Air Conditioning Restrictor

S 864-043

- (1) Supply electrical power (Ref 24-22-00).

S 864-044

- (2) Supply pneumatic power (Ref 36-00-00).

S 864-045

- (3) Remove the DO-NOT-OPERATE tags from the L and R RECIRC FAN switch-lights, on the P5 Panel.
 - (a) Push the switch-lights to the on position.
 - (b) Make sure the ON light comes on.

S 214-047

- (4) Feel for the airflow around the duct joint.
 - (a) Small leaks are permitted.
 - (b) You must repair a large leak.

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F. Put the airplane back to its usual condition

S 864-052

- (1) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 414-049

- (2) Install the applicable ceiling or sidewall panels.

S 864-050

- (3) Remove the pneumatic power, if it is not necessary (Ref 36-00-00).

S 864-051

- (4) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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TASK 21-22-02-204-075

4. Air Conditioning Restrictor (Flow Control Orifice) Inspection and Cleaning
(Fig. 401,402)

A. General

- (1) This task has general inspection steps for any restrictor (flow control orifice) installed in the airplane's air distribution ducts, equipment cooling ducts, or ventilation ducts.

B. Procedure

S 864-071

- (1) Shutoff the airflow in the ducts which have the restrictors (flow control orifices) you plan to inspect.
- (a) To shutoff airflow in the equipment cooling ducts or ventilation ducts, do not supply electrical power to airplane.
- (b) To shutoff airflow in the air distribution ducts, do not operate the air conditioning packs, ground air cart, or the recirculation fans.

S 014-072

- (2) Get access to the restrictor (flow control orifice) in the duct.
- (a) Disconnect the flex hose or sleeve connected to the restrictor (flow control orifice).

S 214-073

- (3) Examine the restrictor (flow control orifice) and make sure the restrictor hole(s) are free of blockage and contamination.
- (a) Remove all blockage from the restrictor hole(s) to restore proper airflow thru the restrictor (flow control orifice).

S 414-074

- (4) Reconnect the flex hose or sleeve to the restrictor (flow control orifice).

S 864-076

- (5) Restore airflow to the ducts.
- (a) Make sure there is no air leakage at the restrictor and that proper airflow thru the restrictor has been restored.

S 864-078

- (6) Shutoff the airflow in the ducts if no longer required.

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FLIGHT COMPARTMENT OVERHEAD OUTLET – REMOVAL/INSTALLATION

1. General

- A. The overhead outlet is installed longitudinally in the center of the overhead circuit breaker panel P11. This procedure has instructions to remove and install the overhead outlet.

TASK 21-22-03-004-001

2. Remove the Overhead Outlet (Fig. 401)

A. References

- (1) 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zones
211/212 Control cabin – Section 41

C. Prepare for the Removal

S 864-002

- (1) Supply electrical power (Ref 24-22-00).

S 864-003

- (2) Push the L and R RECIRC FAN switch-lights, on the pilot's overhead panel P5, to the off position.
(a) Make sure the ON light is not on.
(b) Put a DO-NOT-OPERATE tag on the switch-lights.

S 864-006

- (3) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.
(a) Make sure the PACK OFF lights come on.
(b) Put a DO-NOT-OPERATE tag on the selectors.

D. Remove the Overhead Outlet

S 034-007

- (1) Remove the screws from the overhead outlet flange.

S 024-008

- (2) Remove the outlet.

S 034-009

- (3) Remove the overhead outlet seal.

TASK 21-22-03-404-010

3. Install the Overhead Outlet (Fig. 401)

A. References

- (1) 24-22-00/201, Electric Power Control

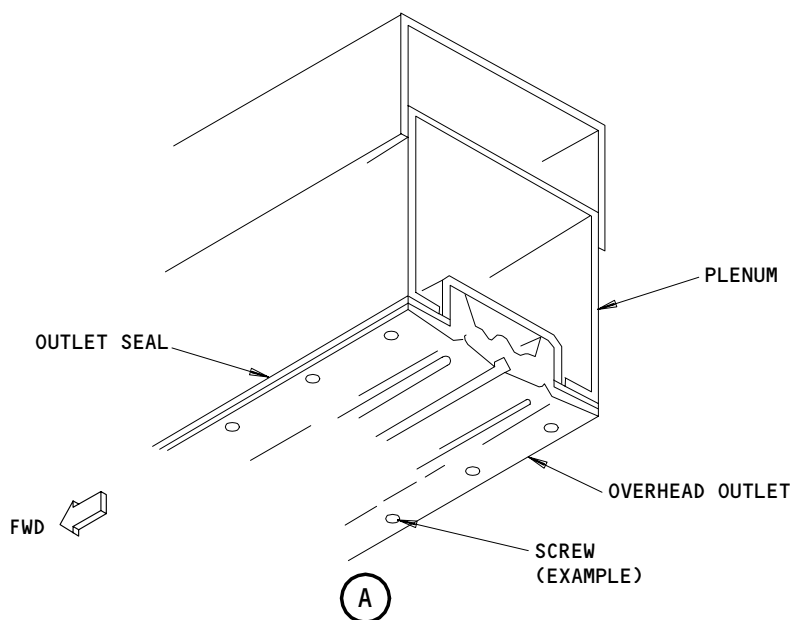
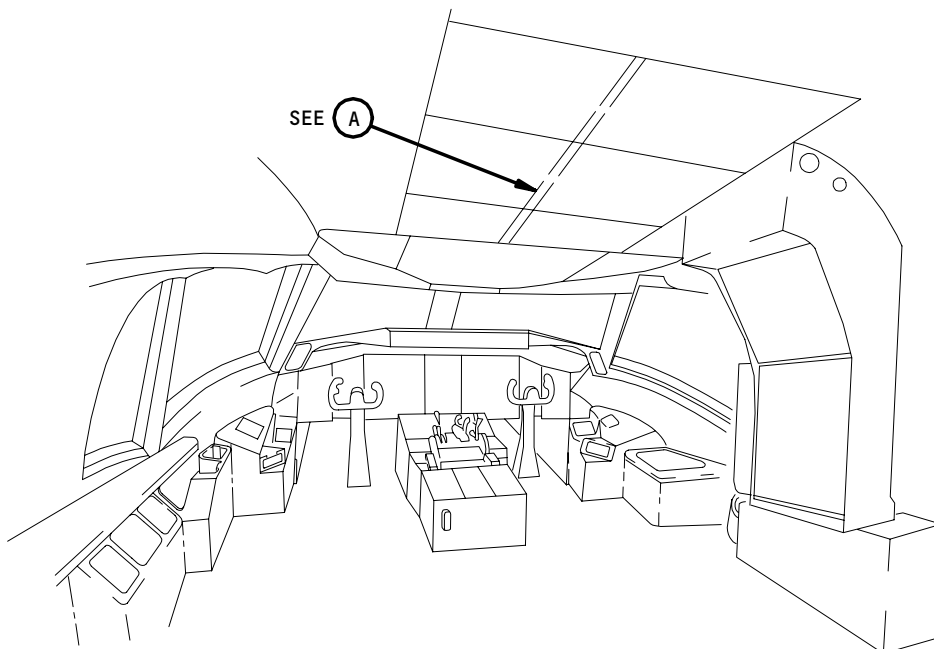
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Flight Compartment Overhead Outlet Installation
Figure 401

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B. Access

- (1) Location Zones
211/212 Control Cabin - Section 41

C. Install the Overhead Outlet

S 434-011

- (1) Install a new seal for the overhead outlet.

S 424-012

- (2) Put the overhead outlet into position in the overhead circuit breaker panel P11.

S 434-013

- (3) Install the screws and washers into the overhead outlet.
(a) Tighten the screws to 2 inch-pounds.

D. Do the overhead outlet installation test.

S 864-014

- (1) Supply electrical power (Ref 24-22-00).

S 864-016

- (2) Remove the DO-NOT-OPERATE tags from the L and R RECIRC FAN switch-lights, on the P5 panel.
(a) Push the L and R RECIRC FAN switch-lights to the on position.
(b) Make sure the ON lights come on.

S 214-017

- (3) Feel for airflow from the overhead outlet.

E. Put the airplane back to its usual condition.

S 864-019

- (1) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 864-020

- (2) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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PASSENGER COMPARTMENT CONDITIONED AIR DISTRIBUTION – DESCRIPTION AND OPERATION

1. General (Fig. 1)
 - A. The passenger-compartment-air-distribution system supplies conditioned air from the mix manifold (Ref 21-21-00) to all areas of the passenger cabin. The system has sidewall risers, overhead ducts, overhead outlets, return air grills, and mufflers.
 - B. Conditioned air from the mix manifold mixes with trim air (Ref 21-61-00) and goes into six sidewall risers (three on each side). The air flows through each sidewall riser and into the overhead ducts. Then the air flows through the overhead outlets (located directly below the overhead duct) and into the passenger compartment. The air exits the passenger compartment through the return air grills located in the sidewalls, near the floor.
 - C. Mufflers are installed above each zone temperature sensor to decrease the noise in the passenger compartment.
 - D. Conditioned air also flows from the overhead duct into the lavatories through non-adjustable outlets. Conditioned air flows into the galley areas through adjustable gasper outlets. Air is drawn out of the lavatories and galleys through the ventilation system (Ref 21-26-00).
2. Component Details
 - A. Ducts
 - (1) Conditioned air reaches the passenger compartment through six sidewall risers and two 11 inch diameter rigid foam overhead ducts. Four-ply Kevlar walls make up the 2.5 inch by 18 inch sidewall risers located in the wall lining of the passenger compartment just forward of the wing leading edge. Smaller, three inch diameter ducts attach each outlet to the main overhead ducts.
 - B. Mufflers
 - (1) Near the overhead duct, above each temperature zone sensor, is one 4-inch diameter muffler. The mufflers are made of a Kevlar housing with a needle nomex filler. The filler is kept in place by a screen cylinder.
 - C. Outlets
 - (1) Air enters the passenger compartment through overhead outlets beside each stowage bin or in the ceiling of the passenger compartment. The outlets consist of a flow divider and a blade inside a housing. The flow divider and blade direct the airflow to prevent drafts in the passenger compartment.

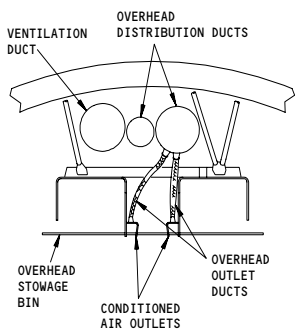
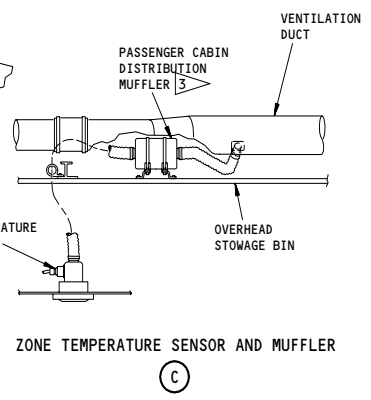
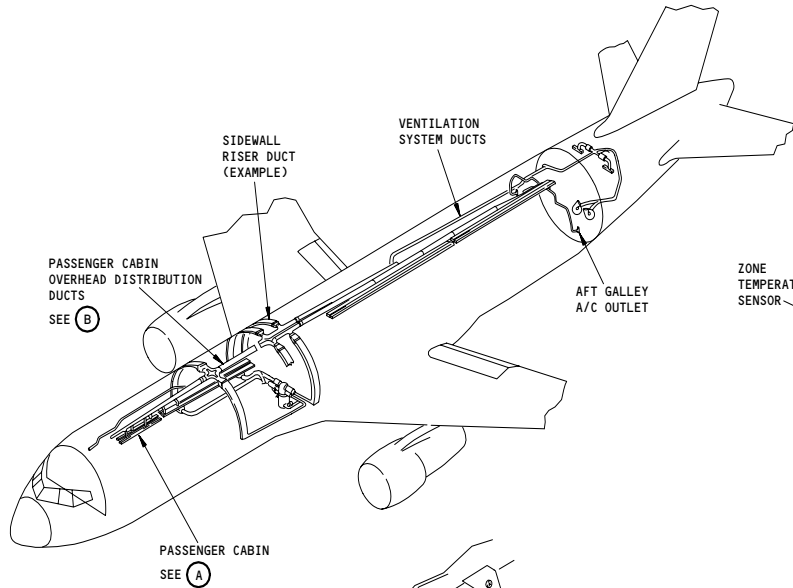
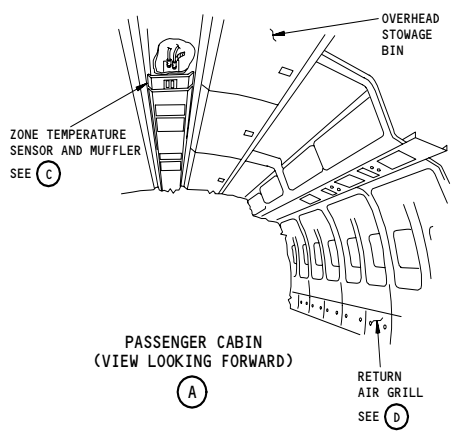
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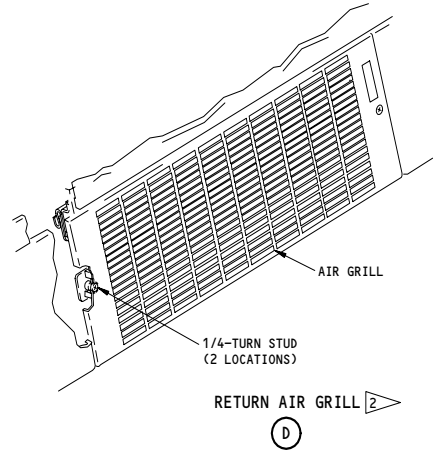
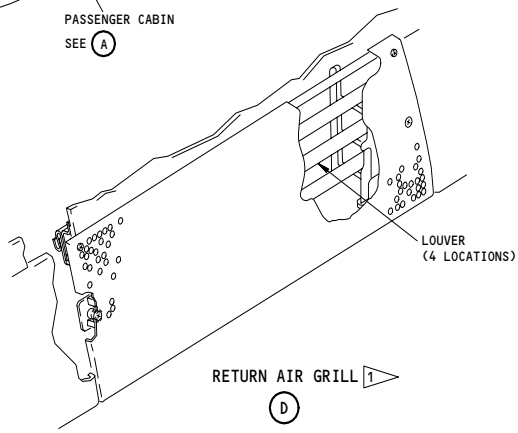
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PASSENGER CABIN OVERHEAD DISTRIBUTION DUCTS (B)



- 1 AIRPLANES WITH METAL RETURN AIR GRILLS
- 2 AIRPLANES WITH INJECTION MOLDED ULTEM RETURN AIR GRILL
- 3 NOT INSTALLED ON ALL AIRPLANES

Passenger Compartment Conditioned Air Distribution
Figure 1

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- (2) Non-adjustable gasper outlets allow conditioned air to flow into each lavatory. Adjustable gasper outlets allow conditioned air to flow into each galley area. The aft galley area has an additional, non-adjustable outlet.

D. Return Air Grills

- (1) The return air grills provide a way for air to exit the passenger compartment to be recirculated and control compartment pressure. The return air grills are located near the floor on each side of the wall in the passenger cabin.

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AFT GALLEY CONDITIONED AIR OUTLET - REMOVAL/INSTALLATION

1. General

- A. The conditioned air outlet in the aft galley supplies conditioned air to the aft galley area. It is installed near the floor, immediately forward of the aft entry/service doors. The cover of the outlet can be easily removed. To remove any of the ducting, the aft lavatory must be removed (AMM 25-41-04/401).
- B. This procedure has instructions to remove and install the aft galley conditioned air outlet.

TASK 21-23-04-004-001

2. Remove the Aft Galley Conditioned Air Outlet (Fig. 401)

- A. References
 - (1) 24-22-00/201, Electric Power - Control
- B. Access
 - (1) Location Zones
 - 251/252 Passenger Cabin - Section 46
 - 253/254 Area Above Passenger Cabin Ceiling - Section 46
- C. Prepare for the Removal
 - S 864-002
 - (1) Supply electrical power (Ref 24-22-00).
 - S 864-003
 - (2) Push the L and R RECIRC FAN switch-lights, on the pilots' overhead panel P5, to the off position.
 - (a) Make sure the ON light is not on.
 - (b) Put a DO-NOT-OPERATE tag on the switch-lights.
 - S 864-005
 - (3) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.
 - (a) Make sure the PACK OFF lights come on.
 - (b) Put a DO-NOT-OPERATE tag on the selectors.
- D. Remove the Aft Galley Outlet.
 - S 034-026
 - (1) Remove the screws (3 places) from the cover of the outlet.
 - S 024-027
 - (2) Remove the cover of the outlet.

TASK 21-23-04-404-028

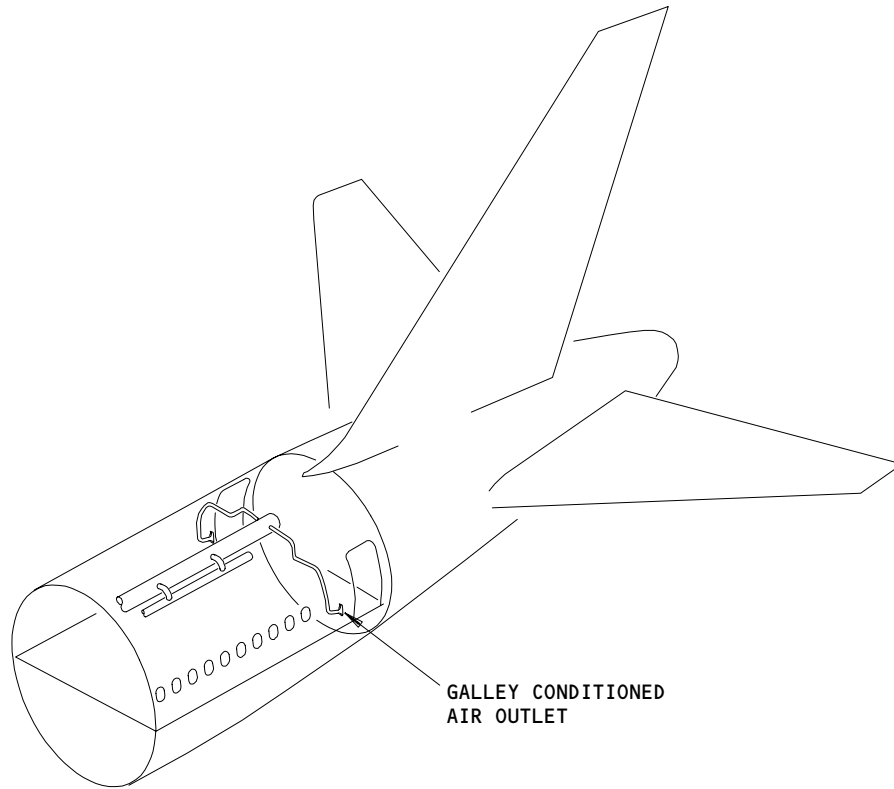
3. Install the Aft Galley Conditioned Air Outlet (Fig. 401)

- A. References
 - (1) 24-22-00/201, Electric Power - Control

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Aft Galley Conditioned Air Outlet
Figure 401

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B. Access

(1) Location Zones

- | | |
|---------|---|
| 251/252 | Passenger Cabin - Section 46 |
| 253/254 | Area Above Passenger Cabin Ceiling - Section 46 |

C. Install the Aft Galley Outlet

S 424-049

- (1) Put the cover into position.

S 434-050

- (2) Install the screws to hold the cover in position.

D. Do the Aft Galley Outlet Installation Test

S 864-051

- (1) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 864-053

- (2) Remove the DO-NOT-OPERATE tags from the L and R RECIRC FAN switch-lights, on the P5 panel.
(a) Push the L and R RECIRC FAN switch-lights to the on position.
(b) Make sure the ON lights come on and the INOP lights go off.

S 214-055

- (3) Feel for the airflow from the aft galley outlet.
(a) Make sure the air flows out of the outlet.
(b) Make sure there are no leaks.

E. Put the Airplane Back to Its Usual Condition

S 864-057

- (1) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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RETURN AIR GRILLES – MAINTENANCE PRACTICES

1. General

- A. This procedure has instructions to do the tasks that follow:
 - (1) Return Air Grille Removal
 - (2) Return Air Grille Installation
 - (3) 767-200/300 AIRPLANES WITH METAL RETURN AIR GRILLES;
Return Air Grille Operational Check
 - (4) Return Air Grille Cleaning
- B. The return air grilles, which are sometimes called decompression vents, are installed near the floor, in the passenger compartment sidewall. The return air grilles let the passenger cabin air flow into the lower fuselage areas. This will prevent damage to the airplane if a decompression condition occurs.
- C. 767-200/300 AIRPLANES WITH METAL RETURN AIR GRILLES;
Different types of air grilles are installed on the airplane. Some air grilles have pre-adjusted louvers, non-adjustable louvers, or no louvers at all. One or two vinyl decals of different colors are installed on the back of each air grille. Corresponding decals are also installed on the airplane structure or insulation, directly behind each air grille, to show the correct location for each air grille. To prevent damage to the airplane structure during decompression, make sure each air grille is installed in the correct position.

TASK 21-23-05-002-001

2. Return Air Grille Removal (Fig. 201, Fig. 201A)

- A. References
 - (1) AMM 25-25-01/201, Passenger Seats
- B. Access
 - (1) Location Zones
221/222, 231/232, 241/242, 251/252 Passenger Cabin
- C. Prepare for the removal
 - S 012-003
 - (1) Remove the passenger seats for access, if necessary (AMM 25-25-01/201).
- D. Return Air Grille Removal
 - S 032-004
 - (1) Loosen the 1/4-turn studs on the return air grille.
 - S 022-008
 - (2) Remove the air grille.

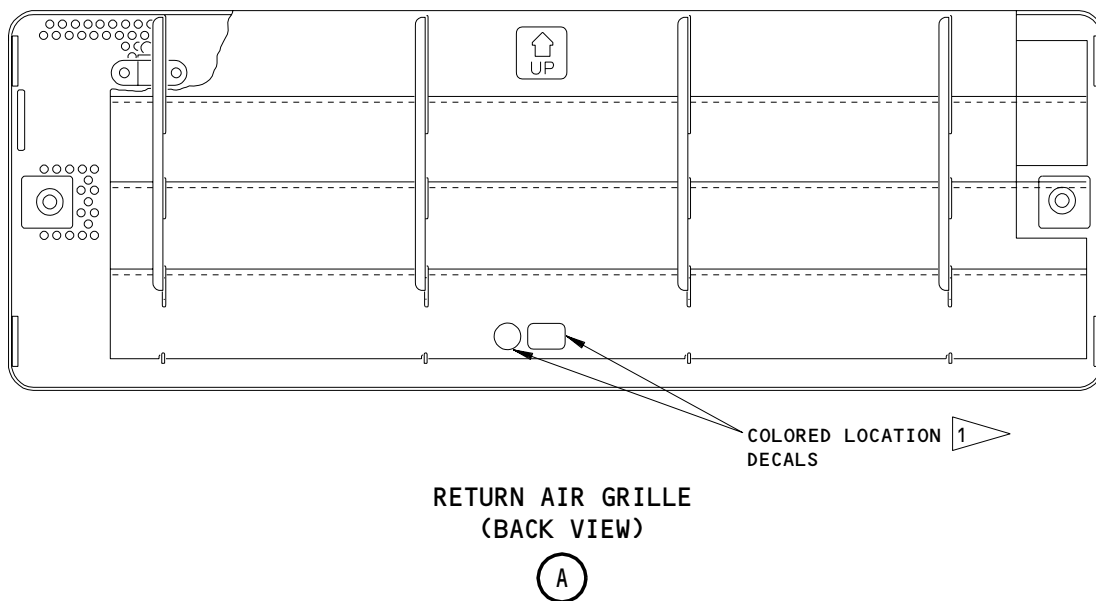
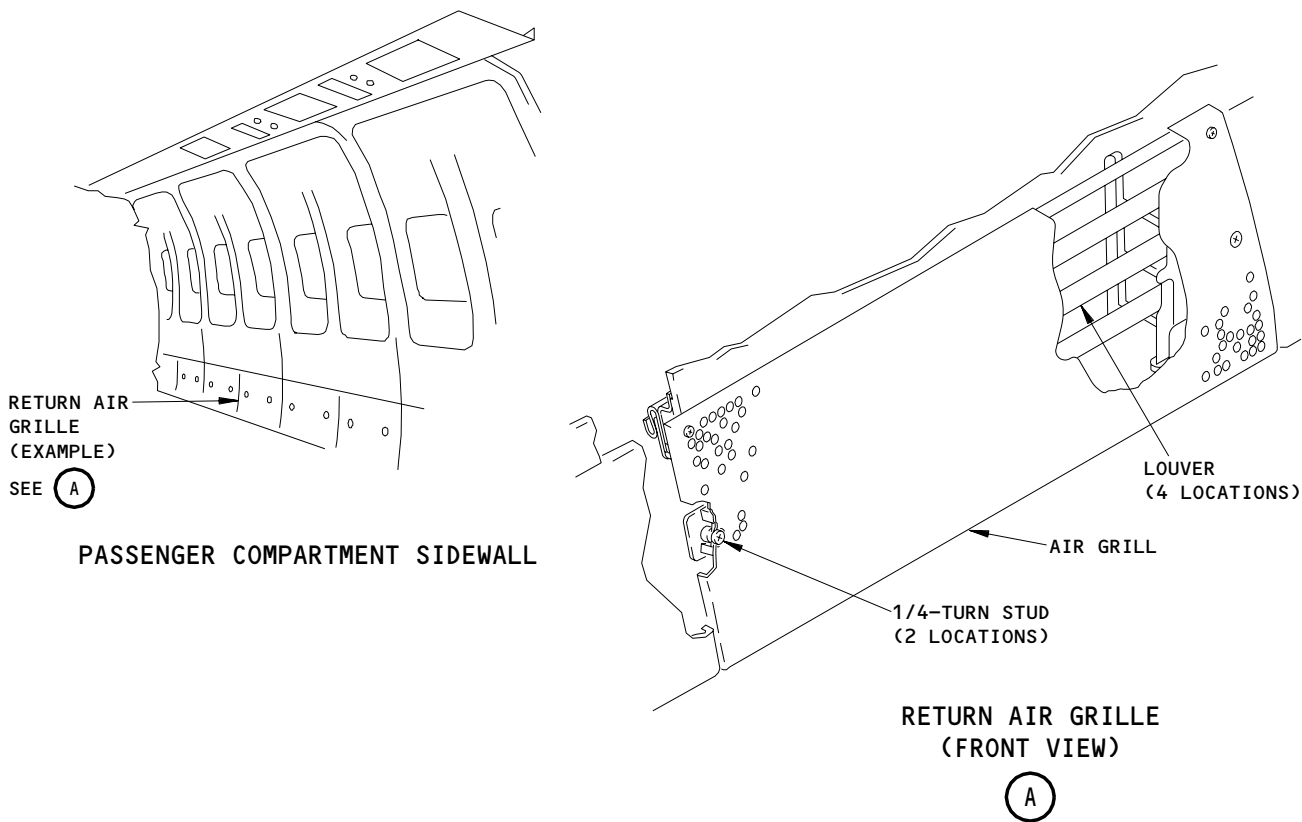
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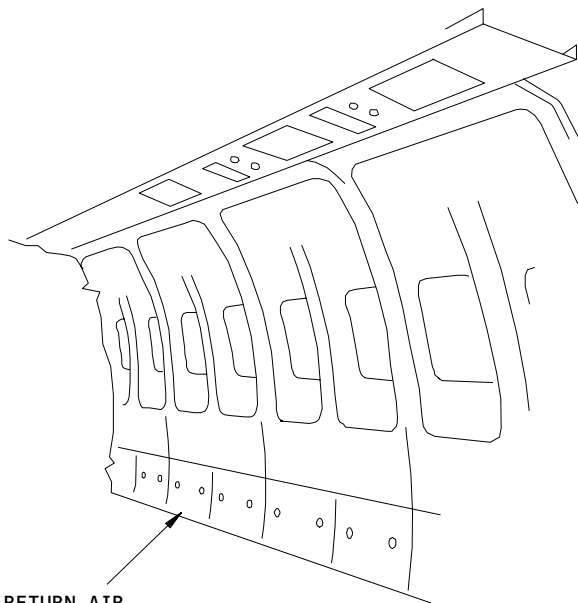


1 CORRESPONDING COLORED LOCATION DECALS ALSO INSTALLED BEHIND GRILLE ON INSULATION OR AIRPLANE STRUCTURE.

Return Air Grille Installation
Figure 201

EFFECTIVITY
767-200/300 AIRPLANES WITH METAL RETURN AIR GRILLES

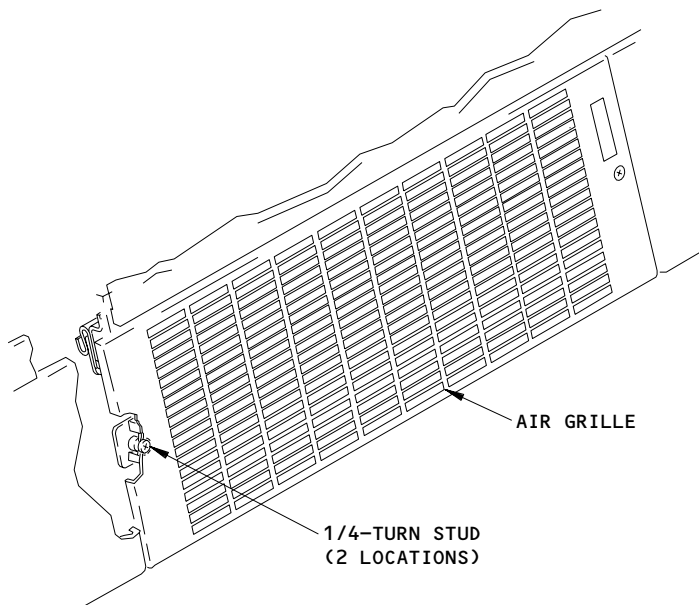
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RETURN AIR
GRILLE
(EXAMPLE)

SEE (A)

PASSENGER COMPARTMENT SIDEWALL



RETURN AIR GRILLE

(A)

Return Air Grille Installation
Figure 201A

EFFECTIVITY
767-200/300 AIRPLANES WITH INJECTION
MOLDED ULTEM RETURN AIR GRILLES

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TASK 21-23-05-402-009

3. Return Air Grille Installation (Fig. 201, Fig. 201A)

A. References

- (1) AMM 25-25-01/201, Passenger Seats

B. Access

- (1) Location Zones
221/222, 231/232, 241/242, 251/252 Passenger Cabin

C. Return Air Grille Installation

S 282-036

- (1) METAL RETURN AIR GRILLES WITH PRE-ADJUSTED LOUVERS;
Make sure that the louvers move easily and that the spring pulls them back to their minimum-open position.

NOTE: When the return air grilles are installed, the air grille front panels may touch the louvers.

S 422-011

WARNING: MAKE SURE THE GRILLES ARE INSTALLED IN THE CORRECT LOCATION. IF THE GRILLES ARE NOT INSTALLED IN THE CORRECT LOCATION, A SUDDEN DECOMPRESSION CONDITION COULD CAUSE INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.

- (2) Put the air grille in position in the passenger cabin sidewall.

NOTE: Make sure the colored decals on the air grille are the same as the decals on the airplane structure or insulation.

- (a) Make sure the 1/4-turn studs align with the holes.

S 432-012

- (3) Tighten the 1/4-turn studs.

D. Put the airplane back to its usual condition.

S 412-013

- (1) Install the passenger seat, if necessary (AMM 25-25-01/201).

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TASK 21-23-05-702-032

4. 767-200/300 AIRPLANES WITH METAL RETURN AIR GRILLES;
Return Air Grille Operational Check (Fig. 201)

A. Access

- (1) Location Zones
221/222, 231/232, 241/242, 251/252 Passenger Cabin

B. Procedure

S 012-015

- (1) Remove the return air grille.

S 282-042

- (2) Make sure the louvers move easily and that the spring pulls them back to their minimum-open position.

S 412-017

- (3) Install the return air grille.

TASK 21-23-05-102-002

5. Return Air Grille Cleaning (Fig. 201, Fig. 201A)

A. Equipment

- (1) Vacuum Cleaner - commercially available

B. References

- (1) AMM 25-25-01/201, Passenger Seats

C. Access

- (1) Location Zones
221/222, 231/232, 241/242, 251/252 Passenger Cabin

D. Return Air Grille Cleaning

S 012-037

- (1) Remove the passenger seats to get access to the return air grille (AMM 25-25-01/201).

S 012-018

- (2) Remove the return air grille.

S 162-019

- (3) Use the vacuum cleaner to remove the dust, lint, and unwanted material from the return air grille.

S 162-021

- (4) Use the vacuum cleaner to remove the dust, lint, or unwanted material from the airplane structure behind the return air grille.

S 412-022

- (5) Install the return air grille.

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767
MAINTENANCE MANUAL

- S 412-038
(6) Install the passenger seats (AMM 25-25-01/201).

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PASSENGER CABIN DISTRIBUTION MUFFLER – REMOVAL/INSTALLATION

1. General

- A. The passenger cabin mufflers are attached to the top of the overhead stowage units, on the right of the temperature sensors. One muffler is installed for each zone temperature sensor assembly in the passenger cabin (AMM 21-61-00/001).
- B. ON SAS 150-152; three mufflers are installed. One muffler is in the forward section of the passenger cabin. One muffler is in the mid section of the passenger cabin. One muffler is in the aft section of the passenger cabin.
- C. ON SAS 050-149, 153-999; five mufflers are installed. One muffler is in each of these sections of the passenger cabin: the aux forward, the forward, the aux mid, the mid, and the aft sections.
- D. This procedure has instructions to remove and install all of the passenger compartment mufflers.

TASK 21-23-06-004-021

2. Remove the Passenger Compartment Muffler (Fig. 401)

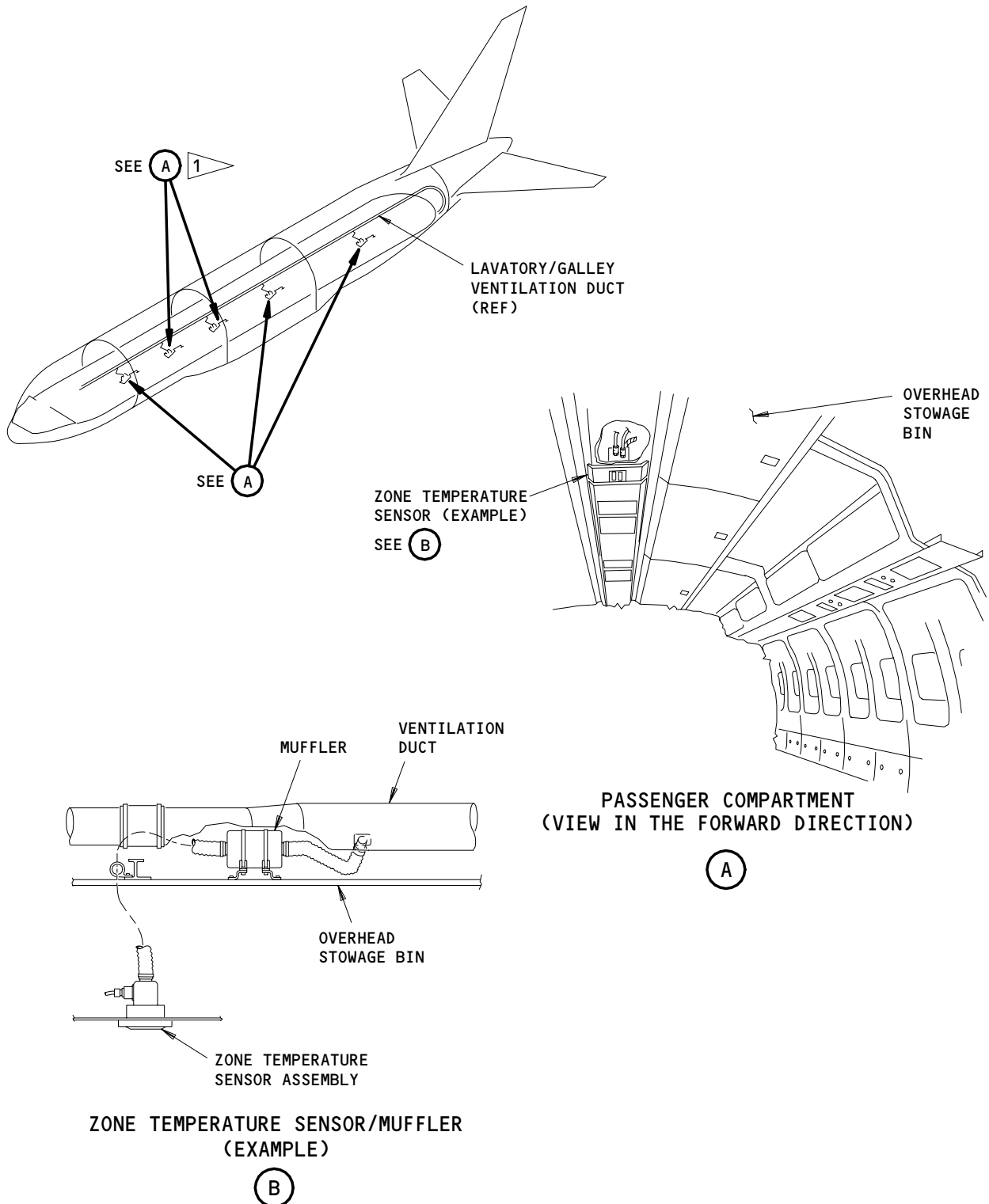
- A. References
 - (1) AMM 25-22-00/001, Passenger Compartment Ceiling Lining
 - (2) AMM 25-23-01/401, Passenger Service Unit – Removal/Installation
- B. Access
 - (1) Location Zones

224	Area Above Passenger Cabin Ceiling – Section 41 (Right)
234	Area Above Passenger Cabin Ceiling – Section 43 (Right)
244	Area Above Passenger Cabin Ceiling – Section 45 (Right)
254	Area Above Passenger Cabin Ceiling – Section 46 (Right)
- C. Prepare for the Removal
 - S 864-001
 - (1) Open and attach a DO-NOT-CLOSE tag to these circuit breakers:
 - (a) On the forward miscellaneous electrical equipment panel P33:
 - 1) 33B1, EQUIP COOL AFT FAN 1
 - (b) On the left miscellaneous electrical equipment panel P36:
 - 1) 36G4, EQUIP COOL AFT FAN 2
 - S 014-002
 - (2) Find the applicable muffler.
 - (a) Find the applicable temperature sensor inlet in the center Passenger Service Unit (PSU) area.
 - (b) Find the overhead stowage bin that is to the right of the sensor inlet.
 - (c) Remove the ceiling panel that is to the right of the overhead stowage bin (AMM 25-22-00/001) or remove the PSU that is aft of the sensor inlet (AMM 25-23-01/401).

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1 AIRPLANES WITH SIX TEMPERATURE ZONES (TRI-CLASS)

Passenger Cabin Distribution Muffler
Figure 401

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- (d) Look on top of the overhead stowage bin to find the muffler. The muffler will be within 5 feet (1.7 meters) forward or aft of the sensor inlet.

D. Remove the Muffler

S 034-005

- (1) Remove the clamps from the ends of the muffler.

S 034-006

- (2) Move the flex ducts away from the muffler.

S 034-007

- (3) Remove the clamps that hold the muffler to the support brackets.

S 024-012

- (4) Remove the muffler.

S 434-008

- (5) Put a cover on the duct openings.

TASK 21-23-06-404-009

3. Install the Passenger Compartment Muffler (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electrical Power - Control
- (2) AMM 25-22-00/001, Passenger Compartment Ceiling Lining
- (3) AMM 25-23-01/401, Passenger Service Unit - Removal/Installation

B. Access

(1) Location Zones

- 224 Area Above Passenger Cabin Ceiling - Section 41 (Right)
- 234 Area Above Passenger Cabin Ceiling - Section 43 (Right)
- 244 Area Above Passenger Cabin Ceiling - Section 45 (Right)
- 254 Area Above Passenger Cabin Ceiling - Section 46 (Right)

C. Install the muffler

S 034-010

- (1) Remove the covers from the duct openings.

S 034-011

- (2) Make sure no unwanted material is in the ducts.

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- S 424-012
- (3) Put the muffler into position against the support brackets.
- S 434-013
- (4) Install the clamps that hold the muffler to the support brackets.
- S 434-014
- (5) Move part of the flex ducts onto the ends of the muffler.
- S 434-015
- (6) Install the clamps on the ends of the muffler.
- D. Do the muffler installation test.
- S 864-016
- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
- (a) On the forward miscellaneous electrical equipment panel P33:
 - 1) 33B1, EQUIP COOL AFT FAN 1
 - (b) On the left miscellaneous electrical equipment panel P36:
 - 1) 36G4, EQUIP COOL AFT FAN 2
- S 864-017
- (2) Supply electrical power (AMM 24-22-00/201).
- S 214-018
- (3) Feel for the airflow around the muffler.
- (a) If a leak occurs, repair the duct clamp installation.
- E. Put the airplane back to its usual condition.
- S 414-019
- (1) Install the ceiling panel (AMM 25-22-00/001) or the PSU (AMM 25-23-01/401).
- S 864-020
- (2) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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AIR CONDITIONING SYSTEM DUCTS – REPAIRS

1. General

- A. This procedure gives instructions for the repair of the following types of air conditioning ducts:
- (1) Fiberglass or Kevlar Duct (Fig. 801)
 - (a) Taped Joint Repair
 - (b) External Patch Repair
 - (c) Structural Repair
 - (2) Rigid Foam Duct (Fig. 802)
 - (a) Taped Joint Repair
 - (b) Duct End Repair
 - (c) External Patch Repair
 - (d) Structural Repair
 - (e) Inner Lining Repair
 - (3) Ducts Insulated with Melamine or Polyimide Foam (Fig. 803)
 - (a) Rework Ducts Insulated with Polyimide Foam Insulation
 - (b) Tape Replacement
 - (c) Insulation Repair
 - (d) Insulation Replacement
 - (4) Ducts with Fiberglass Insulation/Flame-Resistant Covering (Fig. 805)
 - (a) Tape Replacement
 - (b) Insulation and Covering Repair
 - (c) Insulation and Covering Replacement

TASK 21-23-07-308-207

2. Taped Joint Repair – Fiberglass or Kevlar Duct (Fig. 801)

A. General

- (1) This procedure gives instructions for the repair of a taped joint that connects two sections of Fiberglass or Kevlar air conditioning ducts.
- (2) This procedure may also be used to make a temporary repair to a damaged Fiberglass or Kevlar air conditioning duct when time is not available to make a permanent repair or if the materials are not available to make a permanent repair. If a temporary repair is made, make the permanent repair as soon as possible.

B. Consumable Materials

- (1) Cloth – Glass
 - (a) G00031 Cloth – Glass (Fiberglass), minimum 0.007-inch thick (MIL-C-9084 Type VIII)
 - (b) G02454 Fabric – Aromatic Polyamide Fiber (Kevlar), minimum 0.007-inch thick (alternative to the Fiberglass glass cloth)
- (2) Plastic sheet – polyethylene or vinyl – commercially available
- (3) Primer – Dow Corning 1200
- (4) Sandpaper – 320 grit – commercially available

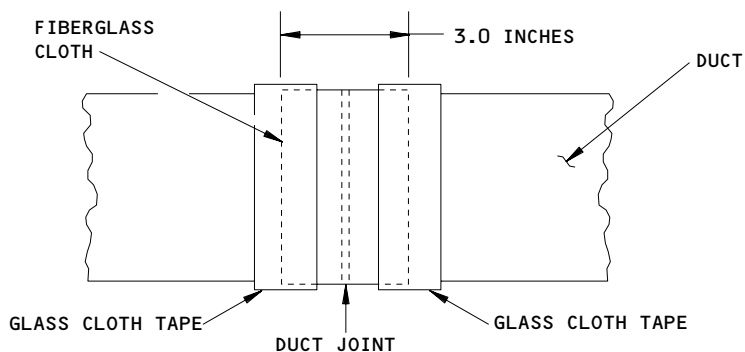
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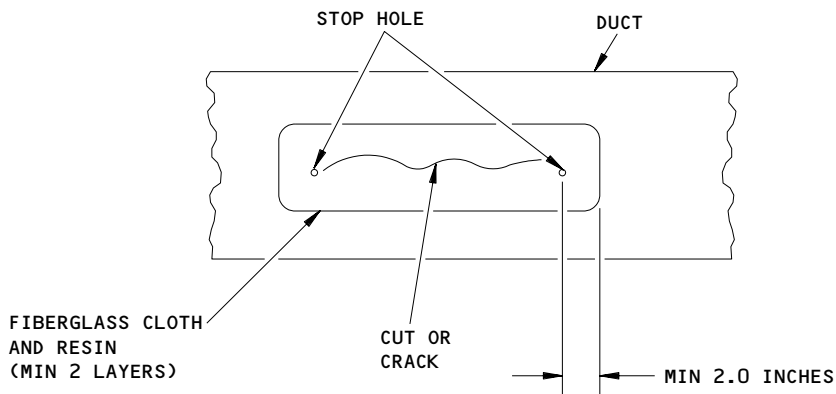
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TAPED JOINT REPAIR - FIBERGLASS/KEVLAR DUCT



EXTERNAL PATCH - FIBERGLASS/KEVLAR DUCT

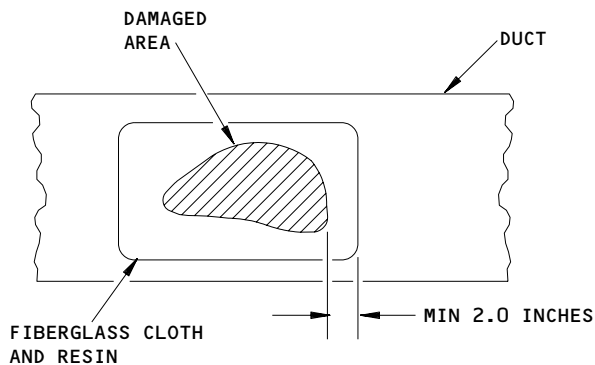
Air Conditioning System Ducts Repair (Fiberglass/Kevlar)
Figure 801 (Sheet 1)

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FIBERGLASS DUCTS;
KEVLAR DUCTS

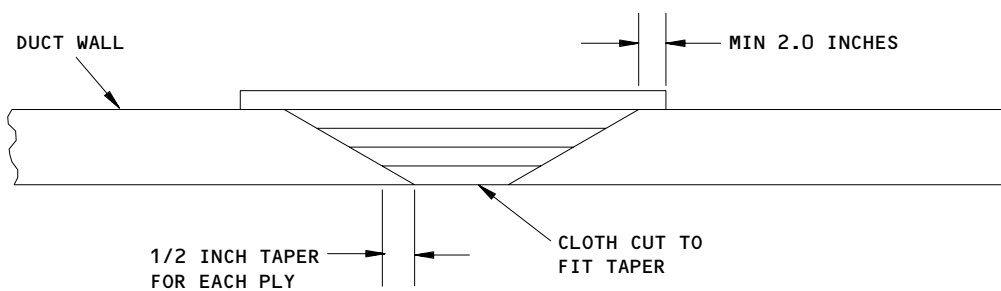
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STRUCTURAL REPAIR - FIBERGLASS/KEVLAR DUCT - OVERHEAD VIEW



STRUCTURAL REPAIR - FIBERGLASS/KEVLAR DUCT - CROSS-SECTION VIEW

Air Conditioning System Ducts Repair (Fiberglass/Kevlar)
Figure 801 (Sheet 2)

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FIBERGLASS DUCTS;
KEVLAR DUCTS

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- (5) Sealant - Dow Corning 90-006
 - (6) Solvent
 - (a) Solvent - Butyl carbitol (alternative to B01011, Series 91) - commercially available (AMM 20-30-91/201)
 - (b) B01011 Solvent - Series 91, commercially available (AMM 20-30-91/201)
 - (7) Squeegee - commercially available
 - (8) Tape - Glass Cloth, Thermosetting, Pressure-Sensitive Adhesive
 - (a) G00511 Tape - Glass Cloth, 3M Scotch brand No.361
 - (b) G50344 Tape - Glass Cloth, Heavy-Duty, Permacel P-212HD
 - (c) Tape - Glass Cloth, Polyken 292 (optional)
(Kendall Company, Boston, MA)
(Tyco/Covalence Adhesives, Franklin, MA)
 - (9) Tape - Cargo Liner Joint Sealing (alternative to glass cloth tape)
 - (a) G02361 Tape - Cargo Liner (BMS 5-146, Type 1, Class 1, Grade A)
 - (b) Tape - Cargo Liner, Polyken 294FR (optional)
(Tyco/Covalence Adhesives, Franklin, MA)
 - (10) Wiping cloth, lint-free - commercially available
- C. References
- (1) AMM 36-00-00/201, Depressurize the Pneumatic System
- D. Prepare for the Repair

S 868-010

- (1) Release the pressure from the pneumatic system (AMM 36-00-00/201).

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

S 868-011

- (2) On the bleed air control module on the pilots' overhead panel, P5, put the pack control switches in the OFF position.

S 018-012

- (3) Remove the applicable ceiling, sidewall, or floor panels to gain access to the damaged air conditioning duct joint.

S 018-013

- (4) If insulation is installed on the duct joint, remove the insulation.

S 348-014

- (5) Do these steps to prepare the damaged area of the duct.

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (a) Use the solvent and a wiping cloth to clean the damaged area.

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- (b) Sand the damaged area to remove any remaining adhesive and contamination.
- (c) Use the solvent and a wiping cloth to clean the damaged area.

S 348-015

- (6) Cut a piece of the Fiberglass or Kevlar cloth that is 3 inches wide and long enough to wind around the duct a minimum of two times.

E. Repair the Taped Joint

S 348-016

- (1) Apply a thin, smooth layer of the primer to the duct joint area and let it dry at room temperature for a minimum of 1 hour.

S 348-017

- (2) Apply the sealant to one side of the Fiberglass or Kevlar cloth.

S 348-018

- (3) Wind the Fiberglass or Kevlar cloth around the duct joint a minimum of two times.

NOTE: Make sure that the sealant on the Fiberglass or Kevlar cloth is in contact with the duct.

S 348-019

- (4) Put a piece of plastic sheet on the Fiberglass or Kevlar cloth and press lightly with a squeegee or with your hand. Make the Fiberglass or Kevlar cloth smooth from the center to the edges of the Fiberglass or Kevlar cloth to remove any bubbles or any wrinkles and to remove unwanted resin.

S 348-020

- (5) Remove the plastic sheet from the Fiberglass or Kevlar cloth and remove unwanted resin with a wiping cloth.

S 348-021

- (6) Wind the glass cloth tape around the two edges of the Fiberglass or Kevlar cloth repair.

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NOTE: Make sure the tape is flat with no wrinkles or gaps.

F. Put the Airplane Back to Its Usual Condition

S 418-022

- (1) If insulation was removed from the duct joint, install new insulation.

S 418-023

- (2) Replace the panels or other airplane structure removed to gain access to the duct joint.

TASK 21-23-07-308-208

3. External Patch Repair - Fiberglass or Kevlar Duct (Fig. 801)

A. General

- (1) This procedure gives instructions for the repair of a crack or cut in a Fiberglass or Kevlar air conditioning duct with an external patch.
- (2) An external patch is applicable when the cut or the crack is less than 1/4 inch wide and is less than 3 inches long.

B. Consumable Materials

- (1) Cloth - Glass
 - (a) G00031 Cloth - Glass (Fiberglass), minimum 0.007-inch thick (MIL-C-9084 Type VIII)
 - (b) G02454 Fabric - Aromatic Polyamide Fiber (Kevlar), minimum 0.007-inch thick (alternative to the Fiberglass glass cloth)
- (2) Plastic sheet - polyethylene or vinyl - commercially available
- (3) Resin - Fiberglass (two part resin system, resin and hardener)
 - (a) G50400 Resin - Fiberglass, BMS 8-201 Type IV (preferred)
 - (b) G50399 Resin - Fiberglass, BMS 8-201 Type III (preferred)
 - (c) G00315 Resin - Fiberglass, BMS 8-201 Type II (alternate)
 - (d) A00040 Resin - Fiberglass, BMS 8-201 Type I (alternate)
 - (e) G02137 Resin - Polyester, Hetron 92 (alternate)

NOTE: For the repair of fiberglass ducts only.

- (4) Sandpaper - 320 grit - commercially available

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- (5) Solvent
 - (a) Solvent – Butyl carbitol (alternative to B01011, Series 91) – commercially available (AMM 20-30-91/201)
 - (b) B01011 Solvent – Series 91, commercially available (AMM 20-30-91/201)
- (6) Squeegee – commercially available
- (7) Wiping cloth, lint-free – commercially available
- C. References
 - (1) AMM 36-00-00/201, Depressurize the Pneumatic System
- D. Prepare for the Repair

S 868-024

- (1) Release the pressure from the pneumatic system (AMM 36-00-00/201)

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

S 868-025

- (2) On the bleed air control module on the pilots' overhead panel, P5, put the pack control switches in the OFF position.

S 018-026

- (3) Remove the applicable ceiling, sidewall, or floor panels to gain access to the damaged air conditioning duct.

S 018-027

- (4) If insulation is installed on the duct, remove the insulation.

S 348-028

- (5) Do these steps to prepare the damaged area of the duct.

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (a) Use the solvent and a wiping cloth to clean the damaged area.
- (b) Drill a hole at each end of the cut or crack to prevent the cut or crack from getting larger. The holes should be a maximum of 1/16 inch diameter.
- (c) Sand the damaged area to remove any remaining adhesive and contamination.
- (d) Use the solvent and a wiping cloth to clean the damaged area.

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S 348-029

- (6) Prepare the Fiberglass or Kevlar cloth.
 - (a) Cut sufficient pieces of Fiberglass or Kevlar cloth to equal the thickness of the duct.
 - (b) Cut the Fiberglass or Kevlar cloth pieces 2 inches larger on all sides than the damage.
 - (c) Round the corners of the pieces of Fiberglass or Kevlar cloth.

S 348-030

- (7) Prepare the applicable resin.
- E. Repair the Air Conditioning Duct

S 348-031

- (1) Apply a thin, smooth layer of resin to the duct where the Fiberglass or Kevlar cloth will be applied.

NOTE: Make sure the area of the resin is larger than the size and shape of the Fiberglass or Kevlar cloth pieces.

S 348-032

- (2) Put a piece of Fiberglass or Kevlar cloth on the resin so that it extends beyond the cut or crack a minimum of 2 inches on all sides.

S 348-033

- (3) Soak the Fiberglass or Kevlar cloth with the applicable resin.

S 348-034

- (4) Put a piece of plastic sheet on the Fiberglass or Kevlar cloth and press lightly with a squeegee or with your hand. Make the Fiberglass or Kevlar cloth smooth from the center to the edges of the cloth to remove any bubbles or any wrinkles and to remove unwanted resin.

S 348-035

- (5) Remove the plastic sheet from the Fiberglass or Kevlar cloth and remove unwanted resin with a wiping cloth.

S 348-036

- (6) Put another piece of the Fiberglass or Kevlar cloth on the first piece, soak it with resin, and make it smooth.

NOTE: Continue using the same procedure until the thickness of the patch equals the thickness of the duct.

S 348-037

- (7) Let the resin cure for 24 hours at room temperature.

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F. Put the Airplane Back to Its Usual Condition

S 418-038

- (1) If insulation was removed from the duct joint, install new insulation.

S 418-039

- (2) Replace the panels or other airplane structure removed to gain access to the duct joint.

TASK 21-23-07-308-209

4. Structural Repair - Fiberglass or Kevlar Duct (Fig. 801)

A. General

- (1) This procedure gives instructions for making a structural repair to a Fiberglass or Kevlar air conditioning duct.
- (2) A structural repair is applicable when the damage to the air conditioning duct is a cut or a hole that is more than 1/4 inch wide and more than 3 inches long but less than 5 percent of the total surface area of the duct. If the damage is more than 5 percent of the total surface area of the duct, replace the duct section.

B. Consumable Materials

- (1) Cloth - Glass
 - (a) G00031 Cloth - Glass (Fiberglass), minimum 0.007-inch thick (MIL-C-9084 Type VIII)
 - (b) G02454 Fabric - Aromatic Polyamide Fiber (Kevlar), minimum 0.007-inch thick (alternative to the Fiberglass glass cloth)
- (2) Plastic sheet - polyethylene or vinyl - commercially available
- (3) Resin - Fiberglass (two part resin system, resin and hardener)
 - (a) G50400 Resin - Fiberglass, BMS 8-201 Type IV (preferred)
 - (b) G50399 Resin - Fiberglass, BMS 8-201 Type III (preferred)
 - (c) G00315 Resin - Fiberglass, BMS 8-201 Type II (alternate)
 - (d) A00040 Resin - Fiberglass, BMS 8-201 Type I (alternate)
 - (e) G02137 Resin - Polyester, Hetron 92 (alternate)

NOTE: For the repair of fiberglass ducts only.

- (4) Sandpaper - 320 grit - commercially available

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- (5) Solvent
 - (a) Solvent - Butyl carbitol (alternative to B01011, Series 91) - commercially available (AMM 20-30-91/201)
 - (b) B01011 Solvent - Series 91, commercially available (AMM 20-30-91/201)
- (6) Squeegee - commercially available
- (7) Wiping cloth, lint-free - commercially available
- C. References
 - (1) AMM 36-00-00/201, Depressurize the Pneumatic System
- D. Prepare for the Repair

S 868-040

- (1) Release the pressure from the pneumatic system (AMM 36-00-00/201).

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

S 868-041

- (2) On the bleed air control module on the pilots' overhead panel, P5, put the pack control switches in the OFF position.

S 018-042

- (3) Remove the applicable ceiling, sidewall, or floor panels to gain access to the damaged air conditioning duct.

S 018-043

- (4) If insulation is installed on the duct, remove the insulation.

S 348-044

- (5) Do these steps to prepare the damaged area of the duct.

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (a) Use the solvent and a wiping cloth to clean the damaged area.
- (b) Cut away the damaged area to make a rounded opening with a smooth shape. Cut the sides of the opening at an angle to make a taper of 1/2 inch between each ply of material.
- (c) Sand the edge of the opening to make a smooth surface.
- (d) Sand the surface of the duct around the opening a distance of 1/2 inch for each ply in the duct. For example, if there are 6 plies, sand 3 inches from the opening on all sides ($1/2 \times 6 = 3$ inches).
- (e) Use the solvent and a wiping cloth to clean the edge of the opening and the sanded surface of the duct.

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S 348-045

- (6) Prepare the Fiberglass or Kevlar cloth.
- (a) Cut sufficient pieces of Fiberglass or Kevlar cloth to equal the thickness of the duct.
 - (b) Cut each piece of Fiberglass or Kevlar cloth 1/2 inch larger to fit the taper of the opening.
 - (c) Cut one piece of Fiberglass or Kevlar cloth a minimum of 2 inches larger on all sides than the opening in the duct.

S 348-046

- (7) Cut a piece of plastic sheet 2 to 3 inches larger on all sides than the opening.

S 348-047

- (8) Cut a piece of cardboard or aluminum 2 to 3 inches larger than the opening on all sides.

S 348-048

- (9) Attach the plastic sheet to the inside of the opening with adhesive tape so that it covers the opening.

S 348-049

- (10) Attach the cardboard or aluminum to the inside of the opening with adhesive tape so that it covers the opening and provides support for the plastic sheet.

S 348-050

- (11) Prepare the applicable resin.

E. Repair the Air Conditioning Duct

S 348-051

- (1) Apply a thin, smooth layer of resin to the plastic sheet in the opening in the duct.

S 348-052

- (2) Put a piece of Fiberglass or Kevlar cloth in the opening over the plastic sheet so that it covers the opening completely.

S 348-053

- (3) Soak the Fiberglass or Kevlar cloth with the applicable resin.

S 348-054

- (4) Put a piece of plastic sheet on the Fiberglass or Kevlar cloth and press lightly with a squeegee or with your hand. Make the Fiberglass or Kevlar cloth smooth from the center to the edges of the cloth to remove any bubbles or any wrinkles and to remove unwanted resin.

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S 348-055

- (5) Remove the plastic sheet from the Fiberglass or Kevlar cloth and remove unwanted resin with a wiping cloth.

S 348-056

- (6) Put another piece of Fiberglass or Kevlar cloth on the first piece so that it covers the opening, soak it with resin, and make it smooth.

NOTE: Continue using the same procedure until the thickness of the patch equals the thickness of the duct.

S 348-057

- (7) Put the last piece of Fiberglass or Kevlar cloth on top of the patch so it extends beyond the opening a minimum of 2 inches on all sides. Make the Fiberglass or Kevlar cloth smooth from the center to the edges of the cloth to remove any bubbles or any wrinkles and to remove unwanted resin.

S 348-216

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- (8) Wipe the duct around the patch with a wiping cloth and solvent to remove unwanted resin.

S 348-059

- (9) Let the resin to cure for 24 hours at room temperature.
- F. Put the Airplane Back to Its Usual Condition

S 418-060

- (1) If insulation was removed from the duct joint, install new insulation.

S 418-061

- (2) Replace the panels or other airplane structure removed to gain access to the duct joint.

TASK 21-23-07-308-210

5. Taped Joint Repair - Rigid Foam Duct (Fig. 802)

A. General

- (1) This procedure gives instructions for the repair of the taped joint that connects sections of rigid polyisocyanurate foam air conditioning duct.

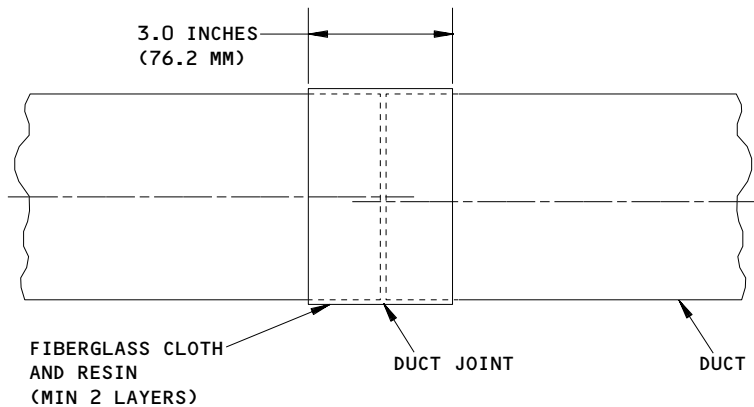
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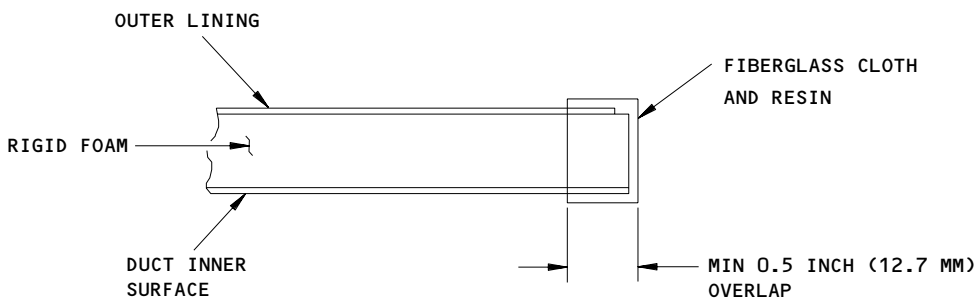
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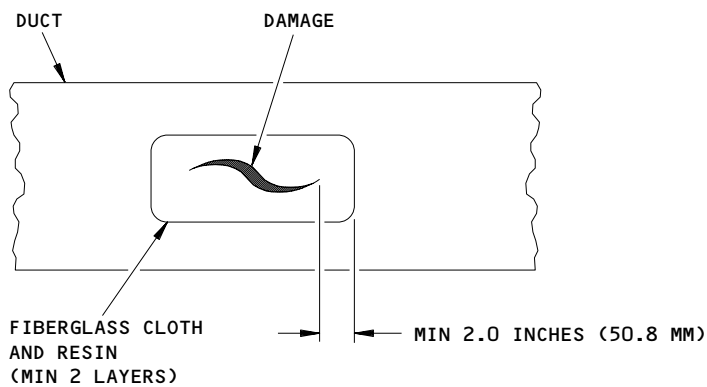
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TAPED JOINT REPAIR - RIGID FOAM DUCT



DUCT END REPAIR - RIGID FOAM DUCT



EXTERNAL PATCH - RIGID FOAM DUCT

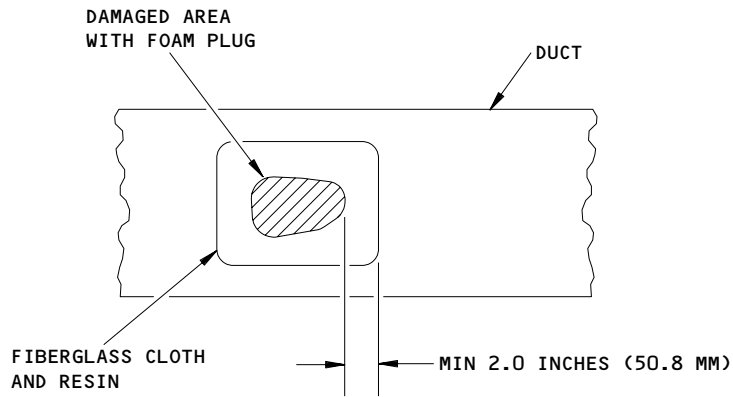
**Air Conditioning System Ducts Repair (Rigid Foam)
Figure 802 (Sheet 1)**

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RIGID FOAM DUCTS

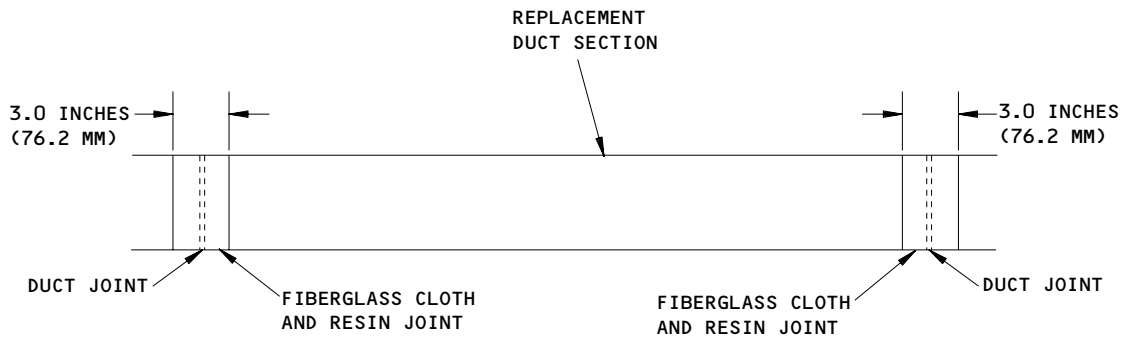
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STRUCTURAL REPAIR - RIGID FOAM DUCT



DUCT SECTION REPLACEMENT - RIGID FOAM DUCT

Air Conditioning System Ducts Repair (Rigid Foam)
Figure 802 (Sheet 2)

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RIGID FOAM DUCTS

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- (2) This procedure may also be used to make a temporary repair to a damaged rigid foam air conditioning duct when time is not available to make a permanent repair or if the materials are not available to make a permanent repair. If a temporary repair is made, make the permanent repair as soon as possible.

B. Consumable Materials

- (1) Cloth - Glass
 - (a) G00031 Cloth - Glass (Fiberglas), minimum 0.007-inch thick (MIL-C-9084 Type VIII)
- (2) Plastic sheet - polyethylene or vinyl - commercially available
- (3) Resin - Fiberglass (two part resin system, resin and hardener)
 - (a) G50400 Resin - Fiberglass, BMS 8-201 Type IV (preferred)
 - (b) G50399 Resin - Fiberglass, BMS 8-201 Type III (preferred)
 - (c) G00315 Resin - Fiberglass, BMS 8-201 Type II (alternate)
 - (d) A00040 Resin - Fiberglass, BMS 8-201 Type I (alternate)
 - (e) G02137 Resin - Polyester, Hetron 92 (alternate)

NOTE: For the repair of fiberglass ducts only.

- (4) Solvent
 - (a) Solvent - Butyl carbitol (alternative to B01011, Series 91) - commercially available (AMM 20-30-91/201)
 - (b) B01011 Solvent - Series 91, commercially available (AMM 20-30-91/201)
- (5) Squeegee - commercially available
- (6) Wiping cloth, lint-free - commercially available

C. References

- (1) AMM 36-00-00/201, Depressurize the Pneumatic System

D. Prepare for the Repair

S 868-062

- (1) Release the pressure from the pneumatic system (AMM 36-00-00/201).

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

S 868-063

- (2) On the bleed air control module on the pilots' overhead panel, P5, put the pack control switches in the OFF position.

S 018-064

- (3) Remove the applicable ceiling, sidewall, or floor panels to gain access to the damaged air conditioning duct joint.

S 018-065

- (4) If insulation is installed on the duct, remove the insulation.

S 868-066

- (5) Do these steps to prepare the damaged area of the duct.

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- (a) Use the solvent and a wiping cloth to clean the damaged area.
- (b) Sand the damaged area to remove any remaining adhesive and contamination.
- (c) Use the solvent and a wiping cloth to clean the damaged area.

S 348-067

- (6) Examine the end of each air conditioning duct for damage.

S 348-068

- (7) If the duct lining is damaged so that the foam core of the duct shows, then do the Duct End Repair – Rigid Foam Duct procedure below.

S 348-069

- (8) Cut a piece of the Fiberglass cloth that is 3 inches wide and is long enough to wind around the duct a minimum of two times.

S 348-070

- (9) Prepare the applicable resin.

E. Repair the Taped Joint

S 348-071

- (1) Apply resin to the duct ends.

S 348-072

- (2) Let the resin partially dry until it is sticky.

S 348-073

- (3) Press the duct ends together by aligning the installation checkmarks.

S 348-074

- (4) Apply a thin, smooth layer of resin to the joint area a minimum of 2 inches wider than the duct joint.

S 348-075

- (5) Apply resin to one side of the Fiberglass cloth.

S 348-076

- (6) Wind the Fiberglass cloth around the duct joint a minimum of two times.

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NOTE: Make sure the resin on the Fiberglass cloth is in contact with the duct.

S 348-077

- (7) Put a plastic sheet on the Fiberglass cloth and press lightly with a squeegee or with your hand. Make the Fiberglass cloth smooth from the center to the edges of the cloth to remove any bubbles or any wrinkles and to remove unwanted resin.

S 348-078

- (8) Let the resin cure for 24 hours at room temperature.
- F. Put the Airplane Back to Its Usual Condition

S 418-079

- (1) If insulation was removed from the duct joint, install new insulation.

S 418-080

- (2) Replace the panels or other airplane structure removed to gain access to the duct joint.

TASK 21-23-07-308-211

6. Duct End Repair - Rigid Foam Duct (Fig. 802)

A. General

- (1) This procedure gives instructions for the repair of the end of a rigid foam air conditioning duct. This procedure is done if the lining that covers the rigid foam at the duct end is damaged and the rigid foam is exposed.
- (2) This procedure may be required when doing the repair of a taped duct joint.

B. Consumable Materials

- (1) Cloth - Glass
 - (a) G00031 Cloth - Glass (Fiberglas), minimum 0.007-inch thick (MIL-C-9084 Type VIII)
- (2) Plastic sheet - polyethylene or vinyl - commercially available

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- (3) Resin - Fiberglass (two part resin system, resin and hardener)
 - (a) G50400 Resin - Fiberglass, BMS 8-201 Type IV (preferred)
 - (b) G50399 Resin - Fiberglass, BMS 8-201 Type III (preferred)
 - (c) G00315 Resin - Fiberglass, BMS 8-201 Type II (alternate)
 - (d) A00040 Resin - Fiberglass, BMS 8-201 Type I (alternate)
 - (e) G02137 Resin, Polyester - Hetron 92 (alternate)

NOTE: For the repair of fiberglass ducts only.

- (4) Solvent
 - (a) Solvent - Butyl carbitol (alternative to B01011, Series 91) - commercially available (AMM 20-30-91/201)
 - (b) B01011 Solvent - Series 91, commercially available (AMM 20-30-91/201)
- (5) Squeegee - commercially available
- (6) Wiping cloth, lint-free - commercially available

C. References

- (1) AMM 36-00-00/201, Depressurize the Pneumatic System

D. Prepare for the Repair

S 868-081

- (1) Release the pressure from the pneumatic system (AMM 36-00-00/201).

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

S 868-082

- (2) On the bleed air control module on the pilots' overhead panel, P5, the pack control switches in the OFF position.

S 018-083

- (3) Remove the applicable ceiling, sidewall, or floor panels to gain access to the damaged air conditioning duct.

S 018-084

- (4) If insulation is installed on the duct joints, remove the insulation.

S 348-085

- (5) Do these steps to prepare the damaged area of the duct.

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (a) Use the solvent and a wiping cloth to clean the damaged area.

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NOTE: Clean the duct end area and the inside and outside of the duct a minimum of 1 inch from the duct end.

- (b) Sand the damaged area to remove any remaining adhesive and contamination.
- (c) Use the solvent and a wiping cloth to clean the damaged area.

S 348-086

- (6) Prepare the Fiberglass cloth.
 - (a) Cut a piece of Fiberglass cloth the length of the outside circumference of the duct.
 - (b) The Fiberglass cloth should have the width needed to overlap the duct end and the inside and outside of the duct a minimum of 1/2 inch.

S 348-087

- (7) Prepare the applicable resin.
- E. Repair the Duct End

S 348-088

- (1) Apply a thin, smooth layer of resin on the duct end and on the surface of the duct a minimum of 1/2 inch from the duct end.

S 348-089

- (2) Wind the Fiberglass cloth around the duct end so that it overlaps a minimum of 1/2 inch on both sides of the end.

S 348-183

- (3) Soak the Fiberglass cloth with the applicable resin.

S 348-184

- (4) Put a piece of plastic sheet on the Fiberglass cloth and press lightly with a squeegee or with your hand. Make the Fiberglass cloth smooth from the center to the edges of the cloth to remove any bubbles or any wrinkles and to remove unwanted resin.

S 348-095

- (5) Let the resin cure for 24 hours at room temperature.

S 348-217

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (6) Clean the area with a wiping cloth and solvent to remove unwanted resin.

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F. Put the Airplane Back to Its Usual Condition

S 418-185

- (1) If insulation was removed from the duct joint, install new insulation.

S 418-186

- (2) Replace the panels or other airplane structure removed to gain access to the duct joint.

TASK 21-23-07-308-212

7. External Patch Repair - Rigid Foam Duct (Fig. 802)

A. General

- (1) This procedure gives instructions for the repair of a rigid foam air conditioning duct if the damage is less than 1/4 inch deep less than 1 inch long and the inner lining is not damaged. If the damage is larger, do the Structural Repair - Rigid Foam Duct procedure below.

B. Consumable Materials

- (1) Cloth - Glass
 - (a) G00031 Cloth - Glass (Fiberglas), minimum 0.007-inch thick (MIL-C-9084 Type VIII)
- (2) Plastic sheet - polyethylene or vinyl - commercially available
- (3) Resin - Fiberglass (two part resin system, resin and hardener)
 - (a) G50400 Resin - Fiberglass, BMS 8-201 Type IV (preferred)
 - (b) G50399 Resin - Fiberglass, BMS 8-201 Type III (preferred)
 - (c) G00315 Resin - Fiberglass, BMS 8-201 Type II (alternate)
 - (d) A00040 Resin - Fiberglass, BMS 8-201 Type I (alternate)
 - (e) G02137 Resin - Polyester, Hetron 92 (alternate)

NOTE: For the repair of fiberglass ducts only.

(4) Solvent

- (a) Solvent - Butyl carbitol (alternative to B01011, Series 91) - commercially available (AMM 20-30-91/201)
- (b) B01011 Solvent - Series 91, commercially available (AMM 20-30-91/201)

(5) Squeegee - commercially available

(6) Wiping cloth, lint-free - commercially available

C. References

- (1) AMM 36-00-00/201, Depressurize the Pneumatic System

D. Prepare for the Repair

S 868-097

- (1) Release the pressure from the pneumatic system (AMM 36-00-00/201).

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

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- S 868-098
- (2) On the bleed air control module on the pilots' overhead panel, P5, put the pack control switches in the OFF position.
- S 018-099
- (3) Remove the applicable ceiling, sidewall, or floor panels to gain access to the damaged air conditioning duct joint.
- S 018-100
- (4) If insulation is installed on the duct joint, remove the insulation.
- S 348-101
- (5) Examine the inner surface of the duct for damage.
- S 348-102
- (6) If the inner lining is damaged, then do the Duct Section Replacement - Rigid Foam Duct procedure below.
- S 348-103
- (7) Examine the damage to the duct. If the damage is more than 3 inches long or more than 5 square inches in area, do the Duct Section Replacement - Rigid Foam Duct procedure below.
- S 348-104
- (8) Do these steps to prepare the damaged area of the duct:
- WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.
- (a) Use the solvent and a wiping cloth to clean the damaged area.
- (b) Sand the damaged area to remove any remaining adhesive and contamination.
- (c) Use the solvent and a wiping cloth to clean the damaged area.
- S 348-105
- (9) Prepare the Fiberglass cloth.
- (a) Cut two pieces of the Fiberglass cloth 2 inches larger on all sides than the damaged area.
- (b) Round the corners of the Fiberglass cloth pieces.
- S 348-198
- (10) Prepare the applicable resin.

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E. Repair the Duct

S 348-106

- (1) Apply a thin, smooth layer of resin to the duct where the Fiberglass cloth will be applied.

NOTE: Make sure the area of the resin is larger than the size and shape of the Fiberglass cloth.

S 348-107

- (2) Put a piece of Fiberglass cloth on the resin so that it extends beyond the damaged area a minimum of 2 inches to all sides.

S 348-108

- (3) Soak the fiberglass cloth with the applicable resin.

S 348-109

- (4) Put a piece of plastic sheet on the Fiberglass cloth and press lightly with a squeegee or with your hand. Make the Fiberglass cloth smooth from the center to the edges of the cloth to remove any bubbles or any wrinkles and to remove unwanted resin.

S 348-110

- (5) Remove the plastic sheet from the Fiberglass cloth and remove unwanted resin with a wiping cloth.

S 348-111

- (6) Follow the same procedure to apply the second piece of the Fiberglass cloth.

S 348-112

- (7) Let the resin cure for 24 hours at room temperature.

S 348-218

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- (8) Remove unwanted resin from the edges of the Fiberglass cloth with a wiping cloth soaked with solvent.

F. Put the Airplane Back to Its Usual Condition

S 418-187

- (1) If insulation was removed from the duct joint, install new insulation.

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S 418-188

- (2) Replace the panels or other airplane structure removed to gain access to the duct joint.

TASK 21-23-07-308-213

8. Structural Repair - Rigid Foam Duct (Fig. 802)

A. General

- (1) This procedure gives instructions for making a structural repair to a rigid foam air conditioning duct. A structural repair replaces the rigid foam in the surface of the duct if the damage or deterioration to the rigid foam is greater than 1/4 inch deep and 1 inch long, but the inner lining is not damaged.

B. Consumable Materials

- (1) Cloth - Glass
 - (a) G00031 Cloth - Glass (Fiberglas), minimum 0.007-inch thick (MIL-C-9084 Type VIII)
- (2) Urethane foam - rigid (BMS 8-133 Type I Grade 20 Form A)
- (3) Plastic sheet - polyethylene or vinyl - commercially available
- (4) Potting compound BMS 5-28, Type 19 (Epocast 1619A/B)
- (5) Resin - Fiberglass (two part resin system, resin and hardener)
 - (a) G50400 Resin - Fiberglass, BMS 8-201 Type IV (preferred)
 - (b) G50399 Resin - Fiberglass, BMS 8-201 Type III (preferred)
 - (c) G00315 Resin - Fiberglass, BMS 8-201 Type II (alternate)
 - (d) A00040 Resin - Fiberglass, BMS 8-201 Type I (alternate)
 - (e) G02137 Resin - Polyester, Hetron 92 (alternate)

NOTE: For the repair of fiberglass ducts only.

- (6) Sandpaper - 320 grit - commercially available
- (7) Solvent
 - (a) Solvent - Butyl carbitol (alternative to B01011, Series 91) - commercially available (AMM 20-30-91/201)
 - (b) B01011 Solvent - Series 91, commercially available (AMM 20-30-91/201)
- (8) Squeegee - commercially available
- (9) Wiping cloth, lint-free - commercially available

C. References

- (1) AMM 36-00-00/201, Depressurize the Pneumatic System

D. Prepare for the Repair

S 868-116

- (1) Release the pressure from the pneumatic system (AMM 36-00-00/201).

NOTE: This will make sure that there is no airflow in the ducts when you do the repair.

S 868-117

- (2) On the bleed air control module on the pilots' overhead panel, P5, put the pack control switches in the OFF position.

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S 018-120

- (3) Remove the applicable ceiling, sidewall, or floor panels to gain access to the damaged air conditioning duct joint.

S 018-119

- (4) If insulation is installed on the duct joint, remove the insulation.

S 348-121

- (5) Examine the inner surface of the duct for damage.

S 348-122

- (6) If the inner lining is damaged, then do the Duct Section Replacement - Rigid Foam Duct procedure below.

S 348-123

- (7) Examine the damage to the duct. If the damage is more than half the thickness of the foam duct material, then do the Duct Section Replacement - Rigid Foam Duct procedure below.

S 348-124

- (8) Do these steps to prepare the air conditioning duct.
(a) Remove the damaged portion of the outer lining and the damaged foam material.

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- (b) Use the solvent and a wiping cloth to clean the damaged area.
(c) Sand the duct outer surface a minimum of 2 inches from the edges of the damaged area to remove any remaining adhesive and contamination.
(d) Use the solvent and a wiping cloth to clean the damaged area.

S 348-125

- (9) Cut a piece of the rigid foam to fit the area where the damaged foam was removed.

NOTE: Put the foam in the opening to make sure it is the correct size and shape.

S 348-126

- (10) Prepare the Fiberglass cloth.
(a) Cut two pieces of the Fiberglass cloth 2 inches larger on all sides than the damaged area.
(b) Round the corners of the Fiberglass cloth pieces.

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S 348-127

- (11) Prepare the potting compound.

E. Repair the Duct

S 348-128

- (1) Apply the potting compound to the area where the rigid foam was removed.

S 348-129

- (2) Put the piece of rigid urethane foam in the area where the damaged foam was removed.

S 348-130

- (3) Put a piece of plastic sheet on the piece of rigid foam and press on it to align the surface of the piece with the surface of the duct.

S 348-219

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- (4) Remove any unwanted resin from the edges of the piece of rigid foam with a wiping cloth soaked with solvent.

S 348-132

- (5) Leave the plastic sheet on the repair area and let the potting compound cure for 5 hours at 125°F. Apply heat with a heat gun, heat lamp or heating blanket.

S 348-133

- (6) Remove the plastic sheet and smooth the surface of the foam with sandpaper.

S 348-220

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- (7) Use the solvent and a wiping cloth to remove any dust from the duct.

S 348-135

- (8) Prepare the applicable resin.

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S 348-136

- (9) Put a piece of the Fiberglass cloth on the resin so that it extends beyond the damaged area a minimum of 2 inches on all sides.

S 348-137

- (10) Soak the Fiberglass cloth with the applicable resin.

S 348-138

- (11) Put a piece of plastic sheet on the Fiberglass cloth and press lightly with a squeegee or with your hand. Make the Fiberglass cloth smooth from the center to the edges of the cloth to remove any bubbles or any wrinkles and to remove unwanted resin.

S 348-139

- (12) Remove the plastic sheet from the Fiberglass cloth and remove unwanted resin with a wiping cloth.

S 348-140

- (13) Follow the same procedure to apply the second piece of the Fiberglass cloth.

S 348-141

- (14) Let the resin cure for 24 hours at room temperature.

S 348-221

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- (15) Remove unwanted resin from the edges of the repaired area with a wiping cloth soaked with solvent.

F. Put the Airplane Back to Its Usual Condition

S 418-143

- (1) If insulation was removed from the duct joint, install new insulation.

S 418-144

- (2) Replace the panels or other airplane structure removed to gain access to the duct joint.

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TASK 21-23-07-308-214

9. Inner Lining Repair – Rigid Foam Duct (Fig. 802)

A. General

- (1) Rigid foam ducts (polyurethane or polyisocyanurate) with damage or delamination to the inner lining are not considered to be repairable per Boeing CMM 36-10-02 and CMM 36-10-12. The rigid foam duct inner lining cannot be repaired and the duct must be replaced.

B. Procedure

S 968-304

- (1) If the inner lining has damage or become delaminated, replace the duct.

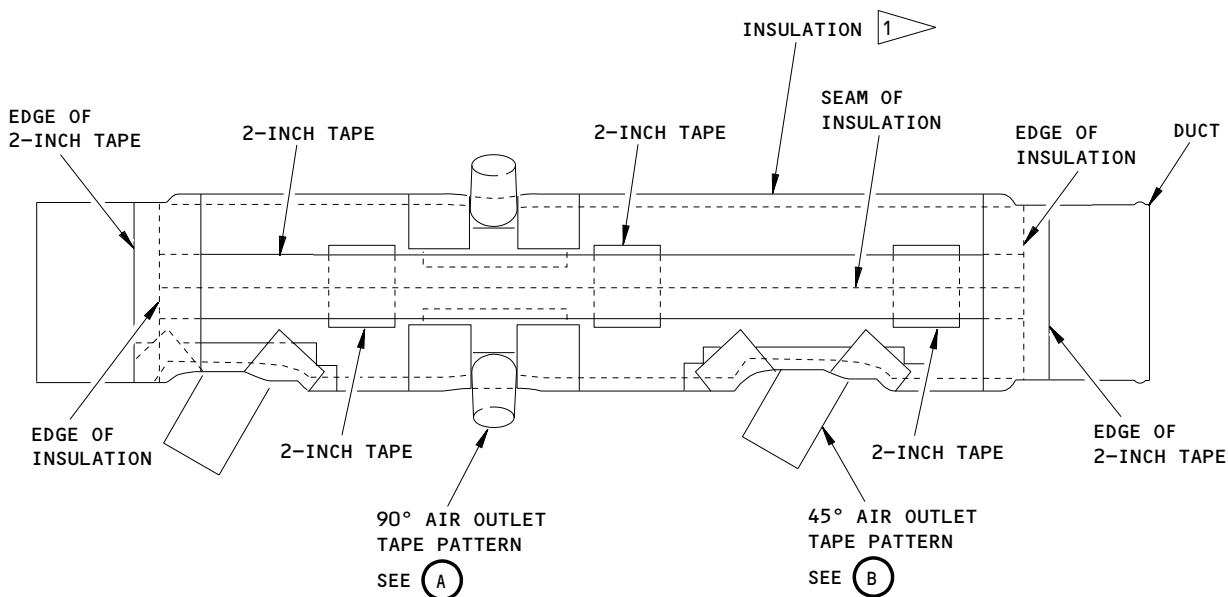
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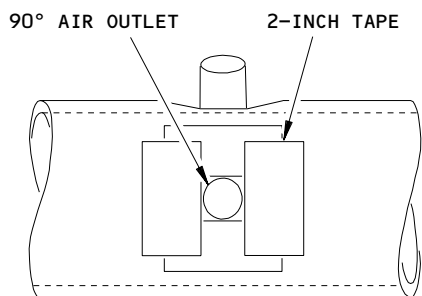
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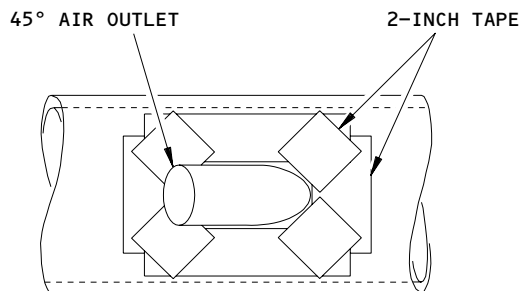


**FOAM INSULATED DUCT
(EXAMPLE)**



90° AIR OUTLET TAPE PATTERN

(A)



45° AIR OUTLET TAPE PATTERN

(B)

1 FOR INSULATION DAMAGE APPLY A MINIMUM 2-INCH X 2-INCH PATCH OF PRESSURE SENSITIVE ADHESIVE TAPE TO THE DAMAGED AREA. MAKE SURE YOU HAVE FULL COVERAGE OF THE DAMAGED OR TORN AREA WITH NO LESS THAN 1/2-INCH OVERLAP.

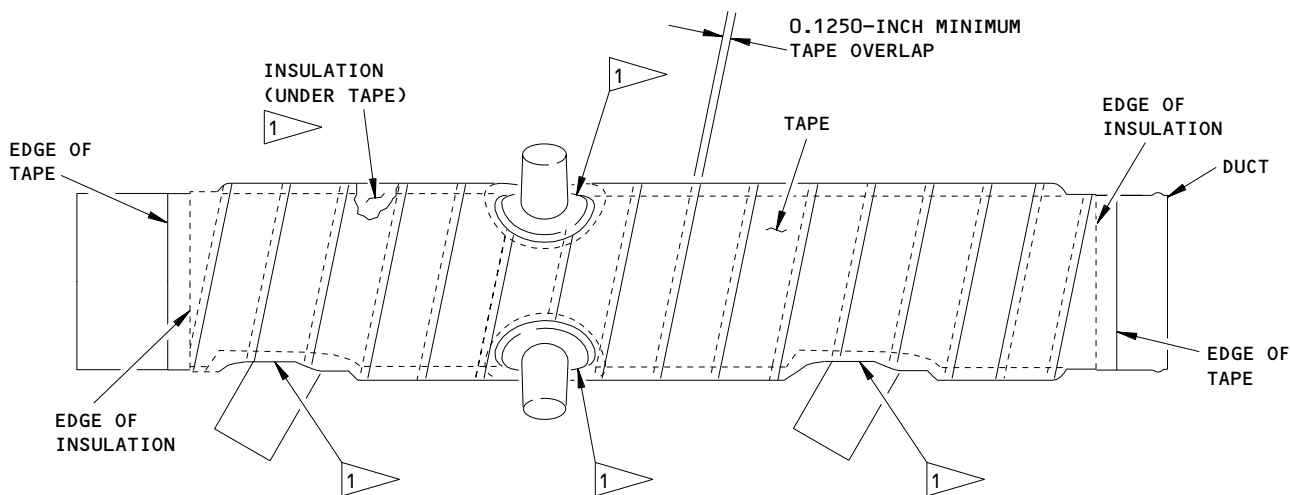
**Foam Insulated Duct Repair
Figure 803**

EFFECTIVITY
DUCTS INSULATED WITH MELAMINE FOAM;
DUCTS INSULATED WITH POLYIMIDE FOAM

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**REWORK POLYIMIDE FOAM INSULATED DUCT
(EXAMPLE)**

NOTE:

- 2-INCH WIDE, 3-INCH WIDE OR 12-INCH WIDE TAPE (BMS 5-157 TYPE I, CLASS 1, GRADE B) MUST COVER 100% OF THE BROWN HYPALON INSULATION SURFACE.
- TAPE MAY BE INSTALLED SPIRAL WRAPPED AS SHOWN OR LENGTHWISE DOWN THE DUCT DEPENDING ON THE INSTALLERS PREFERENCE.
- SHOWN PATTERN IS FOR REFERENCE ONLY. TAPE MAY BE APPLIED IN ANY CONFIGURATION AS LONG AS COMPLETE BMS 8-300 COVERAGE IS OBTAINED.
- WIDER TAPE MAY BE CUT INTO NARROWER STRIPS OR ANY UNIQUE SHAPE IF DESIRED TO ASSIST IN OBTAINING COMPLETE BMS 8-300 COVERAGE.
- MAINTAIN MINIMUM 0.1250-INCH OVERLAP OF TAPE.
- AVOID COMPRESSION OF BMS 8-300 INSULATION.
- WRINKLES IN TAPE ARE ACCEPTABLE IF PINCHED TOGETHER AND CONTAIN NO VOIDS.
- COVERING OF EXISTING BMS 5-157 TAPE IS NOT REQUIRED.
- TAPE MAY BE APPLIED TO THE BLANKET PRIOR TO THE BLANKET INSTALLATION ON THE DUCT IF DESIRED BY THE INSTALLER.
- FOR BLANKETS INSTALLED ON DUCT JOINTS, TAPE MAY BE APPLIED TO THE BLANKET BEFORE OR AFTER THE BLANKET IS INSTALLED OVER THE DUCT JOINT. TAPE ORIENTATION IS OPTIONAL.

1 COVER ALL EXPOSED INSULATION (BMS 8-300 TYPE II, GRADE 5) WITH TAPE (BMS 5-157 TYPE I, CLASS 1, GRADE B). CUT TAPE AS REQUIRED TO FIT AROUND AIR OUTLETS, BRANCHES AND INSULATION VENT HOLES.

Rework Polyimide Foam Insulated Duct Repair
Figure 804

EFFECTIVITY
REWORKED DUCTS INSULATED WITH
POLYIMIDE FOAM

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TASK 21-23-07-308-270

10. Foam Insulation Duct Repairs (Fig. 803, 804)

A. General

- (1) This procedure has instructions to repair those air conditioning ducts insulated with either 'Melamine' foam or 'Polyimide' foam which is wrapped around the duct and secured with adhesive tape.
- (2) Melamine foam insulation (BMS 8-385, Type IV, Grade 1) has a non-reinforced polyvinyl fluoride (PVF) 'Tedlar' film that is bonded to one side of the foam insulation and has a silver-gray color appearance.
- (3) Polyimide foam insulation (BMS 8-300, Type II, Grade 5) has a reinforced elastomer 'Hypalon' film that is bonded to one side of the foam insulation and has a brown color appearance.
- (4) Service Letter 767-SL-25-114-A discusses the new flammability requirement for thermal/acoustic insulation materials used on air distribution ducts. CFR 14 Part 121.312(e)(1) mandates that when thermal/acoustic insulation is installed in the fuselage as a 'replacement' after September 2,2005, the new insulation must meet the flame propagation test requirements of CFR 14 Part 25.856(a) if it is installed around air ducting.
 - (a) Polyimide foam insulation failed the flame propagation testing. Therefore, any replacement Polyimide foam insulation installed after September 2,2005, must be reworked to have 100% of the brown 'Hypalon' film covered with adhesive tape (BMS 5-157, Type I, Class 1, Grade B, Form 1, Composition MPVF) in order to comply with the flame propagation test requirements.
 - (b) Melamine foam insulation complies with the flame propagation test requirements and is the preferred foam insulation material for replacement.
- (5) Existing insulation material can be removed and re-installed if it is not damaged. Replacement insulation material must meet the flame propagation test requirement.
- (6) When insulation material is removed and re-installed, any existing tape that does not meet the flame propagation test requirement must be removed or completely covered with tape that does meet the requirement.

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- (7) The use of BMS 8-39 polyurethane foam insulation for repairs is 'not' permitted due to the degradation in flammability properties over time.
 - (8) This procedure has these repair instructions:
 - (a) Rework ducts insulated with polyimide foam (BMS 8-300, Type II)
 - (b) Replacement of Tape (Repair Method 1)
 - (c) Repair of cuts or tears in foam insulation (Repair Method 2)
 - (d) Replacement of foam insulation (Repair Method 3)
- B. Consumable Materials
- (1) Foam - Insulation
 - (a) G02470 Foam - Flexible Polyimide, BMS 8-300, Type II, Grade 5
 - (b) G50449 Foam - Flexible Melamine, BMS 8-385, Type IV, Grade 1
 - (2) Solvent
 - (a) B01011 Solvent - Series 91, commercially available (AMM 20-30-91/201)
 - (3) Tape - Insulation
 - (a) G50327 Tape - Advanced Insulation Blanket, 2-inch, 3-inch, or 12-inch wide (BMS 5-157, Type I, Class 1, Grade B, Form 1, Composition MPVF) (AMM 20-30-07/201)
 - 1) E and H 743-MT
E and H Laminating, 138 Grand Street,
Paterson, NJ 07501
 - 2) SF65003100
Bekaert Speciality Films LLC, 4540 Viewridge Ave.,
San Diego, CA 92123
 - 3) Orcotape 0T-157
Orcon Corporation, 1570 Atlantic Street,
Union City, CA 94587
 - (4) Wiping cloth, lint free - commercially available
- C. Access
- (1) Location Zones
 - 200 Upper Half of Fuselage
- D. Rework Ducts Insulated with Polyimide Foam (Fig. 804)
- S 428-297
- (1) Install new insulation tape (BMS 5-157, Type I, Class 1, Grade B, Form 1, Composition MPVF) to completely cover all exposed surfaces of the polyimide foam insulation.
 - (a) 2-inch wide, 3-inch wide, or 12-inch wide insulation tape must cover 100% of the brown colored 'Hypalon' insulation surface.
 - (b) Cut the tape as required to fit around air outlets, branches and insulation vent holes.
 - (c) Tape may be installed spiral wrapped as shown or lengthwise down the duct depending on installers preference.
 - (d) Tape may be installed in any configuration as long as 100% complete coverage of the foam insulation is obtained.

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- (e) Wider tape may be cut into narrower strips or any unique shape if desired, to assist with complete foam insulation coverage.
- (f) Maintain a minimum 1/8-inch (0.1250) overlap of tape.
- (g) Avoid compression of the foam insulation.
- (h) Wrinkles in the tape are acceptable if pinched together and contain no voids.
- (i) Covering of existing insulation tape (BMS 5-157) is not required.
- (j) Tape may be installed to the foam insulation prior to installation on the duct if desired by the installer.
- (k) For foam insulation installed on duct joints, tape may be applied to the foam insulation before or after the foam insulation is installed over the duct joint.
- (l) Tape orientation is optional.

E. Tape Replacement (Repair Method 1)

S 028-277

- (1) Remove the duct if needed for better access.

S 028-271

- (2) Remove all loose or old tape from the insulation.

S 168-278

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- (3) Use the solvent and a wiping cloth to clean the surface of the insulation where new adhesive tape will be installed.

S 428-272

- (4) Install new insulation tape to hold the foam insulation to the duct as shown in Figure 803.
 - (a) Make sure the insulation tape overlaps all the edges and seams of the foam insulation by a minimum of 1-inch.

S 428-298

- (5) Do the procedure above to rework the ducts insulated with the polyimide foam insulation.

S 428-279

- (6) Re-install the duct (if removed).

F. Cuts or Tears in Foam Insulation (Repair Method 2)

S 028-280

- (1) Remove the duct if needed for better access.

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S 168-281

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- (2) Use the solvent and a wiping cloth to clean the surface of the insulation around the damaged area.

S 428-251

- (3) Apply a minimum 2-inch wide patch of insulation tape to completely cover the damaged area on the foam insulation, or replace the foam insulation.
 - (a) Make sure to apply a large enough patch to assure full coverage of the damaged area with a minimum 1/2-inch overlap.

S 428-299

- (4) Do the procedure above to rework the ducts insulated with the polyimide foam insulation.

S 428-282

- (5) Re-install the duct (if removed).

G. Foam Insulation Replacement (Repair Method 3)

S 028-276

- (1) Remove the duct to permit removal of the insulation.

S 028-283

- (2) Remove all tape and existing insulation from the duct.

S 428-284

- (3) Install a new section of foam insulation around the duct:

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- (a) Use the solvent and a wiping cloth to clean the outer surface of the insulation.

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- (b) Wrap the insulation around the duct.
- (c) Install strips of 2-inch wide insulation tape to the edges and seams of the foam insulation as shown in Figure 803 to hold it to the duct.
- (d) Make sure the insulation tape overlaps all the edges and seams of the foam insulation by a minimum of 1-inch.

S 428-300

- (4) Do the procedure above to rework the ducts insulated with the polyimide foam insulation.

S 428-285

- (5) Re-install the duct.

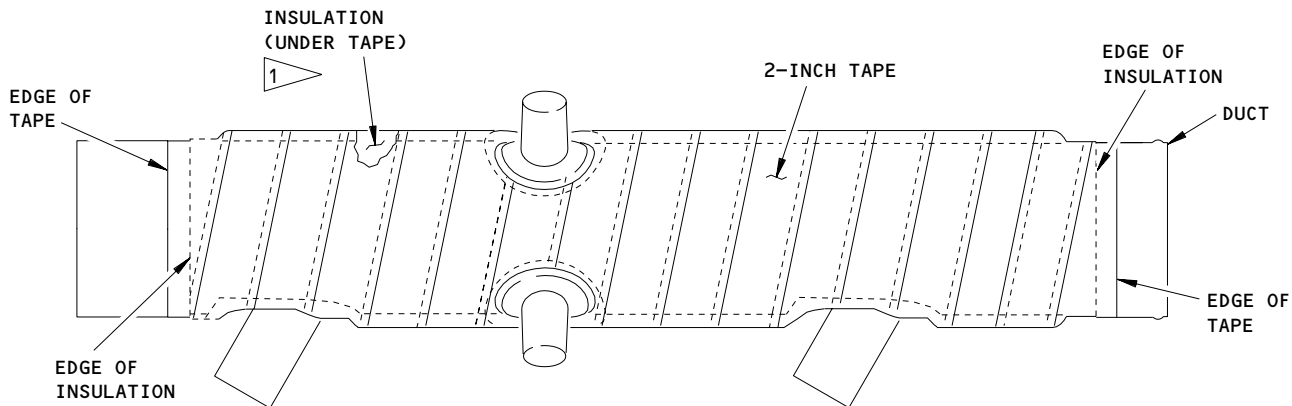
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FIBERGLASS INSULATED DUCT
(EXAMPLE)

1 COVER ALL EXPOSED INSULATION WITH CARGO LINER JOINT SEALER TAPE.
CUT TAPE AS REQUIRED TO FIT AROUND AIR OUTLETS.

Fiberglass Insulated Duct Repair
Figure 805

EFFECTIVITY
DUCTS INSULATED WITH FIBERGLASS
INSULATION AND FLAME-RESISTANT COVERING

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TASK 21-23-07-308-233

11. Fiberglass Insulated Duct Repair (Fig. 805)

A. General

- (1) This procedure has instructions to repair those air conditioning ducts insulated with Fiberglass insulation (BMS 8-48) and a flame-resistant covering (BMS 8-142) which have been overwrapped with cargo liner joint sealing tape (BMS 5-146).
- (2) This procedure has these repair instructions:
 - (a) Replacement of loose or old tape (Repair Method 1)
 - (b) Repair of cuts or tears in the flame-resistant covering and Fiberglass insulation (Repair Method 2)
 - (c) Replacement of the Fiberglass insulation (Repair Method 3)

B. Consumable Materials

- (1) Solvent
 - (a) B01011 Solvent - Series 91, commercially available (AMM 20-30-91/201)
- (2) Tape - Cargo Liner Joint Sealing
 - (a) G02361 Tape - Cargo Liner (BMS 5-146, Type 1, Class 1, Grade A)
- (3) Wiping cloth, lint free - commercially available

C. Access

- (1) Location Zones
200 Upper Half of Fuselage

D. Tape Replacement (Repair Method 1)

S 028-286

- (1) Remove the duct if needed for better access.

S 028-287

- (2) Remove all loose or old cargo liner joint sealing tape from the insulation/covering.

S 168-288

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- (3) Use the solvent and a wiping cloth to clean the surface of the insulation/covering where new tape will be installed.

S 428-289

- (4) Install new cargo liner joint sealing tape (BMS 5-146) to completely cover all of the insulation/covering as shown in Figure 804.
 - (a) Use a continuous strip of tape to wrap around the insulation/covering and the duct.

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- (b) Make sure the new tape overlaps the edges of the adjacent tape by a minimum of 1/8-inch.
- (c) Make sure the new tape overlaps onto the ends of the duct by a minimum of 1-inch.

S 428-291

- (5) Re-install the duct (if removed).

E. Cuts or Tears in Fiberglass Insulation/Covering (Repair Method 2)

S 028-290

- (1) Remove the duct if needed for better access.

S 168-292

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- (2) Use the solvent and a wiping cloth to clean the surface of the insulation/covering around the damaged area.

S 428-293

- (3) Apply a minimum 2-inch wide patch of cargo liner joint sealing tape (BMS 5-146) to completely cover the damaged area on the insulation/covering.
 - (a) Make sure to apply a large enough patch to assure full coverage of the damaged area with a minimum 2-inch overlap.

S 428-294

- (4) Re-install the duct (if removed).

F. Fiberglass Insulation Replacement (Repair Method 3)

S 028-295

- (1) Remove the fiberglass insulation from the duct.

S 428-296

- (2) Do the instructions in AMM TASK 21-23-01-308-270 to install new foam insulation (Repair Method 3) around the duct.

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GASPER AIR SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The gasper air system provides conditioned air to a gasper outlet at each passenger and attendant's seat. The gasper ducting connects to the passenger and flight compartment conditioned air supply. A gasper fan within the system provides added velocity to the cooling air.
- B. The gasper air system includes distribution ducting located overhead in the passenger cabin. The ducting routes the cooling air supply to each passenger service unit (PSU) and attendant's seat where individually controlled gasper air outlets are located. A gasper fan, located in the mid cabin area, boosts the airflow to provide proper amounts of air to each station.
- C. The pilots' overhead panel P5 contains a GASPER FAN switch/light to control the fan. An OFF lamp on the GASPER switch/light provides indication of a fan failure. The system also includes a fan current sensor and a printed circuit card which contains the logic circuitry for fan operation.
- D. ON SAS 150-166;
restrictors are installed in the outlet ducts near the gasper fan.

2. Component Details

A. Gasper Fan

- (1) ON 767-200 AIRPLANES;
the gasper fan is located on the right side, above the passenger cabin ceiling, just forward of the wing leading edge.
- (2) ON 767-300 AIRPLANES;
the gasper fan is located on the left side, above the passenger cabin ceiling, just forward of the wing leading edge.
- (3) The centrifugal fan consists of an electric motor, a scroll, and three thermal switches. The fan motor requires 115/200 VAC, 3-phase, 400-Hz power. The thermal switches provide fan overheat protection by restricting fan operation to below 275°F ±8°F (135°C ±5°C). The switches will reset when the fan temperature decreases to 245°F ±8°F (118°C ±5°C). The fan weighs about 22 pounds and output capacity is 670 cfm. The 1.5 hp motor turns at 5700 rpm.

B. Gasper Air Outlet Valve

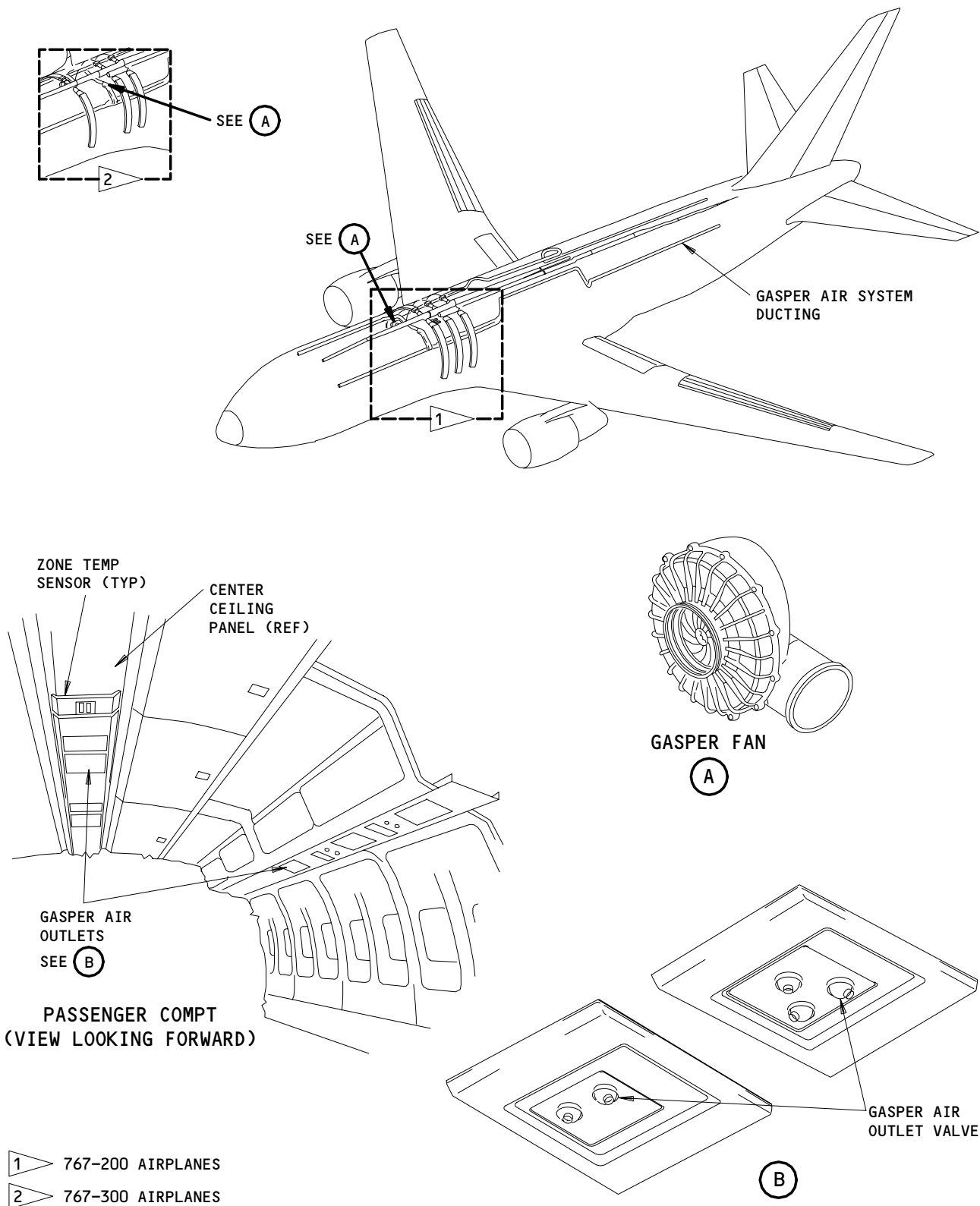
- (1) The gasper air outlet valves mount to each PSU. For the center three rows of seating, a three outlet valve cluster is used (one for each seat). For the outboard seating, a two outlet valve cluster is used (one for each seat). The outlet valves may be adjusted manually to provide proper volume and airflow direction. Each outlet valve consists of a drilled ball within a socket and an adjustable valve to control airflow volume.

C. C ECS Control Card

- (1) The C ECS control card, in the E/E equipment bay P50 box/card file, contains the control logic circuit to operate the gasper fan. The control card is a printed circuit card.

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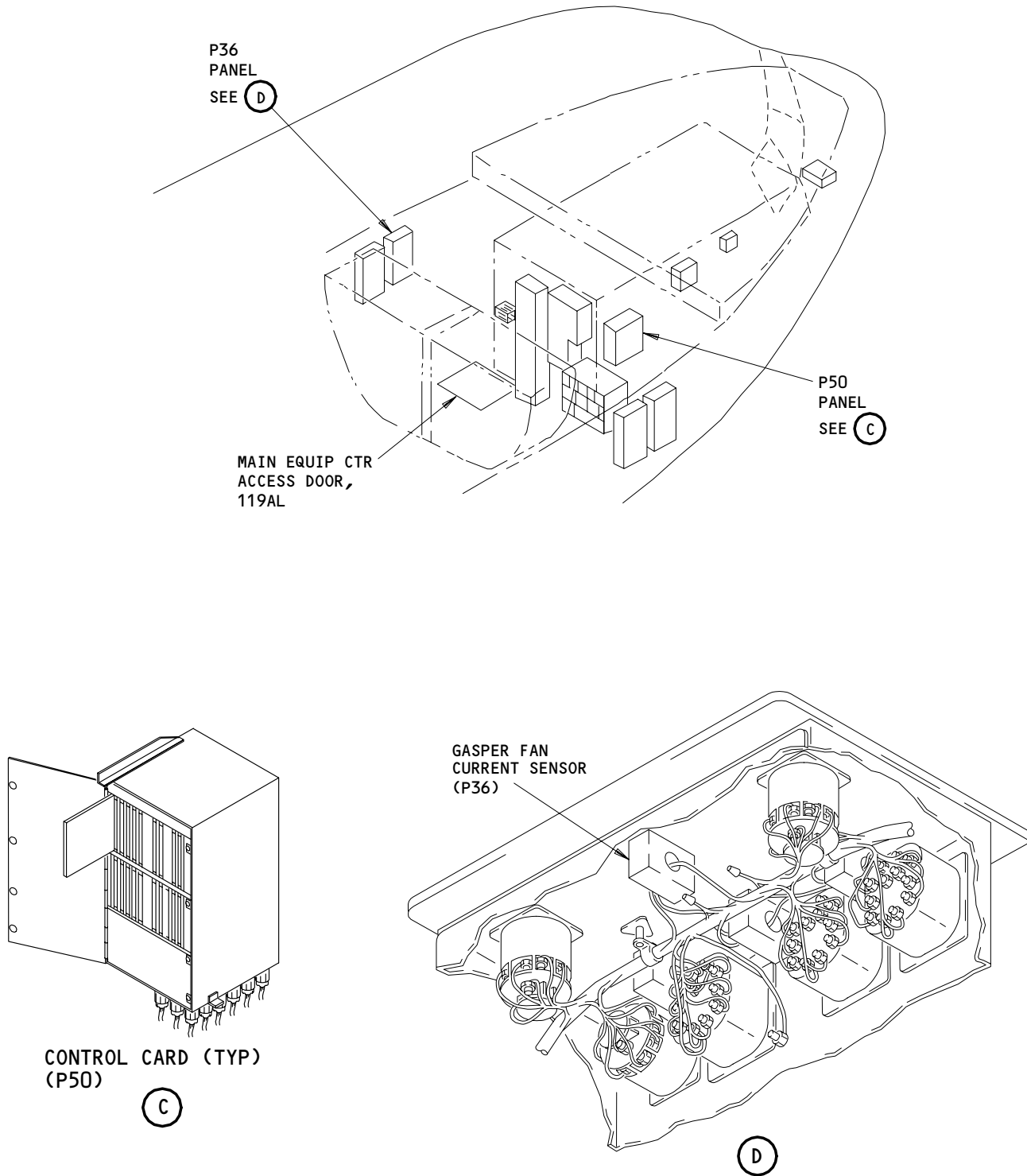


- 1 767-200 AIRPLANES
- 2 767-300 AIRPLANES

Gasper Air System Components
Figure 1 (Sheet 1)

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Gasper Air System Components
Figure 1 (Sheet 2)

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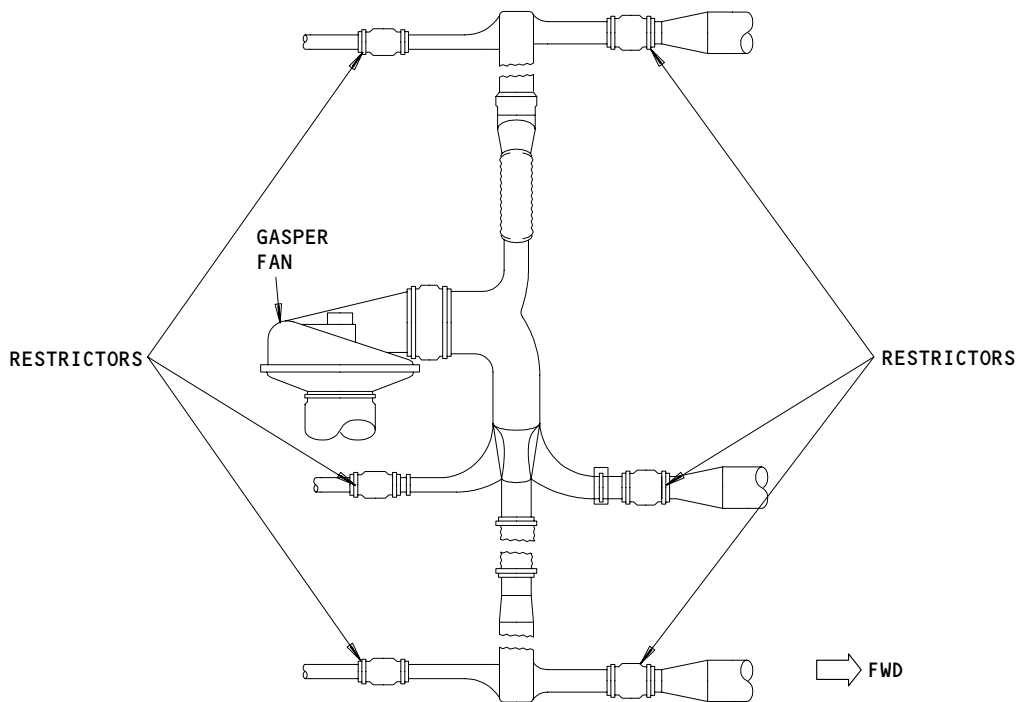
D. Fan Current Sensor

- (1) The fan current sensor mounted on the left miscellaneous electrical equipment P36 panel, monitors current flow of a single phase from the power source to the gasper fan. An integral transformer senses the current in the wires passing through the current sensor.

3. Operation (Fig. 2)

A. Functional Description

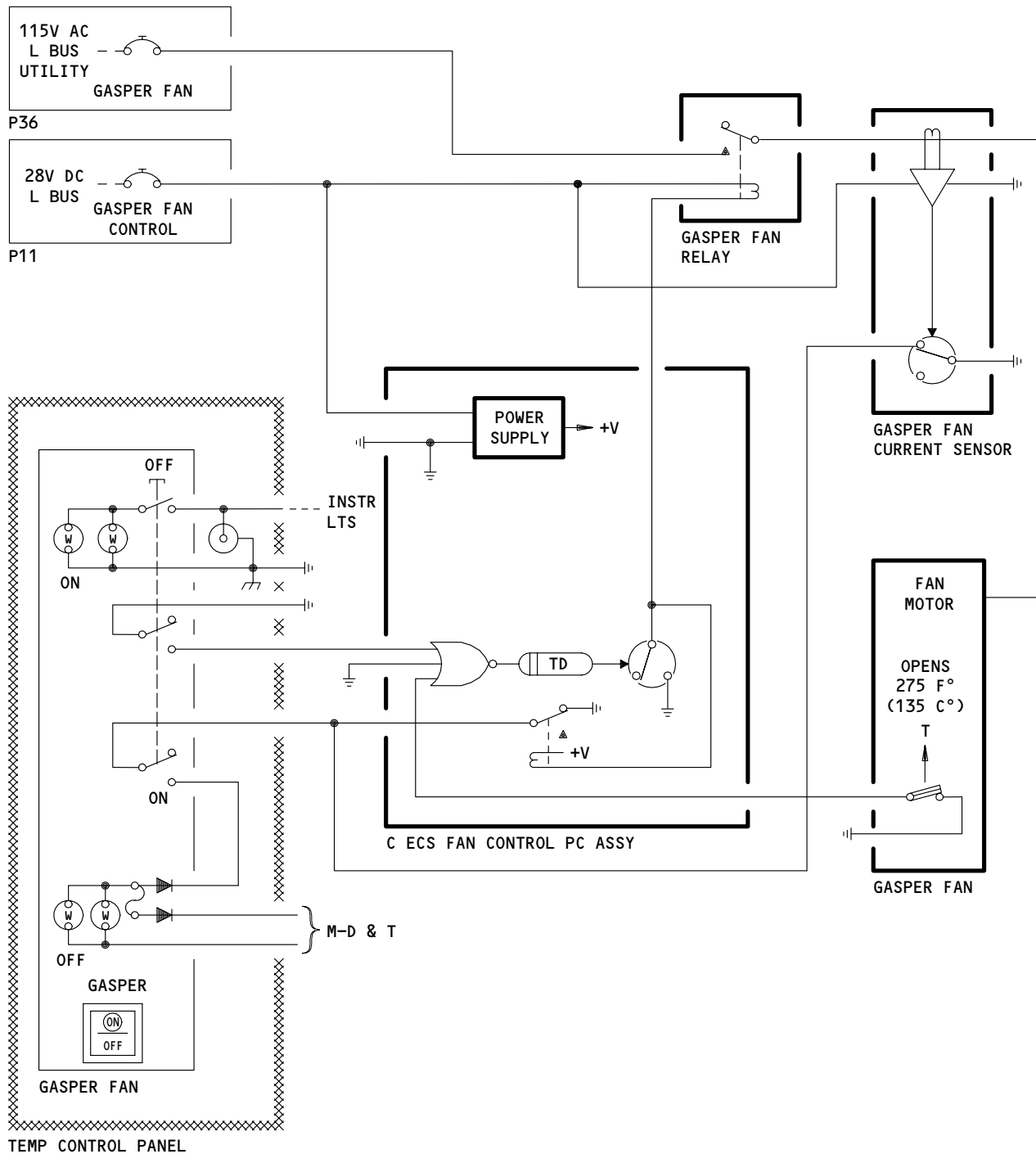
- (1) Selecting the GASPER FAN switch/light on the P5 panel to ON starts the gasper air fan. The fan draws air from the main overhead conditioned air outlet. At each outlet the airflow volume and direction can be adjusted. Selecting the GASPER FAN switch/light off or a gasper fan failure causes system shutdown. A white fan OFF lamp on the P5 panel provides indication of fan failure. A gasper fan relay, a current sensor, and a control card provide fan control based on switch position.
- (2) The C ECS fan control card contains the control logic to operate the gasper fan. The fan circuit controls a power relay, providing 115-VAC, 3-phase power to the fan.



Gasper Air System Components
Figure 1A

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Gasper Air Distribution System Operation
Figure 2

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(3) Basic Fan Circuit

- (a) 1.25 second after selecting the GASPER FAN switch/light to ON, the FAN ON COMMAND portion of the circuit energizes, unless the FAN FAIL portion of the circuit inhibits the command. The FAN FAIL portion energizes 2.0 second after detecting a fan motor overheat condition . The FAN FAIL circuit latches ON and resets only when the fan motor overheat condition clears and upon selecting the GASPER FAN switchlight off.
- (b) The circuit also contains an OFF output. The OFF output is grounded when the GASPER FAN switchlight is ON and when the fan current sensor does not sense current flow.

B. Control

- (1) Provide electrical power (Ref 24-22-00).
- (2) Check that GASPER FAN CONTROL circuit breaker on overhead circuit breaker panel P11 is closed.
- (3) Check that GASPER FAN circuit breaker on left miscellaneous electrical equipment panel P36 is closed.
- (4) Press GASPER FAN switchlight, on P5 panel, to ON. Check that white ON lamp comes on.

GASPER AIR SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure has instructions to do a system test of the gasper air system.

TASK 21-24-00-705-001

2. System Test – Gasper Air System

A. References

- (1) 24-22-00/201, Electric Power – Control

B. Access

(1) Location Zones

ON 767-200 AIRPLANES

234 Area above passenger cabin ceiling – section 43 (Right)

ON 767-300 AIRPLANES

233 Area above passenger cabin ceiling – section 43 (Left)

C. Prepare for the Test

S 865-002

- (1) Supply electrical power (Ref 24-22-00).

S 865-003

- (2) Make sure this circuit breaker, on the overhead circuit breaker panel, P11, is closed:

(a) 11R17, GASPER FAN CONT

S 865-004

- (3) Make sure this circuit breaker, on the miscellaneous equipment panel, P36, is closed:

(a) 36E2, GASPER FAN

S 015-005

- (4) Get access to the gasper fan.

(a) ON 767-200 AIRPLANES;

remove the sculptured ceiling panel (Ref 25-22-03) that is above the right side aisle, approximately two seats forward of the wing leading edge.

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- (b) ON 767-300 AIRPLANES;
remove the sculptured ceiling panel (Ref 25-22-03) that is above the left side aisle, immediately forward of the wing leading edge.

D. Do the Gasper Air System Test

S 735-006

- (1) Do the test procedure.

CAUTION: IF THE FAN IS ON, BUT NO AIRFLOW IS FELT AT A FULLY OPEN GASPER OUTLET, IMMEDIATELY PUSH THE GASPER FAN SWITCH-LIGHT TO THE OFF POSITION. FAILURE TO PUSH THE SWITCH-LIGHT CAN CAUSE DAMAGE TO THE FAN.

- (a) Push the GASPER switch-light, on the pilot's overhead panel, P5, to the on position.
 - 1) Make sure the GASPER OFF light does not come on.
- (b) Listen for the fan to come on.
- (c) Feel for the airflow at one of the open gasper outlets.
- (d) ON 767-200 AIRPLANES;
disconnect the fan ground wire from the ground GD3802-DC.
- (e) ON 767-300 AIRPLANES;
disconnect the fan ground wire from the ground GD4992-DC.
- (f) Listen for the fan to stop.
- (g) Make sure the GASPER OFF light comes on.
- (h) ON 767-200 AIRPLANES;
connect the fan ground wire to the ground GD3802-DC
- (i) ON 767-300 AIRPLANES;
connect the fan ground wire to the ground GD4992-DC.
- (j) Listen for the fan to stay off.
- (k) Make sure the GASPER OFF light stays on.
- (l) Push the GASPER switch-light, on the P5 panel, to the off and then to the on position.
- (m) Listen for the fan to come on.
- (n) Make sure the GASPER OFF light goes off.
- (o) Open this circuit breaker, on the P36 panel:
 - 1) 36E2, GASPER FAN
- (p) Listen for the fan to stop.
- (q) Make sure the GASPER OFF light comes on.
- (r) Close this circuit breaker, on the P36 panel:
 - 1) 36E2, GASPER FAN
- (s) Listen for the fan to come on.
- (t) Make sure the GASPER OFF light goes off.
- (u) Do the steps that follow to all the gasper outlets.
 - 1) Turn the gasper outlet until it is fully open.
 - 2) Feel for the airflow at the gasper outlet.

E. Put the airplane back to its usual condition

S 865-007

- (1) Push the GASPER switch-light, on the P5 panel, to the off position.

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- S 415-008
- (2) Install the sculptured ceiling panel (Ref 25-22-03).
- S 865-009
- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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21-24-00

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GASPER FAN - REMOVAL/INSTALLATION

1. General

- A. The gasper fan is installed above the passenger compartment ceiling, and forward of the wing leading edge. This procedure has instructions to remove and install the gasper fan.

TASK 21-24-01-004-001

2. Remove the Gasper Fan (Fig. 401)

A. Access

(1) Location Zones

- 233 Area Above Passenger Cabin Ceiling - Section 43 (Left)
234 Area Above Passenger Cabin Ceiling - Section 43 (Right)

B. Prepare for the Removal

S 864-002

- (1) Open this circuit breaker on the overhead circuit breaker panel P11, and attach a DO-NOT-CLOSE tag:
(a) 11R17, GASPER FAN CONT

S 864-003

- (2) Open this circuit breaker on the left miscellaneous relay panel P36, and attach a DO-NOT-CLOSE tag:
(a) 36E2, GASPER FAN

S 014-006

- (3) 767-200 AIRPLANES;
Remove the right side ceiling panel, approximately two seats forward of the wing leading edge.

S 014-007

- (4) 767-300 AIRPLANES;
Remove the left side ceiling panel, immediately forward of the wing leading edge.

C. Remove the Gasper fan

S 034-008

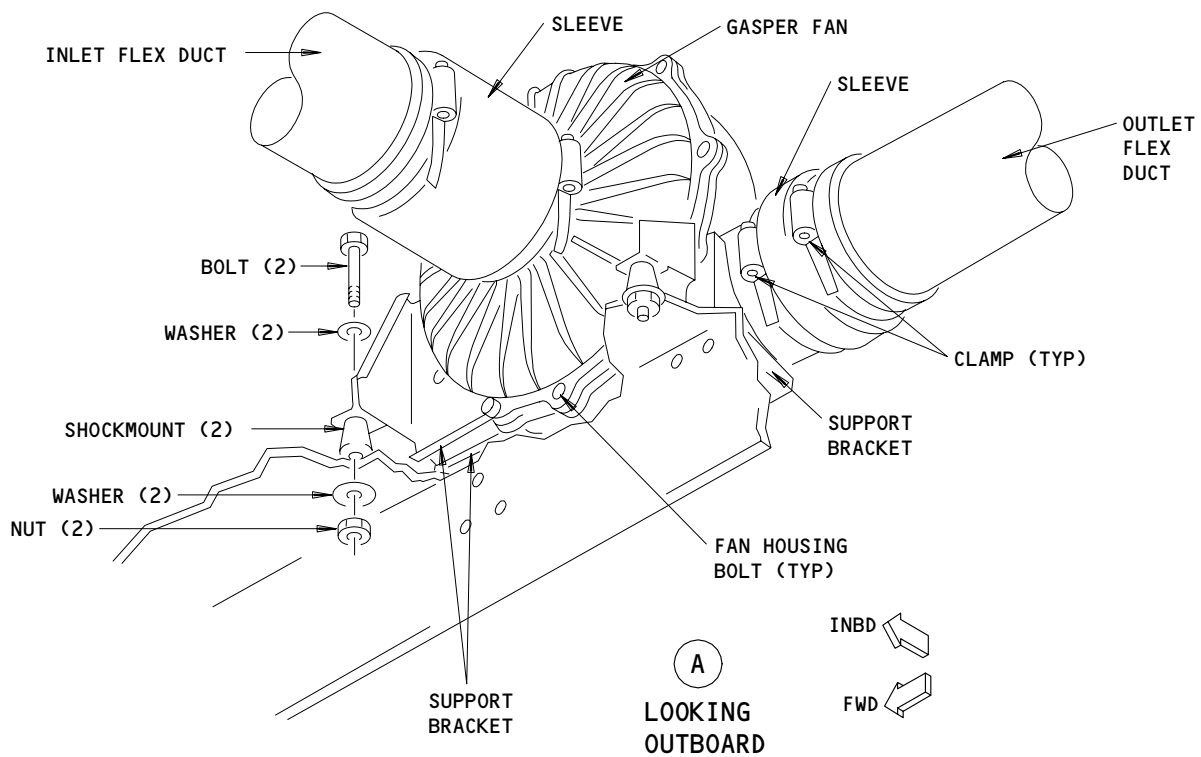
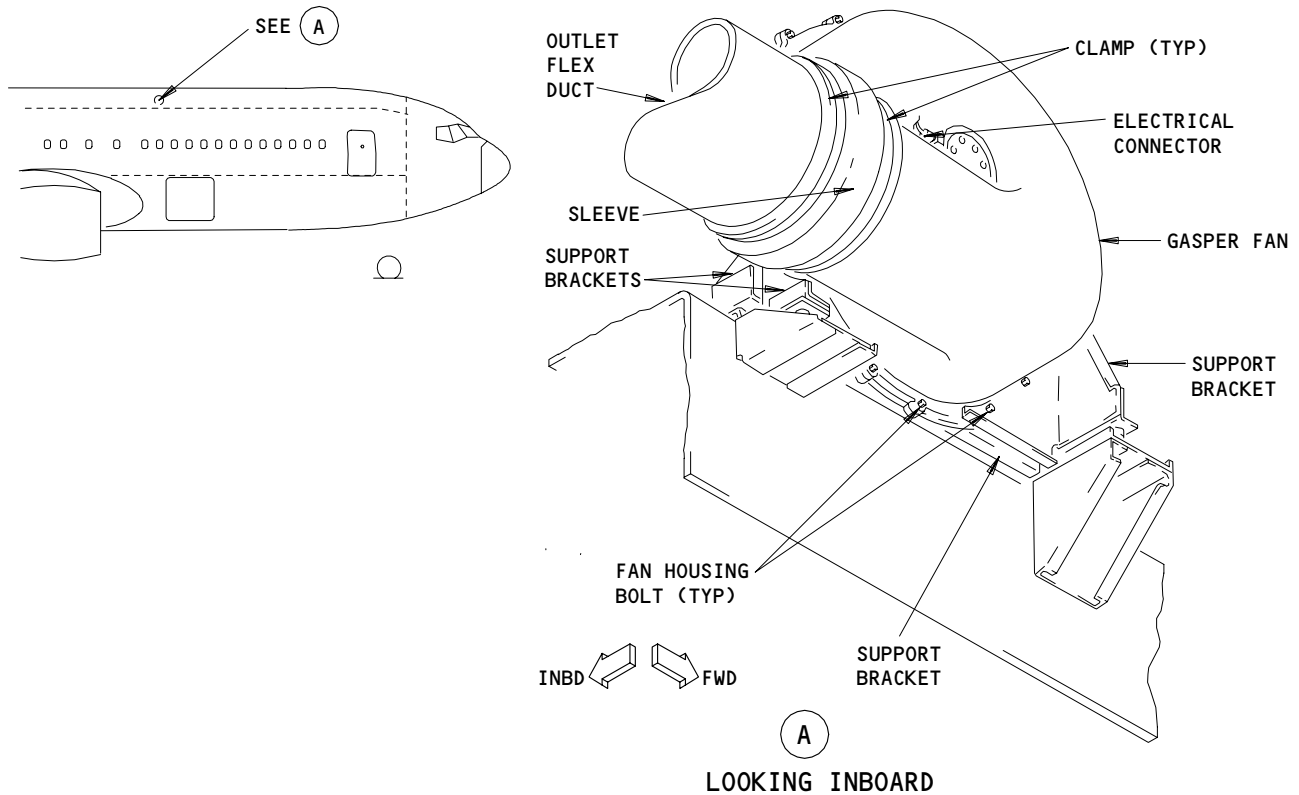
- (1) Remove the electrical connector from the fan.

EFFECTIVITY
ALL SAS AIRPLANES

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Gasper Fan Installation
Figure 401

EFFECTIVITY
ALL SAS AIRPLANES

21-24-01

S 034-009

- (2) Remove the clamp that is on the inlet flex duct.
 - (a) Move the flex duct away from the fan.

S 034-010

- (3) Remove the clamp that is on the outlet flex duct.
 - (a) Move the flex duct away from the fan.

S 034-011

- (4) Hold the fan and remove the bolts from the shockmounts.

NOTE: The gasper fan weighs approximately 22 pounds.

S 024-012

- (5) Remove the gasper fan and the support brackets as one unit.

S 434-013

- (6) Put a cover on the duct openings.

S 034-014

- (7) Remove the fan housing bolts from the support brackets.

S 034-015

- (8) Remove the support brackets from the fan.

TASK 21-24-01-404-016

3. Install the Gasper Fan (Fig. 401)

A. References

- (1) 24-22-00/201, Electric Power Control

B. Access

(1) Location Zones

- | | |
|-----|---|
| 233 | Area Above Passenger Cabin Ceiling - Section 43 (Left) |
| 234 | Area Above Passenger Cabin Ceiling - Section 43 (Right) |

C. Install the Gasper Fan

S 434-017

- (1) Align the holes in the support brackets with the holes in the gasper fan housing.

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- S 434-018
- (2) Install the bolts, washers, and nuts to attach the support brackets to the fan housing.
- S 034-019
- (3) Remove the duct covers from the duct openings.
- S 424-020
- (4) Put the gasper fan and support brackets into position on the shockmounts.
- S 434-021
- (5) Install the bolts, washers, nuts to attach the fan to the shockmounts.
- S 434-022
- (6) Move the inlet flex duct onto the gasper fan inlet.
- S 434-023
- (7) Install the clamp on the inlet flex duct.
- S 434-024
- (8) Move the outlet flex duct onto the gasper fan outlet.
- S 434-025
- (9) Install the clamp on the outlet flex duct.
- S 434-026
- (10) Attach the electrical connector to the gasper fan.
- D. Do the gasper fan installation test
- S 864-027
- (1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
- (a) 11R17, GASPER FAN CONT
- S 864-028
- (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
- (a) 36E2, GASPER FAN

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- S 864-029
- (3) Supply electrical power (Ref 24-22-00).
- S 864-030
- (4) Push the GASPER switch-light, on pilot's overhead panel P5, to the on position.
- (a) Make sure the ON light comes on and the OFF light goes off.
- S 214-031
- (5) Listen for the fan to come on.
- S 214-032
- (6) Feel for airflow at a full open gasper air outlet, above one of the passenger seats.
- S 214-033
- (7) Feel for airflow around the fan duct connections.
- (a) A small leak is permitted.
- (b) You must repair a large leak.
- E. Put the airplane back to its usual condition.
- S 864-034
- (1) Push the GASPER switch-light, on the P5 panel, to the off position.
- S 864-035
- (2) Remove the electrical power, if it is not necessary (Ref 24-22-00).
- S 414-036
- (3) Install the ceiling panel that was removed.

EFFECTIVITY
ALL SAS AIRPLANES

21-24-01

GASPER AIR CONDITIONING DUCT INSULATION – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the insulation blankets for the gasper air conditioning ducts. The blankets insulate the gasper air conditioning duct sections in the main passenger cabin ceiling.

TASK 21-24-03-004-001

2. Remove the Gasper Air Conditioning Duct Insulation (Fig. 401)

A. References

- (1) 25-21-01/401, Sidewall Lining
- (2) 25-23-01/401, Passenger Service Units

B. Access

- (1) Location Zones
 - 223/224 Area Above Passenger Cabin Ceiling – Section 41
 - 233/234 Area Above Passenger Cabin Ceiling – Section 43
 - 243/244 Area Above Passenger Cabin Ceiling – Section 45
 - 253/254 Area Above Passenger Cabin Ceiling – Section 46

C. Prepare for the Removal

S 014-002

- (1) Remove the applicable sidewall panels (Ref 25-21-01).

S 014-003

- (2) Remove the applicable passenger service units (Ref 25-23-01).

S 014-004

- (3) If necessary, remove the ceiling panels near the overwing exit doors.

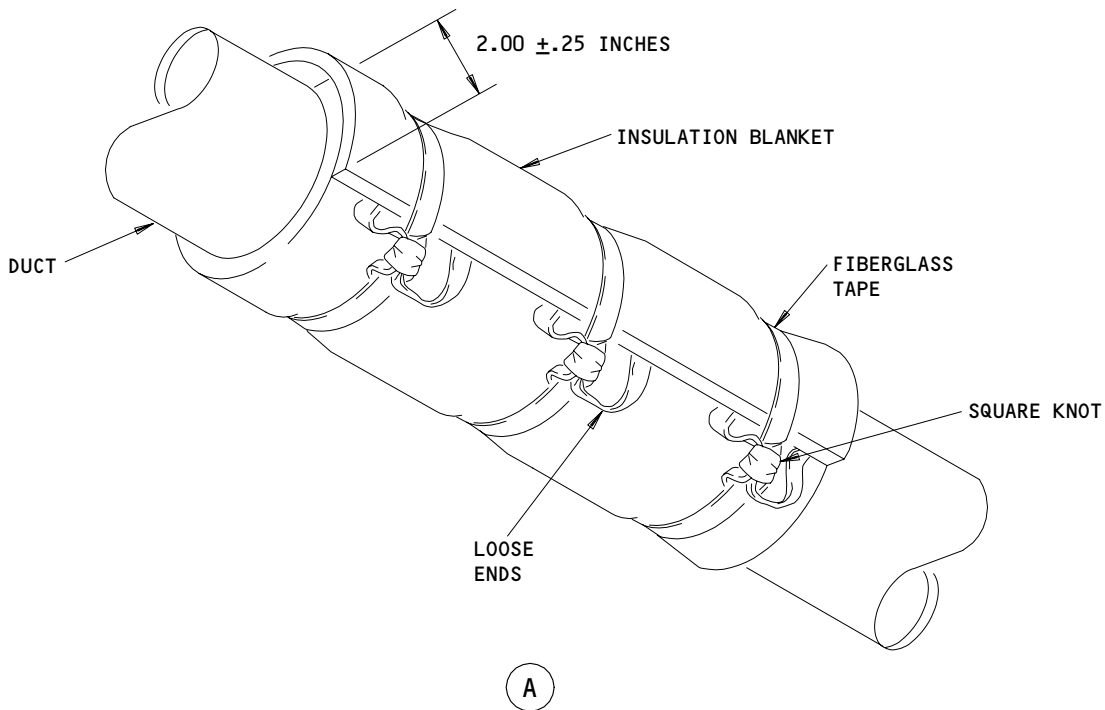
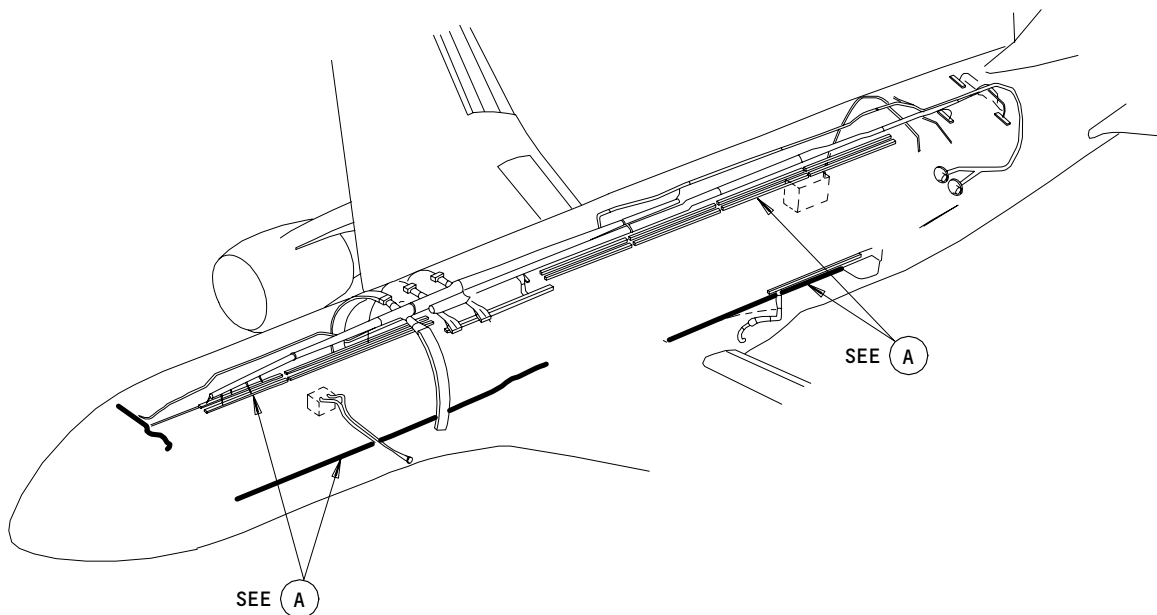
D. Remove the Duct Insulation

S 034-005

- (1) Remove the tape from around the insulation.
 - (a) Turn the duct insulation so you can get to the square knots in the tape.
 - (b) Untie the square knots.

EFFECTIVITY
FOR SAS AIRPLANES
WITH DUCT INSULATION

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Gasper Air Conditioning Duct Insulation Installation
Figure 401

EFFECTIVITY
FOR SAS AIRPLANES
WITH DUCT INSULATION

21-24-03

- (c) If the square knots cannot be untied, use a knife to cut the tape.

S 024-006

- (2) Remove the insulation blanket from the duct.

TASK 21-24-03-404-007

3. Install the Gasper Air Conditioning Duct Insulation (Fig. 401)

A. Consumable Materials

- (1) G00431 - Fiberglass Tape, Owens Corning - ECC-A

B. References

- (1) 25-21-01/401, Sidewall Lining
- (2) 25-23-01/401, Passenger Service Units

C. Access

(1) Location Zones

223/224	Area Above Passenger Cabin Ceiling - Section 41
233/234	Area Above Passenger Cabin Ceiling - Section 43
243/244	Area Above Passenger Cabin Ceiling - Section 45
253/254	Area Above Passenger Cabin Ceiling - Section 46

D. Install the insulation.

S 424-008

- (1) Put the insulation blanket around the duct. Make sure the insulation blanket has a 2.0 ±0.25 inch (50 ±10 mm) overlap along its length.

S 434-009

- (2) Put the tape around the insulation where it is necessary.
 - (a) Tie the tape together with a square knot.
 - (b) Put the loose ends of the tape under the insulation blanket overlap.

E. Put the airplane back to its usual condition.

S 414-010

- (1) Install the applicable sidewall panels (Ref 25-21-01).

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WITH DUCT INSULATION

21-24-03

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- S 414-011
- (2) Install the applicable passenger service units (Ref 25-23-01).
- S 414-012
- (3) Install the applicable ceiling panels.

EFFECTIVITY
FOR SAS AIRPLANES
WITH DUCT INSULATION

21-24-03

02

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GASPER FAN CURRENT SENSOR – REMOVAL/INSTALLATION

1. General

- A. The gasper fan current sensor is installed in the left miscellaneous electrical equipment panel, P36. This procedure has instructions to remove and install the current sensor for the gasper fan.

TASK 21-24-04-004-001

2. Remove the Gasper Fan Current Sensor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 20-41-01/201, Electrostatic Discharge Sensitive Devices
- (3) 24-22-00/201, Electric Power – Control
- (4) 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zone
119 Main Equipment Center (Left)

- (2) Access Panel
119AL Main Equipment Center

C. Prepare for the Removal

S 864-002

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.

S 864-025

- (2) Remove the electrical power (Ref 24-22-00).

S 014-003

- (3) Open the access door to the main equipment center, 119AL (Ref 06-41-00).

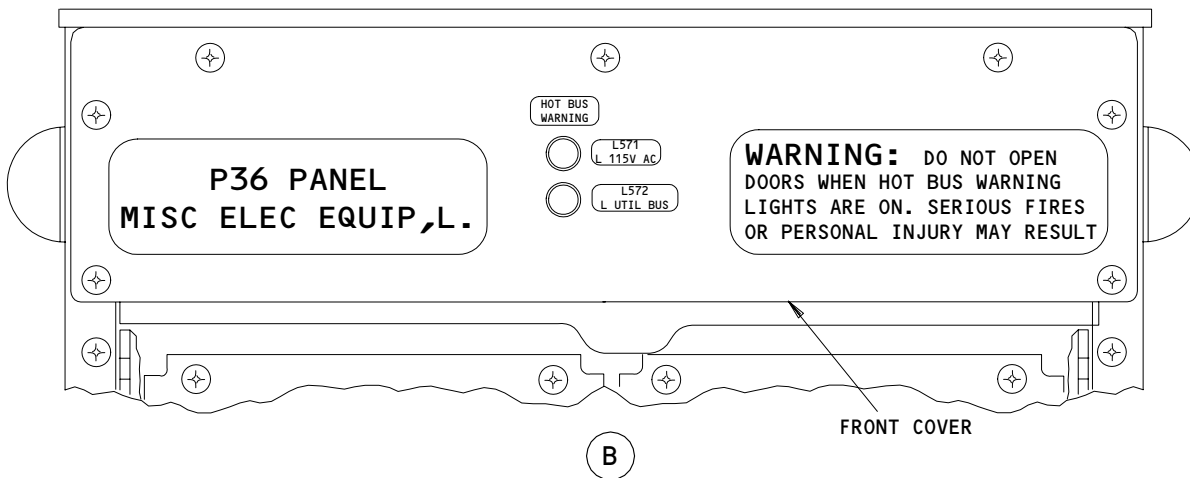
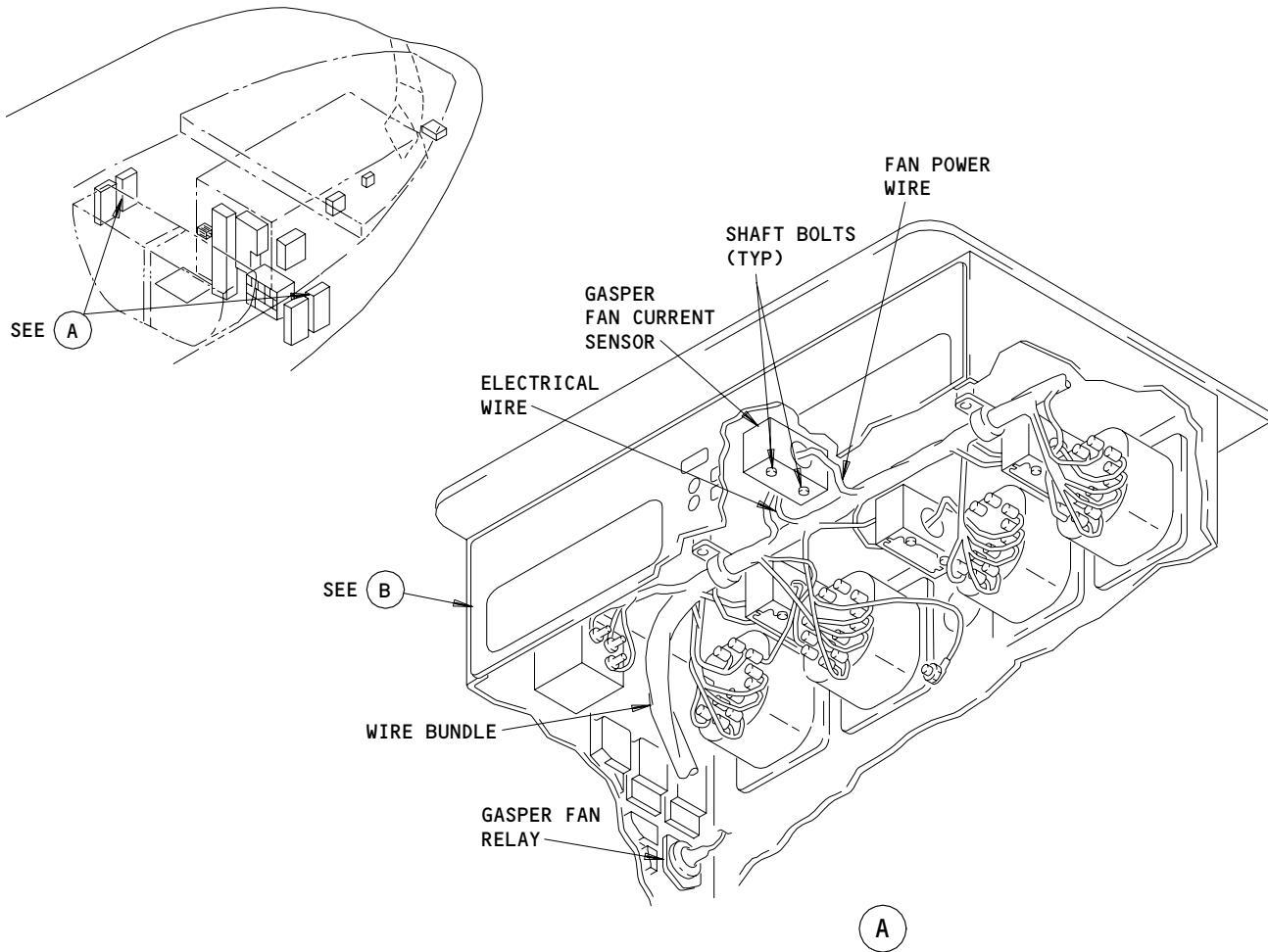
S 014-004

- (4) Remove the front cover of the P36 panel, to find the gasper fan current sensor.

D. Remove the current sensor.

EFFECTIVITY
ALL SAS AIRPLANES

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Gasper Fan Current Sensor Installation
Figure 401

EFFECTIVITY
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S 034-005

CAUTION: THE CURRENT SENSOR IS A STATIC SENSITIVE PART. DO NOT DO THE SUBSEQUENT STEP UNTIL YOU HAVE READ THE REFERENCED PROCEDURE. A STATIC DISCHARGE COULD CAUSE DAMAGE TO THE CURRENT SENSOR.

- (1) Cut the current sensor wire at the splice area (Ref 20-41-01).

S 434-006

- (2) Put a tag on the wires to show their installation.

S 034-007

- (3) Disconnect the fan wire from the terminal A2 of the gasper fan relay.

S 034-024

- (4) Unwrap the wire bundle to loosen the fan wire.

S 034-008

- (5) Pull the fan wire through the current sensor.

S 034-009

- (6) Remove the bolts from the current sensor.

S 024-010

- (7) Remove the current sensor.

TASK 21-24-04-404-011

3. Install the Gasper Fan Current Sensor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 20-41-01/201, Electrostatic Discharge Sensitive Devices
- (3) 24-22-00/201, Electric Power - Control
- (4) 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zone
119 Main Equipment Center (Left)
- (2) Access Panel
119AL Main Equipment Center

C. Install the current sensor.

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S 424-012

CAUTION: THE CURRENT SENSOR IS A STATIC SENSITIVE PART. DO NOT DO THE SUBSEQUENT STEP UNTIL YOU HAVE READ THE REFERENCED PROCEDURE. A STATIC DISCHARGE COULD CAUSE DAMAGE TO THE CURRENT SENSOR.

- (1) Put the current sensor into position in the P36 panel (Ref 20-41-01).

S 434-013

- (2) Install the bolts to hold the current sensor to the P36 panel.

S 434-014

- (3) Put the fan wire through the current sensor.

S 434-015

- (4) Connect the fan wire to the terminal A2 of the gasper fan relay.

S 434-016

- (5) Wrap the wire bundle.

S 434-017

- (6) Connect the current sensor wire to the splice area.
 - (a) Make sure the wires have the same number.
 - (b) Remove the installation tag from the wire.

S 414-018

- (7) Install the front cover of the P36 panel.
- D. Do the installation test for the gasper fan current sensor.

S 864-019

- (1) Supply electrical power (Ref 24-22-00).

S 864-020

- (2) Push the GASPER switch-light, on the pilot's overhead panel P5, to the on position.
 - (a) Make sure the ON light comes on and the OFF light goes off.
- E. Put the airplane back to its usual condition.

S 864-021

- (1) Push the GASPER switch-light, on the P5 panel, to the off position.

S 864-022

- (2) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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- S 414-023
- (3) Close the access door to the main equipment center, 119AL
(Ref 06-41-00).

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ALL SAS AIRPLANES

21-24-04

02

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RECIRCULATION SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. To improve cabin ventilation and supplement airflow, cabin air recirculates back into the passenger cabin. The recirculation air mixes with conditioned air from the cooling packs (Ref 21-51-00) in the mix manifold (Ref 21-21-00). This results in a 50% mixture of fresh conditioned air to recirculation air. The use of recirculation air improves airflow without placing an undue load on the air supply system (Ref 36-10-00) or the cooling packs.
- B. The recirculation system consists of separate left and right units. Each unit contains a filter assembly, ducting, recirculation check valve, and recirculation fan. The units mount on either side of the mix manifold at the rear of the forward cargo compartment.
- C. Air flows from the passenger cabin into the forward cargo compartment through air return grills at the passenger compartment sidewall floorline. The recirculation fans draw the air through the filter assembly and check valve, and discharge it into the mix manifold. The check valves prevent reverse airflow from the mix manifold back into the cargo compartment. EICAS provides indication for fan malfunction (Ref 31-41-00).
 - (1) The recirculation system components lie behind the removable curtain in the aft end of the forward cargo compartment.

2. Component Details

A. Passenger Cabin Recirculation Air Fan

- (1) The recirculation air fan is a single stage, vane-axial fan. The fan requires 115/200 VAC, 3-phase, 400 Hz power to drive its squirrel cage, 4-pole induction motor. The motor, designed for continuous operation, turns at 11,600 rpm. A thermal switch in the winding of each phase of the motor provides overheat protection. An 11-bladed impeller shares a common shaft with the motor. In addition to its main air drawing function, the impeller provides motor cooling. Deswirl vanes attached to the fan case, downstream of the impeller, aid in motor cooling and channel the airflow into the mix manifold. The fan weighs about 14 pounds.

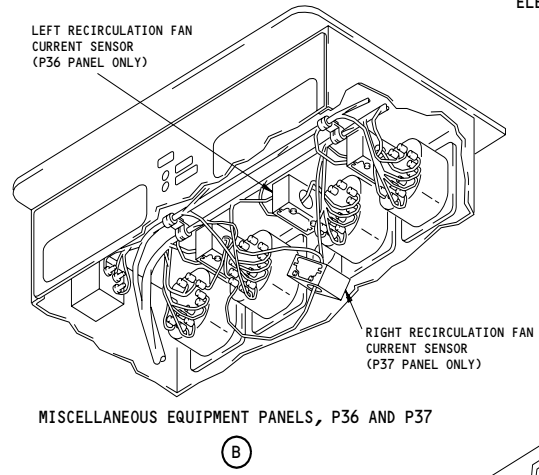
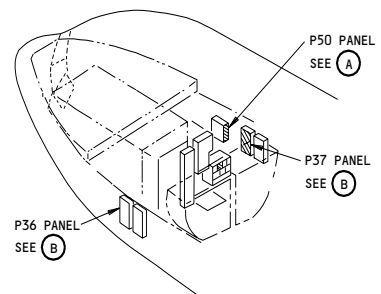
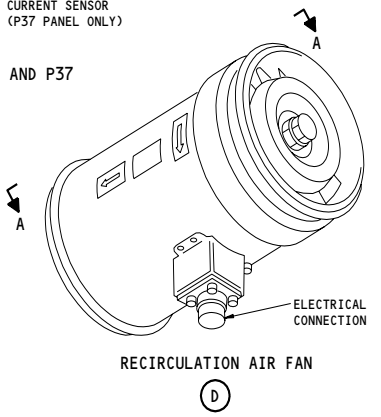
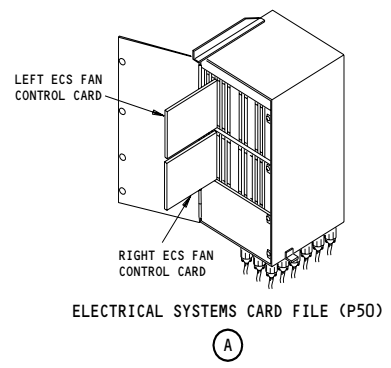
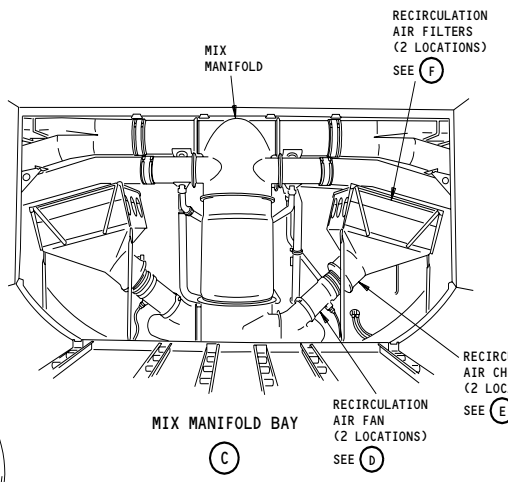
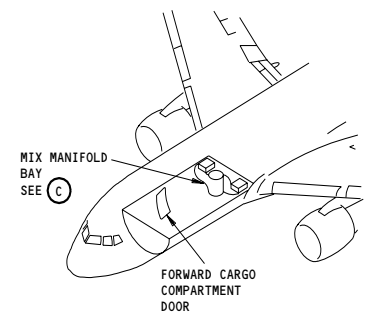
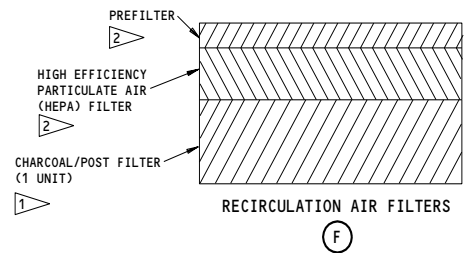
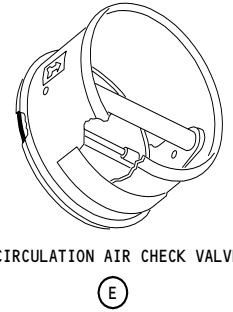
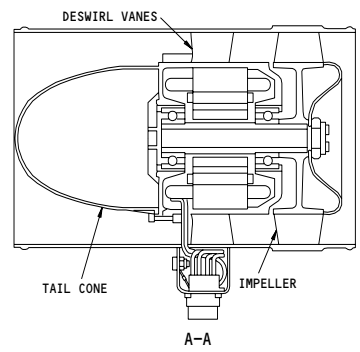
EFFECTIVITY

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Recirculation System
Figure 1

1 SAS AIRPLANES ONLY
2 DONALDSON COMPANY FILTERS OPTIONAL TO THE PALL LAND AND MARINE HEPA FILTER WITHOUT A PREFILTER

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B. Recirculation Air Filters

- (1) A set of recirculation filters are stacked in a box upstream of each of the recirculation check valves. The filters remove odors, debris, and contaminant gases from the air in the recirculation system. Each set contains one of each of the following filters:
- (a) AIRPLANES WITH DONALDSON FILTERS;
Prefilter
 - 1) The air first passes through the prefilter. The prefilter is a particulate filter with an 24 x 32 inch aluminum frame around a fiberglass pad. The filter weighs about three pounds. The filter is rated at 1200 cfm airflow and has a minimum arrestance of 60%. The prefilter traps the largest of the contaminant particles.
 - (b) High Efficiency Particulate Air (HEPA) Filter
 - (c) Charcoal/Postfilter Assembly
 - 1) The charcoal filter and the postfilter assemble together to make up one unit. An aluminum frame 24 x 32 inches borders the filters. The postfilter is identical to the prefilter. The charcoal absorber consists of granular charcoal retained within perforated, corrugated steel sheets. Rated at 1200 cfm airflow, the charcoal filter has a minimum arrestance of 90%. The charcoal/postfilter assembly removes odors and gases from the airflow and the postfilter prevents charcoal abraded particles or dust from entering the recirculation fan.

C. Recirculation Air Check Valve

- (1) 767-200 AIRPLANES;
The recirculation air check valve, 7 inches in diameter and located upstream of the fan, prevents airflow from the mix manifold to the cargo compartment. The valve consists of a seat/flapper assembly centered and riveted into a check valve housing. The seat/flapper assembly consists of two semi-circular flappers hinged about a central pin. A stop pin provides a travel limit to prevent over travel of the flappers.
- (2) 767-300 AIRPLANES;
The recirculation air check valve, 9 inches in diameter and located upstream of the fan, prevents airflow from the mix manifold to the cargo compartment. The valve consists of a seat/flapper assembly centered and riveted into a check valve housing. The seat/flapper assembly consists of two semi-circular flappers hinged about a central pin. A stop pin provides a travel limit to prevent over travel of the flappers. A helical torsion spring loads the check valve flappers in the closed direction.
- (3) Airflow in the direction of the flow arrow on the check valve housing opens the valve flappers until they contact the stop pin. Reverse airflow closes the check valve flappers against the seat. This prevents air from passing back through the valve into the cargo compartment.

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D. Recirculation Fan Current Sensors

- (1) Two fan current sensors, one on each of two miscellaneous electrical equipment panels, P36 and P37, check for current flow from the RECIRC FAN switchlight to the recirculation air fans. A transformer senses the current flowing through each sensor.

E. ECS Fan Control Card

- (1) The electrical systems card file P50 in the E/E equipment bay houses two ECS fan control cards (L, R). The L and R control cards are printed circuit cards which contain control logic to operate and control the recirculation air fans.

3. Operation (Fig 2)

A. Functional Description - Passenger Compartment Recirculation System

- (1) Passenger cabin conditioned air passes through return air grilles in the passenger cabin floor, into the forward cargo compartment. The air then enters the recirculation system through the filters in the filter box. The filters clean the air of debris, odors, and contaminant gases before the air passes through the recirculation air check valve. The check valve prevents reverse airflow from the mix manifold back into the forward cargo compartment. The cleaned air then flows through the recirculation air fan and enters the mix manifold.
- (2) Two alternate action switchlights, on the pilot's overhead panel P5, control the recirculation air fans. Relays and control cards provide fan control using 28 vdc input. The fans operate on 115 vac power.
- (3) Two ECS fan control cards contain the control logic circuits to operate the recirculation air fans. Each fan circuit controls a power relay, providing 115 vac, three-phase power to the fan.
- (4) Basic Fan Circuit
 - (a) When the RECIRC FAN switchlight is pushed ON, the FAN ON COMMAND circuit energizes, unless the FAN FAIL circuit is energized. The FAN FAIL circuit will energize after a fan motor overheat condition occurs or the fan current sensor does not sense a current flowing through the RECIRC FAN circuit. The FAN FAIL circuit will de-energize only after the fan motor overheat condition is gone and the RECIRC FAN switchlight is pushed off.
 - (b) In addition to the basic circuit, the fan control circuit has an AUTO OFF input. The AUTO OFF input turns off the FAN ON COMMAND without de-energizing the FAN FAIL circuit. The RECIRC FAN circuit also includes an INOP output. The INOP is grounded whenever the RECIRC FAN ON COMMAND is off or the RECIRC FAN is not powered.

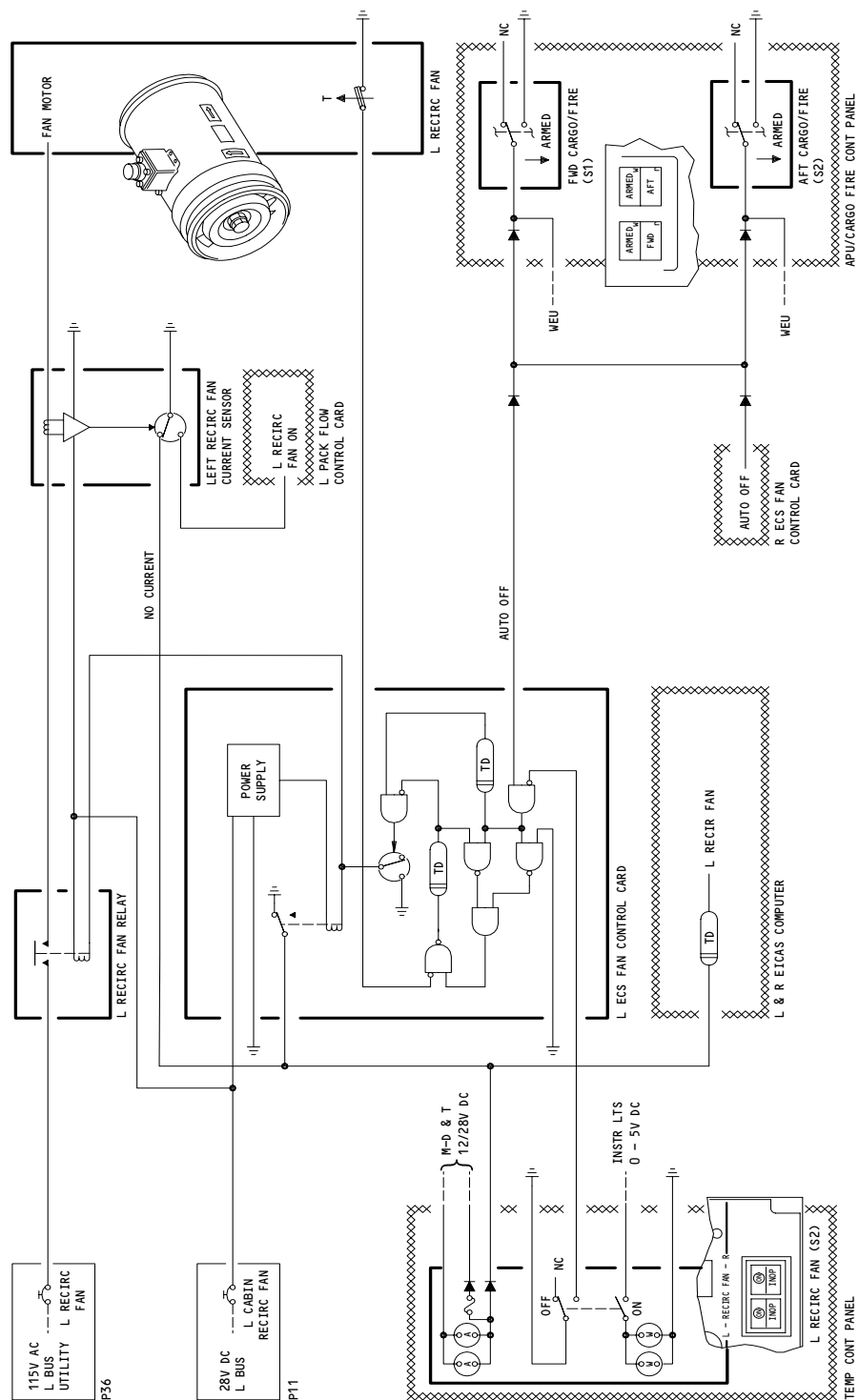
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NOTE: LEFT RECIRCULATION FAN CIRCUIT SHOWN
RIGHT RECIRCULATION FAN CIRCUIT SIMILAR

Recirculation System Operation
Figure 2

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- (c) If one or both recirculation fans fail, the fan control circuit sends a signal to the respective pack temperature controller. This signal allows the packs to go into high flow.
- (5) A thermal switch in the winding of each phase of the fan motor provides overheat protection. Reduced airflow, foreign object damage, two phasing, improper voltage, and bearing overheating causes the thermal switch to open at 300°F (149°C). When open, the switch activates an airplane latching relay in the miscellaneous electrical equipment panel (P36 or P37), removing power from the motor. The INOP light then illuminates. An EICAS advisory message, L RECIR FAN or R RECIR FAN, also provides indication for fan malfunction (Ref 31-41-00).
- B. Control – Passenger Compartment Recirculation System
- (1) Provide electrical power (Ref 24-22-00)
 - (2) Check that L CABIN RECIRC FAN and R CABIN RECIRC FAN circuit breakers on the overhead circuit breaker panel P11 are closed.
 - (3) Check that L RECIRC FAN and R RECIRC FAN circuit breakers on the miscellaneous electrical equipment panels P36 and P37 are closed.
 - (4) Cycle L and R UTILITY BUS switch/lights on the P5 panel from ON to OFF and back to ON.
 - (5) Push the L RECIRC FAN and R RECIRC FAN switch/lights on the P5 panel to the ON position.

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RECIRCULATION SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure has instructions for the operational test and the system test of the recirculation system. The system test includes the test for the CARGO FIRE switches.

TASK 21-25-00-705-001

2. Operational Test – Recirculation System (Fig. 501)

A. References

- (1) 24-22-00/201, Electric Power – Control

B. Prepare for the Test

S 865-002

- (1) Supply electrical power (Ref 24-22-00).

S 865-003

- (2) Make sure these circuit breakers are closed:
- (a) On the pilot's overhead circuit breaker panel, P11:
 - 1) 11R14, L RECIRC FAN
 - 2) 11R23, R RECIRC FAN
 - (b) On the left miscellaneous electrical equipment panel, P36:
 - 1) 36F2 or 36F4, L RECIRC FAN
 - (c) On the right miscellaneous electrical equipment panel, P37.
 - 1) 37G4 or 37C4, R RECIRC FAN

S 865-004

- (3) Push the L and R UTILITY BUS switch-lights, on the pilot's overhead panel, P5, to the off and then to the on position.

S 865-006

- (4) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the off position.
- (a) Make sure the INOP lights come on.

S 865-008

- (5) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.
- (a) Make sure the PACK OFF lights come on.
 - (b) Put a DO-NOT-OPERATE tag on the selectors.

S 865-010

- (6) Make sure the FWD and AFT CARGO FIRE switch-lights, on the pilot's control stand panel, P8, are off (the ARMED light is not on).

C. Do the Operational Test for the Recirculation System

S 715-011

- (1) Do the test procedure.

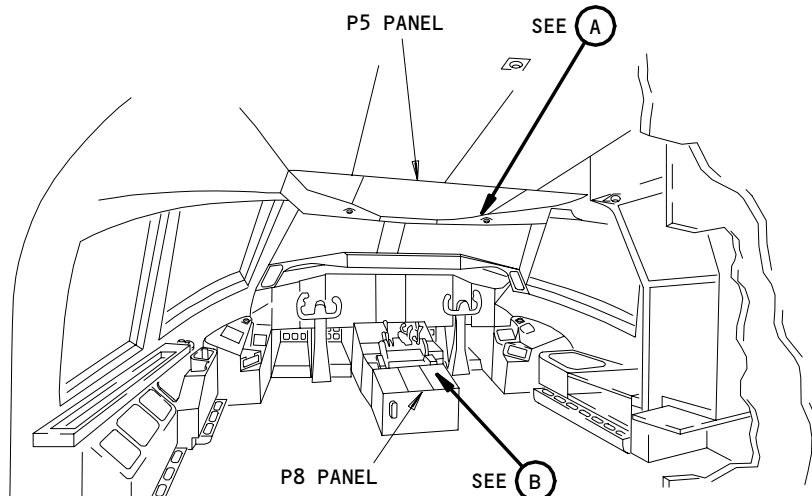
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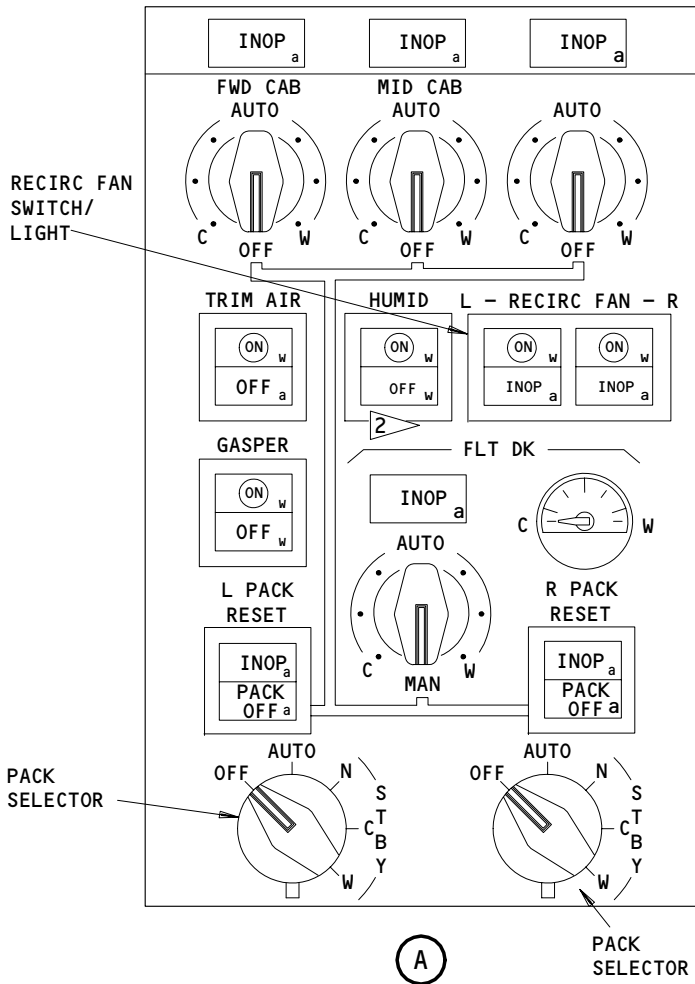
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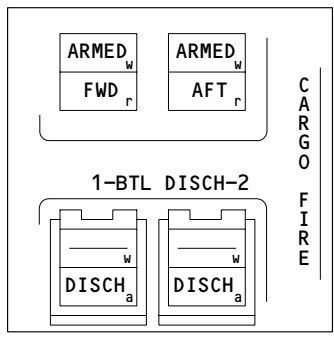
FLIGHT COMPT



(A)

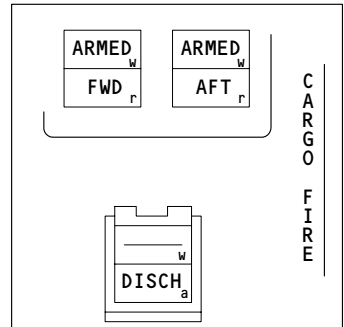
PACK SELECTOR

Recirculation System Control
Figure 501



APU/CARGO FIRE CONTROL PANEL

(B) 1



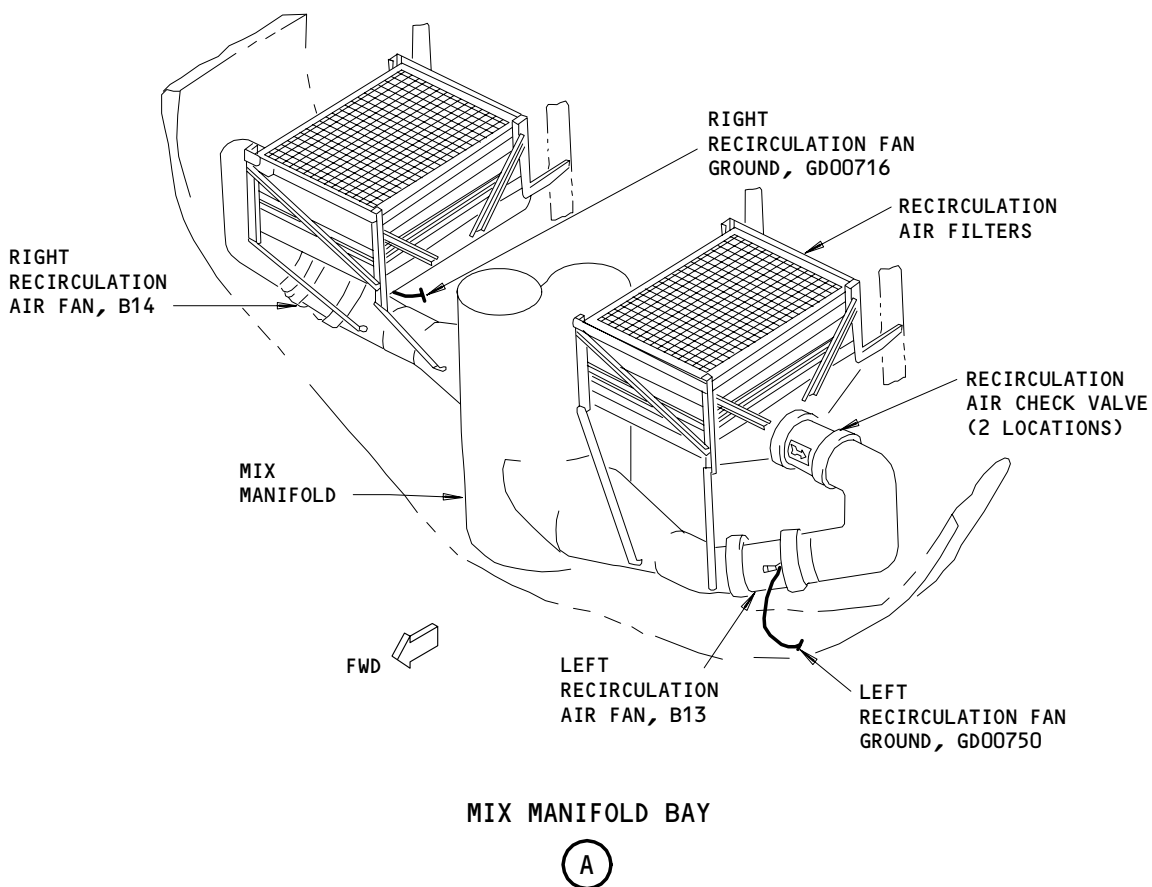
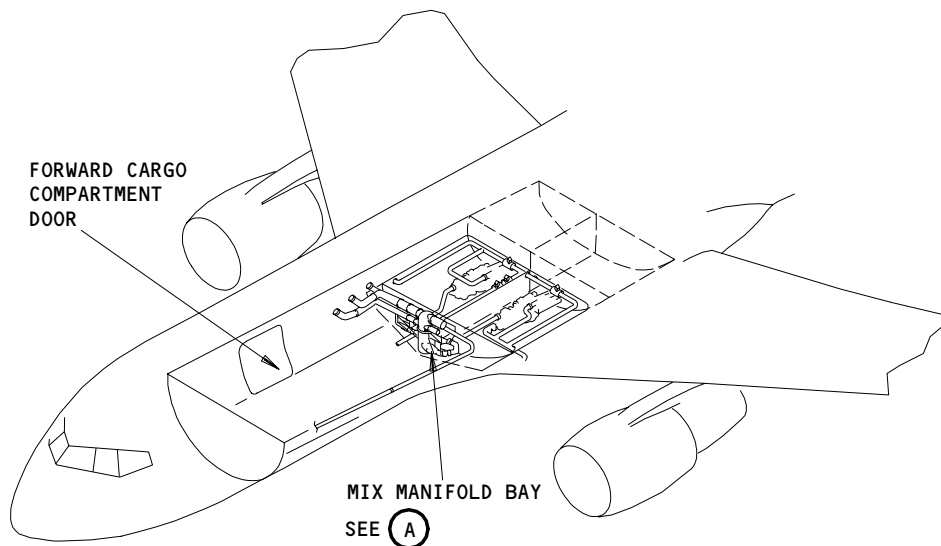
APU/CARGO FIRE CONTROL PANEL

(B) 2

- 1 767-200 AIRPLANES
- 2 767-300 AIRPLANES

EFFECTIVITY	ALL
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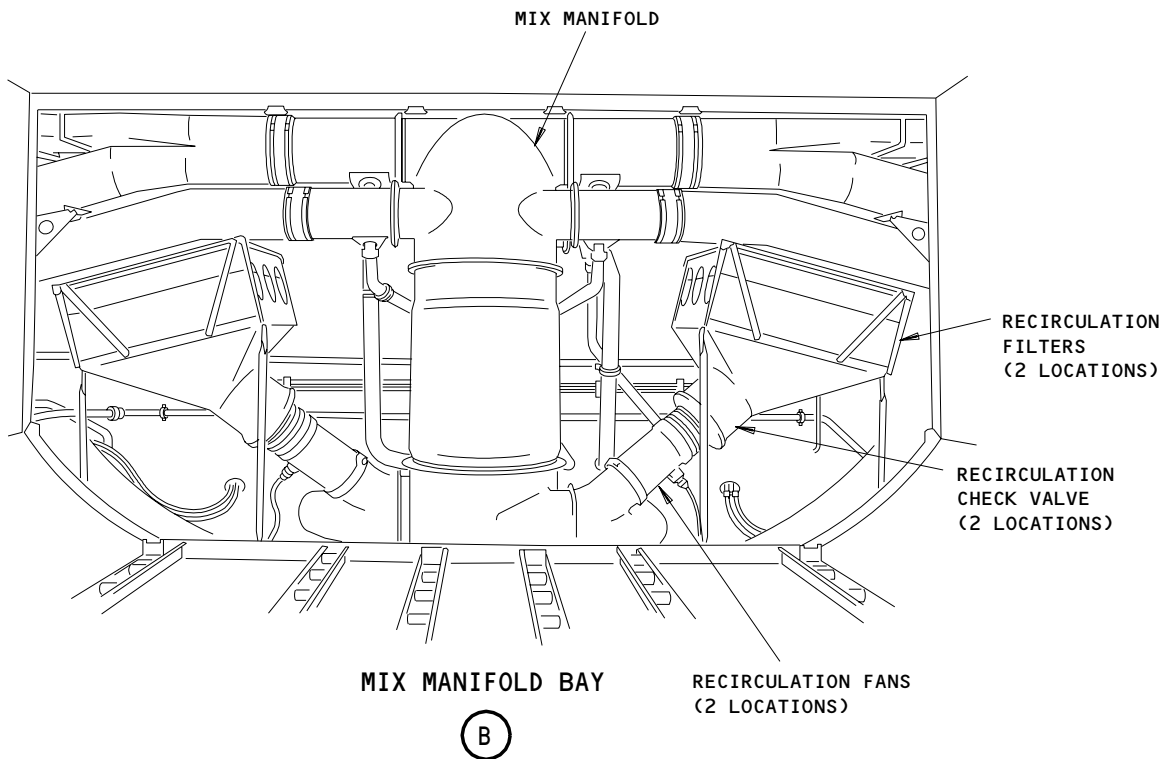
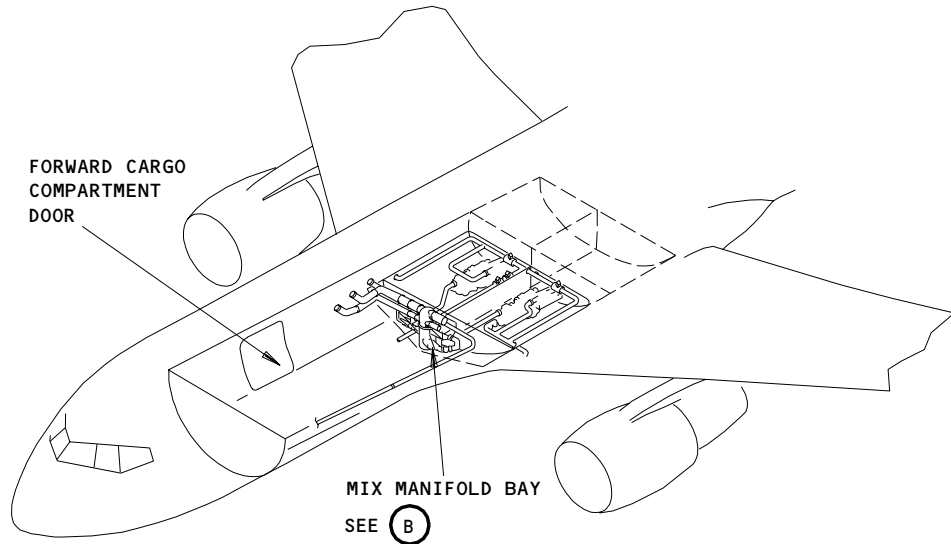
21-25-00



Recirculation Air System
Figure 502 (Sheet 1)

EFFECTIVITY
767-200 AIRPLANES

21-25-00



Recirculation Air System
Figure 502 (Sheet 2)

EFFECTIVITY
767-300 AIRPLANES

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CAUTION: IF THE LEFT RECIRCULATION FAN IS ON BUT NO AIRFLOW IS FELT AT THE PASSENGER CABIN OUTLET, IMMEDIATELY PUSH THE L RECIRC FAN SWITCH-LIGHT TO THE OFF POSITION. FAILURE TO PUSH THE SWITCH-LIGHT TO THE OFF POSITION CAN CAUSE DAMAGE TO THE FAN.

- (a) Push the L RECIRC FAN switch-light, on the P5 panel, to the on position.
 - 1) Listen for the fan to come on.
 - 2) Feel for the airflow at an outlet in the passenger cabin.
- (b) Push the L RECIRC FAN switch-light, on the P5 panel, to the off position.
 - 1) Listen for the fan to stop.

CAUTION: IF THE RIGHT RECIRCULATION FAN IS ON BUT NO AIRFLOW IS FELT AT THE PASSENGER CABIN OUTLET, IMMEDIATELY PUSH THE R RECIRC FAN SWITCH-LIGHT TO THE OFF POSITION. FAILURE TO PUSH THE SWITCH-LIGHT TO THE OFF POSITION CAN CAUSE DAMAGE TO THE FAN.

- (c) Push the R RECIRC FAN switch-light, on the P5 panel, to the on position.
 - 1) Listen for the fan to come on.
 - 2) Feel for the airflow at an outlet in the passenger cabin.
- (d) Push the R RECIRC FAN switch-light, on the P5 panel, to the off position.
 - 1) Listen for the fan to stop.

D. Put the airplane back to its usual condition

S 865-012

- (1) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 865-014

- (2) Remove the electrical power, if it is not necessary (Ref 24-22-00).

TASK 21-25-00-705-015

3. System Test - Recirculation System (Fig. 501, 502)

A. Equipment

- (1) Hot film anemometer - equivalent to TSI Model 1650. Velocity zero to 6,000 ft/min.

B. References

- (1) 24-22-00/201, Electric Power - Control
- (2) 31-41-00/201, EICAS

C. Access

- (1) Location Zones
 - 125/126 Area aft of the forward cargo compartment

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D. Prepare for the Test

S 865-020

- (1) Supply electrical power (Ref 24-22-00).

S 865-021

- (2) Make sure these circuit breakers are closed:
- (a) On the pilot's overhead circuit breaker panel, P11:
 - 1) 11R14, L RECIRC FAN
 - 2) 11R23, R RECIRC FAN
 - 3) EICAS circuit breakers (6 locations).
 - (b) On the left miscellaneous electrical equipment panel, P36:
 - 1) 36F2 or 36F4, L RECIRC FAN
 - (c) On the right miscellaneous electrical equipment panel, P37.
 - 1) 37G4 or 37C4, R RECIRC FAN

S 865-016

- (3) Push the L and R UTILITY BUS switch-lights, on the pilot's overhead panel, P5, to the off and then to the on position.

S 865-018

- (4) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the off position.
- (a) Make sure the INOP lights come on.

S 865-022

- (5) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.
- (a) Make sure the PACK OFF lights come on.
 - (b) Put a DO-NOT-OPERATE tag on the selectors.

S 865-024

- (6) Make sure the FWD and AFT CARGO FIRE switch-lights, on the pilot's control stand panel, P8, are off (the ARMED light is not on).

S 865-025

- (7) Push the ECS MSG switch on the EICAS MAINT panel, on the P61 panel.

E. Do the System Test for the Recirculation System

S 735-026

- (1) Do the left recirculation system test.

CAUTION: IF THE LEFT RECIRCULATION FAN IS ON BUT NO AIRFLOW IS FELT AT THE PASSENGER CABIN OUTLET, IMMEDIATELY PUSH THE L RECIRC FAN SWITCH-LIGHT TO THE OFF POSITION. FAILURE TO PUSH THE SWITCH-LIGHT TO THE OFF POSITION CAN CAUSE DAMAGE TO THE FAN.

- (a) Push the L RECIRC FAN switch-light, on the P5 panel, to the on position.
 - 1) Listen for the fan to come on.

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- 2) Make sure the INOP light goes off.
 - 3) Feel for the airflow at an outlet in the passenger cabin.
 - (b) Make sure there are no leaks near the left recirculation check valve, the left recirculation fan, and the duct joints of the mix manifold.
 - 1) Put the anemometer approximately two inches away from the duct joint.
 - a) Make sure the velocity is between 0 and 100 ft/min more than the ambient.
 - 2) If you cannot use the anemometer, put your hand approximately two inches from the duct joint.
 - a) Make sure you feel no airflow from the duct joint.
 - (c) Disconnect the fan ground wire from the ground GD750-DC.
 - (d) Make sure these conditions occur:
 - 1) The left recirculation fan stops.
 - 2) The INOP light comes on.
 - 3) The EICAS message, L RECIRC FAN, shows on the top display.
 - (e) Connect the fan ground wire to the ground GD750-DC.
 - (f) Make sure these conditions occur:
 - 1) The left recirculation fan stays off.
 - 2) The INOP light stays on.
 - 3) The EICAS message, L RECIRC FAN, shows on the top display.
 - (g) Push the L RECIRC FAN switch-light, on the P5 panel, to the off and then to the on position.
 - (h) Make sure these conditions occur:
 - 1) The left recirculation fan comes on.
 - 2) The INOP light goes off.
 - 3) The EICAS message, L RECIRC FAN, does not show on the top display.
 - (i) Open this circuit breaker, on the P36 panel:
 - 1) 36F2 or 36F4, L RECIRC FAN
 - (j) Make sure these conditions occur:
 - 1) The left recirculation fan goes off.
 - 2) The INOP light comes on.
 - 3) The EICAS message, L RECIRC FAN, shows on the top display.
 - (k) Close this circuit breaker, on the P36 panel:
 - 1) 36F2 or 36F4, L RECIRC FAN
 - (l) Make sure these conditions occur:
 - 1) The left recirculation fan comes on.
 - 2) The INOP light goes off.
 - 3) The EICAS message, L RECIRC FAN, does not show on the top display.
- S 735-027
- (2) Do the right recirculation system test.

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CAUTION: IF THE RIGHT RECIRCULATION FAN IS ON BUT NO AIRFLOW IS FELT AT THE PASSENGER CABIN OUTLET, IMMEDIATELY PUSH THE R RECIRC FAN SWITCH-LIGHT TO THE OFF POSITION. FAILURE TO PUSH THE SWITCH-LIGHT TO THE OFF POSITION CAN CAUSE DAMAGE TO THE FAN.

- (a) Push the R RECIRC FAN switch-light, on the P5 panel, to the on position.
 - 1) Listen for the fan to come on.
 - 2) Make sure the INOP light goes off.
 - 3) Feel for the airflow at an outlet in the passenger cabin.
- (b) Make sure there are no leaks near the right recirculation check valve, the right recirculation fan, and the duct joints of the mix manifold.
 - 1) Put the anemometer approximately two inches away from the duct joint.
 - a) Make sure the velocity is between 0 and 100 ft/min more than the ambient.
 - 2) If you cannot use the anemometer, put your hand approximately two inches from the duct joint.
 - a) Make sure you feel no airflow from the duct joint.
- (c) Disconnect the fan ground wire from the ground GD716-DC.
- (d) Make sure these conditions occur:
 - 1) The right recirculation fan stops.
 - 2) The INOP light comes on.
 - 3) The EICAS message, R RECIRC FAN, shows on the top display.
- (e) Connect the fan ground wire to the ground GD716-DC.
- (f) Make sure these conditions occur:
 - 1) The right recirculation fan stays off.
 - 2) The INOP light stays on.
 - 3) The EICAS message, R RECIRC FAN, shows on the top display.
- (g) Push the R RECIRC FAN switch-light, on the P5 panel, to the off and then to the on position.
- (h) Make sure these conditions occur:
 - 1) The right recirculation fan comes on.
 - 2) The INOP light goes off.
 - 3) The EICAS message, R RECIRC FAN, does not show on the top display.
- (i) Open this circuit breaker, on the P37 panel:
 - 1) 37G4 or 37C4, R RECIRC FAN
- (j) Make sure these conditions occur:
 - 1) The right recirculation fan goes off.
 - 2) The INOP light comes on.
 - 3) The EICAS message, R RECIRC FAN, shows on the top display.
- (k) Close this circuit breaker, on the P37 panel:
 - 1) 37G4 or 37C4, R RECIRC FAN
- (l) Make sure these conditions occur:
 - 1) The right recirculation fan comes on.
 - 2) The INOP light goes off.

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- 3) The EICAS message, R RECIRC FAN, does not show on the top display.

S 735-028

- (3) Do the Test for the CARGO FIRE switches.
 - (a) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the on position.
 - 1) Listen for the fans to come on.

CAUTION: MAKE SURE THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE OPENED. IF THEY ARE NOT OPENED, THE FIRE EXTINGUISHER BOTTLES COULD RELEASE THEIR CONTENTS DURING THE STEPS THAT FOLLOW.

- (b) Open these circuit breakers, on the main power distribution panel, P6, and put a DO-NOT-CLOSE tag on them:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (c) Push the FWD CARGO FIRE switch-light, on the P8 panel, to the ARMED position.
- (d) Make sure these conditions occur:
 - 1) The ARMED light comes on.
 - 2) The left and right recirculation fans stop.
 - 3) The L and R RECIRC FAN INOP lights, on the P5 panel, come on.
- (e) Push the FWD CARGO FIRE switch-light, on the P8 panel, to the off position.
- (f) Make sure these conditions occur:
 - 1) The ARMED light goes off.
 - 2) The L and R RECIRC FAN INOP lights go off.
 - 3) The left and right recirculation fans come on.
- (g) Push the AFT CARGO FIRE switch/light, on the P8 panel, to the ARMED position.
- (h) Make sure these conditions occur:
 - 1) The ARMED light comes on.
 - 2) The left and right recirculation fans stop.
 - 3) The L and R RECIRC FAN INOP lights, on the P5 panel, come on.
- (i) Push the AFT CARGO FIRE switch-light, on the P8 panel, to the off position.
- (j) Make sure these conditions occur:
 - 1) The ARMED light goes off.
 - 2) The L and R RECIRC FAN INOP lights go off.
 - 3) The left and right recirculation fans come on.
- (k) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P6 panel:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2

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 **BOEING**
767
MAINTENANCE MANUAL

F. Put the airplane back to its usual condition

S 865-029

(1) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 865-031

(2) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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RECIRCULATION AIR FAN – REMOVAL/INSTALLATION

1. General

- A. Two recirculation air fans are installed in the mix manifold area, which is aft of the forward cargo compartment. This procedure has instructions to remove and install the fans.

TASK 21-25-01-004-001

2. Remove the Recirculation Air Fan (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) 21-21-02/401, Conditioned Air Ground Connector
- (3) 24-22-00/201, Electric Power Control
- (4) 25-52-01/401, Sidewall Panels.

B. Access

- (1) Location Zones
 - 125 Area Aft of Forward Cargo Compartment (Left)
 - 126 Area Aft of Forward Cargo Compartment (Right)
 - 821 Forward Cargo Compartment

C. Prepare for the Removal

S 864-002

- (1) Supply electrical power (Ref 24-22-00).

S 864-003

- (2) Turn the L and R PACK selectors, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF lights come on.
 - (b) Put a DO-NOT-OPERATE tag on the selectors.

S 864-047

- (3) Push the applicable (L or R) RECIRC FAN switch-light, on the P5 panel, to the off position.
 - (a) Make sure the ON light goes off.
 - (b) Put a DO-NOT-OPERATE tag on the switch-lights.

S 864-005

- (4) Put a DO-NOT-OPERATE tag on the ground air connector (Ref 21-21-02).

S 864-006

- (5) Open and attach a DO-NOT-CLOSE tag to these circuit breakers:
 - (a) To remove the right recirculation air fan:
 - 1) On the overhead circuit breaker panel, P11, 11R23, R RECIRC FAN

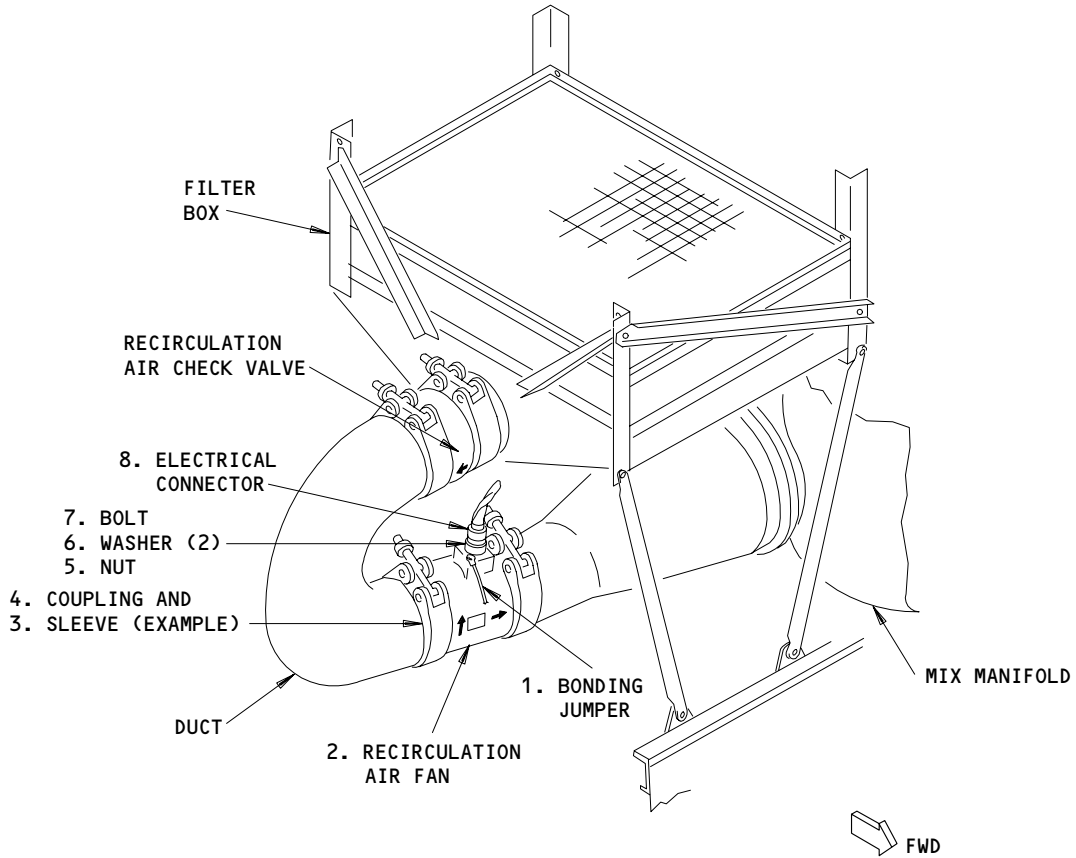
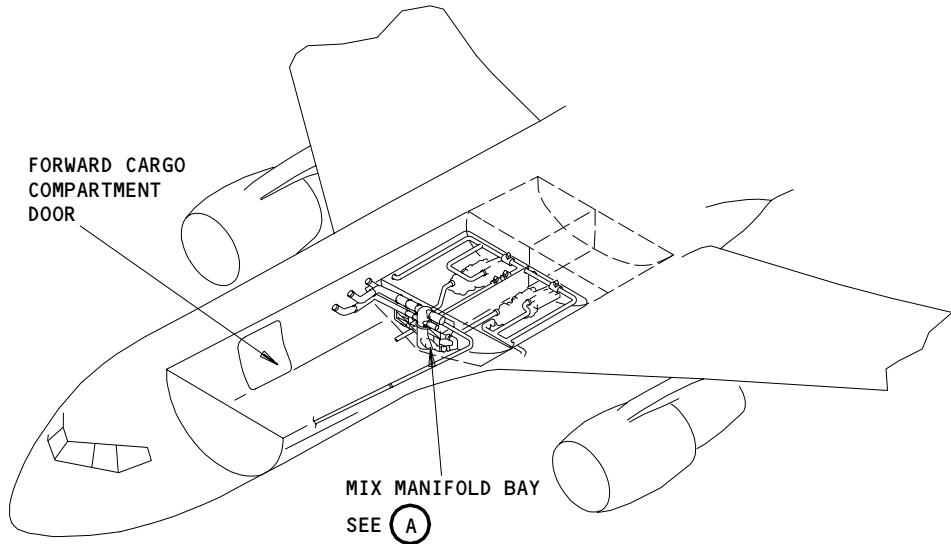
EFFECTIVITY

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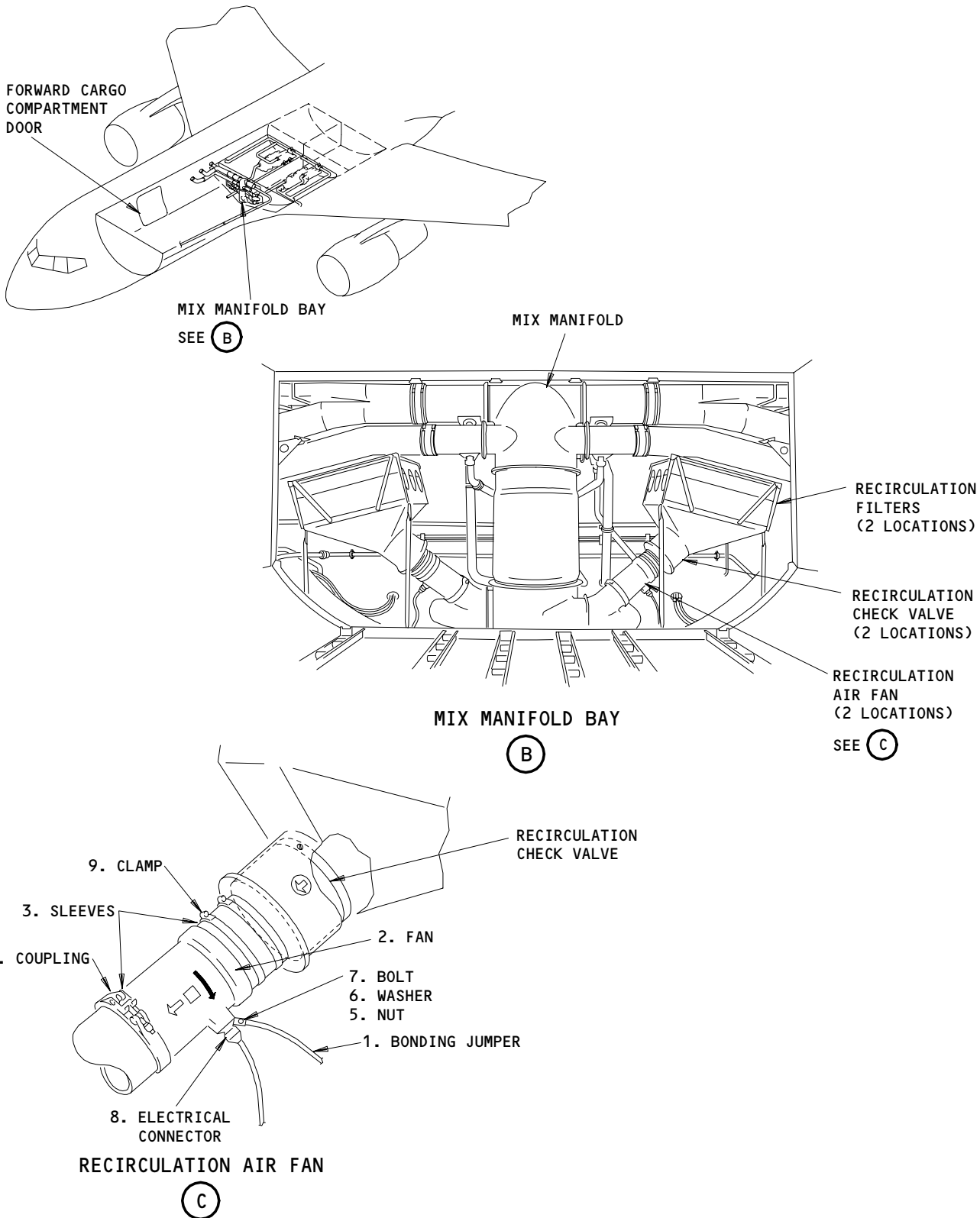
RIGHT SIDE SHOWN
(LEFT SIDE OPPOSITE)

(A)

Recirculation Air Fan Installation
Figure 401 (Sheet 1)

EFFECTIVITY
767-200 AIRPLANES

21-25-01



Recirculation Air Fan Installation
Figure 401 (Sheet 2)

EFFECTIVITY
767-300 AIRPLANES

21-25-01

- 2) On the right miscellaneous electrical equipment panel, P37, 37G4 or 37C4, R RECIRC FAN
- (b) To remove the left recirculation air fan:
 - 1) On the overhead circuit breaker panel, P11, 11R14, L RECIRC FAN
 - 2) On the left miscellaneous electrical equipment panel, P36, 36F2 or 36F4, L RECIRC FAN

S 014-007

- (6) Open the forward cargo door (Ref 06-46-00).

S 014-008

- (7) Remove the endliner curtain at the aft end of the forward cargo compartment.

D. Remove the fan

S 034-012

- (1) RECIRCULATION AIR FAN (HONEYWELL P/N 606622) PRE-SB 21-0215;
Disconnect the electrical connector (8) from the fan (2) (Fig. 401).

S 034-125

- (2) RECIRCULATION AIR FAN (HONEYWELL P/N 606622) POST-SB 21-0215;
Disconnect the aircraft-fan wiring [24] and electrical connector plug [24] from the vibration monitor [21] (Fig. 402).
 - (a) Do the removal task in this procedure to remove the vibration monitor [21] from the recirculation air fan [31] (TASK 21-25-01-004-102).

S 034-013

- (3) Disconnect the bonding jumper (1) from the fan (2).

S 034-014

- (4) 767-200 AIRPLANES;
Remove the couplings (4) on each side of the fan (2).

S 034-042

- (5) 767-300 AIRPLANES;
Remove the coupling (4) on the side of the fan (2) that is nearest the mix manifold.

S 024-050

- (6) Remove the clamp (9), on the other side of the fan (2), that is farthest from the filters.

S 034-016

- (7) Move the sleeves (3) away from the fan (2).

S 024-017

- (8) Remove the fan (2).

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S 434-018

(9) Put a cover on the duct openings.

TASK 21-25-01-404-019

3. Install the Recirculation Air Fan (Fig. 401)

A. Equipment

(1) Bonding Meter - Model T477W Microhm Bridge, Type W Bonding Meter - Avtron Manufacturing, Inc., Cleveland, Ohio.

B. Parts

(1) Look at the Illustrated Parts Catalog (IPC) to find the part numbers and the effectivities of the items in the table that follows:

(a) 767-200 AIRPLANES;

Refer to the table that follows:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2	Fan	21-25-01	01	60
	3	Sleeve			50
	4	Coupling			45
	5	Nut			25
	6	Washer			20
	7	Bolt			15

(b) 767-300 AIRPLANES;

Refer to the table that follows:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2	Fan	21-25-01	02	262
	3	Sleeve			55
	4	Coupling			50
	5	Nut			25
	5	Nut			45
	6	Washer			20
	6	Washer			40
	7	Bolt			15
	7	Bolt			35

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C. Access

(1) Location Zones

- 125 Area Aft of Forward Cargo Compartment (Left)
- 126 Area Aft of Forward Cargo Compartment (Right)
- 821 Forward Cargo Door

D. Install the fan

S 034-017

- (1) Remove the covers from the duct openings.
 - (a) Make sure there is no unwanted material in the ducts.

S 424-018

- (2) Put the fan (2) into position with the flow arrow pointed to the mix manifold.

S 434-019

- (3) Move part of the sleeves (3) on to each end of the fan (2).

S 434-044

- (4) 767-200 AIRPLANES;
Install a coupling (4) on each end of the fan (2).
 - (a) Tighten the coupling nut to 40-45 pound-inches.

S 434-045

- (5) 767-300 AIRPLANES;
Install a coupling (4) on the end of the fan (2) that is nearest to the mix manifold.
 - (a) Tighten the coupling to 40-45 pound-inches.

S 424-051

- (6) Install a clamp (9) on the other end of the fan (2).
 - (a) Tighten the clamp to 20-25 pound-inches.

S 434-020

- (7) Connect the bonding jumper (1) to the fan (2).
 - (a) Use the bonding meter to make sure the bonding resistance is not more than 0.005 ohm.

S 424-049

- (8) RECIRCULATION AIR FAN (HONEYWELL P/N 606622) PRE-SB 21-0215;
Connect the electrical connector (8) to the fan (2) (Fig. 401).

S 424-126

- (9) RECIRCULATION AIR FAN (HONEYWELL P/N 606622) POST-SB 21-0215;
Do the installation task in this procedure to install the vibration monitor [21] to the recirculation air fan [31] (TASK 21-25-01-404-112).
 - (a) Connect the aircraft-fan wiring [24] and electrical connector plug [24] to the vibration monitor [21] (Fig. 402).

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E. Do the fan installation test

S 864-022

- (1) Supply electrical power (Ref 24-22-00).

S 864-023

- (2) Push the L and R UTILITY BUS switch-lights, on the P5 panel, to the off and then to the on position.

S 864-025

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
- (a) If the right recirculation air fan was installed:
 - 1) On the P11 panel,
11R23, R RECIRC FAN
 - 2) On the P37 panel,
37G4 or 37C4, R RECIRC FAN
 - (b) If the left recirculation air fan was installed:
 - 1) On the P11 panel,
11R14, L RECIRC FAN
 - 2) On the P36 panel,
36F2 or 36F4, L RECIRC FAN

S 724-127

- (4) RECIRCULATION AIR FAN (HONEYWELL P/N 606622) PRE-SB 21-0215;
Do these steps to test the operation of the recirculation air fan:
- (a) Remove the DO-NOT-OPERATE tag from the applicable (L or R) RECIRC FAN switch-light, on the P5 panel.
 - 1) Push the switch-light to the on position.
 - 2) Listen for the fan to come on.
 - 3) Make sure there are no air leaks around the fan and sleeves.

S 724-128

- (5) RECIRCULATION AIR FAN (HONEYWELL P/N 606622) POST-SB 21-0215;
Do these steps to reset the vibration monitor [21] and to test the operation of the recirculation air fan [31]:
- (a) Open this circuit breaker for the applicable left/right recirculation air fan:
 - 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11R14, L RECIRC FAN
 - b) 11R23, R RECIRC FAN
 - (b) Remove the DO-NOT-OPERATE tag and set the L/R RECIRC FAN switch-light, on the pilot's P5 overhead panel, to ON position.

NOTE: The applicable left/right recirculation air fan should still be off. The INOP lamp for the L/R RECIRC FAN switch-light will illuminate, and the EICAS message L/R RECIRC FAN (Advisory) will also show.

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- (c) Push and hold the RESET button on the vibration monitor while you restore electrical power to the applicable left/right recirculation fan in the next step.

NOTE: This is a two person operation. One person to push the RESET button while a second person restores electrical power.

- (d) Close this circuit breaker for the applicable left/right recirculation air fan:
1) P11 Pilot's Overhead Circuit Breaker Panel
a) 11R14, L RECIRC FAN
b) 11R23, R RECIRC FAN
- (e) Make sure the applicable left/right recirculation air fan now operates.

NOTE: The INOP lamp for the L/R RECIRC FAN switch-light should be off, and the EICAS message L/R RECIRC FAN (Advisory) should not show.

- (f) Release the RESET button on the vibration monitor after the fan operates, then within ten (10) seconds push and hold the RESET button again for three (3) to five (5) seconds until the STATUS light (LED) on the vibration monitor changes to 'green'.
- (g) Release the RESET button on the vibration monitor.
- (h) Make sure the recirculation fan continues to operate for up to seven (7) minutes and that the fan does not shutdown.

NOTE: During the seven (7) minutes, the STATUS light (LED) may blink 'amber' (yellow) on occasion which is acceptable. If the STATUS light (LED) blinks 'red' during the seven (7) minutes, the vibration monitor will initiate a shutdown of the fan. This is an indication that the fan should be replaced.

- (i) After the seven (7) minutes, make sure the recirculation air fan continues to operate without a shutdown, and that the STATUS light (LED) on the vibration monitor is blinking 'green' every two (2) seconds.
- (j) Make sure there are no air leaks around the fan and sleeves.
- (k) Set the L/R RECIRC FAN switch-light to the off position (ON lamp is not illuminated).
1) Make sure the recirculation air fan does not operate.

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F. Put the airplane back to its usual condition.

S 414-029

- (1) Install the endliner curtain in the aft end of the forward cargo compartment.

S 414-033

- (2) Close the forward cargo door, 821 (Ref 06-46-00).

S 864-034

- (3) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the off position.

S 864-036

- (4) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 864-038

- (5) Remove the DO-NOT-OPERATE tag from the connector for the ground conditioned air (Ref 21-21-02).

S 864-039

- (6) Remove the electrical power, if it is not necessary (Ref 24-22-00).

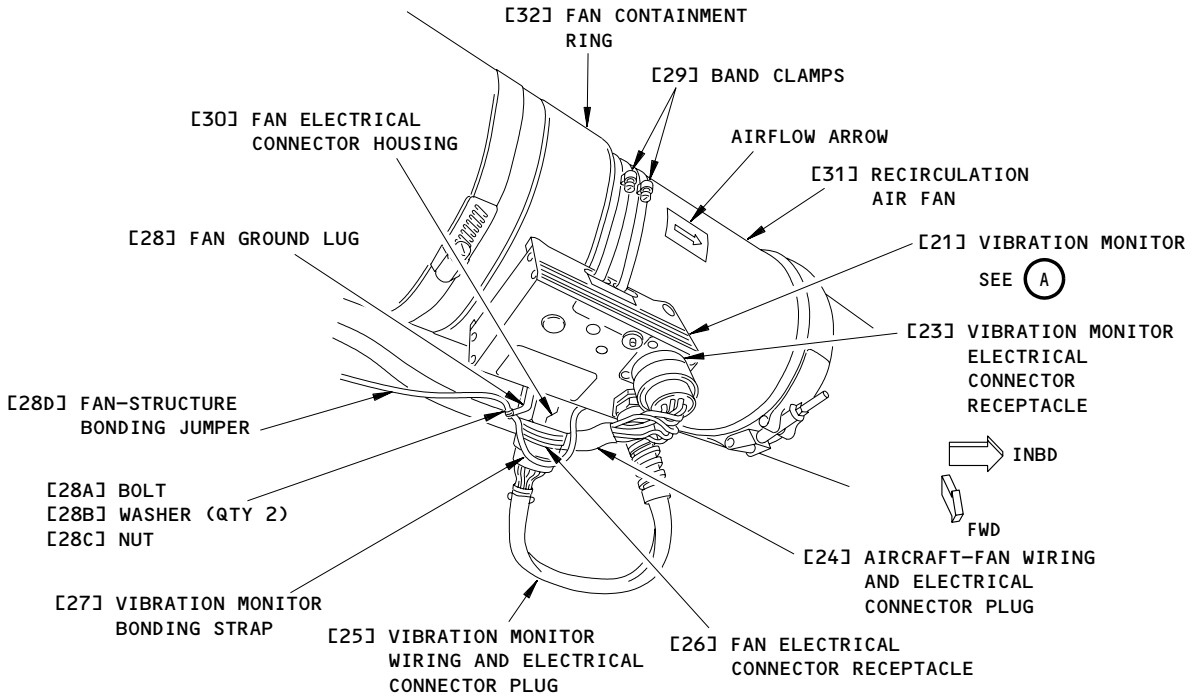
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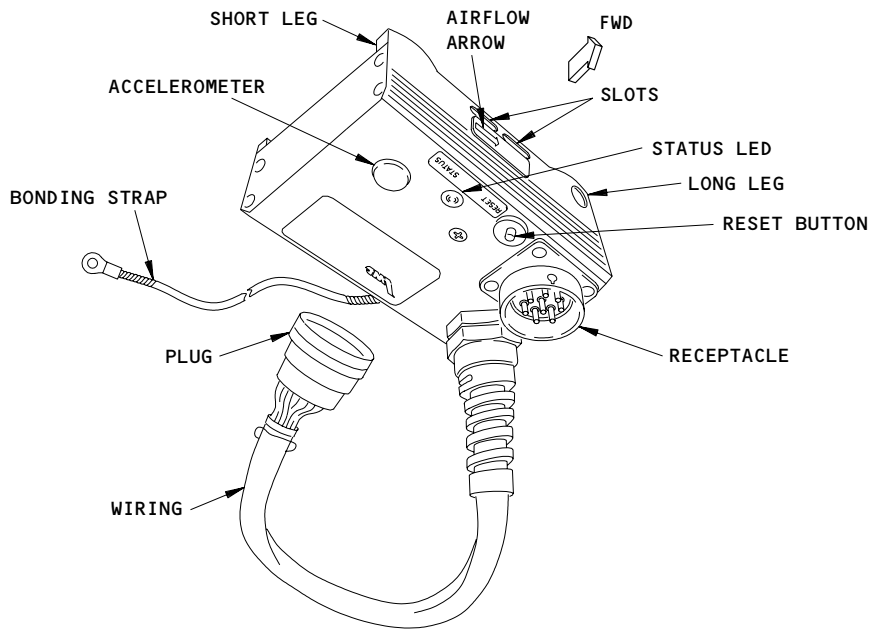
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FAN P/N 606622 WITH VIBRATION MONITOR
(EXAMPLE)



VIBRATION MONITOR (MODEL 211)

(A)

Recirculation Air Fan Vibration Monitor Installation
Figure 402

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RECIRCULATION AIR FAN (HONEYWELL
P/N 606622) POST-SB 21-0215

21-25-01

TASK 21-25-01-004-102

4. RECIRCULATION AIR FAN (HONEYWELL P/N 606622) POST-SB 21-0215;

Recirculation Air Fan Vibration Monitor Removal (Fig. 402)

A. References

- (1) AMM 24-22-00/201, Control (Supply Power)
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (3) SWPM 20-20-00, Electrical Bonds and Grounds (D6-54446)

B. Access

(1) Location Zones

- 125 Area Aft of Forward Cargo Compartment (left)
- 126 Area Aft of Forward Cargo Compartment (right)

(2) Access Panels

- 821 Forward Cargo Compartment Door

C. Prepare for Removal

S 864-103

- (1) Make sure the L/R RECIRC FAN switch-lights are selected off (ON lamp is not illuminated), on the pilot's P5 overhead panel, and attach a DO-NOT-OPERATE tag.

S 864-104

- (2) Open these circuit breakers and attach DO-NOT-CLOSE tags:

- (a) P11 Pilot's Overhead Circuit Breaker Panel
 - 1) 11R14, L RECIRC FAN
 - 2) 11R23, R RECIRC FAN
- (b) P36 Left Miscellaneous Electrical Equipment Panel
 - 1) 36F2 or 36F4, L RECIRC FAN
- (c) P37 Right Miscellaneous Electrical Equipment Panel
 - 1) 37G4 or 37C4, R RECIRC FAN

S 014-105

- (3) Get access to the recirculation air fans behind the aft endwall of the forward cargo compartment.
 - (a) Open the forward cargo door, 821.
 - (b) Remove the liner on the aft endwall (AMM 25-52-01/401).

D. Vibration Monitor Removal

S 024-106

- (1) Disconnect the aircraft-fan wiring [24] and electrical connector plug [24] from the vibration monitor [21].

S 024-107

- (2) Disconnect the vibration monitor wiring [25] and electrical connector plug [25] from the recirculation air fan [31].

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S 024-108

- (3) Remove the bolt [28A], washers [28B] (qty 2), and nut [28C] to disconnect the vibration monitor bonding strap [27] and the fan-structure bonding jumper [28D] from the fan ground lug [28].

S 024-109

- (4) Remove the two band clamps [29] that hold the vibration monitor [21] to the recirculation air fan [31].

S 024-110

- (5) Remove the vibration monitor [21].

E. Recirculation Air Fan Restoration after Vibration Monitor Removal

S 904-111

- (1) If you do not plan to re-install the vibration monitor [21], do these steps to restore the recirculation air fan [31] to the PRE-SB 21-0215 configuration:
 - (a) Install the bolt [28A], washers [28B] (qty 2), and nut [28C] to connect the fan-structure bonding jumper [28D] to the fan ground lug [28].
 - 1) Do an electrical bonding and resistance check of the recirculation air fan [31] (SWPM 20-20-00, Electrical Bonds and Grounds, Standard Wiring Practice Manual, D6-54446).
 - a) Make sure the electrical resistance is not more than 0.005 ohms (5 milliohms).
 - (b) Reconnect the aircraft-fan wiring [24] and electrical connector plug [24] to the recirculation air fan [31].
 - 1) Make sure the aircraft-fan wiring [24] is kept away from any object which could cause wear and/or an electrical short.
 - (c) Close these circuit breakers and remove the DO-NOT-CLOSE tags:
 - 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11R14, L RECIRC FAN
 - b) 11R23, R RECIRC FAN
 - 2) P36 Left Miscellaneous Electrical Equipment Panel
 - a) 36F2 or 36F4, L RECIRC FAN
 - 3) P37 Right Miscellaneous Electrical Equipment Panel
 - a) 37G4 or 37C4, R RECIRC FAN
 - (d) Supply electrical power (AMM 24-22-00/201).
 - (e) Make sure the FWD/AFT CARGO FIRE switches are not set to ARMED, on the APU/Cargo Fire control panel M10444 (P8 panel).

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- (f) Remove the DO-NOT-OPERATE tag and set the L/R RECIRC FAN switch-light(s) to the ON position.
 - 1) Make sure the left/right recirculation air fan operates.
- (g) Set the L/R RECIRC FAN switch-light(s) to the off position (ON lamp is not illuminated).
 - 1) Make sure the left/right recirculation air fans do not operate.
- (h) Close the access to the recirculation air fans behind the aft endwall in the forward cargo compartment:
 - 1) Install the liner to the aft endwall (AMM 25-52-01/401).
 - 2) Close the forward cargo door, 821.
- (i) Remove electrical power (AMM 24-22-00/201).

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TASK 21-25-01-404-112

5. RECIRCULATION AIR FAN (HONEYWELL P/N 606622) POST-SB 21-0215;
Recirculation Air Fan Vibration Monitor Installation (Fig. 402)

A. References

- (1) AMM 24-22-00/201, Control (Supply Power)
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (3) SWPM 20-20-00, Electrical Bonds and Grounds (D6-54446)

B. Access

(1) Location Zones

- 125 Area Aft of Forward Cargo Compartment (left)
- 126 Area Aft of Forward Cargo Compartment (right)

(2) Access Panels

- 821 Forward Cargo Compartment Door

C. Vibration Monitor Installation

S 424-113

- (1) Install the vibration monitor [21] to the recirculation air fan [31].
 - (a) Put the two band clamps [29] thru the slots in each side of the vibration monitor [21], then loosely install the band clamps [29] around the recirculation air fan [31].
 - (b) Make sure the airflow arrow on the vibration monitor [21] points in the same direction as the airflow arrow on the recirculation air fan [31].

NOTE: The direction of airflow is from the recirculation air fan [31] towards the mix manifold.

- (c) Make sure the two short legs on the vibration monitor [21] sit on the fan containment ring [32] to ensure the vibration monitor accelerometer is positioned directly above the fan impeller bearings.

NOTE: The fan containment ring [32] is at the upstream end of recirculation air fan [31] and has the larger outer diameter.

- (d) Make sure the two long legs of the vibration monitor [21] sit on the housing of the recirculation air fan [31].
- (e) Make sure the screw and nut that connects the bonding strap [27] to the vibration monitor [21] does not contact the fan electrical connector housing [30].

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- (f) Tighten each band clamp [29] to 12–15 pound–inches (1.35–1.69 newton–meters).
 - 1) Make sure each band clamp [29] engages fully around the entire circumference of the recirculation air fan [31].

NOTE: The band clamps [29] should be perpendicular to the horizontal axis of the recirculation air fan [31].

- (g) Make sure each leg of the vibration monitor [21] is in full contact with the recirculation air fan [31].

S 434–114

- (2) Install the bolt [28A], washers [28B] (qty 2), and nut [28C] to connect the vibration monitor bonding strap [27] and the fan–structure bonding jumper [28D] to the fan ground lug [28].
 - (a) Do an electrical bonding and resistance check of the recirculation air fan [31] and the vibration monitor [21] (SWPM 20–20–00, Electrical Bonds and Grounds, Standard Wiring Practice Manual, D6–54446).
 - 1) Make sure the electrical resistance is not more than 0.005 ohms (5 milliohms).

S 434–115

- (3) Connect the vibration monitor wiring [25] and electrical connector plug [25] to the recirculation air fan [31].
 - (a) Make sure the vibration monitor wiring [25] is kept away from any object which could cause wear and/or an electrical short.

S 434–116

- (4) Connect the aircraft–fan wiring [24] and electrical connector plug [24] to the vibration monitor [21].
 - (a) Make sure the aircraft–fan wiring [24] is kept away from any object which could cause wear and/or an electrical short.
- D. Post-Installation Test – Vibration Monitor and Recirculation Air Fan

S 864–129

- (1) Do these steps to restore electrical power.
 - (a) Close these circuit breakers and remove the DO–NOT–CLOSE tags:
 - 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11R14, L RECIRC FAN
 - b) 11R23, R RECIRC FAN
 - 2) P36 Left Miscellaneous Electrical Equipment Panel
 - a) 36F2 or 36F4, L RECIRC FAN
 - 3) P37 Right Miscellaneous Electrical Equipment Panel
 - a) 37G4 or 37C4, R RECIRC FAN

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(b) Supply electrical power (AMM 24-22-00/201).

S 864-130

- (2) Make sure the FWD/AFT CARGO FIRE switches are not set to ARMED, on the APU/Cargo Fire control panel M10444 (P8 panel).

S 724-121

- (3) Do these steps to reset the vibration monitor [21] and to test the operation of the recirculation air fan [31]:
- (a) Open this circuit breaker for the applicable left/right recirculation air fan:
- 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11R14, L RECIRC FAN
 - b) 11R23, R RECIRC FAN
- (b) Remove the DO-NOT-OPERATE tag and set the L/R RECIRC FAN switch-light, on the pilot's P5 overhead panel, to ON position.

NOTE: The applicable left/right recirculation air fan should still be off. The INOP lamp for the L/R RECIRC FAN switch-light will illuminate, and the EICAS message L/R RECIRC FAN (Advisory) will also show.

- (c) Push and hold the RESET button on the vibration monitor while you restore electrical power to the applicable left/right recirculation fan in the next step.

NOTE: This is a two person operation. One person to push the RESET button while a second person restores electrical power.

- (d) Close this circuit breaker for the applicable left/right recirculation air fan:
- 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11R14, L RECIRC FAN
 - b) 11R23, R RECIRC FAN
- (e) Make sure the applicable left/right recirculation air fan now operates.

NOTE: The INOP lamp for the L/R RECIRC FAN switch-light should be off, and the EICAS message L/R RECIRC FAN (Advisory) should not show.

- (f) Release the RESET button on the vibration monitor after the fan operates, then within ten (10) seconds push and hold the RESET button again for three (3) to five (5) seconds until the STATUS light (LED) on the vibration monitor changes to 'green'.
- (g) Release the RESET button on the vibration monitor.

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- (h) Make sure the recirculation fan continues to operate for up to seven (7) minutes and that the fan does not shutdown.

NOTE: During the seven (7) minutes, the STATUS light (LED) may blink 'amber' (yellow) on occasion which is acceptable. If the STATUS light (LED) blinks 'red' during the seven (7) minutes, the vibration monitor will initiate a shutdown of the fan. This is an indication that the fan should be replaced.

- (i) After the seven (7) minutes, make sure the recirculation air fan continues to operate without a shutdown, and that the STATUS light (LED) on the vibration monitor is blinking 'green' every two (2) seconds.
- (j) Set the L/R RECIRC FAN switch-light to the off position (ON lamp is not illuminated).
 - 1) Make sure the recirculation air fan does not operate.

E. Restore the Airplane to Normal Configuration

S 414-122

- (1) Close the access to the recirculation air fans behind the aft endwall in the forward cargo compartment:
 - (a) Install the liner to the aft endwall (AMM 25-52-01/401).
 - (b) Close the forward cargo door, 821.

S 864-123

- (2) Remove electrical power (AMM 24-22-00/201).

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RECIRCULATION AIR FILTER – REMOVAL/INSTALLATION

1. General

- A. This task has instructions to replace the recirculation air filters which are found behind the aft endwall in the forward cargo compartment.

TASK 21-25-02-904-001-003

2. Recirculation Air Filter Replacement

A. Equipment

- (1) Plastic disposal bags - (38"x48", 1-2mil, 40-42 gal) (or equivalent)
- (2) Personal protective equipment & clothing (PPE/PPC) (disposable) - commercially available
 - (a) Particulate Respirator (NIOSH 42 CFR 84 Class N95, N99, N100) - 3M model 8210 (or equivalent)
 - (b) Safety Goggles - 3M model 1621 (or equivalent)
 - (c) Latex or Nitrile Gloves - Kimberly-Clark KleenGuard, SafeSkin, or ShieldMaster models (or equivalent)
 - (d) Coverall with hood - Dupont 'Tyvek' style S1428 or 01414 (or equivalent)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401		Recirculation Air Filter	21-25-01	01	110
401		Recirculation Air Filter	21-25-01	01	120
401		Recirculation Air Filter	21-25-01	01	121
401		Recirculation Air Filter	21-25-01	01	125
401		Recirculation Air Filter	21-25-01	01	127
401		Recirculation Air Filter	21-25-01	03	120
401		Recirculation Air Filter	21-25-01	03	125
401		Recirculation Air Filter	21-25-01	03	127

C. References

- (1) AMM 24-22-00/201, Electrical Power
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Panels

D. Access

- (1) Location Zones
 - 125 Area Aft of Forward Cargo Compartment (Left)
 - 126 Area Aft of Forward Cargo Compartment (Right)
- (2) Access Panels
 - 821 Forward Cargo Door

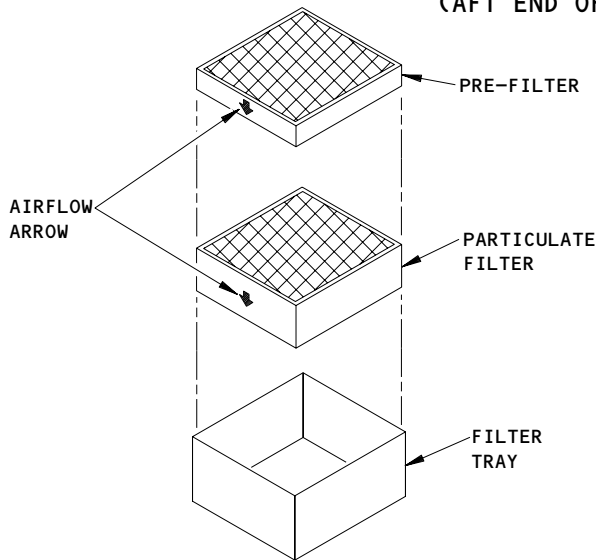
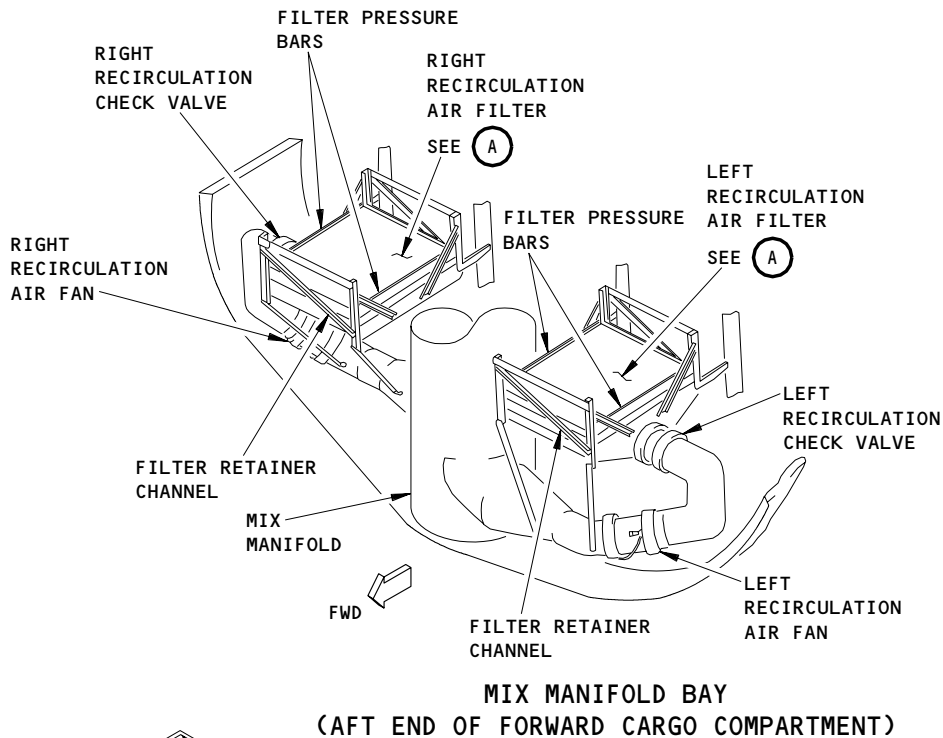
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767-200 AIRPLANES

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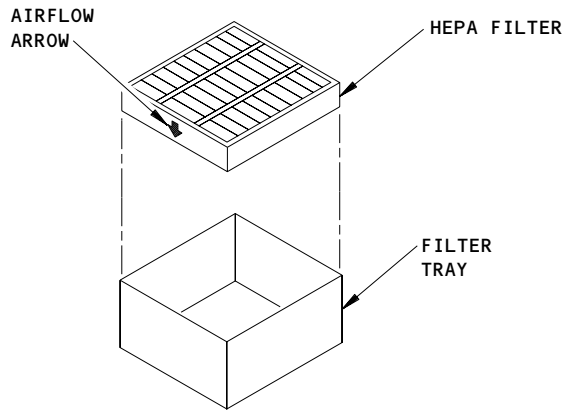
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(A) 2



(A) 1

- 1 SINGLE-PIECE HEPA FILTER (DONALDSON OR PALL-LAND & MARINE).
- 2 TWO-PIECE AIR FILTER COMBO (DONALDSON).

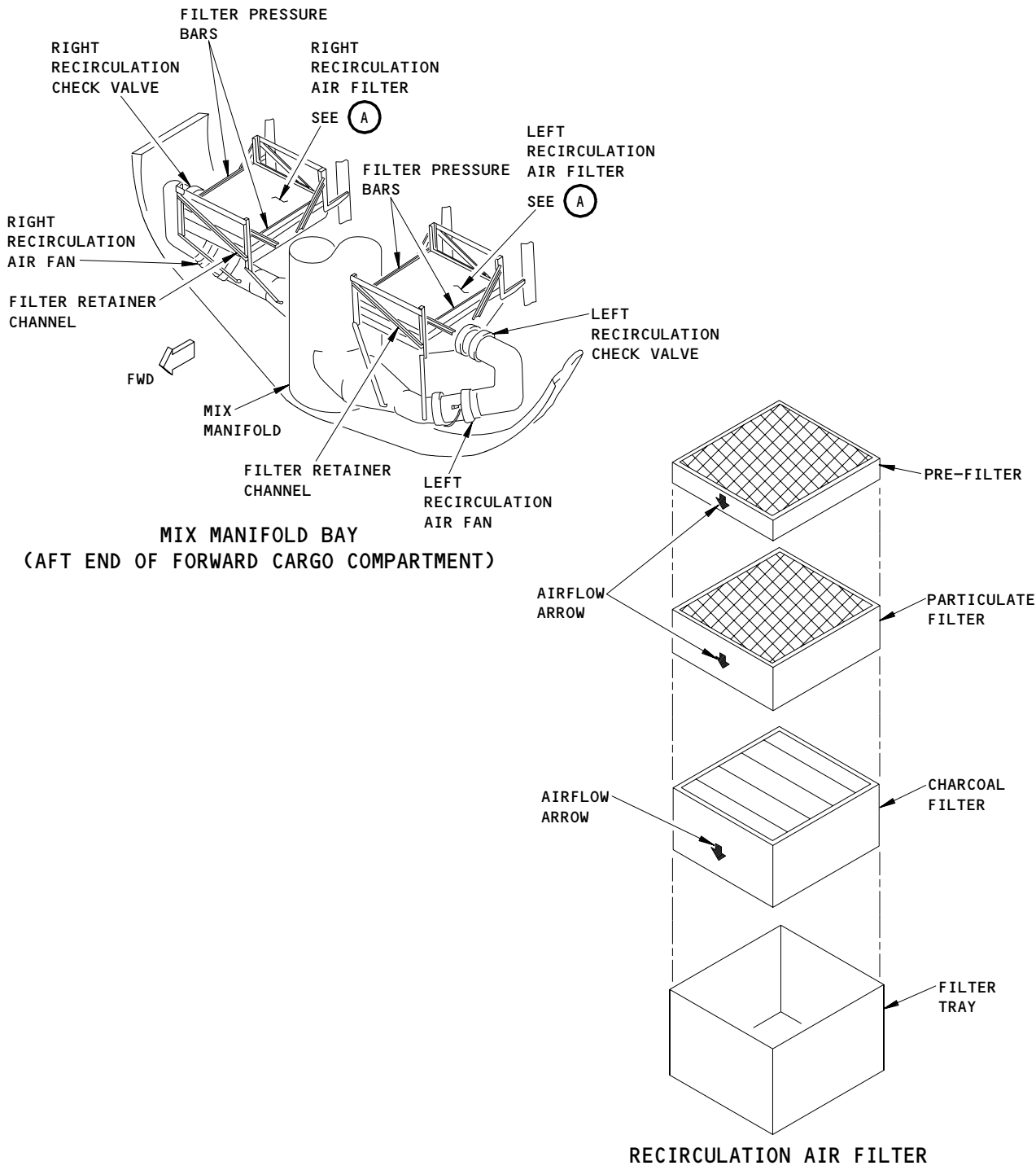
**Recirculation Air Filter Installation
Figure 401**

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767-200 AIRPLANES

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02



1 TWO-PIECE AIR FILTER COMBO WITH CHARCOAL FILTER (DONALDSON).

(A) 1

Recirculation Air Filter Installation
Figure 401A

EFFECTIVITY
767-200 AIRPLANES WITH CHARCOAL FILTER
(DONALDSON)

21-25-02
CONFIG 3
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M33376

E. Prepare for Removal

S 864-005-003

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-002-003

- (2) Do this step if you will remove the left recirculation air filter:
(a) Push the L RECIRC FAN switch-light, on the P5 overhead panel, to the off position and attach a DO-NOT-OPERATE tag.
1) Make sure the ON light goes off.

S 864-003-003

- (3) Do this step if you will remove the right recirculation air filter:
(a) Push the R RECIRC FAN switch-light, on the P5 overhead panel, to the off position and attach a DO-NOT-OPERATE tag.
1) Make sure the ON light goes off.

S 014-004-003

- (4) Open the forward cargo door, 821.

S 014-006-003

- (5) Remove the aft endwall (bulkhead) panels in the forward cargo compartment to get access to the recirculation air filters (AMM 25-52-01/401).

S 944-054-003

WARNING: PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES.

- (6) Put on the personal protective equipment before you touch the filter.

F. Single-piece HEPA Filter Replacement (Fig. 401)

NOTE: Donaldson and Pall Land & Marine 'single-piece' HEPA filters are interchangeable with the Donaldson 'two-piece' prefilter/particulate filter combination (767-SL-21-058).

S 024-018-003

- (1) Remove the filter retainer channel from the filter tray.

S 024-055-003

WARNING: DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE INJURIES TO PERSONS.

- (2) Pull the 4-inch thick HEPA filter out from the filter tray.

WARNING: PUT ALL AIR FILTERS THAT ARE REMOVED FROM THE AIRPLANE INTO PLASTIC DISPOSAL BAGS. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT AND LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF MATERIAL.

- (a) Put the filter in a plastic disposal bag and discard in accord with airline, local health, safety and regulatory procedures for disposal of material.

S 214-019-003

- (3) Examine the inside of the filter tray and remove any unwanted material that could prevent proper airflow through the check valve.

S 964-021-003

- (4) Push a new 4-inch thick HEPA filter into the filter tray.
(a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-022-003

- (5) Reinstall the filter retainer channel to the filter tray.

G. Prefilter Replacement (Fig. 401)

NOTE: Donaldson 'two-piece' prefilter/particulate filter combination is interchangeable with the Donaldson and Pall Land & Marine 'single-piece' HEPA filters (767-SL-21-058).

S 024-007-003

- (1) Remove the filter retainer channel from the filter tray.

S 024-056-003

WARNING: DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE INJURIES TO PERSONS.

- (2) Pull the 1-inch thick prefilter out from the top position of the filter tray.

NOTE: As an option the prefilter media can be replaced instead of replacement of the entire prefilter assembly (767-SL-21-053).

- (a) To replace the prefilter media, twist the corners of the prefilter frame then remove the prefilter media from the frame.

WARNING: PUT ALL AIR FILTERS THAT ARE REMOVED FROM THE AIRPLANE INTO PLASTIC DISPOSAL BAGS. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT AND LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF MATERIAL.

- (b) Put the filter in a plastic disposal bag and discard in accord with airline, local health, safety and regulatory procedures for disposal of material.
- (c) Carefully put the new prefilter media (Donaldson p/n AB0470048) into the frame so that the "blue" side of the prefilter media faces the upstream side of the filter frame.

NOTE: An airflow arrow is on the prefilter frame to help determine which side is the upstream side of the frame.

S 964-009-003

- (3) Push a new 1-inch thick prefilter into the top position of the filter tray.
 - (a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-010-003

- (4) Reinstall the filter retainer channel to the filter tray.

H. Particulate Filter Replacement (Fig. 401)

NOTE: Donaldson 'two-piece' prefilter/particulate filter combination is interchangeable with the Donaldson and Pall Land & Marine 'single-piece' HEPA filters (767-SL-21-058).

S 024-011-003

- (1) Remove the filter retainer channel from the filter tray.

S 024-062-003

- (2) Pull the 1-inch thick prefilter out from the top of the filter tray.
(a) Keep the 1-inch thick prefilter for re-installation.

S 024-057-003

WARNING: DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE INJURIES TO PERSONS.

- (3) Pull the 3-inch thick particulate filter out from the filter tray.

WARNING: PUT ALL AIR FILTERS THAT ARE REMOVED FROM THE AIRPLANE INTO PLASTIC DISPOSAL BAGS. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT AND LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF MATERIAL.

- (a) Put the particulate filter in a plastic disposal bag and discard in accord with airline, local health, safety and regulatory procedures for disposal of material.

S 214-014-003

- (4) Examine the inside of the filter tray and remove any unwanted material that could prevent proper airflow through the check valve.

S 964-015-003

- (5) Push a new 3-inch thick particulate filter into the filter tray.
(a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-017-003

- (6) Reinstall the 1-inch thick prefilter into the top position of the filter tray.
(a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-016-003

- (7) Reinstall the filter retainer channel to the filter tray.
I. Charcoal Filter Replacement (if equipped) (Fig. 401A)

S 024-023-003

- (1) Remove the filter retainer channel from the filter tray.

S 024-063-003

- (2) Pull the 1-inch thick prefilter out from the top of the filter tray.
(a) Keep the 1-inch thick prefilter for re-installation.

S 024-064-003

- (3) Pull the 3-inch thick particulate filter out from the mid position of the filter tray.
(a) Keep the 3-inch thick particulate filter for re-installation.

S 024-058-003

WARNING: DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE INJURIES TO PERSONS.

- (4) Pull the 7-inch thick charcoal filter out of the bottom position of the filter tray.

WARNING: PUT ALL AIR FILTERS THAT ARE REMOVED FROM THE AIRPLANE INTO PLASTIC DISPOSAL BAGS. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT AND LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF MATERIAL.

- (a) Put the charcoal filter in a plastic disposal bag and discard in accord with airline, local health, safety and regulatory procedures for disposal of material.

S 214-027-003

- (5) Examine the inside of the filter tray and remove any unwanted material that could prevent proper airflow through the check valve.

S 964-028-003

- (6) Push a new 7-inch thick charcoal filter into the bottom position of the filter tray.
 - (a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-029-003

- (7) Reinstall the 3-inch thick particulate filter into the mid position of the filter tray.
 - (a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-030-003

- (8) Reinstall the 1-inch thick prefilter into the top position of the filter tray.
 - (a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-031-003

- (9) Reinstall the filter retainer channel to the filter tray.

J. Restore the Airplane to Normal

S 024-061-003

WARNING: DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG.

- (1) Remove the personal protective equipment and put them in a plastic disposal bag, and discard them in accord with airline, local health, safety and regulatory procedures for disposal of material.

S 114-060-003

WARNING: CLEAN YOUR HANDS WITH SOAP AND RUNNING HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES.

- (2) Clean your hands with soap and running hot water.

 **BOEING**
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MAINTENANCE MANUAL

- S 414-033-003
- (3) Reinstall the aft endwall (bulkhead) panels in the forward cargo compartment (AMM 25-52-01/401).
- S 414-034-003
- (4) Close the forward cargo door, 821.
- S 864-036-003
- (5) Remove the DO-NOT-OPERATE tag(s) from the L/R RECIRC FAN switch-light(s) on the P5 overhead panel.
- S 864-035-003
- (6) Remove electrical power (AMM 24-22-00/201).

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RECIRCULATION AIR FILTER – REMOVAL/INSTALLATION

1. General

- A. This task has instructions to replace the recirculation air filters which are found behind the aft endwall in the forward cargo compartment.

TASK 21-25-02-904-001-004

2. Recirculation Air Filter Replacement

A. Equipment

- (1) Plastic disposal bags - (38"x48", 1-2mil, 40-42 gal) (or equivalent)
- (2) Personal protective equipment & clothing (PPE/PPC) (disposable) - commercially available
 - (a) Particulate Respirator (NIOSH 42 CFR 84 Class N95, N99, N100) - 3M model 8210 (or equivalent)
 - (b) Safety Goggles - 3M model 1621 (or equivalent)
 - (c) Latex or Nitrile Gloves - Kimberly-Clark KleenGuard, SafeSkin, or ShieldMaster models (or equivalent)
 - (d) Coverall with hood - Dupont 'Tyvek' style S1428 or 01414 (or equivalent)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401		Recirculation Air Filter	21-25-01	02	264
401		Recirculation Air Filter	21-25-01	02	265
401		Recirculation Air Filter	21-25-01	02	270
401		Recirculation Air Filter	21-25-01	02	272
401		Recirculation Air Filter	21-25-01	02	273
401		Recirculation Air Filter	21-25-01	02	275
401		Recirculation Air Filter	21-25-01	04	185
401		Recirculation Air Filter	21-25-01	04	190
401		Recirculation Air Filter	21-25-01	04	195
401		Recirculation Air Filter	21-25-01	04	197
401		Recirculation Air Filter	21-25-01	04	300

C. References

- (1) AMM 24-22-00/201, Electrical Power
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Panels

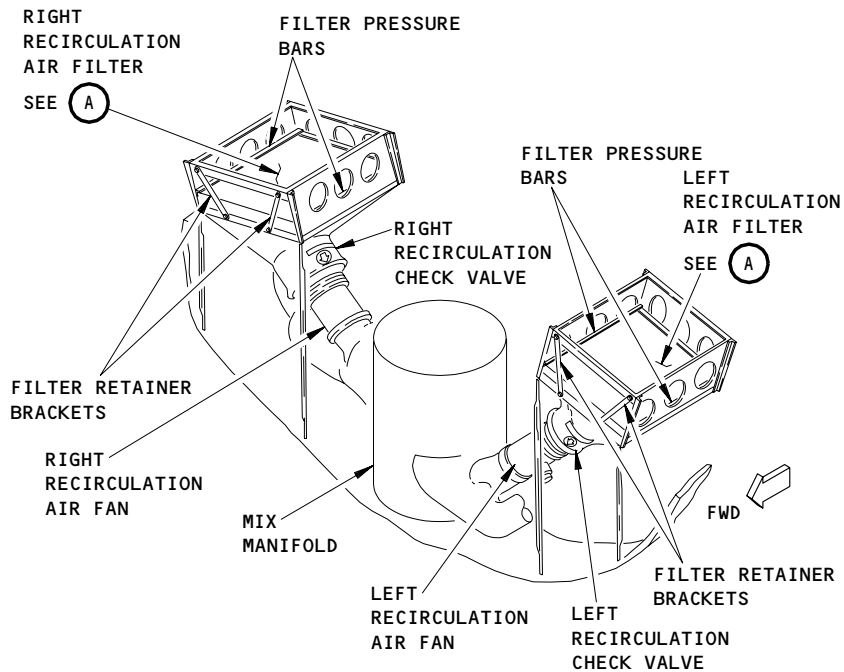
D. Access

- (1) Location Zones
 - 125 Area Aft of Forward Cargo Compartment (Left)
 - 126 Area Aft of Forward Cargo Compartment (Right)
- (2) Access Panels
 - 821 Forward Cargo Door

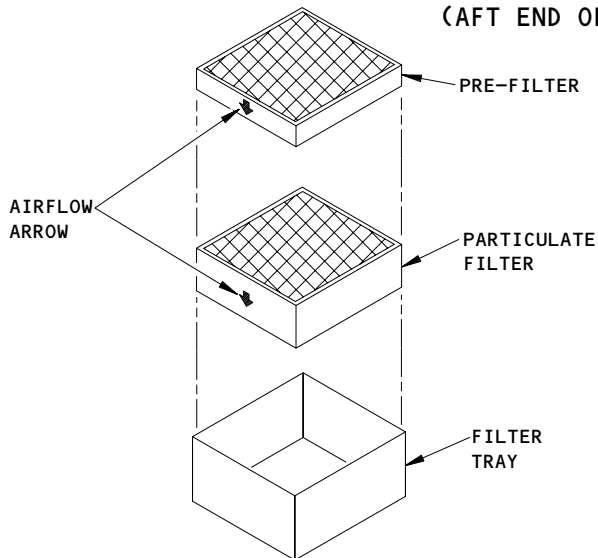
EFFECTIVITY
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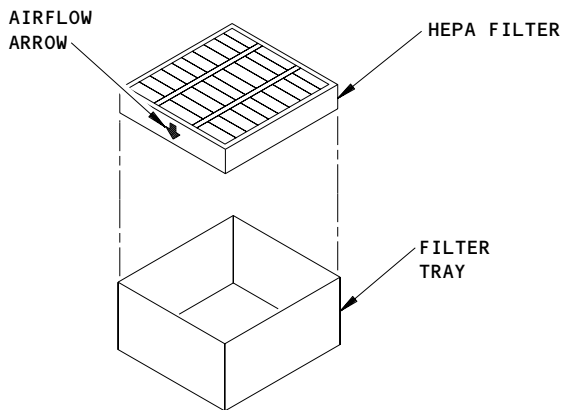
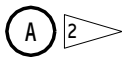
01



MIX MANIFOLD BAY
(AFT END OF FORWARD CARGO COMPARTMENT)



RECIRCULATION AIR FILTER
(ALTERNATIVE)



RECIRCULATION AIR FILTER
(PREFERRED)



- 1 SINGLE-PIECE HEPA FILTER (DONALDSON OR PALL-LAND & MARINE).
- 2 TWO-PIECE AIR FILTER COMBO (DONALDSON).

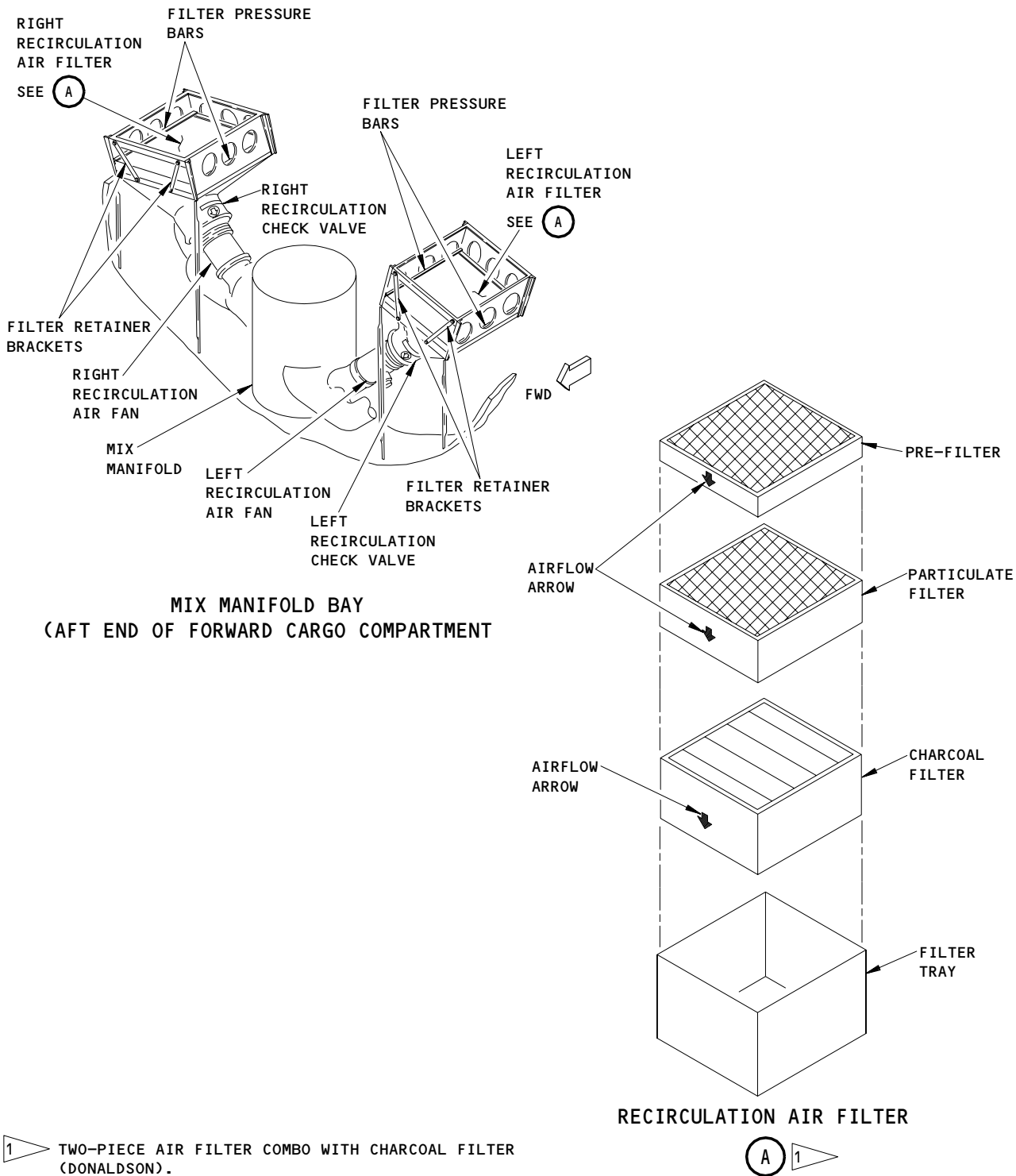
Recirculation Air Filter Installation
Figure 401

EFFECTIVITY
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Recirculation Air Filter Installation
Figure 401A

EFFECTIVITY
767-300 AIRPLANES WITH CHARCOAL FILTER
(DONALDSON)

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E. Prepare for Removal

S 864-002-004

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-003-004

- (2) Do this step if you will remove the left recirculation air filter:
(a) Push the L RECIRC FAN switch-light, on the P5 overhead panel, to the off position and attach a DO-NOT-OPERATE tag.
1) Make sure the ON light goes off.

S 864-004-004

- (3) Do this step if you will remove the right recirculation air filter:
(a) Push the R RECIRC FAN switch-light, on the P5 overhead panel, to the off position and attach a DO-NOT-OPERATE tag.
1) Make sure the ON light goes off.

S 014-005-004

- (4) Open the forward cargo door, 821.

S 014-006-004

- (5) Remove the aft endwall (bulkhead) panels in the forward cargo compartment to get access to the recirculation air filters (AMM 25-52-01/401).

S 944-053-004

WARNING: PUT ON THE PERSONAL PROTECTIVE EQUIPMENT BEFORE YOU TOUCH THE FILTER. THE FILTER REMOVES SMALL PARTICLES (SMOKE, DUST, LINT, FIBERS, POLLEN) AND INFECTIOUS MATERIALS (BACTERIA, VIRUSES, MOLD SPORES, FUNGI) FROM THE AIR WHICH CAN CAUSE ILLNESSES.

- (6) Put on the personal protective equipment before you touch the filter.

F. Single-piece HEPA Filter Replacement (Fig. 401)

NOTE: Donaldson and Pall Land & Marine 'single-piece' HEPA filters are interchangeable with the Donaldson 'two-piece' prefilter/particulate filter combination (767-SL-21-058).

S 024-007-004

- (1) Remove the two filter retainer brackets from the filter tray.

S 024-054-004

WARNING: DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE INJURIES TO PERSONS.

(2) Pull the 4-inch thick HEPA filter out from the filter tray.

WARNING: PUT ALL AIR FILTERS THAT ARE REMOVED FROM THE AIRPLANE INTO PLASTIC DISPOSAL BAGS. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT AND LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF MATERIAL.

(a) Put the filter in a plastic disposal bag and discard in accord with airline, local health, safety and regulatory procedures for disposal of material.

S 214-009-004

(3) Examine the inside of the filter tray and remove any unwanted material that could prevent proper airflow through the check valve.

S 964-010-004

(4) Push a new 4-inch thick HEPA filter into the filter tray.
(a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-011-004

(5) Reinstall the filter retainer brackets to the filter tray.

G. Prefilter Replacement (Fig. 401)

NOTE: Donaldson 'two-piece' prefilter/particulate filter combination is interchangeable with the Donaldson and Pall Land & Marine 'single-piece' HEPA filters (767-SL-21-058).

S 024-012-004

(1) Remove the two filter retainer brackets from the filter tray.

S 024-055-004

WARNING: DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE INJURIES TO PERSONS.

- (2) Pull the 1-inch thick prefilter out from the top position of the filter tray.

NOTE: As an option the prefilter media can be replaced instead of replacement of the entire prefilter assembly (767-SL-21-053).

- (a) To replace the prefilter media, carefully twist the prefilter frame until you can pull the prefilter media out of the frame, then discard the prefilter media.

WARNING: PUT ALL AIR FILTERS THAT ARE REMOVED FROM THE AIRPLANE INTO PLASTIC DISPOSAL BAGS. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT AND LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF MATERIAL.

- (b) Put the filter in a plastic disposal bag and discard in accord with airline, local health, safety and regulatory procedures for disposal of material.
- (c) Carefully put the new prefilter media (Donaldson p/n AB0476900) into the frame so that the "blue" side of the prefilter media faces the upstream side of the filter frame.

NOTE: An airflow arrow is on the prefilter frame to help determine which side is the upstream side of the frame.

S 964-014-004

- (3) Push a new 1-inch thick prefilter into the top position of the filter tray.
 - (a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-015-004

- (4) Reinstall the filter retainer brackets to the filter tray.

H. Particulate Filter Replacement (Fig. 401)

NOTE: Donaldson 'two-piece' prefilter/particulate filter combination is interchangeable with the Donaldson and Pall Land & Marine 'single-piece' HEPA filters (767-SL-21-058).

S 024-016-004

- (1) Remove the two filter retainer brackets from the filter tray.

S 024-056-004

- (2) Pull the 1-inch thick prefilter out from the top of the filter tray.
(a) Keep the 1-inch thick prefilter for re-installation.

S 024-057-004

WARNING: DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE INJURIES TO PERSONS.

- (3) Pull the 3-inch thick particulate filter out from the filter tray.

WARNING: PUT ALL AIR FILTERS THAT ARE REMOVED FROM THE AIRPLANE INTO PLASTIC DISPOSAL BAGS. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT AND LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF MATERIAL.

- (a) Put the particulate filter in a plastic disposal bag and discard in accord with airline, local health, safety and regulatory procedures for disposal of material.

S 214-019-004

- (4) Examine the inside of the filter tray and remove any unwanted material that could prevent proper airflow through the check valve.

S 964-020-004

- (5) Push a new 3-inch thick particulate filter into the filter tray.
(a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-021-004

- (6) Reinstall the 1-inch thick prefilter into the top position of the filter tray.
(a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-022-004

- (7) Reinstall the filter retainer brackets to the filter tray.

I. Charcoal Filter Replacement (if equipped) (Fig. 401A)

S 024-023-004

- (1) Remove the two filter retainer brackets from the filter tray.

S 024-058-004

- (2) Pull the 1-inch thick prefilter out from the top of the filter tray.
(a) Keep the 1-inch thick prefilter for re-installation.

S 024-059-004

- (3) Pull the 3-inch thick particulate filter out from the mid position of the filter tray.
(a) Keep the 3-inch thick particulate filter for re-installation.

S 024-060-004

WARNING: DO NOT LET THE FILTER TOUCH YOUR SKIN. DO NOT SHAKE OR HIT THE FILTER. DO NOT LET THE FILTER FALL. DO NOT USE COMPRESSED AIR TO CLEAN THE FILTER OR FILTER HOUSING. THIS CAN CAUSE THE INFECTIOUS MATERIAL TO BECOME AIRBORNE. DISCARD THE FILTER IN A PLASTIC DISPOSAL BAG. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN CAUSE INJURIES TO PERSONS.

- (4) Pull the 7-inch thick charcoal filter out of the bottom position of the filter tray.

WARNING: PUT ALL AIR FILTERS THAT ARE REMOVED FROM THE AIRPLANE INTO PLASTIC DISPOSAL BAGS. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT AND LAW ENFORCEMENT REGULATIONS FOR DISPOSAL OF MATERIAL.

- (a) Put the charcoal filter in a plastic disposal bag and discard in accord with airline, local health, safety and regulatory procedures for disposal of material.

S 214-027-004

- (5) Examine the inside of the filter tray and remove any unwanted material that could prevent proper airflow through the check valve.

S 964-028-004

- (6) Push a new 7-inch thick charcoal filter into the bottom position of the filter tray.
 - (a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-029-004

- (7) Reinstall the 3-inch thick particulate filter into the mid position of the filter tray.
 - (a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-030-004

- (8) Reinstall the 1-inch thick prefilter into the top position of the filter tray.
 - (a) Make sure the airflow arrow on the filter frame points down into the filter tray.

S 424-031-004

- (9) Reinstall the filter retainer brackets to the filter tray.

J. Restore the Airplane to Normal

S 024-061-004

WARNING: DISCARD ALL PERSONAL PROTECTIVE EQUIPMENT AFTER YOU USE IT ONE TIME. DO NOT TRY TO CLEAN IT. DISCARD THE EQUIPMENT IN A PLASTIC DISPOSAL BAG.

- (1) Remove the personal protective equipment and put them in a plastic disposal bag, and discard them in accord with airline, local health, safety and regulatory procedures for disposal of material.

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S 114-062-004

WARNING: CLEAN YOUR HANDS WITH SOAP AND RUNNING HOT WATER. DIRTY HANDS WITH CONTAMINATION CAN CAUSE DISEASE AND ILLNESSES.

(2) Clean your hands with soap and running hot water.

S 414-032-004

(3) Reinstall the aft endwall (bulkhead) panels in the forward cargo compartment (AMM 25-52-01/401).

S 414-033-004

(4) Close the forward cargo door, 821.

S 864-034-004

(5) Remove the DO-NOT-OPERATE tag(s) from the L/R RECIRC FAN switch-light(s) on the P5 overhead panel.

S 864-035-004

(6) Remove electrical power (AMM 24-22-00/201).

RECIRCULATION AIR CHECK VALVE – REMOVAL/INSTALLATION

1. General

- A. Two recirculation air check valves are installed in the mix manifold bay, at the aft end of the forward cargo compartment. This procedure has instructions to remove and install the recirculation air check valves.

TASK 21-25-03-004-001

2. Remove the Recirculation Air Check Valves (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) 21-25-02/401, Recirculation Air Filters
- (3) 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zones
125/26 Area Aft of Forward Cargo Compartment

C. Prepare for the Removal

S 864-002

- (1) Push the L and R RECIRC FAN switch-lights, on the pilots' overhead panel P5, to the off position.
 - (a) Make sure the ON light goes off.
 - (b) Put a DO-NOT-OPERATE tag on the switch-lights.

S 864-004

- (2) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.
 - (a) Make sure the PACK OFF lights come on.
 - (b) Put a DO-NOT-OPERATE tag on the selectors.

S 864-038

- (3) Open and attach a DO-NOT-CLOSE tag to these circuit breakers:
 - (a) To remove the right check valve:
 - 1) On the overhead circuit breaker panel, P11, 11R23, R RECIRC FAN
 - 2) On the right miscellaneous electrical equipment panel, P37, 37G4 or 37C4, R RECIRC FAN
 - (b) To remove the left check valve:
 - 1) On the overhead circuit breaker panel, P11, 11R14, L RECIRC FAN
 - 2) On the left miscellaneous electrical equipment panel, P36, 36F2 or 36F4, L RECIRC FAN

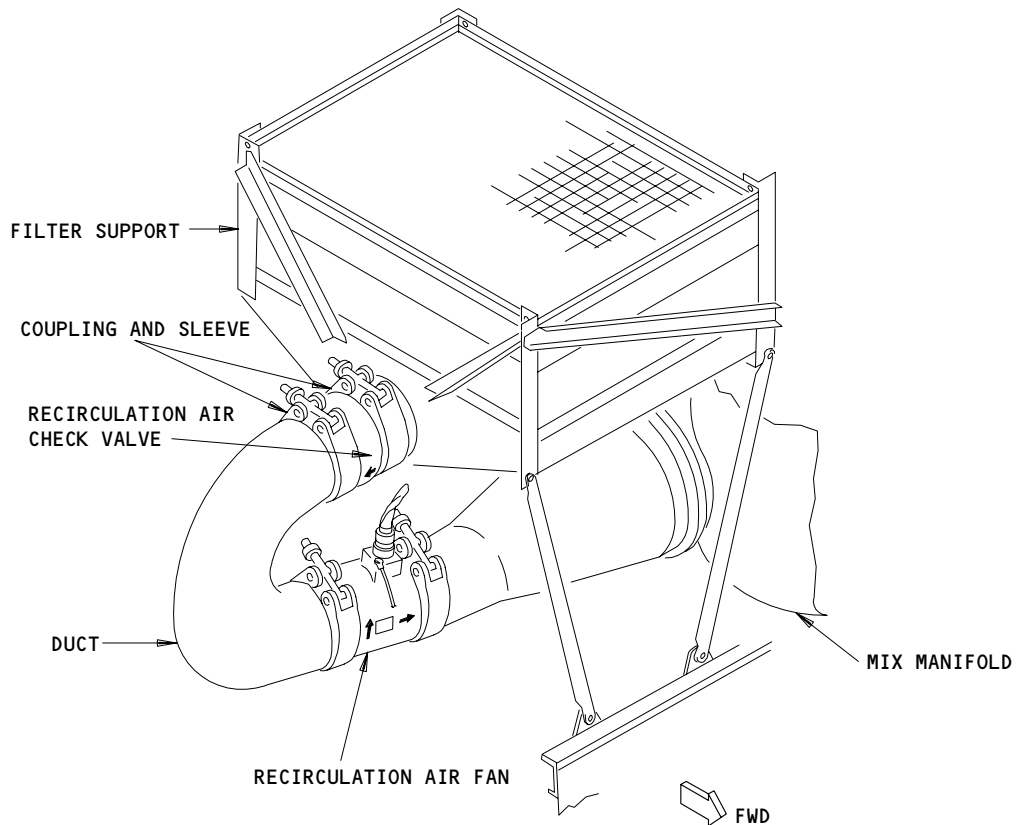
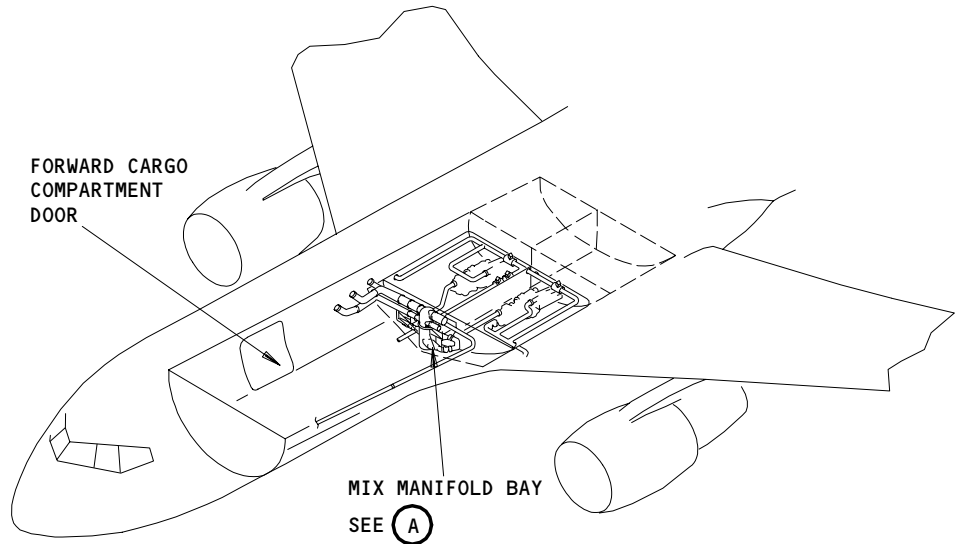
EFFECTIVITY

ALL

21-25-03

02

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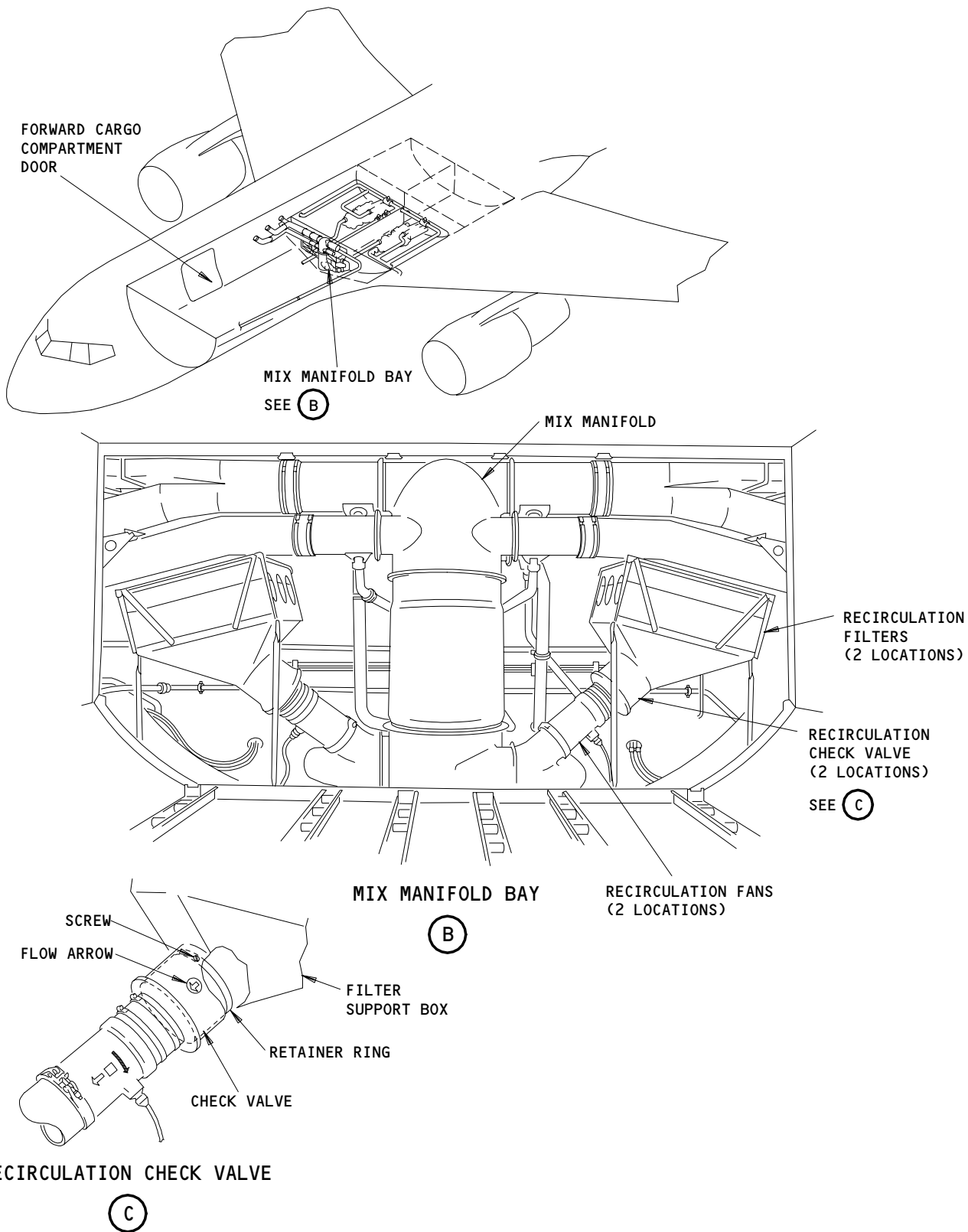
RIGHT SIDE SHOWN
(LEFT SIDE OPPOSITE)

(A)

Recirculation Air Check Valve Installation
Figure 401 (Sheet 1)

EFFECTIVITY
767-200 AIRPLANES

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Recirculation Air Check Valve Installation
Figure 401 (Sheet 2)

EFFECTIVITY
767-300 AIRPLANES

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- S 014-006
(4) Open the forward cargo door 821 (Ref 06-46-00).

- S 014-007
(5) Remove the retaining curtain at the aft end of the forward cargo compartment.

D. Remove the check valve.

- S 034-033
(1) 767-200 AIRPLANES;
Do the steps that follow:
(a) Remove the couplings on both sides of the check valve.
(b) Move the rubber sleeves away from the check valve.

- S 034-034
(2) 767-300 AIRPLANES;
Do the steps that follow:
(a) Remove the filters from the filter support box (Ref 21-25-02).
(b) Remove the screws from the duct that contains the check valve.
(c) Remove the retainer ring from the inner side of the duct.

- S 024-013
(3) Remove the check valve.

- S 434-014
(4) Put a cover on the duct openings.

TASK 21-25-03-404-015

3. Install the Recirculation Air Check Valve (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
(2) 21-25-02/401, Recirculation Air Filters
(3) 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zones
125/26 Area Aft of Forward Cargo Compartment

C. Install the Check Valve

- S 034-016
(1) Remove the duct covers from the duct openings.

- S 434-017
(2) Make sure there is no unwanted material in the ducts.

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- S 424-018
- (3) Put the check valve into position in the duct.
- (a) 767-300 AIRPLANES;
Make sure you can see the flow arrow through the hole in the duct.
- (b) Make sure the flow arrow points away from the filter box.
- (c) Make sure the valve shaft is in a vertical position.
- S 434-036
- (4) 767-200 AIRPLANES;
Do the steps that follow:
- (a) Move the rubber sleeves onto the check valve flanges.
- (b) Install the couplings on both sides of the check valve.
- 1) Tighten the couplings nuts to 40-45 pound-inches.
- S 434-037
- (5) 767-300 AIRPLANES;
Do the steps that follow:
- (a) Put the retainer ring on the top of the check valve.
- (b) Install the screws and washers that hold the retainer ring to the duct.
- (c) Install the filters in the filter support box (Ref 21-25-02).
- D. Do the installation test for the Recirculation Air Check Valves
- S 864-046
- (1) Supply electrical power (AMM 24-22-00/201).
- S 864-041
- (2) Push the L and R UTILITY BUS switch-lights, on the P5 panel, to the off and then to the on position.
- S 864-039
- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
- (a) If the right check valve was installed:
- 1) On the P11 panel,
11R23, R RECIRC FAN
- 2) On the P37 panel,
37G4 or 37C4, R RECIRC FAN
- (b) If the left check valve was installed:
- 1) On the P11 panel,
11R14, L RECIRC FAN
- 2) On the P36 panel,
36F2 or 36F4, L RECIRC FAN
- S 864-021
- (4) Remove the DO-NOT-OPERATE tags and push the L and R RECIRC FAN switch-lights, on the P5 panel, to the on position.
- (a) Make sure the ON lights come on.

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S 214-023

- (5) Feel for airflow around the check valve.
 - (a) A small leak is permitted.
 - (b) A large leak must be repaired.

E. Put the Airplane Back to Its Usual Condition

S 864-031

- (1) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 414-026

- (2) Install the retaining curtain at the aft end of the forward cargo compartment.

S 414-029

- (3) Close the forward cargo compartment door, 821 (Ref 06-46-00).

S 864-030

- (4) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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RECIRCULATION FAN CURRENT SENSOR – REMOVAL/INSTALLATION

1. General

- A. There is one recirculation fan current sensor for each recirculation fan. The current sensor for the left recirculation fan is in the left miscellaneous equipment panel, P36. The current sensor for the right recirculation fan is in the right miscellaneous electrical equipment panel P37.
- B. The current sensor for the forward cargo recirculation fan is in the right miscellaneous electrical equipment panel P37.
- C. This procedure has instructions to remove and install the current sensors for all of the recirculation fans.

TASK 21-25-04-004-034

2. Remove the Recirculation Fans Current Sensors (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 24-22-00/201, Electric Power-Control
- (3) 27-61-00/201 Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
119/120 Main Equipment Center
- (2) Access Panel
119AL Main Equipment Center

C. Prepare for the Removal

S 864-001

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.

S 864-002

- (2) Remove the electrical power (Ref 24-22-00).

S 014-003

- (3) Open the access door for the main equipment center, 119AL (Ref 06-41-00).

S 014-004

- (4) Remove the front cover from the applicable (P36 or P37) panel to find the current sensor.

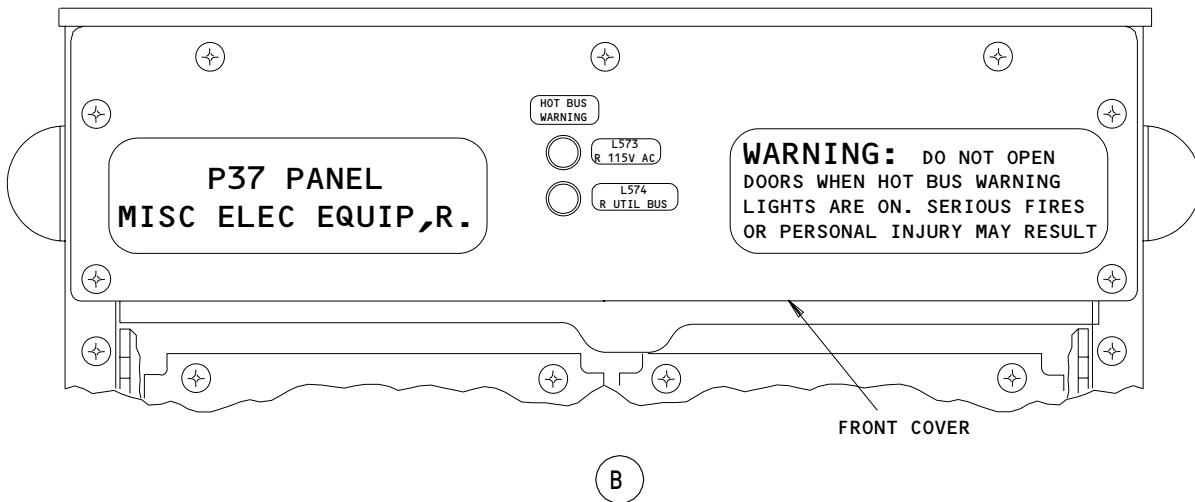
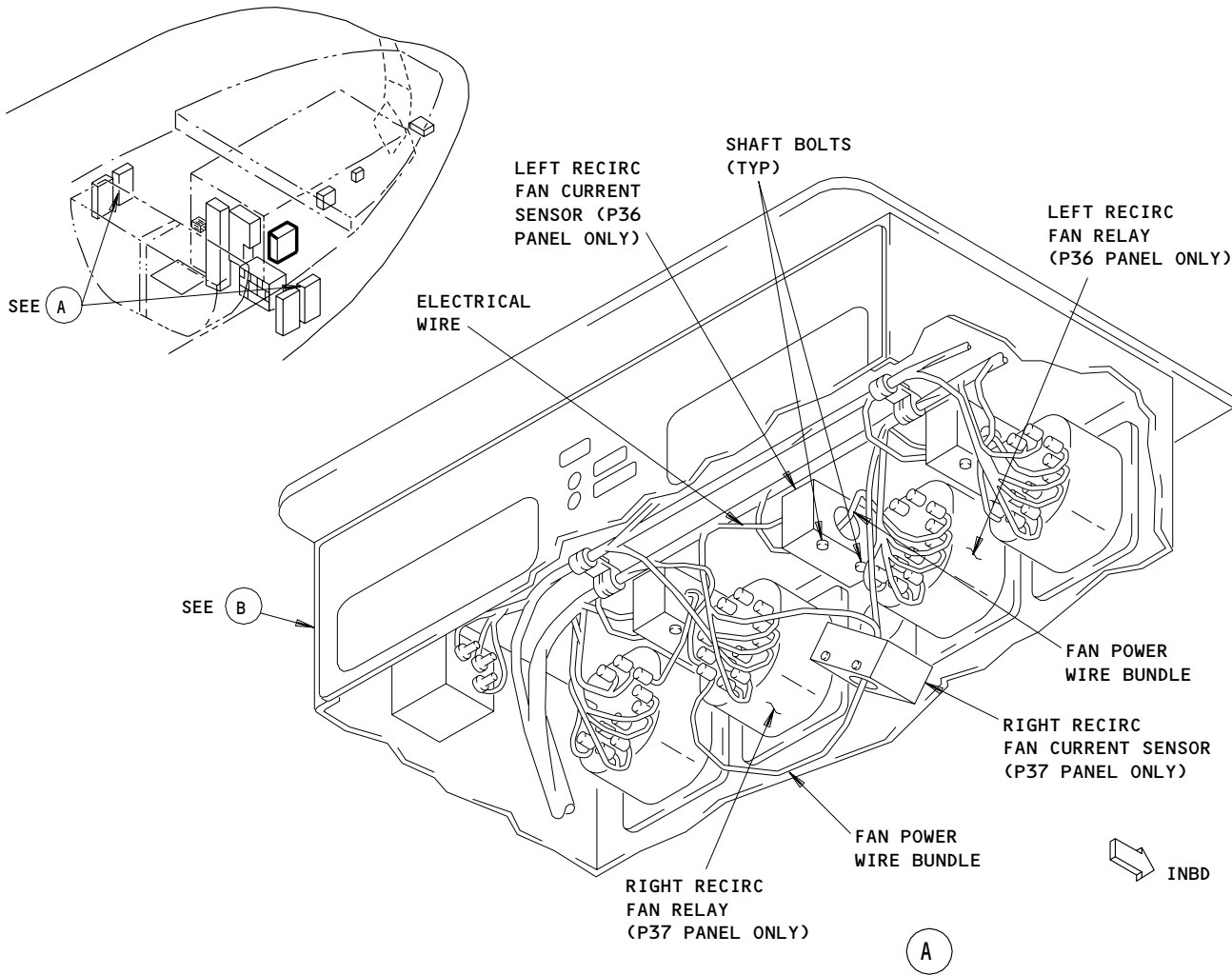
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Recirculation Fan Current Sensors Installation
Figure 401

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D. Remove the current sensor.

S 034-005

- (1) Cut the current sensor wire at the splice area.

S 034-006

- (2) Put a tag on the wires to show their installation.

S 034-007

- (3) Use one of the methods that follow to remove the fan power wire from the current sensor.

(a) Method 1:

- 1) Cut the wire on one side the current sensor.
- 2) Pull the wire through the current sensor hole.
- 3) Put a tag on the wire to show its installation.

(b) Method 2:

- 1) Disconnect the wire at the terminal C1 of the recirc fan relay.
- 2) Unwrap the wire bundle to loosen the wire.
- 3) Pull the wire through the current sensor.

S 834-008

- (4) Remove the bolts from the current sensor.

S 024-009

- (5) Remove the current sensor.

TASK 21-25-04-404-010

3. Install the Recirculation Fan Current Sensor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 24-22-00/201, Electric Power-Control
- (3) 27-61-00/201 Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
119/120 Main Equipment Center
- (2) Access Panel
119AL Main Equipment Center

C. Install the current sensor.

S 424-011

- (1) Put the current sensor into position in the applicable (P36 or P37) panel.

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- S 434-012
- (2) Install the bolts to hold the current sensor in its position.
- S 434-013
- (3) Put the fan power wire through the current sensor.
- S 434-015
- (4) For the forward cargo recirculation fan current sensor, put the fan power wire through the current sensor two times.
- S 434-016
- (5) Attach the fan power wire by one these methods:
- (a) If the fan power wire is cut:
- 1) Splice the wire to the tagged wire.
 - 2) Remove the tags that showed the installation.
- (b) If the fan power wire is not cut:
- 1) Wrap the wire to the wire bundle.
 - 2) Attach the wire to the terminal C1 of the recirc fan relay.
- S 434-017
- (6) Connect the current sensor wire to the splice area.
- (a) Make sure the wires have the same number.
- (b) Remove the tags from the wires.
- S 414-018
- (7) Install the front cover on the applicable panel.
- D. If the left or right recirculation fan current sensor was installed, do the current sensor installation test which follows:
- S 864-019
- (1) Supply electrical power (Ref 24-22-00).
- S 864-021
- (2) Push the applicable (L or R) RECIRC FAN switch-light, on the pilot's overhead panel P5, to the on position.
- S 214-022
- (3) Make sure the ON light comes on and the INOP light goes off.

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- S 864-024
- (4) Push the applicable RECIRC FAN switch-light, on the P5 panel, to the off position.
- S 214-025
- (5) Make sure the INOP light comes on.
- E. If the forward cargo recirculation fan current sensor was installed, do the current sensor installation test which follows:
- S 864-026
- (1) Supply electrical power (Ref 24-22-00).
- S 864-027
- (2) Push the SYSTEM switch-light on the FWD CARGO AIR COND / VENT FAN module, on the P5 panel.
- S 214-028
- (3) Make sure the ON light comes on.
- S 864-029
- (4) Push the ECS/MSG switch on the EICAS MAINT module, on the P61 panel.
- S 214-030
- (5) Make sure the FWD CARGO FAN message is not shown on the EICAS display.
- S 864-031
- (6) Push the SYSTEM switch-light, on the P5 panel, so that the ON light goes out.
- F. Put the Airplane Back to Its Usual Condition
- S 864-032
- (1) Remove the electrical power, if it is not necessary (Ref 24-22-00).
- S 414-033
- (2) Close the access door for the main equipment center, 119AL (Ref 06-41-00).

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VENTILATION SYSTEM – DESCRIPTION AND OPERATION

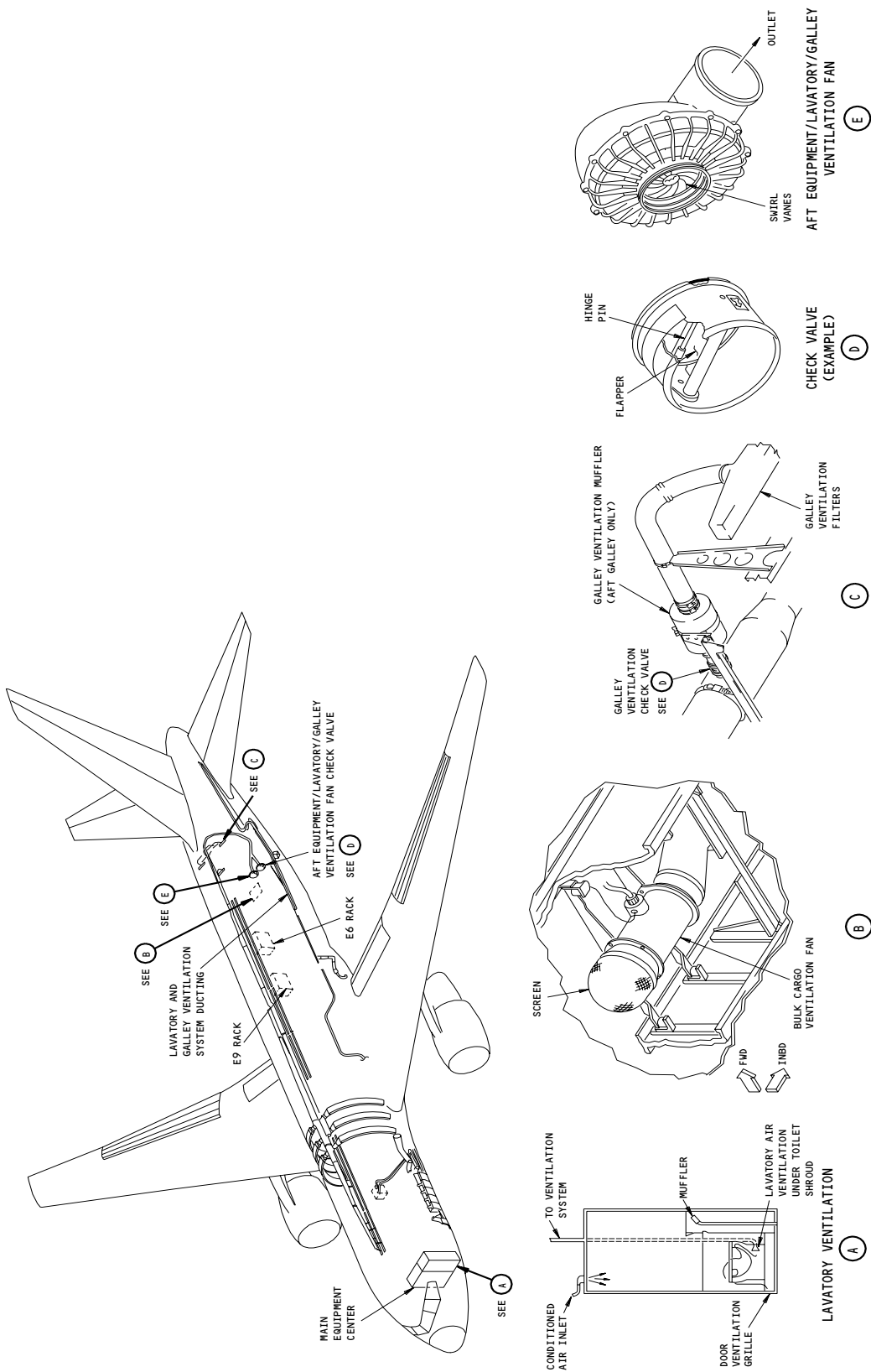
1. General (Fig. 1)

- A. The ventilation system draws smoke and odor-filled air from the lavatories and galleys through overhead ducting and exhausts it overboard. The lavatory and galley ventilation system contains:
 - (1) Two aft equip/lavatory/galley ventilation fans.
 - (2) Two aft equip/lavatory/galley ventilation fan check valves.
 - (3) A ventilation check valve for each galley.
 - (4) A galley ventilation filter for each galley.
 - (5) Restrictors
 - (6) Two fan current sensors.
 - (7) Two fan control cards.
- B. The lavatory and galley ventilation system also provides cooling of the aft electrical/electronic equipment (E6) rack units.
- C. SAS 167-999;
The lavatory and galley ventilation system also provides cooling of the satellite communications (SATCOM) (E9) rack units.
- D. SAS 156-999;
The lavatory and galley ventilation system also provides cooling of the satellite communications (SATCOM) electrical equipment above the center passenger stowage units.
- E. A separate ventilation system for the bulk cargo area increases the amount of air circulated through the bulk cargo compartment. This allows live cargo to be carried in the compartment. The ventilation system consists of a bulk cargo ventilation fan and a bulk cargo ventilation fan current sensor.
- F. Another ventilation system is installed in the forward cargo compartment. The forward-cargo-compartment-ventilation system lets air exit the cargo compartment to flow overboard. The forward-cargo-compartment-ventilation system has an exhaust fan, a fan current sensor, an exhaust valve, a ground exhaust valve, and a ground-exhaust-backup valve.
- G. Passenger Cabin Ventilation System
 - (1) Either of the two redundant fans draws air from the lavatories and galleys through common overhead ducting. Air exits the galleys through a filter and passes through a check valve and then enters the overhead ducting. Air from the aft galleys passes through a muffler before going through the check valve. Lavatory air exits through a ceiling vent into overhead ducting. The exhaust air passes through a fan check valve and fan before being exhausted at the cabin air outflow valve (Ref 21-31-00).
 - (2) The aft equipment/lavatory/galley ventilation fans draw cool air from the aft cargo compartment through the E6 rack to cool the rack equipment.
 - (3) The aft equipment/lavatory/galley ventilation fans operate in the same manner, for aft equipment cooling, as for ventilating the lavatories and galleys. The fans draw cool air from the aft cargo compartment through the aft equipment rack to cool the components. Aft equipment cooling air exhausts through the cabin air outflow valve (Ref 21-31-00).
 - (4) Mufflers are installed in the aft galley vent lines to reduce noise levels near the lavatories and galleys.

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Ventilation System
Figure 1

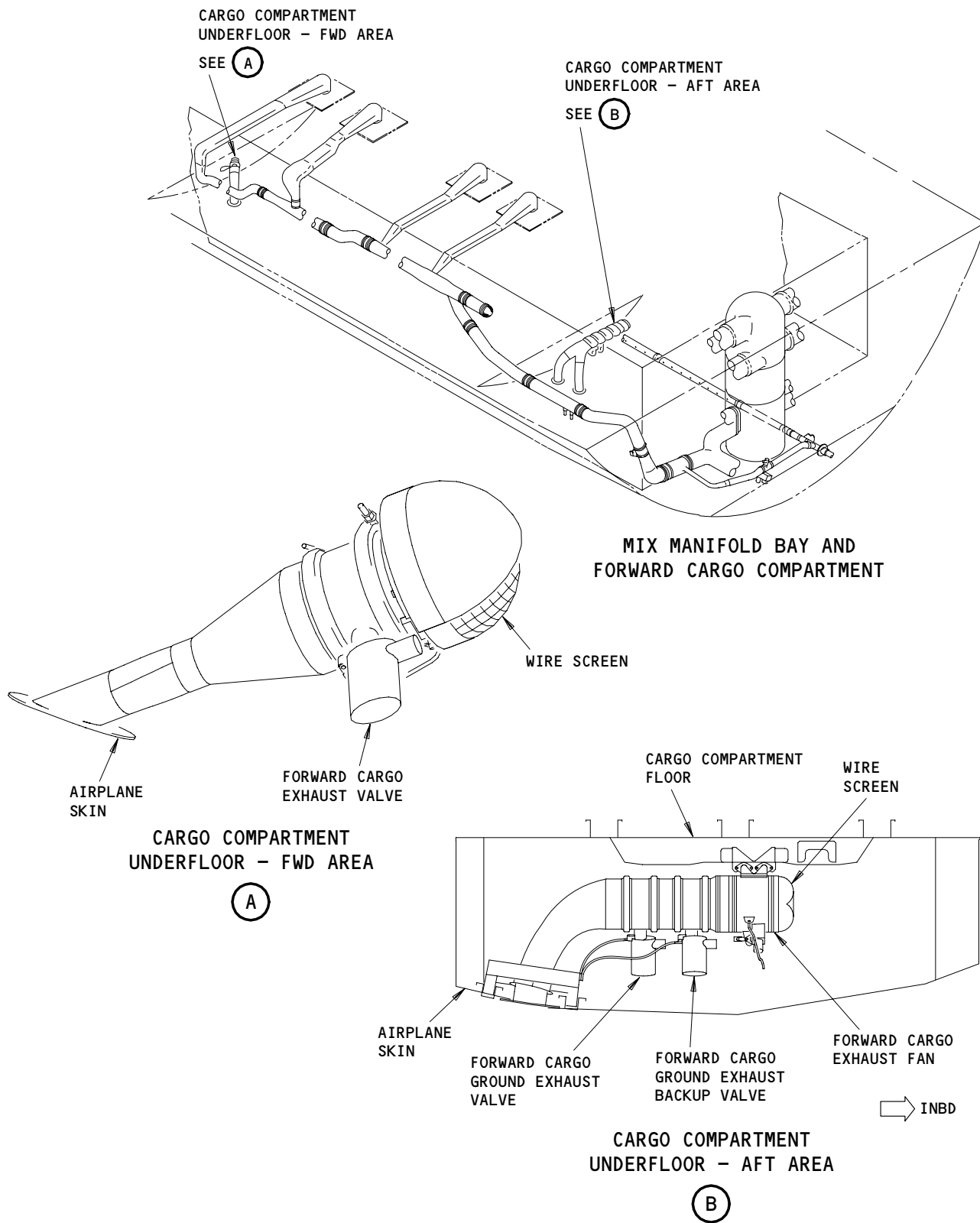
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Ventilation System
Figure 1A

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H. Bulk Cargo Compartment Ventilation System

(1) The bulk cargo ventilation system is separate from the aft equipment/lavatory/galley ventilation system. A selector, on the side panel, P61, controls the bulk cargo ventilation fan. The fan moves passenger cabin exhaust air through the fan check valve, and the air diffuser in the bulk cargo compartment ceiling and into the bulk cargo compartment. A BULK CARGO FAN status or maintenance message provides indication for fan malfunction (Ref 31-41-00).

I. Forward Cargo Compartment Ventilation System

(1) The forward-cargo-compartment-ventilation system operates when recirculated air (Ref 21-25-00) or conditioned air (Ref 21-28-00) is supplied to the forward cargo compartment. The exhaust valve lets air leave the forward cargo compartment when the airplane is in the air. The exhaust valve closes when the airplane is on the ground. The exhaust fan, the ground exhaust valve, and the ground-exhaust-backup-valve are installed in line with each other. They work together to let air leave the forward cargo compartment when the airplane is on the ground.

2. Component Details

A. Aft Equipment/Lavatory/Galley Ventilation Fan

(1) The aft cargo compartment contains two redundant identical fans just forward of the aft pressure bulkhead. The centrifugal fans consist of an electric motor, a scroll, and a thermal switch for each of the three phases. The fan motor requires 115/200 vac, 3 phase, 400 Hz power. The thermal switches restrict fan operation to below 275°F (135°C). The fan weighs about 22 pounds and output capability is 670 cfm.

B. Aft Equipment/Lavatory/Galley Ventilation Check Valve

(1) A 9-inch diameter check valve, just upstream of each aft equipment/lavatory/galley ventilation fan, consists of two semi-circular flappers attached to a centered hinge pin. A torsion spring keeps the check valve closed with no fan induced airflow.
(2) Airflow in the direction of an arrow on the check valve body overcomes the spring tension and drives the flappers open. A stop pin limits flapper travel. Reverse airflow aids the spring in closing the valve flappers.

C. Galley Ventilation Filter

(1) The galley ventilation filter, made of open-weave fiberglass, press-fits into each galley ventilation inlet. The filter prevents entrance of foreign matter into the air ducts and into the fans.

D. Galley Ventilation Muffler

(1) A 5.5 inch diameter muffler is located in each of the aft galley ventilation ducts, just upstream of the galley ventilation check valve. The muffler is constructed of a kevlar housing with needle nomex filler held by a screen cylinder.
(2) The mufflers reduce ventilating airflow noise in the aft galley areas.

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E. Restrictors

- (1) Restrictors are installed in the ventilation system where each galley inlet, each temperature sensor assembly, and some lavatory inlets connect to the overhead ventilation duct. A restrictor is also installed aft of each equip/lav/galley ventilation fan.
- (2) The restrictors are made of thin aluminum-clad alloy with different numbers and sizes of holes. The restrictor number is on the identification tag, which shows when the restrictor is installed.

F. Galley Ventilation Check Valve

- (1) A 2.5-inch diameter check valve, in the feeder duct just above each galley ceiling inlet, consists of two semi-circular flappers attached to a center hinge pin. A torsion spring keeps the check valve closed.
- (2) Airflow in the direction of an arrow on the check valve body overcomes the spring and drives the flappers open. Reverse airflow aids the spring in closing the valve flappers.

G. Bulk Cargo Ventilation Fan and Check Valve

- (1) The fan mounts between the passenger cabin floor and the bulk cargo compartment ceiling to the right of an outlet in the bulk cargo ceiling. The fan is a single stage vaneaxial type fan with a 4.75 inch diameter impeller and a built-in check valve. Downstream of the impeller, deswirl vanes recover the energy in the swirling airflow leaving the impeller. Spring loaded closed, both check valve flappers prevent back flow of air through the fan.
- (2) The single speed, squirrel cage, induction fan motor operates from 115/200 vac, 3-phase, 400 Hz power at about 11,000 rpm.

H. Fan Control Card

- (1) Two ECS fan control cards are housed in the electrical/electronic equipment bay in the P50 box/card file. The two printed circuit cards provide the control logic for operating the aft equipment/lavatory/galley ventilation fans.

I. Fan Current Sensors

- (1) Two fan current sensors, one on each of two miscellaneous electrical equipment panels (P36 and P37) monitor current flow to the aft equipment/lavatory/galley ventilation fans. An integral transformer senses the current in the wires passing through the current sensor.
- (2) A third current sensor, on the P37 panel, monitors current flow to the bulk cargo ventilation fan. An integral transformer senses the current in the wires passing through the current sensor.
- (3) A fourth current sensor, on the P37 panel, monitors current flow between the GND EXH FAN circuit breaker and the forward cargo exhaust fan. An integral transformer senses the current in the wires passing through the current sensor.

J. Forward Cargo Exhaust Valve (Fig. 1A)

- (1) The three forward cargo exhaust valves are identical and interchangeable. They are also identical and interchangeable with the forward-cargo-air-conditioning-shutoff valve (Ref 21-28-01).
- (2) Description
 - (a) The forward cargo exhaust valves are 5-inch diameter, electrically actuated, butterfly valves. The valves are made up of an actuator assembly and a valve flow section.

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- (b) The actuator includes an electrical connector, a control switch, two position switches, a motor, an actuator shaft, and a manual override handle.
 - (c) The valve flow section includes a valve flow housing and a butterfly. The actuator assembly is bolted to the valve flow housing. The actuator shaft is bolted to the top of the butterfly. A stabilizer shaft is bolted to the bottom of the butterfly.
 - (d) The manual override handle travels with the actuator shaft. When the valve is electrically operated, the handle acts as the position indicator for the valve. The handle can also be used to manually position the valve.
- (3) Function
- (a) The forward cargo exhaust valves are installed below the floor of the forward cargo compartment. The forward-cargo-exhaust valve is near the front of the forward cargo compartment. The forward-cargo-ground-exhaust valve and the forward-cargo-ground-exhaust-backup valve are near the aft of the forward cargo compartment. They let air exit the forward cargo compartment and flow overboard.
 - (b) When 28vdc is supplied to the electrical connector, the control switch moves, the motor is energized, and the butterfly is moved into position. The valve will only move to the fully closed position or the fully open position. It will not move to a partially open position. However, the manual override handle can be used to manually put the valve in any position.

K. Forward Cargo Exhaust Fan (Fig. 1A)

- (1) Description
- (a) The forward cargo exhaust fan is a single-stage, vane-axial-flow fan. It includes an electrical connector, a motor, a 13-bladed impeller, and a fan housing. The motor requires 115/200 vac, 3-phase, 400 Hz power. It includes a stator, a rotor, a rotor shaft, and three miniature thermostats. A thermostat is installed in a coil in each of the motor's three phases. The impeller is attached to the rotor shaft.
- (2) Function
- (a) The forward cargo exhaust fan is installed in line with the two forward-cargo-ground-exhaust valves. It is used to blow air from the forward cargo compartment to the outside of the airplane. It comes on only when the forward-cargo-ground-exhaust valve and the forward-cargo-ground-exhaust-backup valve are open.
 - (b) When power is supplied to the electrical connector, the stators cause the rotor, and therefore the impeller, to rotate. When the impeller rotates, the impeller blades push air through the housing. The three thermostats act as thermal protective devices. If the temperature of one of the thermostats increases to 400°F (204°C), the motor will turn off. The motor will turn on again when the thermostat temperature decreases to 340°F (171°C).

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3. Operation

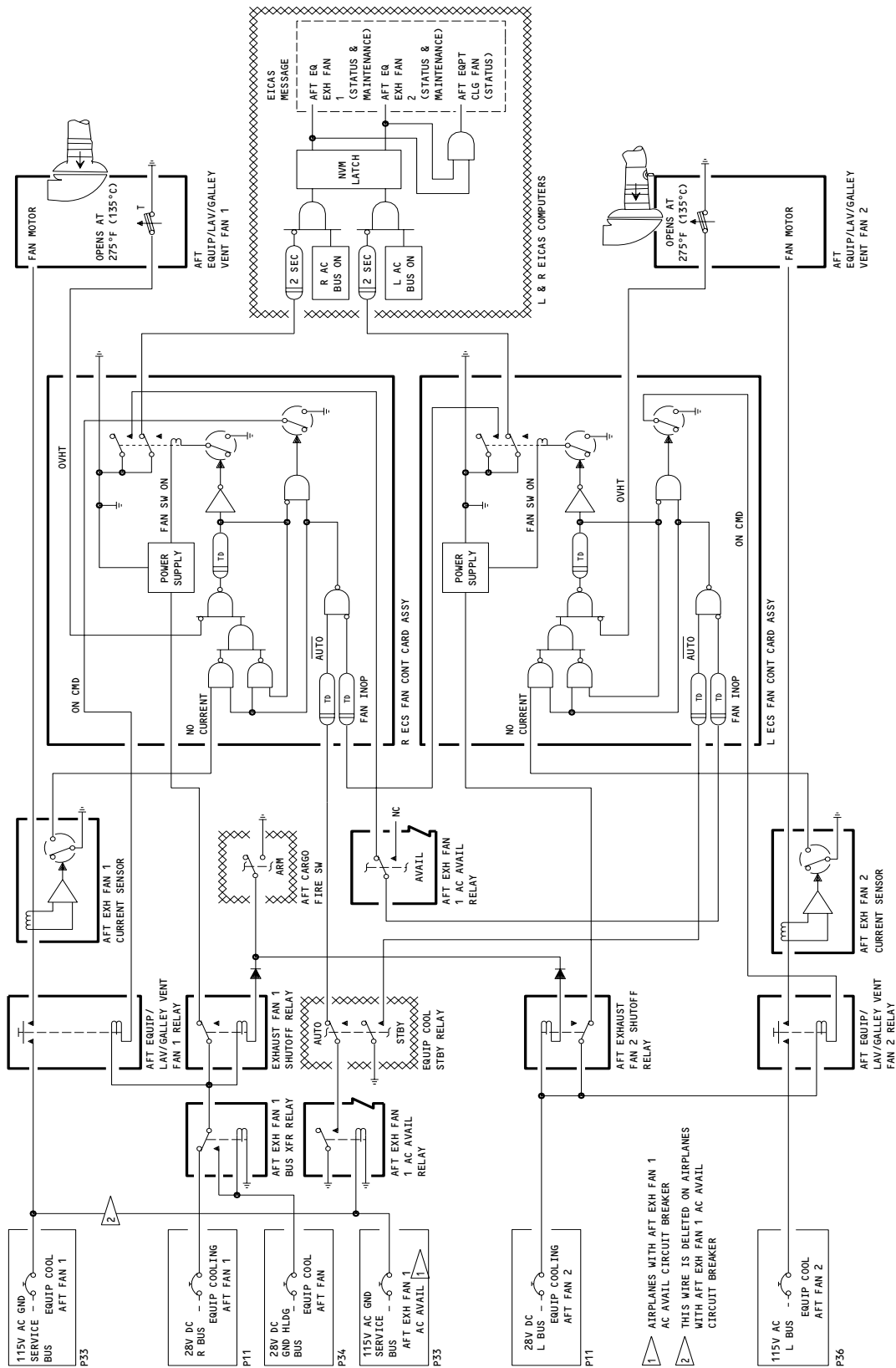
A. Functional Description - Aft Equipment/Lavatory/Galley Ventilation System (Fig. 2)

- (1) The aft equipment/lavatory/galley ventilation fans draw air out of the lavatories through a vent in the lavatory ceiling. Air, from the galleys, passes through a filter and a galley ventilation check valve. Air from the aft galleys passes through a muffler before going through the check valve. The filter prevents grease and oils from entering the overhead ducting as well as the downstream fans. The muffler reduces ventilating airflow noise in the galley areas. The check valve prevents back flow of smoke and odor filled air from the ducts into the galley. Air leaves the lavatories and galleys and enters overhead ducting. The fans draw the air through the ducting to then pass through the lavatory and galley ventilation fan check valve just upstream of the fan. Only one fan operates at a time. The lavatory and galley ventilation fan check valve prevents exhausted air from the operating fan from passing back through the non-operating fan.
- (2) The two fans, electrically interlocked through two ECS fan control cards, operate one at a time. The system automatically switches to the standby fan if the primary fan fails. Normally fan No. 1 operates with the EQUIP COOLING mode selector, on the pilots' overhead panel P5, positioned to AUTO. Fan No. 2 operates only if fan No. 1 fails or the EQUIP COOLING mode selector is placed in the STBY position. Failure of an individual fan generates an EICAS status and maintenance message (AMM 31-41-00) AFT EQ EXH FAN 1 or AFT EQ EXH FAN 2. Failure of both fans generates an EICAS message AFT EQPT CLG FAN. The fans operate on 115v ac power. Relays and control cards provide fan control from 28v dc input.
- (3) The two ECS fan control cards (L,R) are in the P50 box/card file of the electrical/electronic equipment bay. They contain the control logic circuits to operate the aft equip/lavatory/galley ventilation fans. They have a short time delay when power to the fan is turned off. The time delay prevents an EICAS message if power is quickly turned off and then on.

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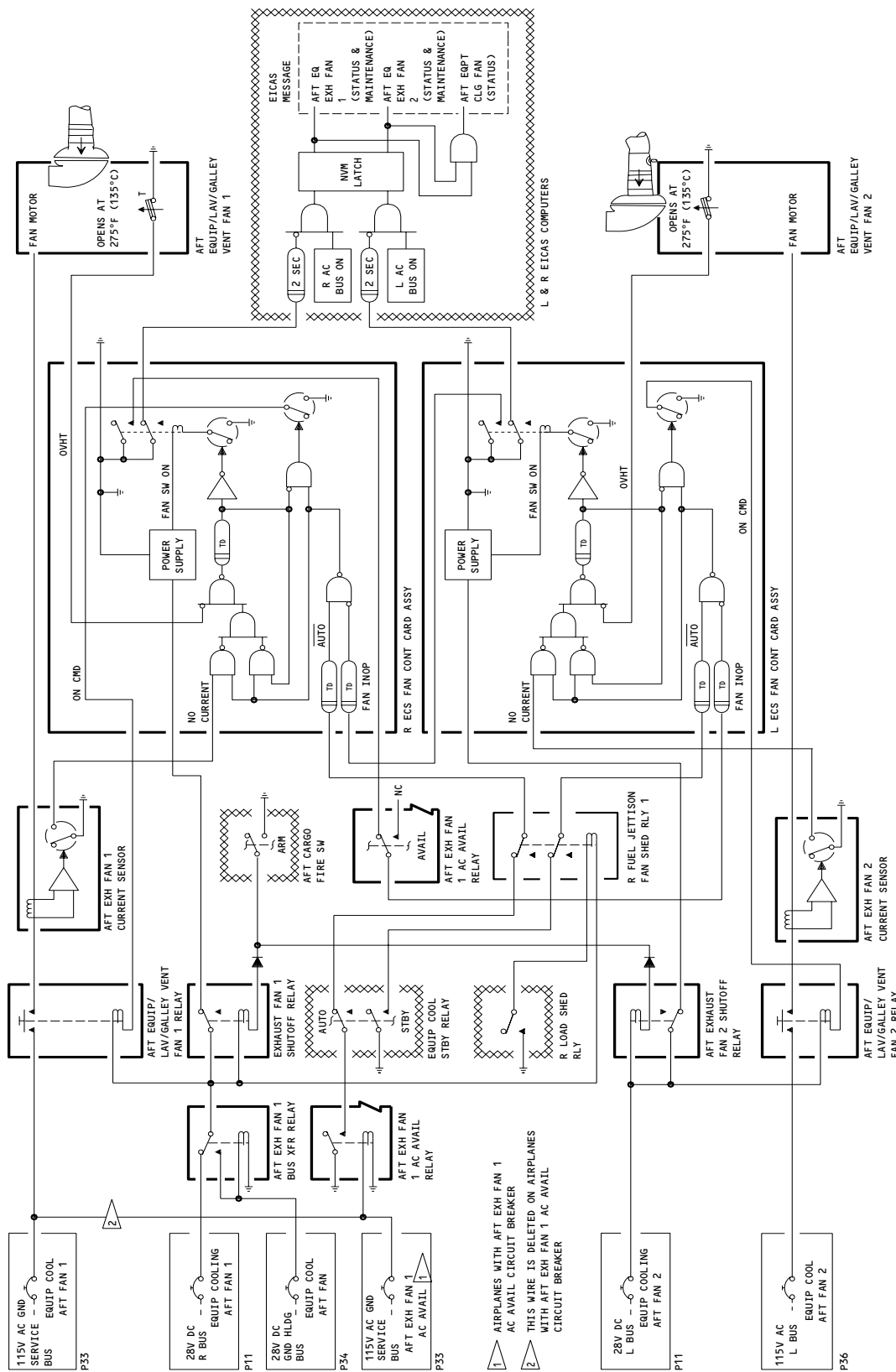
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Aft Equipment/Lavatory/Galley Ventilation System Operation Schematic
Figure 2 (Sheet 1)

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SAS 150-154, MTH 275

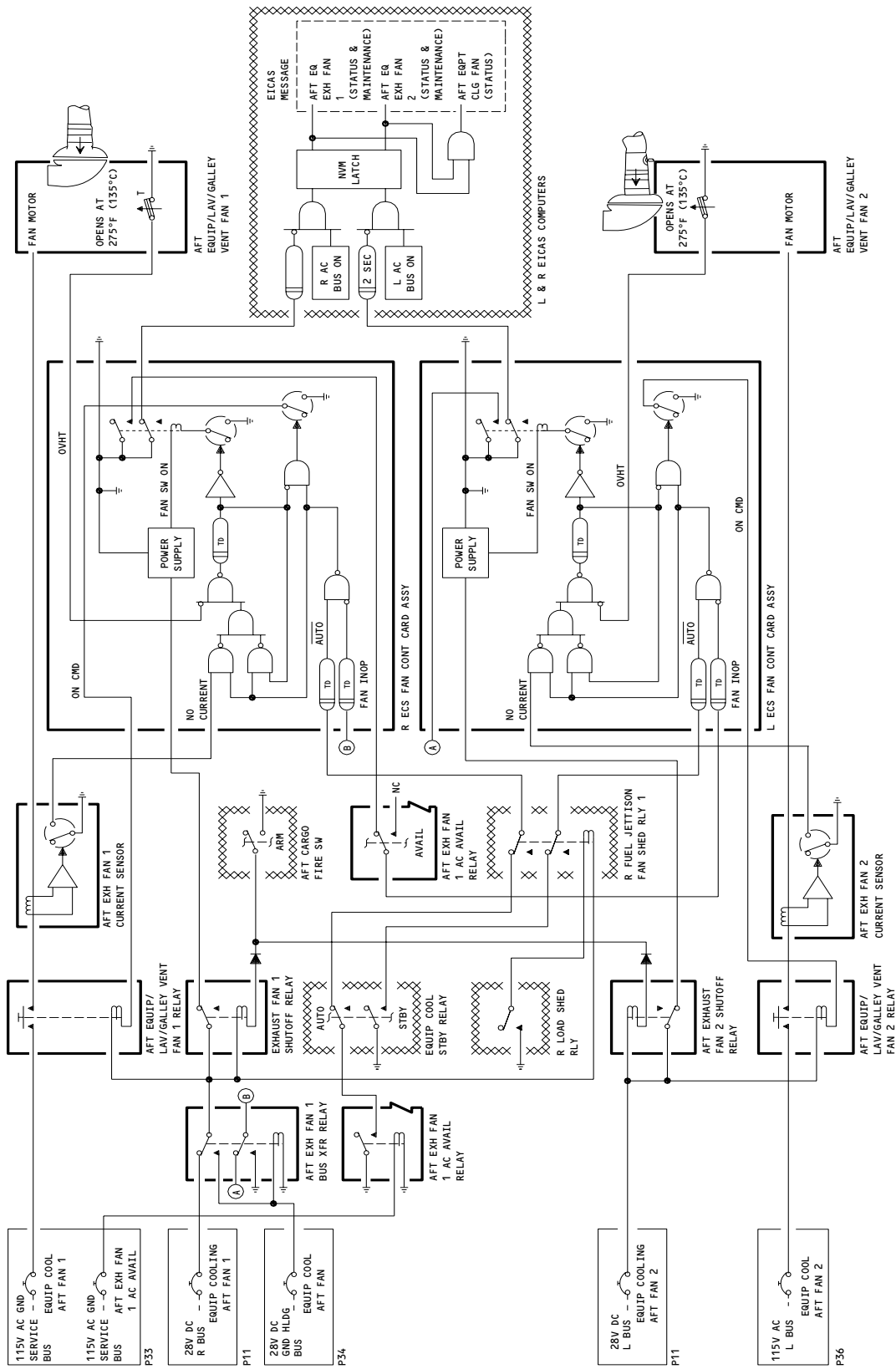
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Aft Equipment/Lavatory/Galley Ventilation System Operation Schematic
Figure 2 (Sheet 2)

EFFECTIVITY
SAS 050, 051, 155, 162-165
MTH 276

21-26-00



Aft Equipment/Lavatory/Galley Ventilation System Operation Schematic
Figure 2 (Sheet 3)

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EFFECTIVITY
SAS 052-149, 156-161, 166-999
MTH 277-999

21-26-00

- (4) Each circuit receives inputs from fan thermal protectors, fan current sensors, and the EQUIP COOL STBY relay. Each fan circuit controls a power relay, providing 115 vac, three-phase power to the fan. Each circuit provides a ground to the aft equip/lav/galley vent fan relay when it receives a fan inop signal from the other control circuit and no fan overheat switch has tripped. The fan current sensor then provides a ground to allow the fan to turn on if power exists through the current sensor for that fan. If a fan overheat switch trips or the fan current sensor detects no current to the fan, the control circuit automatically transfers control to the standby control card. Arming the AFT CARGO FIRE switch/light, on the aft pilots' control stand, shuts off both the aft equip/lav/galley vent fans.
- (5) SAS 050-149, 155-999;
MTH 276-999;
if the fuel jettison pumps are turned on when only one IDG is in operation, then the aft equip/lav/gal vent fans and the bulk cargo vent fan will stop.

B. Control - Aft Equipment/Lavatory/Galley Ventilation System

- (1) Provide electrical power (Ref 24-22-00).
- (2) Check that the following circuit breakers are closed:

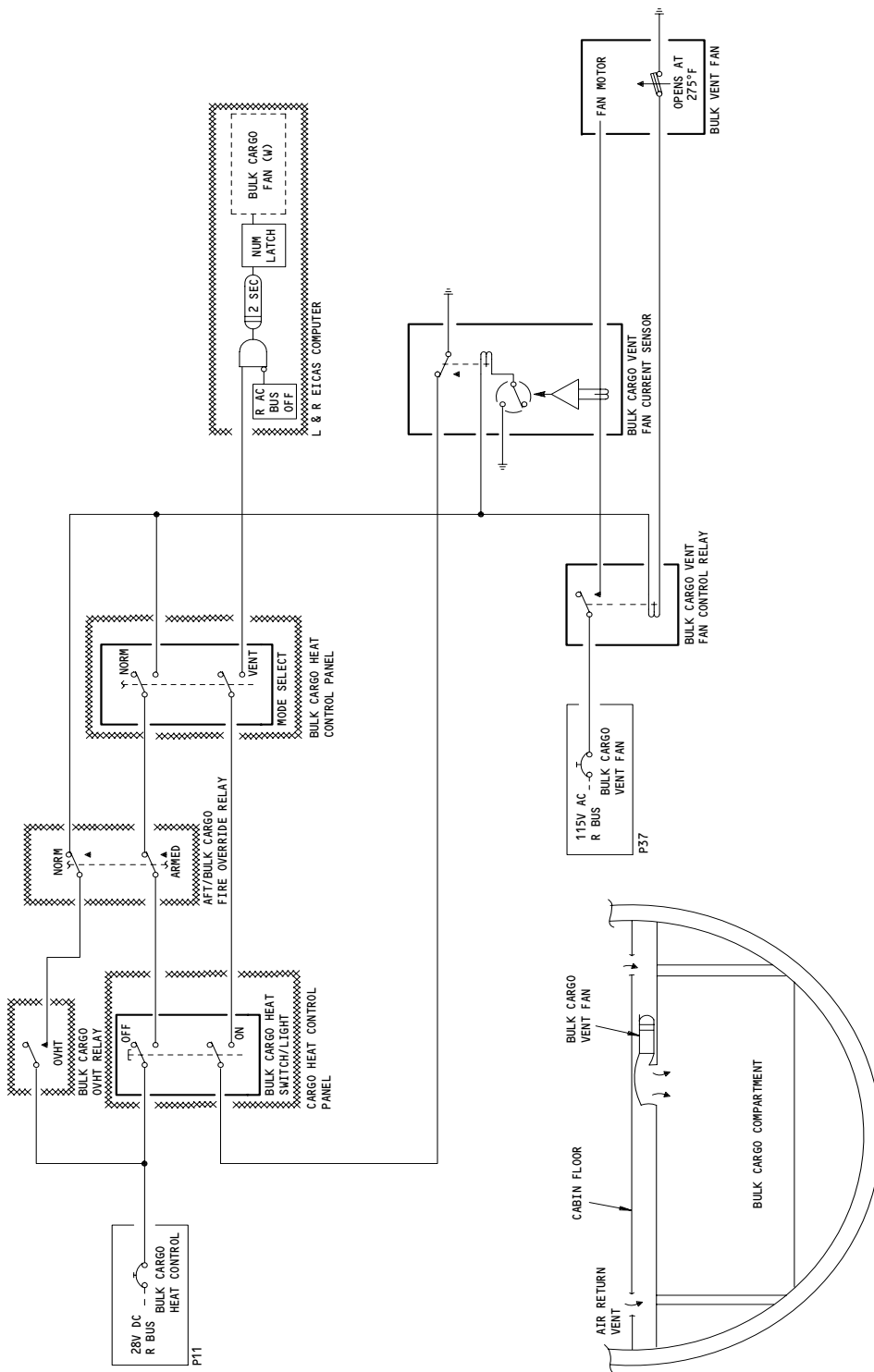
<u>Panel P33</u>	<u>Panel P11</u>
EQUIP COOLING AFT FAN 1	EQUIP COOLING AFT FAN 1
	EQUIP COOLING AFT FAN 2
	EQUIP COOL OVHT/SMOKE/VALVE IND
 <u>Panel P34</u>	 <u>Panel P36</u>
EQUIP COOL AFT FAN 1	EQUIP COOL AFT FAN 2

- (3) Place EQUIP COOLING Mode Selector, on pilots' overhead panel P5, to AUTO position. Fan number 1 will operate.
- (4) To check fan No. 2 operation or to select fan No. 2: Place EQUIP COOLING mode selector, on P5 panel, to STBY position.

C. Functional Description - Bulk Cargo Ventilation System (Fig. 3)

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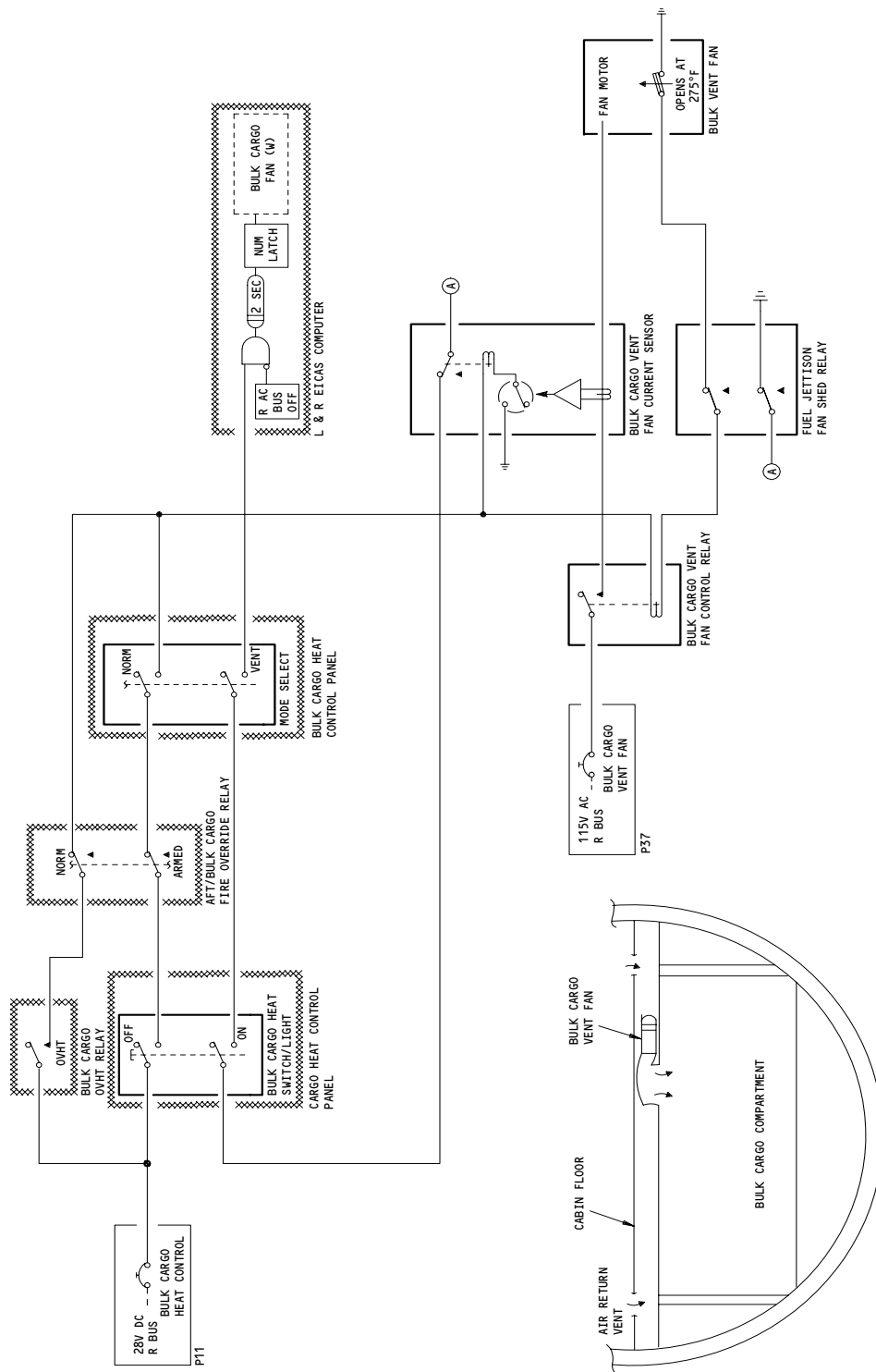
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Bulk Cargo Ventilation Operation Schematic
Figure 3 (Sheet 1)

EFFECTIVITY
AIRPLANES WITHOUT A FUEL JETTISON FAN
SHED RELAY

21-26-00



Bulk Cargo Ventilation Operation Schematic
Figure 3 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH A FUEL JETTISON FAN SHED
RELAY

21-26-00

- (1) The bulk cargo ventilation fan will start when the BULK CARGO HEAT selector (on the right side panel P61) is moved to VENT and the BULK CARGO HEAT switchlight (on the P5 panel) is pushed to on. The fan makes air from the passenger compartment flow through a diffuser and into the bulk cargo compartment. The air pressurizes the compartment. The bulk cargo ventilation fan will stop when the BULK CARGO HEAT is moved to NORM or the BULK CARGO HEAT switchlight is pushed to off.
- (2) With the BULK CARGO HEAT switchlight in the ON position, the aft/bulk cargo fire override relay de-energized, and the BULK CARGO HEAT selector in the VENT position, 28v dc power energizes the bulk cargo vent fan control relay if the bulk cargo vent fan overheat switch has not tripped. 115v ac power then passes through the energized bulk cargo vent fan control relay and starts the fan. The bulk cargo vent fan current sensor senses 115v ac power to one coil of the fan. If no current exists, EICAS displays a BULK CARGO FAN status message (Ref 31-41-00). The same EICAS message displays when the fan overheats. A fan overheat occurs when the temperature in any fan phase exceeds 275°F (135°C). Arming of the AFT CARGO FIRE switch/light, on the aft pilots' control stand, shuts down the fan.

D. Control – Bulk Cargo Ventilation System

- (1) Provide electrical power (Ref 24-22-00).
- (2) Check that BULK CARGO HEAT CONTROL circuit breaker on overhead circuit breaker panel P11 is closed.
- (3) Check that BULK CARGO VENT FAN circuit breaker on right miscellaneous electrical equipment panel P37 is closed.
- (4) Press BULK CARGO HEAT switchlight to on position.
- (5) Place BULK CARGO HEAT selector to VENT position.

E. Functional Description – Forward Cargo Exhaust System (Fig. 4)

- (1) When the airplane is in the air, the forward-cargo-exhaust valve supplies the way for air to exit the compartment. If the airplane is on the ground, the air must go through the forward-cargo-ground-exhaust valve and the forward-cargo-ground-exhaust-backup valve.
- (2) The forward-cargo-exhaust valve is controlled by the forward-cargo-exhaust-valve-control relay. When the relay is energized, 28v dc is supplied to the open side of the valve. When the relay is relaxed, 28v dc is supplied to the close side of the valve. 28v dc is supplied to the relay at all times. A ground is supplied by the pack flow controller. The controller will supply a ground to energize the relay and cause the valve to open when these conditions occur:
 - (a) The airplane is in the air.
 - (b) The FWD CARGO AIR COND / VENT FAN SYSTEM switch/light, on the P5 panel, is ON.
 - (c) The FWD and AFT CARGO FIRE switch/lights, on the P8 panel, are not ARMED.

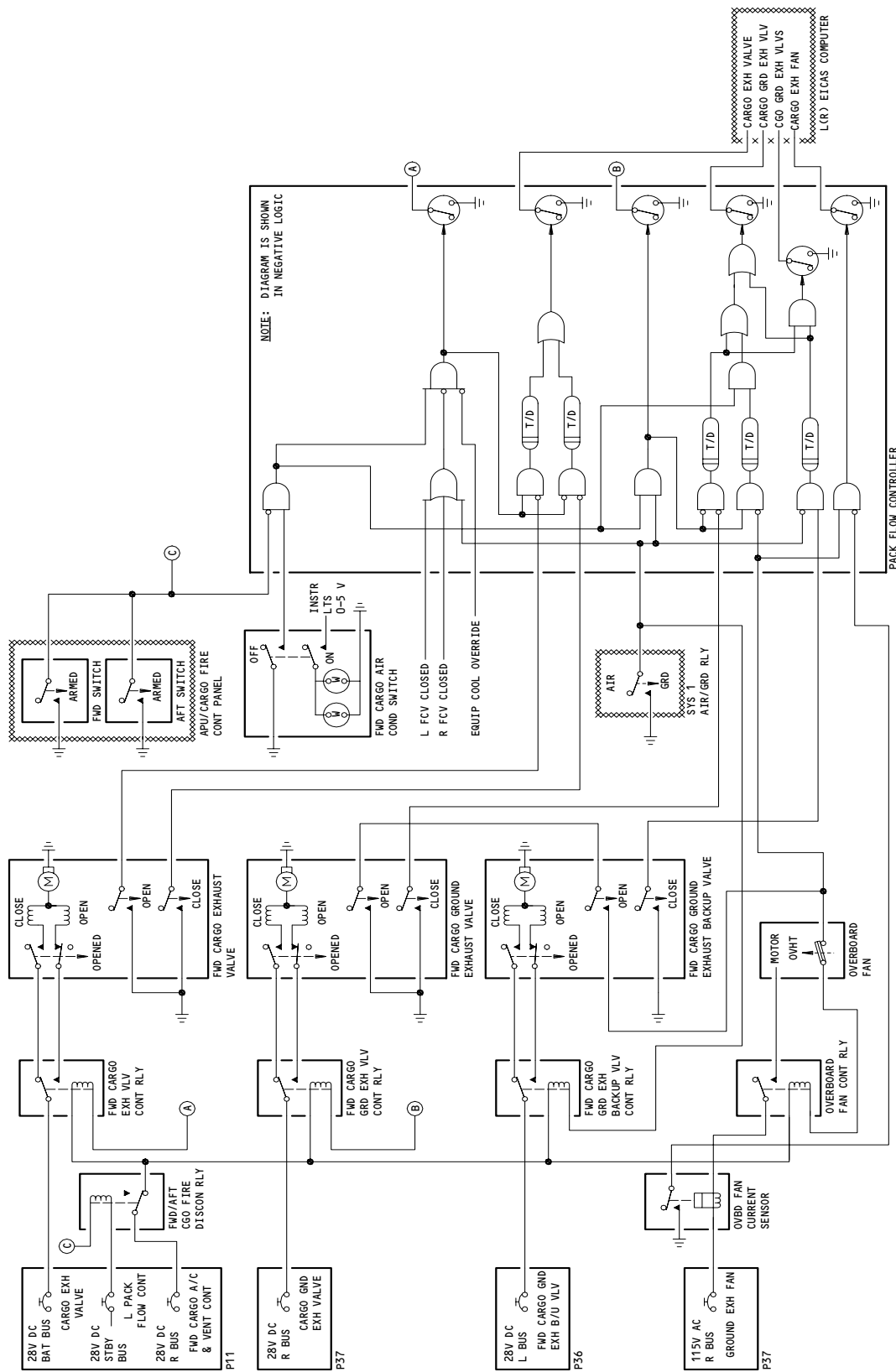
EFFECTIVITY

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Forward Cargo Exhaust System
Figure 4

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- (d) The EQUIP COOLING selector, on the P5 panel, is in AUTO or STBY.
- (e) The L PACK and R PACK switch/lights, on the P5 panel, are not OFF or INOP.
- (3) The forward-cargo-ground-exhaust valve is controlled by the forward-cargo-ground-exhaust-valve-control relay. When the relay is energized, 115v ac is supplied to the open side of the valve. When the relay is relaxed, 115v ac is supplied to the close side of the valve. 28v dc is supplied to the relay at all times. A ground is supplied by the pack flow controller. The controller will supply a ground to energize the relay and cause the valve to open when these conditions occur:
 - (a) The airplane is on the ground.
 - (b) The FWD CARGO AIR COND / VENT FAN SYSTEM switch/light, on the P5 panel, is ON.
 - (c) The FWD and AFT CARGO FIRE switch/lights, on the P8 panel, are not ARMED.
- (4) The forward-cargo-ground-exhaust-backup valve is controlled by the forward-cargo-ground-exhaust-backup-valve-control relay. When the relay is energized, 115v ac is supplied to the open side of the relay. When the relay is relaxed, 115v ac is supplied to the close side of the relay. 28v dc is supplied to the relay at all times. A ground is supplied by the system-1-air/ground relay. The control relay is always energized and the valve open when the airplane is on the ground. The control relay is always relaxed and the valve closed when the airplane is in the air.
- (5) The forward-cargo-exhaust fan is controlled by the forward-cargo-exhaust-fan relay. When the relay is energized, 115v ac is supplied to turn on the fan motor. When the relay is relaxed, power to the fan will be cut off and the fan motor will turn off. 28 v dc is supplied to the relay at all times. A ground is supplied through the ground exhaust valve and the ground-exhaust-backup valve. The ground is supplied to energize the relay and cause the fan to come on only when both valves are open. The exhaust fan helps to draw air out of the forward cargo compartment when the airplane is on the ground.
- (6) The pack flow controller monitors the system for failures. If the pack flow controller finds a failure, it sends a signal to the EICAS computer. The EICAS computer displays a message to show the applicable failure. Here is a list of the EICAS messages and what causes them:
 - (a) CARGO EXH VALVE is displayed when the forward-cargo-exhaust valve is open and it should be closed or when it is closed and it should be open.
 - (b) CARGO GND EXH VLV is displayed when the forward-cargo-ground-exhaust valve or the forward-cargo-ground-exhaust-backup valve are closed and they should be open or when the forward-cargo-exhaust fan is off and it should be on.
 - (c) CARGO GND EXH VLVS is displayed when the forward-cargo-ground-exhaust valve and the forward-cargo-ground-exhaust-backup valve are open and they should be closed.

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- (d) CARGO EXH FAN is displayed when the forward-cargo-exhaust-fan-current sensor does not sense an electrical current and both ground exhaust valves are open.

F. Control – Forward Cargo Exhaust System

- (1) Supply electrical power (Ref 22-24-00).
- (2) Make sure these circuit breakers, on the P11 panel, are closed:
 - (a) LEFT PACK FLOW CONT
 - (b) CARGO EXH VALVE
 - (c) FWD CARGO A/C & VENT CONT
- (3) Make sure this circuit breaker, on the P36 panel, is closed:
 - (a) GND EXH B/U VALVE
- (4) Make sure these circuit breakers, on the P37 panel, are closed:
 - (a) CARGO GND EXH VALVE
 - (b) GND EXH FAN
- (5) Push the FWD CARGO AIR COND / VENT FAN SYSTEM switch/light, on the P5 panel, so that the ON light comes on.

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VENTILATION SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure has instructions for the tasks that follow:
- (1) Operational Test – Lavatory and Galley Ventilation System
 - (2) Operational Test – Bulk Cargo Ventilation System
 - (3) System Test – Lavatory and Galley Ventilation System
 - (4) System Test – Bulk Cargo Ventilation System
 - (5) System Test – Forward Cargo Exhaust System

TASK 21-26-00-705-070

2. Operational Test – Lavatory and Galley Ventilation System (Fig. 501)

A. References

- (1) 06-46-00/201, Entry, Service, and Cargo Doors, Access Doors and Panels
- (2) 24-22-00/201, Electric Power – Control
- (3) 25-52-01/401, Sidewall Lining

B. Access

- (1) Location Zones
165 Area aft of bulk cargo compartment (Left)

C. Prepare for the Test

S 865-010

- (1) Make sure these circuit breakers are closed:
 - (a) On the pilot's overhead circuit breaker panel, P11:
 - 1) 11P10, EQUIPMENT COOLING AFT FAN EXH 2
 - 2) 11P19, EQUIPMENT COOLING AFT FAN EXH 1
 - (b) On the miscellaneous relay panel, P33:
 - 1) 33B1, EQUIP COOL AFT FAN 1
 - 2) AIRPLANES WITH THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6;
33D6, AFT EXH FAN 1 AC AVAIL
 - (c) On the APU/external power panel, P34:
 - 1) 34L8, EQUIP COOL AFT FAN 1
 - (d) On the left miscellaneous electrical equipment panel, P36:
 - 1) 36G4, EQUIP COOL AFT FAN 2

S 865-011

- (2) Supply electrical power (Ref 24-22-00).

S 015-012

- (3) Open the bulk cargo door, 811 (Ref 06-46-00).

S 015-013

- (4) Remove the aft endliner of the bulk cargo compartment (Ref 25-52-01).

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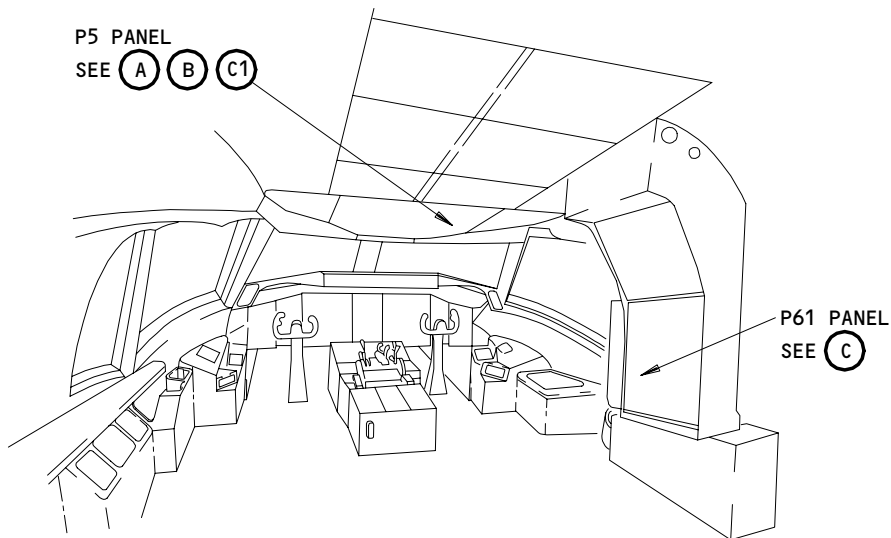
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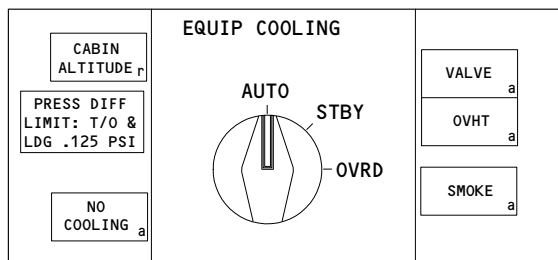
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BOEING

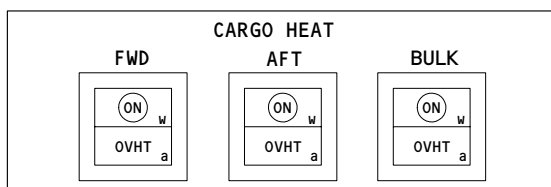
767 MAINTENANCE MANUAL



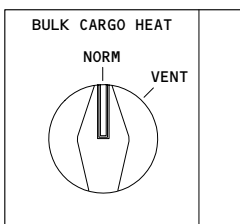
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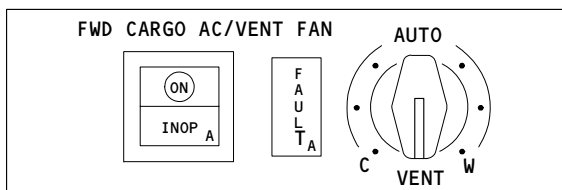
(A)



(B)



(C)



(C1)

Ventilation System Test
Figure 501 (Sheet 1)

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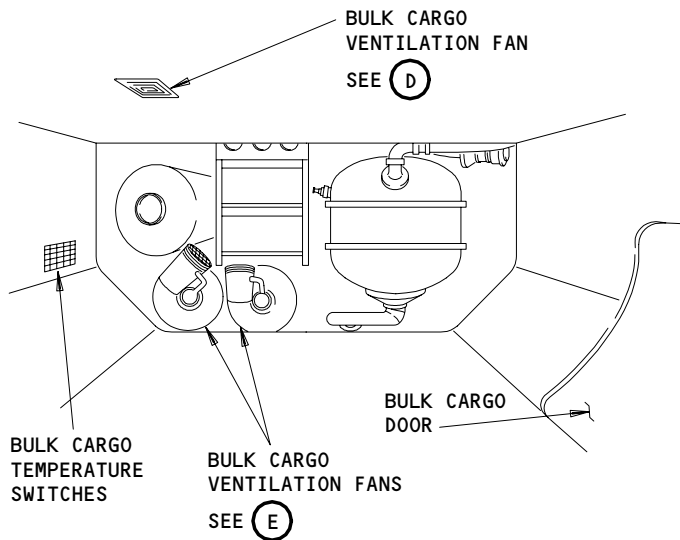
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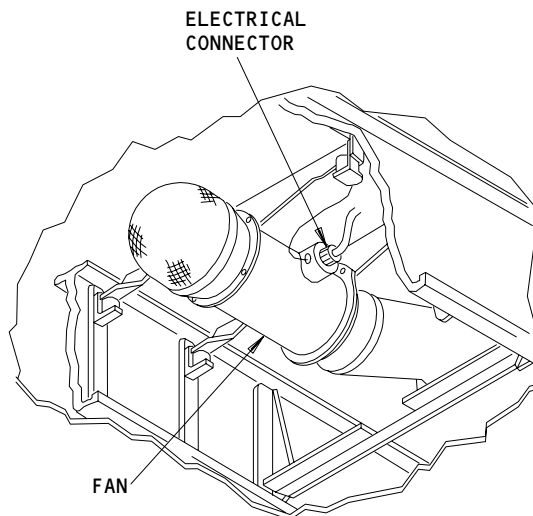
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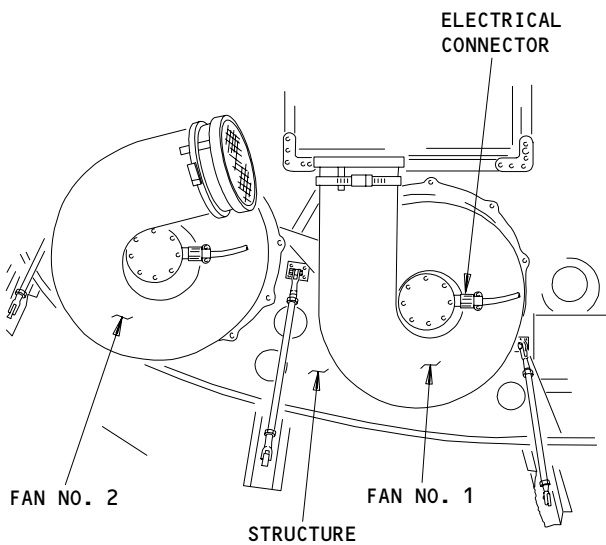
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**BULK CARGO COMPARTMENT
(VIEW IN THE AFT DIRECTION)**



**BULK CARGO VENTILATION FAN
(D)**



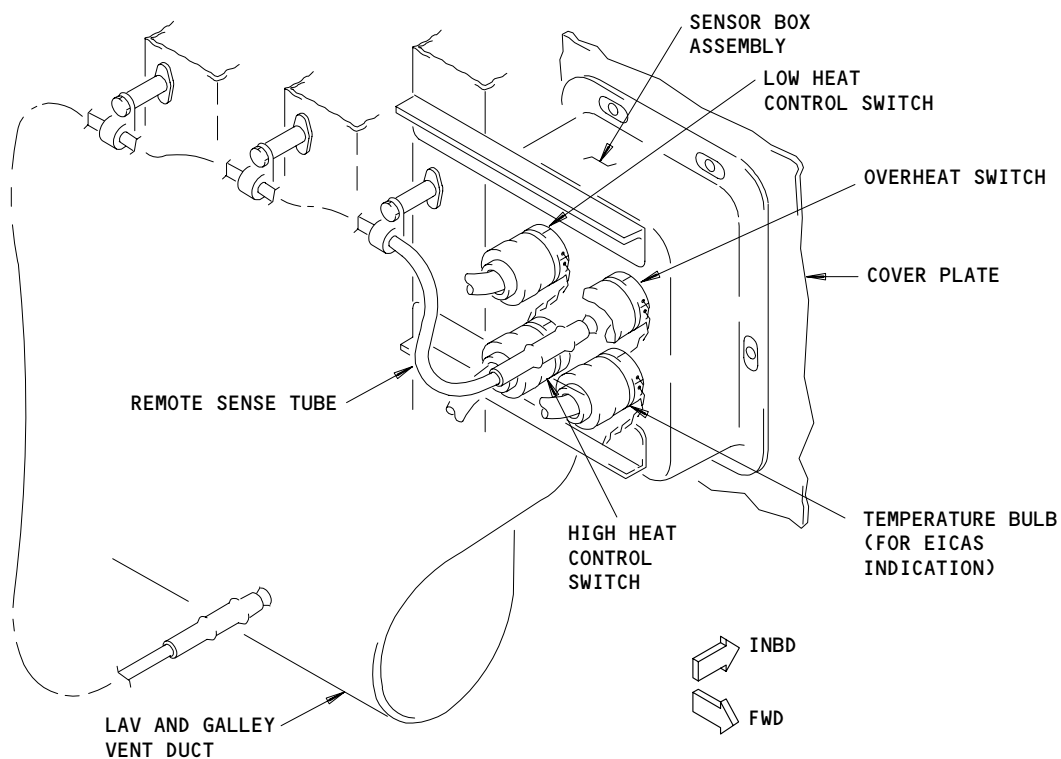
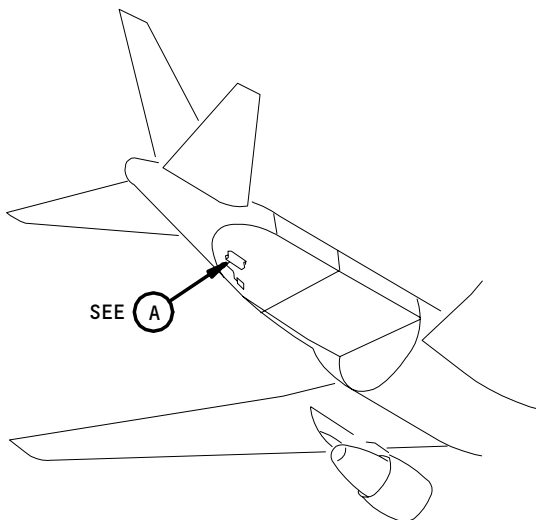
**AFT EQUIPMENT/LAVATORY/GALLEY
VENTILATION FANS**

(E)

**Ventilation System Test
Figure 501 (Sheet 2)**

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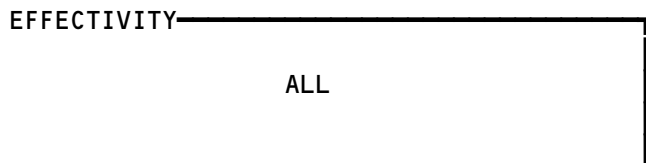


NOTE: THE INSULATION BLANKET IS NOT SHOWN INSTALLED AROUND THE SENSOR BOX ASSEMBLY IN ORDER TO SHOW THE INSTALLATION OF THE BULK CARGO TEMPERATURE SWITCHES.

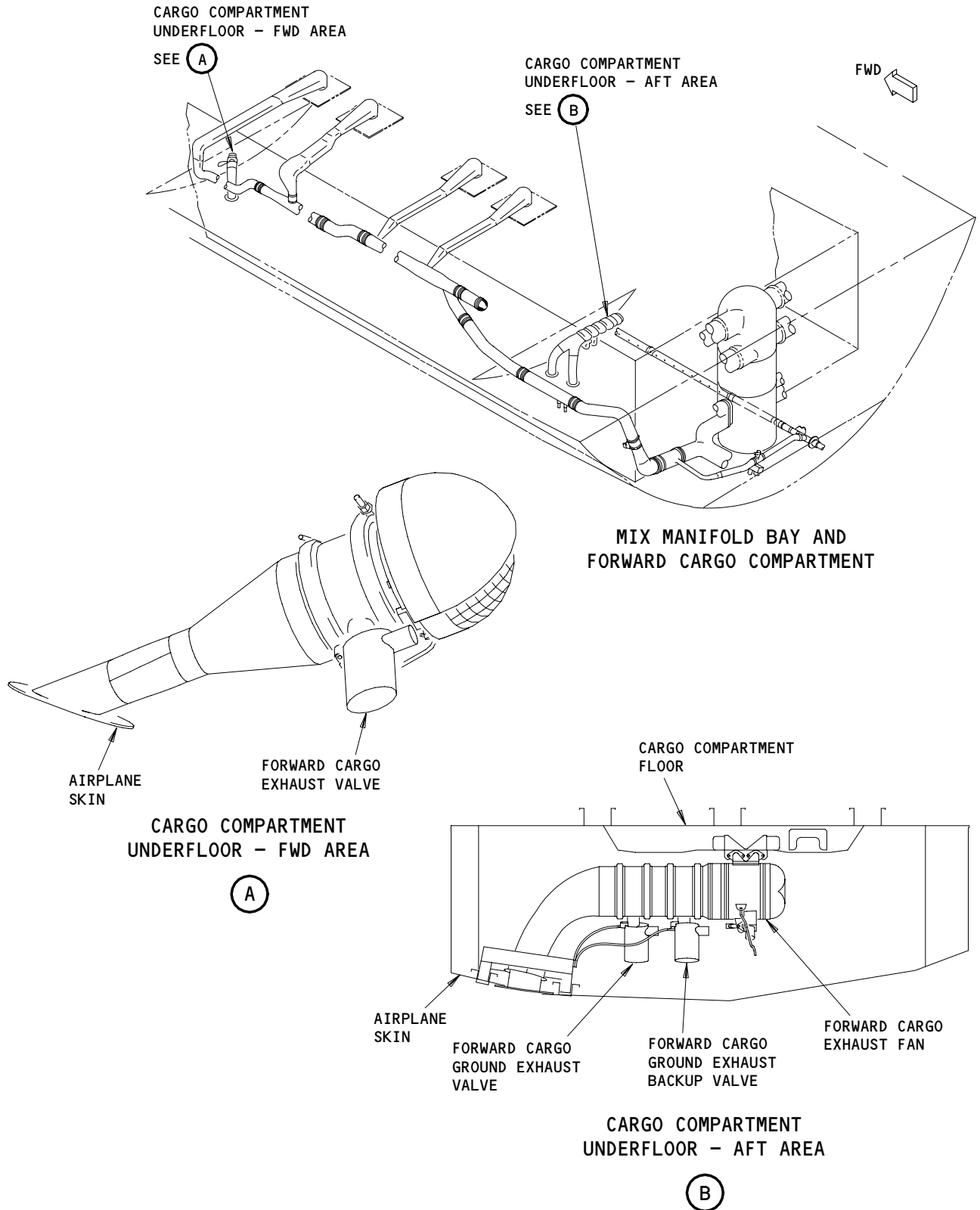
BULK CARGO TEMPERATURE SWITCHES

A

**Bulk Cargo Ventilation Test
Figure 502**



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Forward Cargo Exhaust System
Figure 503

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D. Do the Test for the Lavatory and Galley Ventilation System

S 715-014

- (1) Do the test procedure

CAUTION: IF THE NO. 1 FAN IS ON BUT NO AIRFLOW IS FELT AT THE FAN OUTLET, IMMEDIATELY OPEN THE CIRCUIT BREAKER 33B1, EQUIPMENT COOLING AFT FAN 1, ON THE P33 PANEL. FAILURE TO OPEN THIS CIRCUIT BREAKER COULD CAUSE DAMAGE TO THE FAN.

- (a) Turn the EQUIP COOLING selector, on the pilot's overhead panel, P5, to the AUTO position.
- (b) Listen for the No. 1 fan to come on.
- (c) Feel for the airflow at the fan outlet.
- (d) Make sure the air flows into the ventilation system at each ventilation inlet in all of the galleys and lavatories.
 - 1) Put your hand on the ventilation inlet.
 - 2) Feel that the air flows into the inlet.

CAUTION: IF THE NO. 2 FAN IS ON BUT NO AIRFLOW IS FELT AT THE FAN OUTLET, IMMEDIATELY OPEN THE CIRCUIT BREAKER 36G4, EQUIPMENT COOLING AFT FAN 2, ON P36 PANEL. FAILURE TO OPEN THIS CIRCUIT BREAKER COULD CAUSE DAMAGE TO THE FAN.

- (e) Turn the EQUIP COOLING selector, on the P5 panel, to the STBY position.
- (f) Listen for the No. 1 fan to stop and the No. 2 fan to come on.
- (g) Feel for the airflow at the fan outlet.
- (h) Make sure the air flows into the ventilation system at each ventilation inlet in all of the galleys and lavatories.
 - 1) Put your hand on the ventilation inlet.
 - 2) Feel that the air flows into the inlet.

E. Put the airplane back to its usual condition.

S 865-134

- (1) Turn the EQUIP COOLING selector, on the P5 panel, to the AUTO position.

S 415-015

- (2) Install the aft endliner in the bulk cargo compartment (Ref 25-52-01).

S 415-016

- (3) Close the bulk cargo door, 811 (Ref 06-46-00).

S 865-017

- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00 24-22-00/201).

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TASK 21-26-00-705-018

3. Operational Test - Bulk Cargo Ventilation System (Fig. 502)

A. References

- (1) 06-46-00/201, Entry, Service, and Cargo Doors, Access Doors and Panels
- (2) 24-22-00/201, Electric Power - Control

B. Access

- (1) Location Zones
161/162 Bulk cargo compartment

C. Prepare for the Test

S 015-019

- (1) Open the bulk cargo door, 811 (Ref 06-46-00).

S 865-020

- (2) Supply electrical power (Ref 24-22-00).

S 865-021

- (3) Make sure these circuit breakers are closed:
 - (a) On the pilot's overhead circuit breaker panel, P11:
 - 1) 11N26, BULK CARGO HEAT CONT
 - (b) On the right miscellaneous electrical equipment panel, P37:
 - 1) 37E6 or 37F7, BULK CARGO VENT FAN

D. Do the Test for the Bulk Cargo Ventilation System

S 715-022

- (1) Do the test procedure
 - (a) Push the BULK CARGO HEAT switch-light, on the P5 panel, to the on position.
 - (b) Make sure the ON light comes on.
 - (c) Turn the BULK CARGO HEAT selector, on the P61 panel, to the VENT position.
 - (d) Listen for the vent fan in the bulk cargo compartment to come on.
 - (e) Feel for the airflow at the fan outlet, in the ceiling of the bulk cargo compartment.
 - (f) Push the BULK CARGO HEAT switch-light, on the P5 panel, to the off position.
 - (g) Listen for the vent fan in the bulk cargo compartment to stop.
 - (h) Feel to make sure there is no airflow is at the fan outlet.

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E. Put the airplane back to its usual condition

S 415-023

(1) Close the bulk cargo door, 811 (Ref 06-46-00).

S 865-024

(2) Remove the electrical power, if it is not necessary (Ref 24-22-00).

TASK 21-26-00-705-025

4. System Test - Lavatory and Galley Ventilation (Fig. 501, 502)

A. References

- (1) 06-46-00/201, Entry, Service, and Cargo Doors, Access Doors and Panels
- (2) 24-22-00/201, Electric Power - Control
- (3) 25-52-01/401, Sidewall Lining
- (4) 31-41-00/201, Engine Indication and Crew Alerting Systems

B. Access

- (1) Location Zones
165 Area aft of bulk cargo compartment (Left)

C. Prepare for the Test

S 865-026

(1) Supply electrical power (Ref 24-22-00).

S 015-027

(2) Open the bulk cargo door, 811 (Ref 06-46-00).

S 015-028

(3) Remove the aft endliner of the bulk cargo compartment (Ref 25-52-01).

D. Do the System Test for the Lavatory and Galley Ventilation System

S 735-029

(1) Do the test for the aft equipment fans

(a) Open these circuit breakers:

- 1) On the pilot's overhead circuit breaker panel, P11:
 - a) 11P10, EQUIPMENT COOLING AFT FAN EXH 2
 - b) 11P19, EQUIPMENT COOLING AFT FAN EXH 1
- 2) On the miscellaneous relay panel, P33:
 - a) 33B1, EQUIP COOL AFT FAN 1
 - b) AIRPLANES WITH THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6;
Open this circuit breaker:
33D6, AFT EXH FAN 1 AC AVAIL
- 3) On the APU/external power panel, P34:
 - a) 34L8, EQUIP COOL AFT FAN 1
- 4) On the left miscellaneous electrical equipment panel, P36:
 - a) 36G4, EQUIP COOL AFT FAN 2

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- (b) Turn the EQUIP COOLING selector, on the pilot's overhead panel, P5, to the AUTO position.
 - (c) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.
 - (d) Make sure these EICAS messages show on the bottom display:
 - 1) The message, AFT EQ EXH FAN 1.
 - 2) The message, AFT EQ EXH FAN 2.
 - (e) Push the STATUS DISPLAY switch, on the forward electrical control stand panel, P9.
 - (f) Make sure this EICAS message shows on the bottom display:
 - 1) The message, AFT EQPT CLG FAN.
 - (g) Close this circuit breaker on the APU external power panel, P34:
 - 1) 34L8, EQUIP COOL AFT FAN 1
 - (h) After 5 to 15 seconds, close these circuit breakers on the forward miscellaneous electrical equipment panel, P33:
 - 1) 33B1, EQUIP COOL AFT FAN 1
 - 2) AIRPLANES WITH THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6;
33D6, AFT EXH FAN 1 AC AVAIL
 - (i) Close this circuit breaker on the pilots overhead panel, P11:
 - 1) 11P19, EQUIPMENT COOLING AFT FAN EXH 1
- CAUTION:** IF THE NO. 1 FAN IS ON BUT NO AIRFLOW IS FELT AT THE FAN OUTLET, IMMEDIATELY OPEN THE CIRCUIT BREAKER 33B1, EQUIPMENT COOLING AFT FAN 1, ON THE P33 PANEL. FAILURE TO OPEN THIS CIRCUIT BREAKER COULD CAUSE DAMAGE TO THE FAN.
- (j) Listen for the No. 1 fan to come on.
 - (k) Feel for the airflow at the fan outlet.
 - (l) Close this circuit breaker on the pilot's overhead panel, P11:
 - 1) 11P10, EQUIPMENT COOLING AFT FAN EXH 2
 - (m) Close this circuit breaker on the left miscellaneous electrical equipment panel, P36:
 - 1) 36G4, EQUIP COOL AFT FAN 2

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- (n) Open this circuit breaker on the APU external power panel, P34:
 - 1) 34L8, EQUIP COOL AFT FAN 1
- (o) Listen to make sure the No. 2 fan is not on.
- (p) Disconnect the ground wire of the No. 1 fan from the ground GD 1332-DC, which is 1 foot forward of the fan.
- (q) Listen for the No. 1 fan to stop.
- (r) After 5 to 15 seconds, listen for the No. 2 fan to come on.
- (s) Connect the ground wire of the No. 1 fan to the ground GD 1332-DC.
- (t) Listen for the No. 1 fan to stay off and the No. 2 fan to stay on.
- (u) Turn the EQUIP COOLING selector, on the P5 panel, to the STBY position.
- (v) Listen for the No. 2 fan to stay on.
- (w) Disconnect the ground wire of the No. 2 fan from the ground GD 1338-DC, which is 1 foot forward of the fan.
- (x) Listen for the No. 2 fan to stop.
- (y) After 5 to 15 seconds, listen for the No. 1 fan to come on.
- (z) Connect the ground wire of the No. 2 fan to the ground GD 1338-DC.
- (aa) Listen for the No. 2 fan to stay off and the No. 1 fan to stay on.
- (ab) Turn the EQUIP COOLING selector, on the P5 panel, to the AUTO and then to the STBY position.
- (ac) Listen for the No. 1 fan to stop and the No. 2 fan to come on.
- (ad) Turn the EQUIP COOLING selector, on the P5 panel, to the AUTO position.
- (ae) Listen for the No. 2 fan to stop and the No. 1 fan to come on.
- (af) Open this circuit breaker on the P33 panel:
 - 1) 33B1, EQUIP COOL AFT FAN 1
- (ag) Listen for the No. 1 fan to stop.
- (ah) After 5 to 15 seconds, listen for the No. 2 fan to come on.
- (ai) AIRPLANES WITHOUT THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6;
Do these steps:
 - 1) Remove the relay AFT EXH FAN 1 AC AVAIL, K835, from the electrical connector D10724, on the P37 panel.
 - 2) Connect a jumper wire between the pins A1 and A2 of the electrical connector D10724.
 - 3) Connect a jumper wire between the pins B1 and B2 of the electrical connector D10724.
- (aj) Close this circuit breaker on the P33 panel:
 - 1) 33B1, EQUIP COOL AFT FAN 1
- (ak) Listen for the No. 2 fan to stay on.
- (al) Open these circuit breakers on the forward miscellaneous electrical equipment panel, P33:
 - 1) 33B1, EQUIP COOL AFT FAN 1

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- 2) AIRPLANES WITH THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6;
33D6, AFT EXH FAN 1 AC AVAIL
- (am) AIRPLANES WITHOUT THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6;
Do these steps:
 - 1) Remove the jumpers from the electrical connector D10724, in the P37 panel.
 - 2) Install the relay AFT EXH FAN 1 AC AVAIL, K835, in the P37 panel.
 - 3) Connect the relay to the electrical connector, D10724.
- (an) Close these circuit breakers on the forward miscellaneous electrical equipment panel, P33:
 - 1) 33B1, EQUIP COOL AFT FAN 1
 - 2) AIRPLANES WITH THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6;
33D6, AFT EXH FAN 1 AC AVAIL
- (ao) Listen for the No. 2 fan to stop and the No. 1 fan to come on.
- (ap) Turn the EQUIP COOLING selector, on the P5 panel, to the STBY position.
- (aq) Listen for the No. 1 fan to stop and the No. 2 fan to come on.
- (ar) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36:
 - 1) 36G4, EQUIP COOL AFT FAN 2
- (as) After 15 seconds, close this circuit breaker on the left miscellaneous electrical equipment panel, P36:
 - 1) 36G4, EQUIP COOL AFT FAN 2
- (at) Listen for the No. 2 fan to stop and the No. 1 fan to come on.
- (au) Turn the EQUIP COOLING selector, on the P5 panel, to the AUTO and then to the STBY position.
- (av) Listen for the No. 1 fan to stop and the No. 2 fan to come on.

CAUTION: MAKE SURE THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE OPENED. IF THEY ARE NOT OPENED, THE FIRE EXTINGUISHER BOTTLES COULD RELEASE THEIR CONTENTS DURING THE STEPS THAT FOLLOW.

- (aw) Open these circuit breakers, on the main power distribution panel, P6, and attach a DO-NOT-CLOSE tag to them:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (ax) Do the steps that follow:
 - 1) Push the AFT CARGO FIRE switch-light, on the aft pilot's control stand P8, to the ARMED position.
 - 2) Listen for the No. 2 fan to stop and the No. 1 fan to stay off.
 - 3) Push the AFT CARGO FIRE switch-light, on the P8 panel, to the off (not ARMED) position.

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- 4) Listen for the No. 2 fan to come on.
- 5) Turn the EQUIP COOLING selector, on the P5 panel, to the AUTO position.
- 6) Listen for the No. 2 fan to stop.
- 7) After 5 to 15 seconds, listen for the No. 1 fan to come on.
- 8) Push the AFT CARGO FIRE switch-light, on the P8 panel, to the ARMED position.
- 9) Listen for the No. 1 fan to stop and the No. 2 fan to stay off.
- 10) Push the AFT CARGO FIRE switch-light, on the P8 panel, to the off (not ARMED) position.
- 11) Listen for the No. 1 fan to come on.

- (ay) Do the Maintenance Message Erase procedure (Ref 31-41-00).
- (az) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P6 panel:
- 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (ba) Close this circuit breaker on the P34 panel:
- 1) 34L8, EQUIP COOL AFT FAN 1

S 735-106

- (2) SAS 050-149, 155-999;
MTH 276-999;

Do the fuel jettison test

- (a) Make sure the aft fan 1 is on and the aft fan 2 is off.
- (b) Make sure the FUEL JETTISON switch, on the P5 panel, is in the OFF position.
- (c) Open these circuit breakers:
 - 1) On the P11 panel:
 - a) 11M14, LEFT JETT NOZZLE VALVE
 - b) 11M23, RIGHT JETT NOZZLE VALVE
 - 2) On the P36 panel:
 - a) 36F4 or 36G7, LEFT FUEL JTSN PUMP
 - 3) On the P37 panel:
 - a) 37F4 or 37G4, RIGHT FUEL JTSN PUMP
- (d) Close these circuit breakers on the P11 panel:
 - 1) 11M13, FUEL LEFT JETT CONT
 - 2) 11M22, FUEL RIGHT JETT CONT
- (e) Turn the FUEL JETTISON switch, on the P5 panel, to the ON position.
- (f) Make sure the aft 1 goes off and the aft 2 fan stays off.

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- (g) Turn the FUEL JETTISON switch, on the P5 panel, to the OFF position.
- (h) Make sure the aft 1 fan comes on.
- (i) Close these circuit breakers:
 - 1) On the P11 panel:
 - a) 11M14, LEFT JETT NOZZLE VALVE
 - b) 11M23, RIGHT JETT NOZZLE VALVE
 - 2) On the P36 panel:
 - a) 36F4 or 36G7, LEFT FUEL JTSN PUMP
 - 3) On the P37 panel:
 - a) 37F4 or 37G4, RIGHT FUEL JTSN PUMP

S 735-030

- (3) Do the leak test for the Lavatory and Galley Ventilation System.
 - (a) Remove the ceiling panels near the zone temperature sensors (Ref 21-61-08).
 - (b) Remove the sidewall lining aft of the aft equipment rack, E6 (Ref 25-52-01).
 - (c) Close these circuit breakers:
 - 1) On the overhead circuit breaker panel, P11:
 - a) 11P10, EQUIPMENT COOLING AFT FAN EXH 2
 - b) 11P19, EQUIPMENT COOLING AFT FAN EXH 1
 - 2) On the miscellaneous relay panel, P33:
 - a) 33B1, EQUIP COOL AFT FAN 1
 - 3) On the APU/external power panel, P34:
 - a) 34L8, EQUIP COOL AFT FAN 1
 - 4) On the left miscellaneous electrical equipment panel, P36:
 - a) 36G4, EQUIP COOL AFT FAN 2
 - (d) Turn the EQUIP COOLING selector, on the P5 panel, to the AUTO position.

CAUTION: IF THE NO. 1 FAN IS ON BUT NO AIRFLOW IS FELT AT THE FAN OUTLET, IMMEDIATELY OPEN THE CIRCUIT BREAKER 33B1, EQUIPMENT COOLING AFT FAN 1, ON THE P33 PANEL. FAILURE TO OPEN THIS CIRCUIT BREAKER COULD CAUSE DAMAGE TO THE FAN.

- (e) Listen for the No. 1 fan to come on.
- (f) Feel for the airflow at the fan outlet.
- (g) Feel for no airflow at these duct joints:
 - 1) Around the sleeve clamps and the band clamps at the aft E/E equipment rack, E6.
 - 2) Where the duct from the E6 rack connects with the ventilation ducts.
 - 3) At the duct connection in each of the lavatories.
 - 4) Where the ventilation duct connects with the flexible ducts from the assemblies for the zone temperature sensors.
- (h) Feel for the airflow at all the ventilation inlets in each of the galleys.
- (i) Feel for the airflow at all the ventilation inlets in each of the lavatories.

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E. Put the airplane back to its usual condition

S 415-031

- (1) Install the aft endliner in the bulk cargo compartment (Ref 25-52-01).

S 415-032

- (2) Close the bulk cargo door, 811 (Ref 06-46-00).

S 865-033

- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

System Test - Bulk Cargo Ventilation System (Fig. 501, 502)

TASK 21-26-00-705-034

5. System Test - Bulk Cargo Ventilation System (Fig. 501, 502)

A. References

- (1) 06-46-00/201, Entry, Service, and Cargo Doors, Access Doors and Panels
- (2) 24-22-00/201, Electric Power - Control
- (3) 25-52-01/401, Sidewall Panels
- (4) 26-23-00/501, Cargo Compartment Fire Extinguishing

B. Access

- (1) Location Zones
161/162 Bulk cargo compartment

C. Prepare for the Test

S 865-035

- (1) Supply electrical power (Ref 24-22-00).

S 015-036

- (2) Open the bulk cargo door, 811 (Ref 06-46-00).

S 015-037

- (3) Remove the sidewall lining near the temperature switch box in the bulk cargo compartment (Ref 25-52-01).

D. Do the System Test for the Bulk Cargo Ventilation System

S 735-038

- (1) Do the Test for the Bulk Cargo Ventilation Fan
 - (a) Disconnect the electrical connectors from the temperature switches in the bulk cargo compartment:
 - 1) D504 from the normal temperature switch, S498
 - 2) D524 from the high temperature switch, S499
 - 3) D566 from the overheat temperature switch, S500
 - (b) Install a jumper between the pins 1 and 2 of the electrical connector D504.
 - (c) Install a jumper between the pins 1 and 2 of the electrical connector D524.
 - (d) Make sure the AFT CARGO FIRE switch-light, on the aft pilot's control stand panel P8, is in the off (not ARMED) position.

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- (e) Make sure the BULK CARGO HEAT switch-light, on the pilot's overhead panel, P5, is in the off position.
- (f) Make sure these circuit breakers are closed:
 - 1) On the overhead circuit breaker panel, P11:
 - a) 11R20, CARGO HEAT CONTROL AFT
 - b) 11N26, BULK CARGO HEAT CONT
 - c) 11N27, BULK CARGO HEAT OVRD
 - 2) On the left miscellaneous electrical equipment panel, P36:
 - a) 36L1 or 36K4, BULK CARGO HEAT VALVE
 - 3) On the right miscellaneous electrical equipment panel, P37:
 - a) 37E6 or 37F7, BULK CARGO VENT FAN
- (g) Listen to make sure the vent fan in the bulk cargo ceiling is not on.
- (h) Make sure these EICAS messages show:
 - 1) The message, BULK CARGO OVHT, shows on the top display.
 - 2) The message, BULK CARGO FAN, shows on the bottom display.
 - 3) The message, BULK CARGO HEAT, shows on the bottom display.
- (i) Push the BULK CARGO HEAT switch-light, on the P5 panel, to the on position.
- (j) Listen for the vent fan to come on.
- (k) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.
- (l) Install a jumper between the pins 1 and 2 of the electrical connector D566.
- (m) Make sure the OVHT light, on the BULK CARGO HEAT switch-light, comes on.
- (n) Make sure the EICAS message, BULK CARGO OVHT, shows on the top display.
- (o) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.
- (p) Remove the jumper from the pins 1 and 2 of the electrical connector D566.
- (q) Make sure the OVHT light, on the BULK CARGO HEAT switch-light, goes off.
- (r) Make sure the EICAS message, BULK CARGO OVHT, does not show on the top display.
- (s) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.
- (t) Remove the jumper from the pins 1 and 2 of the electrical connector D504.
- (u) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.
- (v) Turn the BULK CARGO HEAT selector, on the P61 panel, to the VENT position.
- (w) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.
- (x) Listen for the vent fan to come on.
- (y) Feel for the airflow at the fan outlet.
- (z) Install a jumper between the pins 1 and 2 of the electrical connector D566.
- (aa) Listen for the vent fan to stop.

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- (ab) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.
- (ac) Make sure the EICAS message, BULK CARGO OVHT, shows on the top display.
- (ad) Make sure the OVHT light, on the BULK CARGO HEAT switch-light, comes on.
- (ae) Remove the jumper from the pins 1 and 2 of the electrical connector D524.
- (af) Make sure the EICAS message, BULK CARGO OVHT, does not show on the top display.
- (ag) Make sure the OVHT light, on the BULK CARGO HEAT switch-light, goes off.
- (ah) Listen for the vent fan to come on.
- (ai) Remove the jumper from the pins 1 and 2 of the electrical connector D566.
- (aj) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.
- (ak) Install a jumper between the pins 1 and 2 of the electrical connector D524.
- (al) Listen for the vent fan to come on.
- (am) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.

CAUTION: MAKE SURE THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE OPENED. IF THEY ARE NOT OPENED, THE FIRE EXTINGUISHER BOTTLES COULD RELEASE THEIR CONTENTS DURING THE STEPS THAT FOLLOW.

- (an) Open and attach a DO-NOT-CLOSE tag to these circuit breakers on the main power distribution panel, P6:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (ao) Push the AFT CARGO FIRE switch-light, on the P8 panel, to the ARMED position.
- (ap) Listen for the vent fan to stop.
- (aq) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.
- (ar) Make sure the EICAS message, BULK CARGO FAN, shows on the bottom display.
- (as) Push the AFT CARGO FIRE switch-light, on the P8 panel, to the off (not ARMED) position.
- (at) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P6 panel:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (au) Listen for the vent fan to come on.
- (av) Make sure the EICAS message, BULK CARGO FAN, does not show on the bottom display.
- (aw) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.

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- (ax) Remove the jumper from the pins 1 and 2 of the electrical connector D524.
- (ay) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.
- (az) Open this circuit breaker on the P37 panel:
 - 1) 37E6 or 37F7, BULK CARGO VENT FAN
- (ba) Listen for the vent fan to stop.
- (bb) Make sure the EICAS message, BULK CARGO FAN, shows on the bottom display.
- (bc) Turn the BULK CARGO HEAT selector, on the P61 panel, to the NORM position.
- (bd) Make sure the EICAS message, BULK CARGO FAN, does not show on the bottom display.
- (be) Push the BULK CARGO HEAT switch-light, on the P5 panel, to the off position.
- (bf) Connect the electrical connectors to the temperature switches in the bulk cargo compartment:
 - 1) D504 to the normal temperature switch, S498
 - 2) D524 to the high temperature switch, S499
 - 3) D566 to the overheat temperature switch, S500

S 735-121

- (2) SAS 050-149, 155-999;
MTH 276-999;

Do the fuel jettison test:

- (a) Turn the BULK CARGO HEAT selector, on the P61 panel, to the VENT position (View C).
- (b) Close this circuit breaker on the P34 panel:
 - 1) 34L8, EQUIP COOL AFT FAN 1
- (c) Push the BULK CARGO HEAT switch-light, on the P5 panel, to the ON position (View B).
- (d) Make sure the aft fan 1 is on and the aft fan 2 is off.
- (e) Make sure the FUEL JETTISON switch, on the P5 panel, is in the OFF position.
- (f) Make sure the L and R NOZZLE switch-lights are off.
- (g) Open these circuit breakers:
 - 1) On the P11 panel:
 - a) 11M14, LEFT JETT NOZZLE VALVE
 - b) 11M23, RIGHT JETT NOZZLE VALVE
 - 2) On the P36 panel:
 - a) 36F4 or 36G7, LEFT FUEL JTSN PUMP
 - 3) On the P37 panel:
 - a) 37F4 or 37G4, RIGHT FUEL JTSN PUMP
- (h) Close these circuit breakers, on the P11 panel:
 - 1) 11M13, FUEL LEFT JETT CONT
 - 2) 11M22, FUEL RIGHT JETT CONT
- (i) Turn the FUEL JETTISON switch, on the P5 panel, to the ON position.
- (j) Make sure the aft 1 goes off and the aft 2 fan stays off.
- (k) Turn the FUEL JETTISON switch, on the P5 panel, to the OFF position.

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- (l) Make sure the aft 1 fan comes on.
 - (m) Close these circuit breakers:
 - 1) On the P11 panel:
 - a) 11M14, LEFT JETT NOZZLE VALVE
 - b) 11M23, RIGHT JETT NOZZLE VALVE
 - 2) On the P36 panel:
 - a) 36F4 or 36G7, LEFT FUEL JTSN PUMP
 - 3) On the P37 panel:
 - a) 37F4 or 37G4, RIGHT FUEL JTSN PUMP
- E. Put the airplane back to its usual condition

S 415-052

- (1) Install the sidewall panels (Ref 25-52-01).

S 415-053

- (2) Close the bulk cargo door, 811 (Ref 06-46-00).

S 865-054

- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

TASK 21-26-00-705-055

6. System Test - Forward Cargo Exhaust System (Fig. 503)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (3) 20-41-01/201, Electro-Static Sensitive Devices
- (4) 24-22-00/201, Electrical Power - Control
- (5) 27-51-00/201, Flaps
- (6) 31-41-00/201, Engine Indication and Crew Alerting System
- (7) 32-09-02/201, Air/Ground Relay
- (8) 36-11-12/401, Air Supply Control Card Assembly

B. Access

- (1) Location Zones
 - 119/120 Main equipment center
 - 123/124 Area below the forward cargo compartment

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C. Prepare for the test

S 865-056

- (1) Supply electrical power (Ref 24-22-00).

S 865-057

- (2) Make sure these circuit breakers, on the pilot's overhead circuit breaker panel, P11, are closed:
- (a) 11A13, LEFT PACK FLOW CONT
 - (b) 11A26, RIGHT PACK FLOW CONT
 - (c) 11N10, LEFT PACK AUTO PWR
 - (d) 11N11, LEFT PACK AUTO CONT
 - (e) 11N15, R PACK STANDBY PWR
 - (f) 11N16, R PACK STANDBY CONT
 - (g) 11N17, PACK FLOW INDICATION
 - (h) 11N18, CARGO EXH VALVE
 - (i) 11N19, RIGHT PACK AUTO PWR
 - (j) 11N20, RIGHT PACK AUTO CONT
 - (k) 11N21, FWD CARGO CONT VLV CLOSE
 - (l) 11N22, FWD CARGO DUCT OVHT/INOP
 - (m) 11N24, L PACK STANDBY PWR
 - (n) 11N25, L PACK STANDBY CONT
 - (o) 11P21, FWD CARGO A/C & VENT CONT
 - (p) 11R11, AUX ZONE CONTROLLER
 - (q) 11R14, RECIRC FAN L
 - (r) 11R15, ZONE CONTROLLER
 - (s) 11R19, FWD CARGO HEAT CONT
 - (t) 11R21, CARGO HEAT OVERRIDE
 - (u) 11R23, RECIRC FAN R
 - (v) 11R24, F/D ZONE DUCT OVHT/INOP
 - (w) EICAS circuit breakers (6 locations)

S 865-058

- (3) Make sure these circuit breakers, on the left miscellaneous electrical panel, P36, are closed:
- (a) 36E4 or 36K3, CGO GND EXH B/U VAL

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- (b) 36F2 or 36F4, RECIRC FAN L
- (c) 36L2 or 36K5, FWD CARGO HT CONT VLV

S 865-059

- (4) Make sure these circuit breakers, on the right miscellaneous electrical panel, P37, are closed:
 - (a) 37E3 or 37K7, CARGO GND EXH VALVE
 - (b) 37E4 or 37K6, CARGO A/C SOV
 - (c) 37G4 or 37C4, RECIRC FAN R
 - (d) 37J3 or 37G1, FWD CARGO VENT FAN
 - (e) 37J6 or 37F1, CGO GND EXH FAN

S 865-060

- (5) Do these steps on the overhead control panel, P5:
 - (a) Make sure the L and R PACK selectors are in the AUTO position.
 - 1) Make sure the PACK OFF lights are off.
 - (b) Make sure the F/D zone temperature selector is in the AUTO (12 o'clock) position.
 - (c) Make sure the other zone temperature selectors are in the OFF position.
 - (d) Make sure the ON lights, on the L and R RECIRC switch-lights, are on.
 - (e) Make sure the ON light, on the FWD CARGO A/C switch-light, is on.
 - (f) Make sure the FWD CARGO A/C selector is in the VENT position.

S 865-061

- (6) Make sure the FWD and AFT CARGO FIRE switch-lights, on the pilot's control stand panel P8, are off (the ARMED light is not on).

S 865-062

- (7) Make sure the flaps are in the retracted position (Ref 27-51-00).

S 015-063

- (8) Open the access door to the main equipment center, 119AL (Ref 06-41-00).

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S 865-064

- (9) Find the electrical systems cardfile panel, P50.
(a) Turn and hold the channel 2 test switch, on the L and R N2 ENGINE SPEED cards, to the TEST positions.

CAUTION: DO NOT TOUCH THE CONTROL CARDS BEFORE YOU DO THE PROCEDURE FOR THE DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. AN ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CONTROL CARD.

- (b) Do the procedure for the devices that are sensitive to electrostatic discharge (Ref 20-41-01).
(c) Remove the L and R BLEED AIR CONTROL cards (Ref 36-11-12).

S 015-065

- (10) Open the forward cargo compartment door, 821 (Ref 06-46-00).

S 015-066

- (11) Remove the floor panels that are four feet aft of the forward bulkhead and at the center line of the forward cargo compartment.
(a) Find the exhaust valve.

S 015-067

- (12) Remove the floor panels that are six feet aft of the cargo door and at the center line of the forward cargo compartment.
(a) Find the ground exhaust valve.
(b) Find the ground exhaust backup valve.
(c) Find the ground exhaust fan.

S 865-068

- (13) Push the ESC MSG switch on the EICAS MAINT panel, on the right side control panel, P61.

D. Do the System Test for the Forward Cargo Exhaust System

S 735-069

- (1) Do the Exhaust Valve Test

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoilers.

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WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (b) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (Ref 32-09-02).
- (c) Open this circuit breaker on the P11 panel:
 - 1) 11N18, CARGO EXH VALVE
- (d) Push the FWD CARGO A/C switch-light, on the P5 panel, to the off position.
 - 1) Make sure the ON light goes off.
- (e) After 20 seconds, make sure the EICAS message, CARGO EXH VALVE, shows on the bottom display.
- (f) Close this circuit breaker on the P11 panel:
 - 1) 11N18, CARGO EXH VALVE
- (g) Make sure the position indicator on the exhaust valve moves to the CLOSE position in 10 seconds.
- (h) Do the Maintenance Message Erase procedure (Ref 31-41-00).
- (i) Make sure the EICAS message, CARGO EXH VALVE, shows on the bottom display.
- (j) Open this circuit breaker on the P11 panel:
 - 1) 11N18, CARGO EXH VALVE
- (k) Push the FWD CARGO A/C switch-light, on the P5 panel, to the on position.
 - 1) Make sure the ON light comes on.
- (l) After 20 seconds, make sure the EICAS message, CARGO EXH VALVE, shows on the bottom display.
- (m) Close this circuit breaker on the P11 panel:
 - 1) 11N18, CARGO EXH VALVE
- (n) Make sure the position indicator on the exhaust valve moves to the OPEN position in 10 seconds.
- (o) Do the Maintenance Message Erase procedure (Ref 31-41-00).
- (p) Make sure the EICAS message, CARGO EXH VALVE, does not show on the bottom display.
- (q) Put the airplane back to the ground mode (Ref 32-09-02).

S 735-008

- (2) Do the Ground Exhaust Valve Test
 - (a) Open this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CARGO GND EXH VALVE
 - (b) Push the FWD CARGO A/C switch-light, on the P5 panel, to the off position.
 - 1) Make sure the ON light goes off.
 - (c) After 20 seconds, make sure the EICAS message, CARGO GND EXH VLV, shows on the bottom display.
 - (d) Close this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CARGO GND EXH VALVE
 - (e) Make sure the position indicator on the ground exhaust valve moves to the CLOSED position in 10 seconds.
 - (f) Do the Maintenance Message Erase procedure (Ref 31-41-00).

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- (g) Make sure the EICAS message, CARGO GND EXH VLV, does not show on the bottom display.
- (h) Open this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CARGO GND EXH VALVE
- (i) Push the FWD CARGO A/C switch-light, on the P5 panel, to the ON position.
 - 1) Make sure the ON light comes on.
- (j) After 20 seconds, make sure the EICAS message, CARGO GND EXH VLV, shows on the bottom display.
- (k) Close this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CARGO GND EXH VALVE
- (l) Make sure the position indicator on the ground exhaust valve moves to the OPEN position in 10 seconds.
- (m) Do the Maintenance Message Erase procedure (Ref 31-41-00).
- (n) Make sure the EICAS message, CARGO GND EXH VALVE, does not show on the bottom display.

S 735-007

- (3) Do the Ground Exhaust Backup Valve Test
 - (a) Remove the air/ground relay K211 from the P37 panel (Ref 32-09-02).
 - (b) After 20 seconds, make sure the EICAS message, CARGO GND EXH VALVE, shows on the bottom display.
 - (c) Install the air/ground relay K211 into the P37 panel (Ref 32-09-02).
 - (d) Do the Maintenance Message Erase procedure (Ref 31-41-00).
 - (e) Make sure the EICAS message, CARGO GND EXH VALVE, does not show on the bottom display.
 - (f) Open this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CARGO GND EXH VALVE
 - (g) Remove the air/ground relay K211 from the P37 panel (Ref 32-09-02).
 - (h) After 20 seconds, make sure these conditions occur:
 - 1) The EICAS message, CGO GND EXH VLVS, shows on the top display.
 - 2) The EICAS message, CARGO GND EXH VALVE, shows on the bottom display.
 - 3) The FAULT light on the FWD CARGO A/C module, on the P5 panel, comes on.
 - (i) Install the air/ground relay K211 into the P37 panel (Ref 32-09-02).
 - (j) Make sure these conditions occur:
 - 1) The EICAS message, CGO GND EXH VLVS, does not show on the top display.
 - 2) The EICAS message, CARGO GND EXH VALVE, does not show on the bottom display.
 - 3) The FAULT light on the FWD CARGO A/C module, on the P5 panel, goes off.
 - (k) Close this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CARGO GND EXH VALVE

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- (l) Remove the air/ground relay K1219 from the P36 panel (Ref 32-09-02).
- (m) Make sure the position indicator on the ground exhaust valve moves to the CLOSED position in 10 seconds.
- (n) After 20 seconds, make sure the EICAS message, CARGO GND EXH VALVE, shows on the bottom display.
- (o) Install the air/ground relay K1219 into the P36 panel (Ref 32-09-02).
- (p) Make sure the position indicator on the ground exhaust valve moves to the OPEN position in 10 seconds.
- (q) Do the Maintenance Message Erase procedure (Ref 31-41-00).
- (r) Make sure the EICAS message, CARGO GND EXH VALVE, does not show on the bottom display.

S 735-006

- (4) Do the Ground Exhaust Fan Test
 - (a) Push the FWD CARGO A/C switch-light, on the P5 panel, to the off position.
 - 1) Make sure the ON light goes off.
 - (b) Listen for the ground exhaust fan to stop.
 - (c) Remove the electrical connector D13576 from the ground exhaust fan.
 - (d) Install a jumper between the pins 5 and 7 of the electrical connector D13576.
 - (e) Push the FWD CARGO A/C switch-light, on the P5 panel, to the on position.
 - 1) Make sure the ON light comes on.
 - (f) Open this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CARGO GND EXH VALVE
 - (g) Make sure the EICAS message, CARGO EXH FAN, shows on the bottom display.
 - (h) Remove the jumper from the pins 5 and 7 of the electrical connector D13576.
 - (i) Connect the electrical connector D13576 to the ground exhaust fan.
 - (j) Do the Maintenance Message Erase procedure (Ref 31-41-00).
 - (k) Make sure the EICAS message, CARGO EXH FAN, does not show on the bottom display.

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- (L) Close this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CARGO GND EXH VALVE
- E. Put the airplane back to its usual condition

S 865-001

- (1) Release the channel 2 test switch on the L and R N2 ENGINE SPEED cards, in the P50 panel, from the TEST positions.

S 415-002

CAUTION: DO NOT TOUCH THE CONTROL CARDS BEFORE YOU DO THE PROCEDURE FOR THE DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. AN ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CONTROL CARD.

- (2) Do the procedure for the devices that are sensitive to electrostatic discharge (Ref 20-41-01).

S 415-071

- (3) Install the L and R BLEED AIR CONTROL cards, in the P50 panel (Ref 36-11-12).

S 415-003

- (4) Close the access door for the main equipment center, 119AL (Ref 06-41-00).

S 415-004

- (5) Close the forward cargo door, 821 (Ref 06-46-00).

S 865-005

- (6) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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VENTILATION SYSTEM – CLEANING/PAINTING

1. General

- A. This procedure has the following task for the ventilation system:
(1) Ventilation System Cleaning

TASK 21-26-00-107-001

2. Ventilation System Cleaning

A. General

- (1) Over time, normal airplane operation can result in the accumulation of dust and lint in the ventilation system components and those electronic equipment centers and/or main cabin video equipment centers that are cooled by the ventilation system fans. Without periodic cleaning and maintenance, a build-up of airborne dust and lint can reduce the ventilation system cooling capability and cause electronic equipment to overheat and fail.
- (2) Electronic equipment installed in these equipment centers are cooled by draw-thru cooling from the ventilation system fans:
 - (a) E6 aft electronic equipment center in aft cargo compartment.
 - (b) E9 SATCOM electronic equipment center in aft cargo compartment (if installed)
 - (c) E10 and E11 SATCOM electronic equipment cabinets above main cabin center stowage compartments (if installed).
 - (d) Main cabin video equipment center (if installed)
- (3) The ventilation system fans pulls the cabin air and any airborne contaminants in the galleys, lavatories, zone temperature sensor assemblies, electronic equipment centers, and main cabin video equipment centers into the overhead ventilation ducting and exhausts the air overboard out through the cabin pressurization outflow valve (AMM 21-31-00/001).
- (4) Airborne contaminants such as dust and lint can accumulate in the galley ventilation air inlets/grilles/filters, lavatory air vents (behind toilet shroud), zone temperature sensor air inlets/filters, the cooling air inlet ports in the electronic equipment racks, the airflow control orifices (restrictors) installed in the ventilation ducts, the ventilation system fans and fan outlet screens.
- (5) Air filters are installed in the galley ventilation air inlets and zone temperature sensor air inlets to help prevent the entry of airborne contaminants into the ventilation system ducting.

B. References

- (1) AMM 20-10-01/401, E/E Rack-Mounted Components
- (2) AMM 20-60-02/201, Cleaning to Remove Combustible Material Around Wiring
- (3) AMM 20-60-06/201, Electronic Line Replaceable Unit Cleaning
- (4) AMM 21-22-02/401, Air Conditioning Restrictor (Flow Control Orifice)
- (5) AMM 21-26-01/401, Aft Equip/Lavatory/Galley Ventilation Fan

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- (6) AMM 21-26-03/401, Galley Ventilation Filter
- (7) AMM 21-61-00/701, Temperature Control System
- (8) AMM 21-61-09/401, Zone Temperature Sensor Filters
- (9) AMM 24-22-00/201, Control (Supply Power)
- (10) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (11) AMM 52-35-00/201, Aft Cargo Door

C. Access

(1) Location Zones

- 154 Aft Cargo Compt, Right
- 166 Area Aft of Bulk Cargo Compt, Right
- 200 Upper Half of Fuselage

(2) Access Panels

- 811 Bulk Cargo Door
- 822 Aft Cargo Door

D. Prepare for Cleaning

S 867-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 017-005

- (2) Get access to the ventilation system fans behind the aft endwall in the bulk cargo compartment:
 - (a) Open the bulk cargo door, 811.
 - (b) Remove the right aft endwall lining (AMM 25-52-01/401).

S 017-003

- (3) Get access to the electronic equipment centers behind the right sidewall in the aft cargo compartment:
 - (a) Open the aft cargo door, 822 (AMM 52-35-00/201).
 - (b) Remove the right sidewall lining aft of the cargo door opening to get access to the E6 electronic equipment rack (AMM 25-52-01/401).

S 867-004

- (4) Remove electrical power (AMM 24-22-00/201).

E. Galley Ventilation System Cleaning

S 167-006

- (1) Clean any dust/lint accumulation from the galley ventilation air inlet grille in each galley.

S 217-007

- (2) Inspect the galley ventilation air filter in each galley and replace if necessary (AMM 21-26-03/401).

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F. Lavatory Ventilation System Cleaning

S 167-008

- (1) Remove any dust/lint accumulation from the lavatory air vent behind the toilet shroud in each lavatory.

G. Temperature Control System Cleaning

S 167-029

- (1) Clean any dust/lint accumulation from each zone temperature sensor air inlet and air filter (AMM 21-61-00/701).

S 427-031

- (2) Replace the zone temperature sensor air filters if necessary (AMM 21-61-09/401).

H. E6 Aft Electronic Equipment Center Cleaning

S 027-009

- (1) Remove the electronic equipment (LRU) from the E/E rack (AMM 20-10-01/401).
 - (a) Install protective caps/plugs to the LRU pin connectors to prevent pin contamination from dust and debris which could cause potential shorting between pins when LRU is re-installed.

S 167-010

- (2) Clean the electronic equipment (LRU) (AMM 20-60-06/201).

S 167-011

- (3) Remove any dust or lint from the cooling air ports in the trays of the equipment rack.

S 217-012

- (4) Inspect the wire bundles around the equipment rack for dust accumulation and clean as necessary (AMM 20-60-02/201).

S 427-014

- (5) Re-install the electronic equipment (LRU) (AMM 20-10-01/401).

I. E9/E10/E11 SATCOM Electronic Equipment Center Cleaning (if installed)

S 017-044

- (1) Remove the right sidewall linings forward of the cargo door opening to get access to the E9 SATCOM equipment rack (AMM 25-52-01/401).

S 017-045

- (2) Remove the main cabin ceiling panels to get access to the E10/E11 SATCOM cabinets above the center stowage compartments.

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S 027-039

- (3) Remove the electronic equipment (LRU) from the E9 rack and/or E10/E11 cabinet (AMM 20-10-01/401).
 - (a) Install protective caps/plugs to the LRU pin connectors to prevent pin contamination from dust and debris which could cause potential shorting between pins when LRU is re-installed.

S 167-040

- (4) Clean the electronic equipment (LRU) (AMM 20-60-06/201).

S 167-041

- (5) Remove any dust or lint from the cooling air ports in the trays of the equipment rack.

S 217-042

- (6) Inspect the wire bundles around the equipment rack for dust accumulation and clean as necessary (AMM 20-60-02/201).

S 427-043

- (7) Re-install the electronic equipment (LRU) (AMM 20-10-01/401).

J. Main Cabin Video Equipment Center Cleaning (if installed)

S 167-032

- (1) Vacuum the main cabin floor around the video equipment center, and the inside surfaces, corners, crevices and air inlet grilles of the video equipment center enclosure.

S 427-033

- (2) Replace or clean the air inlet filters in the video equipment center (if installed).

S 167-034

- (3) Remove and clean the video electronic equipment (AMM 20-60-06/201).

S 167-035

- (4) Use a vacuum or a soft, lint-free cloth to clean the external surfaces of the plenum orifices/object debris screens installed behind the video electronic equipment.

S 427-036

- (5) Re-install the video electronic equipment.

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S 017-037

- (6) Get access to the ventilation system ducting above the ceiling area of the video equipment center.
 - (a) Clean the duct orifice (airflow restrictor) installed in the ventilation system ducting for cooling the video equipment center.
 - 1) Use a vacuum or a soft, lint-free cloth and soapy water to clean the orifice (airflow restrictor).
 - 2) If necessary replace the duct orifice (AMM 21-22-02/401).

K. Ventilation System Component Cleaning

S 167-016

- (1) Remove any dust/lint accumulation from the outlet screen on each ventilation system fan.

S 167-017

- (2) Remove each ventilation system fan (AMM 21-26-01/401) and inspect for dust/lint contamination and clean as necessary.

S 167-018

- (3) Remove any dust/lint accumulation inside of the ventilation system ducting just upstream of the ventilation system fans.

S 167-019

- (4) Inspect and clean any duct orifices (airflow restrictors) installed in the ducting upstream of the ventilation system fans to remove any dust/lint accumulation (AMM 21-22-02/401).

S 427-020

- (5) Re-install the ventilation system fans (AMM 21-26-01/401).

L. Post-Cleaning Check

S 427-021

- (1) Make sure all electronic equipment and system components that were removed have been re-installed.

S 867-022

- (2) Supply electrical power (AMM 24-22-00/201).

S 717-024

- (3) Let the ventilation system operate to purge any residual contamination from the airstream that might have been loosened during cleaning.

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S 167-023

- (4) Repeat cleaning of the ventilation system and interfacing systems if necessary.

M. Return the Airplane to Normal Configuration

S 417-025

- (1) Re-install the cargo sidewall linings (AMM 25-52-01/401).

S 417-026

- (2) Close the bulk cargo door, 811.

S 417-027

- (3) Close the aft cargo door, 822 (AMM 52-35-00/201).

S 867-028

- (4) Remove electrical power if no longer required (AMM 24-22-00/201).

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AFT EQUIP/LAVATORY/GALLEY VENTILATION FAN – REMOVAL/INSTALLATION

1. General

- A. The aft equip/lavatory/galley ventilation fans are installed forward of the aft pressure bulkhead and aft of the bulk cargo compartment. Both fans are the same. The fans operate, one at a time, to pull air from the electronic equipment areas, the lavatories, and the galleys.
- B. This procedure has instructions to remove and install the aft equip/lavatory/galley ventilation fans.

TASK 21-26-01-004-001

2. Ventilation Fan Removal (Fig. 401)

A. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors, Access Doors and Panels.
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Sidewall Panels

B. Access

- (1) Location Zone
165/166 Area aft of bulk cargo compartment

C. Prepare for the Removal.

S 864-017

- (1) Remove electrical power (AMM 24-22-00/201).

S 864-002

- (2) Open these circuit breakers and attach the DO-NOT-CLOSE tags.
 - (a) P11 pilot's overhead circuit breaker panel:
 - 1) 11P10, EQUIPMENT COOLING AFT FAN EXH 2
 - 2) 11P19, EQUIPMENT COOLING AFT FAN EXH 1
 - (b) P33 forward miscellaneous electrical equipment panel:
 - 1) 33B1, EQUIP COOL AFT FAN 1
 - 2) AIRPLANES WITH THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6:
 - a) 33D6, AFT EXH FAN 1 AC AVAIL

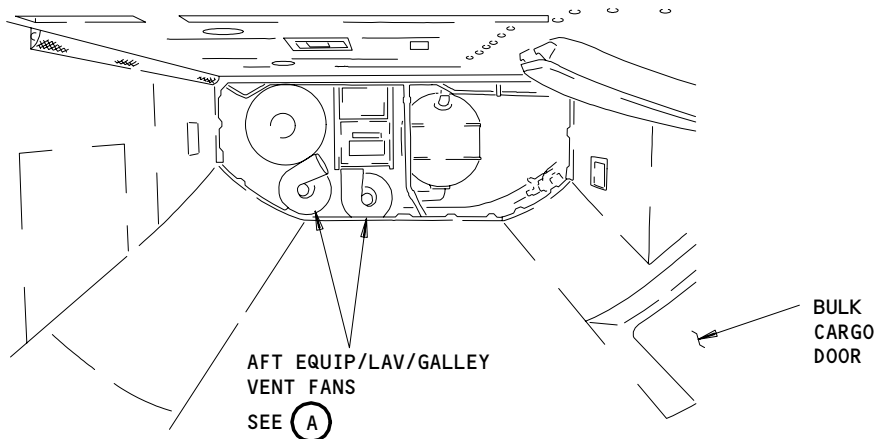
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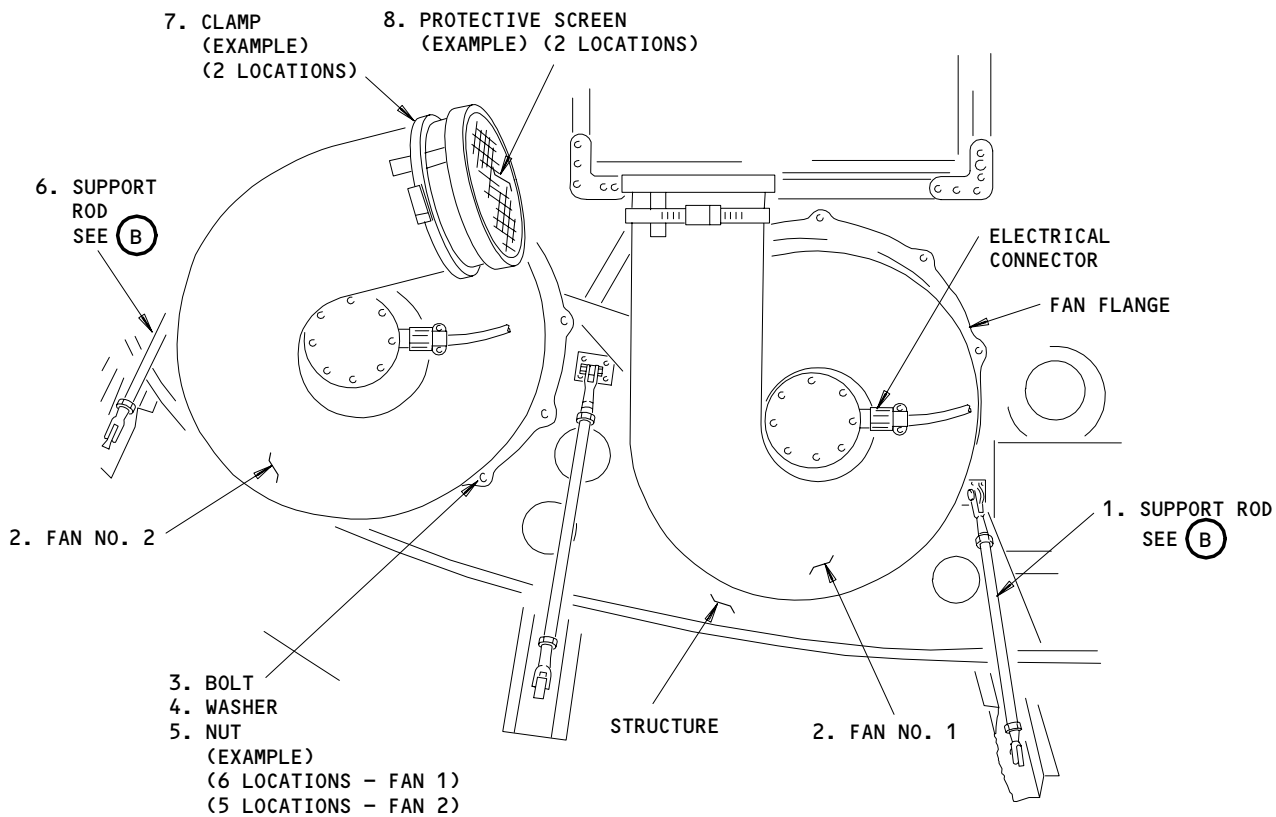
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BULK CARGO COMPARTMENT (LOOKING AFT)



AFT EQUIP/LAVATORY/GALLEY VENTILATION FAN

(A)

Aft Equip/Lavatory/Galley Ventilation Fan Installation
Figure 401 (Sheet 1)

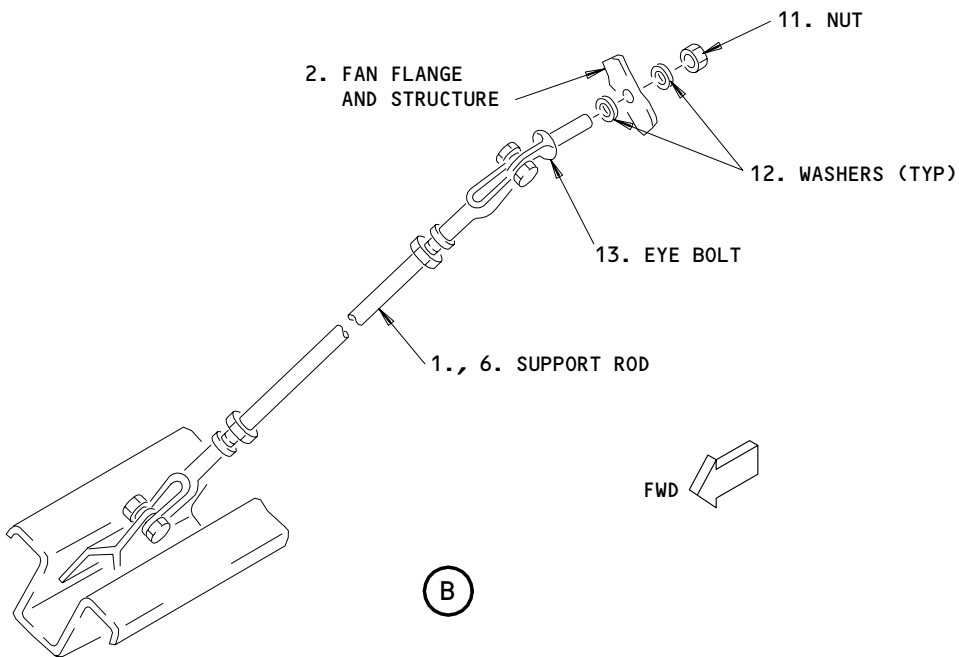
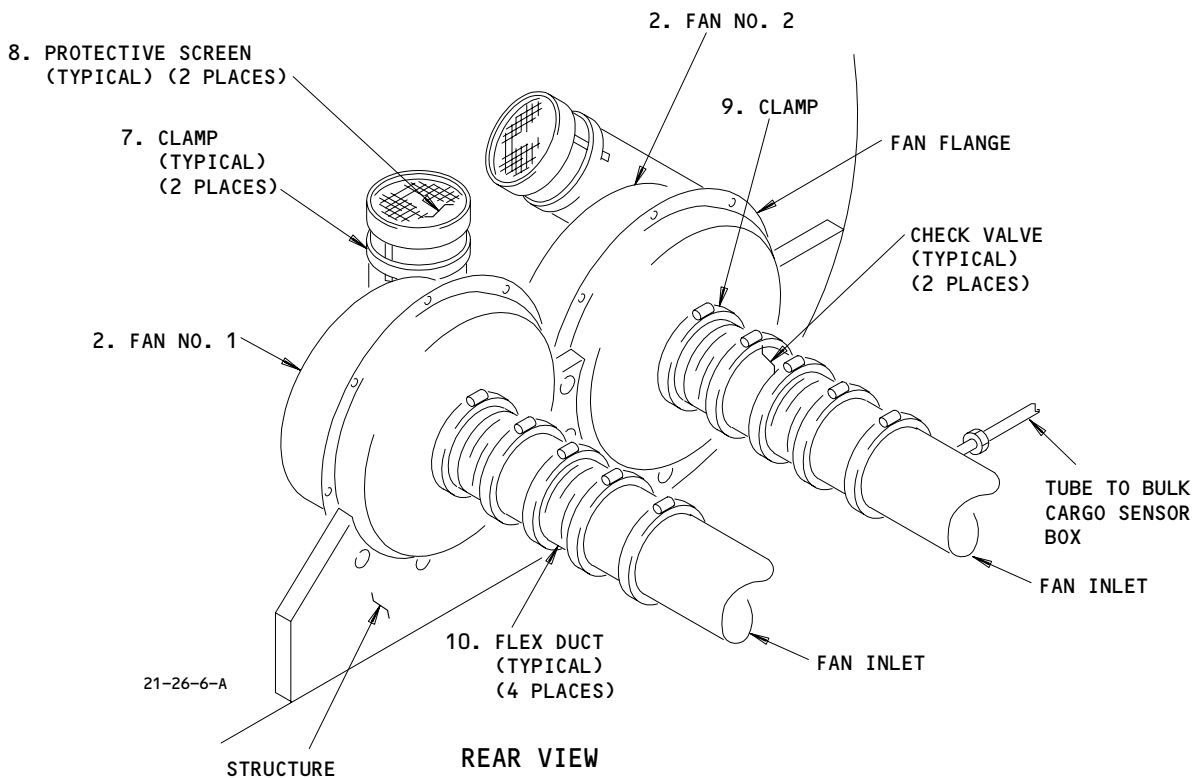
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Aft Equip/Lavatory/Galley Ventilation Fan Installation
Figure 401 (Sheet 2)

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- (c) P34 APU/external power panel:
 - 1) 34L8, EQUIPMENT COOLING AFT FAN 1
- (d) P36 left miscellaneous equipment panel:
 - 1) 36G4, EQUIP COOL AFT FAN 2

S 864-003

- (3) Put the APU selector, on the pilots' overhead control panel, P5, to the OFF position and attach a DO-NOT-OPERATE tag.

S 014-005

- (4) Open the bulk cargo door, 823 (AMM 06-46-00/201).

S 014-006

- (5) Remove the endliner at the aft end of the bulk cargo compartment (AMM 25-52-01/401).

D. Remove the vent fans.

S 034-007

- (1) Disconnect the electrical connector from the applicable (No. 1 or 2) fan.

S 034-008

- (2) Loosen the clamp (9) on the aft side of the fan (2).

S 034-027

- (3) Move the clamp (9) and the flex duct (10) away from the fan (2).

S 034-009

- (4) Remove the eyebolt (13) from the support rod (1, 6).

S 034-010

- (5) Remove the bolts (3) from the fan flange.

S 024-011

- (6) Remove the fan (2).

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TASK 21-26-01-404-024

3. Ventilation Fan Installation (Fig. 401)

A. Parts

(1) Refer to the Airplane Illustrated Parts Catalog (AIPC) for the part numbers and effectivities of items in the table that follows:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Rod	21-26-01	01	140
	2	Fan			160
	3	Bolt			79
	4	Washer			83
	5	Nut			85
	6	Rod			130
	7	Clamp			5
	8	Screen			44
	9	Clamp			5
	10	Hose			10
	11	Nut			85
	12	Washer			83
	13	Bolt			81

B. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors, Access Doors and Panels.
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Sidewall Panels

C. Access

- (1) Location Zone
165/166 Area aft of bulk cargo compartment

D. Install the vent fans.

S 424-031

- (1) Make sure to install the vent fans as shown in figure 401.

S 424-012

- (2) Put the vent fan (2) into position against the airplane structure.

S 434-013

- (3) Install the bolts (3), washers (4), and nuts (5) to attach the fan flange to the airplane structure.
 - (a) Tighten the bolts.

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- S 434-014
- (4) Install the eyebolt (13), washers (12), and nut (11).
(a) Tighten the eye bolt.

- S 434-015
- (5) Move the flex duct (10) and the clamp (9) onto the aft end of the fan.
(a) Tighten the clamp (9).

- S 434-016
- (6) Install the electrical connector to the fan (2).

E. Fan Post-Installation Test

- S 864-025
- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers.
- (a) P11 pilot's overhead circuit breaker panel:
- 1) 11P10, EQUIPMENT COOLING AFT FAN EXH 2
 - 2) 11P19, EQUIPMENT COOLING AFT FAN EXH 1
- (b) P33 forward miscellaneous electrical equipment panel:
- 1) 33B1, EQUIP COOL AFT FAN 1
 - 2) AIRPLANES WITH THE "AFT EXH FAN 1 AC AVAIL" CIRCUIT BREAKER INSTALLED AT PANEL GRID LOCATION 33D6:
 - a) 33D6, AFT EXH FAN 1 AC AVAIL
- (c) P34 APU/external power panel:
- 1) 34L8, EQUIPMENT COOLING AFT FAN 1
- (d) P36 left miscellaneous equipment panel:
- 1) 36G4, EQUIP COOL AFT FAN 2

- S 864-074
- (2) Supply electrical power (AMM 24-22-00/201).

- S 864-028
- (3) Do the procedure to erase the latched EICAS Status and Maintenance Messages (AMM 31-41-00/201).

- S 714-075
- (4) Set the EQUIP COOLING mode selector to the AUTO position, on the Equipment Cooling Control module (M17, P5 panel).
(a) Make sure that fan 1 (B15) is on and fan 2 (B16) is off.

NOTE: Fan 1 (B15) is the inboard fan and fan 2 (B16) is the outboard fan.

- (b) Make sure there are no air leaks around the fan and sleeve.

- S 714-077
- (5) Set the EQUIP COOLING mode selector to the STBY position, on the Equipment Cooling Control module (M17, P5 panel).
(a) Make sure that fan 1 (B15) is off and fan 2 (B16) is on.
(b) Make sure there are no air leaks around the fan and sleeve.

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- S 714-079
- (6) Set the EQUIP COOLING mode selector to the AUTO position, on the Equipment Cooling Control module (M17, P5 panel).
 - (a) Make sure that fan 1 (B15) is on and fan 2 (B16) is off.
- F. Put the airplane back to its usual condition.
- S 414-020
- (1) Install the endliner in the aft end of the bulk cargo compartment (AMM 25-52-01/401).
- S 414-021
- (2) Close the bulk cargo door, 823 (AMM 06-46-00/201).
- S 864-022
- (3) Remove the DO-NOT-OPERATE tag from the APU selector, on the P5 panel.
- S 864-023
- (4) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

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VENTILATION CHECK VALVE - REMOVAL/INSTALLATION

1. General

- A. Two ventilation check valves are installed in the area aft of the bulk cargo compartment, immediately aft of the aft equip/lavatory/galley ventilation fans. This procedure has instructions to remove and install the check valves.

TASK 21-26-02-004-001

2. Remove the Ventilation Check Valves (Fig. 401)

A. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
(2) AMM 25-52-01/401, Sidewall Panels

B. Access

- (1) Location Zone
165 Area aft of bulk cargo compartment (Left)

C. Prepare for the Removal

S 864-002

- (1) Open and attach a DO-NOT-CLOSE tag to these circuit breakers:
(a) On the forward miscellaneous electrical equipment panel, P33, 33B1, EQUIP COOL AFT FAN 1
(b) On the left miscellaneous electrical equipment panel, P36, 36G4, EQUIP COOL AFT FAN 2

S 864-003

- (2) Turn the APU selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Put a DO-NOT-OPERATE tag on the selector.

S 014-005

- (3) Open the bulk cargo door, 811 (AMM 06-46-00/201).

S 014-006

- (4) Remove the left endliner panel in the aft end of the bulk cargo compartment (AMM 25-52-01/401).

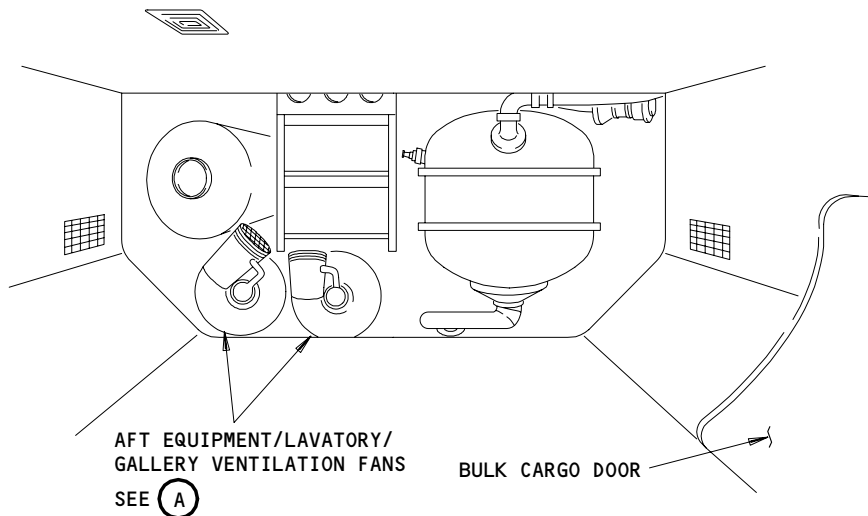
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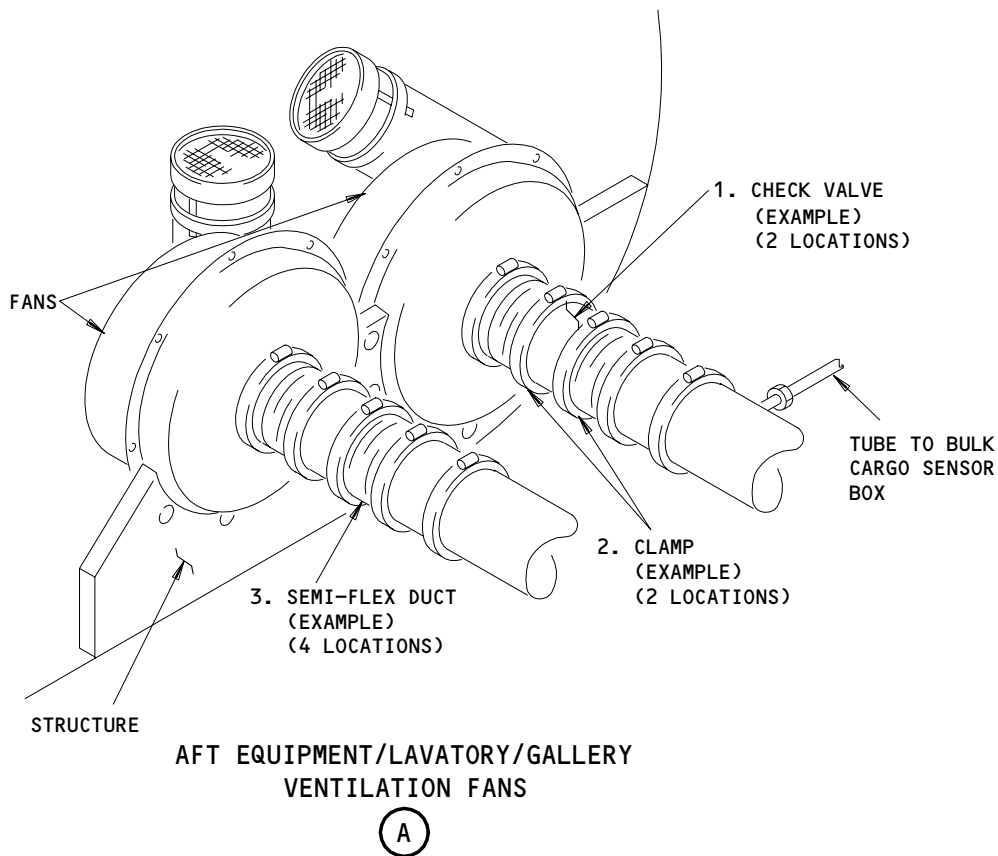
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**BULK CARGO COMPARTMENT
(WHEN YOU LOOK AFT)**



**Aft Equipment/Lavatory/Galley Ventilation Check Valve Installation
Figure 401**

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D. Remove the check valve

S 034-007

- (1) Loosen the clamps (2) on each side of the check valve (1).

S 034-008

- (2) Move the flexible ducts (3) away from the check valve (1).

S 024-009

- (3) Remove the check valve (1).

S 434-010

- (4) Install a cover on the duct openings.

TASK 21-26-02-404-011

3. Install the Ventilation Check Valves (Fig. 401)

A. Parts

- (1) Refer to the Illustrated Parts Catalog (IPC) for the part numbers and the effectivities of the items in the table that follows.

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Valve	21-26-01	01	15
	2	Clamp			5
	3	Hose			10

B. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
 (2) AMM 25-52-01/401, Sidewall Panels

C. Access

- (1) Location Zones
 165 Area aft of bulk cargo compartment (Left)

D. Install the check valve

S 034-012

- (1) Remove the covers from the duct openings.

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S 424-013

- (2) Put the check valve (1) into position aft of the aft equip/lavatory/galley ventilation fan.
 - (a) Make sure the hinge of the check valve is in a vertical position.
 - (b) Make sure the flow arrow on the check valve points to the ventilation fan.

S 434-014

- (3) Move part of the flexible ducts (3) on to each end of the check valve (1).

S 434-015

- (4) Install a clamp (2) on each end of the check valve (1).
- E. Do the installation test of the check valve

S 864-016

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-017

- (2) If the No. 1 check valve was installed:
 - (a) Remove the DO-NOT-CLOSE tag and close the circuit breaker 33B1, EQUIP COOL AFT FAN 1, on the P33 panel.
 - (b) Make sure the No. 1 fan comes on.

S 864-018

- (3) If the No. 2 check valve was installed:
 - (a) Remove the DO-NOT-CLOSE tag and close the circuit breaker 36G4, EQUIP COOL AFT FAN 2, on the P36 panel.
 - (b) Make sure the No. 2 fan comes on.

S 794-019

- (4) Feel for the airflow around the check valve.
 - (a) Small leaks are permitted.

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- (b) You must repair a large leak.
F. Put the airplane back to its usual condition

S 414-020

- (1) Install the left endliner panel in the aft end of the bulk cargo compartment (AMM 25-52-01/401).

S 414-021

- (2) Close the bulk cargo door, 811 (AMM 06-46-00/201).

S 864-022

- (3) Remove the DO-NOT-OPERATE tag from the APU selector, on the overhead panel, P5.

S 864-024

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) On the forward miscellaneous electrical equipment panel, P33, 33B1, EQUIP COOL AFT FAN 1
(b) On the left miscellaneous electrical equipment panel, P36, 36G4, EQUIP COOL AFT FAN 2

S 864-025

- (5) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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GALLEY VENTILATION FILTER – REMOVAL/INSTALLATION

1. General

- A. Each galley ventilation inlet has one filter in it. The galley ventilation inlets are installed next to the galley ceiling light assemblies. The filters keep small particles and debris out of the ventilation ducts and fans.
- B. This procedure has instructions to remove and install the galley ventilation filters.

TASK 21-26-03-004-001

2. Remove the Galley Ventilation Filters (Fig. 401)

A. Access

(1) Location Zones

221/222, 241/242, 251,252 Passenger Cabin (Galleys)

B. Remove the galley ventilation filter

S 014-002

- (1) Lower the cover from the galley light assembly.
 - (a) Push the quick release fasteners or remove the bolts on the light assembly cover.
 - (b) Lower the light assembly cover and let it hang by the cables.

CAUTION: DO NOT REMOVE THE COVER FROM THE CABLE HOOK THAT IS NEXT TO THE AIR HOSE. IF THE CABLE HOOK NEXT TO THE AIR HOSE IS REMOVED WHILE THE AIR HOSE IS ATTACHED TO THE COVER, THEN DAMAGE TO THE AIR HOSE MAY OCCUR.

- (c) Remove all the cable hooks, except the cable hook next to the air hose, from the light assembly cover.

S 034-003

- (2) Remove 8 bolts and washers from the sides of the vent inlet.

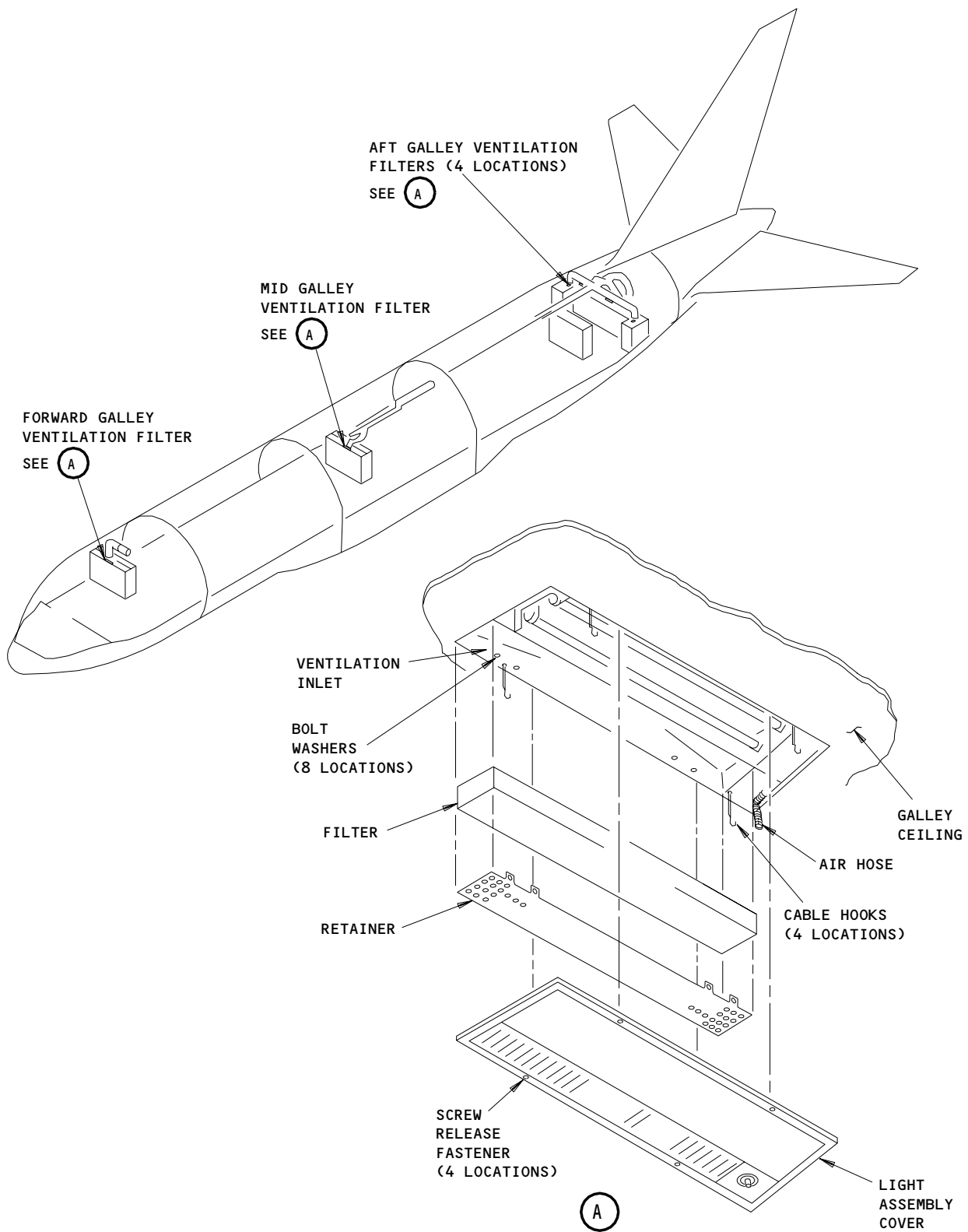
S 034-004

- (3) Pull the filter retainer out of the vent inlet.

EFFECTIVITY

ALL

21-26-03



Galley Ventilation Filter Installation
Figure 401

EFFECTIVITY	
	ALL

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S 024-018

- (4) Remove the galley ventilation filter.

TASK 21-26-03-404-019

3. Install the Galley Ventilation Filters (Fig. 401)

A. Consumable Materials

- (1) G02041 - Fiberglass Filter Material,
P/N: 628-975-232 or FRONTLINE BLUE WITH SKIN DRY ROLL FIBERGLASS
MEDIA ,
American Air Filter International,
215 Central Ave,
Louisville, KY 40208-01406 (Phone 1-800-501-3146)

B. Access

- (1) Location Zones
221/222, 241/242, 251/252 Passenger Cabin (Galleys)

C. Install the vent filter

S 544-020

- (1) If necessary, cut a new filter from the fiberglass filter material.
Make sure it is the same size as the filter which is replaced.

S 424-021

- (2) Put the new filter into the galley vent inlet. Make sure the
colored side of the filter is up, against the top of the vent inlet.

NOTE: The filter material is 2-inches thick, but compresses to
1 inch when it is installed.

S 434-022

- (3) Put the filter retainer into the galley vent inlet, against the
filter, with the bolt holes pointed up.

S 434-023

- (4) Install eight bolts and washers in the side of the vent inlet to
hold the retainer in position.

S 414-037

- (5) Attach the light assembly cover to the cable hooks.

S 414-038

- (6) Raise the light assembly cover into position.

EFFECTIVITY

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- S 214-050
- (7) Make sure the air hose is aligned correctly so that airflow is not prevented.
- S 434-049
- (8) Install the quick release fasteners or the bolts.

EFFECTIVITY

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FAN CURRENT SENSOR – REMOVAL/INSTALLATION

1. General

- A. There is one current sensor for each aft equip/lav/galley ventilation fan. The current sensor for the fan 1 is installed in the right miscellaneous electrical equipment panel, P37. The current sensor for the fan 2 is in the left miscellaneous electrical equipment panel, P36. The current sensors are behind the front cover, on the right side, and attached to the dripshield of each panel.
- B. There is one current sensor for the bulk cargo ventilation fan. It is installed in the right miscellaneous electrical equipment panel, P37. The current sensor, K614, is located close to the center of the panel.
- C. There is one current sensor for the forward cargo exhaust fan. It is installed in the right miscellaneous electrical equipment panel, P37.
- D. This procedure has instructions to remove and install the current sensors.

TASK 21-26-04-004-001

2. Remove the Current Sensor (Fig. 401)

- A. References
 - (1) 06-41-00/201, Fuselage Access Doors and Panels
 - (2) 20-41-01/201, Electrostatic Sensitive Devices
 - (3) 24-22-00/201, Electric Power Control
 - (4) 27-61-00/201, Spoiler/Speedbrake Control System
- B. Access
 - (1) Location Zones
 - 119/120 Main Equipment Center
 - (2) Access Panel
 - 119AL Main equipment center
- C. Prepare for the Removal

S 864-002

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL THE PERSONS AND THE EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT.

- (1) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all the persons and the equipment away from the spoilers.

S 864-003

- (2) Remove the electrical power (Ref 24-22-00).

S 014-004

- (3) Open the access door for the main equipment center, 119AL (Ref 06-41-00)

S 014-005

- (4) Remove the front cover of the applicable (P36 or P37) miscellaneous electrical equipment panel.

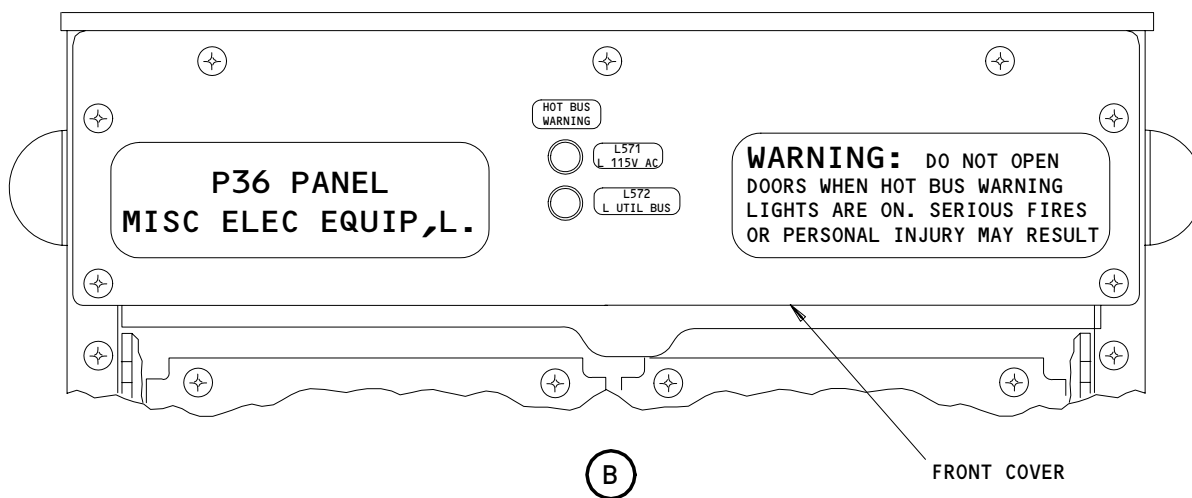
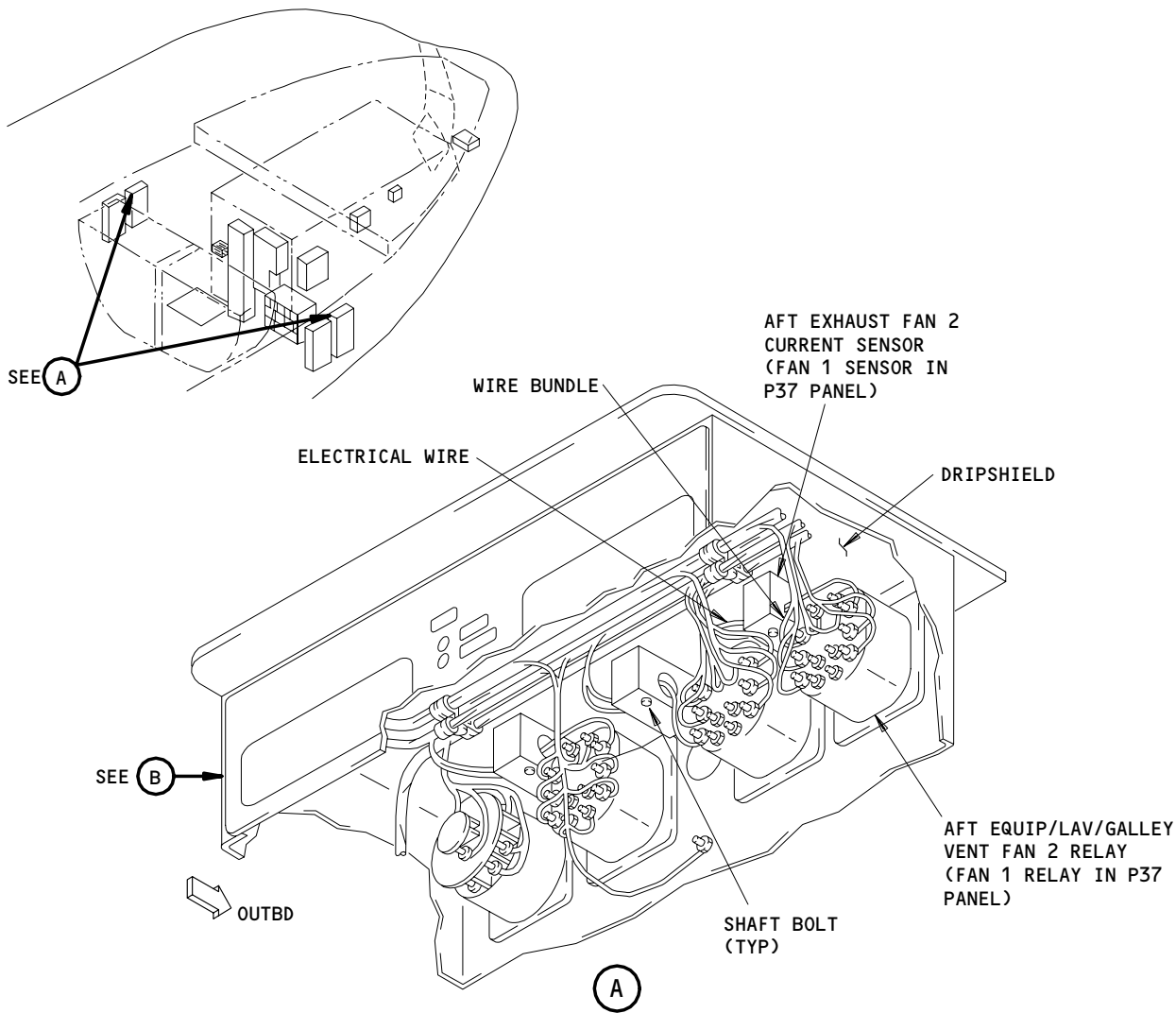
EFFECTIVITY

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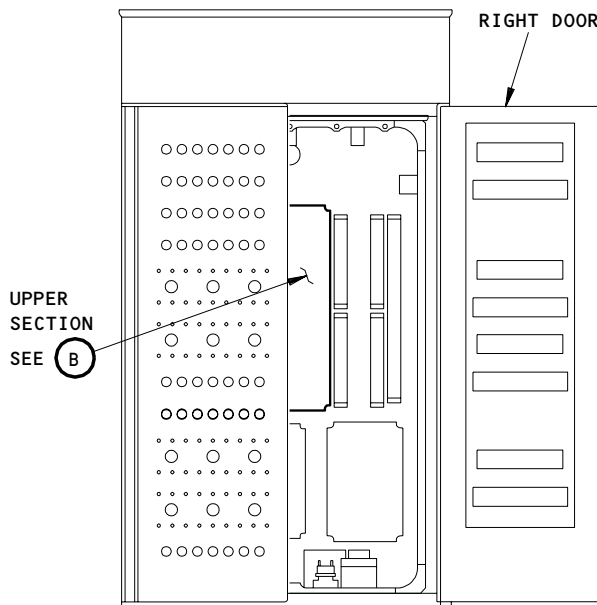
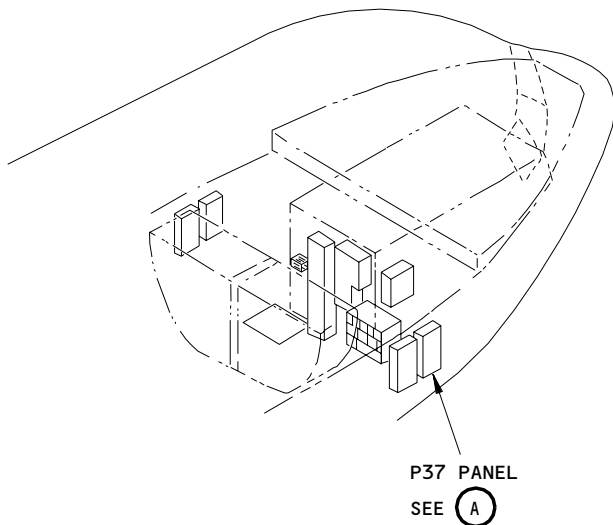
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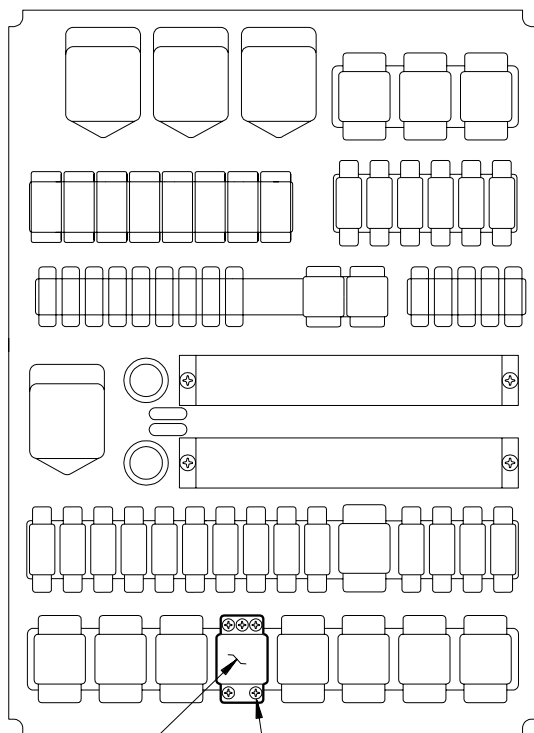
Fan Current Sensors Installation
Figure 401

EFFECTIVITY	
	ALL

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P37 PANEL
(RIGHT DOOR OPEN)
(A)



BULK CARGO VENTILATION CURRENT SENSOR, K614

SCREW (5 LOCATIONS)

UPPER SECTION
(B)

Bulk Cargo Ventilation Fan Current Sensor Installation
Figure 402

EFFECTIVITY	ALL
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D. Remove the current sensor

S 864-008

CAUTION: THE CURRENT SENSOR IS AN ELECTROSTATIC SENSITIVE DEVICE. MAKE SURE YOU USE THE CORRECT PROCEDURE WHEN YOU TOUCH IT. FAILURE TO USE THE CORRECT PROCEDURE COULD CAUSE DAMAGE TO THE CURRENT SENSOR.

- (1) Use the Electrostatic Sensitive Device procedure when you are near the current sensor (Ref 20-41-01).

S 024-034

- (2) To remove the aft equip/lav/galley ventilation fan current sensor or the forward cargo exhaust fan current sensor,
 - (a) Cut the electrical wires at the splice area on each side of the current sensor.
 - (b) Use one of these procedures to disconnect the fan power wire:
 - 1) Procedure No. 1:
 - a) Cut the fan power wire on one side of the hole in the current sensor.
 - 2) Procedure No. 2:
 - a) Loosen the screw at the terminal A2 of the applicable (vent fan 1 or vent fan 2) relay, K346 or K347.
 - b) Remove the fan power wire from the relay.
 - c) If it is necessary, remove the tape from the wire bundle.
 - (c) Pull the fan power wire through the hole in the current sensor.
 - (d) Remove the bolts that hold the current sensor.
 - (e) Remove the current sensor.

S 024-035

- (3) To remove the bulk cargo ventilation fan current sensor,
 - (a) Remove the screws that hold the current sensor.
 - (b) Remove the current sensor.

TASK 21-26-04-404-012

3. Install the Current Sensor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 20-41-01/201, Electrostatic Sensitive Devices
- (3) 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zones
 - 119/120 Main Equipment Center
- (2) Access Panel
 - 119AL Main equipment center

C. Install the current sensor

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S 864-016

CAUTION: THE CURRENT SENSOR IS AN ELECTROSTATIC SENSITIVE DEVICE. MAKE SURE YOU USE THE CORRECT PROCEDURE WHEN YOU TOUCH IT. FAILURE TO USE THE CORRECT PROCEDURE COULD CAUSE DAMAGE TO THE CURRENT SENSOR.

- (1) Use the Electrostatic Sensitive Device procedure when you are near the current sensor (Ref 20-41-01).

S 424-037

- (2) To install the aft equip/lav/galley ventilation fan current sensor or the forward cargo exhaust fan current sensor,
 - (a) Put the current sensor into position in the applicable (P36 or P37) miscellaneous electrical equipment panel.
 - 1) Make sure you align the bolt holes.
 - (b) Install the bolts that hold the current sensor in position.
 - (c) Put the fan power wire through the hole in the current sensor.
 - 1) For the current sensor for the forward cargo exhaust fan,

put the fan power wire through the hole in the current sensor two times.
 - (d) If the fan power wire was cut, make a splice to put it together.
 - (e) If the fan power wire was not cut, do the steps that follow:
 - 1) Attach the fan power wire to the terminal A2 of the applicable (vent fan 1 or vent fan 2) relay, K346 or K347.
 - 2) If it is necessary, put the tape on the wire bundle.
 - (f) Make a splice to put the electrical wires together, on each side of the current sensor.
 - 1) Make sure that the wires have the same number because they are polarity sensitive.

S 424-038

- (3) To install the bulk cargo ventilation fan current sensor,
 - (a) Put the current sensor into position in the P37 miscellaneous electrical equipment panel.
 - (b) Install the screws that hold the current sensor in position.

S 414-020

- (4) Install the front cover on the miscellaneous electrical equipment panel.

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D. Post-Installation Test - Lav/Galley Vent Fan 1 or Fan 2 Current Sensor

S 864-019

- (1) Supply electrical power (Ref 24-22-00).

S 214-020

- (2) If the current sensor for the vent fan 1 was installed, make sure the vent fan 1 is on.

S 214-021

- (3) If the current sensor for the vent fan 2 was installed, do the steps that follow:
 - (a) Turn the EQUIP COOLING selector, on the pilot's overhead panel, P5, to the STBY position.
 - (b) Make sure the vent fan 2 comes on.
 - (c) Turn the EQUIP COOLING selector, on the P5 panel, to the AUTO position.

E. Post-Installation Test - Forward Cargo Exhaust Fan Current Sensor

S 864-022

- (1) Supply electrical power (Ref 24-22-00).

S 864-023

- (2) Push the FWD CARGO A/C switch-light, on the pilot's overhead panel, P5, to the on position.

S 864-024

- (3) Push the ECS MSG switch on the EICAS MAINT module, on the P61 panel.

S 214-025

- (4) Make sure the EICAS message, CARGO EXH FAN, does not show on the bottom display.

S 864-028

- (5) Push the FWD CARGO A/C switch-light, on the P5 panel, to the off position.

F. Post-Installation Test - Bulk Cargo Vent Fan Current Sensor

S 864-039

- (1) Supply electrical power (Ref 24-22-00).

S 864-040

- (2) Push the BULK CARGO HEAT switch-light, on the pilot's overhead panel, P5, to the ON position.

S 864-041

- (3) Turn the BULK CARGO HEAT selector, on the right side panel, P61, to the VENT position.

S 864-042

- (4) Push the ECS MSG switch on the EICAS MAINT module, on the P61 panel.

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- S 214-043
- (5) Make sure the EICAS message, BULK CARGO FAN, does not show on the bottom display.
- S 864-047
- (6) Turn the BULK CARGO HEAT selector, on the right side panel, P61, to the NORM position.
- S 864-048
- (7) Push the BULK CARGO HEAT switch-light, on the pilot's overhead panel, P5, to the off position.
- G. Put the airplane back to its usual condition.
- S 414-029
- (1) Close the access door for the main equipment center, 119AL (Ref 06-41-00).
- S 864-030
- (2) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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ECS FAN CONTROL CARDS – REMOVAL/INSTALLATION

1. General

- A. The ECS FAN CONTROL cards are installed in the electrical systems cardfile, P50, in the main equipment center. This procedure has instructions to remove and install the ECS FAN CONTROL cards.

TASK 21-26-05-004-001

2. Remove the ECS FAN CONTROL Cards (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-01/401, E/E Rack Mounted Components
- (3) AMM 20-41-01/201, Electro Static Sensitive Devices
- (4) AMM 24-22-00/201, Electric Power Control
- (5) AMM 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
119/120 Main equipment center
- (2) Access Panel
119AL Main equipment center

C. Prepare for the Removal

S 864-002

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL THE PERSONS AND THE EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT.

- (1) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all the persons and the equipment away from the spoilers.

S 864-003

- (2) Remove the electrical power (AMM 24-22-00/201).

S 014-004

- (3) Open the access door for the main equipment center, 119AL (AMM 06-41-00/201).

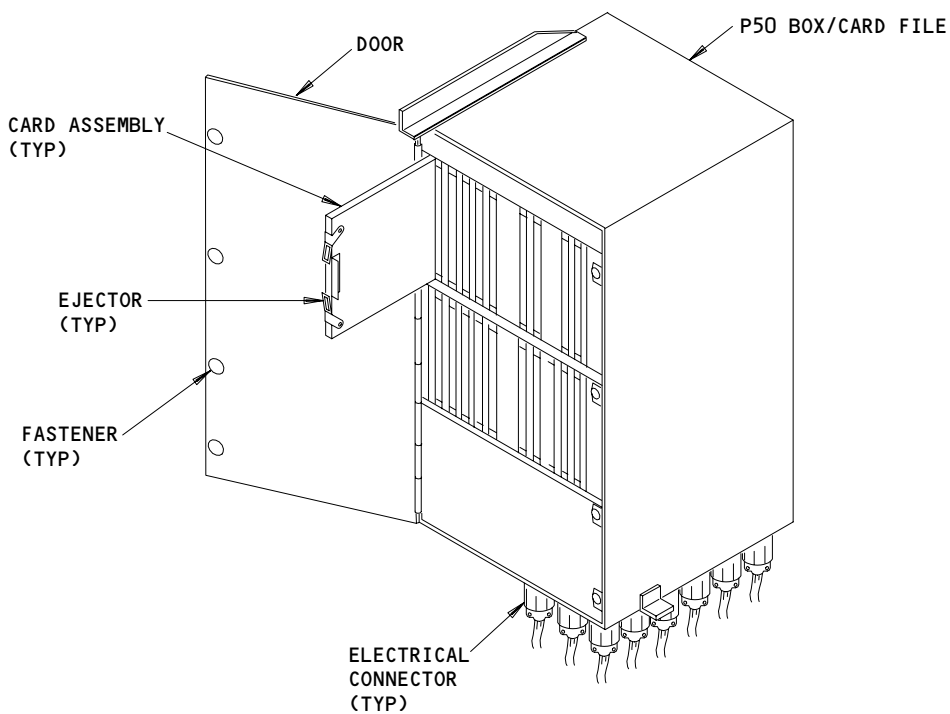
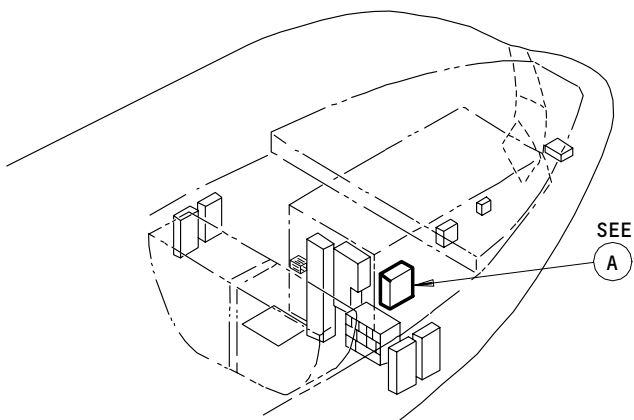
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A

Fan Control Card Assembly Installation
Figure 401

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D. Remove the card

S 014-005

- (1) Loosen the fasteners on the door of the P50 cardfile.

S 014-006

- (2) Open the door of the P50 cardfile.

S 864-007

CAUTION: DO NOT TOUCH THE CONTROL CARDS BEFORE YOU DO THE PROCEDURE FOR THE DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. AN ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CONTROL CARDS.

- (3) Do the procedure for the devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 024-008

- (4) Remove the applicable ECS FAN CONTROL card (AMM 20-10-01/401).

NOTE: A diagram of the card positions is on the inner side of the door.

TASK 21-26-05-404-009

3. Install the ECS FAN CONTROL Cards (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-01/401, E/E Rack Mounted Components
(3) AMM 20-41-01/201, Electro Static Sensitive Devices
(4) AMM 24-22-00/201, Electric Power Control
(5) AMM 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
119/120 Main equipment center
(2) Access Panel
119AL Main equipment center

C. Install the card

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S 914-024

CAUTION: DO NOT TOUCH THE CONTROL CARDS BEFORE YOU DO THE PROCEDURE FOR THE DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. AN ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CONTROL CARDS.

- (1) Do the procedure for the devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 424-011

- (2) Install the applicable (L, R, or C) ECS FAN CONTROL card (AMM 20-10-01/401).

NOTE: A diagram of the card positions is on the inner side of the door.

S 414-012

- (3) Close the door for the electrical system cardfile, P50.

S 414-013

- (4) Tighten the fasteners on the door of the P50 cardfile.
- D. Do the installation test for the card.

S 864-014

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-015

- (2) Push the UTILITY BUS switch-light, on the pilot's overhead panel, P5, to the off position and then to the on position.

S 714-017

- (3) If the L ECS FAN CONTROL card was installed, do the steps that follow:
 - (a) Push the L RECIRC FAN switch-light, on the P5 panel, to the on position.

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- (b) Listen for the left recirculation fan to come on.
- (c) Push the L RECIRC FAN switch-light to the off position.
- (d) Turn the EQUIP COOLING selector, on the P5 panel, to the AUTO position.
- (e) Listen for the forward rack supply fan 1 to come on.
- (f) Turn the EQUIP COOLING selector to the STBY position.
- (g) Listen for aft equip/lav/galley vent fan 2 to come on.
- (h) Turn the EQUIP COOLING selector to the AUTO position.

S 714-018

- (4) If the R ECS FAN CONTROL card was installed, do the steps that follow:
 - (a) Push the R RECIRC FAN switch-light, on the P5 panel, to the on position.
 - (b) Listen for the right recirculation fan to come on.
 - (c) Push the R RECIRC FAN switch-light to the off position.
 - (d) Turn the EQUIP COOLING selector, on the P5 panel, to the STBY position.
 - (e) Listen for the forward rack supply fan 2 to come on.
 - (f) Turn the EQUIP COOLING selector to the AUTO position.
 - (g) Listen for the aft exhaust fan 1 to come on.

S 714-019

- (5) If the C ECS FAN CONTROL card was installed, do the steps that follow:
 - (a) Push the GASPER FAN switch-light, on the P5 panel, to the on position.
 - 1) Listen for the gasper fan to come on.
 - 2) Push the GASPER FAN switch-light to the off position.
 - (b) Make sure the forward rack exhaust fan is on.

S 714-020

- (6) If the EQUIPMENT COOLING INDICATION card was installed, do the steps that follow:
 - (a) Move the EQUIP COOL test switch, on the right side panel, P61, to the EQUIP COOL position.
 - (b) Make sure the EQUIP COOLING OVHT light, on the pilot's overhead panel, P5, comes on.

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- (c) Move the EQUIP COOL test switch, on the P61 panel, to the neutral position.
- E. Put the airplane back to its usual condition.

S 864-021

- (1) Do the activation procedure for the spoilers if you did the deactivation procedure (AMM 27-61-00/201).

S 414-022

- (2) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

S 864-023

- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

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BULK CARGO VENTILATION FAN – REMOVAL/INSTALLATION

1. General

- A. One ventilation fan is installed in the ceiling of the bulk cargo compartment. It supplies the recirculation air to the bulk cargo compartment. This procedure has instructions to remove and install the vent fan.

TASK 21-26-06-004-001

2. Remove the Bulk Cargo Vent Fan (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
(2) 25-52-02/401, Cargo Compartment Ceiling Panels

B. Access

- (1) Location Zone
162 Bulk cargo compartment (Right)

C. Prepare for the Removal

S 864-002

- (1) Turn the BULK CARGO HEAT selector, on the right side panel, P61, to the NORM position.
(a) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (2) Open and put a DO-NOT-CLOSE tag on this circuit breaker on the right miscellaneous electrical equipment panel, P37:
(a) 37E6 or 37F7, BULK CARGO VENT FAN

S 014-005

- (3) Open the bulk cargo door, 811 (Ref 06-46-00).

S 014-006

- (4) Remove the ceiling panel on the right side of the vent inlet (Ref 25-52-02).

D. Remove the vent fan

S 034-007

- (1) Disconnect the electrical connector(2) from the fan.

S 034-008

- (2) Disconnect the bonding jumper(1) from the fan(5).

S 034-009

- (3) Remove the clamp(4) between the flexible duct and the fan(5).

S 034-010

- (4) Remove the bolts(9) that hold the fan(5) to the wire screen(8) and the outboard support bracket(7).

NOTE: Keep the screen attached to the support bracket.

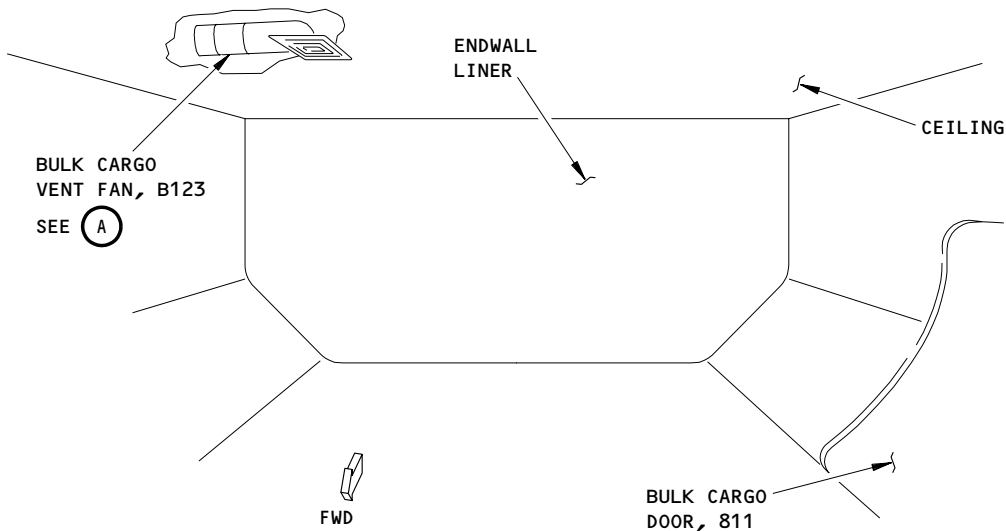
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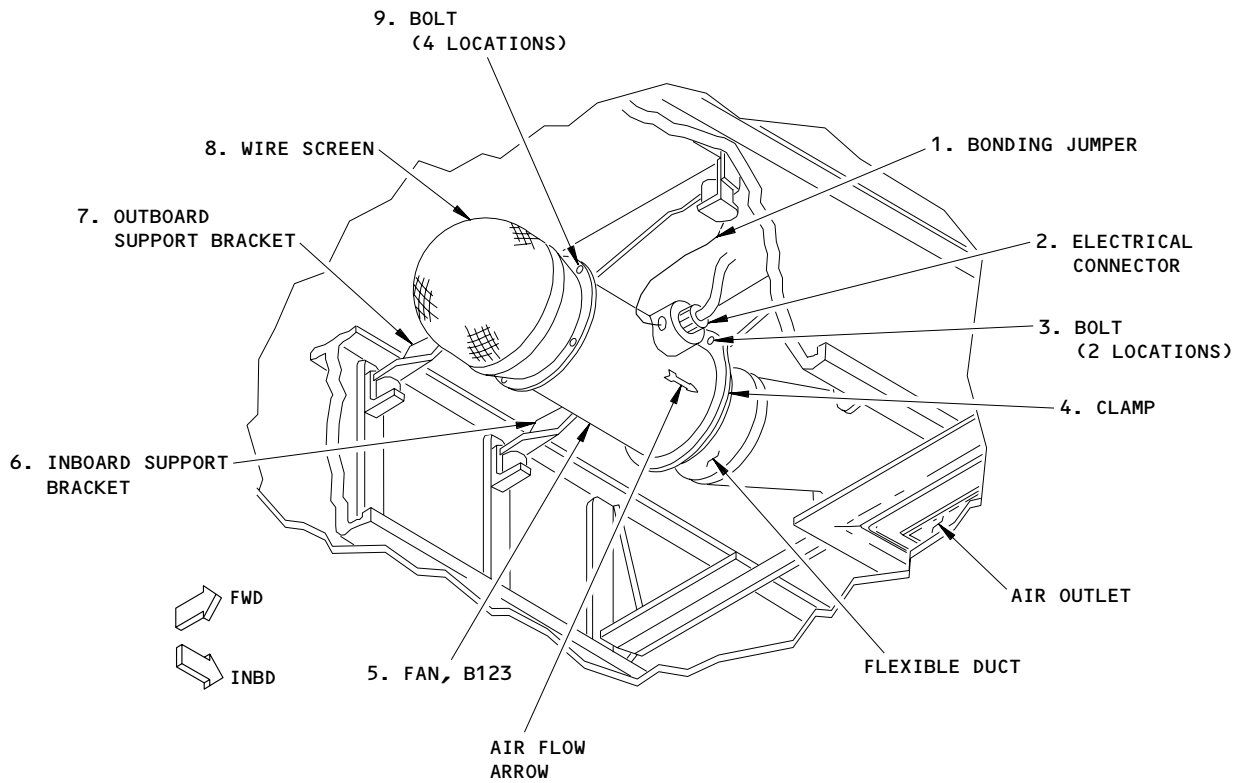
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BULK CARGO COMPARTMENT



BULK CARGO VENT FAN, B123

(A)

Bulk Cargo Vent Fan Installation
Figure 401

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- S 034-011
(5) Remove the bolts(3) that hold the fan(5) to the inboard support bracket(6).

- S 024-012
(6) Remove the fan(5).

TASK 21-26-06-404-013

3. Install the Bulk Cargo Vent Fan (Fig. 401)

A. Parts

- (1) Refer to the Airplane illustrated Parts Catalog (AIPC) for the part numbers and effectivities of items in the tables that follows.

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	5	Fan	21-28-02	01	215
401	5	Fan	21-28-02	02	195
401	5	Fan	21-28-02	03	135
401	5	Fan	21-28-02	04	130
401	5	Fan	21-28-02	05	135
401	5	Fan	21-28-02	06	170
401	5	Fan	21-28-02	07	115
401	5	Fan	21-28-02	08	170

B. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
(2) 24-22-00/201, Electrical Power Control
(3) 25-52-02/401, Cargo Compartment Ceiling Panels

C. Access

- (1) Location Zone
162 Bulk cargo compartment (Right)

D. Install the vent fan(5)

- S 034-014
(1) Make sure there is no unwanted material in the duct.

- S 424-015
(2) Put the fan against the support brackets(6)(7).
(a) Make sure the flow arrow, on the vent fan, points away from the vent inlet.

- S 434-016
(3) Install the bolts(3), washers(3A), and nuts(3B) to connect the fan fan(5) to the inboard support bracket(6).

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- S 434-017
- (4) Install the bolts(9), washers(9A), and nuts(9B) to connect the fan(5) to the wire screen(8) and the outboard support bracket(7).
- S 434-018
- (5) Install the clamp(4) to connect the duct to the fan(5).
(a) Tighten the clamp(4) to 15-20 pound-inches.
- S 434-019
- (6) Connect the bonding jumper(1) to the fan(5).
- S 434-020
- (7) Connect the electrical connector(2) to the fan(5).
- E. Do the fan installation test.
- S 864-021
- (1) Supply electrical power (Ref 24-22-00).
- S 864-022
- (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P37 panel:
(a) 37E6 or 37F7, BULK CARGO VENT FAN
- S 864-023
- (3) Remove the DO-NOT-OPERATE tag and turn the BULK CARGO HEAT selector, on the P61 panel, to the VENT position.
- S 864-033
- (4) Push the BULK CARGO HEAT switch-light, on the P5 panel, to the ON position.
(a) Make sure the ON light comes on.
- S 214-025
- (5) Listen for the vent fan to come on.
- S 864-026
- (6) Turn the BULK CARGO HEAT selector, on the P61 panel, to the NORM position.
- S 214-028
- (7) Listen for the vent fan to stop.
- F. Put the airplane back to its usual condition
- S 414-029
- (1) Install the ceiling panel in the bulk cargo compartment (Ref 25-52-02).
- S 414-030
- (2) Close the bulk cargo door, 811 (Ref 06-46-00).

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S 864-031

- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

EFFECTIVITY

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GALLEY VENTILATION CHECK VALVE - REMOVAL/INSTALLATION

1. General

- A. One check valve is installed above each galley ventilation inlet. The ventilation inlets are in the ceilings of the galley areas. This procedure has instructions to remove and install the galley ventilation check valves.

TASK 21-26-07-004-001

2. Remove the Galley Ventilation Check Valve (Fig. 401)

A. References

- (1) AMM 25-22-02/401, Lowered Ceiling Panels
(2) AMM 25-22-03/401, Movable Ceiling Panels

B. Access

- (1) Location Zones
221/222 Passenger cabin - section 41
231/232 Passenger cabin - section 43
241/242 Passenger cabin - section 45
251/252 Passenger cabin - section 46

C. Prepare for the Removal

S 864-002

- (1) Open and attach a DO-NOT-CLOSE tag to this circuit breaker on the forward miscellaneous equipment panel, P33:
(a) 33B1, EQUIP COOL AFT FAN 1

S 864-003

- (2) Open and attach a DO-NOT-CLOSE tag to this circuit breaker on the left miscellaneous equipment panel, P36:
(a) 36G4, EQUIP COOL AFT FAN 2

S 014-004

- (3) Get an access to the check valve.
(a) For the forward galley check valve, open the movable ceiling panels (AMM 25-22-03/401).
(b) For the middle galley check valve, remove the lowered ceiling panel 2 (AMM 25-22-02/401).
(c) For the aft galley check valves, open the lowered ceiling panel 1 (AMM 25-22-02/401).

D. Remove the check valve

S 034-005

- (1) Remove the clamps on each end of the check valve.

S 034-006

- (2) Move the sleeves away from the check valve.

S 034-007

- (3) On the middle galley check valve, remove the clamp that holds the check valve to the overhead ventilation duct.

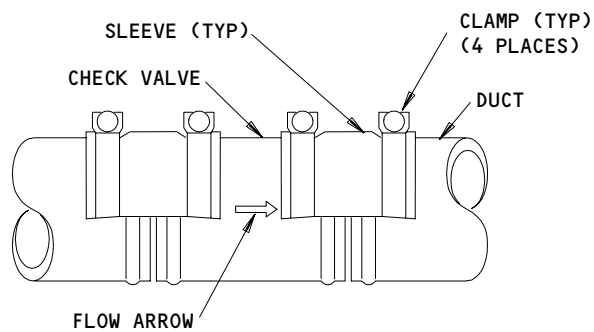
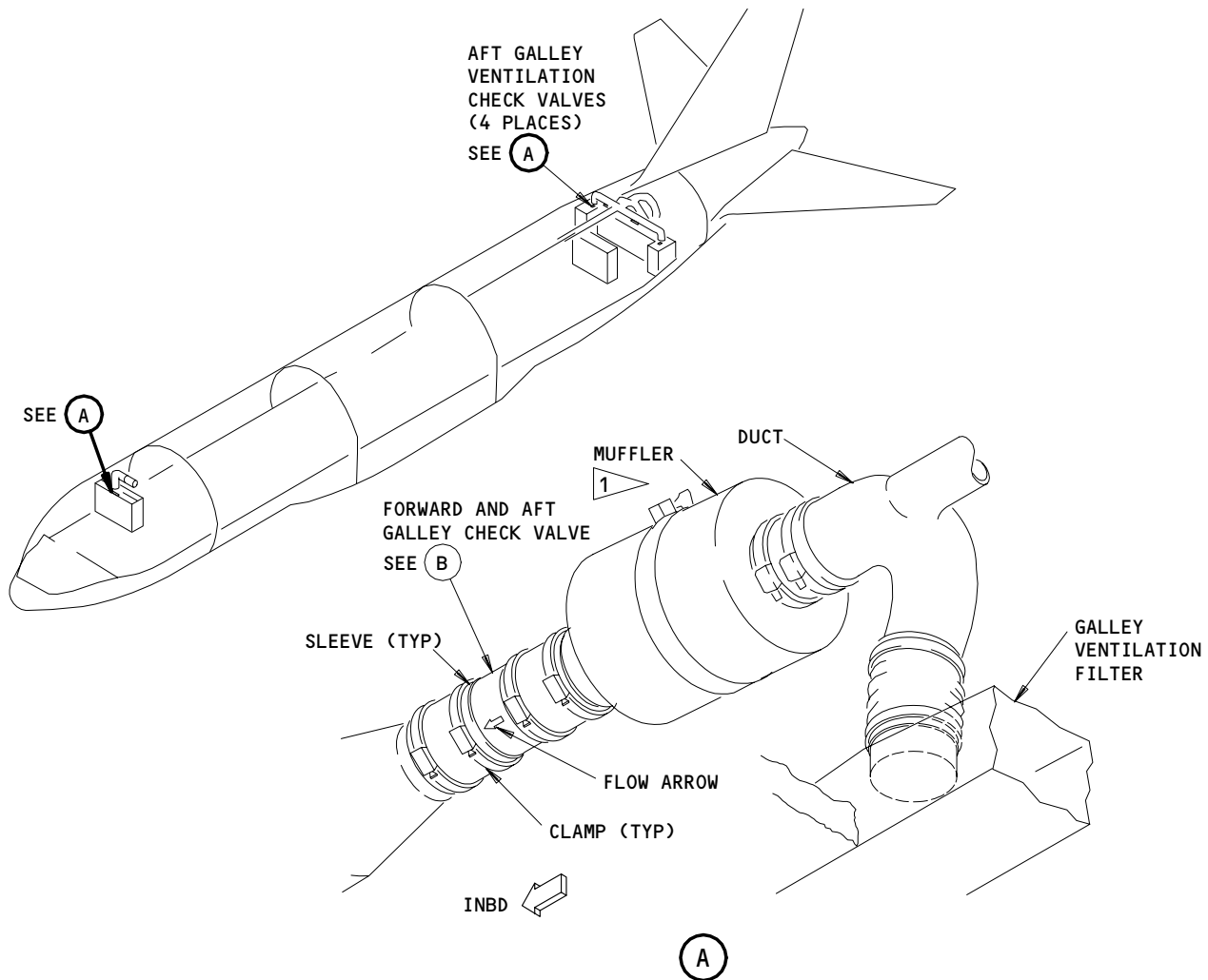
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FORWARD AND AFT GALLEY
VENTILATION CHECK VALVE

1 AFT GALLEY AREAS ONLY

Galley Ventilation Check Valve Installation
Figure 401

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21-26-07

- S 024-008
(4) Remove the check valve.

- S 434-009
(5) Put a cover on the duct openings.

TASK 21-26-07-404-010

3. Install the Galley Ventilation Check Valve (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power - Control
- (2) AMM 25-22-02/401, Lowered Ceiling Panels
- (3) AMM 25-22-03/401, Movable Ceiling Panels

B. Access

- (1) Location Zones
 - 221/222 Passenger cabin - section 41
 - 231/232 Passenger cabin - section 43
 - 241/242 Passenger cabin - section 45
 - 251/252 Passenger cabin - section 46

C. Install the check valve

- S 034-011
(1) Remove the covers from the duct openings.
(a) Make sure there is no unwanted material in the ducts.

- S 424-012
(2) Put the check valve into position in the ventilation duct.
(a) Make sure the flow arrow on the check valve points away from the vent inlet.

- S 434-013
(3) Move part of the sleeves on to the ends of the check valve.

- S 434-014
(4) Install the clamps on each end of the check valve.

- S 434-015
(5) On the check valve for the middle galley ventilation, install the clamp to hold the check valve to the overhead ventilation duct.

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D. Do the installation test for the check valve

S 864-016

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-017

- (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P33 panel:
(a) 33B1, EQUIP COOL AFT FAN 1

S 864-018

- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
(a) 36G4, EQUIP COOL AFT FAN 2

S 214-019

- (4) Make sure the vent fan 1 is on.

S 214-020

- (5) Feel for the airflow around the check valve.
(a) Small leaks are permitted.
(b) You must repair a large leak.

E. Put the airplane back to its usual condition

S 414-021

- (1) Install the applicable ceiling panel.
(a) If the forward galley check valve was installed, install the moveable ceiling panels (AMM 25-22-03/401).
(b) If the middle galley check valve was installed, install the lowered ceiling panel 2 (AMM 25-22-02/401).
(c) If the aft galley check valve was installed, install the lowered ceiling panel 1 (AMM 25-22-02/401).

S 864-022

- (2) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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GALLEY VENTILATION MUFFLER – REMOVAL/INSTALLATION

1. General

- A. One muffler is installed above each ventilation inlet in the aft galley area. This procedure has instructions to remove and install the galley ventilation mufflers.

TASK 21-26-08-004-001

2. Remove the Galley Ventilation Muffler (Fig. 401)

A. References

- (1) 25-22-02/401, Lowered Ceiling Panels

B. Access

- (1) Location Zones
253/254 Area above passenger cabin ceiling – section 46

C. Prepare for the Removal

S 864-033

- (1) Remove electrical power to shutdown operation of the galley ventilation system (AMM 24-22-00/201).

S 864-002

- (2) Open and attach a DO-NOT-CLOSE tag to this circuit breaker on the forward miscellaneous equipment panel, P33:
(a) 33B1, EQUIP COOL AFT FAN 1

S 864-003

- (3) Open and attach a DO-NOT-CLOSE tag to this circuit breaker on the left miscellaneous equipment panel, P36:
(a) 36G4, EQUIP COOL AFT FAN 2

S 014-004

- (4) Open the lowered ceiling panel 1 in the aft galley area (Ref 25-22-02).

D. Remove the muffler

S 034-005

- (1) Remove the clamps on each end of the muffler.

S 034-006

- (2) Move the sleeves, on each end of the muffler, away from the muffler.

S 034-007

- (3) Remove the support clamp from the muffler.

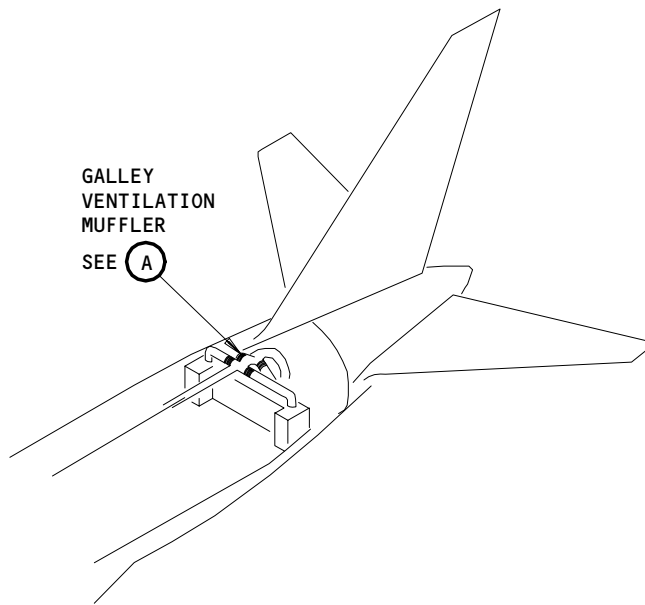
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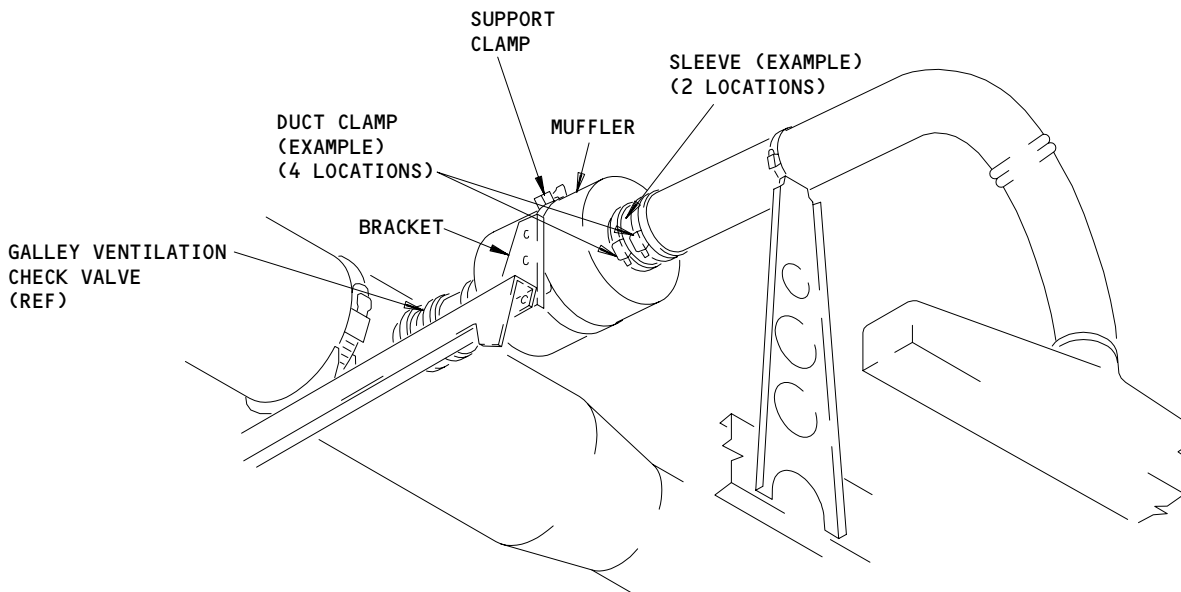
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AFT GALLEY
(EXAMPLE)



GALLEY VENTILATION MUFFLER

(A)

Galley Ventilation Muffler Installation
Figure 401

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- S 024-008
- (4) Remove the muffler.

- S 434-009
- (5) Put a cover on the duct openings.

TASK 21-26-08-404-011

3. Install the Galley Ventilation Muffler (Fig. 401)

A. References

- (1) 24-22-00/201, Electric Power - Control
- (2) 25-22-02/401, Lowered Ceiling Panels

B. Access

- (1) Location Zones
253/254 Area above passenger cabin ceiling - section 46

C. Install the muffler

- S 034-013
- (1) Remove the covers from the duct openings.
 - (a) Make sure there is no unwanted material in the ducts.

- S 424-014
- (2) Put the muffler into position in the ventilation duct.

- S 434-015
- (3) Install the support clamp to hold the muffler in its position.

- S 434-016
- (4) Move part of the sleeves on to each end of the muffler.

- S 434-017
- (5) Install the clamps on each end of the muffler.

D. Do the installation test for the muffler

- S 864-018
- (1) Supply electrical power (Ref 24-22-00).

- S 864-019
- (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P33 panel:
 - (a) 33B1, EQUIP COOL AFT FAN 1

- S 834-020
- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
 - (a) 36G4, EQUIP COOL AFT FAN 2

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- S 214-021
- (4) Make sure the vent fan 1 is on.
- S 794-025
- (5) Feel for the airflow around the muffler.
- (a) Small leaks are permitted.
- (b) You must repair a large leak.
- E. Put the airplane back to its usual condition
- S 414-023
- (1) Install the lowered ceiling panel 1 in the aft galley area (Ref 25-22-02).
- S 864-024
- (2) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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FORWARD CARGO EXHAUST VALVE – REMOVAL/INSTALLATION

1. General

- A. The exhaust valve is below the floor of the forward cargo compartment, approximately four feet aft of the forward wall. This procedure has instructions to remove and install the valve.

TASK 21-26-10-004-001

2. Remove the Exhaust Valve (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
(2) 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zone
123 Area below the forward cargo compartment (Left)

C. Prepare for the Removal

S 864-002

- (1) Push the FWD CARGO AIR COND / VENT FAN switch-light, on the pilot's overhead panel, P5, to the off position.
(a) Make sure the ON light is off.
(b) Put a DO-NOT-OPERATE tag on to the switch-light.

S 864-003

- (2) Open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the pilot's overhead circuit breaker panel, P11:
(a) 11C20, CARGO EXH VLV

S 014-004

- (3) Open the forward cargo door, 821 (Ref 06-46-00).

S 014-005

- (4) Remove the floor panels that are approximately four feet aft of the forward bulkhead, and near the center line of the forward cargo compartment.

D. Remove the Valve

S 034-006

- (1) Disconnect the electrical connector from the valve.

S 034-007

- (2) Disconnect the bonding jumper from the valve.

S 034-008

- (3) Remove the clamps on each end of the valve.

S 024-009

- (4) Remove the valve.

S 434-010

- (5) Put a cover on the duct opening.

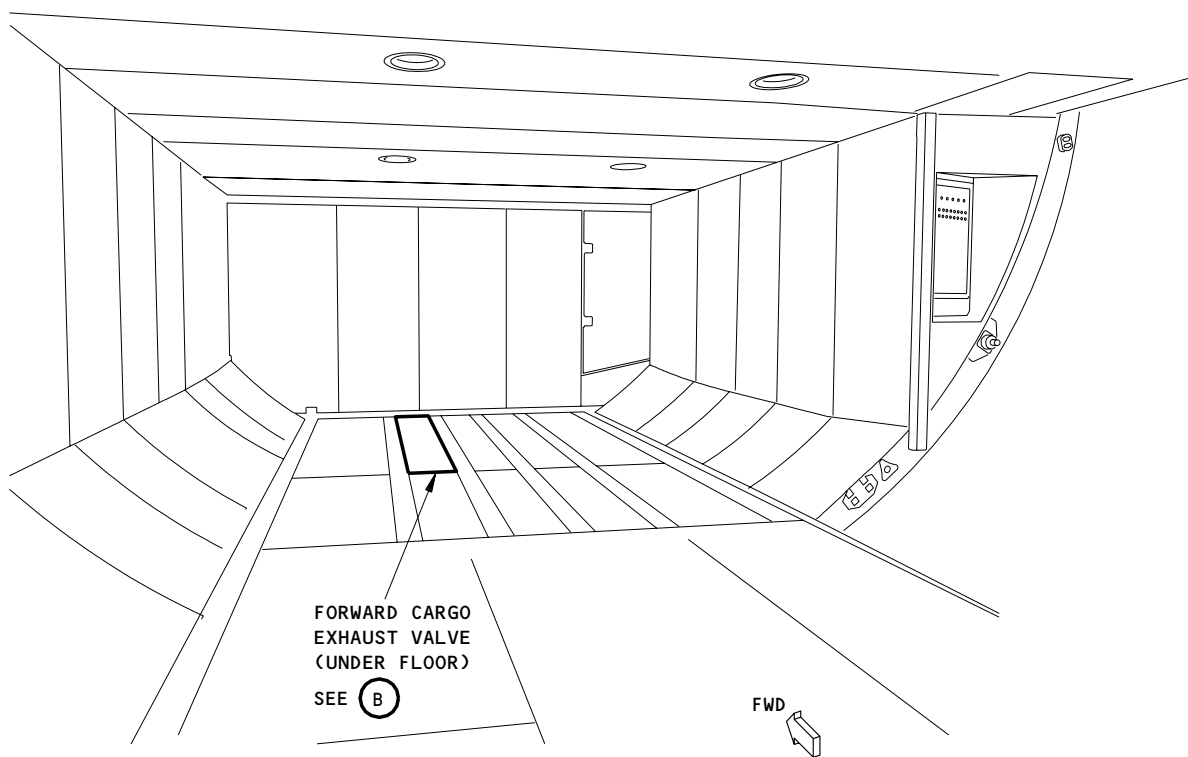
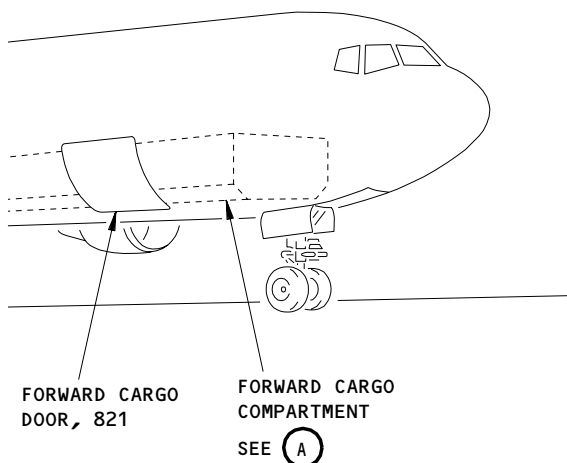
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FORWARD CARGO COMPARTMENT

(A)

Forward Cargo Exhaust Valve Installation
Figure 401 (Sheet 1)

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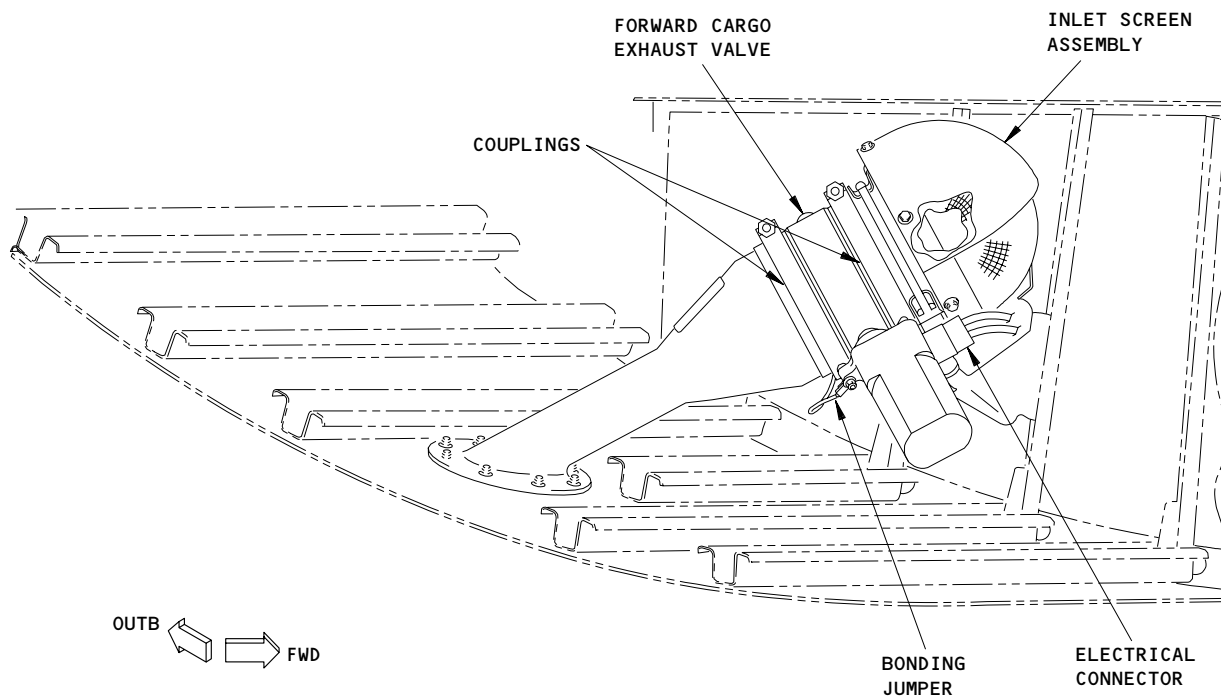
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FORWARD CARGO EXHAUST VALVE

(B)

Forward Cargo Exhaust Valve Installation
Figure 401 (Sheet 2)

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TASK 21-26-10-404-011

3. Install the Exhaust Valve (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zone
123 Area below the forward cargo compartment (Left)

C. Install the Valve

S 034-012

- (1) Remove the cover from the duct opening.
 - (a) Make sure there is no unwanted material in the ducts.

S 424-013

- (2) Put the valve into position between the duct and the wire screen.

S 434-014

- (3) Install the clamps on each end of the valve.
 - (a) Tighten the clamps to 50 pound-inches.

S 434-015

- (4) Connect the electrical connector to the valve.

S 434-016

- (5) Connect the bonding jumper to the valve.

D. Cargo Exhaust Valve Post-Installation Test

S 864-045

- (1) Close this circuit breaker on the P11 overhead panel and remove the DO-NOT-CLOSE tag:
 - (a) 11C20, CARGO EXH VLV

S 864-017

- (2) Supply electrical power (AMM 24-22-00/201).

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S 864-046

- (3) Put the airplane in this configuration:
- (a) EQUIP COOLING selector set to AUTO or STBY (not OVRD)
 - (b) FWD/AFT CARGO FIRE switches set to NORM (not ARMED)
 - (c) Left/right air conditioning pack is ON (AMM 21-00-00/201).
 - (d) Air/ground relay System No. 2 simulated for air mode operation (AMM 32-09-02/201).
 - (e) FWD CARGO AIR COND panel is selected off and the position indicator on the cargo exhaust valve is in CLOSED position.

S 864-051

- (4) Push the FWD CARGO AIR COND switch/light to ON and set temperature selector to AUTO, on the pilots P5 panel, to start the forward cargo air conditioning system.
- (a) Make sure the position indicator on the cargo exhaust valve now moves to the fully OPEN position.
 - (b) Make sure the EICAS message, CARGO EXH VALVE (status and maintenance) does not show on the bottom EICAS display.

S 864-049

- (5) Shutdown the forward cargo air conditioning system.
- (a) Make sure the cargo exhaust valve moves back to the CLOSED position.

S 864-048

- (6) Return the airplane to this configuration:
- (a) System 2 air/ground relay returned to ground mode (AMM 32-09-02/201).
 - (b) Left/right air conditioning pack shutdown (AMM 21-00-00/201).
- E. Put the Airplane Back to its Usual Condition

S 414-024

- (1) Install the floor panels in the forward cargo compartment.

S 414-025

- (2) Close the forward cargo door, 821 (Ref 06-46-00).

S 864-026

- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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FORWARD CARGO GROUND EXHAUST VALVES – REMOVAL/INSTALLATION

1. General

- A. Two ground exhaust valves are installed below the floor at the aft end of the forward cargo compartment. The ground exhaust valve is nearest to the overboard outlet. The ground exhaust backup valve is nearest to the ground exhaust fan.
- B. This procedure has instructions to remove and install the ground exhaust valves.

TASK 21-26-11-004-001

2. Remove the Ground Exhaust Valves (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels

B. Access

- (1) Location Zone
123 Area below the forward cargo compartment (Left).

C. Prepare for the Removal

S 864-002

- (1) Push the FWD CARGO A/C switch-light, on the pilot's overhead panel, P5, to the off position.
 - (a) Make sure the ON light is off.
 - (b) Put a DO-NOT-OPERATE tag on the switch-light.

S 014-003

- (2) Open the access door to the main equipment center, 119AL (Ref 06-41-00).

S 864-004

- (3) To remove the ground exhaust valve, open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the right miscellaneous equipment panel, P37:
 - (a) 37E3 or 37K7, CGO GND EXH VLV

S 864-005

- (4) To remove the ground exhaust backup valve, open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the left miscellaneous equipment panel, P36:
 - (a) 36E4 or 36K3, GND EXH B/U VAL

S 014-006

- (5) Open the forward cargo door, 821 (Ref 06-46-00).

S 014-007

- (6) Remove the floor panels that are approximately six feet aft of the forward cargo door and immediately to the left of the floor center line.

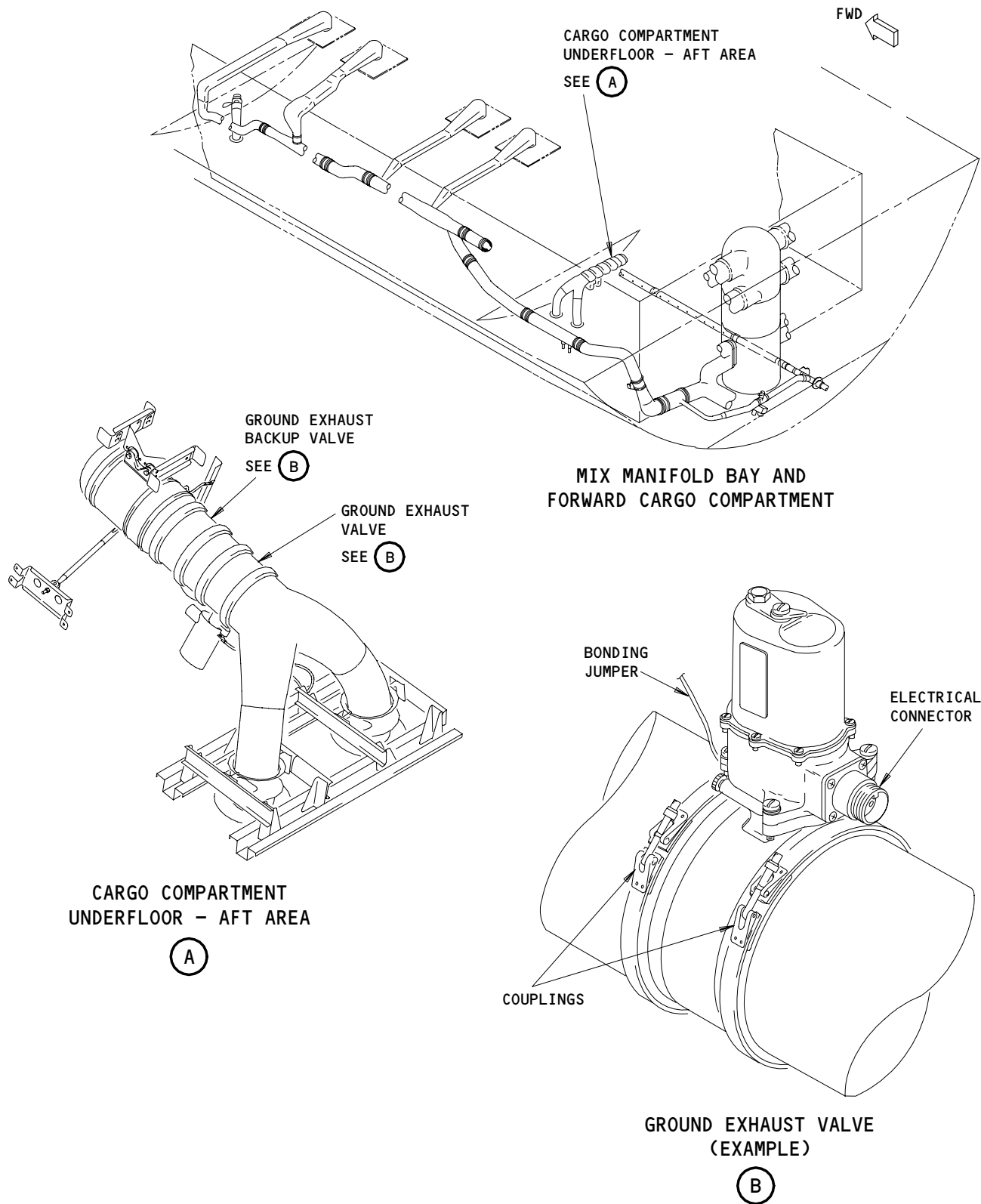
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Ground Exhaust Valve Installation
Figure 401

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D. Remove the valve

S 034-008

- (1) Disconnect the electrical connector from the valve.

S 034-009

- (2) Disconnect the bonding jumper from the valve.

S 034-010

- (3) Remove the clamps on each end of the valve.

S 024-011

- (4) Remove the valve.

S 434-012

- (5) Put a cover on the duct openings.

TASK 21-26-11-404-013

3. Install the Ground Exhaust Valves (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
(2) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
(3) 24-22-00/201, Electrical Power Control
(4) 27-61-00/201, Spoiler/Speedbrake Control System
(5) 32-09-02/201, Air/Ground Systems

B. Access

- (1) Location Zone
123 Area below the forward cargo compartment (Left).

C. Install the Valve

S 034-014

- (1) Remove the cover from the duct openings.
(a) Make sure there is no unwanted material in the ducts.

S 424-015

- (2) Put the valve into position between the ducts.

S 434-016

- (3) Install the clamps on each end of the valve.
(a) Tighten the clamps to 55 pound-inches.

S 434-017

- (4) Connect the electrical connector to the valve.

S 434-018

- (5) Use a bolt, 2 washers, and a nut to connect the bonding jumper to the valve.

D. Do the Valve Installation Test

S 864-019

- (1) Supply electrical power (Ref 24-22-00).

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S 864-020

- (2) If the ground exhaust valve was installed, do the subsequent steps:
- (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P37 panel:
 - 1) 37E3 or 37K7, CGO GND EXH VLV
 - (b) Make sure the position indicator on the valve is in the CLOSED position.
 - (c) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C switch-light, on the P5 panel.
 - 1) Push the switch-light to the on position.
 - 2) Make sure the ON light comes on.
 - (d) Make sure the position indicator on the valve moves to the OPEN position.

S 864-021

- (3) If the ground exhaust backup valve was installed, do the subsequent steps:
- (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
 - 1) 36E4 or 36K3, GND EXH B/U VAL

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL THE PERSONS AND THE EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT.

- (b) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoilers.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (c) Do the Flight Mode Simulation procedure for the No. 1 air/ground system (Ref 32-09-02).
- (d) Make sure the position indicator on the valve is in the CLOSED position.
- (e) Put the airplane back to the ground mode (Ref 32-09-02).
- (f) Do the activation procedure for the spoilers if you did the deactivation procedure (Ref 27-61-00).

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- (g) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C switch-light, on the P5 panel.
 - (h) Make sure the position indicator on the valve moves to the OPEN position.
- E. Put the Airplane back to its Usual Condition
- S 414-022
 - (1) Install the floor panels in the forward cargo compartment.
 - S 414-023
 - (2) Close the forward cargo door, 821 (Ref 06-46-00).
 - S 414-024
 - (3) Close the access door for the main equipment center, 119AL (Ref 06-41-00).
 - S 864-025
 - (4) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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FORWARD CARGO GROUND EXHAUST FAN – REMOVAL/INSTALLATION

1. General

- A. The ground exhaust fan is installed below the floor at the aft end of the forward cargo compartment. It is near the ground exhaust valves. This procedure has instructions to remove and install the fan.

TASK 21-26-12-004-001

2. Remove the Ground Exhaust Fan (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (3) 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zone
124 Area below the forward cargo compartment (Right)

C. Prepare for the Removal

S 864-002

- (1) Push the FWD CARGO A/C switch-light, on the pilot's overhead panel, P5, to the off position.
 - (a) Make sure the ON light is off.
 - (b) Put a DO-NOT-OPERATE tag on the switch-light.

S 014-003

- (2) Open the access door to the main equipment center, 119AL (Ref 06-41-00).

S 864-004

- (3) Open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the right miscellaneous equipment panel, P37:
 - (a) 37J6 or 37F1, GND EXH FAN

S 014-005

- (4) Open the forward cargo door, 821 (Ref 06-46-00).

S 014-006

- (5) Remove the floor panels that are six feet aft of the forward cargo door and immediately to the right of the floor center line.

D. Remove the Fan

S 034-007

- (1) Disconnect the electrical connector from the fan.

S 034-008

- (2) Disconnect the bonding jumper from the fan.

S 034-009

- (3) Remove the clamps on each end of the fan.

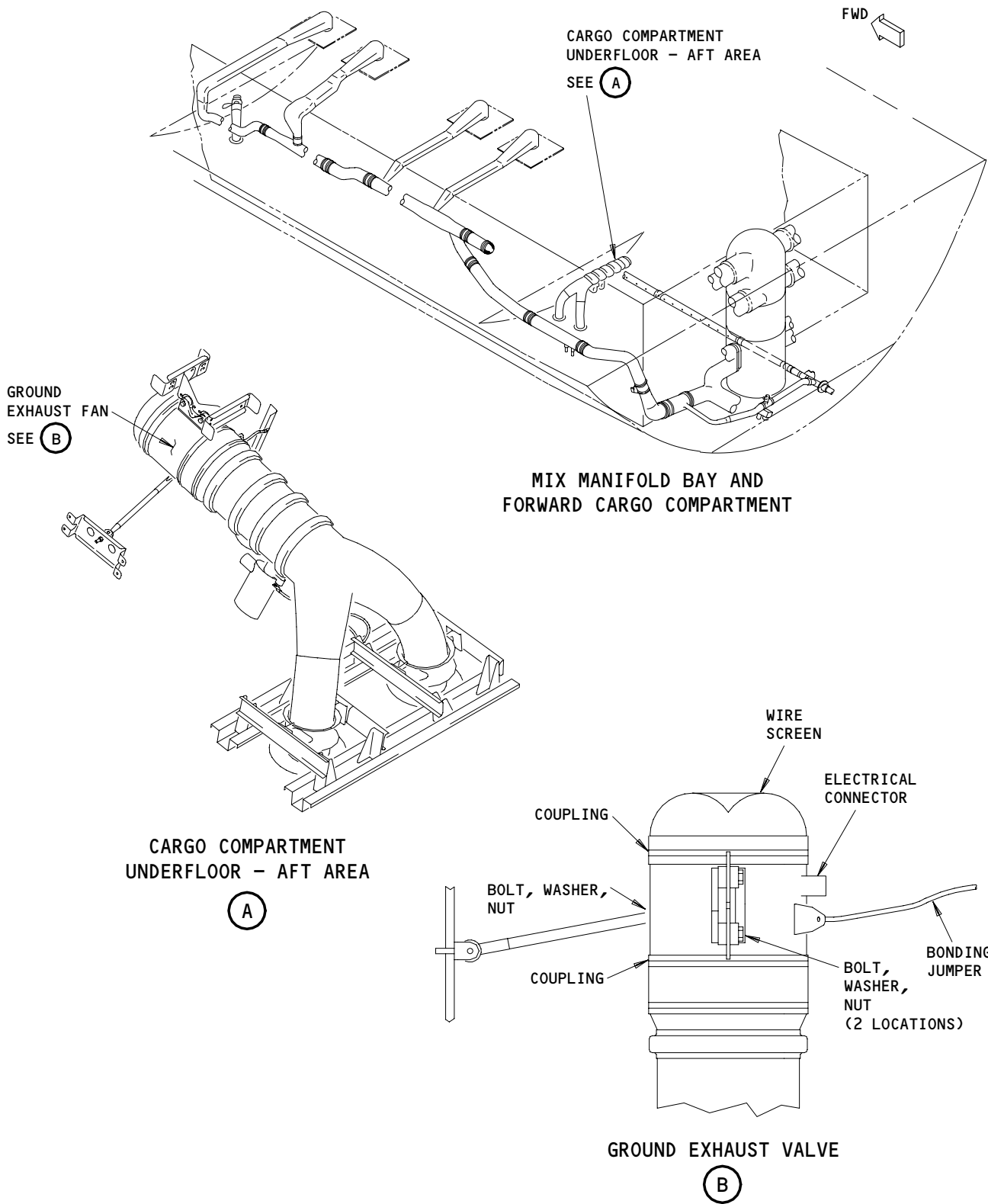
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Ground Exhaust Fan Installation
Figure 401

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- S 024-010
(4) Remove the fan.

- S 434-011
(5) Put a cover on the duct opening.

TASK 21-26-12-004-012

3. Install the Ground Exhaust Fan (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (3) 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zone
124 Area below the forward cargo compartment (Right)

C. Install the Fan

- S 034-013
(1) Remove the cover from the duct opening.
(a) Make sure there is no unwanted material in the duct.

- S 424-014
(2) Put the fan into position between the duct and the wire screen.
(a) Make sure the flow arrow on the fan points to the overboard outlet.

- S 434-015
(3) Install the clamps on each end of the fan.
(a) Tighten the clamps to 55 pound-inches.

- S 434-016
(4) Connect the electrical connector to the fan.

- S 434-017
(5) Use a bolt, 2 washers, and a nut to connect the bonding jumper to the fan.

D. Do the Fan Installation Test

- S 864-018
(1) Supply the electrical power (Ref 24-22-00).

- S 864-019
(2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P37 panel:
(a) 37J6 or 37F1, GND EXH FAN

- S 864-020
(3) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C switch-light, on the P5 panel.
(a) Push the switch-light to the on position.

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(b) Make sure the ON light comes on.

S 214-021

(4) Listen for the fan to come on.

S 864-022

(5) Push the ECS MSG switch on the EICAS MAINT module, on the right side panel, P61.

S 214-023

(6) Make sure the EICAS message, CARGO EXH FAN, does not show on the bottom display.

S 864-024

(7) Push the FWD CARGO A/C switch-light, on the P5 panel, to the on position.

S 214-025

(8) Listen for the fan to stop.

E. Put the Airplane Back to its Usual Condition

S 414-026

(1) Close the access door to the main equipment center, 119AL (Ref 06-41-00).

S 414-027

(2) Install the floor panels in the forward cargo compartment.

S 414-028

(3) Close the forward cargo door, 821 (Ref 06-46-00).

S 864-029

(4) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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SATCOM AIR INLET SCREEN – MAINTENANCE PRACTICES

1. General

- A. This procedure has the following task:
 - (1) SATCOM Air Inlet Screen Inspection/Cleaning
- B. The SATCOM air inlet screen is installed behind the right sidewall near the forward endwall of the aft cargo compartment (STA1109-1131). The air behind the right sidewall is drawn thru the SATCOM air inlet screen and into the SATCOM E10/E11 cabinets by the aft equipment/lav/galley ventilation system fans (AMM 21-26-01/401). The SATCOM air inlet screen must be kept clean to permit sufficient airflow thru the SATCOM E10/E11 cabinets. The SATCOM E10/E11 cabinets are located above the center stowage compartments in the main passenger cabin (STA1090/STA1175, Left).

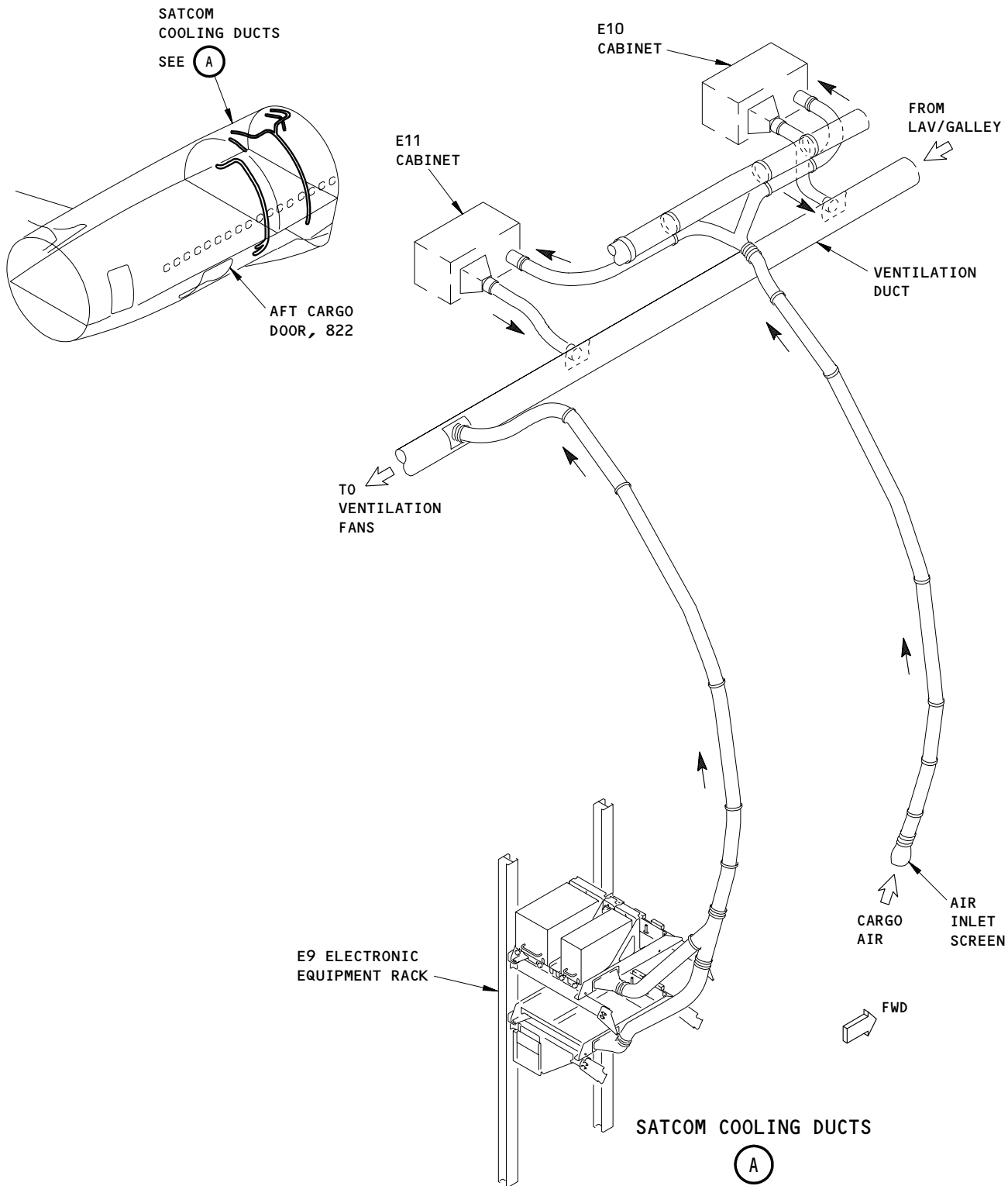
TASK 21-26-13-202-002

2. SATCOM Air Inlet Screen Inspection/Cleaning

- A. References
 - (1) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
 - (2) AMM 52-35-00/201, Aft Cargo Door
- B. Access
 - (1) Location Zone
 - 154 Aft Cargo Compartment, Right
 - 253 Area Above Ceiling – Pass Cabin – Sect 46, Left
 - (2) Access Panel
 - 822 Aft Cargo Door
- C. Prepare for Inspection/Cleaning
 - S 012-001
 - (1) Get access to the SATCOM air inlet screen as follows:
 - (a) Open the aft cargo compartment door, 822 (AMM 52-35-00/201).
 - (b) Remove the cargo lining from the right sidewall near the forward endwall at approx. STA1109-1131 (AMM 25-52-01/401).
- D. Inspection/Cleaning
 - S 212-003
 - (1) Inspect the air inlet screen for contamination (such as accumulation of dust and lint).

EFFECTIVITY
SAS 156, 157, 166, 167, 277, 278, 280

21-26-13



SATCOM Air Inlet Screen Inspection
Figure 201

EFFECTIVITY
SAS 156, 157, 166, 167, 277, 278, 280

21-26-13

S 162-004

- (2) Use a vacuum to clean the air inlet screen and any dust or debris which has accumulated around the air inlet.
 - (a) Inspect the SATCOM E10/E11 cabinets located above the left main cabin ceiling area (STA1090/STA1175) for possible contamination and clean as necessary.
 - (b) Inspect the SATCOM E9 equipment rack (STA1200, right) forward of the aft cargo door opening for possible contamination and clean as necessary.

E. Return the Airplane to Normal Configuration

S 412-005

- (1) Close up the access area:
 - (a) Install the cargo sidewall linings (AMM 25-52-01/401).
 - (b) Close the aft cargo compartment door, 822 (AMM 52-35-00/201).

EFFECTIVITY
SAS 156, 157, 166, 167, 277, 278, 280

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FORWARD CARGO AIR CONDITIONING DISTRIBUTION – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The forward-cargo-air-conditioning-distribution system supplies conditioned air to the forward cargo compartment. The purpose of the system is to maintain the forward cargo compartment at any temperature between 6°C (43°F) and 25°C (77°F). This allows for any temperature-sensitive cargo to be transported in a controlled environment.
- B. The forward-cargo air-conditioning distribution system has a shutoff valve, a fan, ducting, restrictors, and outlets.
- C. Conditioned air is supplied to the forward cargo compartment from the left-air-conditioning pack (Ref 21-51-00). The forward-cargo-compartment ducting attaches to the left-air-conditioning-pack-outlet duct before the outlet duct reaches the mix manifold (Ref 21-21-00). If the air-conditioning-shutoff valve is open, about 16 percent of the air from the left-air-conditioning pack flows into the forward-cargo-compartment ducting, while the rest of the air flows into the mix manifold. If the air-conditioning-shutoff valve is closed, all of the air from the left-air-conditioning pack flows into the mix manifold.
- D. The shutoff valve controls the supply of air to the forward cargo compartment. The valve is installed in the forward cargo A/C distribution duct just after the duct leaves the mix manifold. When the shutoff valve is open, conditioned air can flow through the ducting, through the outlets, and into the forward cargo compartment. When the shutoff valve is closed, conditioned air cannot enter the ducting and is not supplied to the forward cargo compartment. The shutoff valve is controlled by the pack flow controller (Ref 21-51-00).
- E. The forward-cargo vent fan also adds air to the forward cargo compartment. The fan blows air from the mix manifold bay into the forward-cargo-compartment-distribution ducts. In the distribution duct, the recirculated air mixes with the conditioned air from the left cooling pack (Ref 21-51-00). This results in a mixture of 50 percent conditioned air and 50 percent recirculated air. The use of recirculation air improves airflow without placing an undue load on the air supply system (Ref 36-10-00) or the cooling packs. The forward cargo vent fan can operate, and thus, supply recirculated air to the forward cargo compartment when the shutoff valve is closed.
- F. A wire screen is attached to the vent fan to keep dirt and debris out of the fan. The wire screen and the recirculation fan are installed on the left side of the forward cargo compartment, about 4 feet forward of the mix manifold bay. The forward cargo A/C fan is controlled by the pack flow controller (Ref 21-51-00).
- G. Air leaves the forward cargo compartment via the forward-cargo-compartment-exhaust system (Ref 21-26-00).

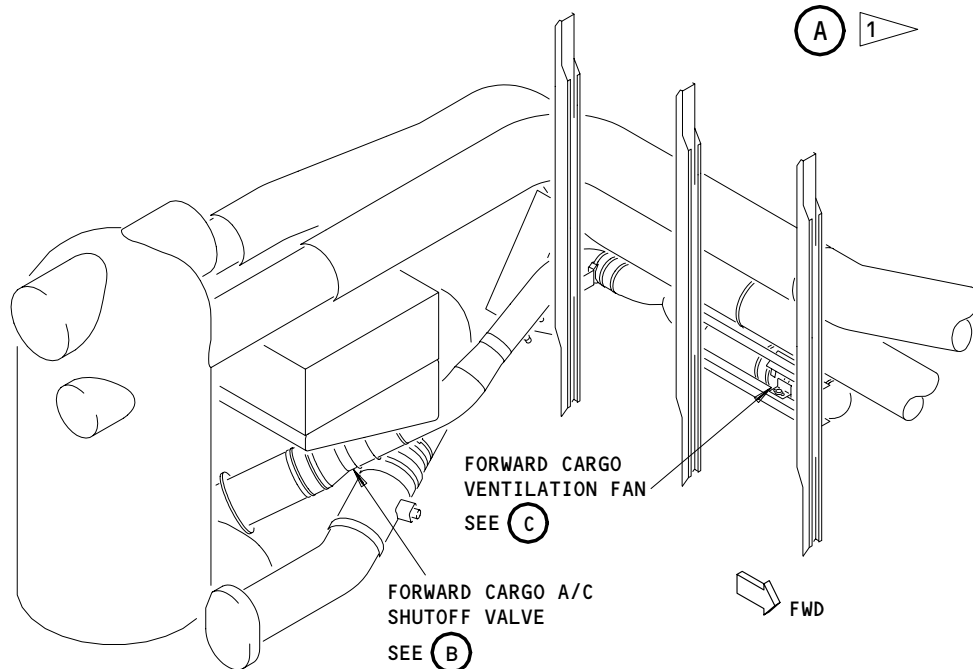
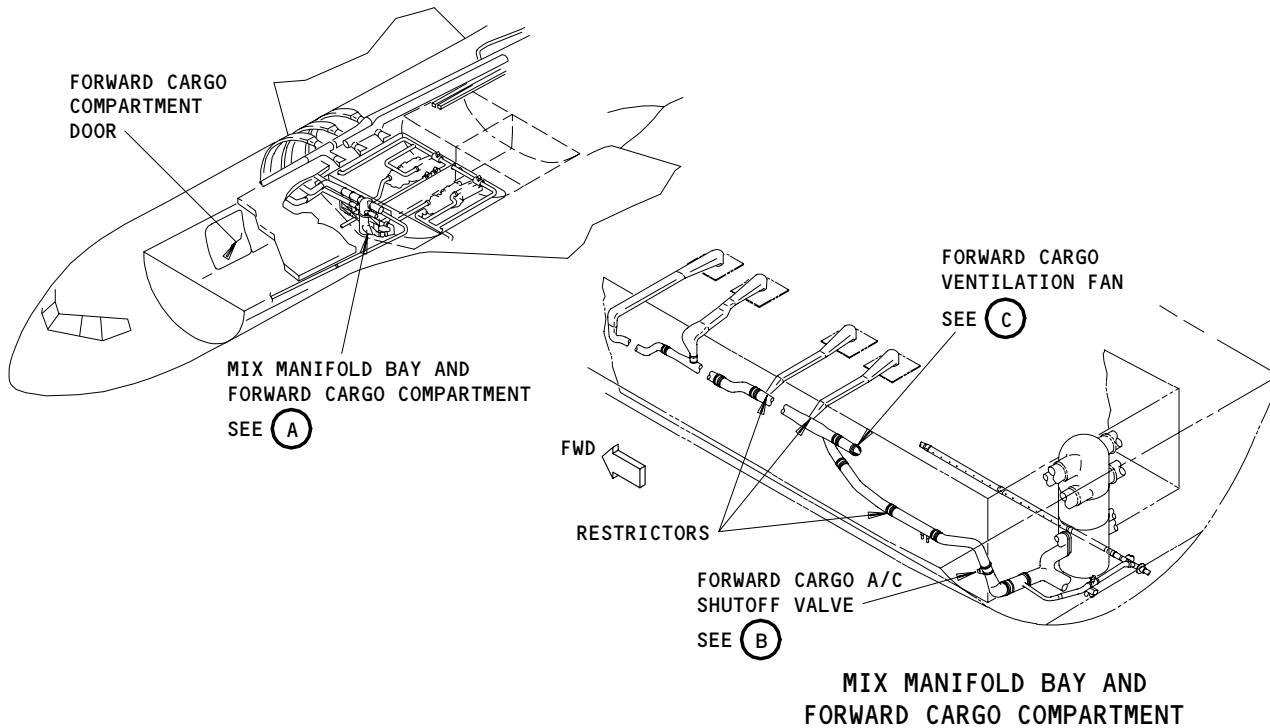
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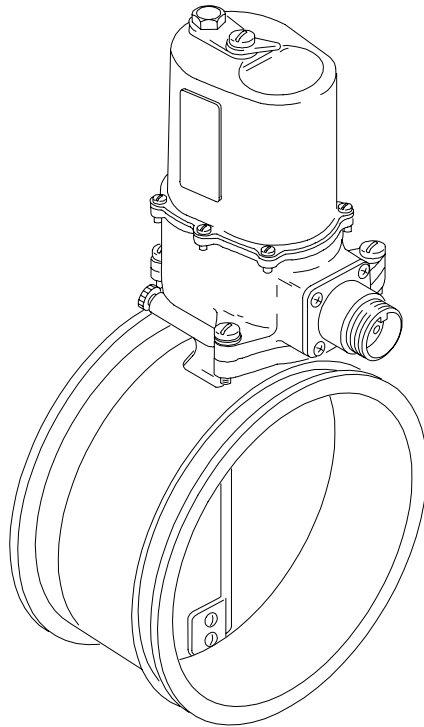
- 1 SAS 150-999; MTH AIRPLANES
- 2 SAS 050-149

(A) 2

Forward Cargo Conditioned Air Distribution System
Figure 1 (Sheet 1)

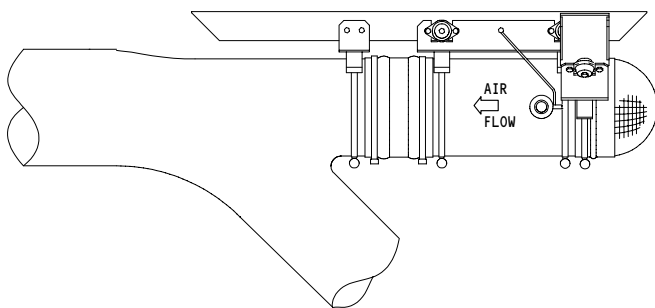
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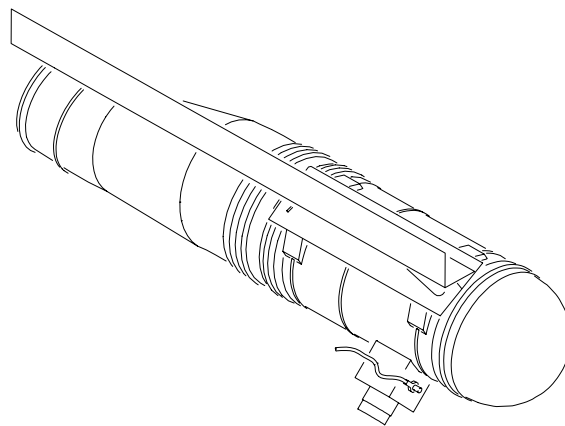
FORWARD CARGO A/C SHUTOFF VALVE

(B)



FORWARD CARGO VENTILATION FAN

(C) 1



FORWARD CARGO VENTILATION FAN

(C) 2

Forward Cargo Conditioned Air Distribution System
Figure 1 (Sheet 2)

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H. When the forward-cargo-compartment-air-conditioning system is on, the forward cargo compartment temperature is controlled by the temperature control system (Ref 21-61-00). Also, the temperature control system operates in coordination with the forward-cargo-compartment-heating system (Ref 21-43-00). It is suggested that the forward cargo heat system be on whenever the forward cargo A/C system is on. This will prevent a large temperature gradient condition occurring in the forward cargo compartment. However, the forward cargo heat system should be selected off when the temperature in the forward cargo compartment is to be maintained below 7-degrees C (45-degrees F) by the forward cargo A/C system. This will prevent the forward cargo heat system from interfering with the operation of the forward cargo A/C system since both systems are controlled by the pack flow and cargo air conditioning controller (PFCACC).

2. Component Details

A. Air Conditioning Shutoff Valve (Fig. 1)

(1) Description

- (a) The air-conditioning-shutoff valve is a 5-inch diameter, electrically actuated, butterfly valve. The valve is made up of an actuator assembly and a valve flow section.
- (b) The actuator includes an electrical connector, a control switch, two position switches, a motor, an actuator shaft, and a manual override handle.
- (c) The valve flow section includes a valve flow housing and a butterfly. The actuator assembly is bolted to the valve flow housing. The actuator shaft is bolted to the top of the butterfly. A stabilizer shaft is bolted to the bottom of the butterfly.
- (d) The manual override handle travels with the actuator shaft. When the valve is electrically operated, the handle acts as the position indicator for the valve. The handle can also be used to manually position the valve.

(2) Function

- (a) The air conditioning shutoff valve is installed in the mix manifold bay, on the left side of the mix manifold. It controls the supply of conditioned air to the forward cargo compartment.
- (b) When 28vdc is supplied to the electrical connector, the control switch moves, the motor is energized, and the butterfly is moved into position. The valve will only move to the fully closed position or the fully open position. It will not move to a partially open position. However, the manual override handle can be used to manually put the valve in any position.

B. Fan Current Sensor

- (1) The current sensor for the forward cargo vent fan is in the right miscellaneous electrical equipment panel P37. It monitors the current between the FWD CARGO VENT FAN circuit breaker and the fan motor. A transformer senses the current flowing through the sensor.

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C. Forward Cargo Vent Fan

- (1) The forward cargo vent fan is a single-stage, vane-axial flow fan. It has a fan housing, an electrical connector, an 11-bladed impeller, and a motor. The motor has a stator, a rotor, a rotor shaft, three miniature thermostats, and a built-in check valve. The motor is designed to operate at 11,750 rpms. The fan weighs approximately 6 pounds.
- (2) When 115/200v ac, 3-phase, 400 Hz power is supplied to the electrical connector, the stator causes the rotor turn. The rotor shaft connects the rotor to the impeller and thus causes the impeller to turn. The movement of the blades on the impeller pushes air through the fan housing. If the fan motor gets too hot, the power to the motor will be stopped and the motor will turn off.
- (3) The forward-cargo vent fan is installed in the left sidewall, at the aft end of the forward cargo compartment. It is used to blow air from the mix manifold bay into the forward-cargo conditioned-air-distribution duct.

D. Air Conditioning Ducts (Fig. 1)

- (1) The forward cargo compartment air conditioning ducts direct the conditioned air from the left-air-conditioning pack outlet to the forward-cargo-compartment-air-conditioning outlets. Two types of ducts are used. The round ducts are made of seamless aluminum alloy tubing with a 0.035-inch skin thickness and are 3.0 or 5.0 inches in diameter. The elongated, rectangular, or odd-shaped ducts are made of kevlar reinforced epoxy laminate. The skin is 0.015-0.025 (2-ply), 0.025-0.035 (3-ply), or 0.035-0.048 (4-ply) inches thick. The kevlar ducts are tested up to a pressure of 22.5 inches water.

E. Air Conditioning Outlets (Fig. 1)

- (1) The outlet assembly is made up of a kevlar housing assembly, four aluminum stiffeners, and an anemostat air diffuser. The diffuser is made of three different-sized, square, diffuser-vanes to send the air evenly in all directions.
- (2) The forward-cargo-compartment-air-conditioning outlets are attached to the floor beams in the ceiling of the forward cargo compartment. Four outlets are used to send the conditioned air into all areas of the compartment.

3. Operation

A. Functional Description (Fig. 2)

- (1) The air-condition-shutoff valve is controlled by the cargo-A/C-shutoff-valve-control relay. When the relay is energized, 28v dc power is supplied to the open side of the valve. When the relay is relaxed, 28v dc power is supplied to the close side of the valve. A different 28v dc power is supplied through the relay at all times. The ground necessary to energize the relay is supplied by the pack flow controller when all of these conditions occur:
 - (a) The FWD CARGO AIR COND / VENT FAN SYSTEM switch/light, on the P5 panel, is ON.
 - (b) The FWD CARGO AIR COND / VENT FAN selector, on the P5 panel, is in AUTO.
 - (c) The FWD and AFT CARGO FIRE switch/lights, on the P8 panel, are not ARMED.

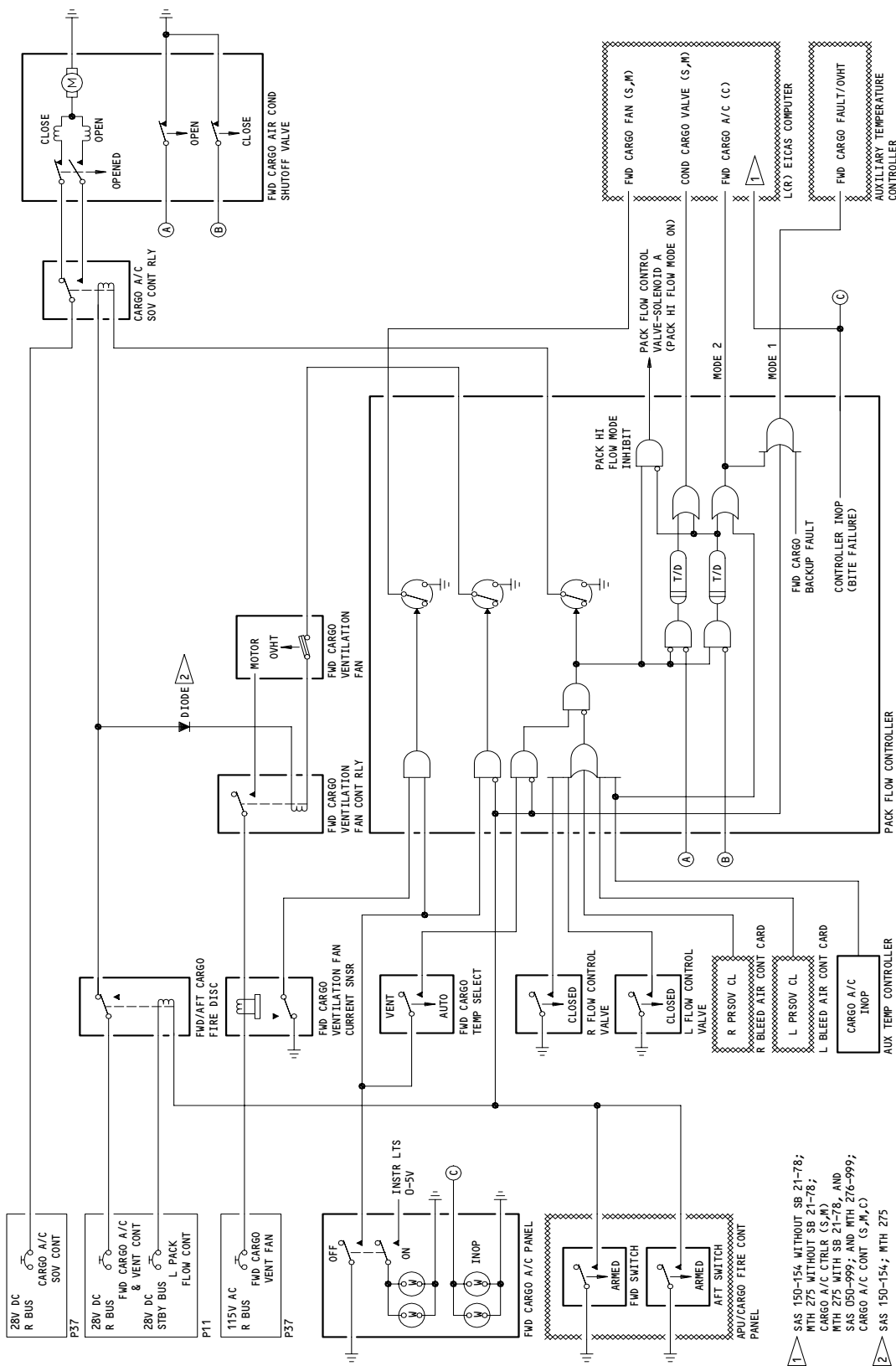
EFFECTIVITY

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Forward Cargo Air Conditioning System
Figure 2

- 1 SAS 150-154, WTHOUT SB 21-78; CARGO A/C CHIB (S,M,C)
- 2 SAS 150-154, WTH 275 AND WTH 276-999; CARGO A/C CONT (S,M,C)

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- (d) The left or right pressure-regulating-and-shutoff valves (Ref 36-11-09) are open.
- (e) The left or right pack-flow-control-and-shutoff valves (Ref 21-51-01) are open.
- (f) The CARGO A/C INOP condition does not occur.
- (2) Two indications show that a CARGO A/C INOP fault condition has occurred. The INOP light on the FWD CARGO AIR COND / VENT FAN module will come on and an EICAS advisory message "FWD CARGO A/C" will be displayed. Any of these failures will cause the CARGO A/C INOP condition to occur:
 - (a) The FWD CARGO AIR COND / VENT FAN temperature selector potentiometer fails.
 - (b) The auxiliary zone temperature controller fails.
 - (c) Power is not supplied through the auxiliary controller.
 - (d) The forward-cargo air-conditioning-shutoff valve fails.
- (3) The forward-cargo vent fan is controlled by the forward-cargo vent fan control relay. When the relay is energized, 115v ac power is supplied to turn on the fan motor. 28v dc is supplied to the relay at all times. A ground is supplied through the fan overheat thermostats and in the pack flow controller. The relay will be energized when these conditions occur:
 - (a) The SYSTEM switch/light on the FWD CARGO AIR COND / VENT FAN module, on the P5 panel, is ON.
 - (b) The vent fan is not overheated.
 - (c) The FWD and AFT CARGO FIRE switch/lights, on the P8 panel, are not ARMED.
- (4) The pack flow controller also controls parts of other systems. These parts work together to make the airflow through the forward cargo compartment better. When the FWD CARGO AIR COND / VENT FAN SYSTEM switch/light is ON and the temperature selector is in AUTO, these conditions occur:
 - (a) The forward-cargo air-conditioning shutoff valve opens.
 - (b) The forward-cargo vent fan comes on.
 - (c) The forward-cargo heating-shutoff valve opens (Ref/21-43-00).
 - (d) The forward-cargo-exhaust valve or the forward-cargo ground-exhaust valves will open (Ref 21-26-00).
 - (e) The left-air-conditioning pack goes into the high flow mode (Ref 21-51-00).
- (5) When the FWD CARGO AIR COND / VENT FAN SYSTEM switch/light is ON and the temperature selector is in VENT, these conditions occur:
 - (a) The forward-cargo air-conditioning shutoff valve closes.
 - (b) The forward-cargo vent fan stays on.
 - (c) The forward-cargo heating-shutoff valve closes.
 - (d) The forward-cargo-exhaust valve or the forward-cargo ground-exhaust valves stay open.
 - (e) The left-air-conditioning pack goes into the normal flow mode.

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- (6) If the left air cooling pack is inhibited from the high flow mode, the forward-cargo air-conditioning-shutoff valve will remain open. However, because of the reduced air flow, the passenger cabin may not receive the amount of air needed to keep its selected temperature. If the passenger cabin environment is more important than the forward cargo compartment environment, then the FWD CARGO AIR COND / VENT FAN temperature selector should be turned to VENT.
- (7) If the forward-cargo air-conditioning-shutoff valve fails, the COND CARGO VALVE message will also be shown on the EICAS display. The pack flow controller monitors the shutoff valve and, if a failure occurs, sends a signal to the EICAS computer. A failure occurs when the shutoff valve is not in the position it has been commanded to be in.
- (8) The forward cargo air conditioning system will operate in the back-up mode when any of these conditions occur:
 - (a) The duct temperature sensor fails.
 - (b) The compartment temperature sensor fails.
 - (c) The trim air modulating valve fails.
 - (d) The forward cargo heating shutoff valve fails to fully open.
 - (e) Duct overheat temperature greater than 190 degrees Fahrenheit (88 degrees Celsius).
 - (f) Compartment overheat, temperature greater than 90 degrees Fahrenheit (32 degrees Celsius).
 - (g) Underfloor overheat, temperature greater than 90 degrees Fahrenheit (32 degrees Celsius).
- (9) In the back-up mode the forward cargo air conditioning system operates as follows:
 - (a) The left pack demand temperature is driven to the cargo compartment temperature selected on the flight deck overhead plus a +10 degrees Fahrenheit (+6 degrees Celsius) bias.
 - (b) Left pack control is taken away from the passenger compartment so the right pack demand temperature will be driven to compensate for the loss of control.
 - (c) The cargo trim air system is shut down.
 - (d) The forward cargo heating shutoff valve and cargo trim modulating valve are both disabled and closed.

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- (e) The ventilation fan and the forward cargo compartment exhaust system are still operable.
- (f) The bias has been added to keep the cargo compartment as close to the selected temperature as possible for all outside air temperature conditions.
- (g) The left pack demand temperature is allowed to drive warmer than the right pack for this condition.
- (h) The system will not be allowed to automatically return to a "normal mode" after the fault ceases to exist.

B. Control

- (1) Supply electrical power (Ref 24-22-00).
- (2) Make sure these circuit breakers, on the P11 panel, are closed:
 - (a) LEFT PACK FLOW CONT
 - (b) FWD CARGO A/C & VENT CONT
- (3) Make sure this circuit breaker, on the P37 panel, is closed:
 - (a) CARGO A/C SOV CONT
- (4) Push the FWD CARGO AIR COND / VENT FAN SYSTEM switch/light, on the P5 panel, so that the ON light comes on.

NOTE: At this time the forward cargo vent fan will come on if there are no failures.

- (5) Turn the FWD CARGO AIR COND / VENT FAN temperature selector, on the P5 panel, to AUTO.

NOTE: At this time the forward cargo shutoff valve will open if there are no failures.

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FORWARD CARGO AIR CONDITIONING DISTRIBUTION – ADJUSTMENT/TEST

1. General

- A. This procedure has instructions to do the System Test and the Operational Test for the air conditioning system in the forward cargo compartment. The Operational Test has a test for each of these components:
- (1) The Pack Flow Controller
 - (2) The Forward Cargo A/C Shutoff Valve
 - (3) The Forward Cargo Vent Fan

TASK 21-28-00-705-001

2. Operational Test – Forward Cargo Air Conditioning

A. References

- (1) 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) 24-22-00/201, Electrical Power – Control
- (3) 27-51-00/201, Trailing Edge Flap Systems
- (4) 27-61-00/201, Spoiler/Speedbrake Control System
- (5) 32-09-02/201, Air/Ground Relay
- (6) 36-00-00/201, Pneumatic – General

B. Access

- (1) Location Zones
121/122 Forward cargo compartment

C. Prepare for the test

S 865-002

- (1) Supply electrical power (Ref 24-22-00).

S 865-003

- (2) Make sure the circuit breakers, on the pilot's overhead circuit breaker panel, P11, are closed:
 - (a) 11A13, LEFT PACK FLOW CONT
 - (b) 11A26, RIGHT PACK FLOW CONT
 - (c) 11N10, LEFT PACK AUTO PWR
 - (d) 11N11, LEFT PACK AUTO CONT
 - (e) 11N15, R PACK STANDBY PWR
 - (f) 11N16, R PACK STANDBY CONT
 - (g) 11N17, PACK FLOW INDICATION
 - (h) 11N18, CARGO EXH VALVE
 - (i) 11N19, RIGHT PACK AUTO PWR
 - (j) 11N20, RIGHT PACK AUTO CONT
 - (k) 11N21, FWD CARGO CONT VLV CLOSE
 - (l) 11N22, FWD CARGO DUCT OVHT/INOP
 - (m) 11N24, L PACK STANDBY PWR
 - (n) 11N25, L PACK STANDBY CONT
 - (o) 11P21, FWD CARGO A/C & VENT CONT
 - (p) 11R11, AUX ZONE CONTROLLER
 - (q) 11R14, RECIRC FAN L
 - (r) 11R15, ZONE CONTROLLER
 - (s) 11R19, FWD CARGO HEAT CONT
 - (t) 11R21, CARGO HEAT OVERRIDE

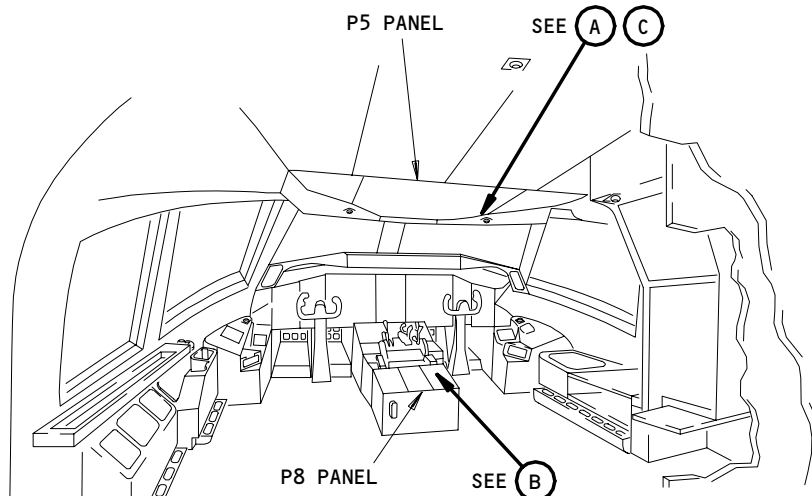
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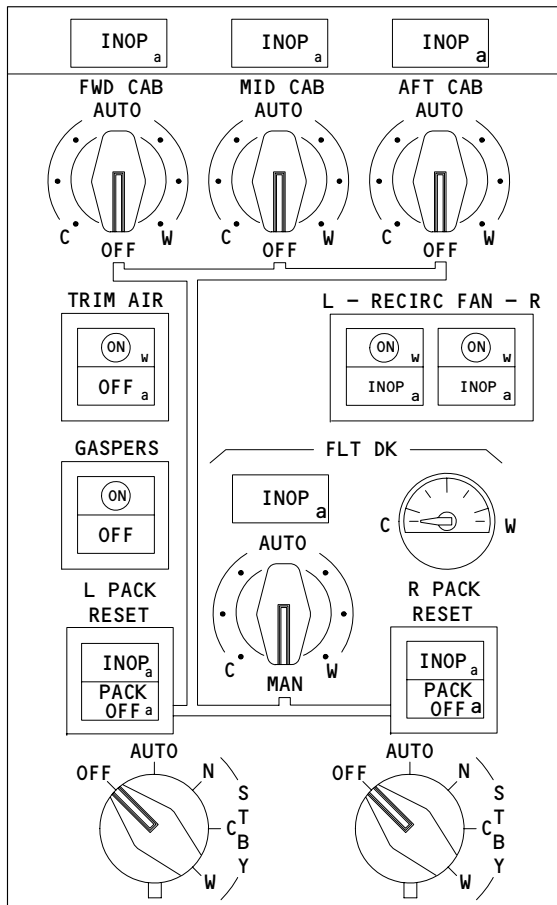
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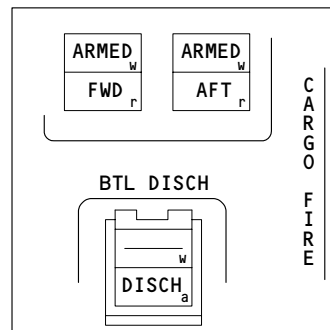
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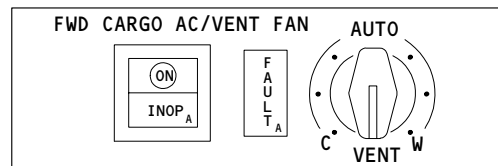


(A)



APU/CARGO FIRE CONTROL PANEL

(B)



FORWARD CARGO A/C PANEL

(C)

Cargo Compartment Air Conditioning System Control
Figure 501

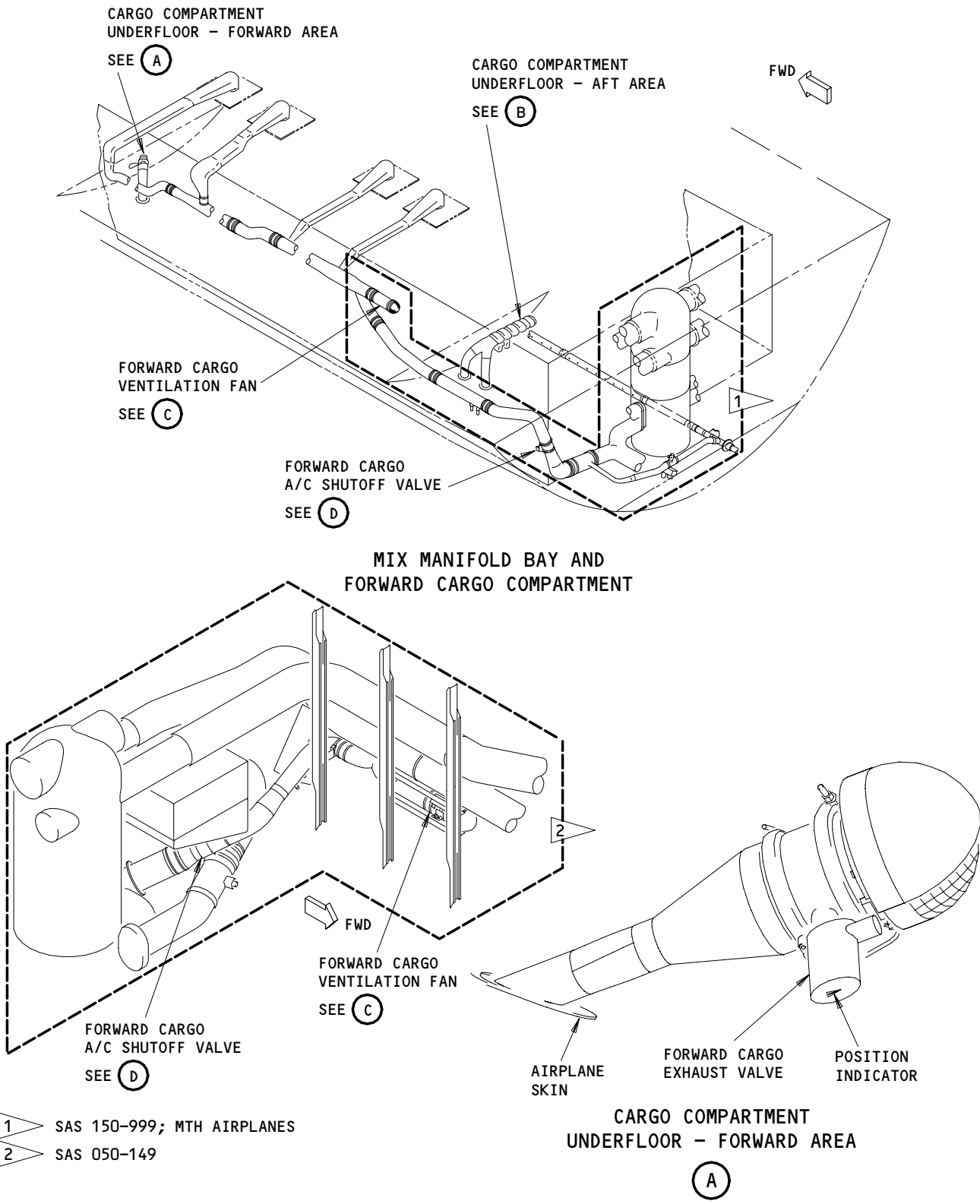
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Cargo Compartment Air Conditioning System - Test
Figure 502 (Sheet 1)

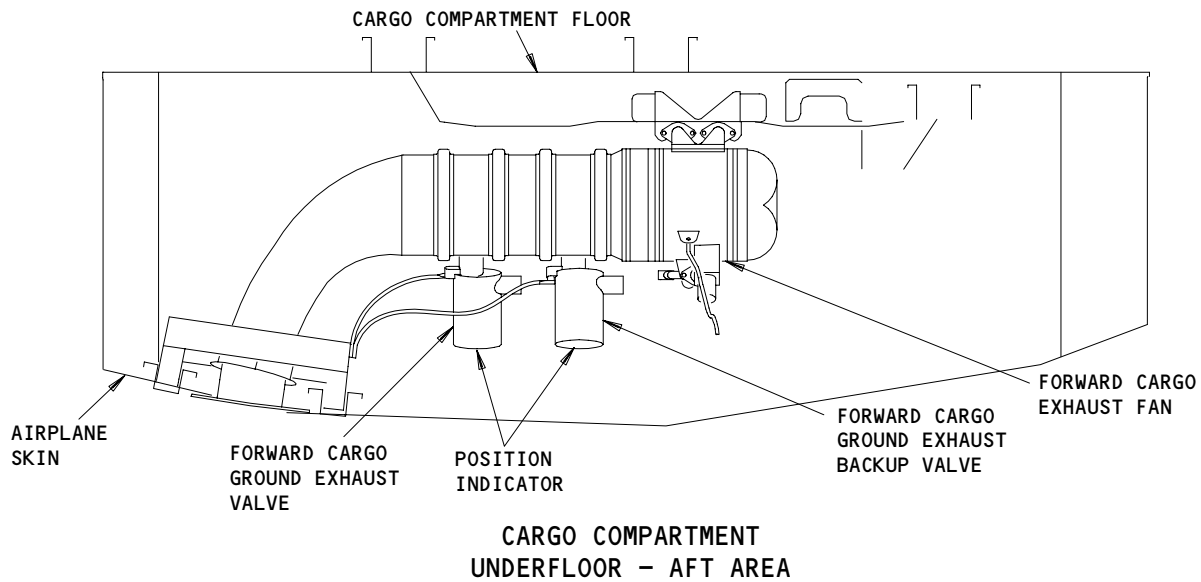
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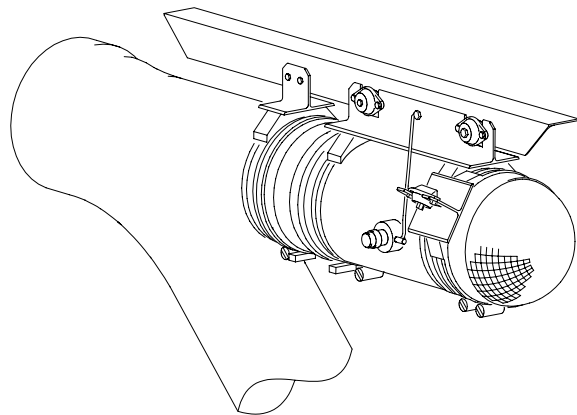
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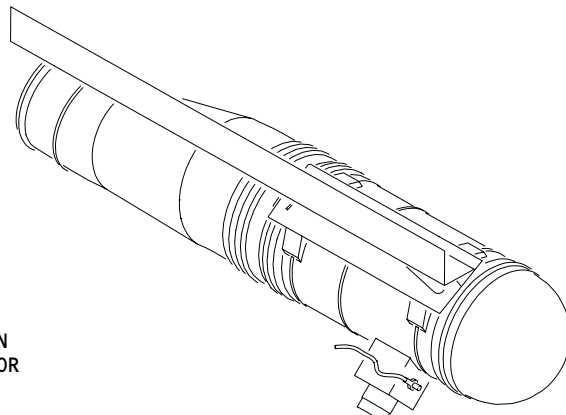
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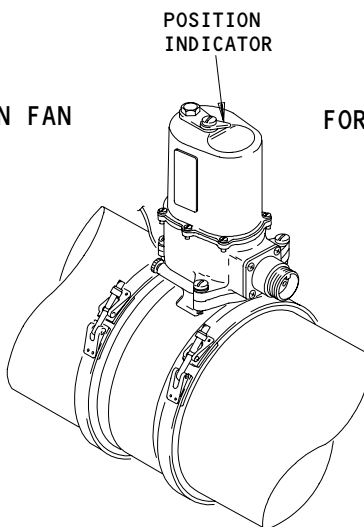
(B)



(C) 1



(C) 2



(D)

Cargo Compartment Air Conditioning System - Test
Figure 502 (Sheet 2)

EFFECTIVITY	
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21-28-00

- (u) 11R23, RECIRC FAN R
- (v) 11R24, F/D ZONE DUCT OVHT/INOP
- (w) The EICAS circuit breakers (6 locations)

S 865-004

- (3) Make sure these circuit breakers, on the left miscellaneous electrical panel, P36, are closed:
- (a) 36E4 or 36K3, CGO GND EXH B/U VAL
 - (b) 36F2 or 36F4, RECIRC FAN L
 - (c) 36L2 or 36K5, FWD CARGO HT CONT VLV

S 865-005

- (4) Make sure these circuit breakers, on the right miscellaneous electrical panel, P37, are closed:
- (a) 37E3 or 37K7, CARGO GND EXH VALVE
 - (b) 37E4 or 37K6, CARGO A/C SOV
 - (c) 37G4 or 37C4, RECIRC FAN R
 - (d) 37J3 or 37G1, FWD CARGO VENT FAN
 - (e) 37J6 or 37F1, CGO GND EXH FAN

S 865-006

- (5) Do the steps that follow, on the pilot's overhead panel, P5:
- (a) Make sure the L and R PACK selectors are in the OFF position (the PACK OFF lights are on).
 - (b) Make sure the zone temperature selectors are in the AUTO (12 o'clock) position.
 - (c) Make sure the TRIM AIR switch-light is in the off position (the ON light is not on).
 - (d) Make sure the L and R RECIRC switch-lights are in the on positions (the ON lights are on).
 - (e) Make sure the EQUIP COOLING selector is in the AUTO or the STBY position.
 - (f) Make sure the FWD and AFT CARGO HEAT switch-lights are in the off positions (the ON lights are off).
 - (g) Make sure the FWD CARGO A/C switch-light is in the off position (the ON light is off).
 - (h) Make sure the FWD CARGO A/C selector is in the AUTO position.
 - (i) Make sure the AIR HYD PUMP selector is in the OFF position and the PRESS light is on.
 - (j) Make sure the WING ANTI-ICE switch-light is in the off position (the ON light is off).

S 865-007

- (6) Make sure the FWD and AFT CARGO FIRE switch-lights, on the pilot's control stand panel, P8, are in the off positions (the ARMED lights are off).

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MAINTENANCE MANUAL

S 865-058

- (7) Make sure the flaps are in the retracted position (AMM 27-51-00/201).

S 865-008

- (8) Supply pneumatic power (Ref 36-00-00).
(a) If the source of pneumatic power is the APU or a ground air source, open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:

NOTE: This will make sure that the packs will be in the normal low flow mode at the start of the test.

- 1) 11S10, LEFT ENG BLEED IND
- 2) 11S11, LEFT ENG BLEED CONT
- 3) 11S19, RIGHT ENG BLEED IND
- 4) 11S20, RIGHT ENG BLEED CONT

- (b) Make sure the L and R DUCT PRESS indications, on the EICAS display, are approximately the same and are between 30 and 50 psig.

S 865-009

- (9) Turn the L and R PACK selectors, on the P5 panel, to the AUTO positions.
(a) Make sure the PACK OFF lights go off.

S 865-010

- (10) Push the TRIM AIR switch-light, on the P5 panel, to the on position.
(a) Make sure the ON light comes on.

S 865-011

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL THE PERSONS AND THE EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT.

- (11) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all the persons and the equipment away from the spoilers.

S 865-012

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (12) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02).

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S 865-059

- (13) Move and hold the channel 2 test switches on the left and right N2 Engine Speed Cards, in the electrical systems cardfile panel, P50, to the TEST positions.

S 215-013

- (14) Make sure the EICAS messages, HI FLOW ON and HI FLOW INHIBIT, do not show on the bottom display.

S 015-014

- (15) Open the forward cargo door, 821 (AMM 06-46-00).

S 415-057

- (16) Make sure the door(s) between the main equipment center and the forward cargo compartment is closed.

D. Do the Forward Cargo Air Conditioning Test.

S 865-015

- (1) Push the FWD CARGO A/C switch-light, on the P5 panel, to the ON position.

S 715-016

- (2) Make sure these conditions occur:
- (a) The ON light, on the FWD CARGO A/C switch-light, is on.
 - (b) The left pack is in HI flow mode and the right pack is in LO flow mode:
 - 1) Push the button adjacent to the UNIT REF message shown on the Flight Management Computer (FMC).
 - 2) Push the button adjacent to the INDEX message shown on the FMC.
 - 3) Push the button adjacent to the MAINT message shown on the FMC.
 - 4) Push the button adjacent to the DISCRETES message shown on the FMC.
 - 5) Make sure the ECS PACK H/L shows the left pack is in HI flow mode.
 - 6) Make sure the ECS PACK H/L shows the right pack is in LO flow mode.
 - (c) Listen to make sure the ground exhaust fan is off.
 - (d) Listen to make sure the forward cargo vent fan is on.
 - (e) Make sure approximately the same quantity of air comes out of each of the outlets in the forward cargo compartment.

S 415-017

- (3) Close the forward cargo door, 821 (Ref 06-46-00).
- (a) Make sure the air comes out of the outlet for the exhaust valve.
 - (b) Make sure the air does not come out of the outlet for the ground exhaust valves.

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- S 865-018
(4) Put the airplane back to the ground mode (AMM 32-09-02/201).

- S 715-019
(5) Make sure these conditions occur:
(a) The air does not come out of the outlet for the exhaust valve.
(b) The air comes out of the outlet for the ground exhaust valves.
(c) Listen to make sure the ground exhaust fan is on.

- S 015-020
(6) Open the forward cargo door, 821 (Ref 06-46-00).

- S 865-021
(7) Turn the FWD CARGO A/C selector, on the P5 panel, to the VENT position.

- S 715-022
(8) Make sure these conditions occur:
(a) Make sure the ECS PACK H/L on the FMC shows the left pack is in LO flow mode.
(b) Make sure the ECS PACK H/L on the FMC shows the right pack is in LO flow mode.
(c) Listen to make sure the forward cargo vent fan stays on.
(d) Make sure the air from the outlets in the forward cargo compartment has decreased.

NOTE: This shows that the forward cargo A/C shutoff has closed.

- S 865-023
(9) Push the FWD CARGO A/C switch-light, on the P5 panel, to the off position.

- S 715-024
(10) Make sure these conditions occur:
(a) The ON light, on the FWD CARGO A/C switch-light, is off.
(b) Listen to make sure the forward cargo vent fan stops.
(c) Listen to make sure the ground exhaust fan stops.

E. Put the airplane back to its usual condition.

- S 415-025
(1) Close the forward cargo door, (Ref 06-46-00).

- S 865-026
(2) Do the activation procedure for the spoilers if you did the deactivation procedure (Ref 27-61-00).

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- S 865-060
- (3) Release the channel 2 test switches on the left and right N2 Engine Speed Cards, in the P50 panel, from the TEST positions.
- S 865-056
- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11S10, LEFT ENG BLEED IND
 - (b) 11S11, LEFT ENG BLEED CONT
 - (c) 11S19, RIGHT ENG BLEED IND
 - (d) 11S20, RIGHT ENG BLEED CONT
- S 865-027
- (5) Remove the pneumatic power, if it is not necessary (AMM 36-00-00).
- S 865-028
- (6) Remove the electrical power, if it is not necessary (AMM 24-22-00).

TASK 21-28-00-705-029

3. System Test - Forward Cargo Air Conditioning

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (3) 20-41-01/201, Electro-Static Sensitive Devices
- (4) 24-22-00/201, Electrical Power - Control
- (5) 25-55-02/401, Bulkhead Lining
- (6) 27-51-00/201, Flaps
- (7) 31-41-00/201, Engine Indication and Crew Alerting System
- (8) 36-11-12/401, Air Supply Control Card Assembly

B. Access

- (1) Location Zones
 - 119/120 Main equipment center
 - 121 Forward cargo compartment (Left)
 - 123/124 Area below forward cargo compartment
 - 125 Area aft of forward cargo compartment (Left)
- (2) Access Panels
 - 119AL Main equipment center

C. Prepare for the Tests

- S 865-030
- (1) Supply electrical power (Ref 24-22-00).
- S 865-031
- (2) Make sure these circuit breakers, on the pilot's overhead circuit breaker panel, P11, are closed:
- (a) 11A13, LEFT PACK FLOW CONT
 - (b) 11A26, RIGHT PACK FLOW CONT
 - (c) 11N10, LEFT PACK AUTO PWR
 - (d) 11N11, LEFT PACK AUTO CONT

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- (e) 11N15, R PACK STANDBY PWR
- (f) 11N16, R PACK STANDBY CONT
- (g) 11N17, PACK FLOW INDICATION
- (h) 11N18, CARGO EXH VALVE
- (i) 11N19, RIGHT PACK AUTO PWR
- (j) 11N20, RIGHT PACK AUTO CONT
- (k) 11N21, FWD CARGO CONT VLV CLOSE
- (l) 11N22, FWD CARGO DUCT OVHT/INOP
- (m) 11N24, L PACK STANDBY PWR
- (n) 11N25, L PACK STANDBY CONT
- (o) 11P21, FWD CARGO A/C & VENT CONT
- (p) 11R11, AUX ZONE CONTROLLER
- (q) 11R14, RECIRC FAN L
- (r) 11R15, ZONE CONTROLLER
- (s) 11R19, FWD CARGO HEAT CONT
- (t) 11R21, CARGO HEAT OVERRIDE
- (u) 11R23, RECIRC FAN R
- (v) 11R24, F/D ZONE DUCT OVHT/INOP
- (w) The EICAS circuit breakers (6 locations)

S 865-032

- (3) Make sure these circuit breakers, on the left miscellaneous electrical panel, P36, are closed:
- (a) 36E4 or 36K3, CGO GND EXH B/U VAL
 - (b) 36F2 or 36F4, RECIRC FAN L
 - (c) 36L2 or 36K5, FWD CARGO HT CONT VLV

S 865-033

- (4) Make sure these circuit breakers, on the right miscellaneous electrical panel, P37, are closed:
- (a) 37E3 or 37K7, CARGO GND EXH VALVE
 - (b) 37E4 or 37K6, CARGO A/C SOV
 - (c) 37G4 or 37C4, RECIRC FAN R
 - (d) 37J3 or 37G1, FWD CARGO VENT FAN
 - (e) 37J6 or 37F1, CGO GND EXH FAN

S 865-034

- (5) Do the steps that follow, on the pilot's overhead control panel, P5:
- (a) Make sure the L and R PACK selectors are in the AUTO positions (the PACK OFF lights are off).
 - (b) Make sure the F/D zone temperature selector is in the AUTO (12 o'clock) position.
 - (c) Make sure the other zone temperature selectors are in the OFF positions.
 - (d) Make sure the L and R RECIRC switch-lights are on (the ON lights are on).
 - (e) Make sure the FWD CARGO A/C switch-light is on (the ON light is on).
 - (f) Make sure the FWD CARGO A/C selector is in the VENT position.

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- S 865-035
- (6) Make sure the FWD and AFT CARGO FIRE switch-lights, on the pilot's control stand panel, P8, are in the off position (the ARMED light is off).
- S 865-036
- (7) Make sure the flaps are in the retracted position (Ref 27-51-00).
- S 865-061
- (8) Open these circuit breakers on the P11 overhead circuit breaker panel and attach DO-NOT-CLOSE tags:
- (a) 11S10, LEFT ENG BLEED IND
 - (b) 11S11, LEFT ENG BLEED CONT
 - (c) 11S19, RIGHT ENG BLEED IND
 - (d) 11S20, RIGHT ENG BLEED CONT
- S 015-037
- (9) Open the access door for the main equipment center, 119AL (Ref 06-41-00).
- S 865-038
- (10) Do these steps in the electrical systems cardfile panel, P50:
- (a) Move and hold the channel 2 test switches, on the left and right N2 Engine Speed cards, to the TEST position.
- S 015-039
- (11) Find the valves and the fans for the forward cargo A/C system.
- (a) Open the forward cargo door, 821 (Ref 06-46-00).
 - (b) Remove the floor panels that are six feet aft of the cargo door and at the center line of the forward cargo compartment.
 - 1) Find the ground exhaust valve, the ground exhaust backup valve, and the ground exhaust fan.
 - (c) Remove the floor panels that are four feet aft of the forward bulkhead and two feet left of the center line of the forward cargo compartment.
 - 1) Find the exhaust valve.
 - (d) Remove the aft bulkhead lining of the forward cargo compartment (Ref 25-55-02/401).
 - 1) Find the forward cargo A/C shutoff valve.
 - (e) Remove the left sidewall panel, eight feet forward of the aft bulkhead in the forward cargo compartment.
 - 1) Find the forward cargo vent fan.
 - (f) Open the access door for the right Environmental Control Systems (ECS) bay, 194LR (Ref 06-41-00).
 - 1) Find the forward cargo heat shutoff valve.
- S 865-040
- (12) Push the ESC MSG switch on the EICAS MAINT module, on the right side panel, P61.

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D. Do the Test

S 735-041

- (1) Do the Test for the Pack Flow Controller.
 - (a) Open this circuit breaker on the P11 panel:
 - 1) 11A13, LEFT PACK FLOW CONT
 - (b) Make sure the EICAS message, CARGO A/C CONT, shows on the top and bottom displays.
 - (c) Make sure the FWD CARGO A/C INOP light, on the P5 panel, comes on.
 - (d) Close this circuit breaker on the P11 panel:
 - 1) 11A13, LEFT PACK FLOW CONT
 - (e) Make sure the FWD CARGO A/C INOP light, on the P5 panel, goes off.
 - (f) Do the Maintenance Message Erase procedure (Ref 31-41-00).
 - (g) Make sure the EICAS message, CARGO A/C CONT, does not show on the top or bottom displays.

S 735-042

- (2) Do the Test for the Forward Cargo A/C Shutoff Valve.
 - (a) Push the FWD CARGO A/C switch-light, on the P5 panel, to the on position.
 - 1) Make sure the ON light comes on.
 - (b) Open this circuit breaker on the P37 panel:
 - 1) 37E4 or 37K6, CARGO A/C SOV
 - (c) Turn the FWD CARGO A/C selector, on the P5 panel, to the AUTO position.
 - (d) After 20 seconds, make sure these conditions occur on the EICAS display:
 - 1) The message, COND CARGO VALVE, shows on the bottom display.
 - 2) The message, FWD CARGO A/C, shows on the top display.
 - (e) Make sure the FWD CARGO A/C INOP light, on the P5 panel, comes on.
 - (f) Close this circuit breaker on the P37 panel:
 - 1) 37E4 or 37K6, CARGO A/C SOV
 - (g) Push the FWD CARGO A/C switch-light, on the P5 panel, to the off and then to the on positions.
 - (h) Look at the forward cargo A/C shutoff valve to make sure it opens in 10 seconds.
 - (i) Make sure the FWD CARGO A/C INOP light, on the P5 panel, goes off.
 - (j) Do the Maintenance Message Erase procedure (Ref 31-41-00).
 - (k) Make sure the EICAS message, COND CARGO VALVE, does not show on the bottom display.
 - (l) Open this circuit breaker on the P37 panel:
 - 1) 37E4 or 37K6, CARGO A/C SOV

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- (m) Turn the FWD CARGO A/C selector, on the P5 panel, to the VENT position.
- (n) After 20 seconds, make sure the EICAS message, COND CARGO VALVE, shows on the bottom display.
- (o) Close this circuit breaker on the P37 panel:
 - 1) 37E4 or 37K6, CARGO A/C SOV
- (p) Look at the forward cargo A/C shutoff valve to make sure it closes in 10 seconds.
- (q) Do the Maintenance Message Erase procedure (Ref 31-41-00).
- (r) Make sure the EICAS message, COND CARGO VALVE, does not show on the bottom display.

S 735-043

- (3) Do the Test for the Forward Cargo Vent Fan.
 - (a) Push the FWD CARGO A/C switch-light, on the P5 panel, to the on position.
 - 1) Make sure the ON light comes on.
 - (b) Listen to make sure the forward cargo vent fan comes on.
 - (c) Push the FWD CARGO A/C switch-light, on the P5 panel, to the off position.
 - 1) Make sure the ON light goes off.
 - (d) Listen to make sure the forward cargo vent fan goes off.
 - (e) Remove the electrical connector, D13574, from the forward cargo vent fan.
 - (f) Install a jumper between the pin 5 and the pin 7 of the electrical connector, D13574.
 - (g) Push the FWD CARGO A/C switch-light, on the P5 panel, to the on position.
 - 1) Make sure the ON light comes on.
 - (h) Open this circuit breaker on the P37 panel:
 - 1) 37J3, FWD CARGO VENT FAN
 - (i) Make sure the EICAS message, FWD CARGO FAN, shows on the bottom display.
 - (j) Remove the jumper from the pins 5 and 7 of the electrical connector, D13574.

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- (k) Connect the electrical connector, D13574, to the forward cargo vent fan.
 - (l) Do the Maintenance Message Erase procedure (Ref 31-41-00).
 - (m) Make sure the EICAS message, FWD CARGO FAN, does not show on the bottom display.
- E. Put the airplane back to its usual condition.

S 865-044

- (1) Do these steps in the P50 panel:
 - (a) Release the channel 2 test switch, on the left and right N2 Engine Speed cards, from the TEST position.

S 865-062

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 overhead circuit breaker panel:
 - (a) 11S10, LEFT ENG BLEED IND
 - (b) 11S11, LEFT ENG BLEED CONT
 - (c) 11S19, RIGHT ENG BLEED IND
 - (d) 11S20, RIGHT ENG BLEED CONT

S 015-045

- (3) Close the access door for the main equipment center, 119AL (Ref 06-41-00).

S 015-046

- (4) Install the bulkhead lining at the aft end of the forward cargo compartment (Ref 25-55-02/401).

S 015-047

- (5) Install the floor panels in the forward cargo compartment.

S 015-048

- (6) Close the forward cargo door, 821 (Ref 06-46-00).

S 865-049

- (7) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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FORWARD CARGO AIR CONDITIONING SHUTOFF VALVE – REMOVAL/INSTALLATION

1. General

- A. This shutoff valve is for the air conditioning system of the forward cargo compartment. It is installed on the left side of the mix manifold area, which is aft of the forward cargo compartment. This procedure has instructions to remove and install the valve.

TASK 21-28-01-004-001

2. Remove the Shutoff Valve (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zone
120 Main Equipment Center, Right
125 Area aft of the forward cargo compartment (Left)
212 Control Cabin – Sect 41 – Right

C. Prepare for the Removal

S 864-002

- (1) Push the FWD CARGO A/C switch-light, on the pilot's overhead panel, P5, to the off position.
(a) Make sure the ON light is off.
(b) Put a DO-NOT-OPERATE tag on the switch-light.

S 864-003

- (2) Turn the L PACK and R PACK selectors, on the P5 panel, to the OFF position.
(a) Make sure the PACK OFF light comes on.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 864-043

- (3) Push the L RECIRC FAN and R RECIRC FAN switch-lights, on the P5 overhead panel, to the off position.
(a) Make sure the ON lights go off.
(b) Put a DO-NOT-OPERATE tag on the switch-lights.

S 014-037

- (4) Open the main equipment center door, 119AL (AMM 06-41-00/201).

S 864-004

- (5) Open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the right miscellaneous electrical equipment panel, P37, in the main equipment center:
(a) 37E4 or 37K6, CGO A/C SOV CONT

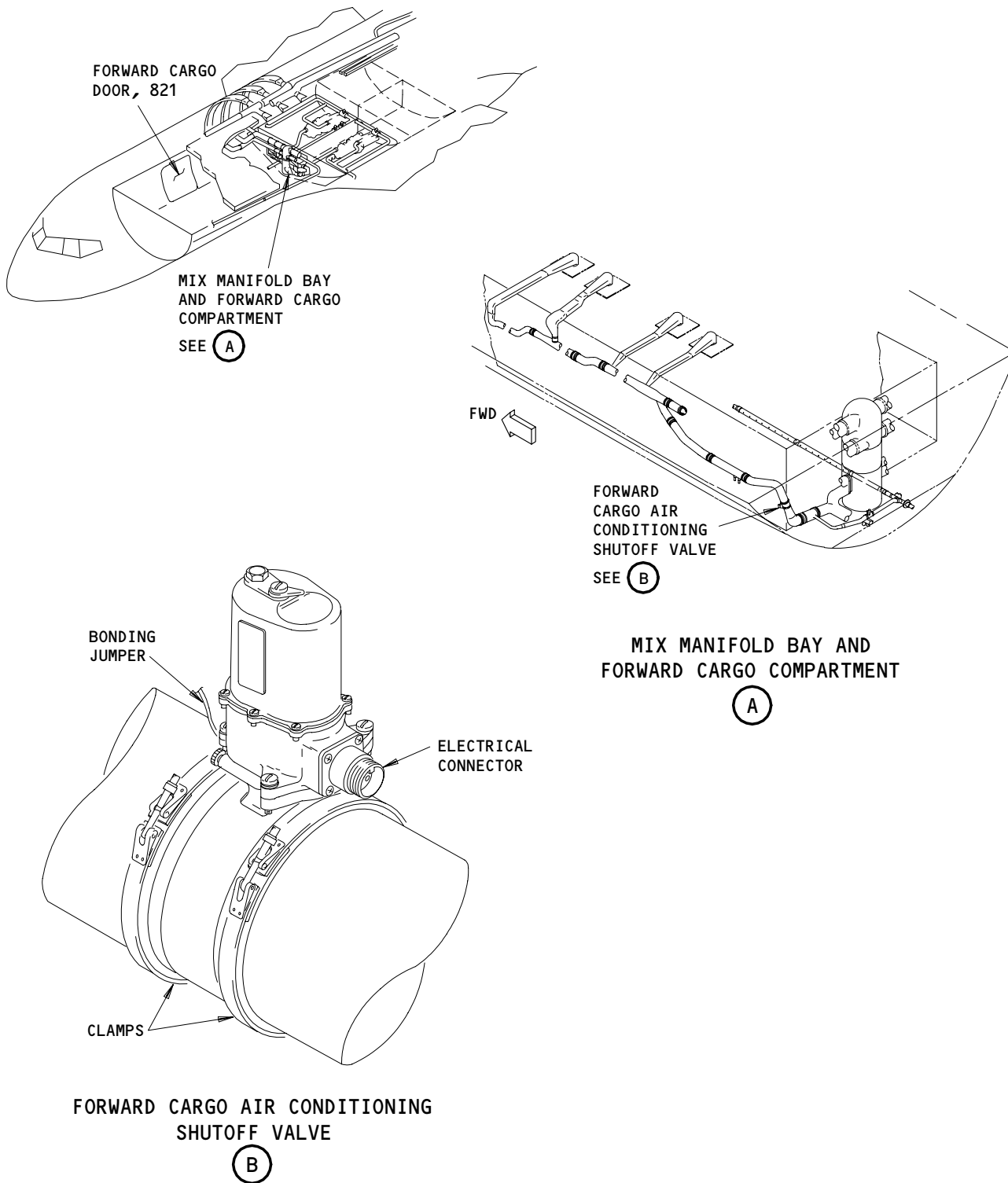
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Forward Cargo Air Conditioning Shutoff Valve Installation
Figure 401

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- S 864-046
- (6) Put a DO-NOT-OPERATE tag on the ground air connector (Ref 21-21-02).
- S 014-005
- (7) Open the forward cargo door, 821 (Ref 06-41-00).
- S 014-006
- (8) Remove the bulkhead lining in the aft end of the forward cargo compartment (AMM 25-52-01/401).
- D. Remove the Valve
 - S 034-007
 - (1) Disconnect the electrical connector from the valve.
 - S 034-008
 - (2) Remove the bonding jumper from the valve.
 - S 034-009
 - (3) Remove the clamps on each end of the valve.
 - S 024-010
 - (4) Remove the valve.
 - S 434-011
 - (5) Install a cover on the duct openings.

TASK 21-28-01-404-012

3. Install the Shutoff Valve (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (4) 36-00-00/201, Pneumatic - General

B. Access

- (1) Location Zone
 - 120 Main Equipment Center, Right
 - 125 Area aft of the forward cargo compartment (Left)
 - 212 Control Cabin - Sect 41 - Right

C. Install the Valve

- S 034-013
- (1) Remove the covers from the duct openings.
 - (a) Make sure there is no unwanted material in the ducts.
- S 424-014
- (2) Put the valve into position in the duct.
 - (a) Make sure the flow arrow on the valve points away from the mix manifold.
 - (b) Make sure there is sufficient clearance to install the electrical connector.

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- S 434-015
- (3) Install the clamps on each end of the valve.
(a) Tighten the clamps to 55 pound-inches.
- S 434-016
- (4) Use a bolt, 2 washers, and a nut to connect the bonding jumper to the valve.
- S 434-017
- (5) Connect the electrical connector to the valve.
- D. Do the Valve Installation Test
- S 864-018
- (1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the right miscellaneous electrical equipment panel, P37, in the main equipment center:
(a) 37E4 or 37K6, CARGO A/C SOV CONT
- S 864-019
- (2) Supply electrical power (Ref 24-22-00).
- S 864-020
- (3) Supply pneumatic power (Ref 36-00-00).
- S 864-021
- (4) Remove the DO-NOT-OPERATE tag from the L PACK and R PACK selectors, on the P5 panel.
- S 864-039
- (5) Turn the L PACK or R PACK selector to the AUTO or the STBY position.
(a) Make sure the L PACK OFF or R PACK OFF light goes off.
- S 214-022
- (6) Make sure the position indicator on the valve is in the CLOSED position.
- S 794-032
- (7) Feel for the airflow around the valve.
(a) Small leaks are permitted.
(b) You must repair a large leak.
- S 864-024
- (8) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C switch-light, on the P5 panel.
(a) Push the switch-light to the on position.
(b) Make sure the ON light comes on.
- S 214-025
- (9) Make sure the position indicator on the valve moves to the OPEN position.

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S 864-044

- (10) Remove the DO-NOT-OPERATE tag from the L RECIRC and R RECIRC switch-lights.

S 864-026

- (11) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side panel, P61.

S 214-027

- (12) Make sure the EICAS message, COND CARGO VALVE, does not show on the bottom display.

S 864-047

- (13) Remove the DO-NOT-OPERATE tag from the ground air connector.
E. Put the Airplane Back to its Usual Condition

S 414-028

- (1) Install the bulkhead lining in the aft end of the forward cargo compartment (AMM 25-52-01/401).

S 414-029

- (2) Close the forward cargo door, 821 (Ref 06-41-00).

S 414-038

- (3) Close the main equipment center door, 119AL (AMM 06-41-00/201).

S 864-030

- (4) Remove the electrical power, if it is not necessary (Ref 24-22-00).

S 864-031

- (5) Remove the pneumatic power, if it is not necessary (Ref 36-00-00).

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FORWARD CARGO VENT FAN - REMOVAL/INSTALLATION

1. General

SAS **NOTE:** The specific requirements for forward cargo compartment conditioned
SAS air are met with currently certified system having an inoperable
SAS ventilation fan. Thus, on all SAS and MTH A/C, the forward cargo
SAS vent fan has been removed, in order to reduce weight.

- A. The forward cargo vent fan is installed in the left sidewall of the forward cargo compartment, about 4 feet forward of the mix manifold bay. It blows air from the mix manifold bay to the forward cargo compartment. This procedure has instructions to remove and install the forward cargo vent fan.

TASK 21-28-02-004-001

2. Remove the Forward Cargo Vent Fan (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) 24-22-00/201, Electric Power Control
- (3) 25-52-01/401, Sidewall Panels.

B. Access

- (1) Location Zone
121 Forward Cargo Compartment (Left)

C. Prepare For the Removal

S 864-002

- (1) Find the SYSTEM switch-light on the FWD CARGO AIR COND/VENT FAN module, on the pilot's overhead control panel, P5.
 - (a) Push the SYSTEM switch-light so that the ON light is not on.
 - (b) Attach a DO-NOT-OPERATE tag to the switch-light.

S 864-003

- (2) Open this circuit breaker, on the pilot's overhead circuit breaker panel P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11P21, FWD CARGO A/C & VENT CONT

S 864-004

- (3) Open this circuit breaker, on the right miscellaneous electrical equipment panel P37, and attach a DO-NOT-CLOSE tag:
 - (a) 37J3 or 37G1, CARGO VENT FAN

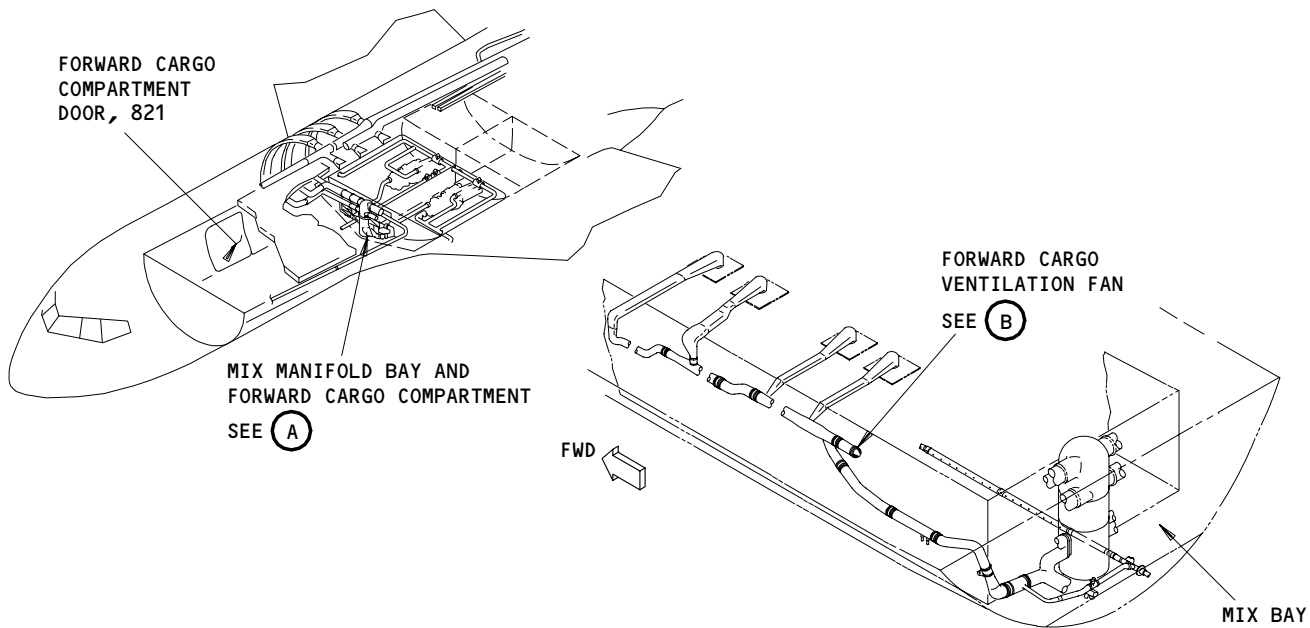
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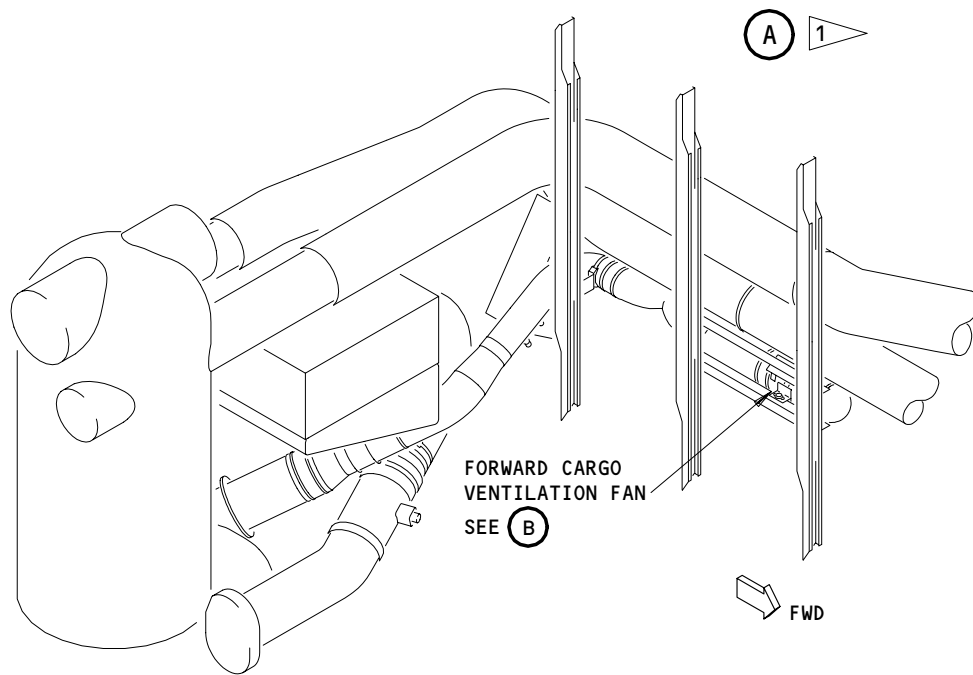
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MIX MANIFOLD BAY AND FORWARD CARGO COMPARTMENT



MIX MANIFOLD BAY AND FORWARD CARGO COMPARTMENT

- 1 SAS 150-999; MTH AIRPLANES
- 2 SAS 050-149

(A) 2

Forward Cargo Ventilation Fan Installation
Figure 401 (Sheet 1)

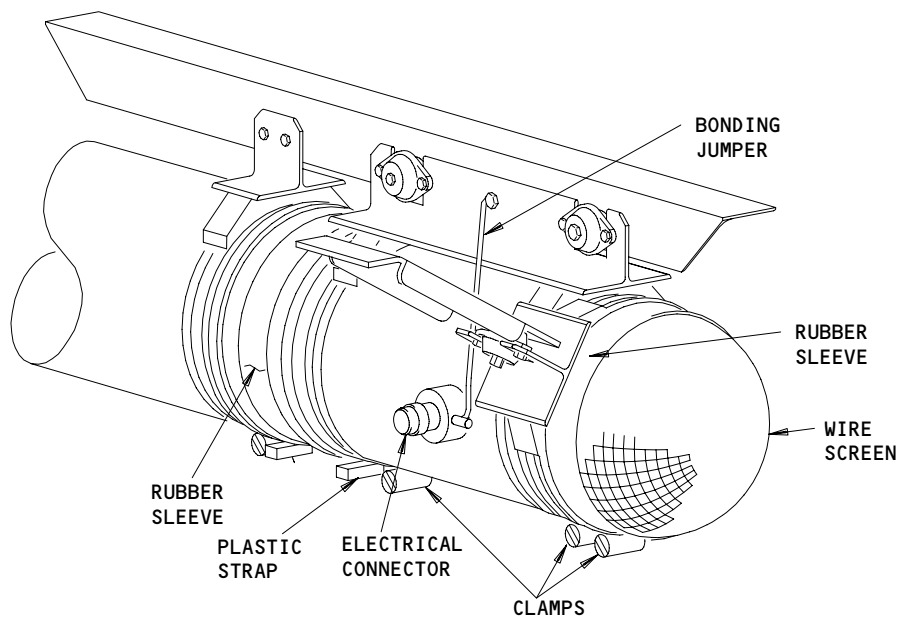
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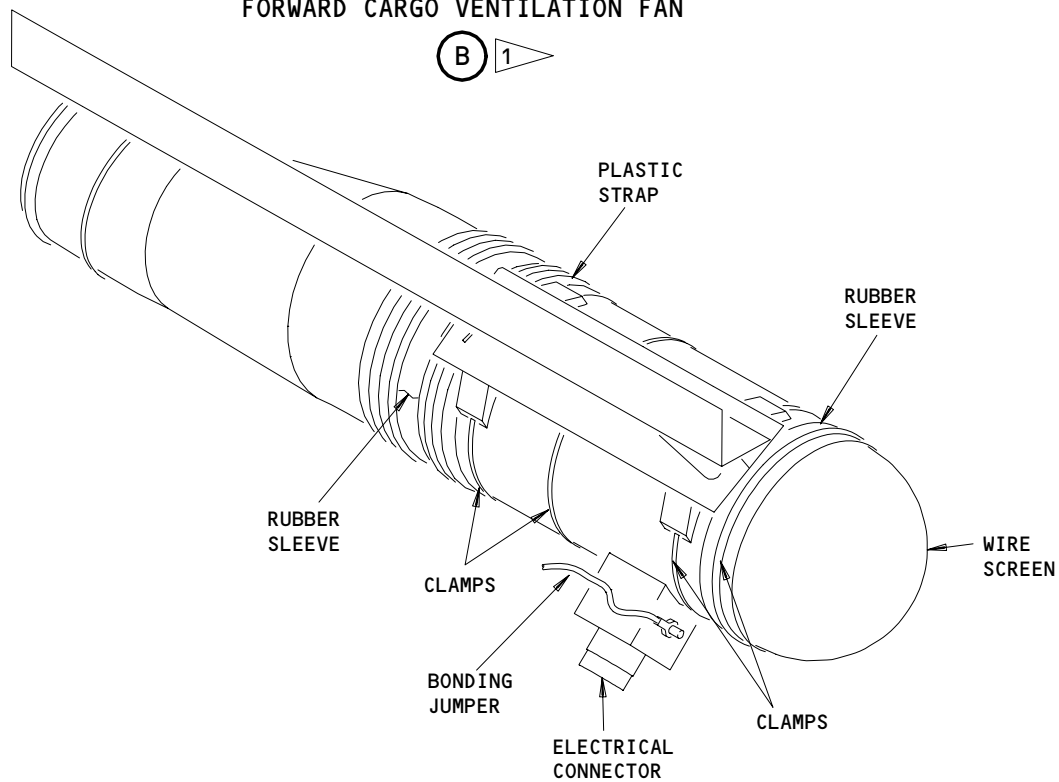
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FORWARD CARGO VENTILATION FAN

(B) 1



FORWARD CARGO VENTILATION FAN

(B) 2

Forward Cargo Ventilation Fan Installation
Figure 401 (Sheet 2)

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846844

- S 014-005
(4) Open the forward cargo compartment door, 821 (Ref 06-46-00).

- S 014-006
(5) Remove the left sidewall panel of the forward cargo compartment, about 4 feet forward of the mix manifold bay (Ref 25-52-01).

- S 014-007
(6) Remove the air ducts necessary to get access to the forward cargo vent fan.

- S 434-008
(7) Put a cover on the duct openings.

D. Remove the Fan

- S 034-009
(1) Disconnect the electrical connector from the fan.

- S 034-010
(2) Disconnect the bonding jumper from the fan.

- S 034-011
(3) Remove the clamps from the brackets which support the fan.

- S 034-012
(4) Remove the plastic strap from the forward end of the fan.

- S 034-013
(5) Move the rubber sleeve away from the fan.

- S 024-014
(6) Remove the fan.

- S 434-015
(7) Put a cover on the duct openings.

- S 034-016
(8) Remove the wire screen from the fan.
(a) Remove the clamp that holds the wire screen to the fan.
(b) Move the rubber sleeve away from the fan.
(c) Remove the wire screen.

TASK 21-28-02-404-017

3. Install the Forward Cargo Vent Fan (Fig. 401)

A. Equipment

- (1) Strap Installation Tool, Panduit Corp., GS4H
17301 Ridgeland Ave., Tinley Park, IL 60477

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B. Consumable Materials

- (1) Plastic, adjustable, self-locking strap, BACS38K6

C. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) 20-10-21/601, Electrical Bonding
- (3) 24-22-00/201, Electric Power Control
- (4) 25-52-01/401, Sidewall Panels.
- (5) 36-00-00/201, Pneumatic Power - General

D. Access

- (1) Location Zone
 - 121 Forward Cargo Compartment (Left)

E. Install the fan

S 434-018

- (1) Attach the wire screen to the aft end of the fan.
 - (a) Put the wire screen in position on the fan so that the flow arrow on the fan points away from the screen.
 - (b) Move some of the rubber sleeve onto the fan.
 - (c) Install a clamp to keep the rubber sleeve on the fan.
 - (d) Tighten the clamp to 18 pound-inches.

S 034-019

- (2) Remove the cover from the duct opening.

S 214-020

- (3) Make sure there is no unwanted material in the duct.

S 424-021

- (4) Put the fan in position in the duct. Make sure the flow arrow points to the duct.

S 434-022

- (5) Move some of the rubber sleeve onto the forward end of the fan.

S 434-023

- (6) Install a plastic strap to keep the rubber sleeve in position.
 - (a) Use the strap installation tool to tighten the strap to a tension of 60 pounds.

S 434-024

- (7) Install a clamp through each bracket and around the fan.
 - (a) Tighten the clamps to 18 pound-inches.

S 434-025

- (8) Install a bolt and a washer to connect the bonding jumper to the fan.

S 434-026

- (9) Connect the electrical connector to the fan.

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F. Do the installation test for the forward cargo vent fan.

S 864-027

- (1) Supply electrical power (Ref 24-22-00).

S 864-028

- (2) Supply pneumatic power (Ref 36-00-00).

S 864-029

- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:

(a) 11P21, FWD CARGO A/C & VENT CONT

S 864-030

- (4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P37 panel:

(a) 37J3 or 37G1, FWD CARGO VENT FAN

S 864-031

- (5) Find the SYSTEM switch-light on the FWD CARGO AIR COND / VENT FAN module, on the P5 panel.

(a) Remove the DO-NOT-OPERATE tag from the switch-light.

(b) Push the SYSTEM switch-light so that the ON light comes on.

S 214-032

- (6) Listen for the fan to come on.

S 214-033

- (7) Feel for airflow around the fan coupling.

(a) A small leak is permitted.

(b) You must repair a large leak.

G. Put the Airplane Back to Its Usual Condition

S 034-034

- (1) Remove the covers from the openings of the ducts that were removed to get access to the fan.

S 214-035

- (2) Make sure there is no unwanted material in the ducts.

S 414-036

- (3) Install the ducts that were removed to get access to the fan.

S 414-037

- (4) Install the sidewall panel in the forward cargo compartment (Ref 25-52-01).

S 414-038

- (5) Close the forward cargo compartment door 821 (Ref 06-46-00).

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767
MAINTENANCE MANUAL

- S 864-039
(6) Remove the electrical power, if it is not necessary (Ref 24-22-00).
- S 864-040
(7) Remove the pneumatic power, if it is not necessary (Ref 36-00-00).

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CREW REST AIR CONDITIONING DISTRIBUTION – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The air conditioning distribution system supplies conditioned air to all of the crew rest areas (CRAs). Each CRA has its own distribution system, which operates independently of the other CRAs. The purpose of each system is to maintain the crew rest areas at any temperature between 64°F (18°C) and 76°F (24°C).
- B. The air for the forward and aft CRAs is supplied from the overhead distribution duct (Ref 21-23-00). It supplies 55 CFM of air to each forward and aft CRA. The air for the flight deck CRA is supplied from the left forward riser duct (Ref 21-23-00). It supplies 75 CFM of air to the flight deck CRA.
- C. Each CRA distribution system has ducts, a restrictor, a fan, and an outlet. The fan is controlled by a system of relays. The flight deck CRA air distribution system also has a shutoff valve, a heat exchanger, a dual modulating valve, and a smoke evacuation valve. Each of these components are controlled by the flight deck CRA temperature controller (Ref 21-61-00).

2. Component Details

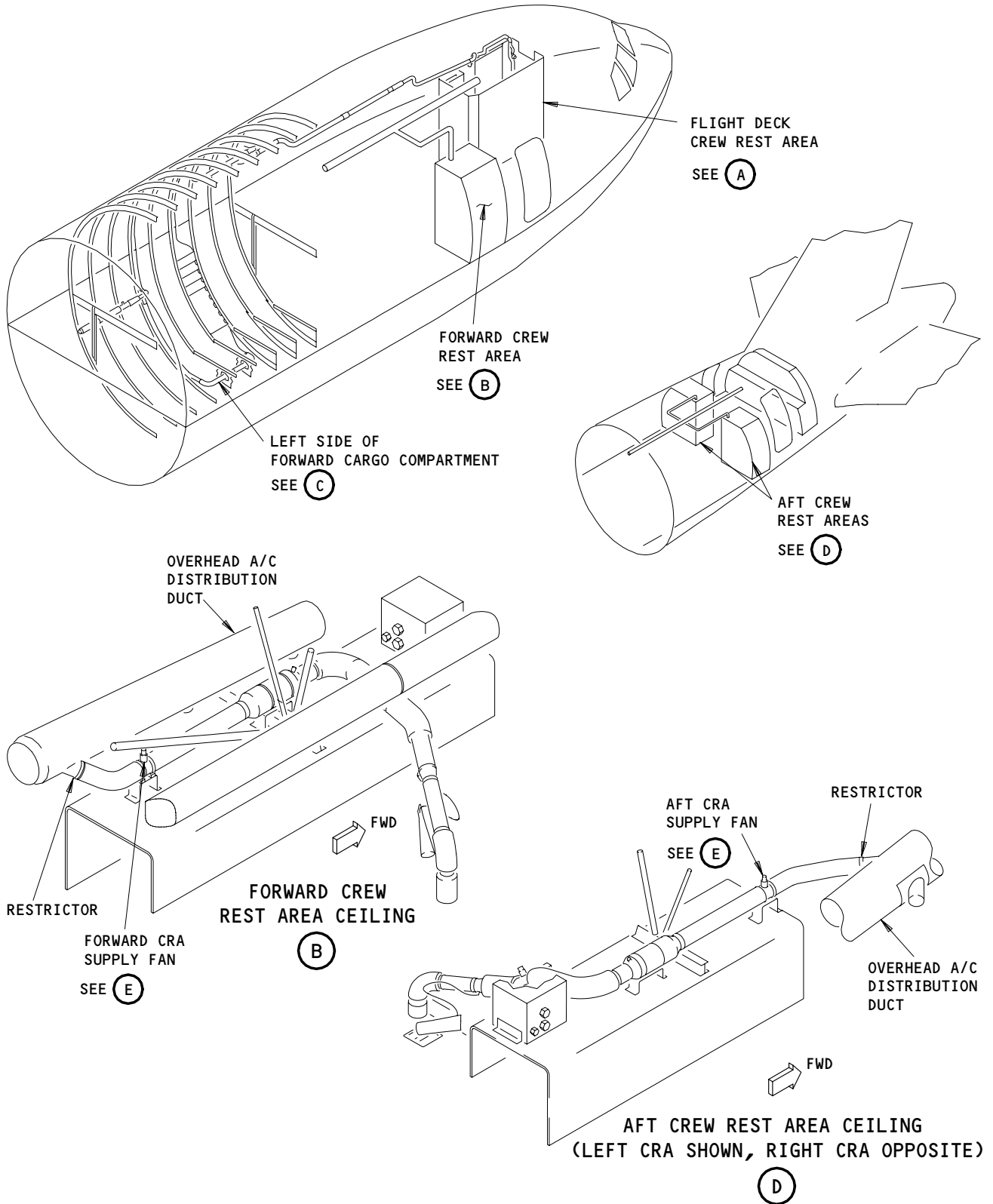
A. Flight Deck CRA Shutoff Valve (Fig. 1)

(1) Description

- (a) the flight deck CRA shutoff valve is a 5-inch diameter, electrically actuated, butterfly valve. The valve is made up of an actuator assembly and a valve flow section.
- (b) The actuator includes an electrical connector, a control switch, two position switches, a motor, an actuator shaft, and a manual override handle.
- (c) The valve flow section includes a valve flow housing and a butterfly. The actuator assembly is bolted to the valve flow housing. The actuator shaft is bolted to the top of the butterfly. A stabilizer shaft is bolted to the bottom of the butterfly.
- (d) The manual override handle travels with the actuator shaft. When the valve is electrically operated, the handle acts as the position indicator for the valve. The handle can also be used to manually position the valve.

(2) Function

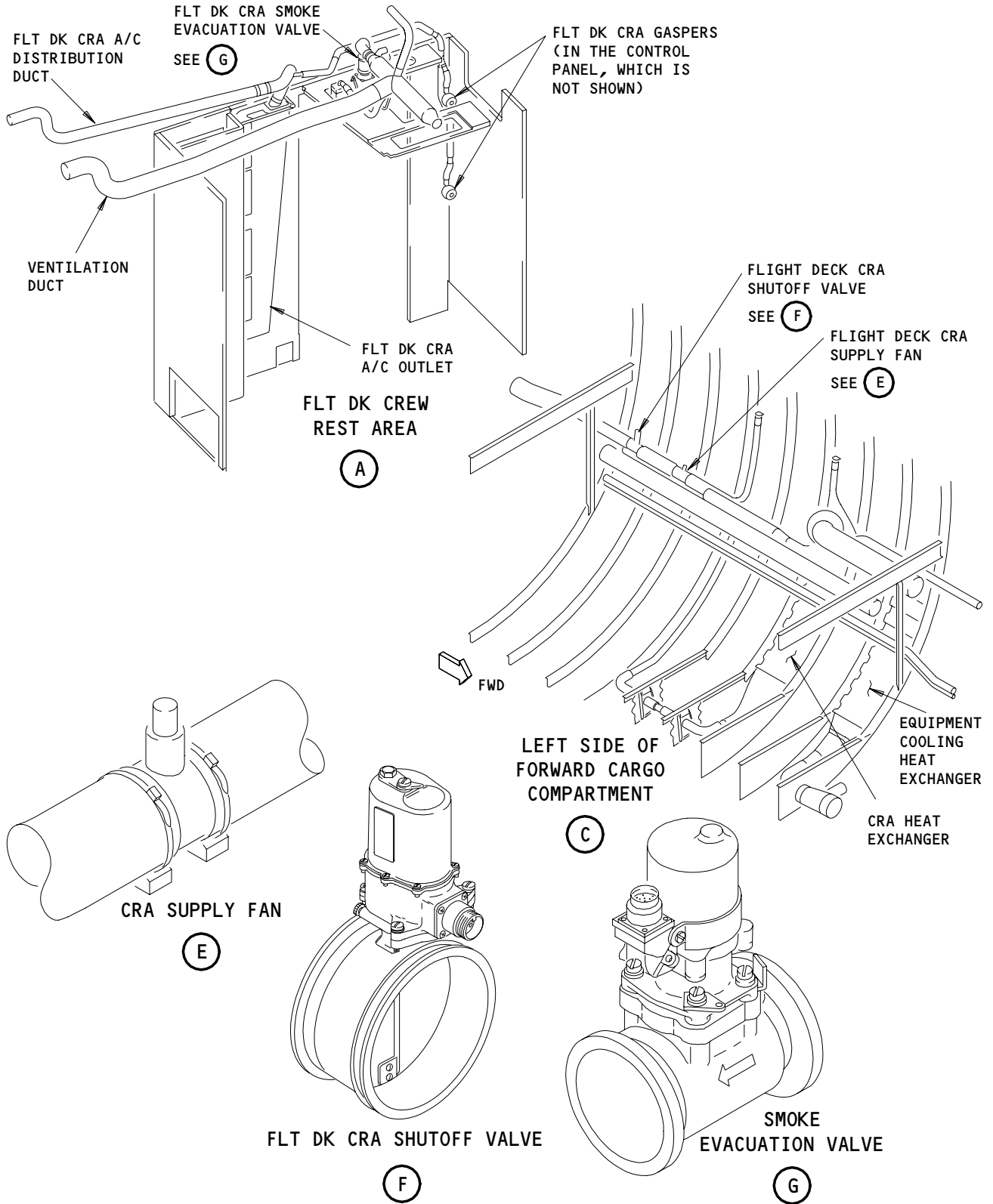
- (a) The flight deck CRA shutoff valve is installed in the left sidewall of the forward cargo compartment, immediately forward of the left forward riser. It controls the supply of conditioned air to the flight deck CRA.



Crew Rest Area A/C Distribution System
Figure 1 (Sheet 1)

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AIRPLANES WITH CREW REST AREAS

21-29-00



Crew Rest Area A/C Distribution System
Figure 1 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

21-29-00

- (b) When 28vdc is supplied to the electrical connector, the control switch moves, the motor is energized, and the butterfly is moved into position. The valve will only move to the fully closed position or the fully open position. It will not move to a partially open position. However, the manual override handle can be used to manually put the valve in any position.

B. Smoke Evacuation Valve

(1) Description

- (a) The smoke evacuation valve has a butterfly disk operated by an electrical actuator. The actuator output shaft controls the butterfly disk. With the disk rotated parallel to the passage through the valve body, the valve opens. The valve closes with the disk turned across the valve body. A manual override also functions as a position indicator.

(2) Function

- (a) With 28 vdc power applied to either the open or close side (windings) of the actuator motor, the butterfly disk rotates accordingly.
- (b) Moving the manual override handle to the open or close position on the actuator, positions the disk accordingly.

C. Dual Modulating Valve

- (1) The flight deck CRA dual modulating valve has two connected butterfly disks with one common actuator and shaft. Each butterfly disk is oriented 90 degrees out of phase with the other such that when the bypass disk is full open, the skin heat exchanger disk is fully closed, and vice versa. As the bypass disk moves to close, the heat exchanger disk moves to open.
- (2) The valve has a position indicator. When the skin heat exchanger duct is fully open, the position indicator points to COLD. When the bypass duct is fully open, the position indicator points to HOT. The valve is powered by 115 vac from the CRA temperature controller (Ref 21-66-00).

D. Fan Current Sensor

- (1) The current sensors for the CRA supply fans are in the left and right miscellaneous electrical equipment panel P36 and P37. They monitor the current between the CREW REST AREA FAN circuit breakers and the fan motors. A transformer senses the current flowing through the sensor.

E. Crew Rest Area (CRA) Supply Fans

- (1) The CRA supply fans are single-stage, vane-axial flow fans. They each have a fan housing, an electrical connector, an impeller, and a motor. The motor has a stator, a rotor, a rotor shaft, and a thermal protector. The motor is designed to operate at 10,650 rpms. Each fan weighs approximately 3.25 pounds.

- (2) When 200 vac, 3-phase, 400 Hz power is supplied to the electrical connector, the stator causes the rotor turn. The rotor shaft connects the rotor to the impeller and thus causes the impeller to turn. The movement of the blades on the impeller pushes air through the fan housing. If the fan motor gets too hot, the power to the motor will be stopped and the motor will turn off.
- (3) One supply fan is installed for each crew rest area. For the forward and aft CRAs, the supply fans are installed in the ceiling above the CRA. The flight deck CRA supply fan is installed in the forward cargo compartment, immediately forward of the left forward riser. The supply fans blow the conditioned air to the crew rest areas.

F. Air Conditioning Ducts (Fig. 1)

- (1) The air conditioning ducts for the forward and aft CRAs direct the conditioned air from the overhead distribution duct to the CRA outlets. The air conditioning ducts for the flight deck CRA direct the conditioned air from the left forward riser to the flight deck CRA outlet.

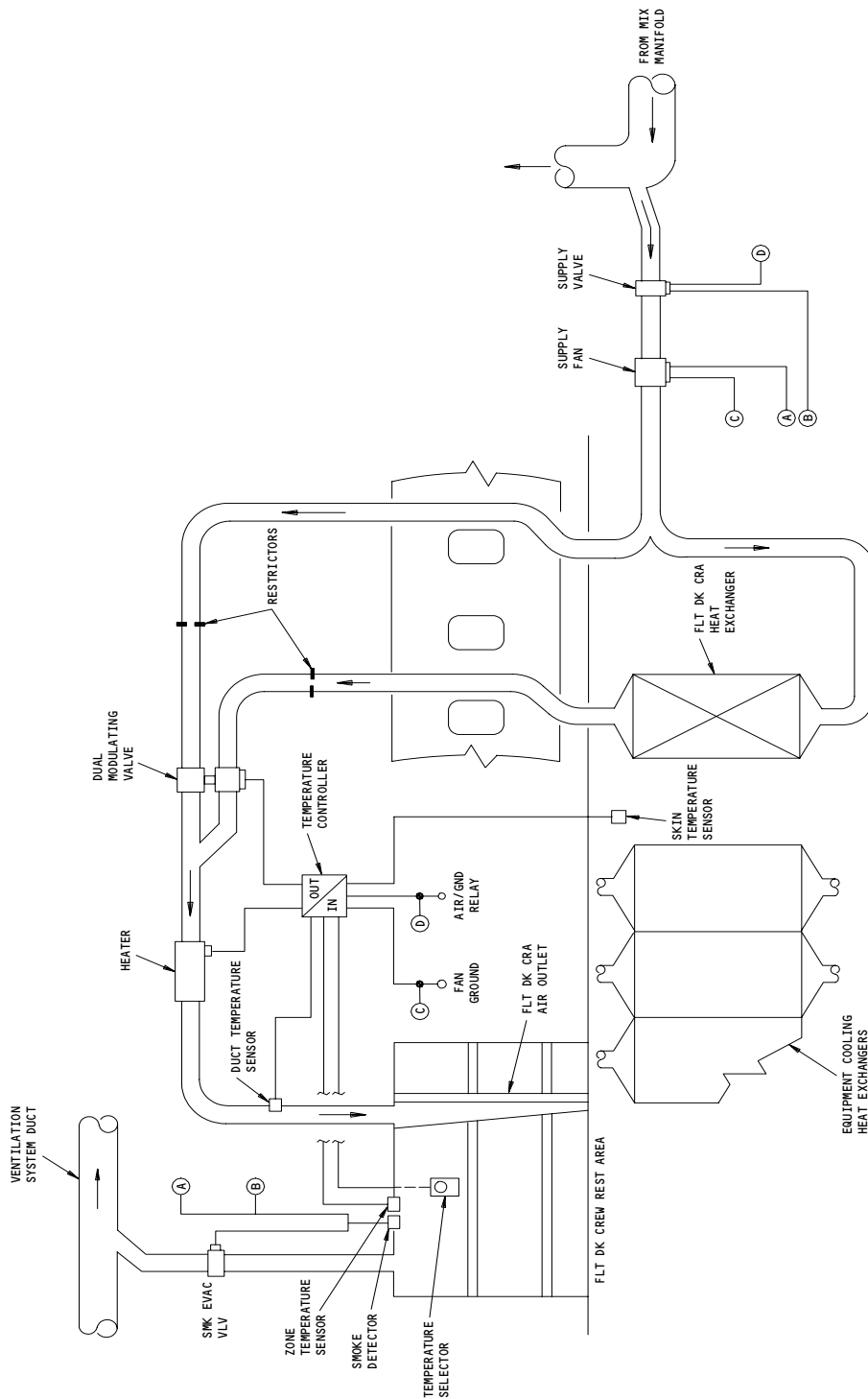
G. Air Conditioning Outlets (Fig. 1)

- (1) Each CRA has an outlet plenum, which distributes the conditioned air evenly throughout the CRA.
- (2) The flight deck CRA also has two gasper outlets in the anomalies panel. One gasper for each bunk. The amount and the direction of flow from each gasper is adjustable.

3. Operation

A. Functional Description - Flight Deck CRA (Fig. 2)

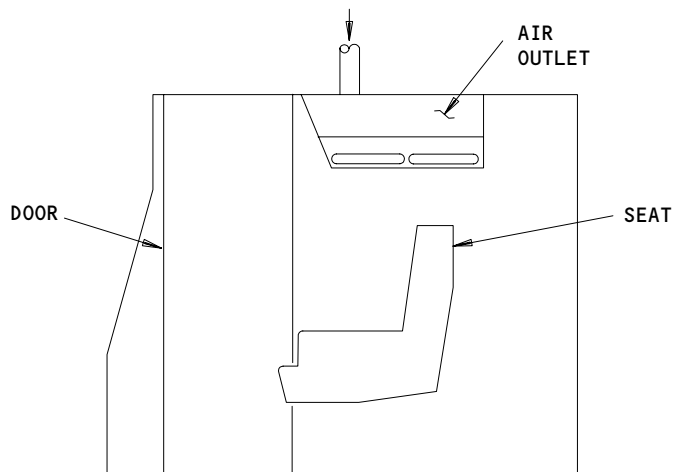
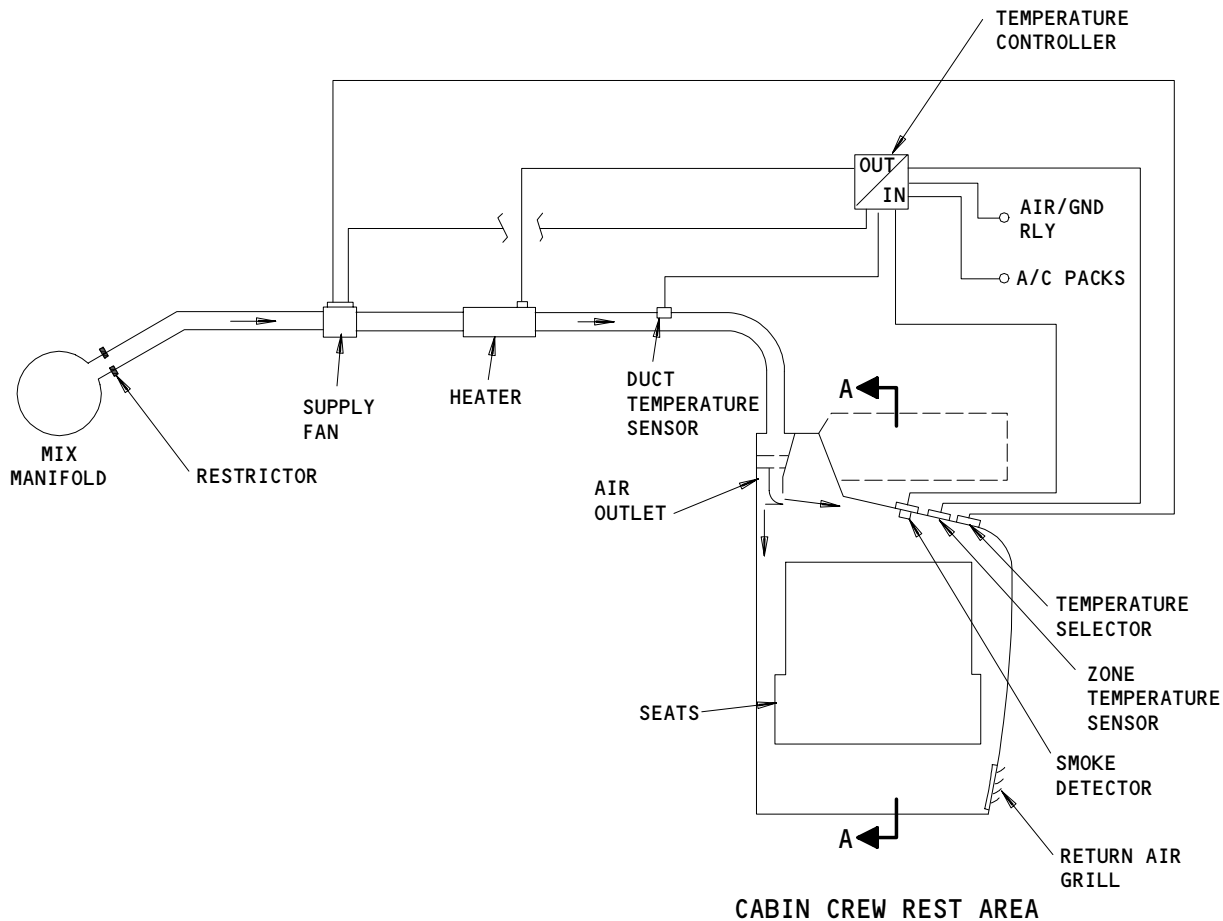
- (1) The flight deck CRA distribution system is completely self-controlled. The shutoff valve and the dual modulating valve are controlled by the flight deck CRA temperature controller (Ref 21-66-00). The supply fan is controlled by a separate system of relays.
- (2) Conditioned air is supplied to the flight deck CRA from the left forward riser, which is connected to the mix manifold. From the left forward riser, the air flows through the shutoff valve, the supply fan, the skin heat exchanger or the bypass duct, through the dual modulating valve, and into the CRA outlets.
- (3) Conditioned air is supplied to the flight deck CRA whenever the shutoff valve is open. The shutoff valve is usually open. It only closes when one of these conditions occur:
 - (a) The airplane is on the ground.
 - (b) Smoke is detected in the flight deck CRA.
 - (c) The FWD or AFT CARGO FIRE switch-lights, on the P8 panel, are ARMED.



Flight Deck Crew Rest Area Air Distribution System
Figure 2

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CABIN CREW REST AREA (EXAMPLE)

A-A

Cabin Crew Rest Area Air Distribution System
Figure 3

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

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- (4) The supply fan increases the flow of air to the flight deck CRA. It comes on when all of these conditions occur (three of the conditions are the same as having the shutoff valve open, but the signals come from a different source):
 - (a) At least one A/C pack is on.
 - (b) The shutoff valve is open.
 - (c) The airplane is in the air.
 - (d) Smoke has not been detected in the flight deck CRA.
 - (e) The FWD or AFT CARGO FIRE switch-lights, on the P8 panel, are not ARMED.
 - (5) The dual modulating valve controls whether the air flows through the skin heat exchanger or through the bypass duct. It has two operations; to modulate between positions or to be in the fully bypass position. The valve is controlled as follows:
 - (a) The valve modulates between positions when the skin temperature is less than the supply temperature. It modulates to supply the air at the demanded temperature.
 - (b) The valve will move to the full bypass position when the airplane is on the ground or the skin temperature is greater than the supply temperature.
 - (6) The smoke evacuation valve is usually closed. It only opens when smoke is detected in the flight deck CRA. When it is open, it lets air flow out of the flight deck CRA and into the ventilation system duct. When smoke is detected in the flight deck CRA, a system of relays will also command the shutoff valve to close and the supply fan to stop.
 - (7) If the smoke detection relay relaxes, the CRA system will automatically be reset aft one minute. The shutoff valve will open and the supply fan will come on. However, the smoke evacuation valve will stay open until the airplane lands, to clear the odors from the compartment.
- B. BITE - Flight Deck CRA
- (1) The flight deck CRA temperature controller has built-in-test (BIT) for all of the components in the flight deck CRA system. When the controller is powered on, it cycles the shutoff valve and the dual modulating valve to make sure they operate correctly. It also continuously monitors the valves and the supply fan. If a failure occurs, the controller sends a signal to the EICAS computer. Here is a list of the EICAS messages and what they mean:
 - (a) FLT REST SYS means that one of the components in the flight deck CRA has failed.
 - (b) FLT REST SOV means the flight deck CRA shutoff valve is not in the commanded position.
 - (c) FLT REST SMK VLV means the flight deck CRA smoke evacuation valve is not in the commanded position.

- (2) If the flight deck CRA temperature controller fails, the dual modulating valve will stay in the last commanded position and the shutoff valve will stay open. The supply fan will operate as usual, controlled by the system of relays.
- C. Functional Description – Forward and aft CRAs (Fig. 3)
- (1) Conditioned air is supplied to each CRA from the overhead distribution duct. Each CRA system has its own distribution system, which operate independently of each other. However, they all operate the same way.
- (2) For each CRA, a supply fan draws air from the overhead distribution duct and blows it into the CRA outlet. The supply fan is monitored by the CRA temperature controller, but it is controlled by a separate system of relays. It comes on when all of these conditions occur:
- (a) At least one A/C pack is on.
 - (b) The airplane is in the air.
 - (c) Smoke has not been detected in the flight deck CRA.
 - (d) The FWD or AFT CARGO FIRE switch-lights, on the P8 panel, are not ARMED.
- (3) If smoke is detected in the CRA, the supply fan will stop. If the smoke detection relay relaxes, the CRA system will automatically be reset after one minute and the supply fan will come on.
- D. BITE – Forward and aft CRA
- (1) The CRA temperature controllers have built-in-test (BIT) for all of the components in the CRA systems. It continuously monitors the supply fan and the other components. If a failure occurs, the controller sends a signal to the EICAS computer. Here is a list of the EICAS messages and what they mean:
- (a) FWD REST SYS means that one of the components in the forward CRA has failed.
 - (b) AFT REST SYS means that one of the components in the left or right aft CRAs has failed.
- (2) If the CRA temperature controller fails, the supply fan will still operate as usual because it is controlled by the relays.
- E. Control
- (1) The CRA systems are completely self-controlled. You can shutdown the systems if you open the applicable circuit breakers on the P36 or the P37 panels. You can cause the systems to operate if you close the applicable circuit breakers and do the flight simulation procedure (Ref 32-09-02).

FLIGHT DECK CREW REST AREA (CRA) SHUTOFF VALVE – REMOVAL/INSTALLATION

1. General

- A. The shutoff valve for the flight deck crew rest area (CRA) is installed on the left side of the forward cargo compartment. The valve controls the amount of conditioned air that is supplied to the flight deck CRA. This procedure has instructions to remove and install the shutoff valve.

TASK 21-29-01-004-001

2. Remove the Shutoff Valve (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zones
121 Forward Cargo Compartment (Left)

C. Prepare for the Removal

S 864-003

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
 - (a) 36C4, FLT DK CREW REST AREA HEAT
 - (b) 36D2, FLT DK CREW REST AREA VLV CONT
 - (c) 36D3, FLT DK CREW REST AREA TEMP CONT

S 864-004

- (2) Turn the L and R PACK selectors, on the pilots' overhead control panel P5, to the OFF position.
 - (a) Make sure the PACK OFF lights come on.
 - (b) Attach the DO-NOT-OPERATE tags to the selectors.

S 864-005

- (3) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the off position.
 - (a) Make sure the ON lights go off.
 - (b) Attach the DO-NOT-OPERATE tags to the switch-lights.

S 014-006

- (4) Open the forward cargo door, 821 (Ref 06-41-00).

S 014-007

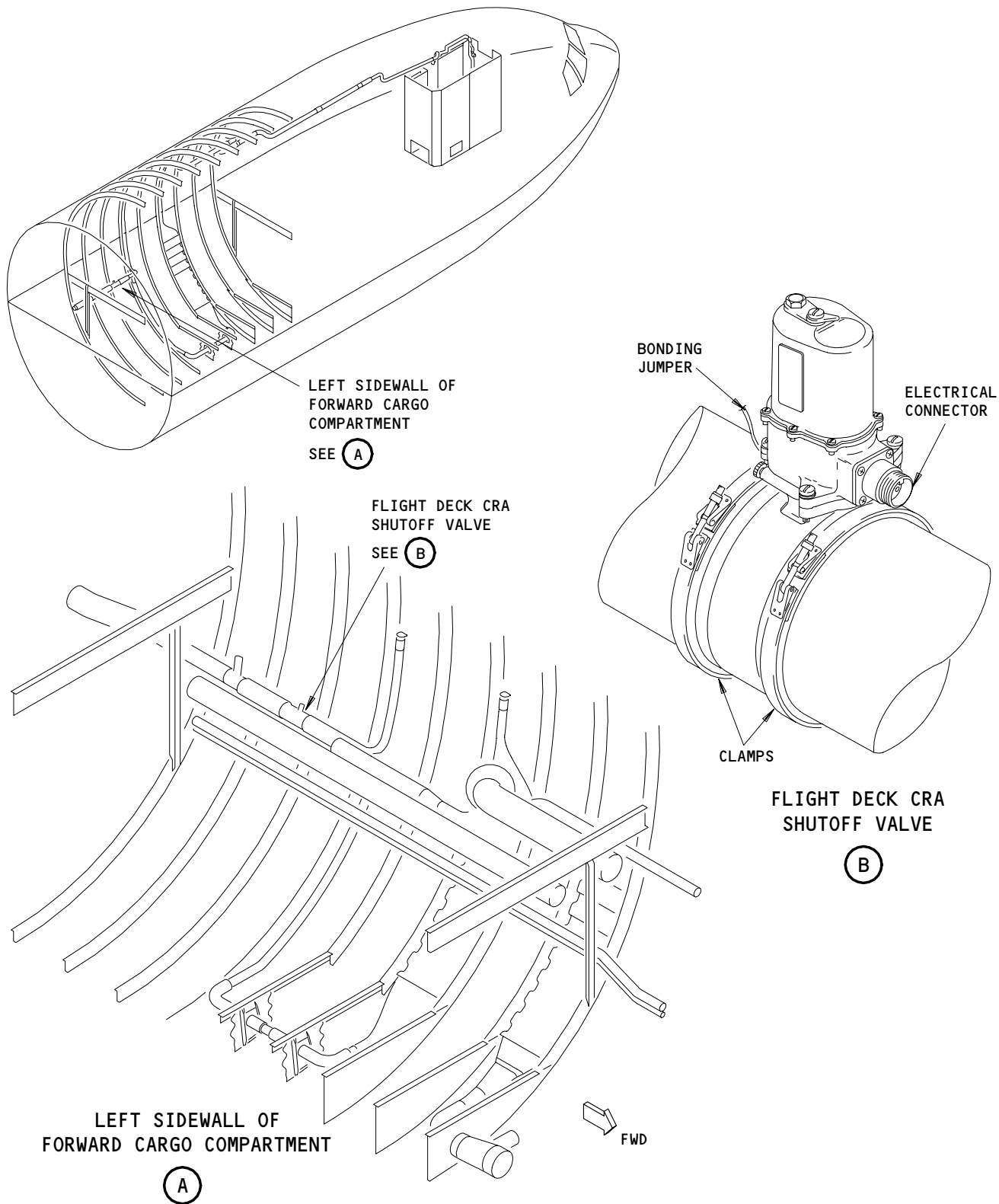
- (5) Remove the left cargo sidewall lining, 10 feet (3 meters) forward of the aft end of the forward cargo compartment (Ref 25-52-01).

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CREW REST AREA

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Flight Deck Crew Rest Area Shutoff Valve Installation
Figure 401

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AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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D. Remove the valve

S 034-008

- (1) Disconnect the electrical connector from the valve.

S 034-009

- (2) Remove the bonding jumper from the valve.

S 034-030

- (3) Remove the clamps from both sides of the valve.

S 024-011

- (4) Remove the valve.

S 434-012

- (5) Install a cover over each duct opening.

TASK 21-29-01-404-013

3. Install the Shutoff Valve (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
(2) 24-22-00/201, Electrical Power Control
(3) 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
(4) 36-00-00/201, Pneumatic - General

B. Access

- (1) Location Zones
121 Forward Cargo Compartment (Left)

C. Install the valve

S 034-031

- (1) Remove the duct covers.

S 034-011

- (2) Make sure the ducts do not have any debris or equipment in them.

S 424-012

- (3) Put the valve in position in the duct.
(a) Make sure the flow arrow points forward.
(b) Make sure that there is enough clearance to install the electrical connector.

S 434-013

- (4) Install the clamps on both sides of the valve.

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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- S 434-014
- (5) Connect the bonding jumper to the valve with a bolt, 2 washers, and a nut.
- S 434-015
- (6) Connect the electrical connector to the valve.
- D. Do the shutoff valve installation test
- S 864-016
- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
- (a) 36C4, FLT DK CREW REST AREA HEAT
 - (b) 36D2, FLT DK CREW REST AREA VLV CONT
 - (c) 36D3, FLT DK CREW REST AREA TEMP CONT
- S 864-017
- (2) Supply electrical power (Ref 24-22-00).
- S 864-018
- (3) Supply pneumatic power (Ref 36-00-00).
- S 864-019
- (4) Remove the DO-NOT-OPERATE tags from the L and R RECIRC FAN switch-lights, on the P5 panel.
- (a) Push the L and R RECIRC FAN switch-lights to the on position.
 - (b) Make sure the ON lights come on.
- S 214-020
- (5) Make sure the position indicator on the valve is in the CLOSED position.
- S 214-021
- (6) Make sure that air does not leak out at the valve connections.
- (a) A small leak is permitted.
 - (b) You must repair a large leak.
- S 864-022

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (7) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.

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AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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S 864-023

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (8) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (Ref 32-09-02).

S 214-024

- (9) Make sure the position indicator on the valve moves to the OPEN position.

S 864-025

- (10) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.

S 214-026

- (11) Make sure the EICAS message FLT REST SOV does not show on the lower display.

E. Put the Airplane Back to its Usual Condition

S 414-026

- (1) Install the left cargo sidewall lining, 10 feet (3 meters) forward of the aft end of the forward cargo compartment (Ref 25-52-01).

S 414-027

- (2) Close the forward cargo door, 821 (Ref 06-41-00).

S 864-028

- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

S 864-029

- (4) Remove the pneumatic power, if it is not necessary (Ref 36-00-00).

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AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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CREW REST AREA (CRA) SUPPLY FANS – REMOVAL/INSTALLATION

1. General

- A. Each crew rest area has its own supply fan. The supply fans supply conditioned air to the crew rest areas. This procedure has instructions to remove and install all of the supply fans.
- B. The supply fan for the flight deck crew rest area is installed in the left side of the forward cargo compartment.
- C. The supply fans for the forward and aft crew rest areas are installed near its specified crew rest area, in the passenger ceiling, near the overhead distribution duct.

TASK 21-29-02-004-001

2. Remove the Supply Fans (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zones
 - 121 Forward cargo compartment (Left)
 - 234 Area above ceiling, passenger cabin – section 45 (Right)
 - 253 Area above ceiling, passenger cabin – section 46 (Left)
 - 254 Area above ceiling, passenger cabin – section 46 (Right)

C. Prepare for the Removal

S 864-002

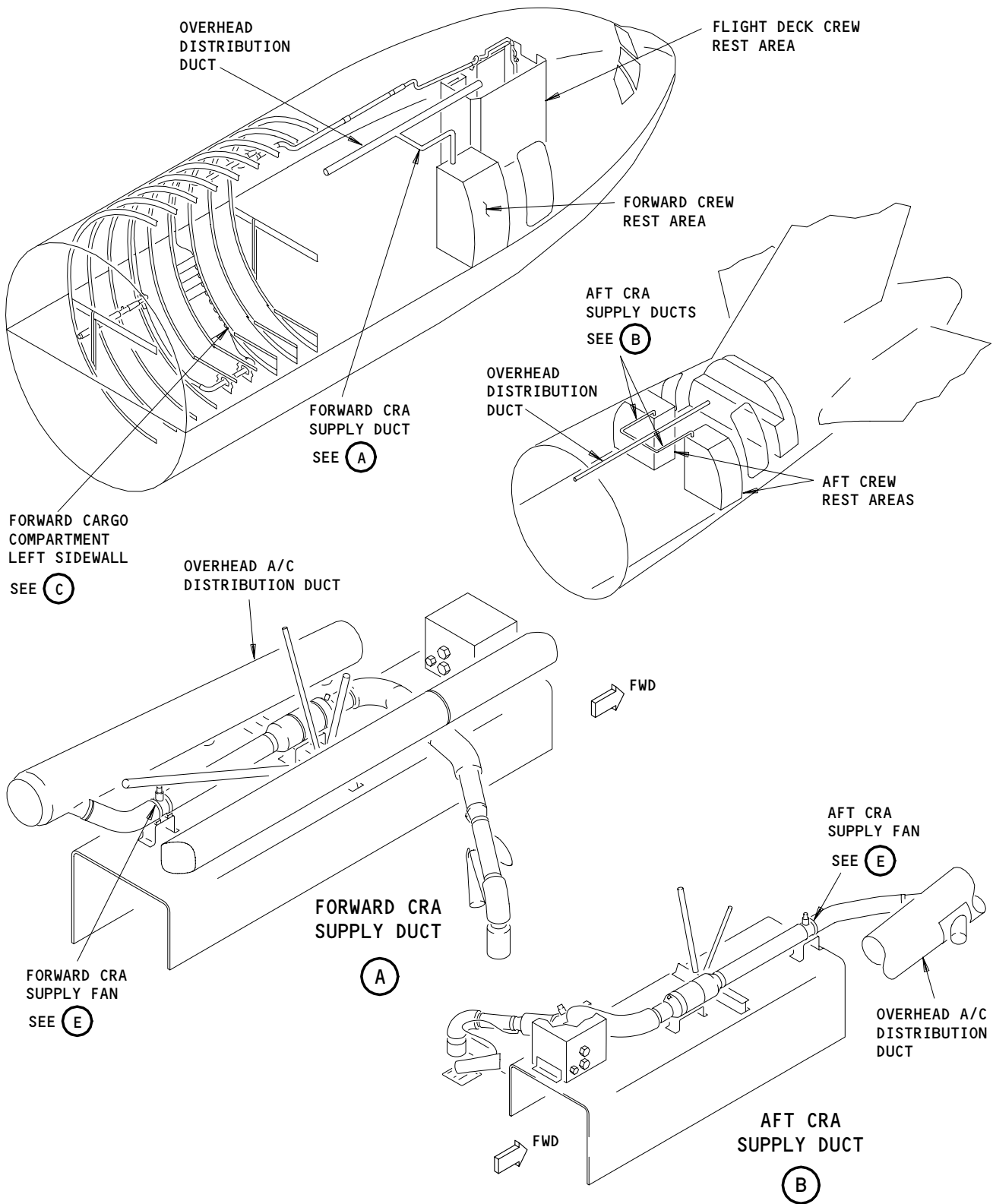
- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
 - (a) 36B2, AFT LH CBN CREW REST AREA FAN
 - (b) 36B4, AFT LH CBN CREW REST AREA HEAT
 - (c) 36C4, FLT DK CREW REST AREA HEAT
 - (d) 36C6, FLT DK CREW REST AREA FAN
 - (e) 36D3, FLT DK CREW REST AREA TEMP CONT
 - (f) 36D4, FLT DK CREW REST AREA FAN CONT
 - (g) 36D5, AFT LH CBN CREW REST AREA FAN CONT
 - (h) 36D6, AFT LH CBN CREW REST AREA TEMP CONT

S 864-003

- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel P37, and attach the DO-NOT-CLOSE tags:
 - (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B6, AFT RH CBN CREW REST AREA HEAT
 - (c) 37C4, FWD CBN CREW REST AREA FAN
 - (d) 37C6, AFT RH CBN CREW REST AREA FAN
 - (e) 37D6, FWD CBN CREW REST AREA FAN CONT
 - (f) 37D7, AFT RH CBN CREW REST AREA FAN CONT

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

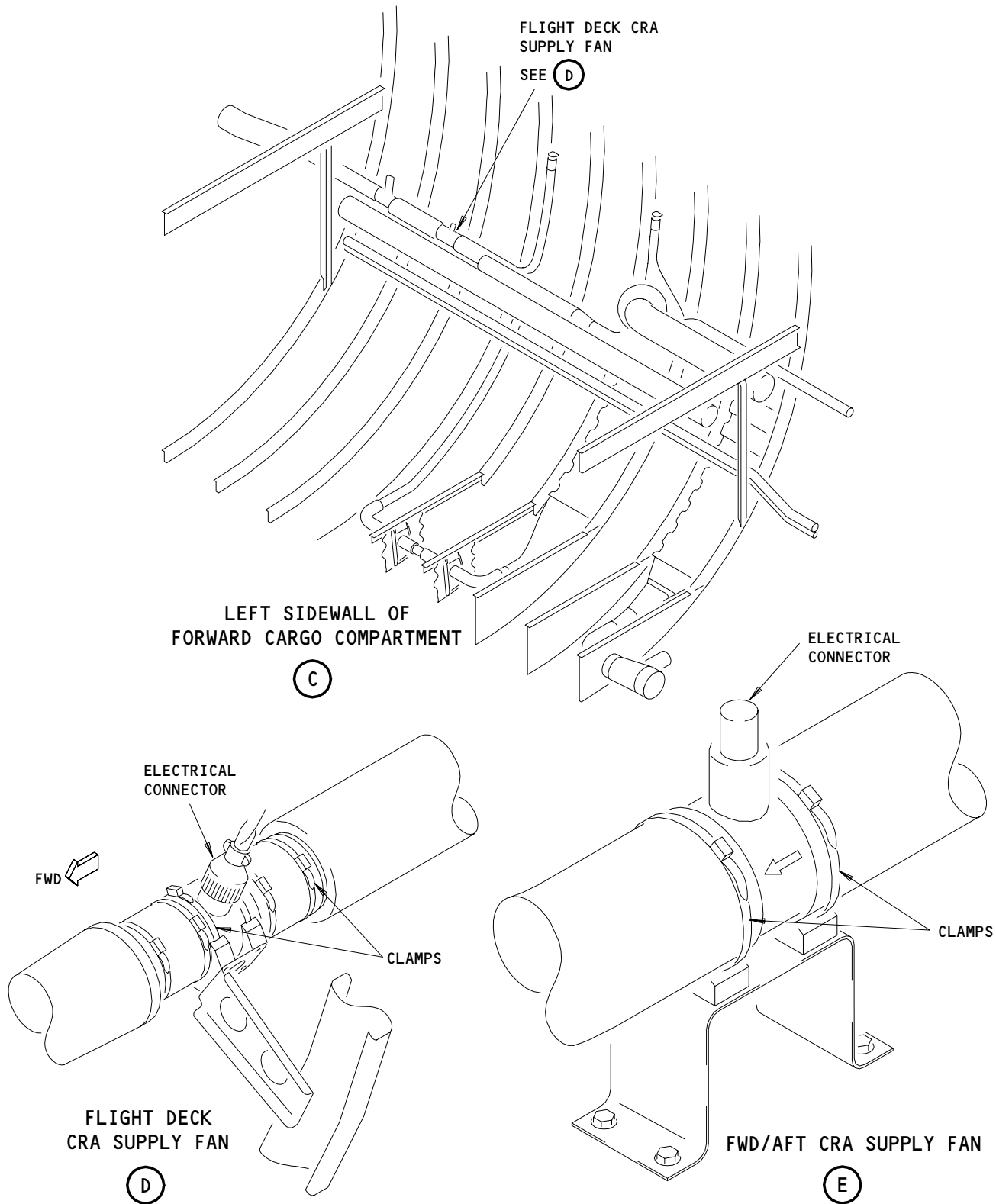
21-29-02



Crew Rest Area Supply Fan Installations
Figure 401 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

21-29-02



Crew Rest Area Supply Fan Installation
Figure 401 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

21-29-02

- (g) 37H4, FWD CBN CREW REST AREA TEMP CONT
- (h) 37H5, AFT RH CBN CREW REST AREA TEMP CONT

S 864-004

- (3) Turn the L and R PACK selectors, on the pilots' overhead control panel P5, to the OFF position.
 - (a) Make sure the PACK OFF lights come on.
 - (b) Attach the DO-NOT-OPERATE tags to the selectors.

S 864-005

- (4) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the off position.
 - (a) Make sure the ON lights go off.
 - (b) Attach the DO-NOT-OPERATE tags to the switch-lights.

S 014-006

- (5) Get access to the supply fan for the flight deck crew rest area.
 - (a) Open the forward cargo door, 821 (Ref 06-41-00).
 - (b) Remove the left cargo sidewall lining, 10 feet (3 meters) forward of the aft end of the forward cargo compartment (Ref 25-52-01).

S 014-007

- (6) Get access to the supply fan for the forward crew rest area.
 - (a) Remove the sculptured ceiling panel immediately left and aft of the forward crew rest area.

S 014-008

- (7) Get access to the supply fan for the left aft crew rest area.
 - (a) Remove the sculptured ceiling panel immediately forward and right of the left aft crew rest area.

S 014-009

- (8) Get access to the supply fan for the right aft crew rest area.
 - (a) Remove the sculptured ceiling panel immediately forward and left of the right aft crew rest area.

D. Remove the supply fan

S 034-010

- (1) Disconnect the electrical connector from the fan.

S 034-011

- (2) Remove the bonding jumper from the fan.

S 034-012

- (3) Remove the plastic straps from both sides of the fan.

S 034-013
(4) Move the flex ducts away from each end of the fan.

S 024-014
(5) Remove the fan.

S 434-015
(6) Install a cover over each duct opening.

TASK 21-29-02-404-016

3. Install the Supply Fan (Fig. 401)

A. Equipment

(1) Strap installation tool, Panduit Corp., P/N GS4H 17301 Ridgeland Ave., Tinley Park, IL 60477

B. Consumable Materials

(1) Strap - Plastic, adjustable, self-locking, BACS38K6

C. References

(1) 06-41-00/201, Fuselage Access Doors and Panels

(2) 24-22-00/201, Electrical Power Control

(3) 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

D. Access

(1) Location Zones

121 Forward cargo compartment (Left)

234 Area above ceiling, passenger cabin - section 45 (Right)

253 Area above ceiling, passenger cabin - section 46 (Left)

254 Area above ceiling, passenger cabin - section 46 (Right)

E. Install the supply fan

S 034-017
(1) Remove the duct covers.

S 034-018
(2) Make sure the ducts do not have any debris or equipment in them.

S 424-019
(3) Put the fan in position against the fan bracket.
(a) Make sure the flow arrow points forward.
(b) Make sure that there is enough clearance to install the electrical connector.

S 434-020
(4) Move the flex ducts on to each end of the fan.

S 434-021
(5) Install the plastic straps on both sides of the fan.

S 434-022

- (6) Use a panduit tool to tighten the straps.
 - (a) Set the selector position to the heavy position.
 - (b) Set the tension indicator to 8.

S 434-023

- (7) Connect the bonding jumper to the fan with a bolt, 2 washers, and a nut.

S 434-024

- (8) Connect the electrical connector to the fan.
- F. Do the supply fan installation test

S 864-025

- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
 - (a) 36B2, AFT LH CBN CREW REST AREA FAN
 - (b) 36B4, AFT LH CBN CREW REST AREA HEAT
 - (c) 36C4, FLT DK CREW REST AREA HEAT
 - (d) 36C6, FLT DK CREW REST AREA FAN
 - (e) 36D3, FLT DK CREW REST AREA TEMP CONT
 - (f) 36D4, FLT DK CREW REST AREA FAN CONT
 - (g) 36D5, AFT LH CBN CREW REST AREA FAN CONT
 - (h) 36D6, AFT LH CBN CREW REST AREA TEMP CONT

S 864-026

- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P37 panel:
 - (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B6, AFT RH CBN CREW REST AREA HEAT
 - (c) 37C4, FWD CBN CREW REST AREA FAN
 - (d) 37C6, AFT RH CBN CREW REST AREA FAN
 - (e) 37D6, FWD CBN CREW REST AREA FAN CONT
 - (f) 37D7, AFT RH CBN CREW REST AREA FAN CONT
 - (g) 37H4, FWD CBN CREW REST AREA TEMP CONT
 - (h) 37H5, AFT RH CBN CREW REST AREA TEMP CONT

S 864-027

- (3) Supply electrical power (Ref 24-22-00).

S 864-028

- (4) Remove the DO-NOT-OPERATE tag from the L and R RECIRC FAN switch-lights, on the P5 panel.

S 864-029

- (5) Remove the DO-NOT-OPERATE tag from the L and R PACK selectors, on the P5 panel.
 - (a) Turn the L and R PACK selectors to AUTO.
 - (b) Make sure the PACK OFF lights go off.

S 864-030

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (6) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.

S 864-031

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (7) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (Ref 32-09-02).

S 214-032

- (8) Make sure the supply fan comes on.

S 864-033

- (9) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.

S 214-034

- (10) Make sure the applicable EICAS message (FLT, FWD, or AFT) REST SYS does not show on the lower display.

G. Put the Airplane Back to its Usual Condition

S 864-035

- (1) Put the airplane back to the ground mode (Ref 32-09-02).

S 864-036

- (2) Do the activation procedure for the spoilers if you did the deactivation procedure (Ref 27-61-00).

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AIRPLANES WITH CREW REST AREAS

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- S 414-037
- (3) If the supply fan for the flight deck crew rest area was installed:
- (a) Install the left cargo sidewall lining, 10 feet (3 meters) forward of the aft end of the forward cargo compartment (Ref 25-52-01).
 - (b) Close the forward cargo door, 821 (Ref 06-41-00).
- S 414-038
- (4) If the supply fan for the forward crew rest area was installed, install the sculptured ceiling panel immediately aft and left of the forward crew rest area.
- S 414-039
- (5) If the supply fan for the left aft crew rest area was installed, install the sculptured ceiling panel immediately forward and right of the left aft crew rest area.
- S 414-040
- (6) If the supply fan for the right aft crew rest area was installed, install the sculptured ceiling panel immediately forward and left of the right aft crew rest area.
- S 864-041
- (7) Remove the electrical power, if it is not necessary (Ref 24-22-00).

SMOKE EVACUATION VALVE – REMOVAL/INSTALLATION

1. General

- A. The smoke evacuation valve is installed in the ceiling of the flight deck crew rest area (CRA). When it is open, it lets air flow from the flight deck CRA into the ventilation duct system. This procedure has instructions to remove and install the smoke evacuation valve.

TASK 21-29-03-004-001

2. Remove the Smoke Evacuation Valve (Fig. 401)

A. Access

- (1) Location Zones

223 Area above ceiling, passenger cabin – section 41 (Left)

B. Prepare for the Removal

S 864-026

CAUTION: DO NOT LEAVE THE EQUIP COOL AFT FAN 1 AND THE EQUIP COOL AFT FAN 2 CIRCUIT BREAKERS OPEN FOR MORE THAN TEN MINUTES IF ELECTRICAL POWER IS SUPPLIED TO THE AIRPLANE. CORRECT COOLING FOR EQUIPMENT WILL NOT BE SUPPLIED AND EQUIPMENT DAMAGE COULD OCCUR.

- (1) Open this circuit breaker, on the forward miscellaneous electrical equipment panel P33, and attach the DO-NOT-CLOSE tags:
(a) 33B1, EQUIP COOL AFT FAN 1

S 864-003

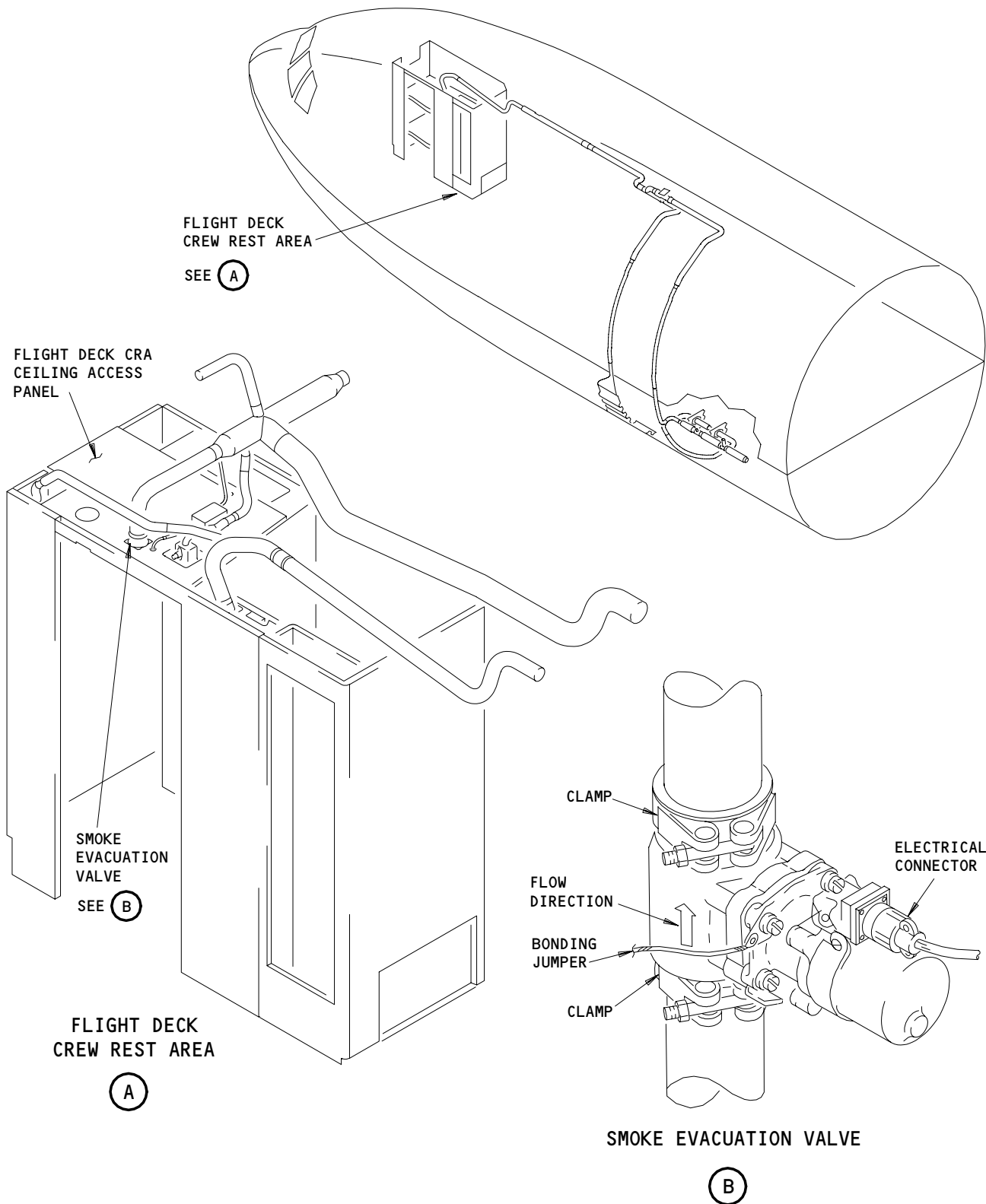
- (2) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
(a) 36C4, FLT DK CREW REST AREA HEAT
(b) 36D2, FLT DK CREW REST AREA VLV CONT
(c) 36D3, FLT DK CREW REST AREA TEMP CONT
(d) 36G4, EQUIP COOL AFT FAN 2

S 014-004

- (3) Lower the ceiling access panel in the flight deck crew rest area.

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

21-29-03



Smoke Evacuation Valve Installation
Figure 401

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

21-29-03

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C. Remove the valve

S 034-005

- (1) Disconnect the electrical connector from the valve.

S 034-006

- (2) Remove the bonding jumper from the valve.

S 034-007

- (3) Remove the clamps from both sides of the valve.

S 024-008

- (4) Remove the valve.

S 434-009

- (5) Install a cover over each duct opening.

TASK 21-29-03-404-010

3. Install the Smoke Evacuation Valve (Fig. 401)

A. References

- (1) 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zones

223 Area above ceiling, passenger cabin - section 41 (Left)

C. Install the valve

S 034-011

- (1) Remove the duct covers.

S 034-012

- (2) Make sure the ducts do not have any debris or equipment in them.

S 424-013

- (3) Put the valve in position in the duct.
(a) Make sure the flow arrow points up.
(b) Make sure that there is enough clearance to install the electrical connector.

S 434-014

- (4) Install the clamps on both sides of the valve.
(a) Tighten the clamps to 40 - 45 inch-pounds.

S 434-015

- (5) Connect the bonding jumper to the valve with a bolt, 2 washers, and a nut.

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

21-29-03

S 434-016

- (6) Connect the electrical connector to the valve.
D. Do the smoke evacuation valve installation test

S 864-017

- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P33 panel:
(a) 33B1, EQUIP COO FAN 1

S 864-018

- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
(a) 36C4, FLT DK CREW REST AREA HEAT
(b) 36D2, FLT DK CREW REST AREA VLV CONT
(c) 36D3, FLT DK CREW REST AREA TEMP CONT
(d) 36G4, EQUIP COOL FAN 2

S 864-019

- (3) Supply electrical power (Ref 24-22-00).

S 214-020

- (4) Make sure the position indicator on the valve is in the CLOSED position.

S 214-021

- (5) Feel for airflow around the valve.
(a) A small leak is permitted.
(b) You must repair a large leak.

S 864-023

- (6) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.

S 214-022

- (7) Make sure the EICAS message FLT REST SMK VAL does not show on the lower display.

- E. Put the Airplane Back to its Usual Condition

S 414-024

- (1) Lift the ceiling access panel in the flight deck crew rest area until it clicks into position.

S 864-025

- (2) Remove the electrical power if it is not necessary (Ref 24-22-00).

FLIGHT DECK CREW REST AREA (CRA) DUAL MODULATING VALVE - REMOVAL/INSTALLATION

1. General

- A. The dual modulating valve for the flight deck crew rest area (CRA) is installed in the ceiling of the left side of passenger compartment, about 17 feet (5 meters) aft of the flight deck CRA. The valve controls the amount of air that can bypass the heat exchanger for the flight deck CRA. This procedure has instructions to remove and install the dual modulating valve.

TASK 21-29-04-004-001

2. Remove the Dual Modulating Valve (Fig. 401)

A. Access

- (1) Location Zones

233 Area above passenger cabin ceiling - section 43 (Left)

B. Prepare for the Removal

S 864-002

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
- (a) 36B4, AFT LH CBN CREW REST AREA HEAT
 - (b) 36C4, FLT DK CREW REST AREA HEAT
 - (c) 36D3, FLT DK CREW REST AREA TEMP CONT
 - (d) 36D6, AFT LH CBN CREW REST AREA TEMP CONT

S 864-003

- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel P37, and attach the DO-NOT-CLOSE tags:
- (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B6, AFT RH CBN CREW REST AREA HEAT
 - (c) 37H4, FWD CBN CREW REST AREA TEMP CONT
 - (d) 37H5, AFT RH CBN CREW REST AREA TEMP CONT

S 864-004

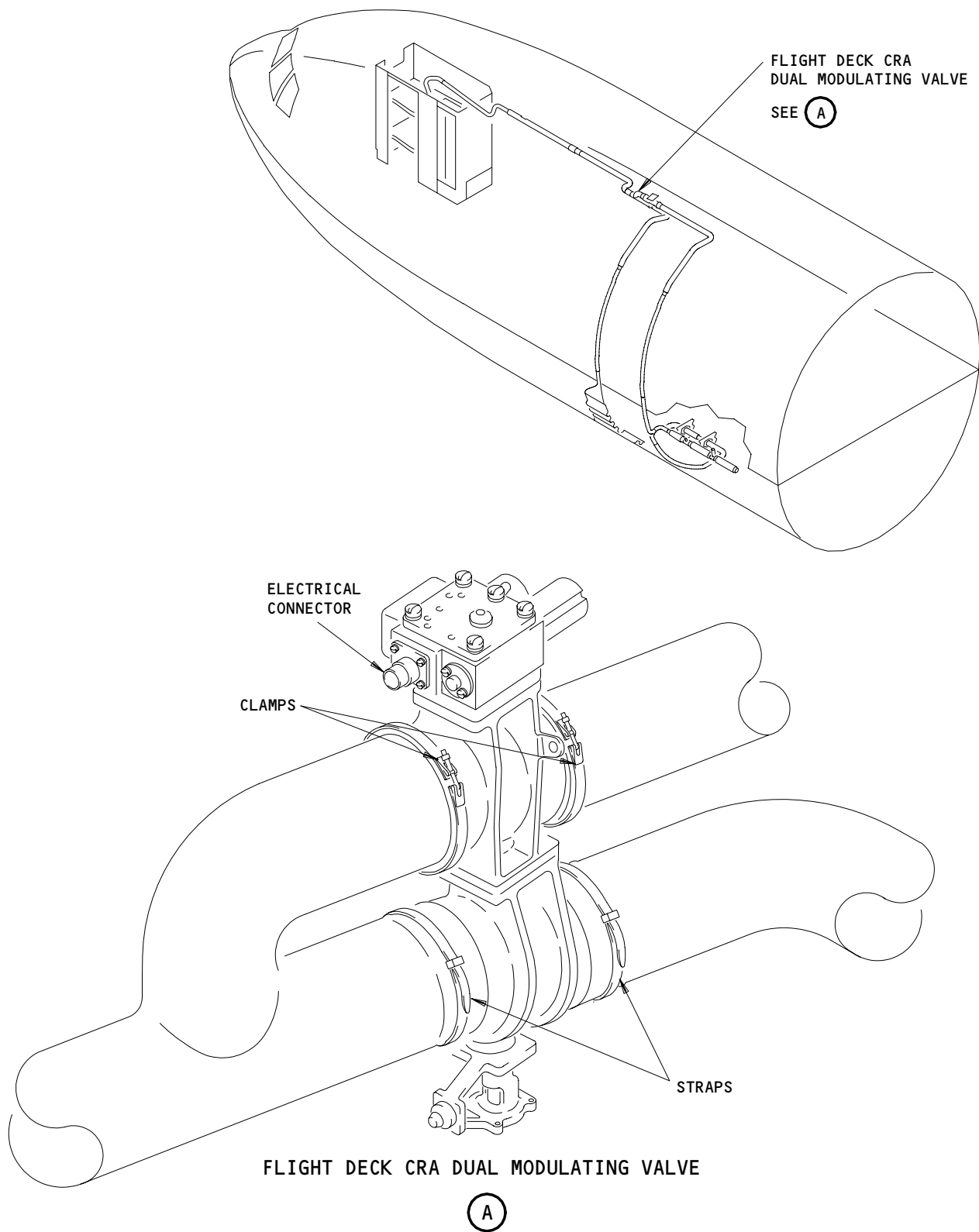
- (3) Turn the L and R PACK selectors, on the pilots' overhead control panel P5, to the OFF position.
- (a) Make sure the PACK OFF lights come on.
 - (b) Attach the DO-NOT-OPERATE tags to the selectors.

S 864-005

- (4) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to OFF.
- (a) Make sure the ON lights go off.
 - (b) Attach the DO-NOT-OPERATE tags to the switch-lights.

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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Flight Deck Crew Rest Area Dual Modulating Valve Installation
Figure 401

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AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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- S 014-006
- (5) Remove the sculptured ceiling panel on the left side of the passenger cabin, about 17 feet (5 meters) aft of the flight deck CRA.
- C. Remove the dual modulating valve
 - S 034-007
 - (1) Disconnect the electrical connector from the valve.
 - S 034-008
 - (2) Remove the bonding jumper from the valve.
 - S 034-009
 - (3) Remove the plastic straps on both ends of the lower mechanism of the valve.
 - S 034-010
 - (4) Move the flex ducts away from the lower mechanism.
 - S 034-011
 - (5) Remove the clamps from both ends of the upper mechanism of the valve.
 - S 024-012
 - (6) Remove the valve.
 - S 434-013
 - (7) Install a cover over each duct opening.

TASK 21-29-04-404-014

3. Install the Dual Modulating Valve (Fig. 401)

- A. Equipment
 - (1) Strap installation tool, Panduit Corp., P/N GS4H 17301 Ridgeland Ave., Tinley Park, IL 60477
- B. Consumable Material
 - (1) Strap - Plastic, adjustable, self-locking, BACS38K6
- C. References
 - (1) 24-22-00/201, Electrical Power Control
 - (2) 36-00-00/201, Pneumatic - General
- D. Access
 - (1) Location Zones
 - 233 Area above passenger cabin ceiling - section 43 (Left)
- E. Install the dual modulating valve

- S 034-015
- (1) Remove the duct covers.

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AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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- S 034-016
- (2) Make sure the ducts do not have any debris or equipment in them.
- S 424-017
- (3) Put the valve in position in the ducts.
- (a) Make sure the flow arrow points forward.
- S 434-018
- (4) Install the clamps on both ends of the upper mechanism of the valve.
- S 434-019
- (5) Pull the flex hose over both ends of the lower mechanism of the valve.
- S 434-020
- (6) Install the plastic straps on both ends of the lower mechanism.
- S 434-021
- (7) Tighten the straps with the panduit tool.
- (a) Set the selector to the heavy position.
- (b) Set the tension indicator to 8.
- S 434-022
- (8) Connect the bonding jumper to the valve with a bolt, 2 washers, and a nut.
- S 434-023
- (9) Connect the electrical connector to the valve.
- F. Do the dual modulating valve installation test
- S 864-024
- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
- (a) 36B4, AFT LH CBN CREW REST AREA HEAT
- (b) 36C4, FLT DK CREW REST AREA HEAT
- (c) 36D3, FLT DK CREW REST AREA TEMP CONT
- (d) 36D6, AFT LH CBN CREW REST AREA TEMP CONT
- S 864-025
- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P37 panel:
- (a) 37B4, FWD CBN CREW REST AREA HEAT
- (b) 37B6, AFT RH CBN CREW REST AREA HEAT
- (c) 37H4, FWD CBN CREW REST AREA TEMP CONT
- (d) 37H5, AFT RH CBN CREW REST AREA TEMP CONT

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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- S 864-026
- (3) Supply electrical power (Ref 24-22-00).
- S 864-027
- (4) Supply pneumatic power (Ref 36-00-00).
- S 864-028
- (5) Find the L and R RECIRC FAN switch-lights, on the P5 panel.
- (a) Remove the DO-NOT-OPERATE tags from the switchlights.
- (b) Push the L and R RECIRC FAN switch-lights to ON. Make sure the ON light comes on.
- S 214-029
- (6) Make sure the position indicator on the valve is in the CLOSED position.
- S 214-030
- (7) Make sure that air does not leak out at the valve connections.
- (a) A small leak is permitted.
- (b) You must repair a large leak.

S 864-031

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (8) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.

S 864-032

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (9) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (Ref 32-09-02).

S 214-033

- (10) Make sure the position indicator on the valve moves to the OPEN position.

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AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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S 864-034

- (11) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.

S 214-035

- (12) Make sure the EICAS message FLT REST SYS does not show on the lower display.

G. Put the Airplane Back to its Usual Condition

S 864-036

- (1) Put the airplane back to the ground mode (Ref 32-09-02).

S 864-037

- (2) Do the activation procedure for the spoilers if you did the deactivation procedure (Ref 27-61-00).

S 414-038

- (3) Install the sculptured ceiling panel in the left side of the passenger cabin, about 17 feet (5 meters) aft of the flight deck CRA.

S 864-039

- (4) Remove the electrical power, if it is not necessary (Ref 24-22-00).

S 864-040

- (5) Remove the pneumatic power, if it is not necessary (Ref 36-00-00).

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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CABIN PRESSURE CONTROL SYSTEM – DESCRIPTION OPERATION

1. General (Fig. 1)

- A. The pressurization control system maintains a comfortable and safe cabin pressure, by controlling the rate of airflow from the cabin, in all flight modes. The air conditioning system provides air for pressurization (AMM 21-00-00/001).
- B. The system uses two modes of operation, automatic and manual. Positive pressure relief valves (AMM 21-32-00/001) provide protection against overpressurization. Negative pressure relief doors in the cargo bay access doors (ATA 52) provide protection against underpressurization. Pressure indicators and a 10,000 ft altitude switch provide cabin pressure indication and warning (AMM 21-33-00/001).
- C. A selector panel, two automatic pressure controllers and an outflow valve provide system control. The selector panel supplies signals to the controller. The controller then modulates the outflow valve towards open or closed to maintain safe cabin pressures. The pressurization control system provides three independent control paths for the outflow valve. The controller's built in test function (BITE) provides system integrity checks.

2. Component Details

A. Automatic Pressure Controller (Fig. 2)

- (1) Two identical automatic pressure controllers control airplane pressurization by modulating the outflow valve. One controller remains in a standby mode, monitoring system operation. The standby controller takes over system control if the selected controller fails. Both controllers receive identical signals. Each controller contains the sensory and electronic logic, and the control circuit for one outflow valve control channel. 115 vac powers each E/E rack mounted controller.

B. Controller Crosstalk And Tie Breaker

- (1) Each controller has a set of relay contacts which informs the other controller that it is selected and is the one in control. In the event of both controllers thinking the other is in control (a possible selector switch to controller wiring problem) a tie breaker jumper is installed on controller 2. Should the condition exist where both controller 1 and 2 are enabled by the selector switch input, the tie breaker jumper on controller 2 allows controller 2 to take control and controller 1 will fault the selector panel.

C. Cabin Pressure Selector Panel

- (1) The pilots overhead panel (P5) contains the cabin pressure selector panel. The cabin pressure selector panel consists of a mode selector switch, auto rate input selector, landing (field) altitude input selector, valve position indicator and manual momentary contact switch.
 - (a) The mode selector switch allows selection of AUTO 1, AUTO 2 or MAN.

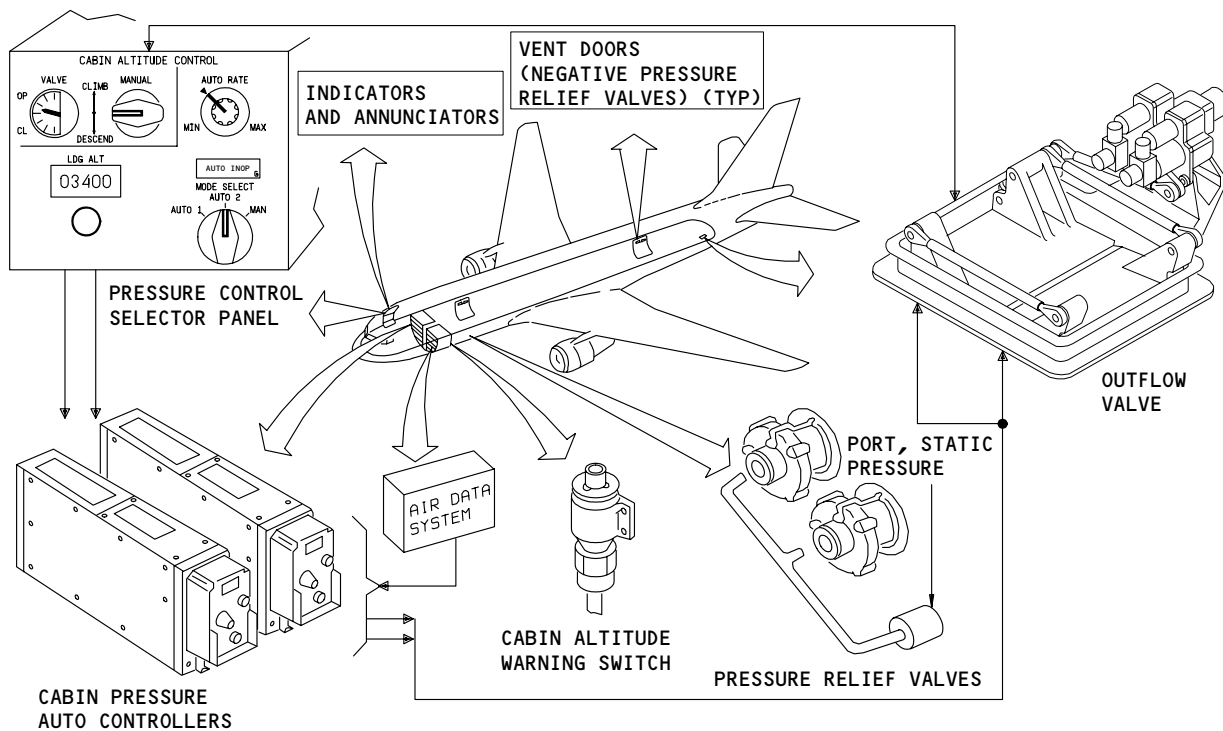
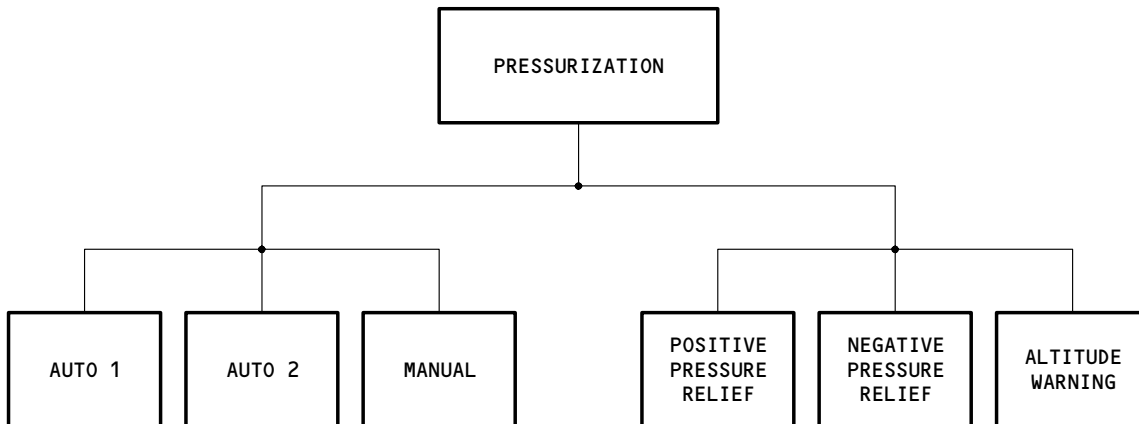
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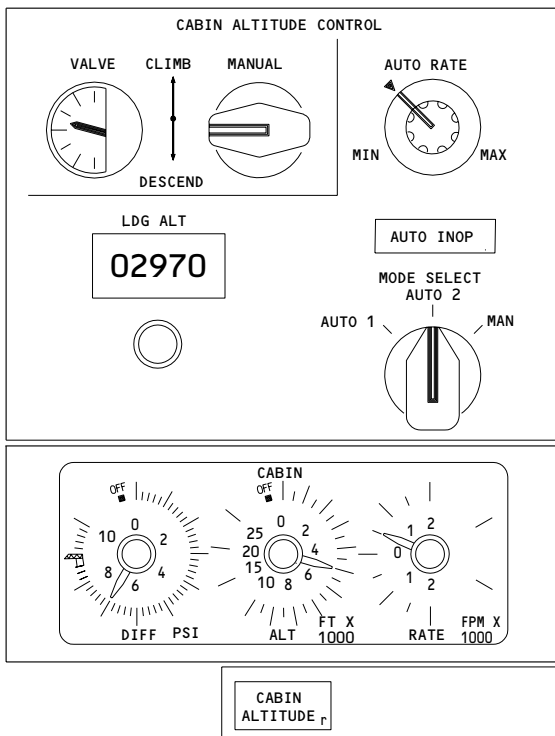
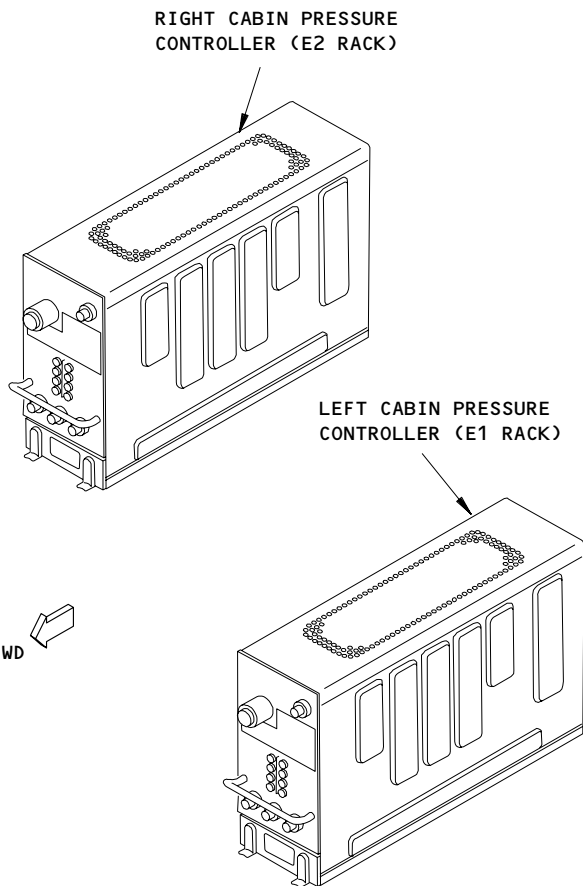
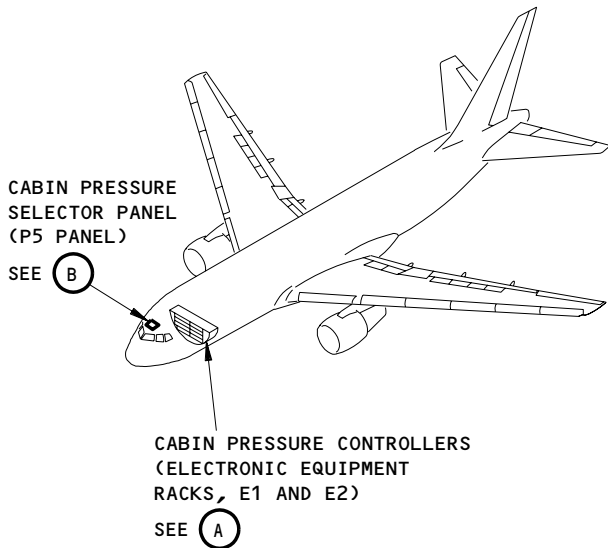
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Pressurization Control System
Figure 1

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CABIN PRESSURE CONTROLLERS (ELECTRONIC EQUIPMENT RACKS, E1 AND E2)
(A)

CABIN PRESSURE SELECTOR PANEL (P5 PANEL)

(B)

Automatic Pressure Controller and Cabin Pressure Selector Panel
Figure 2

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- (b) The auto rate input selector allows the crew to select the rate of change limit for cabin pressurization. Range of selection is 50 to 2000 FPM for climb, and 30 to 1200 FPM for descent. The index position indicates 500 FPM climb and 300 FPM descent. The ratio of climb to descent is always 5 to 3.
- (c) The landing (field) altitude input selector allows landing altitude selection by the crew for controller information. Landing altitude range selection is -1000 to +14,000 ft.
- (d) The valve position indicator shows outflow valve position. A momentary contact switch allows manual control of the outflow valve.

D. Outflow Valve (Fig. 3)

- (1) The outflow valve is a double-door thrust-recovery type valve. The doors and valve frame are aluminum with a Teflon coating to prevent binding and excessive friction. Connecting rods on each side of the valve frame link the forward and aft doors together. The valve controls the flow of cabin air overboard by modulating the valve doors. In the full open position the valve has an effective flow area of 108 sq in. The valve mounts on the left underside of the airplane immediately aft of the bulk cargo compartment.

E. Outflow Valve Actuator

- (1) The outflow valve actuator mounts directly on the valve frame and drives both doors simultaneously through a control arm and linkage. The actuator consists of two identical 115 vac 400 Hz motors, each with a feedback tachometer, a 28 vdc motor and a gearbox. The gearbox dc motor housing also includes a feedback potentiometer and limit switches.

3. Operation

A. Functional Description

- (1) Pressure Control System (Fig. 4)
 - (a) The pressure controller modulates the outflow valve to maintain the desired cabin pressure. Opening the valve allows more air to exhaust from the airplane. This reduces cabin pressure. Closing the valve increases cabin pressure. Modulating the valve between the full open and full close extremes, allows the desired cabin pressure to be maintained.
 - (b) Before takeoff the crew selects the desired auto mode, landing (field) altitude and the auto rate limit. Placing the mode selector to AUTO 1 or AUTO 2 releases control of the pressurization system to the cabin pressurization performance. The other controller goes into a standby mode and monitors the cabin pressurization performance.
 - (c) The airplane's two air data computers (ADC) supply ambient pressure signals and barometric corrections to each pressure controller. The controller's integral pressure sensor measures cabin pressure.

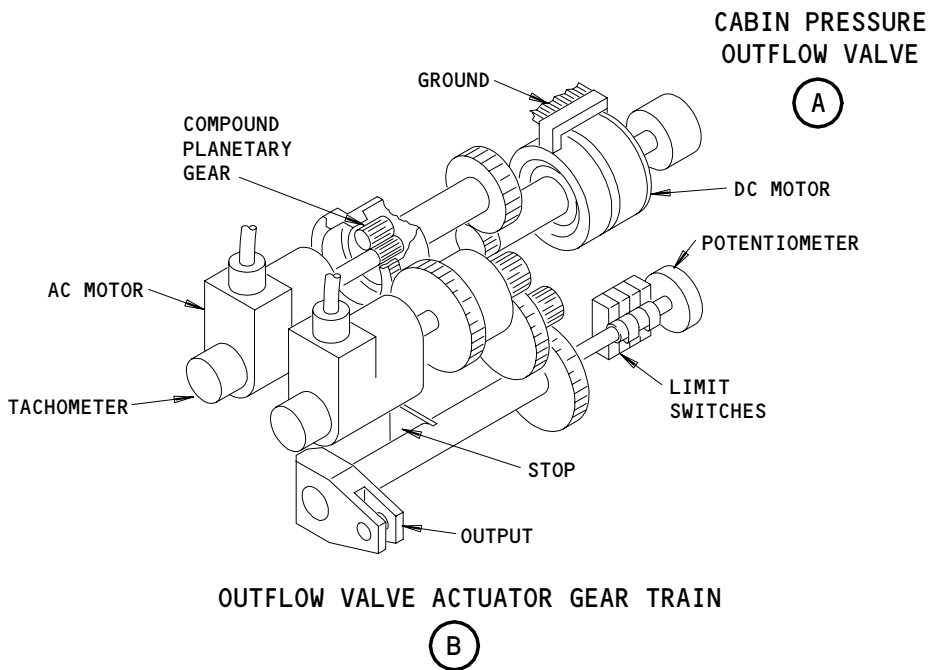
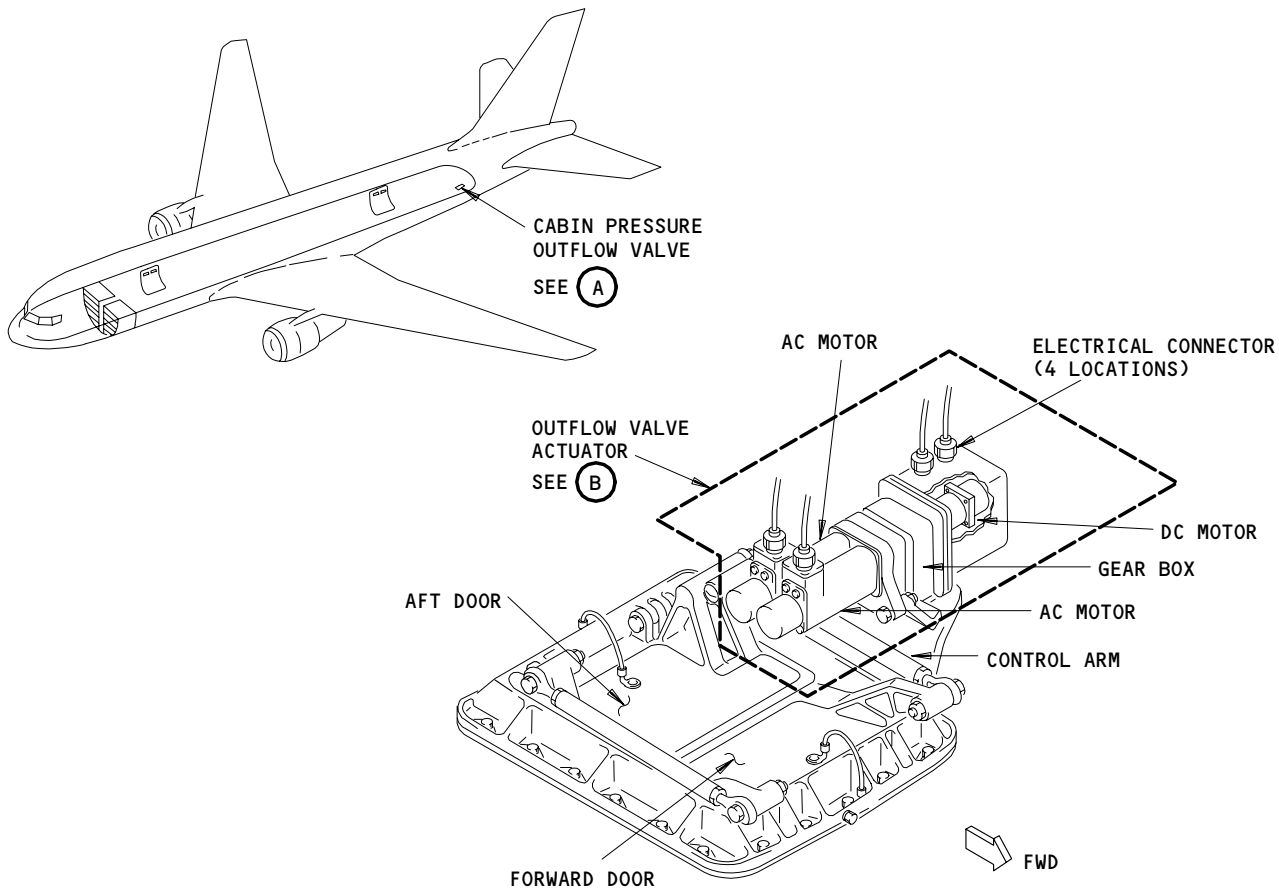
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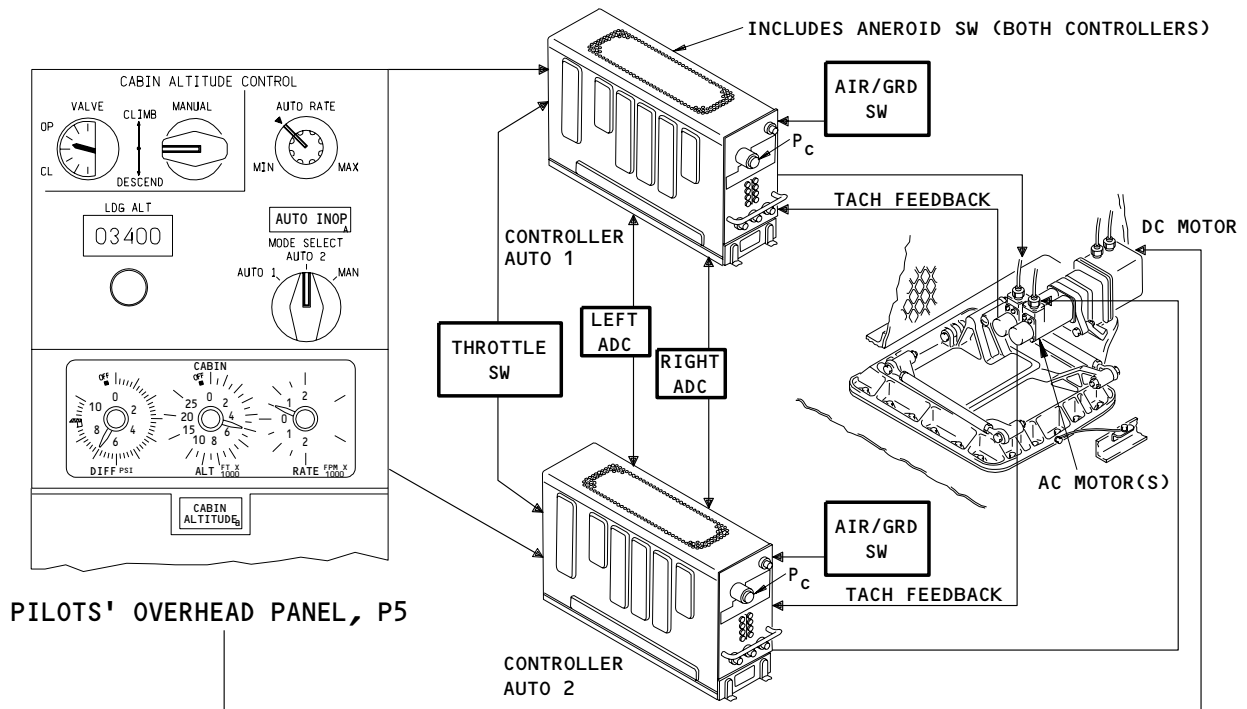
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Cabin Pressure Outflow Valve
Figure 3

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Pressure Control System
Figure 4

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- (d) A throttle advance signal from the throttle microswitch pack assembly greater than 10.5°, puts the controller in the takeoff mode. At liftoff the controller receives a signal from the air/ground relay, and enters the flight mode. Once in the flight mode, the controller references a cabin pressure autoschedule. The autoschedule is the ideal cabin altitude for various airplane altitudes. The selected landing altitude and the maximum cabin-to-ambient pressure ratio ($\Delta P = 8.6$ psi) limit the autoschedule.
- (e) The error between the cabin pressure and the cabin pressure command determines the cabin pressure change command. The selected auto rate limits the rate of change. In cruise, the cabin pressure follows the cabin pressure command.
- (f) The controller positions the outflow valve to maintain the correct cabin pressure and rate of cabin pressure change. A tachometer on the outflow valve ac motor provides a feedback signal to the controller. If the cabin altitude reaches 11,000 ft (low cabin pressure) the controller automatically closes the outflow valve.

B. BITE (Fig. 5)

- (1) Each controller includes built-in test circuitry to monitor system operation, detect critical faults, and identify the faulty line replaceable units (LRU's) by means of a fault display. The controller contains switches and indicator lamps on the controller face for initiating fault isolation, system checks and fault display.
- (2) The PRESS TEST switch serves as a lamp-test function. When pressed, all fault indicator lamps come on. If no lights come on, this indicates a defective controller.
- (3) When the BIT switch is pressed, the controller will display any faults previously recorded. If no faults are present, the NO FAULT lamp will come on for 30 seconds and then go out. If a fault exists in memory, the appropriate lamp will come on for 30 seconds and then go out.
- (4) The VERIFY switch is used to determine if any faults still exist in the system. When the VERIFY switch is pressed on the selected controller, the VERIFY MODE lamp will light and remain on while the test is being performed. If any faults are detected, the applicable fault light comes on for 30 seconds. If no faults are detected, the NO FAULT light comes on for 30 seconds. The faults in the verify selection are taken from a temporary memory. It is possible that an intermittent fault that occurred in flight, but no longer exists, would not show up in the verify mode. Pressing the BIT switch would display any intermittent fault. If the VERIFY switch is pressed on a nonselected controller, the VERIFY MODE light will flash. This indicates that the verify mode is not being performed. If the cabin pressurization mode selector switch is moved from the correct to incorrect selection while the VERIFY MODE lamp is on, the test will be terminated. The VERIFY MODE lamp will go out. The VERIFY switch overrides the BIT switch.

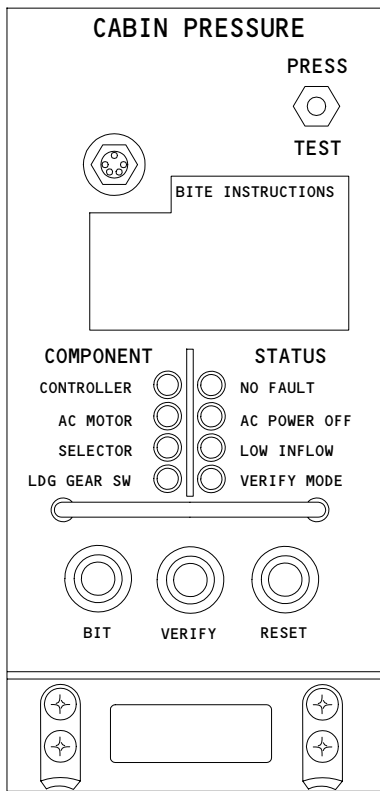
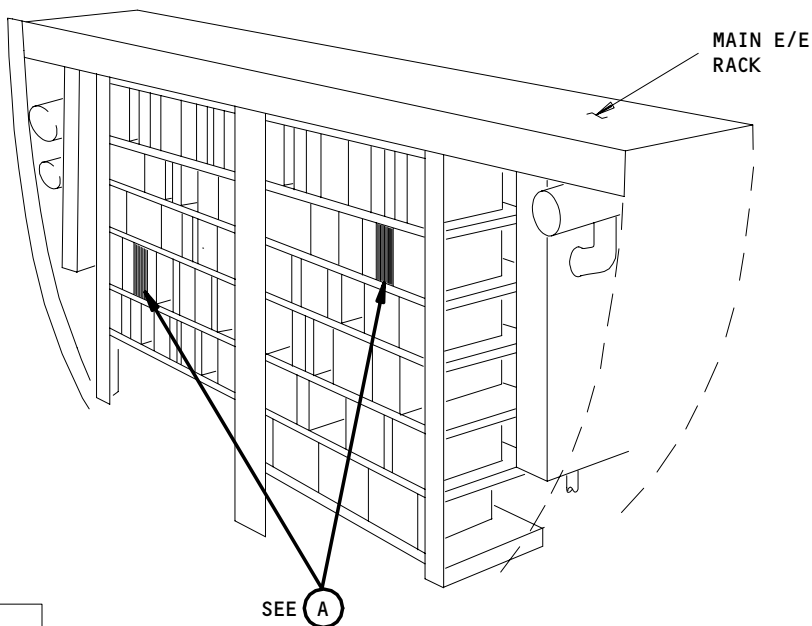
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(A)

Cabin Pressure Cont
Figure 5

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- (5) The RESET switch is used to erase the memory and set the controller in an operable mode. The switch must be pressed while the VERIFY MODE light is on. If the RESET switch is pressed before the VERIFY switch, nothing will occur. When the memory has been successfully erased, the NO FAULT light will come on for 30 seconds.

C. Control

- (1) Cabin Pressurization System - Auto Mode (Fig. 6, 7)
- (a) 115 vac powers both controllers, through the mode selector switch. Each controller is powered from independent sources.
 - (b) Each controller contains a central processing unit (CPU). The CPU provides two major functions. It receives signals from the ADC and selector panel, and constantly samples cabin pressure. The CPU also tests the entire controller system operation.
 - (c) An analog to digital converter (A/D) changes analog input signals to digital signals for CPU use. Analog inputs to the CPU through the A/D include selected auto rate, selected landing field altitude, and cabin pressure signals. The ADC, air/ground relay and throttle position signals provide direct digital inputs to the CPU. The ADC provides ambient pressure and barometric correction signals. The air/ground signal determines the controller's mode of operation (ground mode, flight mode, etc.). The throttle position signal initiates the takeoff mode when the throttles are advanced beyond 10.5°.
 - (d) The CPU collects the above signals and determines cabin pressure. Maximum cabin-to-ambient differential pressure, selected landing (field) altitude pressure and the autoschedule, limit the cabin pressure.
 - (e) After determining existing cabin pressure, the CPU determines a cabin pressurization rate command. The cabin pressurization rate command depends on:
 - 1) The error between the actual cabin pressure and the cabin pressure command ($P = P_c \text{ Actual} - P_c \text{ command}$).
 - 2) The selected auto rate limit.
 - 3) The maximum cabin-to-ambient differential pressure.
 - (f) The CPU compares the cabin pressurization rate command with the actual cabin pressure. The difference produces a digital error signal. A digital to analog (D/A) converter changes the digital signal to an analog signal. The signal goes through the controller's motor drive logic and solid state relays. The relays energize the outflow valve actuator. The actuator controls the outflow valve. A tachometer monitors the ac motor speed, and sends a feedback signal to the controller motor drive logic.

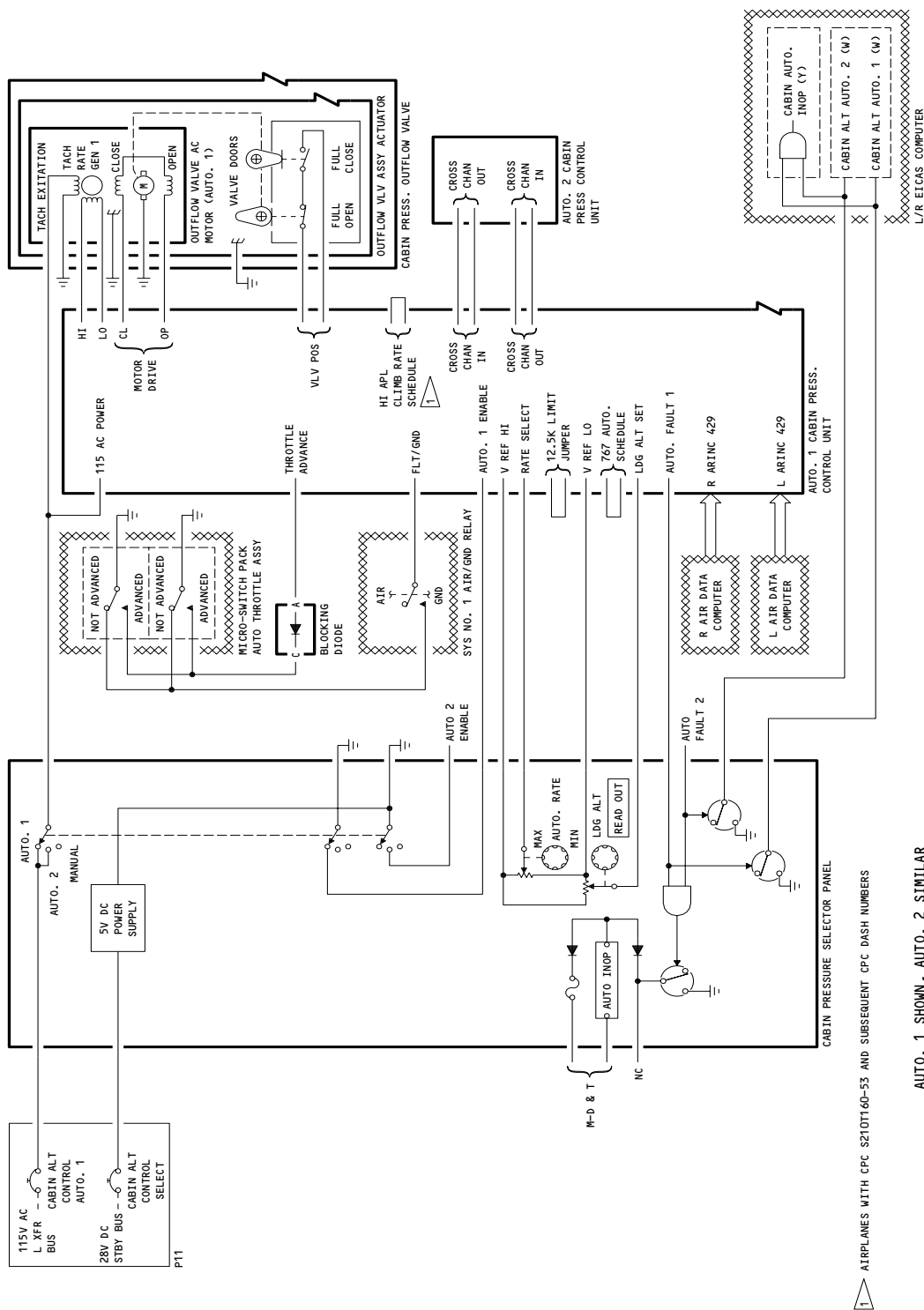
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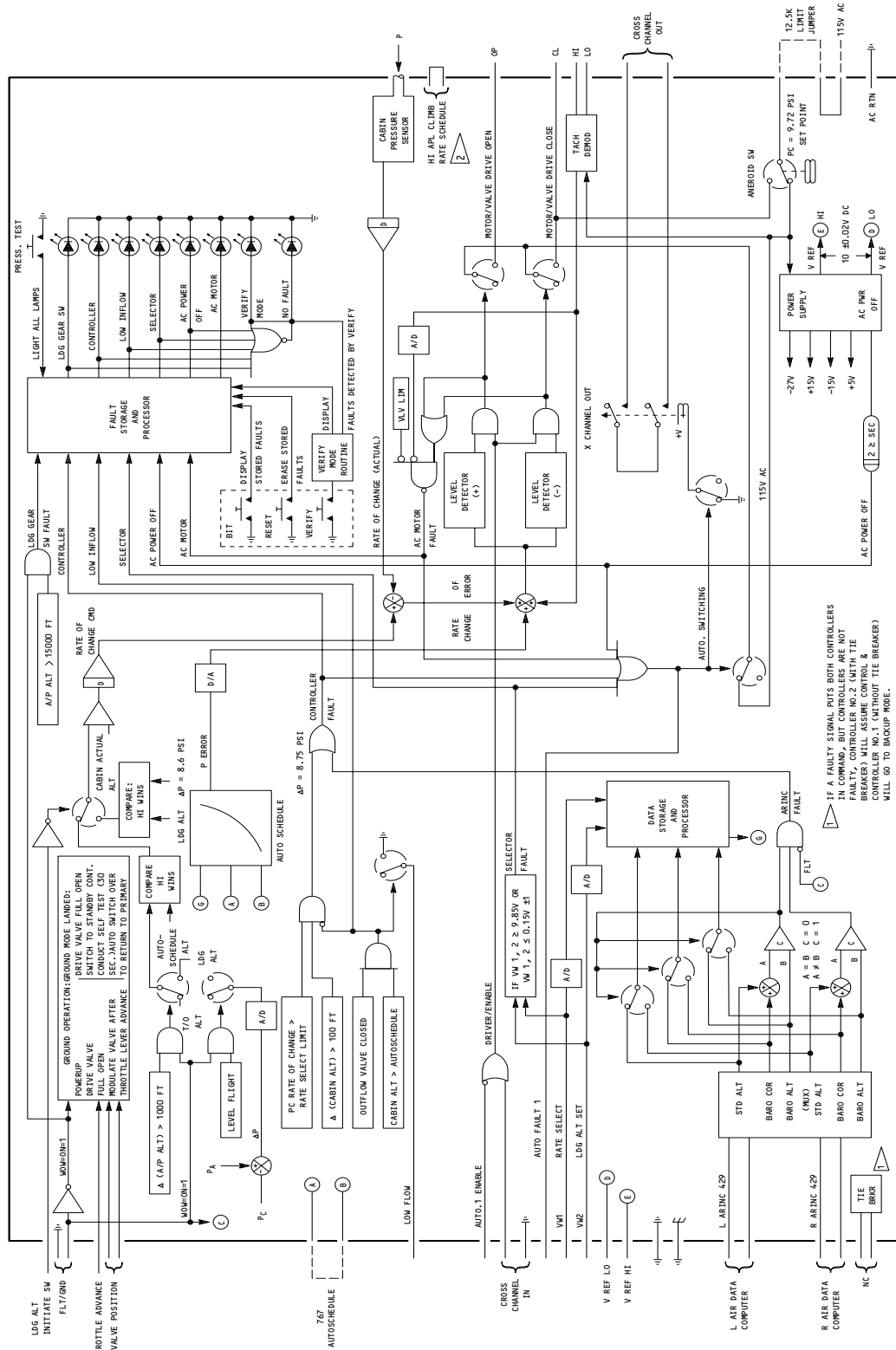
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AUTO. 1 CABIN PRESSURE CONTROLLER UNIT

Automatic Pressure Control System Schematic - Controller Operation
Figure 7

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- (g) The CPU faults the controller and automatically switches control to the standby controller, if performance or signal faults exist. These faults are:
- 1) Excess Cabin Rate: Excessive cabin rate exists when the controller detects a cabin rate of pressurization 200 FPM greater or less than the cabin rate limit command for a time period when the cabin altitude changes by 250 feet. The system switches to the standby controller. EICAS status and maintenance messages CABIN ALT AUTO 1, or CABIN ALT AUTO 2 are received.
 - 2) High Cabin Pressure: Automatic switchover occurs if the cabin-to-ambient differential pressure is greater than 8.75 psi. EICAS status and maintenance messages CABIN ALT AUTO 1 or CABIN ALT AUTO 2 are received.
 - 3) AC Power Loss: Loss of AC power for 2 seconds or longer causes automatic switchover to the standby controller. The CABIN ALT AUTO 1 or CABIN ALT AUTO 2 status and maintenance messages are received by EICAS. The selected controller takes back control and the EICAS messages disappear when power is restored. The AUTO INOP light comes on and a level B EICAS message appears, CABIN AUTO INOP, if both controllers lose power. The AUTO INOP light and EICAS message remain on when the MAN mode is selected.
 - 4) Ground Mode Failure: If the air/ground relays fail to the ground mode, then the pressurization system will operate as usual until the airplane reaches 15,000 feet altitude. If the failure occurs before takeoff, the system will maintain the takeoff field altitude. If the failure occurs in the air while the airplane is below 15,000 feet, then the cabin will depressurize at a rate of 500 feet per minute until it reaches the landing field altitude. But at 15,000 feet, if the system still indicates that the airplane is on the ground, then it will detect that a failure has occurred. Then the fault will be stored, the EICAS message CABIN ALT AUTO 1 or 2 will be shown, and the standby controller will takeover the pressurization system.
 - 5) Component Failure: Each controller monitors the selector panel, the outflow valve ac motor, selected interface signals, and itself for any failures. If a failure occurs in the active channel, the failure is stored, and the appropriate EICAS status or maintenance message CABIN ALT AUTO 1, or CABIN ALT AUTO 2 is shown. Then the standby controller takes over the pressurization system. If a failure occurs in the inactive (standby) channel, it will not be indicated or stored unless it affects the active channel. The standby controller is given control during the ground test mode, at which time it will indicate any failures that have been stored in its memory.

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- 6) ARINC 429 Failure: Each controller receives data from two independent data buses. The controller fault logic monitors the validity of the input signals. If the data is not valid, the fault monitor logic causes a switchover to the backup data bus. If this bus is also failed, then the controller assumes its receiver has failed. This failure is stored and the standby controller takes over the pressurization system. If the backup bus is good, the controller assumes a single data bus failure and continues operation with no failures stored or indicated. This failure logic is inhibited during the ground mode.
- (h) If the cabin altitude goes above 10,000 feet an EICAS warning message, CABIN ALTITUDE, is displayed (AMM 21-33-00/001).
- (2) Power Up (Fig. 8)
- (a) With 115 vac supplied to the airplane, the selected controller enters the standby mode and tests itself for faults. The controller reads the air/ground signal, establishes that the airplane is on the ground and enters the ground mode. The EICAS status message AIR/GND DISAGREE will be displayed if the air/ground inputs to the controller are contradictory.
- (3) Ground Mode
- (a) In the ground mode, the controller drives the outflow valve to the full open position. This is done by setting a 15,000 ft cabin altitude demand (low pressure) and a 2000 FPM pressurization uprate limit. Three seconds after the outflow valve reaches full open, the controller removes the open drive command to prevent actuator heating. A throttle advance signal tells the controller to enter the takeoff mode.
- (4) Takeoff Mode
- (a) When the throttles are advanced beyond 10.5°, the controller enters the takeoff mode. The controller stores the existing cabin pressure as the takeoff field command. The controller sets the cabin altitude demand 70 ft below the takeoff field command, and limits the cabin pressurization rate of change to 50 fpm limit. During the takeoff roll, the forward door of the outflow valve produces a depressurizing effect around the valve. The valve moves toward close. If positive pressure occurs around the valve because of rotation, the outflow valve moves toward open. At rotation the air/ground signal puts the controller in the flight mode.

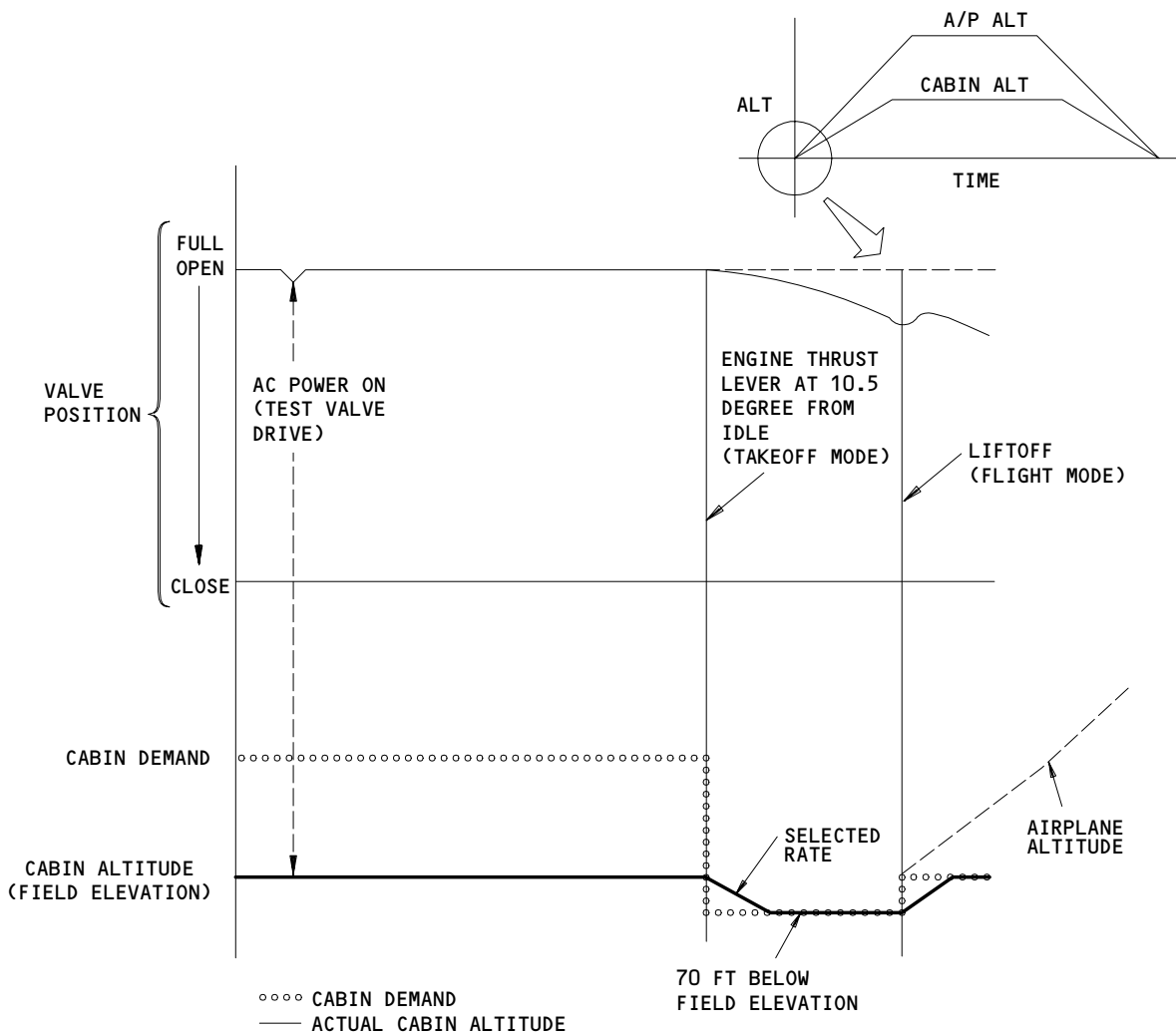
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Ground and Takeoff Mode
Figure 8

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- (5) Autoschedule (Fig. 9)
 - (a) The autoschedule is the ideal cabin pressure altitude, programmed into the controller, for different flight altitudes. The maximum cabin-to-ambient differential pressure is 8.6 psi under normal flight conditions. For normal airplane descent, cabin-to-ambient differential pressure is less than 8.6 psi. The selected rate of pressurization limits the rate of cabin pressure change.
- (6) Initial Climb - Auto Mode (Fig. 10)
 - (a) The controller reads ambient pressure from the ARINC 429 databus and creates an autoschedule cabin altitude command which is a function of the aircraft altitude. The controller will select the normal climb and cruise schedule or the high aircraft climb rate schedule (if enabled on aircraft equipped for high altitude landing). When the aircraft starts its initial climb, the controller compares the takeoff altitude command with the autoschedule altitude command and sets the cabin altitude demand to the higher value. The cabin holds the takeoff altitude until the autoschedule intersects this altitude (if ever). This comparison is made throughout the initial climb and therefore, two general autoschedule profiles are possible during initial climb:
 - (b) Typical takeoff - takeoff altitude lower than autoschedule cruise altitude.
 - 1) At rotation, the controller reads the ambient pressure and the autoschedule cabin altitude demand. The controller compares the takeoff field altitude with the autoschedule command, and sets the cabin altitude demand to the takeoff field altitude. The cabin holds this takeoff field altitude while the airplane climbs until the autoschedule command intersects the takeoff altitude. The cabin then follows the autoschedule to the cruise altitude.
 - (c) Takeoff altitude higher than autoschedule cruise altitude.
 - 1) At rotation, the controller sets the cabin equal to the takeoff altitude. In this case, the takeoff altitude is so high that the autoschedule never reaches the takeoff altitude. Therefore, the cabin remains at the takeoff altitude throughout initial climb until cruise, or until the airplane starts its descent.

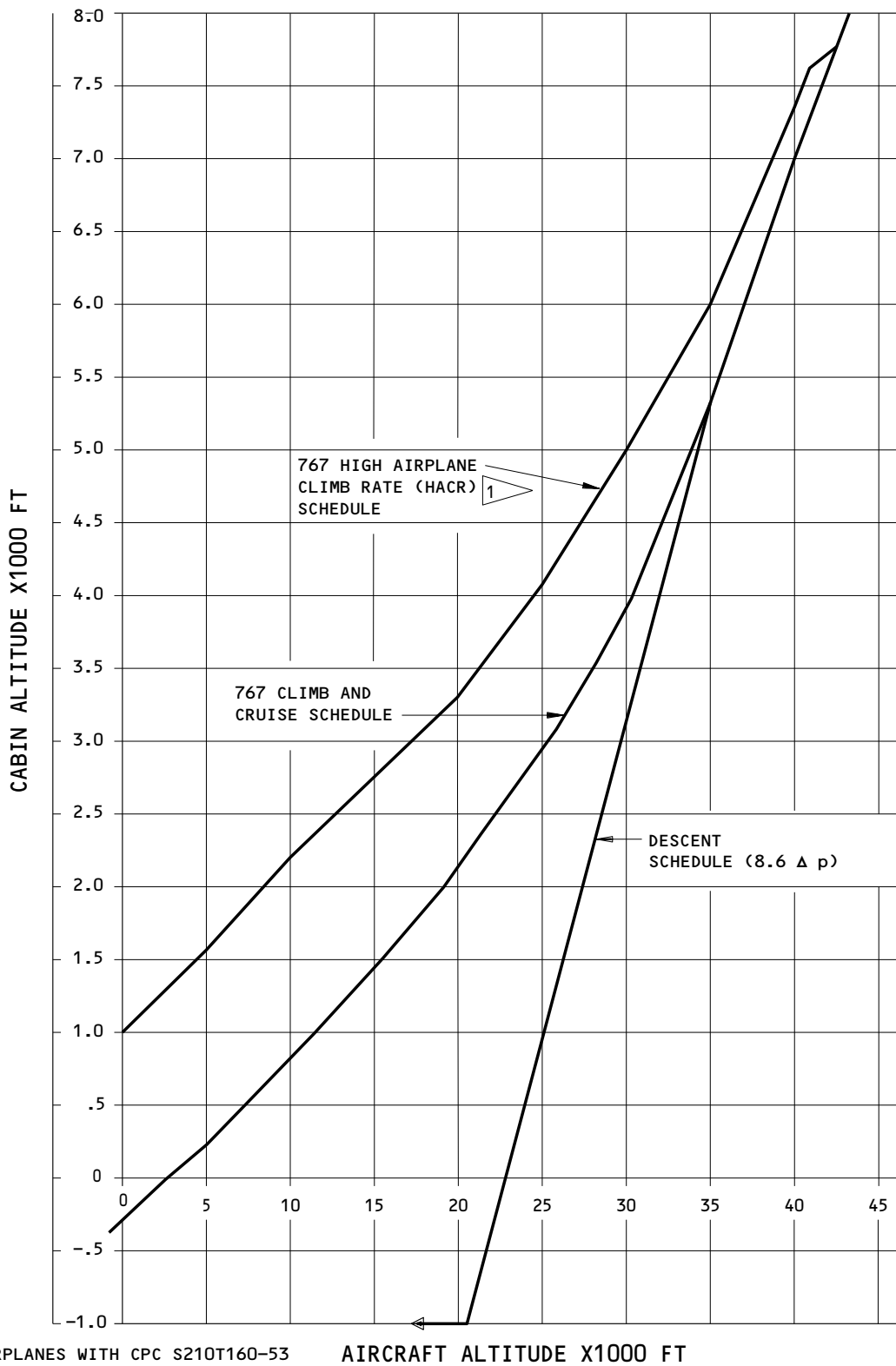
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1 AIRPLANES WITH CPC S210T160-53 AND SUBSEQUENT CPC DASH NUMBERS

AIRCRAFT ALTITUDE X1000 FT

Autoschedule
Figure 9

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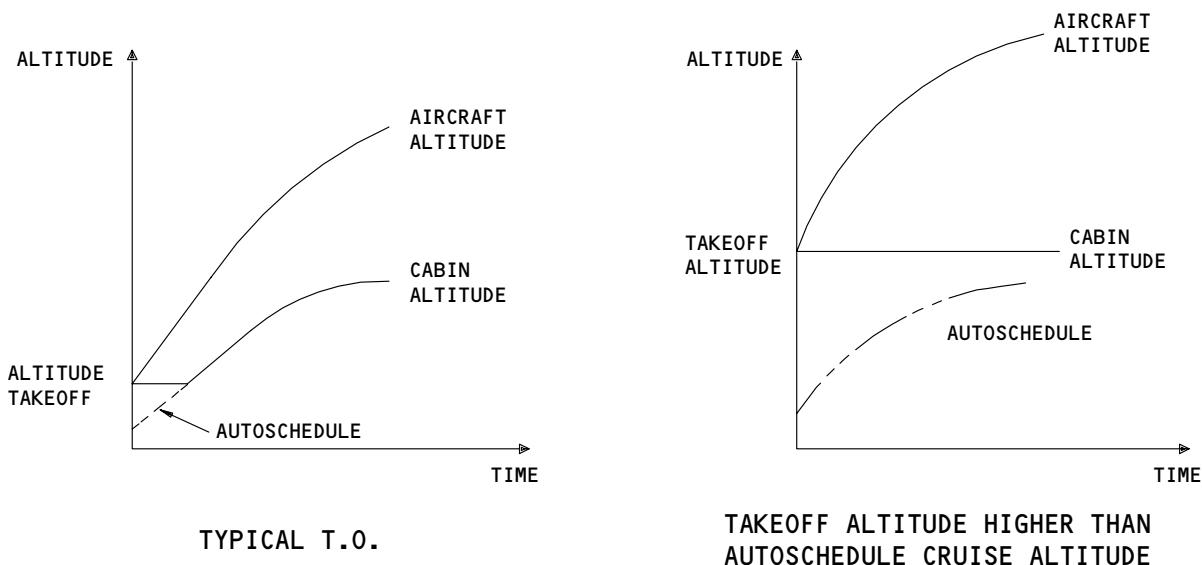
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- (7) CPC P/N S210T106-83 AND ON (HONEYWELL P/N 2117388-11 AND ON);
Initial Climb - Abort Mode
- (a) Climb abort is used for air turnback (termination of a flight shortly after takeoff and subsequent return to the airport of departure). Climb abort mode is entered if the airplane descends 500 feet after taking off from an airport at 2500 feet or lower elevation and has not climbed to 8000 feet. If the airplane descends 500 feet after taking off from an airport that is higher than 2500 feet elevation, then the airplane altitude threshold, below which climb abort will be effective, ramps up from 8000 feet (for an airport altitude of 2500 feet) to 24,000 feet (for an airport altitude of 15000 feet). In the climb abort mode, the scheduled landing altitude will be the takeoff altitude. Climb abort will be overridden if the selected landing altitude is changed by more than 250 feet.



Initial Climb Flight Profiles
Figure 10

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- (8) Cruise - Auto Mode (Fig. 11)
- (a) When airplane altitude does not change more than ± 250 ft for 1 minute, the controller enters cruise logic. The autoschedule command is clamped (fixed) and remains unchanged until the airplane climbs 500 feet or descends 1000 ft. One of four general cabin altitude profiles occur in cruise.
- 1) Landing altitude above autoschedule but below takeoff altitude (Fig. A):
 - a) At cruise clamp, the controller sets the cabin demand to the landing altitude (Landing altitude is higher than autoschedule). The cabin pressurizes to the landing altitude pressure from the takeoff altitude pressure at the selected auto rate limit.
 - 2) Landing altitude above both takeoff and autoschedule altitude (Fig. B):
 - a) At cruise clamp, the controller compares the clamp altitude with the selected landing altitude. Since the landing altitude is higher than the takeoff and autoschedule altitudes, the controller sets the cabin demand to the landing altitude. The cabin depressurizes to the landing altitude pressure, from the takeoff altitude pressure, at the rate of 1/2 the selected auto rate limit.
 - 3) Landing altitude below autoschedule with takeoff altitude above autoschedule (Fig. C):
 - a) At cruise clamp, the controller sets the clamped autoschedule as the cabin demand (autoschedule higher than landing field). The cabin descends from the takeoff altitude to the autoschedule at the selected rate limit.
 - 4) Landing altitude and takeoff altitude below autoschedule (Fig. D):
 - a) Before cruise clamp, the controller sets the cabin demand to the autoschedule (autoschedule higher than takeoff altitude). After cruise clamp, the cabin demand follows the autoschedule since the autoschedule is higher than the landing altitude. The cabin altitude becomes the clamped autoschedule and no uprate or downrate occurs when changing from climb to cruise logic.

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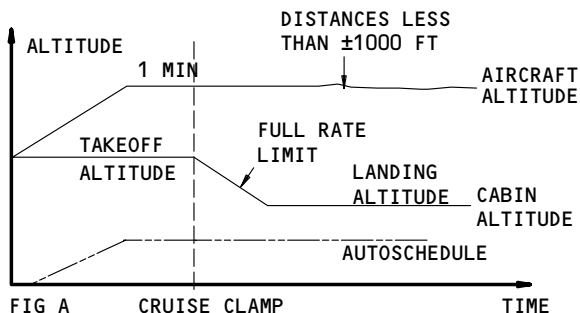


FIG A CRUISE CLAMP
LANDING ALTITUDE ABOVE AUTOSCHEDULE BUT BELOW TAKEOFF ALTITUDE

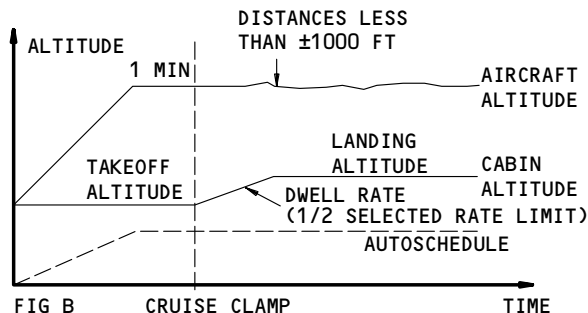


FIG B CRUISE CLAMP
LANDING ALTITUDE ABOVE BOTH TAKEOFF AND AUTOSCHEDULE ALTITUDES

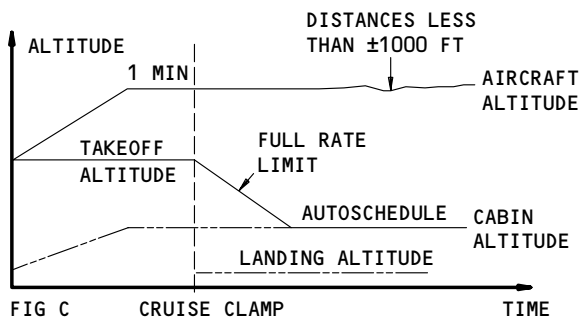


FIG C CRUISE CLAMP
LANDING ALTITUDE BELOW AUTOSCHEDULE WITH TAKEOFF ALTITUDE ABOVE AUTOSCHEDULE

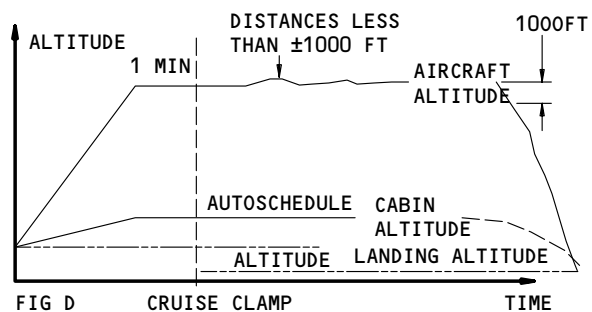
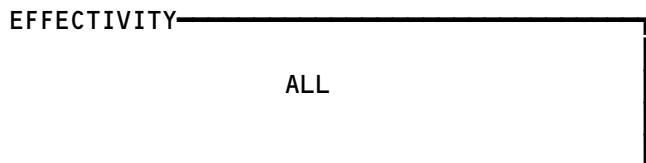


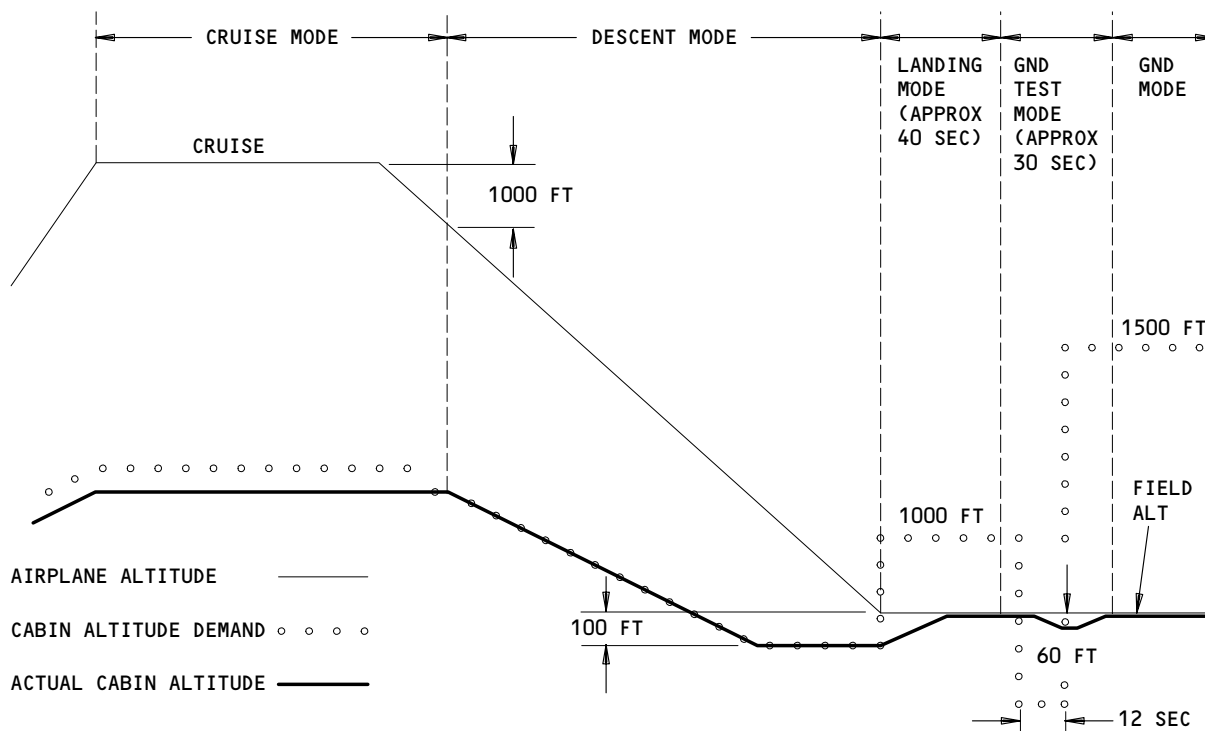
FIG D CRUISE CLAMP
LANDING ALTITUDE AND TAKEOFF ALTITUDE BOTH BELOW AUTOSCHEDULE (MOST TYPICAL IN U.S.)

Cruise and Landing Flight Profile
Figure 11



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- (9) Descent-Auto Mode (Fig. 12)
- (a) After detecting a 1000 ft airplane descent, the controller unclamps the autoschedule. The cabin altitude descends with the airplane descent schedule or at the selected auto rate limit, whichever is less.
 - (b) When the cabin reaches the landing altitude minus 100 ft, (the controller reads the landing (field) altitude as 100 ft below the actual landing altitude selected at the pressurization control panel), the cabin holds that altitude and waits for the airplane to touchdown.
 - (c) Upon descent, if the airplane levels off or climbs prior to reaching the landing altitude, the passenger cabin altitude continues to descend until the cabin-to-ambient differential pressure reaches 8.6 psi. The cabin altitude will then parallel the airplane altitude, maintaining the 8.6 psi differential pressure level.



Descent, Landing and Ground Test
Figure 12

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- (10) CPC P/N S210T106-83 AND ON (HONEYWELL P/N 2117388-11 AND ON);
Climb After Descent - Abort Mode
- (a) The descent mode will abort when the airplane climbs 500 feet above the minimum altitude reached after the descent mode has been detected. The cabin pressure is then controlled by the initial climb logic where the existing cabin pressure at re-entry into flight is used in place of the takeoff altitude for the initial cabin pressure. If the CPC is intermixed with an earlier model CPC (S210T106-73 and earlier), the logic of the CPC in control will prevail.
- (11) Landing and Ground Test - Auto Mode
- (a) The ground signal from the air/gnd relay puts the controller in the landing mode. In the landing mode, the cabin depressurizes at 500 FPM, by setting the cabin pressure demand 1000 ft above the selected landing (field) altitude. The system remains in the landing mode for 40 seconds to allow for complete thrust reversal and to allow the outflow valve to reach the full-open position. The selected controller then enters the ground test mode and relinquishes control to the standby controller for approximately 30 seconds. During this 30 second period, the selected controller determines if a critical fault has been registered in the EAROM, and if EAROM check is successful the controller resumes control and enters the ground mode. The standby controller enters the ground test mode during the same 30 second period that it assumed control from the selected controller and tests the entire system for faults. The outflow valve moves toward the close position 2 seconds after the standby controller enters the ground test mode. This regulates the cabin rate to 300 fpm for 12 seconds (equivalent to 60 ft altitude decrease). The system then returns to the ground mode. This drives and holds the outflow valve open. The standby controller then releases control of the system back to the selected controller.
- (12) Manual Mode (Fig. 13)
- (a) If both controllers fail, or, if contradictory air/ground position data is fed to the controller, the cabin pressurization system can be manually controlled from the flight deck. Placing the mode selector switch to MAN allows a momentary contact switch to directly control the outflow valve. In the manual mode, the 28 vdc motor powers the outflow valve. The outflow valve position indicator monitors valve movement.

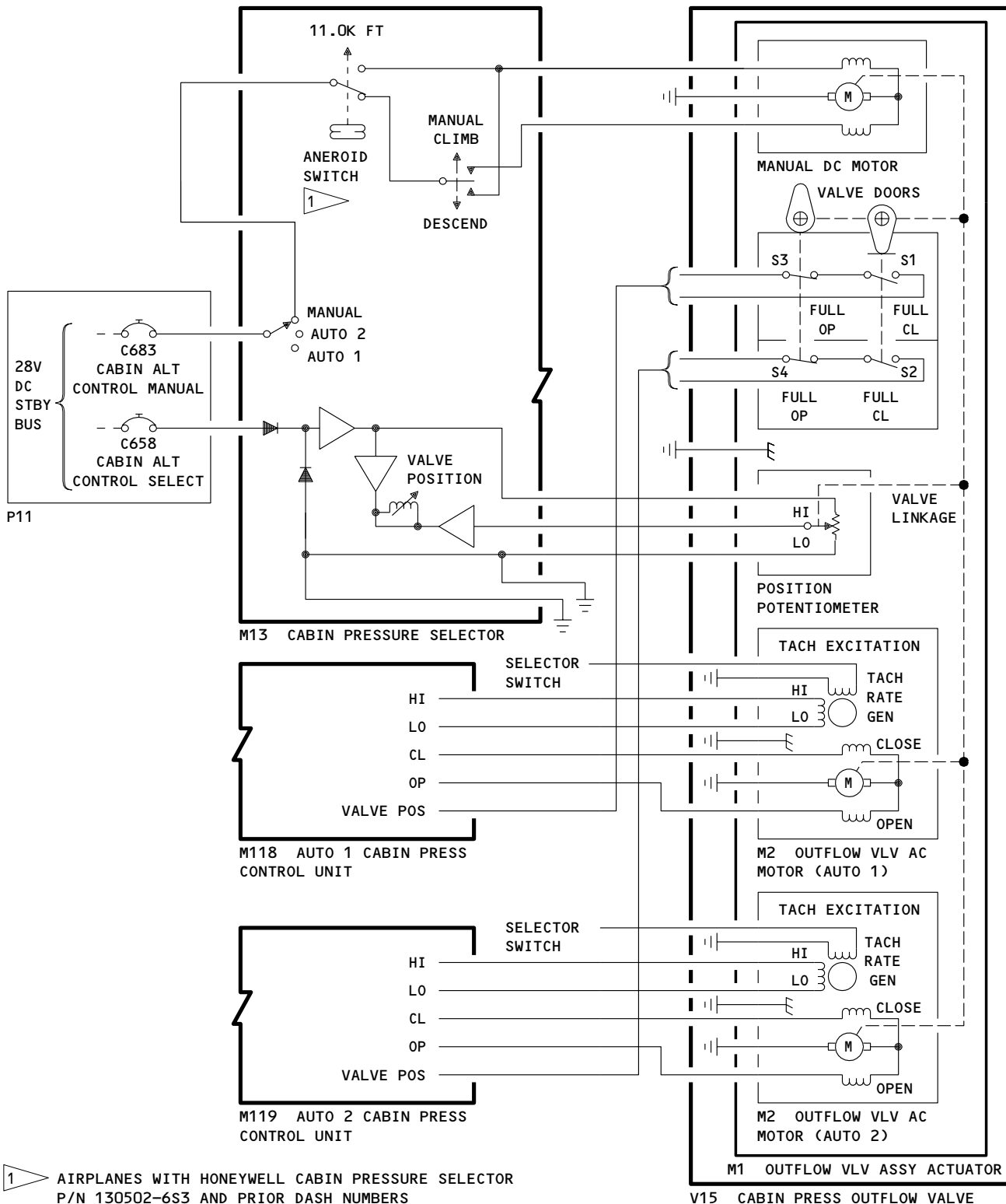
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Pressure Control System Schematic (MANUAL Mode)
Figure 13

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MAINTENANCE MANUAL

- (b) Turning the momentary switch toward DESCEND closes the outflow valve and increases cabin pressure. Turning the switch toward CLIMB, opens the outflow valve and decreases cabin pressure.
- (c) AIRPLANES WITH CABIN SELECTOR PANEL HONEYWELL P/N 130502-6S3 AND PRIOR DASH NUMBERS;
The manual mode circuit also contains an 11,000 ft aneroid switch. If the cabin altitude reaches 11,000 ft with the system in the manual mode, the aneroid switch closes. This allows 28 vdc to flow to the close windings of the outflow valve motor and automatically closes the valve.

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FAULT ISOLATION/MAINT MANUAL

CABIN PRESSURE CONTROL SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - CABIN PRESSURE OUTFLOW VALVE, YBWM1	1	1	811, BULK CARGO COMPT, CABIN PRESS OUTFLOW VALVE, V15	21-31-04
CIRCUIT BREAKER -	2		FLT COMPT, P11	
CABIN ALTITUDE CONTROL AUTO 1, C686		1	11P15	*
CABIN ALTITUDE CONTROL AUTO 2, C701		1	11P23	*
CABIN ALTITUDE CONTROL MANUAL, C683		1	11B14	*
CABIN ALTITUDE CONTROL SELECT, C658		1	11B15	*
COMPUTER - (FIM 31-41-00/101)				
EICAS L, M10181				
EICAS R, M10181				
CONTROLLER - CABIN PRESSURE, AUTO 1, M118	3	1	119AL, MAIN EQUIP CTR, E1	21-31-02
CONTROLLER - CABIN PRESSURE, AUTO 2, M119	3	1	119AL, MAIN EQUIP CTR, E2	21-31-02
DIODE, R205		1	TB130D	*
MICROSWITCH PACK - (FIM 22-32-00/101)				
AUTO THROTTLE, M966				
MOTOR - OUTFLOW VALVE ACTUATOR AC, AUTO 1, YBWM2	1	1	811, BULK CARGO COMPT	21-31-05
MOTOR - OUTFLOW VALVE ACTUATOR AC, AUTO 2, YBWM2	1	1	811, BULK CARGO COMPT	21-31-05
RELAY - (FIM 31-01-36/101)				
AIR/GND SYS NO. 1, K716				
RELAY - (FIM 31-01-37/101)				
AIR/GND SYS NO. 2, K211				
SELECTOR - CABIN PRESSURE, M13	2	1	FLT COMPT, P5	21-31-01
VALVE - CABIN PRESSURE OUTFLOW, V15	1	1	811, BULK CARGO COMPT	21-31-03

* SEE THE WDM EQUIPMENT LIST

Cabin Pressure Control System - Component Index
Figure 101

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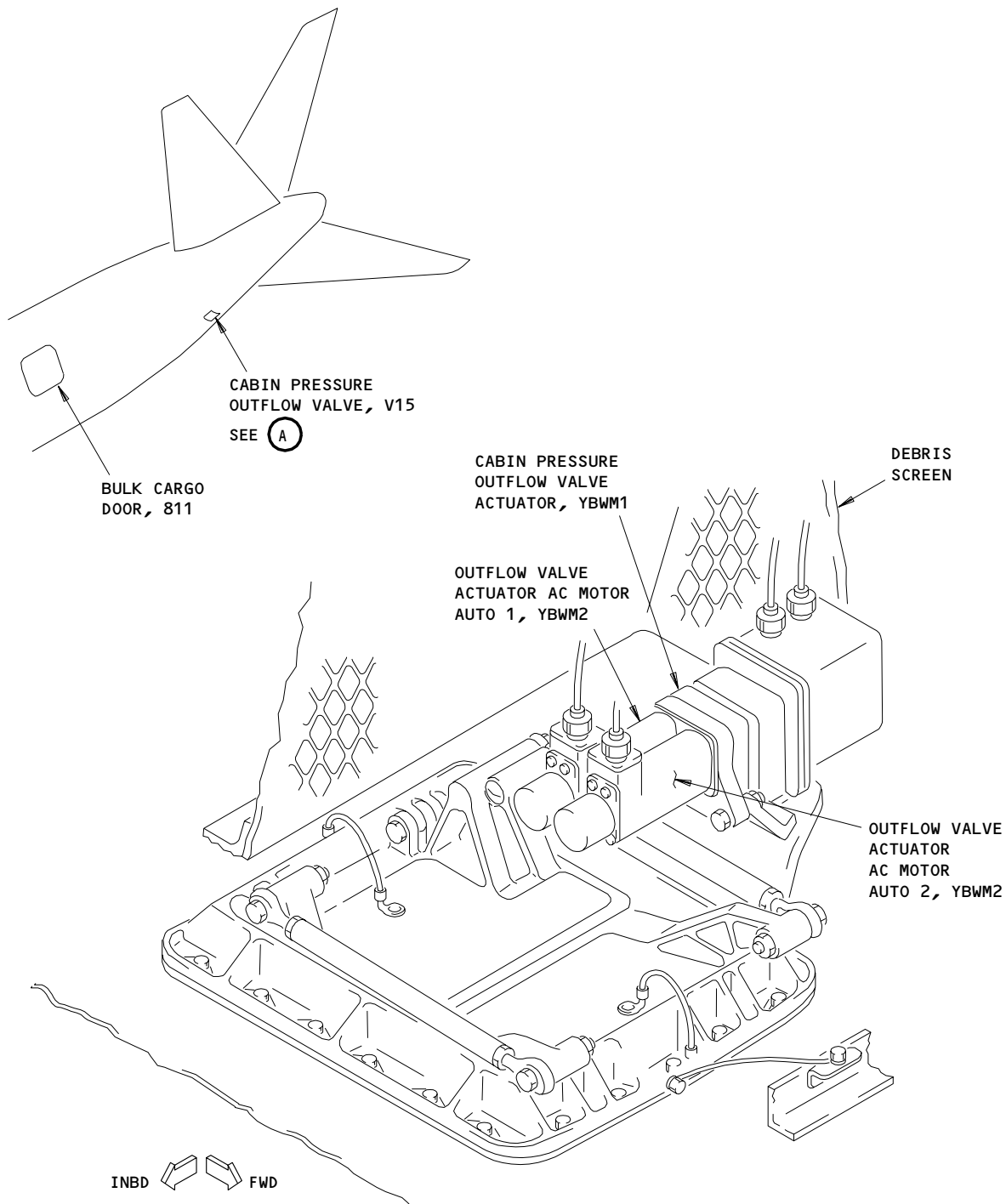
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CABIN PRESSURE OUTFLOW VALVE, V15

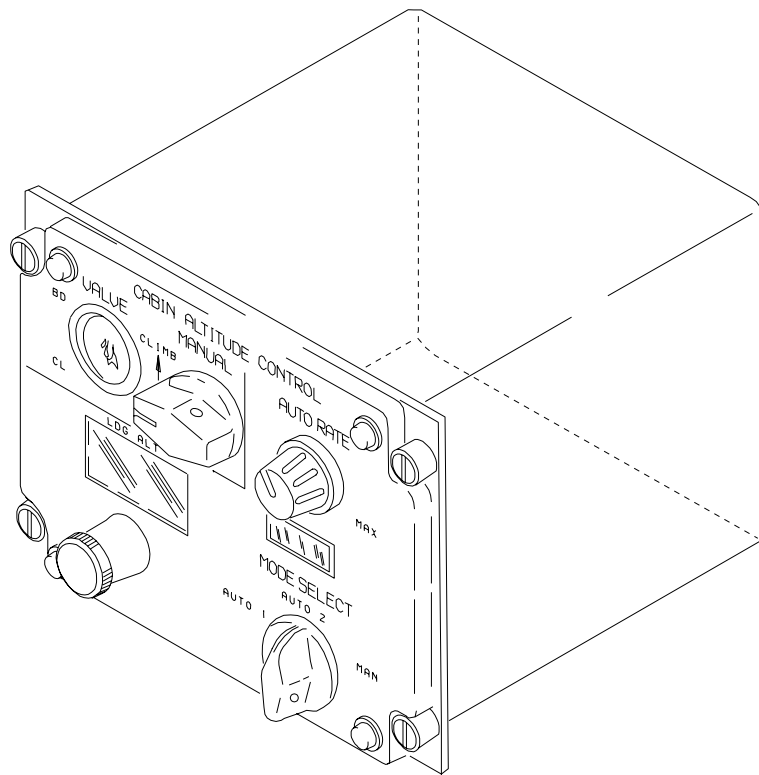
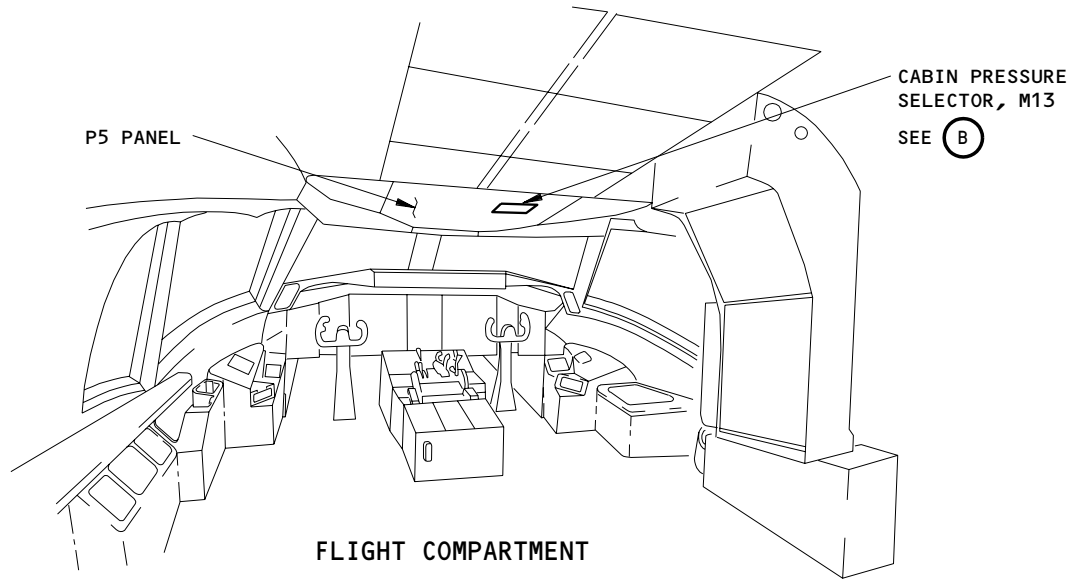
(A)

Cabin Pressure Control System - Component Location
 Figure 102 (Sheet 1)

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CABIN PRESSURE SELECTOR, M13

(B)

Cabin Pressure Control System - Component Location
Figure 102 (Sheet 2)

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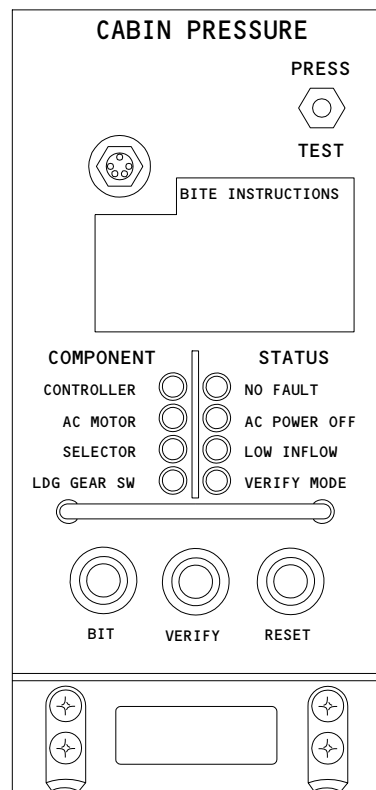
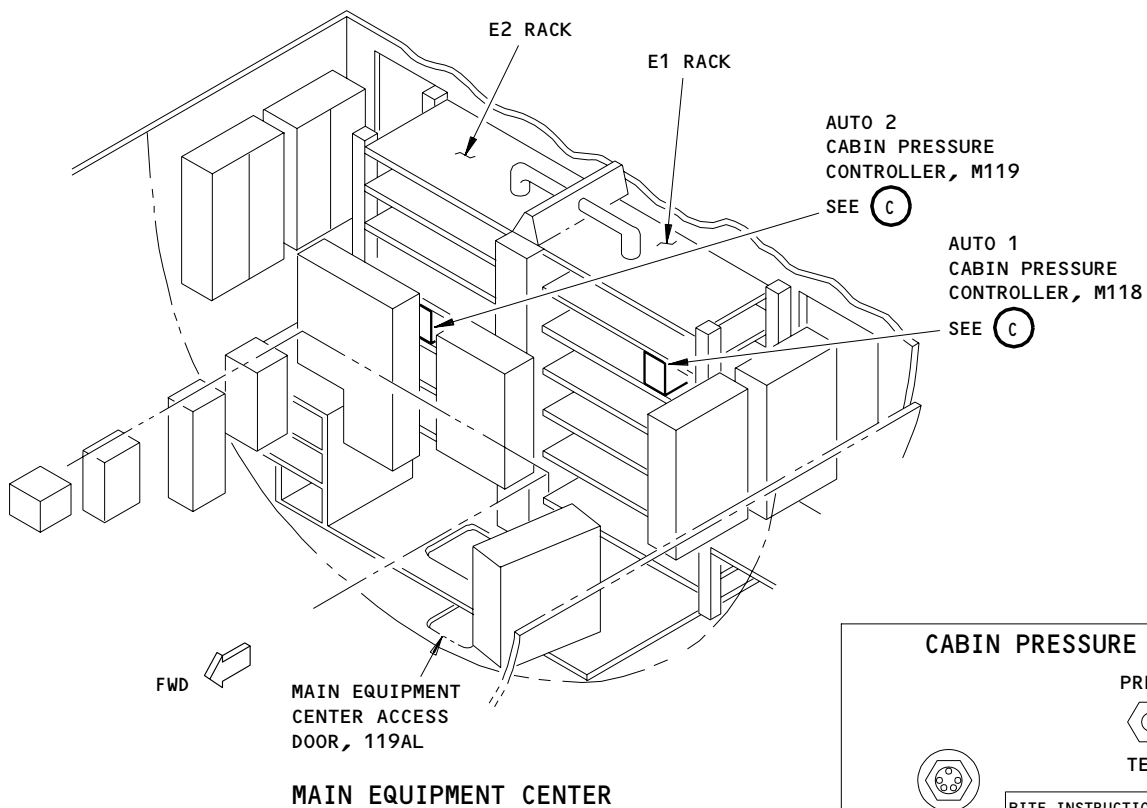
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FAULT ISOLATION/MAINT MANUAL



**CABIN PRESSURE CONTROLLER
AUTO 1, (M118) OR AUTO 2, (M119)**

(C)

Cabin Pressure Control System - Component Location
Figure 102 (Sheet 3)

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CABIN PRESSURE CONTROL SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure has these tests of the cabin pressure control system:
- (1) BITE Test – Automatic Cabin Pressure Controllers
 - (2) Manual Mode Control Test – Cabin Pressure Control System
 - (a) This procedure is for a scheduled maintenance task.
 - (3) System Test – Pressurization Control System
 - (a) The Cabin Pressure Caution Lights Test
 - (b) The Low Flow Indication Test
 - (c) The Cabin Pressure Leakage Test (Ref 05-51-24/201).

TASK 21-31-00-705-001

2. BITE Test – Automatic Cabin Pressure Controllers (Fig. 501)

A. General

- (1) This procedure performs a BITE test of the Auto 1 and Auto 2 cabin pressure controllers.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 32-09-02/201, Air/Ground Relay System

C. Access

- (1) Location Zones
 - 211/212 Control Cabin
 - 119/120 Main Equipment Center
- (2) Access Panels
 - 119AL Main equipment center access door

D. Prepare for the Test

S 865-080

- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

S 865-002

- (2) Make sure these circuit breakers, on the pilots' overhead circuit breaker panel, P11, are closed:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11B15, CABIN ALTITUDE CONTROL SELECT
 - (c) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (d) 11P23, CABIN ALTITUDE CONTROL AUTO 2
 - (e) 11U15, AIR/GND SYS 1

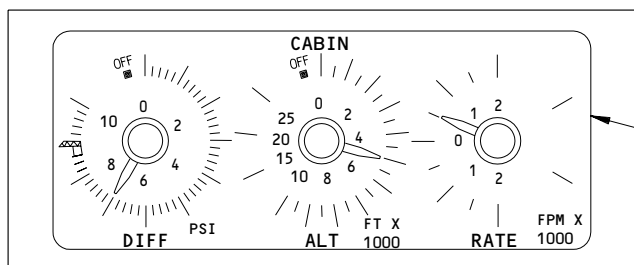
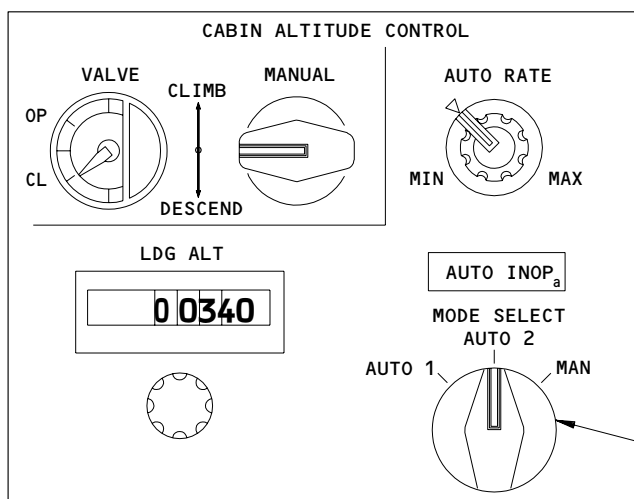
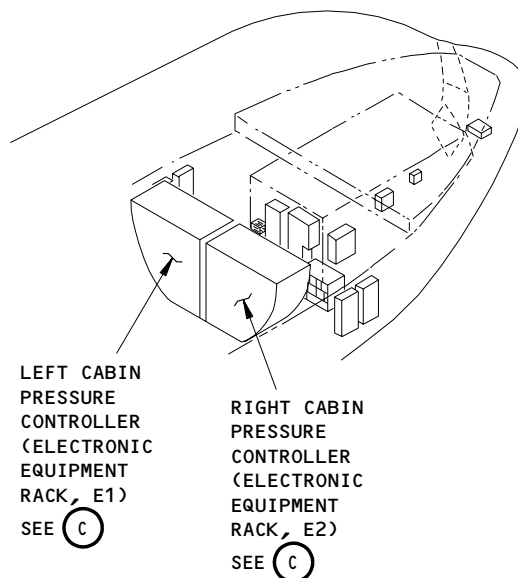
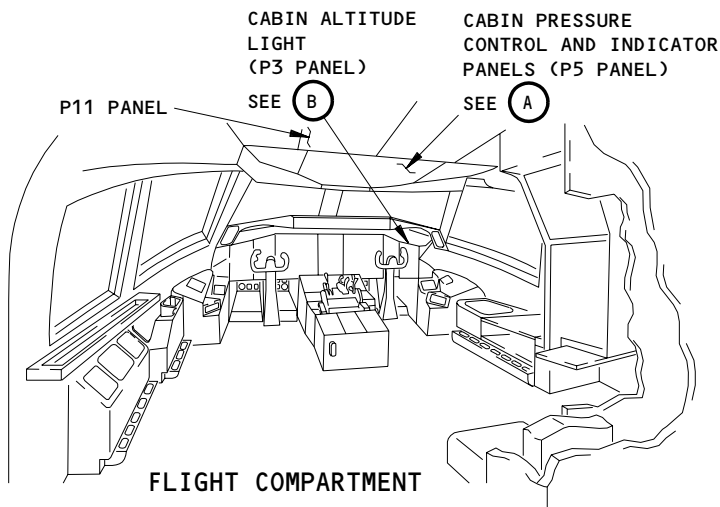
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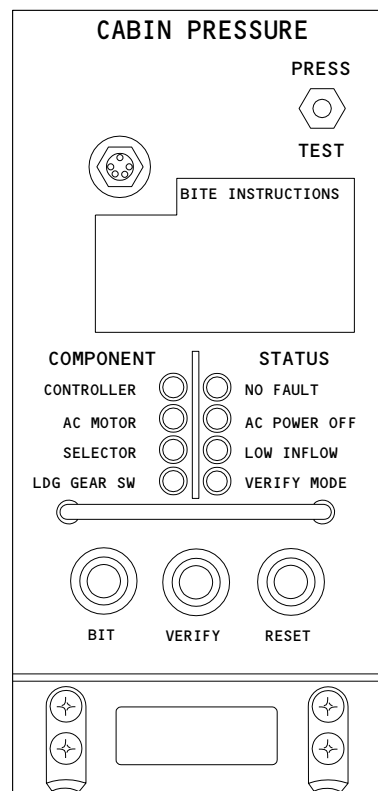
CABIN PRESSURE CONTROL AND INDICATOR PANELS (P5 PANEL)

(A)



CABIN ALTITUDE LIGHT (P3 PANEL)

(B)



CABIN PRESSURE CONTROLLER

(C)

Pressurization Control System Test
Figure 501 (Sheet 1)

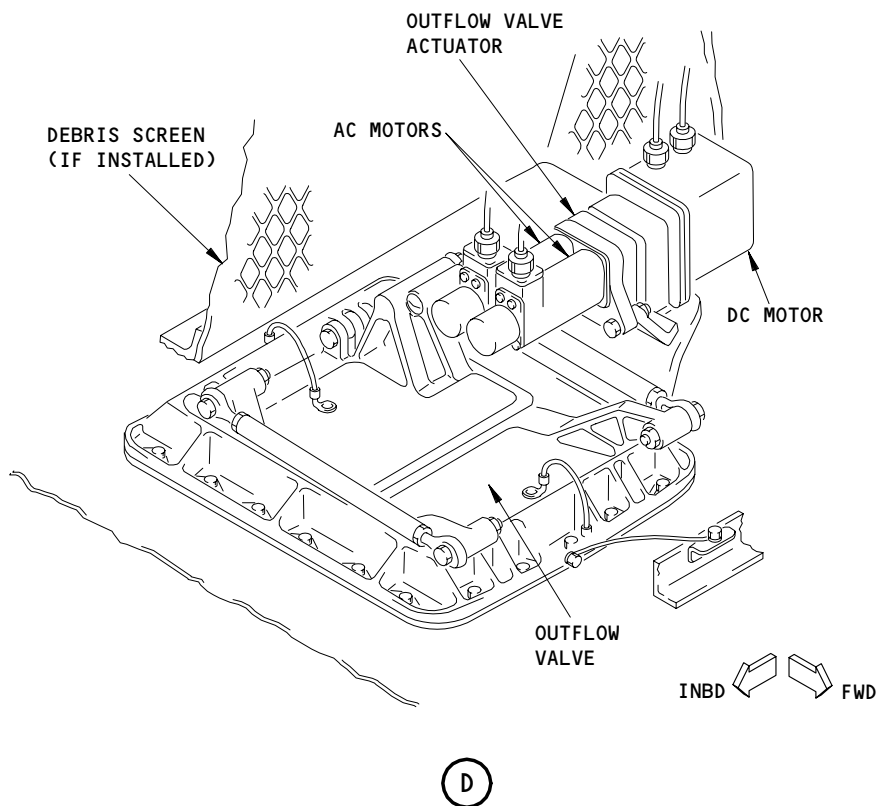
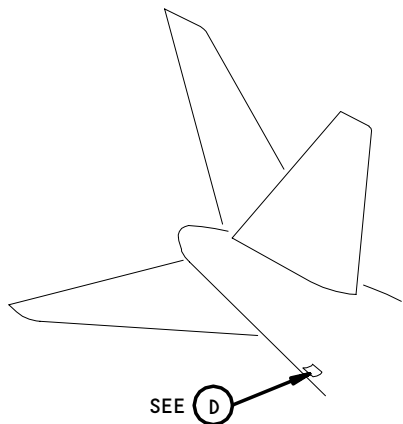
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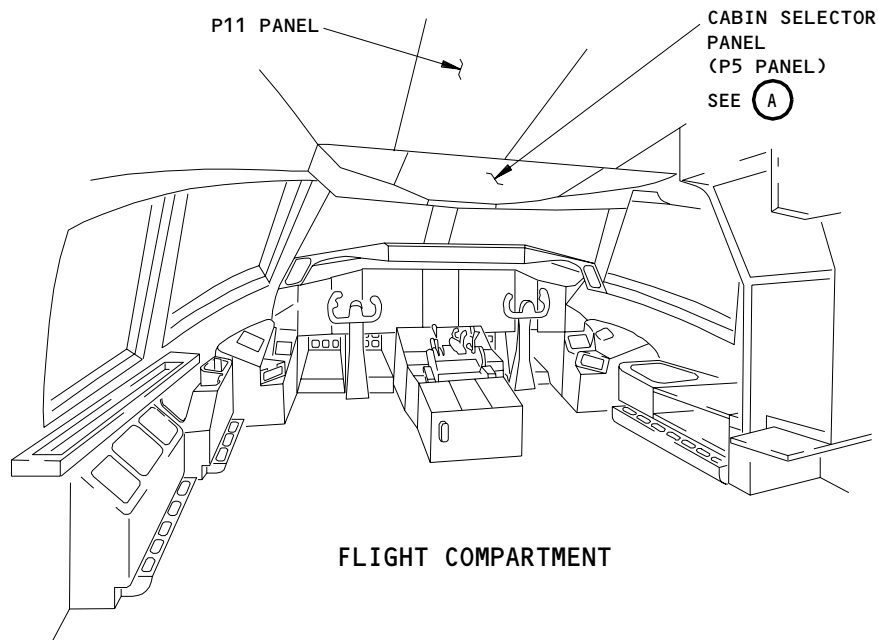
Pressurization Control System Test
Figure 501 (Sheet 2)

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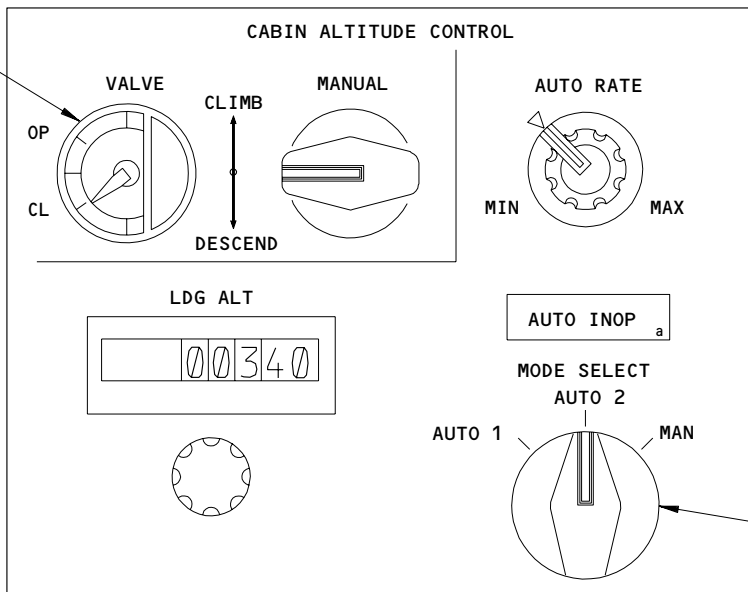
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VALVE POSITION INDICATOR
SEE TABLE A



CABIN SELECTOR PANEL (EXAMPLE)

(A)

Valve Position Indications for Mixed Cabin Pressure Controller/
Outflow Valve Combinations
Figure 502 (Sheet 1)

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CABIN PRESSURE CONTROLLER/OUTFLOW VALVE COMBINATIONS	CABIN PRESSURE SELECTOR PANEL	VALVE POSITION INDICATOR	
		OPEN	CLOSED
S210T160-83, -113, -133 CPC S210T160-114 OFV	S210T160-42 S210T160-52 S210T160-62		
	S210T160-72		
S210T160-83, -113, -133 CPC S210T160-64, -74, -84, -94 OFV	S210T160-42 S210T160-52 S210T160-62		
	S210T160-72		
S210T160-33, -43, -53, -63, -73 CPC S210T160-64, -74, -84, -94, -114 OFV	S210T160-42 S210T160-52 S210T160-62		
	S210T160-72		

TABLE A
Valve Position Indications for Mixed Cabin Pressure Controller/
Outflow Valve Combinations
Figure 502 (Sheet 2)

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(f) 11U23 or 11U24, POSITION AIR/GND SYS 2

S 865-003

(3) Supply electrical power (AMM 24-22-00/201).

S 865-069

(4) Make sure the airplane air/ground relay systems are set to the ground mode (AMM 32-09-02/201).

S 015-004

(5) Open the main equipment center access door, 119AL (AMM 06-41-00/201).

S 215-078

(6) Find the Auto 1 (Auto 2) cabin pressure controller, in the main equipment center, on the E1-2 (E2-4) shelf.

E. Built-In-Test Equipment (BITE) Test - Cabin Pressure Controller

NOTE: The cabin pressure controller does not know the difference between an LRU fault and a wiring fault. If the controller indicates an LRU fault, make sure the connector and the wiring is correct before you replace the LRU. This test is done on only one controller at a time.

S 745-005

(1) Do a BITE test of the Auto 1 (Auto 2) cabin pressure controller:

(a) Turn the MODE SELECT selector, on the pilot's overhead control panel, P5, to the AUTO 1 (AUTO 2) position.

(b) Make sure the MODE SELECT selector, on the P5 panel, has been at AUTO 1 (AUTO 2) for at least two minutes, to let the system warm-up.

(c) Push the PRESS TEST button to test the fault lights (LEDs) on the front of the controller.

1) All fault lights (LEDs) on the front of the controller should come on when the PRESS TEST button is pushed.

2) If no fault lights (LEDs) come on when the PRESS TEST button is pushed, the controller has an internal failure.

NOTE: This indicates a failure of the power supply or CPU within the controller, assuming the system circuit breakers are closed and the MODE SELECT is set to the appropriate AUTO mode.

a) Replace the inoperative controller if necessary.

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- (d) Push the BIT button to interrogate the controller's fault memory.

NOTE: This will cause the CPU to look at the fault memory and display any faults previously recorded.

- 1) If no faults are present in the fault memory, the NO FAULT light (LED) will come on for 30 seconds and then go off.
- 2) If a fault exists in the fault memory, the appropriate LRU component fault light (LED) will come on for 15-30 seconds and then go out.

NOTE: Each time the BIT button is pushed, the appropriate LRU component fault light (LED) will be recalled for 15-30 seconds.

- a) Replace the LRU component associated with the fault light (LED) that shows.
- 3) CONTROLLER P/N 2117388-11 (S210T16-83) AND SUBSEQUENT; Push the PRESS TEST button within 15 seconds after you push the BIT button to display any faults from the previous flight legs.

NOTE: When the BIT button is pushed, the current flight leg fault data is displayed. Subsequent pushes of the PRESS TEST button within 15 seconds will display any faults from the previous flight legs.

WARNING: MAKE SURE THE CABIN PRESSURE OUTFLOW VALVE AREA IS CLEAR OF ALL PERSONS. WHEN THE VERIFY BUTTON IS PUSHED, THE OUTFLOW VALVE WILL MOVE AND COULD CAUSE INJURY TO PERSONS.

- (e) Keep all persons and equipment clear of the outflow valve before you push the VERIFY button on the controller.

NOTE: The outflow valve will operate and move when the VERIFY button is pushed.

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- (f) Push the VERIFY button to test that the installation, operation and interfaces for a replacement LRU component is satisfactory.
- 1) The VERIFY MODE light will illuminate when the VERIFY button is pushed and will remain illuminated until the verification test is complete (approximately 10 seconds).

NOTE: The VERIFY MODE light will not illuminate and the verification test will not run if there is no weight-on-wheels signal (flight mode). The VERIFY MODE light will begin to flash if the MODE SELECT is not set to the correct AUTO position. The verification test will terminate and the VERIFY MODE light will extinguish if the MODE SELECT is moved from a correct selection to an incorrect selection while the VERIFY MODE light is on.

- 2) When the verification test is complete, the VERIFY MODE light will go off, and if no faults were detected, the NO FAULT light will come on for about 30 seconds.

NOTE: If a fault is detected, the appropriate LRU component fault light (LED) will be illuminated.

- (g) Erase a stored fault in the fault memory and reset the controller:

NOTE: CONTROLLER P/N 2117388-11 (S210T160-83) AND SUBSEQUENT;
This will push the stored fault one place down in the memory fault stack.

- 1) Push the VERIFY button and make sure that the VERIFY MODE light and the appropriate LRU component fault light are on.
- 2) Push the RESET button while the VERIFY MODE light is on.

NOTE: When the RESET button is pushed, the LRU component fault light will go off after the erase procedure is completed in approximately 9 seconds, and then the NO FAULT light will come on for about 30 seconds and then go off. If the RESET button was pushed before the VERIFY button is pushed, no fault indications will show. If the stored fault was not erased, a hard failure still exists within the system.

- (h) Do the BITE test for the Auto 2 (Auto 1) controller.

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F. Put the Airplane Back to Its Usual Condition

S 415-076

- (1) Close the main equipment center access door, 119AL.

S 865-077

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-31-00-705-071

3. Manual Mode Control Test - Cabin Pressure Control System (Fig. 501)

A. General

- (1) This procedure is for a scheduled maintenance task.

B. References

- (1) AMM 24-22-00/201, Electrical Power Control

C. Access

- (1) Location Zones
211/212 Control Cabin

D. Prepare for the Test

S 865-081

- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

S 865-075

- (2) Make sure these circuit breakers, on the pilots' overhead circuit breaker panel, P11, are closed:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11B15, CABIN ALTITUDE CONTROL SELECT
 - (c) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (d) 11P23, CABIN ALTITUDE CONTROL AUTO 2
 - (e) 11U15, AIR/GND SYS 1
 - (f) 11U23 or 11U24, POSITION AIR/GND SYS 2

S 865-072

- (3) Supply electrical power (AMM 24-22-00/201).

E. MANUAL Mode Test procedure

S 715-006

- (1) Do the MANUAL Mode Test
 - (a) Turn the MODE SELECT selector, on the P5 panel, to the MAN position.

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- (b) Turn the MANUAL selector, on the P5 panel, to the DESCEND position and hold it.
 - 1) Make sure the VALVE position indicator needle moves to the CL position within 25 seconds.
 - (c) Release the MANUAL selector.
 - 1) Look at the outflow valve to make sure it is fully closed.
 - (d) Turn the MANUAL selector, on the P5 panel, to the CLIMB position and hold it.
 - 1) Make sure the VALVE position indicator needle moves within 2-3 needle widths of the OP position.
 - (e) Release the MANUAL selector.
 - 1) Look at the outflow valve to make sure it is fully open.
 - (f) Turn the MODE SELECT selector, on the P5 panel, to AUTO 1 or AUTO 2 position.
- F. Put the airplane back to its usual condition
- S 865-008
- (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-31-00-705-009

4. System Test - Pressurization Control System (Fig. 501)

A. References

- (1) AMM 05-51-24/201, Cabin Pressure Leakage Test
- (2) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 32-09-02/201, Air Ground Relays
- (6) AMM 32-09-04/401, Proximity Switch Electronics Unit
- (7) AMM 34-11-00/201, Pitot-Static System

B. Equipment

- (1) Pitot Static Tester, commercially available
- (2) Portable Pressure Vacuum Pump, commercially available
- (3) End fitting - compatible with MS 33649-02 female thread on controller sensor air-inlet, commercially available
- (4) Jumper Wire, commercially available

C. Prepare for the Test

- S 865-082
- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

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S 865-011

- (2) Make sure these circuit breakers, on the pilots' overhead circuit breaker panel, P11, are closed:
- (a) 11A33, IND LTS 1
 - (b) 11A34, IND LTS 2
 - (c) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (d) 11B15, CABIN ALTITUDE CONTROL SELECT
 - (e) 11B16, AURAL WARN SPKR L
 - (f) 11B18, WARN ELEX B
 - (g) 11H35, AURAL WARN SPKR R
 - (h) 11J34, WARN ELEX A
 - (i) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (j) 11P23, CABIN ALTITUDE CONTROL AUTO 2
 - (k) 11R1, LEFT IND LTS 1
 - (l) 11R28, RIGHT IND LTS 1
 - (m) 11U15, AIR/GND SYS 1
 - (n) EICAS circuit breakers (6 locations)
 - (o) ON 767-200 AIRPLANES;
11U24, POSITION AIR/GND SYS 2
 - (p) ON 767-300 AIRPLANES;
11U23, POSITION AIR/GND SYS 2

S 865-010

- (3) Supply electrical power (AMM 24-22-00/201).

S 015-012

- (4) Open the main equipment center access door, 119AL (Ref 06-41-00).

D. System Test procedure

S 715-013

- (1) Do the BITE test of the auto 1 and auto 2 cabin pressure controllers (para.2).

S 715-079

- (2) Do the Manual Mode control test of the cabin pressure control system (para. 3).

S 735-014

- (3) Do the Cabin Pressure Caution Lights Test
- (a) Turn the MODE SELECT selector, on the P5 panel, to the AUTO 2 position.
 - (b) Open this circuit breaker, on the P11 panel, and attach a DO-NOT-CLOSE tag:
 - 1) 11P23, CABIN ALTITUDE CONTROL AUTO 2

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- (c) Make sure the computer switch on the EICAS DISPLAY select-panel, P9, is in the L position.
- (d) Make sure the EICAS message CABIN ALT AUTO 2 is shown on the display.
- (e) Open this circuit breaker on P11 panel and attach a DO-NOT-CLOSE tag:
 - 1) 11P15, CABIN ALTITUDE CONTROL AUTO 1
- (f) Make sure these conditions occur:
 - 1) The EICAS messages CABIN ALT AUTO 1 and CABIN AUTO INOP are shown on the display.
 - 2) The cabin altitude AUTO INOP light, on the P5 panel, comes on within 5 seconds.
- (g) Move the EICAS computer switch, on the P9 panel, to the R position.
 - 1) Make sure the EICAS messages CABIN ALT AUTO 1 and CABIN ALT AUTO 2, show on the display.
- (h) Turn the MODE SELECT selector, on the P5 panel, to the MAN position.
- (i) Make sure the EICAS messages CABIN ALT AUTO 1, CABIN ALT AUTO 2, CABIN AUTO INOP are shown on the display, and the AUTO INOP light stays on.
- (j) Turn the MODE SELECT selector, on the P5 panel, to the AUTO 2 position.
- (k) Make sure the EICAS messages CABIN ALT AUTO 1, CABIN ALT AUTO 2, and CABIN AUTO INOP still show on the display.
- (l) Move the EICAS computer switch, on the P9 panel, to the L position.
- (m) Make sure the EICAS messages CABIN ALT AUTO 1, CABIN ALT AUTO 2, and CABIN AUTO INOP still show on the display.
- (n) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel.
 - 1) 11P15, CABIN ALTITUDE CONTROL AUTO 1
- (o) Make sure the EICAS messages CABIN ALT AUTO 1 and CABIN AUTO INOP do not show on the display.
- (p) Make sure the AUTO INOP light goes off.
- (q) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel.
 - 1) 11P23, CABIN ALTITUDE CONTROL AUTO 2

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- (r) Make sure the EICAS message CABIN ALT AUTO 2 does not show on the display.
- (s) Find the AUTO 2 cabin pressure controller in the main equipment center, on the E2-4 shelf.
 - 1) Push the BIT button on the front of the controller.
 - 2) Make sure the AC PWR OFF light does not come on.
 - 3) Make sure the NO FAULT light does come on for 30 seconds.
- (t) Find the AUTO 1 cabin pressure controller in the main equipment center, on the E1-2 shelf.
 - 1) Push the BIT button on the front of the controller.
 - 2) Make sure the AC PWR OFF light does not come on.
 - 3) Make sure the NO FAULT light does come on for 30 seconds.

S 735-015

- (4) Do the Low Flow Indication Test

NOTE: Do the Low Flow Indication test for the Auto 1 controller, then do it again for the Auto 2 controller. The instructions for the Auto 2 controller are in parentheses.

- (a) Turn the MODE SELECT selector, on the P5 panel, to the MAN position.
- (b) Connect a Pitot-Static Tester to supply input to the Air Data Computer 1 and 2 (Ref 34-11-00).
- (c) Use the pitot-static tester to send a signal that the airplane altitude is 2500 ft. above the test field altitude.

NOTE: This altitude is permitted to increase during the test, but any increase must be held to less than 400 feet.

- (d) Connect a vacuum pump to the pressure port on the AUTO 1 (AUTO 2) cabin pressure controller. The pressure port is on the front of the controller, in the upper, left hand corner.
- (e) Use the vacuum pump to pull vacuum on the cabin pressure controller. Increase the vacuum at a rate of 0.60 to 1.20 in. Hg per minute (500 to 1000 ft. of altitude per minute).

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WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (f) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (g) Do the Flight Mode Simulation procedure for the No. 1 (No. 2) air/ground system (Ref 32-09-02).
- (h) Turn the MODE SELECT selector, on the P5 panel, to the AUTO 1 (AUTO 2) position.
- (i) Make sure the VALVE position indicator needle, on the P5 panel, moves to the CL position.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

Refer to Figure 502 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

- (j) In less than 4 seconds after the valve position indicator gets to the CL position, turn the MODE SELECT selector to the MAN position.
- (k) Remove the vacuum pump from the AUTO 1 (AUTO 2) controller.
- (l) Remove the pitot-static tester from the Air Data Computer (Ref 34-11-00).

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (m) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.
- (n) Put the No. 1 (No. 2) air/ground system back to the ground mode (Ref 32-09-02).

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- (o) Turn the MODE SELECT selector, on the P5 panel, to the AUTO 1 (AUTO 2) position.
- (p) After approximately one minute, make sure the outflow valve is in the fully open position.
- (q) Do the BITE test on the Auto 1 (Auto 2) controller.

NOTE: The LOW FLOW light and the AC POWER OFF light will come on when the BIT button is pushed. The lights will go off when the VERIFY button is pushed.

S 785-067

- (5) Do the cabin pressure leakage test (Ref 05-51-24/201).
- E. Put the Airplane Back to Its Usual Condition

S 415-024

- (1) Close the main equipment center bay access door, 119AL (Ref 06-41-00).

S 865-025

- (2) Remove electrical power if it is not necessary (Ref 24-22-00).

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CABIN PRESSURE SELECTOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains three tasks. The first task is the removal of the cabin pressure selector. The second task is the installation of the cabin pressure selector. The third task is a test of the cabin pressure selector.

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2. Remove the Cabin Pressure Selector (Fig. 401)

A. Access

- (1) Location Zones
211/212 Control Cabin – Section 41

B. Procedure

S 864-002

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11B14, CABIN ALTITUDE CONTROL MANUAL
(b) 11B15, CABIN ALTITUDE CONTROL SELECT
(c) 11P15, CABIN ALTITUDE CONTROL AUTO 1
(d) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 034-003

- (2) Loosen the 1/4-turn fasteners on the selector panel.

S 024-004

- (3) Remove the selector from the P5 panel.

S 034-006

- (4) Disconnect the electrical connectors from the selector.

TASK 21-31-01-404-007

3. Install the Cabin Pressure Selector (Fig. 401)

A. Access

- (1) Location Zones
211/212 Control Cabin – Section 41

B. Procedure

S 434-008

- (1) Connect the electrical connectors to the selector.

S 424-009

- (2) Install the selector in the P5 panel.

S 434-011

- (3) Tighten the 1/4-turn fasteners (4 locations) on the selector panel.

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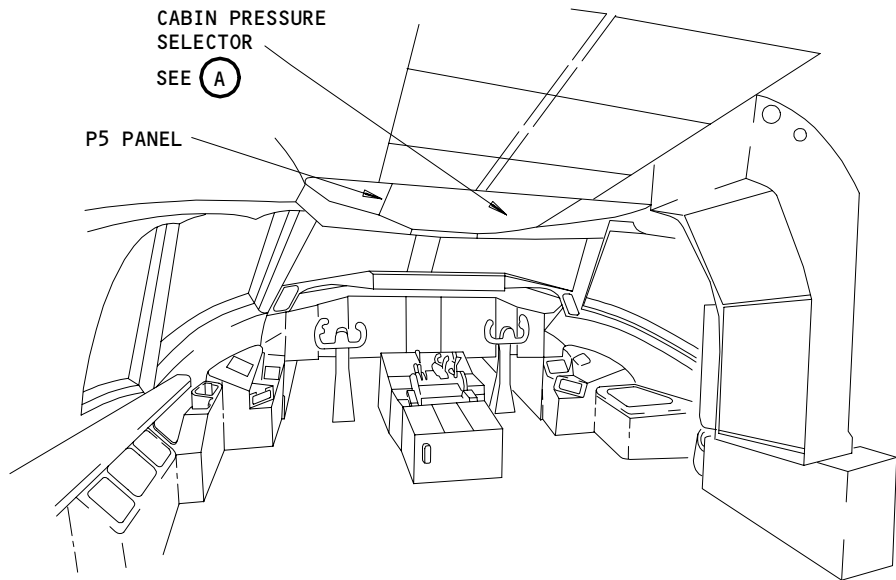
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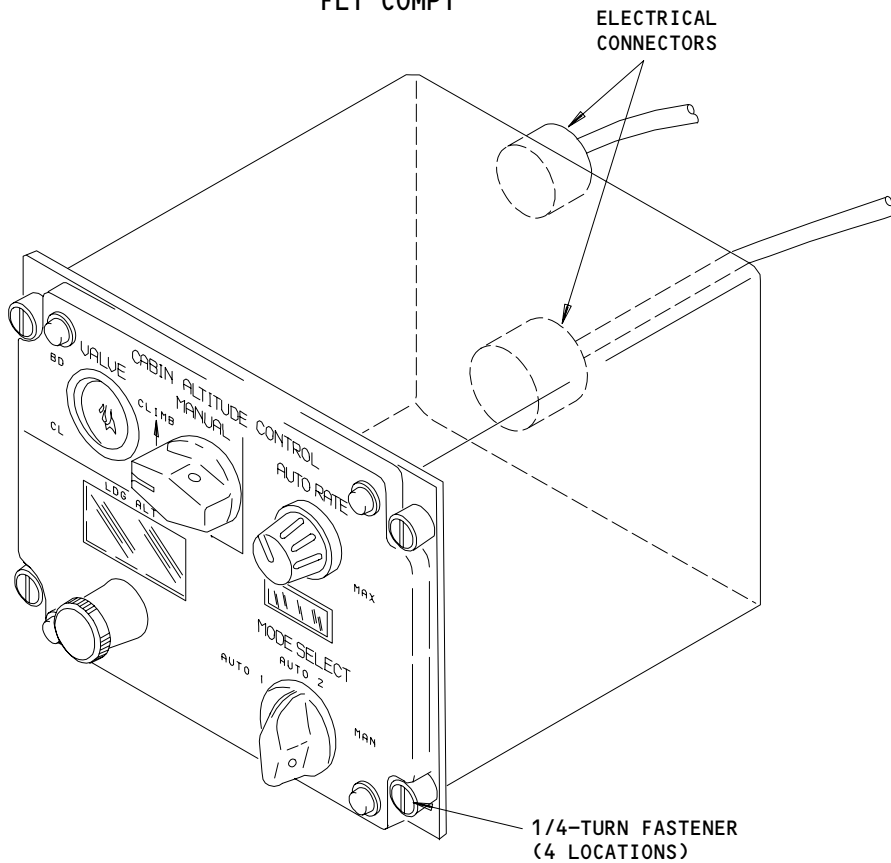
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FLT COMPT



CABIN PRESSURE SELECTOR

(A)

Cabin Pressure Selector Installation
Figure 401

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C. Post-Installation Test

S 864-027

- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

S 864-012

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11B15, CABIN ALTITUDE CONTROL SELECT
 - (c) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (d) 11P23, CABIN ALTITUDE CONTROL AUTO 2

TASK 21-31-01-704-014

4. Cabin Pressure Selector Test

A. References

- (1) AMM 06-41-00/201, Section 41 Access Doors and Panels
- (2) AMM 21-31-02/401, Automatic Pressure Controller
- (3) AMM 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zones

119/120	Main Equipment Center
211/212	Control Cabin - Section 41
- (2) Access Panel
119AL

C. Procedure

S 864-028

- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

S 864-013

- (2) Supply electrical power (AMM 24-22-00/201)

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- (3) Do the AUTO 1 mode test.
- (a) Put the cabin pressure selector, on the P5 panel, to AUTO 1.
 - (b) Open the access door (119AL) for the main equipment center.
 - (c) Find the No. 1 automatic pressure controller on the E1-2 shelf (Ref 06-41-00/201).
 - (d) Push the PRESS/TEST switch, on the No. 1 controller.
 - 1) Make sure all the lamps on the controller come on.

WARNING: MAKE SURE THE AREA NEAR THE CABIN PRESSURE OUTFLOW VALVE IS CLEAR OF PERSONS. WHEN YOU PUSH THE VERIFY SWITCH, THE OUTFLOW VALVE WILL MOVE AND COULD CAUSE INJURY.

- (e) Push the VERIFY switch.
 - 1) Make sure that the SELECTOR lamp does not come on.

S 714-016

- (4) Do the AUTO 2 mode test.
- (a) Put the cabin pressure selector, on the P5 panel, to AUTO 2.
 - (b) Find the No. 2 automatic pressure controller on the E2-4 shelf.
 - (c) Push the PRESS/TEST switch, on the No. 2 controller.
 - 1) Make sure that all the lamps on the controller come on.

WARNING: MAKE SURE THE AREA NEAR THE CABIN PRESSURE OUTFLOW VALVE IS CLEAR OF PERSONS. WHEN YOU PUSH THE VERIFY SWITCH, THE OUTFLOW VALVE WILL MOVE AND COULD CAUSE INJURY.

- (d) Push the VERIFY switch.
 - 1) Make sure that the SELECTOR lamp does not come on.

S 414-020

- (5) Close the access door, 119AL, for the main equipment center.

S 714-018

- (6) Do the MANUAL mode test.
- (a) Put the cabin pressure selector, on the P5 panel, to MAN.
 - (b) Make sure the AUTO INOP light comes on and the EICAS message, CABIN AUTO INOP, shows on the top display.
 - (c) Put the MANUAL selector to CLIMB and hold it there.

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- (d) Make sure the VALVE position indicator needle moves to the OP position.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

Refer to AMM 21-31-00/501 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

- (e) Put the MANUAL selector to DESCEND and hold it there.
(f) Make sure the VALVE position indicator needle moves to the CL position.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

Refer to AMM 21-31-00/501 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

S 864-019

- (7) Put the cabin pressure selector to AUTO 1.

S 864-021

- (8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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AUTOMATIC CABIN PRESSURE CONTROLLER – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the automatic pressure controller. The second task is the installation of the automatic pressure controller.
- B. The airplane's two automatic pressure controllers are the same. The two controllers are in the main electrical/electronics rack at STA 317 and WL 147. The No. 1 controller is on shelf E1-2. The No. 2 controller is on shelf E2-4.

TASK 21-31-02-004-001

2. Remove the Automatic Pressure Controller (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 20-10-01/401, E/E Rack Mounted Components

B. Access

- (1) Location Zones
119/120 Main Equipment Center
- (2) Access Panel
119AL

C. Procedure

S 864-002

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11B15, CABIN ALTITUDE CONTROL SELECT
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 014-003

- (2) Open the access door (119AL) to the main equipment center and find the controller you will remove (Ref 6-41-00).

S 024-004

- (3) Remove the controller (Ref 20-10-01).

TASK 21-31-02-404-005

3. Install the Automatic Pressure Controller (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels

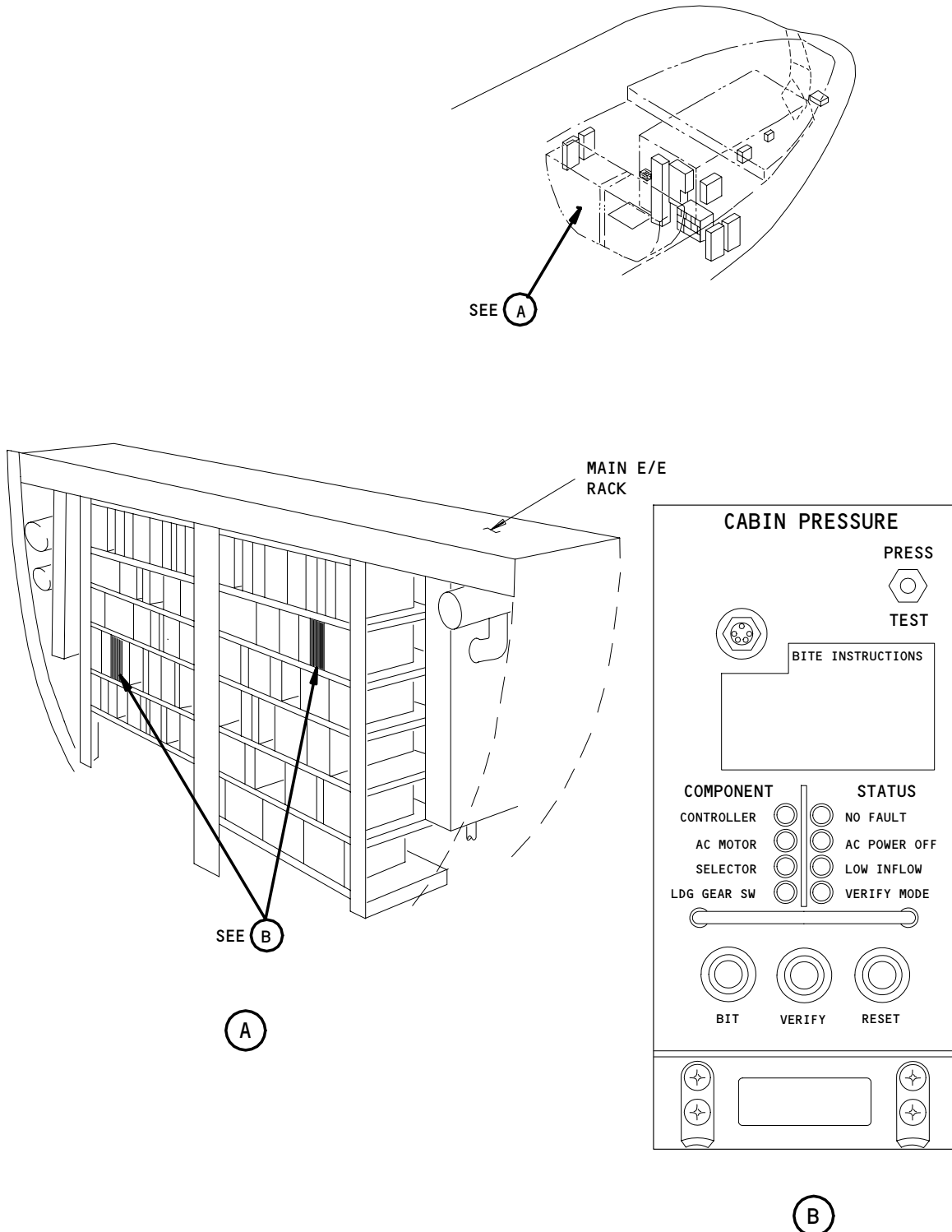
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Automatic Pressure Controller Installation
Figure 401

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- (2) 20-10-01/401, E/E Rack Mounted Components.
- (3) 24-22-00/201, Electrical Power Control
- B. Access
 - (1) Location Zones
 - 119/120 Main Equipment Center
 - (2) Access Panel
 - 119AL
- C. Procedure
 - S 424-006
 - (1) Install the controller (Ref 20-10-01).
- D. Post-Installation Test
 - S 864-013
 - (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

- S 864-007
- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11B15, CABIN ALTITUDE CONTROL SELECT
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

- S 864-008
- (3) Supply electrical power (Ref 24-22-00).

- S 714-009
- (4) Wait approximately two minutes after you supply power, then do these steps:
 - (a) Set the cabin pressure mode selector on P5 panel to AUTO 1 or AUTO 2, as applicable to the installed controller.
 - (b) Push the PRESS/TEST button on the installed controller.
 - 1) Make sure all eight lights come on.

NOTE: Lights must stay on while you push the button. If a light does not come on, replace the controller.

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WARNING: MAKE SURE THE CABIN PRESSURE OUTFLOW VALVE AREA IS CLEAR OF ALL PERSONS. WHEN THE VERIFY BUTTON IS PUSHED, THE OUTFLOW VALVE WILL MOVE AND COULD CAUSE INJURY TO PERSONS.

- (c) Push the VERIFY button.
 - 1) Make sure the VERIFY mode light comes on for about 25 seconds.
 - 2) Make sure the NO FAULT lamp comes on for 30 seconds and then goes off. If there is a failure, replace the applicable LRU.
- (d) Push the RESET button while the VERIFY MODE light is on. Push the VERIFY button if necessary to display VERIFY MODE lights.

S 414-010

- (5) Close the access door (119AL) to the main equipment center (Ref 06-41-00).

S 864-011

- (6) Remove electrical power if it is not necessary.

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CABIN PRESSURE OUTFLOW VALVE – MAINTENANCE PRACTICES

1. General

A. This procedure has the instructions to do the tasks that follow:

- (1) Remove the Cabin Pressure Outflow Valve.
- (2) Install the Cabin Pressure Outflow Valve.
- (3) Clean the Cabin Pressure Outflow Valve.
- (4) Do a Check of the Cabin Pressure Outflow Valve.

TASK 21-31-03-002-001

2. Remove the Cabin Pressure Outflow Valve (Fig. 201)

A. General

- (1) The outflow valve can be removed through the aft end of the bulk cargo compartment or from out of the airplane. The valve is most easily removed through the cargo compartment. The procedure to remove the valve from out of the airplane is used when access through the bulk cargo compartment is not possible.
 - (a) To remove the valve from out of the airplane, the valve must be in the closed position.

B. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Sidewall Lining

C. Access

- (1) Location Zones
 - 165 Area Aft of the Bulk Cargo Compartment (Left)
 - 811 Bulk Cargo Door

D. Prepare for the Removal

S 862-040

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE tags:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1

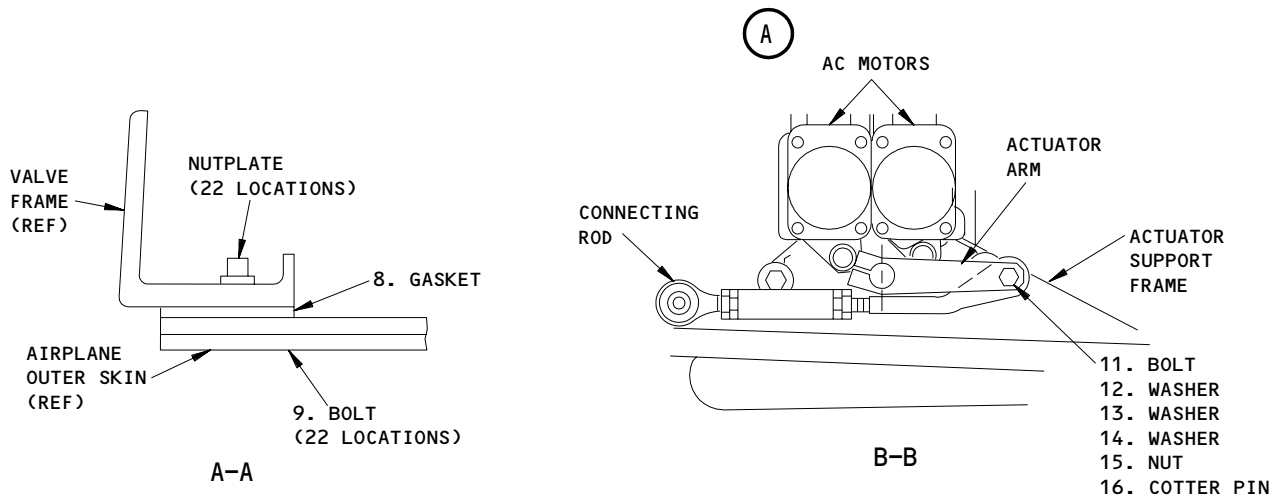
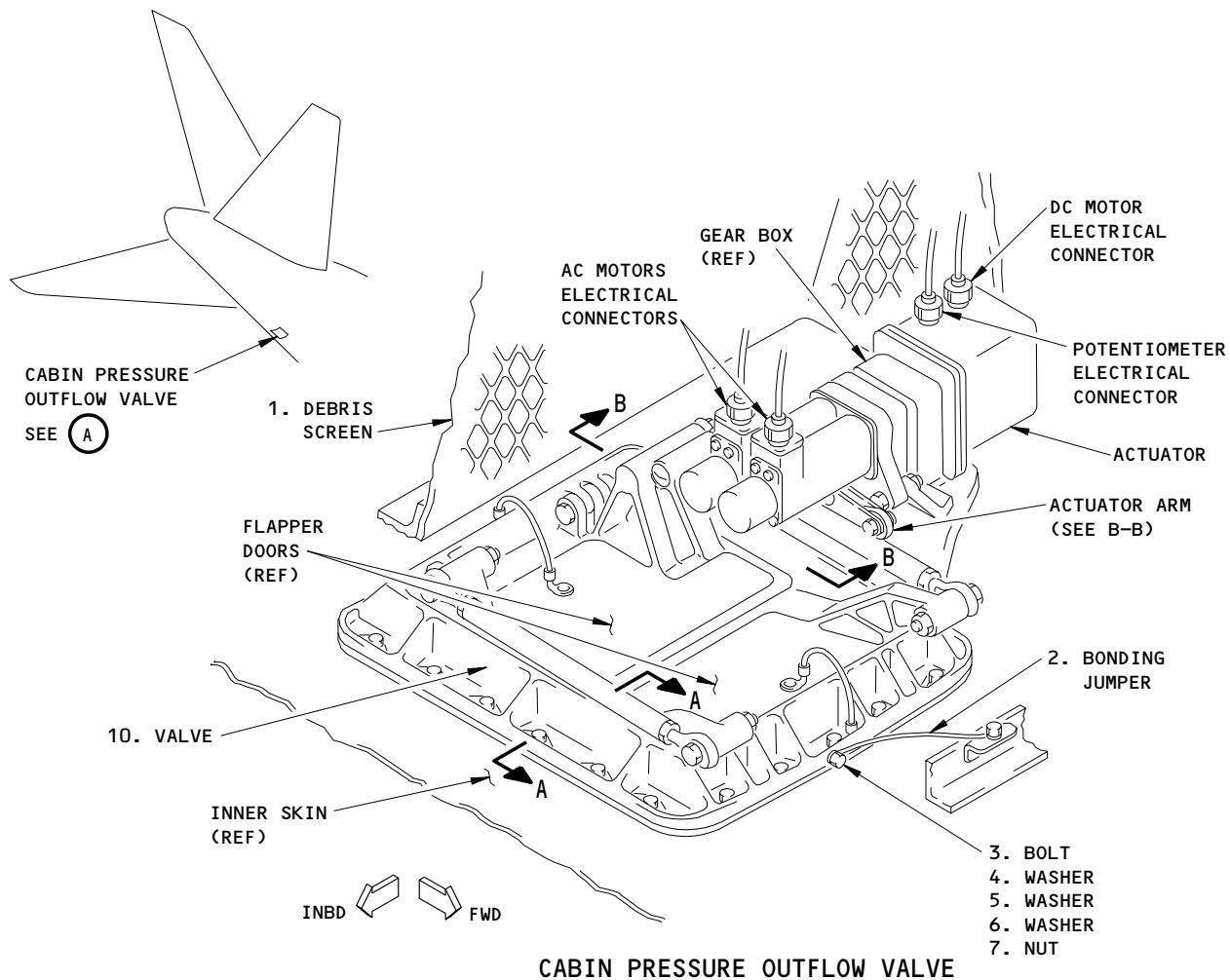
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Cabin Pressure Outflow Valve Installation
Figure 201

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(c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 012-041

- (2) If the outflow valve will be removed through the bulk cargo compartment, do the steps that follow:
- (a) Open the bulk cargo door, 811 (AMM 06-46-00/201).
 - (b) Remove the endliner at the aft end of the bulk cargo compartment (AMM 25-52-01/401).
 - (c) AIRPLANES WITH THE DEBRIS SCREEN;
Do the steps that follow:
 - 1) Release the latches on the debris screen.
 - 2) Remove the debris screen that is around the outflow valve.

S 862-045

- (3) If you will remove the valve from out of the airplane, make sure the valve is in the closed position.
- (a) If you cannot close the valve, you must remove the valve through the bulk cargo compartment.
- E. Remove the Outflow Valve

S 032-002

- (1) Remove the bolts (9) that are on the outer side of the airplane.

S 032-003

- (2) Disconnect the bonding jumper (2) from the valve.
- (a) To access the bonding jumper from out of the airplane, carefully push the forward edge of the valve (10) inboard.

S 032-060

- (3) Disconnect the electrical connectors from the valve.

NOTE: Identify the electrical connectors for installation.

S 022-004

- (4) Remove the outflow valve (10).
- (a) To remove the valve from out of the airplane, turn the outflow valve assembly so that the actuator motor comes out first, with the valve diagonal to the skin opening.

S 032-005

- (5) Remove the gasket (8) from the outflow valve.

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S 322-071

- (6) Save gasket (8) from the outflow valve for reinstallation if no visible damage is present on the gasket.

TASK 21-31-03-402-006

3. Install the Cabin Pressure Outflow Valve

A. General

- (1) You can install the outflow valve through the aft end of the bulk cargo compartment or from out of the airplane. The valve is most easily installed through the cargo compartment. The procedure to install the valve from out of the airplane is used when access through the bulk cargo compartment is difficult or not possible.
- (a) To install the valve from out of the airplane, the valve must be in the closed position.

B. Consumable Materials

- (1) A00247 - Sealant, Chromate, Type BMS 5-95

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	1	Screen Assembly	21-31-03	01	192
	2	Jumper Assembly			20
	3	Bolt			5
	4	Washer			10
	5	Washer			10
	6	Washer			10
	7	Nut			15
	8	Gasket			191
	9	Bolts			25
	10	Valve Assembly			30

D. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control

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(3) AMM 25-52-01/401, Sidewall Lining

E. Access

(1) Location Zones

- | | |
|-----|---|
| 165 | Area Aft of the Bulk Cargo Compartment (Left) |
| 811 | Bulk Cargo Door |

F. Prepare for Outflow Valve Installation

S 212-084

- (1) Make sure that the outflow valve flapper doors can move freely:
 - (a) Remove the cotter pin, nut, washers (qty 3), and bolt to disconnect the connecting rod from the actuator arm.
 - (b) Manually move the flapper doors to the fully open and fully closed positions, and make sure that the doors can move freely.
 - 1) If the flapper doors do not move freely, replace the outflow valve with a serviceable outflow valve.
 - (c) Install the bolt, washers (qty 3), nut, and cotter pin to attach the connecting rod to the actuator arm.
 - 1) Make sure that the head of the bolt is installed on the inboard side of the actuator arm.
 - 2) Tighten the nut to 17 pound-inches (1.9 Newton-Meters).
 - 3) Install the cotter pin.

G. Outflow Valve Installation

S 432-007

- (1) Install a new gasket (8) in the outflow valve opening.

S 422-008

- (2) Put the outflow valve (10) onto the gasket (8).
 - (a) To install the valve from out of the airplane, do the steps that follow:
 - 1) Put the outflow valve through the skin opening and into the approximately installed position.
 - 2) Slowly push the valve inward to get access to the electrical connectors and the bonding jumper.

S 432-009

- (3) Install the electrical connectors on the valve motors.

S 432-010

- (4) Connect the bonding jumper (2) to the valve with a bolt (3), three washers (4, 5, 6), and a nut (7) (AMM 20-10-21/401).

S 432-063

- (5) Tighten the bolt (3).

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- S 432-011
- (6) Align the outflow valve holes with the fastener holes in the airplane skin.
- S 432-012
- (7) Apply BMS 5-95 sealant to the fastener holes on the outer side of the airplane.
- S 432-013
- (8) Install the bolts (9).
- S 432-064
- (9) Tighten the bolts (9) to 100 ±10 pound-inches.
- H. Do the outflow valve installation test.
- S 862-085
- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.
- NOTE:** The outflow valve actuator will begin to operate and move when electrical power is supplied.
- S 862-014
- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2
- S 862-015
- (3) Supply electrical power (AMM 24-22-00/201).
- S 862-016
- (4) Put the MODE SELECT selector, on the overhead panel, P5, to the MAN position.
- S 862-018
- (5) Turn the MANUAL selector to the DESCEND position.

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S 212-077

- (6) Make sure the VALVE position indicator needle moves to the CL position within 25 seconds.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

NOTE: Refer to AMM 21-31-00/501 for the normal position of the the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

S 862-020

- (7) Put the MODE SELECT selector, on the P5 panel to the AUTO 1 position.

S 212-078

- (8) Make sure the VALVE position indicator needle moves to the OP position within 13 seconds.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

NOTE: Refer to AMM 21-31-00/501 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

S 862-023

- (9) Put the MODE SELECT selector, on the P5 panel to the MAN position.

S 862-025

- (10) Turn the MANUAL selector to the DESCEND position.

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S 212-079

- (11) Make sure the VALVE position indicator needle moves to the CL position within 25 seconds.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

NOTE: Refer to AMM 21-31-00/501 for the normal position of the position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

S 862-027

- (12) Put the MODE SELECT selector, on the P5 panel, to the AUTO 2 position.

S 212-080

- (13) Make sure the VALVE position indicator needle moves to the OP position within 13 seconds.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

NOTE: Refer to AMM 21-31-00/501 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

I. Put the airplane back to its usual condition.

S 412-030

- (1) If the valve was installed through the bulk cargo compartment, then do the steps that follow:
- (a) AIRPLANES WITH THE DEBRIS SCREEN;
Do the steps that follow:
- 1) Make sure the insulation inboard of the debris screen is attached to velcro on the stringer below the debris screen.

NOTE: No insulation or loose equipment is permitted inside the debris screen.

- 2) Install the debris screen (1) over the outflow valve.
- 3) Tighten the latches on the debris screen.

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- (b) Install the endliner on the aft end of the bulk cargo compartment (AMM 25-52-01/401).
- (c) Close the bulk cargo door, 811 (AMM 06-46-00/201).

S 862-034

- (2) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-31-03-102-065

4. Clean the Cabin Pressure Outflow Valve (Fig. 201)

A. General

- (1) You can clean the outflow valve from the aft end of the bulk cargo compartment or from out of the airplane. Access to the outflow valve is most easily done from out of the airplane. However, to clean the valve from out of the airplane, the valve must be fully open.

B. Consumable Materials

- (1) B00074 - Solvent, MIL-PRF-680 (Supersedes P-D-680)
- (2) G00268 - Brush, soft bristle
- (3) G00034 Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze) BMS 15-5

C. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Sidewall Lining

D. Access

- (1) Location Zones
 - 165 Area Aft of the Bulk Cargo Compartment (Left)
 - 811 Bulk Cargo Door

E. Prepare to clean.

S 862-046

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 012-047

- (2) If you will clean the outflow valve from the bulk cargo compartment, do the steps that follow:
 - (a) Open the bulk cargo door, 811 (AMM 06-46-00/201).
 - (b) Remove the endliner at the aft end of the bulk cargo compartment (AMM 25-52-01/401).
 - (c) AIRPLANES WITH THE DEBRIS SCREEN;
Do the steps that follow:
 - 1) Release the latches on the debris screen.
 - 2) Remove the debris screen that is around the outflow valve.

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S 862-051

- (3) If you will clean the valve from out of the airplane, make sure that the valve is in the open position.
 - (a) If you cannot open the valve, you must clean it from in the bulk cargo compartment.

F. Clean the outflow valve.

S 112-035

- (1) Use the brush and the solvent to clean all of the outflow valve assembly.

S 112-036

- (2) Rub the door gates and the seals of the outflow valve with the solvent.

S 162-037

- (3) Rub the outflow valve with the dry cloth.

G. Put the airplane back to its usual condition.

S 862-086

- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

S 862-088

- (2) Close these circuit breakers on the overhead circuit breaker panel, P11, and remove DO-NOT-CLOSE tags:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1

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(c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 412-052

- (3) If the valve was cleaned from in the bulk cargo compartment, do the steps that follow:
- (a) AIRPLANES WITH THE DEBRIS SCREEN;
Do the steps that follow:
 - 1) Make sure the insulation inboard of the debris screen is attached to velcro on the stringer below the debris screen.

NOTE: No insulation or loose equipment is permitted inside the debris screen.

- 2) Install the debris screen (1) over the outflow valve.
 - 3) Tighten the latches on the debris screen.
- (b) Install the endliner on the aft end of the bulk cargo compartment (Ref 25-52-01).
- (c) Close the bulk cargo door, 811 (Ref 06-46-00).

TASK 21-31-03-202-066

5. Do a Check of the Cabin Pressure Outflow Valve (Fig. 201)

A. General

- (1) You can inspect the outflow valve from the aft end of the bulk cargo compartment or from the out side of the airplane. Access to the outflow valve is most easily done from out of the airplane. However, to inspect the valve from out of the airplane, the valve must be fully open.

B. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Sidewall Lining

C. Access

- (1) Location Zones
- | | |
|-----|---|
| 165 | Area Aft of the Bulk Cargo Compartment (Left) |
| 811 | Bulk Cargo Door |

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D. Prepare to do the check.

S 862-061

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 862-067

- (2) If the outflow valve will be inspected from the bulk cargo compartment, then do the steps that follow:
 - (a) Open the bulk cargo door, 811 (AMM 06-46-00/201).
 - (b) Remove the endliner at the aft end of the bulk cargo compartment (AMM 25-52-01/401).
 - (c) AIRPLANES WITH THE DEBRIS SCREEN;
Do the steps that follow:
 - 1) Release the latches on the debris screen.
 - 2) Remove the debris screen that is around the outflow valve.

S 862-062

- (3) If the valve will be inspected from out of the airplane, make sure that the valve is in the open position.
 - (a) If the valve cannot be opened, it must be inspected from the bulk cargo compartment.

E. Cabin pressure outflow valve check.

S 212-038

- (1) Do these steps to make sure the outflow valve is serviceable:
 - (a) Make sure that there are no grease leaks from the gear box.
 - (b) Make sure the flapper doors and hinges do not have cracks or are loose.
 - (c) Make sure the connecting rods and connecting rod bolts are not damaged, worn, or corroded.
 - (d) Make sure the teflon and butyl rubber seals are not damaged, worn or have any grease on them.
 - (e) Make sure the actuator is not loose.

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- (f) Make sure the outflow valve frame is not cracked.
- (g) Make sure the outflow valve bolts are not loose.
- (h) Make sure that the Outflow Valve movement is not restricted.
 - 1) Disconnect the Outflow Valve Linkage from the Valve Actuator.
 - 2) Move the flapper doors and make sure that they move freely.
 - 3) Connect the Outflow Valve Linkage to the Valve Actuator.

S 902-039

- (2) If one or more of the above conditions has occurred, replace the worn or corroded parts and/or tighten the loose fasteners. If the flapper doors do not move freely, the valve must be replaced .
- F. Put the airplane back to its usual condition.

S 862-087

- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

S 862-089

- (2) Close these circuit breakers on the overhead circuit breaker panel, P11, and remove DO-NOT-CLOSE tags:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 412-056

- (3) If the valve was inspected from the bulk cargo compartment, then do the steps that follow:
 - (a) AIRPLANES WITH THE DEBRIS SCREEN;
Do the steps that follow:
 - 1) Make sure the insulation inboard of the debris screen is attached to velcro on the stringer below the debris screen.

NOTE: No insulation or loose equipment is permitted inside the debris screen.

- 2) Install the debris screen (1) over the outflow valve.

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- 3) Tighten the latches on the debris screen.
- (b) Install the endliner on the aft end of the bulk cargo compartment (AMM 25-52-01/401).
- (c) Close the bulk cargo door, 811 (AMM 06-46-00/201).

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CABIN PRESSURE OUTFLOW VALVE ACTUATOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the cabin pressure outflow valve actuator. The second task is the installation of the cabin pressure outflow valve actuator.
- B. The cabin pressure outflow valve actuator is at STA 1550, WL 148, and LBL 49. Access to the actuator is through the bulk cargo door (811) or through the outflow valve doors which are open when the airplane is on the ground.

TASK 21-31-04-004-001

2. Remove the Cabin Pressure Outflow Valve Actuator (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service, and Cargo Doors, Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 25-52-01/401, Sidewall Lining

B. Access

- (1) Location Zone
811 Bulk Cargo Door

C. Procedure

S 864-031

- (1) Remove the electrical power (AMM 24-22-00/201).

S 864-002

- (2) Open these circuit breakers on the overhead panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 014-032

WARNING: IF YOU USE THE ACCESS THROUGH THE CABIN PRESSURE OUTFLOW VALVE, MAKE SURE THE ELECTRICAL POWER IS OFF, THE CIRCUIT BREAKERS ARE OPEN, AND THE DO-NOT-CLOSE TAGS ARE ATTACHED. IF ELECTRICAL POWER IS SUPPLIED TO THE VALVE WHEN IT IS IN THE FULLY OPEN POSITION, IT WILL MOVE TO THE NOT FULLY OPEN POSITION. THE MOVEMENT OF THE VALVE CAN CAUSE INJURY TO PERSONS.

- (3) Get access to the actuator through the bulk cargo compartment or through the cabin pressure outflow valve.

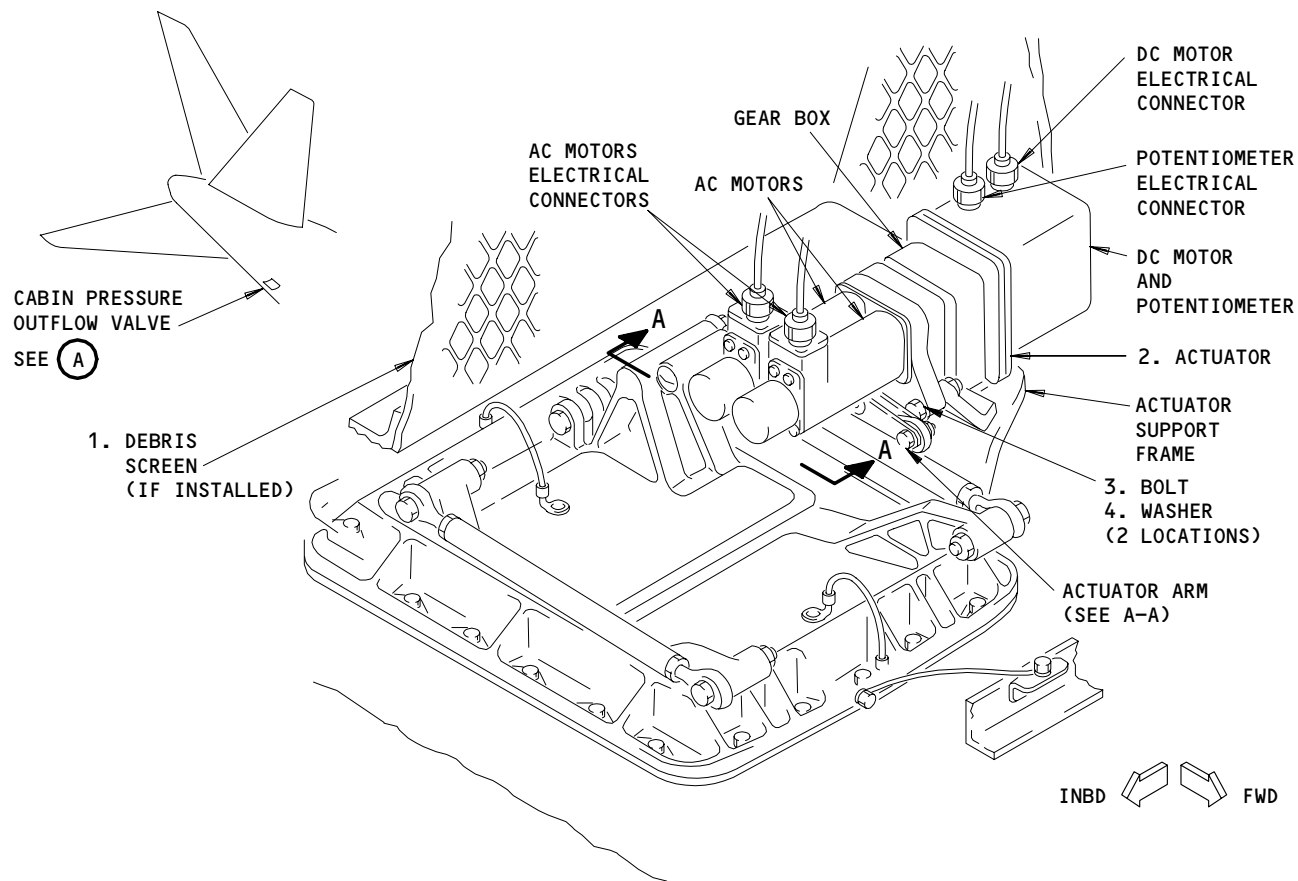
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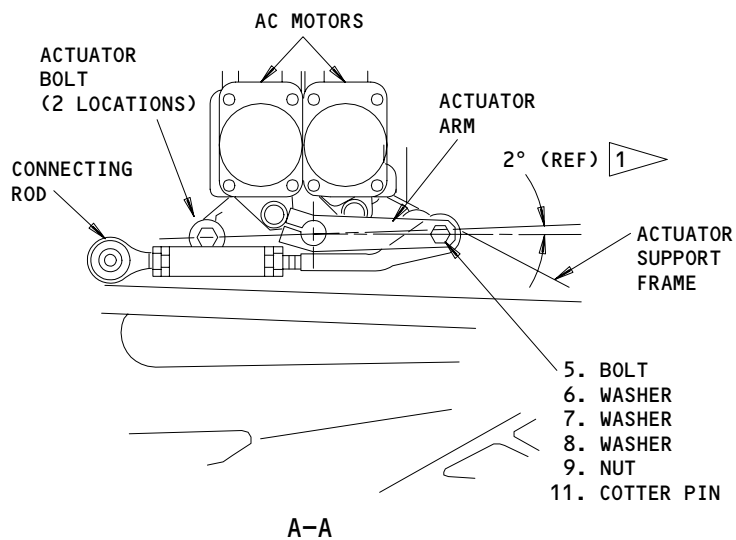
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CABIN PRESSURE OUTFLOW VALVE

(A)



1 ANGLE MEASURED BETWEEN HORIZONTAL AND DOWNWARDS SLOPE OF CENTERLINE OF ACTUATOR ARM (VALVE FULLY CLOSED)

Cabin Pressure Outflow Valve Actuator Installation
Figure 401

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- S 014-035
- (4) If you get access through the bulk cargo compartment, do the steps that follow:
- (a) Open the bulk cargo door, 811 (AMM 52-36-00/001).
 - (b) Remove the endliner at the aft end of the bulk cargo compartment (AMM 25-52-01/401).
 - (c) AIRPLANES WITH A DEBRIS SCREEN;
Do the steps that follow:
 - 1) Release the latches on the debris screen.
 - 2) Remove the debris screen.

- S 034-006
- (5) Disconnect the electrical connector on the manual DC and auto AC motors.
- (a) Put a tag on the motor connectors to identify them for installation.

- S 034-007
- (6) Disconnect the potentiometer electrical connector.

- S 034-008
- (7) Remove the bolt (5) that connects the actuator arm to the connecting rod.

- S 024-009
- (8) Remove the actuator bolts (3) and the actuator (2).

TASK 21-31-04-404-010

3. Install the Cabin Pressure Outflow Valve Actuator (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Screen Assembly	21-31-03	01	192
	2	Actuator Assembly			37
	3	Bolt			38
	4	Washer			39
	5	Bolt			33
	6	Washer			34
	7	Washer			34
	8	Washer			34
	9	Nut			35
	11	Cotter Pin			32

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B. References

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 21-31-00/501, Cabin Pressure Control System
- (3) AMM 21-31-03/201, Cabin Pressure Outflow Valve
- (4) AMM 24-22-00/201, Electrical Power - Control
- (5) AMM 25-52-01/401, Sidewall Lining
- (6) AMM 52-36-00/001, Bulk Cargo Door

C. Access

- (1) Location Zone
811 Bulk Cargo Door

D. Prepare for Installation

S 214-041

- (1) Make sure that the outflow valve flapper doors can move freely:
 - (a) Manually move the flapper doors to the fully open and fully closed positions, and make sure that the doors can move freely.
 - 1) If the flapper doors do not move freely, replace the outflow valve with a serviceable outflow valve (AMM 21-31-03/201).

E. Actuator Installation

S 434-043

- (1) Do these steps if the actuator crank arm prevents the installation of the forward bolt (3) to the actuator support frame.

NOTE: When the actuator crank arm is in the closed position (faces in forward direction), it can interfere with the installation of the forward bolt (3) to the actuator support frame.

- (a) Remove the bolt that connects the actuator crank arm to the actuator spur gearshaft.
- (b) Remove the actuator crank arm from the actuator spur gearshaft.
- (c) Install the bolt (3) and washer (4) to the forward mounting lug on the actuator (2).

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- (d) Install the actuator crank arm to the actuator spur gearshaft.
- (e) Install the bolt to attach the actuator crank arm to the actuator spur gearshaft.

S 424-011

- (2) Put the actuator (2) against the actuator support frame and install the actuator bolts (3), washers (4), and lockwires (AMM 20-10-23/401).
 - (a) Tighten the bolts (3) to 55-65 pound-inches (6.2-7.3 Newton-meters).

S 424-042

- (3) Install the bolt (5), washers (6,7,8), nut (9), and cotter pin (11) to attach the connecting rod to the actuator arm.

CAUTION: MAKE SURE THAT THE HEAD OF THE BOLT IS INSTALLED ON THE INBOARD SIDE OF THE ACTUATOR ARM. IF THE BOLT IS NOT INSTALLED IN THE CORRECT ORIENTATION, THE BOLT WILL INTERFERE WITH THE PUSH ROD ASSEMBLY WHICH CAN CAUSE DAMAGE AND PREVENT PROPER OPERATION OF THE OUTFLOW VALVE.

- (a) Make sure that the head of the bolt (5) is installed on the inboard side of the actuator arm.
- (b) Tighten the nut (9) to 17 pound-inches (1.9 Newton-Meters).
 - 1) In order to install the cotter pin (11), you can increase the nut torque but do not tighten the nut (9) to more than 34 pound-inches (3.8 Newton-Meters).
- (c) Install the cotter pin (11).

S 434-013

- (4) Connect the AC and DC motor electrical connectors.

S 434-014

- (5) Connect the potentiometer electrical connector.

F. Actuator Post-Installation Test

S 864-044

- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

S 864-015

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead P11 panel:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1

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(c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

S 864-016

(3) Supply electrical power (AMM 24-22-00/201).

S 864-017

(4) Set the CABIN ALTITUDE CONTROL MODE SELECT switch on the P5 panel to the MAN position.

S 214-019

(5) Turn the MANUAL selector towards DESCEND.

(a) Make sure the VALVE position indicator needle moves to the CL position within 25 seconds.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

NOTE: Refer to AMM 21-31-00/501 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

S 214-039

(6) Make sure the outflow valve is fully closed.

S 824-021

(7) If the valve is not fully closed, adjust the actuator arm:

(a) Loosen the nuts on the connecting rod and turn the tube to engage with the actuator drive link as shown in Fig. 401.

S 864-022

(8) Set the CABIN ALTITUDE CONTROL MODE SELECT switch on the P5 panel to AUTO 1 or AUTO 2.

S 214-040

(9) Make sure the VALVE position indicator needle moves to the OP position.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

NOTE: Refer to AMM 21-31-00/501 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

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G. Return the Airplane to Normal Configuration

S 414-025

- (1) Install the debris screen, if it is necessary.

S 414-026

- (2) Install the endliner on the aft end of the bulk cargo compartment, if necessary (AMM 25-52-01/401).

S 414-028

- (3) Close the bulk cargo door, 811, if it is necessary (AMM 52-36-00/001).

S 864-029

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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OUTFLOW VALVE AC MOTORS – REMOVAL/INSTALLATION

1. General

- A. Two ac motors are attached to the actuator on the cabin-pressure-outflow valve. The ac motors operate when the CABIN ALTITUDE CONTROL selector, on the overhead panel, P5, is in the AUTO 1 or AUTO 2 position. One ac motor is for the AUTO 1 system. The other ac motor is for the AUTO 2 system. The motors drive the actuator which opens and closes the outflow valve.
- B. This procedure has instructions to remove and install the ac motors from the cabin pressure outflow valve. You can remove or install the motors from the bulk cargo compartment or from out of the airplane.

TASK 21-31-05-004-003

2. Remove the AC Motors (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electrical Power Control
- (2) AMM 25-52-01/401, Sidewall Panels
- (3) AMM 52-35-00/201, Aft Cargo Door
- (4) AMM 52-36-00/001, Bulk Cargo Door

B. Access

- (1) Location Zones
 - 165 Area aft of the bulk cargo compartment (Left)
 - 811 Bulk Cargo Door
 - 822 Aft Cargo Door

C. Prepare for the Removal

S 864-032

- (1) Remove the electrical power (AMM 24-22-00/201).

S 864-001

- (2) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE tags:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

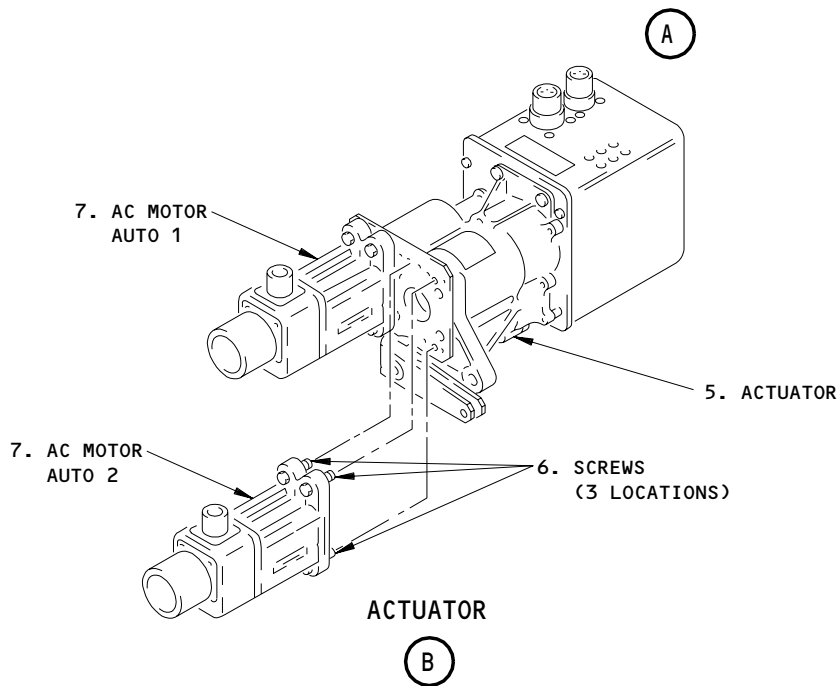
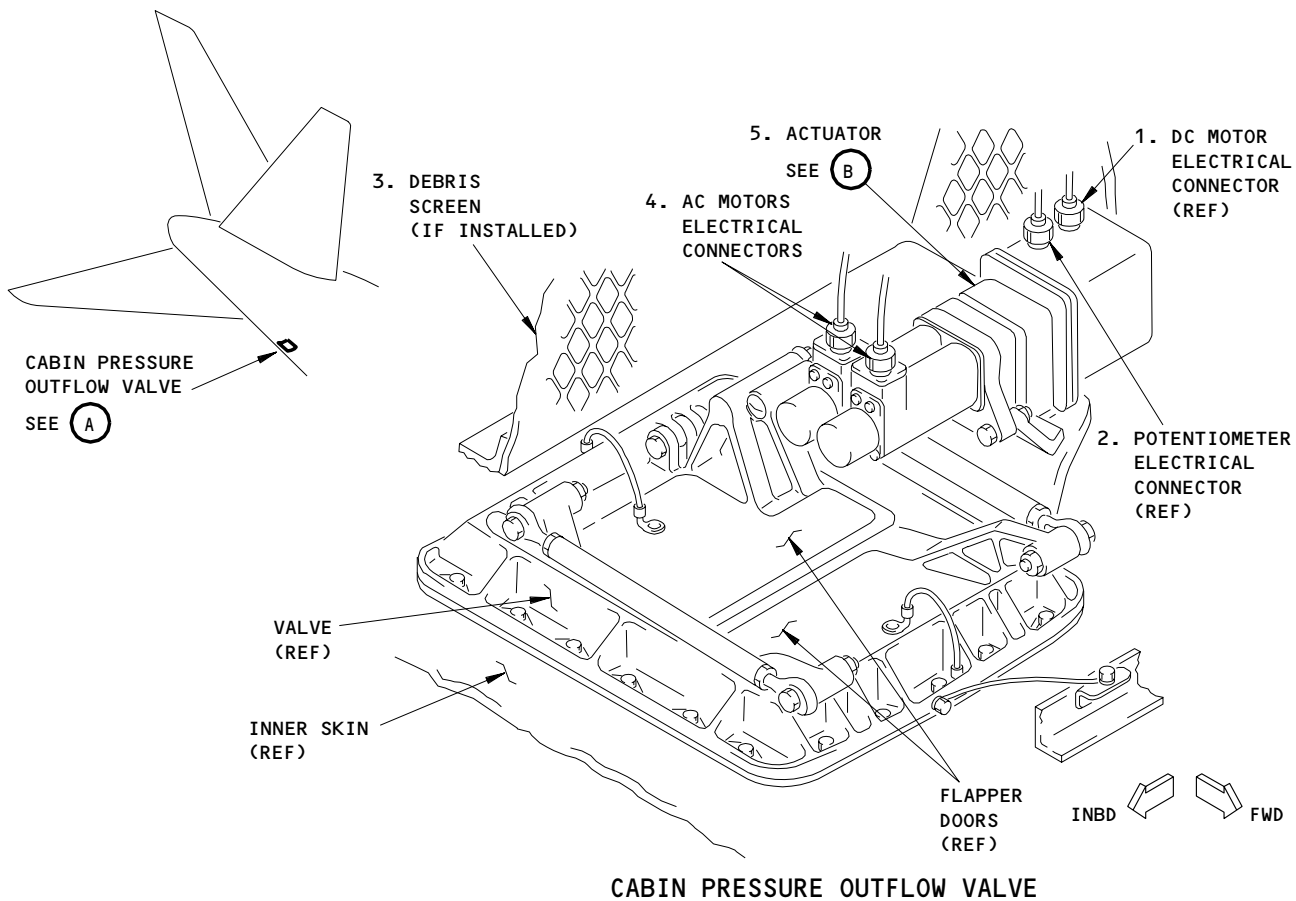
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Cabin Pressure Outflow Valve Actuator AC Motors Installation
Figure 401

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S 014-031

WARNING: MAKE SURE THE ELECTRICAL POWER IS OFF, THE CIRCUIT BREAKERS ARE OPENED, AND THE "DO-NOT-CLOSE" TAGS ARE ATTACHED BEFORE USING THE ACCESS THROUGH THE CABIN PRESSURE OUTFLOW. IF ELECTRICAL POWER IS SUPPLIED TO THE VALVE WHEN IT IS IN THE FULLY OPEN POSITION, THE VALVE WILL MOVE TO THE NOT FULLY OPEN POSITION. THE MOVEMENT OF THE VALVE CAN CAUSE INJURY.

- (3) To remove the ac motor(7) from out of the airplane, make sure the cabin pressure outflow valve is fully open.

NOTE: If the cabin pressure outflow valve will not open, then you must remove the motors from in the bulk cargo compartment.

S 014-002

- (4) To remove the ac motors(7) from the bulk cargo compartment, do the steps that follow:

(a) Open the aft cargo door, 822 (AMM 52-35-00/201), or the bulk cargo door, 811 (AMM 52-36-00/001).

(b) Remove the endliner at the aft end of the bulk cargo compartment (AMM 25-52-01/401).

(c) AIRPLANES WITH A DEBRIS SCREEN;

Do the steps that follow:

1) Release the catches on the debris screen(3) that covers the cabin pressure outflow valve.

2) Remove the debris screen(3).

D. Remove the AC Motor(7)

S 034-005

- (1) Disconnect the electrical connector(4) from the applicable (AUTO 1 or AUTO 2) ac motor(7).

S 434-004

- (2) If both ac motors(7) are removed, put a tag on the electrical connectors(4) to show which motors(7) they were connected to.

S 034-006

- (3) Remove the screws(6) on the ac motor(7).

S 024-007

- (4) Remove the ac motor(7).

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TASK 21-31-05-404-008

3. Install the AC Motors (Fig. 401)

A. References

- (1) AMM 21-31-00/501, Cabin Pressure Control System
- (2) AMM 24-22-00/201 Electrical Power Control
- (3) AMM 25-52-01/401, Sidewall Panels
- (4) AMM 52-35-00/201, Aft Cargo Door
- (5) AMM 52-36-00/001, Bulk Cargo Door

B. Access

- (1) Location Zones
 - 165 Area aft of the bulk cargo compartment (Left)
 - 811 Bulk Cargo Door
 - 822 Aft Cargo Door

C. Install the AC Motor

S 424-009

- (1) Put the ac motor(7) into position against the mounting plate on the cabin pressure outflow valve actuator.

S 434-010

- (2) Install the screws(6) at the base of the motor(7).

S 434-011

- (3) Connect the applicable (AUTO 1 or AUTO 2) electrical connector(4) to the ac motor(7).

S 034-012

- (4) If both ac motors were removed, remove the tags from the electrical connectors.

D. Do the AC Motor Installation Test

S 864-038

- (1) Make sure that all persons, clothing and loose materials are kept clear of the outflow valve, actuator crank arm, push rods, and flapper doors before electrical power is supplied to the outflow valve actuator.

NOTE: The outflow valve actuator will begin to operate and move when electrical power is supplied.

S 864-013

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11B14, CABIN ALTITUDE CONTROL MANUAL
 - (b) 11P15, CABIN ALTITUDE CONTROL AUTO 1
 - (c) 11P23, CABIN ALTITUDE CONTROL AUTO 2

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- S 864-014
- (3) Supply electrical power (AMM 24-22-00/201)
- S 864-015
- (4) Put the CABIN ALTITUDE CONTROL MODE SELECT selector on the P5 panel to the MAN position.
- S 864-017
- (5) Turn the MANUAL selector to the DESCEND position.
- S 214-036
- (6) Make sure the outflow valve closes and that the VALVE position indicator needle moves to the CL position within 25 seconds.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

NOTE: Refer to AMM 21-31-00/501 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

- S 864-019
- (7) If the AUTO 1 ac motor was installed, put the CABIN ALTITUDE CONTROL MODE SELECT selector, on the P5 panel, to the AUTO 1 position.
- S 864-025
- (8) If the AUTO 2 ac motor was installed, put the CABIN ALTITUDE CONTROL MODE SELECT selector, on the P5 panel, to the AUTO 2 position.
- S 214-037
- (9) Make sure the outflow valve moves to full open position and that the VALVE position indicator needle moves to the OP position.

NOTE: Different part number combinations of the cabin pressure controller and the outflow valve installed on the aircraft can cause the VALVE position indicator needle to point differently at the "CL/OP" positions.

NOTE: Refer to AMM 21-31-00/501 for the normal position of the VALVE position indicator needle at the "CL/OP" positions when different part number combinations of the cabin pressure controller and outflow valve are installed on the aircraft.

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E. Put the airplane back to its usual condition.

S 414-020

- (1) If the ac motors(7) were installed from in the bulk cargo compartment, do the steps that follow:
 - (a) Install the debris screen(3) if it is necessary.
 - (b) Install the endliner on the aft end of the bulk cargo compartment (AMM 25-52-01/401).
 - (c) Close the aft cargo door, 822, or the bulk cargo door, 811 (AMM 06-46-00/201).

S 864-024

- (2) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

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CABIN PRESSURE RELIEF SYSTEM – DESCRIPTION AND OPERATION

1. General

- A. The pressurization relief valves provide cabin pressure relief from extreme cabin-to-ambient differential pressure, if the pressurization system malfunctions (AMM 21-31-00/001).
- B. Two positive pressure relief valves prevent high cabin-to-ambient differential pressures if the pressurization system malfunctions. The valves normally open at a differential pressure of 8.95 psi with back-up protection at 9.42 psi in the event of a malfunction of the remote static port. High cabin-to-ambient differential pressures could cause structural damage to the airplane.
- C. Four negative pressure relief vent doors are part of the forward and aft cargo door system (ATA 52). The vent doors ensure that cabin pressure does not fall below ambient pressure. If an emergency descent from cruise is necessary, the vent doors open at a differential pressure of -0.3 to -0.5 psi.
- D. 767-300 PASSENGER AIRPLANES;
A negative pressure relief door is located in the forward cargo compartment fuselage immediately forward of the positive pressure relief valves. The door will ensure that cabin pressure does not fall below ambient pressure. If an emergency descent from cruise is necessary, the door will open at a differential pressure of -0.3 to -0.5 psi.
- E. Removal/installation procedures for the negative pressure relief vent doors on the cargo doors are in Chapter 52 Doors.

2. Component Details (Fig. 1, 2)

A. Positive Pressure Relief Valve

- (1) The positive pressure relief valve is a pneumatically operated poppet valve. The valve mounts directly on the fuselage skin forward of the left wing leading edge. The valve discharges cabin air directly overboard when high cabin-to-ambient differential pressures exist. The relief valve limits the cabin-to-ambient differential pressure by controlling airflow through the poppet. The relief valve's head pressure (same as cabin pressure) controls poppet motion. Airflow through a metering section controls the head pressure. When the differential pressure sensed by the metering section approaches 8.95 psi, the metering pin lifts off its seat. This releases head pressure through a dump tube.

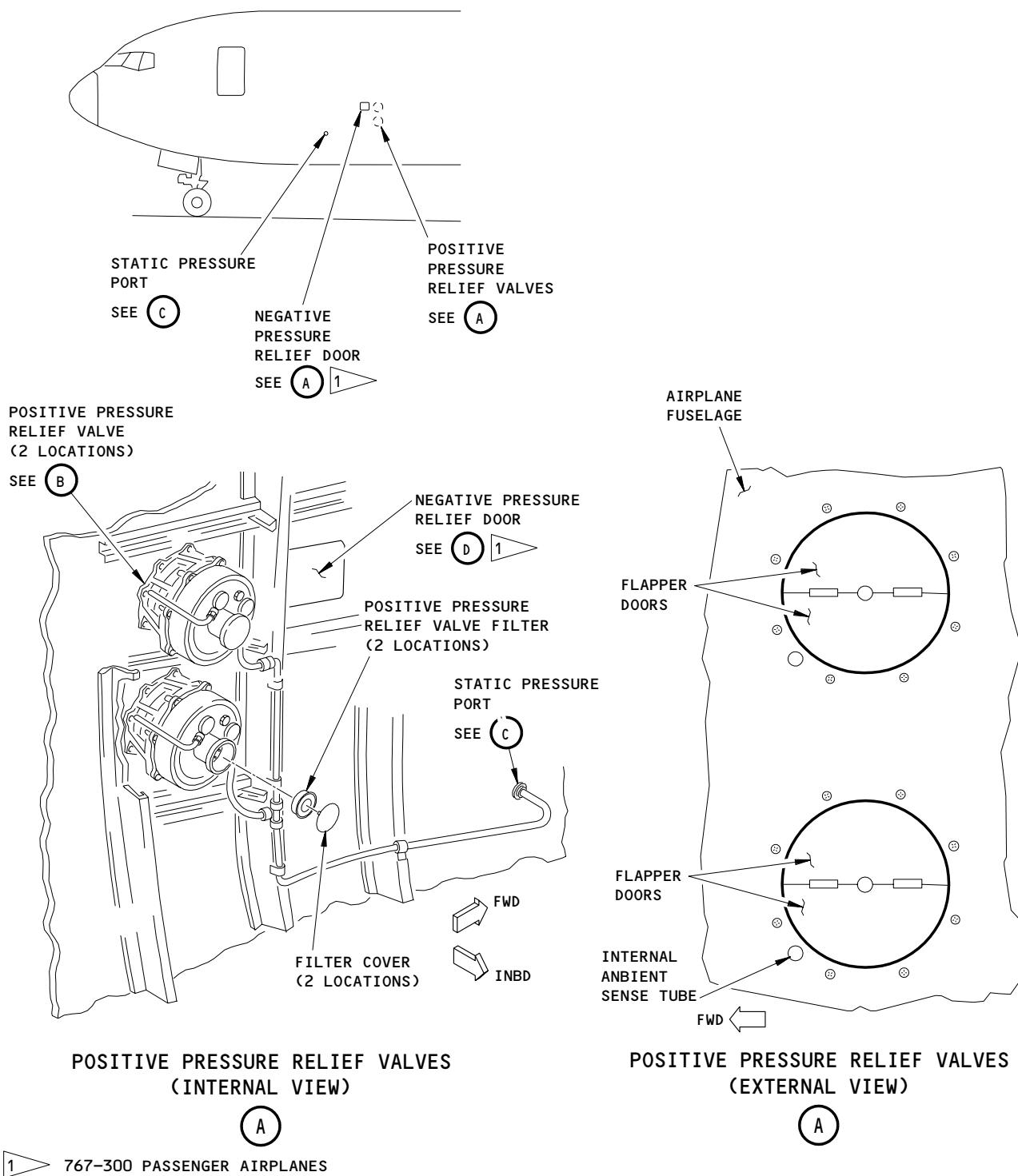
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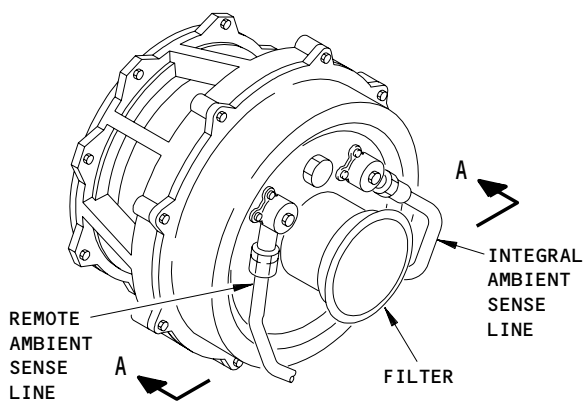
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Cabin Pressure Relief System - Component Location
Figure 1 (Sheet 1)

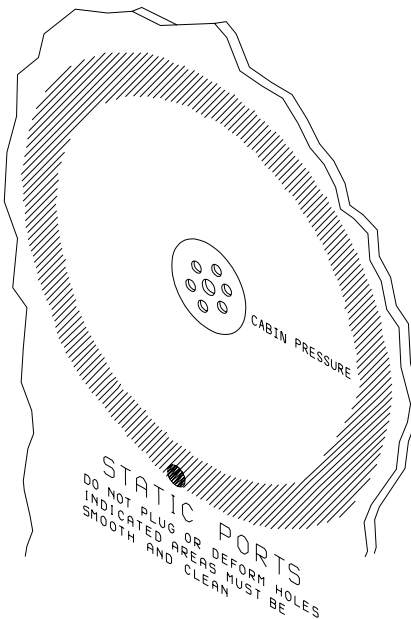
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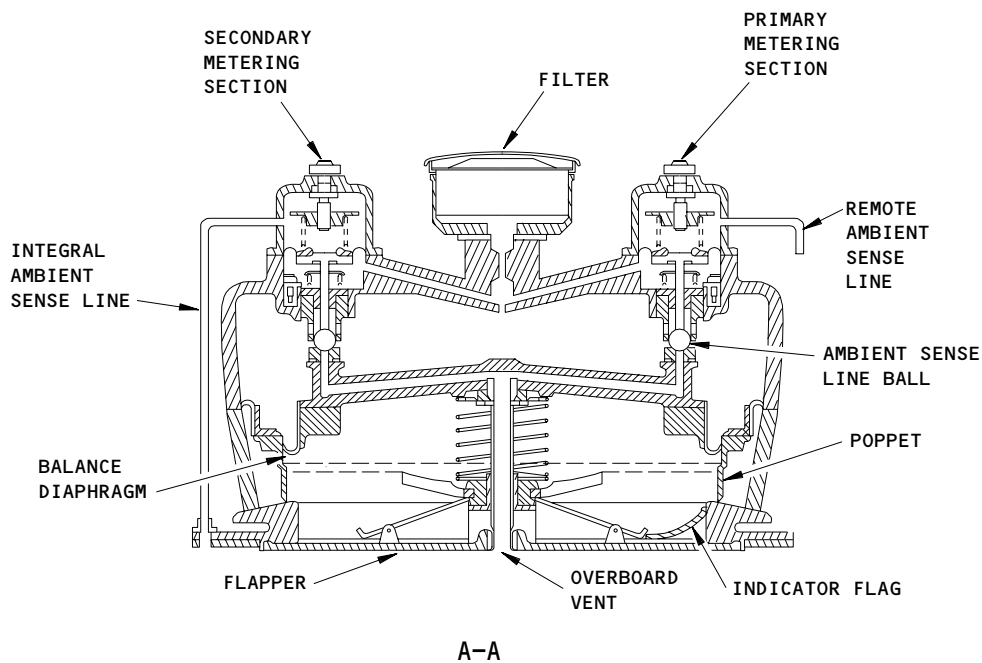
**POSITIVE PRESSURE RELIEF VALVE
(INTERNAL VIEW)**

(B)



STATIC PRESSURE PORT

(C)



**Cabin Pressure Relief System - Component Location
Figure 1 (Sheet 2)**

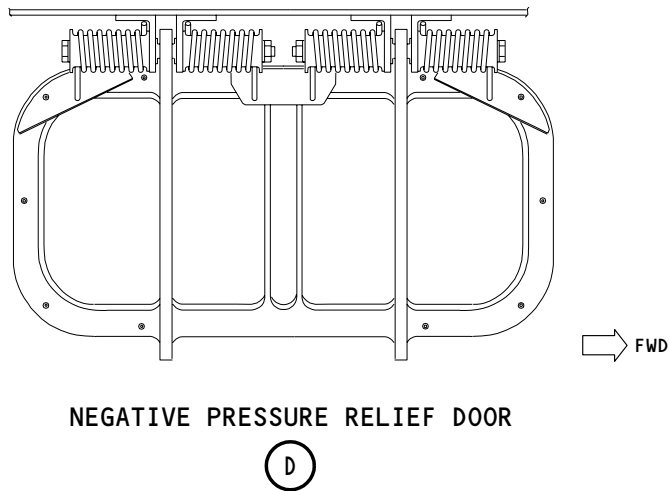
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Cabin Pressure Relief System - Component Location
Figure 1 (Sheet 3)

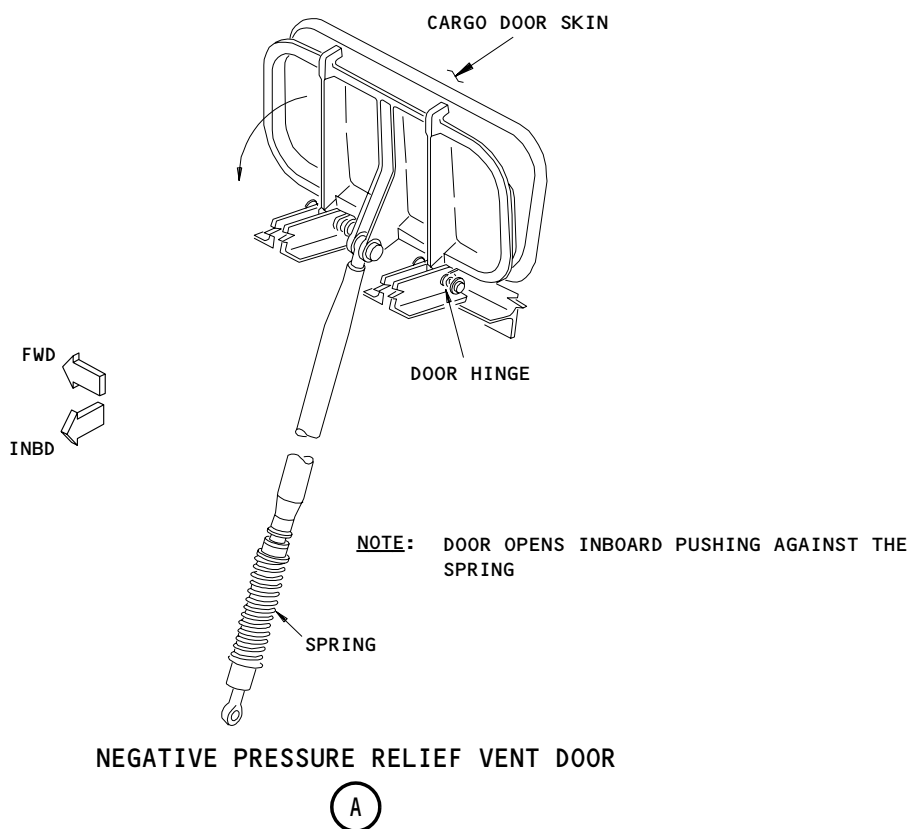
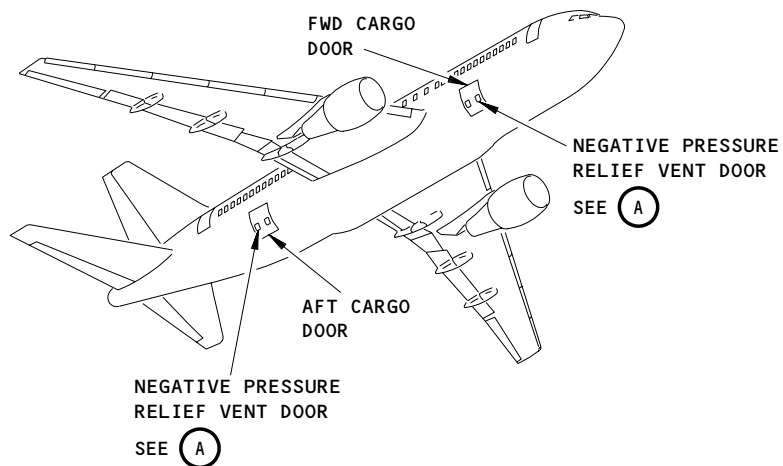
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MAINTENANCE MANUAL



Cargo Door Negative Pressure Relief Vent Door
Figure 2

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- (2) The valve uses two control metering sections. The primary metering section uses a remote ambient sense line and limits the differential pressure to 8.95 psi. The secondary metering section (backup control) uses an integral ambient sense tube. This section limits the differential pressure to 9.42 psi.
 - (3) At a cabin-to-ambient differential pressure of 8.95 psi or higher, the released head pressure allows cabin pressure to force the poppet open. This vents cabin air overboard. A small flag on the valve flappers visually indicates that the valve has operated. The flag is reset by opening the flappers manually and tucking the flag back in place.
- B. 767-300 PASSENGER AIRPLANES;
- Fuselage Negative Pressure Relief Door (Fwd Cargo Compartment)
- (1) A negative pressure relief door is located in the fuselage of the forward cargo compartment immediately forward of the positive pressure relief valves. It is a flapper type door and is spring loaded closed. Negative pressure of -0.3 to -0.5 psi on the door opens the door inward allowing air into the cargo compartment.
- C. Negative Pressure Relief Vent Doors (Fwd/Aft Cargo Compartment Doors)
- (1) Two vent doors are located in each of the forward and aft cargo compartment doors to provide negative pressure relief. The vent doors are part of the cargo door linkage and are spring loaded closed. Negative pressure of -0.3 to -0.5 psi on the vent door opens the door inward allowing air into the cargo compartment.

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767
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CABIN PRESSURE RELIEF SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
DOOR - (FIM 52-34-00/101) NEGATIVE PRESSURE RELIEF/VENT (ON CARGO DOOR)				
DOOR - NEGATIVE PRESSURE RELIEF/VENT (ON FUSELAGE) ¹	1	1	821, FWD CARGO COMPT	21-32-03
FILTER - POSITIVE PRESSURE RELIEF VALVE	1	2	821, FWD CARGO COMPT	21-32-02
VALVE - POSITIVE PRESSURE RELIEF	1	2	821, FWD CARGO COMPT	21-32-01

* SEE THE WDM EQUIPMENT LIST

¹ 767-300 PASSENGER AIRPLANES

Cabin Pressure Relief System - Component Index
Figure 101

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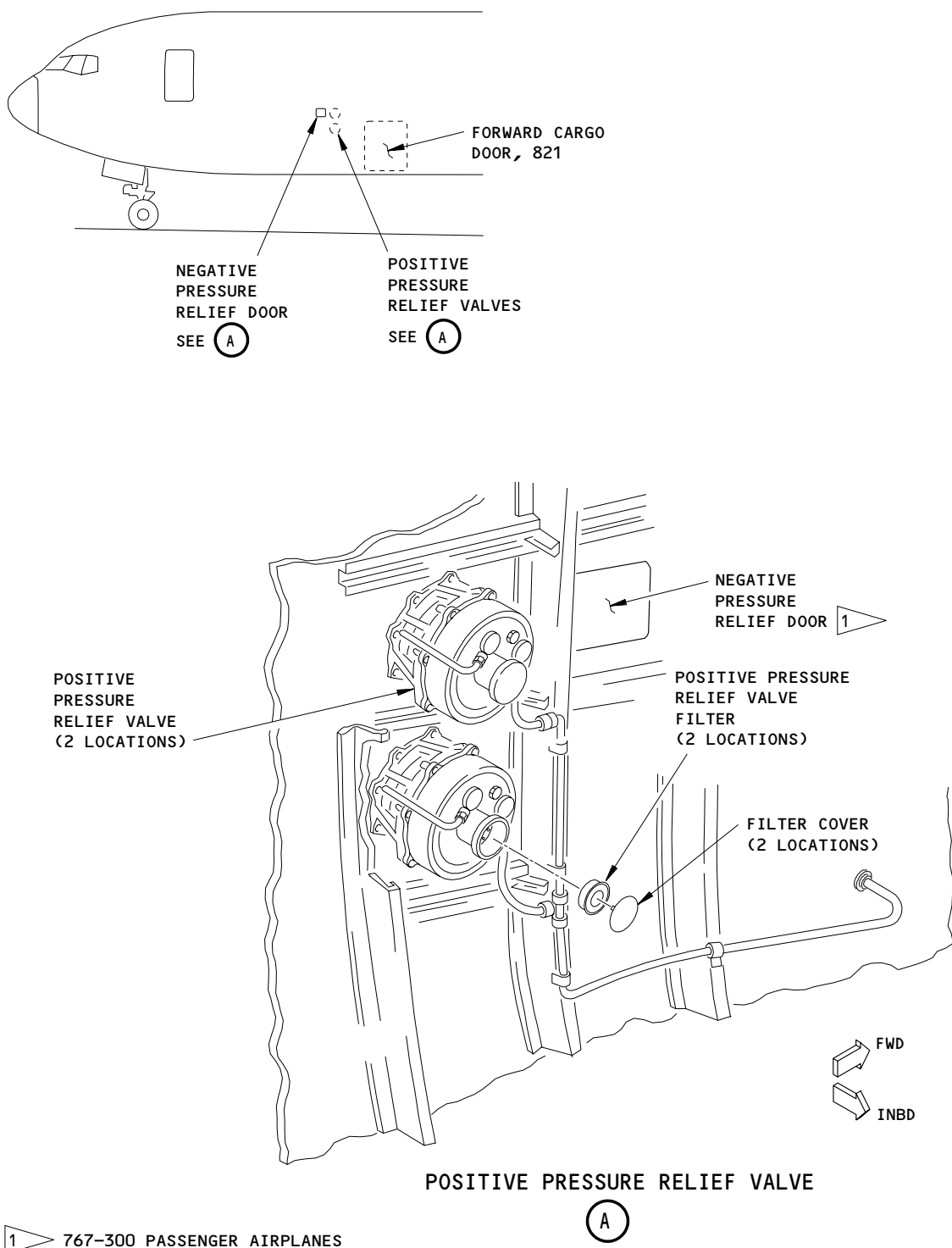
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767
FAULT ISOLATION/MAINT MANUAL



Cabin Pressure Relief System - Component Location
Figure 102

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POSITIVE PRESSURE RELIEF VALVE – MAINTENANCE PRACTICES

1. General

- A. This procedure has these tasks:
 - (1) Positive Pressure Relief Valve Removal
 - (2) Positive Pressure Relief Valve Installation
 - (3) Static System Leak Check – Positive Pressure Relief Valve
 - (4) Positive Pressure Relief Valve Indicator Flag Reset
- B. Two positive pressure relief valves are installed on the left forward cargo compartment airplane skin at STA 621 and between WL 163.5 and WL 200. The removal/installation procedure for each valve is the same.

TASK 21-32-01-002-001

2. Positive Pressure Relief Valve Removal (Fig. 201)

- A. References
 - (1) 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- B. Access
 - (1) Location Zone
821 Forward Cargo Door

C. Procedure

S 012-002

- (1) Open the forward cargo compartment door 821 (Ref 6-46-00).

S 012-003

- (2) Remove the cargo compartment lining to get access to the valve.

S 032-004

- (3) Disconnect the remote ambient sense tube from the pressure relief valve.

S 032-005

- (4) Remove the reducer, elbow, and seal from the valve head.

S 432-006

- (5) Put a cap on the pressure remote ambient sense tube and port in the metering section of the valve.

NOTE: The cap keeps out unwanted material.

S 022-007

- (6) Remove the pressure relief valve bolts from the airplane's outer skin and remove the pressure relief valve.

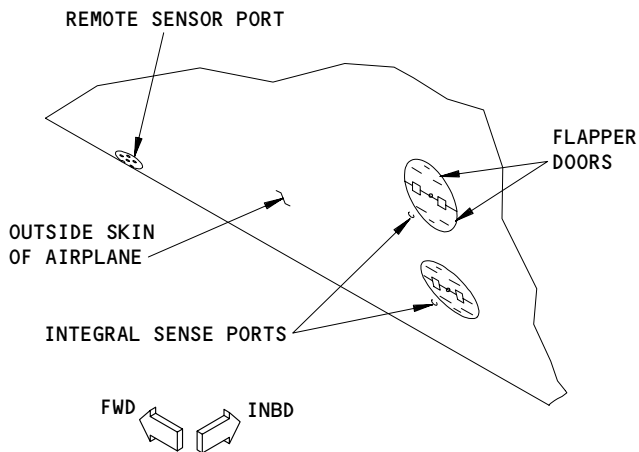
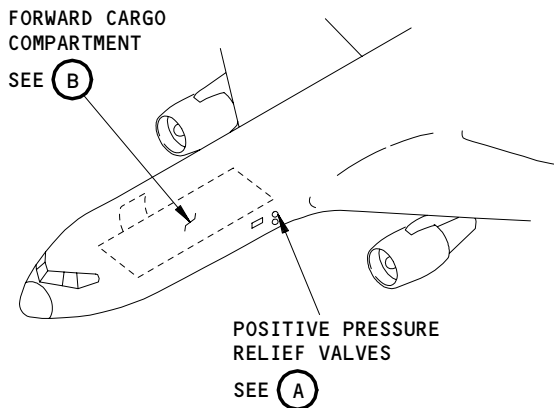
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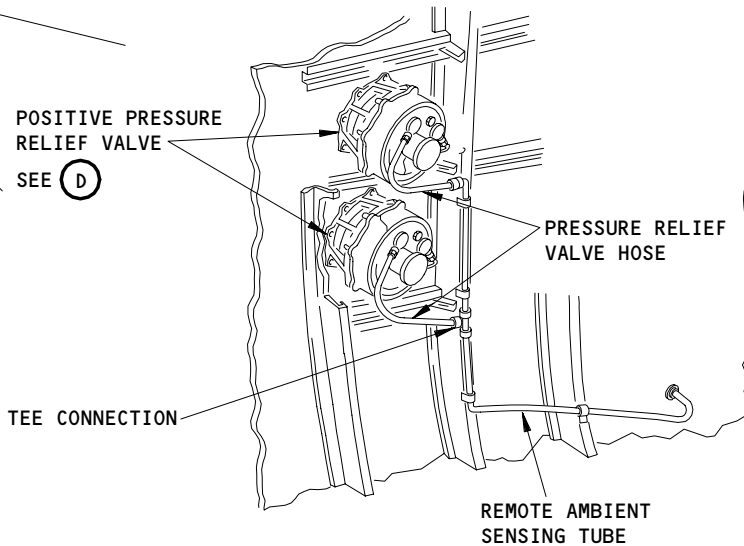
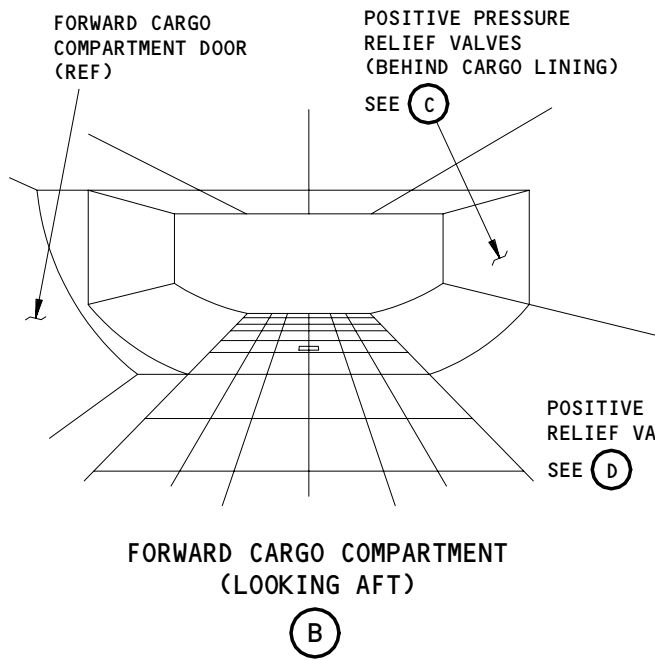
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POSITIVE PRESSURE RELIEF VALVES
(VIEW FROM OUTSIDE OF AIRPLANE)

(A)



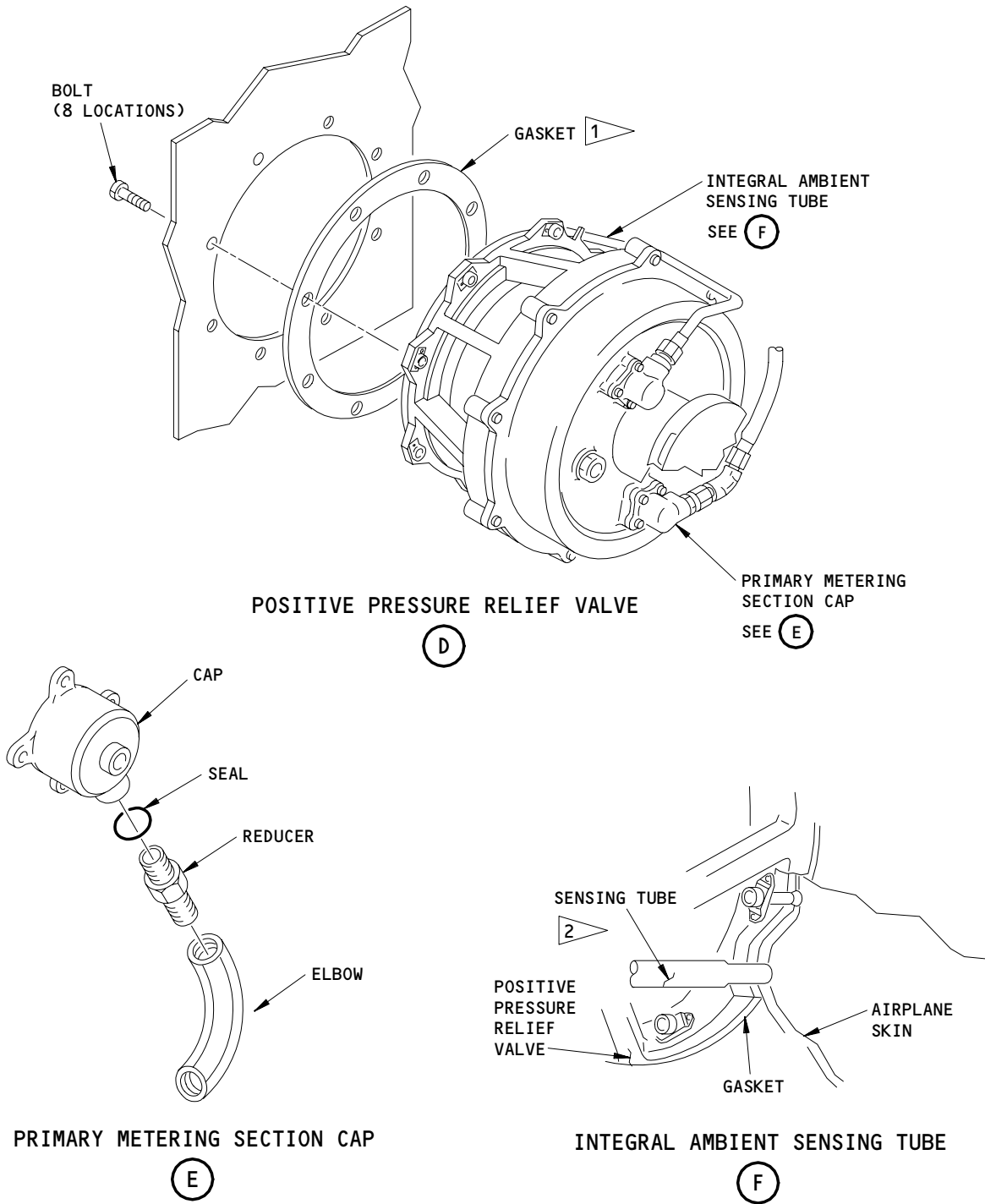
POSITIVE PRESSURE RELIEF VALVES
(VIEW FROM INSIDE OF AIRPLANE)

(C)

Positive Pressure Relief Valve Installation
Figure 201 (Sheet 1)

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- 1 MAKE SURE THE RIBBED SIDE OF THE GASKET IS AGAINST THE VALVE
- 2 MAKE SURE THE SENSING TUBE DOES NOT GO MORE THAN 0.02 INCH FARTHER THAN THE AIRPLANE SKIN

Positive Pressure Relief Valve Installation
Figure 201 (Sheet 2)

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TASK 21-32-01-402-008

3. Positive Pressure Relief Valve Installation (Fig. 201)

A. Consumable Materials

- (1) C00259 Primer BMS10-11 Type I
- (2) B00184 Solvent - BMS 11-7
- (3) A00247 Compound-Sealing BMS 5-95
- (4) C00261 Primer - BMS10-79 Type II
- (5) A00247 Sealant - Chromate Type BMS 5-95
- (6) C00033 Preventive - corrosion BMS 10-60 Type II
- (7) G00216 Wipers, lint-free, commercially available.

B. References

- (1) 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) 21-32-01/501, Positive Pressure Relief Valve

C. Access

- (1) Location Zone
821 Forward Cargo Door

D. Procedure

S 112-009

- (1) Remove remaining sealant from the airplane skin with solvent. Do not use too much solvent.

S 802-010

- (2) Rub the clean, wet surfaces with clean, lint-free wipers.

S 392-011

- (3) Apply the sealant to the smooth side of the gasket.

S 432-012

- (4) Put the new gasket into the correct position against the airplane skin.
 - (a) Make sure the holes in the gasket align with the holes in the airplane skin.
 - (b) Make sure the ribbed side of the gasket points to the valve.

S 392-013

- (5) Apply sealant to the bolts.

S 432-014

- (6) Install the pressure relief valve bolts through the airplane's outer skin.
 - (a) Tighten the bolts to 35 pound-inches.

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S 392-015

- (7) Apply sealing compound in the clearance between the pressure relief valve and the cutout in the airplane's outer skin.

S 392-016

CAUTION: MAKE SURE THE SEALANT DOES NOT GET INTO THE AMBIENT SENSING TUBE. SEALANT IN THE SENSING TUBE CAN CAUSE THE PRESSURE RELIEF VALVE TO MALFUNCTION.

- (8) Apply sealing compound around the integral ambient sensing tube and the airplane's outer skin.

S 112-017

- (9) If the integral ambient sensing tube extends more than .02 inches more than the airplane outer skin, do these steps:

CAUTION: BE CAREFUL NOT TO CAUSE DAMAGE TO THE AIRPLANE SKIN. DO NOT LET PARTICLES INTO THE TUBE.

- (a) Grind off the end of the tube to have .02 inch maximum dimension and put back the chamfer.
- (b) Clean the surface, the visible part of sensing tube OD, and 0.5 inch of tube ID.
- (c) Apply BMS 10-11, type 1 primer.
- (d) Apply one layer of BMS 10-79, type 2 primer to the part that comes out of the sensing tube.
- (e) Apply one layer of corrosion preventive BMS 10-60 Type II to the part that comes out of the sensing tube.

S 032-018

- (10) Remove the cap from the port in metering section of valve.

S 432-019

- (11) Install the seal, elbow, and reducer to the valve head.

S 032-020

- (12) Remove the cap from the remote ambient sense tube.

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S 422-021

CAUTION: DO NOT TWIST OR CAUSE KINKS IN THE HOSE WHEN YOU TIGHTEN THE HOSE NUT TO THE FITTING. DAMAGE CAN OCCUR.

(13) Connect the remote ambient sense tube to the elbow on the valve head.

NOTE: Make sure the remote ambient sensing tube has a 3 degree minimum slope down to the remote ambient static pressure port.

S 782-024

(14) Do this task: Static System Leak Check - Positive Pressure Relief Valve (AMM 21-32-01/201).

NOTE: This leak check will determine if there is air leakage at the connection of the remote ambient sense tube to the positive pressure relief valve, and in the remote ambient sense tubes between the static pressure port and the positive pressure relief valves.

E. Put the Airplane Back to Its Usual Condition

S 412-025

(1) Install the cargo compartment lining.

S 412-026

(2) Close the forward cargo compartment door (821).

TASK 21-32-01-702-027

4. Static System Leak Check - Positive Pressure Relief Valve

A. General

- (1) This procedure does a leak check of the static system for the positive pressure relief valve.
- (2) This procedure will determine if there is air leakage in the remote ambient sense tubes between the remote static pressure port and the positive pressure relief valves.
- (3) If you replaced both positive pressure relief valves with two new valves which were successfully tested off-aircraft in the shop, you can use this procedure as an alternate test to the Positive Pressure Relief Valve - System Test in AMM 21-32-01/501.

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B. Equipment

- (1) 33410M-125-4 Adapter - Static Port, or equivalent

NOTE: The adapter is included with the Vacuum Tank - Positive Pressure Relief Valve Test Equipment, A21010.

- (2) Tester- Pitot/Static, or equivalent vacuum source (AMM 34-11-00/501)

C. References

- (1) AMM 34-11-00/501, Pitot-Static System

D. Access

- (1) Location Zones
121 Forward Cargo Compartment (left)

E. Procedure

S 212-028

- (1) Make sure the static pressure port is free of blockage or contamination.

S 482-029

- (2) Connect the static port adapter to the static pressure port.

S 482-030

- (3) Connect the pitot/static tester (or equivalent vacuum source) to the static port adapter.

S 862-044

- (4) Supply a 4-psig (21.78-in Hg, 8500-foot altitude, 412-knots) vacuum to the static system.

S 862-032

- (5) Isolate the vacuum.

S 982-033

- (6) Make a record of the initial pressure.

S 982-035

- (7) After 1 minute make a record of the final pressure.

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- S 982-045
- (8) Subtract the final pressure from the initial pressure to determine the leakage rate.
- S 782-037
- (9) If leakage rate is more than 0.1 psi (0.2-in Hg, 214-feet altitude, 65 knots), find and repair the leak, then do the leak test again.
- S 862-038
- (10) Put the static system back to ambient pressure.
- S 082-039
- (11) Disconnect the pitot/static tester from the static port adapter.
- S 082-040
- (12) Disconnect the static port adapter from the static pressure port.

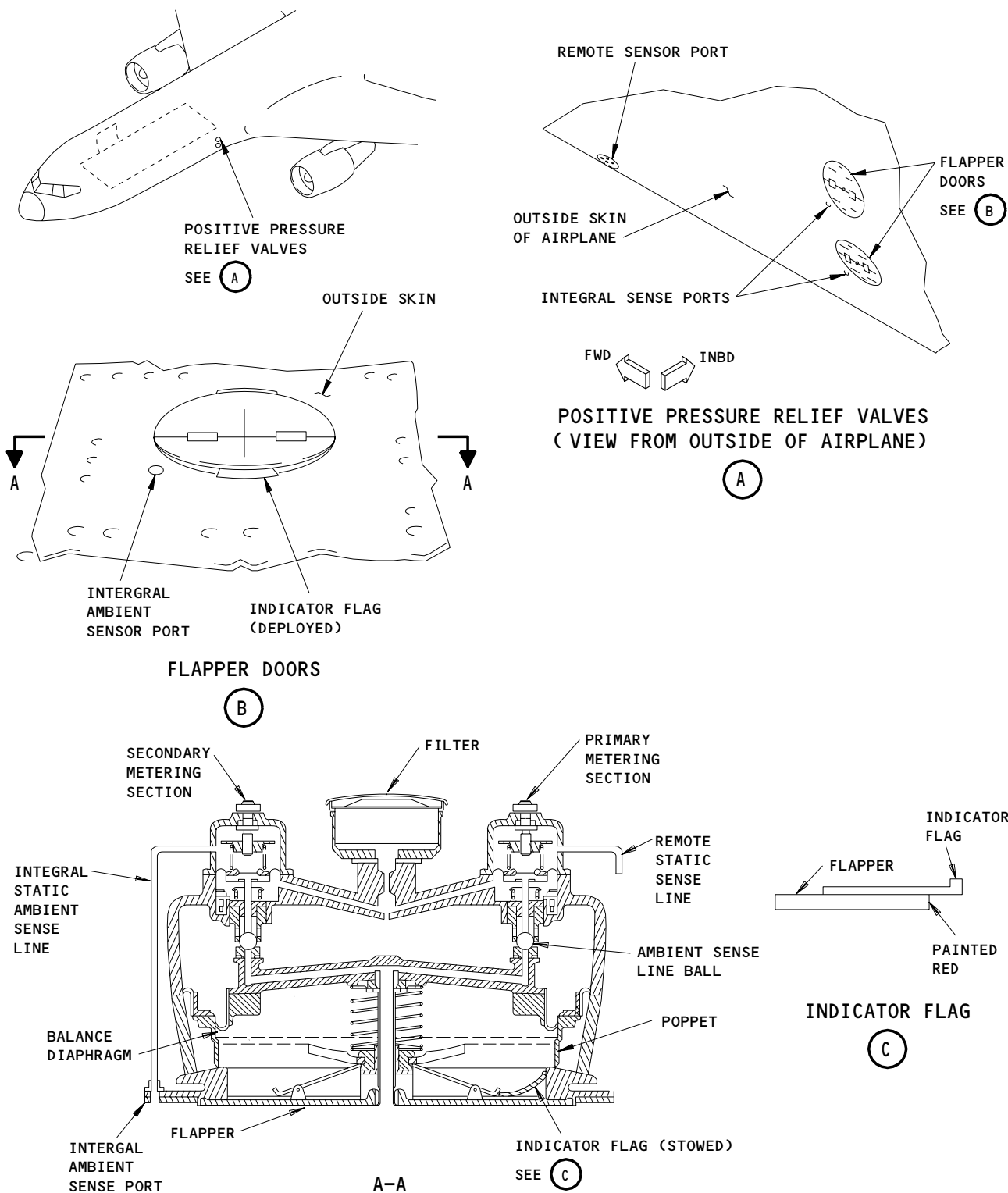
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Positive Pressure Relief Valve Indicator Flag Reset
Figure 202

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TASK 21-32-01-902-046

5. Positive Pressure Relief Valve Indicator Flag Reset (Fig. 202)

A. General

- (1) This procedure gives instructions to reset the indicator flag and close the flappers when a positive pressure relief valve has opened.

B. Indicator Flag Reset

S 212-047

- (1) Locate the pressure relief valve that is open (Fig. 202).

NOTE: You can see the red indicator flag if the valve is open.

S 982-049

- (2) Pull the flapper open.

S 982-050

- (3) Push the indicator flag into the valve.

S 982-051

- (4) Close the flapper.

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POSITIVE PRESSURE RELIEF VALVE – ADJUSTMENT/TEST

TASK 21-32-01-705-001

1. System Test – Positive Pressure Relief Valve

A. General

- (1) This procedure has instructions to do the positive pressure relief valve test. There are two parts to this test:
 - (a) The Remote Ambient Sensor Test
 - (b) The Integral Ambient Sensor Test

B. Equipment

- (1) Vacuum Tank – Pressure Relief Valve Test Equipment, A21010-70 (Recommended)
- (2) Vacuum Tank – Pressure Relief Valve Test Equipment, A21010-69,-57 (Alternative)
- (3) Air compressor or air source – capable of 60-80 psi at 22 scfm, commercially available.

C. Access

- (1) Location Zones
 - 121 Forward cargo compartment (Left)

NOTE: The relief valves are installed on the airplane skin.
This test can only be done from the out side of the airplane.

D. Positive Pressure Relief Valve Test (Fig. 501)

NOTE: Each valve must be tested separately.

S 215-035

- (1) Make sure there is no blockage or unwanted materials at these locations on the fuselage skin by the positive pressure relief valves:
 - (a) The static pressure port (fwd of the relief valves)

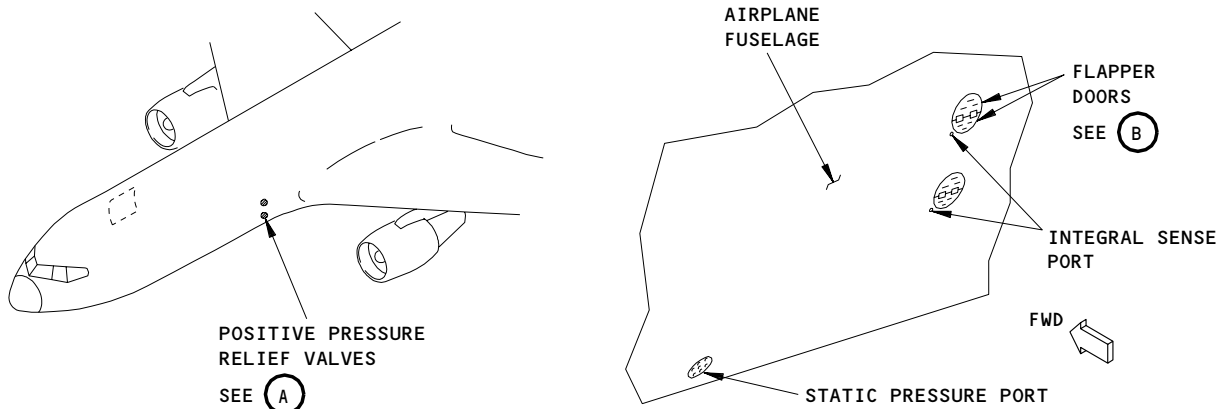
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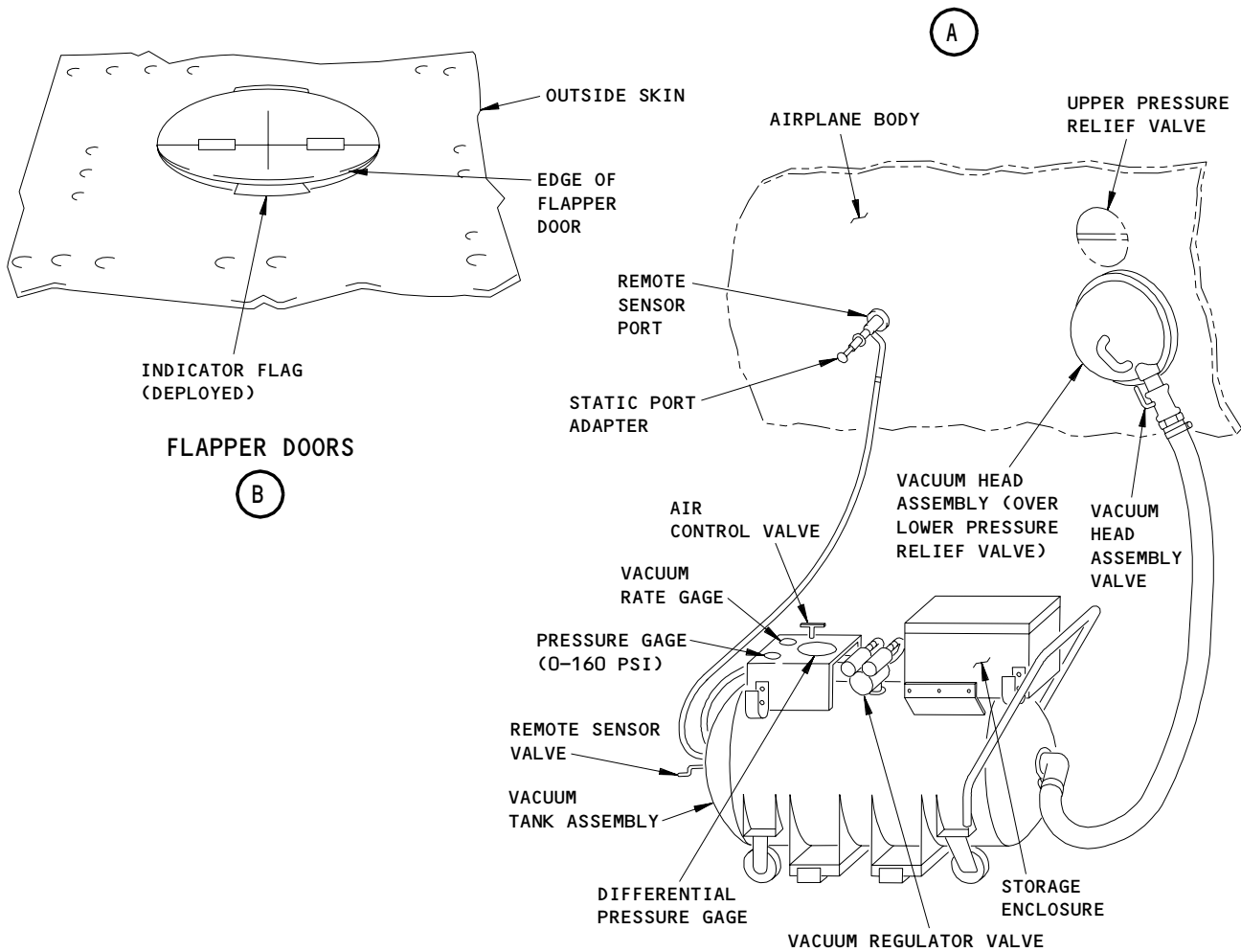
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POSITIVE PRESSURE RELIEF VALVES



NOTE: THE A21010-70 VACUUM TANK IS THE PREFERRED TEST EQUIPMENT.

A21010-70, -69, OR -57 VACUUM TANK -
PRESSURE RELIEF VALVE TEST

Positive Pressure Relief Valve Test Setup (Preferred)
Figure 501

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- (b) The integral ambient sense tube opening (adjacent to each relief valve).

S 485-036

- (2) Connect the test equipment to the applicable relief valve.
 - (a) Make sure all the valves on the test equipment are closed.
 - (b) Connect the air pressure source to the quick-disconnect air connection on the vacuum tank assembly.
 - (c) Make sure the vacuum regulator valve on the vacuum tank assembly is turned fully clockwise.
 - (d) A21010-70,-69,-57 TEST EQUIPMENT;
Adjust the air control valve until the indication on the pressure gage is 70 (+10/-10) psi.
 - (e) Adjust the vacuum regulator valve until the differential pressure is approximately 2.0 psi (4.07 inches Hg).

NOTE: Turn the vacuum regulator valve counter-clockwise to increase the vacuum (differential pressure). The arrow on the vacuum regulator valve indicates an increase of pressure not vacuum.

A21010-70 TEST EQUIPMENT AND SUBSEQUENT;
The differential pressure will show as a negative value on the digital vacuum pressure gage.

- (f) Install the static port adapter to the remote sensor port on the airplane fuselage.
 - 1) Make sure the plunger is in the center hole of the port and that the adapter is over all of the port.
- (g) Open the remote sensor valve to the static port adapter.

CAUTION: HOLD THE VACUUM HEAD ASSEMBLY AGAINST THE AIRPLANE FUSELAGE AS YOU DO THE TEST. THE VACUUM HEAD CAN BE DAMAGED IF IT FALLS TO THE GROUND WHEN THERE IS NO VACUUM.

- (h) Put and hold the vacuum head assembly over the applicable relief valve and open the vacuum head assembly valve.
 - 1) Make sure the vacuum head assembly is sealed to the airplane skin.

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S 735-005

(3) Do the Remote Ambient Sensor Test.

(a) Adjust the vacuum regulator valve to increase the differential pressure at the rates that follow:

NOTE: A21010-70 TEST EQUIPMENT AND SUBSEQUENT;
The differential pressure will show as a negative value on the digital vacuum pressure gage.

- 1) When the differential pressure is less than 8.70 psig (17.71 inches Hg), apply the vacuum at a rate not greater than 5.00 psig/min (10.18 inches Hg/min).
- 2) When the differential pressure is 8.70 - 9.10 psig (17.71 - 18.53 inches Hg), apply the vacuum at a rate not greater than 2.00 psig/min (4.07 inches Hg/min).

(b) Monitor closely the needle position on the differential pressure gage to confirm the crackpoint pressure of the pressure relief valve occurs at a differential pressure of 8.95 ±0.15 psig (18.22 ±0.31 in-Hg).

NOTE: The crackpoint pressure of the valve occurs when the needle on the differential pressure gage stops increasing, then suddenly decreases slightly, and then increases slightly again and then stabilizes. It is not necessary for the pressure relief valve to actuate to the full open position (poppet action).

The crackpoint pressure of the valve occurs when sufficient differential pressure causes the valve poppet to move away from the valve seat. Valve operation can be observed from inside the airplane by removing a section of the left sidewall lining in the forward cargo compartment.

(c) If the pressure relief valve cracks open at a differential pressure more than 9.10 psig (18.53 in-Hg), make sure that there are no leaks at any of the tubing connections on the vacuum tank assembly.

NOTE: A21010-70 TEST EQUIPMENT AND SUBSEQUENT;
The differential pressure will show as a negative value on the digital vacuum pressure gage.

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- (d) Adjust the vacuum regulator valve until the differential pressure is approximately 2.0 psig (4.07 inches Hg) at a rate not more than 4.0 psig/min (8.14 inches Hg/min).

NOTE: A21010-70 TEST EQUIPMENT AND SUBSEQUENT;
The differential pressure will show as a negative value on the digital vacuum pressure gage.

S 735-012

- (4) Do the Integral Ambient Sensor Test
- (a) Close the remote sensor valve.
 - (b) Adjust the vacuum regulator valve to increase the differential pressure at the rates that follow:

NOTE: A21010-70 TEST EQUIPMENT AND SUBSEQUENT;
The differential pressure will show as a negative value on the digital vacuum pressure gage.

- 1) When the differential pressure is 0 - 9.00 psig (0 - 18.33 inches Hg), apply the vacuum at a rate not more than 5.00 psig/min (10.18 inches Hg/min).
 - 2) When the differential pressure is 9.00 - 9.62 psig (18.33 - 19.59 inches Hg), apply the vacuum at a rate not more than 2.00 psig/min (4.07 inches Hg/min).
- (c) Monitor closely the needle position on the differential pressure gage to confirm the crackpoint pressure of the pressure relief valve occurs at a differential pressure of 9.42 ±0.20 psig (19.18 ±0.41 in-Hg).

NOTE: The crackpoint pressure of the valve occurs when the needle on the differential pressure gage stops increasing, then suddenly decreases slightly, and then increases slightly again and then stabilizes. It is not necessary for the pressure relief valve to actuate to the full open position (poppet action).

The crackpoint pressure of the valve occurs when sufficient differential pressure causes the valve poppet to move away from the valve seat. Valve operation can be observed from inside the airplane by removing a section of the left sidewall lining in the forward cargo compartment.

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- (d) If the pressure relief valve cracks open at a differential pressure more than 9.62 psig (19.59 in-Hg), make sure that there are no leaks at any of the tubing connections on the vacuum tank assembly.

NOTE: A21010-70 TEST EQUIPMENT AND SUBSEQUENT;
The differential pressure will show as a negative value on the digital vacuum pressure gage.

S 865-017

- (5) Adjust the vacuum regulator valve until the differential pressure is approximately 2.0 psig (4.07 inches Hg) at a rate not more than 4.0 psig/min (8.14 inches Hg/min).

NOTE: A21010-70 TEST EQUIPMENT AND SUBSEQUENT;
The differential pressure will show as a negative value on the digital vacuum pressure gage.

S 485-021

- (6) Close the vacuum head assembly valve and remove the vacuum head assembly.

S 865-018

- (7) Adjust the vacuum regulator valve fully clockwise and reduce the differential pressure to zero psi.

S 735-022

- (8) Do the remote ambient sensor test and the integral ambient sensor test for the other positive pressure relief valve.

E. Put the airplane back to its usual condition

S 085-019

- (1) Remove the test equipment from the airplane.

S 855-057

- (2) Indicator Flag Reset
(a) Locate the pressure relief valve that is open.

NOTE: You can see the red indicator flag if the valve is open.

- (b) Pull the flapper open.
(c) Push the indicator flag into the valve.
(d) Close the flapper.

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POSITIVE PRESSURE RELIEF VALVE FILTER – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the filters that are in the positive pressure relief valves.

TASK 21-32-02-004-001

2. Remove the Relief Valve Filter (Fig. 401)

A. References

- (1) 06-46-00/201 Entry, Service and Cargo Door Access Doors and Panels
(2) 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zone
121 Forward Cargo Compartment (Left)

C. Prepare for the Removal

S 014-002

- (1) Open the forward cargo compartment door, 821 (Ref 06-46-00).

S 014-003

- (2) Remove the sidewall lining on the left side of the cargo compartment, across from the aft end of the cargo door (Ref 25-52-01).

D. Remove the relief valve filter.

S 034-004

- (1) Pull the filter cover off of the valve.

S 024-005

- (2) Pull the filter out of valve.

TASK 21-32-02-404-006

3. Install the Relief Valve Filter (Fig. 401)

A. References

- (1) 06-46-00/201 Entry, Service and Cargo Door Access Doors and Panels
(2) 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zone
121 Forward Cargo Compartment (Left)

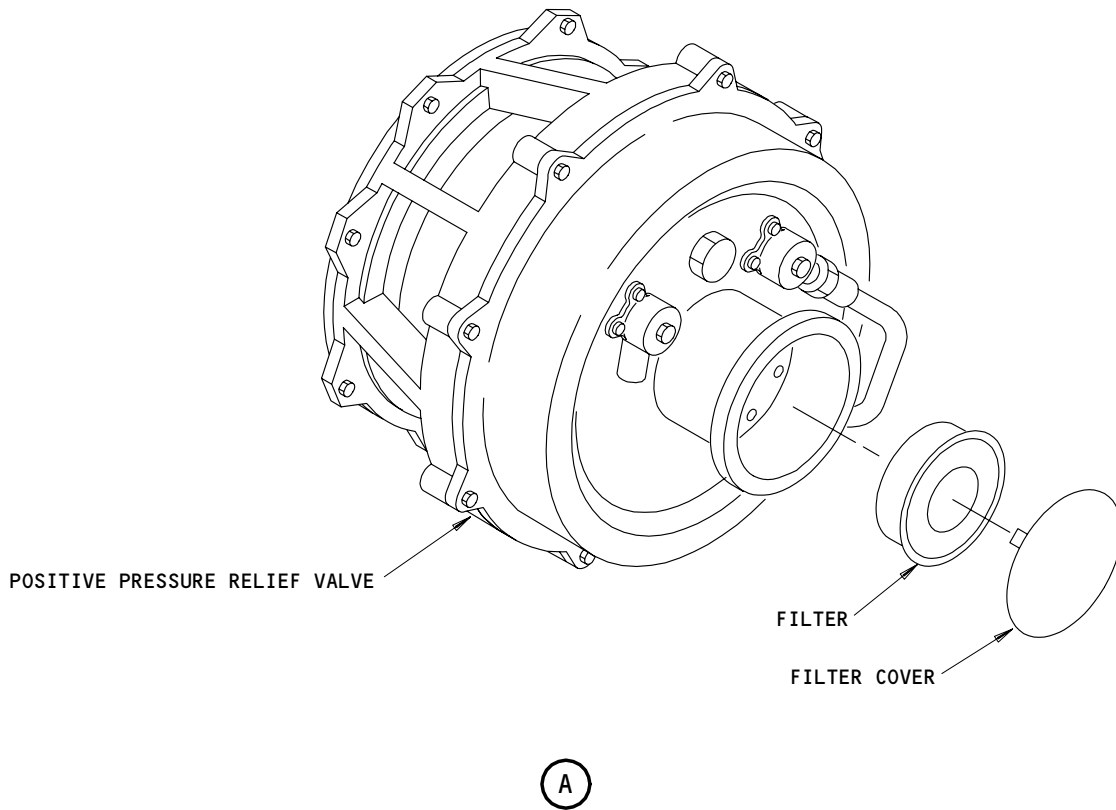
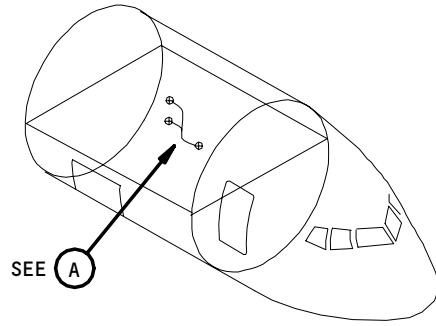
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Positive Pressure Relief Valve Filter Installation
Figure 401

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C. Install the relief valve filter.

S 434-010

- (1) Put the filter into the relief valve.

S 434-007

- (2) Push the filter cover onto the relief valve until it snaps into position.

D. Put the Airplane Back to its Usual Condition

S 414-008

- (1) Install the sidewall lining on the left side of the cargo compartment, across from the aft end of the cargo door (Ref 25-52-01).

S 414-009

- (2) Close the forward cargo compartment door, 821 (Ref 06-46-00).

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NEGATIVE PRESSURE RELIEF DOOR – MAINTENANCE PRACTICES

1. General

- A. This procedure contains three tasks. The first task is the removal of the negative pressure relief door on the forward fuselage. The second task is the installation of the negative pressure relief door on the forward fuselage. The third task is an adjustment/test of the negative pressure relief door.
- B. The airplane has five negative pressure relief doors. Two relief doors are installed on each of the cargo doors and one door is installed in the forward cargo compartment fuselage.
- C. Removal/Installation procedures for the negative pressure relief doors on the cargo doors are in Chapter 52 Doors.

TASK 21-32-03-002-001

2. Remove the Negative Pressure Relief Door (Fig. 201)

A. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zone
821 Forward Cargo Door

C. Procedure

S 012-002

- (1) Open the forward cargo door, 821 (AMM 06-46-00/201).

S 012-003

- (2) Remove the left cargo compartment sidewall lining, across from the aft end of the cargo compartment door (AMM 25-52-01/401).

NOTE: The negative pressure relief door is forward of the positive pressure relief valves.

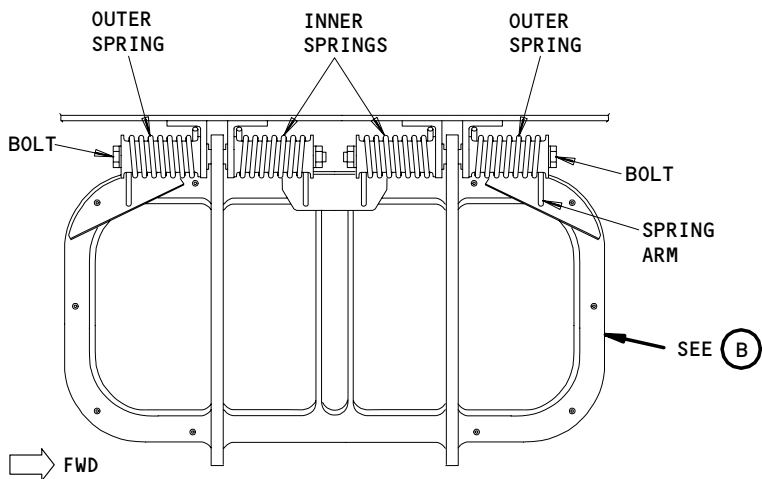
S 032-004

- (3) Remove the bolts on the door:

NOTE: Fully remove one bolt before you start to remove the other bolt.

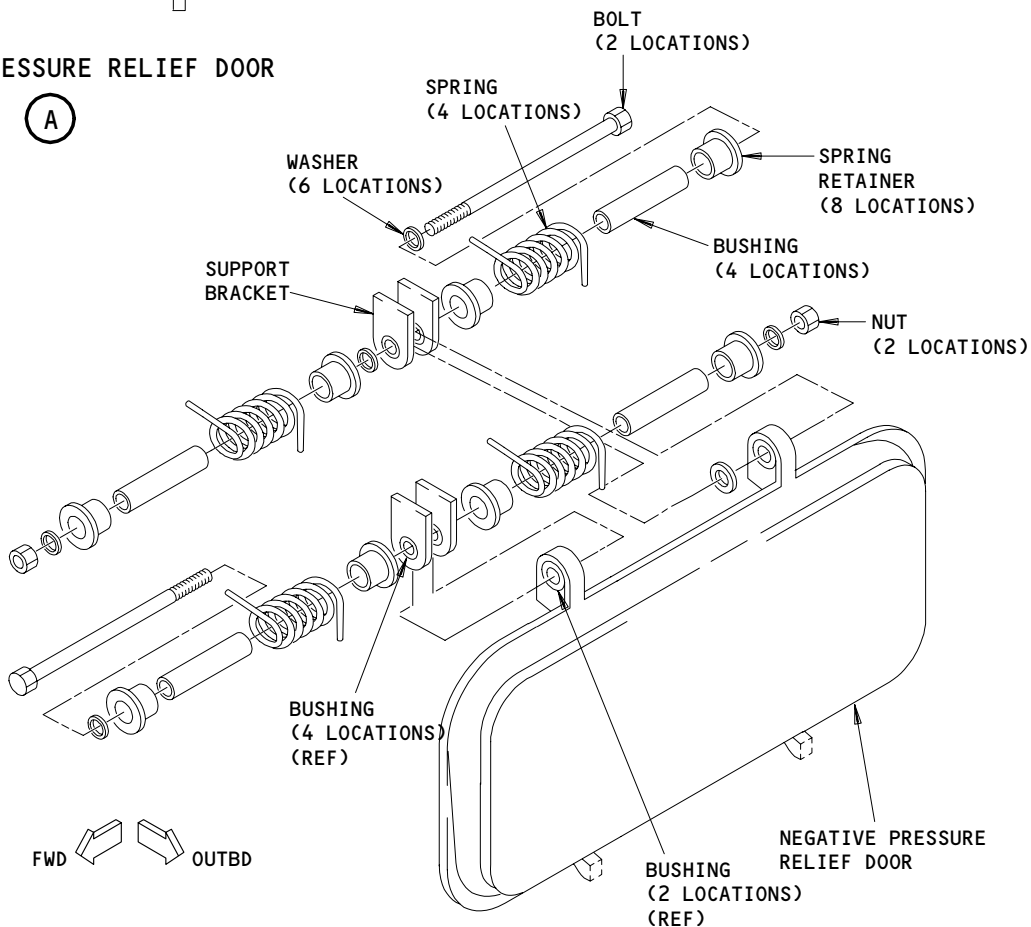
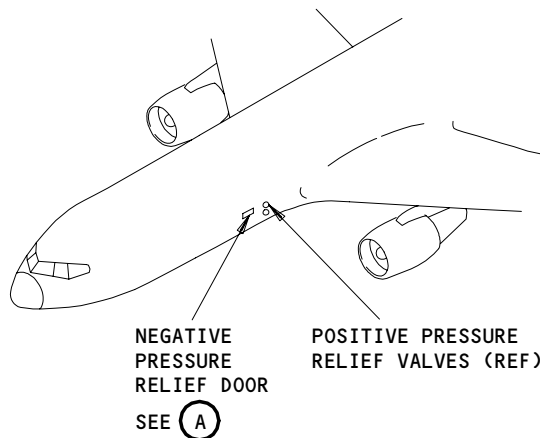
- (a) Remove the washer and nut from the inner end of the bolt.
- (b) Hold the inner and outer springs to release pressure on the bolt.

NOTE: Do not let the spring come out when you remove the bolt. The springs will unwind approximately 1/4 to 1/2 of a turn.



NEGATIVE PRESSURE RELIEF DOOR

(A)



NEGATIVE PRESSURE RELIEF DOOR DETAIL

(B)

**Negative Pressure Relief Door Installation
Figure 201**

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767-300 PASSENGER AIRPLANES

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- (c) Pull the bolt out of the door hinge and remove the bolt and outer spring assembly.
- (d) Remove the inner spring assembly.

NOTE: The outer spring assembly stays on the bolt.

- (e) Do the steps above to remove the other bolt and spring assembly.

S 022-005

- (4) Remove the door.

TASK 21-32-03-402-006

3. Install the Negative Pressure Relief Door

A. Access

- (1) Location Zone
821 Forward Cargo Door

B. Procedure

S 212-007

- (1) Make sure all the bushings are in the door hinges and the support brackets.

S 802-008

- (2) Hold the door in position against the opening in the airplane skin.

S 432-009

- (3) Put the spring assemblies together.

NOTE: Each spring assembly includes one bushing, two spring retainers, and one spring.

S 432-010

- (4) Install the bolts on the door:

NOTE: Fully install one bolt before you start to install the other bolt.

- (a) Put the washer and the outer spring assembly on the bolt.
- (b) Put the bolt through the bracket and door hinge with the head of the bolt near the outer edge of the door.
 - 1) Wind the outer spring approximately 1/4 to 1/2 of a turn until one spring arm is against the bracket and the other spring arm is against the door.
- (c) Put the inner spring assembly on the bolt.
 - 1) Wind the spring approximately 1/4 to 1/2 of a turn until one spring arm is against the bracket and the other spring arm is against the door.
- (d) Install the washer and nut on the inner end of the bolt.

(e) Do the steps above to install the other bolt and spring assembly.

S 712-011

(5) Do the adjustment/test for the negative pressure relief door.

S 412-012

(6) Install the cargo compartment sidewall lining (AMM 25-52-01/401).

S 412-013

(7) Close the forward cargo compartment door, 821.

TASK 21-32-03-702-014

4. Negative Pressure Relief Door Adjustment/Test

A. Equipment

(1) Spring scale - push type, 5-50 lb range, commercially available

NOTE: Use the scale with a soft compression head to prevent damage to the outer surface of the door.

B. Access

(1) Location Zone
821 Forward Cargo Door

C. Procedure

S 482-015

(1) On the external surface of the airplane, hold the spring scale against the door. Put the scale at approximately the center of the door and 1 1/2 inches above the lower edge.

S 212-016

(2) Make sure the spring scale is set at zero.

S 802-017

(3) Slowly push the spring scale against the door.

NOTE: Make sure you keep the spring scale at approximately a 90 degree angle to the door.

S 222-018

(4) Make sure the door starts to open when the scale shows between 8 and 14 pounds.

S 222-019

- (5) Push the spring scale against the door until the lower end of the door opens 2 to 2 1/2 inches.

NOTE: Measure the distance in a straight line from the lower edge of the door opening to the lower edge of the door.

Make sure you keep the scale at approximately a 90 degree angle to the door.

S 222-020

- (6) Make sure the scale shows between 13 and 19 pounds.

S 012-021

WARNING: PUSH THE DOOR WITH YOUR HAND VERTICAL TO THE SURFACE TO PREVENT HAND INJURY WHILE THE DOOR TURNS TO THE FULL OPEN POSITION.

- (7) With your hand, push the door until the lower end of the door opens a minimum of six inches.

S 412-022

- (8) Let the door close.

CABIN PRESSURE INDICATION AND WARNING SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

A. The pressurization indicating and warning system provides visual and aural warning if the pressurization control system fails (AMM 21-31-00).

- (1) High cabin altitudes endanger people and airplane structure. An aneroid switch senses cabin altitude. The switch actuates aural, level A EICAS warning, CABIN ALTITUDE, and visual warnings in the flight deck, if the cabin altitude increases to 10,000 ±300 feet. The switch resets when the cabin altitude decreases to 8,500 ±500 feet.
- (2) Three pressure indicators in the flight deck, show cabin-to-ambient differential pressure, cabin altitude, and cabin pressure rate of climb or descent.

2. Component Details (Fig. 1)

A. Altitude Switch

- (1) The altitude switch is an aneroid type switch mounted on the aft face of the E2 equipment rack. As cabin altitude increases the aneroid expands. At 10,000 ±300 feet cabin altitude the aneroid actuates a warning switch completing the warning circuit. The switch resets when the cabin altitude decreases to 8,500 ±500 feet.

B. Pressure Indicators (Fig. 2)

- (1) Three pressure gauges located on the pilots overhead panel (P5) provide cabin pressure indication.
- (2) The CABIN DIFF indicator receives cabin and static pressure signals. An open port in the indicator case receives cabin pressure. The pitot-static system (AMM 34-11-00) provides static pressure signals through a remote differential pressure transducer/sensor (TS5072) which is located along the right sidewall outboard of the nose landing gear wheel well (STA 212). The CABIN DIFF indicator compares the two signals and indicates the differential pressure.
 - (a) 767-200ER/-300ER WITH MTOW MORE THAN 380K LBS;
Alternate static ports connect to the 'Alternate' static system on each side of the fuselage and sense the static pressure which is supplied to the remote differential pressure sensor (TS5072).
- (3) The CABIN ALT receives cabin pressure signals through an open port in the indicator case. Cabin pressure signals are converted to cabin altitude. The indicator shows the cabin altitude from 0 to 25,000 ft.
- (4) The CABIN RATE indicator receives cabin pressure signals through an open port in the indicator case. The indicator displays the rate of cabin pressure change as a function of time.

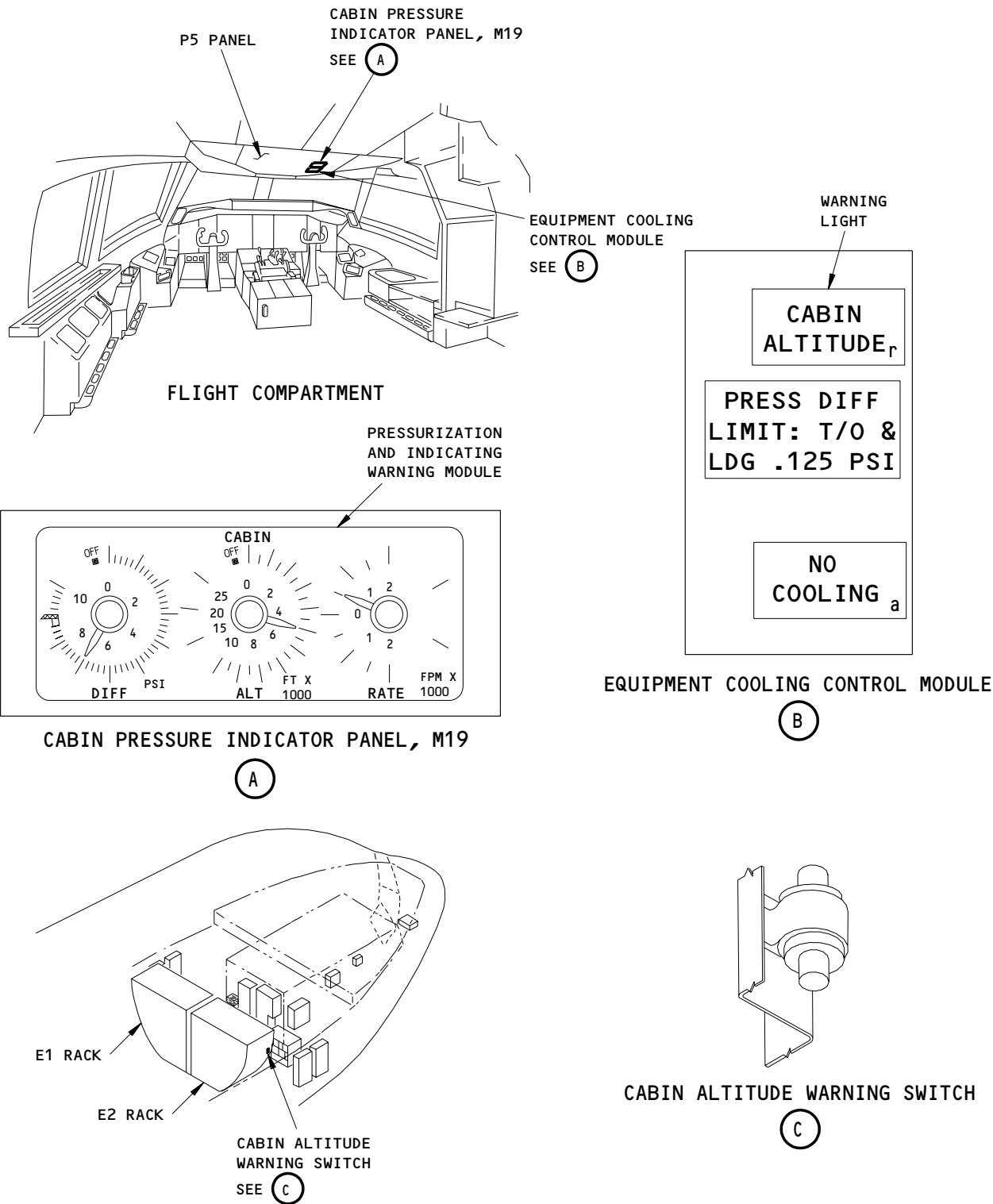
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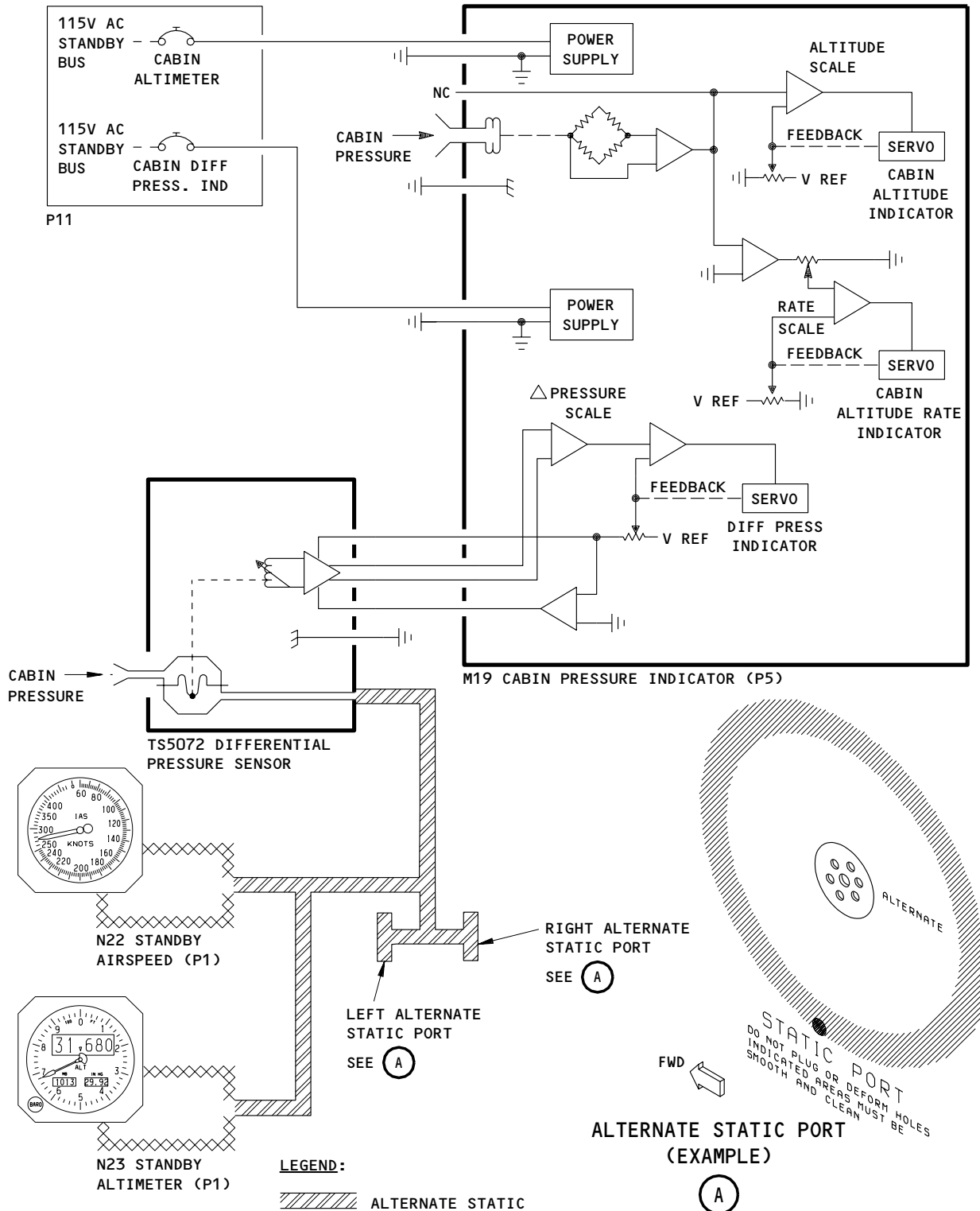
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Pressurization and Indicating Warning System
Figure 1

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Cabin Pressurization Indicating System Schematic
Figure 2

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21-33-00

3. Operation

A. Altitude Warning System (Fig. 3)

- (1) If the cabin altitude increases to 10,000±300 feet, the altitude switch actuates. The CABIN ALTITUDE light on the P5 panel comes on. The CABIN ALT light on the captain's instrument P1 panel comes on. The pilot's and first officer's master WARNING light, on the glareshield P7, comes on. The aural warning siren sounds. A Level A EICAS message, CABIN ALTITUDE, appears. The aural warning can be silenced by pressing the Master Warning and Caution Switchlight. When the cabin altitude decreases below 8,500±500 feet the altitude switch resets, the CABIN ALTITUDE and CABIN ALT lights go out, the Level A EICAS message disappears, and the aural warning siren is silenced.

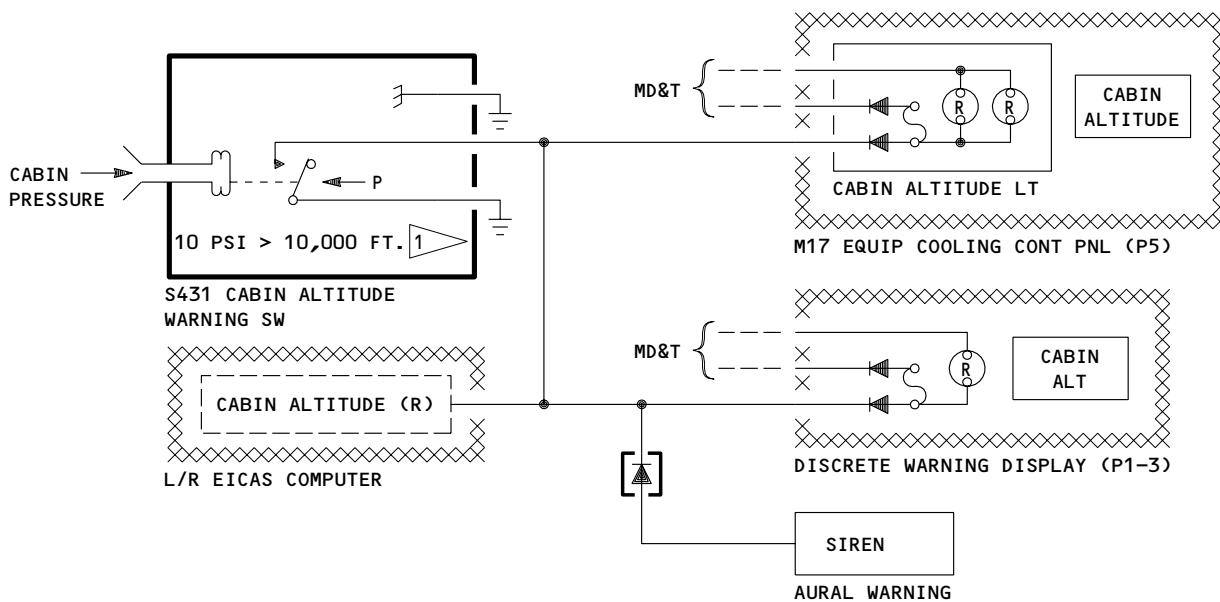
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1 SWITCH ACTIVATES WHEN CABIN ALTITUDE >10,000 ±300 FT.
SWITCH RESETS WHEN CABIN ALTITUDE <8,500 ±500 FT.

Cabin Altitude Warning System Schematic
Figure 3

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FAULT ISOLATION/MAINT MANUAL

CABIN PRESSURE INDICATION AND WARNING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - CABIN ALTM, C4205		1	FLT COMPT, P11 11B13	*
CABIN DIFF PRESS IND, C4206		1	11B12	*
COMPUTER - (FIM 31-41-00/101) EICAS L, M10181 EICAS R, M10181				
HORN - (FIM 23-43-00/101) GROUND CREW CALL - WARNING				
LIGHT - CABIN ALT, YDAL1	1	1	FLT COMPT, P5, EQUIP COOLING CONTROL PANEL, M17	*
MODULE - (FIM 31-51-00/101) WARNING DISPLAY DISCRETE, M779				
PANEL - (FIM 21-58-00/101) EQUIP COOLING CONTROL, M17	1	1	FLT COMPT, P5	21-58-00
PANEL - CABIN PRESSURE INDICATION, M19	1	1	FLT COMPT, P5	21-33-01
SENSOR - DIFFERENTIAL PRESSURE, TS5072	2	1	113AL, FORWARD ACCESS DOOR RIGHT SIDEWALL	21-33-04
SWITCH - CABIN ALTITUDE WARNING, S431	2	1	119AL, MAIN EQUIP CTR	21-33-00

* SEE THE WDM EQUIPMENT LIST

Cabin Pressure Indication and Warning System - Component Index
Figure 101

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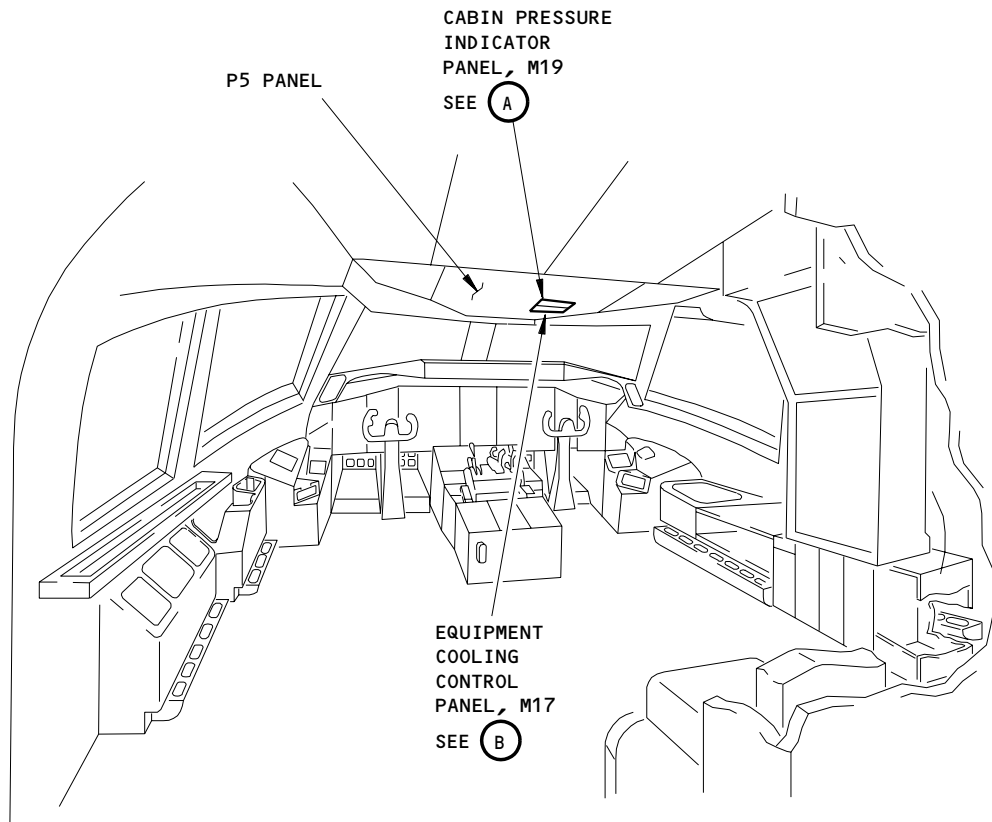
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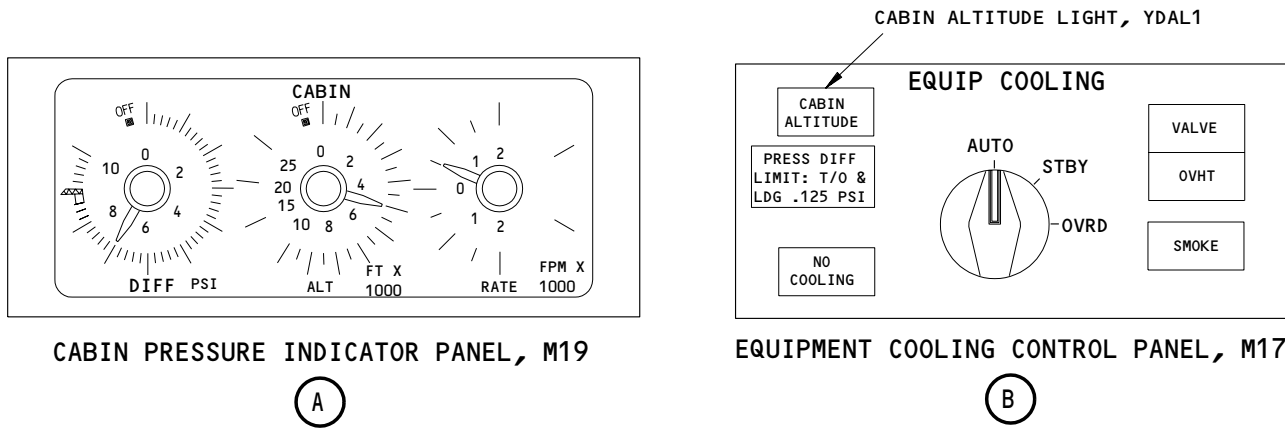
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FAULT ISOLATION/MAINT MANUAL



FLIGHT COMPARTMENT



Cabin Pressure Indication and Warning System - Component Location
Figure 102 (Sheet 1)

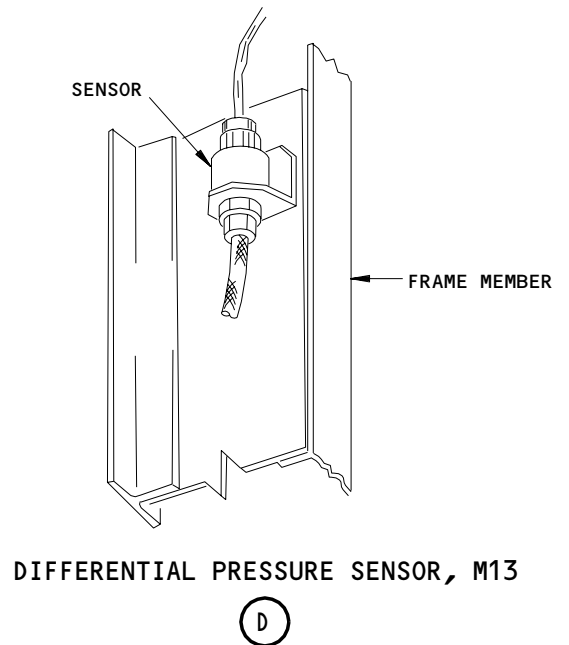
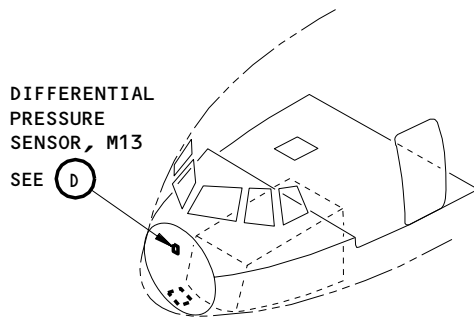
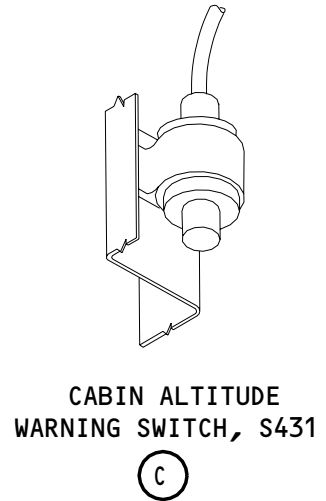
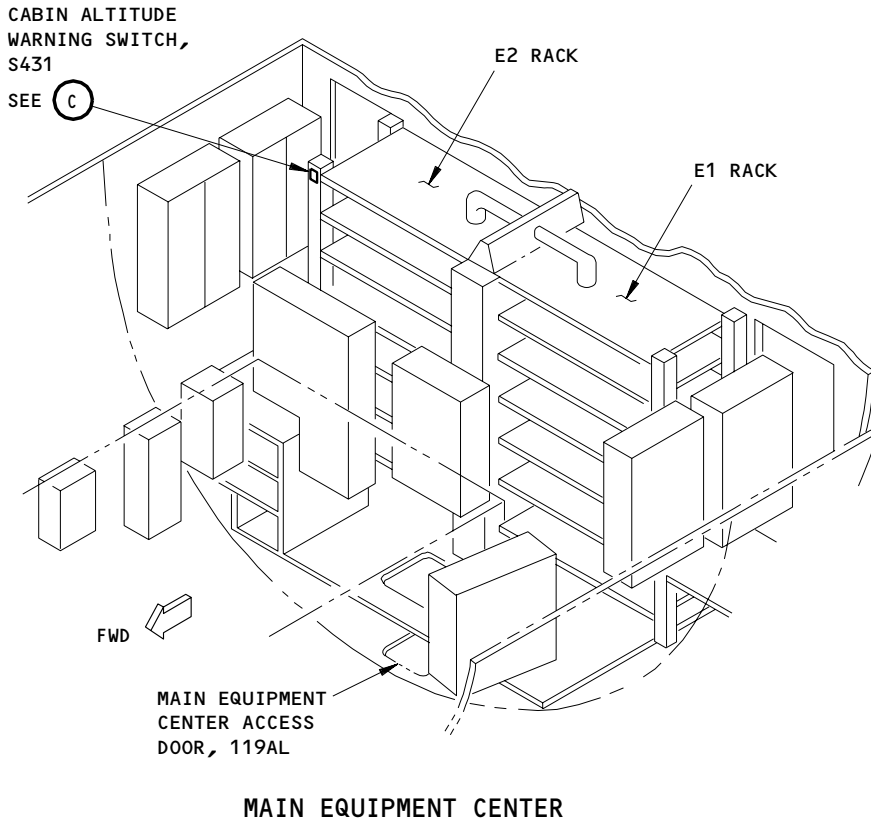
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Cabin Pressure Indication and Warning System - Component Location
Figure 102 (Sheet 2)

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CABIN PRESSURE INDICATION AND WARNING SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure contains these tasks:
(1) System Test – Cabin Altitude Warning System
(2) System Test – Cabin Pressure Indication System

TASK 21-33-00-705-001

2. System Test – Cabin Altitude Warning System

A. Equipment

- (1) Portable Pressure Vacuum Pump, commercially available
(2) End fitting – Compatible with the MS 33649-4 female thread on the Altitude Warning Switch (S431), commercially available

B. References

- (1) AMM 24-22-00/201, Electrical Power Control.

C. Access

- (1) Location Zones
119 Main Equipment Center
211 Control Cabin – Section 41 (Left)
212 Control Cabin – Section 41 (Right)
- (2) Access Panel
119AL Main Equipment Center Access Door

D. Prepare for the Test

S 865-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-003

- (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11A33, IND LTS 1
(b) 11A34, IND LTS 2
(c) 11B14, CABIN ALTITUDE CONTROL MANUAL
(d) 11B15, CABIN ALTITUDE CONTROL SELECT
(e) 11B16, AURAL WARN SPKR L
(f) 11B18, WARN ELEX B
(g) 11H35, AURAL WARN SPKR R
(h) 11J34, WARN ELEX A
(i) 11P15, CABIN ALTITUDE CONTROL AUTO 1
(j) 11P23, CABIN ALTITUDE CONTROL AUTO 2
(k) 11R1, LEFT IND LTS 1
(l) 11R28, RIGHT IND LTS 1

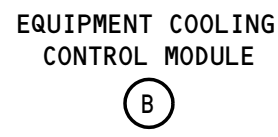
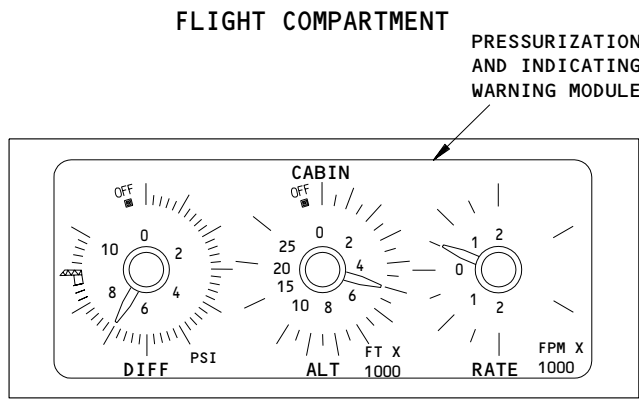
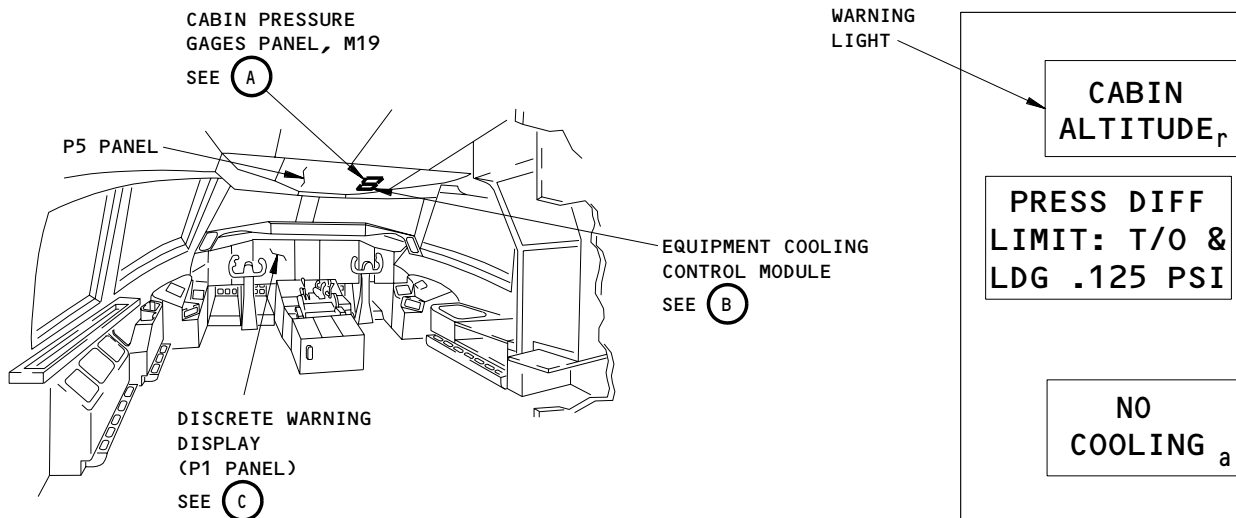
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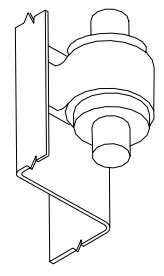
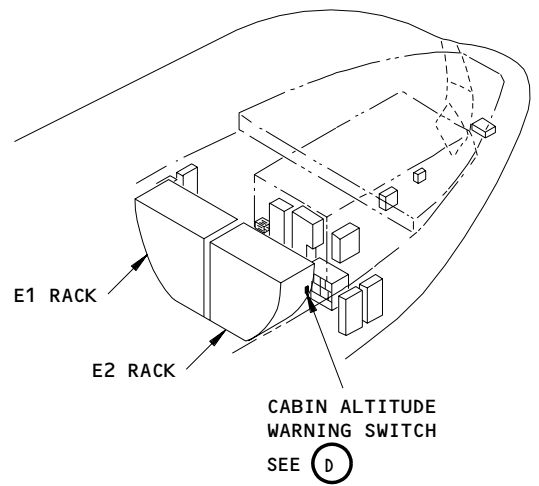
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FIRE _r	CONFIG _r
PULL UP _r	A/P DISC _r
CABIN ALT _r	OVSPD _r

CABIN PRESSURE GAGES PANEL, M19

DISCRETE WARNING DISPLAY



Pressurization and Indicating Warning System Adjustment/Test
Figure 501

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(m) EICAS circuit breakers (6 locations)

S 015-004

(3) Open the main equipment center access door, 119AL.

E. Do the Cabin Altitude Warning Test

S 485-013

(1) Connect the vacuum pump to the cabin altitude warning switch, S431, near the forward right hand corner of the E2 equipment rack.

S 735-022

(2) Increase the vacuum pressure (Pvac) to the equivalent cabin altitude of 10,000 ±300 ft (10.1 ±0.12 psia). Do not increase the altitude at a rate greater than 4000 ft/minute (2.0 psi/minute).

NOTE: The vacuum pressure (Pvac) necessary to get the equivalent cabin altitude of 10,000 ft (10.1 psia) is calculated as follows: $P_{vac} = P_{ambient} - 10.1$
At sea level, $P_{amb} = 14.7$ psia. Thus, at sea level
 $P_{vac} = 4.6$ psig.

(a) If you are not able to obtain the equivalent cabin altitude of 10,000 feet, make sure the mounting clamp for the cabin altitude warning switch is not too tight. The switch can be damaged if the mounting clamp is too tight.

S 215-009

(3) Make sure these conditions occur:
(a) The CABIN ALTITUDE light, on the P5 panel, comes on.
(b) The CABIN ALT light, on the P1 panel comes on.
(c) The EICAS message CABIN ALTITUDE shows on the display.
(d) The pilot's and first officer's master WARNING light, on the glareshield P7, comes on.
(e) The aural warning signal comes on.

S 735-015

(4) Decrease the vacuum pressure on the cabin altitude warning switch to of 8,500 ±500 ft (10.7 ±0.20 psia). Do not decrease the altitude at a rate greater than 4000 ft/minute (2.0 psi/minute).

S 215-011

(5) Make sure these conditions occur:
(a) The CABIN ALTITUDE light, on the P5 panel goes off.

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- (b) The CABIN ALT light, on the P1 panel, goes off.
- (c) The EICAS message CABIN ALTITUDE does not show on the display.
- (d) The pilot's and first officer's master WARNING light, on glareshield P7 panel, goes off.
- (e) The aural warning signal goes off.

S 085-016

- (6) Decrease the vacuum to 0.00 psig (14.70 psia at sea level).

S 085-017

- (7) Remove the vacuum pump from the cabin altitude warning switch.

S 415-018

- (8) Close the main equipment center access door, 119AL.

S 865-024

- (9) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-33-00-705-025

3. System Test - Cabin Pressure Indication System

A. Equipment

- (1) Pitot Static Tester - Commercially available
- (2) Vacuum Source - Commercially available

B. References

- (1) AMM 24-22-00/201, Electrical Power Control
- (2) AMM 34-11-00/201, Pitot-Static System

C. Access

- (1) Location Zones
 - 211 Control Cabin - Section 41 (Left)
 - 212 Control Cabin - Section 41 (Right)

D. Prepare for Test

S 865-026

- (1) Supply electrical power (AMM 24-22-00/201).

E. Do the Cabin Pressure Indication System Test

S 735-019

- (1) Do the Cabin Altimeter Test.
 - (a) Open this circuit breaker on the overhead circuit breaker panel, P11:
 - 1) 11B13, CABIN ALTM
 - (b) Make sure the needle on the CABIN ALT indicator, on the overhead panel, P5, aligns with the OFF mark.
 - (c) Close this circuit breaker on the P11 panel:
 - 1) 11B13, CABIN ALTM

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- (d) Turn the BARO knob, on the ALT indicator, on pilot's center instrument panel, P1, to set the internal barometer at 29.92 in. Hg.

NOTE: When the barometric pressure is greater than 29.92 in-Hg, the CABIN ALT indicator will show a negative altitude. It shows a negative altitude when the needle is between the zero and OFF positions.

- (e) Make sure the CABIN ALT indicator, on the P5 panel, and the ALT indicator, on the P1 panel, show the same altitudes (± 300 ft).

S 735-020

- (2) Do the Cabin Differential Pressure Indicator Test.
 - (a) Open this circuit breaker on the P11 panel:
 - 1) 11B12, CABIN DIFF PRESS IND
 - (b) Make sure the needle of the CABIN DIFF indicator, on the P5 panel, aligns with the OFF mark.
 - (c) Close this circuit breaker on the P11 panel:
 - 1) 11B12, CABIN DIFF PRESS IND
 - (d) Make sure the CABIN DIFF indicator, on the P5 panel, shows 0 ± 0.35 psi.
 - (e) 767-200ER/-300ER WITH MTOW MORE THAN 380K LBS;
Connect the pitot-static tester to the 'Alternate' Static Pressure System (AMM 34-11-00/201).
 - (f) Apply a vacuum to the static pressure system at a rate no more than 5000 ft/min until the airspeed indication shows 345 knots on the pitot-static tester (or standby flight instrument on the P1 panel).
 - (g) Make sure the CABIN DIFF indicator shows 3.0 ± 0.35 psi.
 - (h) Decrease the vacuum to the ambient altitude.

NOTE: Do not decrease the altitude at a rate of more than 5000 ft/min.

- (i) Make sure the CABIN DIFF indicator shows 0.0 ± 0.35 psi.
- (j) Disconnect the pitot-static tester from the static pressure system.

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F. Put the Airplane Back to It's Usual Condition

S 865-021

- (1) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

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CABIN PRESSURIZATION INDICATOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Cabin Pressurization Indicator Removal
 - (2) Cabin Pressurization Indicator Installation
- B. The cabin pressurization indicator is found on the pilot's overhead panel (P5).

TASK 21-33-01-004-001

2. Cabin Pressurization Indicator Removal (Fig. 401)

A. Access

- (1) Location Zones
211/212 Control Cabin – Section 41

B. Procedure

S 864-004

- (1) Open these circuit breakers on the pilot's overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11B12, CABIN DIFF PRESS IND
 - (b) 11B13, CABIN ALTM

S 024-005

- (2) Loosen the 1/4-turn fasteners on the indicator to remove it from from the pilot's overhead panel (P5).

S 024-032

- (3) Disconnect the two electrical connectors from backside of indicator.

S 434-007

- (4) Put a plug on the cabin pressure port to keep out unwanted objects.

TASK 21-33-01-404-008

3. Cabin Pressurization Indicator Installation (Fig. 401)

A. General

- (1) The new Cabin Pressurization Indicator (M19) part number must be compatible with the Remote Differential Pressure Sensor (TS5072) (Service Letter 767-SL-21-10-A). Incompatible indicator/sensor part number combinations can cause inaccurate cabin pressure indications. Refer to the IPC sections 21-33-03, 21-33-04, and 21-33-52 for the correct part numbers of the cabin pressurization indicator and the remote differential pressure sensor.

B. References

- (1) AMM 21-33-04/401, Remote Differential Pressure Sensor
- (2) AMM 24-22-00/201, Electrical Power Control

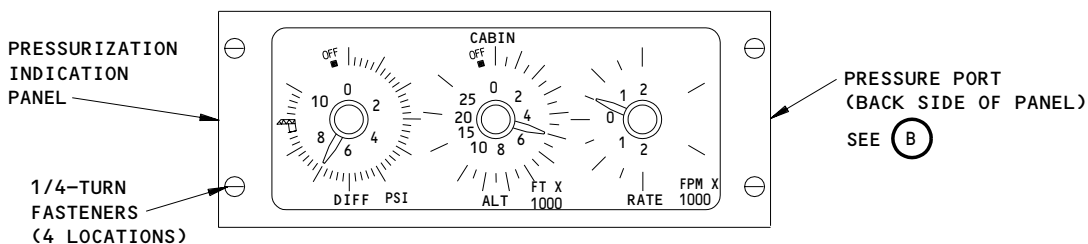
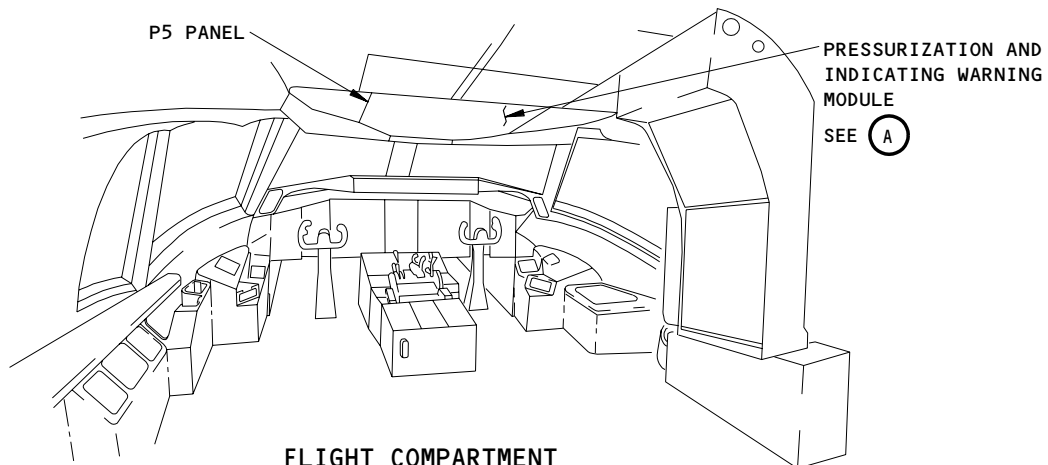
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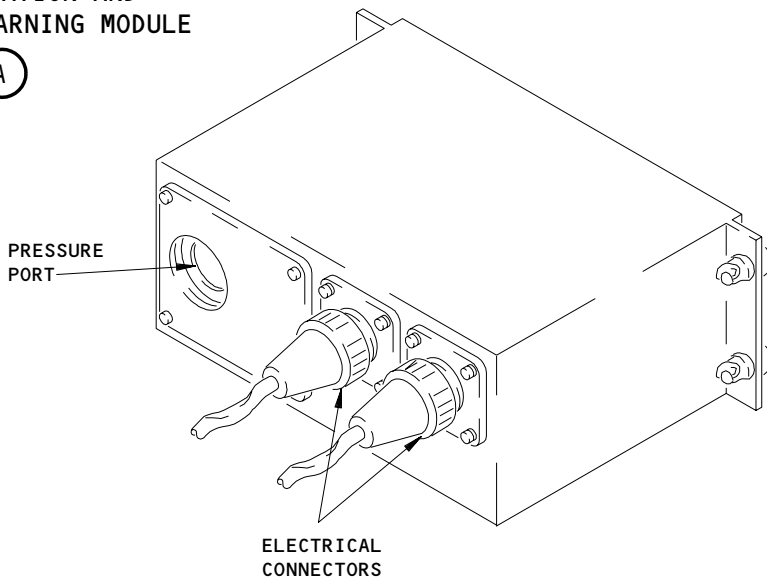
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PRESSURIZATION AND INDICATING WARNING MODULE

(A)



PRESSURE PORT (BACK SIDE OF PANEL)

(B)

Pressurization and Indicating Warning Module Installation
Figure 401

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C. Access

- (1) Location Zones
211/212 Control Cabin - Section 41

D. Procedure

S 214-037

- (1) Make sure the part number of the new cabin pressurization indicator is compatible with the part number of the remote differential pressure sensor (Service Letter 767-SL-21-10-A).

NOTE: The remote differential pressure sensor (TS5072) is installed along the right sidewall outboard of the nose gear wheel well and forward of the main equipment center (AMM 21-33-04/401).

S 024-033

- (2) Remove the plug from the cabin pressure port on back of indicator.

S 424-035

- (3) Connect the two electrical connectors to backside of indicator.

S 424-012

- (4) Put the indicator into the pilot's overhead panel (P5).

S 424-036

- (5) Tighten the 1/4-turn fasteners to secure indicator to panel (P5).

E. Post-Installation Test

S 864-028

- (1) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11B12, CABIN DIFF PRESS IND

S 214-029

- (2) Make sure the needle of the Differential Pressure indicator (left indicator) moves from OFF to the "0" (zero) position.

S 864-030

- (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11B13, CABIN ALTM

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S 214-031

- (4) Make sure the needle of the Cabin Altitude indicator (center indicator) moves clockwise away from the OFF position.

NOTE: If the ambient pressure is more than the standard pressure of 29.92 inch Hg, the needle will be between the OFF position and the "0" (zero) position, otherwise the needle will be at a clockwise position which is more than the "0" (zero) position.

F. Put the Airplane Back to Its Usual Condition

S 864-016

- (1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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REMOTE DIFFERENTIAL PRESSURE SENSOR – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the differential pressure sensor. The second task is the installation of the differential pressure sensor.
- B. The differential pressure sensor changes ambient pressure signals from the pitot-static system into electrical signals for the differential pressure indicator. The sensor is in the nose of the airplane on the right side of the forward equipment bay. The sensor is attached to the forward side of a frame member.

TASK 21-33-04-004-001

2. Remove the Differential Pressure Sensor (Fig. 401)

A. Access

(1) Location Zone

118 Area Outbd and Above NLG Wheel Well, Right

(2) Access Panel

119AL Main Equipment Center Access Door

B. Procedure

S 864-002

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11 and attach DO-NOT-CLOSE tags:
 - (a) 11B13, CABIN ALTM
 - (b) 11B12, CABIN DIFF PRESS IND

S 014-004

- (2) Open the Main Equipment Center Access Door, 119AL.

S 214-020

- (3) Locate the differential pressure sensor along the right sidewall outboard of the nose gear wheel well.

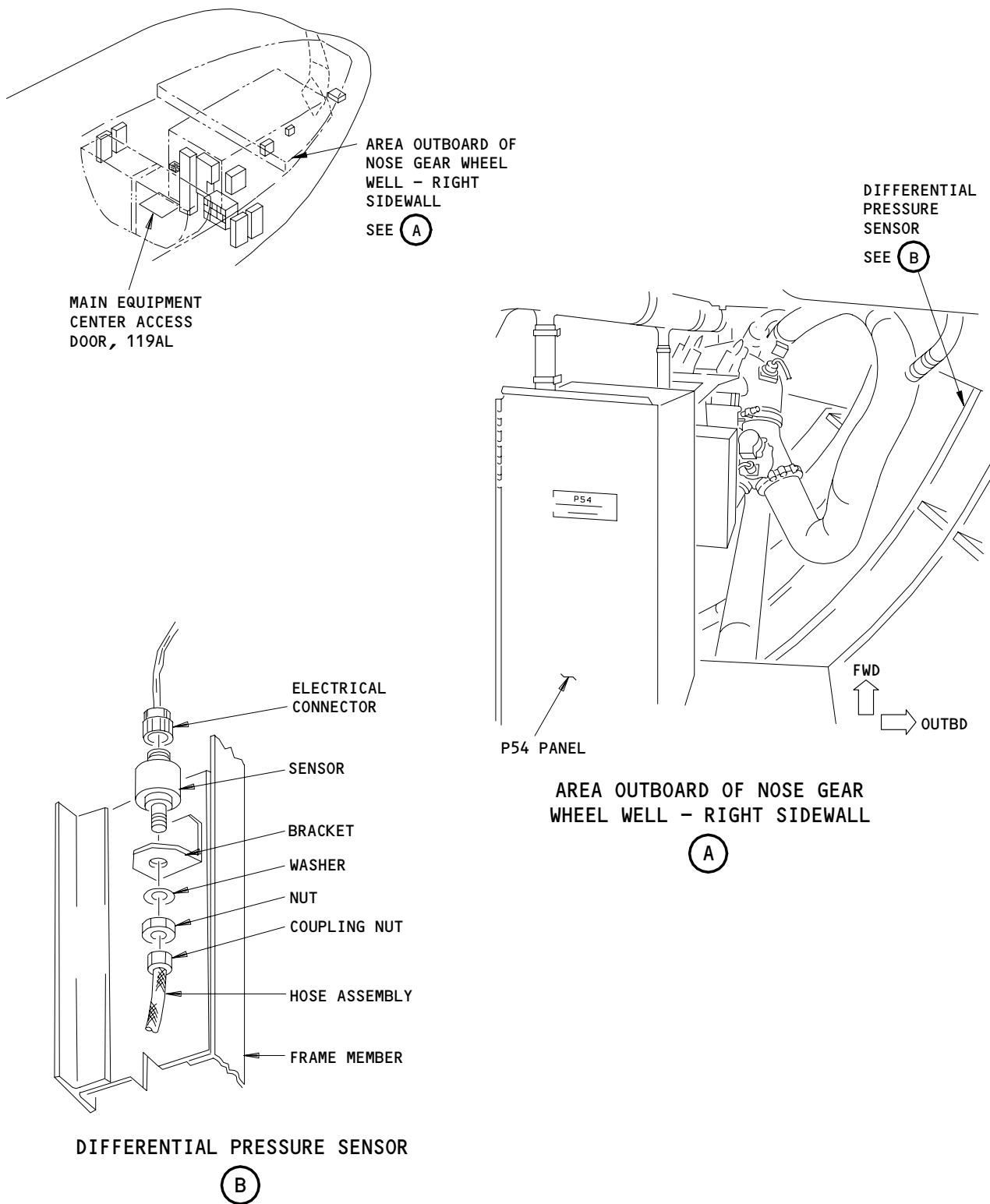
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Differential Pressure Sensor Installation
Figure 401

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- S 034-005
- (4) Disconnect the electrical connector from the sensor.
- S 034-006
- (5) To remove the hose assembly, loosen the coupling nut from the sensor.
- S 024-007
- (6) Remove the nut from the sensor. Remove the sensor from the bracket.

TASK 21-33-04-404-008

3. Install the Differential Pressure Sensor (Fig. 401)

A. General

- (1) The new Remote Differential Pressure Sensor (TS5072) part number must be compatible with the Cabin Pressurization Indicator (M19) (Service Letter 767-SL-21-10-A). Incompatible indicator/sensor part number combinations can cause inaccurate cabin pressure indications. Refer to these IPC sections 21-33-03, 21-33-04, and 21-33-52 for the correct part numbers of the remote differential pressure sensor and cabin pressurization indicator.

B. References

- (1) AMM 21-33-01/401, Cabin Pressurization Indicator
(2) AMM 24-22-00/201, Electrical Power - Control
(3) AMM 34-11-00/501, Pitot-Static System

C. Access

- (1) Location Zone
118 Area Outbd and Above NLG Wheel Well, Right
- (2) Access Panel
119AL Main Equipment Center Access Door

D. Procedure

- S 214-027
- (1) Make sure the part number of the new remote differential pressure sensor is compatible with the part number of the cabin pressurization indicator (Service Letter 767-SL-21-10-A).

NOTE: The cabin pressurization indicator (M19) is installed on pilot's overhead panel (P5) (AMM 21-33-01/401).

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- S 424-030
- (2) Put the sensor into the hole in the bracket, with the electrical connection on top.
- S 434-011
- (3) Install the washer and nut on the sensor. Tighten.
- S 434-012
- (4) Tighten the coupling nut on the sensor to install the hose assembly.
- S 434-013
- (5) Install the electrical connector on the sensor.
- E. Post-Installation Test
- S 864-014
- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11B13, CABIN ALTM
 - (b) 11B12, CABIN DIFF PRESS IND
- S 864-029
- (2) Supply electrical power (AMM 24-22-00/201).
- S 744-033
- (3) 767-200ER/-300ER WITH MTOW MORE THAN 380K LBS;
Do the low range leak check on the Alternate Static System (AMM 34-11-00/501).
- (a) With vacuum applied to the static system, make sure the differential pressure gage, on the P5 panel, shows approximately 2.5 psi.
- F. Put the Airplane Back to Its Usual Condition
- S 414-017
- (1) Close the Main Equipment Center Access Door, 119AL.
- S 864-028
- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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CABIN ALTITUDE WARNING SWITCH – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Cabin Altitude Warning Switch Removal
 - (2) Cabin Altitude Warning Switch Installation
- B. The cabin altitude warning switch is installed in the main equipment center on the E2 rack forward support structure.

TASK 21-33-05-004-001

2. Cabin Altitude Warning Switch Removal (Fig. 401)

- A. References
 - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels.
- B. Access
 - (1) Location Zones
 - 119 Main Equipment Center, Left
 - 120 Main Equipment Center, Right
 - (2) Access Panels
 - 119AL E/E Bay Access Door

C. Prepare for Removal

S 864-019

- (1) Open these circuit breakers on the pilots overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11A35, IND LIGHTS 3
 - (b) 11R2, LEFT IND LT 2

S 014-021

- (2) Open the E/E bay access door, 119AL (AMM 06-41-00/201).

S 024-004

- (3) Find the cabin altitude warning switch on the right forward support structure for the E2 rack.

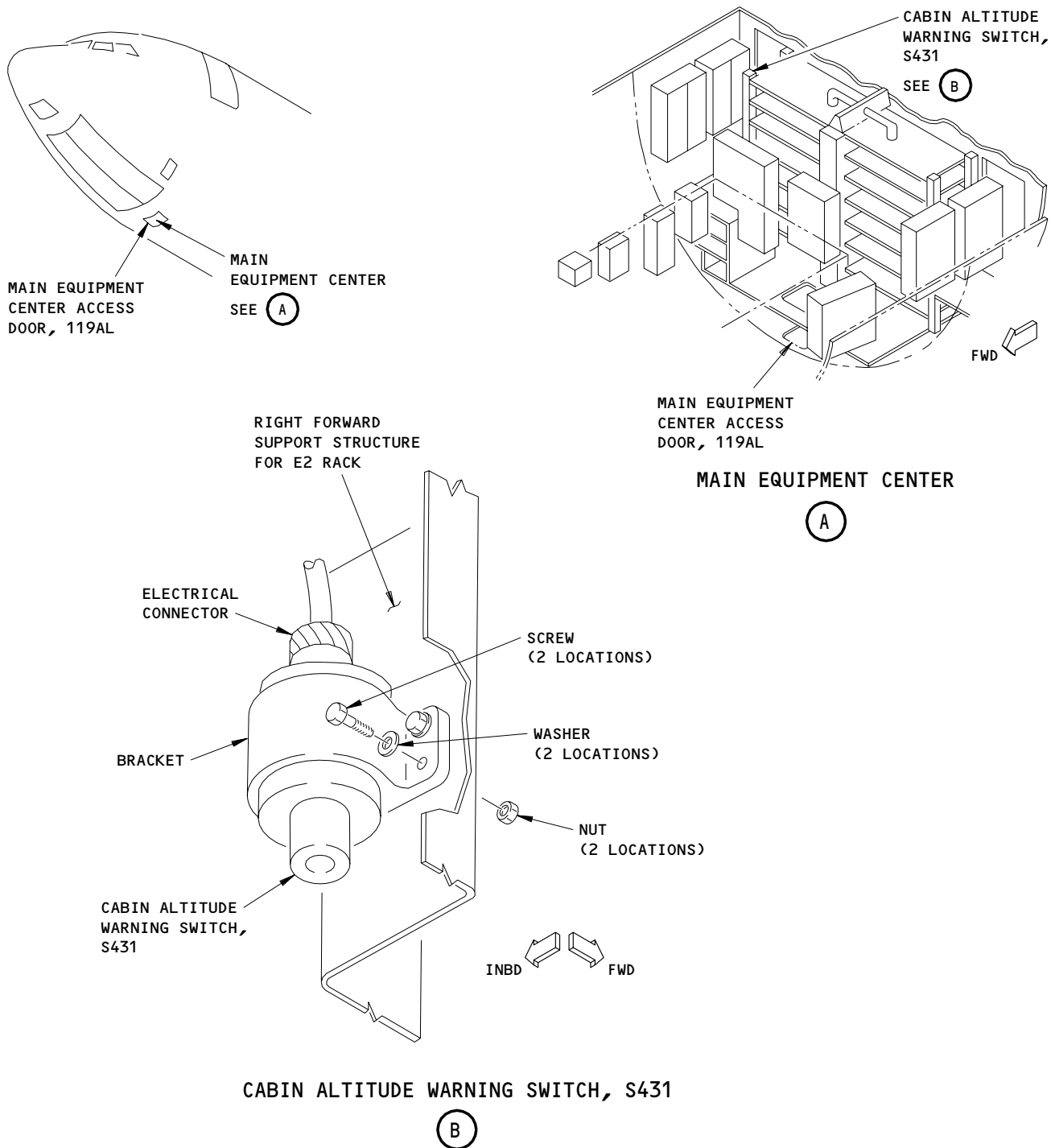
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Cabin Altitude Warning Switch Installation
Figure 401

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D. Switch Removal

S 024-005

- (1) Disconnect the electrical connector from the switch.

S 024-006

- (2) Remove the screws, washers, and nuts which attach the switch to the structure.

S 024-007

- (3) Remove the switch and it's support bracket.

TASK 21-33-05-404-008

3. Cabin Altitude Warning Switch Installation (Fig. 401).

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels.
- (2) AMM 21-33-00/501, Cabin Pressure Indication and Warning System

B. Access

(1) Location Zones

- | | |
|-----|------------------------------|
| 119 | Main Equipment Center, Left |
| 120 | Main Equipment Center, Right |

(2) Access Panels

- | | |
|-------|---------------------|
| 119AL | E/E Bay Access Door |
|-------|---------------------|

C. Switch Installation

S 424-011

- (1) Put the switch and its support bracket against the mounting holes on the structure of the E2 rack.

S 424-012

- (2) Install the switch and its support bracket to the structure with screws, washers, and nuts.
 - (a) Tighten the nuts to maximum 35 lbf-in (4 N-m).

NOTE: Too much torque can cause the support bracket to crush the outer casing of the switch which can cause leakage and prevent proper switch operation.

S 424-013

- (3) Install the electrical connector to the switch.

D. Post-Installation Test

S 864-020

- (1) Close these circuit breakers on the pilots overhead circuit breaker panel, P11, and remove DO-NOT-CLOSE tags:
 - (a) 11A35, IND LIGHT 3
 - (b) 11R2, LEFT IND LT 2

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S 724-025

- (2) Do this task: System Test - Cabin Altitude Warning System (AMM 21-33-00/501).

E. Return the Airplane to Normal Condition

S 414-022

- (1) Close the E/E bay access door, 119AL (AMM 06-41-00/201).

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CARGO HEAT DUCT - MAINTENANCE PRACTICES

1. General

- A. This procedure contains these tasks:
- (1) Cargo Heat Duct Repair
 - (2) Forward Cargo Heat Duct Inspection

TASK 21-40-01-302-001

2. Cargo Heat Duct Repair

A. General

- (1) This section provides information to repair the forward, aft, and bulk cargo heat ducts.
- (2) Two procedures are available to repair the duct. Use procedure 1 to replace short sections of the duct. Use procedure 2 to replace long sections of the duct.

B. Equipment

- (1) Titanium, commercially pure - BMS 7-21, GRADE II (Tube or rolled sheet)
- (2) CRES 301 (MIL-S-5059) .032" thick sheet material (alternative)
- (3) Scrivets - P/N 231-700055-00-3704,
Fastex Co., 195 East Algona Road,
Des Plaines, Illinois 60191-1150
- (4) BMI duct segment (only for repair of long sections)

C. Consumable Materials

- (1) A00235, Sealant - PR1422A
- (2) A00578, Sealant - RTV 60

D. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control

E. Procedure

S 862-002

- (1) Supply electrical power (AMM 24-22-00)

S 212-003

- (2) Make sure the applicable (FWD, AFT, or BULK) CARGO HEAT switch-light is in the off position.

NOTE: The switch-light is on the pilot's overhead control panel, P5.

- (a) Make sure the ON light is off.
- (b) Attach a DO-NOT-OPERATE tag to the switch-light.

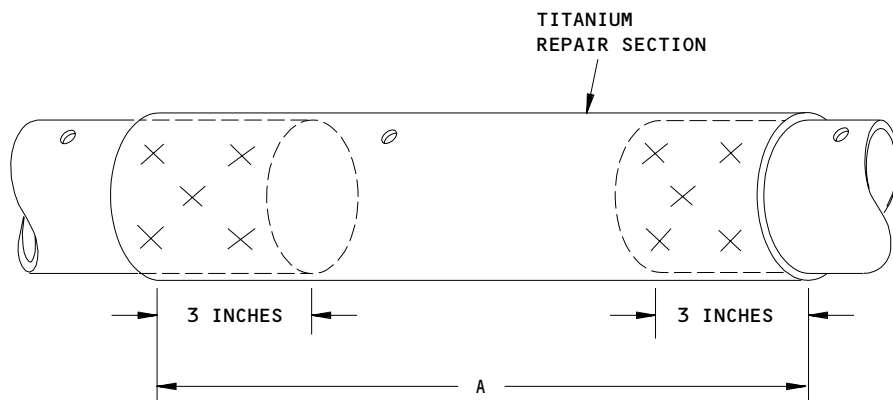
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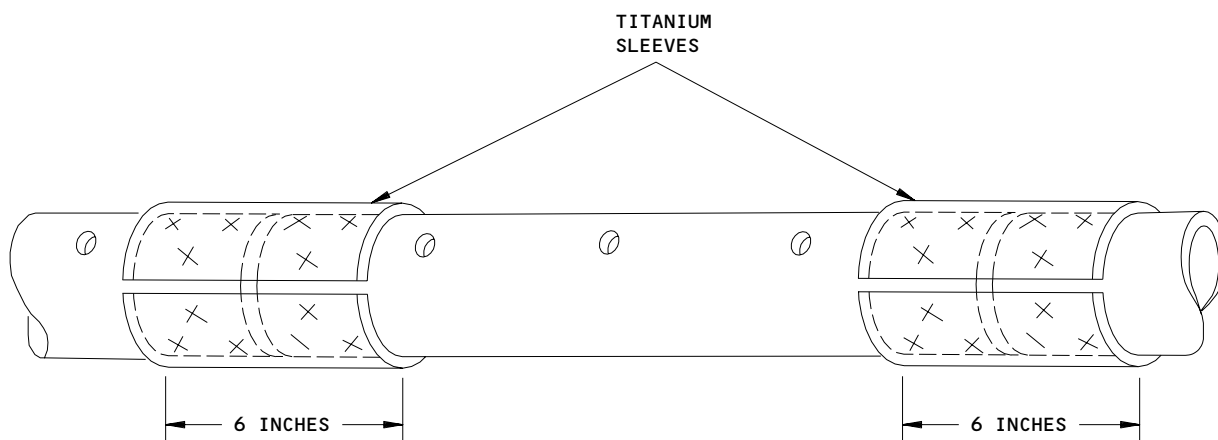
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PROCEDURE 1 - SHORT SECTION REPAIR



PROCEDURE 2 - LONG SECTION REPAIR

NOTE: CUT AND REMOVE THE DAMAGED SECTION TO PERMIT SUFFICIENT ACCESS TO RIVET THE REPAIR SECTION. PUT THE RIVETS 1 TO 1-1/4 INCHES APART WITH 0.35 INCH MINIMUM EDGE DISTANCE.

Cargo Heating Duct - Repair
Figure 201

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S 012-005

- (3) Open the applicable (forward or aft) cargo door, 821 or 822 (AMM 06-41-00).

S 012-007

- (4) Remove the applicable floor panel to get access to the damaged duct section.

S 302-008

- (5) Do these steps to repair the damaged duct section:
- (a) Cut and remove the damaged duct section.
 - (b) To repair a short duct section (2 feet or shorter), do these steps (Procedure 1):
 - 1) Make a new duct section which is 6 inches longer than the damaged duct section from the titanium or CRES duct material.

NOTE: The new duct section must extend at least 3 inches over each end of the mating heat duct sections.

- 2) Use a mandril or ball to expand the diameter of the ends of the new duct section to permit the installation over the mating heat duct sections.
- (c) To repair a long duct section (2 feet or longer), do these steps (Procedure 2):
 - 1) Make a new duct section which is slightly shorter than the damaged duct section from the BMI duct material.
 - 2) Make two 6-inch long sleeves from the titanium or CRES duct material.
 - 3) Use a mandril or ball to expand the diameter of the ends of the sleeve to permit the installation over the mating heat duct sections.
- (d) Install the repair duct section as shown in Figure 201.

NOTE: This heat distribution duct is low pressure. Air leakage at the duct repair joint is not important.

- 1) If it is necessary, loosen the support clamps for the heat duct to permit the installation of the repair duct section.
- 2) For a titanium duct section (or sleeve), use the scrivets to attach the titanium duct section (sleeve) to the mating heat duct sections.

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- 3) For a CRES duct section (or sleeve), use the sealant, PR1422A or RTV 60, to bond the ends of the CRES duct section (sleeve) to the mating heat duct sections.

NOTE: You can use straps or clamps to temporarily hold the CRES duct section (sleeve) to the mating heat duct sections until the sealant has cured.

- 4) Punch or drill holes along the length of the replacement duct section to align with the heat outlet holes in the mating heat duct sections.
 - a) Make sure the heat outlet holes are positioned 15 degrees above horizontal in the underfloor cargo heat ducts.
- 5) Tighten all the duct support clamps.

S 412-009

- (6) Install the floor panels.

S 862-010

- (7) Remove the DO-NOT-OPERATE tag from the applicable CARGO HEAT switch-light on the P5 panel.

S 862-011

- (8) Remove the electrical power if it is not necessary.

TASK 21-40-01-202-021

3. Forward Cargo Heat Duct Inspection

A. General

- (1) This section provides information to examine the forward cargo heat duct for longitudinal movement to prevent duct rupture.

B. Access

- (1) Location Zone
136 Environmental Control System Bay (Right)
- (2) Access Panel
194LR ECS Bay Door, Right

C. Procedure

S 012-022

- (1) Open the right ECS door, 194LR, to get access to the forward cargo heat duct along the center keel beam.

S 022-023

- (2) Remove the aft-most clamp on the forward side of the valve on the forward cargo heat duct.

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S 982-024

- (3) Move the duct and make sure there is longitudinal movement of a maximum of 1.0 inches.
 - (a) If necessary, adjust the brackets as necessary to allow for movement of the duct.

S 432-025

- (4) Install the aft clamp on the forward side of the valve and tighten to 50 pound-inches.
- D. Put the airplane back to its usual condition.

S 412-026

- (1) Close the right ECS door, 194LR.

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FORWARD CARGO COMPARTMENT HEATING SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. Temperatures within the forward cargo compartment are regulated by three air sources. Recirculated air from the mix manifold can be blown into the compartment by the forward-cargo-recirculation system (AMM 21-25-00/001). Conditioned air can be supplied from the left air cooling pack by the forward-cargo-air-conditioning system (AMM 21-28-00/001). Warm air can be supplied from the airplane's pneumatic system (AMM 36-00-00/001) by the forward cargo heating system.
- B. When the forward-cargo-air-conditioning system is on, the compartment temperature is controlled by the air-conditioning-temperature-control system (AMM 21-61-00/001). When the forward-cargo-air-conditioning system is not on, the forward cargo heat system will keep the compartment temperature between 40°F (4.5°C) and 50°F (10°C). It is suggested that the forward cargo heat system be on whenever the forward cargo A/C system is on. This will prevent a large temperature gradient condition to occur in the forward cargo compartment. However, the forward cargo heat system should be selected off when the temperature in the forward cargo compartment is to be maintained below 7-degrees C (45-degrees F) by the forward cargo A/C system. This will prevent the forward cargo heat system from interfering with the operation of the forward cargo A/C system since both systems are controlled by the pack flow and cargo air conditioning controller (PFCACC).
- C. Warm air from the pneumatic system is controlled by a shutoff valve and a control valve. The shutoff valve is controlled by the pack flow controller. The control valve is controlled by the temperature control switch. Seven Engine Indicating and Crew Alerting System (EICAS) messages are used to show the condition of the system.

2. Component Details

A. Forward Cargo Heating Shutoff Valve

- (1) The forward cargo heating shutoff valve mounts forward of the cross-ship manifold in the right ECS bay. The valve is a single phase, 115 vac motor-driven valve, with two modes of operation—open and close. Limit switches interrupt power at the open and close extremes of valve travel. An external indicator shows valve butterfly position and provides manual control of the butterfly.

B. Forward Cargo Heating Control Valve

- (1) The forward-cargo-heating-flow-control valve mounts near the bottom and to the right of the mix manifold. The heating-flow-control valve is identical to the heating shutoff valve.

C. Forward Cargo Compartment Temperature Switch

- (1) The forward cargo compartment uses two thermal switches for temperature control. The switches mount below the cargo floor approximately in the middle of the compartment. The control switch operates between 40-50°F (4.5-10°C). The overheat switch operates between 80-90°F (27-32°C).

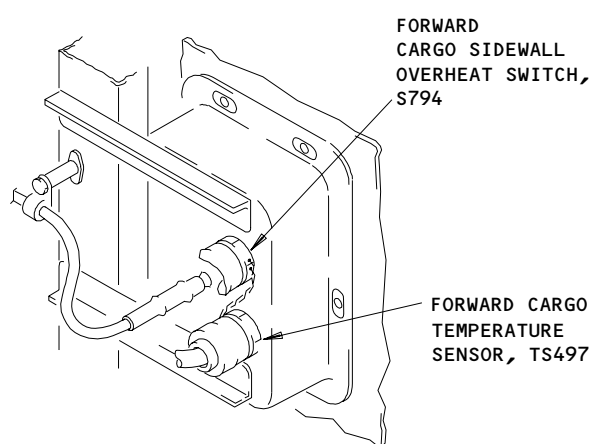
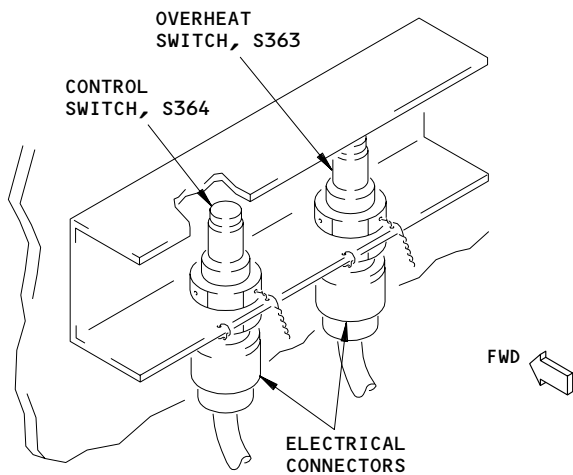
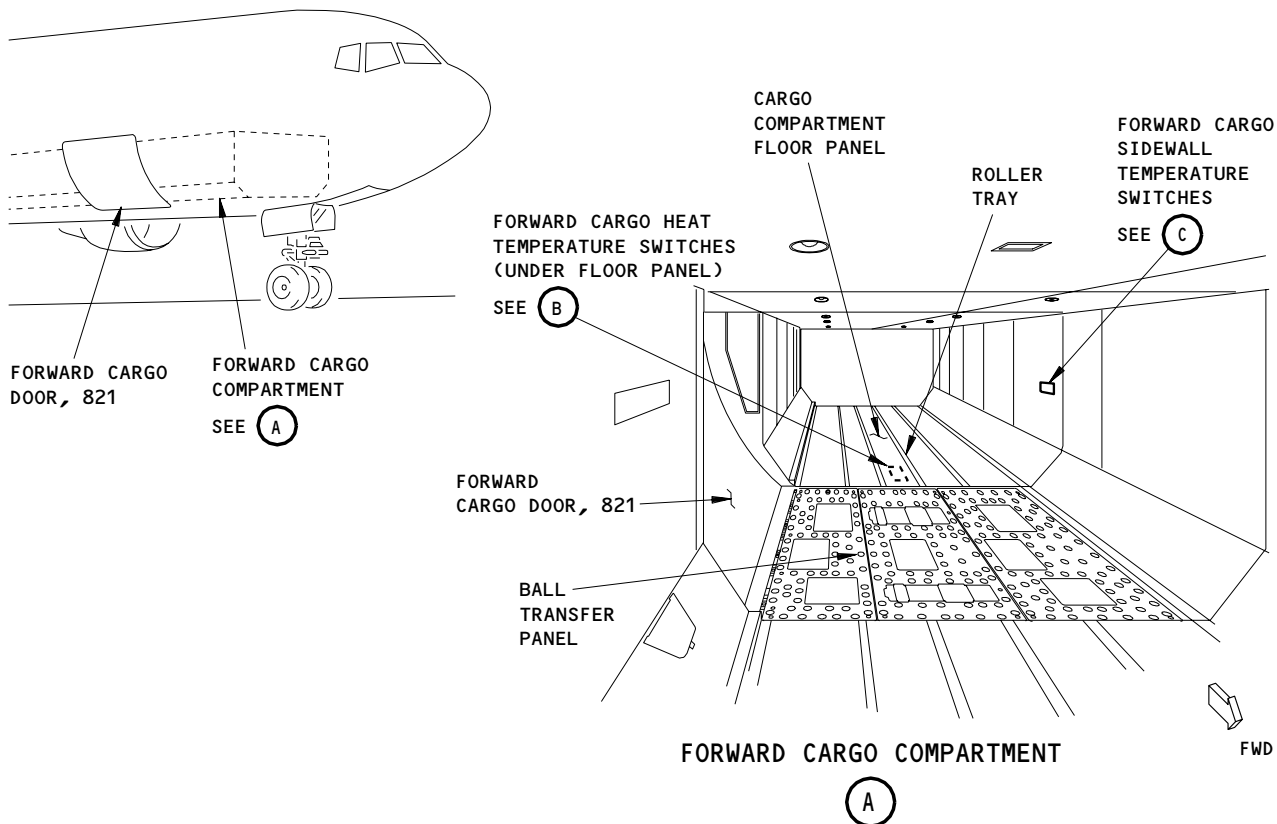
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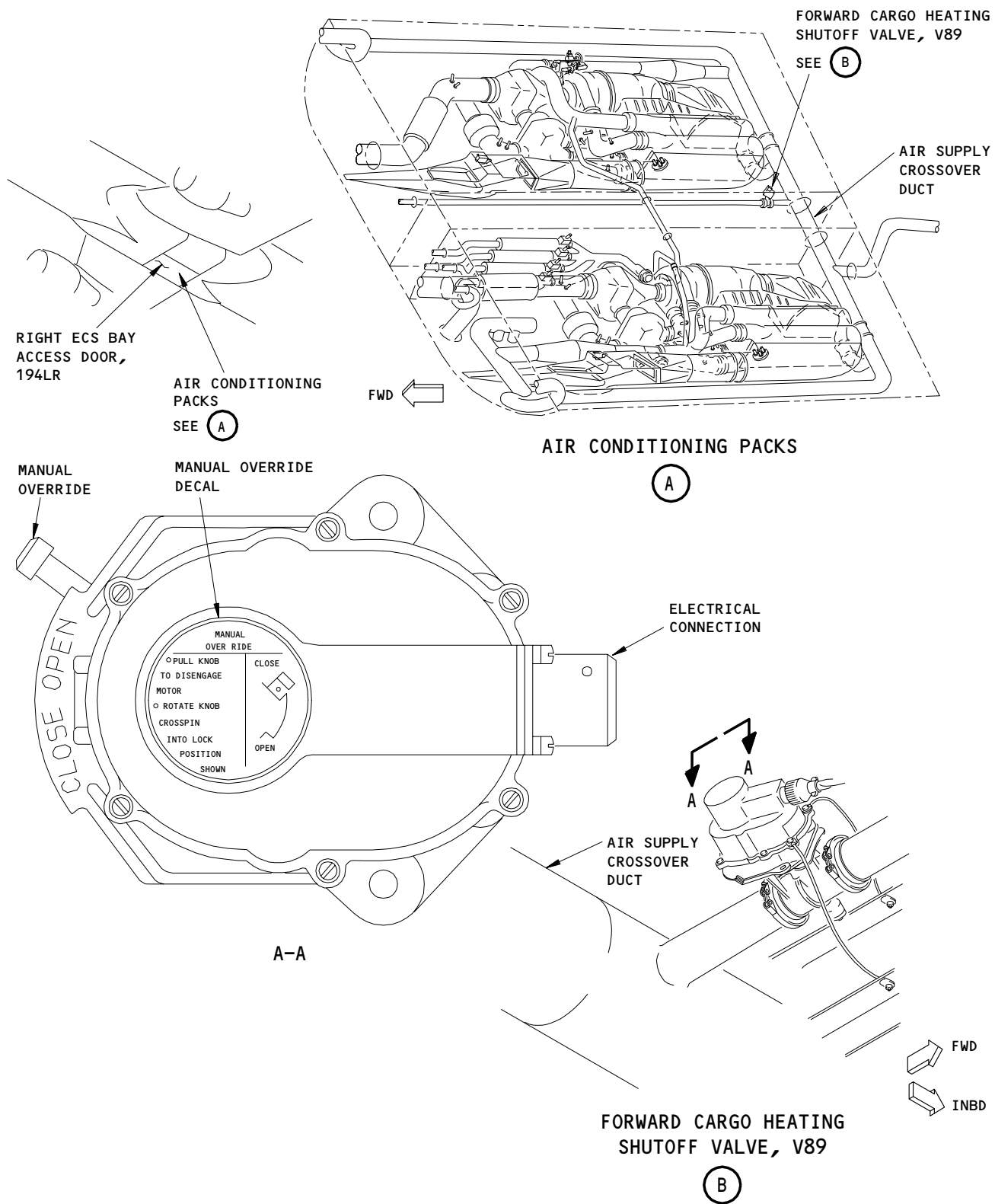


Forward Cargo Heating System Temperature Switch
Figure 1

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Forward Cargo Heating System Control and Shutoff Valves
Figure 2 (Sheet 1)

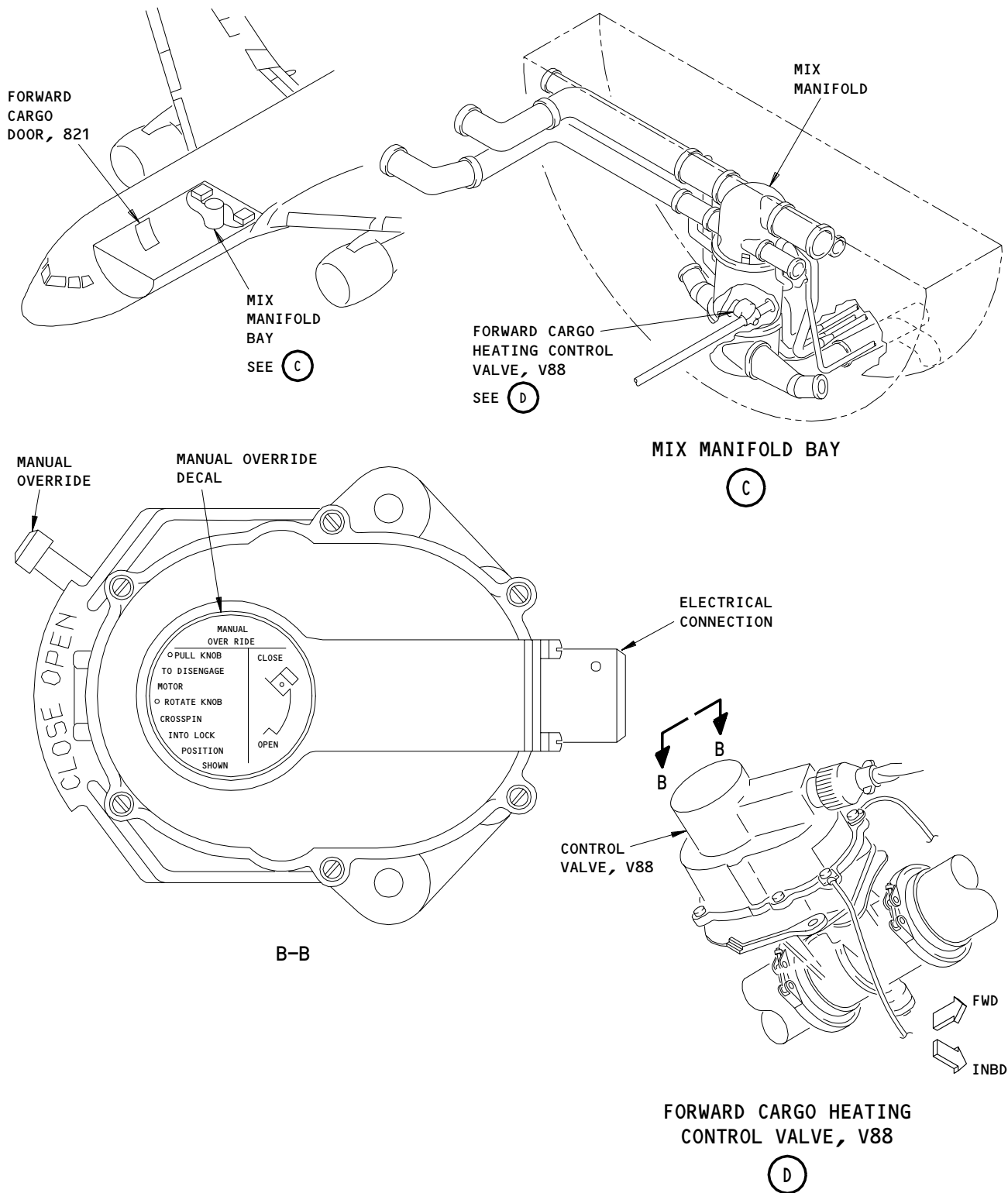
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Forward Cargo Heating System Control and Shutoff Valves
Figure 2 (Sheet 2)

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L71192

- (2) A third temperature switch is used to control the compartment temperature when the forward-cargo-air-conditioning system is on. It operates between 80-90°F (27-32°C). It is installed in a panel on the left forward cargo compartment sidewall, opposite the forward cargo compartment door (AMM 21-65-00/001).

D. Forward Cargo Temperature Bulb

- (1) The forward cargo compartment temperature bulb is installed in a panel on the left-forward-cargo-compartment sidewall, opposite the forward cargo compartment door. It supplies the compartment temperature to EICAS so it can be shown on the EICAS display (AMM 21-65-00/001).

3. Operation (Fig. 2)

A. Forward Cargo Heating

- (1) The pilots overhead panel (P5) contains the forward cargo heating control. An alternate action switch/light controls the system. 28 v dc is supplied to the overheat switch through the forward cargo overheat relay at all times. Pushing the switch/light ON supplies 28v dc to the control switch through the forward cargo heat control relay, and supplies 115v ac to the open side of the heating shutoff valve.
- (2) If the cargo compartment temperature falls below 40°F (4.5°C), the control switch closes, energizing the forward cargo heat control relay. The heating control valve opens, allowing warm air from the pneumatic system into the compartment. When the control valve and shutoff valve are fully open, an EICAS maintenance message, FWD CARGO HEAT, is stored in the EICAS computer for ground operations display. At 50°F (10°C) in the forward compartment, the control switch opens, deenergizing the relay and closing the control valve.
- (3) If the cargo compartment temperature reaches 90°F (32°C), the overheat switch closes, completing the 28v dc circuit through the forward cargo overheat relay. The heating shutoff valve closes. The amber OVHT light (P5 panel) comes on and an EICAS advisory message CGO FLOOR OVHT, appears on EICAS CRT display. The valve remains closed until compartment temperature falls to 80°F (27°C). At this temperature the overheat switch opens, removing power from overheat relay. The shutoff valve opens. The amber OVHT light goes out and the EICAS advisory CGO FLOOR OVHT disappears from EICAS CRT display. The OVHT light and FWD CARGO HEAT EICAS message are not displayed if the heating flow control valve is closed.

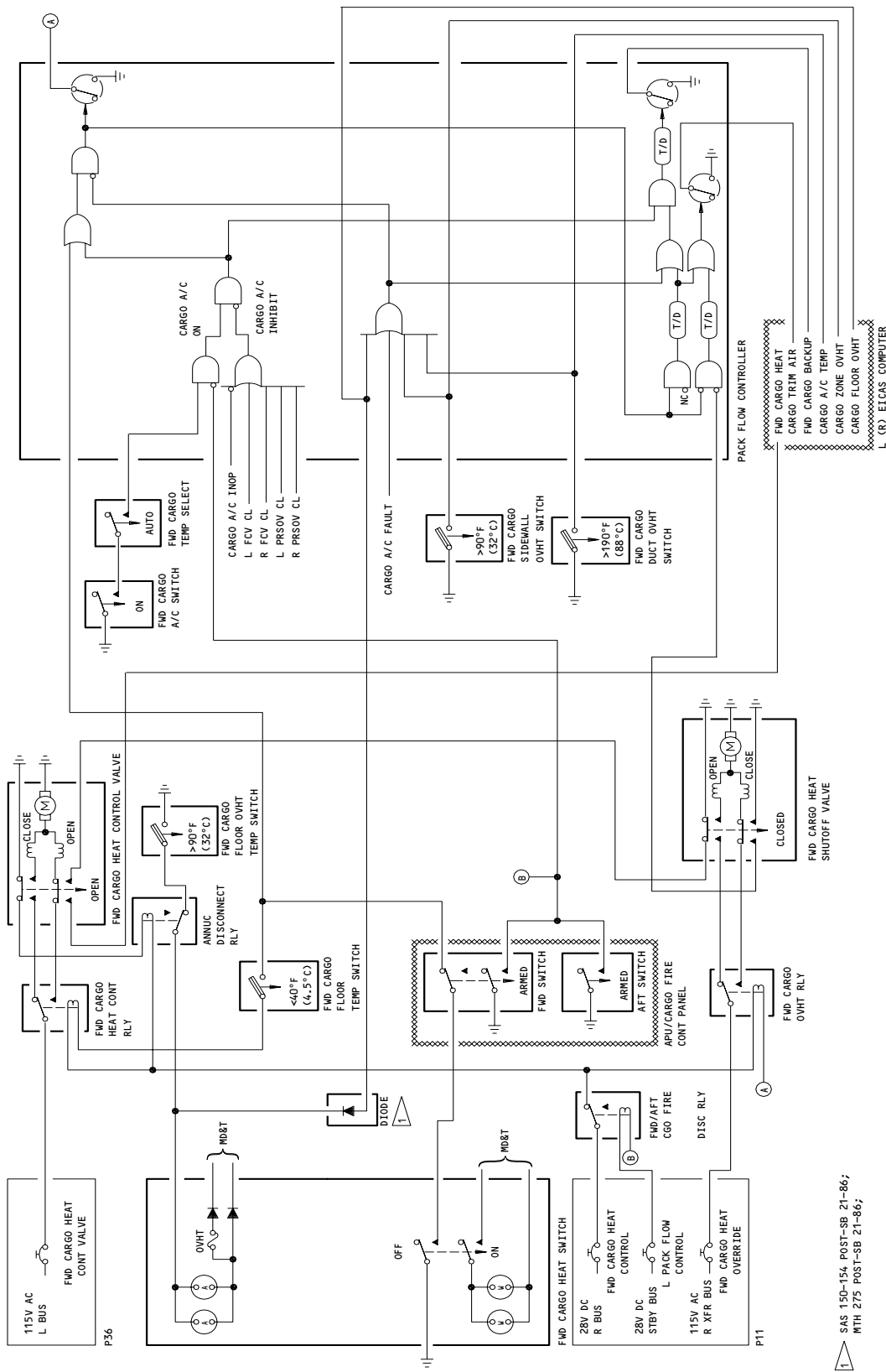
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Forward Cargo Compartment Heating System
Figure 3

1 SAS 150-154 POST-SB 21-86;
MTH 275 POST-SB 21-86;

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- (4) Fire protection is provided to the forward cargo compartment (AMM 26-23-00/001). If a fire is detected a red FWD light appears on the aft electronic control P8 panel. If the FWD CARGO FIRE switch/light on the P8 panel is then placed in the ARMED position, the shutoff valve will close.
- (5) The forward-cargo-heat-control valve is controlled by the forward-cargo-heat-control relay. When the relay is energized, 115v ac power is supplied to the open side of the valve. When the relay is relaxed, 115v ac is supplied to the close side of the valve. 28v dc is supplied through the relay at all times. A ground is supplied to energize the relay when all of these conditions occur:
 - (a) The FWD CARGO switch/light, on the P5 panel, is ON.
 - (b) The FWD CARGO FIRE switch/light, on the P8 panel, is not ARMED.
 - (c) The forward-cargo-floor-temperature switch is closed [the switch closes when the compartment temperature decreases to 40°F (4°C) and opens again when the temperature increases to 50°F (10°C)].
- (6) The-forward-cargo-heating-shutoff valve is controlled by the forward cargo overheat relay. When the relay is energized, 115v ac is supplied to the close side of the valve. When the relay is relaxed, 115v ac is supplied to the open side of the valve. 28v dc is supplied to the relay at all times. The ground is supplied in the pack flow controller.
 - (a) If the FWD CARGO AIR COND / VENT FAN temperature selector, on the P5 panel, is in VENT or the SYSTEM switch/light is not ON, the pack flow controller will supply a ground to energize the relay and close the valve when any of these conditions exist:
 - 1) The FWD CARGO HEAT switch/light, on the P5 panel, is not ON.
 - 2) The FWD CARGO FIRE switch/light, on the P8 panel, is ARMED.
 - 3) A compartment overheat condition occurs.
 - 4) The CARGO A/C FAULT condition occurs.
 - (b) If the FWD CARGO AIR COND / VENT FAN temperature selector, on the P5 panel, is in AUTO and the SYSTEM switch/light is ON, the pack flow controller will supply a ground when any of these conditions occur:
 - 1) The FWD or AFT CARGO FIRE switch, on the P8 panel, is ARMED.
 - 2) The left or right pack-flow-control-and-shutoff valve is closed.
 - 3) The left or right pressure-regulation-and-shutoff valve (PRSOV) is closed.
 - 4) A compartment overheat condition occurs.
 - 5) The CARGO A/C FAULT condition occurs.
 - 6) The CARGO A/C INOP condition occurs.

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- (7) The EICAS display shows indications of failures in the forward cargo heating system. The pack flow controller and the auxiliary controller monitor parts of the system and, if a failure occurs, sends a signal to the EICAS computer. The EICAS computer shows a message for the applicable failure. Some failures have other indications which show with the EICAS message. Here is a list of the failure conditions, the indications that are shown, and what causes them:
- (a) Two indications of a CARGO A/C INOP condition are supplied. The INOP light on the FWD CARGO AIR COND / VENT FAN SYSTEM switch/light comes on and the "FWD CARGO A/C" message is shown on the EICAS display. A CARGO A/C INOP condition occurs when any of these failures occur:
 - 1) The FWD CARGO AIR COND / VENT FAN temperature selector potentiometer fails.
 - 2) The auxiliary controller fails.
 - 3) Power is not supplied through the auxiliary controller.
 - 4) The forward-cargo air-conditioning-shutoff valve fails.
 - (b) Two indications of a CARGO A/C FAULT condition are supplied. The FAULT light on the FWD CARGO AIR COND / VENT FAN module comes on and the "FWD CARGO BACKUP" message is shown on the EICAS display. The CARGO A/C FAULT condition occurs when any of these failures occurs:
 - 1) The forward cargo heating shutoff valve fails.
 - 2) The forward cargo heating control valve fails.
 - 3) The forward-cargo trim-air-modulating valve fails.
 - 4) The overheat temperature switch in the forward-cargo-air-conditioning-distribution duct fails.
 - 5) The overheat temperature switch in the sidewall panel of the forward cargo compartment fails.
 - 6) A compartment overheat condition occurs.
 - (c) The EICAS message "CARGO TRIM AIR" shows that the cargo heating shutoff valve has failed in either the open or the closed position.
 - (d) Indications of a compartment overheat condition are supplied by three messages on the EICAS display. Here is a list of the EICAS messages and what they mean:
 - 1) The "CARGO FLOOR OVHT" message means the forward-cargo floor-overheat-temperature switch is closed [the compartment temperature is greater than 90°F (32°C)].
 - 2) The "CARGO ZONE OVHT" message means the forward-cargo sidewall-overheat-temperature switch is closed [the compartment temperature is greater than 90°F (32°C)].
 - 3) The "CARGO A/C TEMP" message means the forward-cargo air-conditioning-duct-overheat-temperature switch is closed [the duct temperature is greater than 190°F (88°C)].

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 **BOEING**
767
MAINTENANCE MANUAL

- (e) More EICAS messages show the condition of the forward cargo heating system. Here is a list of those other EICAS messages and what they mean:
- 1) The "FWD CARGO HEAT" message means that the forward-cargo-heating-shutoff valve and the forward-cargo-heating-control valve are open.
 - 2) The "FWD CARGO _____" message shows the temperature of the forward cargo compartment in degrees celcius.

EFFECTIVITY

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 **BOEING**
767
FAULT ISOLATION/MAINT MANUAL

FORWARD CARGO COMPARTMENT HEATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - CONTROL, FWD CARGO HEAT, C697 OVERRIDE, FWD CARGO HEAT, C685		1	FLT COMPT, P11 11R19	*
CIRCUIT BREAKER - VALVE, FWD CARGO HEAT CONT, C696		1	11R21	*
COMPUTER - (FIM 31-41-00/101) EICAS, LEFT, M10181 EICAS, RIGHT, M10182		1	119AL, MAIN EQUIP CTR, P36 36L2 OR 36K5	
PANEL - (FIM 26-22-00/101) APU/CARGO FIRE, M10444				
PANEL - CARGO HEAT CONTROL, M29 RELAY - (FIM 31-01-36/101) AIR/GND SYS NO. 1, K145 CONT, FWD CARGO HEAT, K230	1	1	FLT COMPT, P5	*
RELAY - (FIM 31-01-37/101) AIR/GND SYS NO. 2, K203 ANNUCIATION, FWD CARGO, K766 OVHT, FWD CARGO, K231				
SWITCH - FWD CARGO TEMP CONTROL, S364	2	1	821, FWD CARGO COMPT	21-43-05
SWITCH - FWD CARGO TEMP OVERHEAT, S363	2	1	821, FWD CARGO COMPT	21-43-05
SWITCH/LIGHT - (FIM 26-22-00/101) FWD CARGO FIRE, S1				
SWITCH/LIGHT - FWD CARGO HEAT, YDBS1	1	1	FLT COMPT, P5, CARGO HEAT CONTROL PNL, M29	
VALVE - FWD CARGO HEATING CONTROL, V88	3	1	194LR, RIGHT ECS BAY	21-43-02
VALVE - FWD CARGO HEATING SHUTOFF, V89	3	1	194LR, RIGHT ECS BAY	21-43-01

* SEE THE WDM EQUIPMENT LIST

Forward Cargo Compartment Heating System - Component Index
Figure 101

EFFECTIVITY
767-200 AIRPLANES;
767-300 AIRPLANES PRE-PRR B13100-6

21-43-00



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FAULT ISOLATION/MAINT MANUAL

FORWARD CARGO COMPARTMENT HEATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - CONTROL, FWD CARGO HEAT, C697 OVERRIDE, FWD CARGO HEAT, C685		1	FLT COMPT, P11 11R19	*
CIRCUIT BREAKER - VALVE, FWD CARGO HEAT CONT, C696		1	11R21 119AL, MAIN EQUIP CTR, P36 36L2 OR 36K5	*
COMPUTER - (FIM 31-41-00/101) EICAS, LEFT, M10181 EICAS, RIGHT, M10182				
PANEL - (FIM 26-22-00/101) APU/CARGO FIRE, M10444				
PANEL - CARGO HEAT CONTROL, M29 RELAY - (FIM 31-01-36/101) AIR/GND SYS NO. 1, K145 CONT, FWD CARGO HEAT, K230	1	1	FLT COMPT, P5	*
RELAY - (FIM 31-01-37/101) AIR/GND SYS NO. 2, K203 ANNUCIATION, FWD CARGO, K766 OVHT, FWD CARGO, K231				
SWITCH - FWD CARGO TEMP CONTROL, S364	2	1	821, FWD CARGO COMPT	21-43-05
SWITCH - FWD CARGO TEMP OVERHEAT, S363	2	1	821, FWD CARGO COMPT	21-43-05
SWITCH/LIGHT - (FIM 26-22-00/101) FWD CARGO FIRE, S1				
SWITCH/LIGHT - FWD CARGO HEAT, YDBS1	1	1	FLT COMPT, P5, CARGO HEAT CONTROL PNL, M29	
VALVE - FWD CARGO HEATING CONTROL, V89	4	1	821, FWD CARGO COMPT, BEHIND AFT RIGHT ENDWALL	21-43-02
VALVE - FWD CARGO HEATING CONTROL, V88	5	1	194LR, RIGHT ECS BAY	21-43-01

* SEE THE WDM EQUIPMENT LIST

Forward Cargo Compartment Heating System - Component Index
Figure 101A

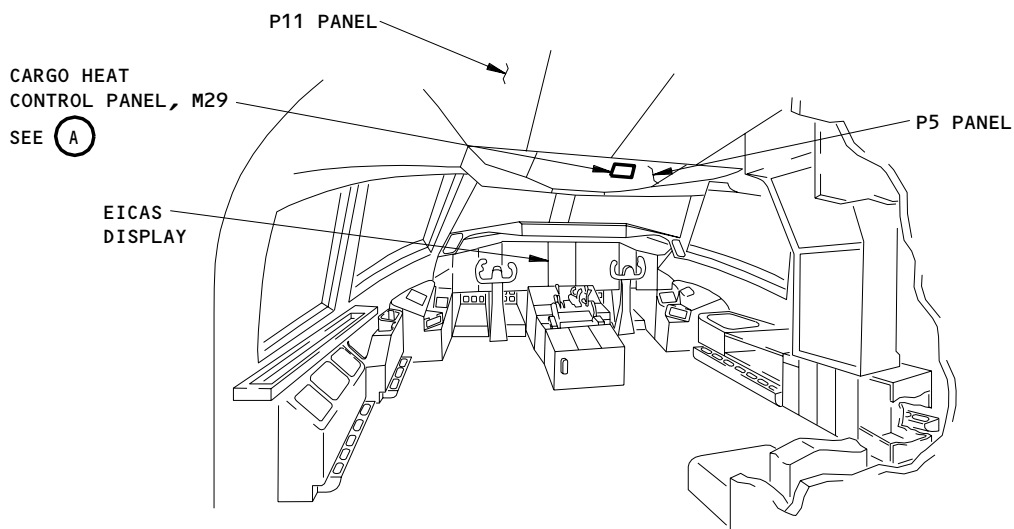
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767-300 AIRPLANES POST-PRR B13100-6

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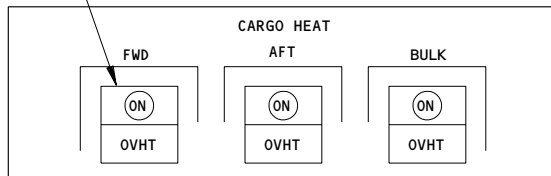
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FLIGHT COMPARTMENT

FORWARD CARGO HEAT SWITCH/LIGHT, YDBS1



CARGO HEAT CONTROL PANEL, M29

(A)

Forward Cargo Compartment Heating System - Component Location
Figure 102 (Sheet 1)

EFFECTIVITY

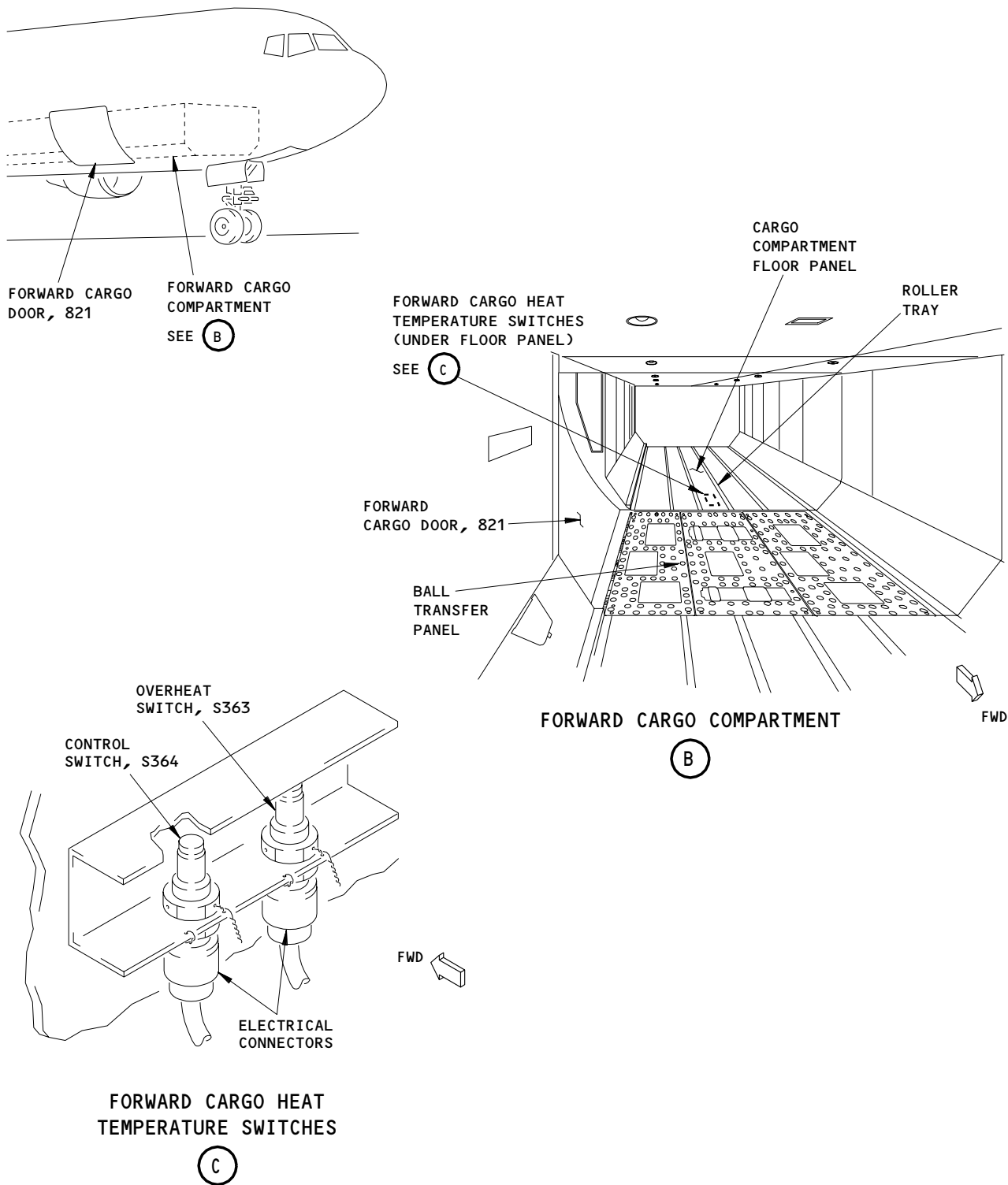
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Forward Cargo Compartment Heating System - Component Location
Figure 102 (Sheet 2)

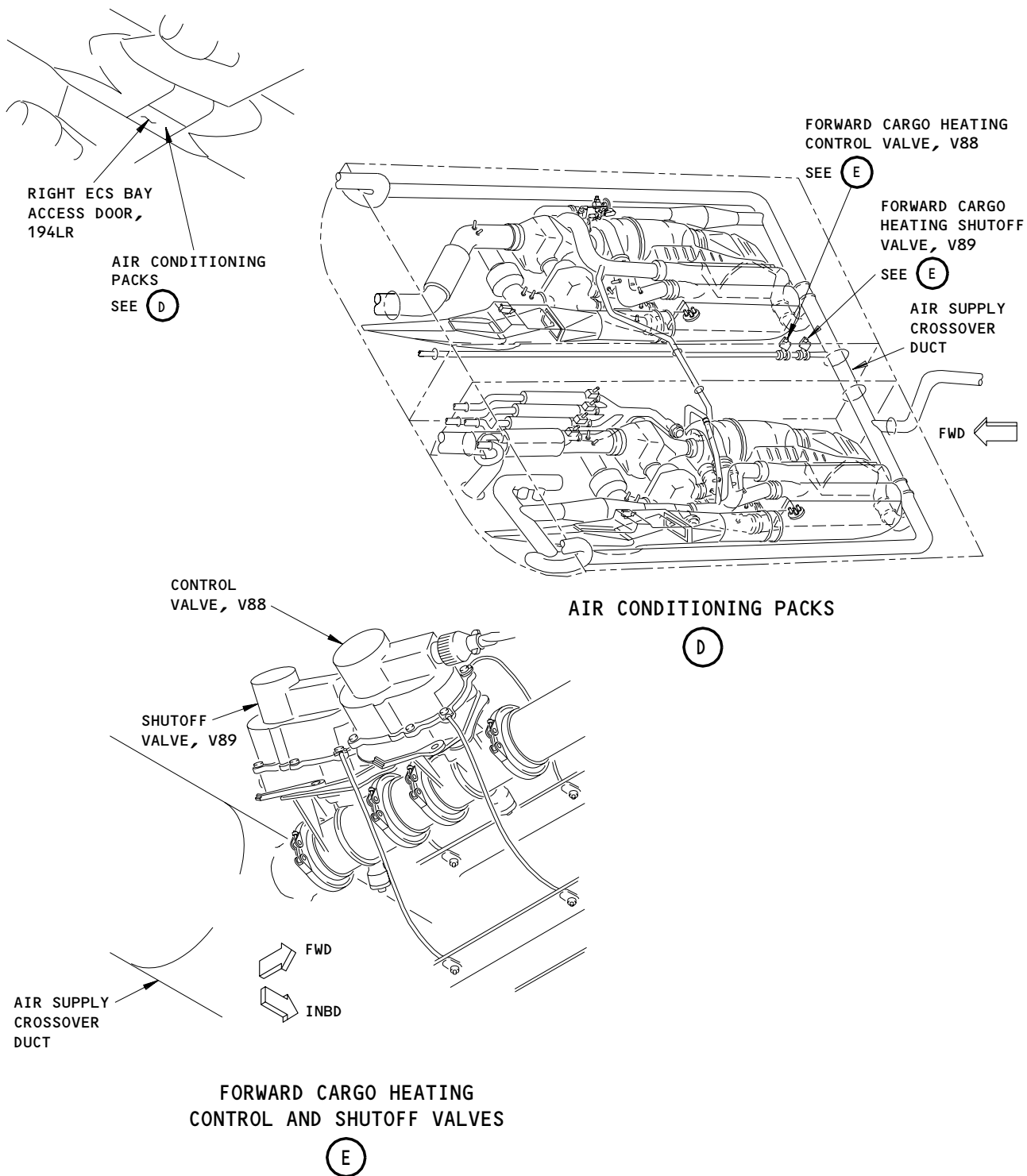
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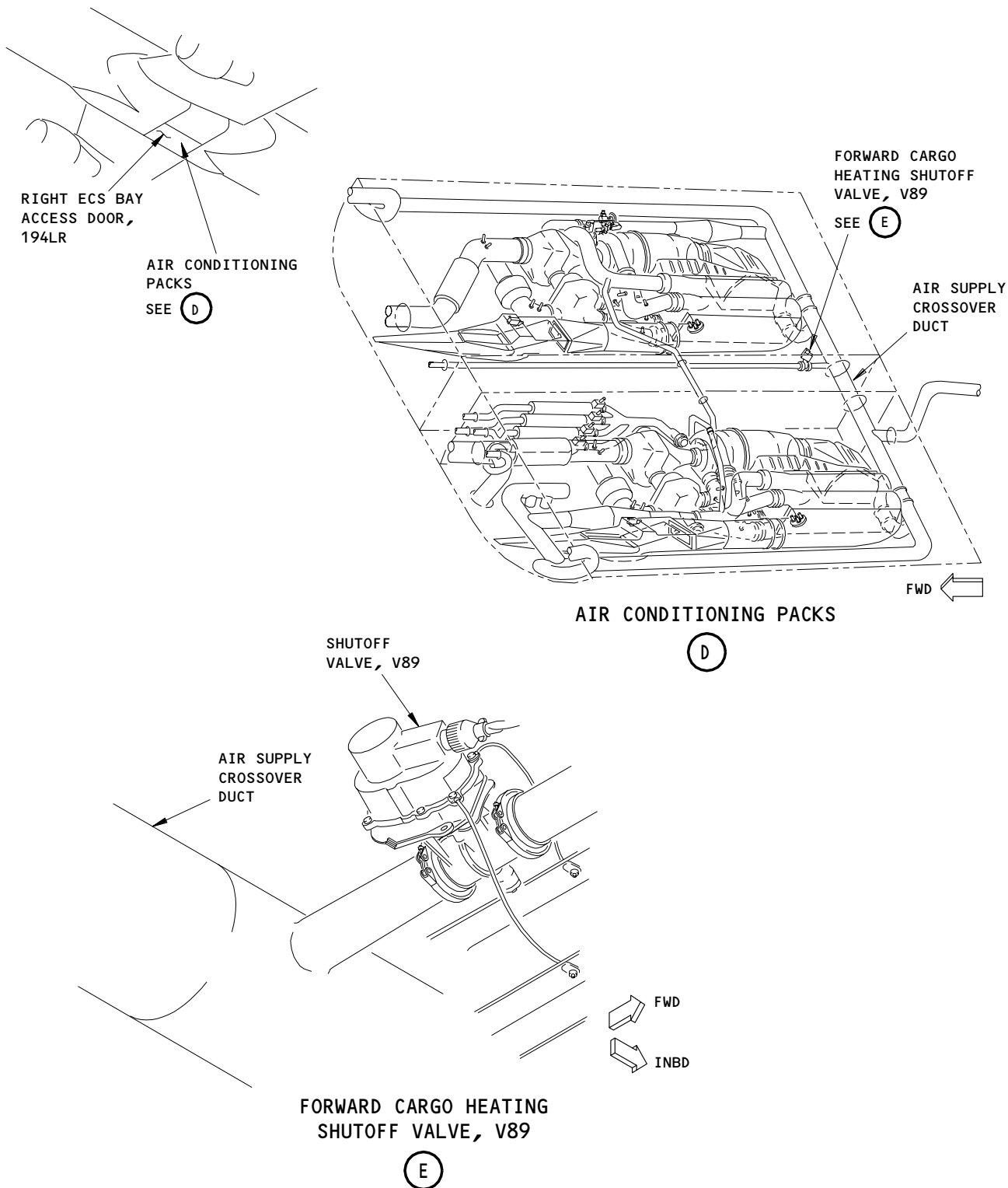
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Forward Cargo Compartment Heating System - Component Location
Figure 102 (Sheet 3)

EFFECTIVITY
767-200 AIRPLANES;
767-300 AIRPLANES PRE-PRR B13100-6

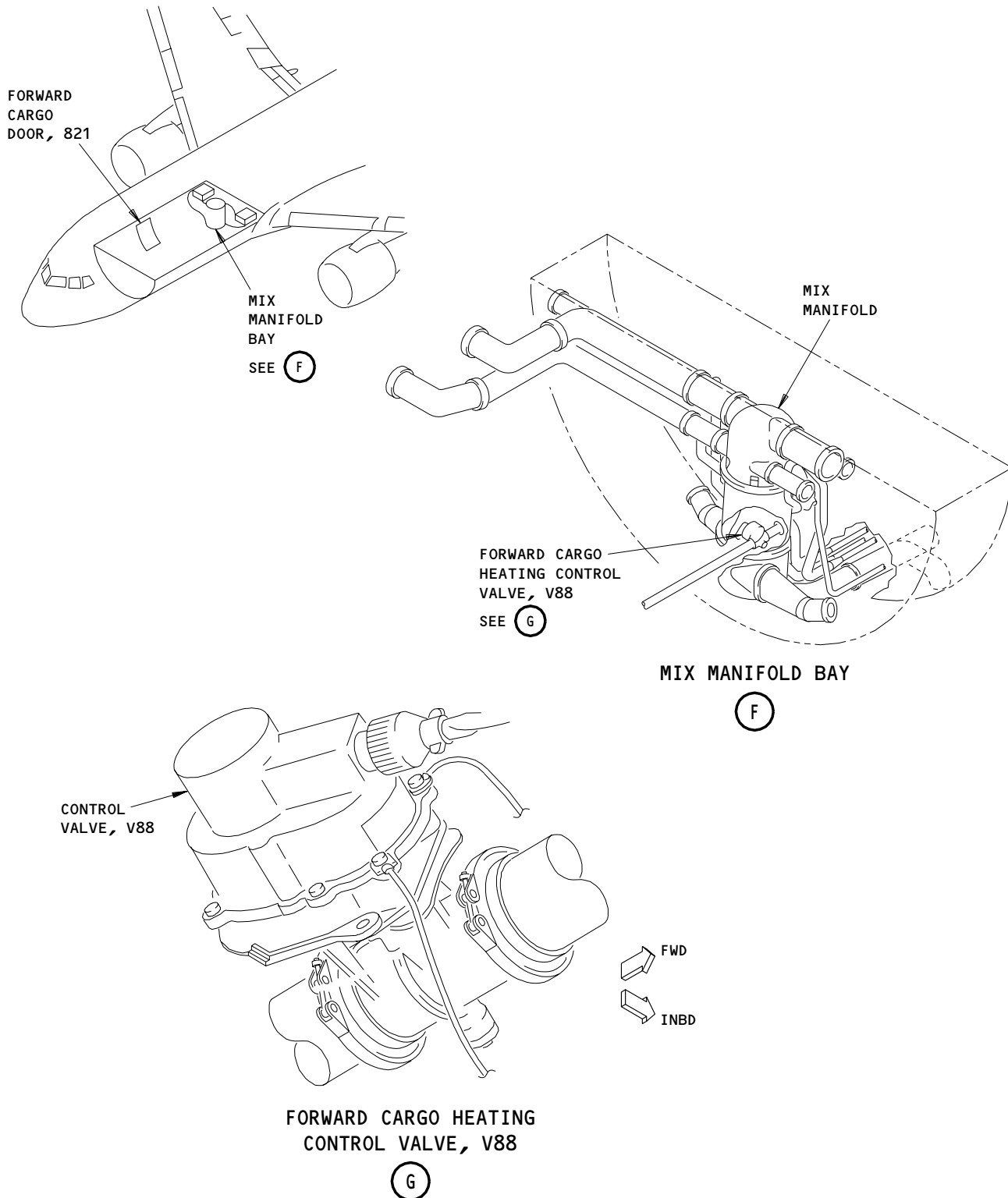
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Forward Cargo Compartment Heating System - Component Location
Figure 102 (Sheet 4)

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767-300 AIRPLANES POST-PRR B13100-6

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Forward Cargo Compartment Heating System - Component Location
Figure 102 (Sheet 5)

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767-300 AIRPLANES POST-PRR B13100-6

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FORWARD CARGO COMPARTMENT HEATING SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure has three tasks. The first task is an operational test of the forward cargo heating system. The second task is a system test of the heating system for the forward cargo compartment. The third task is an operational test of the forward cargo overheat switch.

TASK 21-43-00-705-001

2. Operational Test – Forward Cargo Heating System

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zones
121/122 Forward cargo compartment
123/124 Area below forward cargo compartment
- (2) Access Panels
119AL Main Equipment Center
194LR ECS Access Door (Right)

C. Prepare for the test

S 865-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 015-141

- (2) Open the main equipment center access door, 119AL (AMM 06-41-00/201)

S 865-003

- (3) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11R19, FWD CARGO HEAT CONTROL
(b) 11R21, FWD CARGO HEAT OVERRIDE
(c) EICAS circuit breakers (6 locations)

S 865-004

- (4) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
(a) 36L2 or 36K5, CARGO HEAT VALVE FWD CONT

S 485-005

- (5) If the temperature in the forward cargo compartment is greater than 40°F (5°C), then apply a cold source to the forward cargo control switch.
(a) Remove the floor panel aft of the ball transfer panel, on the airplane centerline, to find the control and overheat temperature switches below the forward cargo deck.

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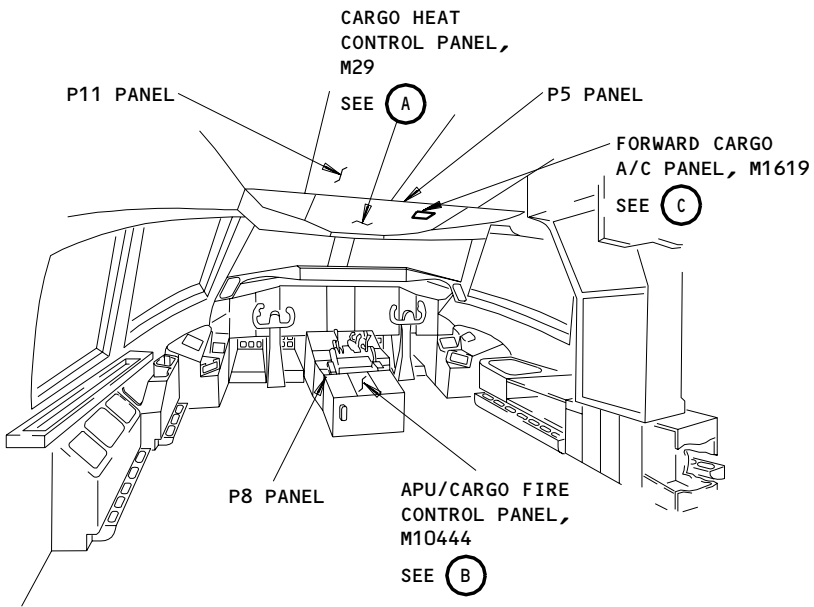
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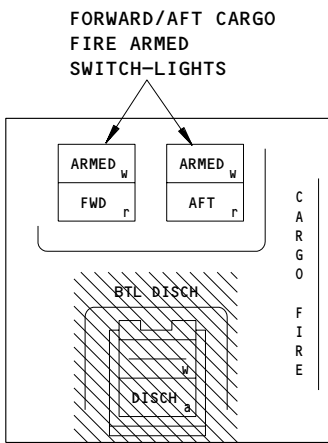
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BOEING

767 MAINTENANCE MANUAL

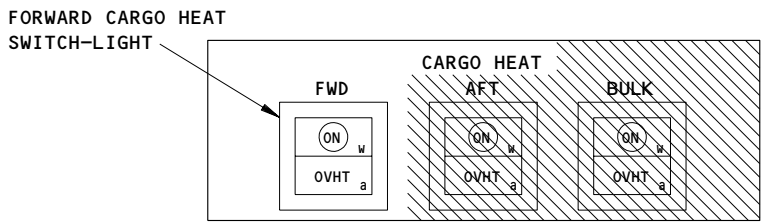


FLIGHT COMPARTMENT



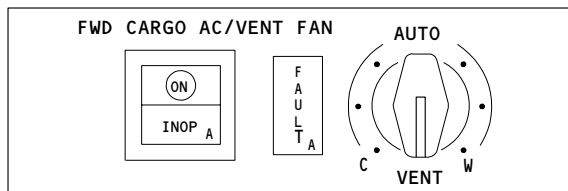
FORWARD/AFT CARGO
FIRE ARMED
SWITCH-LIGHTS

(B)



CARGO HEAT CONTROL PANEL, M29

(A)



FORWARD CARGO A/C PANEL, M1619

(C)

Forward Cargo Heating System Adjustment Test
Figure 501

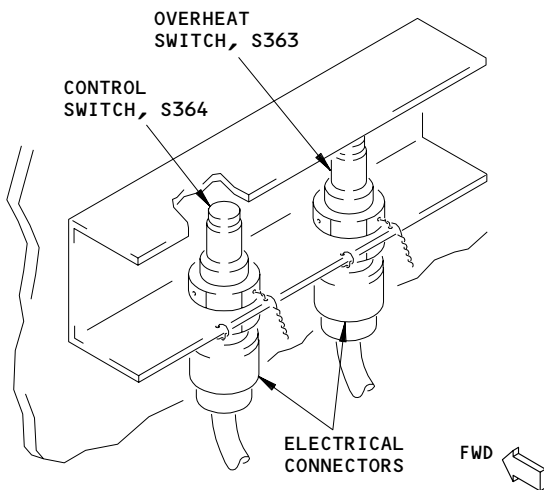
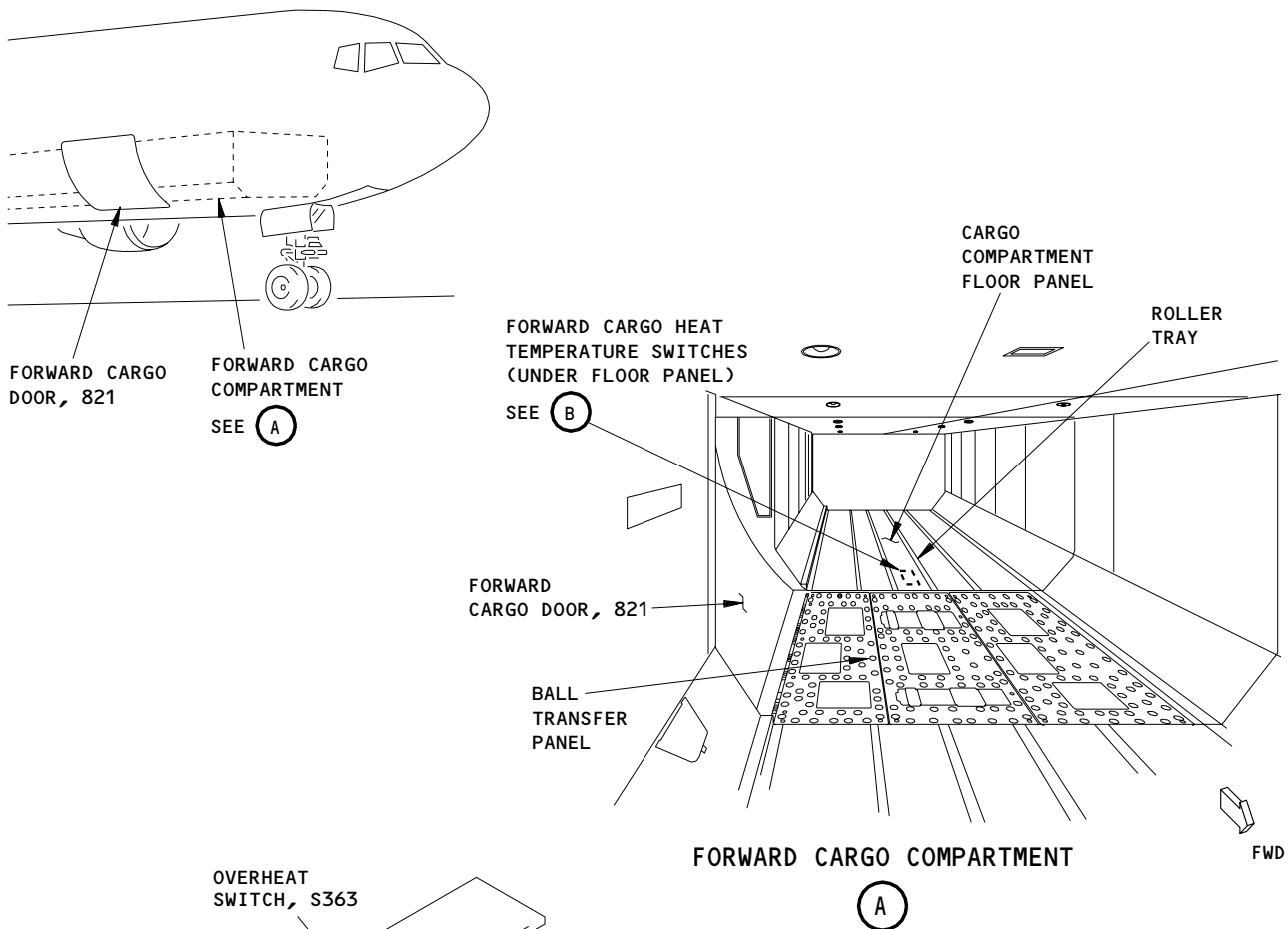
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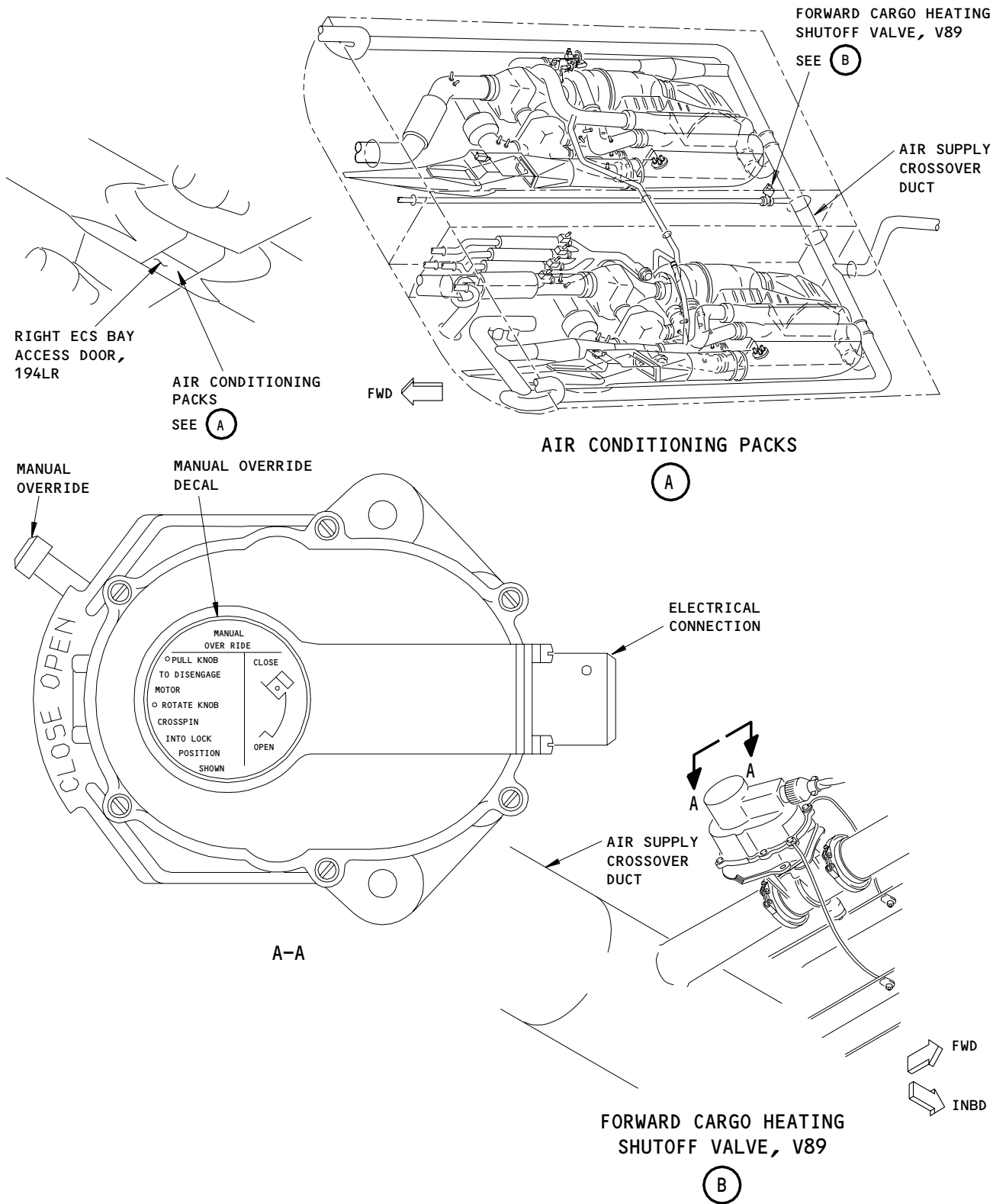
FORWARD CARGO HEAT TEMPERATURE SWITCHES

(B)

Forward Cargo Heating System Temperature Switches
Figure 502

EFFECTIVITY	ALL
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Forward Cargo Heating System Control and Shutoff Valves
Figure 503 (Sheet 1)

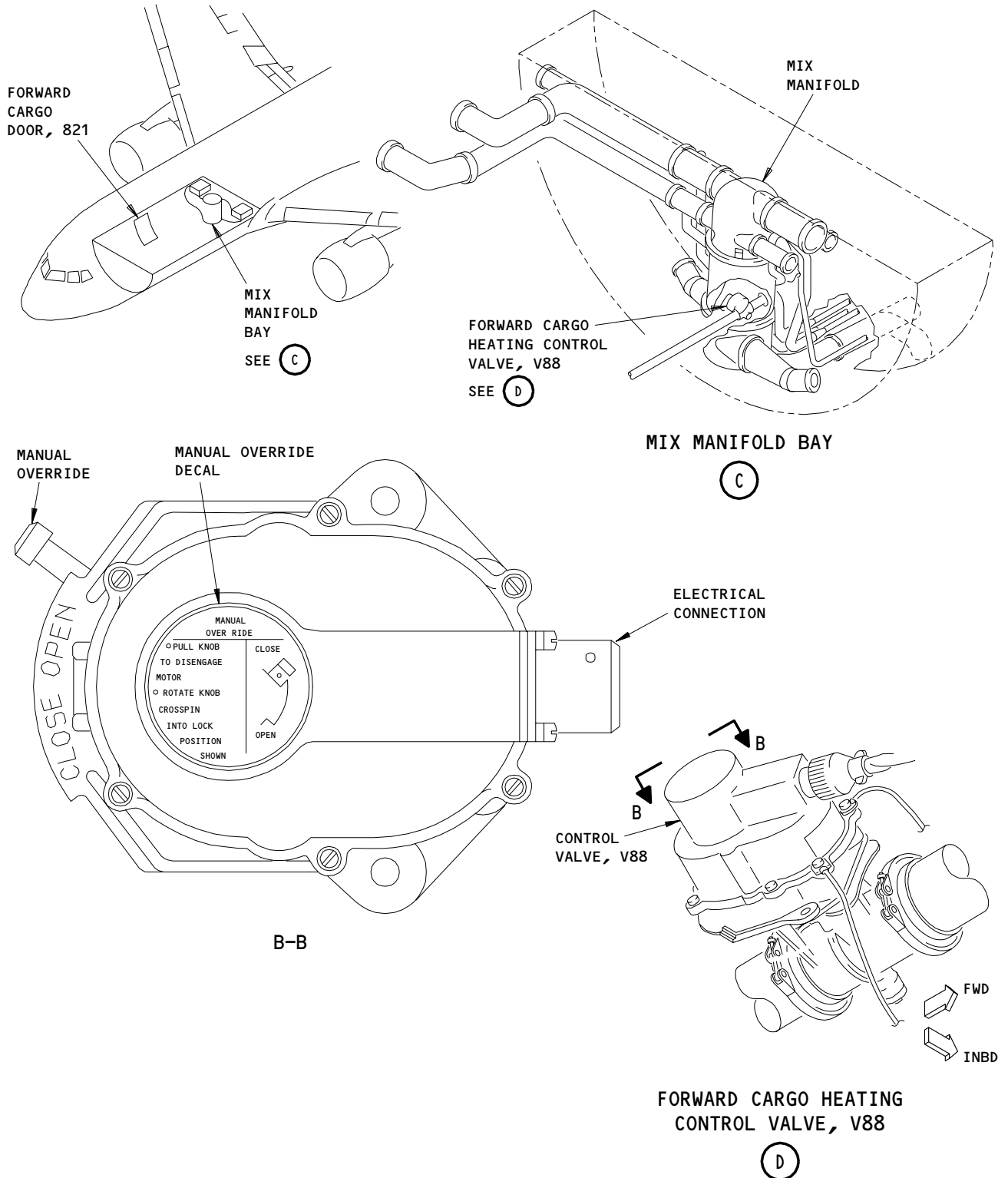
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Forward Cargo Heating System Control and Shutoff Valves
Figure 503 (Sheet 2)

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S 485-006

- (6) If the temperature in the forward cargo compartment is greater than 80°F (32°C), then apply a cold source to the forward cargo overheat switch.

S 015-074

- (7) Open the right ECS access door 194LR (AMM 06-41-00/201) to find the forward cargo heating valves.

S 865-007

- (8) Push the ESC MSG button, on the P61 panel, to get the EICAS maintenance page.

D. Operational Test Procedure

S 715-008

- (1) Do the Operational Test
- (a) Push the FWD CARGO HEAT switch-light on the overhead panel, P5, to the ON position.
 - 1) Make sure the ON light comes on.
 - (b) Make sure the EICAS message, FWD CARGO HEAT, shows on the bottom display.
 - (c) Make sure the position indicator on the shutoff valve is in the OPEN position.

S 865-009

CAUTION: OPEN THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP. IF THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE NOT OPENED, THE CARGO FIRE EXTINGUISHER BOTTLES MAY DISCHARGE WHEN YOU DO THE STEPS THAT FOLLOW.

- (2) Open these circuit breakers on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags:
- (a) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - (b) 6H6, FIRE EXTINGUISHING CARGO BTL 2

S 715-010

- (3) Continue the procedure
- (a) Push the CARGO FIRE FWD switch-light on the pilots control stand panel, P8, to the ARMED position.
 - 1) Make sure the ARMED light comes on.
 - (b) Make sure the EICAS message, FWD CARGO HEAT, does not show on the bottom display.

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- (c) Make sure the position indicator on the shutoff valve is in the CLOSE position.
 - (d) Make sure the position indicator on the control valve is in the CLOSE position.
 - (e) Push the CARGO FIRE FWD switch-light, on the P8 panel, to the off position.
 - 1) Make sure the ARMED light goes off.
 - (f) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
 - (g) Make sure the EICAS message, FWD CARGO HEAT, shows on the bottom display.
 - (h) Make sure the position indicator on the shutoff valve is in the OPEN position.
 - (i) Make sure the position indicator on the control valve is in the OPEN position.
 - (j) Push the FWD CARGO HEAT switch-light, on the P5 panel, to the off position.
 - 1) Make sure the ON light goes off.
 - (k) Make sure the EICAS message, FWD CARGO HEAT, does not show on the bottom display.
- E. Put the Airplane Back to Its Usual Condition

S 085-011

- (1) If necessary, remove the cold source from the forward cargo temperature switches.

S 415-118

- (2) Re-install the applicable floor panel in the forward cargo compartment.

S 415-075

- (3) Close the right ECS access door, 194LR (AMM 06-41-00/201).

S 415-140

- (4) Close the main equipment center access door, 119AL, (AMM 06-41-00/201).

S 865-012

- (5) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-43-00-705-013

3. System Test - Forward Cargo Compartment Heating System

A. Equipment

- (1) Heat Source (blow dryer), commercially available.
- (2) Cold Source (ice pack), commercially available.
- (3) Thermometer, range 0 to 120°F (0 to 49°C) - commercially available.
- (4) Mirror - commercially available

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B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (4) AMM 31-41-00/201, Engine Indication and Crew Alerting System
- (5) AMM 32-09-02/201, Air/Ground Relay
- (6) AMM 36-00-00/201, Pneumatic - General
- (7) AMM 52-33-00/201, Large Forward Cargo Door

C. Access

- (1) Location Zones
 - 121/122 Forward cargo compartment
 - 123/124 Area below the forward cargo compartment
 - 126 Area aft of the forward cargo compartment
 - 136 Environmental control systems bay (Right)
 - 821 Forward Cargo Door
 - 194LR ECS Access Door (Right)

D. Prepare for the Test

S 865-014

- (1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11R19, FWD CARGO HEAT CONTROL
 - (b) 11R21, FWD CARGO HEAT OVERRIDE
 - (c) EICAS circuit breakers (6 locations)

S 865-015

- (2) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
 - (a) 36L2 or 36K5, CARGO HEAT VALVE FWD CONT

S 865-016

- (3) Supply electrical power (AMM 24-22-00/201).

S 865-017

- (4) Push the ECS MSG button, on the P61 panel, to get the EICAS maintenance page.

S 865-018

- (5) Make sure the FWD CARGO HEAT switch-light on the overhead control panel, P5, is off (the ON light is not on).

S 865-020

- (6) Make sure the FWD CARGO A/C switch-light, on the P5 panel, is on (the ON light is on).

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S 865-021

- (7) Make sure the FWD CARGO A/C selector, on the P5 panel, is in the VENT position.

S 865-023

- (8) Make sure the CARGO FIRE FWD switch-light on the aft pilots control stand panel, P8, is off (the ARMED light is not on).

S 015-024

- (9) Open the forward cargo door, 821 (AMM 52-33-00/201).

S 015-139

- (10) Remove the floor panel aft of the ball transfer panel, on the airplane centerline, to find the control and overheat temperature switches below the forward cargo deck.

S 015-029

- (11) Open the right ECS access door, 194LR, (AMM 06-41-00/201) to find the forward cargo heating shutoff valve.

S 015-030

- (12) Remove the curtain panel at the aft end of the forward cargo compartment to find the forward cargo heating control valve (which is installed below and to the right of the mix manifold).

E. Do the Forward Cargo Compartment Heating System Test

S 735-031

- (1) Do the Forward Cargo Heating Control Test
- (a) Make sure the position indicators for the control valve and the shutoff valve are in the CLOSED position.
 - (b) Push the FWD CARGO HEAT switch-light, on the P5 panel, to the ON position.
 - 1) Make sure the ON light comes on.
 - (c) If the forward cargo compartment temperature is greater than 40°F (5°C), then apply a cold source to the forward cargo control switch.

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- (d) If the forward cargo compartment temperature is greater than 80°F (32°C), then apply a cold source to the forward cargo overheat switch.
- (e) Make sure the position indicators on the control valve and the shutoff valve move to the OPEN positions.
- (f) Make sure the EICAS maintenance message, FWD CARGO HEAT, shows on the bottom display.
- (g) Supply pneumatic power (AMM 36-00-00/201).
- (h) Feel for air leaks from the forward cargo heating ducts.
 - 1) Small leaks are permitted.
 - 2) Large leaks must be repaired.
- (i) Remove the pneumatic power (AMM 36-00-00/001).
- (j) If applicable, remove the cold source from the forward cargo temperature switches.
- (k) If the temperature in the forward cargo compartment is less than 55°F (13°C), then apply a heat source to the control switch.
- (l) Make sure the position indicator on the control valve moves to the CLOSED position.
- (m) Make sure the position indicator on the shutoff valve stays in the OPEN position.
- (n) Make sure the EICAS message, FWD CARGO HEAT, does not show on the bottom display.

S 735-032

- (2) Do the Forward Cargo Heating Shutoff Valve Test.
 - (a) Push the FWD CARGO HEAT switch-light, on the P5 panel, to the ON position.
 - 1) Make sure the ON light comes on.
 - (b) If the temperature in the forward cargo compartment is greater than 40°F (5°C), then apply a cold source to the forward cargo control switch.
 - (c) If the temperature in the forward cargo compartment is greater than 80°F (32°C), then apply a cold source to the forward cargo overheat switch.

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- (d) Make sure the EICAS message, FWD CARGO HEAT, shows on the bottom display.
- (e) Make sure the position indicator on the shutoff valve is in the OPEN position.

S 865-033

CAUTION: OPEN THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP. IF THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE NOT OPENED, THE CARGO FIRE EXTINGUISHER BOTTLES MAY DISCHARGE WHEN YOU DO THE STEPS THAT FOLLOW.

- (3) Open these circuit breakers on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags:
 - (a) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - (b) 6H6, FIRE EXTINGUISHING CARGO BTL 2

S 735-034

- (4) Continue the procedure
 - (a) Push the CARGO FIRE FWD switch-light on the aft pilots control stand panel, P8, to the ARMED position.
 - 1) Make sure the ARMED light comes on.
 - (b) Make sure the position indicator on the shutoff valve moves to the CLOSED position.
 - (c) Make sure the EICAS message, FWD CARGO HEAT, does not show on the bottom display.
 - (d) Push the CARGO FIRE FWD switch-light, on the P8 panel, to the off position.
 - 1) Make sure the ARMED light goes off.
 - (e) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
 - (f) Make sure the position indicator on the shutoff valve moves to the OPEN position.

S 735-089

- (5) Continue the test as follows:
 - (a) Open this circuit breaker on the P11 panel:
 - 1) 11R21, CARGO HEAT OVERRIDE

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WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (b) Make sure the flaps are in the retracted position (AMM 27-51-00/201).
- (c) To simulate the left and right flow control valves are in the open position, do the steps that follow:
 - 1) Disconnect connector D2770 from the left flow control valve.
 - 2) Disconnect connector D1276 from the right flow control valve.
- (d) To simulate the left and right engines are on, do the steps that follow:
 - 1) Hold the channel 2 switch on the N2 engine speed card assemblies in the TEST position.
 - 2) Put the left and right fuel control switches in the RUN position.
- (e) To simulate the left and the right PRSOV's are in the open position, open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
 - 1) 11S10, L AIR SUP IND
 - 2) 11S11, L AIR SUP ENG BLEED CONT
 - 3) 11S19, R AIR SUP ENG IND
 - 4) 11S20, R AIR SUP ENG BLEED CONT
- (f) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (g) Turn the Maintenance Enable Bypass switch, S612 to the BYPASS position.

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- (h) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).
 - 1) Turn the FWD CARGO A/C selector, on the P5 panel, to the AUTO position.
 - 2) Make sure the left pack is in the HI flow mode:
 - a) Push the button adjacent to the UNIT REF message shown on the Flight Management Computer (FMC).
 - b) Push the button adjacent to the INDEX message shown on the FMC.
 - c) Push the button adjacent to the MAINT message shown on the FMC
 - d) Push the button adjacent to the DISCRETES message shown on the FMC
 - e) Make sure the ECS PACK H/L shows the left pack is in the HI flow mode.
- (i) After 20 seconds, make sure these conditions occur:
 - 1) The EICAS message, FWD CARGO BACKUP, shows on the top display.
 - 2) The EICAS message, CARGO TRIM AIR, shows on the bottom display.
 - 3) The FWD CARGO A/C FAULT light, on the P5 panel, comes on.
- (j) Put the No. 1 and the No. 2 air/ground systems to the ground mode (AMM 32-09-02/201).
- (k) Make sure these conditions occur:
 - 1) The EICAS message, FWD CARGO BACKUP, does not show on the top display.
 - 2) The FWD CARGO A/C FAULT light, on the P5 panel, goes off.
- (l) Close this circuit breaker on the P11 panel:
 - 1) 11R21, CARGO HEAT OVERRIDE
- (m) Make sure the position indicator on the shutoff valve moves to the OPEN position.
- (n) Do the Maintenance Message Erase procedure (AMM 31-41-00/201).
- (o) Make sure the EICAS message, CARGO TRIM AIR, does not show on the bottom display.
- (p) Open this circuit breaker on the P11 panel:
 - 1) 11R21, CARGO HEAT OVERRIDE

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- (q) Turn the FWD CARGO A/C selector, on the P5 panel, to the VENT position.
- (r) Make sure the ECS PACK H/L on the FMC shows the left pack is in the LO flow mode.
- (s) After 20 seconds, make sure the EICAS message, CARGO TRIM AIR, shows on the bottom display.
- (t) Close this circuit breaker on the P11 panel:
 - 1) 11R21, CARGO HEAT OVERRIDE
- (u) Make sure the position indicator on the shutoff valve moves to the CLOSED position.
- (v) Do the Maintenance Message Erase procedure (AMM 31-41-00/201).
- (w) Make sure the EICAS message, CARGO TRIM AIR, does not show on the bottom display.

S 735-044

- (6) Do the Forward Cargo Overheat Switch Test.
 - (a) Push the FWD CARGO HEAT switch-light, on the P5 panel, to the ON position.
 - 1) Make sure the ON light comes on.
 - (b) Disconnect the electrical connector from the control valve.
 - (c) If the temperature in the forward cargo compartment is less than 95°F (35°C), then apply a heat source to the forward cargo temperature switches.
 - (d) Make sure the position indicator on the shutoff valve moves to the CLOSED position.
 - (e) Make sure the FWD CARGO HEAT OVHT light, on the P5 panel, comes on.
 - (f) Make sure the EICAS message, CGO FLOOR OVHT, shows on the top display.
 - (g) Do the steps that follow:
 - 1) Connect the electrical connector to the control valve.
 - 2) Make sure the position indicator on the control valve moves to the CLOSED position.
 - 3) Make sure the EICAS message, CGO FLOOR OVHT, does not show on the top display.

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- 4) Make sure the FWD CARGO HEAT OVHT light, on the P5 panel, goes off.
 - 5) Disconnect the electrical connector from the control valve.
 - 6) Make sure the FWD CARGO HEAT OVHT light, on the P5 panel, comes on.
 - (h) Remove the heating source from the temperature switches.
 - (i) If the cargo compartment temperature is greater than 75°F (24°C), then apply a cold source to the temperature switches.
 - (j) Make sure the position indicator on the shutoff valve moves to the OPEN position.
 - (k) Make sure the FWD CARGO HEAT OVHT light, on the P5 panel, goes off.
 - (l) Make sure the EICAS message, CGO FLOOR OVHT, does not show on the top display.
 - (m) Connect the electrical connector to the control valve.
 - (n) Push the FWD CARGO HEAT switch-light, on the P5 panel, to the off position.
 - 1) Make sure the ON light goes off.
 - (o) Make sure the position indicators for the control valve and the shutoff valve move to the CLOSED positions.
- F. Put the Airplane Back to Its Usual Condition

S 415-045

- (1) Install the curtain panel in the aft end of the forward cargo compartment.

S 415-046

- (2) Install the floor panels above the temperature switches.

S 415-048

- (3) Close the forward cargo door, 821 (AMM 52-33-00/201).

S 415-049

- (4) Close the right ECS access door, 194LR (AMM 06-41-00/201).

S 865-050

- (5) Remove the electrical power if it is no longer necessary (AMM 24-22-00/201).

TASK 21-43-00-705-051

4. Operational Test - Forward Cargo Overheat Test

A. Equipment

- (1) Heat Source (blow dryer), commercially available.
- (2) Cold Source (ice pack), commercially available.
- (3) Thermometer, range 0 to 120°F (0 to 49°C) - commercially available.
- (4) Mirror - commercially available

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

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- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 52-33-00/201, Large Forward Cargo Door.

C. Access

(1) Location Zones

- 121/122 Forward cargo compartment
- 123/124 Area below the forward cargo compartment
- 136 Environmental control systems bay (Right)
- 821 Forward cargo door

(2) Access Panel

- 194LR ECS Access Door (Right)

D. Prepare for the Test

S 865-052

- (1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11R19, FWD CARGO HEAT CONTROL
 - (b) 11R21, FWD CARGO HEAT OVERRIDE
 - (c) EICAS circuit breakers (6 locations)

S 865-053

- (2) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
 - (a) 36L2 or 36K5, CARGO HEAT VALVE FWD CONT

S 865-054

- (3) Supply electrical power (AMM 24-22-00/201).

S 865-055

- (4) Push the ECS MSG button, on the P61 panel, to get the EICAS maintenance page.

S 865-056

- (5) Make sure the FWD CARGO HEAT switch-light, on the overhead control panel P5, is off (the ON light is not on).

S 865-059

- (6) Make sure the CARGO FIRE FWD switch-light on the aft pilots control stand panel, P8, is off (the ARMED light is not on).

S 015-060

- (7) Open the forward cargo door, 821 (AMM 52-33-00/201).

S 015-063

- (8) Remove the floor panel aft of the ball transfer panel, on the airplane centerline to find the control and overheat control temperature switches below the forward cargo deck.

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S 015-065

- (9) Open the right ECS access door, 194LR, (Ref 06-41-00/201) to find the forward cargo heating shutoff valve.

S 015-066

- (10) Remove the curtain panel at the aft end of the forward cargo compartment to find the forward cargo heating control valve (which is installed below and to the right of the mix manifold).

E. Forward Cargo Overheat Test Procedure

S 735-067

- (1) Do the Forward Cargo Overheat Switch Test.
- (a) If the temperature in the forward cargo compartment is greater than 50°F (10°C), then apply a cold source to the forward cargo temperature switches.
 - (b) Push the FWD CARGO HEAT switch-light, on the P5 panel, to the ON position.
 - 1) Make sure the ON light comes on.
 - (c) Disconnect the electrical connector from the control valve.
 - (d) If the temperature in the forward cargo compartment is less than 95°F (35°C), then apply a heat source to the forward cargo temperature switches.
 - (e) Make sure the position indicator on the shutoff valve moves to the CLOSED position.
 - (f) Make sure the FWD CARGO HEAT OVHT light, on the P5 panel, comes on.
 - (g) Make sure the EICAS message, CGO FLOOR OVHT, shows on the top display.
 - (h) Do the steps that follow:
 - 1) Connect the electrical connector to the control valve.
 - 2) Make sure the position indicator on the control valve moves to the CLOSED position.
 - 3) Make sure the EICAS message, CGO FLOOR OVHT, does not show on the top display.
 - 4) Make sure the FWD CARGO HEAT OVHT light, on the P5 panel, goes off.
 - 5) Disconnect the electrical connector from the control valve.
 - 6) Make sure the FWD CARGO HEAT OVHT light, on the P5 panel, comes on.
 - (i) Remove the heating source from the temperature switches.
 - (j) If the cargo compartment temperature is greater than 75°F (24°C), then apply a cold source to the temperature switches.
 - (k) Make sure the position indicator on the shutoff valve moves to the OPEN position.
 - (l) Make sure the FWD CARGO HEAT OVHT light, on the P5 panel, goes off.

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- (m) Make sure the EICAS message, CGO FLOOR OVHT, does not show on the top display.
 - (n) Connect the electrical connector to the control valve.
 - (o) Push the FWD CARGO HEAT switch-light, on the P5 panel, to the off position.
 - 1) Make sure the ON light goes off.
 - (p) Make sure the position indicators for the control valve and the shutoff valve move to the CLOSED positions.
- F. Put the Airplane Back to Its Usual Condition

S 415-068

- (1) Install the curtain panel in the aft end of the forward cargo compartment.

S 415-069

- (2) Install the floor panels above the temperature switches.

S 415-071

- (3) Close the forward cargo door, 821 (AMM 52-33-00/201).

S 415-072

- (4) Close the right ECS access door, 194LR (AMM 06-41-00/201).

S 865-073

- (5) Remove the electrical power if it is no longer necessary (AMM 24-22-00/201).

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FORWARD CARGO HEATING SHUTOFF VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the forward cargo heating shutoff valve. The second task is the installation of the forward cargo heating shutoff valve.
- B. The forward cargo heating shutoff valve has two functions. One function is to supply overheat protection for the forward cargo compartment heating system. The second function is to supply trim air for the temperature control system of the air conditioning in the forward cargo compartment. The valve is in the right ECS bay, forward of the air supply crossover duct.

TASK 21-43-01-004-001

2. Forward Cargo Heating Shutoff Valve Removal (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 36-00-00/201, Pneumatic – General

B. Access

- (1) Location Zones
 - 194 Wing to Body – Forward Lower Half (Right)
- (2) Access Panels
 - 194LR, Right ECS Door

C. Procedure

S 864-002

- (1) Remove pneumatic power (AMM 36-00-00/201).

S 864-003

- (2) Push the FWD CARGO HEAT switch-light, on the pilot's overhead control panel P5, to the off position.
 - (a) Make sure the ON light is off.
 - (b) Attach a DO-NOT-OPERATE tag to the switch-light.

S 864-005

- (3) Find the SYSTEM switch-light on the FWD CARGO AIR COND / VENT FAN module, on the pilot's overhead control panel, P5.
 - (a) Push the SYSTEM switch-light to put the ON light off.
 - (b) Attach a DO-NOT-OPERATE tag to the switch-light.

S 864-006

- (4) Open these circuit breakers on the pilot's overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11R19, FWD CARGO HEAT CONTROL
 - (b) 11R21, FWD CARGO HEAT OVERRIDE

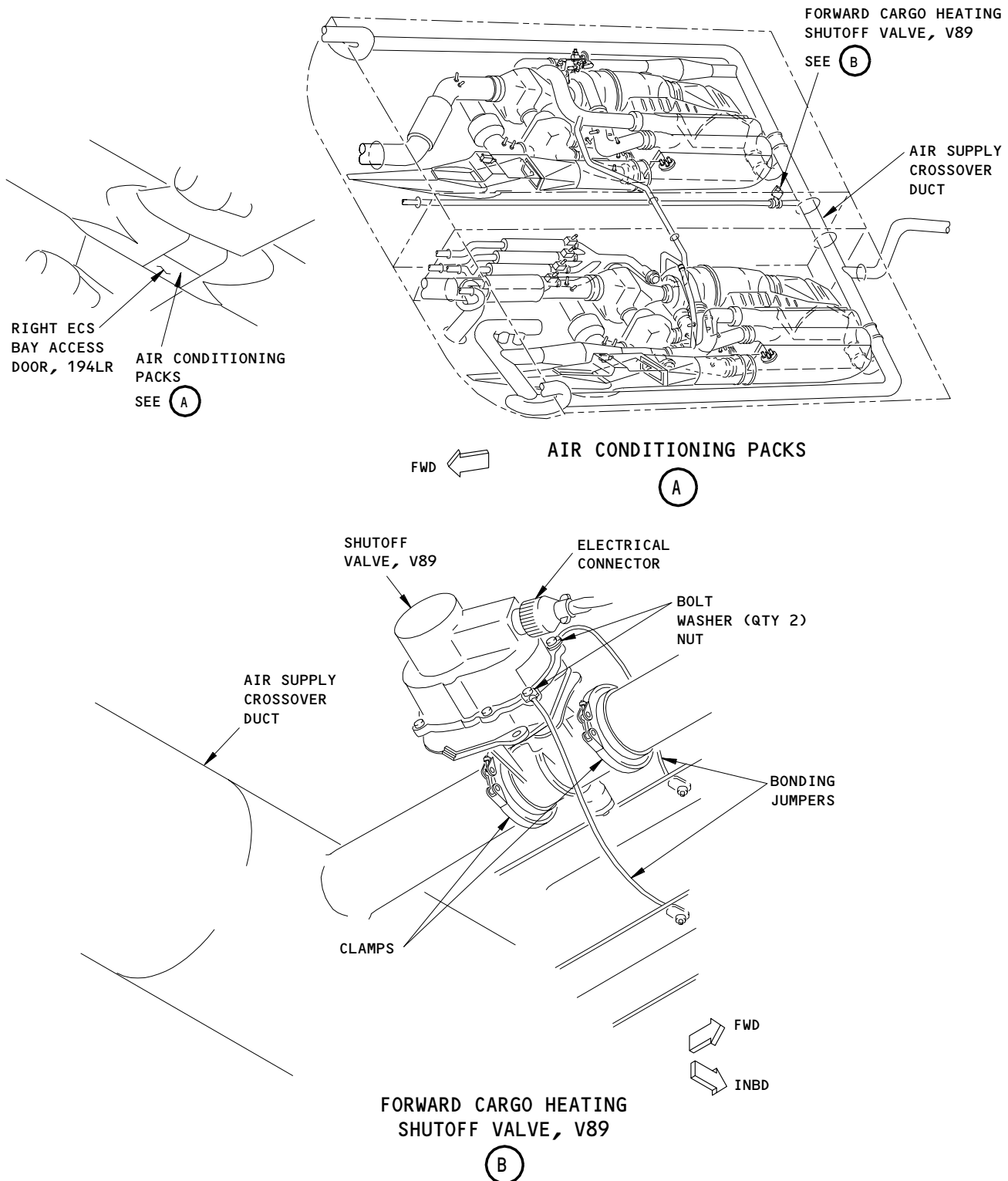
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Forward Cargo Heating Shutoff Valve Installation
Figure 401

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- S 014-007
- (5) Open the right ECS door 194LR (AMM 06-41-00/201).
 - (a) Find the forward cargo heating shutoff valve.
- S 034-008
- (6) Disconnect the electrical connector from the valve.
- S 034-009
- (7) Remove the bonding jumpers from the valve.
- S 024-010
- (8) Remove the clamps from the two sides of the valve. Remove the valve.
- S 434-011
- (9) Install the cover on the duct openings to keep out unwanted objects.

TASK 21-43-01-404-012

3. Forward Cargo Heating Shutoff Valve Installation (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 36-00-00/201, Pneumatic - General

B. Access

- (1) Location Zones
 - 194 Wing to Body - Forward Lower Half (Right)
- (2) Access Panels
 - 194LR, Right ECS Door

C. Procedure

- S 864-013
- (1) Move the manual position lever on the valve to the OPEN position.
- S 034-014
- (2) Remove the duct covers.
- S 424-015
- (3) Put the valve in a position in the duct where the flow arrow points forward.

NOTE: Make sure there is sufficient clearance to install the electrical connector.

- S 434-016
- (4) Install the clamps on the two sides of the valve.
 - (a) Tighten the forward clamp to 50 pound-inches.

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- (b) Move the duct and make sure there is longitudinal movement of a maximum of 1.0 inches.
- (c) Adjust the duct brackets as necessary to allow for movement of the duct.
- (d) Tighten the aft clamp to 50 pound-inches.

S 434-017

- (5) Connect the bonding jumpers to the valve with bolts, washers, and nuts.

S 434-018

- (6) Connect the electrical connector to the valve.

S 864-019

- (7) Remove the DO-NOT-CLOSE tag and close these circuit breakers on the P11 panel:
 - (a) 11R19, FWD CARGO HEAT CONTROL
 - (b) 11R21, FWD CARGO HEAT OVERRIDE

S 714-020

- (8) Do the valve installation test.
 - (a) Supply electrical power (AMM 24-22-00/201).
 - (b) Supply pneumatic power (AMM 36-00-00/201).
 - (c) Make sure the position indicator on the valve moved to the CLOSED position.
 - (d) Look for leakage at the shutoff valve connections for the forward cargo heating.

NOTE: Diffused leakage is permitted.

- 1) To repair jet blast type leakage, align the valve or coupling.

S 414-021

- (9) Close the right ECS door, 194LR (AMM 06-41-00/201).

S 864-022

- (10) Remove the DO-NOT-OPERATE tag from the FWD CARGO HEAT switch-light, on the P5 panel.

S 864-024

- (11) Remove the DO-NOT-OPERATE tag from the FWD CARGO AIR COND / VENT FAN SYSTEM switch-light, on the P5 panel.

S 864-025

- (12) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-026

- (13) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FORWARD CARGO HEATING FLOW CONTROL VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the forward cargo heating flow control valve. The second task is the installation of the forward cargo heating flow control valve.
- B. The forward cargo heating flow control valve is in the mix manifold bay, near the bottom and to the right of the mix manifold.

TASK 21-43-02-004-001

2. Forward Cargo Heating Flow Control Valve Removal (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 36-00-00/201, Pneumatic-General

B. Access

- (1) Location Zones
 - 121/122 Forward Cargo Compartment
- (2) Access Panels
 - 119AL Main Equipment Center Door
 - 821 Forward Cargo Compartment Door

C. Procedure

- S 864-002
 - (1) Supply electrical power (AMM 24-22-00/201).
- S 214-003
 - (2) Push the FWD CARGO HEAT switch-light on pilot's overhead P5 panel to the off position.
 - (a) Make sure the ON light is off.
- S 864-005
 - (3) Remove pneumatic power (AMM 36-00-00/201).
- S 864-006
 - (4) Open this circuit breaker on the pilot's overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11R19, FWD CARGO HEAT CONTROL
 - (b) 11R21, FWD CARGO HEAT OVERRIDE
- S 014-042
 - (5) Open the main equipment center door, 119AL (AMM 06-41-00/201).
- S 864-007
 - (6) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
 - (a) 36L2 or 36K5, CARGO HEAT VALVE FWD CONT

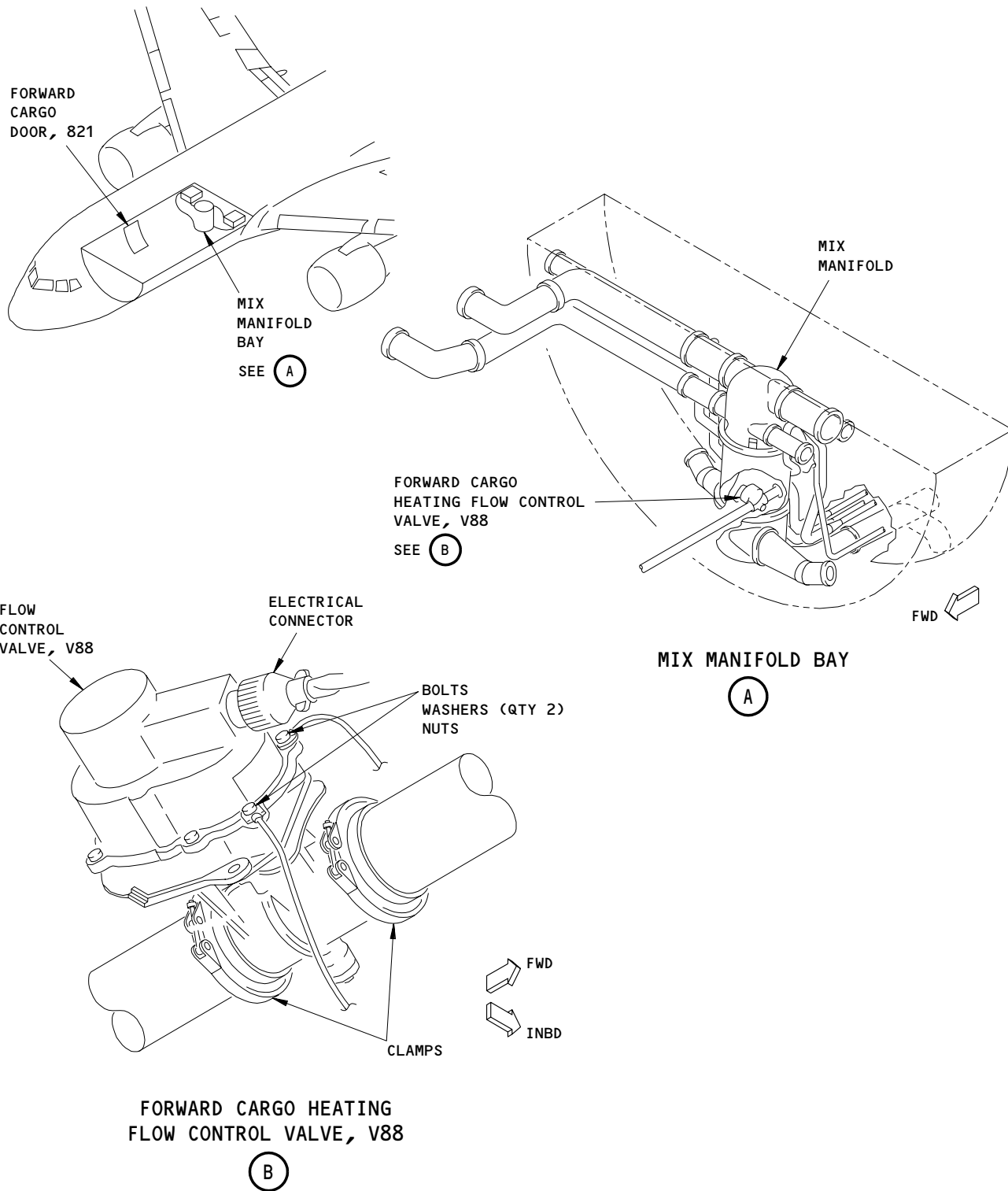
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Forward Cargo Heating Flow Control Valve Installation
Figure 401

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- S 014-009
- (7) Open the forward cargo compartment door, 821 (AMM 06-46-00/201).
- S 014-010
- (8) Remove the aft bulkhead lining of the forward cargo compartment (AMM 25-52-01/401) and find the valve.
- S 034-011
- (9) Disconnect the electrical connector from the valve.
- S 034-012
- (10) Disconnect the bonding jumpers from the valve.
- S 024-013
- (11) Remove the clamps on the two sides of the valve. Remove the valve.
- S 434-014
- (12) Install covers on the duct opening to keep out unwanted objects.

TASK 21-43-02-404-015

3. Forward Cargo Heating Flow Control Valve Installation (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electrical Power Control
- (2) AMM 25-52-01/401, Containerized Cargo Sidewall Lining
- (3) AMM 36-00-00/201, Pneumatic - General

B. Access

- (1) Location Zones
 - 121/122 Forward Cargo Compartment
- (2) Access Panels
 - 119AL Main Equipment Center Door
 - 821 Forward Cargo Compartment Door

C. Procedure

- S 984-016
- (1) To manually open the valve, move the manual position lever to the OPEN position.
- S 014-017
- (2) Remove the duct covers.
- S 424-018
- (3) Put the valve in the duct and install the clamps on the two sides of the valve.

NOTE: Make sure there is sufficient clearance to install the electrical connector.

- (a) Tighten the forward clamp to 50 pound-inches.

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- (b) Move the duct and make sure there is longitudinal movement of a maximum of 1.0 inches.
- (c) Adjust the duct brackets as necessary to allow for movement of the duct.
- (d) Tighten the aft clamp to 50 pound-inches.

S 434-019

- (4) To connect bonding jumpers to the valve, install the bolts, washers, and nuts.

S 434-020

- (5) Install the electrical connector to the valve.

S 864-021

- (6) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - (a) 11R19, FWD CARGO HEAT CONTROL
 - (b) 11R21, FWD CARGO HEAT OVERRIDE

S 864-022

- (7) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
 - (a) 36L2 or 36K5, CARGO HEAT VALVE FWD CONT

S 714-023

- (8) Do the valve installation test:
 - (a) Make sure the position indicator on the forward cargo heating flow control valve moved to CLOSED position.
 - (b) Supply pneumatic power (AMM 36-00-00/201).
 - (c) Examine the connections on the forward cargo heating flow control valve for leakage.
 - 1) Diffused leakage is permitted.
 - 2) To repair jet blast type leakage, align the valve or coupling.

S 414-025

- (9) Install the aft bulkhead lining of the forward cargo compartment (AMM 25-52-01/401).

S 414-026

- (10) Close the forward cargo compartment door, 821 (AMM 06-46-00/201).

S 864-027

- (11) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-028

- (12) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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FORWARD CARGO SIDEWALL OVERHEAT TEMPERATURE SWITCH – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Forward Cargo Sidewall Overheat Temperature Switch Removal
 - (2) Forward Cargo Sidewall Overheat Temperature Switch Cleaning
 - (3) Forward Cargo Sidewall Overheat Temperature Switch Installation
- B. The forward cargo sidewall overheat temperature switch is referred to as the temperature switch in this procedure. The temperature switch sends signals to the pack flow controller when the forward cargo air conditioning system is on.
- C. The temperature switch is installed in the temperature sensor box with the forward cargo temperature bulb (Ref 21-65-03) and the forward cargo temperature sensor (Ref 21-61-08). The temperature sensor box is behind a grill on the left sidewall of the forward cargo compartment, opposite the cargo door.

TASK 21-43-04-004-001

2. Remove the Temperature Switch (Fig. 401)

- A. References
 - (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
 - (2) 25-52-01/401, Sidewall Panels
- B. Access
 - (1) Location Zones
121/122 Forward Cargo Compartment
- C. Procedure
 - S 864-002
 - (1) Turn the L PACK selector, on the pilot's overhead control panel P5, to OFF.
 - (a) If electrical power is on, make sure the PACK OFF light comes on.
 - (b) Attach a DO-NOT-OPERATE tag to the selector.
 - S 864-003
 - (2) Find the SYSTEM switch-light on the FWD CARGO AIR COND / VENT FAN module, on the P5 panel.
 - (a) Push the SYSTEM switch-light to put the ON light off.
 - (b) Attach a DO-NOT-OPERATE tag to the switch-light.
 - S 864-004
 - (3) Open this circuit breaker, on the pilot's overhead circuit breaker panel P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11A13, LEFT PACK FLOW CONT
 - S 014-005
 - (4) Open the forward cargo door, 821 (Ref 06-46-00).

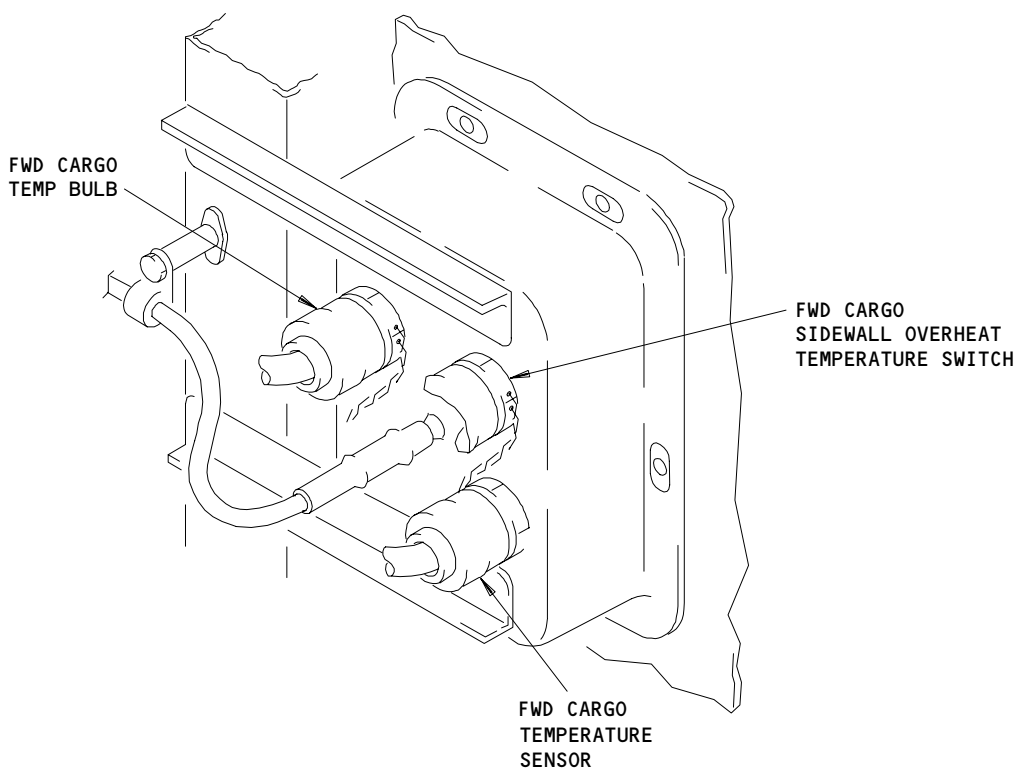
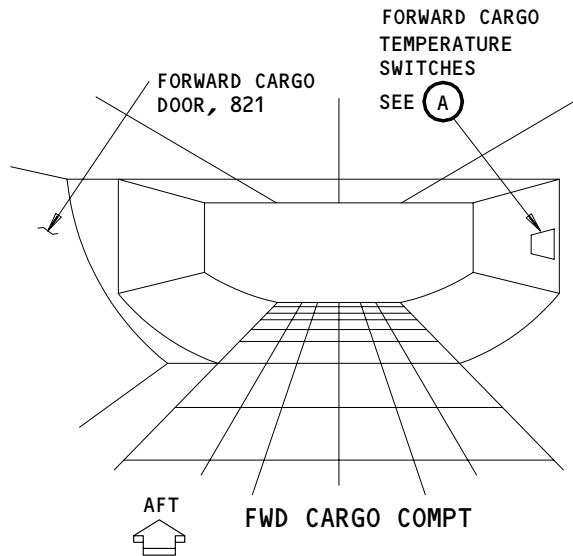
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FORWARD CARGO TEMPERATURE SWITCHES

(A)

Forward Cargo Sidewall Overheat Temperature Switch Installation
Figure 401

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- S 804-006
- (5) Find the temperature switch in the sidewall panel, opposite the forward cargo door.
- S 014-007
- (6) Remove the sidewall panel which is around the sensor box (Ref 25-52-01).
- S 014-008
- (7) Remove the grill from the temperature sensor box.
- S 034-009
- (8) Disconnect the electrical connector from the temperature switch.
- S 034-010
- (9) Remove the lockwire from the temperature switch.
- S 034-011
- (10) Remove the jamnut which holds the temperature switch to the sensor box.
- S 024-012
- (11) Remove the temperature switch.

TASK 21-43-04-104-036

3. Clean the Temperature Switch (Fig. 401)

- A. Standard Tools and Equipment
- (1) Soft bristle brush
- B. Consumable Materials
- (1) B00541 - Detergent (AMM 20-30-02/201)
- (2) B00130 - Isopropyl Alcohol
- (3) Clean and dry cheesecloth or cotton cloths and lint-free tissue
- C. Clean the Switch

- S 114-037
- (1) Do these steps to clean the temperature switch:
- (a) If necessary, a soft bristle brush may be used to clean the surface of the temperature switch.

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- (b) Wipe the switch with a clean, lint-free cloth that is moist with isopropyl alcohol or similar cleaning fluid.
- (c) Rinse the cleaning fluid from the temperature sensor with a clean, lint-free cloth that is moist with water and mild detergent.
- (d) Dry the temperature sensor with a dry clean, lint-free cloth.

TASK 21-43-04-404-013

4. Install the Temperature Switch (Fig. 401)

A. References

- (1) 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) 20-10-23/401, Lockwire
- (3) 21-61-00/501, Primary (Zone) Temperature Control System
- (4) 24-22-00/201, Electric Power Control
- (5) 25-52-01/401, Sidewall Panels

B. Access

- (1) Location Zones
 - 121/122 Forward Cargo Compartment

C. Procedure

S 424-014

- (1) Put the temperature switch in position in the sensor box.

S 434-015

- (2) Install the jamnut which holds the temperature switch to the sensor box.

S 434-016

- (3) Install lockwire on the temperature switch (Ref 20-10-23).

S 434-017

- (4) Install the electrical connector to the temperature switch.

S 704-018

- (5) Do the temperature switch installation test:
 - (a) Supply electrical power (Ref 24-22-00).
 - (b) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - 1) 11A13, LEFT PACK FLOW CONT
 - (c) Remove the DO-NOT-OPERATE tag from the L PACK selector, on the P5 panel.
 - 1) Turn the L PACK selector to AUTO.
 - 2) Make sure the PACK OFF light goes out.
 - (d) Remove the DO-NOT-OPERATE tag from the SYSTEM switch-light on the P5 panel.
 - 1) Push the switch-light so the ON light comes on.
 - (e) Do the BITE test of the auxiliary zone temperature controller in E1 rack (Ref 21-61-00).

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- S 414-019
- (6) Install the grill on the sensor box.
- S 414-020
- (7) Install the the sidewall panel around the sensor box (Ref 25-52-01).
- S 414-021
- (8) Close the forward cargo door, 821 (Ref 06-46-00).
- S 864-022
- (9) Remove electrical power (Ref 24-22-00), if it is not necessary.

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FORWARD CARGO HEAT TEMPERATURE SWITCHES – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Forward Cargo Heat Temperature Switch Removal
 - (2) Forward Cargo Heat Temperature Switch Cleaning
 - (3) Forward Cargo Heat Temperature Switch Installation
- B. The control and overheat temperature switches in the forward cargo compartment are installed by the same procedure. The switches are below the forward cargo deck, aft of the ball transfer panel, on the airplane centerline.

TASK 21-43-05-004-001

2. Remove the Temperature Switch (Fig. 401, 401A)

A. References

- (1) AMM 25-53-02/401, Roller Tray
- (2) AMM 25-53-14/401, Center and Auxiliary Guide
- (3) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zones
123/124 Area Below Forward Cargo Compartment

C. Procedure

S 864-002

- (1) Push the FWD CARGO HEAT switch-light on the pilot's overhead P5 panel to the off position and attach a DO-NOT-OPERATE tag.

S 864-004

- (2) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11R19, FWD CARGO HEAT CONTROL
 - (b) 11R21, FWD CARGO HEAT OVERRIDE

S 864-005

- (3) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
 - (a) 36L2 or 36K5, FWD CARGO HEAT CONT VALVE

S 014-006

- (4) Open the forward cargo door (AMM 52-33-00/201).

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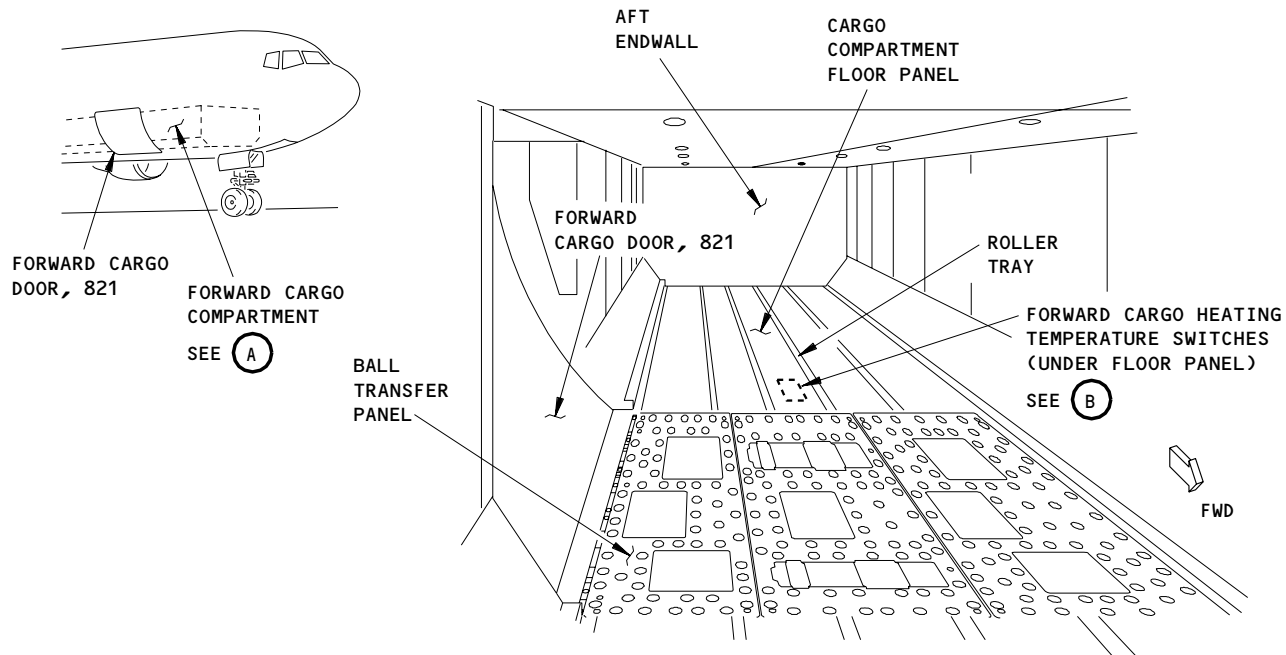
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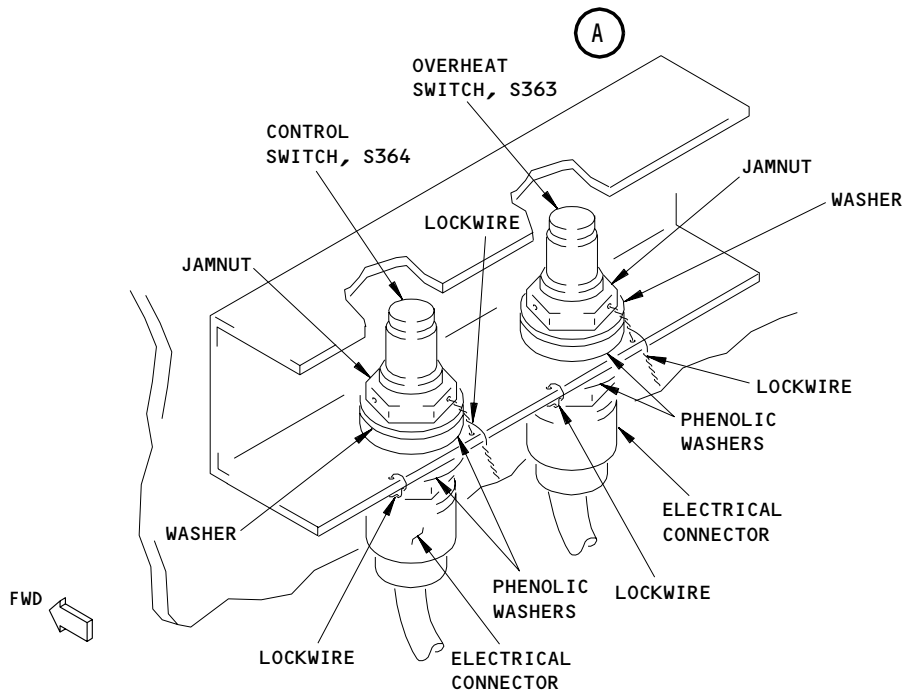
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BOEING

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FORWARD CARGO COMPARTMENT



FORWARD CARGO HEATING TEMPERATURE SWITCHES
(WITH TWO PHENOLIC WASHERS)

(B)

Forward Cargo Heating Temperature Switch Installation
Figure 401

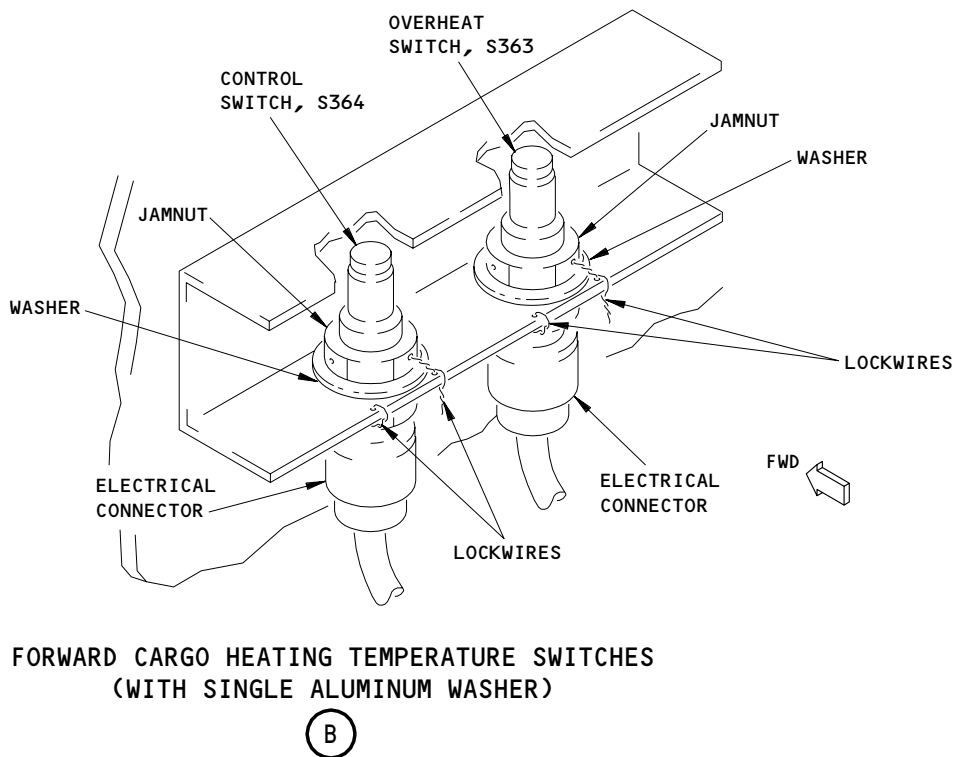
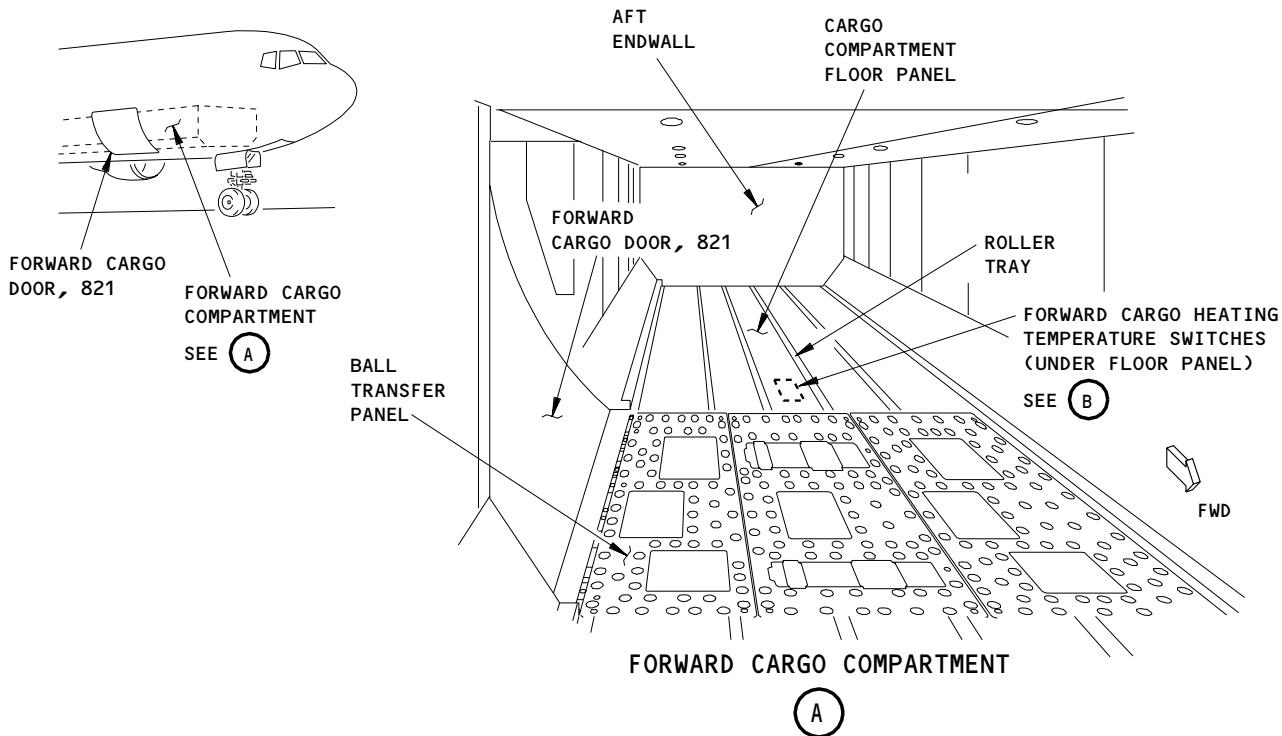
EFFECTIVITY
TEMPERATURE SWITCHES WITH
PHENOLIC WASHERS

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Forward Cargo Heating Temperature Switch Installation
Figure 401A

EFFECTIVITY
TEMPERATURE SWITCHES WITH SINGLE
ALUMINUM WASHER (NO PHENOLIC WASHERS)

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S 804-027

- (5) The temperature switches are below the forward cargo deck, aft of the ball transfer panel, on the airplane centerline, as shown in Figure 401.

S 014-024

- (6) Remove center guide(s) (AMM 25-53-14/401), if installed.

S 014-025

- (7) Remove roller tray(s) (AMM 25-53-02/401), if installed.

S 014-028

- (8) Remove compartment floor panel(s), if installed.

S 804-026

- (9) Find the temperature switches.

S 034-007

- (10) Remove the electrical connector from the temperature switch.

S 024-008

- (11) Remove the jamnut that holds the temperature switch to the structure.

S 024-032

- (12) Remove the washer(s).

S 024-033

- (13) Remove the temperature switch.

TASK 21-43-05-104-046

3. Clean the Temperature Switch (Fig. 401)

A. Standard Tools and Equipment

- (1) Soft bristle brush

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- B. Consumable Materials
 - (1) B00541 - Detergent (AMM 20-30-02/201)
 - (2) B00130 - Isopropyl Alcohol
 - (3) Clean and dry cheesecloth or cotton cloths and lint-free tissue
- C. Clean the Switch

S 114-047

- (1) Do these steps to clean the temperature switch:
 - (a) If necessary, a soft bristle brush may be used to clean the surface of the temperature switch.
 - (b) Wipe the switch with a clean, lint-free cloth that is moist with isopropyl alcohol or similar cleaning fluid.
 - (c) Rinse the cleaning fluid from the temperature sensor with a clean, lint-free cloth that is moist with water and mild detergent.
 - (d) Dry the temperature sensor with a dry clean, lint-free cloth.

TASK 21-43-05-404-009

4. Install the Temperature Switch (Fig. 401, 401A)

A. Equipment

- (1) Heating Source, hand-held blow dryer, commercially available

B. References

- (1) AMM 20-10-23/401, Lockwire
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-53-02/401, Roller Tray
- (4) AMM 52-33-00/201, Large Forward Cargo Door

C. Access

- (1) Location Zones
 - 123/124 Area Below Forward Cargo Compartment

D. Procedure

S 424-040

- (1) TEMPERATURE SWITCH WITH ALUMINUM WASHER (NO PHENOLIC WASHERS);
Install the temperature switch as follows:
 - (a) Install the aluminum washer and temperature switch as shown in Figure 401A so that it's electrical connector plug points down.
 - (b) Install the jamnut and tighten to 15-20 inch-pounds.
 - (c) Install new lockwires to the temperature switch (AMM 20-10-23/401).
 - (d) Connect the electrical connector to the temperature switch.

S 424-041

- (2) TEMPERATURE SWITCH WITH PHENOLIC WASHERS;
Install the temperature switch as follows:
 - (a) Install the phenolic washers, aluminum washer and temperature switch as shown in Figure 401 so that it's electrical connector plug points down.
 - (b) Install the jamnut and tighten to 15-20 inch-pounds.

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- (c) Install new lockwires to the temperature switch (AMM 20-10-23/401).
- (d) Connect the electrical connector to the temperature switch.

E. Temperature Switch Post-Installation Test

S 864-014

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11R19, FWD CARGO HEAT CONTROL
 - (b) 11R21, FWD CARGO HEAT OVERRIDE

S 864-015

- (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
 - (a) 36L2 or 36K5, FWD CARGO HEAT CONTROL VALVE

S 714-016

- (3) Do a test of the forward cargo temperature switches.
 - (a) Supply electrical power (AMM 24-22-00/201).
 - (b) Remove the DO-NOT-OPERATE tag and push the FWD CARGO HEAT switch-light on P5 panel to ON.
 - (c) Do a test of the control temperature switch.
 - 1) If the cargo compartment ambient temperature is less than 40°F (4°C), apply heating source to temperature control switch to increase temperature above 50°F (10°C).
 - 2) Make sure the forward cargo heat control valve closes.
 - 3) If the cargo compartment ambient temperature is more than 40°F (4°C), apply cooling source to temperature control switch to lower temperature to less than 40°F (4°C).
 - 4) Make sure the forward cargo heat control valve opens.
 - (d) Do a test of the overheat temperature switch.
 - 1) If the cargo compartment ambient temperature is less than 80°F (27°C), apply heating source to overheat temperature switch to increase temperature above 90°F (32°C).
 - 2) Make sure the forward cargo heating shutoff valve closes.
 - 3) If the cargo compartment ambient temperature is more than 80°F (27°C), apply cooling source to overheat temperature switch to lower temperature to less than 80°F (27°C).
 - 4) Make sure the shutoff valve for the forward cargo heat is open.
 - (e) Push the FWD CARGO HEAT switch-light on P5 panel to the off position.

S 414-030

- (4) Install compartment floor panel(s), if removed.

S 414-029

- (5) Install roller tray(s) (AMM 25-53-02/401), if removed.

S 414-018

- (6) Install center guide(s), if removed.

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- S 414-019
(7) Close the forward cargo door (AMM 52-33-00/201).
- S 864-020
(8) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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CARGO HEAT DUCT - INSPECTION/CHECK

1. General

- A. This procedure has instructions to examine the forward cargo heat duct for longitudinal movement to prevent duct rupture.

TASK 21-43-07-206-001

2. Cargo Heat Duct Inspection

A. Access

- (1) Location Zone
136 Environmental Control System Bay (Right)

- (2) Access Panel
194LR ECS Bay Door, Right

B. Procedure

S 016-002

- (1) Open the right ECS door, 194LR, to get access to the forward cargo heat duct along the center keel beam.

S 026-003

- (2) Remove the aft-most clamp on the forward side of the valve on the forward cargo heat duct.

S 986-006

- (3) Move the duct and make sure there is longitudinal movement of a maximum of 1.0 inches.
(a) If necessary, adjust the brackets as necessary to allow for movement of the duct.

S 436-005

- (4) Install the aft clamp on the forward side of the valve and tighten to 50 pound-inches.

C. Put the airplane back to its usual condition.

S 416-004

- (1) Close the right ECS door, 194LR.

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CARGO HEAT DUCT – REPAIR

1. General

- A. This procedure contains one task. The task is to repair the forward, aft, and bulk cargo heat ducts.
- B. Two procedures are available to repair the duct. Use procedure 1 to replace short sections of the duct. Use procedure 2 to replace long sections of the duct.

TASK 21-43-07-308-001

2. Repair the Duct Section

A. Equipment

- (1) Titanium, commercially pure – BMS 7-21, GRADE II (Tube or rolled sheet)
- (2) CRES 301 (MIL-S-5059) .032" thick sheet material (alternative)
- (3) Scrivets – P/N 231-700055-00-3704,
Fastex Co., 195 East Algona Road,
Des Plaines, Illinois 60191-1150
- (4) BMI duct segment (only for repair of long sections)

B. Consumable Materials

- (1) A00235, Sealant – PR1422A
- (2) A00578, Sealant – RTV 60

C. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control

D. Procedure

S 868-002

- (1) Supply electrical power (AMM 24-22-00)

S 218-003

- (2) Make sure the applicable (FWD, AFT, or BULK) CARGO HEAT switch-light is in the off position.

NOTE: The switch-light is on the pilot's overhead control panel, P5.

- (a) Make sure the ON light is off.
- (b) Attach a DO-NOT-OPERATE tag to the switch-light.

S 018-005

- (3) Open the applicable (forward or aft) cargo door, 821 or 822 (AMM 06-41-00).

S 018-006

- (4) Remove the applicable floor panel to get access to the damaged duct section.

S 308-007

- (5) Do these steps to repair the damaged duct section:
 - (a) Cut and remove the damaged duct section.

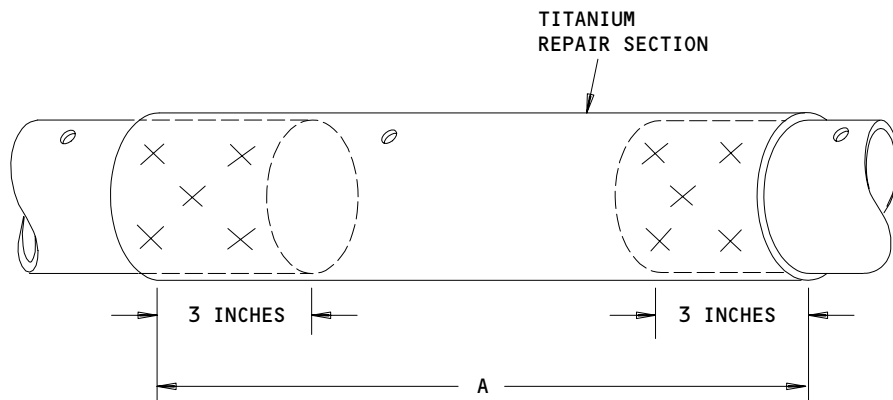
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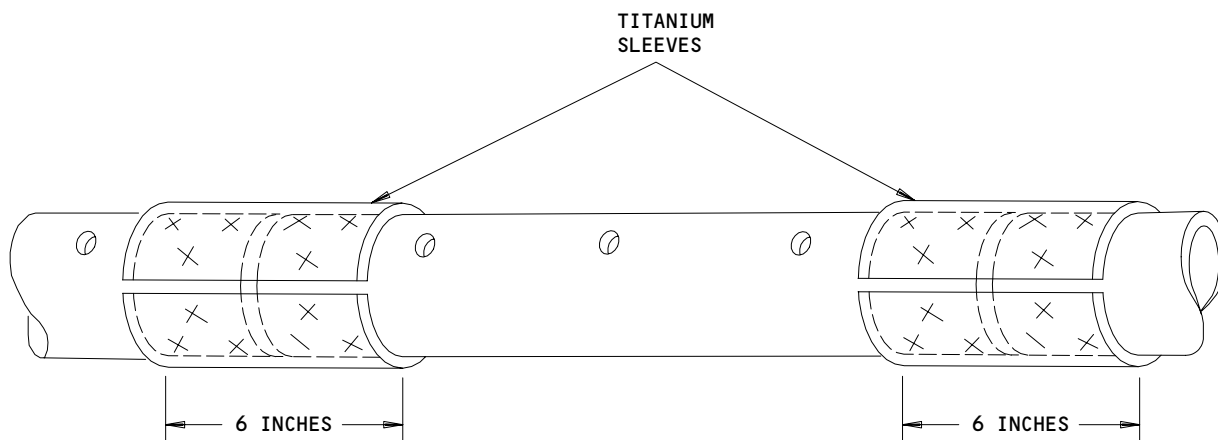
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PROCEDURE 1 - SHORT SECTION REPAIR



PROCEDURE 2 - LONG SECTION REPAIR

NOTE: CUT AND REMOVE THE DAMAGED SECTION TO PERMIT SUFFICIENT ACCESS TO RIVET THE REPAIR SECTION. PUT THE RIVETS 1 TO 1-1/4 INCHES APART WITH 0.35 INCH MINIMUM EDGE DISTANCE.

Cargo Heating Duct - Repair
Figure 801

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- (b) To repair a short duct section (2 feet or shorter), do these steps (Procedure 1):
- 1) Make a new duct section which is 6 inches longer than the damaged duct section from the titanium or CRES duct material.
- NOTE: The new duct section must extend at least 3 inches over each end of the mating heat duct sections.
- 2) Use a mandril or ball to expand the diameter of the ends of the new duct section to permit the installation over the mating heat duct sections.
- (c) To repair a long duct section (2 feet or longer), do these steps (Procedure 2):
- 1) Make a new duct section which is slightly shorter than the damaged duct section from the BMI duct material.
 - 2) Make two 6-inch long sleeves from the titanium or CRES duct material.
 - 3) Use a mandril or ball to expand the diameter of the ends of the sleeve to permit the installation over the mating heat duct sections.
- (d) Install the repair duct section as shown in Figure 801.

NOTE: This heat distribution duct is low pressure. Air leakage at the duct repair joint is not important.

- 1) If it is necessary, loosen the support clamps for the heat duct to permit the installation of the repair duct section.
- 2) For a titanium duct section (or sleeve), use the scrivets to attach the titanium duct section (sleeve) to the mating heat duct sections.
- 3) For a CRES duct section (or sleeve), use the sealant, PR1422A or RTV 60, to bond the ends of the CRES duct section (sleeve) to the mating heat duct sections.

NOTE: You can use straps or clamps to temporarily hold the CRES duct section (sleeve) to the mating heat duct sections until the sealant has cured.

- 4) Punch or drill holes along the length of the replacement duct section to align with the heat outlet holes in the mating heat duct sections.
- 5) Tighten all the duct support clamps.

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- S 418-009
- (6) Install the floor panels.
- S 868-010
- (7) Remove the DO-NOT-OPERATE tag from the applicable CARGO HEAT switch-light on the P5 panel.
- S 868-011
- (8) Remove the electrical power if it is not necessary.

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AFT/BULK CARGO COMPARTMENT HEATING SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The aft cargo, and bulk cargo compartments use separate heating systems. The aft cargo compartment heating system and the forward cargo compartment heating system (Ref 21-43-00) are identical in description and operation.
- B. The aft cargo compartment receives warm air from the APU pneumatic duct. The air passes through a shutoff and a control valve into a perforated duct. Escaping air heats the compartment. Two thermal switches monitor the compartment temperature and control the heating valves. This regulates the temperature between 40°F (4.5°C) and 50°F (10°C). Overheat protection limits compartment temperature to 90°F (32°C). There are two EICAS indication messages for the system.
- C. The APU also supplies air to the bulk cargo compartment. Hot air flows from the APU, through the bulk-cargo-heat-shutoff valve and the bulk-cargo-heat-flow-control valve, and into the bulk-cargo-compartment-heating duct. The duct goes below the floor, around and up the aft end of the bulk cargo compartment, and along the two sidewall-ceiling corners of the bulk cargo compartment. The heating duct has holes along it to let the air escape. A wire mesh screen around the ceiling ducting prevents damage from the cargo.
- D. A vent fan increases air circulation and pressure in the compartment (Ref 21-26-00). Three thermal switches regulate compartment temperatures. There are two Engine Indicating and Crew Alerting System (EICAS) indication messages for this system.
- E. ON SAS AIRPLANES;
a fourth bulk cargo compartment temperature bulb provides EICAS with a temperature indication for display in the flight compartment.
- F. A sensor box assembly installed in the bulk cargo compartment sidewall contains three thermal switches and a temperature bulb (if installed). A remote sensor tube connects to the sensor box assembly and to the lavatory and galley ventilation duct. Air flow through the thermal switches, the temperature bulb (if installed) and the sensor box assembly is caused by the operation of the lavatory and galley ventilation fan. An insulation blanket is installed on the backside of the sensor box assembly.

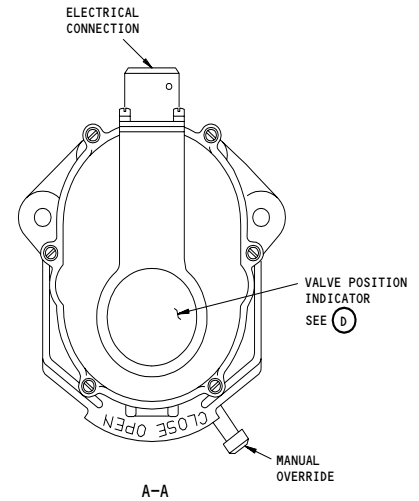
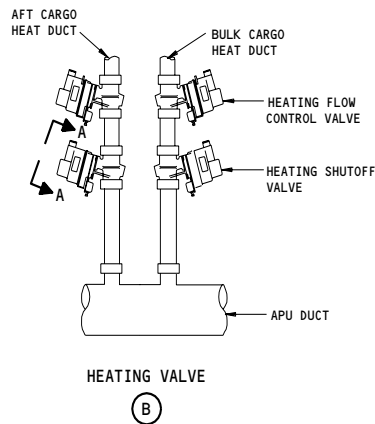
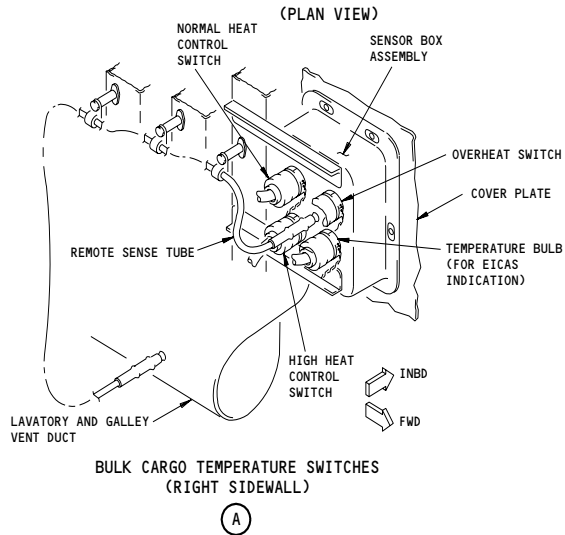
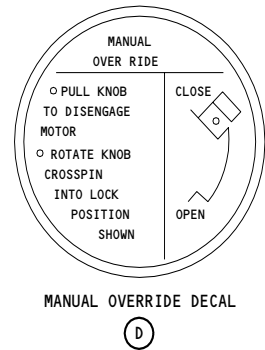
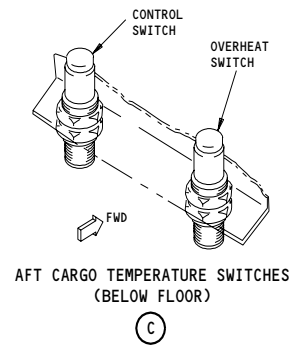
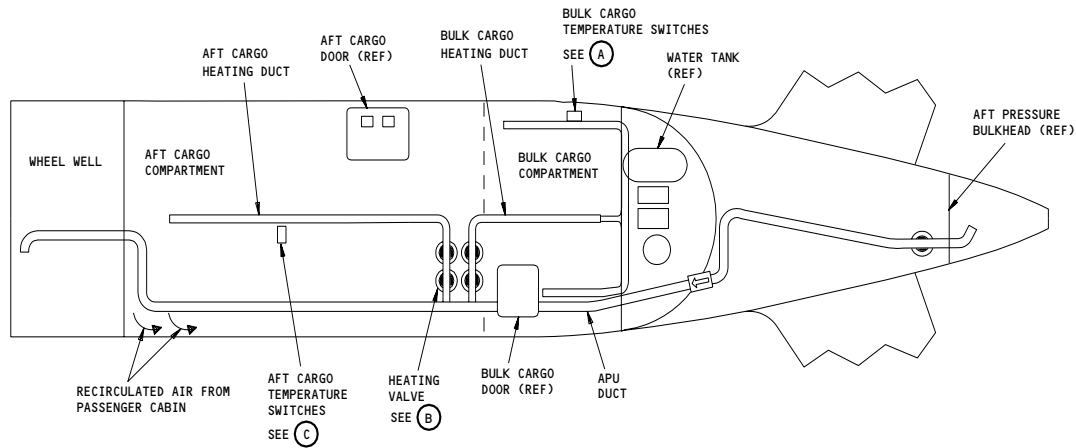
2. Component Details

- A. Aft/Bulk Cargo Heating Shutoff Valve
 - (1) The aft and bulk cargo heating shutoff valves are identical valves. The valves mount next to each other in parallel ducts. The valves are located forward of the bulk cargo door on the left aft cargo sidewall. The valve is a single phase, 115 vac motor-driven valve with two modes of operation, open and close. Limit switches interrupt power at the open and close extremes of valve travel. An external indicator shows valve butterfly position and allows manual control of the butterfly.
- B. Aft/Bulk Cargo Heating Control Valve
 - (1) The aft and bulk cargo heating control valves mount immediately downstream of their respective cargo heating shutoff valves. The valves are identical to the aft/bulk cargo heating shutoff valves.

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NOTE: THE INSULATION BLANKET IS NOT SHOWN INSTALLED AROUND THE SENSOR BOX ASSEMBLY IN ORDER TO SHOW THE INSTALLATION OF THE BULK CARGO TEMPERATURE SWITCHES.

Aft/Bulk Cargo Compartment Heating System
Figure 1

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C. Aft/Bulk Cargo Compartment Thermal Switch

- (1) The aft cargo compartment uses two thermal switches, located in the middle of the aft cargo compartment, just below the cargo floor.
 - (a) The control switch opens when the compartment temperature increases to 50°F (10°C) and closes when the temperature decreases to 40°F (4°C).
 - (b) The overheat switch closes when the compartment temperature increases to 90°F (32°C) and opens when the temperature decreases to 80°F (27°C).
- (2) The bulk cargo compartment uses three temperature control switches. The switches are installed in a panel on the right sidewall of the compartment.
 - (a) The normal-heat-control switch opens when the compartment temperature increases to 50°F (10°C) and closes when the temperature decreases to 40°F (4°C).
 - (b) The high-heat-control switch opens when the compartment temperature increases to 75°F (23°C) and closes when the temperature decreases to 65°F (18°C).
 - (c) The overheat switch opens when the compartment temperature increases to 90°F (32°C) and closes when the temperature decreases to 80°F (27°C).

D. ON ALL SAS AIRPLANES;

Bulk Cargo Compartment Temperature Bulb

- (1) A temperature bulb located with the three other thermal switches provides EICAS with a temperature indication.

3. Operation (Fig. 2)

A. Aft Cargo Heating

- (1) The aft cargo compartment receives warm air from the APU pneumatic duct. Operation of the aft cargo compartment heating systems is identical to the operation of the forward cargo compartment heating system (Ref 21-43-00) except for EICAS indication messages are AFT CARGO OVHT and AFT CARGO HEAT.

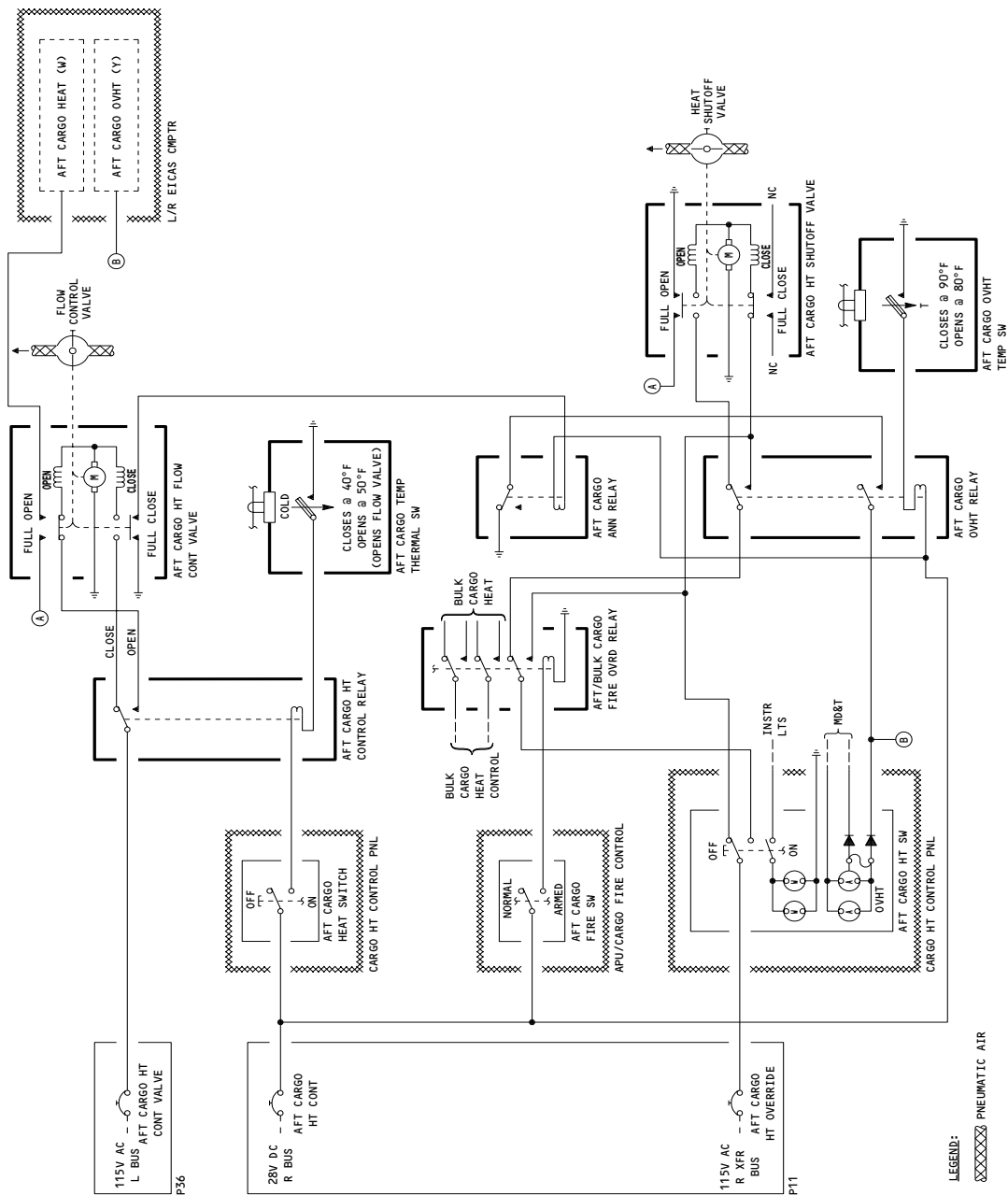
B. Bulk Cargo Heating (Fig. 3)

- (1) The bulk cargo heat ON switch is located on the pilot's overhead P5 panel. A two position selector switch, NORM and VENT, provides additional temperature control. The selector switch is located on the right side P61 panel. System indications are an overheat light on P5 panel and EICAS messages. EICAS provides two messages. BULK CARGO OVHT is a EICAS advisory message indicating the compartment is over 90°F (32°C). BULK CARGO HEAT is a maintenance message that indicates shutoff and flow control valves are fully opened.

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Aft Cargo Heating Operation Schematic
Figure 2

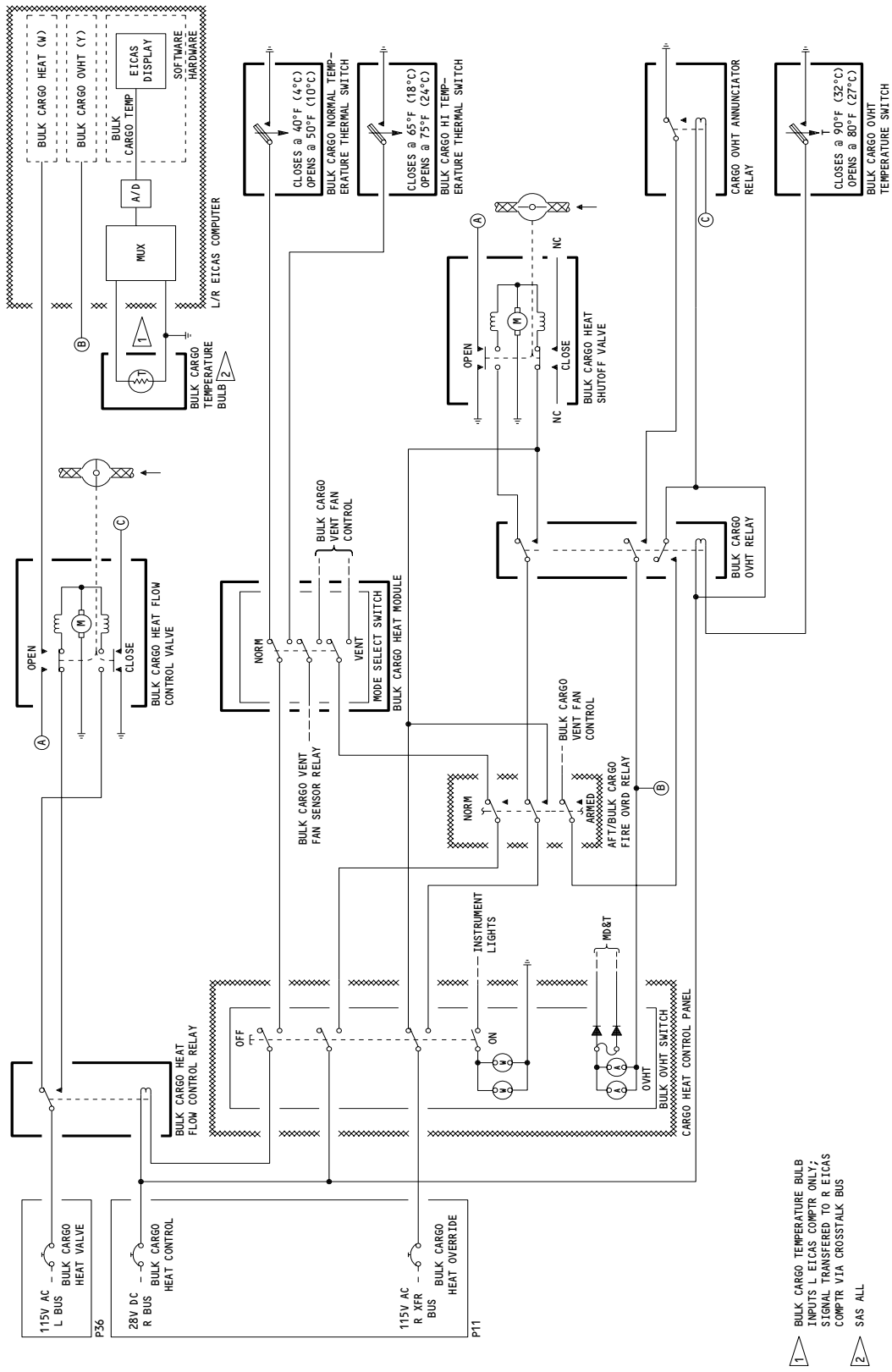
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Bulk Cargo Heating Operation Schematic
Figure 3

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- (2) With the bulk cargo heat switch/light pressed to ON, and the mode selector switch in the NORM position, the bulk-cargo-heat-flow-control valve is controlled by the normal-heat-control switch.
 - (a) If the cargo compartment temperature is low enough for the normal-heat-control switch to be closed, the bulk-cargo-heat-flow-control relay will be energized. When the bulk-cargo-heat-flow-control relay is energized, 115v ac is supplied to the open winding of the flow-control-valve actuator. The flow control valve opens to allow bleed air from the APU duct into the compartment.
 - (b) If the cargo compartment temperature is high enough to make the normal-heat-control switch open, the bulk-cargo-heat-flow-control relay relaxes. When the bulk-cargo-heat-flow-control relay is relaxed, 115v ac is supplied to the close windings of the flow-control-valve actuator and the flow control valve closes.
- (3) With the bulk cargo heat switch/light pressed to ON, and the mode selector switch in the VENT position, the bulk-cargo-heat-flow-control valve is controlled by the high-heat-control switch. Also, power is supplied to the bulk cargo ventilation fan (Ref 21-26-00).
 - (a) If the cargo compartment temperature is low enough for the high-heat-control switch to be closed, the bulk-cargo-heat-flow-control relay will be energized. When the bulk-cargo-heat-flow-control relay is energized, 115v ac is supplied to the open winding of the flow-control-valve actuator. The flow control valve opens to allow bleed air from the APU duct into the compartment.
 - (b) If the cargo compartment temperature is high enough to make the high-heat-control switch open, the bulk-cargo-heat-flow-control relay relaxes. When the bulk-cargo-heat-flow-control relay is relaxed, 115v ac is supplied to the close windings of the flow-control-valve actuator and the flow control valve closes.
- (4) With the bulk cargo heat switch/light pressed to ON, the bulk cargo heat shutoff valve is controlled by the overheat control switch.
 - (a) If the compartment temperature is low enough for the overheat control switch to be open, the bulk-cargo-overheat relay will be relaxed. When the bulk-cargo-overheat relay is relaxed, 115v ac is supplied to the open winding of the shutoff valve actuator. The shutoff valve opens to allow bleed air from the APU duct into the compartment.
 - (b) If the cargo compartment temperature is high enough to make the overheat control switch close, the bulk-cargo-overheat relay is energized. When the bulk-cargo-overheat relay is energized, 115v ac is supplied to the close windings of the shutoff valve actuator and the shutoff valve closes.
 - (c) If the shutoff valve is closed and the flow control valve is not closed, the amber OVHT light comes on and an EICAS advisory message BULK CARGO OVHT is shown.

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- (5) With the bulk-cargo-heat switch/light pressed to OFF, the two bulk-cargo-heat valves will be closed. To close the bulk-cargo-heat-shutoff valve, 115 v ac is supplied directly from the switch/light to the close windings of the shutoff valve actuator. For the bulk-cargo-heat-flow-control valve to close, the bulk-cargo-heat-flow-control relay is relaxed so that 115v ac is supplied to the close windings of the flow-control-valve actuator.
- (6) Fire protection is provided to the bulk cargo compartment (Ref 26-23-00). If a fire is detected a red AFT light appears on the aft electronic control P8 panel. If the AFT CARGO FIRE switchlight on the P8 panel is then placed in the ARMED position, the shutoff valve will close.

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FAULT ISOLATION/MAINT MANUAL

AFT/BULK CARGO COMPARTMENT HEATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
BULB - BULK CARGO TEMPERATURE, TS297	2	1	811, BULK CARGO COMPT	21-65-03
CIRCUIT BREAKER -			FLT COMPT, P11	
CONTROL, AFT CARGO HEAT, C690		1	11R20	*
CONTROL, BULK CARGO HEAT, C689		1	11N26	*
OVERRIDE, AFT CARGO HEAT, C691		1	11R22	*
OVERRIDE, BULK CARGO HEAT, C682		1	11N27	*
CIRCUIT BREAKER -			119AL, MAIN EQUIP CTR, P36	*
VALVE, AFT CARGO HEAT CONT, C684		1	36L3 OR 36K6	
VALVE, BULK CARGO HEAT, C652		1	36L1 OR 36K4	
COMPUTER - (FIM 31-41-00/101)				
EICAS, LEFT, M10181				
EICAS, RIGHT, M10182				
PANEL - (FIM 26-22-00/101)				
APU/CARGO FIRE, M10444				
PANEL - BULK CARGO HEAT MODE SELECTOR, M912	1	1	FLT COMPT, P61	*
PANEL - CARGO HEAT CONTROL, M29	1	1	FLT COMPT, P5	*
RELAY - (FIM 31-01-33/101)				
OVHT, BULK CARGO, K729				
OVHT, CARGO ANNUNCIATION, K767				
OVRD, AFT/BULK CARGO FIRE, K634				
RELAY - (FIM 31-01-36/101)				
AIR/GND SYS NO. 1, K145				
CONT, AFT CARGO HEAT, K228				
CONT, BULK CARGO HEAT, K497				
RELAY - (FIM 31-01-49/101)				
ANNUNCIATION, AFT CARGO, K765				
OVHT, AFT CARGO, K229				
SWITCH - AFT CARGO TEMP THERMAL, S75	2	1	822, AFT CARGO COMPT	21-44-05
SWITCH - AFT CARGO OVHT TEMP, S64	2	1	822, AFT CARGO COMPT	21-44-05
SWITCH - BULK CARGO HIGH TEMP THERMAL, S499	2	1	811, BULK CARGO COMPT	21-44-06
SWITCH - BULK CARGO MODE SELECT, YDUS1	1	1	FLT COMPT, P61, BULK CARGO HEAT MODULE, M912	*
SWITCH - BULK CARGO NORMAL TEMP THERMAL, S498	2	1	811, BULK CARGO COMPT	21-44-06
SWITCH - BULK CARGO OVHT TEMP, S500	2	1	811, BULK CARGO COMPT	21-44-06
SWITCH/LIGHT - (FIM 26-22-00/101)				
AFT CARGO FIRE, S2				
SWITCH/LIGHT - AFT CARGO HEAT, YDBS2	1	1	FLT COMPT, P5, CARGO HEAT CONTROL PNL, M29	
SWITCH/LIGHT - BULK CARGO HEAT, YDBS3	1	1	FLT COMPT, P5, CARGO HEAT CONTROL PNL, M29	
VALVE - AFT CARGO HEATING CONTROL, V13	2	1	822, AFT CARGO COMPT	21-44-02
VALVE - AFT CARGO HEATING SHUTOFF, V14	2	1	822, AFT CARGO COMPT	21-44-01
VALVE - BULK CARGO HEATING CONTROL, V127	2	1	822, AFT CARGO COMPT	21-44-04
VALVE - BULK CARGO HEATING SHUTOFF, V128	2	1	822, AFT CARGO COMPT	21-44-03

* SEE THE WDM EQUIPMENT LIST

Aft/Bulk Cargo Compartment Heating System - Component Index
Figure 101

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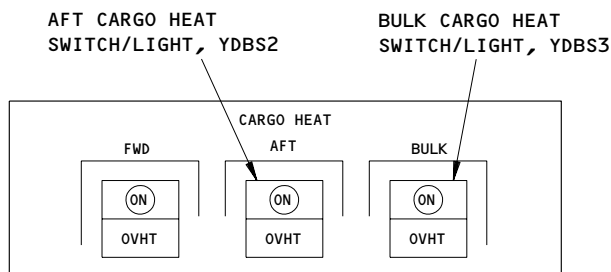
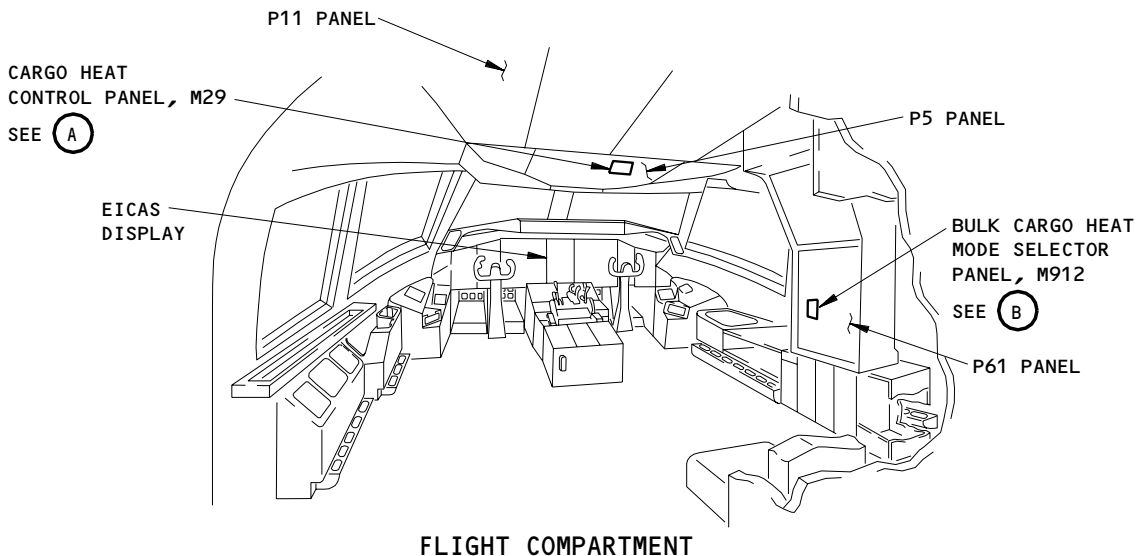
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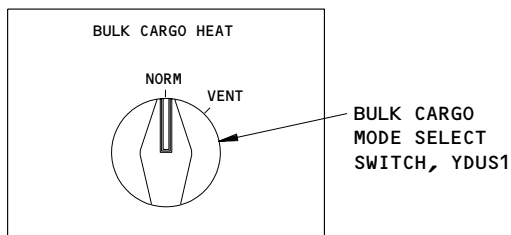
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FAULT ISOLATION/MAINT MANUAL



CARGO HEAT CONTROL PANEL, M29

(A)



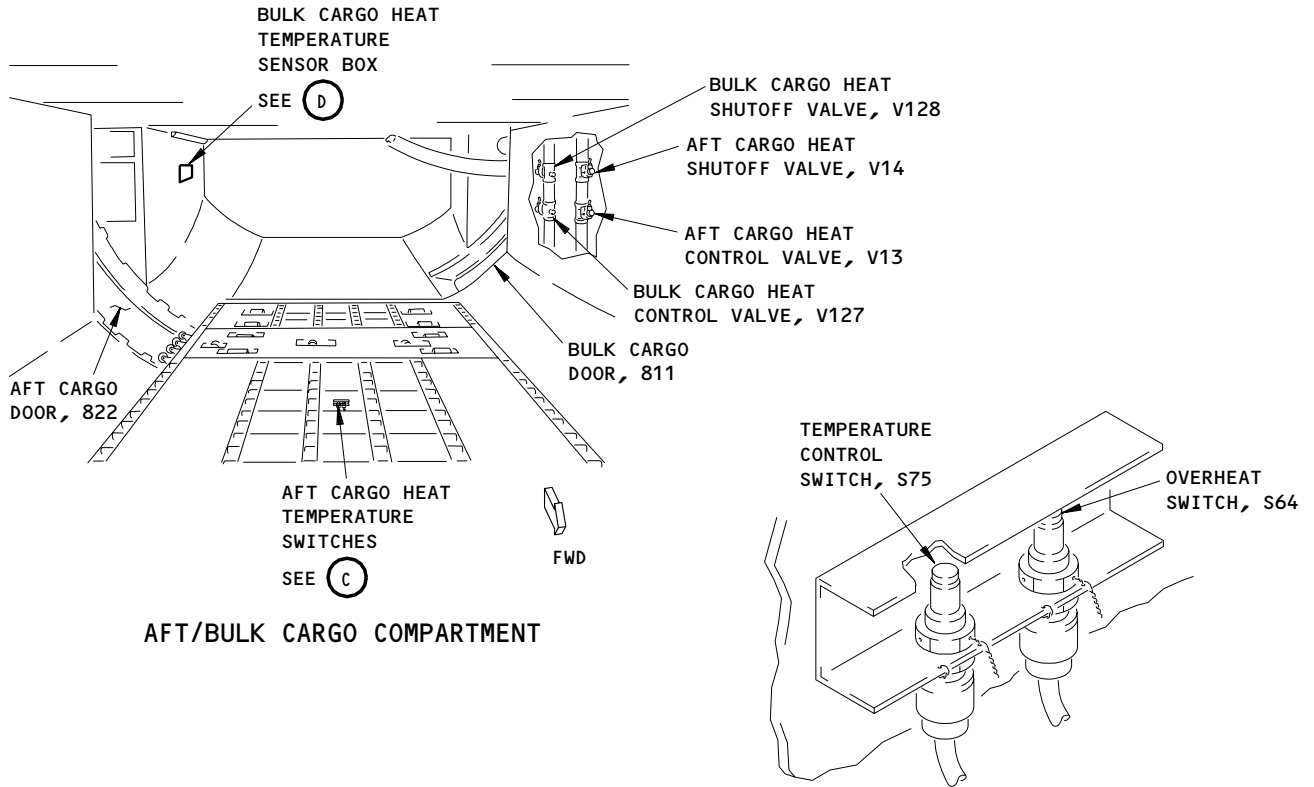
BULK CARGO HEAT MODE SELECTOR PANEL, M912

(B)

**Aft/Bulk Cargo Heating System - Component Location
Figure 102 (Sheet 1)**

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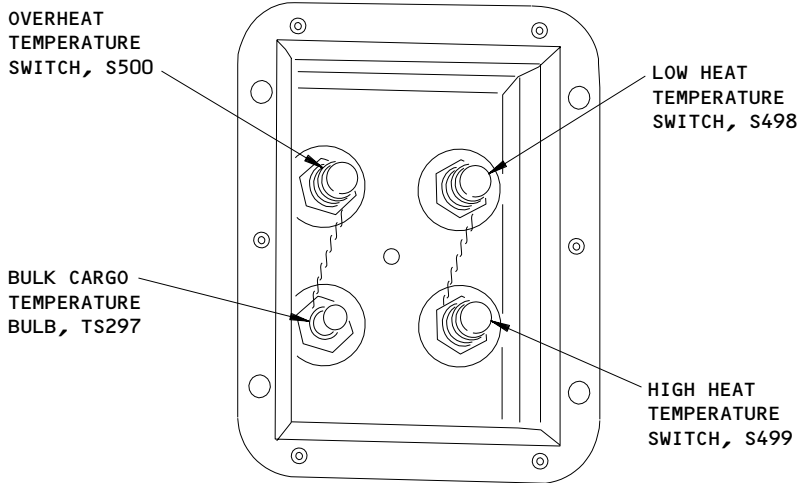
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AFT/BULK CARGO COMPARTMENT

AFT CARGO HEAT TEMPERATURE SWITCHES

(C)



BULK CARGO HEAT TEMPERATURE SENSOR BOX

(D)

Aft/Bulk Cargo Compartment Heating System - Component Location
Figure 102 (Sheet 2)

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AFT/BULK CARGO COMPARTMENT HEATING SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure has instructions to do the tests that follow:
- (1) Operational Test – Aft Cargo Heating System
 - (2) Operational Test – Bulk Cargo Heating System
 - (3) System Test – Aft Cargo Heating System
 - (4) System Test – Bulk Cargo Heating System
 - (5) System Test – Aft Cargo Heating System (Inhibit and Leakage)
 - (6) System Test – Bulk Cargo Heating System (Inhibit and Leakage)

TASK 21-44-00-705-001

2. Operational Test – Aft Cargo Heating System (Fig. 501)

A. Equipment

- (1) Cold source (ice pack), commercially available
- (2) Thermometer, range 0 to 120°F (0 to 49°C) – commercially available

B. References

- (1) 24-22-00/201, Electrical Power Control
- (2) 25-52-01/401, Cargo Compartment Sidewall Panel

C. Access

- (1) Location Zones
 - 153 Aft Cargo Compartment (Left)
 - 155/156 Area below aft cargo compartment

D. Prepare for the Test

S 865-002

- (1) Supply electrical power (Ref 24-22-00).

S 865-003

- (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11R20, AFT CARGO HEAT CONTROL
 - (b) 11R22, AFT CARGO HEAT OVERRIDE
 - (c) EICAS circuit breakers (6 locations)

S 865-004

- (3) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
 - (a) 36L3 or 36K6 CARGO HEAT VALVE AFT CONT

S 865-005

- (4) Push the ECS MSG button, on the P61 panel, to get the EICAS maintenance page.

S 485-006

- (5) If the temperature in the cargo compartment is greater than 40°F (5°C), then apply a cold source to the aft cargo control switch.

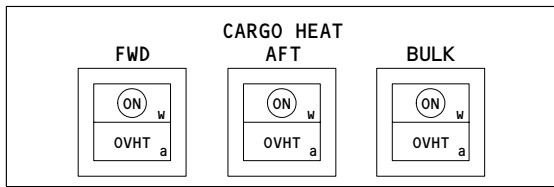
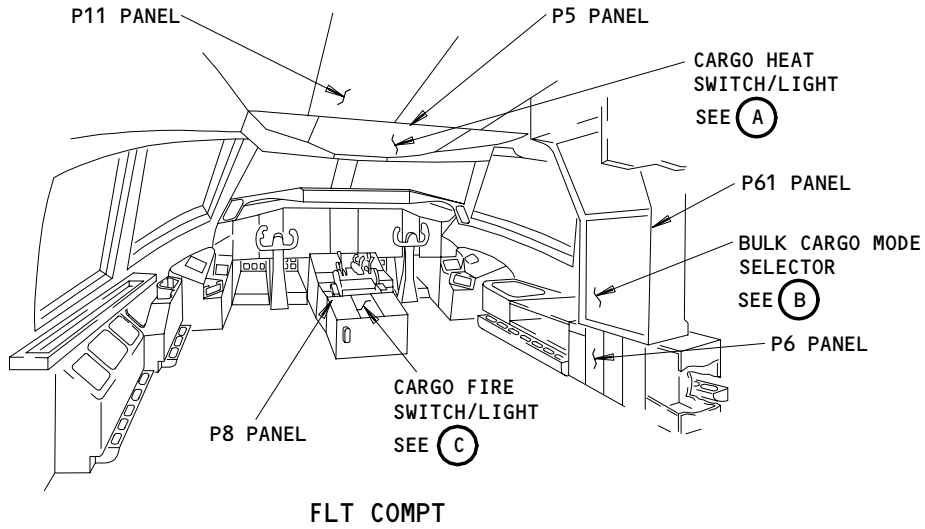
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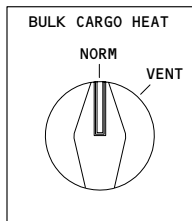
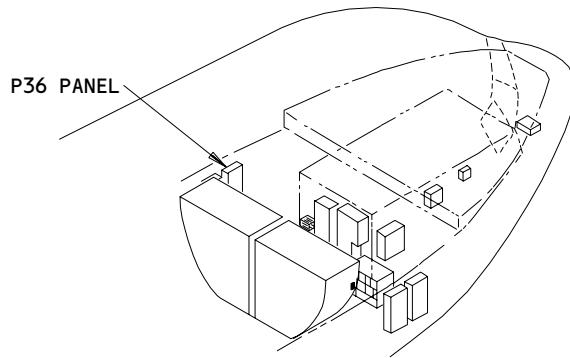
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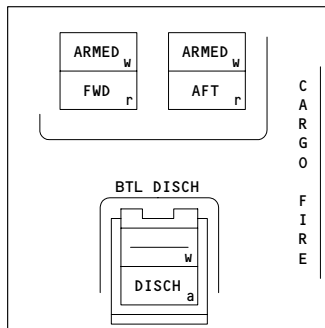
CARGO HEAT SWITCH/LIGHT

(A)



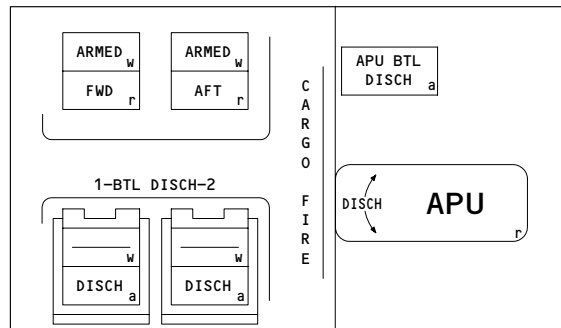
BULK CARGO MODE SELECTOR

(B)



CARGO FIRE SWITCH/LIGHT

(C) 1



CARGO FIRE SWITCH/LIGHT

(C) 2

1 767-300 AIRPLANES

2 767-200 AIRPLANES

Aft/Bulk Cargo Compartment Heating System Adjustment/Test
Figure 501 (Sheet 1)

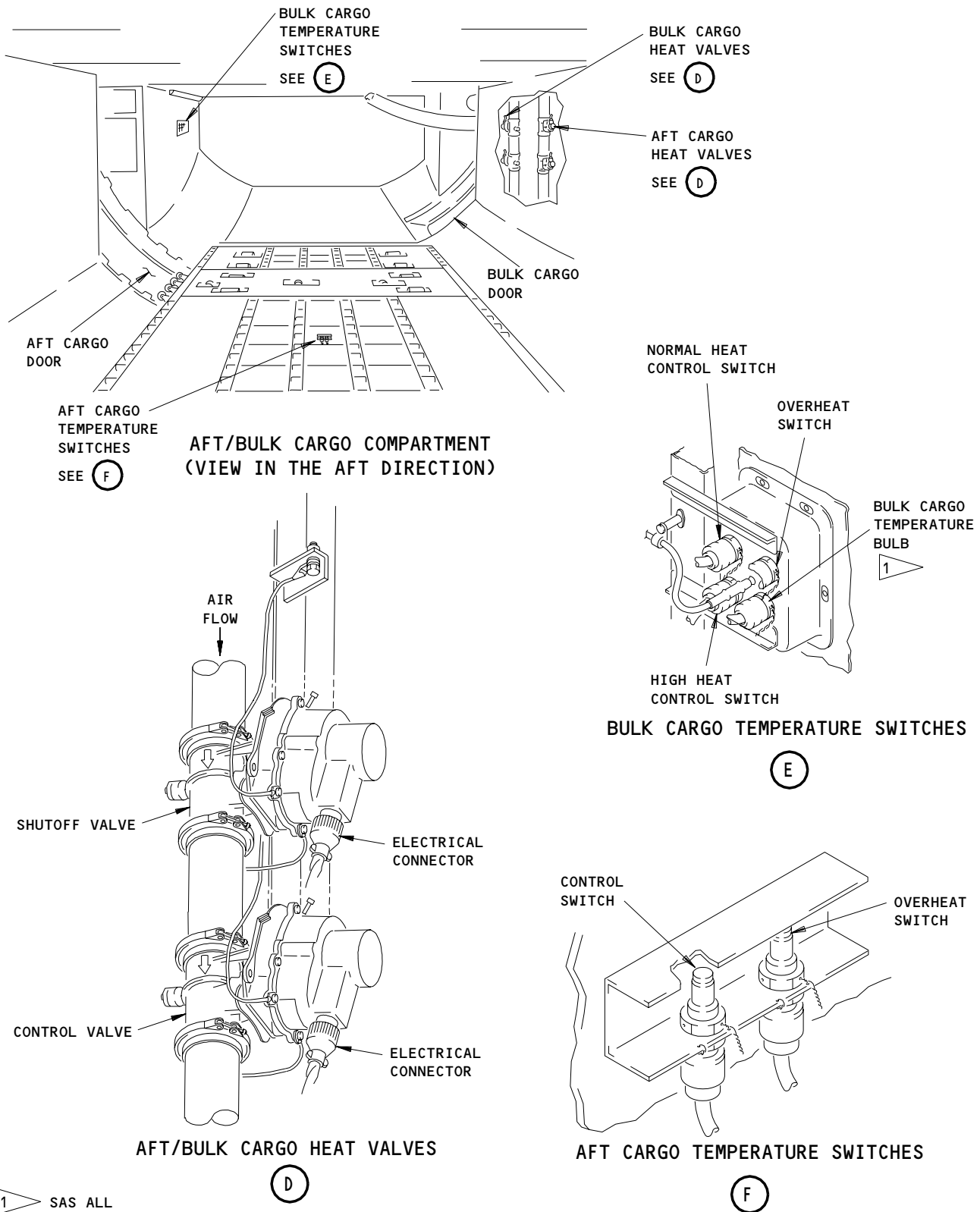
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**Aft/Bulk Cargo Compartment Heating System Adjustment/Test
Figure 501 (Sheet 2)**

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S 485-007

- (6) If the temperature in the cargo compartment is greater than 80°F (27°C), then apply a cold source to the aft cargo overheat and control temperature switches.

S 015-106

- (7) Remove the sidewall panels on the left side of the aft cargo compartment, approximately 5 feet (1.6 meters) forward of the bulk cargo door (Ref 25-52-01).

E. Aft Cargo Heating Operational Test procedure

S 715-008

- (1) Do the Aft Cargo Heating Operational Test
 - (a) Push the AFT CARGO HEAT switch-light, on the overhead panel, P5, to the ON position.
 - (b) Make sure the ON light comes on.
 - (c) Make sure the EICAS message, AFT CARGO HEAT, shows on the bottom display.

CAUTION: IF THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE NOT OPENED, THE CARGO FIRE EXTINGUISHER BOTTLES MAY DISCHARGE WHEN YOU DO THE STEPS THAT FOLLOW.

- (d) Open these circuit breakers on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (e) Push the CARGO FIRE AFT switch-light, on the pilots' control stand panel, P8, to the ARMED position.
- (f) Make sure the ARMED light comes on.
- (g) Make sure the EICAS message, AFT CARGO HEAT, does not show on the bottom display.
- (h) Make sure the position indicator on the aft cargo shutoff valve is in the CLOSE position.
- (i) Push the CARGO FIRE AFT switch-light, on the P8 panel, to the unarmed position.
- (j) Make sure the ARMED light goes off.
- (k) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (l) Push the AFT CARGO HEAT switch-light, on the P5 panel, to the off position.
- (m) Make sure the ON light goes off.

F. Put the Airplane Back to Its Usual Condition

S 085-009

- (1) If applicable, remove the cold source from the overheat and the control temperature switches

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- S 415-174
- (2) Install the sidewall panel 5 feet (1.6 meters) forward of the bulk cargo door (25-52-01).
- S 865-094
- (3) Remove the electrical power if it is no longer necessary (Ref 24-22-00).

TASK 21-44-00-705-011

3. Operational Test - Bulk Cargo Heating System (Fig. 501)

A. Equipment

- (1) Cold source (ice pack), commercially available

B. References

- (1) 24-22-00/201, Electrical Power Control
- (2) 25-52-01/401, Cargo Compartment Sidewall Panel

C. Access

- (1) Location Zones
 - 153 Aft Cargo Compartment (Left)
 - 161/162 Bulk cargo compartment

D. Prepare for the Test

S 865-008

- (1) Supply the electrical power (Ref 24-22-00).

S 865-009

- (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11N26, BULK CARGO HEAT CONT
 - (b) 11N27, BULK CARGO HEAT OVRD
 - (c) EICAS circuit breakers (6 locations)

S 865-095

- (3) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
 - (a) 36L1 or 36K4 CARGO HEAT VALVE BULK

S 485-011

- (4) If the temperature in the cargo compartment is greater than 40°F (5°C), then apply a cold source to the normal heat temperature switch.

S 485-047

- (5) If the temperature in the cargo compartment is greater than 80°F (27°C), then apply a cold source to the overheat temperature switch and the normal heat temperature switch.

S 865-048

- (6) Turn the BULK CARGO HEAT selector, on the right side panel, P61, to the NORM position.

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S 865-050

- (7) Make sure the CARGO FIRE AFT switch, on the aft pilots control stand panel, P8, is not armed (the ARMED light is off).

S 015-107

- (8) Remove the sidewall panel on the left side of the cargo compartment, approximately 4 feet (1.2 meters) forward of the bulk cargo door (Ref 25-52-01).

S 865-051

- (9) Push the ECS MSG button, on the P61 panel, to get the EICAS maintenance page.

E. Bulk Cargo Heating Operational Test procedure

S 715-052

- (1) Do the Bulk Cargo Heating Operational Test
- (a) Push the BULK CARGO HEAT switch-light, on the pilots' overhead control panel, P5, to ON. Make sure the ON light comes on.
 - (b) Make sure the EICAS message BULK CARGO HEAT shows on the lower display.

CAUTION: IF THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE NOT OPENED, THE CARGO FIRE EXTINGUISHER BOTTLES MAY DISCHARGE WHEN YOU DO THE STEPS THAT FOLLOW.

- (c) Open these circuit breakers, on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (d) Push the CARGO FIRE AFT switch-light, on the P8 panel, to ARMED.
- (e) Make sure the ARMED light comes on.
- (f) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.

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- (g) Make sure the position indicator on the bulk cargo shutoff valve is in the CLOSE position.
 - (h) Push the CARGO FIRE AFT switch-light, on the P8 panel, to unarmed. Make sure the ARMED light goes out.
 - (i) Make sure the ARMED light goes out.
 - (j) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P6 panel:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
 - (k) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.
 - (l) Push the BULK CARGO HEAT switch-light, on the P5 panel, to off. Make sure the ON light goes out.
 - (m) Make sure the ON light goes off.
- F. Put the Airplane Back to Its Usual Condition

S 085-053

- (1) If applicable, remove the cold source from the bulk cargo compartment temperature switches.

S 415-108

- (2) Install the sidewall panel approximately 4 feet (1.2 meters) forward of the bulk cargo door (Ref 25-52-01).

S 865-054

- (3) Remove the electrical power if it is no longer necessary (Ref 24-22-00).

TASK 21-44-00-705-055

4. System Test - Aft Cargo Compartment Heating System

A. Equipment

- (1) Heat source (blow dryer), commercially available.
- (2) Cold source (ice pack), commercially available.
- (3) Thermometer, range 0 to 120°F (0 to 49°C) - commercially available

B. References

- (1) 06-41-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) 24-22-00/201, Electrical Power Control
- (3) 25-52-01/401, Cargo Compartment Sidewall Panel

C. Access

- (1) Location Zones
 - 153 Aft cargo compartment (Left)
 - 155/156 Area below aft cargo compartment

D. Prepare for the Test

S 865-069

- (1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11R20, AFT CARGO HEAT CONTROL
 - (b) 11R22, AFT CARGO HEAT OVERRIDE

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(c) EICAS circuit breakers (6 locations)

S 865-070

- (2) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
(a) 36L3 or 36K6 CARGO HEAT VALVE AFT CONT

S 865-071

- (3) Supply electrical power (Ref 24-22-00).

S 865-072

- (4) Make sure the AFT CARGO HEAT switch-light on the overhead panel, P5, is off (the ON light is not on).

S 865-074

- (5) Make sure the CARGO FIRE AFT switch-light on the pilots' aft control stand panel, P8, is not armed (the ARMED light is not on).

S 015-175

- (6) Open the aft cargo compartment door, 822 (Ref 06-46-00).

S 015-090

- (7) Remove the sidewall panels on the left side of the aft cargo compartment, approximately 5 feet (1.6 meters) forward of the bulk cargo door. (Ref 25-52-01).

S 215-098

- (8) Make sure the position indicators on the aft cargo shutoff valve and control valve are in the CLOSED position.

S 015-067

- (9) Remove the applicable floor panel to get access to the aft cargo compartment temperature switches. The switches are installed below the floor deck, approximately 67 inches forward from the middle of the aft cargo door.

S 865-099

- (10) Push the ECS MSG button, on the P61 panel, to get the EICAS maintenance page.

E. Aft Cargo Heat Control Valve and Aft Cargo Heat Shutoff Valve Test

S 735-069

- (1) Do the steps that follow to do a test of the aft cargo heat control valve and the aft cargo heat shutoff valve.
(a) If the temperature in the aft cargo compartment is greater than 40°F (5°C), then apply a cold source to the aft cargo control switch.
(b) If the temperature in the aft cargo compartment is greater than 80°F (27°C), then apply a cold source to the aft cargo overheat and control temperature switches.
(c) Push the AFT CARGO HEAT switch-light, on the P5 panel, to ON.

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- (d) Make sure the ON light comes on.
- (e) Make sure the position indicator on the control valve and the shutoff valve move to the OPEN position.
- (f) Make sure the EICAS message, AFT CARGO HEAT, shows on the bottom display.

F. Aft Cargo Overheat Switch Test

S 735-071

- (1) Do the steps that follow to do a test of the aft cargo overheat switch.
 - (a) Make sure the AFT CARGO HEAT switch-light, on the P5 panel, is in the ON position.
 - 1) Make sure the ON light is on.
 - (b) Disconnect the electrical connector from the aft cargo heating control valve.
 - (c) If the temperature in the aft cargo compartment is less than 95°F (35°C), then apply a heat source to the two aft cargo temperature switches.
 - (d) Make sure the position indicator on the shutoff valve moves to the CLOSED position.
 - (e) Make sure the OVHT light for the AFT CARGO HEAT switch-light, on the P5 panel, comes on.
 - (f) Make sure the EICAS message, AFT CARGO OVHT, shows on the top display.
 - (g) Do the steps that follow:
 - 1) Connect the electrical connector to the aft cargo heating control valve.
 - 2) Make sure the position indicator on the control valve moves to the CLOSED position.
 - 3) Make sure the EICAS message, AFT CARGO OVHT, does not show on the top display.
 - 4) Make sure the OVHT light for the AFT CARGO HEAT switch-light, on the P5 panel, goes off.
 - 5) Disconnect the electrical connector from the control valve.
 - 6) Make sure the OVHT light, on the P5 panel, comes on.
 - (h) If applicable, remove the heat source from the two temperature switches.
 - (i) If the temperature in the aft cargo compartment is greater than 75°F (24°C), then apply a cold source to the two aft cargo temperature switches.
 - (j) Make sure the position indicator on the shutoff valve moves to the OPEN position.
 - (k) Make sure the OVHT light for the AFT CARGO HEAT switch-light, on the P5 panel, goes off.
 - (l) Make sure the EICAS message, AFT CARGO OVHT, does not show on the top display.
 - (m) Connect the electrical connector to the aft cargo heating control valve.
 - (n) If applicable, remove the cold source from the aft cargo temperature switches.
 - (o) Turn the AFT CARGO HEAT switch-light, on the P5 panel, to off.

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- (p) Make sure the ON light goes off.
 - (q) Make sure the position indicators on the control valve and the shutoff valve are in the CLOSED position.
- G. Put the Airplane Back to Its Usual Condition

S 865-100

- (1) Remove the pneumatic power if it is not necessary (Ref 36-00-00).

S 415-074

- (2) Install the floor panel that is above the aft cargo temperature switches.

S 415-091

- (3) Install the sidewall panel 5 feet (1.6 meters) forward of the bulk cargo door (Ref 25-52-01).

S 415-076

- (4) Close the aft cargo compartment door, 822 (Ref 06-46-00).

S 865-077

- (5) Remove the electrical power if it is no longer necessary (Ref 24-22-00).

TASK 21-44-00-705-079

5. System Test - Bulk Cargo Compartment Heating System

A. Equipment

- (1) Heat source (blow dryer), commercially available
- (2) Cold source (ice pack), commercially available
- (3) Thermometer, range 0 to 120°F (0 to 49°C) - commercially available

B. References

- (1) 06-41-00/201, Entry, Service, and Cargo Doors Access Doors and Panels.
- (2) 24-22-00/201, Electrical Power Control
- (3) 25-52-01/401, Cargo Compartment Sidewall Panel

C. Access

- (1) Location Zones
 - 153 Aft cargo compartment (Left)
 - 162 Bulk cargo compartment (Right)

D. Prepare for the Test

S 865-078

- (1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11N26, BULK CARGO HEAT CONT
 - (b) 11N27, BULK CARGO HEAT OVRD

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(c) EICAS circuit breakers (6 locations)

S 865-079

(2) Make sure this circuit breaker, on the left miscellaneous electrical equipment panel, P36, is closed:

(a) 36L1 or 36K4 BULK CARGO HEAT VALVE

S 865-080

(3) Supply electrical power (Ref 24-22-00).

S 865-081

(4) Make sure the BULK CARGO HEAT switch-light, on the overhead panel, P5, is off (the ON light is not on).

S 865-084

(5) Turn the BULK CARGO HEAT selector, on the right side panel, P61, to the NORM position.

S 865-085

(6) Make sure the CARGO FIRE AFT switch-light, on the pilots' control stand panel, P8 is not armed (the ARMED light is not on).

S 015-086

(7) Open the aft cargo compartment door, 822 (Ref 06-46-00).

S 015-092

(8) Remove the sidewall panel is on the left side of the cargo compartment, approximately 4 feet (1.2 meters) forward of the bulk cargo door (Ref 25-52-01).

S 215-087

(9) Make sure the position indicators on the control valve and the shutoff valve are in the CLOSED position.

S 865-101

(10) Push the ECS MSG button, on the P61 panel, to get the EICAS maintenance page.

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E. Bulk Cargo Heat Control Valve and Bulk Cargo Heat Shutoff Valve Test

S 735-092

- (1) Do the steps that follow to do a test of the bulk cargo heat control valve and the bulk cargo heat shutoff valve.
 - (a) If the temperature in the bulk cargo compartment is greater than 40°F (5°C), then apply a cold source to the normal heat temperature switch.
 - (b) Push the BULK CARGO HEAT switch-light, on the P5 panel, to ON.
 - (c) Make sure the ON light comes on.
 - (d) Make sure the position indicators on the control valve and the shutoff valve move to the OPEN position.
 - (e) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.
 - (f) If applicable, remove the cold source from the bulk cargo temperature switches.
 - (g) If the temperature in the bulk cargo compartment is less than 80°F (27°C), then apply a heat source to the bulk cargo temperature switches.
 - (h) Turn the BULK CARGO HEAT selector, on the P61 panel, to the VENT position.
 - (i) Make sure the position indicator on the control valve moves to the CLOSED position.
 - (j) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.
 - (k) If applicable, remove the heat source from the bulk cargo temperature switches.
 - (l) If the temperature in the bulk cargo compartment is greater than 60°F (16°C), then apply a cold source to the bulk cargo temperature switches.
 - (m) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.
 - (n) If applicable, remove the cold source from the temperature switches.

F. Bulk Cargo Overheat Switch Test

S 735-104

- (1) Do the steps that follow to do a test of the bulk cargo overheat switch.
 - (a) Make sure the BULK CARGO HEAT switch-light, on the P5 panel, is in the ON position.
 - 1) Make sure the ON light is on.
 - (b) Disconnect the electrical connector from the bulk cargo heating control valve.
 - (c) If the temperature in the bulk cargo compartment is less than 95°F (35°C), then apply a heat source to the bulk cargo temperature switches.
 - (d) Make sure the position indicator on the shutoff valve moves to the CLOSED position.
 - (e) Make sure the OVHT light for the BULK CARGO HEAT switch-light, on the P5 panel, comes on.

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- (f) Make sure the EICAS message, BULK CARGO OVHT, shows on the top display.
 - (g) Do the steps that follow:
 - 1) Connect the electrical connector the bulk cargo heating control valve.
 - 2) Make sure the position indicator on the control valve moves to the CLOSED position.
 - 3) Make sure the EICAS message, BULK CARGO OVHT, does not show on the top display.
 - 4) Make sure the OVHT light for the BULK CARGO HEAT switch-light, on the P5 panel, goes off.
 - 5) Disconnect the electrical connector from the bulk cargo heating control valve.
 - 6) Make sure the OVHT light for the BULK CARGO HEAT switch-light comes on.
 - (h) If applicable, remove the heat source from the temperature switches.
 - (i) If the temperature in the bulk cargo compartment is greater than 75°F (24°C), then apply a cold source to the bulk cargo temperature switches.
 - (j) Make sure the position indicator on the shutoff valve moves to the OPEN position.
 - (k) Make sure the OVHT light for the BULK CARGO HEAT switch-light goes off.
 - (l) Make sure the EICAS message, BULK CARGO OVHT, does not show on the top display.
 - (m) Connect the electrical connector to the bulk cargo heating control valve.
- G. Put the Airplane Back to Its Usual Condition

S 865-097

- (1) Turn the BULK CARGO HEAT selector, on the P61 panel, to the NORM position.

S 415-093

- (2) Install the sidewall panel approximately 4 feet (1.2 meters) forward of the bulk cargo door (Ref 25-52-01).

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- S 415-088
(3) Close the aft cargo compartment door, 822 (Ref 06-46-00).

- S 865-089
(4) Remove the electrical power if it is no longer necessary (Ref 24-22-00).

TASK 21-44-00-705-103

6. System Test – Aft Cargo Compartment Heating System (Inhibit and Leakage)

A. Equipment

- (1) Heat source (blow dryer), commercially available.
- (2) Cold source (ice pack), commercially available.
- (3) Thermometer, range 0 to 120°F (0 to 49°C) – commercially available

B. References

- (1) 06-41-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) 24-22-00/201, Electrical Power Control
- (3) 25-52-01/401, Cargo Compartment Sidewall Panel
- (4) 36-00-00/201, Pneumatic – General

C. Access

- (1) Location Zones
 - 153 Aft cargo compartment (Left)
 - 155/156 Area below aft cargo compartment

D. Prepare for the Test

- S 865-107
- (1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11R20, AFT CARGO HEAT CONTROL
 - (b) 11R22, AFT CARGO HEAT OVERRIDE
 - (c) EICAS circuit breakers (6 locations)

- S 865-108
- (2) Make sure this circuit breaker on the left miscellaneous electrical equipment panel, P36, is closed:
 - (a) 36L3 or 36K6 CARGO HEAT VALVE AFT CONT

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- S 865-154
- (3) Supply electrical power (Ref 24-22-00).
- S 865-155
- (4) Make sure the AFT CARGO HEAT switch-light on the overhead panel, P5, is off (the ON light is not on).
- S 865-157
- (5) Make sure the CARGO FIRE AFT switch-light on the pilots' aft control stand panel, P8, is not armed (the ARMED light is not on).
- S 015-113
- (6) Open the aft cargo compartment door, 822 (Ref 06-46-00).
- S 015-114
- (7) Remove the sidewall panels on the left side of the aft cargo compartment, approximately 5 feet (1.6 meters) forward of the bulk cargo door. (Ref 25-52-01).
- S 215-115
- (8) Make sure the position indicators on the aft cargo shutoff valve and control valve are in the CLOSED position.
- S 215-116
- (9) Find the aft cargo compartment temperature switches. They are installed below the floor deck, approximately 67 inches forward from the middle of the aft cargo door.
- S 865-158
- (10) Push the ECS MSG button, on the P61 panel, to get the EICAS maintenance page.
- S 865-179
- (11) If the temperature in the aft cargo compartment is greater than 40°F (5°C), then apply a cold source to the aft cargo control switch.

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S 865-180

- (12) If the temperature in the aft cargo compartment is greater than 80°F (27°C), then apply a cold source to the aft cargo overheat and control temperature switches.

E. Do the Aft Cargo Heating System Inhibit Test

S 865-153

- (1) Push the AFT CARGO HEAT switch-light, on the P5 panel, to ON.
 - (a) Make sure the ON light comes on.
 - (b) Make sure the position indicator on the control valve and the shutoff valve move to the OPEN position.
 - (c) Make sure the EICAS message, AFT CARGO HEAT, shows on the bottom display.

S 865-146

CAUTION: OPEN THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP. IF THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE NOT OPENED, THE CARGO FIRE EXTINGUISHER BOTTLES MAY DISCHARGE WHEN YOU DO THE STEPS THAT FOLLOW.

- (2) Open these circuit breakers on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags:
 - (a) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - (b) 6H6, FIRE EXTINGUISHING CARGO BTL 2

S 865-147

- (3) Push the CARGO FIRE AFT switch-light, on the P8 panel, to ARMED.
 - (a) Make sure the ARMED light comes on.
 - (b) Make sure the EICAS message, AFT CARGO HEAT, does not show on the bottom display.
 - (c) Make sure the position indicator on the shutoff valve moves to the CLOSED position.
 - (d) Make sure the position indicator on the control valve stays in the OPEN position.

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- S 865-148
- (4) Push the CARGO FIRE AFT switch-light, on the P8 panel, to off.
- (a) Make sure the ARMED light goes out.
- S 865-177
- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P6 panel:
- (a) 6H5, FIRE EXTINGUISHING CARGO BTL 1
- (b) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (c) Make sure the position indicator on the shutoff valve moves to the OPEN position.
- (d) Make sure the position indicator on the control valve stays in the OPEN position.
- (e) Make sure the EICAS message, AFT CARGO HEAT, shows on the bottom display.
- S 865-178
- (6) If applicable, remove the cold source from the control switch.
- S 865-140
- (7) If the temperature in the aft cargo compartment is less than 55°F (13°C), then apply a heat source to the control switch.
- S 865-141
- (8) Continue to keep the temperature of the overheat switch at less than 80°F (27°C). If necessary, apply a cold source to the overheat switch.
- (a) Make sure the position indicator on the control valve moves to the CLOSED position.
- (b) Make sure the position indicator on the shutoff valve stays in the OPEN position.
- (c) Make sure the EICAS message, AFT CARGO HEAT, does not show on the bottom display.
- S 865-142
- (9) If applicable, remove the heat and cold sources from the aft cargo temperature switches.

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F. Do the Aft Cargo Heating Duct Leakage Test

S 865-127

- (1) Supply pneumatic power (Ref 36-00-00).

S 865-128

- (2) Make sure that air does not flow out from the cargo heating duct connections.
(a) A small leak is permitted.
(b) A large leak must be repaired.

S 865-129

- (3) If applicable, remove the cold source from the aft cargo temperature switches.

S 865-190

- (4) Push the AFT CARGO HEAT switch-light, on the P5 panel, to off.
(a) Make sure the ON light goes off.

S 865-131

- (5) Make sure the position indicators on the control valve and the shutoff valve are in the CLOSED position.

G. Put the Airplane Back to Its Usual Condition

S 865-102

- (1) Remove the pneumatic power if it is not necessary (Ref 36-00-00).

S 415-103

- (2) If applicable, install the floor panel that is above the aft cargo temperature switches.

S 415-104

- (3) Install the sidewall panel 5 feet (1.6 meters) forward of the bulk cargo door (Ref 25-52-01).

S 415-145

- (4) Close the aft cargo compartment door, 822 (Ref 06-46-00).

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S 865-106

- (5) Remove the electrical power if it is no longer necessary (Ref 24-22-00).

TASK 21-44-00-705-102

7. Operational Test - Bulk Cargo Heating System (Inhibit and Leakage)

A. Equipment

- (1) Heat source (blow dryer), commercially available
- (2) Cold source (ice pack), commercially available
- (3) Thermometer, range 0 to 120°F (0 to 49°C) - commercially available

B. References

- (1) 06-41-00/201, Entry, Service, and Cargo Doors Access Doors and Panels.
- (2) 24-22-00/201, Electrical Power Control
- (3) 25-52-01/401, Cargo Compartment Sidewall Panel
- (4) 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
 - 153 Aft cargo compartment (Left)
 - 162 Bulk cargo compartment (Right)

D. Prepare for the Test

S 865-166

- (1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11N26, BULK CARGO HEAT CONT
 - (b) 11N27, BULK CARGO HEAT OVRD
 - (c) EICAS circuit breakers (6 locations)

S 865-167

- (2) Make sure this circuit breaker, on the left miscellaneous electrical equipment panel, P36, is closed:
 - (a) 36L1 or 36K4, BULK CARGO HEAT VALVE

S 865-168

- (3) Supply electrical power (Ref 24-22-00).

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- S 865-169
- (4) Make sure the BULK CARGO HEAT switch-light, on the overhead panel, P5, is off (the ON light is not on).
- S 865-172
- (5) Turn the BULK CARGO HEAT selector, on the right side panel, P61, to the NORM position.
- S 865-173
- (6) Make sure the CARGO FIRE AFT switch-light, on the pilots' control stand panel, P8 is not armed (the ARMED light is not on).
- S 015-140
- (7) Open the aft cargo compartment door, 822 (Ref 06-46-00).
- S 015-141
- (8) Remove the sidewall panel is on the left side of the cargo compartment, approximately 4 feet (1.2 meters) forward of the bulk cargo door (Ref 25-52-01).
- S 215-142
- (9) Make sure the position indicators on the control valve and the shutoff valve are in the CLOSED position.
- S 865-143
- (10) Push the ECS MSG button, on the P61 panel, to get the EICAS maintenance page.
- S 885-146
- (11) If the temperature in the bulk cargo compartment is greater than 40°F (5°C), then apply a cold source to the normal heat temperature switch.
- (a) Push the BULK CARGO HEAT switch-light, on the P5 panel, to ON.
- (b) Make sure the ON light comes on.
- (c) Make sure the position indicators on the control valve and the shutoff valve move to the OPEN position.
- (d) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.
- E. Do the Bulk Cargo Heating System Inhibit Test

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S 865-160

CAUTION: IF THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE NOT OPENED, THE CARGO FIRE EXTINGUISHER BOTTLES MAY DISCHARGE WHEN YOU DO THE STEPS THAT FOLLOW.

- (1) Open these circuit breakers on the main power distribution panel, P6, and attach the DO-NOT-CLOSE tags:
 - (a) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - (b) 6H6, FIRE EXTINGUISHING CARGO BTL 2

S 865-161

- (2) Push the CARGO FIRE AFT switch-light, on the P8 panel, to the ARMED position.

S 865-162

- (3) Make sure the ARMED light comes on.

S 865-163

- (4) Make sure the EICAS message, BULK CARGO HEAT, does not show on the bottom display.

S 865-164

- (5) Make sure the position indicator on the shutoff valve moves to the CLOSED position.

S 865-113

- (6) Make sure the position indicator on the control valve stays in the OPEN position.

S 865-114

- (7) Push the CARGO FIRE AFT switch-light, on the P8 panel, to the unarmed position.

S 865-115

- (8) Make sure the ARMED light goes out.

S 865-116

- (9) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P6 panel:
 - (a) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - (b) 6H6, FIRE EXTINGUISHING CARGO BTL 2

S 865-165

- (10) Make sure the position indicator on the shutoff valve moves to the OPEN position.

S 865-118

- (11) Make sure the EICAS message, BULK CARGO HEAT, shows on the bottom display.

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F. Do the Bulk Cargo Heating Duct Leakage Test

S 865-119

- (1) Supply pneumatic power (Ref 36-00-00).

S 795-120

- (2) Make sure air does not flow out from the heating duct connections.
(a) A small leak is permitted
(b) A large leak must be repaired.

S 865-159

- (3) If applicable, remove the cold source from the temperature switches.

S 865-122

- (4) Push the BULK CARGO HEAT switch-light, on the P5 panel, to off.
(a) Make sure the ON light goes out.
(b) Make sure the position indicator on the control valve and the shutoff valve are in the CLOSED positions.

S 865-126

- (5) Remove the pneumatic power if it is no longer necessary (Ref 36-00-00).

G. ALL SAS AIRPLANES;

Do the Bulk Cargo Temperature Bulb Test.

S 755-144

- (1) With a thermometer, measure the temperature about 6 inches away from the bulk cargo temperature bulb.

S 215-145

- (2) Make sure the temperature is the same +/- 2°F (1°C) as the BULK CARGO TEMP value on the lower EICAS display.

H. Put the Airplane Back to Its Usual Condition

S 415-118

- (1) Install the sidewall panel approximately 4 feet (1.2 meters) forward of the bulk cargo door (Ref 25-52-01).

S 415-119

- (2) Close the aft cargo compartment door, 822 (Ref 06-46-00).

S 865-120

- (3) Remove the electrical power if it is no longer necessary (Ref 24-22-00).

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AFT CARGO HEAT SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the aft cargo heat shutoff valve. The second task is the installation of the aft cargo heat shutoff valve.
- B. The aft cargo heat shutoff valve is on the aft cargo heating duct. The valve is in the sidewall between WL 118.5 and WL 187 at STA 1358 and LBL 75. You can get access to the valve through the aft cargo compartment door.

TASK 21-44-01-004-001

2. Remove the Aft Cargo Heat Shutoff Valve (Fig. 401)

A. References

- (1) AMM 52-35-00/201, Aft Cargo Door
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Cargo Compartment Sidewall Panels
- (4) AMM 36-00-00/201, Pneumatic - General

B. Access

- (1) Location Zone
153 Aft Cargo Compartment, Left
- (2) Access Panel
822 Aft Cargo Door

C. Procedure

S 864-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 214-003

- (2) Push the AFT CARGO HEAT switch-light on the pilot's overhead P5 panel to the off position.
 - (a) Make sure the ON light is off.
 - (b) Attach a DO-NOT-OPERATE tag to the switch-light.

S 864-005

- (3) Remove pneumatic power (AMM 36-00-00/201).

S 864-006

- (4) Open these circuit breakers on overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11R20, AFT CARGO HEAT CONTROL

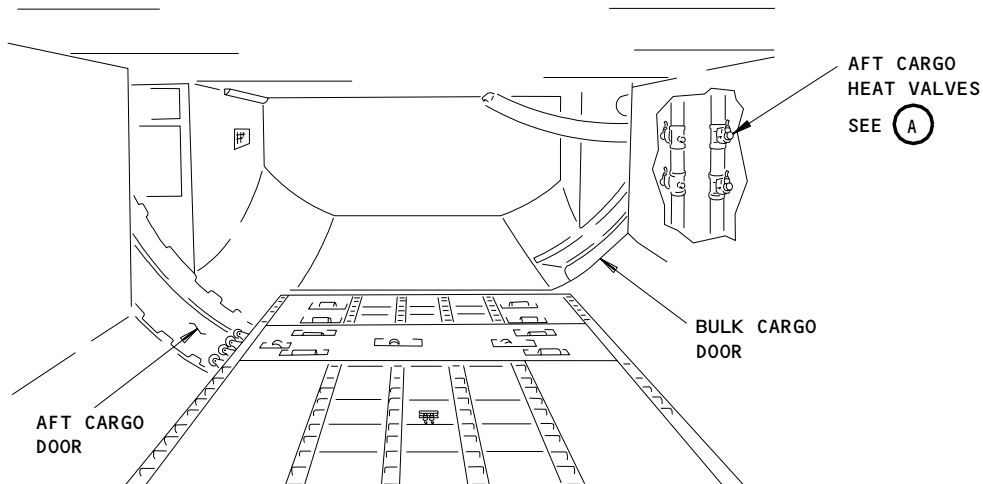
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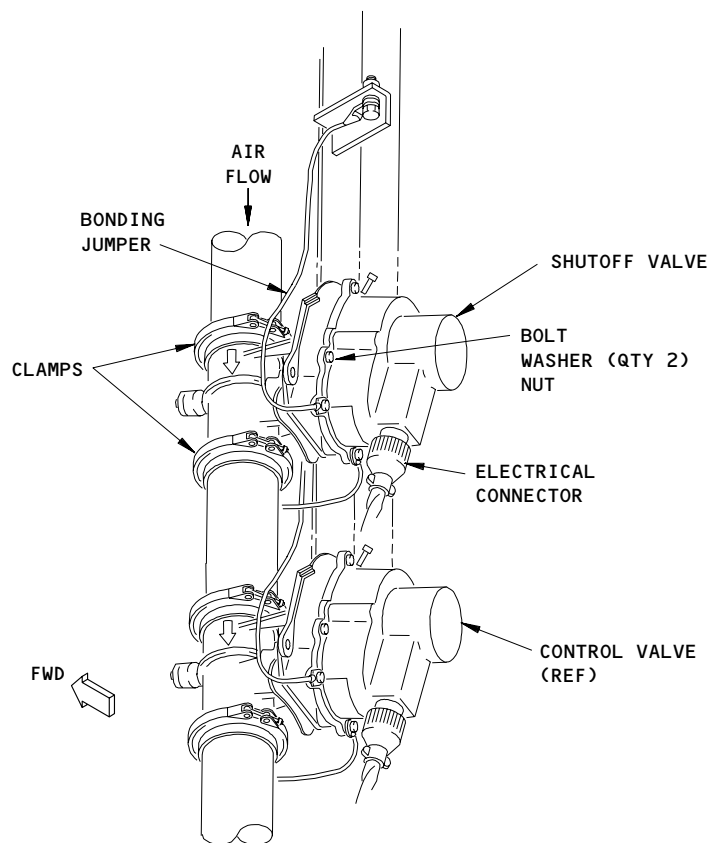
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AFT/BULK CARGO COMPARTMENT
(VIEW IN THE AFT DIRECTION)



AFT CARGO HEAT VALVES

(A)

Aft Cargo Heating Shutoff Valve Installation
Figure 401

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- (b) 11R22, AFT CARGO HEAT OVERRIDE
 - S 014-008
- (5) Open the aft cargo door 822 (AMM 52-35-00/201).
 - S 014-009
- (6) Remove the applicable cargo sidewall panel (AMM 25-52-01/401).
 - S 034-010
- (7) Disconnect the electrical connector from the valve.
 - S 034-011
- (8) Remove the bonding jumpers from the valve.
 - S 024-012
- (9) Remove the valve clamps and remove the valve from the duct.
 - S 434-013
- (10) Put a cover on the duct openings to keep out unwanted material.

TASK 21-44-01-404-014

3. Install the Aft Cargo Heat Shutoff Valve (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-52-01/401, Cargo Compartment Sidewall Panels
- (3) AMM 52-35-00/201, Aft Cargo Door

B. Access

- (1) Location Zone
 - 153 Aft Cargo Compartment, Left
- (2) Access Panel
 - 822 Aft Cargo Door

C. Procedure

- S 984-015
- (1) To manually open the valve, move the manual override to OPEN.
- S 034-016
- (2) Remove the duct covers.
- S 424-017
- (3) Put the valve in the duct so the flow arrow points to the heating control valve.

NOTE: When you put the valve in position, make sure you have sufficient clearance to install the electrical connector on the valve.

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- S 434-018
- (4) Install clamps on each side of the valve.
(a) Tighten the clamps to 50 pound-inches.
- S 434-019
- (5) Install the bolt, washers, and nut that connect the bonding jumpers to the valve.
- S 434-020
- (6) Install the electrical connector to the valve.
- S 864-021
- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
(a) 11R20, AFT CARGO HEAT CONTROL
(b) 11R22, AFT CARGO HEAT OVERRIDE
- S 704-023
- (8) Do a test of the valve.

(a) Make sure the position indicator on the heating shutoff valve moved to the CLOSE position.
(b) Examine the connections on the aft cargo heating shutoff valve for leakage.
- NOTE: Diffused leakage is permitted.
- 1) To repair jet blast type leakage, align the valve or coupling.
- S 414-024
- (9) Install the cargo sidewall panel (AMM 25-52-01/201).
- S 414-025
- (10) Close the aft cargo door 822 (AMM 52-35-00/201).
- S 864-026
- (11) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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AFT CARGO HEATING FLOW CONTROL VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the aft cargo heating flow control valve. The second task is the installation of the aft cargo heating flow control valve.
- B. The heating flow control valve is on the aft cargo heating duct. The valve is behind the left sidewall panel and 5 feet (1.5 meters) forward of the bulk cargo door. You can get access to the valve through the aft cargo compartment door.

TASK 21-44-02-004-001

2. Remove the Heating Flow Control Valve (Fig. 401)

A. References

- (1) AMM 52-35-00/201, Aft Cargo Door
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Cargo Compartment, Sidewall Lining Panels.
- (4) AMM 36-00-00/201, Pneumatic – General

B. Access

- (1) Location Zone
153 Aft Cargo Compartment, Left
- (2) Access Panel
822 Aft Cargo Door

C. Procedure

S 864-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-003

- (2) Remove pneumatic power (AMM 36-00-00/201).

S 214-004

- (3) Push the AFT CARGO HEAT switch-light on the pilot's overhead P5 panel to the off position.
 - (a) Make sure the ON light is off. Attach a DO-NOT-OPERATE tag to the switch-light.

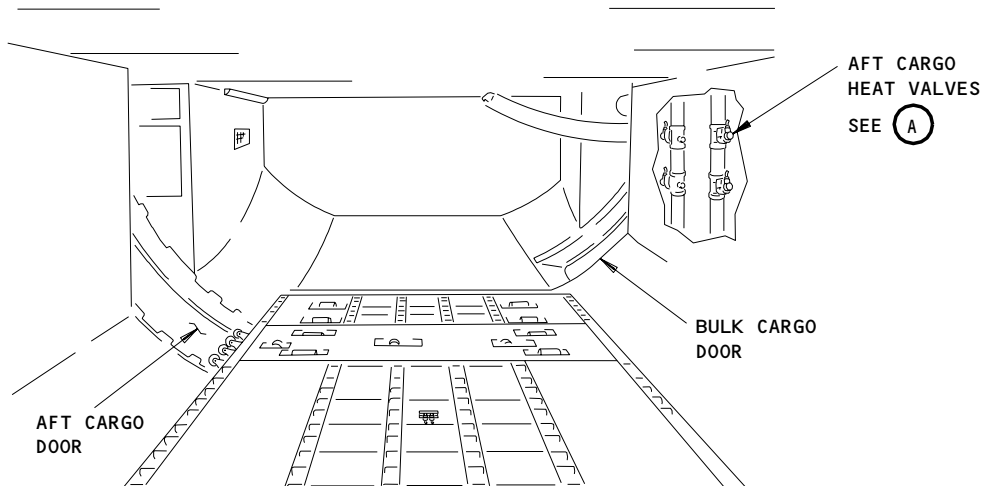
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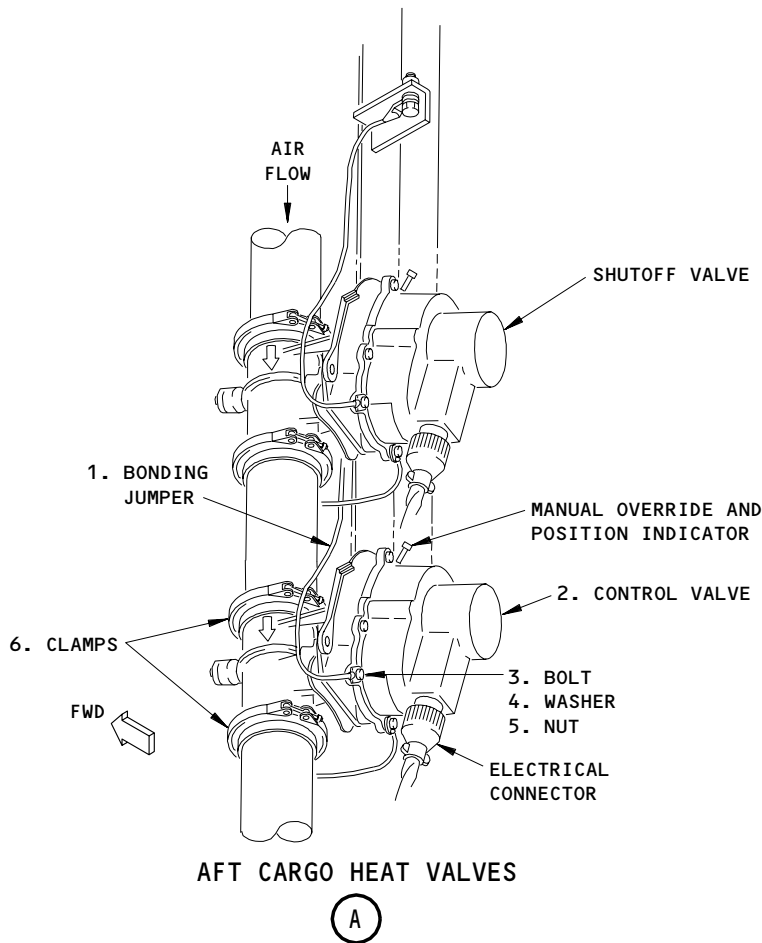
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AFT/BULK CARGO COMPARTMENT
(VIEW IN THE AFT DIRECTION)



Aft Cargo Heating Control Valve Installation
Figure 401

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- S 864-006
- (4) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11R20, AFT CARGO HEAT CONTROL
 - (b) 11R22, AFT CARGO HEAT OVERRIDE
- S 014-008
- (5) Open the aft cargo door 822 (AMM 52-35-00/201).
- S 014-009
- (6) Remove the aft cargo sidewall panel (AMM 25-52-01/401) on the left side that covers the area five feet forward of the bulk cargo door.
- S 034-010
- (7) Disconnect the electrical connector from the valve.
- S 034-011
- (8) Disconnect the bonding jumpers from the valve.
- S 024-012
- (9) Remove the clamps (6) at the two ends of the valve. Remove the valve (2).
- S 434-013
- (10) Install the duct covers on the openings to keep out unwanted material.

TASK 21-44-02-404-014

3. Install the Aft Cargo Heating Flow Control Valve (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2	Valve - Cargo Heating	21-44-01	03	80

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B. References

- (1) AMM 52-35-00/201, Aft Cargo Door
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Cargo Compartment, Sidewall Lining Panels.

C. Access

- (1) Location Zone
153 Aft Cargo Compartment, Left
- (2) Access Panel
822 Aft Cargo Door

D. Procedure

S 984-015

- (1) To manually open the valve you will install, move the manual override to OPEN.

S 034-016

- (2) Remove the duct covers.

S 424-017

- (3) Put the valve (2) in the duct and install duct clamps (6). Tighten the clamps to 50 pound-inches.

NOTE: Put the valve in position with sufficient clearance to install the electrical connector.

S 434-018

- (4) Install the bolt (3), washer (4), and nut (5) that connect the bonding jumpers to valve. Tighten.

S 434-019

- (5) Install the electrical connector to the valve.

S 864-020

- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11R20, AFT CARGO HEAT CONTROL
 - (b) 11R22, AFT CARGO HEAT OVERRIDE

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S 704-022

- (7) Do a test of the valve.
- (a) Make sure the position indicator on the heating control valve moved to the CLOSE position.
 - (b) Examine the connections on the aft cargo heating flow control valve for leakage.

NOTE: Diffused leakage is permitted.

- 1) To repair jet blast type leakage, align the valve or coupling.

S 414-023

- (8) Install the sidewall panel (AMM 25-52-01/401).

S 414-024

- (9) Close the aft cargo compartment door 822 (AMM 52-35-00/201).

S 864-025

- (10) Remove the DO-NOT-OPERATE tag from the AFT CARGO HEAT switch-light on the P5 panel.

S 864-027

- (11) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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BULK CARGO HEATING SHUTOFF VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the bulk cargo heating shutoff valve. The second task is the installation of the bulk cargo heating shutoff valve.
- B. The bulk cargo heating shutoff valve is on the bulk cargo heating duct. The valve is at STA 1365, WL 172, and LBL 75. You can get access to the valve through the aft cargo compartment door.

TASK 21-44-03-004-001

2. Remove the Bulk Cargo Heating Shutoff Valve (Fig. 401)

A. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Cargo Compartment Sidewall Panels
- (4) AMM 36-00-00/201, Pneumatic General

B. Access

- (1) Location Zone
153 Aft Cargo Compartment, Left
- (2) Access Panel
822 Aft Cargo Door

C. Procedure

S 864-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-003

- (2) Make sure pneumatic power is off (AMM 36-00-00/201).

S 214-004

- (3) Push the BULK CARGO HEAT switch-light on the pilot's overhead P5 panel to the off position.
 - (a) Make sure the ON light is off.
 - (b) Attach a DO-NOT-OPERATE tag to the switch-light.

S 864-006

- (4) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11N26, BULK CARGO HEAT CONT

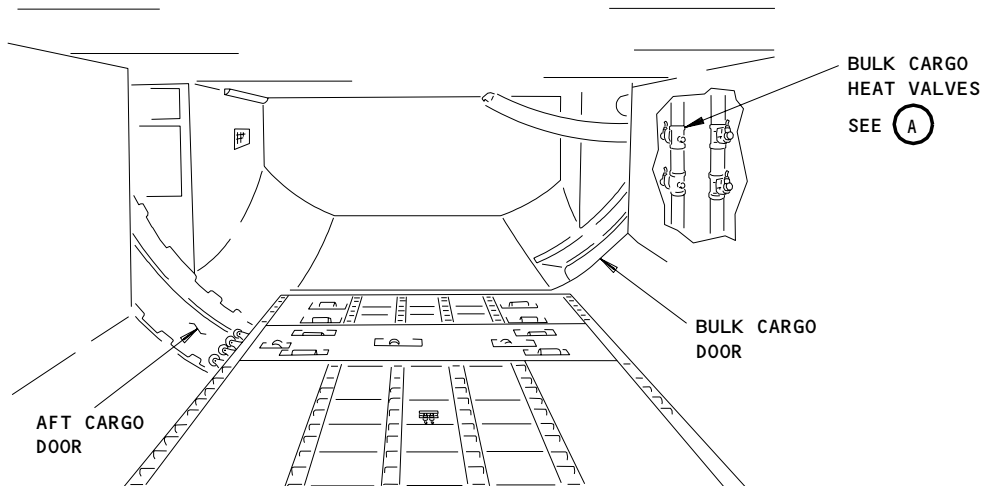
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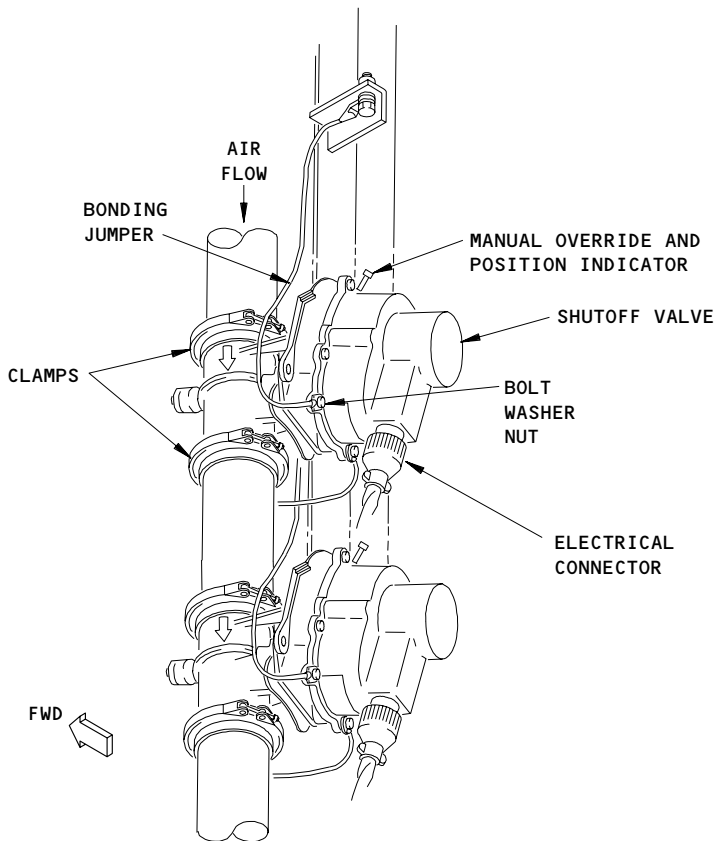
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AFT/BULK CARGO COMPARTMENT
(VIEW IN THE AFT DIRECTION)



BULK CARGO HEAT VALVES

(A)

Bulk Cargo Heating Shutoff Valve Installation
Figure 401

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(b) 11N27, BULK CARGO HEAT OVRD

S 014-007

(5) Open the aft cargo door 822 (AMM 06-46-00/201).

S 014-008

(6) Remove the cargo compartment sidewall panel (AMM 25-52-01/401) on the left side that is over the area four and one-half feet forward of the bulk cargo door.

S 034-009

(7) Disconnect the electrical connector from the valve.

S 034-010

(8) Disconnect the bonding jumpers from the valve.

S 024-011

(9) Remove the duct clamps on the two sides of the valve. Remove the valve.

S 434-012

(10) Put covers on the duct openings to keep out unwanted material.

TASK 21-44-03-404-013

3. Install the Bulk Cargo Heating Shutoff Valve (Fig. 401)

A. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Cargo Compartment Sidewall Panels

B. Access

- (1) Location Zone
153 Aft Cargo Compartment, Left
- (2) Access Panel
822 Aft Cargo Door

C. Procedure

S 984-014

(1) To manually open the valve you will install, move the manual override to OPEN.

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S 034-015

- (2) Remove the duct covers.

S 424-016

- (3) Put the open valve in the duct so the flow arrow points to the heating control valve.

NOTE: When you put the valve in position, make sure you have sufficient clearance to install the electrical connector.

- (a) Install the clamps at the two ends of the valve.
(b) Tighten the clamps to 50 pound-inches.

S 434-017

- (4) Install the bolt, washer, and nut that connect the bonding jumpers to the valve. Tighten the nut.

S 434-018

- (5) Install the electrical connector to the valve.

S 864-019

- (6) Remove the DO-NOT-CLOSE tag and close these circuit breakers on the P11 panel:
(a) 11N26, BULK CARGO HEAT CONT
(b) 11N27, BULK CARGO HEAT OVRD

S 704-020

- (7) Do a test of the valve.
(a) Make sure the visual position indicator on the heating shutoff valve moved to the CLOSE position.
(b) Examine the connections on the bulk cargo heat shutoff valve for leakage.

NOTE: Diffused leakage is permitted.

- 1) To repair jet blast type leakage, align the valve or coupling.

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- S 414-021
(8) Install the compartment sidewall panel (AMM 25-52-01/401).
- S 414-024
(9) Close the aft cargo door 822 (AMM 06-46-00/201).
- S 864-022
(10) Remove the DO-NOT-OPERATE tag from the BULK CARGO HEAT switch-light on the P5 panel.
- S 864-025
(11) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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BULK CARGO HEAT FLOW CONTROL VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal of the bulk cargo heat flow control valve. The second task is the installation of the bulk cargo heat flow control valve.
- B. The bulk cargo heat flow control valve is on the bulk cargo heating duct. The valve is downstream of the bulk cargo heating shutoff valve. You can get access to the valve through the aft cargo compartment door.

TASK 21-44-04-004-001

2. Remove the Bulk Cargo Heat Flow Control Valve (Fig. 401).

A. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Cargo Compartment Sidewall Panels
- (4) AMM 36-00-00/201, Pneumatic – General

B. Access

- (1) Location Zone
153 Aft Cargo Compartment, Left
- (2) Access Panel
822 Aft Cargo Door

C. Procedure

- S 864-002
- (1) Supply electrical power (AMM 24-22-00/201).
- S 864-003
- (2) Remove pneumatic power (AMM 36-00-00/201).
- S 214-004
- (3) Push the BULK CARGO HEAT switch-light on the pilot's overhead P5 panel to the off position.
 - (a) Make sure the ON light is off.
 - (b) Attach a DO-NOT-OPERATE tag to the switch-light.
- S 864-006
- (4) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11N26, BULK CARGO HEAT CONT

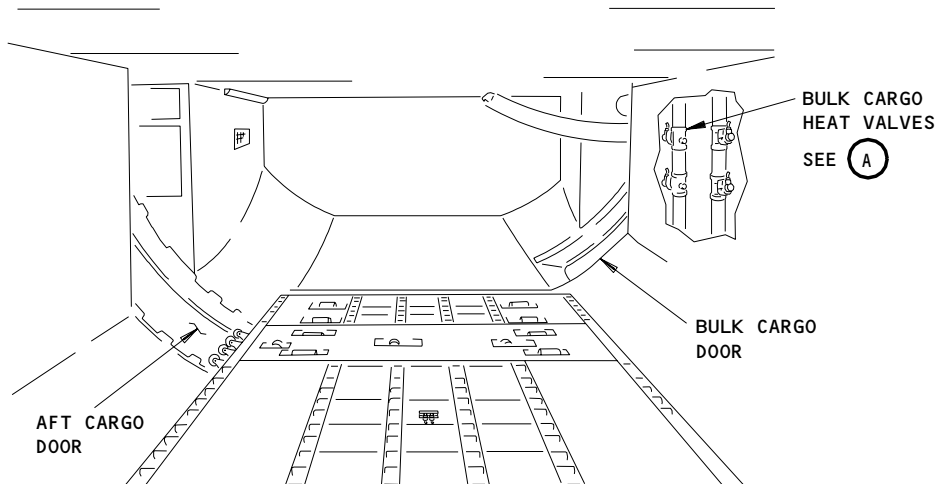
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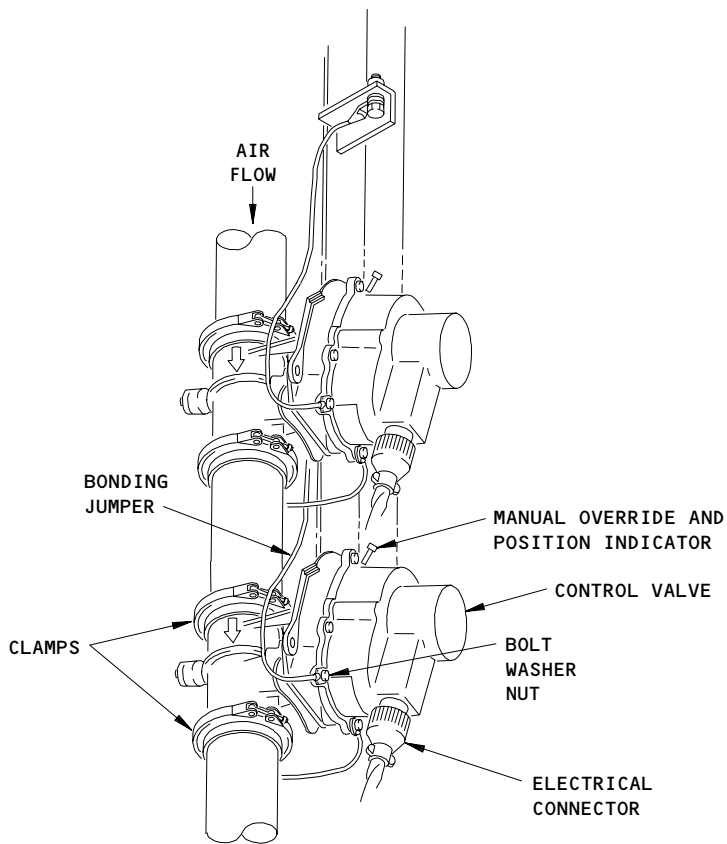
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**AFT/BULK CARGO COMPARTMENT
(VIEW IN THE AFT DIRECTION)**



BULK CARGO HEAT VALVES

(A)

**Bulk Cargo Heating Control Valve Installation
Figure 401**

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(b) 11N27, BULK CARGO HEAT OVRD

S 014-007

(5) Open the aft cargo door 822 (AMM 06-46-00/201).

S 014-026

(6) Remove the cargo compartment sidewall panel (AMM 25-52-01/401) on the left side that is over the area four and one-half feet forward of the bulk cargo door.

S 034-009

(7) Disconnect the electrical connector from the valve.

S 034-010

(8) Disconnect the bonding jumpers from the valve.

S 024-011

(9) Remove the duct clamps on the two sides of the valve. Remove the valve.

S 434-012

(10) Put covers on the duct openings to keep out unwanted objects.

TASK 21-44-04-404-013

3. Install the Bulk Cargo Heat Flow Control Valve (Fig. 401)

A. References

- (1) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Cargo Compartment Sidewall Panels

B. Access

- (1) Location Zone
153 Aft Cargo Compartment, Left
- (2) Access Panel
822 Aft Cargo Door

C. Procedure

S 984-014

(1) To manually open the valve you will install, move the manual override to OPEN.

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S 034-015

- (2) Remove the duct covers.

S 424-016

- (3) Put the open valve in duct so the flow arrow points down.

NOTE: When you put the valve in position, make sure you have sufficient clearance to install the electrical connector.

(a) Install duct clamps at both ends of valve.

(b) Tighten the clamps to 50 pound-inches.

S 434-017

- (4) Install the bolt, washer, and nut that connect the bonding jumpers to valve.

(a) Tighten the nut.

S 434-018

- (5) Install the electrical connector to the valve.

S 864-019

- (6) Remove DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:

(a) 11N26, BULK CARGO HEAT CONT

(b) 11N27, BULK CARGO HEAT OVRD

S 704-020

- (7) Do a test of the valve.

(a) Make sure the position indicator on the heat flow control valve moved to the CLOSE position.

(b) Examine the connections on the heat flow control valve for leakage.

NOTE: Diffused leakage is permitted.

1) To repair jet blast type leakage, align the valve or coupling.

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- S 414-021
(8) Install the cargo compartment sidewall panel (AMM 25-52-01/401).
- S 414-024
(9) Close the aft cargo door 822 (AMM 06-46-00/201).
- S 864-022
(10) Remove the DO-NOT-OPERATE tag from the BULK CARGO HEAT switch-light on the P5 panel.
- S 864-025
(11) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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AFT CARGO TEMPERATURE SWITCHES - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
- (1) Aft Cargo Temperature Switch Removal
 - (2) Aft Cargo Temperature Switch Cleaning
 - (3) Aft Cargo Temperature Switch Installation
- B. Two temperature switches are installed below the floor in the aft cargo compartment just forward of the cargo door opening and near the centerline of the compartment. This procedure has removal/installation instructions for these temperature switches:
- (1) Overheat Temperature switch, S64
 - (2) Control Temperature switch, S75

TASK 21-44-05-004-001

2. Aft Cargo Temperature Switch Removal (Fig. 401)

A. Access

- (1) Location Zones
 - 155 Area Below Aft Cargo Compartment (Left)
 - 156 Area Below Aft Cargo Compartment (Right)

- (2) Access Panels
 - 822 Aft Cargo Door

B. Prepare for Removal

S 864-002

- (1) Make sure the AFT CARGO HEAT switch is set to the off position, on the Cargo Heat control panel (M29, P5 panel), and attach a DO-NOT-OPERATE tag.

S 864-003

- (2) Open this circuit breaker, on the Pilots' overhead circuit breaker panel (P11), and attach a DO-NOT-CLOSE tag:
 - (a) 11R20, CARGO HEAT AFT CONT

S 014-004

- (3) Open the aft cargo compartment door, 822.

S 014-019

- (4) AIRPLANES WITH CARGO FLOOR PANELS;
To get access to the temperature switches under the floor, remove the floor panel(s) just forward of the cargo door opening near the centerline of the aft cargo compartment.

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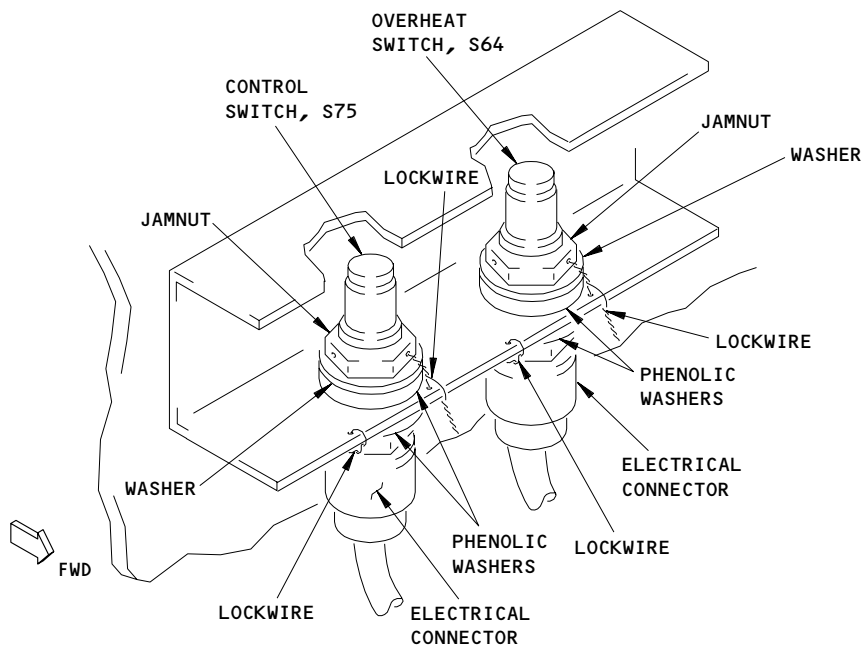
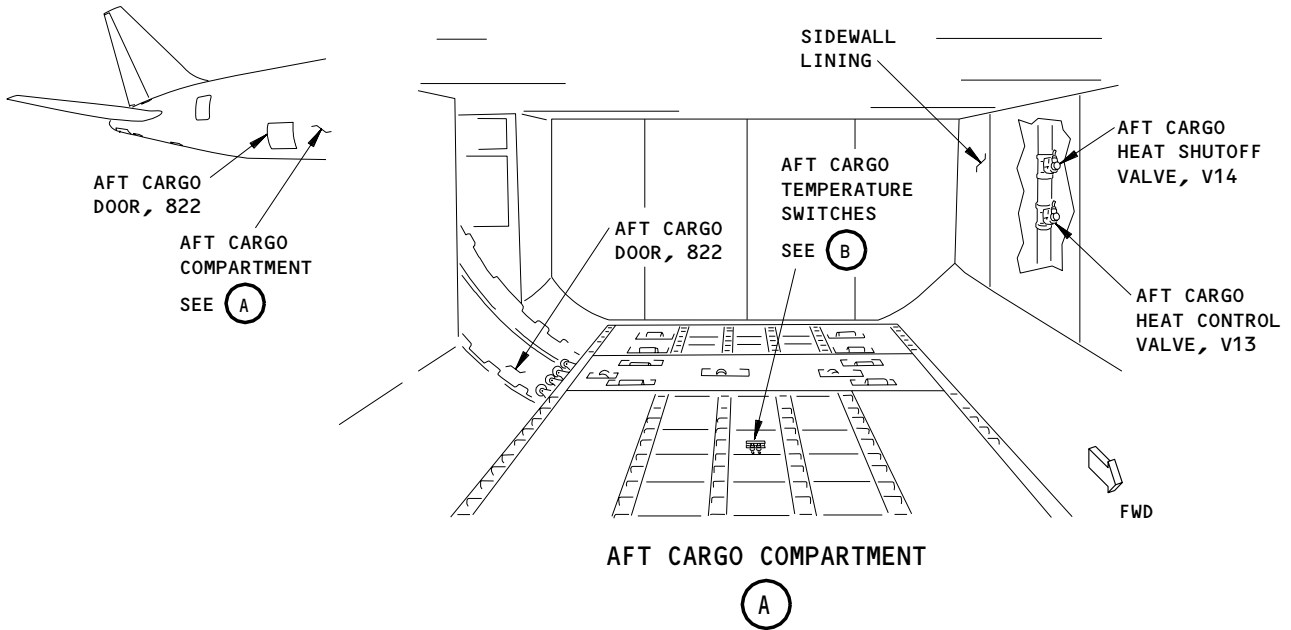
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AFT CARGO TEMPERATURE SWITCHES
(WITH TWO PHENOLIC WASHERS)

(B)

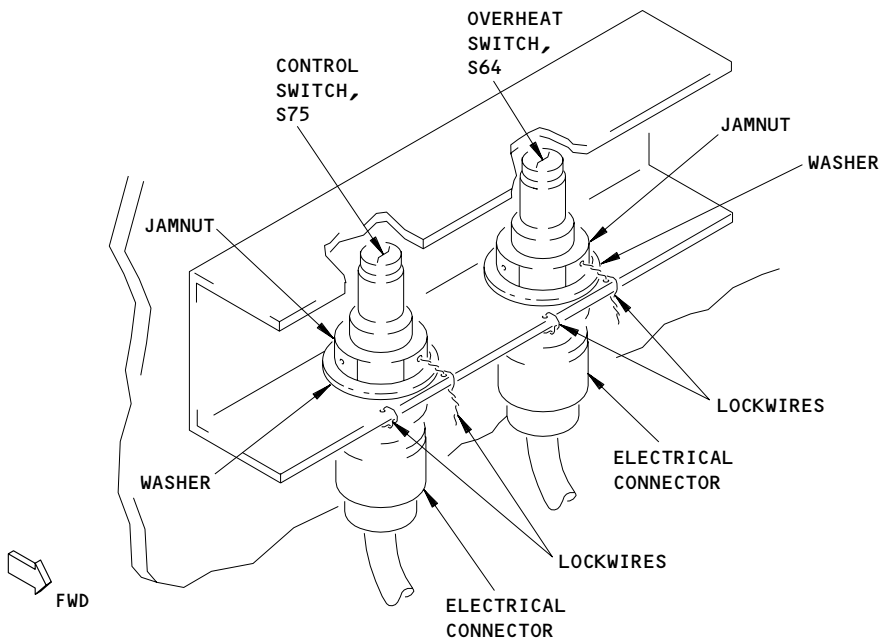
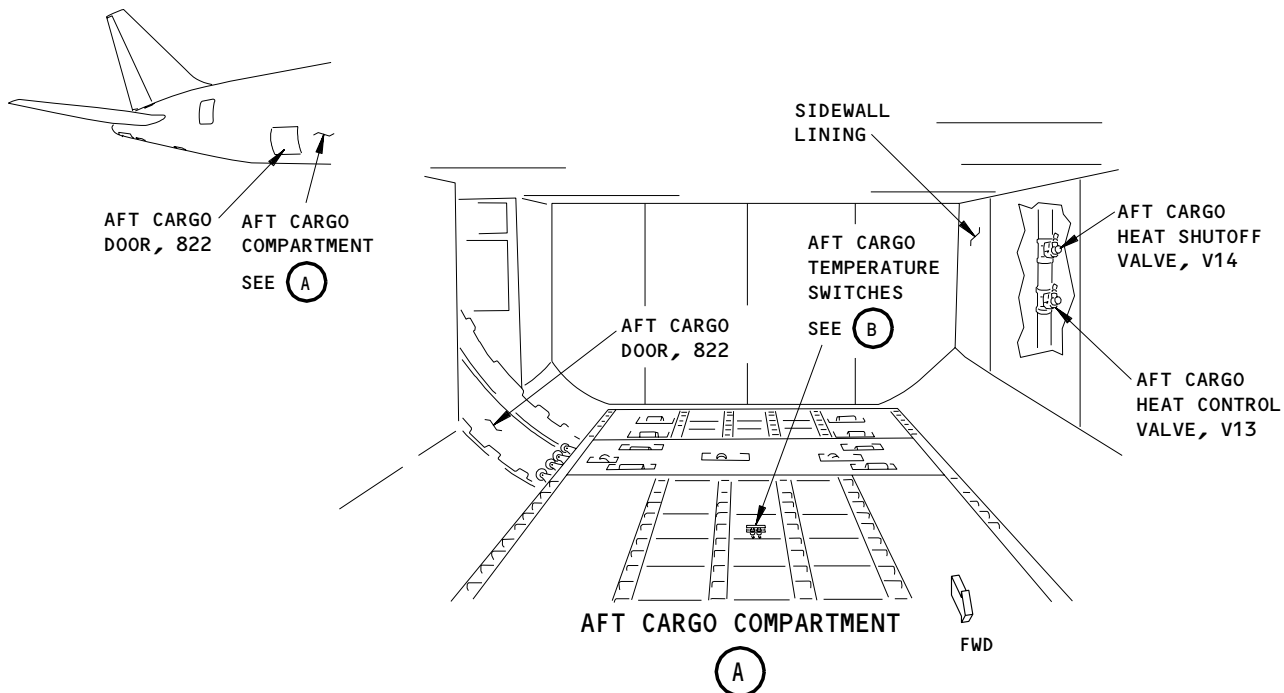
Aft Cargo Compartment Temperature Switch Installation
Figure 401

EFFECTIVITY
TEMPERATURE SWITCHES WITH
PHENOLIC WASHERS

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AFT CARGO TEMPERATURE SWITCHES
(WITH SINGLE ALUMINUM WASHER)

(B)

Aft Cargo Compartment Temperature Switch Installation
Figure 401A

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TEMPERATURE SWITCHES WITH SINGLE
ALUMINUM WASHER (NO PHENOLIC WASHERS)

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C. Temperature Switch Removal

S 024-005

- (1) Disconnect the electrical connector at the bottom of the switch.

S 024-016

- (2) Remove the lockwires from the switch.

S 024-006

- (3) Remove the jamnut that holds the switch to the bracket.

S 024-017

- (4) Remove the washer(s).

S 024-007

- (5) Remove the switch.

TASK 21-44-05-104-040

3. Clean the Temperature Switch (Fig. 401)

A. Standard Tools and Equipment

- (1) Soft bristle brush

B. Consumable Materials

- (1) B00541 - Detergent (AMM 20-30-02/201)

- (2) B00130 - Isopropyl Alcohol

- (3) Clean and dry cheesecloth or cotton cloths and lint-free tissue

C. Clean the Switch

S 114-041

- (1) Do these steps to clean the temperature switch:
- (a) If necessary, a soft bristle brush may be used to clean the surface of the temperature switch.
 - (b) Wipe the switch with a clean, lint-free cloth that is moist with isopropyl alcohol or similar cleaning fluid.
 - (c) Rinse the cleaning fluid from the temperature sensor with a clean, lint-free cloth that is moist with water and mild detergent.

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(d) Dry the temperature sensor with a dry clean, lint-free cloth.

TASK 21-44-05-404-013

4. Aft Cargo Temperature Switch Installation (Fig. 401)

A. Equipment

- (1) Cooling source - Ice pack or Quick-Freeze spray
- (2) Heating source - Hand-held heat gun

B. References

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings

C. Access

(1) Location Zones

- 155 Area Below Aft Cargo Compartment (Left)
- 156 Area Below Aft Cargo Compartment (Right)

(2) Access Panels

- 822 Aft Cargo Door

D. Temperature Switch Installation

S 424-036

(1) TEMPERATURE SWITCH WITH ALUMINUM WASHER (NO PHENOLIC WASHERS);

Install the temperature switch as follows:

- (a) Install the aluminum washer and temperature switch as shown in Figure 401A so that its' electrical connector plug points down.
- (b) Install the jamnut and tighten to 15-20 inch-pounds.
- (c) Install new lockwires to the temperature switch (AMM 20-10-23/401).
- (d) Connect the electrical connector to the temperature switch.

S 424-037

(2) TEMPERATURE SWITCH WITH TWO PHENOLIC WASHERS;

Install the temperature switch as follows:

- (a) Install the two phenolic washers, aluminum washer and temperature switch as shown in Figure 401 so that its' electrical connector plug points down.
- (b) Install the jamnut and tighten to 15-20 inch-pounds.
- (c) Install new lockwires to the temperature switch (AMM 20-10-23/401).
- (d) Connect the electrical connector.

E. Temperature Switch Post-Installation Test

S 864-028

(1) Close this circuit breaker, on the Pilots' overhead circuit breaker panel (P11), and remove the DO-NOT-CLOSE tag:

- (a) 11R20, CARGO HEAT AFT CONT

S 864-020

(2) Supply electrical power (AMM 24-22-00/201).

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- S 014-021
- (3) Remove the left sidewall lining across from the aft cargo door to get access to the aft cargo heat valves (AMM 25-52-01/401).
- S 724-026
- (4) Do this test if you replaced the control temperature switch, S75:
- (a) Push the AFT CARGO HEAT switch to the ON position, on the Cargo Heat control panel (M29, P5 panel).
 - (b) Apply a cooling source to control temperature switch until it's temperature decreases to less than 40°F (4°C).
 - 1) Make sure the visual position indicator on the aft cargo heat control valve, V13, moves to the OPEN position.
 - (c) Apply a heating source to the control temperature switch until it's temperature increases to more than 50°F (10°C).
 - 1) Make sure the visual position indicator on the aft cargo heat control valve, V13, moves to the CLOSE position.
- S 724-027
- (5) Do this test if you replaced the overheat temperature switch, S64:
- (a) Push the AFT CARGO HEAT switch to the ON position, on the Cargo Heat control panel (M29, P5 panel).
 - (b) Apply a heating source to the overheat temperature switch until it's temperature increases to more than 90°F (32°C).
 - 1) Make sure the visual position indicator on the aft cargo heat shutoff valve, V14, moves to the CLOSE position.
 - (c) Apply a cooling source to the overheat temperature switch until it's temperature decreases to less than 80°F (27°C).
 - 1) Make sure the visual position indicator on the aft cargo heat shutoff valve, V14, moves to the OPEN position.
- F. Put the Airplane Back to Its Usual Condition
- S 864-025
- (1) Push the AFT CARGO HEAT switch to the off position.
- S 414-022
- (2) AIRPLANES WITH CARGO FLOOR PANELS;
Install the floor panel(s) that you removed to get access to the temperature switches.
- S 414-023
- (3) Install the left sidewall lining that you removed to get access to the aft cargo heat valves (AMM 25-52-01/401).
- S 414-012
- (4) Close the aft cargo compartment door, 822.
- S 864-024
- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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BULK CARGO TEMPERATURE SWITCHES – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Bulk Cargo Temperature Switch Removal
 - (2) Bulk Cargo Temperature Switch Cleaning
 - (3) Bulk Cargo Temperature Switch Installation
- B. This procedure has removal/installation instructions for these temperature switches that are installed in a temperature sensor box behind the right sidewall lining in the bulk cargo compartment:
 - (1) Low Heat Temperature switch, S498
 - (2) High Heat Temperature switch, S499
 - (3) Overheat Temperature switch, S500

TASK 21-44-06-004-096

2. Bulk Cargo Temperature Switch Removal (Fig. 401)

- A. References
 - (1) AMM 25-55-01/401, Bulk Cargo Compartment Sidewall Lining
- B. Access
 - (1) Location Zones
 - 162 Bulk Cargo Compartment (Right)
 - (2) Access Panels
 - 811 Bulk Cargo Door

C. Prepare for Removal

- S 864-001
 - (1) Make sure the BULK CARGO HEAT switch is set to the off position, on the Cargo Heat control panel (M29, P5 panel), and attach a DO-NOT-OPERATE tag.
- S 864-002
 - (2) Open this circuit breaker and attach a DO-NOT-CLOSE tag:
 - (a) Pilots' Overhead Circuit Breaker Panel, P11
 - 1) 11N26, BULK CARGO HEAT CONT
- S 014-003
 - (3) Open the bulk cargo compartment door, 811.
- S 214-075
 - (4) Find the temperature sensor box on the right sidewall in the bulk cargo compartment (look for an air grille).
- S 014-005
 - (5) Remove the right sidewall lining (AMM 25-55-01/401).

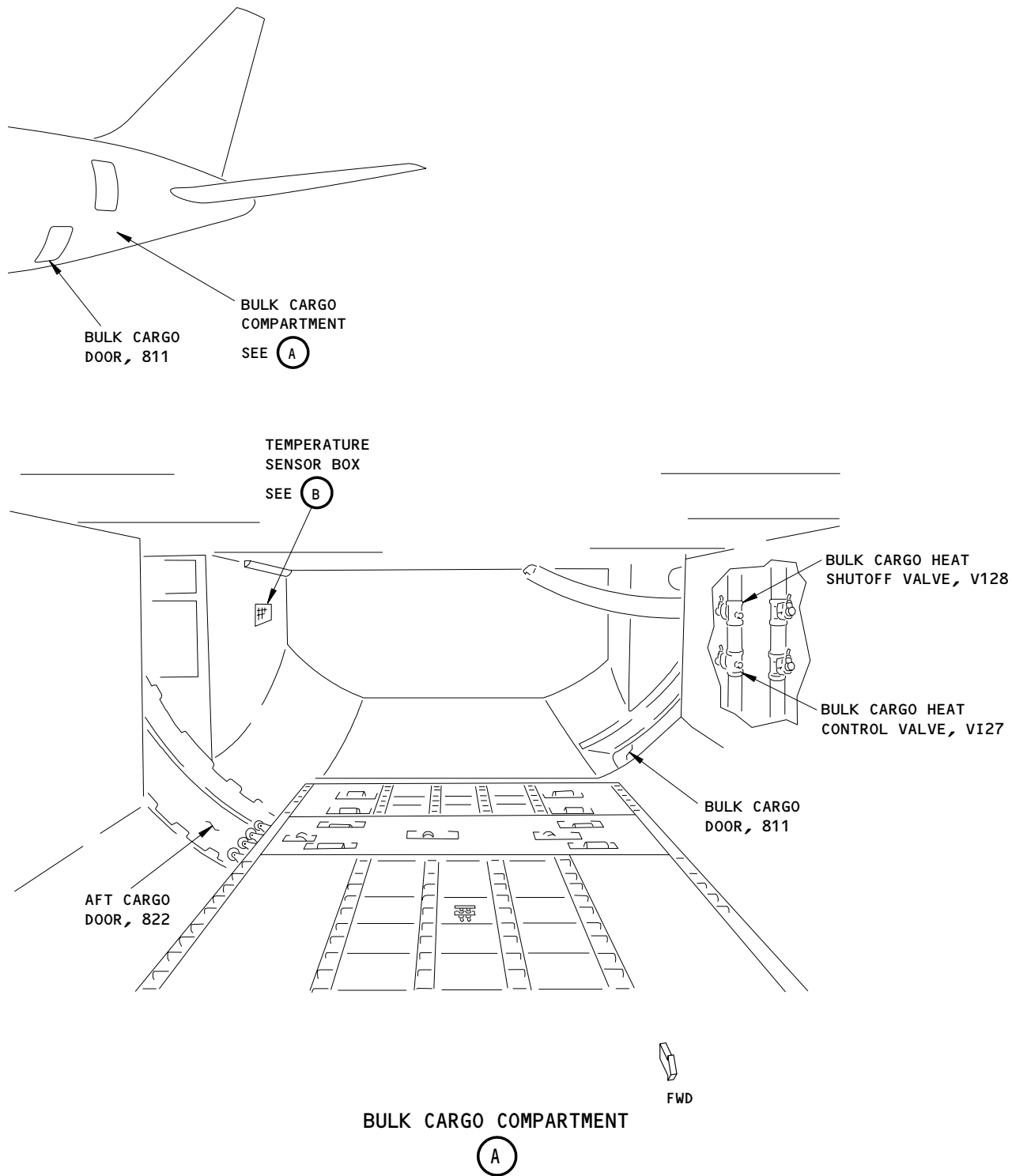
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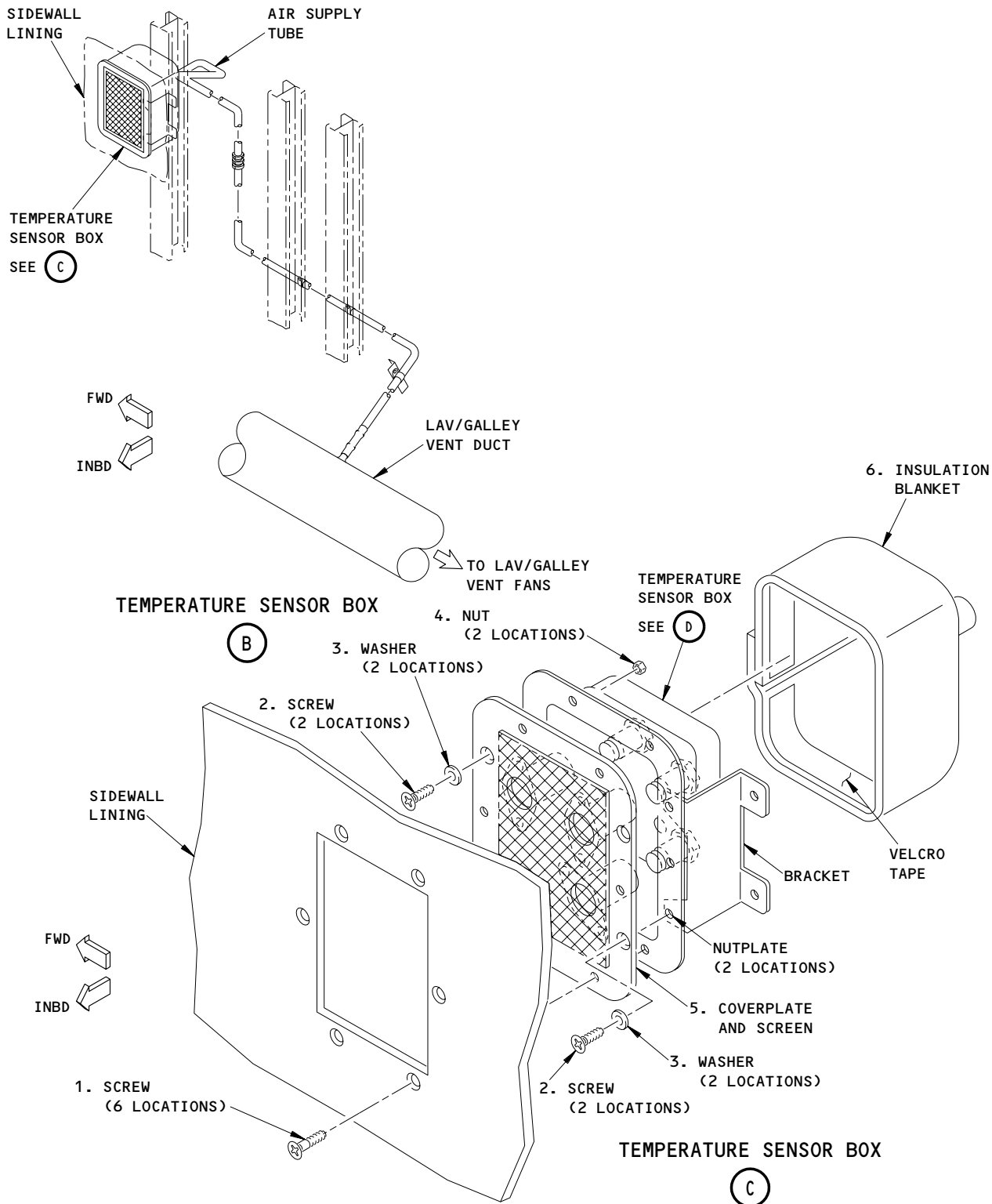
Bulk Cargo Compartment Temperature Switch Installation
Figure 401 (Sheet 1)

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Bulk Cargo Compartment Temperature Switch Installation
Figure 401 (Sheet 2)

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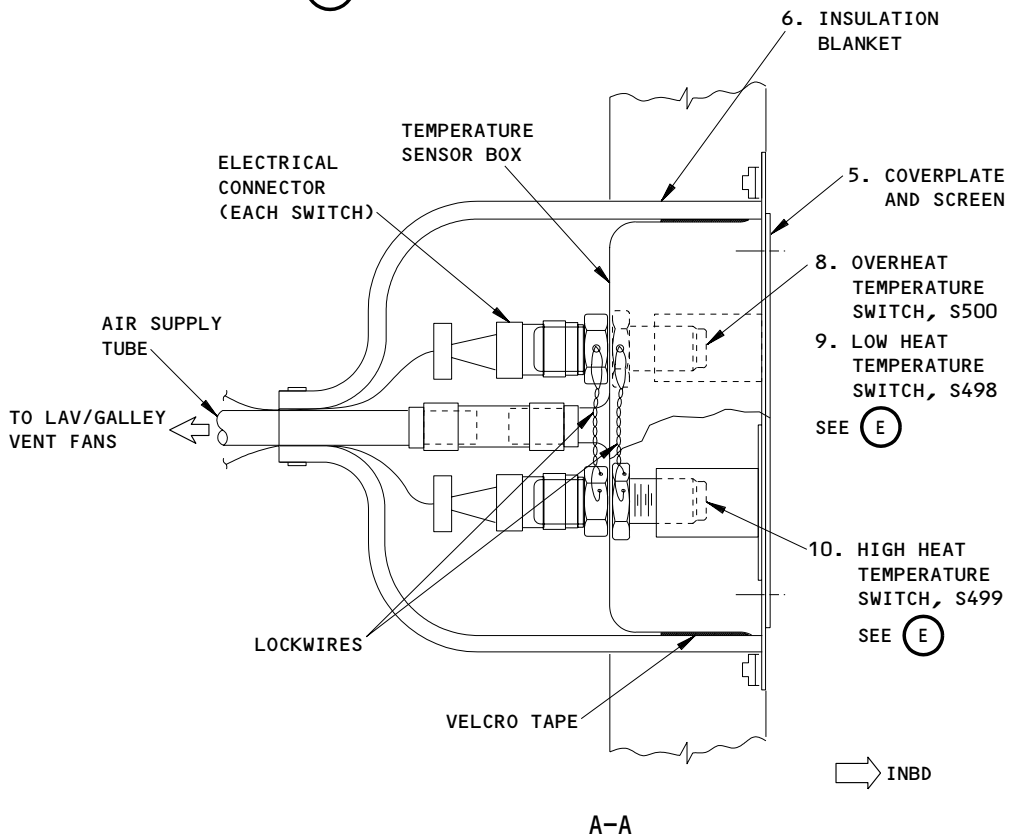
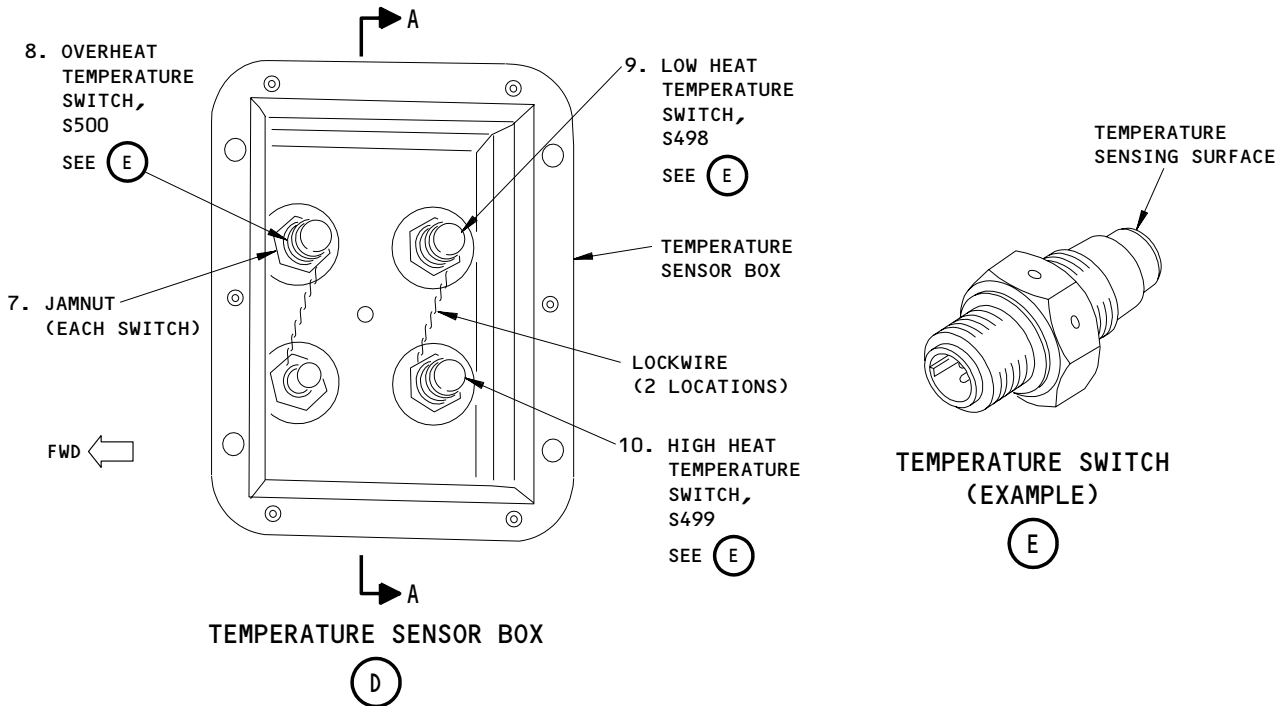
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Bulk Cargo Compartment Temperature Switch Installation
Figure 401 (Sheet 3)

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D. Temperature Switch Removal

S 014-006

- (1) Remove the insulation blanket from the backside of the temperature sensor box.

S 024-007

- (2) Disconnect the electrical connector from the temperature switch.

S 024-008

- (3) Remove the lockwire from the temperature switch at the backside of the temperature sensor box.

S 024-009

- (4) Remove the air inlet grille from the frontside of the temperature sensor box.

S 024-010

- (5) Remove the lockwire from the temperature switch inside the temperature sensor box.

S 024-011

- (6) Remove the jamnut from the temperature switch inside the temperature sensor box.

S 024-012

- (7) Remove the temperature switch from the temperature sensor box.

TASK 21-44-06-104-105

3. Clean the Temperature Switch (Fig. 401)

A. Standard Tools and Equipment

- (1) Soft bristle brush

B. Consumable Materials

- (1) B00541 - Detergent (AMM 20-30-02/201)
- (2) B00130 - Isopropyl Alcohol
- (3) Clean and dry cheesecloth or cotton cloths and lint-free tissue

C. Clean the Switch

S 114-106

- (1) Do these steps to clean the temperature switch:
 - (a) If necessary, a soft bristle brush may be used to clean the surface of the temperature switch.
 - (b) Wipe the switch with a clean, lint-free cloth that is moist with isopropyl alcohol or similar cleaning fluid.
 - (c) Rinse the cleaning fluid from the temperature sensor with a clean, lint-free cloth that is moist with water and mild detergent.
 - (d) Dry the temperature sensor with a dry clean, lint-free cloth.

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TASK 21-44-06-404-097

4. Bulk Cargo Temperature Switch Installation (Fig. 401)

A. Equipment

- (1) Cooling source - Ice pack or Quick-Freeze spray
- (2) Heating source - Hand-held Heat gun

B. References

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (4) AMM 25-55-01/401, Bulk Cargo Compartment Sidewall Lining

C. Access

(1) Location Zones

- 153 Aft Cargo Compartment (Left)
- 162 Bulk Cargo Compartment (Right)

(2) Access Panels

- 811 Bulk Cargo Door
- 822 Aft Cargo Door

D. Temperature Switch Installation

S 424-014

- (1) Install the temperature switch into the temperature sensor box.

S 424-016

- (2) Install the jamnut on the temperature switch inside the temperature sensor box.

S 424-017

- (3) Install a new lockwire to the temperature switch inside the temperature sensor box (AMM 20-10-23/401).

S 424-018

- (4) Install the air inlet grille on the frontside of the temperature sensor box.

S 424-019

- (5) Install a new lockwire to the temperature switch on the backside of the temperature sensor box (AMM 20-10-23/401).

S 424-020

- (6) Connect the electrical connector to the temperature switch.

S 214-076

- (7) Make sure the air supply tube from the lavatory/galley ventilation duct is connected to the backside of the temperature sensor box and is not damaged.

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S 424-021

- (8) Install the insulation blanket around the backside of the temperature sensor box.
 - (a) Make sure the velcro tape holds the insulation blanket securely around the backside of the temperature sensor box.
 - (b) Make sure you wrap the insulation blanket around the air supply tube and wire bundles and secure it with a plastic strap.

E. Temperature Switch Post-Installation Test

S 864-050

- (1) Close this circuit breaker and remove the DO-NOT-CLOSE tag:
 - (a) Pilots' Overhead Circuit Breaker Panel, P11
 - 1) 11N26, BULK CARGO HEAT CONT

S 864-024

- (2) Supply electrical power (AMM 24-22-00/201).
 - (a) Make sure that the lavatory/galley ventilation fan begins to operate and that you can feel air flow through the temperature sensor box.

S 014-079

- (3) Open the aft cargo compartment door, 822.

S 014-080

- (4) Remove the left sidewall lining across from the aft cargo door to get access to the bulk cargo heat valves (AMM 25-52-01/401).

S 714-025

- (5) Do this test if you replaced the low heat temperature switch, S498:
 - (a) Push the BULK CARGO HEAT switch, on the Cargo Heat control panel (M29, P5 panel), to the ON position.
 - (b) Set the BULK CARGO HEAT selector, on the Cargo Heat/Vent Mode control panel (M912, P61 panel), to the NORM position.
 - (c) FOR LOW HEAT SWITCH P/N 3000-46-14 (POST-SB 21-38, PRR B11235); Apply a cooling source to the low heat temperature switch until it's temperature decreases to less than 40°F (4°C).
 - 1) Make sure the visual position indicator on the bulk cargo heat control valve, V127, moves to the OPEN position.
 - (d) FOR LOW HEAT SWITCH P/N 3000-46-14 (POST-SB 21-38, PRR B11235); Apply a heating source to the low heat temperature switch until it's temperature increases to more than 50°F (10°C).
 - 1) Make sure the visual position indicator on the bulk cargo heat control valve, V127, moves to the CLOSE position.

S 714-026

- (6) Do this test if you replaced the high heat temperature switch, S499:
 - (a) Push the BULK CARGO HEAT switch, on the Cargo Heat control panel (M29, P5 panel), to the ON position.
 - (b) Set the BULK CARGO HEAT selector, on the Cargo Heat/Vent Mode control panel (M912, P61 panel), to the VENT position.

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- (c) Apply a cooling source to the high heat temperature switch until it's temperature decreases to less than 65°F (18°C).
 - 1) Make sure the visual position indicator on the bulk cargo heat control valve, V127, moves to the OPEN position.
- (d) Apply a heating source to the high heat temperature switch until it's temperature increases to more than 75°F (24°C).
 - 1) Make sure the visual position indicator on the bulk cargo heat control valve, V127, moves to the CLOSE position.

S 714-027

- (7) Do this test if you replaced the overheat temperature switch, S500:
 - (a) Push the BULK CARGO HEAT switch, on the Cargo Heat control panel (M29, P5 panel), to the ON position.
 - (b) Apply a heating source to the overheat temperature switch until it's temperature increases to more than 90°F (32°C).
 - 1) Make sure the visual position indicator on the bulk cargo heat shutoff valve, V128, moves to the CLOSE position.
 - (c) Apply a cooling source to overheat temperature switch until it's temperature decreases to less than 80°F (27°C).
 - 1) Make sure the visual position indicator on the bulk cargo heat shutoff valve, V128, moves to the OPEN position.

F. Put the Airplane Back to Its Usual Condition

S 864-078

- (1) Push the BULK CARGO HEAT switch to the off position.

S 414-081

- (2) Install the left sidewall lining that you removed to get access to the bulk cargo heat valves in the aft cargo compartment (AMM 25-52-01/401).

S 414-082

- (3) Close the aft cargo compartment door, 822.

S 414-077

- (4) Install the right sidewall lining in the bulk cargo compartment (AMM 25-55-01/401).

S 414-029

- (5) Close the bulk cargo compartment door, 811.

S 864-031

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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SUPPLEMENTAL HEATING SYSTEMS – DESCRIPTION AND OPERATION

1. General

- A. The following supplemental heating systems supply additional heating in the flight compartment and main cabin areas. For description and operation information of these heating systems, please refer to the referenced AMM sections:
- (1) Flight Compartment Supplemental Heating System (AMM 21-45-10/001)
 - (2) Forward Door Area Supplemental Heating System (AMM 21-45-20/001)
 - (3) Aft Door Area Supplemental Heating System (AMM 21-45-50/001)
 - (4) Overwing Escape Hatch Supplemental Heating System (AMM 21-45-60/001)

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FLIGHT COMPARTMENT SUPPLEMENTAL HEATING SYSTEM –
DESCRIPTION AND OPERATION

1. General

- A. The flight compartment supplemental heating system consists of two separately controlled heating systems for both the Captain and the First Officer:
 - (1) A footrest heating system
 - (2) A shoulder heating system
- B. The footrest heating system consists of canister-type heaters installed in the flight compartment air distribution ducts to supply warm air to the captain and first officer's footrest areas. The warm air from the heater heats the surface of the two footrests which are on the floor just forward of the captain and first officer's seats. The heaters are located below the flight compartment floor just forward of the nose landing gear wheel well and against the aft side of the forward bulkhead.
- C. The shoulder heating system consists of canister-type heaters installed in the flight compartment air distribution ducts to supply warm air to the captain and first officer's outboard shoulder areas. The warm air from the heaters flow out of sidewall air outlets outboard of the captain and first officer seats. The heaters are located below the flight compartment floor outboard of the nose landing gear wheel well along the left and right sidewalls.
- D. Each footrest and shoulder heating system is controlled from a Heater Control panel, M901 and M902 (P13 and P14 panel) which is installed outboard of the captain and first officer's seat. The Heater Control panel has three settings, OFF/LOW/HI.

2. Component Details (Fig. 1)

- A. Foot Heater
 - (1) Two canister-type foot heaters are installed below the floor of the flight compartment against the forward bulkhead just forward of the nose landing gear wheel well. Each heater is connected in-line with the conditioned air distribution ducts that supply air to the flight compartment.
 - (2) Each foot heater operates on 115/200VAC power and generates approximately 89+/-10 watts and 270+/-30 watts of energy with the FOOT HEATER switch set to LOW and HI, respectively. Each foot heater has a single heater element with two thermostats for overheat protection. The control thermostat will open when the heater outlet temperature is more than 145-degrees F (63-degrees C). If the control thermostat fails to open, the backup thermostat will then open when the heater outlet temperature is more than 250-degrees F (121-degrees C).

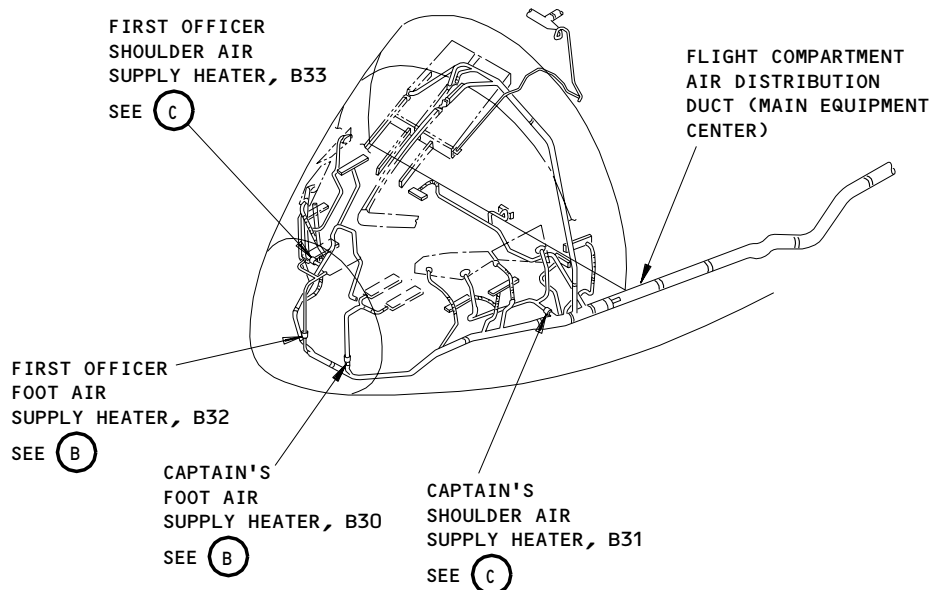
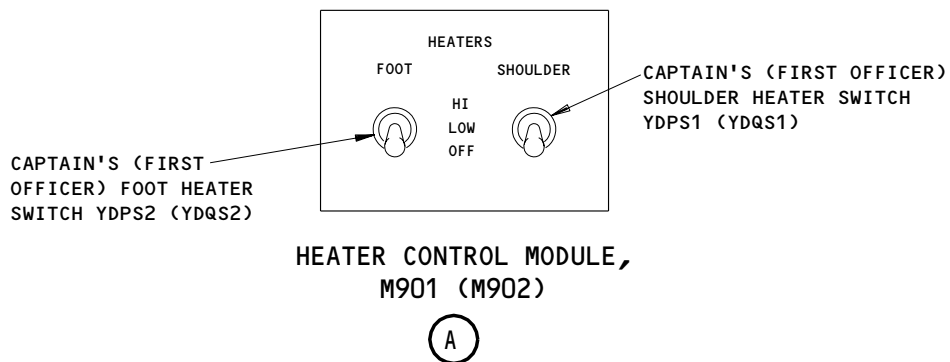
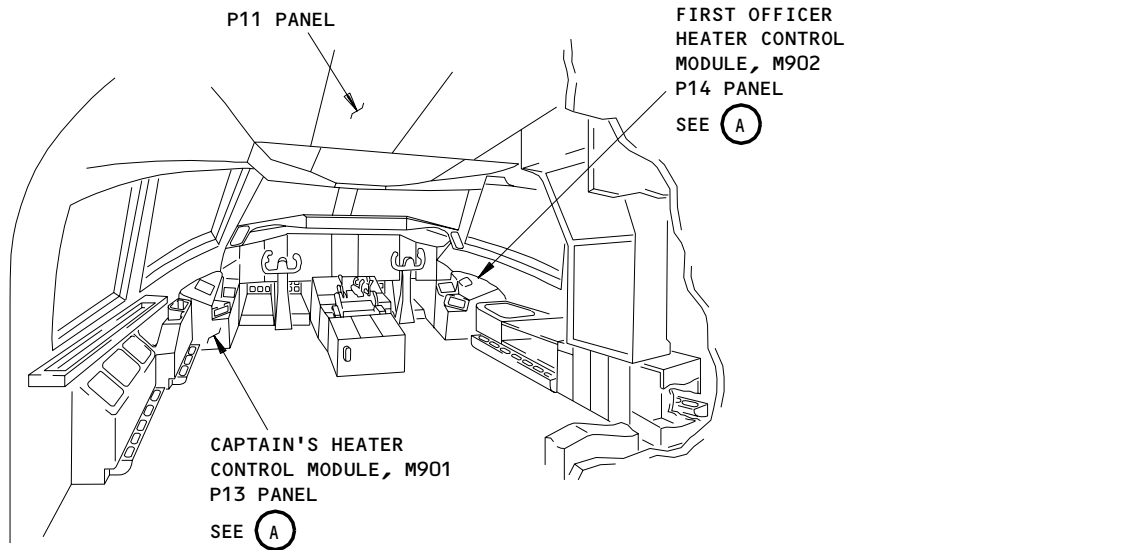
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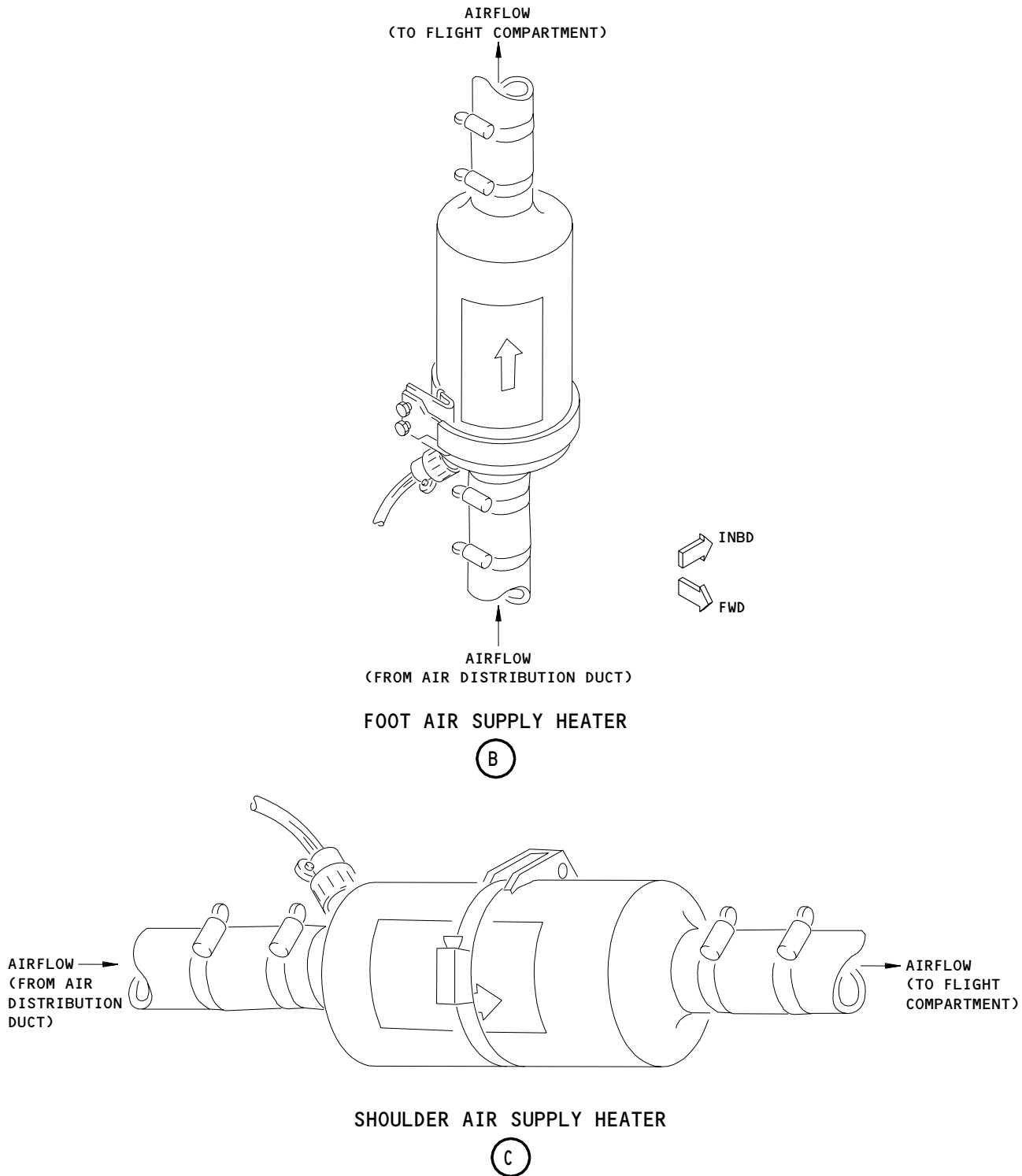
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Flight Compartment Supplemental Heating System - Component Location
Figure 1 (Sheet 1)

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Flight Compartment Supplemental Heating System - Component Location
Figure 1 (Sheet 2)

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B. Shoulder Heater

- (1) Two canister-type shoulder heaters are installed below the floor of the flight compartment along the left and right sidewalls just forward of the nose landing gear wheel well. Each heater is connected in-line with the conditioned air distribution ducts that supply air to the flight compartment.
- (2) Each shoulder heater operates on 115/200VAC power and generates approximately 165+/-17 watts and 500+/-50 watts of energy with the SHOULDER HEATER switch set to LOW and HI, respectively. Each shoulder heater has a single heater element with two thermostats for overheat protection. The control thermostat will open when the heater outlet temperature is more than 145-degrees F (63-degrees C). If the control thermostat fails to open, the backup thermostat will then open when the heater outlet temperature is more than 250-degrees F (121-degrees C).

C. Heater Control Panel

- (1) The captain and first officer each have an independent control panel to control the operation of their foot and shoulder heating systems. The control panels are located outboard of the captain and first officer crew seats, on the P13 and P14 panels, respectively. Each control panel has two toggle switches with three settings OFF/LOW/HI to control the foot heater and shoulder heater.

3. Operation (Fig. 2)

A. Functional Description

- (1) Cool air is supplied to the flight compartment by the air conditioning packs or by the recirculation fans. This cool air flows through the foot and shoulder heaters and the flight compartment air distribution ducts. When the heaters are operational, the cool air gets heated which then gets supplied to the foot and shoulder areas for the flight crew. When the airplane is on the ground, the foot and shoulder heating systems are not operational. The foot and shoulder heating systems require the airplane to be airborne/air mode simulated (air/ground relays energized) to enable heater operation from the heater control panel. Once the heating systems have been enabled (air/ground relays energized), the heaters can be independently controlled to operate in LOW or HI heat mode.
- (2) With the foot or shoulder heater control switch set to LOW, single-phase 115VAC power is supplied to the heater when the air/ground relay is energized. The foot heater supplies approximately 89+/-10 watts of power, while the shoulder heater supplies approximately 165+/-17 watts.

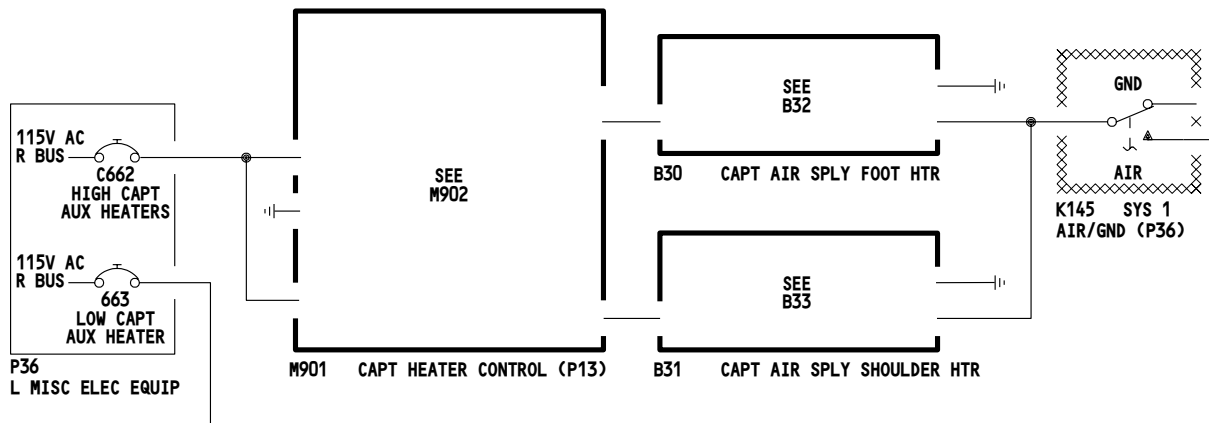
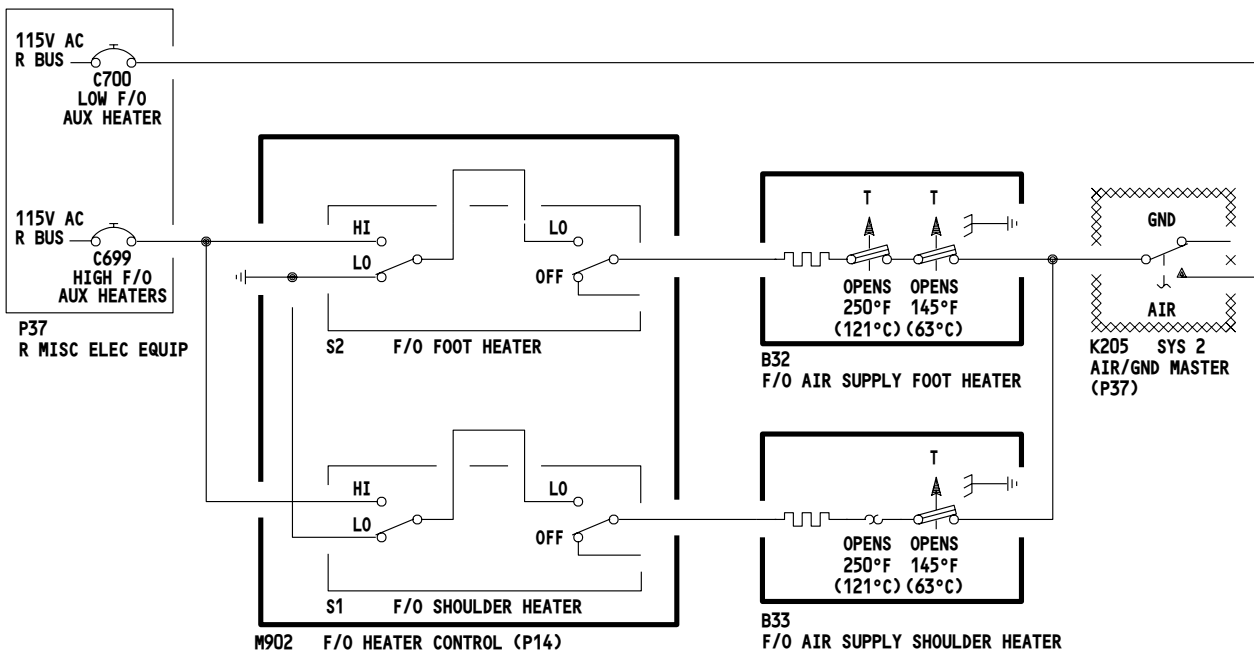
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Flight Compartment Supplemental Heating System Schematic
Figure 2

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- (3) With the foot or shoulder heater control switch set to HI, dual-phase 200VAC power is supplied to the heater when the air/ground relay is energized. The foot heater supplies approximately 270+/-30 watts of power, while the shoulder heater supplies approximately 500+/-50 watts.
- (4) With the foot or shoulder heater control switch set to OFF, electrical power is removed from the heater.
- (5) If the heater outlet temperature is more than 145-deg F (63-deg C), a control thermostat will open thereby removing electrical power from the heater to provide overheat protection. A second backup thermostat will open at 250-deg F (121-deg C), if the control thermostat failed to open.
- (6) There are no crew alerting EICAS messages, indications, or fault annunciations associated with the flight compartment supplemental heating systems.

B. Control

- (1) Supply electrical power (AMM 24-22-00/201).
- (2) Supply conditioned air to the flight compartment with the air conditioning packs or recirculation fans (AMM 21-00-00/201).
- (3) Do the air mode simulation procedure for the System No.1 and No. 2 air/ground relays (AMM 32-09-02/201).
- (4) Set the FOOT and SHOULDER HEAT switches (P13/P14 panel) to LOW/HI.

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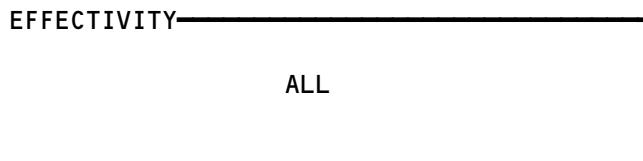
FAULT ISOLATION/MAINT MANUAL

FLIGHT COMPARTMENT SUPPLEMENTAL HEATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - HEATER, CAPT AUX HIGH, C662		1	119AL, MAIN EQUIP CTR, P36 36H1 OR 36D7	
HEATER, CAPT AUX LOW, C663		1	36H2 OR 36D6	
CIRCUIT BREAKER - HEATER, F/O AUX HIGH, C699		1	119AL, MAIN EQUIP CTR, P37 37H1 OR 37D5	
HEATER, F/O AUX LOW, C700		1	37H2 OR 37D4	
HEATER - CAPTAIN'S FOOT AIR SUPPLY, B30	--	1	113AL, LEFT SIDE CEILING	21-45-11
HEATER - CAPTAIN'S SHOULDER AIR SUPPLY, B31	--	1	113AL, LEFT SIDEWALL	21-45-12
HEATER - F/O FOOT AIR SUPPLY, B32	--	1	113AL, RIGHT SIDE CEILING	21-45-11
HEATER - F/O SHOULDER AIR SUPPLY, B33	--	1	113AL, RIGHT SIDEWALL	21-45-12
MODULE - CAPTAIN'S HEATER CONTROL, M901	--	1	FLT COMPT, P13	*
MODULE - F/O HEATER CONTROL, M902	--	1	FLT COMPT, P14	*
RELAY - (FIM 31-01-36/101) AIR/GND SYS NO. 1, K145				
RELAY - (FIM 31-01-37/101) AIR/GND MASTER SYS NO. 2, K205				
SWITCH - CAPTAIN'S FOOT HEATER, YDPS1	--	1	FLT COMPT, P13, CAPTAIN'S HEATER CONTROL MODULE, M901	*
SWITCH - CAPTAIN'S SHOULDER HEATER, YDPS2	--	1	FLT COMPT, P13, CAPTAIN'S HEATER CONTROL MODULE, M901	*
SWITCH - F/O FOOT HEATER, YDQS1	--	1	FLT COMPT, P14, F/O HEATER CONTROL MODULE, M902	*
SWITCH - F/O SHOULDER HEATER, YDQS2	--	1	FLT COMPT, P14, F/O HEATER CONTROL MODULE, M902	*

* SEE THE WDM EQUIPMENT LIST

Flight Compartment Supplemental Heating System - Component Index
Figure 101



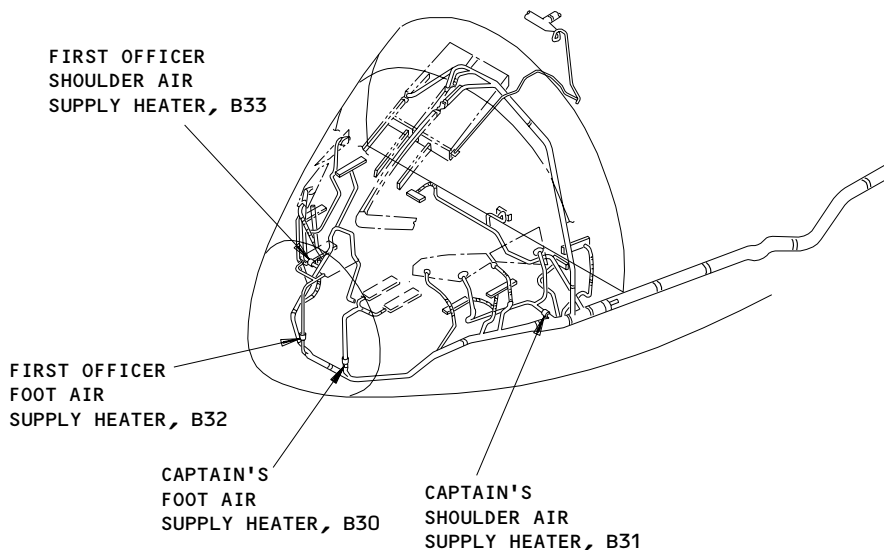
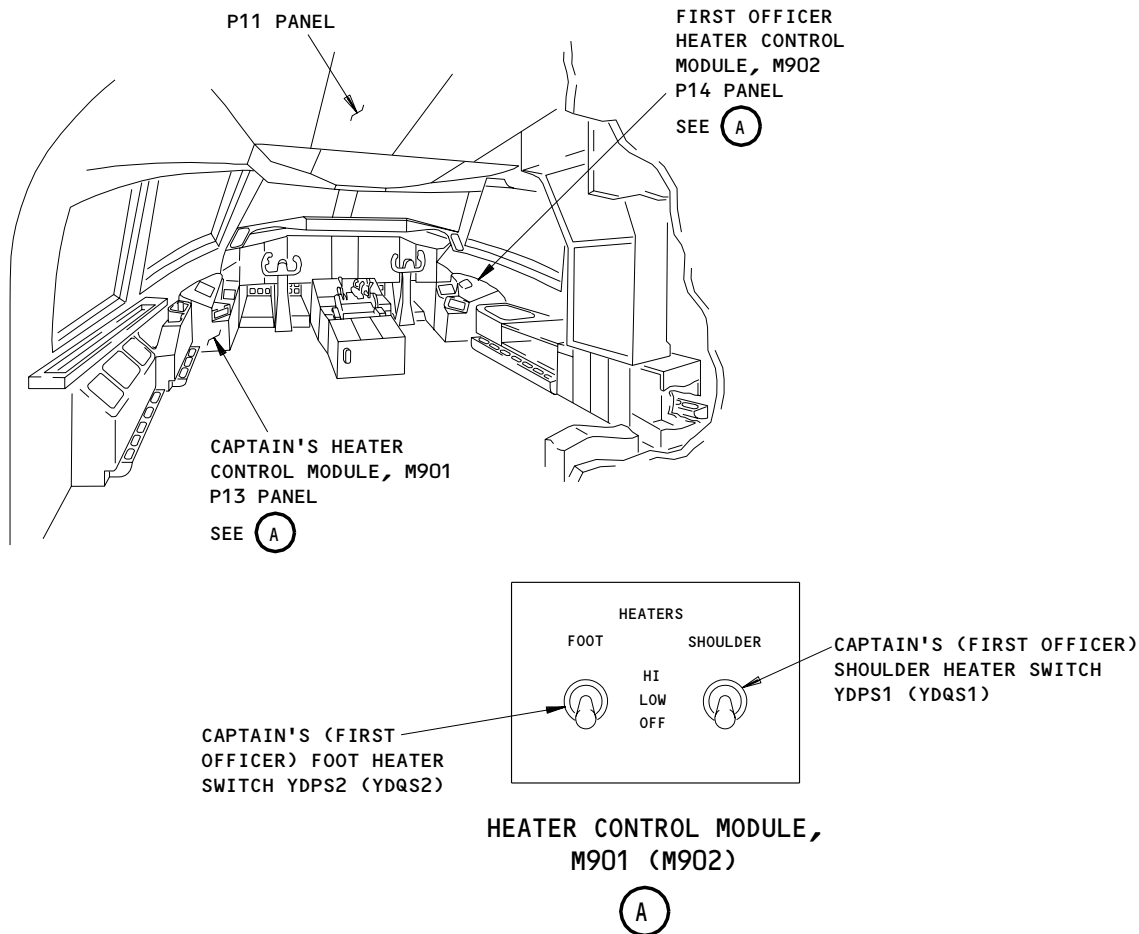
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Flight Compartment Supplemental Heating System - Component Location
Figure 102

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FLIGHT COMPARTMENT SUPPLEMENTAL HEATING SYSTEM –
ADJUSTMENT/TEST

1. General

- A. This procedure has this task:
 - (1) Operational Test – Flight Compartment Supplemental Heating System
- B. The flight compartment supplemental heating system consists of two separately controlled heating systems for both the Captain and the First Officer:
 - (1) A footrest heating system
 - (2) A shoulder heating system
- C. The footrest heating system consists of canister-type heaters installed in the flight compartment air distribution ducts to supply warm air to the captain and first officer's footrest areas. The warm air from the heater heats the surface of the two footrests which are on the floor just forward of the captain and first officer's seats. The heaters are located below the flight compartment floor just forward of the nose landing gear wheel well and against the aft side of the forward bulkhead.
- D. The shoulder heating system consists of canister-type heaters installed in the flight compartment air distribution ducts to supply warm air to the captain and first officer's outboard shoulder areas. The warm air from the heaters flow out of sidewall air outlets outboard of the captain and first officer seats. The heaters are located below the flight compartment floor outboard of the nose landing gear wheel well along the left and right sidewalls.
- E. Each footrest and shoulder heating system is controlled from a Heater Control panel, M901 and M902 (P13 and P14 panel) which is installed outboard of the captain and first officer's seat. The Heater Control panel has three settings, OFF/LOW/HI.
- F. To test the operation of the heating systems, you must supply electrical power, operate the air conditioning packs and/or air recirculation system, then simulate that the airplane is in the air mode.

TASK 21-45-10-705-037

2. Operational Test – Flight Compartment Supplemental Heating System

- A. General
 - (1) It is necessary to supply air to the flight compartment air distribution system to test the operation of the foot and shoulder heating systems. This procedure provides two methods to supply air to the flight compartment. The first method uses the left and right recirculation fans (ATA 21-25) as the air supply. The second method uses the left and right air conditioning packs (ATA 21-51) as the air supply.
- B. References
 - (1) AMM 21-00-00/201, Air Conditioning (General)

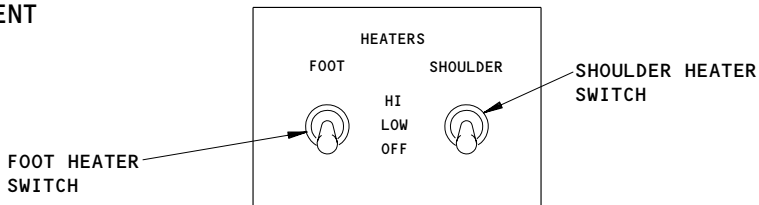
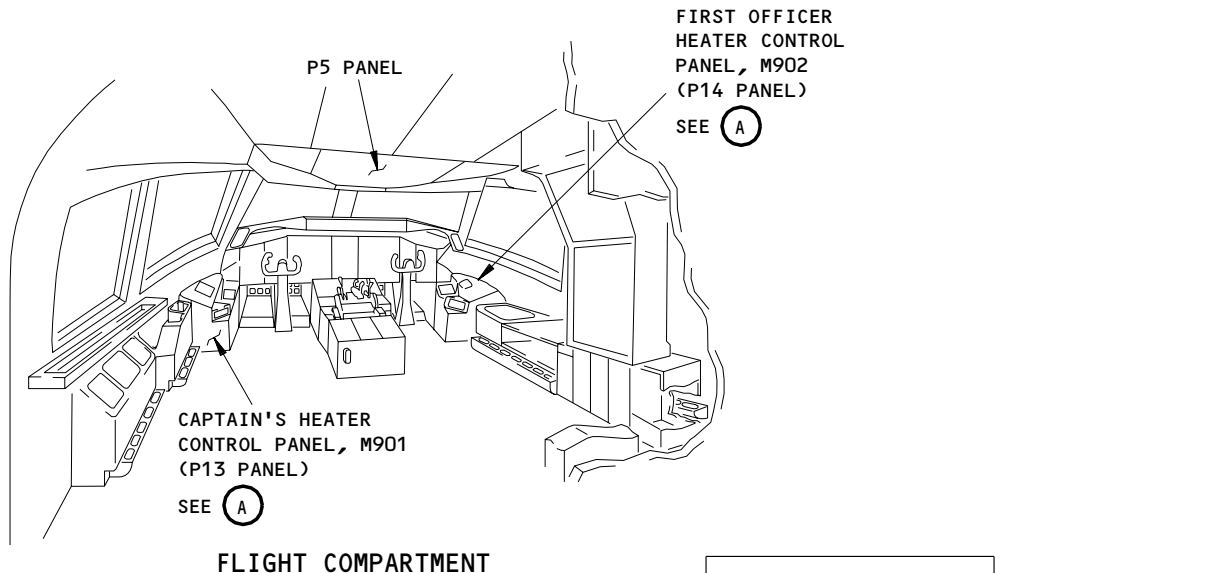
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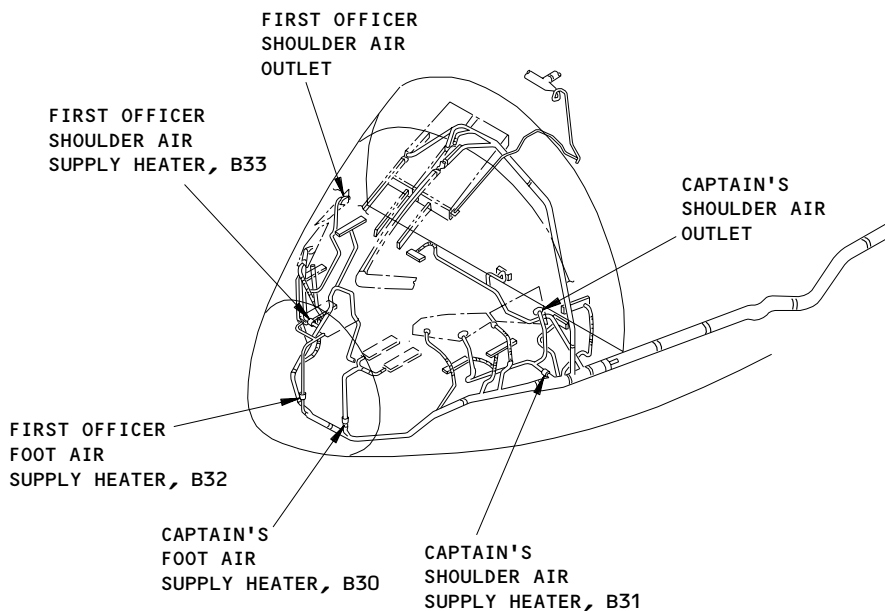
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HEATER CONTROL PANEL
(EXAMPLE)

(A)



Flight Compartment Supplemental Heating System - Adjustment/Test
Figure 501

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- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-61-00/201 Spoiler/Speedbrake Control System
- (4) AMM 32-09-02/201, Air/Ground System Relays

C. Access

- (1) Location Zones
 - 211 Control Cabin - Section 41 (Left)
- (2) Access Panels
 - 119AL Main Equipment Center Access Door

D. Prepare for the Test

S 015-004

- (1) Open the main equipment center access door, 119AL.

S 215-005

- (2) Make sure these circuit breakers are closed:
 - (a) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H1 or 36D7, HIGH CAPT AUX HEATERS
 - 2) 36H2 or 36D6, LOW CAPT AUX HEATERS
 - (b) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 37H1 or 37D5, HIGH F/O AUX HEATERS
 - 2) 37H2 or 37D4, LOW F/O AUX HEATERS

S 865-006

- (3) Supply electrical power (AMM 24-22-00/201).

S 865-038

- (4) Make sure these selectors and switches are set as follows:
 - (a) Air Conditioning Control Panel, M14 (P5 panel)
 - 1) L PACK and R PACK selectors set to OFF
 - 2) L RECIRC FAN and R RECIRC FAN switches set to off
 - (b) Captain's Heater Control Panel, M901 (P13 panel)
 - 1) FOOT HEATERS switch set to OFF
 - 2) SHOULDER HEATERS switch set to OFF
 - (c) First Officer's Heater Control Panel, M902 (P14 panel)
 - 1) FOOT HEATERS switch set to OFF
 - 2) SHOULDER HEATERS switch set to OFF

E. Operational Test of Foot and Shoulder Heating Systems with Recirculation Fans as Air Supply

S 865-039

- (1) Push the L RECIRC FAN switch, on the Air Conditioning Control panel (M14, P5 panel), to the ON position.
 - (a) Make sure the surface of the footrests are cool.

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- (b) Make sure that cool air flows out of the sidewall outlets which are adjacent to the captain's and first officer's seat.

S 865-040

- (2) Push the L RECIRC FAN switch to the off position, then push the R RECIRC FAN switch to the ON position.
 - (a) Make sure the surface of the footrests is still cool.
 - (b) Make sure that cool air still flows out of the sidewall outlets.

S 865-041

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (3) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-042

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (4) Do the air mode simulation procedure for the System No. 1 and No. 2 air/ground relays (AMM 32-09-02/201).
 - (a) Make sure the surface of the footrests is still cool.
 - (b) Make sure that cool air still flows out of the sidewall outlets.
 - (c) Do these steps at the Captain's and First Officer's Heater Control Panel, M901 and M902 (P13 and P14 panels):
 - 1) Set the FOOT HEATERS switch and SHOULDER HEATER switch to LO.
 - a) Make sure the surface of the footrests become warm.
 - b) Make sure that warm air flows out of the sidewall outlets.
 - 2) Set the FOOT HEATERS switch and SHOULDER HEATERS switch to HI.
 - a) Make sure the surface of the footrests become warmer.
 - b) Make sure that warmer air flows out of the sidewall outlets.
 - 3) Set the FOOT HEATERS switch and SHOULDER HEATER switch to OFF.
 - a) Make sure the surface of the footrests become cool.

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- b) Make sure that cool air flows out of the sidewall outlets.

S 865-044

- (5) Push the L RECIRC FAN switch to the ON position, then push the R RECIRC FAN switch to the off position.
 - (a) Do these steps at the Captain's and First Officer's Heater Control Panel, M901 and M902 (P13 and P14 panels):
 - 1) Set the FOOT HEATERS switch and SHOULDER HEATER switch to LO.
 - a) Make sure the surface of the footrests become warm.
 - b) Make sure that warm air flows out of the sidewall outlets.
 - 2) Set the FOOT HEATERS switch and SHOULDER HEATERS switch to HI.
 - a) Make sure the surface of the footrests become warmer.
 - b) Make sure that warmer air flows out of the sidewall outlets.
 - 3) Set the FOOT HEATERS switch and SHOULDER HEATER switch to OFF.
 - a) Make sure the surface of the footrests become cool.
 - b) Make sure that cool air flows out of the sidewall outlets.

S 865-045

- (6) Do the procedure to return the System No. 1 and No. 2 air/ground relays to the ground mode (AMM 32-09-02/201).
 - (a) Make sure the surface of the footrests are still cool.
 - (b) Make sure that cool air still flows out of the sidewall outlets.

S 865-046

- (7) Push the L RECIRC FAN switch to the off position.
- F. Operational Test of Foot and Shoulder Heating Systems with Air Conditioning Packs as Air Supply

S 865-047

- (1) Operate the left air conditioning pack (AMM 21-00-00/201).
 - (a) Make sure the surface of the footrests are cool.
 - (b) Make sure that cool air flows out of the sidewall outlets which are adjacent to the captain's and first officer's seat.

S 865-048

- (2) Operate the right air conditioning pack, then stop the operation of the left air conditioning pack (AMM 21-00-00/201).
 - (a) Make sure the surface of the footrests is still cool.

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- (b) Make sure that cool air still flows out of the sidewall outlets.

S 865-049

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (3) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-050

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (4) Do the air mode simulation procedure for the System No. 1 and No. 2 air/ground relays (AMM 32-09-02/201).
 - (a) Make sure the surface of the footrests is still cool.
 - (b) Make sure that cool air still flows out of the sidewall outlets.
 - (c) Do these steps at the Captain's and First Officer's Heater Control Panel, M901 and M902 (P13 and P14 panels):
 - 1) Set the FOOT HEATERS switch and SHOULDER HEATER switch to LO.
 - a) Make sure the surface of the footrests become warm.
 - b) Make sure that warm air flows out of the sidewall outlets.
 - 2) Set the FOOT HEATERS switch and SHOULDER HEATERS switch to HI.
 - a) Make sure the surface of the footrests become warmer.
 - b) Make sure that warmer air flows out of the sidewall outlets.
 - 3) Set the FOOT HEATERS switch and SHOULDER HEATER switch to OFF.
 - a) Make sure the surface of the footrests become cool.
 - b) Make sure that cool air flows out of the sidewall outlets.

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S 865-051

- (5) Operate the left air conditioning pack, then stop the operation of the right air conditioning pack (AMM 21-00-00/201).
 - (a) Do these steps at the Captain's and First Officer's Heater Control Panel, M901 and M902 (P13 and P14 panels):
 - 1) Set the FOOT HEATERS switch and SHOULDER HEATER switch to LO.
 - a) Make sure the surface of the footrests become warm.
 - b) Make sure that warm air flows out of the sidewall outlets.
 - 2) Set the FOOT HEATERS switch and SHOULDER HEATERS switch to HI.
 - a) Make sure the surface of the footrests become warmer.
 - b) Make sure that warmer air flows out of the sidewall outlets.
 - 3) Set the FOOT HEATERS switch and SHOULDER HEATER switch to OFF.
 - a) Make sure the surface of the footrests become cool.
 - b) Make sure that cool air flows out of the sidewall outlets.

S 865-052

- (6) Do the procedure to return the System No. 1 and No. 2 air/ground relays to the ground mode (AMM 32-09-02/201).
 - (a) Make sure the surface of the footrests are still cool.
 - (b) Make sure that cool air still flows out of the sidewall outlets.

S 865-053

- (7) Stop the operation of the left air conditioning pack (AMM 21-00-00/201).
- G. Put the Airplane Back to Its Usual Condition

S 865-054

- (1) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

S 415-017

- (2) Close the main equipment center access door, 119AL.

S 865-018

- (3) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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PILOT'S FOOT AIR SUPPLY HEATER – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Pilot's Foot Air Supply Heater Removal
 - (2) Pilot's Foot Air Supply Heater Installation
- B. Two canister-type heaters are installed in the flight compartment air distribution ducts to supply warm air to the captain and first officer's footrest areas. The warm air from the heater heats the surface of the two footrests which are on the floor just forward of the captain and first officer's seats. The heaters are located below the flight compartment floor just forward of the nose landing gear wheel well and against the aft side of the forward bulkhead.
- C. The captain and first officer's heaters are electrically operated and are controlled from a Heater Control panel, M901 and M902 (P13 and P14 panels) installed outboard of the captain and first officer's seat.

TASK 21-45-11-004-001

2. Pilot's Foot Air Supply Heater Removal (Fig. 401)

A. Access

(1) Location Zones

- 113 Area forward of NLG wheel well (Left)
- 114 Area forward of NLG wheel well (Right)
- 211 Control Cabin – Section 41 (Left)
- 212 Control Cabin – Section 41 (Right)

(2) Access Panels

- 113AL Forward Equipment Bay Access Door
- 119AL Main Equipment Center Access Door

B. Prepare for Removal

S 864-054

- (1) To shutoff airflow to the flight compartment air distribution ducts, make sure these selectors and switches are set as follows and attach DO-NOT-OPERATE tags:

NOTE: Also, do not supply conditioned air to the air distribution system with a ground air service cart.

- (a) Air Conditioning Control Panel, M14 (P5 panel)
 - 1) L PACK and R PACK selectors set to OFF

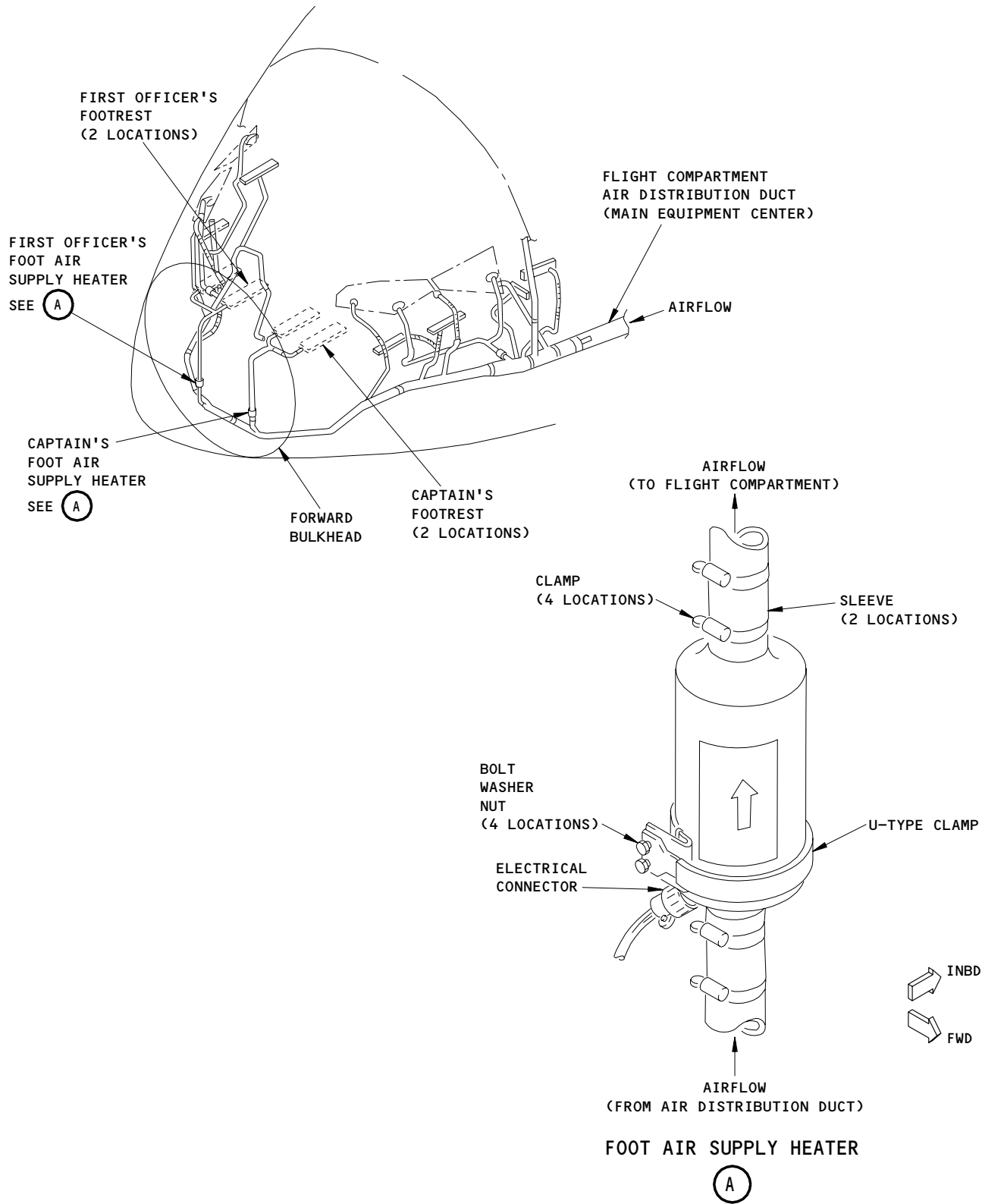
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Pilots' Foot Air Supply Heater Installation
Figure 401

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- 2) L RECIRC FAN and R RECIRC FAN switches set to OFF
- (b) Captain's Heater Control Panel, M901 (P13 panel)
 - 1) FOOT HEATERS switch set to OFF
- (c) First Officer's Heater Control Panel, M902 (P14 panel)
 - 1) FOOT HEATERS switch set to OFF

S 014-033

- (2) Open the main equipment center access door, 119AL.

S 864-009

- (3) Open these circuit breakers and attach DO-NOT-CLOSE tags:
 - (a) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H1 or 36D7, HIGH CAPT AUX HEATERS
 - 2) 36H2 or 36D6, LOW CAPT AUX HEATERS
 - (b) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 37H1 or 37D5, HIGH F/O AUX HEATERS
 - 2) 37H2 or 37D4, LOW F/O AUX HEATERS

S 014-011

- (4) Open the forward equipment bay access door, 113AL, to get access to the foot heaters against the aft side of the forward bulkhead just forward of the nose landing gear wheel well.

C. Heater Removal

S 024-055

WARNING: DO NOT TOUCH THE HEATER IF IT IS HOT. LET THE HEATER BECOME COOL BEFORE YOU REMOVE THE HEATER. A HOT HEATER CAN BURN YOU AND CAUSE INJURY.

- (1) Disconnect the electrical connector from the heater.

S 024-035

- (2) Loosen the two clamps that hold the sleeves to the heater.

S 024-036

- (3) Remove the bolts, washers, and nuts to remove the U-type clamp which holds the heater to the forward bulkhead.

S 024-037

- (4) Remove the heater.

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TASK 21-45-11-404-017

3. Pilot's Foot Air Supply Heater Installation (Fig. 401)

A. References

- (1) AMM 21-00-00/201, Air Conditioning (General)
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 27-61-00/201 Spoiler/Speedbrake Control System
- (4) AMM 32-09-02/201, Air/Ground System Relays

B. Access

(1) Location Zones

- | | |
|-----|--|
| 113 | Area forward of NLG wheel well (Left) |
| 114 | Area forward of NLG wheel well (Right) |
| 211 | Control Cabin - Section 41 (Left) |
| 212 | Control Cabin - Section 41 (Right) |

(2) Access Panels

- | | |
|-------|-----------------------------------|
| 113AL | Forward Equipment Bay Access Door |
| 119AL | Main Equipment Center Access Door |

C. Heater Installation

S 424-018

- (1) Put the heater into the sleeves.

NOTE: Make sure the flow arrow on the heater points upward to the flight compartment floor.

S 424-039

- (2) Tighten the clamps that hold the sleeves to the heater.

S 424-038

- (3) Put the U-type clamp around the heater and install the bolts, washers, and nuts to hold the U-type clamp to the heater.

S 424-044

- (4) Connect the electrical connector to the heater.

D. Heater Post-Installation Test

S 864-023

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
 - (a) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H1 or 36D7, HIGH CAPT AUX HEATERS
 - 2) 36H2 or 36D6, LOW CAPT AUX HEATERS

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- (b) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 37H1 or 37D5, HIGH F/O AUX HEATERS
 - 2) 37H2 or 37D4, LOW F/O AUX HEATERS

S 864-040

- (2) Supply electrical power (AMM 24-22-00/201).

S 864-046

- (3) Make sure the FOOT HEATERS switch is set to OFF, on the Captain's (First Officer's) Heater Control panel, M901 (M902).

S 864-041

- (4) Do one of these steps to supply air to the flight compartment air distribution ducts:
 - (a) Push the L RECIRC FAN and/or R RECIRC FAN switch, on the Air Conditioning Control panel (M14, P5 panel), to the ON position.
 - (b) Operate the left (right) air conditioning packs (AMM 21-00-00/201).

S 724-045

- (5) Make sure the surface of the captain's (first officer's) footrests in the flight compartment are cool.

S 864-042

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (6) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 864-043

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (7) Do the air mode simulation procedure for the System No. 1 (No. 2) air/ground relays (AMM 32-09-02/201).

NOTE: Simulation of the system No. 1 air/ground relays permits operation of the captain's foot heater. Simulation of the system No. 2 air/ground relays permits operation of the first officer's foot heater.

- (a) Make sure the surface of the captain's (first officer's) footrests are still cool.

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S 864-049

- (8) Set the FOOT HEATERS switch to LOW, on the Captain's (First Officer's) Heater Control panel, M901 (M902).
- (a) Make sure the surface of the captain's (first officer's) footrests become warm.

S 864-050

- (9) Set the FOOT HEATERS switch to HI, on the Captain's (First Officer's) Heater Control panel, M901 (M902).
- (a) Make sure the surface of the captain's (first officer's) footrests become warmer.

S 864-028

- (10) Set the FOOT HEATERS switch to OFF.
- (a) Make sure the surface of the captain's (first officer's) footrests become cool.

S 864-032

- (11) Do the procedure to return the System No. 1 (No. 2) air/ground relays to the ground mode (AMM 32-09-02/201).
- (a) Make sure the surface of the captain's (first officer's) footrests are still cool.

S 864-031

- (12) Push the L RECIRC FAN and R RECIRC FAN switches to the off position.

NOTE: If the air conditioning packs are in operation, also shutoff the air conditioning packs (AMM 21-00-00/201).

S 864-052

- (13) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

E. Put the Airplane Back to Its Usual Condition

S 414-053

- (1) Close the forward equipment bay access door, 113AL, and the main equipment center access door, 119AL.

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S 864-029

- (2) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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PILOT'S SHOULDER AIR SUPPLY HEATER – REMOVAL/INSTALLATION

1. General

- A. This procedure has these task:
 - (1) Pilot's Shoulder Air Supply Heater Removal
 - (2) Pilot's Shoulder Air Supply Heater Installation
- B. Two canister-type heaters are installed in the flight compartment air distribution ducts to supply warm air to the captain and first officer's outboard shoulder areas. The warm air from the heater flows out of sidewall air outlets outboard of the captain and first officer seats. The heaters are located below the flight compartment floor outboard of the nose landing gear wheel well along the left and right sidewalls.
- C. The captain and first officer's heaters are electrically operated and are controlled from a Heater Control panel, M901 and M902 (P13 and P14 panels) installed outboard of the captain and first officer's seat.

TASK 21-45-12-004-001

2. Pilot's Shoulder Air Supply Heater Removal (Fig. 401)

A. Access

(1) Location Zones

- 117 Area Outboard and above NLG wheel well (Left)
- 118 Area Outboard and above NLG wheel well (Right)

(2) Access Panel

- 113AL Forward Equipment Bay Access Door
- 119AL Main Equipment Center Access Door

B. Prepare for Removal

S 864-029

- (1) To shutoff airflow to the flight compartment air distribution ducts, make sure these selectors and switches are set as follows and attach DO-NOT-OPERATE tags:

NOTE: Also, do not supply conditioned air to the air distribution system with a ground air service cart.

(a) Air Conditioning Control Panel, M14 (P5 panel)

- 1) L PACK and R PACK selectors set to OFF

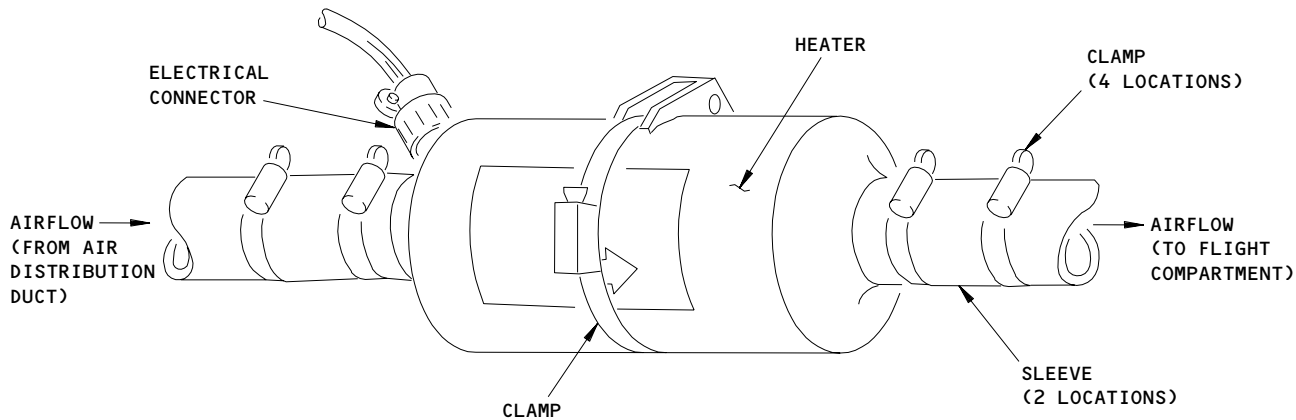
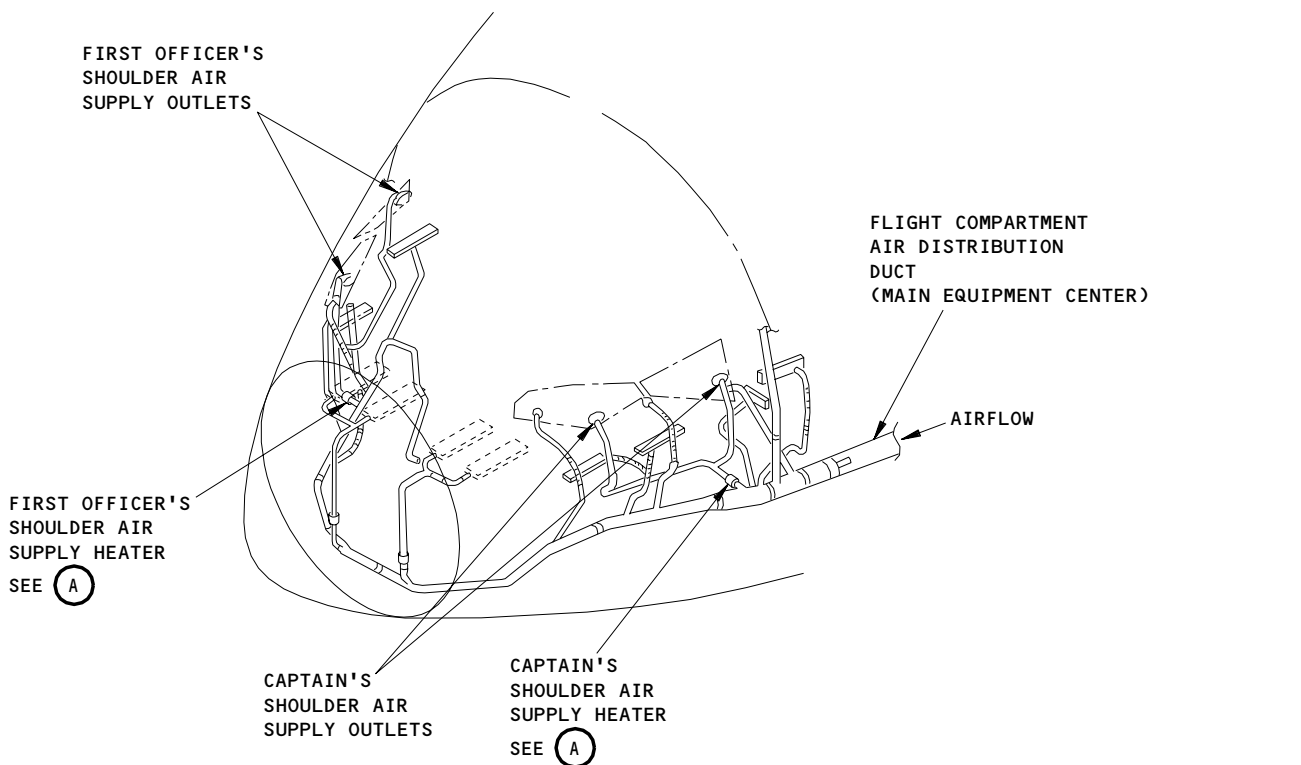
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SHOULDER AIR SUPPLY HEATER

(A)

Pilots' Shoulder Air Supply Heater Installation
Figure 401

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- 2) L RECIRC FAN and R RECIRC FAN switches set to OFF
- (b) Captain's Heater Control Panel, M901 (P13 panel)
 - 1) SHOULDER HEATERS switch set to OFF
- (c) First Officer's Heater Control Panel, M902 (P14 panel)
 - 1) SHOULDER HEATERS switch set to OFF

S 014-030

- (2) Open the main equipment center access door, 119AL.

S 864-031

- (3) Open these circuit breakers and attach DO-NOT-CLOSE tags:
 - (a) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H1 or 36D7, HIGH CAPT AUX HEATERS
 - 2) 36H2 or 36D6, LOW CAPT AUX HEATERS
 - (b) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 37H1 or 37D5, HIGH F/O AUX HEATERS
 - 2) 37H2 or 37D4, LOW F/O AUX HEATERS

S 014-032

- (4) Open the forward equipment bay access door, 113AL, to get access to the shoulder heaters which are outboard of the nose landing gear wheel well on the left and right sidewalls.

C. Heater Removal

S 024-050

WARNING: DO NOT TOUCH THE HEATER IF IT IS HOT. LET THE HEATER BECOME COOL BEFORE YOU REMOVE THE HEATER. A HOT HEATER CAN BURN YOU AND CAUSE INJURY.

- (1) Disconnect the electrical connector from the heater.

S 034-011

- (2) Loosen the two clamps that hold the sleeves to the heater.

S 024-034

- (3) Remove the clamp that holds the heater to the duct support bracket.

S 024-014

- (4) Remove the heater.

TASK 21-45-12-404-015

3. Install the Shoulder Air Supply Heater (Fig. 401)

A. References

- (1) AMM 21-00-00/201, Air Conditioning (General)
- (2) AMM 24-22-00/201, Electrical Power - Control

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- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (4) AMM 32-09-02/201, Air/Ground System Relays

B. Access

(1) Location Zones

- 117 Area Outboard and above NLG wheel well (Left)
- 118 Area Outboard and above NLG wheel well (Right)

(2) Access Panels

- 113AL Forward Equipment Bay Access Door
- 119AL Main Equipment Center Access Door

C. Heater Installation

S 424-016

- (1) Put the heater into the sleeves between the two air distribution ducts.

NOTE: Make sure the flow arrow on the heater points in the direction of the upper-most air distribution duct that goes to the flight compartment.

S 424-036

- (2) Install and tighten the two clamps that hold the sleeves to the heater.

S 424-035

- (3) Install and tighten the clamp that holds the heater to the duct support bracket.

S 424-037

- (4) Connect the electrical connector to the heater.

D. Heater Post-Installation Test

S 864-021

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
 - (a) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H1 or 36D7, HIGH CAPT AUX HEATERS
 - 2) 36H2 or 36D6, LOW CAPT AUX HEATERS
 - (b) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 37H1 or 37D5, HIGH F/O AUX HEATERS
 - 2) 37H2 or 37D4, LOW F/O AUX HEATERS

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- S 864-062
- (2) Supply electrical power (AMM 24-22-00/201).
- S 864-040
- (3) Make sure the SHOULDER HEATERS switch is set to OFF, on the Captain's (First Officer's) Heater Control panel, M901 (M902).
- S 864-041
- (4) Do one of these steps to supply air to the flight compartment air distribution ducts:
- (a) Push the L RECIRC FAN and/or R RECIRC FAN switch, on the Air Conditioning Control panel (M14, P5 panel), to the ON position.
 - (b) Operate the left (right) air conditioning packs (AMM 21-00-00/201).
- S 724-042
- (5) Make sure the air that flows out of the captain's (first officer's) sidewall outlets in the flight compartment is cool.
- S 864-039

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (6) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 864-038

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (7) Do the air mode simulation procedure for the System No. 1 (No. 2) air/ground relays (AMM 32-09-02/201).

NOTE: Simulation of the system No. 1 air/ground relays permits operation of the captain's shoulder heater. Simulation of the system No. 2 air/ground relay permits operation of the first officer's shoulder heater.

- (a) Make sure the air that flows out of the captain's (first officer's) sidewall outlets is still cool.

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S 864-043

- (8) Set the SHOULDER HEATERS switch to LOW, on the Captain's (First Officer's) Heater Control panel, M901 (M902).
- (a) Make sure the air that flows out of the captain's (first officer's) sidewall outlets becomes warm.

S 864-044

- (9) Set the SHOULDER HEATERS switch to HI, on the Captain's (First Officer's) Heater Control panel, M901 (M902).
- (a) Make sure the air that flows out of the captain's (first officer's) sidewall outlets becomes warmer.

S 864-045

- (10) Set the SHOULDER HEATERS switch to OFF.
- (a) Make sure the air that flows out of the captain's (first officer's) sidewall outlets becomes cool.

S 864-046

- (11) Do the procedure to return the System No. 1 (No. 2) air/ground relays to the ground mode (AMM 32-09-02/201).
- (a) Make sure the air that flows out of the captain's (first officer's) sidewall outlets is still cool.

S 864-047

- (12) Push the L RECIRC FAN and R RECIRC FAN switches to the off position.

NOTE: If the air conditioning packs are in operation, also shutoff the air conditioning packs (AMM 21-00-00/201).

S 864-048

- (13) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

E. Put the Airplane Back to Its Usual Condition

S 414-049

- (1) Close the forward equipment bay access door, 113AL, and the main equipment center access door, 119AL.

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S 864-027

- (2) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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FORWARD DOOR AREA SUPPLEMENTAL HEATING SYSTEM -
DESCRIPTION AND OPERATION

1. General

- A. The supplemental heating system for the forward door areas consists of canister-type heaters which are installed in the overhead air distribution ducts above the forward door area ceiling panels.
- B. Two heaters supply warm air to the floor areas through an air outlet grille on the lower sidewall just aft of each forward door.
- C. The air conditioning packs or the recirculation fans supply the necessary airflow movement through the heaters which then gets ducted to the air outlet grilles in the forward door areas. The heaters operate when the airplane is airborne/air mode simulated (air/ground relay energized) and either the left (right) air conditioning pack or left (right) recirculation fan is on.

2. Component Details (Fig. 1, 1A)

A. Forward Door Heater

- (1) Canister-type heaters are installed above the forward door area ceiling panels. Each heater is connected in-line with the overhead air distribution ducts that supply air to the forward door areas.
- (2) 767-200/300 AIRPLANES (POST-SB 21-26, POST-PRR B11158);
The door heaters operate on 115/200VAC power and generates approximately 270+/-30 watts of energy. Each heater has a single heater element with two thermostats for overheat protection. The control thermostat will open when the heater outlet temperature is more than 145-degrees F (63-degrees C). If the control thermostat fails to open, the backup thermostat will then open when the heater outlet temperature is more than 250-degrees F (121-degrees C).
- (3) 767-200/300 AIRPLANES (POST-SB 21-96, POST-SB 21-112, POST-PRR B12139);
The door heaters operate on dual-phase 115/200VAC power and generates approximately 500-watts of energy. Each heater has two heater elements and two thermostats for overheat protection. The control thermostat will open when the heater outlet temperature is more than 185-degrees F (85-degrees C). If the control thermostat fails to open, the backup thermostat will then open when the heater outlet temperature is more than 250-degrees F (121-degrees C).

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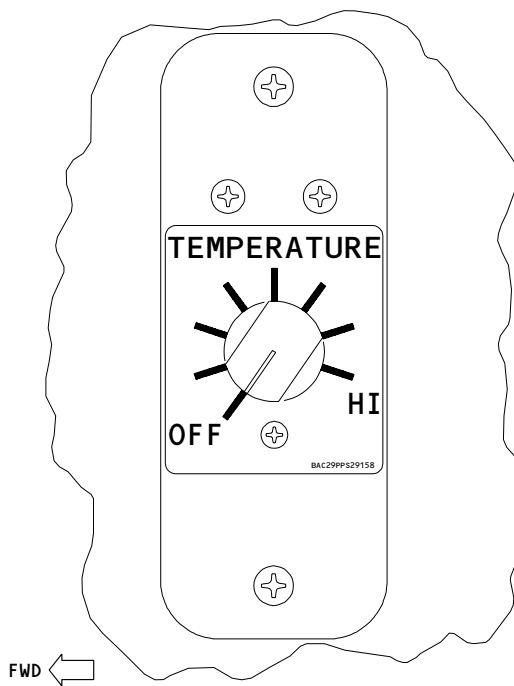
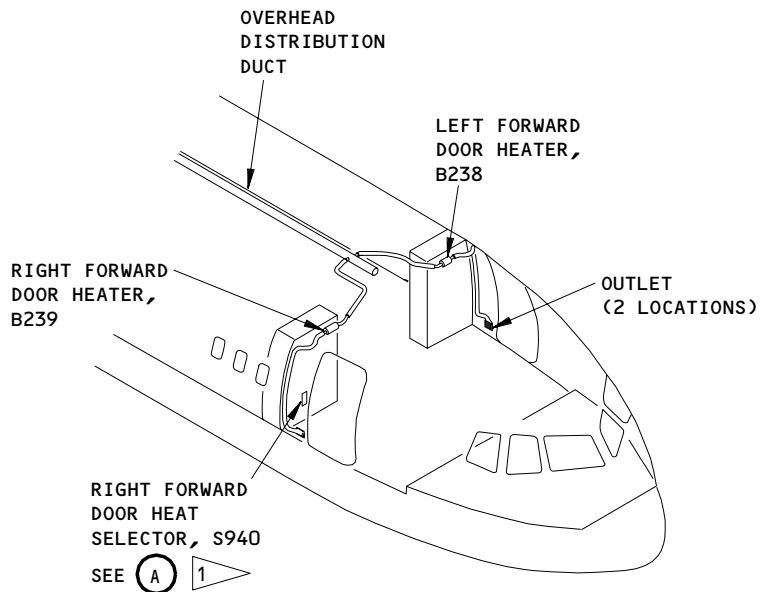
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MAINTENANCE MANUAL



RIGHT FORWARD DOOR HEAT SELECTOR, S940

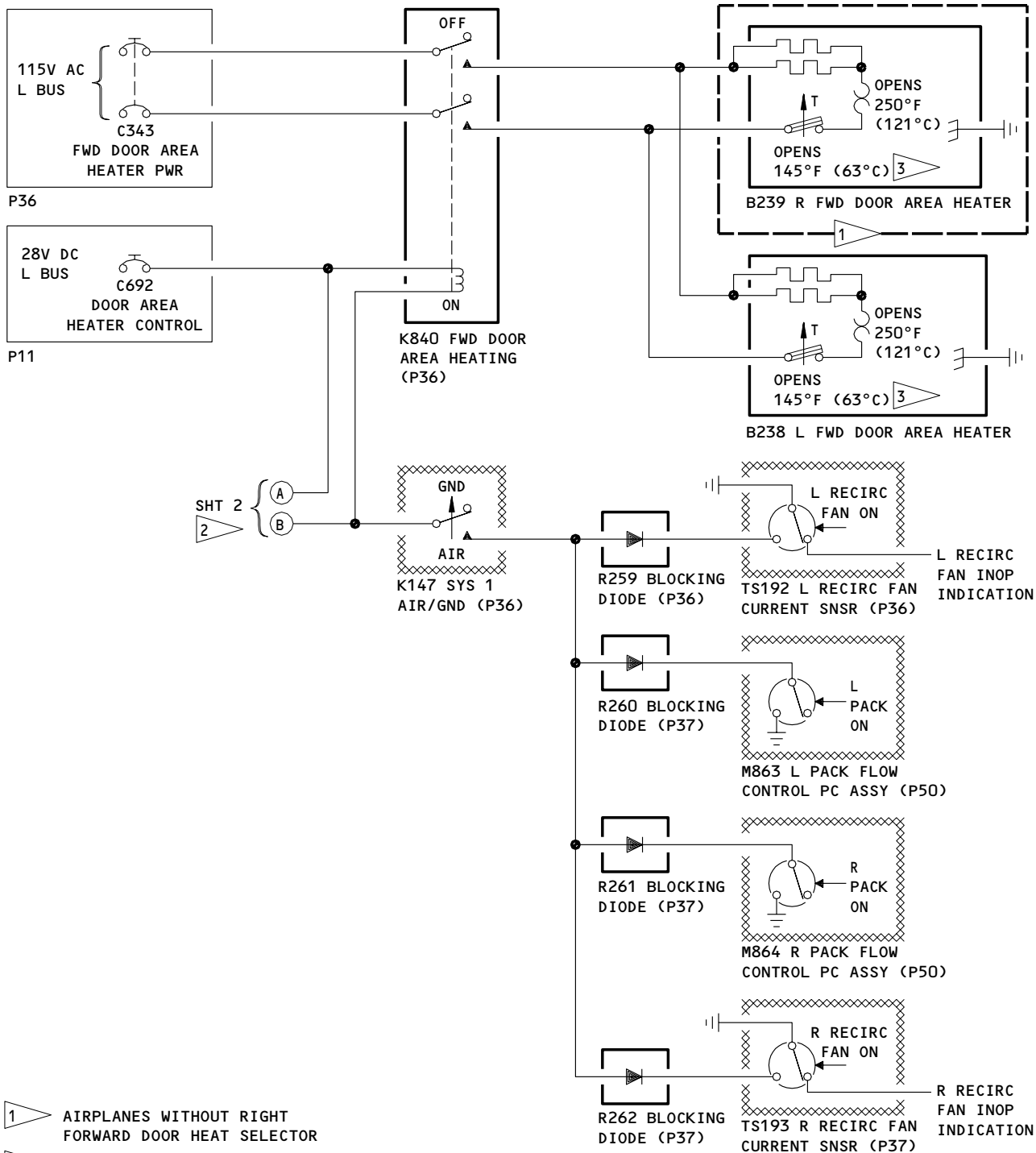
(A) 1

1 AIRPLANES WITH HEAT SELECTOR AT RIGHT FORWARD DOOR

Forward Door Area Supplemental Heating System - Component Location
Figure 1

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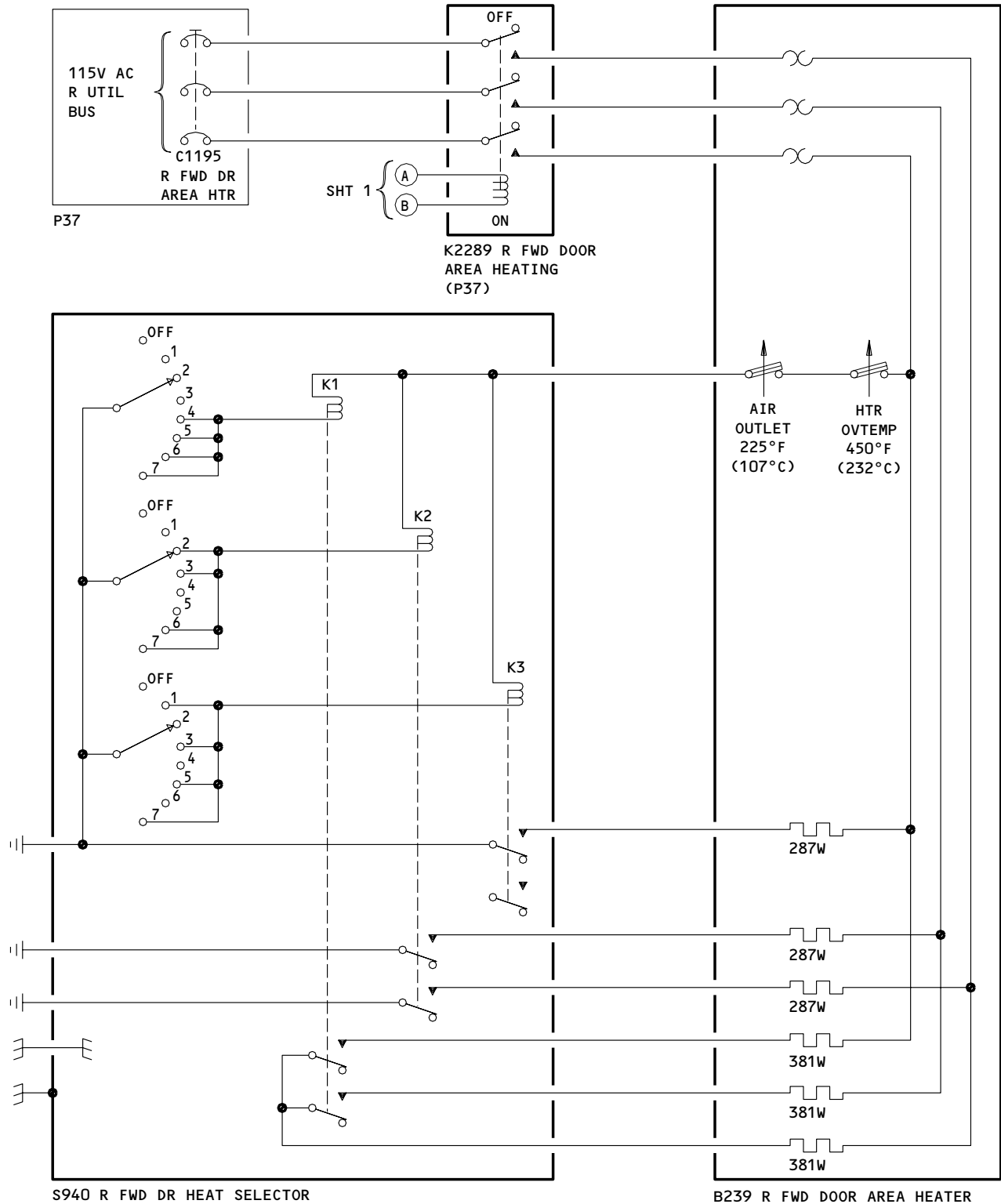


- 1 AIRPLANES WITHOUT RIGHT FORWARD DOOR HEAT SELECTOR
- 2 AIRPLANES WITH RIGHT FORWARD DOOR HEAT SELECTOR
- 3 AIRPLANES WITH 250W HEATER. ON AIRPLANES WITH 500W HEATER, THE THERMAL SWITCH OPENS AT 185°F (85°C)

Forward Door Area Supplemental Heating Schematic
Figure 2 (Sheet 1)

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Forward Door Area Supplemental Heating Schematic
Figure 2 (Sheet 2)

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767-200/300 AIRPLANES (POST-SB 21-134,
POST-SB 21-146, POST-SB 21-169;
POST-PRRB 12666)

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3. Operation (Fig. 2, 2A)

A. Functional Description

- (1) The heaters normally do not operate when the airplane is on the ground. Heater operation is automatically enabled when the airplane is airborne/air mode simulated (air/ground relay energized) and either the left (right) air conditioning pack or left (right) recirculation fan is on.
- (2) There are no crew alerting EICAS messages, indications, or fault annunciations associated with the forward door area supplemental heating system.

B. Control

- (1) Supply electrical power (AMM 24-22-00/201).
- (2) Supply conditioned air to the overhead air distribution system with the air conditioning packs or recirculation fans (AMM 21-00-00/201).
- (3) Do the air mode simulation procedure for the System No.1 air/ground relays (AMM 32-09-02/201).
- (4) Turn the right door TEMPERATURE selector clockwise from the OFF position to operate the right door heater.

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


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 **BOEING**
767
FAULT ISOLATION/MAINT MANUAL

FORWARD DOOR AREA SUPPLEMENTAL HEATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CARD - (FIM 21-51-00/101) LEFT PACK FLOW CONTROL, M863 RIGHT PACK FLOW CONTROL, M864				
CIRCUIT BREAKER - DOOR HEAT CONT, C680 OR C692		1	FLIGHT COMPT, P11 11R12	*
CIRCUIT BREAKER - FWD DOOR AREA HEATER PWR, C343		1	119AL, MAIN EQUIP CTR, P36 36A2 OR 36D2	*
CIRCUIT BREAKER - RIGHT FWD DOOR AREA HEATER PWR, C1195 		1	119AL, MAIN EQUIP CTR, P37 37B4	*
DIODE - BLOCKING (FIM 31-01-36/101) R259		1		*
DIODE - BLOCKING (FIM 31-01-37/101) R260, R261, R262		3		*
HEATER - LEFT FWD DOOR, B238	-	1	PASS COMPT, ABOVE LEFT FWD DOOR CEILING	21-45-21
RIGHT FWD DOOR, B239	-	1	PASS COMPT, ABOVE RIGHT FWD DOOR CEILING	21-45-21
RELAY - (FIM 31-01-36/101) AIR/GND SYS NO. 1, K147		1		*
FWD DOOR AREA HEAT, K840 OR K1041		1		*
RELAY - (FIM 31-01-37/101) RIGHT FWD DOOR AREA HEAT, K2289 		1		*
SELECTOR - RIGHT FWD DOOR HEAT, S940 	-	1	PASS COMPT, RIGHT FWD DOOR SIDEWALL LINING	21-45-22
SENSOR - CURRENT (FIM 21-25-00/101) LEFT RECIRC FAN, TS192				*
RIGHT RECIRC FAN, TS193				*

* SEE THE WDM EQUIPMENT LIST

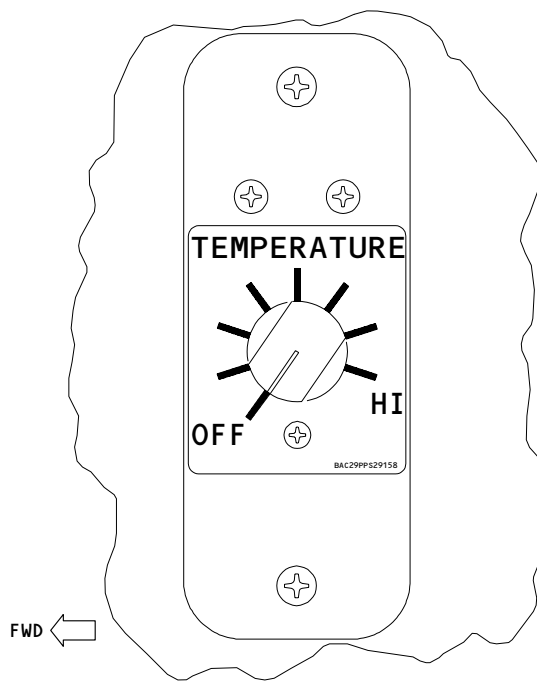
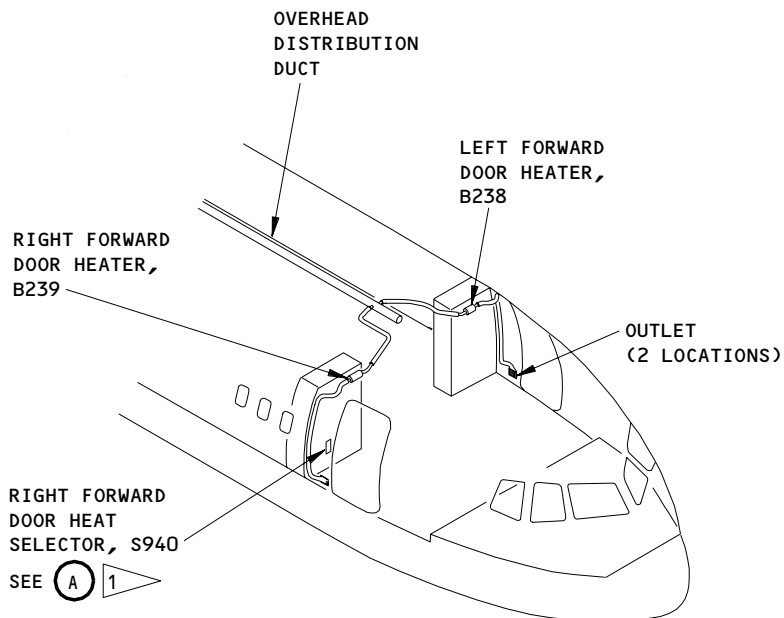
 AIRPLANES WITH HEAT SELECTOR AT RIGHT FORWARD DOOR
(POST-PRR B12666)

Forward Door Area Supplemental Heating System - Component Index
Figure 101

EFFECTIVITY
767-200/300 AIRPLANES
(POST-PRR B12666)

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FAULT ISOLATION/MAINT MANUAL



RIGHT FORWARD DOOR HEAT SELECTOR, S940

1 AIRPLANES WITH HEAT SELECTOR AT RIGHT FORWARD DOOR (POST-PRR B12666)

(A) 1

Forward Door Area Supplemental Heating System - Component Location
Figure 102

EFFECTIVITY
767-200/300 AIRPLANES
(POST-PRR B12666)

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FORWARD DOOR AREA SUPPLEMENTAL HEATING SYSTEM –
ADJUSTMENT/TEST

1. General

- A. This procedure has this task:
 - (1) Operational Test – Forward Door Area Supplemental Heating System
- B. The supplemental heating system for the forward door area consists of heaters which are installed in the overhead air distribution ducts above the forward door area ceiling panels (Fig. 501). The heaters supply warm air to the floor areas through an air outlet grille on the lower sidewalls just aft of the forward door openings.
- C. 767-200/300 (POST-SB 21-134, 21-146, PRR B12666);
A heat selector is found on the sidewall panel on the aft side of the right forward door. The selector has 8-positions to control the power output of the right forward door heater which is found above the right forward door ceiling.
- D. To test the operation of the heaters, you must supply electrical power, operate the air conditioning packs and/or air recirculation system, then simulate that the airplane is in the air mode.

TASK 21-45-20-705-054

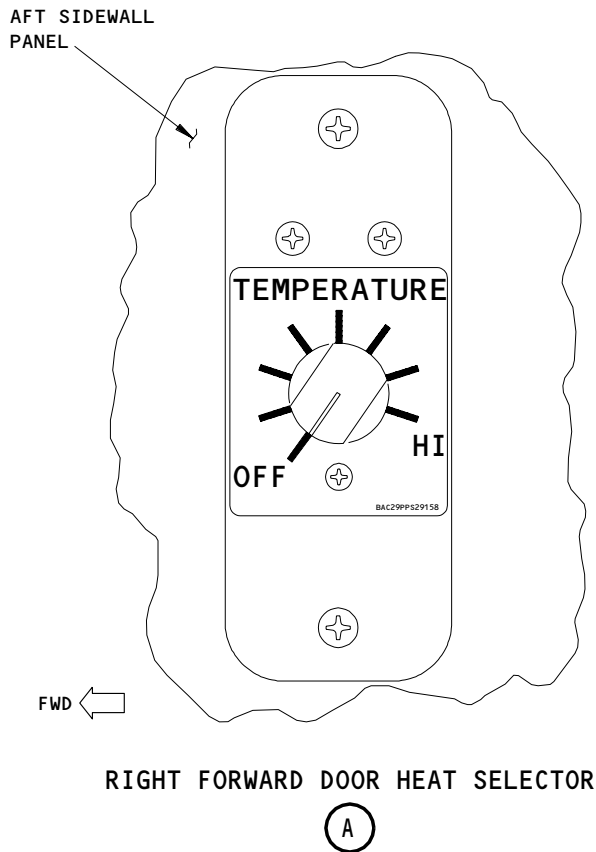
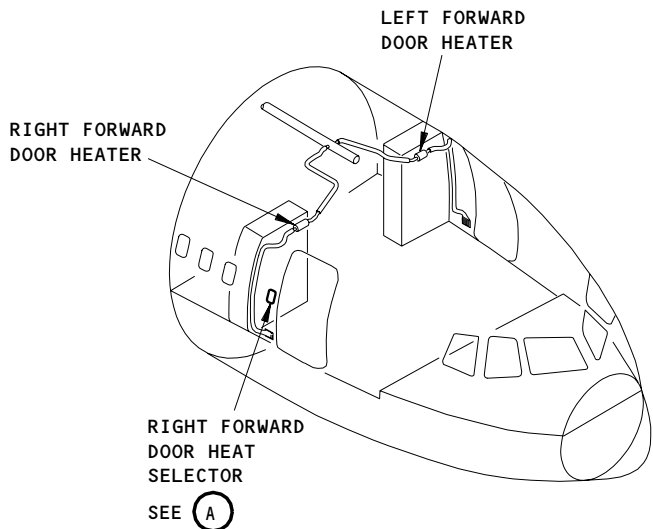
2. Operational Test – Forward Door Area Supplemental Heating System (Fig. 501)

- A. General
 - (1) It is necessary to supply air to the overhead air distribution system to test the operation of the forward door area heating system. This procedure provides these methods to supply air to the forward door area heating system:
 - (a) Operation of the left (right) recirculation fan (ATA 21-25)
 - (b) Operation of the left (right) air conditioning pack (ATA 21-51)
- B. References
 - (1) AMM 21-00-00/201, Air Conditioning (General)
 - (2) AMM 24-22-00/201, Electrical Power Control
 - (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
 - (4) AMM 32-09-02/201, Air/Ground System Relays
- C. Access
 - (1) Location Zones
 - 212 Control Cabin – Section 41 (Right)
 - 221 Passenger Cabin – Section 41 (Left)
 - 222 Passenger Cabin – Section 41 (Right)

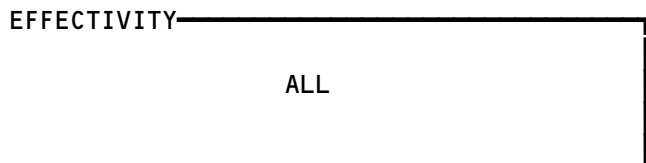
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Forward Door Area Supplemental Heating System - Adjustment/Test
Figure 501



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- (2) Access Panels
 - 119AL Main Equipment Center Access Door

D. Prepare for the Test

S 015-001

- (1) Open the main equipment center access door, 119AL.

S 865-055

- (2) Make sure these circuit breakers are closed:
 - (a) Pilots' Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - or
 - 11R12, FWD DOOR AREA HEATER CONTROL
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36A2, FWD DR AREA/BLKT HTR PWR, or
 - 36D2, FWD DR AREA/BKLT HTR L PWR
 - (c) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 37B4, RIGHT FWD DOOR AREA HTR PWR

S 865-061

- (3) Supply electrical power (AMM 24-22-00/201).

S 865-056

- (4) Make sure these selectors and switches are set as follows:
 - (a) Air Conditioning Control Panel, M14 (P5 panel)
 - 1) L PACK and R PACK selectors set to OFF
 - 2) L RECIRC FAN and R RECIRC FAN switches set to off

S 865-077

- (5) Make sure the right forward door heat selector (S940 or S10606) is set to OFF.

E. Operational Test with Left (Right) Recirculation Fan On

S 865-059

- (1) Push the L RECIRC FAN switch, on the Air Conditioning Control panel (M14, P5 panel), to the ON position.
 - (a) Make sure that cool air flows out of the air outlet grilles in the lower left (right) sidewall near the floor by each forward door.

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S 865-060

- (2) Push the L RECIRC FAN switch to the off position, then push the R RECIRC FAN switch to the ON position.
 - (a) Make sure that cool air still flows out of the air outlet grilles.

S 865-062

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (3) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-063

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (4) Do the air mode simulation procedure for the System No. 1 air/ground relays (AMM 32-09-02/201).
 - (a) Make sure that warm air flows out the air outlet grille in the lower left (right) sidewall near the floor.
 - (b) Do these steps to test the right forward door area heater:
 - 1) Make sure that cool air still flows out of the air outlet grille in the lower right sidewall near the floor.
 - 2) Set the right forward door heat selector (S940 or S10606) to the first selector position after OFF.
 - a) Make sure that warm air flows out of the air outlet grille in the lower right sidewall near the floor.
 - 3) Continue to set the selector to each of the remaining selector positions.
 - a) Make sure the air continues to get warmer at each remaining selector position.

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- 4) Set the right forward door heat selector (S940 or S10606) to OFF.
 - a) Make sure that cool air flows out of the air outlet grille.

S 865-064

- (5) Push the L RECIRC FAN switch to the ON position, then push the R RECIRC FAN switch to the off position.
 - (a) 767-200/300 (PRE-SB 21-134, 21-146 21-169, PRR B12666);
Make sure that warm air still flows out the air outlet grille in the lower left (right) sidewall near the floor.
 - (b) Do these steps to test the right forward door area heater:
 - 1) Make sure that cool air still flows out of the air outlet grille in the lower right sidewall near the floor.
 - 2) Set the right forward door heat selector (S940 or S10606) to the first selector position after OFF.
 - a) Make sure that warm air flows out of the air outlet grille in the lower right sidewall near the floor.
 - 3) Continue to set the selector to each of the remaining selector positions.
 - a) Make sure the air continues to get warmer at each remaining selector position.
 - 4) Set the right forward door heat selector (S940 or S10606) to OFF.
 - a) Make sure that cool air flows out of the air outlet grille.

S 865-065

- (6) Do the procedure to return the System No. 1 air/ground relays to the ground mode (AMM 32-09-02/201).
 - (a) Make sure that cool air flows out of the air outlet grilles.

S 865-066

- (7) Push the L RECIRC FAN switch to the off position.

S 865-067

- (8) Operate the left air conditioning pack (AMM 21-00-00/201).
 - (a) Make sure that cool air flows out of the air outlet grilles in the lower left (right) sidewall near the floor by each forward door.

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S 865-068

- (9) Stop the operation of the left air conditioning pack, then operate the right air conditioning pack (AMM 21-00-00/201).
- (a) Make sure that cool air still flows out of the air outlet grilles.

S 865-069

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (10) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-070

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (11) Do the air mode simulation procedure for the System No. 1 air/ground relays (AMM 32-09-02/201).
- (a) Do these steps to test the right forward door area heater:
- 1) Make sure that cool air still flows out of the air outlet grille in the lower right sidewall near the floor.
 - 2) Set the right forward door heat selector (S940 or S10606) to the first selector position after OFF.
 - a) Make sure that warm air flows out of the air outlet grille in the lower right sidewall near the floor.
 - 3) Continue to set the selector to each of the remaining selector positions.
 - a) Make sure the air continues to get warmer at each remaining selector position.
 - 4) Set the right forward door heat selector (S940 or S10606) to OFF.
 - a) Make sure that cool air flows out of the air outlet grille.

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S 865-071

- (12) Operate the left air conditioning pack, then stop the operation of the right air conditioning pack (AMM 21-00-00/201).
- (a) 767-200/300 (PRE-SB 21-134, 21-146, PRR B12666);
Make sure that warm air still flows out the air outlet grille in the lower left (right) sidewall near the floor.
- (b) Do these steps to test the right forward door area heater:
- 1) Make sure that cool air still flows out of the air outlet grille in the lower right sidewall near the floor.
 - 2) Set the right forward door heat selector (S940 or S10606) to the first selector position after OFF.
 - a) Make sure that warm air flows out of the air outlet grille in the lower right sidewall near the floor.
 - 3) Continue to set the selector to each of the remaining selector positions.
 - a) Make sure the air continues to get warmer at each remaining selector position.
 - 4) Set the right forward door heat selector (S940 or S10606) to OFF.
 - a) Make sure that cool air flows out of the air outlet grille.

S 865-075

- (13) Do the procedure to return the System No. 1 air/ground relays to the ground mode (AMM 32-09-02/201).
- (a) Make sure that cool air flows out of the air outlet grilles.

S 865-072

- (14) Stop the operation of the left air conditioning pack (AMM 21-00-00/201).
- F. Put the Airplane Back to Its Usual Condition

S 415-073

- (1) Close the main equipment center access door, 119AL.

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S 865-074

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FORWARD DOOR AREA HEATER – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Forward Door Area Heater Removal
 - (2) Forward Door Area Heater Installation
- B. Two canister-type heaters are installed in the overhead air distribution ducts above the forward door area ceiling panels to supply warm air to the left and right forward door floor areas. The air from the heaters flow out of air outlet grilles installed in the lower sidewall just aft of each forward door.
- C. A heat selector is found on the sidewall panel on the aft side of the right forward door. The selector has 8-positions to control the power output of the right forward door heater which is found above the right forward door ceiling.

TASK 21-45-21-004-031

2. Forward Door Area Heater Removal (Fig. 401)

- A. References
 - (1) AMM 25-22-02/401, Lowered Ceiling Panels
- B. Access
 - (1) Location Zones
 - 223 Area Above Passenger Cabin Ceiling – Section 41 (Left)
 - 224 Area Above Passenger Cabin Ceiling – Section 41 (Right)
 - (2) Access Panels
 - 119AL Main Equipment Center Access Door
- C. Prepare for Removal
 - S 014-034
 - (1) Open the main equipment center access door, 119AL.
 - S 864-035
 - (2) Open these circuit breakers and attach a DO-NOT-CLOSE tags:
 - (a) Pilots' Overhead Circuit Breaker Panel, P11
 - 1) 11R12, FWD DOOR AREA HEATER CONTROL

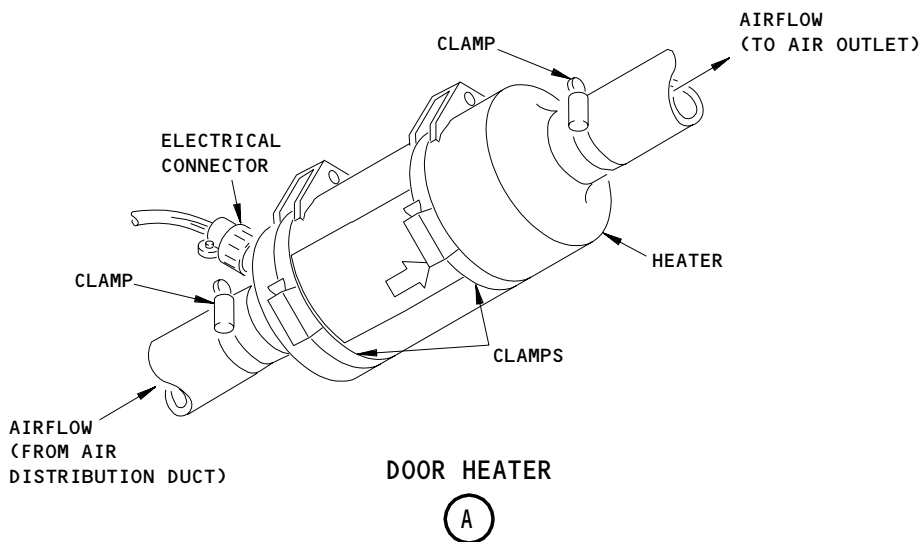
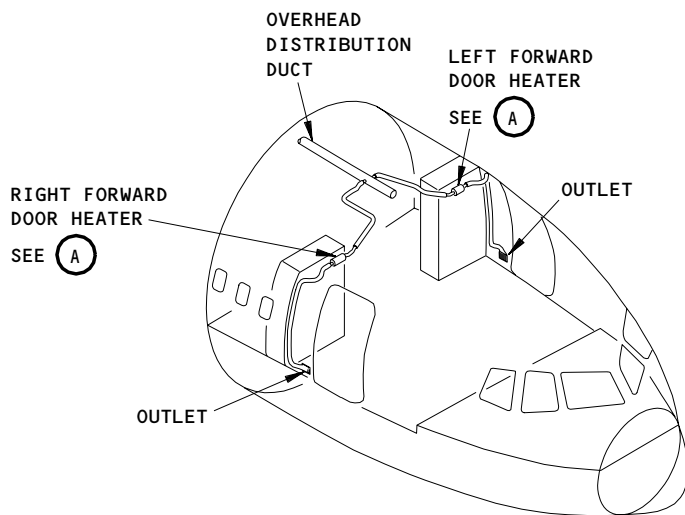
EFFECTIVITY

ALL

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Forward Door Heater Installation
Figure 401

EFFECTIVITY	ALL
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- (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36A2 or 36D2, FWD DR AREA HTR PWR, or
36A2, FWD DOOR AREA HEATER POWER
- (c) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 767-200/300 (POST-SB 21-136, 21-146, POST-PRR B12666);
37B4, RIGHT FWD DOOR AREA HTR PWR

S 864-036

- (3) Make sure these selectors and switches are set as follows and attach DO-NOT-OPERATE tags, to shutoff the airflow to the overhead air distribution ducts:

NOTE: Also, do not operate a ground air service cart to supply conditioned air to the air distribution system.

- (a) Air Conditioning Control Panel, M14 (P5 panel)
 - 1) L PACK and R PACK selectors set to OFF
 - 2) L RECIRC FAN and R RECIRC FAN switches set to off

S 864-082

- (4) 767-200/300 (POST-SB 21-134, 21-146, PRR B12666);
Make sure the right forward door heat selector (S940 or S10606) is set to OFF.

S 014-039

- (5) To get access to the heater, remove the lowered ceiling panel(s) (AMM 25-22-02/401) and/or sculptured ceiling panel(s) above the forward door area.

D. Heater Removal

S 024-033

WARNING: DO NOT TOUCH THE HEATER IF IT IS HOT. LET THE HEATER BECOME COOL BEFORE YOU REMOVE THE HEATER. A HOT HEATER CAN BURN YOU AND CAUSE INJURY.

- (1) Disconnect the electrical connector from the heater.

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S 024-045
(2) Loosen the clamps at each end of the heater.

S 024-040
(3) Remove the clamps that hold the heater to the bracket assembly.

S 024-012
(4) Remove the heater.

TASK 21-45-21-404-032

3. Forward Door Area Heater Installation (Fig. 401)

A. References

- (1) AMM 21-00-00/201, Air Conditioning (General)
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-22-02/401, Lowered Ceiling Panels
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 32-09-02/201, Air/Ground System Relays

B. Access

- (1) Location Zones
 - 223 Area Above Passenger Cabin Ceiling - Section 41 (Left)
 - 224 Area Above Passenger Cabin Ceiling - Section 41 (Right)

- (2) Access Panels
 - 119AL Main Equipment Center Access Door

C. Heater Installation

- S 424-013
(1) Put the heater into position.

NOTE: Make sure the flow arrow on the heater points outboard toward the air outlet in the lower sidewall.

- S 424-041
(2) Install and tighten the clamps that hold the heater to the bracket assembly.

EFFECTIVITY

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- S 424-042
(3) Install and tighten the clamps at each end of the heater.

- S 424-043
(4) Connect the electrical connector to the heater.
D. Heater Post-Installation Test

- S 864-046
(1) Close these circuit breakers and remove the DO-NOT-CLOSE tags:
(a) Pilots' Overhead Circuit Breaker Panel, P11
1) 11R12, FWD DOOR AREA HEATER CONTROL
(b) Left Miscellaneous Electrical Equipment Panel, P36
1) 36A2 or 36D2, FWD DR AREA HTR PWR, or
36A2, FWD DOOR AREA HEATER POWER
(c) Right Miscellaneous Electrical Equipment Panel, P37
1) 767-200/300 (POST-SB 21-136, 21-146, POST-PRR B12666);
37B4, RIGHT FWD DOOR AREA HTR PWR

- S 864-022
(2) Supply electrical power (AMM 24-22-00/201).

- S 864-047
(3) Do one of these steps to supply air to the overhead air distribution ducts:
(a) Push the L RECIRC FAN and/or R RECIRC FAN switch, on the Air Conditioning Control panel (M14, P5 panel), to the ON position.
(b) Operate the left (right) air conditioning packs (AMM 21-00-00/201).
1) Connect an external electric power source if the APU is used to provide electrical power and pneumatic air.

NOTE: If the APU is used to provide electrical power and pneumatic air, when the airplane is put in the air mode, a 'single electrical power source' load shed will occur and power will be removed from the utility buses. As a result, power will not be supplied to the left or right recirculation fans. If an external power source is connected, this 'single source' load shed logic is inhibited and power will be supplied to the utility buses.

- S 864-084
(4) 767-200/300 (POST-SB 21-134, 21-146, PRR B12666);
Set the right forward door heat selector (S940 or S10606) to OFF.

- S 724-050
(5) Make sure that cool air flows out of the air outlet grilles in the lower sidewall near the floor.

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S 864-024

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (6) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 864-025

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (7) Do the air mode simulation procedure for the System No. 1 air/ground relays (AMM 32-09-02/201).
- (a) 767-200/300 (PRE-SB 21-134, 21-146);
Make sure that warm air flows out the air outlet grille in the lower left (right) sidewall near the floor.
- (b) 767-200/300 (POST-SB 21-134, 21-146, PRRB12666);
Do these steps to test the right door area heater:
- 1) Set the right door heat selector (S940 or S10606) to HI.
 - a) Make sure that warm air flows out of the air outlet grille in the lower right sidewall near the floor.
 - 2) Set the right door heat selector (S940 or S10606) to OFF.
 - a) Make sure that cool air flows out of the air outlet grille.

S 864-029

- (8) Do the procedure to return the System No. 1 air/ground relays to the ground mode (AMM 32-09-02/201).
- (a) Make sure that cool air flows out of the air outlet grilles.

S 864-052

- (9) Push the L RECIRC FAN and R RECIRC FAN switches to the off position.

NOTE: If the air conditioning packs are in operation, also shutoff the air conditioning packs (AMM 21-00-00/201).

EFFECTIVITY

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S 864-051

- (10) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

E. Put the Airplane Back to Its Usual Condition

S 414-020

- (1) Install the lowered ceiling panel(s) (AMM 25-22-02/401) and/or sculptured ceiling panel(s).

S 414-053

- (2) Close the main equipment center access door, 119AL.

S 864-021

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

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RIGHT FORWARD DOOR HEAT SELECTOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Right Forward Door Heat Selector Removal
 - (2) Right Forward Door Heat Selector Installation
- B. The heat selector is found on the sidewall panel on the aft side of the right forward door. The selector has 8-positions to control the power output of the right forward door heater which is found above the right forward door ceiling.

TASK 21-45-22-004-001

2. Right Forward Door Heat Selector Removal (Fig. 401)

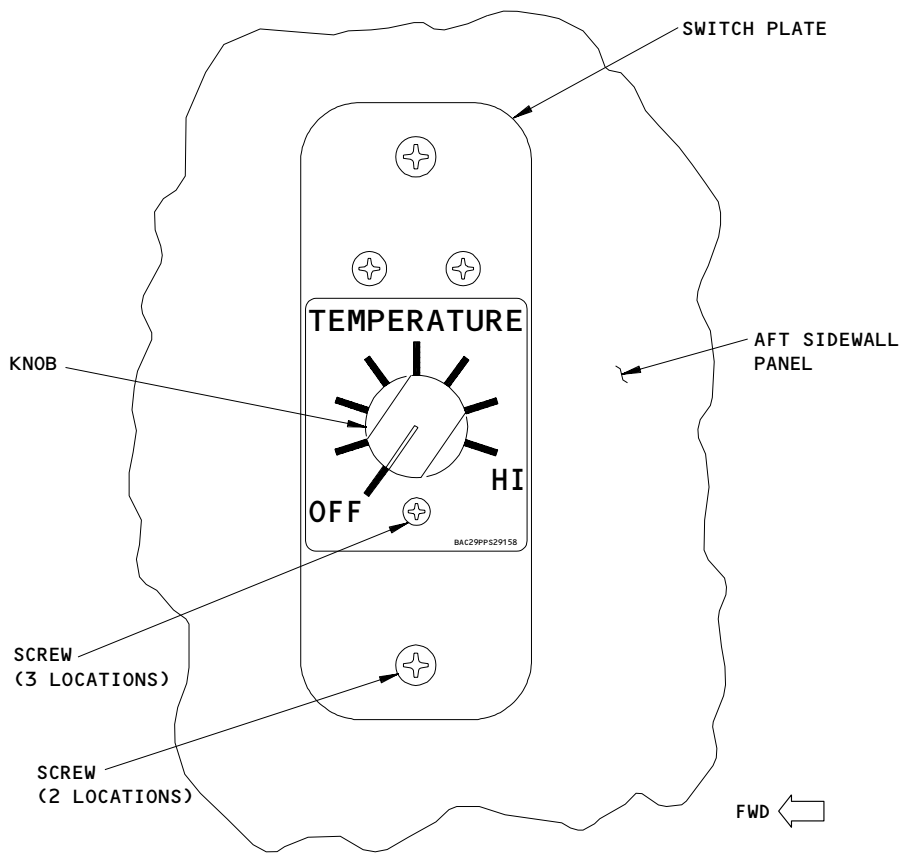
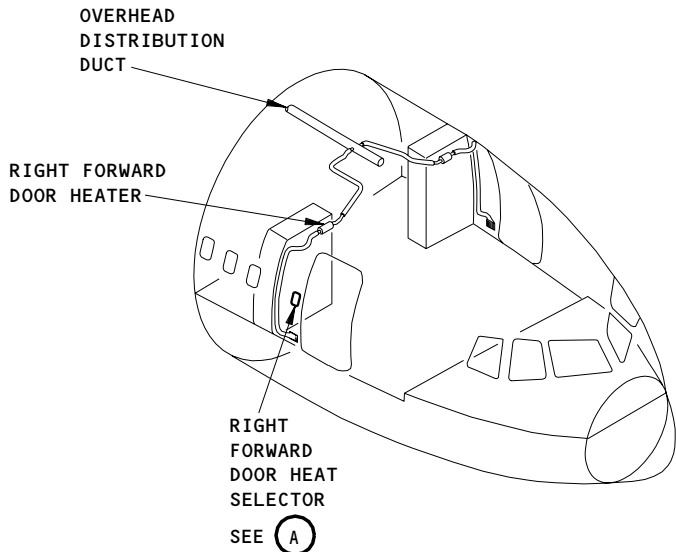
- A. References
 - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- B. Access
 - (1) Location Zones
 - 222 Passenger cabin – Section 41 (Right)
 - (2) Access Panels
 - 119AL Main Equipment Center Access Door

C. Prepare for Removal

- S 014-017
 - (1) Open the main equipment center access door, 119AL (AMM 06-41-00/201).
- S 864-002
 - (2) Open these circuit breakers and attach a DO-NOT-CLOSE tags:
 - (a) Pilots' Overhead Circuit Breaker Panel, P11
 - 1) 11R12, FWD DOOR AREA HEATER CONTROL
 - (b) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 37B4, RIGHT FWD DOOR AREA HTR PWR
- S 864-040
 - (3) Make sure the right forward door heat selector (S940 or S10606) is set to OFF.

EFFECTIVITY
767-300 AIRPLANES WITH RIGHT FORWARD
DOOR HEAT SELECTOR (POST-SB 21-134 OR
POST-SB 21-146; POST-PRR B12666)

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RIGHT FORWARD DOOR HEAT SELECTOR

(A)

Right Forward Door Heat Selector Installation
Figure 401

EFFECTIVITY
767-300 AIRPLANES WITH RIGHT FORWARD
DOOR HEAT SELECTOR (POST-SB 21-134 OR
POST-SB 21-146; POST-PRR B12666)

21-45-22

D. Selector Removal

S 024-005

- (1) Remove the two screws (top and bottom) that hold the selector switchplate to the sidewall panel.

S 024-019

- (2) Pull the selector out of the sidewall panel until you can disconnect the electrical connector on the backside of the selector.

S 024-006

- (3) Disconnect the electrical connector from the selector.

S 024-021

- (4) Do these steps to remove the knob and switchplate from the selector:
 - (a) Remove the knob from the selector.
 - (b) Remove the three screws that hold the switchplate to the selector.
 - (c) Remove the switchplate from the selector.
 - (d) Keep the knob and switchplate for subsequent installation to the new selector.

S 024-020

- (5) Remove the selector.

TASK 21-45-22-404-009

3. Right Forward Door Heat Selector Installation (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-00-00/201, Air Conditioning (General)
- (3) AMM 24-22-00/201, Electrical Power Control
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 32-09-02/201, Air/Ground System Relays

B. Access

- (1) Location Zones
 - 222 Passenger cabin - Section 41 (Right)
- (2) Access Panels
 - 119AL Main Equipment Center Access Door

EFFECTIVITY
767-300 AIRPLANES WITH RIGHT FORWARD
DOOR HEAT SELECTOR (POST-SB 21-134 OR
POST-SB 21-146; POST-PRR B12666)

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C. Selector Installation

S 424-010

- (1) If removed, install the switchplate and knob onto the selector.

S 424-012

- (2) Connect the electrical connector to the selector.

S 424-013

- (3) Install the selector to the sidewall panel with the two screws.

D. Selector Post-Installation Test

S 864-022

- (1) Close these circuit breakers and remove the DO-NOT-CLOSE tags:
- (a) Pilots' Overhead Circuit Breaker Panel, P11
 - 1) 11R12, FWD DOOR AREA HEATER CONTROL
 - (b) Right Miscellaneous Electrical Equipment Panel, P37
 - 1) 37B4, RIGHT FWD DOOR AREA HTR PWR

S 864-023

- (2) Supply electrical power (AMM 24-22-00/201).

S 864-025

- (3) Do one of these steps to supply air to the overhead air distribution ducts:
- (a) Push the L RECIRC FAN and/or R RECIRC FAN switch, on the Air Conditioning Control panel (M14, P5 panel), to the ON position.
 - (b) Operate the left (right) air conditioning packs (AMM 21-00-00/201).

S 724-039

- (4) Set the selector to the OFF position.
- (a) Make sure that cool air flows out of the air outlet grille at the bottom of the sidewall panel on the aft side of the right forward door.

S 864-027

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (5) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

EFFECTIVITY
767-300 AIRPLANES WITH RIGHT FORWARD
DOOR HEAT SELECTOR (POST-SB 21-134 OR
POST-SB 21-146; POST-PRR B12666)

21-45-22

S 864-028

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (6) Do the air mode simulation procedure the System No. 1 air/ground relays (AMM 32-09-02/201).
 - (a) Make sure that cool air still flows out the air outlet grille.
 - (b) Set the selector to the first selector position after OFF.
 - 1) Make sure that warm air flows out of the air outlet grille.
 - (c) Set the selector to the second selector position after OFF.
 - 1) Make sure that warmer air flows out of the air outlet grille.
 - (d) Continue to set the selector to each of the remaining selector positions.
 - 1) Make sure the air continues to get warmer at each remaining selector position.
 - (e) Set the selector to OFF position.
 - 1) Make sure that cool air flows out of the air outlet grille.

S 864-029

- (7) Do the procedure to return the System No. 1 air/ground relays to the ground mode (AMM 32-09-02/201).
 - (a) Make sure that cool air still flows out the air outlet grille.

S 864-036

- (8) Push the L RECIRC FAN and R RECIRC FAN switches to the off position.

NOTE: If the air conditioning packs are in operation, also shutoff the air conditioning packs (AMM 21-00-00/201).

S 864-035

- (9) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

EFFECTIVITY
767-300 AIRPLANES WITH RIGHT FORWARD
DOOR HEAT SELECTOR (POST-SB 21-134 OR
POST-SB 21-146; POST-PRR B12666)

21-45-22

E. Put the Airplane Back to Its Usual Condition

S 414-037

- (1) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

S 864-038

- (2) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY
767-300 AIRPLANES WITH RIGHT FORWARD
DOOR HEAT SELECTOR (POST-SB 21-134 OR
POST-SB 21-146; POST-PRR B12666)

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AFT DOOR AREA SUPPLEMENTAL HEATING SYSTEM -
DESCRIPTION AND OPERATION

1. General

- A. The supplemental heating system for the aft door areas consists of canister-type heaters which are installed in the overhead air distribution ducts above the aft door area ceiling panels. The heaters supply warm air to the floor areas through an air outlet grille on the lower sidewall just forward of the aft doors.
- B. The air conditioning packs or the recirculation fans supply the necessary airflow movement through the heaters which gets ducted to the air outlet grilles in the lower sidewalls. The heaters will only operate when the airplane is airborne/air mode simulated (air/ground relay energized) and either the left (right) air conditioning pack or left (right) recirculation fan is on.
- C. AIRPLANES WITH BOOST FANS (PRE-PRR C12373);
A boost fan is also installed adjacent to each heater to supply additional airflow movement through the air outlet grilles. The boost fans will operate whenever electrical power is on.

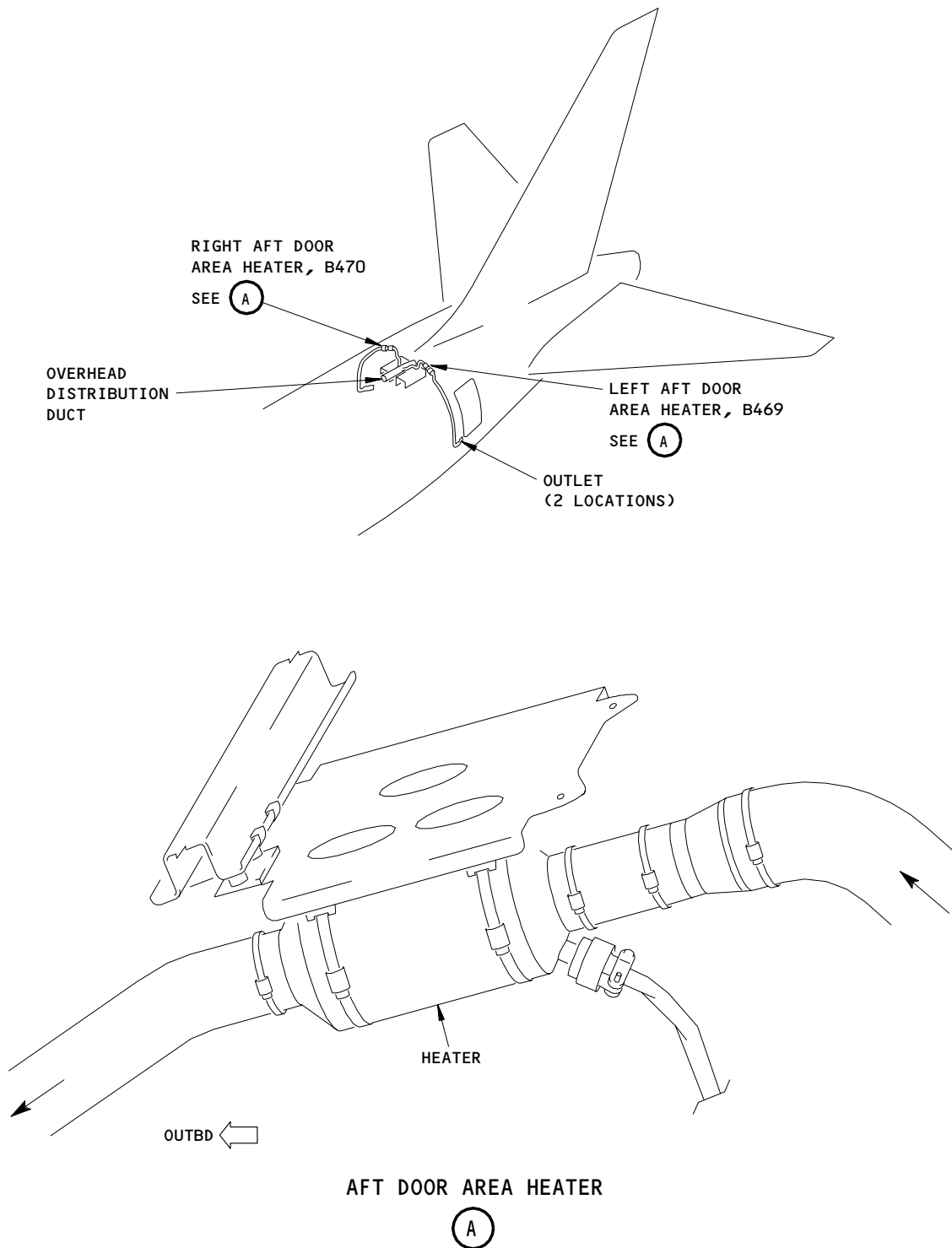
2. Component Details (Fig. 1)

- A. Aft Door Heater
 - (1) Two canister-type heaters are installed above the aft door area ceiling panels. Each heater is connected in-line with the overhead air distribution ducts that supply air to the floor areas through an air outlet grille in the lower sidewall just forward of each aft door.
 - (2) The door heater operates on dual-phase 115/200VAC power and generates approximately 500-watts of power. Each heater has two heater elements and two thermostats for overheat protection. The control thermostat will open when the heater outlet temperature is more than 185-degrees F (85-degrees C). If the control thermostat fails to open, the backup thermostat will then open when the heater outlet temperature is more than 250-degrees F (121-degrees C).
- B. Aft Door Boost Fan (AIRPLANES PRE-PRR C12373)
 - (1) Two boost fans are installed adjacent to the door heaters in the overhead air distribution ducts. The boost fan is a vaneaxial fan type where the airflow through the fan is parallel to the fan motor shaft.
 - (2) The boost fan operates on three-phase 115/200VAC power and has internal protection from high temperatures provided by a thermal protector embedded within the motor windings.

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST PRR B12139)

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767
MAINTENANCE MANUAL



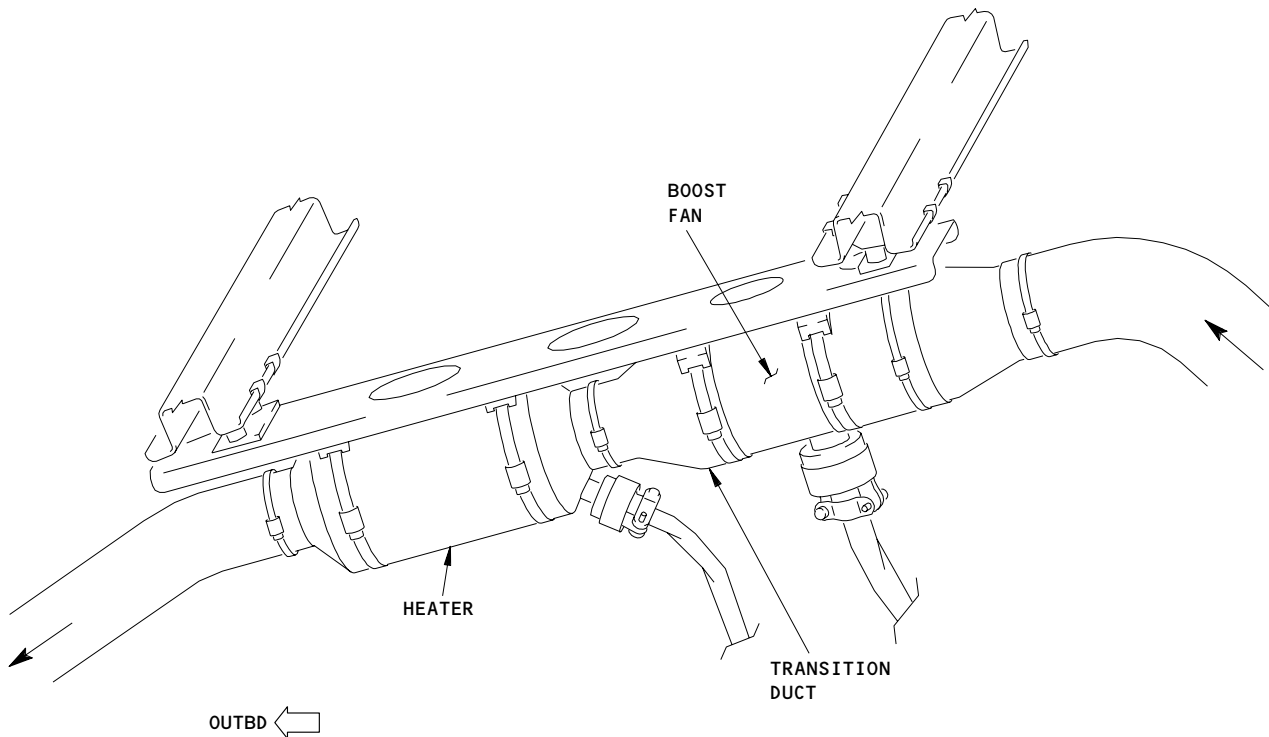
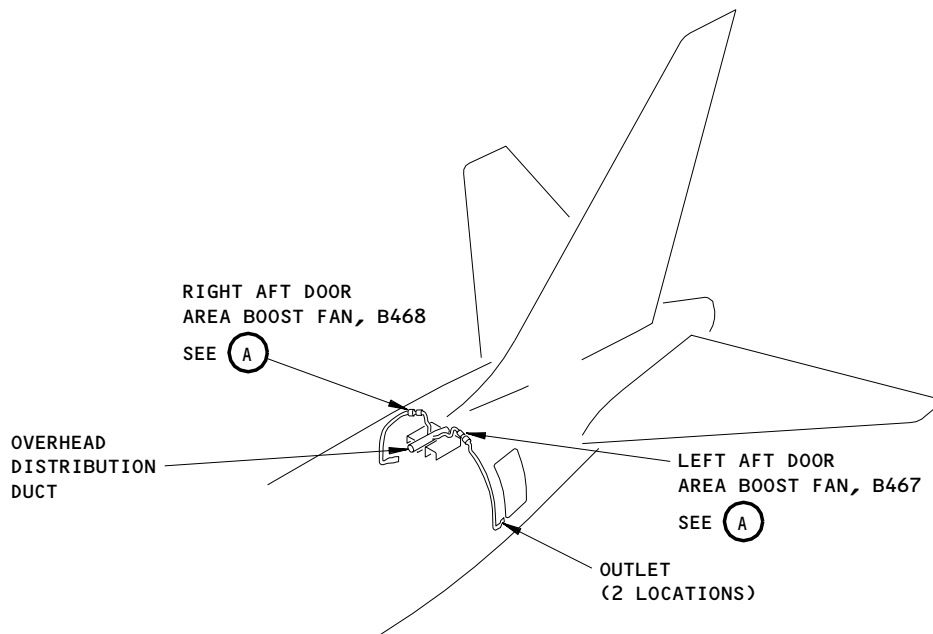
Aft Door Area Supplemental Heating System - Component Location
Figure 1

EFFECTIVITY
AIRPLANES WITH HEATER INSTALLATION
WITHOUT BOOST FAN (POST PRR C12373)

21-45-50

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AFT DOOR AREA BOOST FAN

(A)

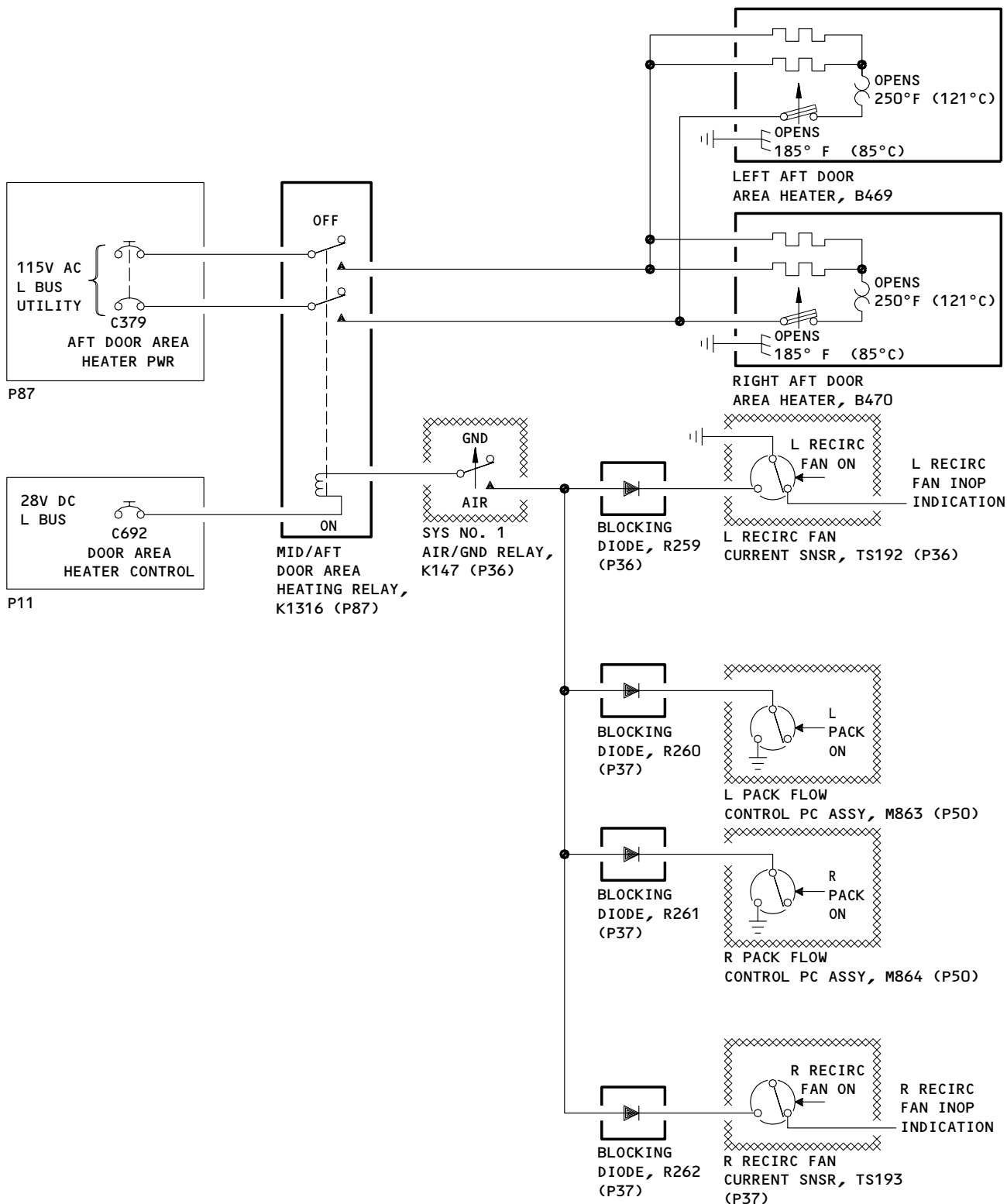
Aft Door Area Supplemental Heating System - Component Location
Figure 1A

EFFECTIVITY
AIRPLANES WITH HEATER INSTALLATION
WITH BOOST FAN (PRE-PRR C12373)

21-45-50

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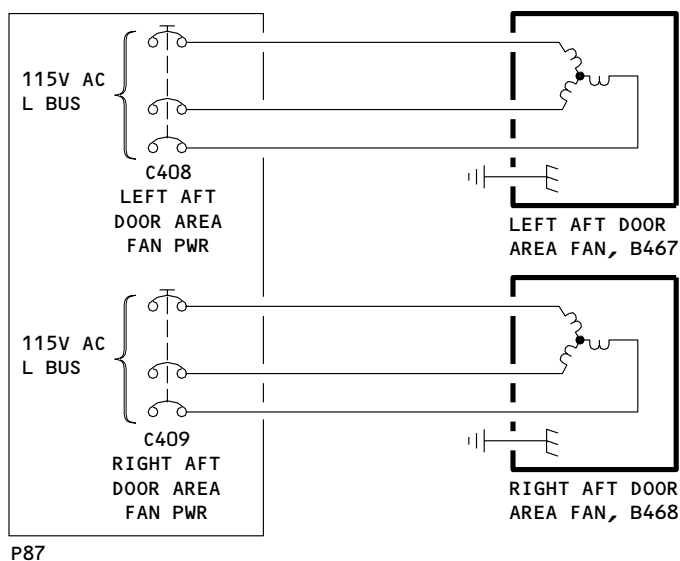
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Aft Door Area Supplemental Heating Schematic
Figure 2

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST PRR B12139)

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Aft Door Area Supplemental Heating Schematic
Figure 2A

EFFECTIVITY
AIRPLANES WITH BOOST FANS
(PRE-PRR C12373)

21-45-50

3. Operation (Fig. 2)

A. Functional Description

- (1) The heaters normally do not operate when the airplane is on the ground. Heater operation is automatically enabled when the airplane is airborne/air mode simulated (air/ground relay energized) and either the left (right) air conditioning pack or left (right) recirculation fan is on.
- (2) AIRPLANES WITH BOOST FANS (PRE-PRR C12373);
The boost fans will operate whenever electrical power is supplied to the airplane.
- (3) There are no crew alerting EICAS messages, indications, or fault annunciations associated with the aft door area supplemental heating system.

B. Control





- (1) Supply electrical power (AMM 24-22-00/201).
- (2) Supply conditioned air to the overhead air distribution system with the air conditioning packs or recirculation fans (AMM 21-00-00/201).
- (3) Do the air mode simulation procedure for the System No.1 air/ground relays (AMM 32-09-02/201).

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST PRR B12139)


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 **BOEING**
767
FAULT ISOLATION/MAINT MANUAL

AFT DOOR AREA SUPPLEMENTAL HEATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CARD - (FIM 21-51-00/101) LEFT PACK FLOW CONTROL, M863 RIGHT PACK FLOW CONTROL, M864				
CIRCUIT BREAKER - DOOR HEAT CONT, C692		1	FLT COMPT, P11 11R12	*
CIRCUIT BREAKER - AFT DOOR AREA HEATER PWR, C379		1	119AL, MAIN EQUIP CTR, P87	*
LEFT AFT DOOR AREA FAN PWR, C408 		1	87B3	*
RIGHT AFT DOOR AREA FAN PWR, C409 		1	87B4	*
DIODE - BLOCKING (FIM 31-01-36/101) R259		1	87A1	*
DIODE - BLOCKING (FIM 31-01-37/101) R260, R261, R262		3		*
FAN - BOOST LEFT AFT DOOR, B467 	-	1	PASS. COMPT, ABOVE LEFT AFT DOOR CEILING	21-45-52
RIGHT AFT DOOR, B468 	-	1	PASS. COMPT, ABOVE RIGHT AFT DOOR CEILING	21-45-52
HEATER - LEFT AFT DOOR, B469	-	1	PASS. COMPT, ABOVE LEFT AFT DOOR CEILING	21-45-51
RIGHT AFT DOOR, B470	-	1	PASS. COMPT, ABOVE RIGHT AFT DOOR CEILING	21-45-51
RELAY - (FIM 31-01-36/101) AIR/GND SYS NO. 1, K147		1		
RELAY - (FIM 31-01-87/101) MID/AFT DOOR AREA HEAT, K1316		1		*
SENSOR - CURRENT (FIM 21-25-00/101) LEFT RECIRC FAN, TS192				*
RIGHT RECIRC FAN, TS193				*

* SEE THE WDM EQUIPMENT LIST

 BOOST FANS NOT INSTALLED ON ALL AIRPLANES (PRR C12373)

Aft Door Area Supplemental Heating System - Component Index
Figure 101

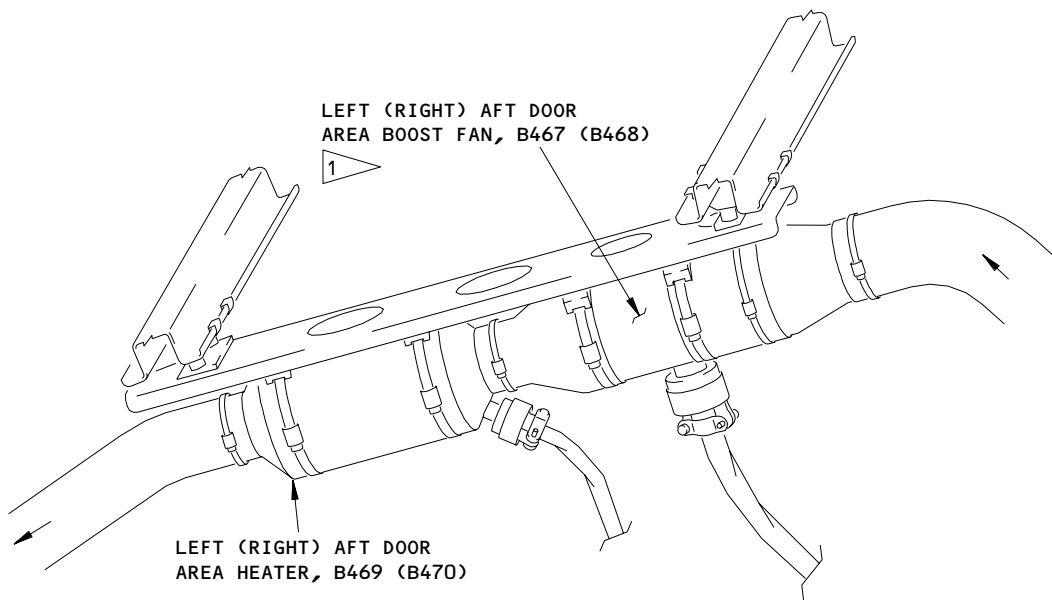
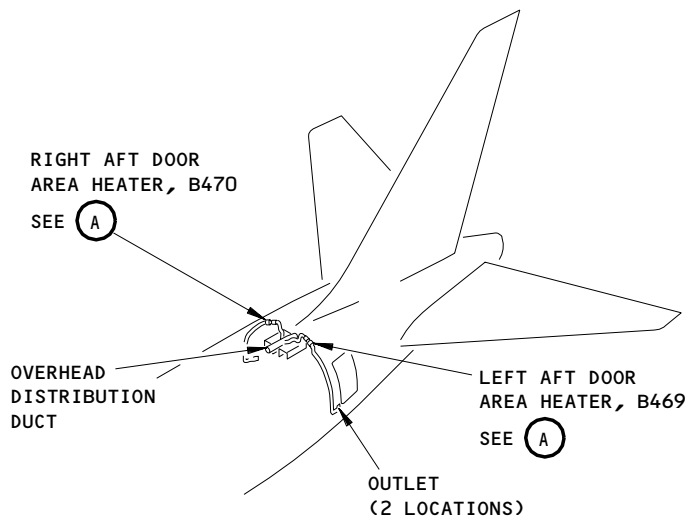
EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST PRR B12319)

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AFT DOOR AREA HEATER

(A)

1 BOOST FANS NOT INSTALLED ON ALL AIRPLANES (PRR C12373)

Aft Door Area Supplemental Heating System - Component Location
Figure 102

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST PRR B12319)

21-45-50

AFT DOOR AREA SUPPLEMENTAL HEATING SYSTEM -
ADJUSTMENT/TEST

1. General

- A. This procedure has this task:
 - (1) Operational Test - Aft Door Area Supplemental Heating System
- B. The supplemental heating system for the aft door area consists of heaters which are installed in the overhead air distribution ducts above the aft door area ceiling panels. The heaters supply warm air to the floor areas through an air outlet grille on the lower sidewalls just forward of the aft doors.
- C. To test the operation of the heaters, you must supply electrical power, operate the air conditioning packs and/or air recirculation system, then simulate that the airplane is in the air mode.

TASK 21-45-50-705-001

2. Operational Test - Aft Door Area Supplemental Heating System

A. General

- (1) It is necessary to supply air to the overhead air distribution system to test the operation of the aft door area heating system. This procedure provides these methods to supply air to the aft door area heating system:
 - (a) Operation of the left (right) recirculation fan (AMM 21-25-00/001).
 - (b) Operation of the left (right) air conditioning pack (AMM 21-51-00/001).

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-00-00/201, Air Conditioning - General
- (3) AMM 24-22-00/201, Electrical Power Control
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 32-09-02/201, Air/Ground System Relays

C. Access

- (1) Location Zones
 - 251 Passenger Cabin - Section 46 (left)
 - 252 Passenger Cabin - Section 46 (right)
- (2) Access Panels
 - 119AL Main Equipment Center Access Door

D. Prepare for the Test

- S 015-002
- (1) Open the main equipment center access door, 119AL (AMM 06-41-00/201).

EFFECTIVITY

767-200/300 AIRPLANES WITH AFT DOOR HEAT (POST-SB 21-111, POST-SB 21-119, OR POST-SB 21-120; POST-PRR B12139)

21-45-50

S 865-003

- (2) Make sure these circuit breakers are closed:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Forward Left Miscellaneous Electrical Equipment Panel, P87
 - 1) 87B3, HEATER PWR - AFT DOOR AREA
 - 2) AIRPLANES WHICH HAVE HEATER INSTALLATIONS WITH A BOOST FAN (PRE-PRR C12373);
Additional circuit breakers:
 - a) 87A1, RIGHT FAN PWR - AFT DOOR AREA
 - b) 87B4, LEFT FAN PWR - AFT DOOR AREA

S 865-004

- (3) Supply electrical power (AMM 24-22-00/201).
 - (a) AIRPLANES WHICH HAVE HEATER INSTALLATIONS WITH A BOOST FAN;
Make sure that cool air flows out of the sidewall outlets at the forward end of the aft door near the floor.
- E. Operational Test with Left (Right) Recirculation Fan On

S 865-007

- (1) Push the L RECIRC FAN switch, on the Air Conditioning Control panel (M14, P5 panel), to the ON position.
 - (a) Make sure that cool air flows out of the sidewall outlets which are adjacent to the forward end of the aft door near the floor.

S 865-008

- (2) Push the L RECIRC FAN switch to the off position, then push the R RECIRC FAN switch to the ON position.
 - (a) Make sure that cool air still flows out of the sidewall outlets.

S 865-012

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (3) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST-PRR B12139)

21-45-50

S 865-013

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (4) Do the air mode simulation procedure for the System No. 1 air/ground relay (AMM 32-09-02/201).
(a) Make sure that warm air flows out of the sidewall outlets.

S 865-014

- (5) Push the L RECIRC FAN switch to the ON position, then push the R RECIRC FAN switch to the off position.
(a) Make sure that warm air still flows out of the sidewall outlets.

S 865-029

- (6) Do the procedure to return the System No. 1 air/ground relay to the ground mode (AMM 32-09-02/201).
(a) Make sure that cool air flows out of the sidewall outlets.

S 865-016

- (7) Push the L RECIRC FAN switch to the off position.
F. Operational Test with Left (Right) Air Conditioning Pack On

S 865-017

- (1) Operate the left air conditioning pack (AMM 21-00-00/201).
(a) Make sure that cool air flows out of the sidewall outlets.

S 865-018

- (2) Stop the operation of the left air conditioning pack, then operate the right air conditioning pack (AMM 21-00-00/201).
(a) Make sure that cool air still flows out of the sidewall outlets.

S 865-020

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (3) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST-PRR B12139)

21-45-50

S 865-021

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (4) Do the air mode simulation procedure for the System No. 1 air/ground relay (AMM 32-09-02/201).
 - (a) Make sure that warm air flows out of the sidewall outlets.

S 865-022

- (5) Operate the left air conditioning pack, then stop the operation of the right air conditioning pack (AMM 21-00-00/201).
 - (a) Make sure that warm air still flows out of the sidewall outlets.

S 865-027

- (6) Do the procedure to return the System No. 1 air/ground relay to the ground mode (AMM 32-09-02/201).
 - (a) Make sure that cool air flows out of the sidewall outlets.

S 865-024

- (7) Stop the operation of the left air conditioning pack (AMM 21-00-00/201).

G. Put the Airplane Back to Its Usual Condition

S 865-030

- (1) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

S 415-025

- (2) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

S 865-026

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST-PRR B12139)

21-45-50

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AFT DOOR AREA HEATER – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Aft Door Area Heater Removal
 - (2) Aft Door Area Heater Installation
- B. Two canister-type heaters are installed in the overhead air distribution ducts above the aft door area ceiling panels to supply warm air to the left and right aft door floor areas. The air from the heaters flow out of air outlet grilles installed in the lower sidewall just forward of each aft door.

TASK 21-45-51-004-001

2. Aft Door Area Heater Removal (Fig. 401)

- A. References
 - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
 - (2) AMM 25-22-02/401, Lowered Ceiling Panels
- B. Access
 - (1) Location Zones
 - 253 Area Above Passenger Cabin Ceiling – Section 46 (left)
 - 254 Area Above Passenger Cabin Ceiling – Section 46 (right)
- C. Prepare for Removal

S 014-051

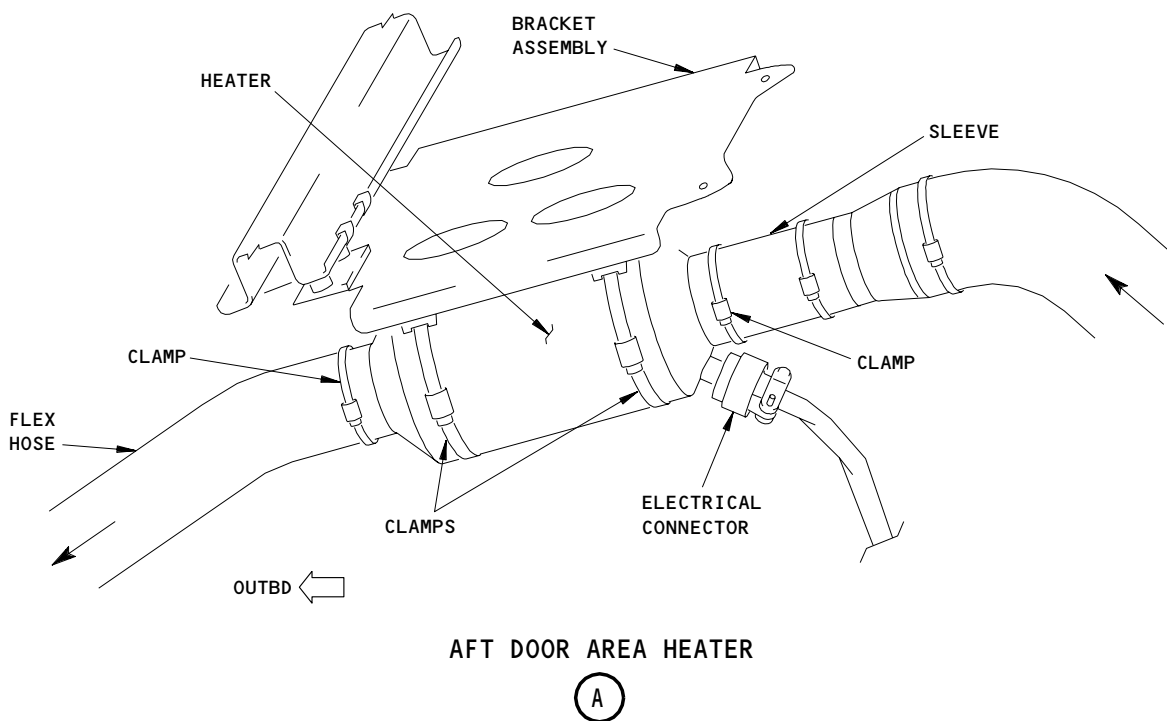
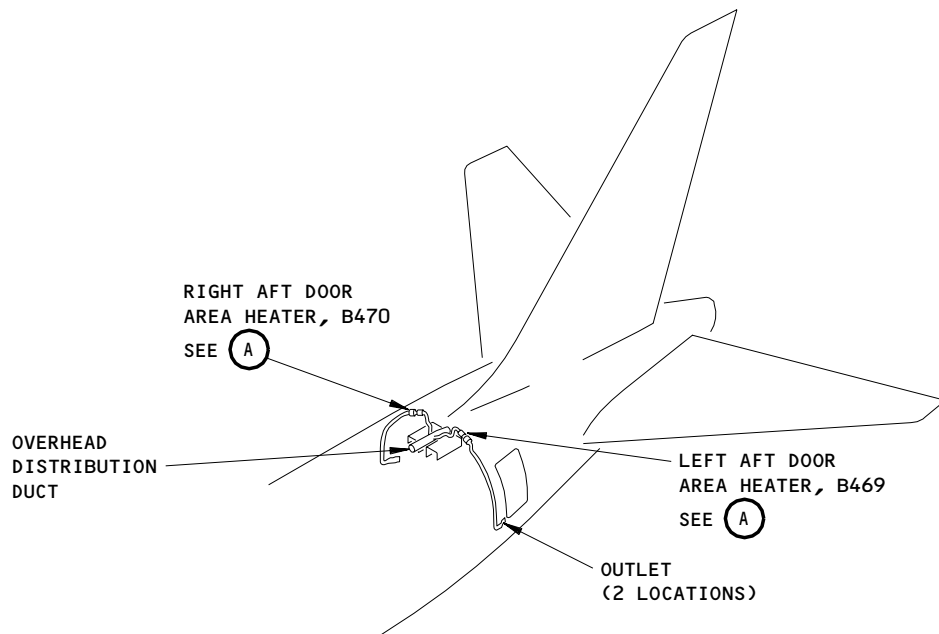
- (1) Open the main equipment center access door, 119AL (AMM 06-41-00/201)

S 864-052

- (2) Open these circuit breakers and attach DO-NOT-CLOSE tags:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Forward Left Miscellaneous Electrical Equipment Panel, P87
 - 1) 87B3, HEATER PWR – AFT DOOR AREA
 - 2) HEATER INSTALLATION WITH A BOOST FAN (PRE-PRR C12373);
Additional circuit breakers:
 - a) 87A1, RIGHT FAN PWR – AFT DOOR AREA
 - b) 87B4, LEFT FAN PWR – AFT DOOR AREA

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST-PRR B12139)

21-45-51



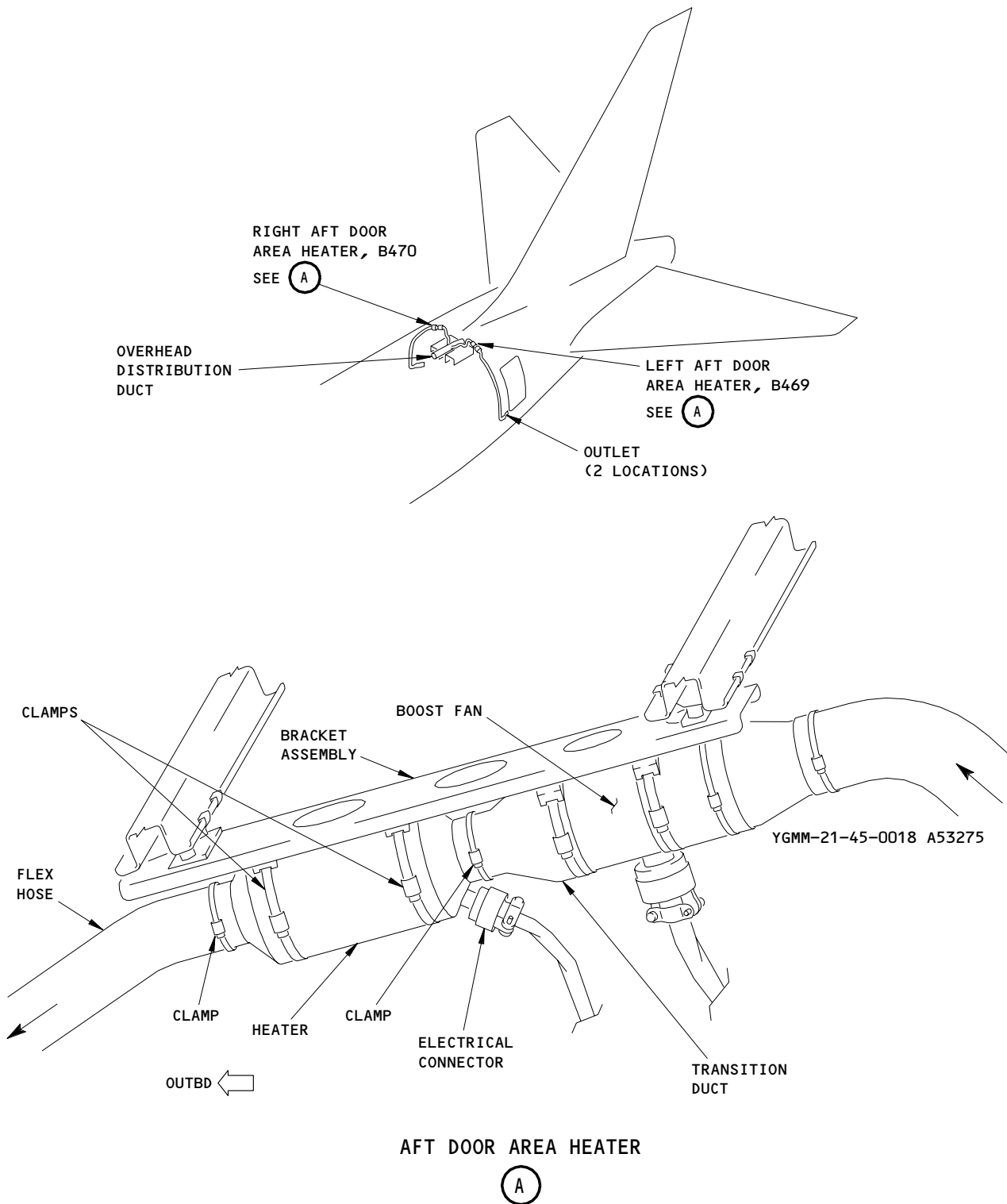
Aft Door Area Heater Installation
Figure 401

EFFECTIVITY
AIRPLANES WHICH HAVE HEATER INSTALLATION
WITHOUT A BOOST FAN (POST-PRR C12373)

21-45-51

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Aft Door Area Heater Installation
Figure 401A

EFFECTIVITY
AIRPLANES WHICH HAVE HEATER INSTALLATION
WITH A BOOST FAN (PRE-PRR C12373)

21-45-51

S 864-054

- (3) Make sure these selectors and switches are set as follows and attach DO-NOT-OPERATE tags, to shutoff the airflow to the overhead air distribution ducts:

NOTE: Also, do not operate a ground air service cart to supply conditioned air to the air distribution system.

- (a) Air Conditioning Control Panel, M14 (P5 panel)
1) L PACK and R PACK selectors set to OFF
2) L RECIRC FAN and R RECIRC FAN switches set to off

S 014-053

- (4) To get access to the heater, remove the lowered ceiling panel(s) (AMM 25-22-02/401) and/or sculptured ceiling panel(s) that is immediately forward of the aft door area.

D. Heater Removal

S 024-073

WARNING: DO NOT TOUCH THE HEATER IF IT IS HOT. LET THE HEATER BECOME COOL BEFORE YOU REMOVE THE HEATER. A HOT HEATER CAN BURN YOU AND CAUSE INJURY.

- (1) Disconnect the electrical connector from the heater.

S 024-059

- (2) Loosen the clamp that holds the heater to the flex hose.

S 024-058

- (3) AIRPLANES WHICH HAVE HEATER INSTALLATIONS WITHOUT A BOOST FAN (POST-PRR C12373);
Loosen the outboard-most clamp that holds the heater to the sleeve.

S 024-060

- (4) AIRPLANES WHICH HAVE HEATER INSTALLATIONS WITH A BOOST FAN (PRE-PRR C12373);
Loosen the outboard-most clamp that holds the heater to the transition duct.

S 024-057

- (5) Loosen the two clamps that hold the heater to the bracket assembly.

S 024-056

- (6) Remove the heater.

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST-PRR B12139)

21-45-51

TASK 21-45-51-404-020

3. Aft Door Area Heater Installation (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-00-00/201, Air Conditioning - General
- (3) AMM 24-22-00/201, Electrical Power Control
- (4) AMM 25-22-02/401, Lowered Ceiling Panels
- (5) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (6) AMM 32-09-02/201, Air/Ground System Relays

B. Access

- (1) Location Zones
 - 253 Area Above Passenger Cabin Ceiling - Section 46 (left)
 - 254 Area Above Passenger Cabin Ceiling - Section 46 (right)

C. Heater Installation

S 424-061

- (1) Put the heater between the flex hose and the sleeve/transition duct.

NOTE: Make sure the flow arrow on the heater points outboard toward the flex hose and toward the air outlet grille.

S 434-022

- (2) Install and tighten the two clamps that hold the heater to the bracket assembly.

S 434-023

- (3) Install and tighten the clamp that holds the heater to the flex hose.

S 434-026

- (4) Connect the electrical connector to the heater.

D. Heater Post-Installation Test

S 864-063

- (1) Close these circuit breakers and remove the DO-NOT-CLOSE tags:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Forward Left Miscellaneous Electrical Equipment Panel, P87
 - 1) 87B3, HEATER PWR - AFT DOOR AREA
 - 2) AIRPLANES WHICH HAVE HEATER INSTALLATIONS WITH A BOOST FAN (PRE-PRR C12373);
Additional circuit breakers:
 - a) 87A1, RIGHT FAN PWR - AFT DOOR AREA
 - b) 87B4, LEFT FAN PWR - AFT DOOR AREA

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST-PRR B12139)

21-45-51

S 864-030

- (2) Supply electrical power (AMM 24-22-00/201).

S 864-068

- (3) Do one of these steps to supply air to the overhead air distribution ducts:
- (a) Push the L RECIRC FAN and/or R RECIRC FAN switch, on the Air Conditioning Control panel (M14, P5 panel), to the ON position.
 - (b) Operate the left (right) air conditioning packs (AMM 21-00-00/201).

S 724-069

- (4) Make sure that cool air flows out of the air outlet grilles in the lower sidewall near the floor.

S 864-032

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY OR DAMAGE.

- (5) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 864-033

WARNING: MAKE SURE YOU DO THE AIR MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY OR DAMAGE CAN OCCUR.

- (6) Do the air mode simulation procedure for the System No. 1 air/ground relay (AMM 32-09-02/201).
- (a) Make sure that warm air flows out of the air outlet grille.

S 864-070

- (7) Do the procedure to return the System No. 1 air/ground relay to the ground mode (AMM 32-09-02/201).
- (a) Make sure that cool air flows out of the air outlet grille.

S 864-035

- (8) Push the L RECIRC FAN and R RECIRC FAN switches to the off position.

NOTE: If the air conditioning packs are in operation, also shutoff the air conditioning packs (AMM 21-00-00/201).

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR HEAT
(POST-SB 21-111, POST-SB 21-119, OR
POST-SB 21-120; POST-PRR B12139)

21-45-51

S 864-067

- (9) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

E. Put the Airplane Back to Its Usual Condition

S 414-037

- (1) Install the lowered ceiling panel(s) (AMM 25-22-02/401) and/or sculptured ceiling panel(s).

S 414-062

- (2) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

S 864-038

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

767-200/300 AIRPLANES WITH AFT DOOR HEAT (POST-SB 21-111, POST-SB 21-119, OR POST-SB 21-120; POST-PRR B12139)

21-45-51

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AFT DOOR AREA BOOST FAN – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Boost Fan Removal
 - (2) Boost Fan Installation
- B. Two boost fans are installed above the ceiling panels which are found immediately forward of the left and right aft door areas. The boost fans help to increase the movement of the air which is supplied by the overhead distribution system to the aft door area heaters. The boost fans are installed adjacent to the aft door area heaters. The boost fans will operate whenever electrical power is supplied.

TASK 21-45-52-004-001

2. Boost Fan Removal (Fig. 401)

- A. References
 - (1) AMM 25-22-02/401, Lowered Ceiling Panels
- B. Access
 - (1) Location Zones
 - 253 Area Above Passenger Cabin Ceiling – Section 46 (left)
 - 254 Area Above Passenger Cabin Ceiling – Section 46 (right)

C. Prepare for Removal

S 014-058

- (1) Open the main equipment center access door, 119AL.

S 864-013

- (2) Open these circuit breakers and attach DO-NOT-CLOSE tags:

(a) Forward Left Miscellaneous Electrical Equipment Panel, P87

- 1) 87A1, RIGHT FAN PWR – AFT DOOR AREA
- 2) 87B4, LEFT FAN PWR – AFT DOOR AREA

S 864-057

- (3) Make sure these selectors and switches are set as follows and attach DO-NOT-OPERATE tags, to shutoff the airflow to the overhead air distribution ducts:

NOTE: Also, do not operate a ground air service cart to supply conditioned air to air distribution system.

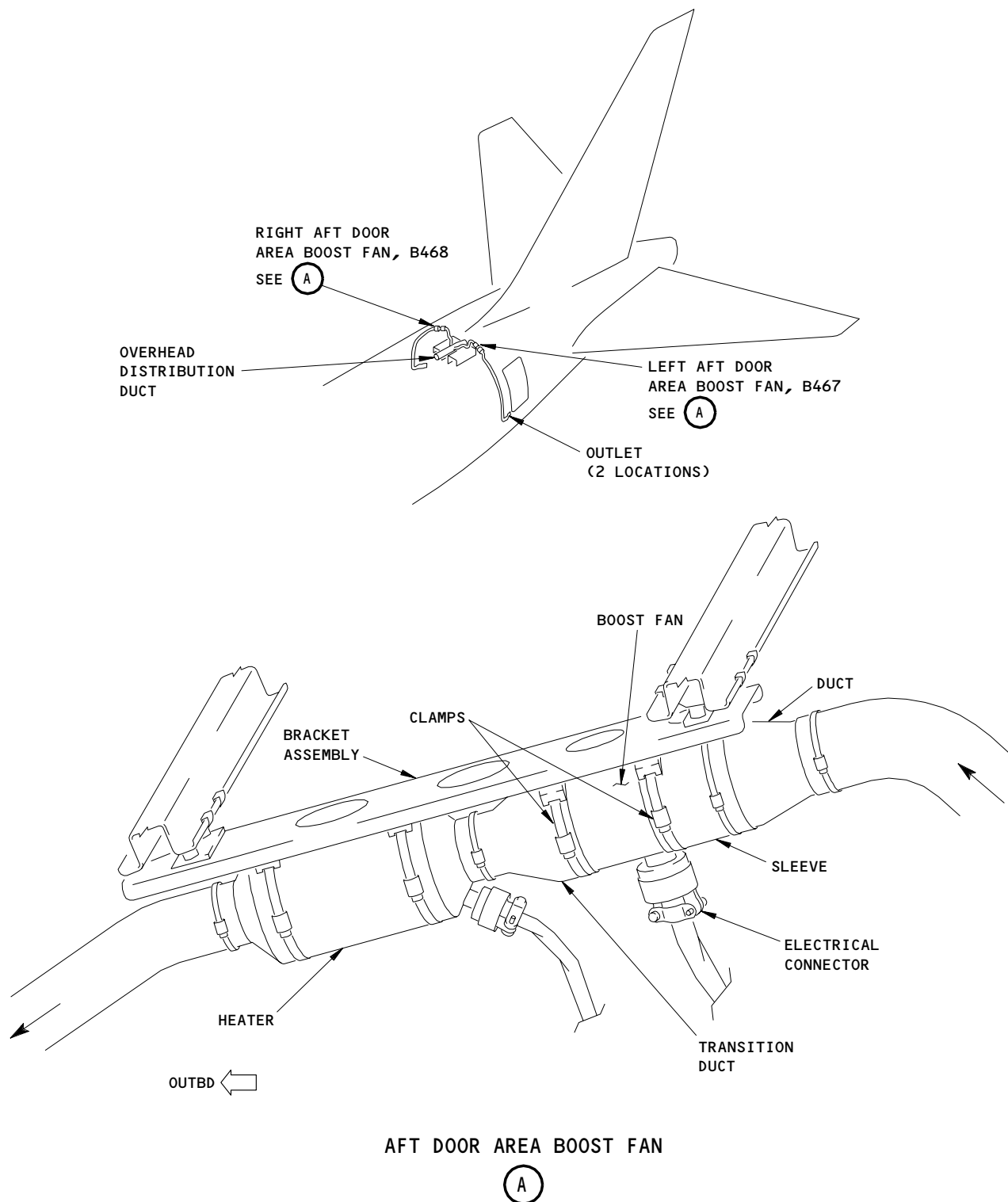
(a) Air Conditioning Control Panel, M14 (P5 panel)

- 1) L PACK and R PACK selectors set to OFF

EFFECTIVITY

767-200/300 AIRPLANES WITH AFT DOOR AREA HEATERS AND BOOST FANS (POST-SB 21-111, POST-SB 21-119, OR POST-SB 21-120; POST-PRR B12139 AND PRE-PRR C12373)

21-45-52



Aft Door Area Boost Fan Installation
Figure 401

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR AREA
HEATERS AND BOOST FANS (POST-SB 21-111,
POST-SB 21-119, OR POST-SB 21-120;
POST-PRR B12139 AND PRE-PRR C12373)

21-45-52

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2) L RECIRC FAN and R RECIRC FAN switches set to off

S 014-014

- (4) To get access to the boost fan, remove the lowered ceiling panel(s) (AMM 25-22-02/401) and/or sculptured ceiling panel(s) that is immediately forward of the aft door area.

D. Boost Fan Removal

S 024-051

- (1) Disconnect the electrical connector from the boost fan.

S 024-055

- (2) Loosen the inboard-most clamp that holds the transition duct to the boost fan, and move the clamp outboard away from the boost fan.

S 024-056

- (3) Loosen the outboard-most clamp that holds the sleeve to the boost fan, and move the clamp inboard away from the boost fan.

S 024-052

- (4) Loosen the two clamps that hold the boost fan to the bracket assembly.

S 024-053

- (5) Remove the boost fan from the transition duct and the sleeve.

TASK 21-45-52-404-020

3. Boost Fan Installation (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electrical Power Control
(2) AMM 25-22-02/401, Lowered Ceiling Panels

B. Access

(1) Location Zones

- 253 Area Above Passenger Cabin Ceiling - Section 46 (left)
254 Area Above Passenger Cabin Ceiling - Section 46 (right)

EFFECTIVITY
767-200/300 AIRPLANES WITH AFT DOOR AREA
HEATERS AND BOOST FANS (POST-SB 21-111,
POST-SB 21-119, OR POST-SB 21-120;
POST-PRR B12139 AND PRE-PRR C12373)

21-45-52

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C. Boost Fan Installation

S 424-039

- (1) Install the boost fan between the transition duct and the sleeve.

NOTE: Make sure the flow arrow on the boost fan points toward the transition duct and the aft door area heater which is outboard of the boost fan.

S 424-061

- (2) Install and tighten the two clamps that hold the boost fan to the bracket assembly.

S 424-059

- (3) Install and tighten the inboard-most clamp that holds the transition duct to the boost fan.

S 424-060

- (4) Install and tighten the outboard-most clamp that holds the sleeve to the boost fan.

S 434-042

- (5) Connect the electrical connector to the boost fan.

D. Boost Fan Post-Installation Test

S 864-062

- (1) Close these circuit breakers and remove the DO-NOT-CLOSE tags:

- (a) Forward Left Miscellaneous Electrical Equipment Panel, P87
 - 1) 87A1, RIGHT FAN PWR - AFT DOOR AREA
 - 2) 87B4, LEFT FAN PWR - AFT DOOR AREA

S 864-043

- (2) Supply electrical power (AMM 24-22-00/201).

S 754-046

- (3) Make sure you can hear the boost fans operate.

S 754-047

- (4) Make sure you can feel air flow out of the air outlet grilles in the lower sidewall near the floor.

E. Put the Airplane Back to Its Usual Condition

S 414-049

- (1) Install the lowered ceiling panel(s) (AMM 25-22-02/401) and/or sculptured ceiling panel(s).

S 414-063

- (2) Close the main equipment center access door, 119AL.

S 864-050

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

767-200/300 AIRPLANES WITH AFT DOOR AREA HEATERS AND BOOST FANS (POST-SB 21-111, POST-SB 21-119, OR POST-SB 21-120; POST-PRR B12139 AND PRE-PRR C12373)

21-45-52

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OVERWING ESCAPE HATCH SUPPLEMENTAL HEATING SYSTEM –
DESCRIPTION AND OPERATION

1. General

- A. To help keep the overwing escape hatch areas warm for passenger comfort, heater blankets are installed behind the escape hatch linings.
- B. The heater blankets normally are not operational when the airplane is on the ground. The heater blankets will operate automatically whenever the airplane is airborne/air mode simulated (air/ground relay energized).
- C. AIRPLANES POST-SB 25-0394;
The Type III overwing escape hatch heating system is deactivated and not operational.

2. Component Details (Fig. 1)

- A. Escape Hatch Heater Blanket
 - (1) The heater blankets consist of electrical wiring sandwiched between sheets of flexible fiberglass that are attached to the lower backside surface of the escape hatch lining. The electrical wiring is spaced 1-inch apart in a zig-zag pattern to transfer the electrical heat energy from the heater blanket to the escape hatch lining.
 - (2) Each heater blanket also has overheat protection provided by a thermostat. The thermostat will open if the heater blanket temperature is more than 110-degrees F (43-degrees C).
 - (3) The heater blankets operate on single-phase 115VAC power and generate approximately 35-watts/square-foot of power.

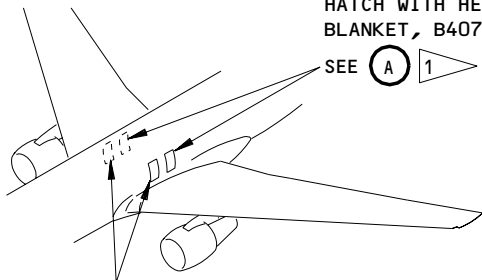
3. Operation (Fig. 2)

- A. Functional Description
 - (1) The heater blankets normally do not operate when the airplane is on the ground. The heater blankets will operate automatically when the airplane is airborne/air mode simulated (air/ground relay energized). When the air/ground relay becomes energized, 28VDC power gets supplied to energize the heater blanket relay (P36 panel) which supplies the necessary 115VAC power to operate the heater blankets.
 - (2) There are no crew alerting EICAS messages, indications, or fault annunciations associated with the overwing escape hatch heating system.
- B. Control
 - (1) Supply electrical power (AMM 24-22-00/201).
 - (2) Do the air mode simulation procedure for the System No.1 air/ground relays (AMM 32-09-02/201).

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

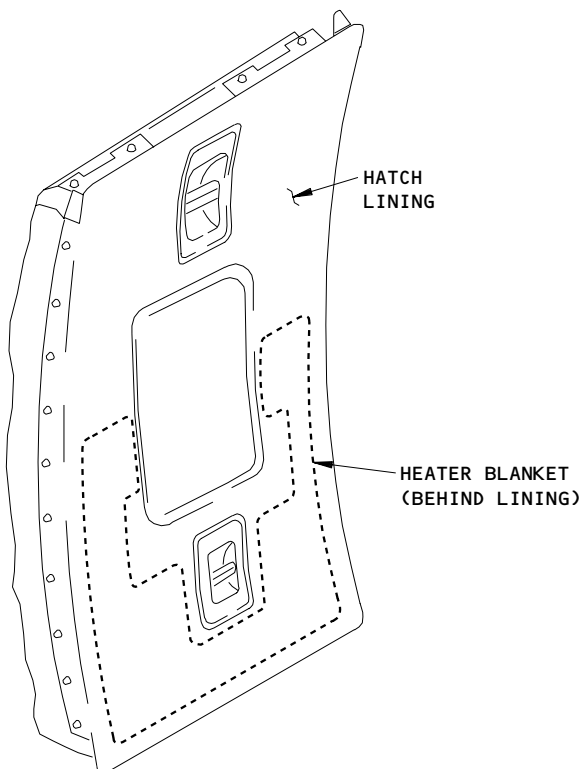
21-45-60

LEFT (RIGHT) AFT
OVERWING ESCAPE
HATCH WITH HEATER
BLANKET, B407 (B409)



LEFT (RIGHT) FORWARD
OVERWING ESCAPE HATCH
WITH HEATER BLANKET,
B406 (B408)

SEE (A) 1



ESCAPE HATCH WITH HEATER BLANKET

(A)

1

AIRPLANES WITH "DUAL" LEFT (RIGHT) OVERWING ESCAPE HATCHES
HAVE HEATER BLANKETS, B406 AND B407 (B408 AND B409).

AIRPLANES WITH "SINGLE" LEFT (RIGHT) OVERWING ESCAPE HATCHES
HAVE HEATER BLANKETS, B406 (B408) OR B407 (B409).

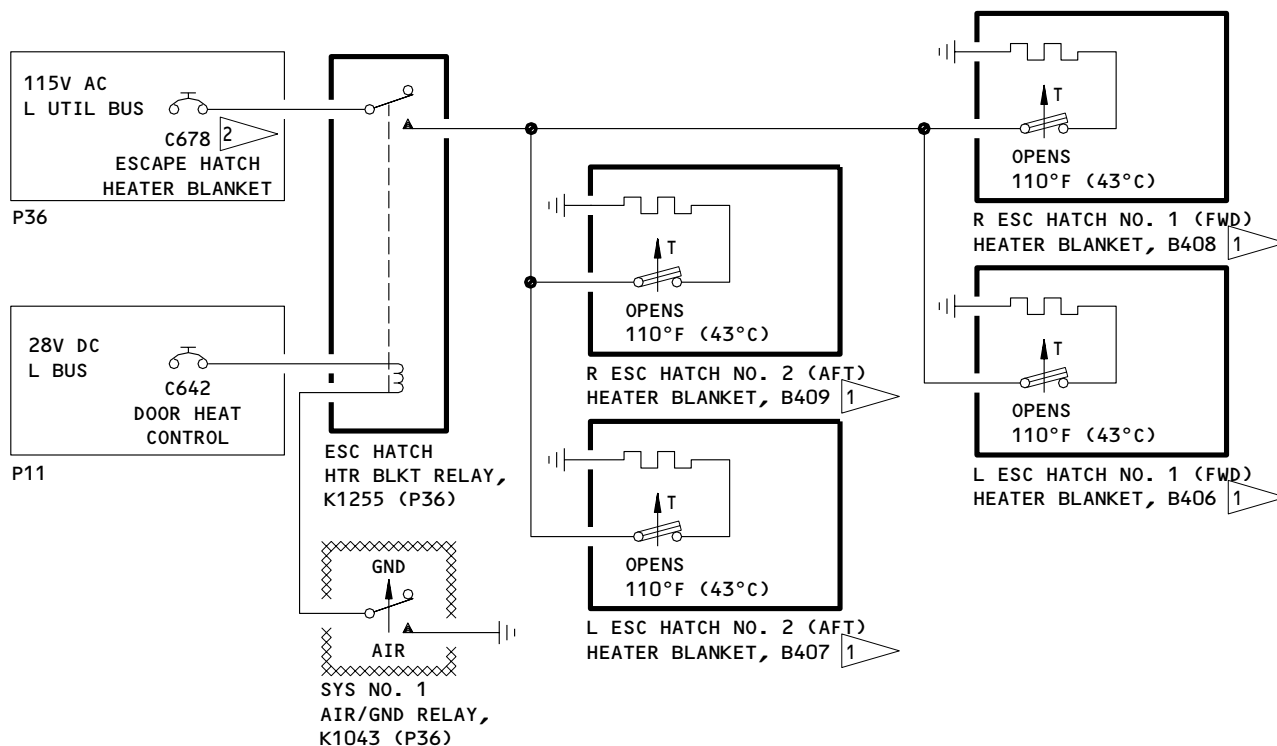
Overwing Escape Hatch Supplemental Heating System - Component Location
Figure 1

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

21-45-60

02

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- 1 AIRPLANES WITH "DUAL" LEFT (RIGHT) OVERWING ESCAPE HATCHES HAVE HEATER BLANKETS, B406 AND B407 (B408 AND B409).
AIRPLANES WITH "SINGLE" LEFT (RIGHT) OVERWING ESCAPE HATCHES HAVE HEATER BLANKETS, B406 (B408) OR B407 (B409).
- 2 AIRPLANES POST-SB 25-0394;
CIRCUIT BREAKER C678 IS OPENED AND COLLARED WITH THE WIRING CAPPED AND STOWED.


Overwing Escape Hatch Supplemental Heating System Schematic
Figure 2

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

21-45-60

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OVERWING ESCAPE HATCH SUPPLEMENTAL HEATING SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CIRCUIT BREAKER - DOOR HEAT CONT, C692		1	FLT COMPT, P11 11R12	*
CIRCUIT BREAKER - ESCAPE HATCH HEATER BLANKET, C678		1	119AL, MAIN EQUIP CTR, P36 36H3 OR 36D5	*
HEATER BLANKET - 				
LEFT OVERWING ESCAPE HATCH 1 (FWD), B406	-	1	PASS. COMPT, ESCAPE HATCH, 832	21-45-61
LEFT OVERWING ESCAPE HATCH 2 (AFT), B407	-	1	PASS. COMPT, ESCAPE HATCH, 834	21-45-61
RIGHT OVERWING ESCAPE HATCH 1 (FWD), B408	-	1	PASS. COMPT, ESCAPE HATCH, 842	21-45-61
RIGHT OVERWING ESCAPE HATCH 2 (AFT), B409	-	1	PASS. COMPT, ESCAPE HATCH, 844	21-45-61
RELAY - (FIM 31-01-36/101)		1		*
AIR/GND SYS NO. 1, K1043		1		*
ESCAPE HATCH HEATER BLANKET, K1255				

* SEE THE WDM EQUIPMENT LIST

 AIRPLANES WITH "DUAL" LEFT (RIGHT) OVERWING ESCAPE HATCHES
HAVE HEATER BLANKETS, B406 AND B407 (B408 AND B409).

AIRPLANES WITH "SINGLE" LEFT (RIGHT) OVERWING ESCAPE HATCHES
HAVE HEATER BLANKETS, B406 (B408) OR B407 (B409).

Overwing Escape Hatch Supplemental Heating System - Component Index
Figure 101

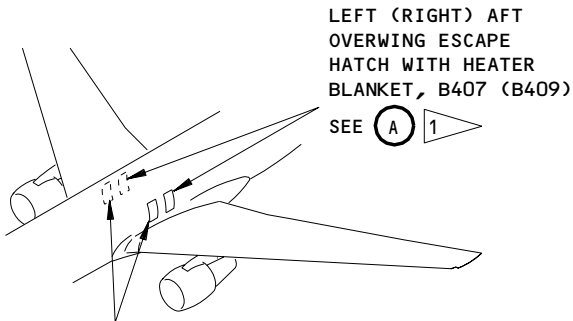
EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

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K15758

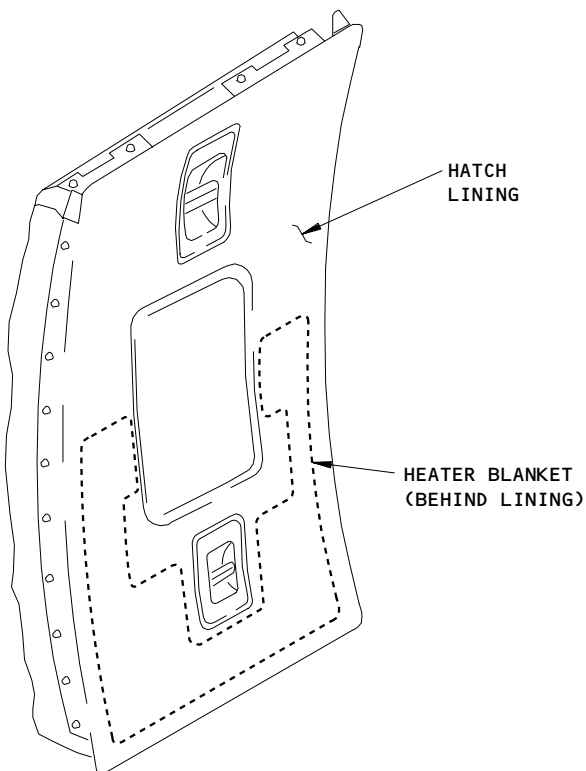


LEFT (RIGHT) AFT
OVERWING ESCAPE
HATCH WITH HEATER
BLANKET, B407 (B409)

SEE (A) 1

LEFT (RIGHT) FORWARD
OVERWING ESCAPE HATCH
WITH HEATER BLANKET,
B406 (B408)

SEE (A) 1



ESCAPE HATCH WITH HEATER BLANKET

(A)

- 1 AIRPLANES WITH "DUAL" LEFT (RIGHT) OVERWING ESCAPE HATCHES HAVE HEATER BLANKETS, B406 AND B407 (B408 AND B409).
AIRPLANES WITH "SINGLE" LEFT (RIGHT) OVERWING ESCAPE HATCHES HAVE HEATER BLANKETS, B406 (B408) OR B407 (B409).

Overwing Escape Hatch Supplemental Heating System - Component Location
Figure 102

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

21-45-60

OVERWING ESCAPE HATCH SUPPLEMENTAL HEATING SYSTEM –
ADJUSTMENT/TEST

1. General

- A. This procedure has these tasks:
(1) Operational Test – Escape Hatch Supplemental Heating System
(2) System Test – Escape Hatch Supplemental Heating System
- B. The supplemental heating system for the overwing escape hatches consist of heater blankets which are installed on the lower backside surface of the escape hatch linings. The heater blankets help keep the escape hatch areas warm for passenger comfort.
- C. To test the operation of the heater blankets, you must supply electrical power and simulate that the airplane is in the air mode.
- D. AIRPLANES POST-SB 25-0394;
The Type III overwing escape hatch heating system is deactivated and not operational.

TASK 21-45-60-705-006

2. AIRPLANES PRE-SB 25-0394;

Operational Test – Escape Hatch Supplemental Heating System

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power – Control
(3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
(4) AMM 32-09-02/201, Air/Ground Relay System

B. Access

- (1) Location Zones
241 Passenger Cabin – Section 45 (Left)
242 Passenger Cabin – Section 45 (Right)

C. Procedure

S 015-028

- (1) Open the main equipment center access door, 119AL (AMM 06-41-00/201).

S 865-001

- (2) Make sure these circuit breakers are closed:
(a) Pilot's Overhead Circuit Breaker Panel, P11
1) 11R12, DOOR HEAT CONT
(b) Left Miscellaneous Electrical Equipment Panel, P36
1) 36H3 or 36D5, ESC HTCH HTR BLKT

S 865-002

- (3) Supply electrical power (AMM 24-22-00/201).
(a) After one minute, use your hand to make sure the lower surface of the escape hatch linings are cool.

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

21-45-60

S 865-003

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN MOVE QUICKLY AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (4) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-004

WARNING: OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) Do the air mode simulation procedure for the System No. 1 air/ground relay (AMM 32-09-02/201).
 - (a) After one minute, use your hand to make sure the lower surface of the escape hatch linings become warmer.

S 865-005

- (6) Do the procedure to put the System No. 1 air/ground relay back to the ground mode (AMM 32-09-02/201).
 - (a) After one minute, use your hand to make sure the lower surface of the escape hatch linings become cooler.

D. Put the Airplane Back to Its Usual Condition

S 865-008

- (1) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

S 415-027

- (2) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

S 865-007

- (3) Remove electrical power if it is not required (AMM 24-22-00/201).

TASK 21-45-60-705-025

3. AIRPLANES PRE-SB 25-0394;

System Test - Escape Hatch Supplemental Heating System

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (4) AMM 32-09-02/201, Air/Ground Relay System

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

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- (5) WDM 21-45-22, Supplemental Heaters - Overwing Escape Hatch
- B. Access
- (1) Location Zones
- | | |
|-----|--|
| 119 | Main Equipment Center (Left and Right) |
| 241 | Passenger Cabin - Section 45 (Left) |
| 242 | Passenger Cabin - Section 45 (Right) |

C. Procedure

- S 015-022
- (1) Open the main equipment center access door, 119AL (AMM 06-41-00/201).
- S 865-009
- (2) Open these circuit breakers and attach DO-NOT-CLOSE tags:
- (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT
- S 725-026
- (3) Use your hand to make sure the lower surface of the escape hatch linings are cool.
- S 865-010
- (4) Do these steps to simulate the air mode for the system No. 1 air/ground relay:

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS (AMM 27-61-00/201) OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS COULD RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Do the deactivation procedure for spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.
- (b) Remove electrical power before you do the next steps (AMM 24-22-00/201).
- (c) Open the doors to the Left Miscellaneous Electrical Equipment Panel, P36.
- (d) Install a clip-on ammeter to the wiring for this circuit breaker in the P36 panel (WDM 21-45-22):
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT (C678)
- (e) Remove the system No. 1 air/ground relay, K1043, from the P36 panel (AMM 32-09-02/201).

EFFECTIVITY

AIRPLANES WITH TYPE III OVERWING ESCAPE HATCH HEATING SYSTEM (POST-SB 25-113 OR POST-PRR B11886)
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- (f) Install a jumper wire between pin 7 and pin 8 of the electrical connector, D11798, for the relay, K1043 (WDM 21-45-22).
- (g) Supply electrical power (AMM 24-22-00/201).

S 865-011

- (5) Close these circuit breakers:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT

S 725-012

- (6) After one minute, use your hand to make sure the lower surface of the escape hatch linings become warmer.

S 765-013

- (7) AIRPLANES WITH TWO (2) OVERWING ESCAPE HATCHES;
Make sure the clip-on ammeter measures at least 0.9 amps of electrical current.

S 765-014

- (8) AIRPLANES WITH FOUR (4) OVERWING ESCAPE HATCHES;
Make sure the clip-on ammeter measures at least 1.8 amps of electrical current.

S 865-015

- (9) Open these circuit breakers and attach DO-NOT-CLOSE tags:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT

S 725-016

- (10) After one minute, use your hand to make sure the lower surface of the escape hatch linings become cooler.

NOTE: The heater blanket has a built-in thermostat which will trip off at approximately 110-degrees F (43-degrees C) to prevent an overheat of the heater blanket. If an overheat condition occurs, it can take up to 2 hours for the thermostat to reset.

S 765-017

- (11) Make sure the clip-on ammeter measures 0 amps of electrical current.

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
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S 865-018

- (12) Do these steps to put the system No. 1 air/ground relay back to the ground mode:
- (a) Remove electrical power before you do the next steps (AMM 24-22-00/201).
 - (b) Remove the clip-on ammeter from the circuit breaker wiring in the P36 panel.
 - (c) Remove the jumper wire between pin 7 and pin 8 of the electrical connector, D11798, for the relay, K1043 (WDM 21-45-22).
 - (d) Install the system No. 1 air/ground relay, K1043, to the P36 panel (AMM 32-09-02/201).
 - (e) Close the doors to Left Miscellaneous Electrical Equipment Panel, P36.
 - (f) Supply electrical power (AMM 24-22-00/201).

S 865-019

- (13) Close these circuit breakers and remove the DO-NOT-CLOSE tags:
- (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT

S 725-024

- (14) After one minute, use your hand to make sure the lower surface of the escape hatch linings are still cool.
- D. Put the Airplane Back to Its Usual Condition

S 865-020

- (1) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

S 415-023

- (2) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

S 865-021

- (3) Remove electrical power if it is not required (AMM 24-22-00/201).

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

21-45-60

OVERWING ESCAPE HATCH HEATER BLANKET – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Escape Hatch Heater Blanket Removal
 - (2) Escape Hatch Heater Blanket Installation
- B. A heater blanket is installed on each escape hatch lining to help keep the escape hatch area warm for passenger comfort. It is necessary to remove the hatch lining to get access to the heater blanket which is on the lower backside surface of the lining.
- C. As an option to heater blanket removal from the hatch lining while on-airplane, you can replace the escape hatch lining with the heater blanket still attached to the lining and send the hatch lining to the shop for heater blanket replacement (preferred method).
- D. The heater blanket is bonded to the backside (outboard) of the hatch lining with a silicone adhesive. However, if the heater blanket had been previously installed to the hatch lining with tape, the tape must be removed and the heater blanket installed with the silicone adhesive.
- E. AIRPLANES POST-SB 25-0394;
The Type III overwing escape hatch heating system is deactivated and not operational.

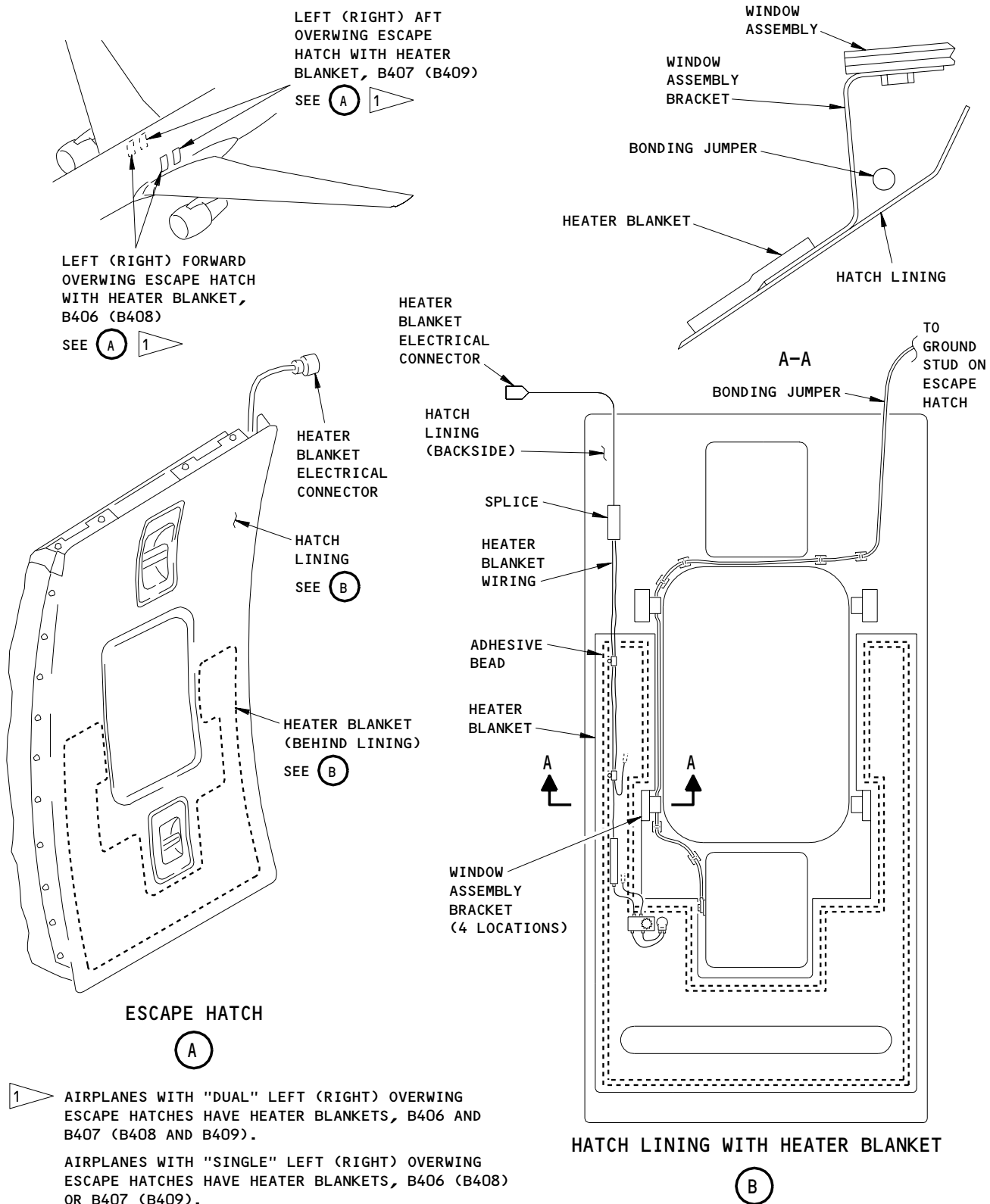
TASK 21-45-61-004-001

2. Escape Hatch Heater Blanket Removal (Fig. 401)

- A. References
 - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
 - (2) AMM 25-25-01/201, Passenger Seats
 - (3) AMM 25-65-00/201, Off-Wing Escape System
 - (4) AMM 52-21-01/201, Overwing Escape Hatch
 - (5) AMM 52-21-02/201, Overwing Escape Hatch Lining
- B. Access
 - (1) Location Zones
 - 241 Passenger Cabin – Section 45 (Left)
 - 242 Passenger Cabin – Section 45 (Right)
- C. Prepare for Removal
 - S 014-037
 - (1) Open the main equipment center access door, 119AL (AMM 06-41-00/201).
 - S 864-002
 - (2) Open these circuit breakers and attach DO-NOT-CLOSE tags:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
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1 AIRPLANES WITH "DUAL" LEFT (RIGHT) OVERWING ESCAPE HATCHES HAVE HEATER BLANKETS, B406 AND B407 (B408 AND B409).

AIRPLANES WITH "SINGLE" LEFT (RIGHT) OVERWING ESCAPE HATCHES HAVE HEATER BLANKETS, B406 (B408) OR B407 (B409).

Overwing Escape Hatch Heater Blanket Installation
Figure 401

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE HATCH HEATING SYSTEM (POST-SB 25-113 OR POST-PRR B11886)

21-45-61

L73668

- (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT

NOTE: AIRPLANES POST-SB 25-0394;
Circuit breaker C678 is opened and collared with the wiring capped and stowed.

S 014-004

- (3) As necessary, remove the passenger seats adjacent to the overwing escape hatch (AMM 25-25-01/201).

D. Heater Blanket Removal

S 014-005

- (1) Remove the escape hatch lining (with heater blanket attached) from the escape hatch (AMM 52-21-02/201).

NOTE: To remove the hatch lining, you must first disarm the off-wing escape system (AMM 25-65-00/201), then remove the escape hatch (AMM 52-21-01/201).

- (a) Carefully remove the escape hatch until you can disconnect the wiring at the top of the escape hatch (AMM 52-21-01/201).

NOTE: An electrical connector is mounted in upper corner of the escape hatch opening.

- 1) Disconnect the electrical connector for the heater blanket.
- (b) Remove the hatch lining from the escape hatch to get access to the heater blanket wiring (AMM 52-21-02/201).
 - 1) Disconnect the bonding jumper from the ground stud at the top of the escape hatch.

NOTE: The bonding jumper is attached to the backside of the hatch lining near the hatch handle.

- 2) Remove the splice that connects the heater blanket wiring to the wiring at the top of the escape hatch.
- 3) Remove the hatch lining (with heater blanket attached).

S 024-027

- (2) Do these steps only if you want to remove the heater blanket from the hatch lining:
 - (a) Carefully pull the heater blanket away from the hatch lining.
 - 1) If silicone adhesive was used to install the heater blanket, remove the adhesive from the lining.
 - 2) If tape was used to install the heater blanket, remove and discard the tape from the heater blanket and the lining.

TASK 21-45-61-404-012

3. Escape Hatch Heater Blanket Installation (Fig. 401)

A. Consumable Materials

- (1) A00027, Adhesive - Silicone, BAC5010, Type 60, RTV 174 or equivalent
- (2) B00147, Solvent - Ethyl Alcohol
- (3) G50523, Tape - Double-sided, 2-inch wide, BMS5-157, Type II, PVF

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 25-25-01/201, Passenger Seats
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 32-09-02/201, Air/Ground System Relays
- (6) AMM 52-21-01/201, Overwing Escape Hatch
- (7) AMM 52-21-02/201, Overwing Escape Hatch Lining
- (8) SWPM 20-30-12, Assembly of Splices
- (9) WDM 21-45-22, Supplemental Heaters - Overwing Escape Hatches

C. Access

- (1) Location Zones
 - 241 Passenger Cabin - Section 45 (Left)
 - 242 Passenger Cabin - Section 45 (Right)

D. Heater Blanket Installation

S 424-028

- (1) Install the heater blanket to the escape hatch lining:

NOTE: This step is not necessary if the escape hatch lining has the heater blanket already installed.

- (a) Use the solvent to clean the surfaces of the hatch lining and heater blanket where they contact each other.
- (b) Apply a 1/8-inch (3 mm) thick bead of the silicone adhesive to the inboard side of the heater blanket and all around the edge of the heater blanket as shown in Fig. 401.

NOTE: Do not put the adhesive on the outboard side of the heater blanket. The outboard side of the heater blanket has identification data and "THIS SIDE OUTBOARD" written on it. The adhesive bead should be more than 1/2-inch (13 mm) away from the edge of the heater blanket.

- (c) Install the heater blanket (adhesive side) to the lower outboard surface of the hatch lining as shown in Fig. 401.
 - 1) Make sure the lower edge of the heater blanket is approximately 1.61-inches (4.09 cm) away from the bottom edge of the hatch lining.
 - 2) Make sure the heater blanket wiring is not between the hatch lining and the heater blanket.

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
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- 3) Make sure the hole in the heater blanket is aligned with the armrest hole in the lining.
- 4) Apply sufficient pressure along the edges of the heater blanket so that the adhesive contacts the hatch lining and the heater blanket.

NOTE: Do not apply too much pressure to cause an excessive amount of the adhesive to squeeze out between the hatch lining and the heater blanket.

- 5) Allow the adhesive to cure under contact pressure for a minimum of 24 hours.

NOTE: Put 5-pound sandbags (or equivalent) onto the heater blanket until the adhesive cures.

S 424-029

- (2) Install the escape hatch lining to the escape hatch:
 - (a) Connect the bonding jumper to the ground stud at the top of the escape hatch.
 - (b) Install a splice to connect the heater blanket wiring to the escape hatch wiring (SWPM 20-30-12), (WDM 21-45-22).
 - (c) Install the hatch lining to the escape hatch (AMM 52-21-02/201).

S 424-059

- (3) Install the escape hatch into the hatch opening:
 - (a) Move the escape hatch so that you connect the escape hatch wiring to the connector mounted in the upper corner of the hatch opening.
 - 1) Connect the electrical connector for the heater blanket.
 - (b) Install the escape hatch into the hatch opening (AMM 52-21-01/201).

E. AIRPLANES PRE-SB 25-0394;
Heater Blanket Post-Installation Test (Method 1)

S 864-030

- (1) Close these circuit breakers and remove the DO-NOT-CLOSE tags:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
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- (b) Left Miscellaneous Electrical Equipment Panel, P36
1) 36H3 or 36D5, ESC HTCH HTR BLKT

S 864-032

- (2) Supply electrical power (AMM 24-22-00/201).
(a) Use your hand to make sure the lower surface of the escape hatch lining is cool.

S 864-033

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN MOVE QUICKLY AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (3) Do the deactivation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 864-034

WARNING: OBEY THE PROCEDURE THAT PUTS THE AIRPLANE IN THE AIR MODE. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) Do the air mode simulation procedure for the System No. 1 air/ground relay (AMM 32-09-02/201).
(a) After one minute, use your hand to make sure the lower surface of the escape hatch lining becomes warmer.

S 864-035

- (5) Do the procedure to return the System No. 1 air/ground relay to the ground mode (AMM 32-09-02/201).
(a) After one minute, use your hand to make sure the lower surface of the escape hatch lining becomes cooler.

S 864-054

- (6) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
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21-45-61

F. AIRPLANES PRE-SB 25-0394;
Heater Blanket Post-Installation Test (Method 2)
(Simplified Air Mode Simulation)

S 864-040

- (1) Make sure these circuit breakers are open:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT

S 724-056

- (2) Use your hand to make sure the lower surface of the escape hatch lining is cool.

S 864-041

- (3) Do these steps to simulate the air mode for the system No. 1 air/ground relay:

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS (AMM 27-61-00/201) OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS COULD RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Do the deactivation procedure for spoiler/speedbrake control system (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.
- (b) Remove electrical power before you do the next steps (AMM 24-22-00/201).
- (c) Open the doors to the Left Miscellaneous Electrical Equipment Panel, P36.
- (d) Install a clip-on ammeter to the wiring for this circuit breaker in the P36 panel (WDM 21-45-22):
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT (C678)
- (e) Remove the system No. 1 air/ground relay, K1043, from the P36 panel (AMM 32-09-02/201).
- (f) Install a jumper wire between pin 7 and pin 8 of the electrical connector, D11798, for the relay, K1043 (WDM 21-45-22).
- (g) Supply electrical power (AMM 24-22-00/201).

S 864-042

- (4) Close these circuit breakers:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT

S 724-048

- (5) After one minute, use your hand to make sure the lower surface of the escape hatch lining becomes warmer.

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

21-45-61

- S 764-051
- (6) AIRPLANES WITH TWO (2) OVERWING ESCAPE HATCHES;
Make sure the clip-on ammeter measures at least 0.9 amps of electrical current.
- S 764-052
- (7) AIRPLANES WITH FOUR (4) OVERWING ESCAPE HATCHES;
Make sure the clip-on ammeter measures at least 1.8 amps of electrical current.
- S 864-045
- (8) Open these circuit breakers and attach DO-NOT-CLOSE tags:
- (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT
- S 724-049
- (9) After one minute, use your hand to make sure the lower surface of the escape hatch lining becomes cooler.
- NOTE:** The heater blanket has a built-in thermostat which will trip off at approximately 110-degrees F (43-degrees C) to prevent an overheat of the heater blanket. If an overheat condition occurs, it can take up to 2 hours for the thermostat to reset.
- S 764-053
- (10) Make sure the clip-on ammeter measures 0 amps of electrical current.
- S 864-046
- (11) Do these steps to put the system No. 1 air/ground relay back to the ground mode:
- (a) Remove electrical power before you do the next steps (AMM 24-22-00/201).
 - (b) Remove the clip-on ammeter from the circuit breaker wiring in the P36 panel.
 - (c) Remove the jumper wire between pin 7 and pin 8 of the electrical connector, D11798, for the relay, K1043 (WDM 21-45-22).
 - (d) Install the system No. 1 air/ground relay, K1043, to the P36 panel (AMM 32-09-02/201).
 - (e) Close the doors to Left Miscellaneous Electrical Equipment Panel, P36.
 - (f) Supply electrical power (AMM 24-22-00/201).

EFFECTIVITY
AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

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S 864-047

- (12) Close these circuit breakers and remove the DO-NOT-CLOSE tags:
 - (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11R12, DOOR HEAT CONT
 - (b) Left Miscellaneous Electrical Equipment Panel, P36
 - 1) 36H3 or 36D5, ESC HTCH HTR BLKT

S 724-050

- (13) After one minute, use your hand to make sure the lower surface of the escape hatch lining is still cool.

S 864-055

- (14) Do the activation procedure for the spoiler/speedbrake control system (AMM 27-61-00/201).

G. Put the Airplane Back to Its Usual Condition

S 414-024

- (1) Install any passenger seats that were removed (AMM 25-25-01/201).

S 414-038

- (2) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

S 864-025

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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AIRPLANES WITH TYPE III OVERWING ESCAPE
HATCH HEATING SYSTEM (POST-SB 25-113 OR
POST-PRR B11886)

21-45-61

COOLING PACK SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)

A. The cooling pack system provides air conditioning within the airplane. The cooling pack system consists of left and right packs which are nearly identical to each other. Each side contains an air cooling pack, a pack temperature controller, a flow control and shutoff valve, a pack overheat switch, and a cabin air supply check valve. The left side contains an altitude switch and the pack flow and cargo air conditioning controller. The right side has a flow control card.

B. Each cooling pack consists of the following components: primary and secondary heat exchangers, air cycle machine, fan/air plenum/diffuser, pack reheater, condenser, catalytic converter, water extractor, pack muffler, pack temperature control valve, low limit control valve, pack temperature sensor and standby sensor, compressor outlet sensor and standby sensor, and compressor outlet overheat switch.

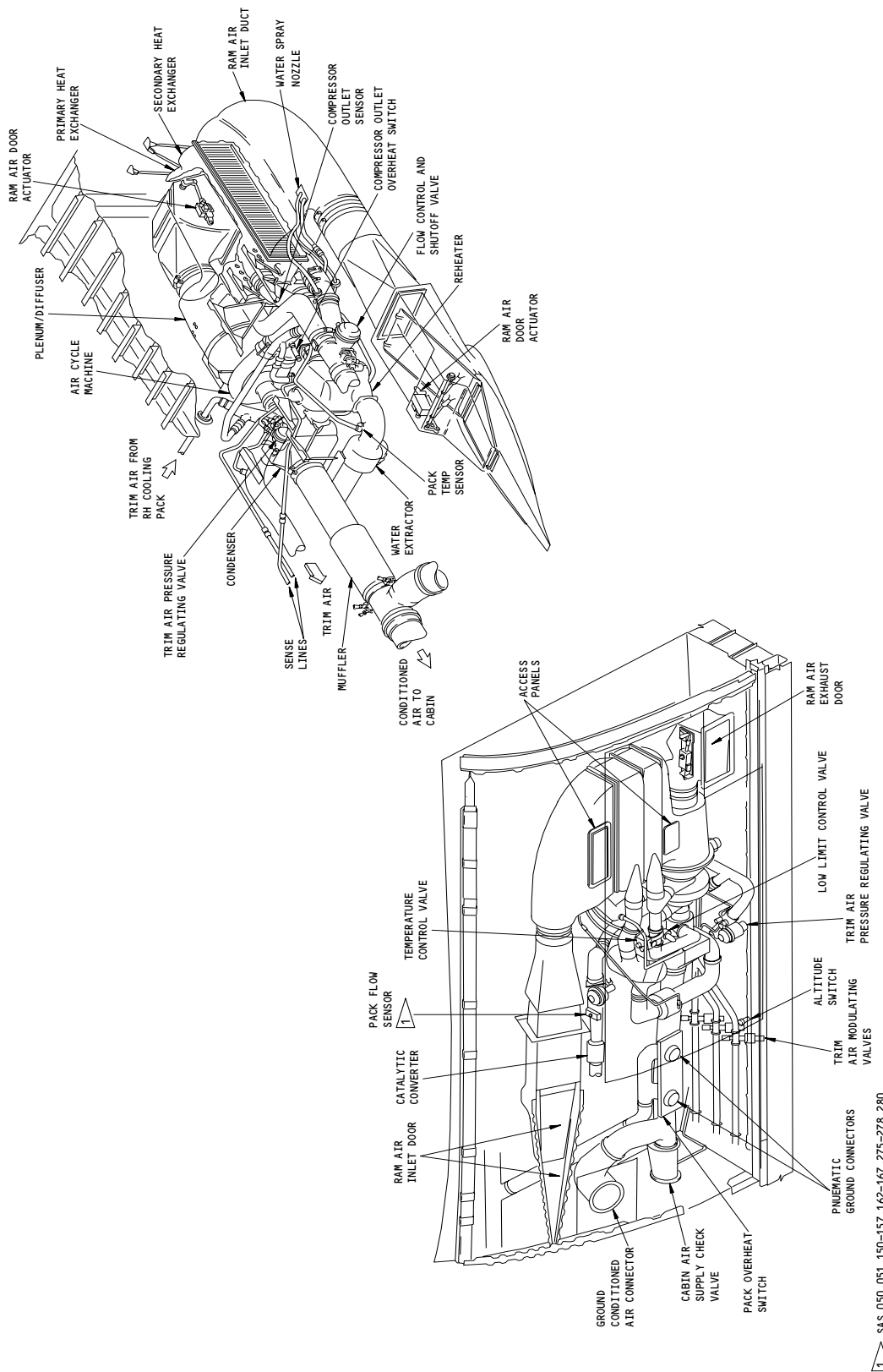
C. Cooling Pack System (Fig. 2)

- (1) Supply air flows through a catalytic converter and enters each cooling pack through the flow control and shutoff valve. The air initially flows through the primary heat exchanger where it is cooled by ram air (AMM 21-53-00/001). The air next enters the compressor section of the air cycle machine (ACM). The ACM compresses the air to a higher pressure and temperature. The compressed air then passes through the secondary heat exchanger where it is cooled by ram air. The air then flows through a series of water separation components: reheater, condenser, and water extractor. The air enters the turbine section of the ACM. The air expands in the turbine section and, through expanding, generates power to drive the compressor and fan impellers. The fan impellers drive ram air through its flowpath when the airplane is on the ground. In flight, the fan impellers assist airflow through the ram air path. The energy removed from the the supply air during expansion causes a temperature reduction. This results in very low turbine discharge air temperature.
- (2) The catalytic converter reduces the level of ozone in the supply air, for the comfort of passengers and crew.

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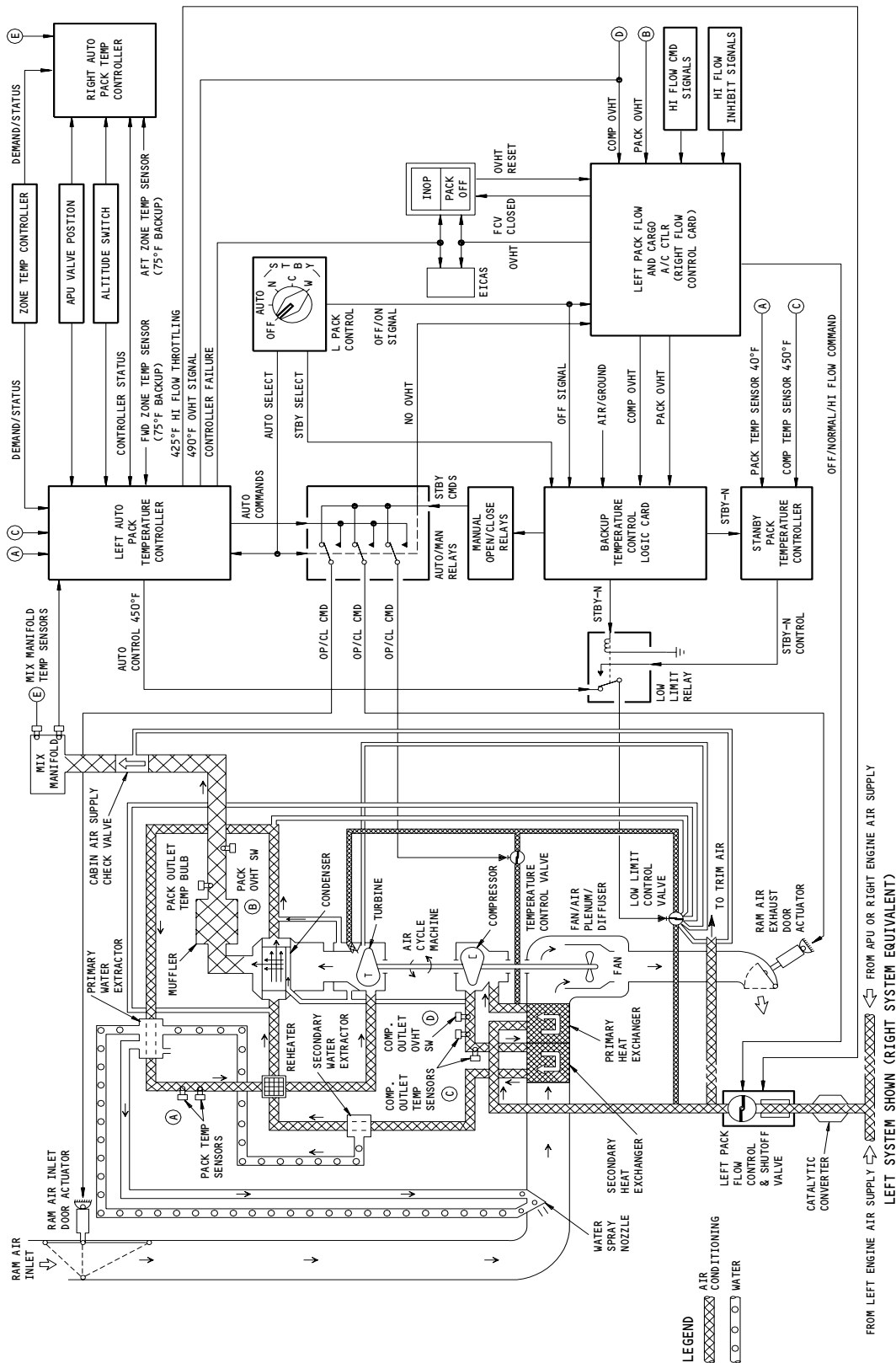


Cooling Pack
Figure 1

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LEFT SYSTEM SHOWN (RIGHT SYSTEM EQUIVALENT)
Cooling Pack System Schematic
Figure 2

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- (3) The flow control and shutoff valve allows air into the pack at two different flow schedules. This dual flow schedule allows cooling pack normal flow to be increased by 65 percent during high flow mode operation when supply air pressure permits. Cooling pack operation in the high flow mode occurs when the recirculation fan on that side has failed, or the flow control and shutoff valve on the opposite pack is closed. The left pack will also go into the high flow mode when the forward cargo air conditioning system is on. The high flow mode is inhibited during takeoff, approach, when one engine is off, or when operating on only one engine air source with the wing thermal anti-ice also in operation. The flow control card assembly provides the electrical power and logic for mode operation of the right pack. The pack flow and cargo air conditioning controller provides the electric power and logic for mode operation of the left pack. Except where noted, the logic in the pack flow and cargo air conditioning controller is identical to the logic in the flow control card.
- (4) High pressure water separation occurs from the following series of airflow through the pack: supply air leaving the secondary heat exchanger passes through the hot side of the reheater; colder air from the water extractor cools the hot air in the reheater. The cooled air then enters the condenser where it is cooled even more by heat exchange with cold turbine discharge air. The air is cooled to a temperature low enough for moisture to condense. Next, the air enters the water extractor. The water extractor removes large droplets of water formed in the condenser. The air then passes a second time through the reheater. The reheater minimizes the temperature difference between the secondary heat exchanger outlet and the turbine inlet. The first pass through the reheater removes heat from the airflow. The second pass returns heat. This reduces the heat added to the turbine discharge air in the condenser and returns the heat to the turbine inlet. Water removed by the extractor is sprayed into the ram inlet and evaporatively cools the ram air providing additional cooling to the ram air system.
- (5) System operation is controlled and monitored at the air conditioning panel on the pilot's overhead panel, P5 in the flight compartment.
- (6) In normal operating mode, temperature control of pack air is automatic and is controlled by the pack temperature controller working in conjunction with the ram air system, temperature control valve, flow control valve and low limit control valve. The pack temperature controller monitors pack air temperature through the pack temperature sensor and compressor outlet sensor and receives overheat indication through the pack overheat and compressor outlet overheat switches.

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- (7) The compressor outlet sensor and compressor overheat switch prevent overheating of the compressor discharge air. The compressor outlet sensor signals the pack temperature controller when it detects an overheat condition. The controller then acts to limit the compressor discharge temperatures to 450°F (232°C) by modulating the ram air doors, flow control valve and low limit valve in a preprogrammed sequence. The compressor overheat switch senses an overheat condition at 490°F (254°C). It signals the flow control card and the card closes the flow control valve, shutting off the pack.
- (8) The pack overheat switch will sense a pack outlet overheat condition at 190°F (88°C). This causes the pack temperature controller to be disconnected, the ram air doors driven full open and the temperature control valve driven closed.
- (9) The temperature control valve regulates the flow of hot air through or around the air cycle machine. For maximum cooling, the ram air doors open and the temperature control valve closes. To increase pack discharge temperature, the ram air doors partially close and the temperature control valve opens.
- (10) Valve position indication provides a relative measurement of cooling pack efficiency. The position of the ram air inlet and exhaust doors indicates the cooling air necessary at the primary and secondary heat exchangers. The temperature valve position indicates the amount of pneumatic air directed through or bypassed around the air cycle machine. Indication is displayed on the EICAS display panel.
- (11) The low limit control valve provides a deicing function for turbine outlet air. It controls the flow of hot air to the condenser heating muff. The low limit valve also receives signals from the pack controller which opens the valve to limit compressor outlet temperature to 450°F (232°C).
- (12) The pack temperature sensor provides inputs to the pack controller for temperature regulation. The controller compares zone demand temperature (AMM 21-61-00/001) with the pack temperature sensor and regulates temperature control components in the pack accordingly.

2. Component Details

A. Flow Control and Shutoff Valve (Fig. 3)

- (1) The flow control and shutoff valve is a four-inch diameter pneumatically actuated venturi-type butterfly valve. The valve controls the airflow rate into the air cooling packs.

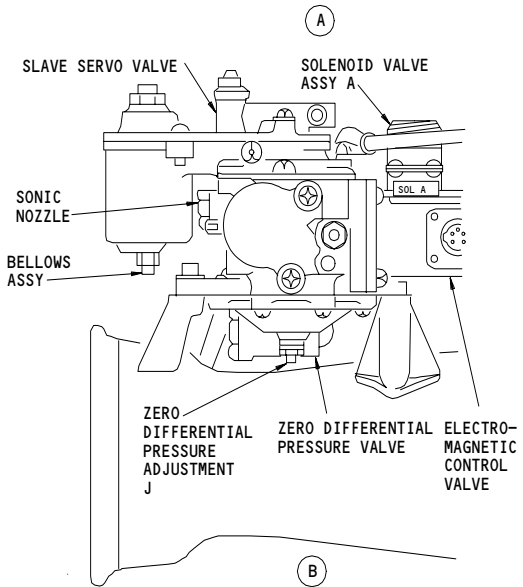
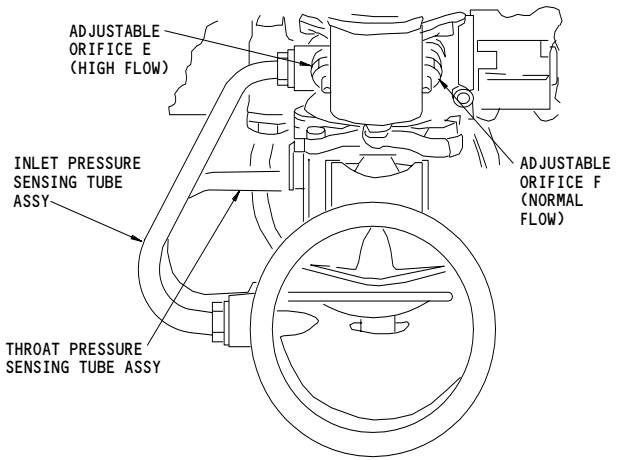
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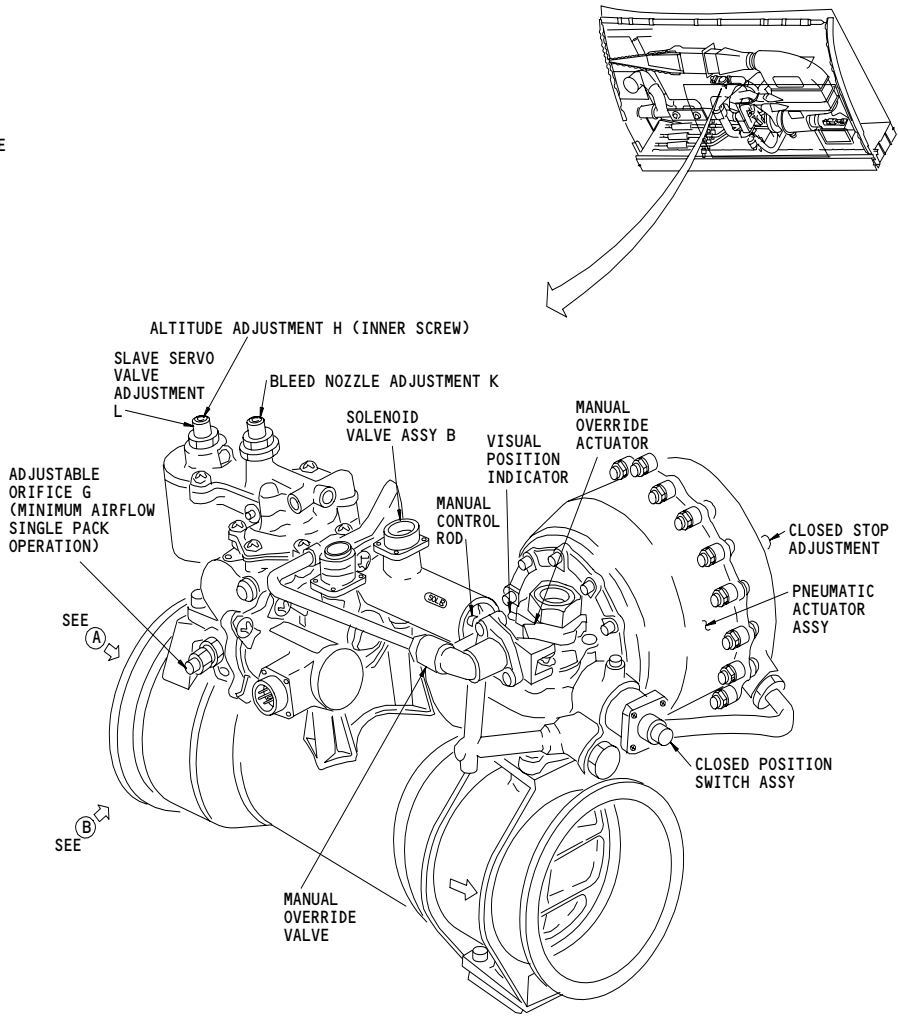
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Flow Control and Shutoff Valve
Figure 3



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- (2) The flow control and shutoff valve consists of two sensing probes, inlet pressure sensing tube assembly, slave servo valve, solenoid valve assembly B, mechanical manual override valve, manual override actuator, visual position indicator, actuator opening pressure tube assembly, pneumatic actuator assembly, actuator linkage assembly, valve flow section, adjustable orifice E, zero differential pressure valve, throat pressure sensing tube assembly, adjustable orifice F, solenoid valve assembly A, closed position switch assembly, adjustable orifice G, and an electromagnetic control valve.
- (a) The slave servo valve consists of evacuated bellows assembly and an actuator lever. The lever is spring-loaded against a bleed nozzle port.
 - (b) The solenoid valve assembly B is a dual electromagnetic solenoid and ball valve assembly. The solenoid consists of two opposing electromagnetic coils and armatures, with an adjustable solenoid latch assembly.
 - (c) The mechanical manual override valve consists of two valve seats and a ball. A shouldered pin is installed in the end of the butterfly shaft assembly.
 - (d) The pneumatic actuator assembly consists of an actuator cover assembly with a closed stop adjustment. The cover bolts to an actuator housing assembly surrounding a spring-loaded actuator diaphragm.
 - (e) The actuator linkage assembly consists of an actuator arm pinned to a connecting link. The actuator arm bolts to the butterfly shaft. One end of the connecting link bolts to the actuator diaphragm so that any movement of the actuator diaphragm results in a rotation of the butterfly shaft. The valve flow section consists of a butterfly plate bolted to a shaft inside a venturi-type valve body.
 - (f) The zero differential pressure valve consists of a servo cover, spring-loaded diaphragm, poppet valve, valve seat, and a servo housing.
 - (g) Solenoid valve assembly A consists of a solenoid and a ball valve. The solenoid contains an electromagnetic coil, armature assembly, and an actuating rod. The actuating rod acts on the ball of the ball valve assembly.
 - (h) The electromagnetic control valve consists of a torque motor, a flapper, a supply nozzle, and a control pressure nozzle.
 - (i) The closed position switch is attached to the side of the actuator housing. The switch is closed by the actuator arm when the butterfly plate closes.
- B. Flow Control and Shutoff Valve Operation (Fig. 4)
- (1) Figure 4 shows the flow control and shutoff valve with the solenoid valve assembly A de-energized (normal flow schedule), solenoid valve assembly B is in the closed position (manual control rod pulled or coil number 2 energized momentarily), and without any current applied to electromagnetic control valve.

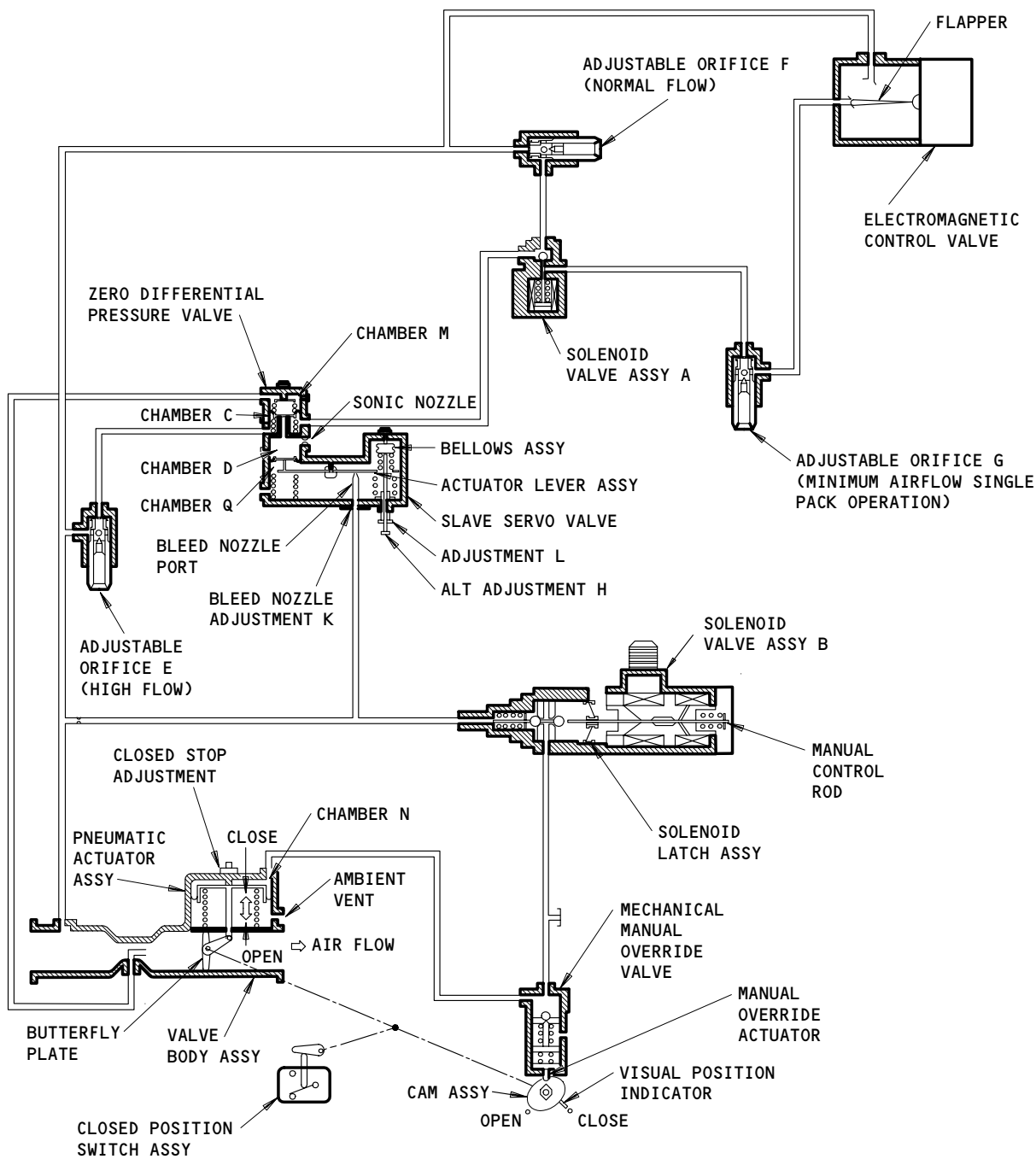
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NOTE: ALL VENTS TO AMBIENT

Flow Control and Shutoff Valve Operation
Figure 4

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- (2) When the solenoid valve B is momentarily energized open, the armature rod latches in this position. With solenoid valve A de-energized, the flow control and shutoff valve is in normal flow schedule. Inlet pressure passes through the ball valve assembly B to the mechanical override valve. The pressure seats the ball of the mechanical override valve; and this allows pressure to be routed to chamber N. The pressure in chamber N acting on the pneumatic actuator, causes shaft to rotate and open the butterfly plate. A normal flow rate is then established through the valve.
- (3) When solenoid valve A is energized and solenoid valve B is latched open, the valve is in the high flow schedule. Energizing solenoid valve A closes the output of adjustable orifice F. This causes the pressure in chamber C to decrease. This happens because the adjustable orifice E is set for a higher flow rate than orifice F. Therefore, the pressure drop across orifice E is greater than the pressure drop across orifice F. This causes the plate valve to close. Pressure in chamber D decreases and the actuator lever reduces the bleed from the bleed nozzle port. This increases the pressure in chamber N. The butterfly plate then opens to provide higher airflow through the valve.
- (4) During normal operation, the current to the electromagnetic control valve is high. This keeps the flapper against the supply nozzle. This prevents airflow through adjustable orifice G to chamber C. A decrease in the current to the electromagnetic control valve occurs when flow control and shutoff valve is in the high flow mode. Activation of the control valve decreases high flow from 165% to a minimum of 118%. When the current to the electromagnetic valve decreases, the flapper opens the supply nozzle in proportion to the decrease in current. The pressure from the supply nozzle flows through orifice G and solenoid A to chamber C. The increased pressure in chamber C opens the plate valve. The pressure in chamber D also increases. This results in increased pressure out the bleed port nozzle, decreasing the pressure in chamber N. This allows the pneumatic actuator to close plate in proportion to decrease in chamber N pressure.
- (5) Airflow regulation within the valve is controlled by maintaining a flow across orifices E and F. This flow is proportional to the flow across the venturi valve body. The zero differential pressure valve provides airflow regulation. The differential pressures between chambers M and C control the airflow out of the plate valve through the sonic nozzle. This in turn controls the pressure to solenoid B through the actuator lever and bleed port nozzle. This in turn regulates the chamber pressure in N and hence the movement of the butterfly plate.

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- (6) The slave servo valve reduces airflow as a function of altitude above 22,000 feet. With increasing altitude, the ambient pressure in chamber Q decreases causing the bellows to expand. Once the altitude exceeds 22,000 feet, the bellows has expanded enough to contact altitude adjustment H. Further increases in altitude cause a drop in the absolute pressure in chamber D. The pressure in chamber D pivots the actuator lever to increase the bleed rate at the bleed port nozzle in proportion to the altitude changes. Chamber N pressure then decreases. The butterfly plate closes in proportion to altitude changes. Thus, a reduced airflow schedule with a constant volume enters the packs.
- (7) When solenoid valve assembly B is momentarily energized closed, the ball of the solenoid valve assembly B unseats and the ball valve is seated. This closes off inlet pressure and vents chamber N to ambient. This allows the spring force on the actuator linkage assembly to drive the butterfly plate closed. This trips the position switch assembly indicating the butterfly plate is closed.
- (8) In case of electrical failure, the valve can be operated on the low flow schedule. Pressing in on the armature rod assembly until the solenoid latch assembly of solenoid valve assembly B snaps through initiates the low flow mode.
- (9) In case of a pneumatic failure in the valve, the valve may be manually closed by rotating the cam assembly clockwise. This causes the manual override actuator to seat the manual override valve on the opposite seat shutting off inlet pressure and venting chamber N to ambient. This allows the spring force acting on the actuator diaphragm assembly to close the butterfly plate.

C. Heat Exchangers (Fig. 5)

- (1) The primary heat exchanger is the first of four heat exchangers that supply air passes through within the air cooling pack.
- (2) The primary heat exchanger consists of an all aluminum brazed and welded plate-fin crossflow core. On the cooling air plate, the fin has a wavy configuration with respect to the cooling flow. This increases heat transfer and reduces contamination. On the supply air plate, the fin is offset in the direction of flow to increase heat transfer.
- (3) Supply air enters the primary heat exchanger through the hot air supply duct. At the same time, cool ram air from the secondary heat exchanger enters via the rectangular duct. Supply air and ram air flow at right angles to each other through their respective plate-fin paths. Heat transfers from the offset fin arrangement of hot supply air to the cooler ram air surface. This supplies the desired cooling of supply air.
- (4) The primary and secondary heat exchangers are identical except that the secondary heat exchanger has a longer cold flow length and hail protection fins in the cooling air inlet. The cooling air inlet face exactly matches the secondary discharge face. The two cores attach by bolts.

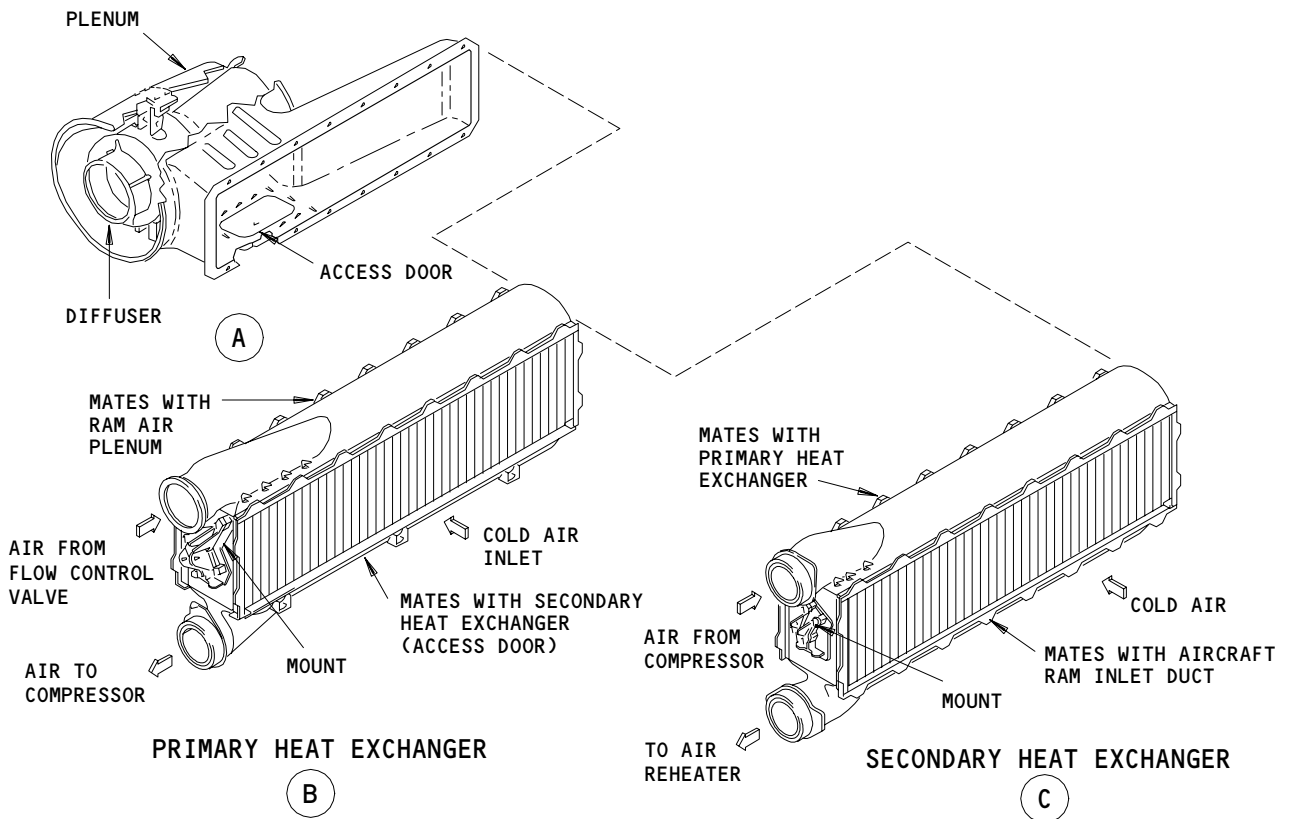
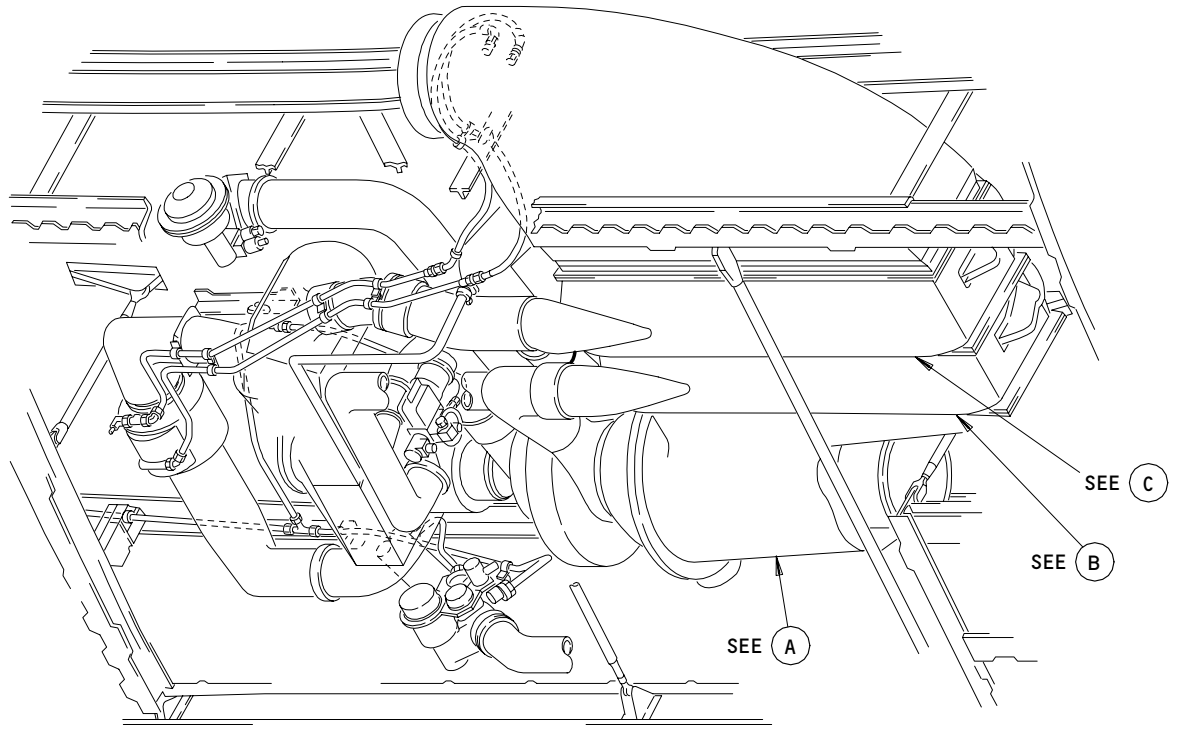
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Heat Exchangers/Fan Air Plenum
Figure 5

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- (5) The secondary heat exchanger works on the same principle as the primary heat exchanger. The only difference is that supply air comes from the compressor and cooling air flows directly from the ram air inlet.
- (6) An access door between the heat exchangers allows cleaning of the exchangers.

D. Fan/Air Plenum/Diffuser

- (1) The fan/air plenum/diffuser is a fiberglass structure joining the air cycle machine, primary heat exchanger, and ram air exhaust duct. The diffuser interfaces with the air cycle machine fan. An access door is provided on the lower portion of the plenum for heat exchanger maintenance.
- (2) The plenum directs ram air leaving the primary heat exchanger into the air cycle machine fan inlet and to the ducting leading to the ram air exhaust door. Cooling air flows through the heat exchangers because of ram air pressure aided by the fan impeller. A bypass around the fan increases total ram airflow. On the ground, when no ram air is available, the fan provides all the cooling airflow through the heat exchangers. The plenum and bypass create an ejector at the bypass and prevent recirculation airflow.

E. Air Cycle Machine (Fig. 6)

- (1) The air cycle machine produces refrigerated air for use as cooling air in the mix manifold.
- (2) The air cycle machine consists of a single shaft rotating assembly on which a compressor, turbine, and fan impeller are mounted. Air bearings support the rotating assembly. The turbine is at one end of the shaft, the fan on the opposite end, and the compressor in the middle.
- (3) After passing through the primary heat exchanger, supply air enters the radial-outflow compressor. The compressor compresses supply air to a higher pressure and temperature.
- (4) Supply air then passes through high pressure water separation equipment and then enters the turbine. In the turbine, air expands and generates power to drive the compressor and cooling fan impellers. The energy removed from the turbine airflow causes a substantial temperature reduction. This produces refrigerated air for the system. To prevent ice build-up, hot air from the low limit and temperature control valves enters near the turbine outlet.

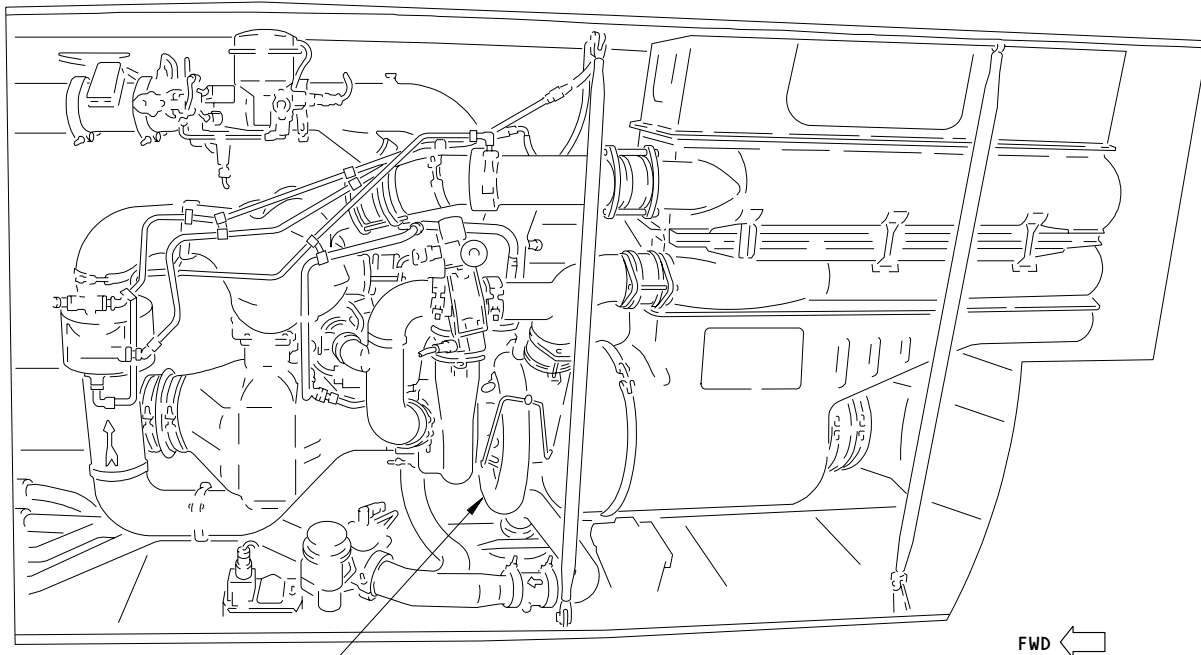
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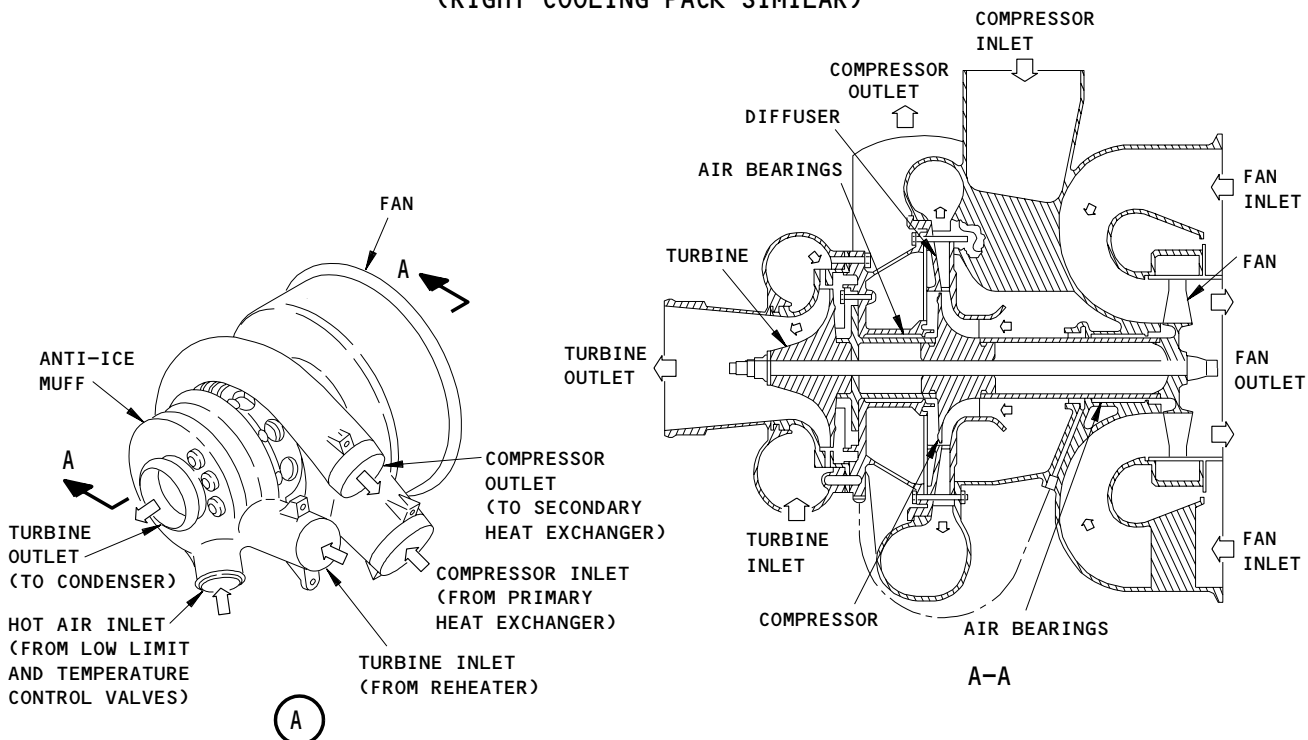
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AIR CYCLE MACHINE (TURBINE, COMPRESSOR AND FAN)
SEE **A**

LEFT COOLING PACK
(RIGHT COOLING PACK SIMILAR)



Air Cycle Machine
Figure 6

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(5) The fan impeller aids ram airflow in flight. On the ground, when no ram air is available, the impeller provides all the cooling airflow.

F. Reheater (Fig. 7)

- (1) The reheater is a crossflow plate-fin unit made of aluminum. The fins are offset in the direction of flow to increase heat transfer. The heat transfer surfaces consist of the same fin configuration on both sides of flow.
- (2) Hot supply air from the secondary heat exchanger passes through the reheater on its way to the condenser. The cold air passing through the reheater is air returning from water extractor on its way to the turbine. The hot air and cold air cross without mixing in the reheater and exchange energy.

G. Condenser (Fig. 8)

- (1) The condenser is a crossflow heat exchanger. The condenser uses refrigerated turbine discharge air to cool incoming supply air to a temperature low enough for moisture condensation.
- (2) The condenser is a crossflow plate-fin heat exchanger made from an aluminum alloy. The core of the condenser consists of two smaller core modules arranged in parallel. An open gap in the center of the cold air face permits a portion of the cold air to bypass the core matrices. The hot side of the core includes hollow bars through which hot external air flows. This prevents ice buildup on the cold air face.
- (3) Supply air from the reheater passes through the hot side of the condenser where it is cooled by discharge air from the turbine. The temperature decreases enough to condense moisture. Icing at the cold air face of the condenser is prevented by bypassing part of the cold air around the condenser core and supplying hot air from the compressor outlet to the deicing passages in the face of the core.
- (4) Cooled, moisture laden supply air exits from the condenser and continues to high pressure water separation equipment. Supply air from the turbine continues to cabin for cooling.

H. Water Extractor (Fig. 9)

- (1) The water extractor removes moisture from supply air from the condenser.

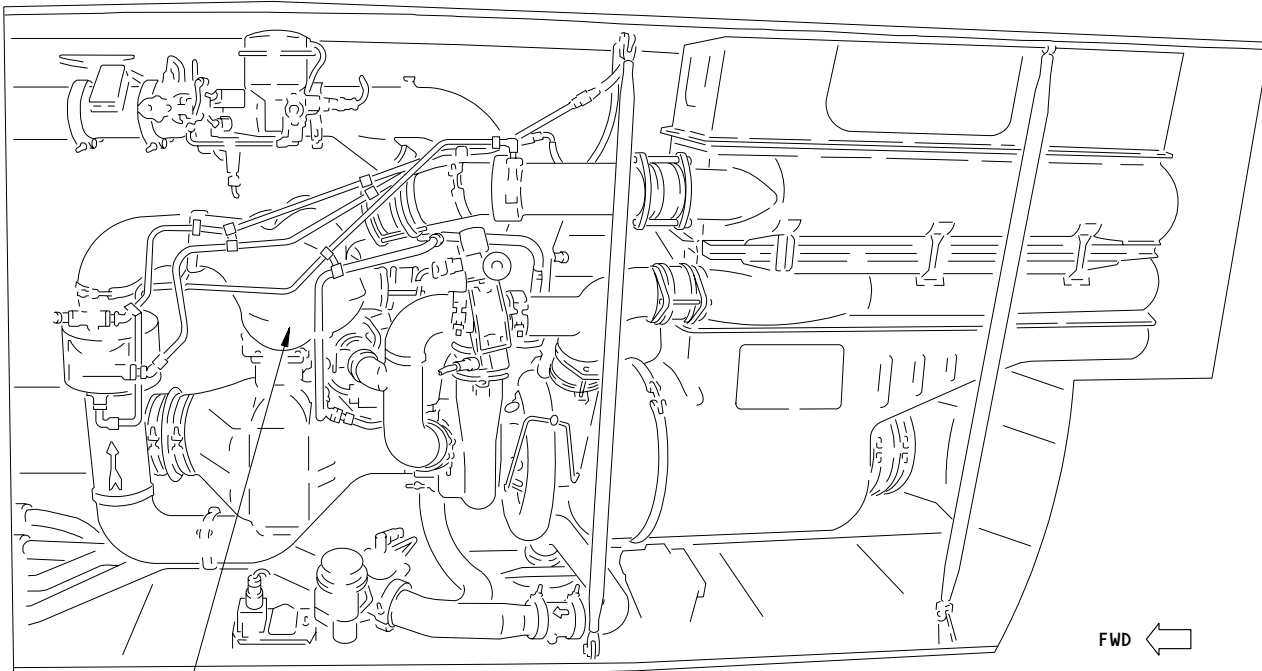
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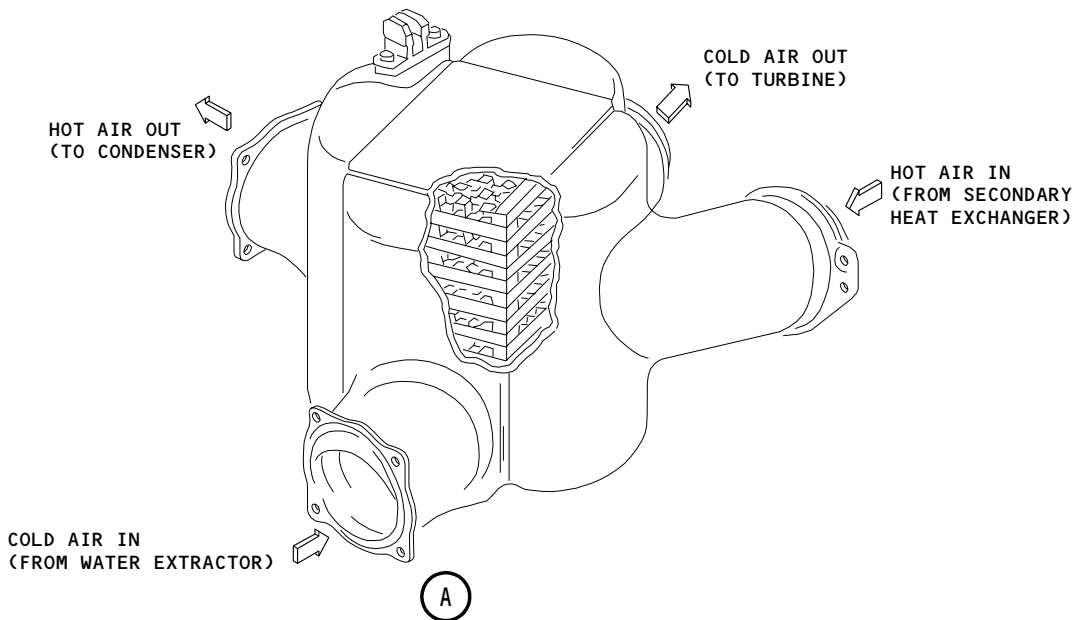
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REHEATER
SEE (A)

LEFT COOLING PACK
(RIGHT COOLING PACK SIMILAR)



Reheater
Figure 7

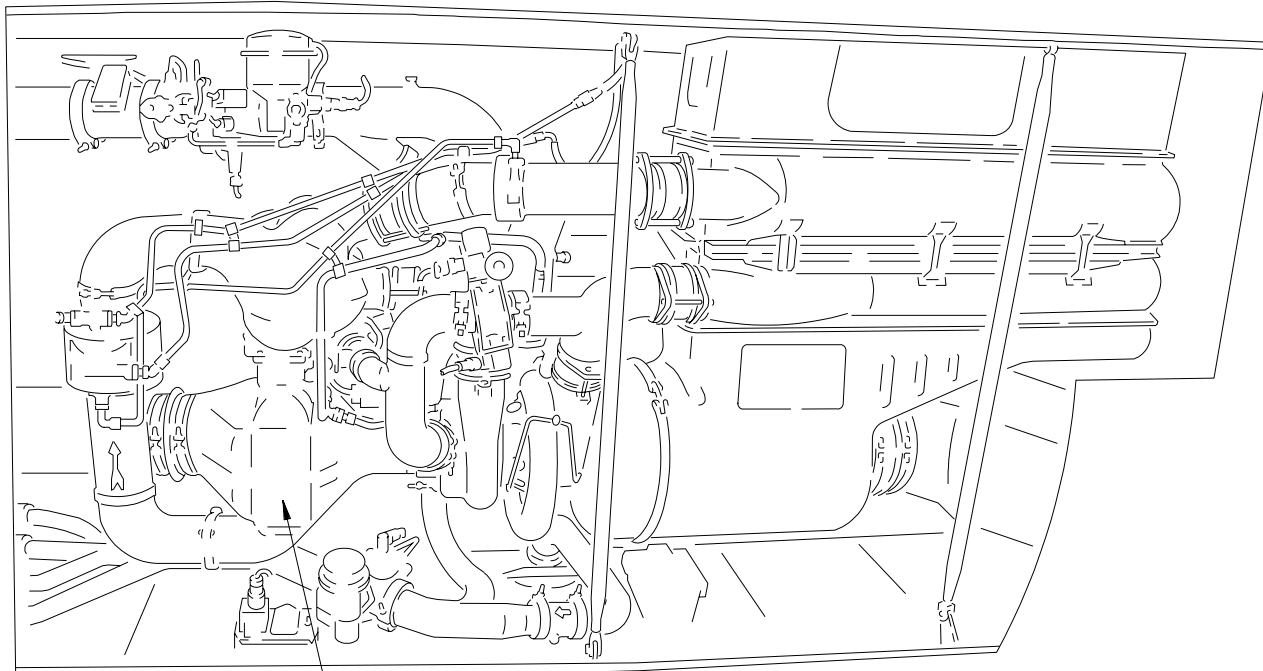
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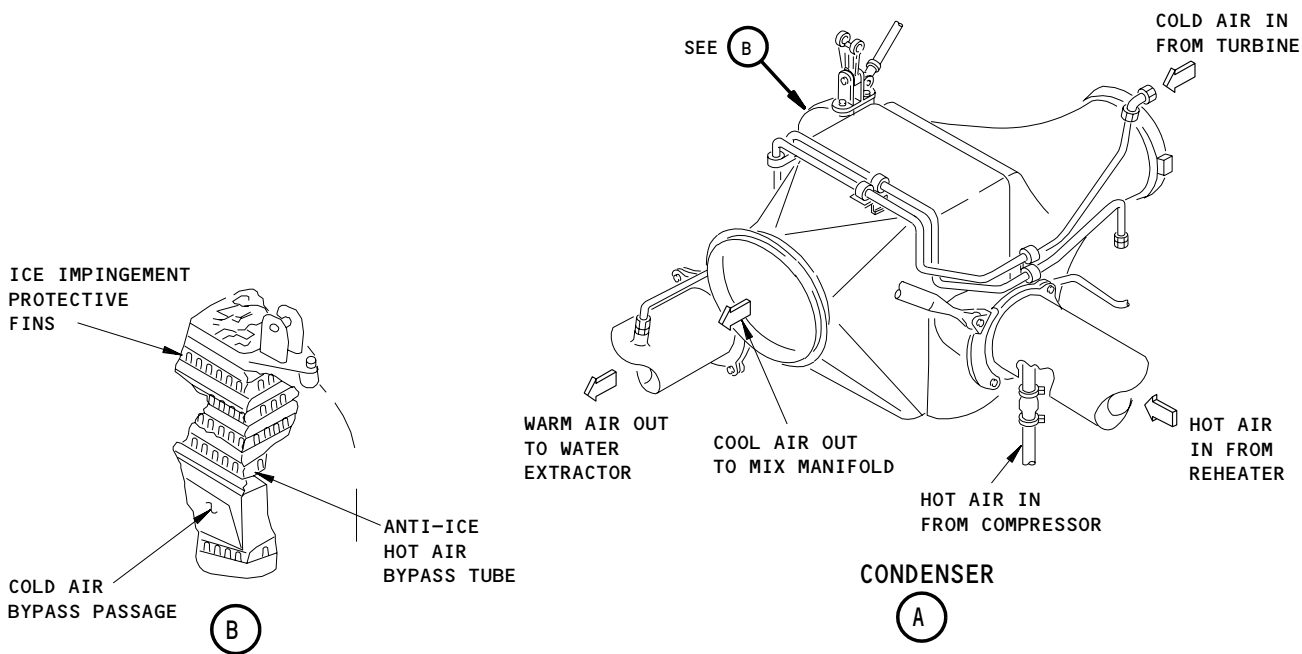
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CONDENSER

SEE (A)

LEFT COOLING PACK (RIGHT PACK SIMILAR)



Condenser
Figure 8

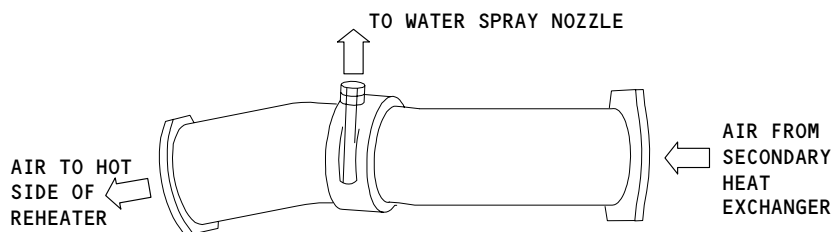
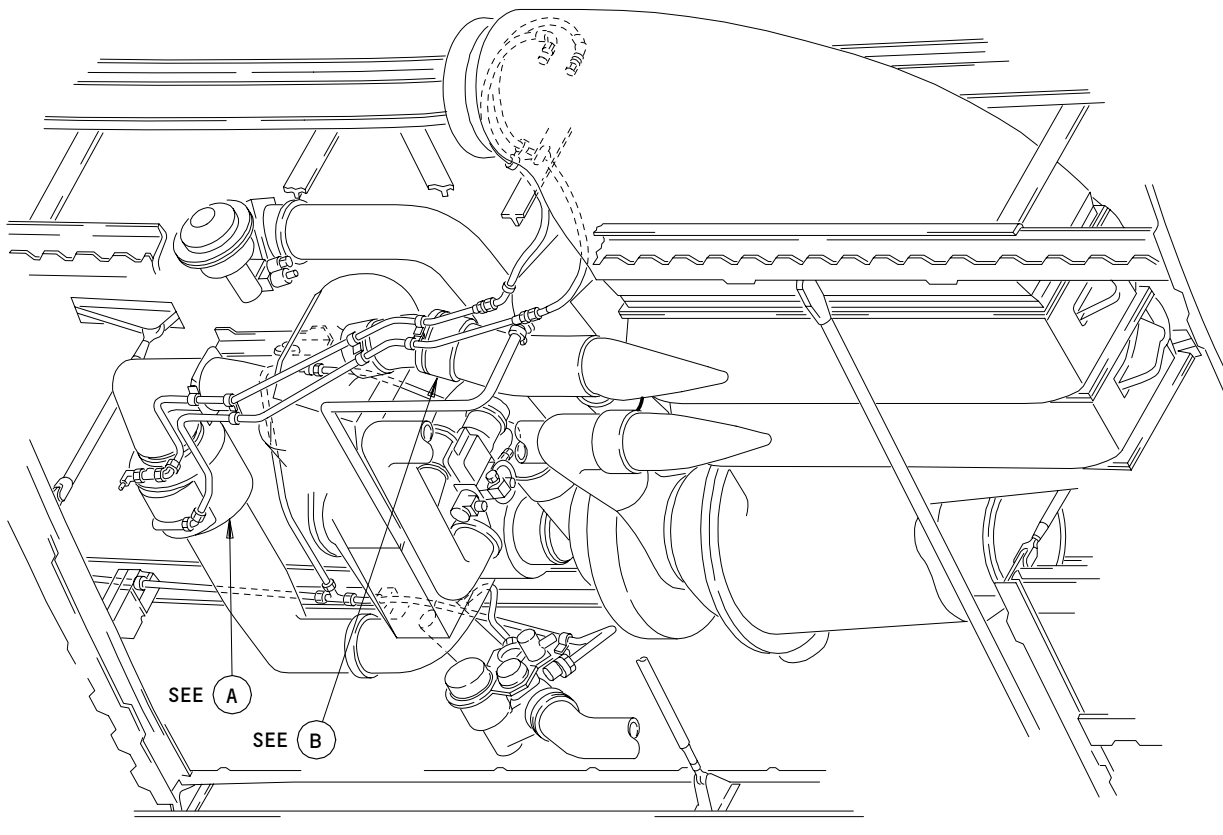
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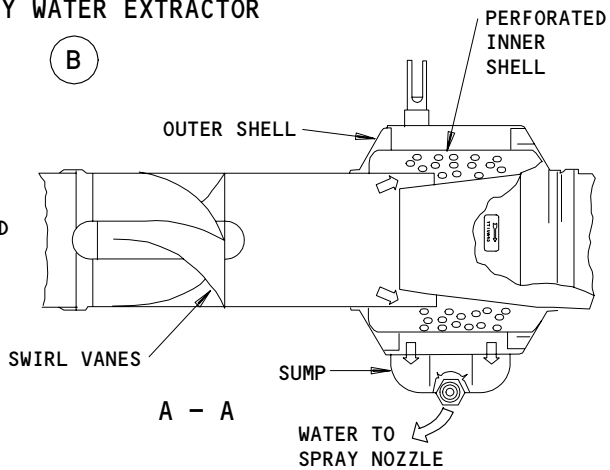
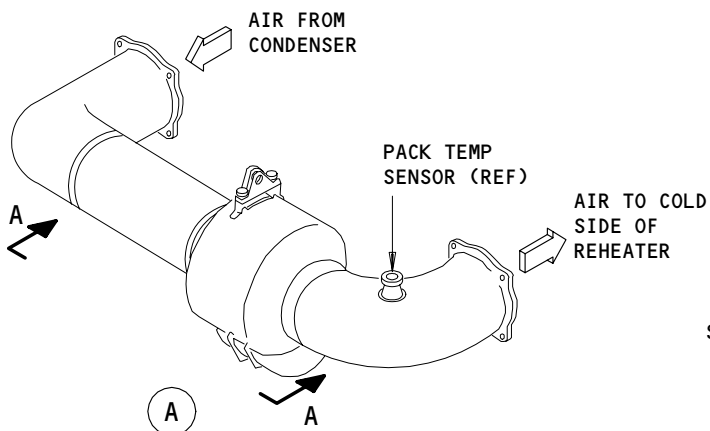
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SECONDARY WATER EXTRACTOR



Water Extractor
Figure 9

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- (2) The water extractor consists of helical swirl vanes and a water collector. Four helical vanes are joined to a central hub and to the duct inner wall. The collector consists of a perforated inner shell, outer shell, and water sump; the parts are joined together as an assembly. A drain boss is welded to the water sump.
- (3) Moisture-laden air from the condenser enters the water extractor. The swirl vanes cause the air to swirl. This creates a centrifugal force which throws the water droplets outward. The perforated inner shell of the collector shaves off the water droplets which accumulate in the space between the inner shell and the outer shell. The water flows down the extractor and collects in the sump. It then enters the drain line which routes the water to the water spray nozzle. The water spray nozzle sprays the water into the secondary heat exchanger cooling airstream.

I. Low Limit Control Valve (Fig. 10)

- (1) The pack low limit control valve is a 2-inch diameter spring-loaded, pneumatically-actuated, butterfly-type modulating and shutoff valve. The valve consists of two differential pressure servo assemblies, an electromagnetic control valve, a valve flow section, and a valve position indicator.
- (2) The low-limit-control valve has two purposes. One purpose is to prevent ice build-up in the turbine outlet and in the condenser. Its other purpose is to decrease the temperature of the air cycle machine when it becomes too hot.
- (3) The low-limit-control valve opens when the open chamber of the pneumatic actuator overcomes the force of the pneumatic-actuator spring. Air pressure is supplied through the trailing probe to the reference-pressure-regulator assembly. The air pressure can only enter the open chamber if an ice buildup or a high air-cycle-machine temperature occurs.
- (4) The high-pressure-delta-P-servo assembly senses ice build-up between the condenser inlet (reheater outlet) and the condenser outlet (water extractor inlet). The low-pressure-delta-P-servo assembly senses ice buildup between the turbine outlet and the pack outlet. If there is an ice build-up, the differential pressure in the appropriate servo assembly will increase.
 - (a) When the differential pressure is below the specified amount, the delta-P-servo poppet remains closed. This is so that air from the reference pressure regulator cannot enter the servo-regulator-diaphragm assembly.

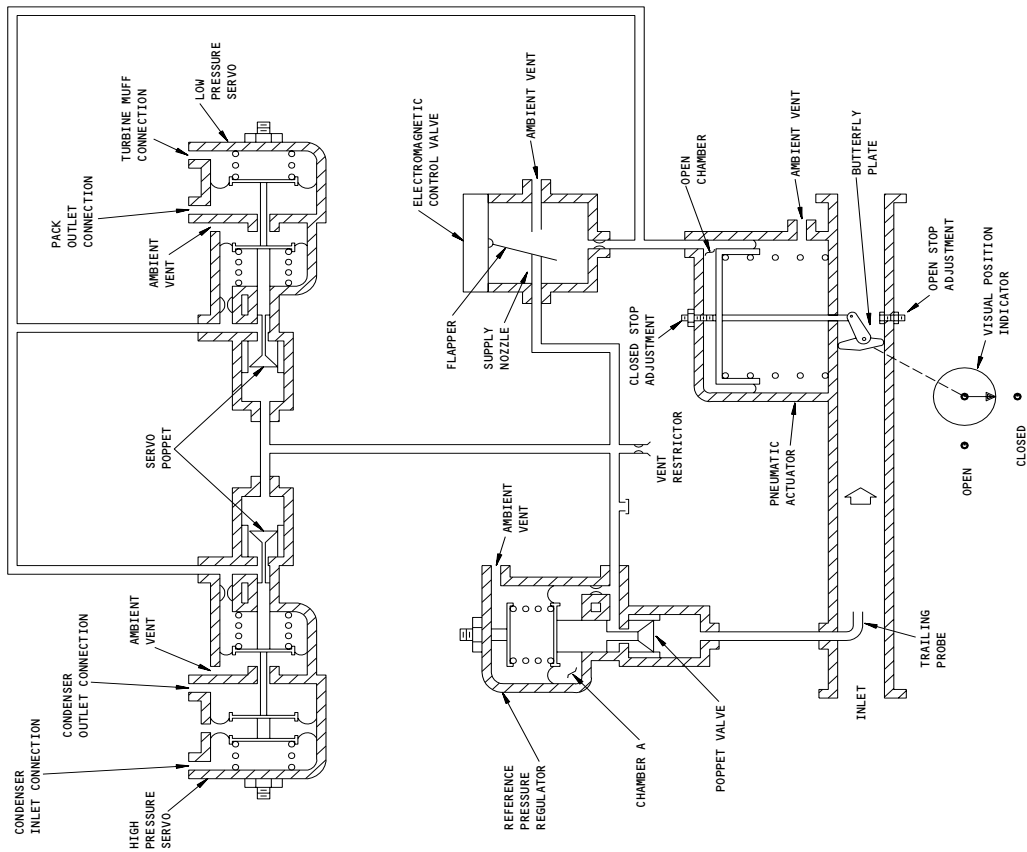
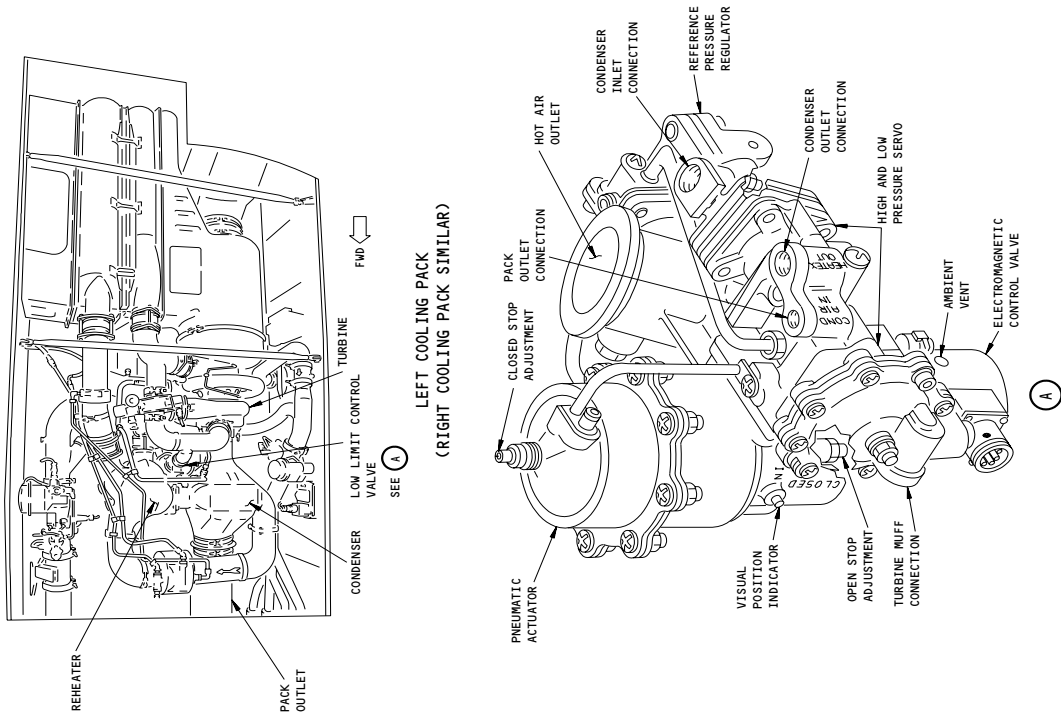
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Low Limit Control Valve
Figure 10

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- (b) When the differential pressure is above the specified amount, the delta-P-servo poppet is pushed off its seat. This allows air from the reference pressure regulator to flow through the servo-regulator-diaphragm assembly and into the open chamber of the pneumatic actuator. This causes the valve to open so that hot air is supplied to the turbine outlet to melt the ice.
 - (5) To decrease the temperature of the air cycle machine, an electrical input to the low limit control valve is supplied. As the current to the electromagnetic control valve increases, the flapper moves to increase the area of supply nozzle. This allows air to flow from the reference-pressure-regulator assembly through the supply nozzle and into the open chamber of the pneumatic operator. As pressure in the open chamber increases, the valve opens to allow heated air to bypass the air cycle machine.
 - (6) Figure 10 shows the valve in the normally closed position. The condensor outlet pressure is equal to the condensor inlet pressure. The pack outlet pressure is equal to the turbine outlet pressure. No electrical current is supplied to the valve.
- J. Temperature Control Valve (Fig. 11)
- (1) The temperature control valve regulates hot air around or through the cooling pack.
 - (2) The pack temperature control valve consists of a rotary electromechanical actuator, a valve flow section, and a linear variable resistor assembly.
 - (3) The rotary electromechanical actuator consists of a connector, two limit switches, capacitor, electrical motor, visual position indicator, and a manual override.
 - (4) The valve flow section consists of valve body assembly, butterfly plate, and a shouldered shaft.
 - (5) A 115V AC electrical motor drives the internal gears which drive the butterfly plate.
 - (6) The limit switches (OPEN/CLOSED) are actuated by the cam when valve reaches its position. The cam also allows the limit switches to be reset.
- K. Pack Temperature Controller (Fig. 12)
- (1) The pack temperature controller includes a microprocessor which regulates the temperature of air cooling pack discharge air and performs Built-In-Test (BITE) function. It is located in the main equipment center on the E-3 rack.

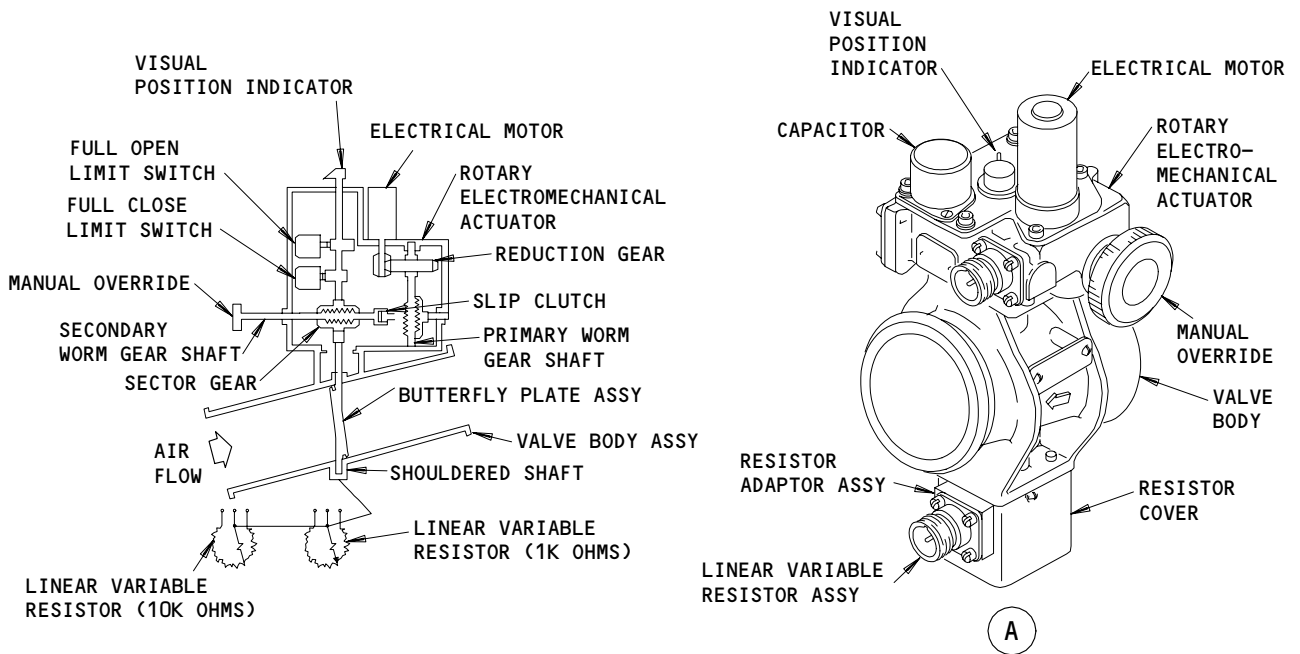
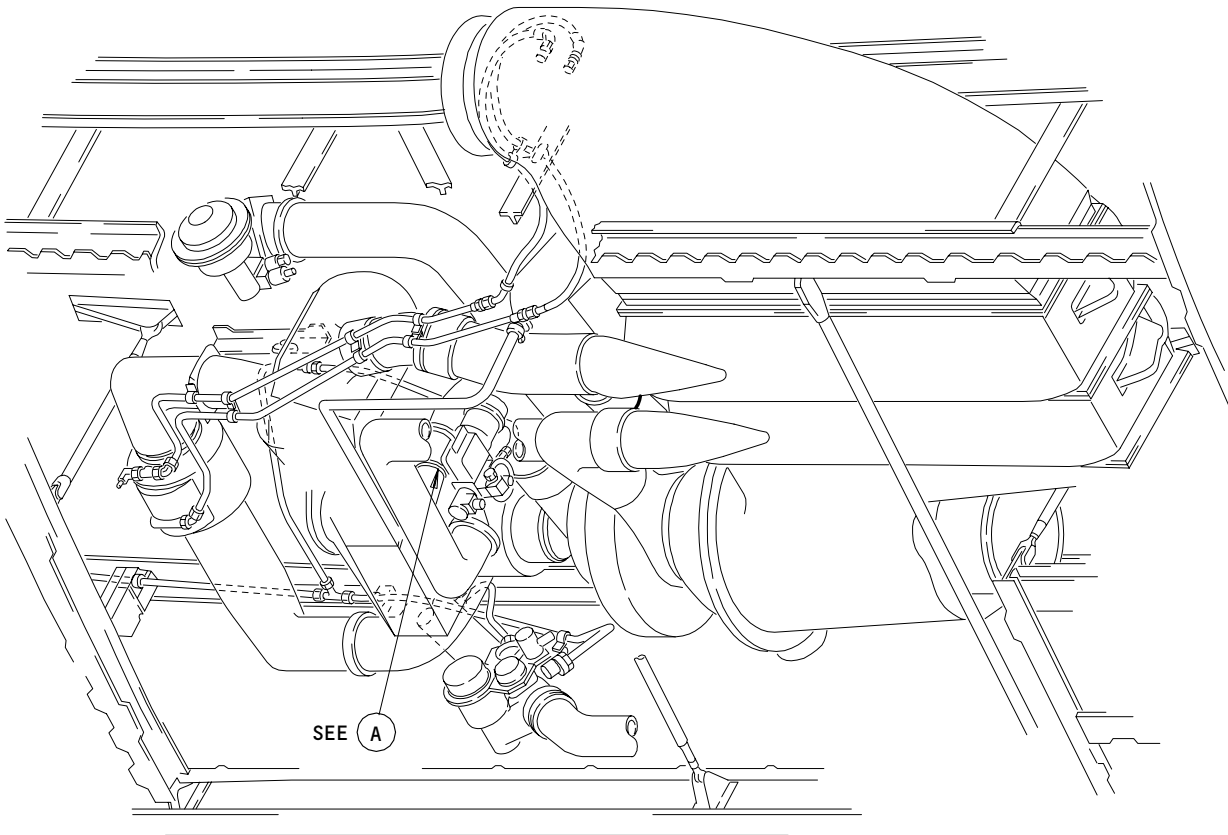
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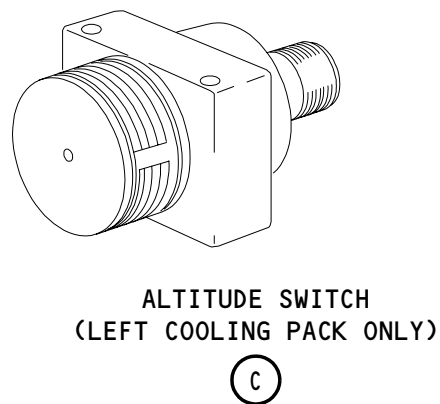
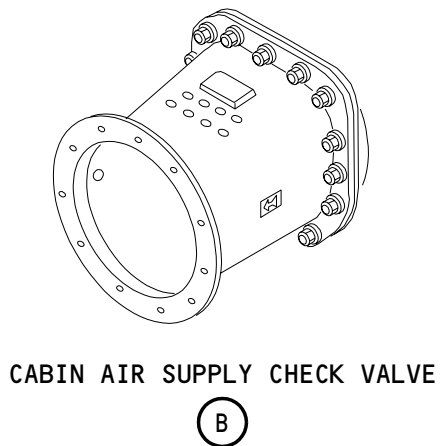
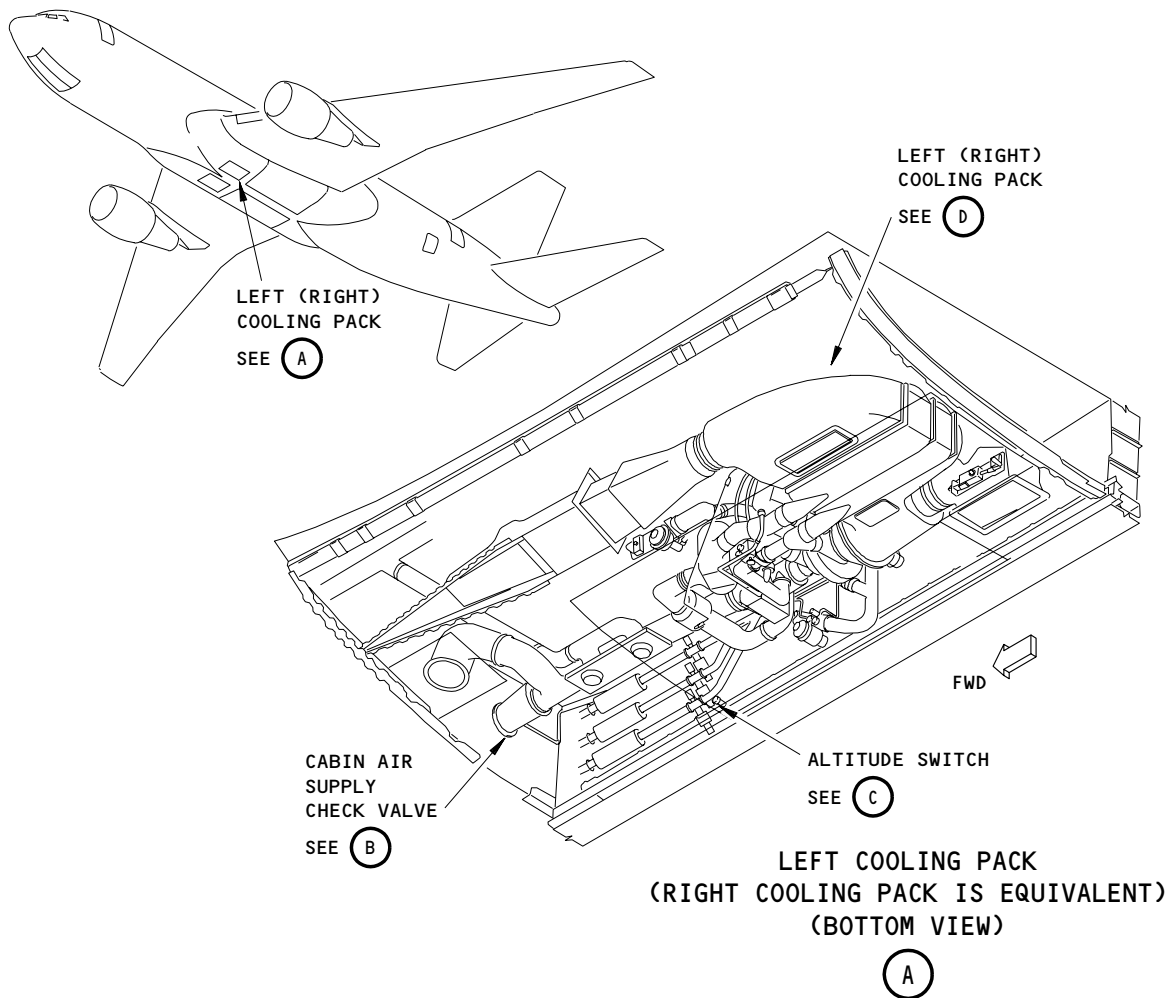
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Temperature Control Valve
Figure 11

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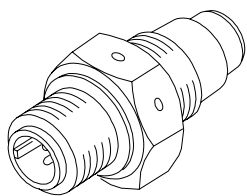
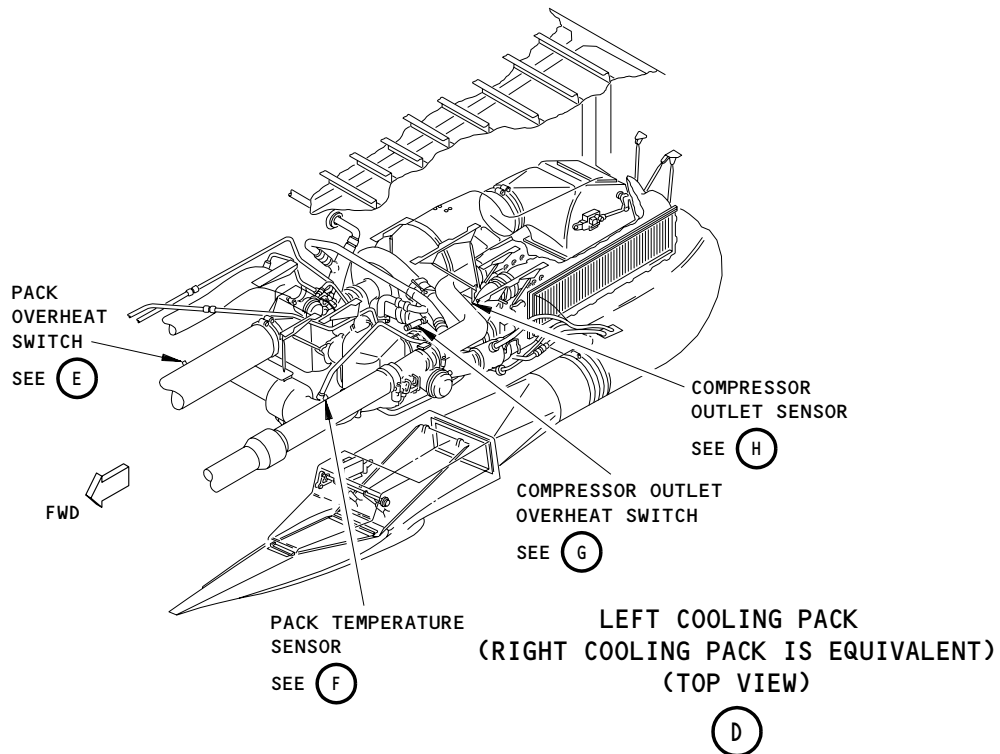
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Cooling Pack Components
Figure 12 (Sheet 1)

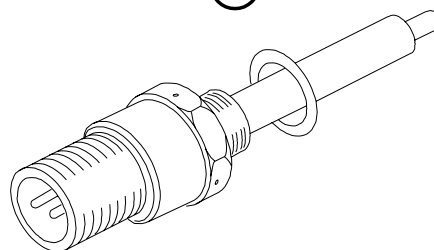
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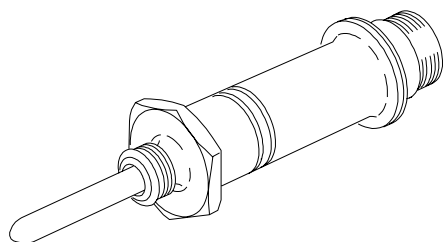
PACK OVERHEAT SWITCH

(E)



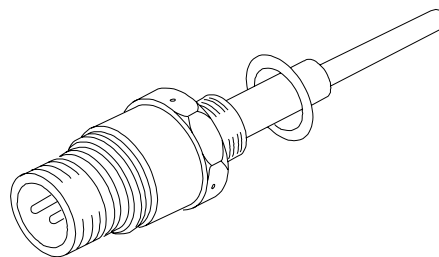
PACK TEMPERATURE SENSOR

(F)



COMPRESSOR OUTLET OVERHEAT SWITCH

(G)



COMPRESSOR OUTLET SENSOR

(H)

Cooling Pack Components
Figure 12 (Sheet 2)

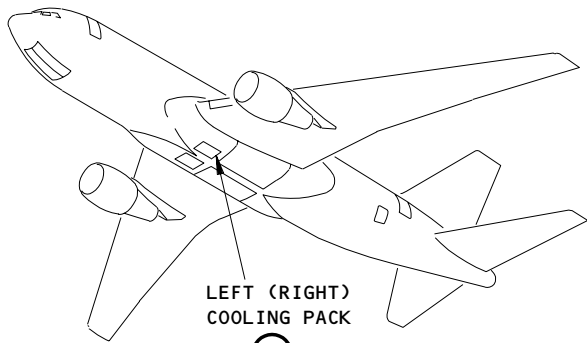
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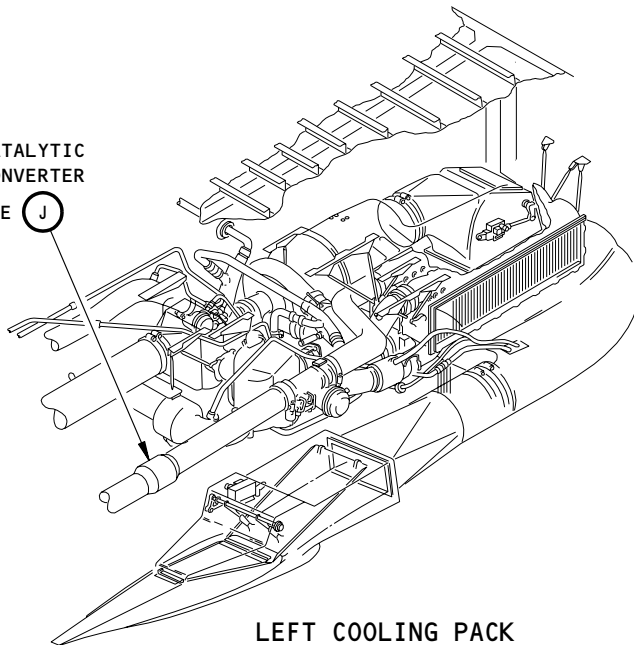
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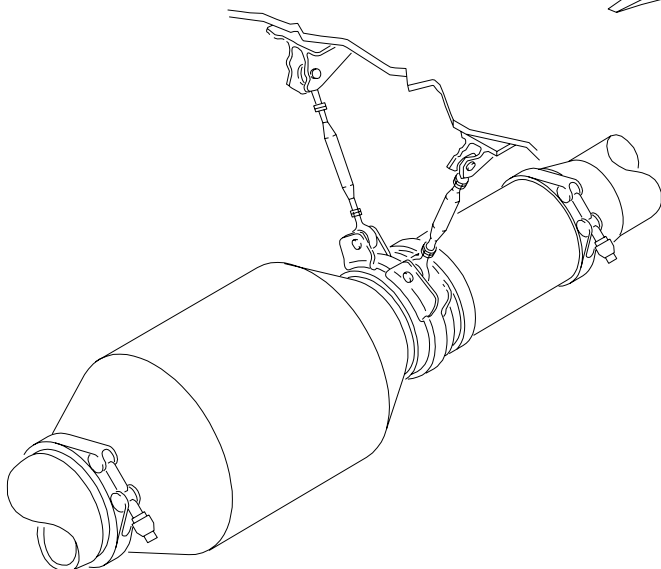
LEFT (RIGHT)
COOLING PACK
SEE (I)

CATALYTIC
CONVERTER
SEE (J)



LEFT COOLING PACK
(RIGHT COOLING PACK IS EQUIVALENT)
(TOP VIEW)

(I)



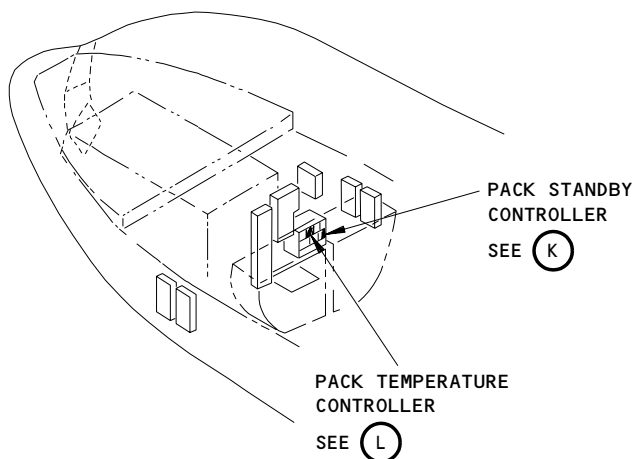
CATALYTIC CONVERTER

(J)

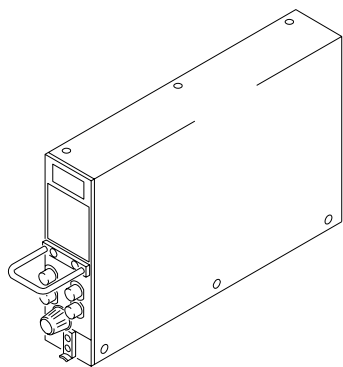
Cooling Pack Components
Figure 12 (Sheet 3)

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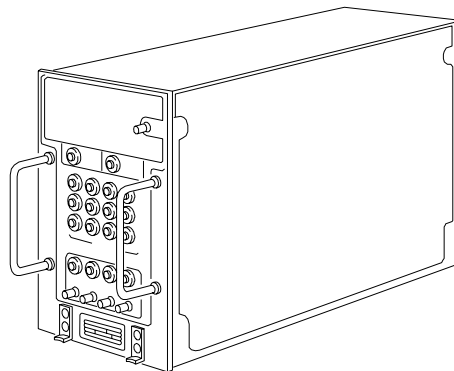


MAIN EQUIPMENT CENTER



PACK STANDBY CONTROLLER
(ELECTRONIC EQUIPMENT RACK, E3)

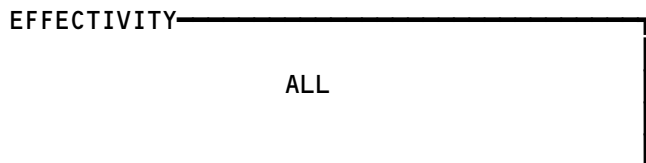
(K)



PACK TEMPERATURE CONTROLLER
(ELECTRONIC EQUIPMENT RACK, E3)

(L)

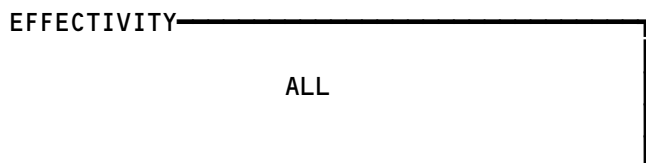
Cooling Pack Components
Figure 12 (Sheet 4)



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Cooling Pack Components
Figure 12 (Sheet 5)

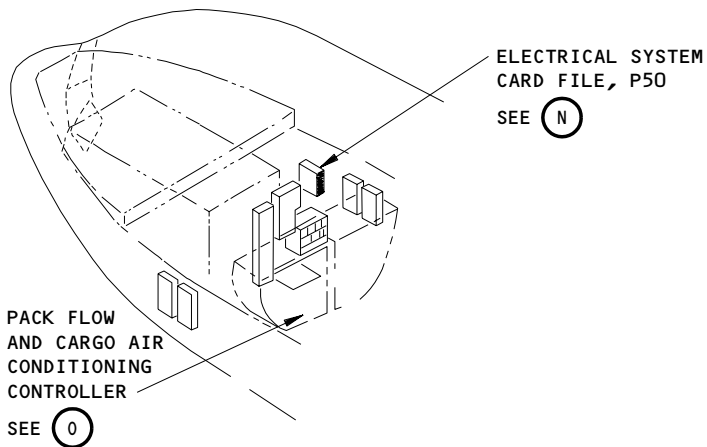


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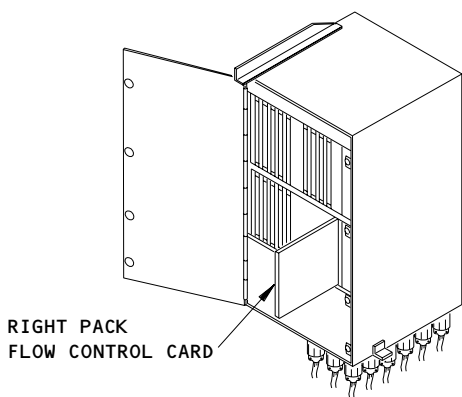
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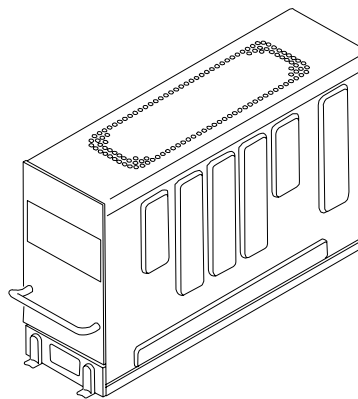


MAIN EQUIPMENT CENTER



ELECTRICAL SYSTEM
CARD FILE, P50

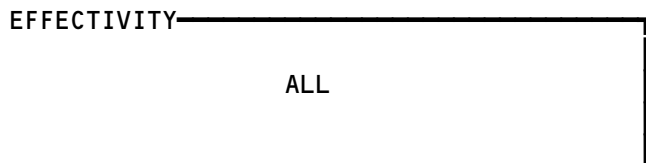
(N)



PACK FLOW AND CARGO AIR CONDITIONING CONTROLLER
(ELECTRONIC EQUIPMENT RACK, E5)

(O)

Cooling Pack Components
Figure 12 (Sheet 6)



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- (2) The controller provides output drives to the temperature control valve, ram air inlet actuator, and ram air exhaust actuator. The BITE function monitors and stores LRU faults for the previous ten flights. The front panel contains the test switches and BITE indicators necessary to interrogate the controller memory and display information.
 - (3) The controller tests itself for two groups of faults: critical faults and non-critical faults.
 - (4) A critical fault is any major fault within the controller. A critical fault latches the fault relay, cuts off power to the temperature control valve and ram air door actuators, and causes the CONTROLLER FAULT light to come on. The following failures are critical faults:
 - (a) Incorrect timing or frequency within the microcomputers program execution mode.
 - (b) Temperature controller's internal power supply regulator failure.
 - (c) Analog/Digital (A/D) input converter out of limits.
 - (d) RAM memory fault.
 - (e) EAROM memory fault.
 - (f) ROM memory fault.
 - (5) Non-critical faults occur when there is a defect in the electrical circuit or in a Line Replaceable Unit (LRU). When a non-critical fault is found, the system will ignore input from that defective zone. Power to the trim air valve of the defective zone is shutoff, causing it to hold its previous position. If the flow control valve driver is defective, the air conditioning pack will not operate in the intermediate or high flow mode. If the low limit valve driver is defective, power to the driver will be shutoff. The valve will close and stay closed unless opened by its internal differential pressure sensing servos. The non-critical fault is stored in EAROM and can be recalled during the Initiated BITE Mode.
- L. Pack Standby Controller (Fig. 12)
- (1) The pack standby controller includes an analog unit which regulates the temperature of the air cooling pack discharge air and limits the compressor outlet temperature. The controller contains built-in test (BITE) circuitry for fault isolation. It is located in the main equipment center on the E-3 rack.
 - (2) The pack standby controller, when energized, takes over the control of the low-limit valve torque motor from the pack temperature controller. The BITE provides simple go/no-go checks of the controller circuit functions and its pack temperature sensor and compressor outlets sensor.

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M. Pack Temperature Sensors

- (1) There are two pack temperature sensors. One sensor provides a resistive signal to the pack temperature controller and the other to the pack standby controller. The controller in turn regulates the pack discharge temperature by modulating the ram air doors and the temperature control valve. The sensor is installed on the outlet of the water extractor.
- (2) The sensor consists of two series-connected glass-sealed thermistors in a stainless steel probe with an integral electrical connector. The electrical resistance varies with temperature in an inverse and non-linear function. The pack controller regulates pack temperature by comparing a pack demand signal from the cabin zone controller with sensed temperature from the sensor. The difference between the signals is the pack error. The pack controller uses the pack error to produce position commands to the ram air door actuators and temperature control valve.
- (3) AIRPLANES WITH FORWARD CARGO AIR CONDITIONING SYSTEM;
During cruise conditions above 32,000 feet, two fixed resistors are connected in parallel circuits with the left pack temperature sensor and the forward cargo duct temperature sensor which produce lower resistance signals (Fig. 14). The lower resistance signals are interpreted by the left pack temperature controller and auxiliary zone temperature controller as higher input temperatures, which then outputs a lower left pack outlet temperature. These lower resistance signals occur when the pack altitude switch is actuated (altitude above 32,000 feet). Since, the left pack provides conditioned air to the forward cargo compartment, the simulated higher input temperature allows the forward cargo compartment to achieve the required lower temperature setpoint. Under these conditions, it is normal for the left pack outlet temperature to be lower than the right pack outlet temperature.

N. Altitude Switch

- (1) The altitude switch provides switching for low-limiting temperature settings of cooling the pack to compensate for changes in altitude. The switch is located near the left cooling pack on the keel beam.
- (2) The switch consists of a pressure sensing aneroid capsule containing a single pull double throw electrical switch. An aluminum housing incorporates an electrical connector and two mounting holes. A single vent hole acts as a pressure-sensing port.
- (3) The altitude switch provides an altitude signal at 31,000 feet to the pack temperature controller. The controller then changes the low-limit setting of cooling pack discharge from 35°F to 0°F (2°C to -18°C). At low altitude, the 35°F (2°C) temperature limit is used to prevent icing at the condenser and water extractor. At an altitude somewhere between 29,500 feet and 32,500 feet, switching occurs. The altitude switch provides switching for both temperature controllers.

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- (4) AIRPLANES WITH FORWARD CARGO AIR CONDITIONING SYSTEM;
Due to a parallel connection of a fixed resistor with left pack temperature sensor, the low-limit setting for the left pack discharge temperature can be lower than the right pack discharge temperature when the pack altitude switch is actuated at altitudes above 32,000 feet (Fig. 14).

O. Compressor Outlet Sensors

- (1) Two compressor outlet sensors are installed in the compressor discharge duct of the air cycle machine. The sensors provide a resistive signal to the pack temperature controller and standby controller which in turn limit compressor discharge temperature.
- (2) The sensor consists of a single platinum element hermetically sealed in a stainless steel probe with an integral electrical connector. The electrical resistance of the platinum element varies directly and linearly with temperature with a nominal resistance of 500 ohms at 32°F (0°C). The pack temperature controller and standby controller uses the resistive signal for overheat protection.

P. Compressor Outlet Overheat Switch

- (1) The compressor outlet overheat switch is mounted on the compressor discharge duct of cooling pack. The switch is a thermal protective device. It supplies a discrete electrical signal to flow control card which in turn closes the flow control and shutoff valve, opens the ram air doors, opens the temperature control valve, and lights a pack overheat light on the pilots' overhead panel. The switch actuates at 490°F (254°C) and resets at 450°F (232°C).

Q. Pack Overheat Switch

- (1) The pack overheat switch senses pack discharge temperature at the condenser outlet.
- (2) The temperature-sensitive element of switch is a bimetallic, snap-acting disc. As temperature reaches a predetermined calibration point, the disc snaps to its reverse curvature; this causes the contacts to close. The switch closes at 190°F (88°C) and resets at 160°F (71°C).
- (3) If cooling pack discharge air exceeds 190°F (88°C), the overheat switch closes to complete the circuit. This lights the pack overheat light on the overhead panel P5, closes the temperature control valve, and opens the ram air doors.

R. Flow Control Card

- (1) The right pack flow control card is located in the main equipment center, in the P50 card file. The flow control card controls the operation of the right-pack-flow-control-and-shutoff valve. It can command the valve to open, close, or go into the high flow mode. It also has the logic which inhibits the valve from the high flow mode. It also has the logic which shows that a compressor outlet overheat or a pack overheat condition has occurred.

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S. Pack Flow and Cargo Air Conditioning Controller (PFCACC)

(1) Description

(a) The pack flow and cargo air conditioning controller is installed in the main equipment center, on shelf 5 of the E1 rack. The controller is a black box which has three printed-circuit boards (PCB). Each PCB controls one main function of the controller. The three main functions of the controller are:

- 1) Control the operation of the left-pack flow-control-and-shutoff valve
- 2) Control the operation of the forward-cargo-compartment air-conditioning system
- 3) Monitor the forward-cargo-compartment air-conditioning system for failures.

(2) Function

(a) The Flow Control PCB controls the left-pack flow-control-and-shutoff valve. It commands the valve to open, close, or go to the high flow mode. It also has the logic which inhibits the high flow mode. It also has the logic which shows that a compressor outlet overheat or a pack overheat condition has occurred.

(b) The Forward Cargo A/C PCB controls the operation of the forward-cargo-compartment air-conditioning system. It has the logic to command these parts to open/close or to turn on/off:

- 1) The forward-cargo air-conditioning-shutoff valve (AMM 21-28-01/401).
- 2) The forward-cargo-exhaust valve (AMM 21-28-00/001).
- 3) The forward-cargo ground-exhaust valve (AMM 21-28-00/001).
- 4) The forward-cargo-recirculation fan (AMM 21-25-01/401).
- 5) The forward-cargo heating-shutoff valve (AMM 21-43-01/401).

(c) The BITE PCB monitors the forward-cargo-compartment air-conditioning system for failures. It continuously does tests on the parts of the system. If a failure does occur, it sends a signal to the EICAS computer to show the applicable message. Here is a list of the EICAS messages and what they mean:

- 1) The CARGO EXH VALVE message means that the forward cargo exhaust valve failed.
- 2) The CARGO GND EXH VLV means that either the forward-cargo ground-exhaust valve or the forward-cargo ground-exhaust-backup valve has failed.
- 3) The CGO GND EXH VLVS message means that the forward-cargo ground-exhaust valve and the forward-cargo ground-exhaust-backup valve have failed in the open position.
- 4) The CARGO TRIM AIR message means that the forward-cargo heating-shutoff valve has failed.
- 5) The CARGO EXH FAN message means that the forward-cargo-exhaust fan has failed.
- 6) The FWD CARGO FAN message means that the forward cargo recirculation fan has failed.

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- 7) The COND CARGO VALVE message means that the forward-cargo air-conditioning-shutoff valve has failed.
- 8) The CARGO A/C CONT message means that the pack flow and cargo air conditioning controller has failed.
- 9) SAS 050-149, 155-999;
MTH 276-999;
The FWD CARGO I/F message means that a failure occurred in the interface between the pack flow and cargo air conditioning controller and one of the LRUs.

T. Cabin Air Supply Check Valve

- (1) The cabin air supply check valve prevents reverse airflow from the mix manifold into the cooling packs.
- (2) The check valve consists of a check valve body and check valve flapper. The check valve body and flapper consist of a single circular flapper hinged about a hinge pin; the pin is positioned perpendicular to the check valve body vertical axis. A roll pin installed in one end of the check valve body hinge pin lug retains the hinge pin.
- (3) When airflow is in normal flow direction, check valve is forced open; it rotates about the hinge pin until check valve flapper contacts the stop. Check valve remains in this position as long as airflow continues in this direction.
- (4) When airflow reverses, the check valve flapper rotates on the hinge pin to seat against the check valve. This prevents reverse airflow.

U. Catalytic Converter

- (1) A catalytic converter mounts in the pneumatic ducting just upstream of each air conditioning pack flow control and shutoff valve.
- (2) The catalytic converter consists of a housing containing a precious metal catalyst deposited on a ceramic, honeycomb substrate. The substrate is held in the housing by a corrugated, knitted wire mesh.
- (3) Ozone found at higher altitudes may have adverse effects on passengers and crew. The catalytic converter reduces the level of ozone through a catalytic reaction between the ozone and the precious metal catalyst.

V. Muffler

- (1) A muffler is located at each pack outlet and mounts in the section of ducting between the condenser and cabin air supply check valve.
- (2) The insulating material in the muffler is needed Nomex supported by a perforated duct. The muffler housing is aluminum.
- (3) Noise from controls and ducting within the air conditioning packs may be audible in the forward passenger compartment. The mufflers reduce the level of noise.

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3. Operation

A. Functional Description

(1) Cooling Pack Operation (Fig. 13, 14, 15, 16, 17, 18)

NOTE: Except where it is stated otherwise, the logic of the pack flow controller is the same as the logic in the right-pack-flow-control card. When the text mentions "the flow control card" it refers to the right-pack-flow-control card (for the right pack control) and the pack flow controller (for the left pack control).

- (a) The operation of the cooling pack is initiated on the pilots' overhead panel P5 by the PACK CONTROL SELECTOR. The selector puts the pack in one of three modes: AUTO, STBY or OFF. The pack flow control card contains the required power and logic to open and close the flow control and shutoff valve. The flow control card also positions the valve for high flow. The pack temperature controller controls the current through the electromagnetic control valve (torque limiter) of the flow control and shutoff valve. This provides overtemperature limiting for the pack.
- (b) When the PACK CONTROL SELECTOR is positioned to AUTO or STBY, the flow control card issues a pulse of 28V DC to the flow control and shutoff valve open solenoid (solenoid B). This allows the pneumatically controlled flow control and shutoff valve to open and regulate supply airflow to air cooling pack. When the PACK CONTROL SELECTOR is in OFF, the flow control card issues a pulse of 28V DC to the close side of solenoid B.
- (c) When the flow control card sends 28V DC power to the high flow solenoid (solenoid A), the solenoid is energized. If solenoid A and solenoid B are energized at the same time, then the valve will move to the high flow mode position. The flow control card automatically sends the power when all of these conditions occur:
 - 1) The flow-control-and-shutoff valve is not fully closed.

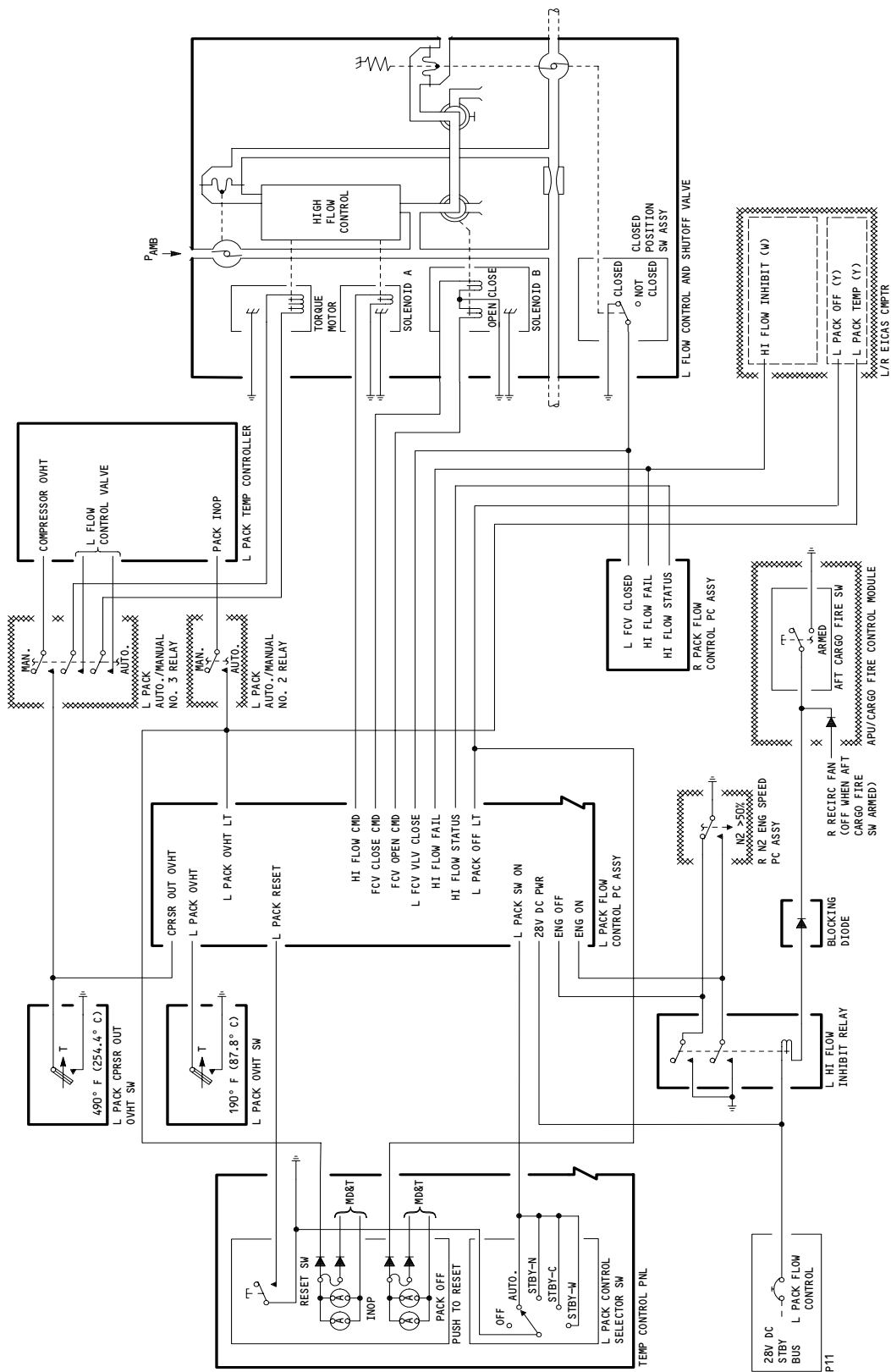
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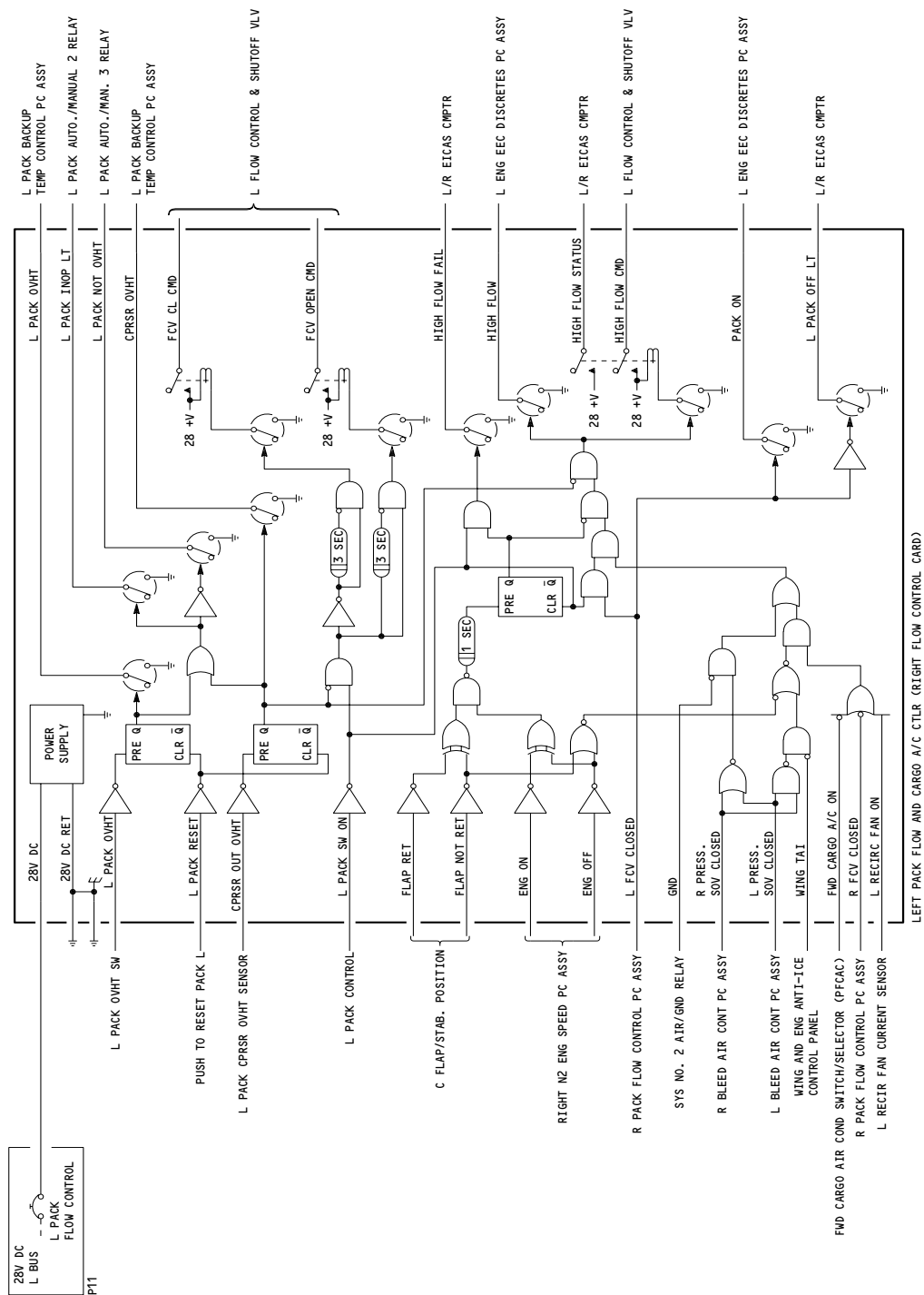


LEFT SYSTEM SHOWN - RIGHT SYSTEM SIMILAR
Pack Flow Control Schematic
Figure 13 (Sheet 1)

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LEFT PACK FLOW AND CARGO A/C CTRL (RIGHT FLOW CONTROL CARD)

LEFT SYSTEM SHOWN
(RIGHT SYSTEM SIMILAR)

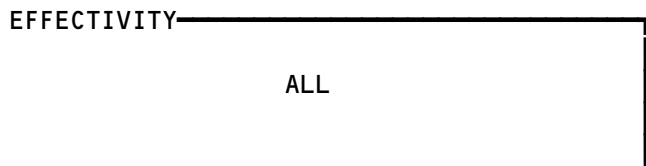
Pack Flow Control Schematic
Figure 13 (Sheet 2)

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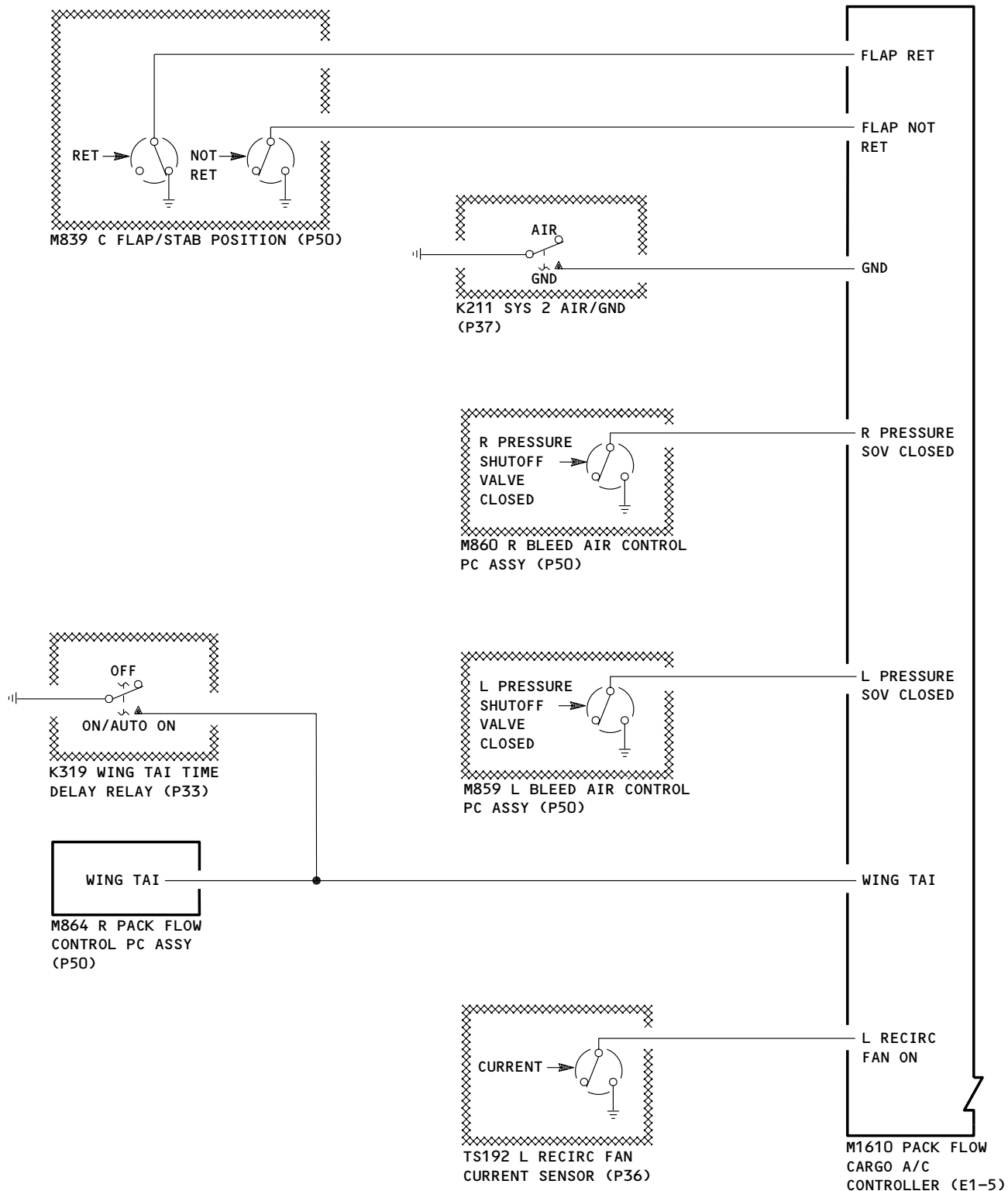
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Not Used
Figure 13A



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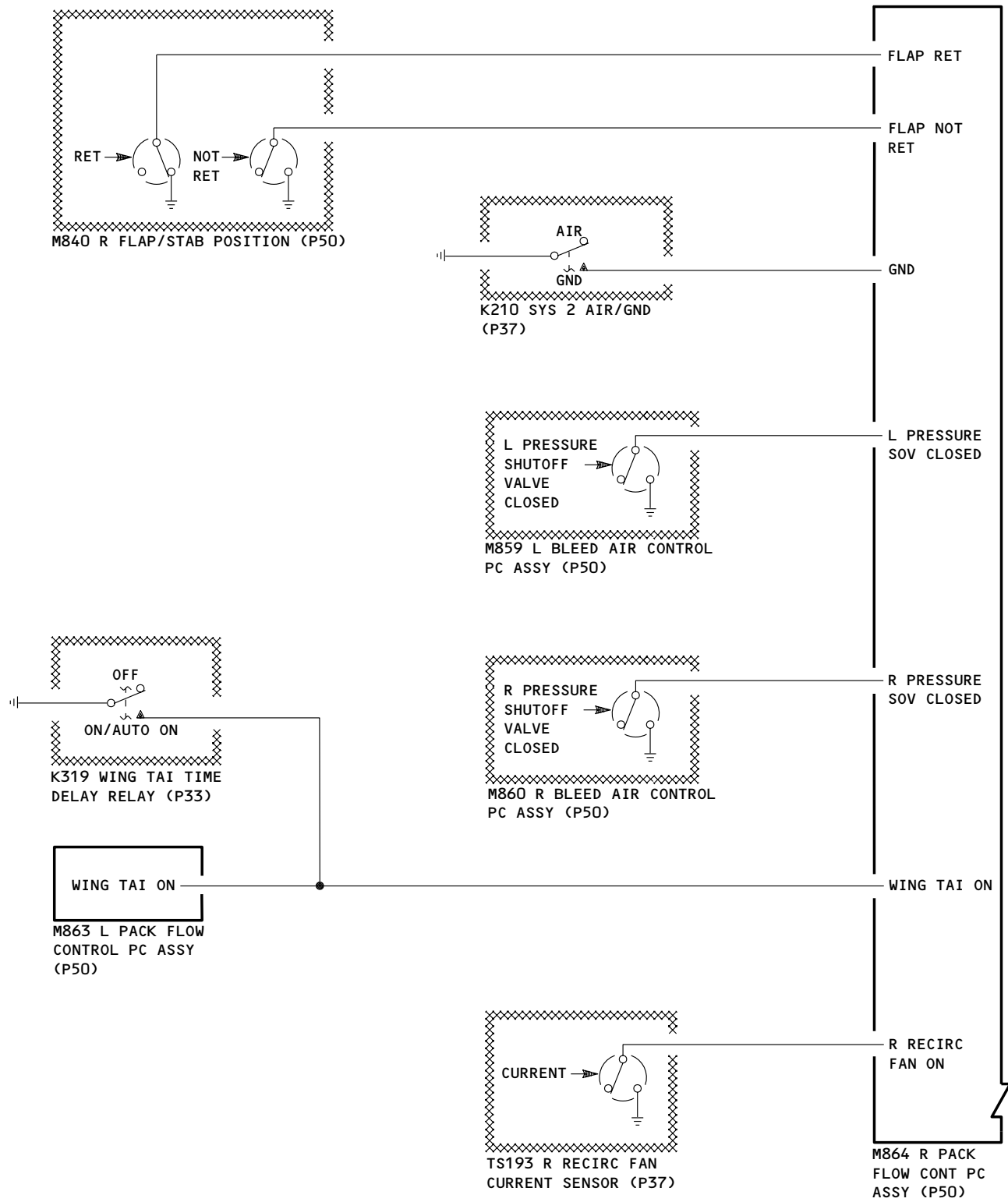


Pack Flow Control Schematic
Figure 13B (Sheet 1)

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Pack Flow Control Schematic
Figure 13B (Sheet 2)

EFFECTIVITY

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- 2) No high flow inhibits occur.
- 3) No high flow inhibit signal failures occur.
- 4) If the airplane is on the ground and the APU or a ground cart is used to supply the air, the two engine-pressure-regulating-and-shutoff valves (PRSOV) are closed.
- 5) One of these conditions occurs:
 - a) The recirculation fan on the same side is off.
 - b) The flow-control-and-shutoff valve for the other pack is closed.
 - c) For the left-flow-control-and-shutoff valve, the FWD CARGO AIR COND / VENT FAN SYSTEM switch/light is ON and the temperature selector is in AUTO.
- (d) High flow inhibits include the following:
 - 1) The engine on the opposite side of the air cooling pack is shut down, as sensed by the N2 speed card.
 - 2) The flaps are not retracted.
 - 3) One engine air supply is inoperative (PRSOV closed) and the wing thermal anti-ice has been selected.
 - 4) 767-300 AIRPLANES;
The aft cargo fire switchlight is ARMED.
- (e) The EICAS message HI FLOW INHIBIT does not always show when a high flow inhibit condition occurs. The only high flow inhibit condition that causes the HI FLOW INHIBIT message to show is when the aft cargo fire switchlight is ARMED. The HI FLOW INHIBIT message will not show when the PACK control selector is turned OFF.
- (f) Some high flow inhibit signals are monitored for failures. The signals that are monitored are the engine on/off and the flaps retracted/not-retracted. A high-flow-inhibit-signal failure occurs when the signals disagree (e.g. the signal for an engine on and the signal for the engine off occur at the same time). The failure is shown by a HI FLOW INHIBIT message on the EICAS display. When the PACK control selector is OFF, the HI FLOW INHIBIT message goes off. To reset the flow control card after a high-flow-inhibit-signal failure, turn the PACK control selector to OFF and then to AUTO or STBY.
- (g) When the air cooling pack outlet temperature exceeds 190°F (88°C), the pack overheat switch closes. This supplies a signal to the flow control card. This signal latches the flow control card in the overheat condition. It resets when discharge temperature is less than 160°F (71°C) and PACK RESET switch is depressed. The overheat signal from the flow control card lights the pack INOP light on the P5 panel. It also de-energizes the pack AUTO/MANUAL relays to inhibit automatic pack temperature control and commands the temperature control card to operate the pack in the full cold mode (ram air full open and temperature control valve closed).

EFFECTIVITY

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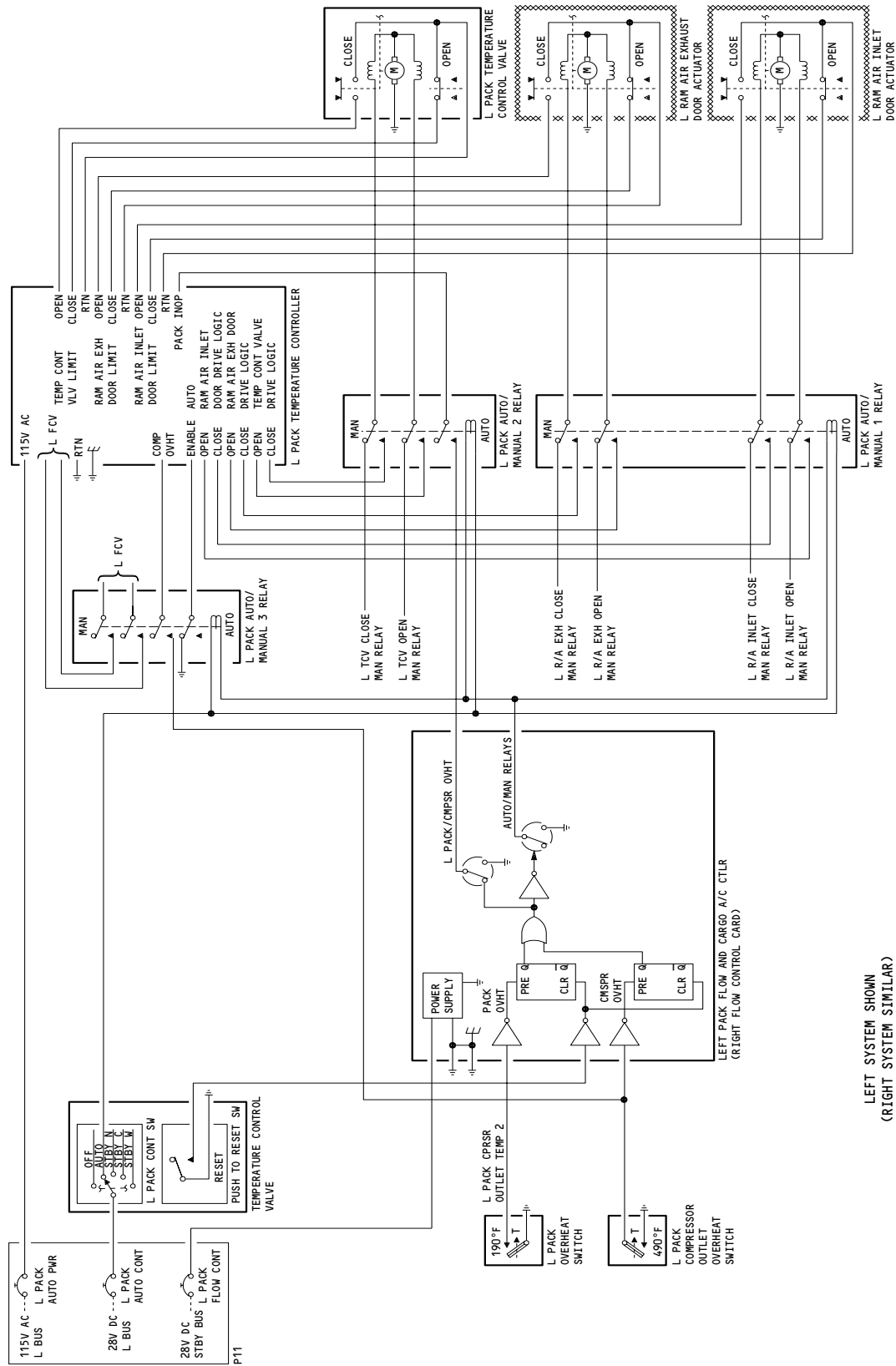
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- (h) When the pack compressor discharge air temperature exceeds 490°F (254°C), the compressor overheat switch closes. This latches the flow control card in overheat condition. The card is reset after the system cools down and the RESET switch is depressed. The overheat signal from the control card illuminates the pack INOP light on the P5 panel. It also shuts the pack off, closes the flow control and shutoff valve, and disables high flow mode. The signal de-energizes the AUTO/MANUAL pack relays to inhibit automatic pack temperature control and sends a signal to pack temperature control card which configures the pack to full cool.
- (2) Cooling Pack Temperature Control Operation—Temperature Limiting
 - (a) The compressor outlet temperature sensor signals the controller at the following temperatures: 400°F, 425°F, 450°F, and 490°F (204°C, 218°C, 232°C and 254°C). At 400°F (204°C), the controller commands the ram air doors to the full open position for maximum cooling regardless of the temperature control valve position. At 425°F (218°C), the controller decreases the current to the electromagnetic valve (torque limiter) of the flow control and shutoff valve. This modulates the valve towards close. At 450°F (232°C), the controller increases current to electromagnetic control valve in the low limit valve. This opens the valve. At 490°F (254°C), controller signals the flow control card to command the flow control and shutoff valve closed and the temperature control valve open.
 - (b) The pack temperature sensor input to the controller limits the temperature at pack temperature sensor to 145°F (63°C) max and 35°F (2°C) min (0°F [-18°C] min above 31,000 ft). The controller does this by modulating ram air doors and temperature control valve.
 - (c) The altitude switch input to controller switches minimum temperature limit at 31,000 ft from 35°F to 0°F (2°C to -18°C).
- (3) Auto Pack Temperature Control (Fig. 15, 16)
 - (a) The pack temperature controller positions the ram air inlet door, ram air exhaust door, and the temperature control valve when system is in AUTO mode. Power requirements include a 115V AC power for the pack temperature controller and 28V DC for relay control.
 - (b) The PACK CONTROL SELECTOR on the P5 panel selected to AUTO energizes AUTO/STBY relay. The flow control card, however, provides overheat logic that inhibits the AUTO mode.
 - (c) The controller positions the ram air doors and temperature control valve according to inputs. The zone controller (AMM 21-61-00/001) inputs pack demand signal. The pack demand signal is compared to the signal from pack temperature sensor. This produces an error signal. The controller uses the error signal to produce position commands to the ram air system and temperature control valve.

EFFECTIVITY

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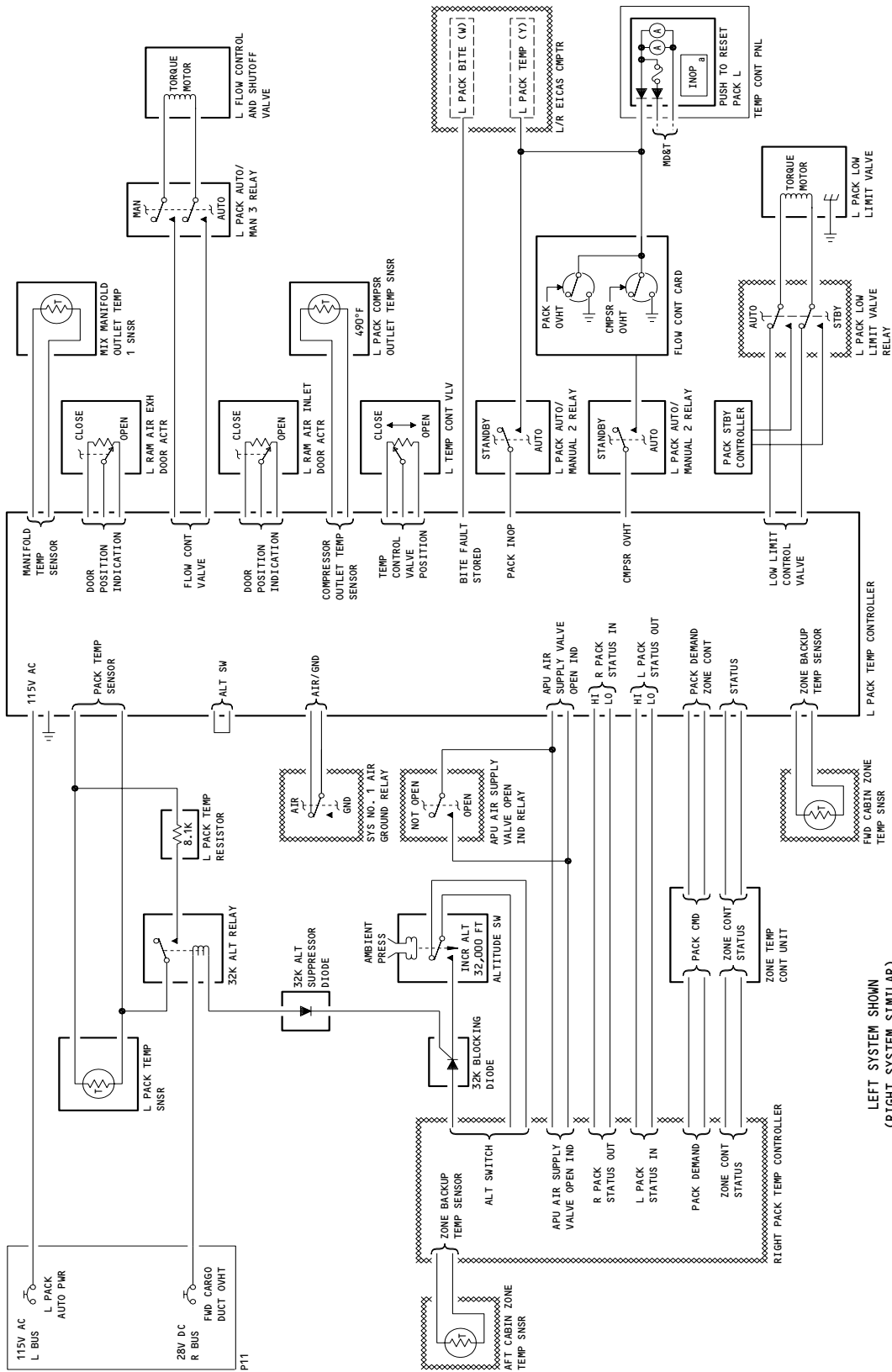


LEFT SYSTEM SHOWN
(RIGHT SYSTEM SIMILAR)
Pack Auto Control Schematic
Figure 14 (Sheet 1)

EFFECTIVITY

ALL

21-51-00



LEFT SYSTEM SHOWN
(RIGHT SYSTEM SIMILAR)
Pack Auto Control Schematic
Figure 14 (Sheet 2)

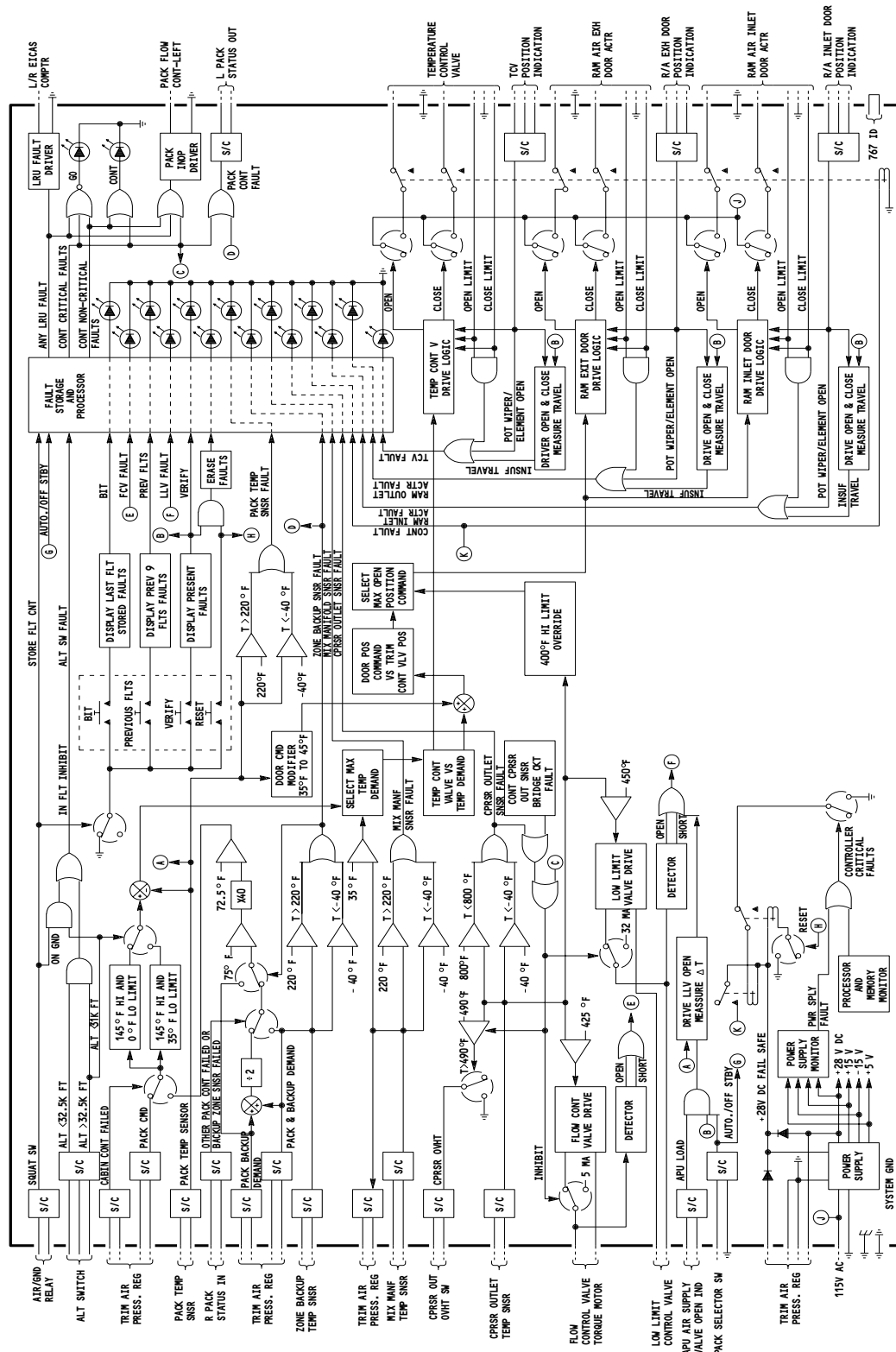
EFFECTIVITY

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LEFT SYSTEM SHOWN, RIGHT SYSTEM SIMILAR

Pack Auto Control Schematic
Figure 14 (Sheet 3)

EFFECTIVITY

ALL

21-51-00

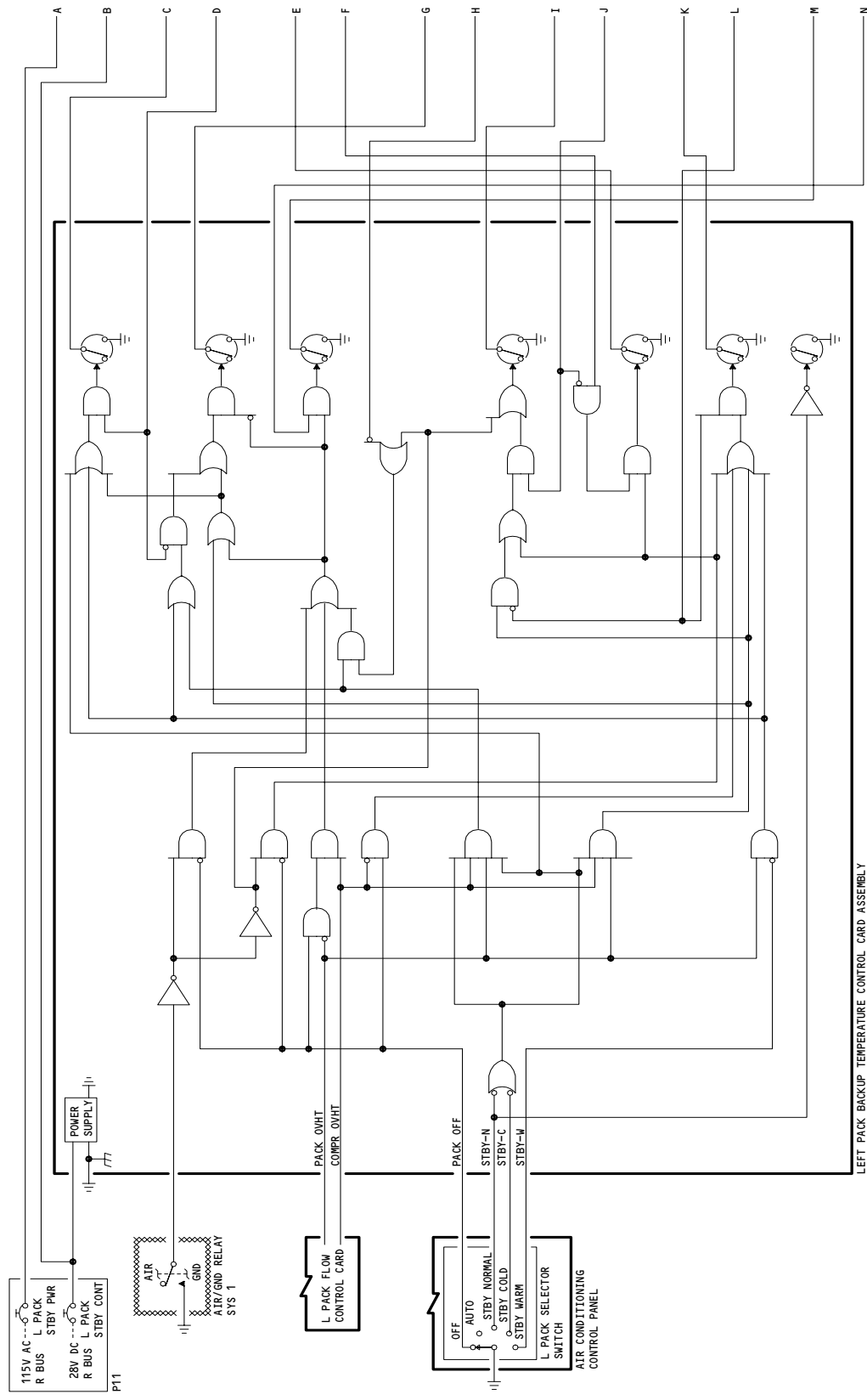
- (d) The ram air doors and temperature control valve are positioned in a preprogrammed relationship. From full cooling demand to 30% heating demand, ram air doors are full open while the temperature control valve modulates from closed toward open. From 30% heating demand to full heating demand, the ram system modulates closed and the temp control valve modulates open.
 - (e) Feedback to the controller is provided by a linear variable potentiometer on the temperature control valve. The potentiometers on the ram air inlet also provide a feedback signal to the controller.
 - (f) Ram Air Door Position Indication
 - 1) The ram air inlet and exhaust position indicating system provides measurement of the cooling air entering and leaving the packs. Operating on 28v dc power, a potentiometer on each inlet and outlet door actuator provides a signal to the pack temperature controller. The ram air inlet and outlet door positions are then displayed on the EICAS screen.
 - (g) Temperature Control Valve Position Indication
 - 1) The temperature control valve position indication system measures the relative amount of air bypassed around the air cycle machine. A linear variable resistor, integral to the temperature control valve, provides a signal to the pack temperature controller. The control valve position is then displayed on the EICAS computer.
- (4) Standby Pack Temperature Control (Fig. 17, 18)
- (a) When the pack control selector is in STBY-N, the pack standby controller and aircraft relay function are energized. This relay function causes the ram air doors to be driven to a full-cold position and the temperature control valve is driven full closed. The standby controller controls the low-limit valve in response to signals from pack and compressor standby outlet temperature sensors.
 - (b) When the pack control selector is in STBY-W, the pack goes into the heat exchanger cooling mode. The ram air doors and the temperature control valve are full-open.
 - (c) When the pack control selector is in STBY-C, the ram air doors and the temperature control valve are positioned as in STBY-N. The low limit valve is no longer controlled by the standby controller and remains fully closed. The valve is still pneumatically controlled if required to limit condenser icing. This maintains the pack in a full cooling mode.
 - (d) With the selector in OFF, ram air inlet doors and temperature control valve positions are governed by whether or not the airplane is in flight. On the ground, the ram air doors are full open with the temperature control valve fully closed. In flight, the ram air doors are fully closed and the temperature control valve is full open.

B. Built-In-Test Equipment (BITE) (Fig. 16)

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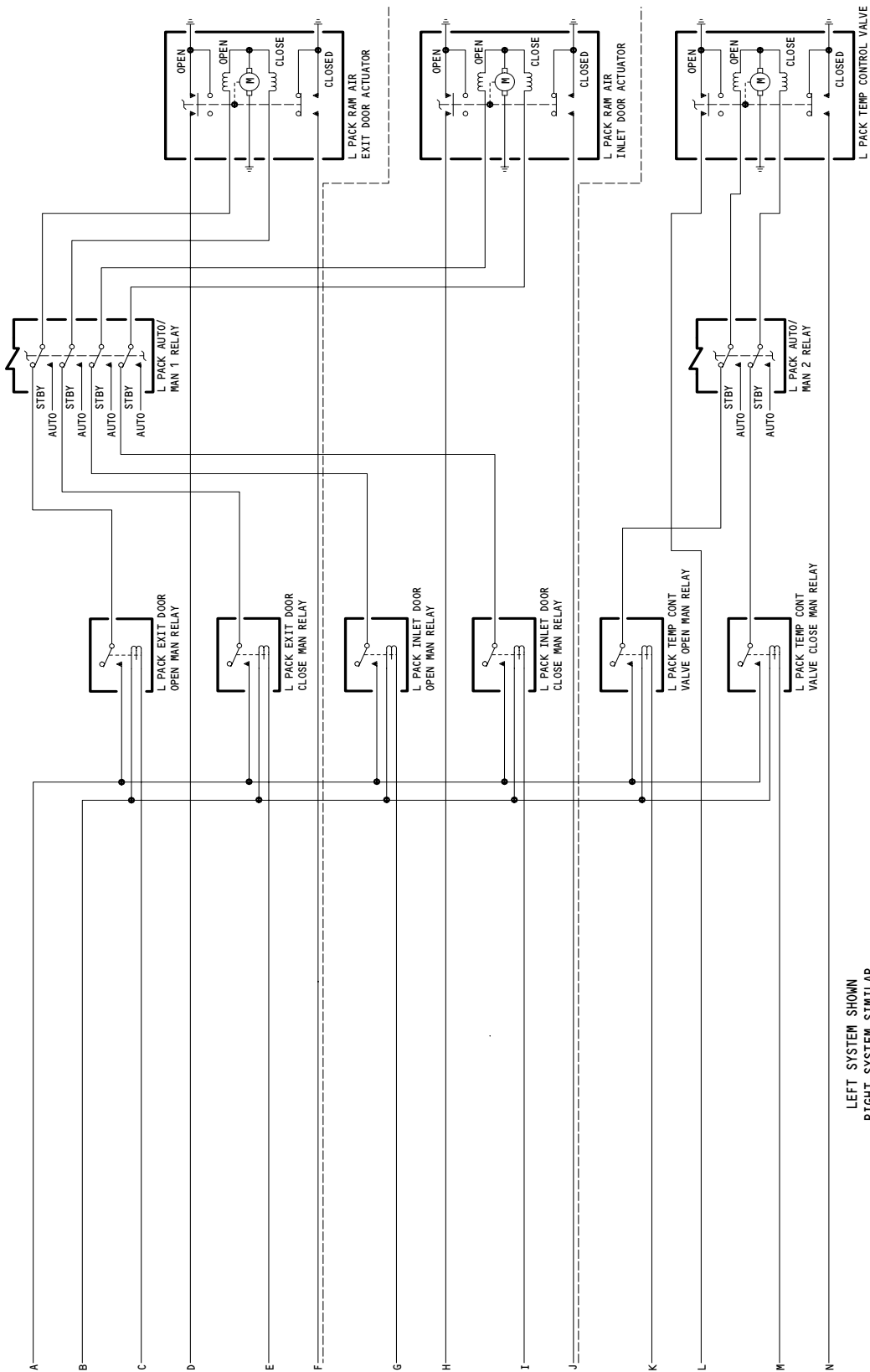


LEFT PACK BACKUP TEMPERATURE CONTROL CARD ASSEMBLY

LEFT SYSTEM SHOWN
RIGHT SYSTEM SIMILAR
Pack Standby Control Operation Schematic
Figure 15 (Sheet 1)

EFFECTIVITY
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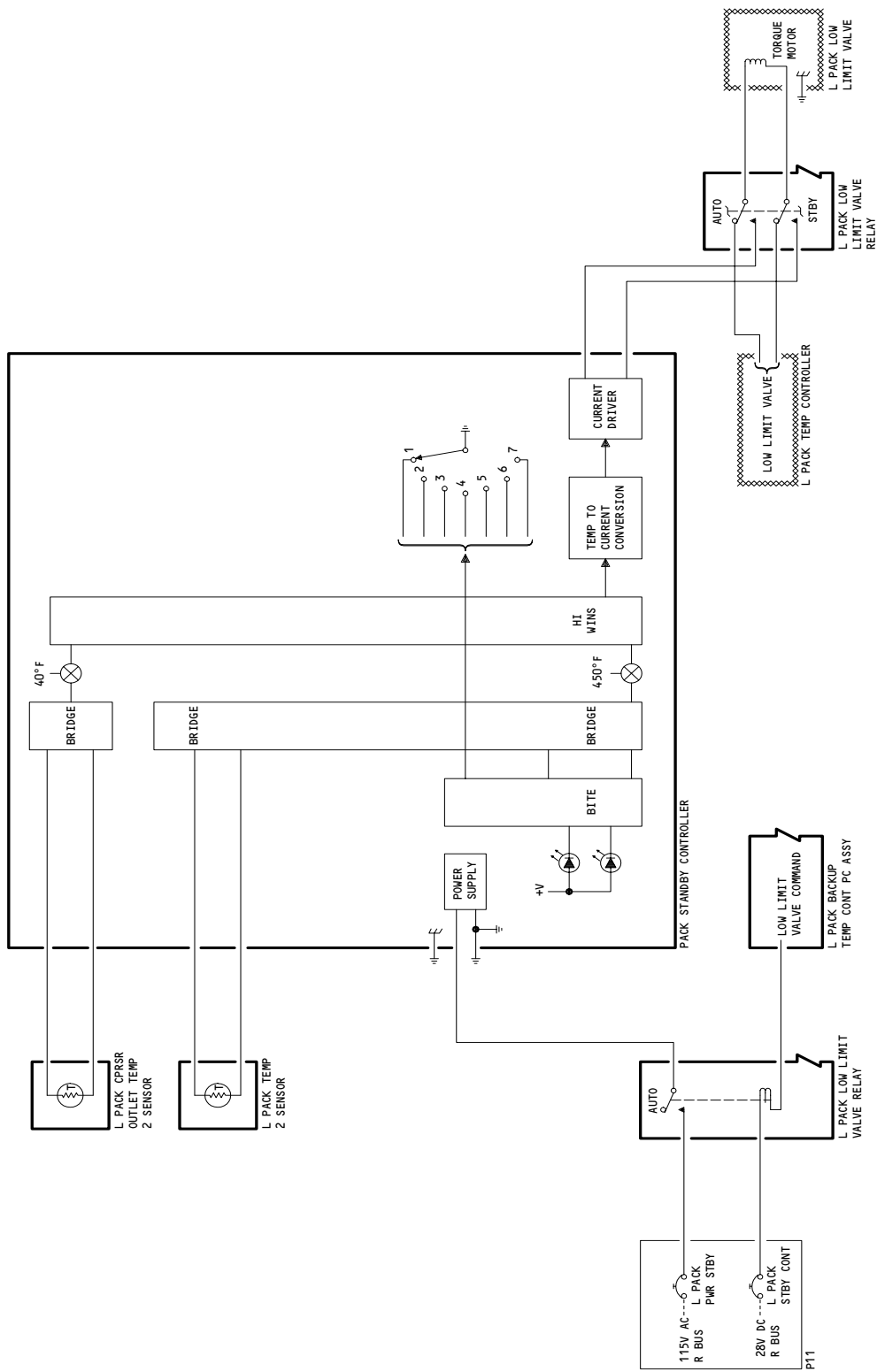


LEFT SYSTEM SHOWN
RIGHT SYSTEM SIMILAR
Pack Standby Control Operation Schematic
Figure 15 (Sheet 2)

EFFECTIVITY

ALL

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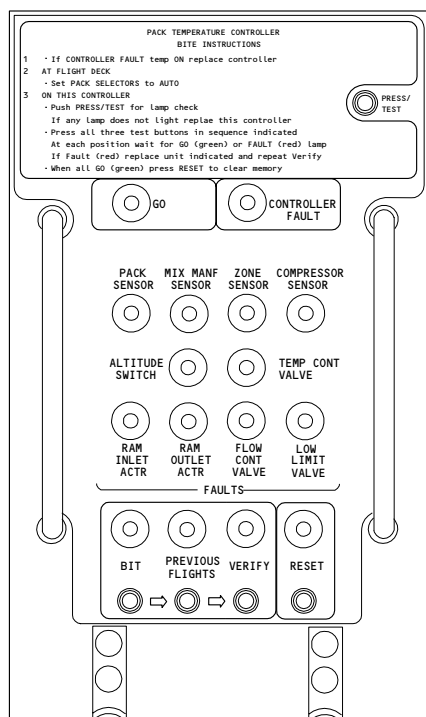
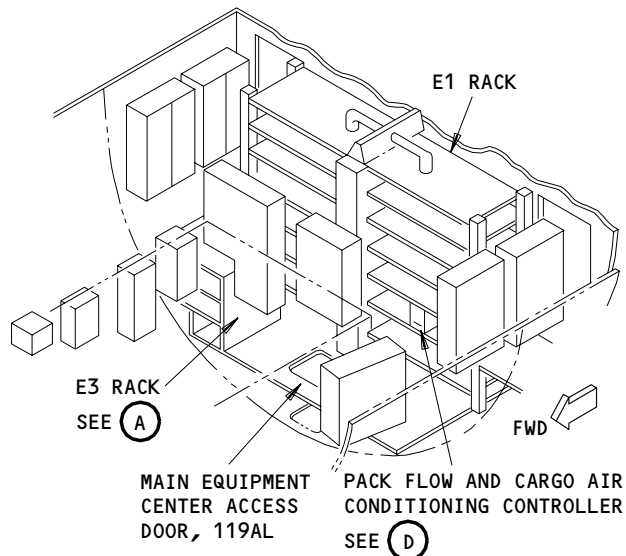
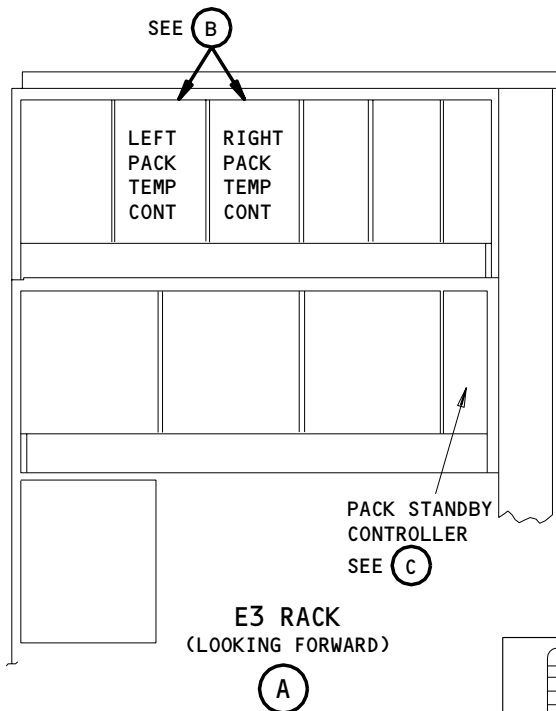


LEFT SYSTEM SHOWN
RIGHT SYSTEM SIMILAR
Left Pack Standby Control Schematic
Figure 15 (Sheet 3)

EFFECTIVITY

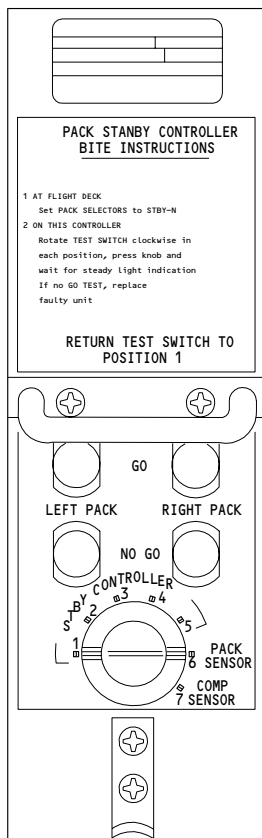
ALL

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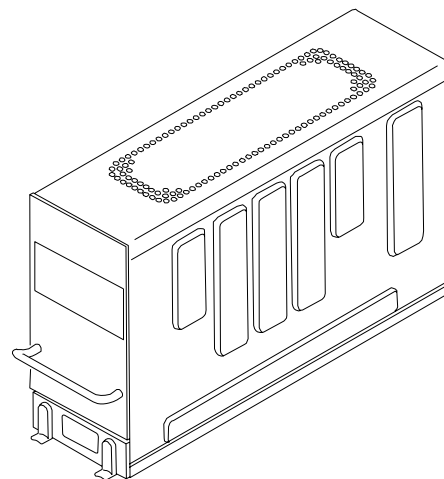
PACK TEMPERATURE CONTROLLER

(B)



PACK STANDBY CONTROLLER

(C)



PACK FLOW AND CARGO AIR CONDITIONING CONTROLLER

(D)

Cooling Pack BITE
Figure 16

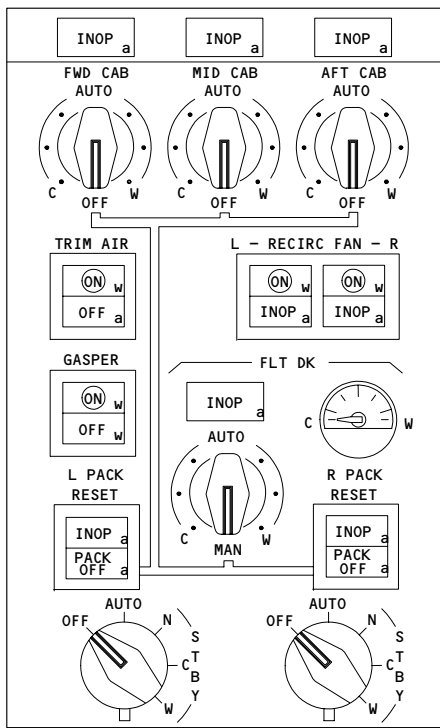
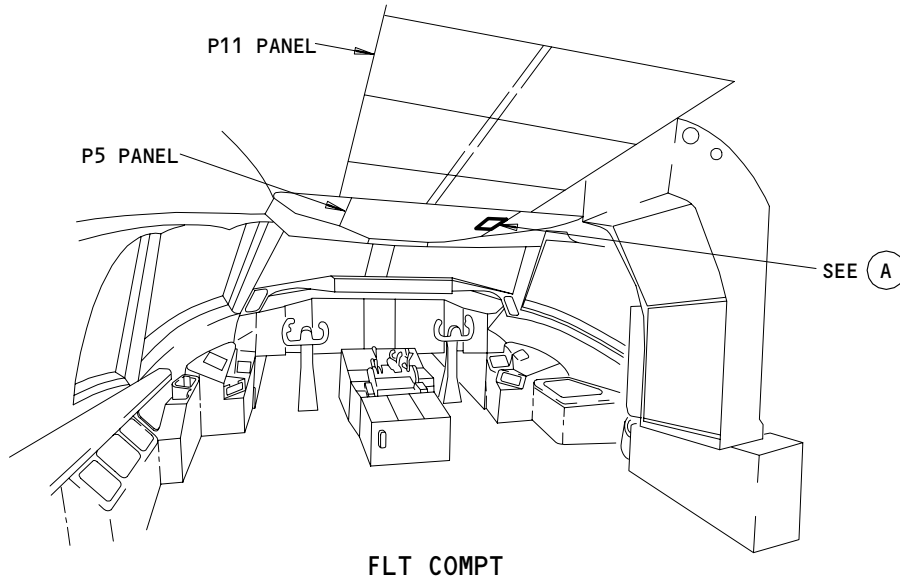
EFFECTIVITY

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MAINTENANCE MANUAL



ECS CONTROL MODULE

A

Cooling Pack Control
Figure 17

EFFECTIVITY

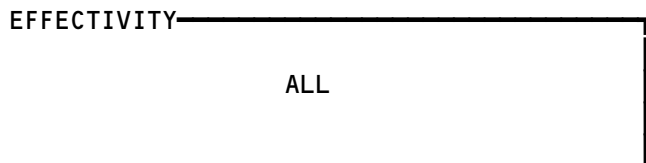
ALL

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MAINTENANCE MANUAL

COMPONENT TYPE	BITE SENSED FAULTS	APPLICABLE MODES
SENSORS	1. OPEN/SHORTED (-40 TO +220°F PACK AND MIX MANIFOLD) (-40 TO +600°F COMPRESSOR OUT)	CONTINUOUS (MEMORY) AND VERIFY
TEMPERATURE CONTROL VALVE AND RAM AIR DOOR ACTUATORS	1. SIMULTANEOUSLY OPEN LIMIT SWITCHES 2. FEEDBACK POTENTIOMETER OPEN WIPER OR OPEN ELEMENT 3. COMMAND ACTUATOR DRIVE TOWARD CENTER FOR 2 SECONDS, MEASURE MOTION, REVERSE DRIVE FOR 2 SECONDS, MEASURE MOTION, CORRELATE TO VALVE DRIVER	CONTINUOUS (MEMORY) AND VERIFY CONTINUOUS (MEMORY) AND VERIFY VERIFY ONLY
ALTITUDE SWITCH	1. LOW ALTITUDE CONTACTS MADE 2. HIGH ALTITUDE CONTACTS MADE WHEN LOW ALTITUDE CONTACTS OPEN 3. LOW ALTITUDE AND SQUAT SWITCH CORRELATION	CONTINUOUS (MEMORY) ONLY VERIFY ONLY
FLOW CONTROL VALVE AND LOW-LIMIT VALVE	1. OPEN/SHORTED TORQUE MOTORS 2. PNEUMATIC RESPONSE TO TORQUE MOTOR SIGNALS (LOW-LIMIT VALVE ONLY)	CONTINUOUS (MEMORY) AND VERIFY VERIFY ONLY WHEN PNEUMATIC SOURCE ON AND PACK SELECTOR IN AUTO
CONTROLLER CRITICAL FAULTS	1. WATCHDOG TIMER CHECKS MICROCOMPUTER PERFORMANCE 2. POWER SUPPLIES IN LIMITS 3. A/D INPUT CONVERTER CHECK 4. RAM LOCATION CHECK	CONTINUOUS (MEMORY) AND VERIFY CONTINUOUS (MEMORY) AND VERIFY CONTINUOUS (MEMORY) AND VERIFY CONTINUOUS (MEMORY) ONLY
CONTROLLER NON-CRITICAL FAULTS	1. BRIDGE CORRELAION CHECK 2. VALVE DRIVERS CHECK 3. EAROM CHECK	CONTINUOUS (MEMORY) AND VERIFY INITIATED (ALL) ONLY

Pack Controller BITE Test
Figure 18



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- (1) Pack Temperature Controller
 - (a) The pack temperature controllers contain built in test equipment (BITE). The BITE function of the pack temperature controller is to store LRU faults from the previous ten flights. The controller consists of switches and indicator lamps for system checks, fault displays, and initiating fault isolation. In addition to monitoring itself for faults, the pack temperature controller monitors the following components for the indicated problems:
 - 1) Pack Temperature Sensor, Mix Manifold Sensor, Zone Temperature Sensor, or Compressor Outlet Sensor for an open or short-circuit element; or an aircraft wiring problem.
 - 2) Altitude Switch for a pressure capsule failure or an electrical switch failure; or an aircraft wiring problem.
 - 3) Temperature Control Valve, Ram Air Inlet Actuator, or Ram Air Exit Actuator for a potentiometer open circuit, a limit switch failure, or failure of the VERIFY mode dynamic test, or an aircraft wiring problem.
 - 4) Flow Control Valve for a torque motor that is open or shorted; or an aircraft wiring problem.
 - 5) Low Limit Valve for a torque motor that is open or shorted, valve failure of the VERIFY mode dynamic test (pneumatic power required), or an aircraft wiring problem.
 - (2) Pack Standby Controller
 - (a) The pack standby controller contains BITE, for system checks, fault displays, and initiating fault isolation. The pack standby controller checks circuits and sensors by using GO/NO GO lamps and a test switch. The items tested are as follows:
 - 1) Position 1 - Controller bridge reference and power supply check.
 - 2) Position 2 - Maximum compressor temperature output current.
 - 3) Position 3 - Maximum pack temperature output current.
 - 4) Position 4 - Minimum output current.
 - 5) Position 5 - Mid-range output current.
 - 6) Position 6 - Performs a resistance check on the pack temperature sensor associated with the pack standby controller.
 - 7) Position 7 - Performs a resistance check on the compressor temperature sensor associated with the pack standby controller.
- C. Pack temperature controller BITE test:
- (1) Provide electrical power (AMM 24-22-00/201).
 - (a) Place appropriate left or right pack selector on pilot's overhead P5 panel to AUTO.
 - (b) On appropriate left or right temperature controller, verify that CONTROLLER FAULT lamp is off. If lamp is lit, there is a problem with the pack temperature controller and/or a wiring problem with the temperature control valve or the ram air inlet/exhaust door actuators.

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NOTE: An electrical short in the circuit wiring for the temperature control valve or the ram air inlet/exhaust door actuators can cause the pack temperature controller to blow a fuse. An electrical resistance check of the circuit wiring must be done first before you replace the PTC in order to isolate the cause of the electrical short to prevent future occurrences of a blown fuse in new PTCs (FIM 21-51-00/101 Figure 103).

AIRPLANES WITH PTC P/N S210T130-69 OR EARLIER PTC DASH NUMBERS;

If the pack temperature controller has a blown fuse, the CONTROLLER FAULT light will only show.

AIRPLANES WITH PTC P/N S210T130-79 AND SUBSEQUENT PTC DASH NUMBERS;

If the pack temperature controller has a blown fuse, the CONTROLLER FAULT light will illuminate in addition to the TEMP CONT VALVE, RAM INLET ACTR, or RAM OUTLET ACTR fault light.

- (c) Position zone temperature control selectors and appropriate pack control selectors on P5 panel to AUTO.
 - (d) On appropriate controller face, press PRESS/TEST pushbutton. Check that all lamps illuminate. If a lamp does not illuminate, replace controller.
 - (e) Press BIT pushbutton on controller. Check that GO lamp illuminates within 30 seconds. If GO lamp does not illuminate, replace indicated faulty component.
 - (f) Within 30 seconds after pushing BIT pushbutton, press PREVIOUS FLIGHTS pushbuttons. Check that GO lamp illuminates within 30 seconds. If GO lamp does not illuminate, replace indicated faulty component.
 - (g) Within 30 seconds after pushing PREVIOUS FLIGHTS pushbutton, press VERIFY pushbutton. Check verify lamp illuminates and that GO lamp lights within 30 seconds. If GO lamp does not illuminate, replace indicated faulty component.
 - (h) Within 90 seconds after pushing the VERIFY button, press RESET.
- D. Pack standby controller BITE test:
- (1) Position left and right pack selectors on P5 panel to STBY-N.
 - (2) Press all GO and NO GO buttons on standby controller. Check that all lamps illuminate. If a lamp does not come on, replace standby controller.
 - (3) Start at test switch position 1. Press test switch. Check that GO lamps come on for both packs. If NO GO lamp illuminates, replace component identified on test switch. Repeat test for positions 2 thru 7.
 - (4) Position L and R PACK selectors on P5 panel to OFF.
 - (5) Remove electrical power if no longer required.

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E. Cooling Pack Control (Fig. 17).

- (1) To place the cooling pack system in operation, provide electrical power (AMM 24-22-00/201) and perform the following:
 - (a) Check that the following overhead P11 panel circuit breakers are closed:
 - 1) LEFT PACK FLOW CONT
 - 2) RIGHT PACK FLOW CONT
 - 3) LEFT PACK AUTO PWR
 - 4) RIGHT PACK AUTO PWR
 - 5) LEFT PACK STANDBY PWR
 - 6) RIGHT PACK STANDBY PWR
 - 7) LEFT PACK STANDBY CONT
 - 8) RIGHT PACK STANDBY CONT
 - (b) Provide electrical power (AMM 24-22-00/201).
 - (c) Provide pneumatic power (AMM 36-00-00/201).
 - (d) Push EICAS MAINT ECS/MSG button on the right side P61 panel.
 - (e) Check that EICAS maintenance message L or R PACK BITE is not displayed on the pilot's center P2 panel lower CRT screen.
 - (f) Check that EICAS advisory message L and R PACK OFF on P2 panel lower CRT screen is displayed.
 - (g) Position L and R PACK control selectors on P5 panel to AUTO. Check that PACK OFF light goes out. Verify that INOP light does not come on.
 - (h) Check that EICAS advisory message L and R PACK OFF on P2 panel lower CRT screen disappears.
 - (i) Check that EICAS maintenance message L or R PACK BITE on P2 panel lower CRT screen is not displayed.
 - (j) Check that L and R PACK FLOW on P2 panel lower CRT screen indicates a flow rate.
- (2) The pack temperature controller contains the BITE. The BITE provides indication of an internal controller fault as well as faults with LRU (line replaceable units) within the primary pack temperature control system. If a fault occurs, only the faults up to the time of failure are stored in the volatile memory.

All fault monitoring within the affected area stops. Setting any pack control selector out of the AUTO position also stops monitoring of that pack.

BITE is used in the following manner:

- (a) Check pack temperature controller and verify that CONTROLLER FAULT lamp is off. Push the RESET button if the lamp is on. If the lamp comes on again, replace the controller. If the lamp did not come on for either action, continue with test.

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- (b) Set both air conditioning pack control selectors on pilot's overhead panel P5 to the controller. Check that all indicator lamps come on. If any lamp does not come on, replace the controller and begin sequence again. If all lamps come on, perform next applicable test.
- (c) Press the BIT pushbutton on the controller and check that the green GO lamp comes on within 30 seconds. If the green GO lamp fails to come on, a faulty component monitored by the controller is indicated by a red lamp. Replace the corresponding component. If the green GO lamp came on initially or a faulty component was replaced, perform next applicable step.
- (d) Press the PREVIOUS FLIGHTS pushbutton. Check again for the green GO lamp to come on within 30 seconds. If the green GO lamp fails to come on, replace the faulty component indicated by the red lamp coming on. If the green GO lamp came on initially or a faulty component was replaced, continue with test.
- (e) Press the VERIFY pushbutton. Check for the green GO lamp to come on within 30 seconds. If the green GO lamp fails to come on, replace the faulty component indicated by the red lamp coming on. If the green GO lamp came on initially or a faulty component was replaced, perform next applicable step.
- (f) Press the RESET pushbutton. Test is complete.

F. Control

- (1) Provide electrical power (AMM 24-22-00/201).
- (2) Check that the following circuit breakers on overhead panel P11 are closed.
 - (a) LEFT PACK FLOW CONT
 - (b) RIGHT PACK FLOW CONT
 - (c) LEFT PACK AUTO PWR
 - (d) RIGHT PACK AUTO PWR
 - (e) LEFT PACK STANDBY PWR
 - (f) RIGHT PACK STANDBY PWR
 - (g) LEFT PACK STANDBY CONT

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- (h) RIGHT PACK STANDBY CONT
- (3) Standby Operation
 - (a) Place all three zone selectors on pilot's overhead panel P5 in AUTO.
 - (b) Place pack control selector on P5 panel to appropriate STBY position.
- (4) Automatic Operation
 - (a) Place all three zone selectors on pilot's overhead panel P5 in AUTO.
 - (b) Place left and right pack control selectors on P5 panel to AUTO.

EFFECTIVITY

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
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
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FAULT ISOLATION/MAINT MANUAL

COOLING PACK

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - (FIM 21-53-00/101) RAM AIR EXHAUST DOOR L, M320 RAM AIR EXHAUST DOOR R, M321 RAM AIR INLET DOOR L, M322 RAM AIR INLET DOOR R, M323				
CARD - (FIM 21-53-00/101) BACKUP TEMP CONTROL L PACK, M10403 BACKUP TEMP CONTROL R PACK, M10404				
CARD - (FIM 36-11-00, FIG. 101) BLEED AIR CONTROL L, M859 BLEED AIR CONTROL R, M860				
CARD - (FIM 73-21-00/101) N2 ENG SPEED L, M1093 N2 ENG SPEED R, M1092				
CARD - FLOW CONTROL PACK, M864	4	1	119AL, MAIN EQUIP CTR, P50	21-51-09
CIRCUIT BREAKER - L PACK FLOW CONT, C653 LEFT PACK AUTO CONT, C702 LEFT PACK AUTO PWR, C673 LEFT PACK STANDBY CONT, C4037 LEFT PACK STANDBY PWR, C4036 PACK FLOW IND, C709 			FLT COMPT, P11 11A13 11N11 11N10 11N25 11N24 11N17 11A26 11N20 11N19 11N16 11N15	* * * * * * * * * *
COMPUTER - (FIM 31-41-00, FIG. 101) EICAS L, M10181 EICAS R, M10182				
CONDENSER - CONTROLLER - PACK FLOW AND CARGO AIR COND, M1610 PACK STANDBY, M10389 PACK TEMPERATURE L, M126 PACK TEMPERATURE R, M127	1	2	193NL, L PACK; 194LR, R PACK	21-51-10
CONVERTER - CATALYTIC	1	2	193NL, L PACK; 194LR, R PACK	21-51-22
DIODE - R563		1	119AL, MAIN EQUIP CTR, P36	*
DIODE - R564		1	119AL, MAIN EQUIP CTR, P37	*
DIODE - R187,R189		2	119AL, MAIN EQUIP CTR, P50	*

* SEE THE WDM EQUIPMENT LIST

 SAS 050,051,150-157,162-167,275-278,280 PRE-SB 21-129

Cooling Pack - Component Index
Figure 101 (Sheet 1)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
EXCHANGER - PRIMARY HEAT	2	2	193NL, L PACK; 194LR, R PACK	21-51-02
EXCHANGER - SECONDARY HEAT	2	2	193NL, L PACK; 194LR, R PACK	21-51-02
EXTRACTOR - SECONDARY WATER	2	2	193NL, L PACK; 194LR, R PACK	21-51-21
EXTRACTOR - WATER	2	2	193NL, L PACK; 194LR, R PACK	21-51-04
FAN/AIR PLENUM/DIFFUSER	2	2	193NL, L PACK; 194LR, R PACK	21-51-16
MACHINE - AIR CYCLE	2	2	193NL, L PACK; 194LR, R PACK	21-51-03
MUFFLER - COOLING PACK	2	2	193NL, L PACK; 194LR, R PACK	21-51-23
PACK - AIR COOLING	1,2	2	193NL, L PACK; 194LR, R PACK	21-51-00
PANEL - AIR CONDITIONING CONTROL, M14	5	1	FLT COMPT, P5	*
REHEATER - PACK	1,2	2	193NL, L PACK; 194LR, R PACK	21-51-07
RELAYS - (FIM 31-01-33/101)				
L PACK LOW LIMIT VALVE, K10317				
R PACK AUTO/MAN NO. 1, K49				
R PACK AUTO/MAN NO. 2, K50				
R PACK AUTO/MAN NO. 3, K10316				
R PACK EXH DR CLOSE MAN, K52				
R PACK EXH DR OPEN MAN, K51				
R PACK INLET DR CLOSE MAN, K54				
R PACK INLET DR OPEN MAN, K53				
R PACK LOW LIMIT VALVE, K10318				
R PACK TEMP CONT VLV CLOSE MAN, K56				
R PACK TEMP CONT VLV OPEN MAN, K55				
RELAYS - (FIM 31-01-36/101)				
AIR/GND SYS 1, K140				
AIR/GND SYS 1, K141				
L HI FLOW INHIBIT, K775				
L PACK AUTO/MAN NO. 1, K57				
L PACK AUTO/MAN NO. 2, K58				
L PACK AUTO/MAN NO. 3, K10315				
L PACK EXH DR CLOSE MAN, K60				
L PACK EXH DR OPEN MAN, K59				
L PACK INLET DR CLOSE MAN, K62				
L PACK INLET DR OPEN MAN, K61				
L PACK TEMP CONT VLV CLOSE MAN, K64				
L PACK TEMP CONT VLV OPEN MAN, K63				
RELAYS - (FIM 31-01-37/101)				
AIR/GND SYS 2, K210				
AIR/GND SYS 2, K211				
R HI FLOW INHIBIT, K776				
RELAYS - (FIM 31-01-49/101)				
APU AIR SUPPLY VALVE OPEN, K25				

* SEE THE WDM EQUIPMENT LIST

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Figure 101 (Sheet 2)

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 FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
SENSOR - COMPRESSOR OUTLET L PACK, TS41	2,3	1	193NL, L PACK	21-51-06
SENSOR - COMPRESSOR OUTLET R PACK, TS42	2,3	1	194LR, R PACK	21-51-06
SENSOR - COMPRESSOR OUTLET STANDBY L PACK, TS5133	2	1	193NL, L PACK	21-51-06
SENSOR - COMPRESSOR OUTLET STANDBY R PACK, TS5135	2	1	194LR, R PACK	21-51-06
SENSOR - DUCT AIR (MIX MANIFOLD) TEMPERATURE, TS200, TS201		2	821, FWD CARGO, MIX BAY	21-61-02
SENSOR - PACK TEMPERATURE L PACK, TS198	2,3	1	193NL, L PACK	21-51-08
SENSOR - PACK TEMPERATURE R PACK, TS199	2,3	1	194LR, R PACK	21-51-08
SENSOR - PACK STANDBY TEMPERATURE L PACK, TS5132		1	193NL, L PACK	21-51-08
SENSOR - PACK STANDBY TEMPERATURE R PACK, TS5134		1	194LR, R PACK	21-51-08
SWITCH - ALTITUDE, S397	1,3	1	193NL, KEEL BEAM	21-51-17
SWITCH - COMPRESSOR OUTLET OVERHEAT L PACK, S555	2,3	1	193NL, L PACK	21-51-19
SWITCH - COMPRESSOR OUTLET OVERHEAT R PACK, S556	2,3	1	194LR, R PACK	21-51-19
SWITCH - PACK OVERHEAT L PACK, S48	1,3	1	193NL, L PACK	21-51-18
SWITCH - PACK OVERHEAT R PACK, S49	1,3	1	194LR, R PACK	21-51-18
SWITCH - L PACK CONTROL SELECTOR, YBFS4	5	1	FLT COMPT, P5, ECS CONTROL PANEL, M14	*
SWITCH - R PACK CONTROL SELECTOR, YBFS7	5	1	FLT COMPT, P5, ECS CONTROL PANEL, M14	*
SWITCH/LIGHT L PACK RESET, YBFS5	5	1	FLT COMPT, P5, ECS CONTROL PANEL, M14	*
SWITCH/LIGHT R PACK RESET, YBFS6	5	1	FLT COMPT, P5, ECS CONTROL PANEL, M14	*
VALVE - CABIN AIR SUPPLY CHECK	1	2	193FL AND 193GL OR 194HR AND 194FR	21-51-15
VALVE - FLOW CONTROL AND SHUTOFF L PACK, V16	1	1	193NL, L PACK	21-51-01
VALVE - FLOW CONTROL AND SHUTOFF R PACK, V17	1	1	194LR, R PACK	21-51-01
VALVE - LOW LIMIT CONTROL L PACK, V131	1	1	193NL, L PACK	21-51-11
VALVE - LOW LIMIT CONTROL R PACK, V132	1	1	194LR, R PACK	21-51-11
VALVE - TEMPERATURE CONTROL L PACK, V18	1	1	193NL, L PACK	21-51-12
VALVE - TEMPERATURE CONTROL R PACK, V19	1	1	194LR, R PACK	21-51-12

* SEE THE WDM EQUIPMENT LIST

Component Index
Figure 101 (Sheet 3)

EFFECTIVITY

ALL

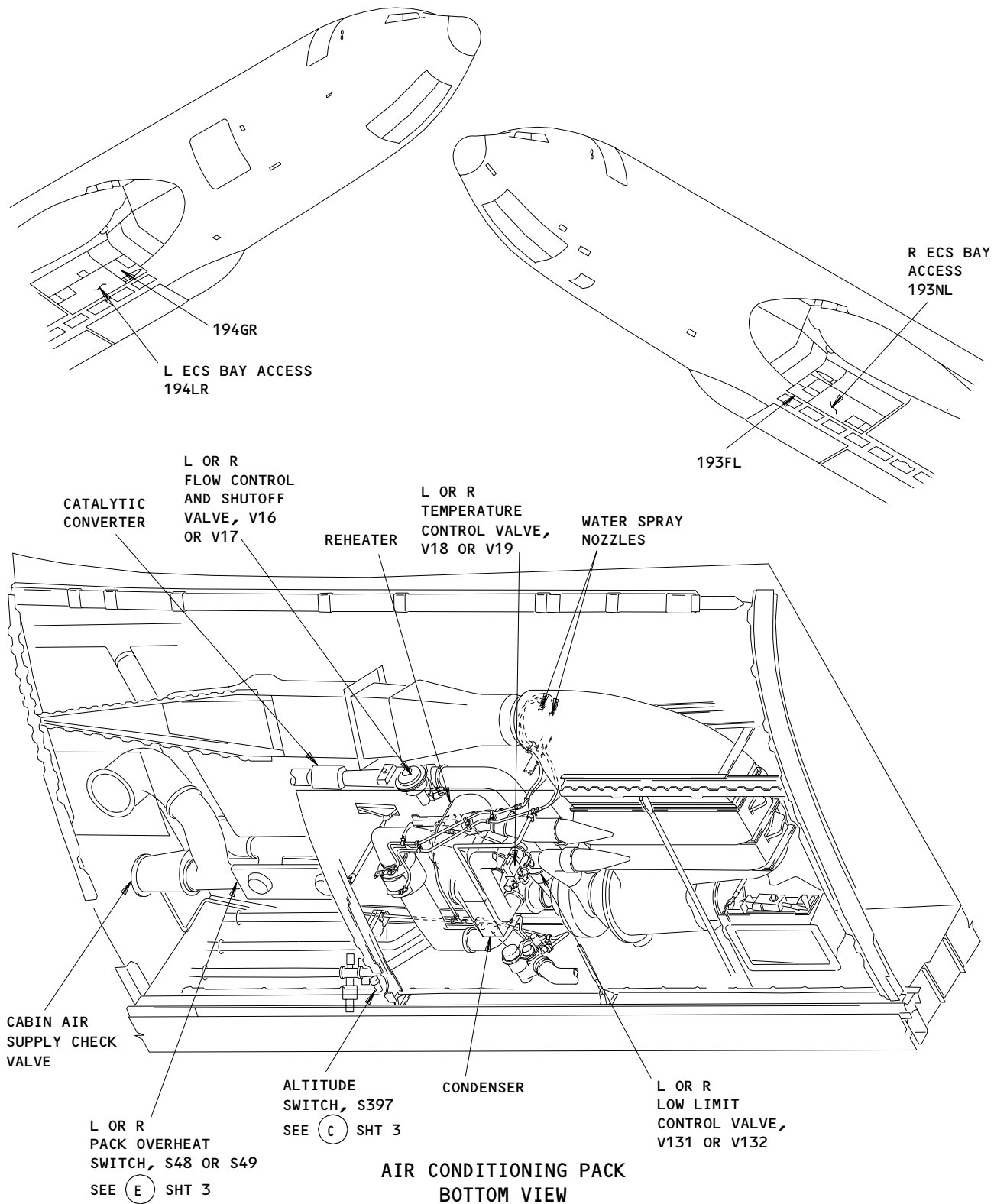
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FAULT ISOLATION/MAINT MANUAL



Component Location
Figure 102 (Sheet 1)

EFFECTIVITY	ALL
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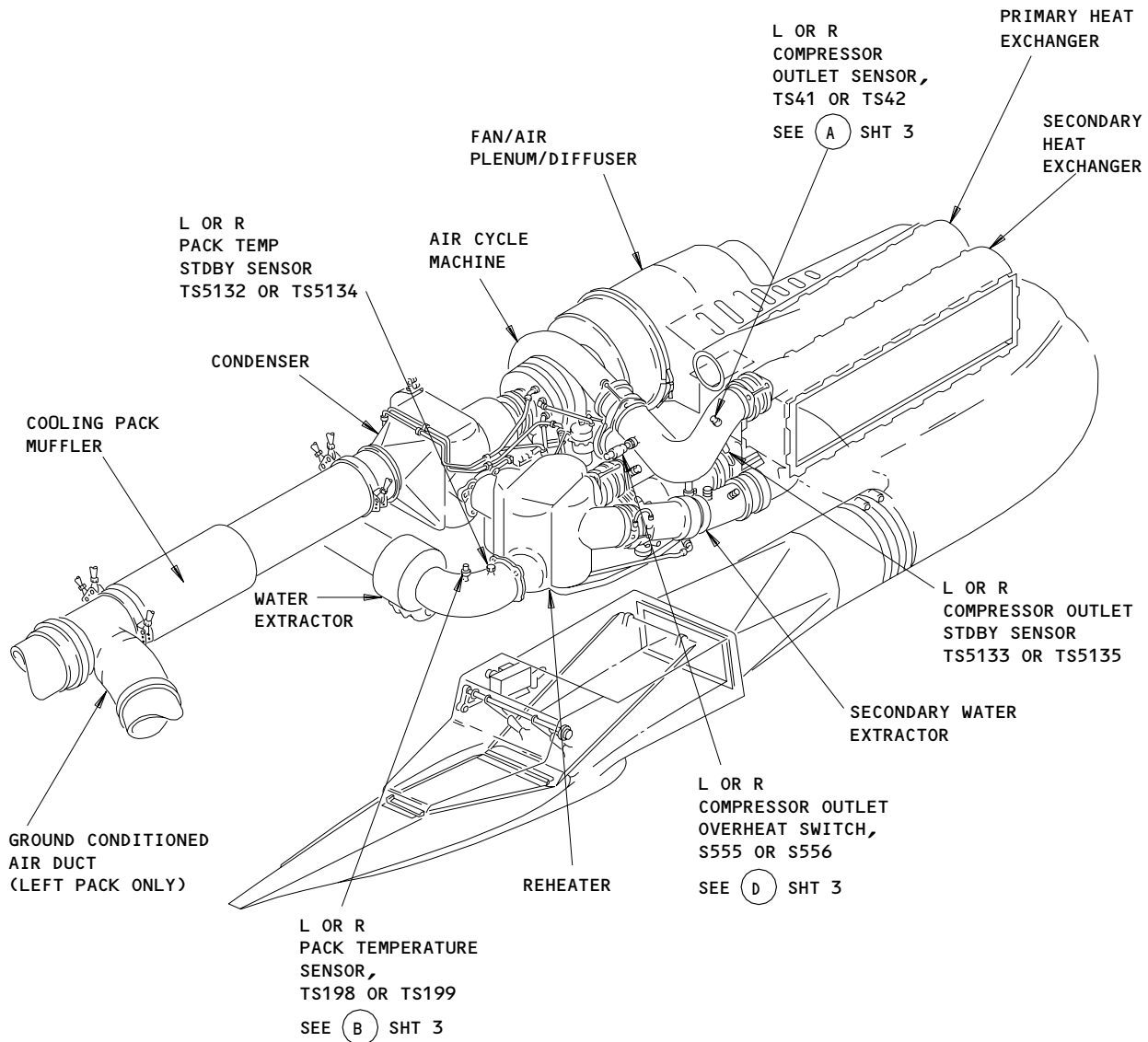
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FAULT ISOLATION/MAINT MANUAL

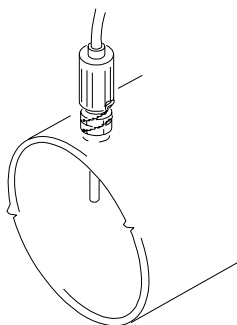


AIR CONDITIONING PACK
TOP VIEW

Component Location
Figure 102 (Sheet 2)

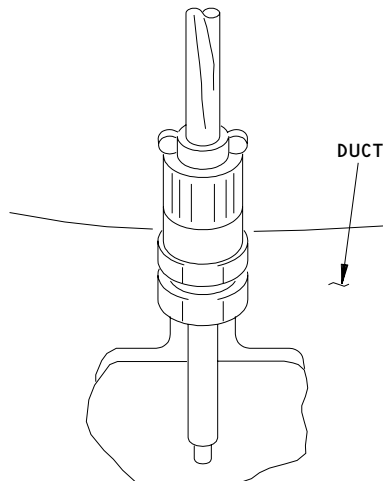
EFFECTIVITY	ALL
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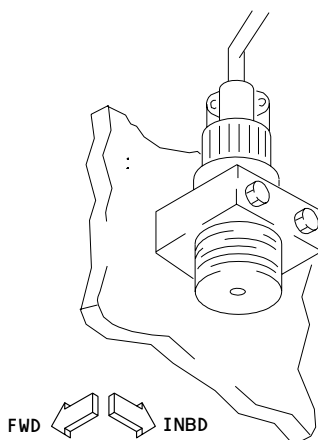
L OR R COMPRESSOR OUTLET SENSOR,
TS41 OR TS42

(A)



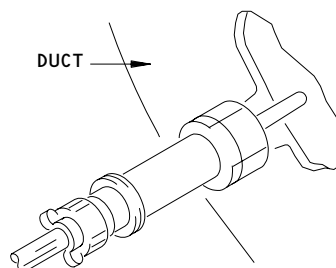
L OR R PACK TEMPERATURE SENSOR,
TS198 OR TS199

(B)



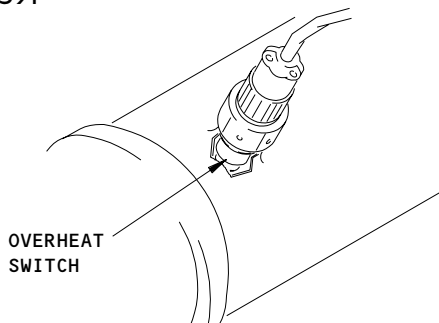
ALTITUDE SWITCH, S397

(C)



L OR R COMPRESSOR OUTLET OVERHEAT SWITCH,
S555 OR S556

(D)



L OR R PACK OVERHEAT SWITCH, S48 OR S49

(E)

DETAILS FROM SHT 1 AND 2

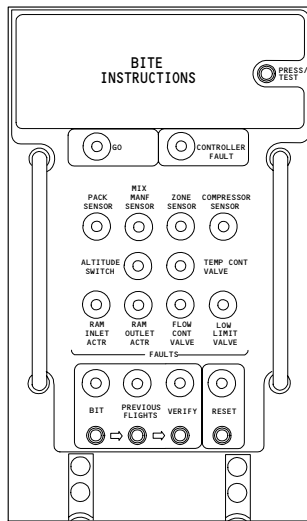
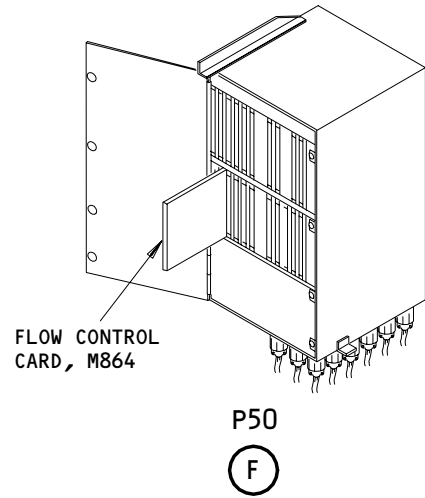
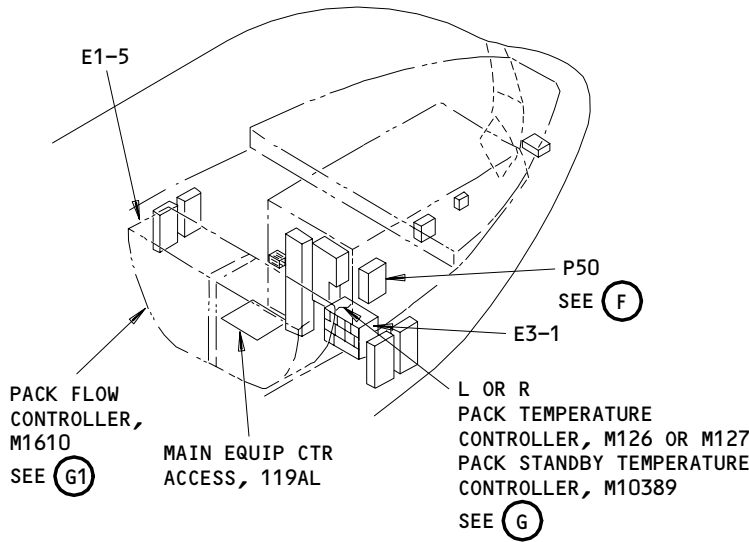
Component Location
Figure 102 (Sheet 3)

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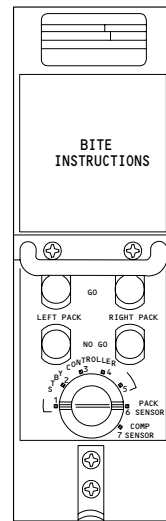
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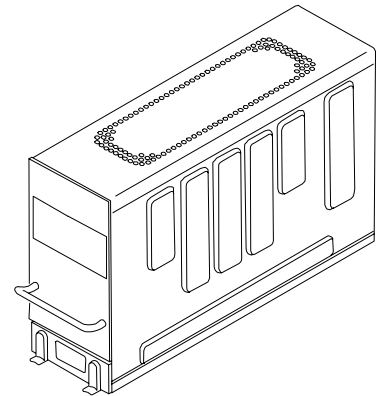
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L OR R PACK TEMPERATURE CONTROLLER, M126 OR M127



PACK STANDBY TEMPERATURE CONTROLLER, M10389



PACK FLOW (CARGO AIR CONDITIONING) CONTROLLER, M1610

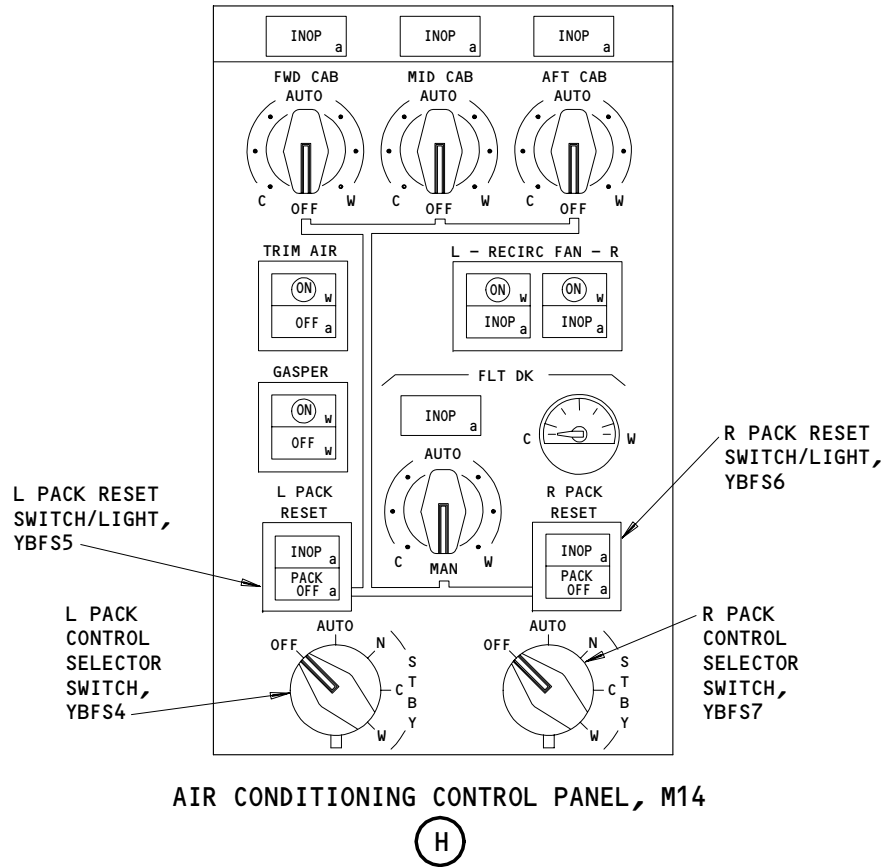
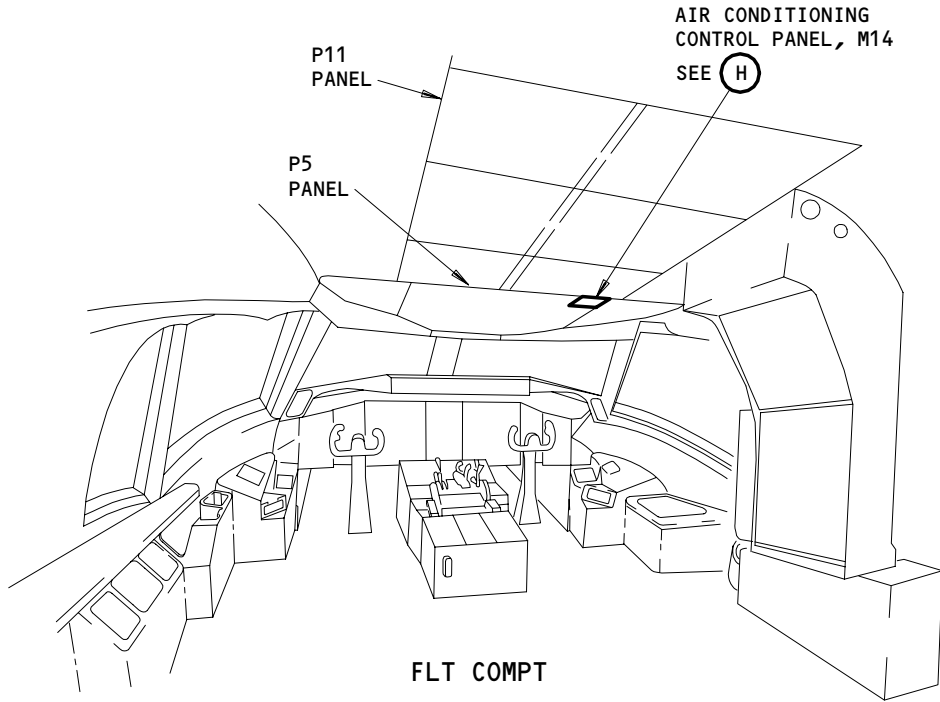
(G)

Component Location
Figure 102 (Sheet 4)

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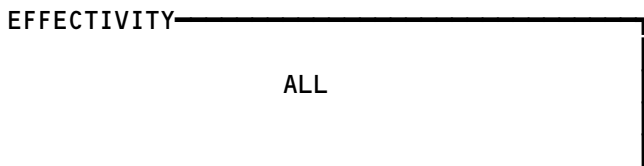
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AIR CONDITIONING CONTROL PANEL, M14

(H)

Component Location
Figure 102 (Sheet 5)



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COOLING PACK SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure supplies instructions to do the Operational Test and the System Test of the cooling pack system.
- B. The Operational Test includes these tests:
 - (1) The BITE tests for the pack temperature and pack standby controllers.
 - (2) The Pack Temperature Control Test.
 - (3) The Low Limit Valve Test.
 - (4) The Pack High Flow Inhibit Test.
- C. The System Test is a complete test of the pack operation.

TASK 21-51-00-705-001

2. BITE Tests – Pack Temperature and Pack Standby Controllers (Fig. 501, 502)

A. General

- (1) When the pneumatic power is off, the BITE (Built In Test Equipment) does an electrical check of the pack temperature controller, the compressor outlet temperature sensor, the pack outlet temperature sensor, the mix manifold temperature sensor, the zone temperature sensors, the altitude switch, the low limit valve, and the flow control and shutoff valve. The BITE does an operational check of the temperature control valve, the ram air inlet actuator, and the ram air exhaust actuator by driving each component open and closed.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power – Control
- (3) AMM 36-00-00/201, Pneumatic – General
- (4) FIM 21-51-00/101, Cooling Pack System

C. Access

- (1) Location Zones
 - 119/120 Main equipment center
 - 135/136 Environmental control system bay
- (2) Access Panels
 - 119AL Main Equipment Center
 - 193NL/194LR Environmental Control Systems (ECS) Bay

D. Prepare for the test

S 865-002

- (1) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
 - (a) 11A13, PACK FLOW CONT L
 - (b) 11A26, PACK FLOW CONT R
 - (c) 11N10, LEFT PACK AUTO PWR

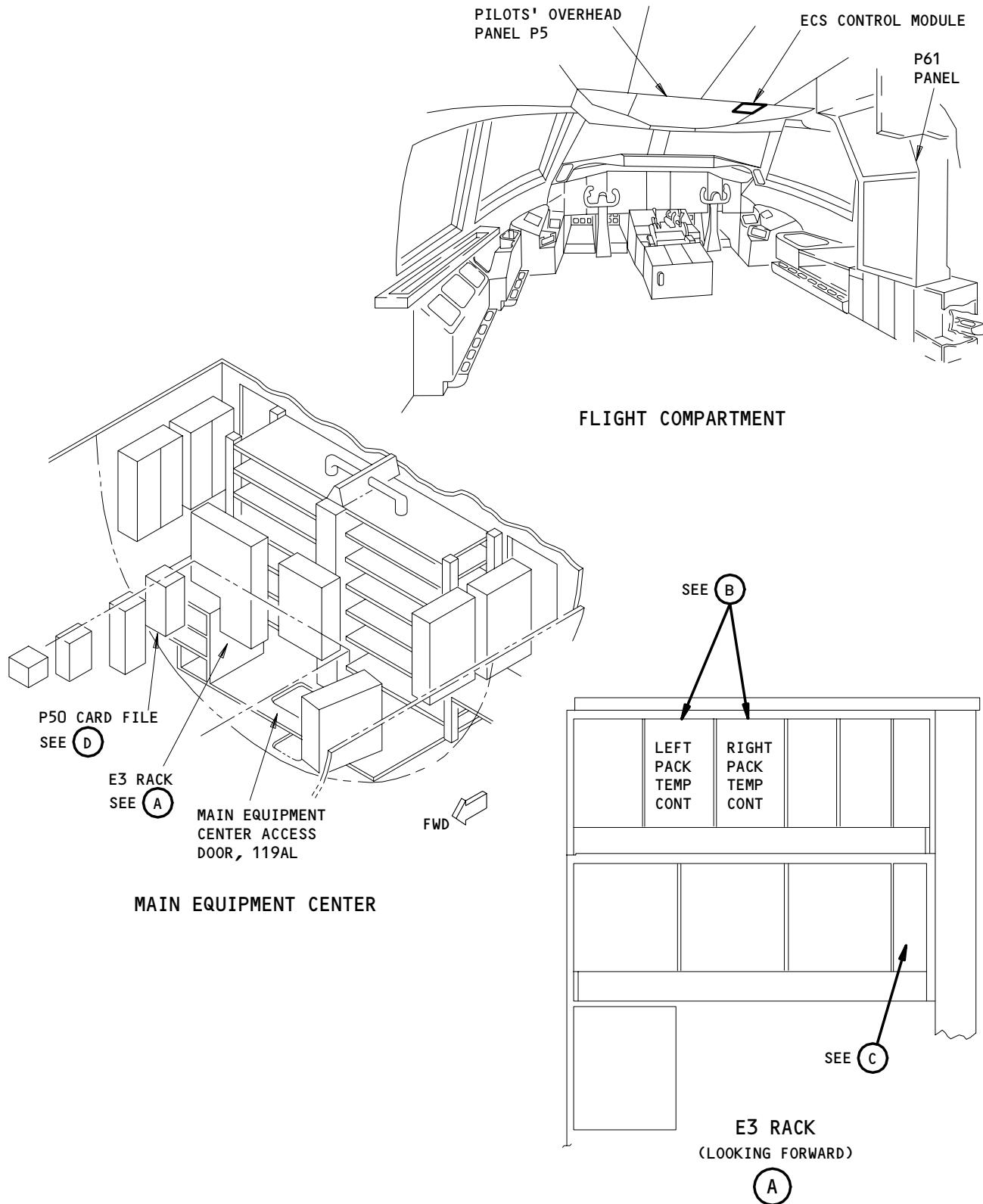
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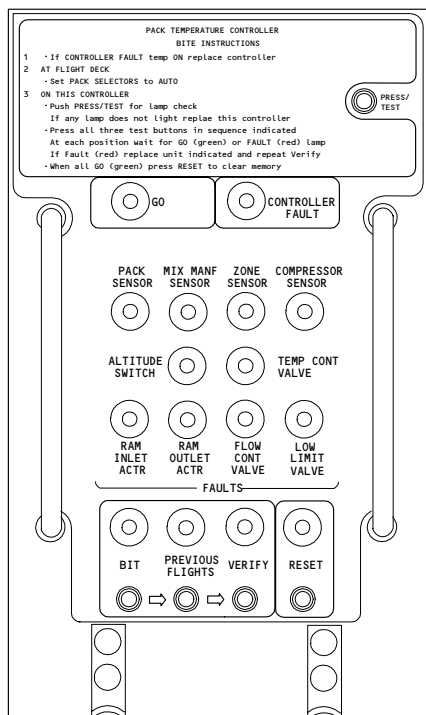
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Cooling Pack Modules and Controllers
Figure 501 (Sheet 1)

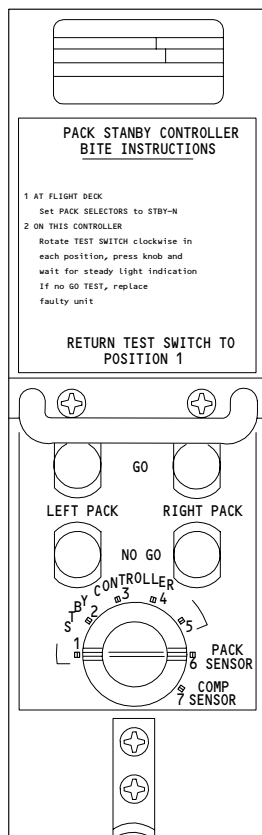
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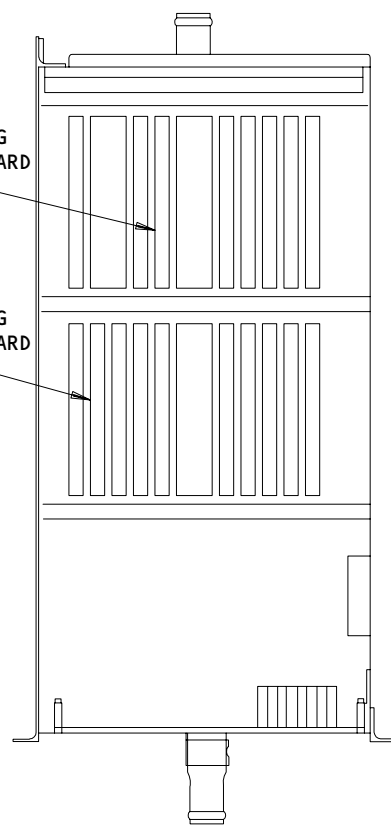
PACK TEMPERATURE CONTROLLER

(B)



PACK STANDBY CONTROLLER

(C)



(D)

**Cooling Pack Modules and Controllers
Figure 501 (Sheet 2)**

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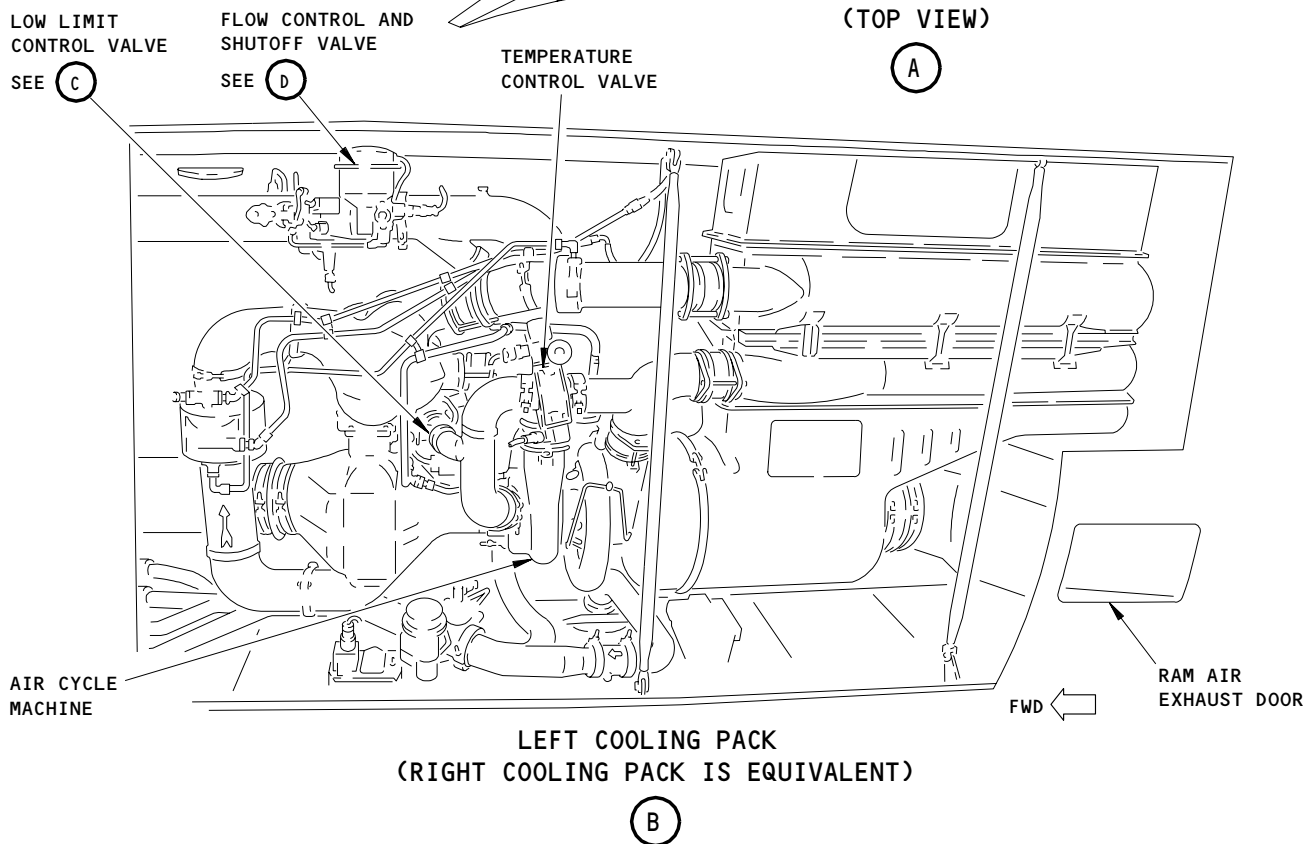
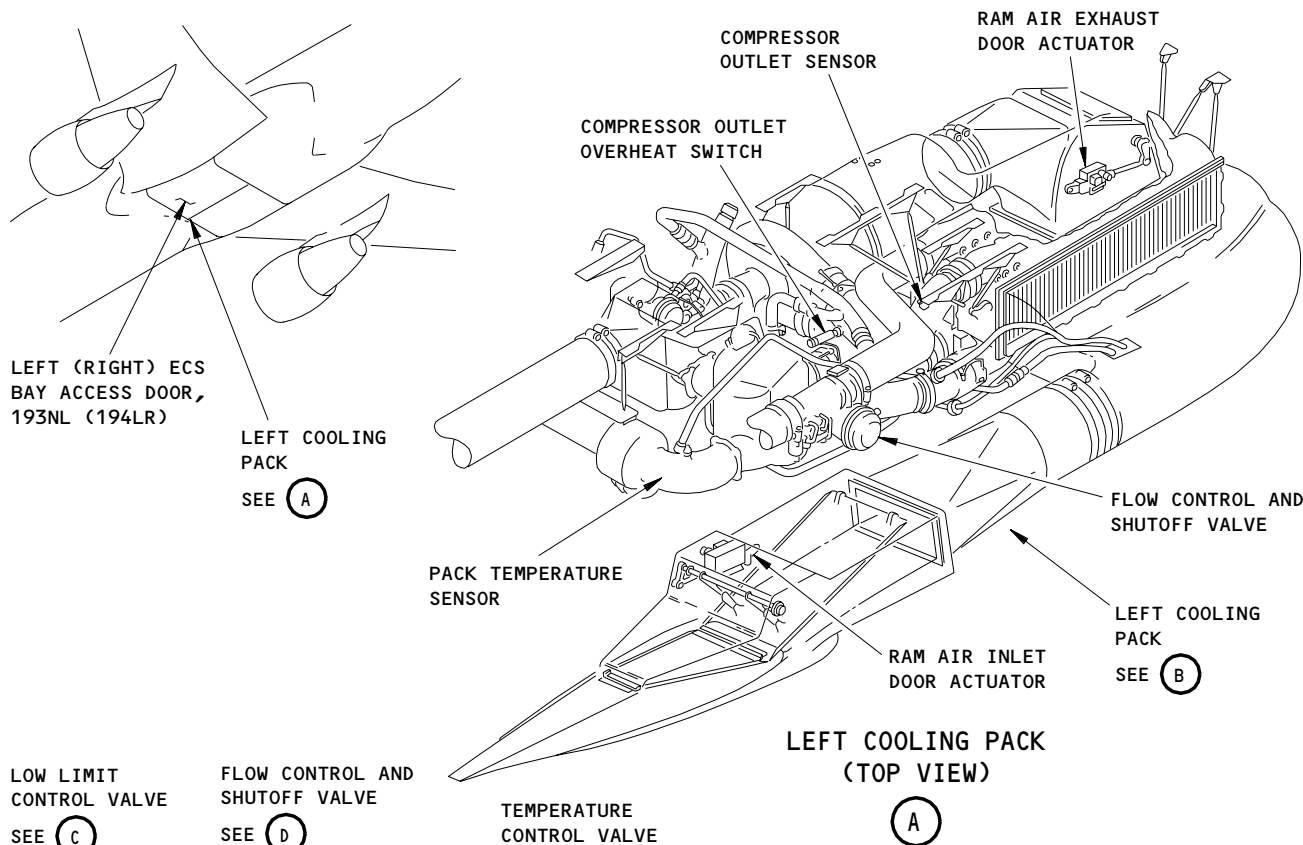
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Cooling Pack Components
Figure 502 (Sheet 1)

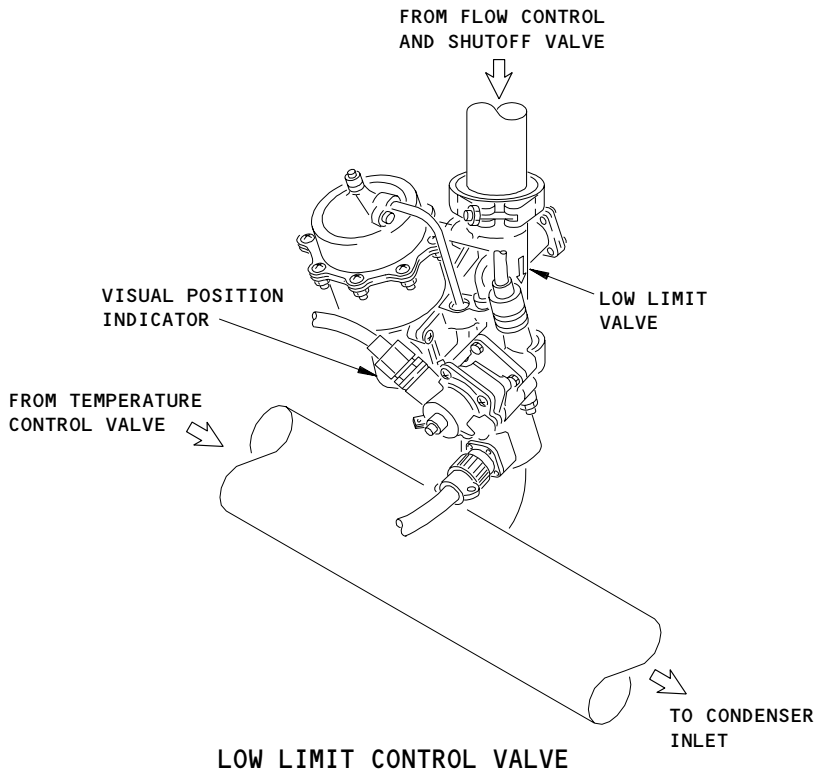
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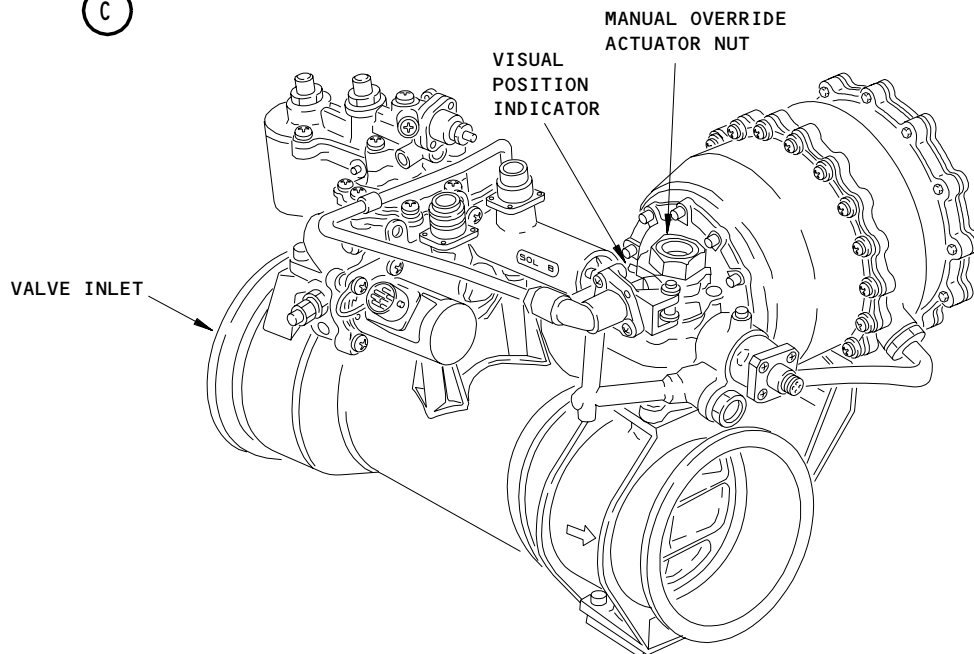
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(C)



FLOW CONTROL AND SHUTOFF VALVE

(D)

Cooling Pack Components
Figure 502 (Sheet 2)

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- (d) 11N11, LEFT PACK AUTO CONT
- (e) 11N15, RIGHT PACK STANDBY PWR
- (f) 11N16, RIGHT PACK STANDBY CONT
- (g) 11N19, RIGHT PACK AUTO PWR
- (h) 11N20, RIGHT PACK AUTO CONT
- (i) 11N24, LEFT PACK STANDBY PWR
- (j) 11N25, LEFT PACK STANDBY CONT
- (k) EICAS circuit breakers (6 locations)

S 865-003

- (2) Supply electrical power (AMM 24-22-00/201).

S 865-109

- (3) Make sure the pneumatic duct pressure is zero (AMM 36-00-00/201).

S 015-004

- (4) Open the main equipment center access door, 119AL (AMM 06-41-00/201).

E. Do the BITE Tests

S 745-005

- (1) Do the pack temperature controller BITE Test.

NOTE: BITE will show the same indication for a component fault or an airplane wiring fault. Make sure the wiring is correct and the connector is in good condition before you replace a component.

- (a) Turn all of the zone temperature selectors, on the pilot's overhead control panel, P5, to the AUTO (12 o'clock) position.
- (b) Push the TRIM AIR switch-light, on the P5 panel, to the on position.
- (c) Turn the L and R PACK selectors, on the P5 panel, to the AUTO positions.
- (d) Find the pack temperature controllers in the main equipment center on the E3-1 shelf.

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- (e) Do the BITE test on the applicable (left or right) pack temperature controller:
- 1) Make sure the CONTROLLER fault light is off.
 - a) If the CONTROLLER FAULT light is on, there is a problem with the pack temperature controller and/or a wiring problem with the temperature control valve or the ram air inlet/exhaust door actuators.

NOTE: An electrical short in the circuit wiring for the temperature control valve or the ram air inlet/exhaust door actuators can cause the pack temperature controller to blow a fuse. An electrical resistance check of the circuit wiring must be done first before you replace the PTC in order to isolate the cause of the electrical short to prevent future occurrences of a blown fuse in new PTCs (FIM 21-51-00/101 Figure 103).

AIRPLANES WITH PTC P/N S210T130-69 OR EARLIER PTC DASH NUMBERS;
If the pack temperature controller has a blown fuse, the CONTROLLER FAULT light will only show.

AIRPLANES WITH PTC P/N S210T130-79 AND SUBSEQUENT PTC DASH NUMBERS;
If the pack temperature controller has a blown fuse, the CONTROLLER FAULT light will illuminate in addition to the TEMP CONT VALVE, RAM INLET ACTR, or RAM OUTLET ACTR fault light.

- 2) Push the PRESS/TEST button.
 - a) Make sure all of the lights on the controller face come on.
- 3) Push the BIT button.
 - a) Make sure the BIT light comes on for 2 to 3 seconds.
 - b) Make sure that the GO light comes on and that none of the fault (red) lights come on.

NOTE: The GO light indicates that there are no controller faults and that no faults were detected the last time the pack was operated.

- 4) Push the PREVIOUS FLIGHTS button.
 - a) Make sure the PREVIOUS FLIGHTS light comes on for 2 to 3 seconds.

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- b) Make sure the GO light comes on and that none of the fault (red) lights come on.

NOTE: The GO light indicates that no faults were detected during the previous nine flights.

WARNING: MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE RAM-AIR INLET DOOR, THE RAM-AIR OUTLET DOOR AND THE TEMPERATURE CONTROL VALVE. WHEN YOU PUSH THE "VERIFY" BUTTON, THESE COMPONENTS WILL MOVE AND COULD CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- 5) Push the VERIFY button.
 - a) Make sure the VERIFY light comes on for 25 to 35 seconds.
 - b) Make sure the GO light comes on and that none of the fault (red) lights come on.

NOTE: The GO light indicates that no LRU faults were detected.

- 6) Push the RESET button while the VERIFY and GO lights are still on. The RESET light will come on for 6 to 10 seconds.

NOTE: Pushing the RESET button clears all of the faults from the controller memory.

- (f) Do the BITE test on the other pack temperature controller.

S 745-006

- (2) Do the BITE test on the pack standby controller.

NOTE: This test does an electrical check of the pack standby controller, the pack temp 2 sensor, and the compressor outlet temp 2 sensor.

- (a) Turn the L and R PACK selectors, on the P5 panel, to the STBY-N position.
- (b) Push all the GO and NO GO lamps on the pack standby controller.
 - 1) Replace any lamps that do not come on.
 - 2) If any lights do not come on after you replace them, replace the controller.
- (c) Do these steps for all seven (7) positions of the test switch on the pack standby controller:
 - 1) Turn the test switch to the applicable position.
 - 2) Push the test switch.
 - 3) Make sure the two GO lights come on.
 - 4) If one of the NO-GO lights comes on, then replace the applicable component.

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(d) Return the test switch to position 1.

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3. Operational Test – Pack Temperature Control (Fig. 501, 502)

A. References

- (1) AMM 24-22-00/201, Electric Power – Control
- (2) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (3) AMM 32-09-02/201, Air/Ground Relay

B. Access

- (1) Location Zones
 - 119/120 Main equipment center
 - 135/136 Environmental control system bay
- (2) Access Panels
 - 119AL Main Equipment Center
 - 193NL/194LR Environmental Control Systems (ECS) Bay

C. Prepare for the test

S 865-164

- (1) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
 - (a) 11A13, PACK FLOW CONT L
 - (b) 11A26, PACK FLOW CONT R
 - (c) 11N10, LEFT PACK AUTO PWR
 - (d) 11N11, LEFT PACK AUTO CONT
 - (e) 11N15, RIGHT PACK STANDBY PWR
 - (f) 11N16, RIGHT PACK STANDBY CONT
 - (g) 11N19, RIGHT PACK AUTO PWR
 - (h) 11N20, RIGHT PACK AUTO CONT
 - (i) 11N24, LEFT PACK STANDBY PWR
 - (j) 11N25, LEFT PACK STANDBY CONT
 - (k) EICAS circuit breakers (6 locations)

S 865-153

- (2) Supply electrical power (AMM 24-22-00/201).
- D. Do the Pack Temperature Control Test

S 865-110

- (1) Push the ECS MSG switch, on the right side panel P61, to get the EICAS maintenance page.

S 865-111

- (2) Turn the L and R PACK selectors, on the P5 panel, to the STBY-N position.

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S 715-113

- (3) Make sure these L and R values show on the EICAS display:

NOTE: The ram inlet door will not open until the ram outlet door is fully open.

- (a) RAM IN DOOR 0.00-0.05 (door open)
- (b) RAM OUT DOOR 0.00-0.05 (door open)
- (c) TEMP VALVE 0.00-0.05 (valve closed)

S 865-114

- (4) Turn the L and R PACK selectors, on the P5 panel, to the STBY-C position.

S 715-116

- (5) Make sure these L and R values show on the EICAS display:

- (a) RAM IN DOOR 0.00-0.05 (door open)
- (b) RAM OUT DOOR 0.00-0.05 (door open)
- (c) TEMP VALVE 0.00-0.05 (valve closed)

S 865-117

- (6) Turn the L and R PACK selectors, on the P5 panel, to the STBY-W position.

S 715-119

- (7) Make sure these L and R values show on the EICAS display:

- (a) RAM IN DOOR 0.00-0.05 (door open)
- (b) RAM OUT DOOR 0.00-0.05 (door open)
- (c) TEMP VALVE 0.95-1.00 (valve open)

S 865-120

- (8) Turn the L and R PACK selector, on the P5 panel, to the OFF position.

S 865-122

- (9) Make sure these L and R values show on the EICAS display:

- (a) RAM IN DOOR 0.00-0.05 (door open)
- (b) RAM OUT DOOR 0.00-0.05 (door open)
- (c) TEMP VALVE 0.00-0.05 (valve closed)

S 865-165

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (10) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

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S 865-166

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (11) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).

S 715-125

- (12) Make sure these L and R values show on the EICAS display:

NOTE: The ram outlet door will not close until the ram inlet door is fully closed.

- (a) RAM IN DOOR 0.95-1.00 (door closed)
- (b) RAM OUT DOOR 0.95-1.00 (door closed)
- (c) TEMP VALVE 0.95-1.00 (valve open)

- E. Put the airplane back to its usual condition

S 865-156

- (1) Put the No. 2 air/ground relay system to the ground mode (AMM 32-09-02/201).

S 865-160

- (2) Remove the electrical power if it is no longer necessary (AMM 24-22-00/201).

TASK 21-51-00-705-162

4. Operational Test - Pack Low Limit Valve (Fig. 501, 502)

A. General

- (1) When the pneumatic power is on, the BITE (Built In Test Equipment) does an operational check of the low limit valve by monitoring the pack outlet temperature while the valve is slowly opened. An increase in the pack outlet temperature shows that the low limit valve has opened.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power - Control
- (3) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones

119/120	Main equipment center
135/136	Environmental control system bay

- (2) Access Panels

119AL	Main Equipment Center
193NL/194LR	Environmental Control Systems (ECS) Bay

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D. Prepare for the test

S 865-150

- (1) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
 - (a) 11N10, LEFT PACK AUTO PWR
 - (b) 11N11, LEFT PACK AUTO CONT
 - (c) 11N15, RIGHT PACK STANDBY PWR
 - (d) 11N16, RIGHT PACK STANDBY CONT
 - (e) 11N19, RIGHT PACK AUTO PWR
 - (f) 11N20, RIGHT PACK AUTO CONT
 - (g) 11N24, LEFT PACK STANDBY PWR
 - (h) 11N25, LEFT PACK STANDBY CONT

S 865-151

- (2) Supply electrical power (AMM 24-22-00/201).
- E. Do the Low Limit Valve Test

S 715-011

- (1) Do the Low Limit Valve Test
 - (a) Use the APU to supply pneumatic power (AMM 36-00-00/201).
 - 1) If you do not use the APU to supply pneumatic power, make sure the APU air supply valve is locked in the open position.
 - (b) Open the left and right ECS bay access door, 193NL and 194LR (AMM 06-41-00/201).
 - (c) Turn all of the zone temperature selectors, on the pilot's overhead panel, P5, to the AUTO (12 o'clock) position.
 - (d) Turn the L and R PACK selectors, on the P5 panel, to the AUTO position.
 - (e) Make sure the position indicators on the left and right flow control valves are in the OPEN position. The position indicators are near the manual override nuts.
 - (f) Make sure the air does not leak from the pneumatic ducts.
 - (g) Do the steps that follow:
 - 1) Push the VERIFY button on the left and right pack temperature controller.

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- 2) Make sure the VERIFY light comes on for 80 to 120 seconds.
- 3) Make sure the GO light comes on and the LOW LIMIT VALVE fault light does not come on.

NOTE: The GO light indicates that no fault was detected.

S 865-016

- (2) Remove the pneumatic power if it is no longer necessary (AMM 36-00-00/201).

TASK 21-51-00-705-163

5. Operational Test - Pack High Flow Inhibit (Fig. 501, 502)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power - Control
- (3) AMM 27-51-00/201, Flaps
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 29-11-00/201, Main (Left, Right and Center) Hydraulic Systems
- (6) AMM 32-09-02/201, Air/Ground Relay
- (7) AMM 36-00-00/201, Pneumatic - General

B. Access

(1) Location Zones

- | | |
|---------|----------------------------------|
| 119/120 | Main equipment center |
| 135/136 | Environmental control system bay |

(2) Access Panels

- | | |
|-------------|---|
| 119AL | Main Equipment Center |
| 193NL/194LR | Environmental Control Systems (ECS) Bay |

C. Prepare for the test

S 865-152

- (1) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
 - (a) 11A13, PACK FLOW CONT L
 - (b) 11A26, PACK FLOW CONT R
 - (c) 11A31, WING ANTI-ICE
 - (d) 11N10, LEFT PACK AUTO PWR

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- (e) 11N11, LEFT PACK AUTO CONT
- (f) 11N15, RIGHT PACK STANDBY PWR
- (g) 11N16, RIGHT PACK STANDBY CONT
- (h) 11N19, RIGHT PACK AUTO PWR
- (i) 11N20, RIGHT PACK AUTO CONT
- (j) 11N24, LEFT PACK STANDBY PWR
- (k) 11N25, LEFT PACK STANDBY CONT
- (l) EICAS circuit breakers (6 locations)
- (m) 11C14, FLAP/STAB POS SENSING - C
- (n) 11D15, ENG SPEED SENSE L2
- (o) 11D16, ENG SPEED SENSE R2
- (p) 11D23, ENG SPEED SENSE L1
- (q) 11D24, ENG SPEED SENSE R1
- (r) 11J26, FLAP/STAB POS SENSING - R
- (s) 11S10, LEFT ENG BLEED IND
- (t) 11S11, LEFT ENG BLEED CONT
- (u) 11S19, RIGHT ENG BLEED IND
- (v) 11S20, RIGHT ENG BLEED CONT

S 865-018

- (2) Use an external power source or use two or more internal power sources (L IDG, R IDG, and APU) to supply the electrical power (AMM 24-22-00/201).

NOTE: If only one internal power source is used, the utility busses will shed when flight mode is simulated. Thus, the recirculation fans will shutdown.

S 865-020

- (3) Supply hydraulic power (AMM 29-11-00/201).

S 865-021

- (4) Make sure the flaps are in the retracted position (AMM 27-51-00/201).

S 865-267

- (5) Make sure the WING ANTI-ICE selector/switch (M10397 panel), on the P5 panel, is in the OFF position.

S 865-022

- (6) Push the L and R RECIRC FAN switch-lights, on the overhead control panel, P5, to ON. Make sure the ON light comes on.

S 865-019

- (7) Supply pneumatic power (AMM 36-00-00/201).

S 865-270

- (8) Turn all of the zone temperature selectors, on the pilot's overhead panel, P5, to the AUTO (12 o'clock) position.

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S 865-024

- (9) Turn the L and R PACK selectors, on the P5 panel, to the AUTO position.

S 865-204

- (10) Push the ECS/MSG button on the EICAS maintenance panel which is on the P61 panel, to view the ECS maintenance page.

NOTE: The ECS maintenance page will be used during this procedure to view the occurrence of EICAS status messages.

S 865-039

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (11) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

S 865-199

- (12) Do these steps on the Flight Management Computer (FMC) Control Display Unit (CDU) to bring up the ANALOG DISCR page 1/2:

NOTE: The FMC CDU will be used during this procedure to view the ECS PACK H/L indication which shows the pack flow mode (High flow/Low flow). The pack flow control and shutoff valve will be checked at the beginning and at the end of the procedure to verify that the CDU display agrees with the valve position indicator.

- (a) Push the function mode key INIT REF on the FMC CDU.
- (b) Push the line select key adjacent to the INDEX prompt shown on the FMC CDU.
- (c) Push the line select key adjacent to the MAINT prompt shown on the FMC CDU.
- (d) Push the line select key adjacent to the DISCRETES prompt shown on the FMC CDU to show the ANALOG DISCR page.

S 865-040

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (13) Do the Flight Mode Simulation procedure for the No. 2 air/ground systems and verify that the airplane is in the air mode (AMM 32-09-02/201).

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S 865-042

- (14) Move and hold the channel 2 test switches on the left and right Engine Speed Cards, in the electrical systems cardfile panel, P50, to the TEST positions.

S 865-271

- (15) Make sure the LEFT and RIGHT ECS PACK H/L entries on the ANALOG DISCR page of the FMC CDU show LO (Low flow).

S 015-201

- (16) Open the ECS bay panels 193NL and 194LR to get access to the visual position indicator on the flow control and shutoff valve for each pack (AMM 06-41-00/201).
- (a) Make a temporary mark on the visual position indicator to show the current position of the flow control and shutoff valve (Low flow).

D. Do the Left (Right) Pack High Flow Inhibit Test.

NOTE: This test can be done on only one pack at a time. Do the test for the left pack, then do it again for the right pack. Use the instructions in parentheses when you do the test for the right pack.

S 865-126

- (1) Turn the R (L) PACK selector, on the P5 panel, to the OFF position.
- (a) Make sure the R (L) PACK OFF light comes on.
- (b) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (High flow).
- (c) Make sure the visual position indicator on the left (right) pack flow control and shutoff valve moves counterclockwise away from the temporary mark towards OPEN (High flow).
- 1) Do the steps that follow if movement of the visual position indicator could not be seen:

NOTE: The voltage check that follows may be used anywhere in the procedure that calls for visual observation of counterclockwise movement of the position indicator.

- a) Open circuit breaker L(R) PACK FLOW CONT on the overhead circuit breaker panel P11.

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- b) Disconnect electrical connector D746 (D1272) from the high flow solenoid A on the left (right) flow control and shutoff valve.
- c) Connect a voltmeter to connector D746 (D1272) pins 3 (negative lead) and 1 (positive lead).
- d) Close circuit breaker L(R) PACK FLOW CONT on the overhead circuit breaker panel P11.
- e) Make sure the indication on the voltmeter is 26 to 30 vdc.
- f) Open circuit breaker L(R) PACK FLOW CONT on the overhead circuit breaker panel P11.
- g) Remove the voltmeter from the connector D746 (D1272).
- h) Connect the connector D746 (D1272) to the high flow solenoid A on the left (right) pack flow control and shutoff valve.
- i) Close the L(R) PACK FLOW CONT circuit breaker on the overhead circuit breaker panel P11.

S 865-264

CAUTION: DO NOT USE THE WING ANTI-ICE SYSTEM FOR LONGER THAN 10 SECONDS ON THE GROUND. USING WING ANTI-ICE ON THE GROUND CAN RESULT IN DAMAGE TO THE WING LEADING EDGE.

- (2) Set the WING ANTI-ICE selector/switch (M10397 panel), on the P5 panel, to ON.
 - (a) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows LO (Low flow).
 - (b) Make sure the visual position indicator on the left (right) pack flow control and shutoff valve moves clockwise to a position near the temporary mark (Low flow).
 - 1) Do the steps that follow if movement of the visual position indicator could not be seen:

NOTE: The voltage check that follows may be used anywhere in the procedure that calls for visual observation of clockwise movement of the position indicator.

- a) Open circuit breaker L(R) PACK FLOW CONT on the overhead circuit breaker panel P11.
- b) Disconnect electrical connector D746 (D1272) from the high flow solenoid A on the left (right) flow control and shutoff valve.
- c) Connect a voltmeter to connector D746 (D1272) pins 3 (negative lead) and 1 (positive lead).
- d) Close circuit breaker L(R) PACK FLOW CONT on the overhead circuit breaker panel P11.
- e) Make sure the indication on the voltmeter is 0 to 5 vdc.

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- f) Open circuit breaker L(R) PACK FLOW CONT on the overhead circuit breaker panel P11.
- g) Remove the voltmeter from the connector D746 (D1272).
- h) Connect the connector D746 (D1272) to the high flow solenoid A on the left (right) pack flow control and shutoff valve.
- i) Close the L(R) PACK FLOW CONT circuit breaker on the overhead circuit breaker panel P11.

S 865-132

- (3) Set the WING ANTI-ICE selector/switch (M10397 panel), on the P5 panel, to OFF.
 - (a) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (High flow).

S 865-133

- (4) Release the channel 2 test switch on the right (left) Engine Speed Card, in the P50 panel, from the TEST position.
 - (a) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows L0 (Low flow).

S 865-134

- (5) Move and hold the channel 2 test switch on the right (left) Engine Speed Card, in the P50 panel, to the TEST position.
 - (a) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (High flow).

S 865-196

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN YOU OPERATE THE FLAP/STAB SYSTEM. ALSO, MAKE SURE THE ENGINE STRUT ACCESS DOORS AND THE THRUST REVERSER COWLING WILL NOT BE IN THE PATH OF THE SLATS. IN THE STEP THAT FOLLOWS, THE TRAILING EDGE FLAPS AND THE LEADING EDGE SLATS WILL MOVE. ALSO, POWER WILL BE SUPPLIED TO THE AILERON, SPOILER RUDDER, ELEVATOR, AND STABILIZER CONTROL SURFACES.

- (6) Extend the flaps at least 5 degrees (AMM 27-51-00/201).
 - (a) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows L0 (Low flow).

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S 865-136

- (7) Retract the flaps (AMM 27-51-00/201).
(a) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (High flow).

S 865-137

- (8) Turn the R (L) PACK selector, on the P5 panel, to the AUTO position.
(a) Make sure the R (L) PACK OFF light goes out.
(b) Make sure the LEFT and RIGHT ECS PACK H/L entry on the ANALOG DISCR page shows LO (Low flow).

S 865-139

- (9) Push the L (R) RECIRC FAN switch-light to OFF.
(a) Make sure the L (R) RECIRC FAN INOP light comes on.
(b) Make sure the visual position indicator on the left (right) pack flow control and shutoff valve moves counterclockwise away from the temporary mark towards OPEN (High flow).

S 865-140

- (10) Push the L (R) RECIRC FAN switch-light to ON.
(a) Make sure the L (R) RECIRC FAN INOP light goes out.
(b) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows LO (Low flow).

S 865-171

- (11) 767-200 AIRPLANES;
Do a test of the PACK HIFLOW INHIBIT function when the AFT CARGO FIRE switch is ARMED:

CAUTION: IF THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE NOT OPENED, THE CARGO FIRE EXTINGUISHER BOTTLES MAY DISCHARGE WHEN YOU DO THE STEPS THAT FOLLOW.

- (a) Open these circuit breakers, on the main power distribution panel P6, and attach a DO-NOT-CLOSE tags:
1) 6H5, FIRE EXTINGUISHING CARGO BTL 1

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- 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (b) Push the CARGO FIRE AFT switch-light, on the pilot's control stand panel P8, to ARMED (ARMED light comes on).
 - 1) Make sure the L and R RECIRC FAN INOP lights come on.
 - 2) Make sure the LEFT and RIGHT ECS PACK H/L entries on the ANALOG DISCR page show HI (High flow).
- (c) Push the CARGO FIRE AFT switch-light, on the P8 panel, to off (ARMED light not on).
 - 1) Make sure the L and R RECIRC FAN INOP lights go out.
 - 2) Make sure the LEFT and RIGHT ECS PACK H/L entries on the ANALOG DISCR page show LO (Low flow).
- (d) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (e) Turn the R (L) PACK selector, on the P5 panel, to the OFF position.
 - 1) Make sure the R (L) PACK OFF light comes on.
 - 2) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (High flow).

S 865-195

(12) 767-300 AIRPLANES;

Do a test of the PACK HIFLOW INHIBIT function when the AFT CARGO FIRE switch is ARMED:

- (a) Turn the R (L) PACK selector, on the P5 panel, to the OFF position.
 - 1) Make sure the R (L) PACK OFF light comes on.
 - 2) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (High flow).

CAUTION: IF THE CIRCUIT BREAKERS IN THE SUBSEQUENT STEP ARE NOT OPENED, THE CARGO FIRE EXTINGUISHER BOTTLES MAY DISCHARGE WHEN YOU DO THE STEPS THAT FOLLOW.

- (b) Open these circuit breakers, on the main power distribution panel P6, and attach a DO-NOT-CLOSE tags:
 - 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1

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- 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2
- (c) Push the CARGO FIRE AFT switch-light, on the pilot's control stand panel P8, to ARMED (ARMED light comes on).
- 1) Make sure the L and R RECIRC FAN INOP lights come on.
 - 2) Make sure the EICAS message HI FLOW INHIBIT shows on the display.

NOTE: AIRPLANES WITH -1001 EICAS S/W OPS VERSION 1 OR 2 AND WITH FCAC SYSTEM (PRE-SB 31-0126);
When the left cooling pack is tested, the EICAS message HI FLOW INHIBIT will show. However, when the right cooling pack is tested, the EICAS message HI FLOW INHIBIT will not show. A message logic change was implemented in the -1001 EICAS to set the message based upon a digital input format. For the left cooling pack, the pack flow control cargo a/c controller (PFCAC) provides this digital input. However, for the right cooling pack, the right pack flow control card provides only an analog input which prevents the HI FLOW INHIBIT message from showing.

NOTE: AIRPLANES WITH -1001 EICAS S/W OPS VERSION 3 AND WITH FCAC SYSTEM (POST-SB 31-0126);
When the left and right cooling pack is tested, the EICAS message HI FLOW INHIBIT will show.

- 3) Make sure the LEFT and RIGHT ECS PACK H/L entries on the ANALOG DISCR page show LO (Low flow).
- (d) Push the CARGO FIRE AFT switch-light, on the P8 panel, to off (ARMED light not on).
- (e) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P6 panel:
- 1) 6H5, FIRE EXTINGUISHING CARGO BTL 1
 - 2) 6H6, FIRE EXTINGUISHING CARGO BTL 2

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- (f) Turn the L (R) PACK selector, on the P5 panel, to the OFF position and then to the AUTO position.
- 1) Make sure the L and R RECIRC FAN INOP lights go out.
 - 2) Make sure the EICAS message HI FLOW INHIBIT does not show on the display.
 - 3) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (High flow).

S 865-144

- (13) Open this circuit breaker on the P11 panel,
11C14, FLAP/STAB POS SENSING - C
(11J26, FLAP/STAB POS SENSING - R)
- (a) Make sure the EICAS message HI FLOW INHIBIT shows on the display.

NOTE: AIRPLANES WITH -1001 EICAS S/W OPS VERSION 1 OR 2 AND WITH FCAC SYSTEM (PRE-SB 31-0126);
When the left cooling pack is tested, the EICAS message HI FLOW INHIBIT will show. However, when the right cooling pack is tested, the EICAS message HI FLOW INHIBIT will not show. A message logic change was implemented in the -1001 EICAS to set the message based upon a digital input format. For the left cooling pack, the pack flow control cargo a/c controller (PFCAC) provides this digital input. However, for the right cooling pack, the right pack flow control card provides only an analog input which prevents the HI FLOW INHIBIT message from showing.

NOTE: AIRPLANES WITH -1001 EICAS S/W OPS VERSION 3 AND WITH FCAC SYSTEM (POST-SB 31-0126);
When the left and right cooling pack is tested, the EICAS message HI FLOW INHIBIT will show.

- (b) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows LO (Low flow).

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S 865-145

- (14) Close this circuit breaker on the P11 panel,
11C14, FLAP/STAB POS SENSING - C
(11J26, FLAP/STAB POS SENSING - R)
(a) Make sure the EICAS message HI FLOW INHIBIT remains.

S 865-146

- (15) Turn the L (R) PACK selector, on the P5 panel, to the OFF and then to the AUTO position.
(a) Make sure the EICAS message HI FLOW INHIBIT does not show on the display.
(b) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (High flow).
(c) Make sure the visual position indicator on the left (right) pack flow control and shutoff valve moves counterclockwise away from the temporary mark towards OPEN (High flow).

S 865-148

- (16) Turn the R (L) PACK selector, on the P5 panel, to the AUTO position.
(a) Make sure the R (L) PACK OFF light goes out.
(b) Make sure the LEFT and RIGHT ECS PACK H/L entry on the ANALOG DISCR page shows LO (Low flow).
(c) Make sure the visual position indicator on the left and right pack flow control and shutoff valves move clockwise to the temporary mark (Low flow).

S 715-051

- (17) Do the steps in the Pack High Flow Inhibit Test for the right pack.
E. Put the airplane back to its usual condition

S 865-053

- (1) Release the channel 2 test switches on the left and right Engine Speed Cards, in the P50 panel, from the TEST positions.

S 865-052

- (2) Put the No. 2 air/ground system to the ground mode (AMM 32-09-02/201).

S 865-205

- (3) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.

S 865-206

- (4) Push the L and R RECIRC FAN switch-lights to OFF.

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- S 415-054
- (5) Close the main equipment center access door, 119AL (AMM 06-41-00/201).
- S 865-055
- (6) Remove the hydraulic power if it is no longer necessary (AMM 29-11-00/201).
- S 865-056
- (7) Remove the pneumatic power if it is no longer necessary (AMM 36-00-00/201).
- S 865-057
- (8) Remove the electrical power if it is no longer necessary (AMM 24-22-00/201).

TASK 21-51-00-705-058

6. System Test – Cooling Pack System

A. Equipment

- (1) Six-inch scale, commercially available
- (2) Six-inch diameter inside caliper, commercially available

B. References

- (1) AMM 06-41-00/201, Access Doors and Panels
- (2) AMM 21-51-18/201, Pack Overheat Switch
- (3) AMM 21-51-19/201, Compressor Outlet Overheat Switch
- (4) AMM 21-53-02/501, Ram Air Exhaust Door
- (5) AMM 24-22-00/201, Electric Power – Control
- (6) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (7) AMM 32-09-02/201, Air/Ground Relay

C. Access

(1) Location Zones

- 119/120 Main equipment center
- 135/136 Environmental control system bay

(2) Access Panels

- 119AL Main Equipment Center
- 193NL/194LR Environmental Control Systems (ECS) Bay

D. Prepare for the Test

S 865-059

- (1) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
- (a) 11A13, PACK FLOW CONT L
- (b) 11A26, PACK FLOW CONT R
- (c) 11N10, LEFT PACK AUTO PWR
- (d) 11N11, LEFT PACK AUTO CONT
- (e) 11N15, RIGHT PACK STANDBY PWR
- (f) 11N16, RIGHT PACK STANDBY CONT
- (g) 11N19, RIGHT PACK AUTO PWR

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- (h) 11N20, RIGHT PACK AUTO CONT
- (i) 11N24, LEFT PACK STANDBY PWR
- (j) 11N25, LEFT PACK STANDBY CONT
- (k) 11R14, RECIRC FAN L
- (l) 11R23, RECIRC FAN R
- (m) EICAS circuit breakers (6 locations)

S 865-060

- (2) Make sure this circuit breaker, on the P36 panel, is closed:
 - (a) 36F2 or 36F4, L RECIRC FAN

S 865-061

- (3) Make sure this circuit breaker, on the P37 panel, is closed:
 - (a) 37G4 or 37C4, R RECIRC FAN

S 015-062

- (4) Open the main equipment center access door, 119AL (AMM 06-41-00/201).

S 015-063

- (5) Open the left and right ECS access doors 193NL, 194LR (AMM 06-41-00/201).

S 865-064

- (6) Supply electrical power (AMM 24-22-00/201).

E. Test Cooling Pack System

S 715-065

- (1) Do the Operational Tests For the Cooling Pack System.

S 715-066

- (2) Do the Pack Overheat Switch Test (AMM 21-51-18/201).

S 715-067

- (3) Do the Compressor Outlet Overheat Switch Test (AMM 21-51-19/201).

S 715-068

- (4) Do the Pack Temperature Control Test.
 - (a) Push the ESC MSG button, on the P61 panel, to get the EICAS maintenance page.
 - (b) Turn the L and R PACK selectors, on the P5 panel, to the OFF positions.
 - (c) Make sure that EICAS display shows these values (L and R):
 - 1) RAM IN DOOR 0.00-0.05 (door open)
 - 2) RAM OUT DOOR 0.00-0.05 (door open)
 - 3) TEMP VALVE 0.00-0.05 (valve closed)

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(d) Measure the ram air doors to make sure they are fully open.

NOTE: In the full open position, the exhaust door opening is 9.90 to 10.30 inches wide at the throat (the area with the smallest diameter). The inlet door opening, in the full open position, is 4.30 to 4.80 inches wide at the throat.

(e) Look at the position indicator on the temperature control valve to make sure it is fully closed.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(f) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

(g) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).

(h) Make sure that EICAS display shows these values (L and R):

- 1) RAM IN DOOR 0.95-1.00 (door closed)
- 2) RAM OUT DOOR 0.95-1.00 (door closed)
- 3) TEMP VLV 0.95-1.00 (valve open)

(i) Measure the ram air doors to make sure they are fully closed.

NOTE: In the fully closed position, the exhaust door opening is 0.80 to 1.00 inches wide at the throat (the area with the smallest diameter). The inlet door, in the fully closed position, is 0.35 to 0.50 inches wide at the throat.

(j) Make sure the position indicator on the temperature control valve is in the fully open position.

(k) Adjust the ram air doors if their dimensions are less than or greater than the specified dimensions (AMM 21-53-02/501).

S 865-072

(5) Put the No. 1 and No. 2 air/ground systems to ground mode (AMM 32-09-02/201).

F. Put the airplane back to its usual condition

S 415-073

(1) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

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- S 415-074
- (2) Close the left and right ECS access doors 193NL, 194LR (AMM 06-41-00/201).
- S 865-075
- (3) Remove the electrical power if it is no longer necessary (AMM 24-22-00/201).

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COOLING PACK SYSTEM – INSPECTION/CHECK

1. General

A. This procedure has instructions to visually examine the cooling packs.

TASK 21-51-00-216-001

2. Do a Check of the Cooling Packs (Fig. 601)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-51-01/401, Flow Control and Shutoff Valve – Removal/Installation
- (3) AMM 21-51-03/401, Air Cycle Machine – Removal/Installation
- (4) AMM 21-51-04/401, Water Extractor – Removal/Installation
- (5) AMM 21-51-06/401, Compressor Outlet Sensor – Removal/Installation
- (6) AMM 21-51-07/401, Pack Reheater – Removal/Installation
- (7) AMM 21-51-08/401, Pack Temperature Sensor – Removal/Installation
- (8) AMM 21-51-10/401, Condenser – Removal/Installation
- (9) AMM 21-51-11/201, Pack Low Limit Control Valve – Maintenance Practices
- (10) AMM 21-51-12/401, Pack Temperature Control Valve – Removal/Installation
- (11) AMM 21-51-15/401, Cabin Air Supply Check Valve – Removal/Installation
- (12) AMM 21-51-19/201, Compressor Outlet Overheat Switch – Maintenance Practices
- (13) AMM 21-51-21/401, Secondary Water Extractor – Removal/Installation

B. Access

- (1) Location Zones
135/136 Environmental Control System (ECS) Bay
- (2) Access Panels
193NL/194LR ECS Access Doors

C. Prepare for the Check

S 866-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 866-003

- (2) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.

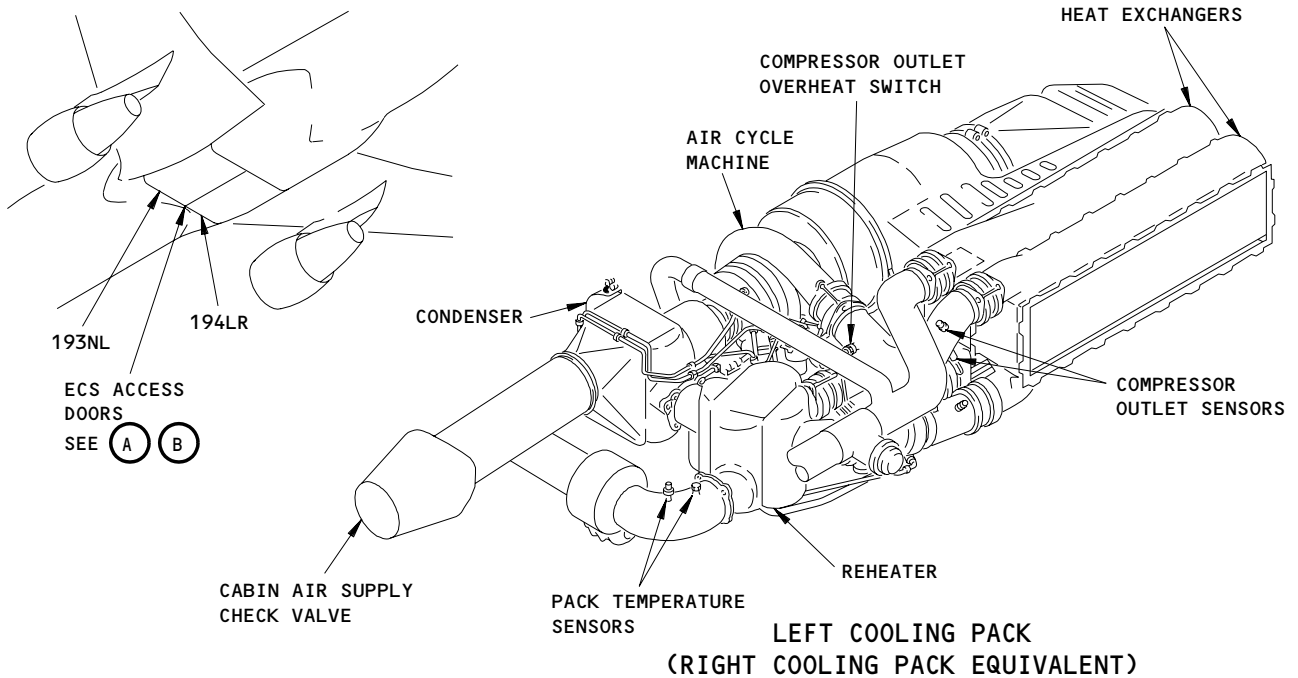
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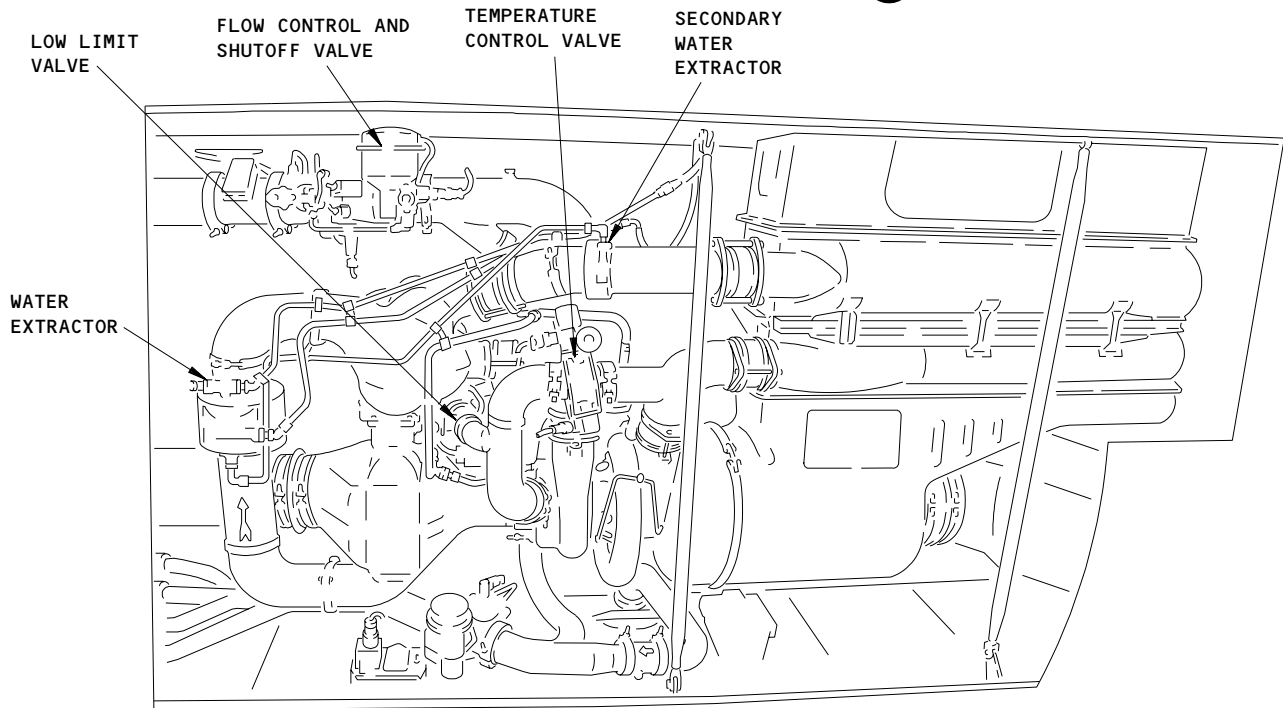
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(A)



FWD ←

(B)

**Cooling Pack Inspection
Figure 601**

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(b) Put a DO-NOT-OPERATE tag on the selector.

S 016-005

(3) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Examine the cooling pack

S 216-006

(1) Examine the cooling pack components (the air cycle machine, the reheater, the condenser, the water extractor, and the secondary water extractor) for the conditions that follow:

- (a) Make sure the supports and the attached components are tightly connected.
- (b) Make sure there are no cracks.
- (c) Make sure there is no corrosion.

S 966-007

(2) Replace the components or repair the connections, if it is necessary (AMM 21-51-03/401, 21-51-04/401, 21-51-07/401, 21-51-10/401, 21-51-21/401).

S 216-008

(3) Examine the temperature switches and sensors (the compressor outlet sensor, the compressor outlet overheat switch, and the pack temperature sensor) for the conditions that follow:

- (a) Make sure there are no signs of a leak.
- (b) Make sure the electrical connectors are tightly connected.
- (c) Make sure the lockwires are tightly connected and are strong.

S 966-009

(4) Replace the packing, tighten the electrical connector, or replace the lockwire, if it is necessary (AMM 21-51-06/401, 21-51-08/401, 21-51-19/201).

S 216-010

(5) Examine the valves (the cabin air supply check valve, the flow control and shutoff valve, the temperature control valve, and the low limit control valve) for the conditions that follow:

- (a) Make sure the couplings are tightly connected.
- (b) Make sure there are no cracks.
- (c) Make sure there is no corrosion.
- (d) Make sure there are no signs of a leak in the valve or the pneumatic lines.
- (e) Make sure the electrical connectors are tightly connected.
- (f) Make sure the bonding jumpers are tightly connected.

S 966-011

(6) Replace the valves or repair the connections, if it is necessary (AMM 21-51-01/401, 21-51-11/201, 21-51-12/401, 21-51-15/401).

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S 216-012

- (7) Examine the primary and secondary heat exchangers for the conditions that follow:
- (a) Make sure there are no cracks.
 - (b) Make sure there is no corrosion.
 - (c) Make sure there are no large dents or bulges.
 - (d) Make sure the nuts and bolts on the heat exchangers are tight.
 - (e) Make sure there are no signs of a leak.

S 966-013

- (8) Tighten the nuts and bolts or replace the heat exchangers, if it is necessary (AMM 21-51-02/401).

S 216-014

- (9) Examine the ducts and the pneumatic lines for the conditions that follow:
- (a) Make sure there are no signs of a leak.
 - (b) Make sure there are no cracks or dents.
 - (c) Make sure no damage is done to the duct flanges.
 - (d) On the duct connections that have a restraint cable:
 - 1) Make sure the bonding jumpers are tightly connected.
 - 2) Make sure the restraint cables are tight and strong.
 - 3) Make sure the distance between the duct flanges is not more than 2.65 inches.
 - (e) Make sure there are no cracks or damage in the hoses for the pneumatic lines.

S 966-018

- (10) Replace or repair the ducts or the pneumatic lines, if it is necessary.

E. Put the airplane back to its usual condition

S 416-015

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 866-016

- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

S 866-017

- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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FLOW CONTROL AND SHUTOFF VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the flow control and shutoff valves. One valve is installed for each air cooling pack.

TASK 21-51-01-004-001

2. Remove the Flow Control and Shutoff Valve (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power-Control
- (3) AMM 36-00-00/201, Pneumatic-General

B. Access

- (1) Location Zones
 - 135/136 Environmental control systems (ECS) bay
- (2) Access Panels
 - 193NL ECS Access Door (Left)
 - 194LR ECS Access Door (Right)
 - 194NR Flow control and shutoff valve (Right)

C. Prepare for the Removal

S 864-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-003

- (2) Remove the pneumatic power (AMM 36-00-00/201) or do the steps that follow:
 - (a) Remove the pneumatic ground cart from the ground air connectors (AMM 21-00-00/201).
 - (b) Push the applicable (L or R) ISLN switch-light, on the pilot's overhead panel, P5, to the off position.
 - 1) Make sure the white bar light goes off.
 - 2) Make sure the amber VALVE light comes on and goes off.
 - 3) Put a DO-NOT-OPERATE tag on the switch-light.
 - (c) Push the applicable (L or R) ENG switch-light, on the P5 panel, to the off position.
 - 1) Make sure the white bar light goes off.

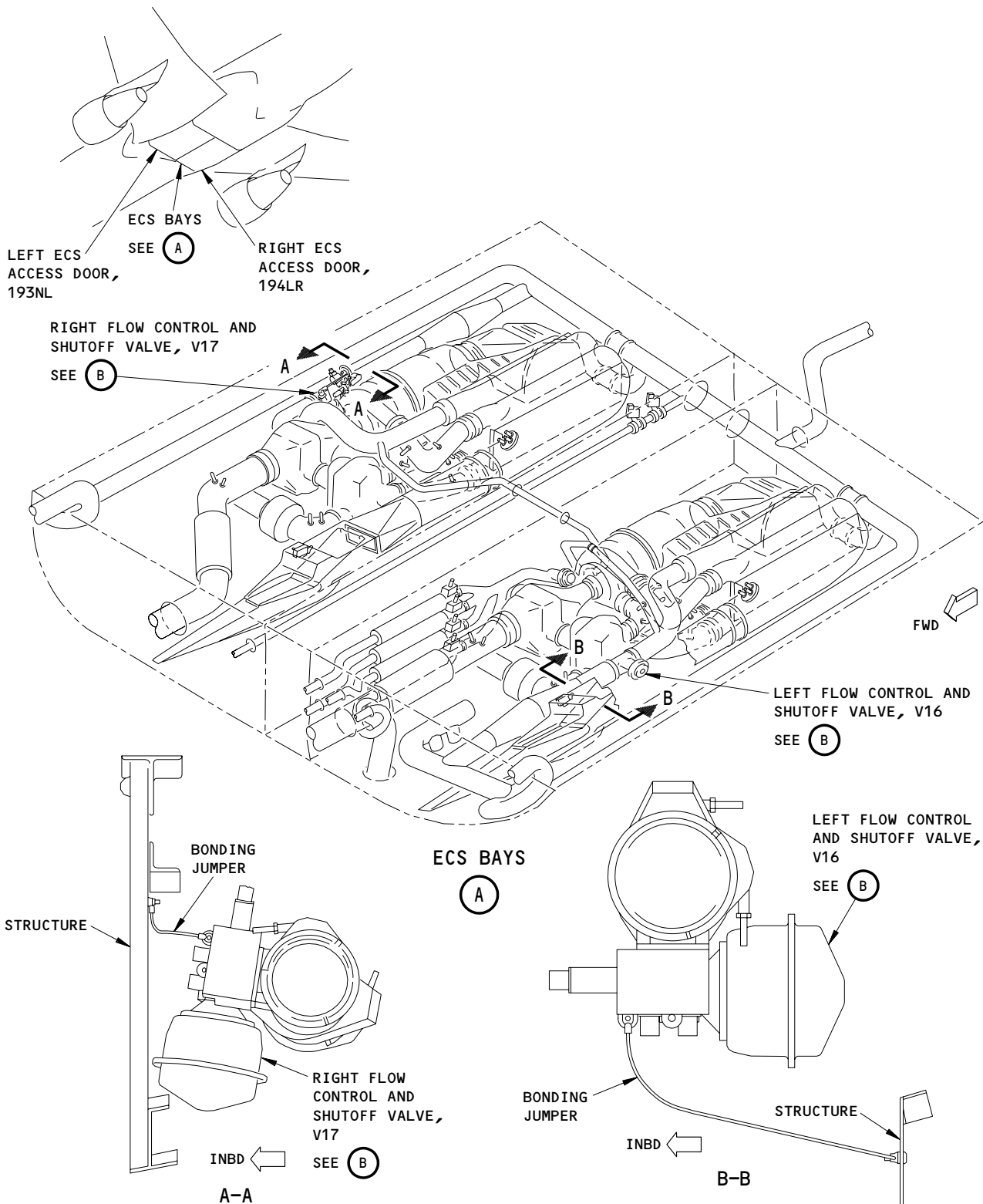
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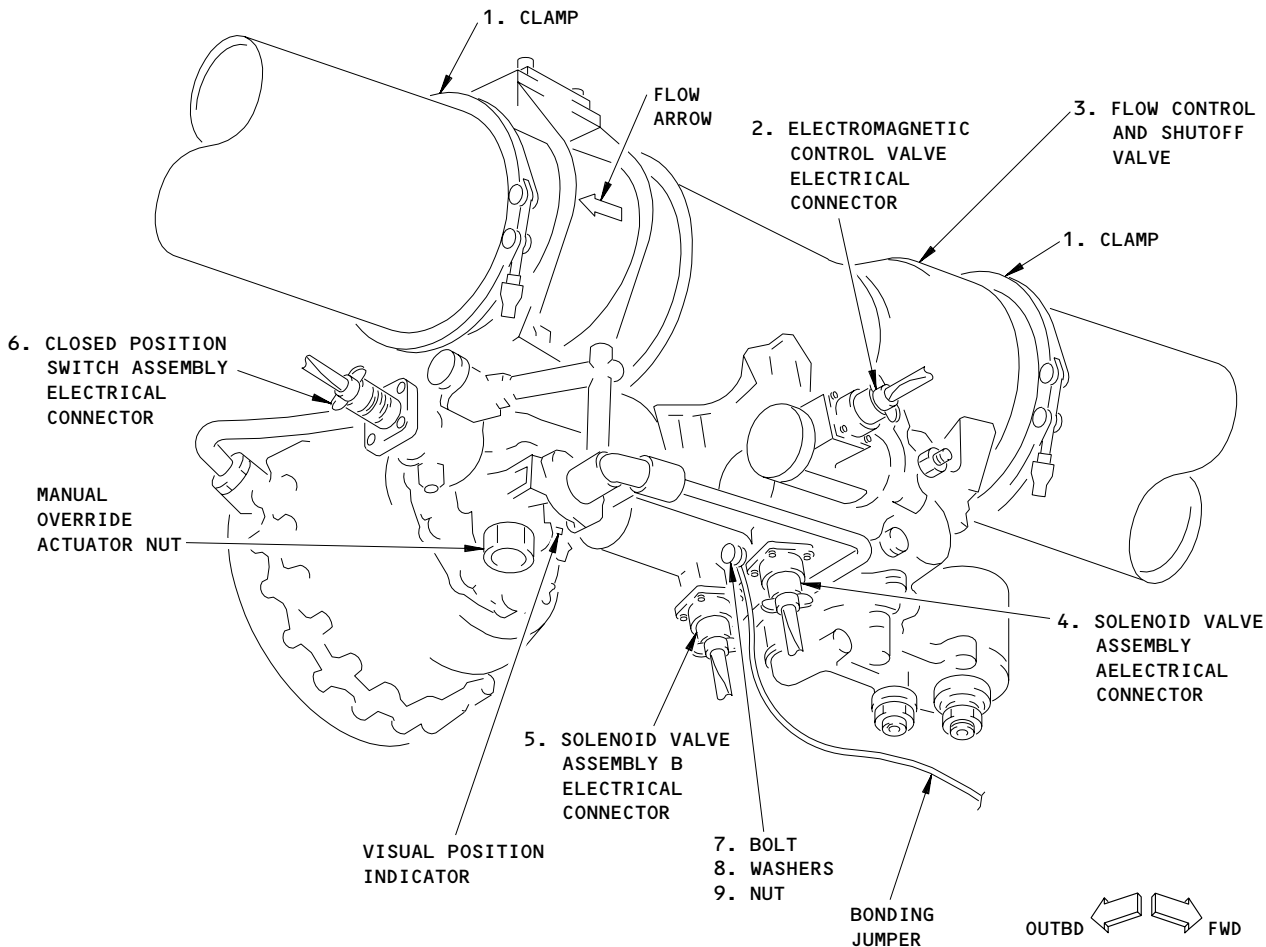
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Flow Control and Shutoff Valve Installation
Figure 401 (Sheet 1)

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LEFT FLOW CONTROL AND SHUTOFF VALVE, V16
(RIGHT FLOW CONTROL AND SHUTOFF VALVE, V17
IS EQUIVALENT)

(B)

Flow Control and Shutoff Valve Installation
Figure 401 (Sheet 2)

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- 2) Make sure the amber OFF light comes on.
- 3) Put a DO-NOT-OPERATE tag on the switch-light.

WARNING: MAKE SURE THAT ALL PERSONS ARE AWAY FROM THE WING LEADING EDGES. RELEASE OF THE HIGH TEMPERATURE AIR FROM THE WING ANTI-ICE SYSTEM CAN CAUSE INJURY TO PERSONS.

- (d) Push and hold the WING ANTI-ICE test switch, on the right side panel, P61.
- (e) Make sure the applicable (left or right) DUCT PRESS indicator, on the P5 panel, goes to zero.
- (f) Release the WING ANTI-ICE test switch, on the P61 panel.

S 864-004

- (3) Open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the overhead circuit breaker panel, P11:
 - (a) To remove the left flow control and shutoff valve:
 - 1) 11A13, PACK FLOW CONT L
 - (b) To remove the right flow control and shutoff valve:
 - 1) 11A26, PACK FLOW CONT R

S 014-005

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 014-006

- (5) To remove the right flow control and shutoff valve, remove the flow control access panel, 194NR (AMM 06-41-00/201).

D. Remove the Valve

S 034-007

- (1) Disconnect the electrical connectors from the valve:
 - (a) The electrical connector (4) from the solenoid A.
 - (b) The electrical connector (5) from the solenoid B.
 - (c) The electrical connector (2) from the electromagnetic control valve.
 - (d) The electrical connector (6) from the closed position switch.

S 034-008

- (2) Disconnect the bonding jumper from the valve.

S 034-009

- (3) Remove the clamps (1) at the ends of the valve (3).

S 024-010

- (4) Remove the flow control and shutoff valve (3).

S 434-011

- (5) Put a cover on the duct openings.

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TASK 21-51-01-404-012

3. Install the Flow Control and Shutoff Valve (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	3	Flow Control and Shutoff Valve	21-61-05	01	650
401	3	Flow Control and Shutoff Valve	21-61-05	02	474
401	3	Flow Control and Shutoff Valve	21-61-05	03	598
401	3	Flow Control and Shutoff Valve	21-61-05	04	829
401	3	Flow Control and Shutoff Valve	21-61-05	08	45

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-51-14/501, Pack Temperature Controller
- (3) AMM 24-22-00/201, Electrical Power-Control
- (4) AMM 27-51-00/201, Flaps
- (5) AMM 30-11-00/501, Wing Thermal Anti-Icing
- (6) AMM 32-09-02/201, Air/Ground Relay
- (7) AMM 36-00-00/201, Pneumatic-General

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay

D. Install the Valve

S 034-013

- (1) Remove the covers from the duct openings.
 - (a) Make sure there is no unwanted material in the ducts.

S 164-014

- (2) Make sure the duct flanges and the valve flanges are clean.

S 424-015

- (3) Put the flow control and shutoff valve (3) in its position between the duct openings.
 - (a) Make sure the flow arrow points to the air cooling pack.

S 434-016

- (4) Install the clamps (1) at the ends of the valve (3).

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S 824-063

- (5) Turn the flow control and shutoff valve (3) until it is in the position as shown in figure 401.

NOTE: The left and right valves are positioned differently.

- (a) Make sure that the valve does not touch the adjacent structure.
- (b) Tighten the clamps to 50-55 pound-inches (5.65-6.21 newton-meters).

S 434-017

- (6) Connect the bonding jumper to the valve.

S 434-018

- (7) On the left flow control and shutoff valve, install these electrical connectors to the valve:
- (a) The electrical connector, D2770, (6) on the closed position switch.
 - (b) The electrical connector, D1598, (2) to the electromagnetic control valve.
 - (c) The electrical connector, D748, (5) to the solenoid B.
 - (d) The electrical connector, D746, (4) to the solenoid A.

S 434-019

- (8) On the right flow control and shutoff valve, install these electrical connectors to the valve:
- (a) The electrical connector, D1276, (6) on the closed position switch.
 - (b) The electrical connector, D1602, (2) to the electromagnetic control valve.
 - (c) The electrical connector, D1278, (5) to the solenoid B.
 - (d) The electrical connector, D1272, (4) to the solenoid A.

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E. Prepare for Post-Installation Test

S 864-039

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11A13, PACK FLOW CONT L
 - (b) 11A26, PACK FLOW CONT R

S 864-042

- (2) Make sure these circuit breakers are closed on the P11 panel:
- (a) 11S10, ENG BLEED AIR SUPPLY IND L
 - (b) 11S11, ENG BLEED AIR SUPPLY CONT L
 - (c) 11S19, ENG BLEED AIR SUPPLY IND R
 - (d) 11S20, ENG BLEED AIR SUPPLY CONT R

S 864-040

- (3) Supply electrical power (AMM 24-22-00/201).

S 744-060

- (4) Do the BITE test for the left (right) pack temperature controller(s) (PTC) (AMM 21-51-14/501).
- (a) Make sure the FLOW CONT VALVE light does not come on during the BITE test(s).

S 864-041

- (5) Put the airplane in this pre-test configuration:
- (a) L PACK and R PACK selectors are OFF (P5 panel).
 - (b) No.2 air/ground system relays are set to 'ground' mode (AMM 32-09-02/201).
 - (c) Flaps are fully retracted (AMM 27-51-00/201).
 - (d) Left and right engines are both off (AMM 71-00-00/201).
 - (e) Channel 1 and 2 switches on both the left and right engine speed cards are set to NORMAL (P50 panel).
 - (f) L ENG and R ENG bleed switch-lights are off (P5 panel).
 - (g) Each CARGO FIRE switch-light is off and 'not' ARMED (P8 panel).
 - (h) WING ANTI-ICE switch is OFF (P5 panel).
 - (i) PASSENGER AIRPLANES;
L RECIRC FAN and R RECIRC FAN switch-lights are 'not' ON (P5 panel).
 - (j) PASSENGER AIRPLANES WITH FORWARD CARGO AIR CONDITIONING;

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FWD CARGO A/C switch-light is 'not' ON (P5 panel).

S 864-043

- (6) Use the Left or Right Flight Management Computer (FMC) Control Display Unit (CDU), on the P9 panel, to view the ECS PACK H/L indications for the LEFT and RIGHT pack flow modes that show on the FMC ANALOG DISCR page 1 (AMM 34-61-00/001):
- Push the INIT/REF function mode key on the FMC CDU to view the INIT/REF INDEX page 1.
 - Push the MAINT > line select key on the FMC CDU to view the MAINTENANCE INDEX page 1.
 - Push the < DISCRETES line select key on the FMC CDU to view the FMC ANALOG DISCR page 1.
 - Find the ECS PACK H/L indications for the LEFT and RIGHT pack flow modes on the FMC ANALOG DISCR page 1.

S 864-044

- (7) Operate the APU or connect an external ground air cart to supply pneumatic power to the cooling packs (AMM 36-00-00/201).
- F. Left Pack Flow Control and Shutoff Valve Post-Installation Test

S 724-045

- (1) Do the 'High' flow mode test of the 'left' pack flow control valve:

NOTE: During the test if the pack flow control valve is not commanded to the 'High' flow mode, it is possible the left and/or right PRSOVs are not fully closed. Normally, during engine-off, APU-on ground operations, the left and right pack flow control valves are commanded to the 'High' flow mode when both left and right engine PRSOVs are fully closed. During engine-off, APU-on ground operations, the APU pressurizes the duct leading to the engine PRSOVs. Over a short time, the air can leak past the PRSOV and pressurize the ducting upstream of the PRSOV. When the PRSOV senses pressure both upstream and downstream, the PRSOV will open enough and subsequently cause the pack flow control valve to be commanded to the 'Low' flow mode instead of 'High' flow mode. This condition can cause warm cabin temperatures on hot days since the quantity of pack cooling air is less.

- Move the L PACK selector to AUTO position (P5 panel).
 - Make sure the L PACK OFF light is 'not' on.
- Make sure the ECS PACK H/L indication shows 'HI' for the LEFT pack flow mode on the FMC ANALOG DISCR page 1.
- Make sure the visual position indicator on the 'left' pack flow control valve moves towards the OPEN position.
 - Record how far the indicator moved towards OPEN to compare against how far it moves when you do the 'Low' flow test.
- Make sure there are no air leaks at the coupling connections between the flow control valve and the ducting.

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- (e) If the 'left' pack flow control valve will not move to the 'High' flow mode, use each PRSOV manual override to keep the left and right PRSOVs fully closed, then do the test again.

S 724-046

- (2) Do the 'Low' flow mode test of the 'left' pack flow control valve:
 - (a) Do one of these steps to command the 'left' pack flow control valve to the 'Low' flow mode:
 - 1) PASSENGER AIRPLANES;
Push the L RECIRC FAN switch-light to ON (P5 panel).
 - 2) Move the R PACK selector to AUTO position (P5 panel).
 - 3) Disconnect the electrical connector, D1276, from the 'right' pack flow control valve to simulate it is open.
 - 4) Set the No.2 air/ground system relays to the 'air' mode (AMM 32-09-02/201).
 - 5) Simulate the left PRSOV is open and the left engine is on:
 - a) To simulate the left PRSOV is open, open these circuit breakers on the P11 panel:
 - <1> 11S10, ENG BLEED AIR SUPPLY IND L
 - <2> 11S11, ENG BLEED AIR SUPPLY CONT L
 - b) To simulate the left engine is on, hold the Channel 2 switch to the TEST position on the left engine speed card (P50 panel).
 - 6) Simulate the right PRSOV is open and the right engine is on:
 - a) To simulate the right PRSOV is open, open these circuit breakers on the P11 panel:
 - <1> 11S19, ENG BLEED AIR SUPPLY IND R
 - <2> 11S20, ENG BLEED AIR SUPPLY CONT R
 - b) To simulate the right engine is on, hold the Channel 2 switch to the TEST position on the right engine speed card (P50 panel).
 - (b) Make sure the ECS PACK H/L indication shows 'LO' for the LEFT pack flow mode on the FMC ANALOG DISCR page 1.
 - (c) Make sure the visual position indicator on the 'left' pack flow control valve moves to a less OPEN position than what was recorded during the 'High' flow mode test.
 - (d) Make sure there are no air leaks at the coupling connections between the flow control valve and the ducting.

S 864-047

- (3) Do the applicable steps to return the airplane back to the pre-test configuration:
 - (a) Set the No.2 air/ground system relays back to the 'ground' mode (AMM 32-09-02/201).
 - (b) Move the L PACK selector to OFF position (P5 panel).
 - (c) PASSENGER AIRPLANES;
Push the L RECIRC FAN switch-light to off (P5 panel).
 - (d) Move the R PACK selector to OFF position (P5 panel).

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- (e) Re-connect the electrical connector, D1276, to the 'right' pack flow control valve.
 - (f) Close these circuit breakers on the P11 panel:
 - 1) 11S10, ENG BLEED AIR SUPPLY IND L
 - 2) 11S11, ENG BLEED AIR SUPPLY CONT L
 - 3) 11S19, ENG BLEED AIR SUPPLY IND R
 - 4) 11S20, ENG BLEED AIR SUPPLY CONT R
 - (g) Return the Channel 2 switch to the NORMAL position on the (left, right) engine speed card (P50 panel).
- G. Right Pack Flow Control and Shutoff Valve Post-Installation Test

S 724-056

- (1) Do the 'High' flow mode test of the 'right' pack flow control valve:

NOTE: During the test if the pack flow control valve is not commanded to the 'High' flow mode, it is possible the left and/or right PRSOVs are not fully closed. Normally, during engine-off, APU-on ground operations, the left and right pack flow control valves are commanded to the 'High' flow mode when both left and right engine PRSOVs are fully closed. During engine-off, APU-on ground operations, the APU pressurizes the duct leading to the engine PRSOVs. Over a short time, the air can leak past the PRSOV and pressurize the ducting upstream of the PRSOV. When the PRSOV senses pressure both upstream and downstream, the PRSOV will open enough and subsequently cause the pack flow control valve to be commanded to the 'Low' flow mode instead of 'High' flow mode. This condition can cause warm cabin temperatures on hot days since the quantity of pack cooling air is less.

- (a) Move the R PACK selector to AUTO position (P5 panel).
 - 1) Make sure the R PACK OFF light is 'not' on.
- (b) Make sure the ECS PACK H/L indication shows 'HI' for the RIGHT pack flow mode on the FMC ANALOG DISCR page 1.
- (c) Make sure the visual position indicator on the 'right' pack flow control valve moves towards the OPEN position.
 - 1) Record how far the indicator moved towards OPEN to compare against how far it moves when you do the 'Low' flow test.
- (d) Make sure there are no air leaks at the coupling connections between the flow control valve and the ducting.
- (e) If the 'right' pack flow control valve will not move to the 'High' flow mode, use each PRSOV manual override to keep the left and right PRSOVs fully closed, then do the test again.

S 724-057

- (2) Do the 'Low' flow mode test of the 'right' pack flow control valve:

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- (a) Do one of these steps to command the 'right' pack flow control valve to the 'Low' flow mode:
 - 1) PASSENGER AIRPLANES;
Push the R RECIRC FAN switch-light to ON (P5 panel).
 - 2) Move the L PACK selector to AUTO position (P5 panel).
 - 3) Disconnect the electrical connector, D2770, from the 'left' pack flow control valve to simulate it is open.
 - 4) Set the No.2 air/ground system relays to the 'air' mode (AMM 32-09-02/201).
 - 5) Simulate the left PRSOV is open and the left engine is on:
 - a) To simulate the left PRSOV is open, open these circuit breakers on the P11 panel:
 - <1> 11S10, ENG BLEED AIR SUPPLY IND L
 - <2> 11S11, ENG BLEED AIR SUPPLY CONT L
 - b) To simulate the left engine is on, hold the Channel 2 switch to the TEST position on the left engine speed card (P50 panel).
 - 6) Simulate the right PRSOV is open and the right engine is on:
 - a) To simulate the right PRSOV is open, open these circuit breakers on the P11 panel:
 - <1> 11S19, ENG BLEED AIR SUPPLY IND R
 - <2> 11S20, ENG BLEED AIR SUPPLY CONT R
 - b) To simulate the right engine is on, hold the Channel 2 switch to the TEST position on the right engine speed card (P50 panel).
- (b) Make sure the ECS PACK H/L indication shows 'LO' for the RIGHT pack flow mode on the FMC ANALOG DISCR page 1.
- (c) Make sure the visual position indicator on the 'right' pack flow control valve moves to a less OPEN position than what was recorded during the 'High' flow mode test.
- (d) Make sure there are no air leaks at the coupling connections between the flow control valve and the ducting.

S 864-058

- (3) Do the applicable steps to return the airplane back to the pre-test configuration:
 - (a) Set the No.2 air/ground system relays back to the 'ground' mode (AMM 32-09-02/201).
 - (b) Move the R PACK selector to OFF position (P5 panel).
 - (c) PASSENGER AIRPLANES;
Push the R RECIRC FAN switch-light to off (P5 panel).
 - (d) Move the L PACK selector to OFF position (P5 panel).
 - (e) Re-connect the electrical connector, D2770, to the 'left' pack flow control valve.
 - (f) Close these circuit breakers on the P11 panel:
 - 1) 11S10, ENG BLEED AIR SUPPLY IND L

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- 2) 11S11, ENG BLEED AIR SUPPLY CONT L
 - 3) 11S19, ENG BLEED AIR SUPPLY IND R
 - 4) 11S20, ENG BLEED AIR SUPPLY CONT R
- (g) Return the Channel 2 test switch to the NORMAL position on the (left, right) engine speed card (P50 panel).
- H. Put the Airplane Back to Its Usual Condition

S 414-031

- (1) Close applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 414-032

- (2) If removed, install the flow control access panel, 194NR (AMM 06-41-00/201).

S 864-062

- (3) Remove pneumatic power if no longer required (AMM 36-00-00/201).

S 864-033

- (4) Remove the electrical power, if it is not needed (AMM 24-22-00/201).

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FLOW CONTROL AND SHUTOFF VALVE - CLEANING/PAINTING

1. General

A. This procedure has the following tasks:

- (1) Clean the flow control and shutoff valve. One valve is installed in each air cooling pack.

TASK 21-51-01-107-011

2. Clean the Flow Control and Shutoff Valve

A. Equipment

- (1) Compressed Air, Range 0 to 5 psig - commercially available
- (2) Spray gun, to apply the cleaning compound - commercially available

B. Consumable Materials

- (1) B00347 - Cleaning Compound, MIL-C-81302

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

D. Access

- (1) Location Zones
 - 135/136 Environmental Controls Systems (ECS) Bay
- (2) Access Panels
 - 193NL ECS access door (left)
 - 194LR ECS access door (right)
 - 194NR Flow Control and Shutoff Valve (right)

E. Prepare to Clean the Valve

S 867-001

- (1) To clean the left valve,
open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
 - (a) 11A13, PACK FLOW CONT L

S 867-002

- (2) To clean the right valve,
open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
 - (a) 11A26, PACK FLOW CONT R

S 017-003

- (3) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

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S 017-004

- (4) To clean the right valve, remove the access panel for the flow control valve, 194NR (AMM 06-41-00/201).

F. Clean the Valve

S 117-005

WARNING: DO NOT GET THE COMPOUND IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE COMPOUND. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE THE COMPOUND. KEEP THE COMPOUND AWAY FROM SPARKS, FLAME AND HEAT. THE COMPOUND IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (1) Use a spray gun to apply the compound to clean the valve.

S 117-006

- (2) Blow clean air on the valve until it is dry.
 - (a) Make sure the air pressure is not more than 5.0 psig.

G. Put the Airplane Back to its Usual Condition

S 867-007

- (1) For the left valve, remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P11 panel:
 - (a) 11A13, PACK FLOW CONT L

S 867-008

- (2) For the right valve, remove the DO-NOT-CLOSE tag and close this circuit breaker, on the P11 panel:
 - (a) 11A26, PACK FLOW CONT R

S 417-009

- (3) If you cleaned the right valve, install the access panel for the flow control valve, 194NR (AMM 06-41-00/201).

S 417-010

- (4) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

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HEAT EXCHANGERS AND PLENUM – REMOVAL/INSTALLATION

1. General

- A. The heat exchanger and plenum assembly includes the primary and secondary heat exchangers and the plenum. It is installed in the aft section of the air cooling pack, which is immediately forward of the front wheel wells for the main landing gear.
- B. Remove the heat exchanger and plenum assembly from the airplane as a unit. After you remove the assembly from the airplane, then you can disconnect the heat exchangers from the plenum. This procedure has instructions to remove and install the heat exchanger and plenum assembly.

NOTE: When the plenum is not removed, only the couplings connecting the plenum to the air cycle machine and ram air exhaust are supporting the plenum. While not recommended, if the plenum is properly supported, the heat exchangers can be removed without removing the plenum.

TASK 21-51-02-004-001

2. Remove the Heat Exchanger and Plenum Assembly (Fig. 401)

A. Equipment

- (1) A21001-44, Hoist Adapter – Air Conditioning Pack
Used with Hein-Werner or Blackhawk jack.
- (2) A21001-45, Hoist Adapter – Air Conditioning Pack
Used with A71015 engine accessory hoist fixture.
- (3) A71015-87, Lift Fixture – Engine Accessory
- (4) Transmission Jack – Hein-Werner Model 64, part No. 62005
Hein-Werner Corp., 1200 National Avenue, Waukesha, Wisconsin, 53186
- (5) Transmission Jack – Blackhawk Model 67554,
General Service Equip. Div., Applied Power Inc., P.O. Box 27207,
Milwaukee, Wisconsin 53227

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

C. Access

- (1) Location Zones
135/136 Environmental Control Systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

D. Prepare for the Removal

S 864-002

- (1) Put the L and R PACK selectors, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF lights come on.
 - (b) Put a DO-NOT-OPERATE tag on the selectors.

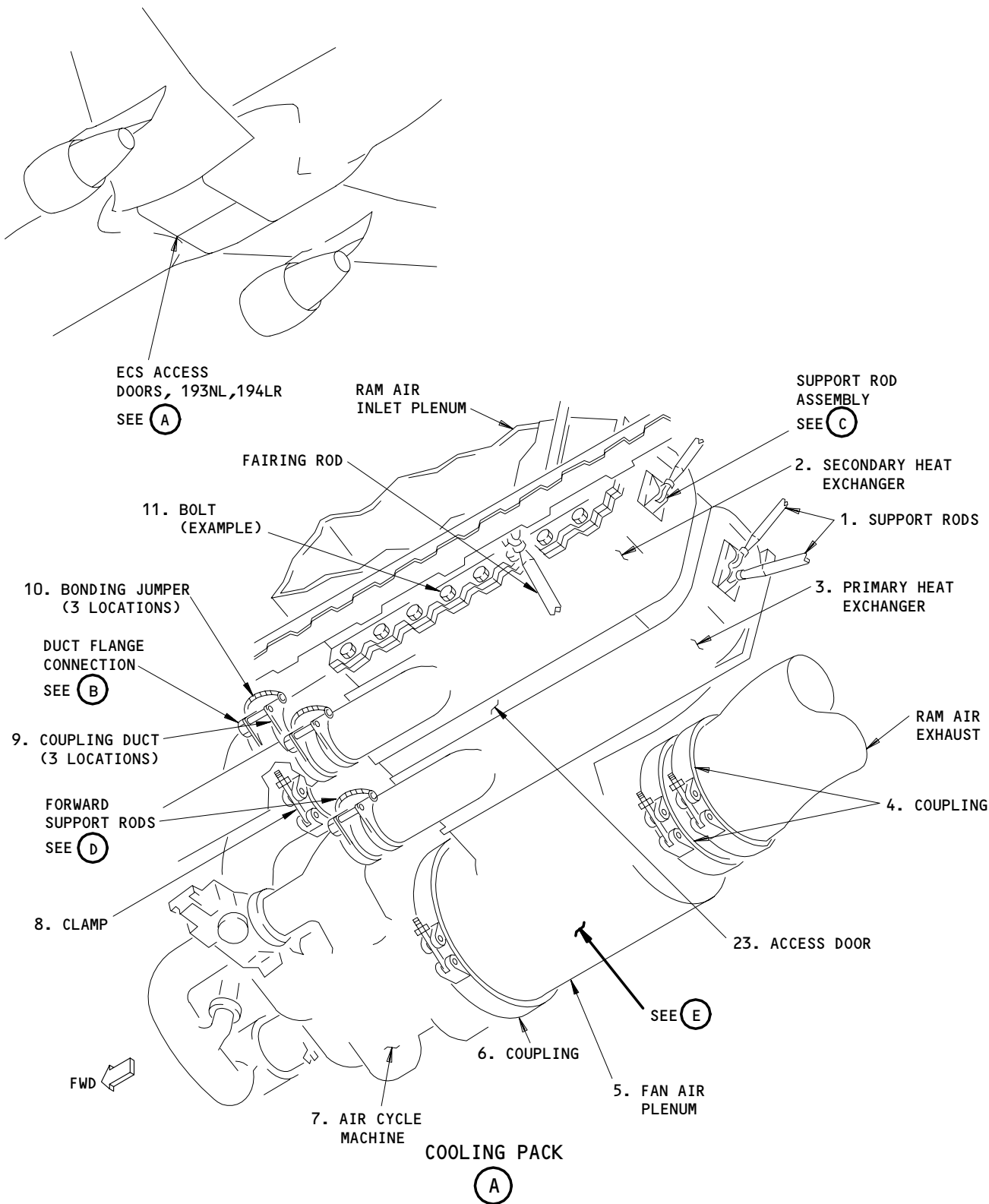
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Heat Exchangers
Figure 401 (Sheet 1)

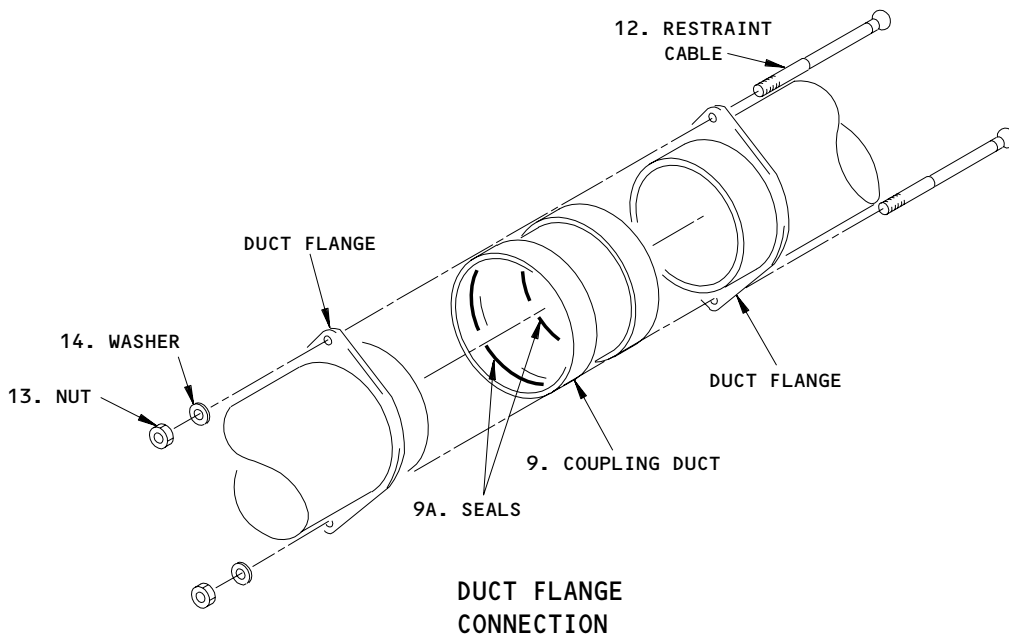
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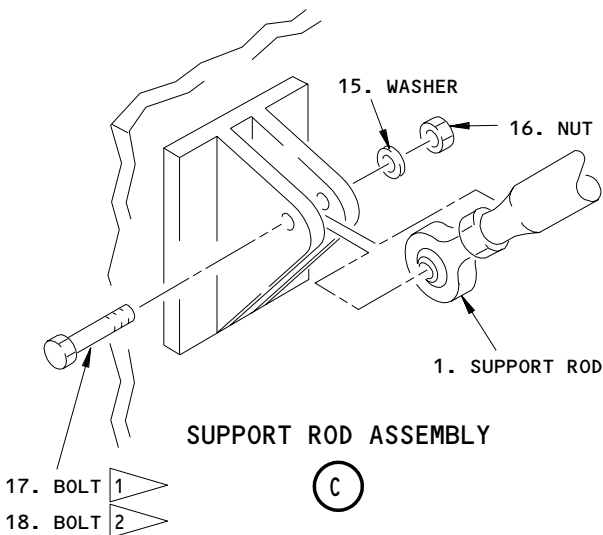
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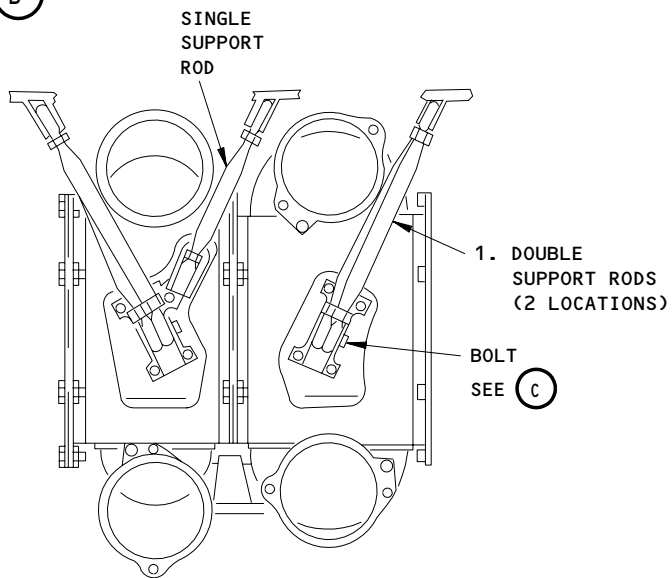
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(B)



(C)



FORWARD SUPPORT RODS

(D)

- 1 AFT SUPPORT ROD ASSEMBLY AND THE SINGLE ROD OF THE FORWARD SUPPORT ROD ASSEMBLY
- 2 DOUBLE RODS OF THE FORWARD SUPPORT ROD ASSEMBLY

Heat Exchangers
Figure 401 (Sheet 2)

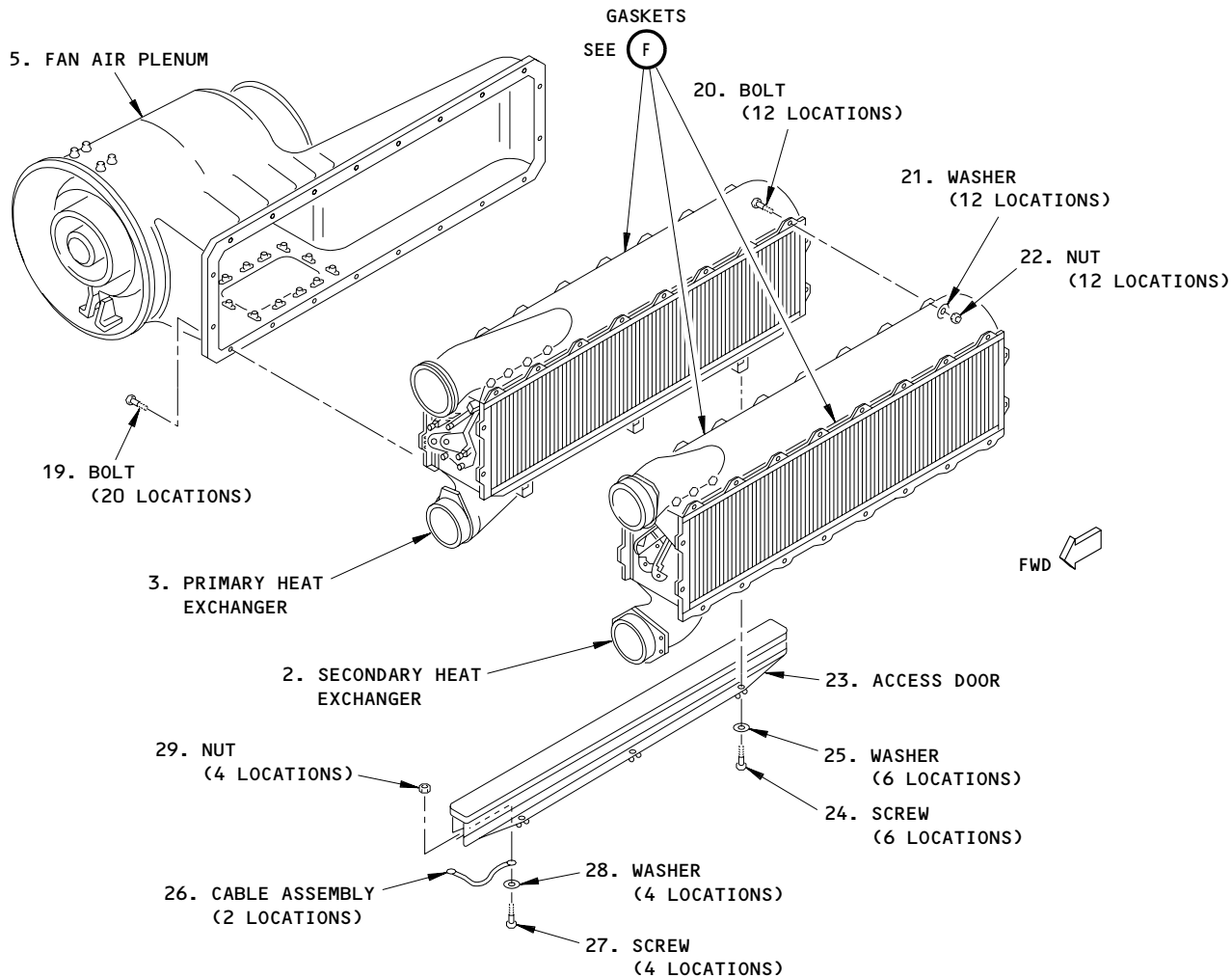
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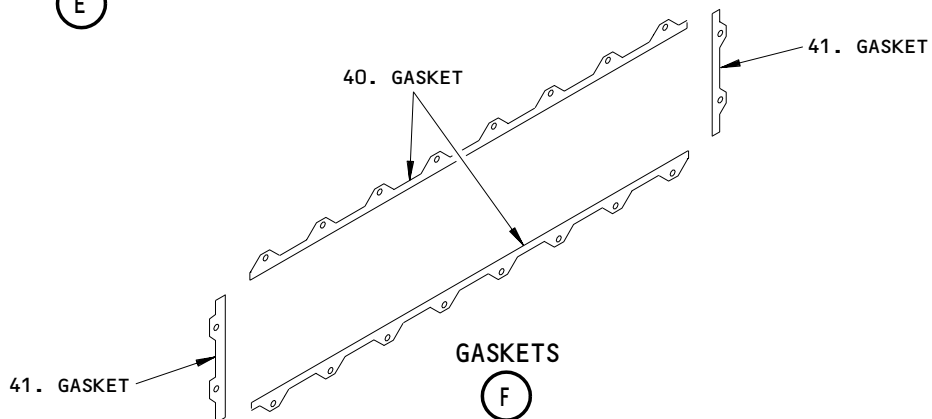
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FAN AIR PLENUM AND HEAT EXCHANGERS

(E)



Heat Exchangers
Figure 401 (Sheet 3)

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D17200

S 864-004

- (2) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
 - (a) To remove the left heat exchanger and plenum assembly:
 - 1) 11A13, PACK FLOW CONT L
 - 2) 11N10, LEFT PACK AUTO PWR
 - 3) 11N11, LEFT PACK AUTO CONT
 - 4) 11N24, LEFT PACK STANDBY PWR
 - 5) 11N25, LEFT PACK STANDBY CONT
 - (b) To remove the right heat exchanger and plenum assembly,
 - 1) 11A26, R PACK FLOW CONT
 - 2) 11N15, RIGHT PACK STANDBY PWR
 - 3) 11N16, RIGHT PACK STANDBY CONT
 - 4) 11N19, RIGHT PACK AUTO PWR
 - 5) 11N20, RIGHT PACK AUTO CONT

S 014-005

- (3) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

E. Remove the Heat Exchanger and Plenum Assembly

S 034-006

- (1) Disconnect the two lower ducts on the forward end of the heat exchangers (2, 3).
 - (a) Remove the bonding jumpers (10) from the two lower coupling ducts (9).
 - (b) Remove the locknuts (13) from the restraint cables (12) that hold the coupling ducts (9).
 - (c) Remove the coupling ducts (9) and the seals (9A) from the lower ducts.

S 034-007

- (2) Disconnect the top duct on the forward end of the secondary heat exchanger (2).
 - (a) Remove the bonding jumper (10) from the top coupling duct (9) of the secondary heat exchanger (2).
 - (b) Remove the locknuts (13) from the restraint cables (12) that hold the coupling duct (9).
 - (c) Remove the coupling duct (9) and seals (9A) from the top duct.

S 034-008

- (3) Remove the clamp (8) from the top duct on the forward end of the primary heat exchanger (3).

S 494-009

- (4) Put the hoist adapter on the transmission jack.

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S 494-010

- (5) Put the transmission jack into its position to hold the heat exchanger and plenum assembly.

NOTE: The hoist adapter goes between the heat exchangers.

S 034-011

- (6) Remove the coupling (6) on the forward end of the plenum (5).

S 034-012

- (7) Remove the coupling (4) on the aft end of the plenum (5).

S 034-013

- (8) Remove the bolts (11) that connect the secondary heat exchanger (2) to the ram-air inlet duct.

S 034-014

- (9) Remove the bolts (18) from the support rods (1) on the forward end of the heat exchangers (2, 3).

S 034-015

- (10) Remove the bolts (17) from the support rods (1) on the aft end of the heat exchangers (2, 3).

S 034-016

- (11) Move the support rods (11) away from the heat exchangers (2, 3).

S 024-017

- (12) Carefully lower the heat exchanger and plenum assembly.
(a) Remove the gaskets (40) and (41) from the ram air inlet side of the secondary heat exchanger (2).

S 024-018

- (13) To disconnect the heat exchangers (2, 3) from the plenum (5), remove the bolts (19) between the primary heat exchanger (3) and the plenum (5).
(a) Remove the gaskets (40) and (41) from the fan air plenum (5) side of the primary heat exchanger (3).

S 024-046

- (14) To remove the primary heat exchanger (3) from the secondary heat exchanger (2) do the steps that follow:
(a) Remove the screws (27), washers (28) and the nuts (29) to remove the cable assemblies (26) from the access door (23) that is between the primary (3) and the secondary heat exchanger (2).
(b) Remove the screws (24) and the washers (25) from the access door (23).
(c) Remove the access door (23).

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- (d) Remove the bolts (20), washers (21) and the nuts (22) that attach the primary heat exchanger (3) to the secondary heat exchanger (2).
- (e) Remove the primary heat exchanger (3).
- (f) Remove the gaskets (40) and (41) between the secondary heat exchanger (2) and primary heat exchanger (3).

TASK 21-51-02-404-019

3. Install the Heat Exchanger and Plenum Assembly (Fig. 401)

A. Equipment

- (1) A21001-44, Hoist Adapter - Air Conditioning Pack
Used with applicable Hein-Werner or Blackhawk jack.
- (2) A21001-45, Hoist Adapter - Air Conditioning Pack
Used with A71015 engine accessory hoist fixture.
- (3) A71015-87, Lift Fixture - Engine Accessory
- (4) Transmission Jack - Hein-Werner Model 64, part No. 62005
Hein-Werner Corp., 1200 National Avenue, Waukesha, Wisconsin, 53186
- (5) Transmission Jack - Blackhawk Model 67554,
General Service Equip. Div., Applied Power Inc., P.O. Box 27207,
Milwaukee, Wisconsin 53227

B. Consumables

- (1) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

C. Parts

- (1) Refer to the Illustrated Parts Catalog (IPC) for the part numbers and the effectivities of the items in the table that follows:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2	Heat Exchanger - Secondary	21-51-01	10	505
401	2	Heat Exchanger - Secondary	21-51-01	10	590
401	2	Heat Exchanger - Secondary	21-51-01	10A	765
401	3	Heat Exchanger - Primary	21-51-01	10	500
401	3	Heat Exchanger - Primary	21-51-01	10	585
401	3	Heat Exchanger - Primary	21-51-01	10A	760
401	5	Plenum - Fan Air	21-51-01	10	440
401	5	Plenum - Fan Air	21-51-01	10A	590
401	9A	Seal	21-51-01	10	155
401	9A	Seal	21-51-01	10A	280
401	40	Gasket	21-51-01	10	510
401	40	Gasket	21-51-01	10	512
401	40	Gasket	21-51-01	10A	770
401	41	Gasket	21-51-01	10	515
401	41	Gasket	21-51-01	10A	780
401	41	Gasket	21-51-01	10A	785

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D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 36-00-00/201, Pneumatic Power

E. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) bay
- (2) Access Panels
 - 193NL/194LR ECS bay access doors

F. Install the Heat Exchanger and Plenum Assembly

S 424-050

- (1) Install serviceable gaskets (40) and (41) on the ram air inlet side of the secondary heat exchanger (3).

S 434-047

- (2) If the primary heat exchanger (3) was removed from the secondary heat exchanger (2) do the steps that follow:
 - (a) Install serviceable gaskets (40) and (41) between the primary heat exchanger (3) and the secondary heat exchanger (2).
 - (b) Install the bolts (20), washers (21) and the nuts (22) to connect the primary heat exchanger (3) to the secondary heat exchanger (2).
 - 1) Make sure that the primary heat exchanger (3) aligns with the secondary heat exchanger (2).
 - (c) Install screws (24) and the washers (25) to attach the access door (23) to the primary heat exchanger (3) and the secondary heat exchanger (2).
 - (d) Install the screws (27), washers (28) and the nuts (29) to connect the cable assemblies (26) to the access door (23) and the secondary heat exchanger (2).

S 434-020

- (3) If the heat exchangers (2, 3) are disconnected from the plenum (5), do the steps that follow:
 - (a) Install serviceable gaskets (40) and (41) on the fan air plenum (5) side of the primary heat exchanger (3).

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- (b) Put the plenum (5) adjacent to the primary heat exchanger (3).
- (c) Install the bolts (19) to hold the plenum (5) to the primary heat exchanger (3).

S 494-021

- (4) Put the hoist adapter on the transmission jack.

S 494-022

- (5) Put the heat exchanger and plenum assembly on the hoist-adapter.

NOTE: The hoist adapter goes between the heat exchangers.

S 424-023

- (6) Use the transmission jack to lift the heat exchanger and plenum assembly into its position in the air cooling pack.

S 434-024

- (7) Put the forward and aft support rods (1) into the brackets on the forward and aft end of the heat exchangers (2, 3).

S 434-025

- (8) Install the bolts (17, 18), washers (15), and nuts (16) to hold the support rods in the brackets.

S 434-026

- (9) Install the coupling (6) on the forward end of the plenum (5).

S 434-027

- (10) Move part of the flexible hose to the aft end of the plenum (5).

S 434-028

- (11) Install the couplings (4) on the aft end of the plenum (5).

S 434-029

- (12) Install the bolts (11) that hold the secondary heat exchanger (2) to the ram-air inlet duct.

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S 434-030

- (13) Remove the hoist adapter and the transmission jack.

S 434-031

- (14) Install the clamp (8) to the top duct on the forward end of the primary heat exchanger (3).

S 434-032

CAUTION: DO NOT TIGHTEN THE CABLE TOO MUCH. IF YOU TIGHTEN THE CABLE TOO MUCH, YOU CAN CAUSE DAMAGE TO THE COUPLING OR THE DUCT WHEN YOU PRESSURIZE THE SYSTEM.

- (15) Install coupling ducts (9) and seals (9A) on the other three ducts on the forward end of the heat exchangers (2, 3).
- (a) Apply a thin layer of the anti-seize compound to the threads of the restraint cables (12).
 - (b) Install the restraint cables (12), washers (14), nuts (13), and the peri-seals (TBD).
 - (c) Tighten the restraint cables (12) equally until only the slack is removed from the restraint cable.
 - (d) Make sure the distance between the duct flanges is less than 2.65 inches (67 mm).
 - (e) Attach a bonding jumper (10) to each coupling duct.

G. Do the Installation Test for the Heat Exchanger and Plenum Assembly

S 864-039

- (1) If the left heat exchanger and plenum assembly was installed, remove the DO-NOT-CLOSE tag and close these circuit breakers on the P11 panel:
- (a) 11A13, PACK FLOW CONT L
 - (b) 11N10, LEFT PACK AUTO PWR
 - (c) 11N11, LEFT PACK AUTO CONT
 - (d) 11N24, LEFT PACK STANDBY PWR

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(e) 11N25, LEFT PACK STANDBY CONT

S 864-040

- (2) If the right heat exchanger and plenum assembly was installed, remove the DO-NOT-CLOSE tag and close these circuit breakers on the P11 panel:
- (a) 11A26, R PACK FLOW CONT
 - (b) 11N15, RIGHT PACK STANDBY PWR
 - (c) 11N16, RIGHT PACK STANDBY CONT
 - (d) 11N19, RIGHT PACK AUTO PWR
 - (e) 11N20, RIGHT PACK AUTO CONT

S 864-034

- (3) Supply electrical power (AMM 24-22-00/201).

S 864-035

- (4) Supply pneumatic power (AMM 36-00-00/201).

S 864-036

- (5) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.
- (a) Turn the applicable (L or R) PACK selector to the AUTO position.
 - (b) Make sure the PACK OFF light goes off.

S 794-049

WARNING: DO NOT PLACE YOUR HAND TOO CLOSE TO THE SOURCE OF THE LEAK. THE AIR FROM THIS LEAK WILL BE VERY HOT AND COULD BURN YOUR HAND.

- (6) Feel for leaks around the heat exchanger and plenum assembly.
- (a) A small leak is permitted.
 - (b) If there are leaks other than at the flange-to-duct joints and around the gaskets, replace the heat exchanger.

NOTE: Cracks at the flange-to-duct joint and around the tie-rods can be welded off-aircraft. You must remove the heat exchanger from the airplane before you weld any cracks in the heat exchanger.

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- (c) If there are leaks at the flange-to-duct joints, remove pneumatic pressure and turn the packs off, then loosen the couplings, realign the heat exchanger flange-to-duct joints, retighten the couplings, then do a check for leaks again.

NOTE: If leakage stills exists, replace the heat exchanger.

- (d) If there are leaks around the gaskets, replace the gaskets.
H. Put the airplane back to its usual condition

S 414-041

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-042

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 864-044

- (3) Remove the pneumatic power, if it is not necessary (AMM 36-00-00/201).

S 864-045

- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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HEAT EXCHANGERS AND PLENUM – INSPECTION/CHECK

1. General

- A. This procedure has instructions to examine the primary and secondary heat exchangers for cleanliness and damage. Each air cooling pack has a primary and a secondary heat exchanger.

TASK 21-51-02-206-020

2. Examine the Secondary and Primary Heat Exchangers

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-51-02/401, Heat Exchangers
- (3) AMM 21-51-02/701, Heat Exchangers
- (4) AMM 24-22-00/201, Electrical Power Control
- (5) AMM 36-00-00/201, Pneumatics – General

B. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
 - 193NL/194LR ECS access doors

C. Prepare for the Inspection

S 866-022

- (1) Supply electrical power (AMM 24-22-00/201).

S 866-001

- (2) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.

S 016-003

- (3) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Do the Inspection

S 216-004

- (1) Make sure the mounting brackets and support rods are not loose.

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- S 216-005
- (2) Make sure the mounting brackets and the support rods do not have a crack in them.
- S 216-006
- (3) Tighten the bolts in the support rods.
- S 216-007
- (4) Look for the dents, cracks and holes on the outer surface and the flanges of the heat exchangers.
- (a) If the damage causes the airflow to be decreased or if there is a leak, replace the heat exchangers (AMM 21-51-02/401).
- S 216-008
- (5) Look for damage or signs of a leak at the coupling ducts.
- (a) If a leak has occurred, align and tighten the couplings.
- S 216-009
- (6) Examine the restraint cables and the bonding jumpers.
- (a) Replace the restraint cables and the bonding jumpers that are damaged.
- CAUTION:** DO NOT TIGHTEN THE CABLE TOO MUCH. IF YOU TIGHTEN THE CABLE TOO MUCH, YOU CAN CAUSE DAMAGE TO THE COUPLING OR THE DUCT WHEN YOU PRESSURIZE THE SYSTEM.
- (b) Tighten the restraint cables if they are loose or if the distance between the flanges is larger than 2.65 inches (67 mm).
- 1) Make sure you tighten the restraint cables equally until only the slack is removed from the cable.
- (c) Tighten the bolts for the bonding jumpers.
- S 216-010
- (7) Open the access door in the ram-air inlet duct.
- (a) Look at the secondary heat exchanger to make sure it is clean and none of the fins are bent.
- 1) If the heat exchanger has contamination in it, clean it (AMM 21-51-02/701)
- 2) If the fins are bent, repair them.

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S 416-024

- (8) Close the access door in the ram-air inlet duct.

S 216-011

- (9) Open the access door in the fan plenum.
- (a) Look at the primary heat exchanger to make sure it is clean and none of the fins are bent.
- 1) If the primary heat exchanger has contamination in it, do these steps:
- a) Remove both heat exchangers and plenum assembly (AMM 21-51-02/401).
- b) Remove the primary heat exchanger from the secondary heat exchanger and plenum assembly (AMM 21-51-02/401).

NOTE: The primary heat exchanger must be cleaned off aircraft. This is due to the possibility of damaging the primary heat exchanger fins which are more fragile than the secondary heat exchanger fins.

- c) Return the primary heat exchanger to the shop to be cleaned off-aircraft.
- d) Install a new primary heat exchanger to the secondary heat exchanger and plenum assembly, or one that was previously cleaned off-aircraft and is serviceable.
- e) Re-install both heat exchangers and plenum assembly (AMM 21-51-02/401).
- 2) If the fins are bent, repair them.

S 416-025

- (10) Close the access door in the fan plenum.
- E. Make sure the heat exchangers do not have leaks.

S 866-012

- (1) Supply pneumatic power (AMM 36-00-00/201).

S 866-013

- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
- (a) Turn the PACK selector to the AUTO position.

S 796-015

- (3) Examine for leaks around the heat exchangers as follows:

WARNING: DO NOT PLACE YOUR HAND TOO CLOSE TO THE SOURCE OF THE LEAK. THE AIR FROM THIS LEAK WILL BE VERY HOT AND COULD BURN YOUR HAND.

- (a) Feel for leaks around the heat exchangers.
- (b) Small leaks are permitted.

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- (c) If there are leaks other than at the flange-to-duct joints and around the gaskets, replace the heat exchanger.

NOTE: Cracks at the flange-to-duct joint and around the tie-rods may be welded off-aircraft. Welding cannot be done with the heat exchanger on the airplane. Remove the heat exchanger before doing any welding.

- (d) If there are leaks at the flange-to-duct joints, realign the heat exchanger and retighten the couplings. Check for leaks. If the leak is still there, replace the heat exchanger.

- (e) If there are leaks around the gaskets, replace the gaskets.

F. Put the airplane back to its usual condition

S 416-019

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 866-016

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 866-018

- (3) Remove the pneumatic power, if it is not necessary (AMM 36-00-00/201).

S 866-021

- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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HEAT EXCHANGERS AND PLENUM – CLEANING/PAINTING

1. General

- A. This procedure contains two tasks. You can use this task to clean the primary heat exchanger or the secondary heat exchanger if it is dirty.

TASK 21-51-02-107-034

2. Clean the Primary Heat Exchanger (Fig. 701)

A. References

- (1) AMM 21-51-02/401, Heat Exchangers

B. Procedure

S 027-035

- (1) Remove the Primary Heat Exchanger (AMM 21-51-02/401).

S 107-036

- (2) Return the primary heat exchanger to the shop to be cleaned off-aircraft.

S 427-037

- (3) Install a new primary heat exchanger or one that was previously cleaned off-aircraft and is serviceable (AMM 21-51-02/401).

TASK 21-51-02-107-001

3. Clean the Secondary Heat Exchanger (Fig. 701)

A. General

CAUTION: DO NOT USE THIS PROCEDURE TO CLEAN THE PRIMARY HEAT EXCHANGER. DAMAGE TO THE PRIMARY HEAT EXCHANGER CORE FINS WILL OCCUR. IF THE PRIMARY HEAT EXCHANGER NEEDS TO BE CLEANED, YOU MUST REMOVE THE PRIMARY HEAT EXCHANGER FROM THE AIRPLANE AND CLEAN IT PER THE VENDOR COMPONENT MAINTENANCE MANUAL.

- (1) This procedure uses compressed air to clean the secondary heat exchanger. You can use this procedure to remove dirt, sand and/or gravel from the secondary heat exchanger.

B. Equipment

- (1) Cleaning Wand Equipment – Heat Exchanger, B21005-1 (alternate), B21005-10 (preferred)
(a) Cleaning Wand – Inlet, B21005-3 (preferred)
(b) Cleaning Wand – Outlet, B21005-2 (alternate), B21005-11 (preferred)
- (2) Air compressor (80 to 100 psi) commercially available
- (3) Spray gun – commercially available
- (4) Steam Cleaner, 80 to 100 psi (alternate) – commercially available

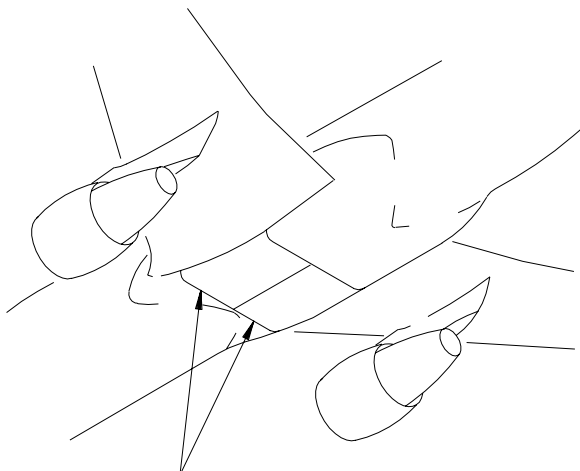
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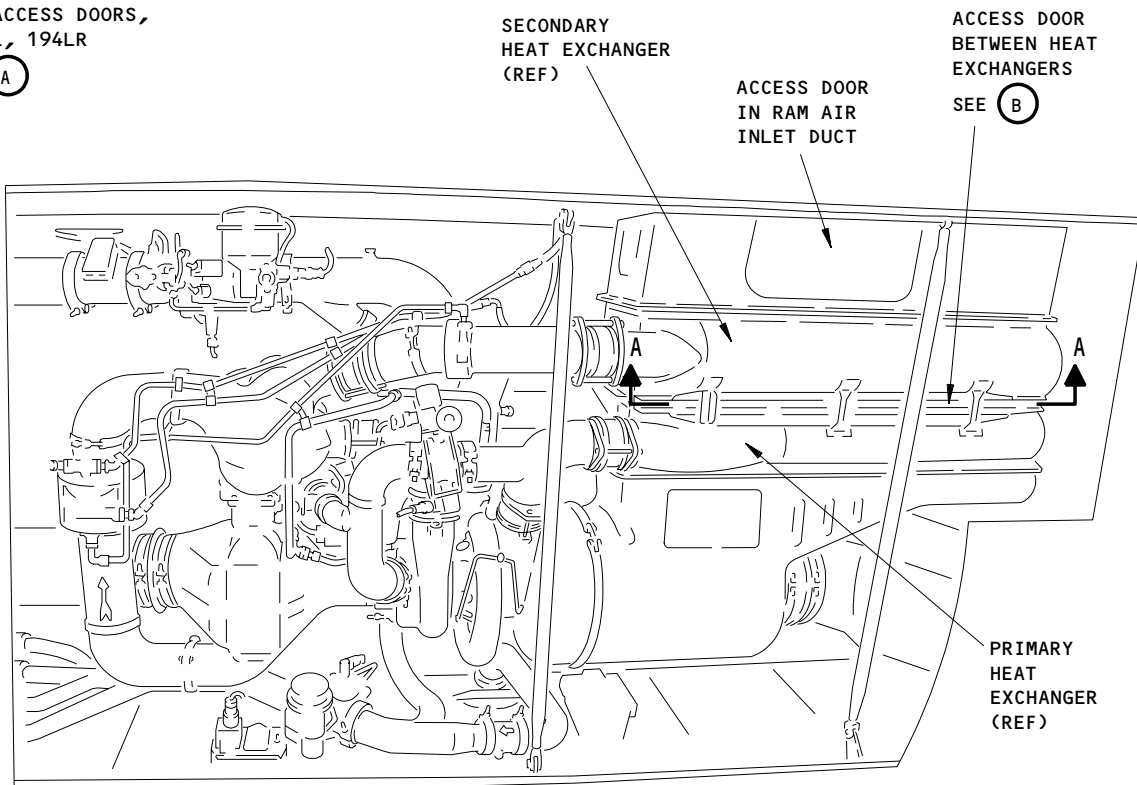
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ECS ACCESS DOORS,
193NL, 194LR
SEE (A)



FWD ←

LEFT COOLING PACK
(RIGHT COOLING PACK EQUIVALENT)

(A)

Heat Exchangers Cleaning
Figure 701 (Sheet 1)

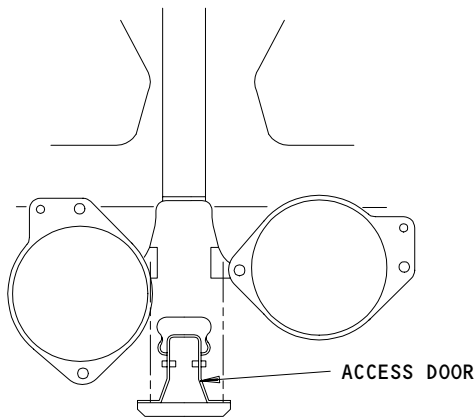
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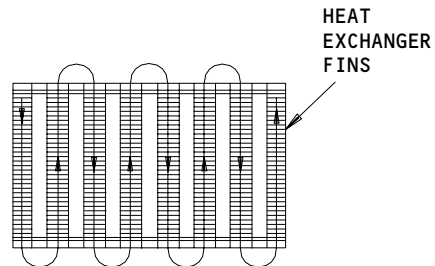
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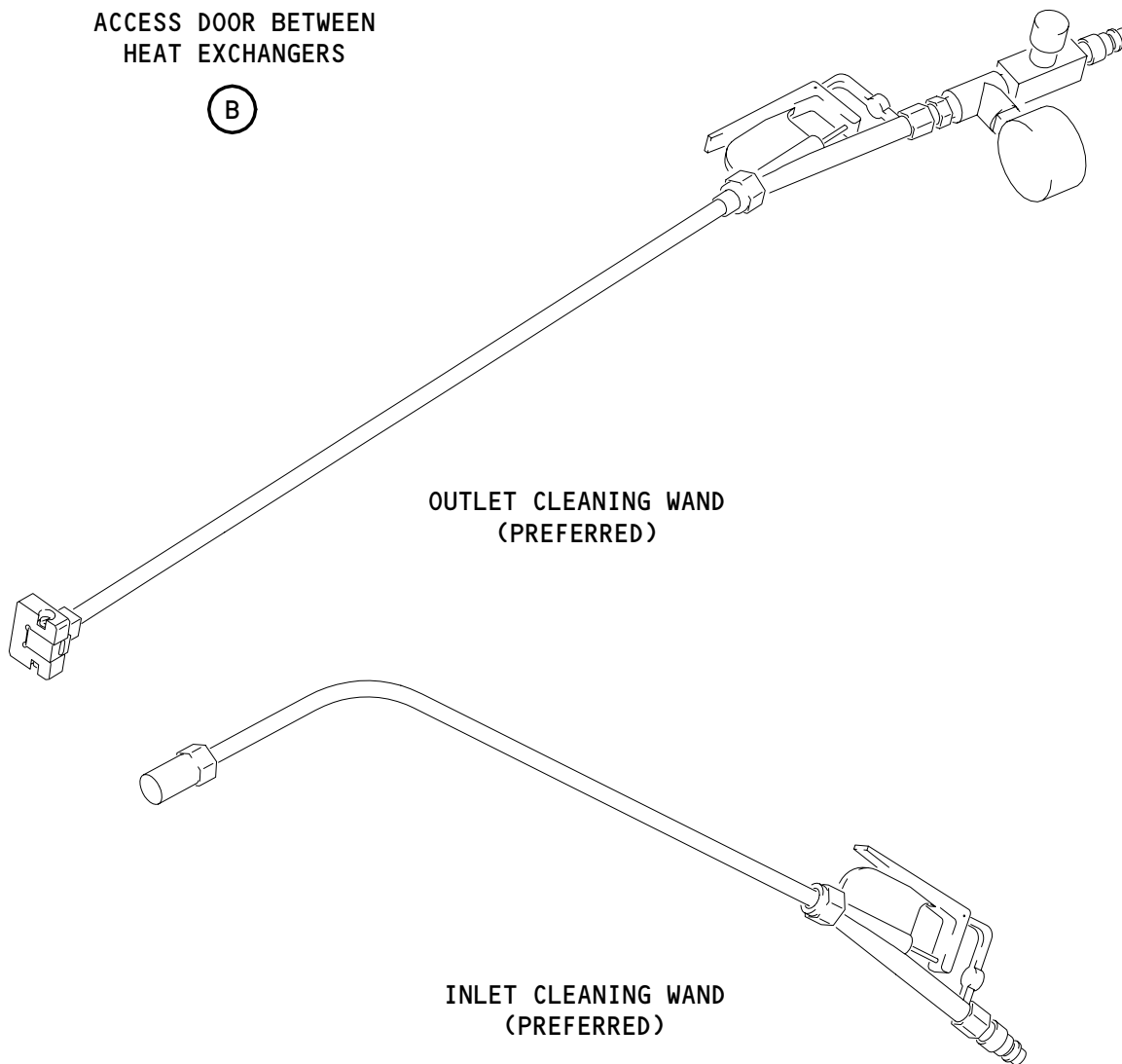


ACCESS DOOR BETWEEN
HEAT EXCHANGERS

(B)



SUGGESTED CLEANING PATH
(SIDE VIEW OF HEAT EXCHANGER FINS)
A-A



Heat Exchangers Cleaning
Figure 701 (Sheet 2)

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C. Consumable Materials

- (1) B00074 Solvent - Degreasing, MIL-PRF-680 (Supersedes P-D-680)

NOTE: The solvent is used for the alternate cleaning procedure.

D. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

E. Access

- (1) Location Zones
135/136 Environmental Control Systems (ECS) Bay
(2) Access Panels
193NL/194LR ECS Bay Access Doors

F. Prepare to Clean the Secondary Heat Exchanger

S 867-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the PACK OFF light is on.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 017-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 017-023

- (3) Remove the access door that is found in the ram air inlet duct.

S 017-024

- (4) Remove the access door that is found between the primary heat exchanger and the secondary heat exchanger.

G. Clean the Secondary Heat Exchanger (preferred)

S 117-019

- (1) Do these steps to clean the secondary heat exchanger:
(a) Attach the outlet cleaning wand to the compressed air source.

CAUTION: MAKE SURE THE AIR PRESSURE GAGE DOES NOT MEASURE MORE THAN 80 PSI DURING OPERATION OF THE TOOL. IF THE AIR PRESSURE GAGE MEASURES MORE THAN 80 PSI, THE CORE FINS OF THE HEAT EXCHANGER CAN BE DAMAGED.

- (b) Use the outlet cleaning wand to blow air at the outlet side of the secondary heat exchanger.

NOTE: Make sure the air pressure gage on the cleaning wand does not measure more than 80 Psi during operation of the tool. Also, follow the suggested cleaning path shown in Fig. 701.

- (c) Attach the inlet cleaning wand to the compressed air source.

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CAUTION: DO NOT PUT THE TIP OF THE INLET CLEANING WAND INTO THE HAIL SCREEN OF THE HEAT EXCHANGER. THE CORE FINS OF THE HEAT EXCHANGER ARE EASILY DAMAGED. IF THE CORE FINS ARE DAMAGED, THE HEAT EXCHANGER WILL NOT OPERATE CORRECTLY.

- (d) Use the inlet cleaning wand to blow air at the inlet side of the secondary heat exchanger.

NOTE: Quickly move the cleaning wand back and forth and side to side. This helps to loosen any dirt, sand and/or gravel that may be stuck. Also, follow the suggested cleaning path in Fig. 701.

- (e) Attach the outlet cleaning wand to the compressed air source.

CAUTION: MAKE SURE THE AIR PRESSURE GAGE DOES NOT MEASURE MORE THAN 80 PSI DURING OPERATION OF THE TOOL. IF THE AIR PRESSURE GAGE MEASURES MORE THAN 80 PSI, THE CORE FINS OF THE HEAT EXCHANGER CAN BE DAMAGED.

- (f) Use the outlet cleaning wand to blow air at the outlet side of the secondary heat exchanger.

NOTE: Make sure the air pressure gage on the cleaning wand does not measure more than 80 Psi during operation of the tool. Also, follow the suggested cleaning path shown in Fig. 701.

- (g) Do the above steps again as necessary until the secondary heat exchanger is clean.

NOTE: To determine if the heat exchanger is clean, put your hand on the opposite side of the heat exchanger that is being cleaned. While you blow air through the fins of the heat exchanger, feel for sand and/or gravel that exits the other side. If you do not feel any sand and/or gravel, the heat exchanger is clean.

- (h) Make sure you remove any loose dirt, sand and/or gravel from the ram air inlet, and from between the heat exchangers.

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H. Clean the Secondary Heat Exchanger (alternate)

NOTE: The equipment used in this procedure can cause the core fins on the outlet side of the secondary heat exchanger to bend. Use a mirror and a flashlight during this procedure to see if the core fins become bent. Do not continue to use this procedure if the core fins become bent or if the secondary heat exchanger is not fully cleaned with this procedure. Use the preferred procedure for cleaning the secondary heat exchanger or remove the secondary heat exchanger and clean it per the vendor component maintenance manual.

S 867-032

WARNING: DO NOT BREATHE THE FUMES FROM THE SOLVENT AND DO NOT LET THE SOLVENT TOUCH YOUR SKIN. KEEP THE SOLVENT AWAY FROM FLAMES, HEAT, OR SPARKS. THE SOLVENT IS POISONOUS AND FLAMMABLE, AND CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (1) If you use solvent to clean the heat exchanger, do the steps that follow:
 - (a) Attach the spray gun and the solvent to the air compressor.
 - (b) Attach the spray nozzle to the spray gun.

S 867-029

- (2) If you use steam to clean the heat exchanger, do this step:
 - (a) Attach the spray nozzle to the steam cleaner.

S 147-028

- (3) Do these steps to clean the heat exchanger:

CAUTION: DO NOT RUB OR TOUCH THE CORE FINS WHEN YOU CLEAN THE HEAT EXCHANGER. THE CORE FINS CAN BE DAMAGED EASILY. IF THE CORE FINS ARE DAMAGED, THE HEAT EXCHANGER WILL NOT OPERATE CORRECTLY.

- (a) Put the air nozzle through the access opening between the heat exchangers.
 - 1) Blow air through the secondary heat exchanger (back flush).
- (b) Put the spray nozzle through the access opening in the ram air inlet duct.
 - 1) Move the spray nozzle in the direction of the cleaning path shown in Figure 701, to clean the secondary heat exchanger.
- (c) Put the air nozzle through the access opening in the ram air inlet duct.
 - 1) Blow air through the secondary heat exchanger until it is dry.

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I. Put the airplane back to its usual condition.

S 417-015

- (1) Install the access door in the ram air inlet duct.

S 417-026

- (2) Install the access door that goes between the heat exchangers.

S 417-016

- (3) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 867-017

- (4) Remove the DO-NOT-OPERATE tag from the L and R PACK selectors, on the P5 panel.

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AIR CYCLE MACHINE – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the air cycle machines. One air cycle machine is installed in each air cooling pack. The air cycle machine has three parts: the turbine, the compressor, and the fan.

TASK 21-51-03-004-001

2. Remove the Air Cycle Machines (Fig. 401, 402)

A. Equipment

- (1) A21001-44, Hoist Adapter – Air Conditioning Pack, Used with applicable Hein-Werner or Blackhawk jack.
- (2) A21001-45, Hoist Adapter – Air Conditioning Pack, Used with A71015 engine accessory hoist fixture.
- (3) A71015-87, Lift Fixture – Engine Accessory
- (4) Transmission Jack – Hein-Werner model 64, Part No. 62005, Hein-Werner Corp., 1200 National Avenue, Waukesha, Wisconsin 53186
- (5) Transmission Jack – Blackhawk Model 67554, General Service Equip. Div., Applied Power Inc., P.O. Box 27207, Milwaukee, Wisconsin 53227

B. References

- (1) AMM 06-41-00/201, Fuselage (Major Zone 100 and 200) Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 36-00-00/201, Pneumatic – General

C. Access

- (1) Location Zones
135/136 Environmental control systems bay
- (2) Access Panels
193NL/194LR Environmental Control Systems (ECS) bay

D. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilots overhead control panel P5, to OFF.
 - (a) Make sure the PACK OFF light is on.
 - (b) Attach a DO-NOT-OPERATE tag to the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

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S 034-005

- (3) Remove the support bar (16) from below the air cycle machine (5).
E. Remove the temperature control valve (2), the bypass duct (1), and the compressor inlet duct (3) as one assembly.

S 024-062

- (1) Disconnect the electrical connectors and the bonding jumpers from the temperature control valve (2).

S 024-063

- (2) Remove the coupling (6) and packing (6A) between the low limit valve and the mix muff inlet duct (1).

S 024-064

- (3) Remove the clamp (25), half-shells (26), and seal (27) from the air cycle machine (5) turbine outlet and mix muff inlet duct (1).

S 024-065

- (4) Remove the heat exchanger coupling (4) from the compressor inlet duct and primary heat exchanger.
(a) Remove the bolt (40), washers (39), washer (37), and nut (36) to disconnect bonding jumper (38) from the heat exchanger coupling (4).
(b) Remove nuts (35) and washers (34) to disconnect restraint cables (31) from heat exchanger coupling (4).
(c) Remove heat exchanger coupling (4) and seals (33).

S 024-066

- (5) Remove the compressor inlet coupling (17) from the air cycle machine (5).
(a) Remove nuts (35) and washers (34) to disconnect restraint cables (31) from compressor inlet coupling (17).
(b) Remove compressor inlet coupling (17) and seals (33).

S 024-067

- (6) Lower the temperature control valve (2), the mix muff inlet duct (1), and the compressor inlet duct (3) as one assembly away from the air cycle machine (5).
F. Remove the air cycle machine.

S 094-007

- (1) Install the hoist-adaptor and the transmission jack to hold the air cycle machine.

S 034-008

- (2) Remove the turbine inlet coupling (18) from the air cycle machine (5).
(a) Remove nuts (35) and washers (34) to disconnect restraint cables (31), bonding jumper (38) and bonding jumper (41) from turbine inlet coupling (18).

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- S 034-009
(3) Remove turbine inlet coupling (18) and seals (33).

- S 034-010
(4) Remove the compressor outlet coupling (19) from the air cycle machine (5).
(a) Remove nuts (35) and washers (34) to disconnect restraint cables (31) from compressor outlet coupling (19).
(b) Remove compressor outlet coupling (19) and seals (33).

- S 034-011
(5) Remove the condensor coupling (28), shell (29), and seal (30) from the air cycle machine (5).

- S 034-012
(6) Remove the elbows (22) and the O-rings (23) to disconnect the hot air outlet line (20), the pressure sense line (21) and the hot air inlet line (24) from the ACM turbine.
(a) Put an identification tag on the lines.

- S 034-013
(7) Remove the plenum coupling (11).

- S 034-014
(8) Remove bolt (8), washer (9), and nut (10) to disconnect the support rod (7) from the air cycle machine (5).

- S 024-015
(9) Lower the air cycle machine (5) away from the ECS bay.

- S 434-055
(10) Put a cover on the duct openings.
G. If you removed the Air Cycle Machine because it will not turn, you can try to repair it with these steps:

NOTE: Contamination of the ACM turbine thrust bearing can cause the ACM impeller shaft not to turn freely or to stop. This procedure will make sure that the ACM impeller shaft can turn freely.

- S 824-051
(1) Put the ACM in a horizontal position.

- S 984-052
(2) Torque the impeller shaft (at the turbine end of the ACM) in the clockwise direction to see if the impeller shaft turns.
(a) Make sure that the breakaway torque value to turn the impeller shaft is less than 90 inch-pounds.

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S 984-053

CAUTION: DO NOT TURN THE IMPELLER SHAFT MORE THAN TWO ROTATIONS. IF YOU CONTINUE TO TURN THE IMPELLER SHAFT YOU CAN DAMAGE THE BEARINGS.

- (3) Make sure that you can continue to turn the impeller shaft at a torque value which is less than 35 inch-pounds.

NOTE: The ACM must be replaced if the torque value at which the impeller shaft continues to turn is more than 35 inch-pounds.

H. Cooling Pack Water Removal/Ice Protection Inspection

NOTE: Do this test if you could not repair the ACM with the above torquing procedure.

S 214-056

- (1) Make sure the outer side of the reheater does not have any bulges or damage.

NOTE: If the reheater has more than 3000 hours and is not P/N 194274-3 Series 3 or 194274-4, it is recommended that you rework the reheater per Allied-Signal SB 194274-21-2475.

- (a) Replace the reheater if it is damaged (AMM 21-51-07/401).

S 214-057

- (2) Examine the water extractor and the reheater:
- (a) Remove the water extractor (AMM 21-51-04/401).
 - (b) Use a mirror and a flashlight to make sure the vane end cap is on the water extractor.
 - (c) Look at the inlet of the reheater to make sure the fins do not have any damage or corrosion and the side plate is not separated.

NOTE: It is permitted for the fins to have dark soot on them.

- (d) Replace the water extractor if it is damaged or install the water extractor that was removed if it is serviceable (AMM 21-51-04/401).

TASK 21-51-03-404-016

3. Install the Air Cycle Machine (Fig. 401, 402, 403)

A. Equipment

- (1) A21001-44, Hoist Adapter - Air Conditioning Pack,
Used with applicable Hein-Werner or Blackhawk jack.

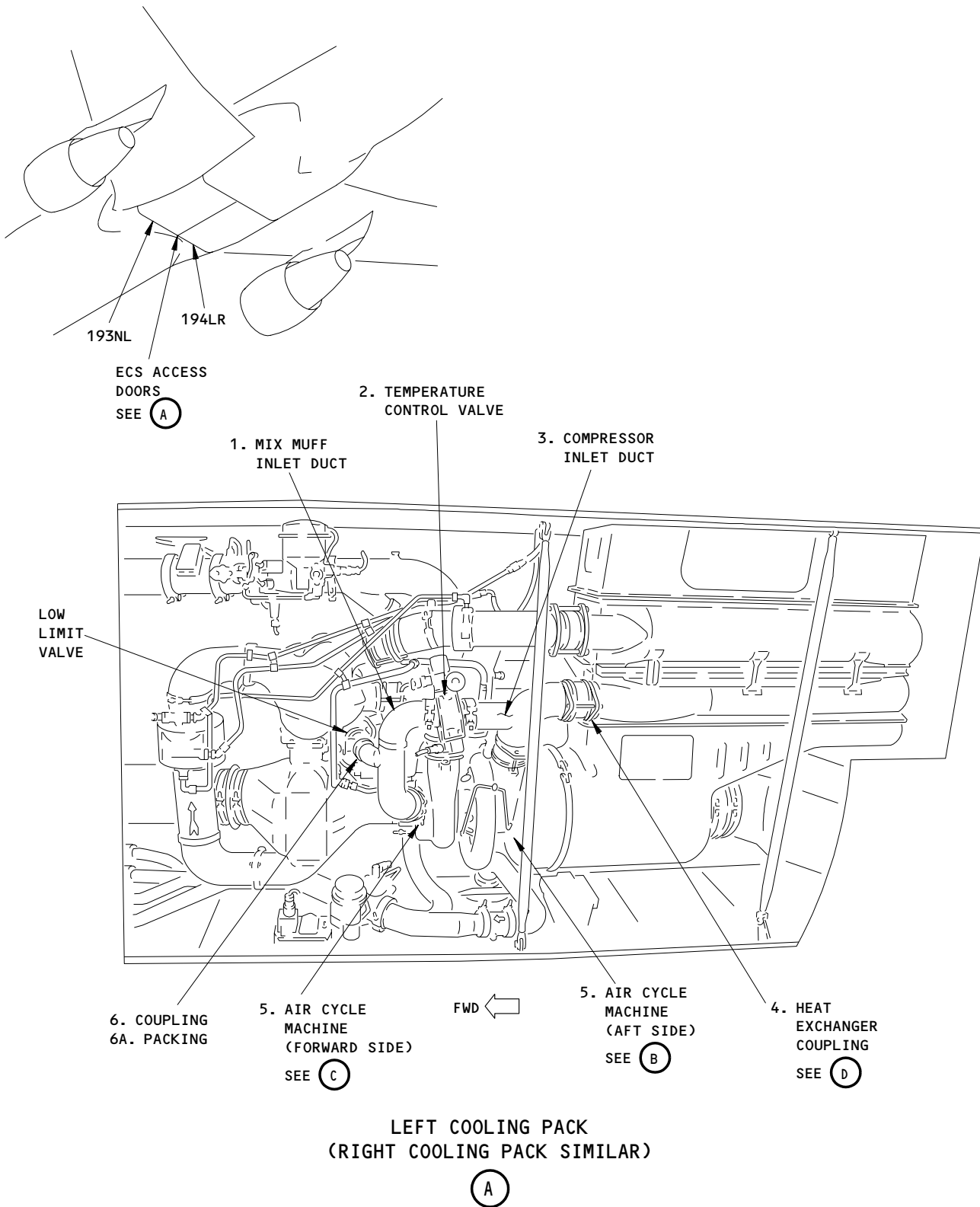
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Air Cycle Machine Installation
Figure 401 (Sheet 1)

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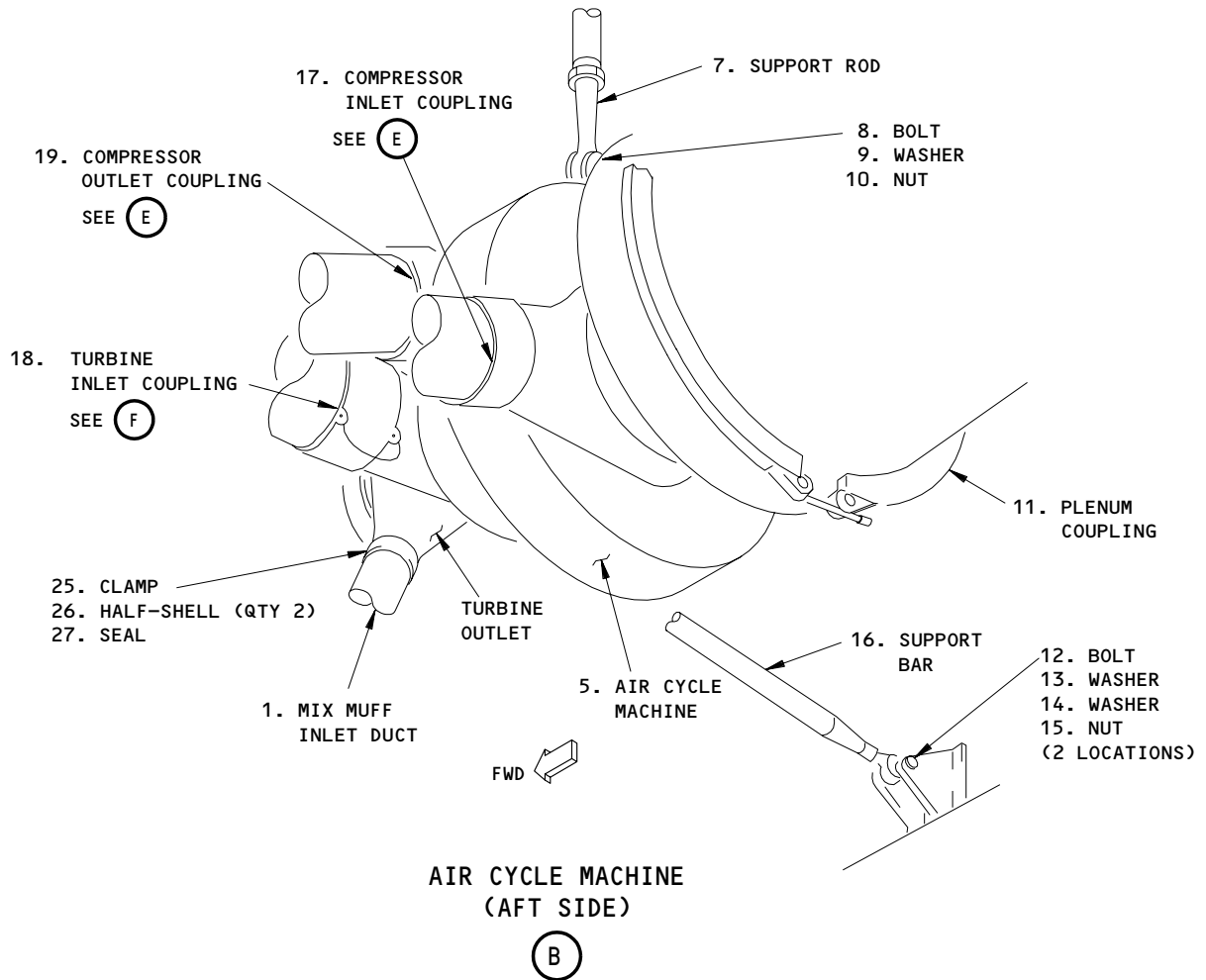
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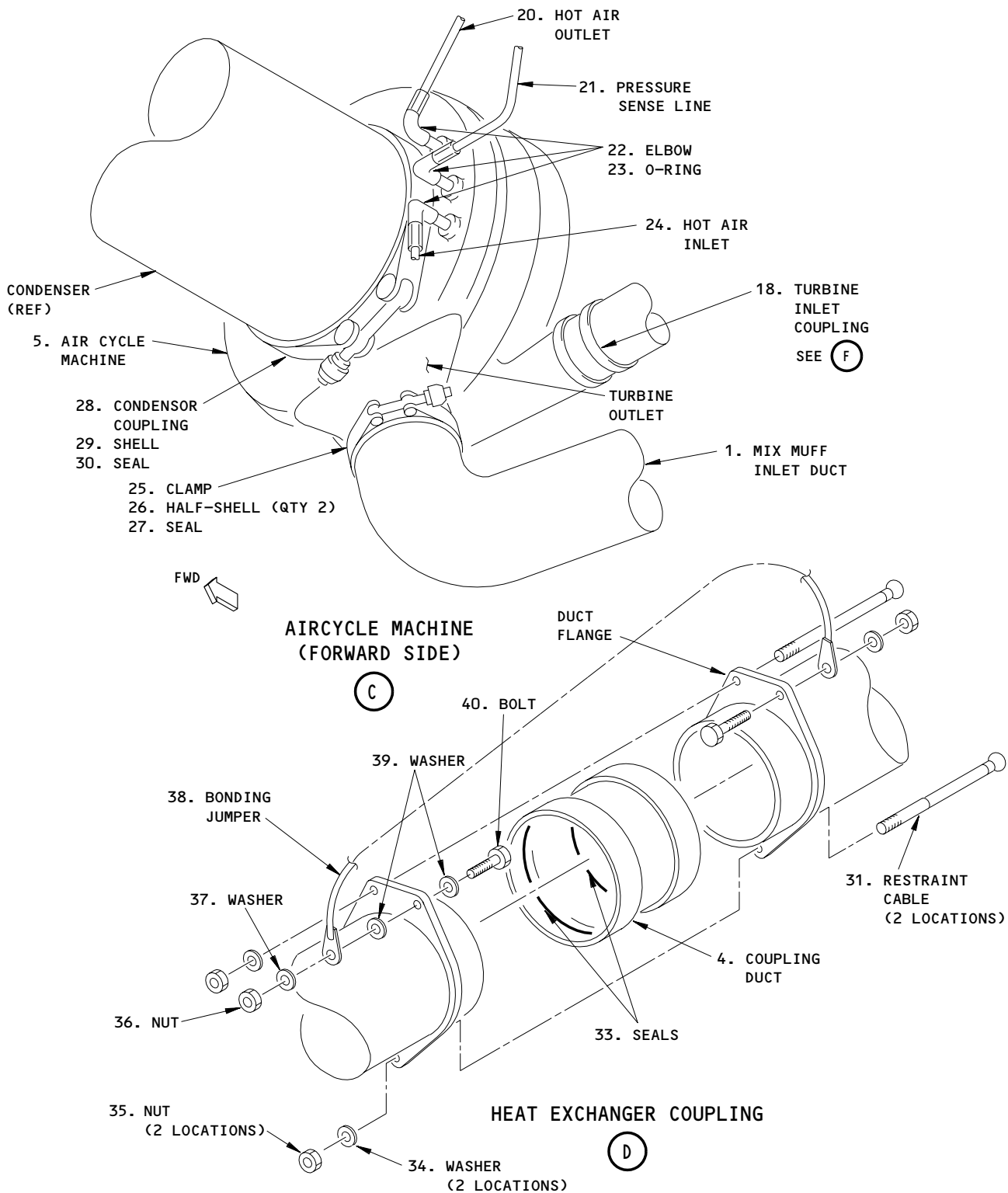
Air Cycle Machine Installation
Figure 401 (Sheet 2)

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Air Cycle Machine Installation
Figure 401 (Sheet 3)

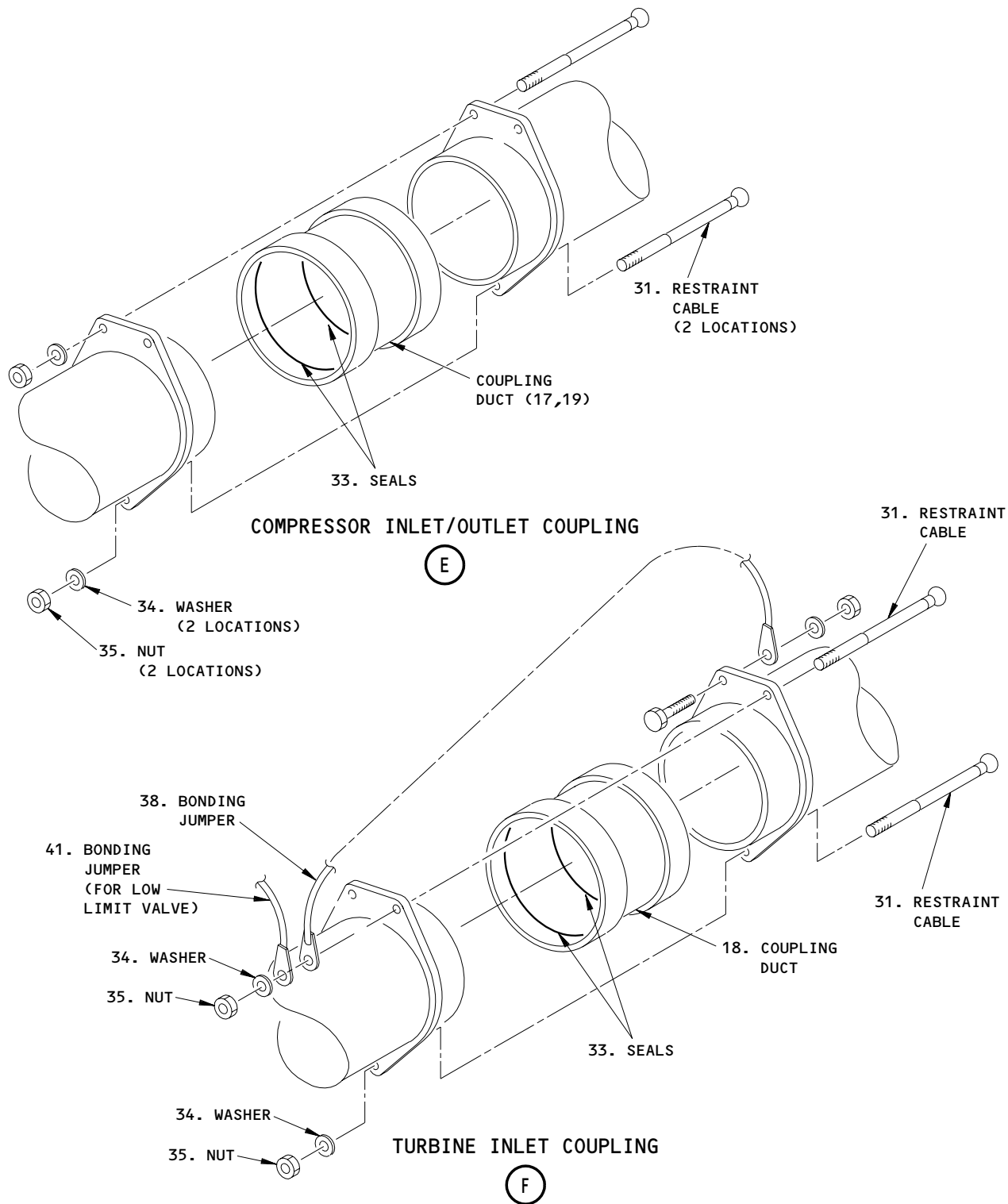
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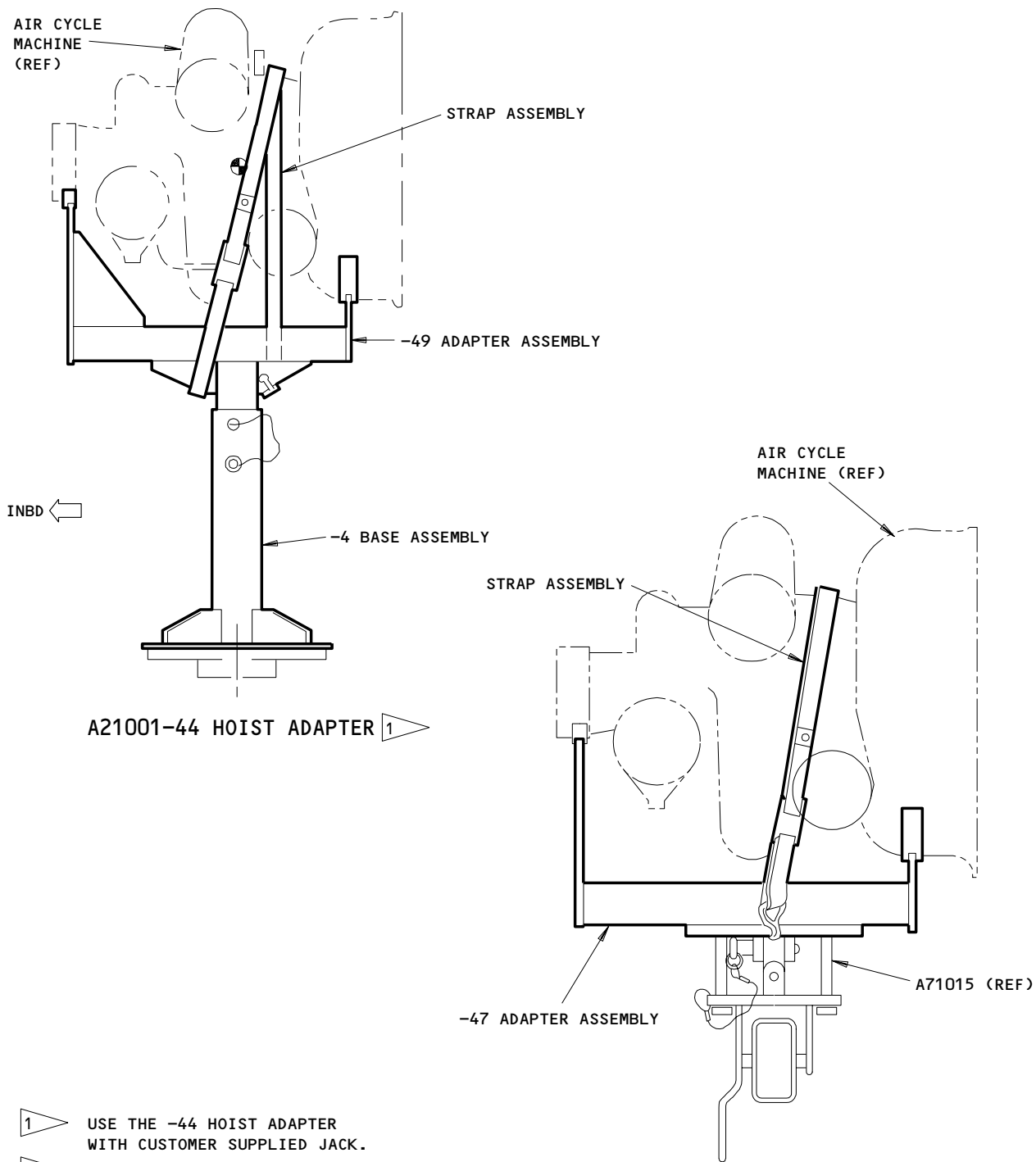
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Air Cycle Machine Installation
Figure 401 (Sheet 4)

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A21001-44 HOIST ADAPTER 1

A21001-45 HOIST ADAPTER 2

- 1 USE THE -44 HOIST ADAPTER WITH CUSTOMER SUPPLIED JACK.
- 2 USE THE -45 HOIST ADAPTER WITH A71015 LIFT FIXTURE.

Air Conditioning Pack Hoist Adapter
Figure 402

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- (2) A21001-45, Hoist Adapter - Air Conditioning Pack, Used with A71015 engine accessory hoist fixture.
- (3) A71015-87, Lift Fixture - Engine Accessory
- (4) Transmission Jack - Hein-Werner model 64, Part No. 62005, Hein-Werner Corp., 1200 National Avenue, Waukesha, Wisconsin 53186
- (5) Transmission Jack - Blackhawk model 67554, General Service Equip. Div., Applied Power Inc., P.O. Box 27207, Milwaukee, Wisconsin 53227

B. Consumables

- (1) D00386, Anti-seize compound, MIL-L-23398
- (2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N (High temperature anti-seize compound)

C. Parts

- (1) Refer to the Illustrated Parts List (IPC) for the numbers and effectivities of items in the following table.

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	5	Air Cycle Machine	21-51-01	10	425
	6A	Packing			212
	23	O-ring			58
	27	Seal			116
	30	Seal			243
	33	Seal			155
	5	Air Cycle Machine			21-51-01
	6A	Packing	360		
	23	O-ring	150		
	27	Seal	215		
	30	Seal	415		
	33	Seal	280		

D. References

- (1) AMM 06-41-00/201, Section 45 Access Doors and Panels

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- (2) AMM 21-51-00/501, Cooling Pack System
 - (3) AMM 21-51-04/401, Water Extractor
 - (4) AMM 21-51-11/201, Pack Low Limit Control Valve
 - (5) AMM 21-53-05/401, Water Spray Nozzle
 - (6) AMM 24-22-00/201, Electrical Power Control
 - (7) AMM 36-00-00/201, Pneumatic - General
- E. Access
- (1) Location Zones
 - 135/136 Environmental control systems bay
 - (2) Access Panels
 - 193NL/194LR Environmental Control Systems (ECS) bay
- F. Install the air cycle machine
- S 034-017
- (1) Remove the covers from the duct openings.
- S 424-018
- (2) Use the hoist-adaptor and the jack to lift the air cycle machine (5) into position in the air cooling pack.
 - (a) Make sure the air cycle machine aligns with the ducts in the air cooling pack.
- S 434-020
- (3) Install the bolt (8), washer (9), and nut (10) to connect the support rod (7) to the air cycle machine.
- S 434-021
- (4) Install the plenum coupling (11).
 - (a) Tighten the coupling to 40 - 60 pound-inches.
- S 644-069
- (5) Apply a thin layer of the anti-seize compound MIL-L-23398 to the threads of the elbow fittings (22).
- S 434-022
- (6) Install the elbows (22) and the O-rings (23) to reconnect the hot air outlet line (20), the pressure sense line (21) and the hot air inlet line (24) to the ACM turbine.
 - (a) Remove the identification tags from the lines.

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- S 434-023
- (7) Install the condensor coupling (28), shell (29), and seal (30).
- S 434-024
- (8) Remove the hoist-adaptor and the jack from the air cycle machine.
- S 644-061
- (9) Apply a thin layer of the anti-seize compound to the threads of the restraint cables (31).
- S 434-025
- (10) Install the compressor outlet coupling (19), restraint cables (31), seals (33), washers (34), and nuts (35).
- (a) Tighten the restraint cables just enough to hold the coupling in place.
- S 434-027
- (11) Install the turbine inlet coupling (18), restraint cables (31), seals (33), washers (34), and nuts (35) to connect bonding jumper (38) and the low limit valve bonding jumper (41).
- (a) Tighten the restraint cables just enough to hold the coupling in place.
- S 434-029
- (12) Install the mix muff inlet duct (1), temperature control valve (2), and the compressor outlet duct (3) as one assembly.
- (a) Lift the assembly into position in the air cooling pack.
- (b) Install the compressor inlet coupling (17), restraint cables (31), seals (33), washers (34), and nuts (35).
- 1) Tighten the restraint cables just enough to hold the coupling in place.
- (c) Install the heat exchanger coupling (4), restraint cables (31), seals (33), washers (34), and nuts (35).
- 1) Tighten the restraint cables just enough to hold the coupling in place.

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- 2) Install the bonding jumper (38), bolt (40), washers (39), washer (37), and nut (36) to the heat exchanger coupling.
- (d) Install the clamp (25), shell (26), and seal (27) between the mix muff inlet duct (1) and the turbine.
- (e) Install the coupling (6) and the packing (6A) between the mix muff inlet duct (1) and the low limit valve.
- (f) Install the bonding jumper and electrical connectors of the temperature control valve (2).

S 434-030

CAUTION: DO NOT TIGHTEN THE CABLE TOO MUCH. IF YOU TIGHTEN THE CABLE TOO MUCH, YOU CAN CAUSE DAMAGE TO THE COUPLING OR THE DUCT WHEN YOU PRESSURIZE THE SYSTEM.

- (13) Do these steps to tighten all the restraint cables (31):
 - (a) Tighten the restraint cables (31) equally until only the slack is removed from the restraint cable.
 - (b) Make sure the distance between the duct flanges is less than 2.65 inches (67 mm).

S 434-031

- (14) Install the support bar (16), bolts (12), washers (13), washers (14), and nuts (15).
- G. Do the Cooling Pack Water Removal/Ice Protection Test (Fig. 403)

NOTE: You must do this test any time an ACM is replaced because it has failed. This test is done to make sure the ACM failure was not caused by another component in the cooling pack.

NOTE: The test is written for the left pack. Do the steps in parenthesis to do the test on the right pack.

S 974-046

- (1) Record the data from this test on a data sheet similar to Fig. 403.

S 864-032

- (2) Supply the electrical power (AMM 24-22-00/201).

S 864-059

- (3) Supply the pneumatic power (AMM 36-00-00/201).

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DATA SHEET

DATE: _____
AIRCRAFT: _____

REHEATER & WATER EXTRACTOR

REHEATER APPARENT CONDITION: _____
WATER EXTRACTOR CONDITION: _____

LOW LIMIT VALVE - DELTA PRESSURE CHECK

	<u>LOW SIDE</u>	<u>HIGH SIDE</u>
CRACK PRESSURE:	_____ (23-25 IN-H2O)	_____ (6.1-8.1 IN-Hg)
FULL OPEN PRESSURE:	_____ (83-89 IN-H2O)	_____ (21.4-25.4 IN-Hg)

SYSTEM TEST-OPERATIONAL

AMBIENT CONDITIONS

OUTSIDE TEMPERATURE: _____
DEW POINT TEMPERATURE: _____
HUMIDITY: _____

ECS/MSG

RECORD 15 MINUTES AFTER SELECTING FWD ZONE TO MAX COLD AND ALL OTHER ZONES OFF.

NOTE: NUMBER OF AVAILABLE EICAS READINGS DEPENDS ON A/C OPTIONS.

	<u>FLT DK</u>	<u>FWD</u>	<u>AUX FWD</u>	<u>MID</u>	<u>AUX MID</u>	<u>AFT</u>
DUCT TEMP	_____	_____	_____	_____	_____	_____
TRIM VALVE	_____	_____	_____	_____	_____	_____

	<u>LEFT</u>	<u>RIGHT</u>	PERFORMANCE LIMITS ¹	
			HOT DAY ²	COLD DAY ³
PACK OUT	_____	_____	7.8	65.4
TURB IN	_____	_____	97.5	12.1
SEC HX OUT	_____	_____	114.1	-23.2
CMPR OUT	_____	_____	326.8	172.2
PRIM HX OUT	_____	_____	205.1	137.6
PRIM HX IN	_____	_____	398.0	243.3
DUCT PRESS	_____	_____	50.0	54.0
PACK FLOW	_____	_____	N/A	N/A
TEMP VALVE	_____	_____	0.0	0.8
RAM IN DOOR	_____	_____	0.0	0.8
RAM OUT DOOR	_____	_____	0.0	0.8

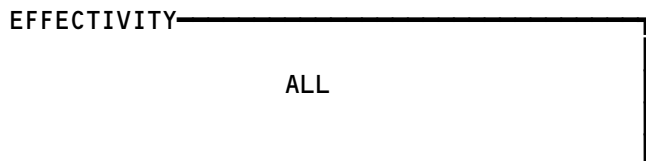
MAINTENANCE MESSAGES: (if any)

¹ BOTH PACK SELECTORS IN "AUTO"
ALL ZONE SELECTORS AT 75°F (12 O'CLOCK POSITION)

² OUTSIDE TEMPERATURE: 103°F
OUTSIDE HUMIDITY: 133 GRN/LB AIR

³ OUTSIDE TEMPERATURE: -40°F
OUTSIDE HUMIDITY: 0.55 GRN/LB AIR

Cooling Pack Water Removal/Ice Protection Test
Figure 403



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- S 864-034
- (4) Remove the DO-NOT-OPERATE tag from the L and R PACK selectors, on the P5 panel.
- S 864-036
- (5) Turn the L (R) PACK selector, on the P5 panel, to the AUTO position.
(a) Make sure the PACK OFF light goes off.
- S 744-047
- (6) Do the BITE test on the left (right) pack temperature controller (AMM 21-51-00/501).
- S 734-049
- (7) Examine the low limit valve.
(a) Supply pneumatic power (AMM 36-00-00/201).
(b) Push the VERIFY switch on the left (right) pack temperature controller.
(c) Make sure the position indicator, on the low limit valve, moves.
(d) Do the Low Limit Valve Differential Pressure Check (AMM 21-51-11/201).
(e) Do the Low Limit Valve Leak Check (AMM 21-51-11/201).
- S 734-050
- (8) Examine the pack operation.
(a) On the P5 panel, do the steps that follow:
1) Turn the R (L) PACK selector to the AUTO position.
2) Push the L and R RECIRC FAN switch-lights to the on position.
3) Push the TRIM AIR switch-light to the on position.
4) Turn all the zone temperature selectors to the fully warm (W) position.
5) Wait for 5 minutes or until all the zone temperatures are at 75°F, whichever is longer.
6) Turn the FWD zone temperature selector to the fully cold (C) position.
7) Turn all the other zone temperature selectors to the OFF position.
(b) Wait for 15 minutes.
(c) Record these ambient conditions:
1) Temperature
2) Dew Point Temperature
3) Humidity

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(d) Record these pack conditions from the EICAS display:

NOTE: For comparisons between airplanes in a operators fleet, the packs must have a similar temperature demand and pneumatic supply pressure. The packs are very sensitive because of the many sensors used to control them. Thus, even with the same temperature demand and pneumatic supply pressure, each pack will be slightly different.

NOTE: If the packs run for longer than 15 minutes, the packs may begin to move off of the full cold mode. When this occurs, you will see the pack outlet temperature start to increase. If the pack outlet temperature increases more than 5°F, then you must start the test again.

NOTE: Some airplanes do not show all of the indications that follow. Record the data only for the indications that do show.

- 1) FLT DECK DUCT TEMP
- 2) FWD DUCT TEMP
- 3) MID DUCT TEMP
- 4) AFT DUCT TEMP
- 5) FLT DECK TRIM VALVE
- 6) FWD TRIM VALVE
- 7) AUX FWD TRIM VALVE
- 8) MID TRIM VALVE
- 9) AUX MID TRIM VALVE
- 10) AFT TRIM VALVE
- 11) L and R PACK OUT
- 12) L and R TURB IN
- 13) L and R SEC HX OUT
- 14) L and R CMPR OUT
- 15) L and R PRIM HX OUT
- 16) L and R PRIM HX IN
- 17) L and R DUCT PRESS
- 18) L and R PACK FLOW
- 19) L and R TEMP VALVE
- 20) L and R RAM IN DOOR
- 21) L and R RAM OUT DOOR
- 22) Any maintenance messages that show.

(e) Look at the pattern of the water from the water spray nozzle in each ram inlet system.

NOTE: The quantity of water is a function of the air humidity and the pack air flow.

(f) Make sure the water pattern from each spray nozzle is similar.

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- (g) If you think that one of the water spray nozzles is blocked, do the steps that follow:
 - 1) Replace the water spray nozzle (AMM 21-53-05/401).
 - 2) Remove the water lines.
 - 3) Blow air through the water lines to make sure they are not blocked.
 - 4) Examine the water line ports to make sure they are not blocked.
 - 5) Install the water lines.
- H. Do the air cycle machine installation test.

S 214-038

- (1) Feel for air leaks around the duct flanges and the clamps.
 - (a) Small leaks are permitted.
 - (b) Large leaks must be repaired.
- I. Put the airplane back to its usual condition

S 864-039

- (1) Turn the applicable PACK selector, on the P5 panel, to OFF. Make sure the PACK OFF light comes on.

S 414-041

- (2) Close the applicable ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-042

- (3) Remove the pneumatic power if it is no longer necessary (AMM 36-00-00/201).

S 864-043

- (4) Remove the electrical power if it is no longer necessary (AMM 24-22-00/201).

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WATER EXTRACTOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the water extractors. One water extractor is installed in the forward part of each air cooling pack.

TASK 21-51-04-004-001

2. Remove the Water Extractor (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-51-08/401, Pack Temperature Sensor

B. Access

- (1) Location Zones
135/136 Environmental Control System (ECS) Bay
- (2) Access Panels
193NL/194LR ECS Bay Access Doors

C. Prepare for the Removal

S 864-002

- (1) Turn the L and R PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (2) To remove the right pack water extractor, open and attach DO-NOT-CLOSE tags to these circuit breakers, on the overhead circuit breaker panel, P11:
 - (a) 11A26, R PACK FLOW CONT

S 864-006

- (3) To remove the left pack water extractor, open and attach DO-NOT-CLOSE tags to these circuit breakers, on the overhead circuit breaker panel, P11:
 - (a) 11A13, PACK FLOW CONT L

S 014-005

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

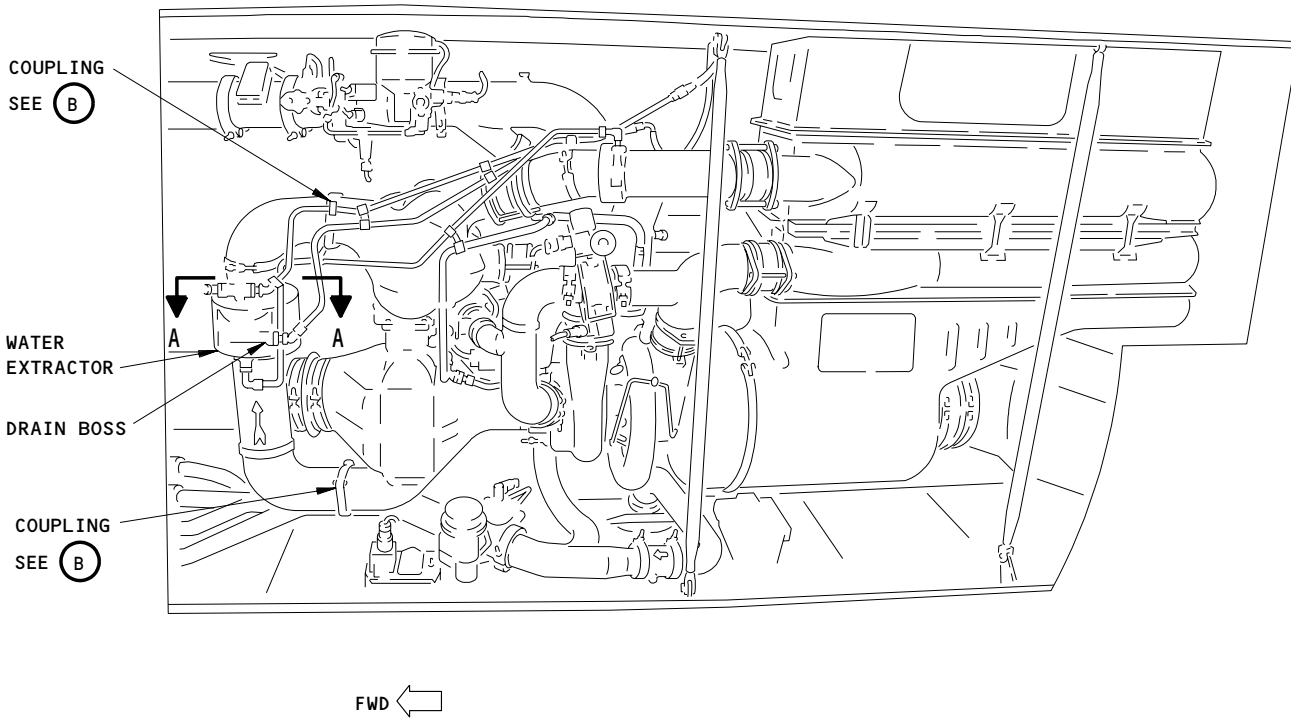
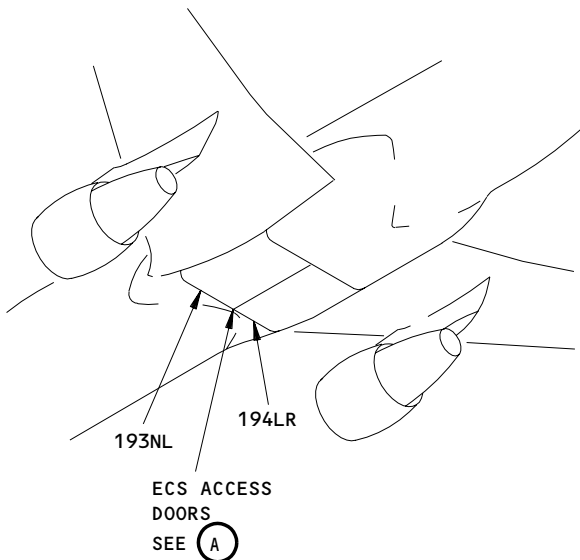
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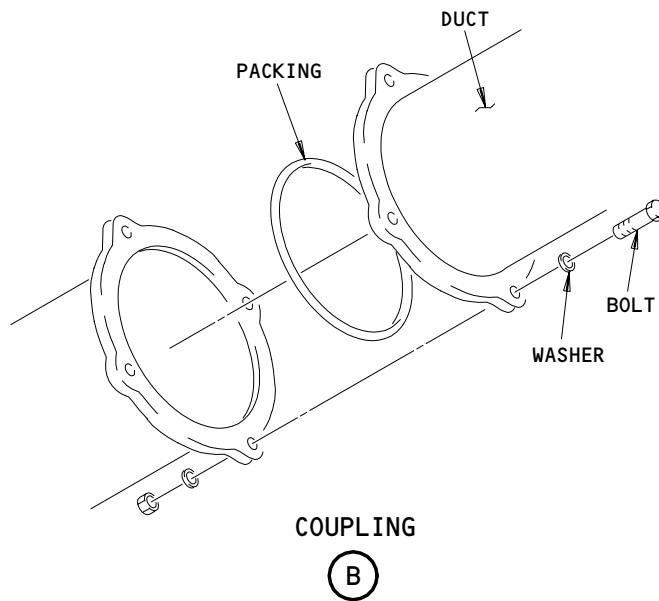
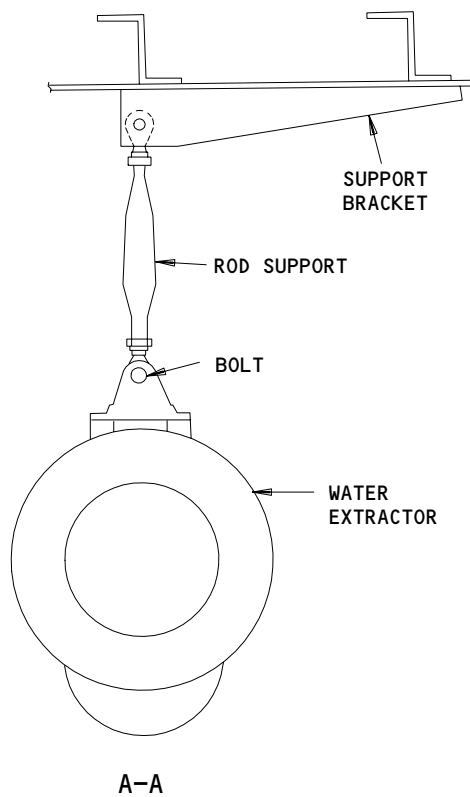
LEFT COOLING PACK
(RIGHT COOLING PACK EQUIVALENT)
(A)

Water Extractor
Figure 401 (Sheet 1)

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Water Extractor
Figure 401 (Sheet 2)

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D. Remove the Water Extractor

S 034-007

- (1) Remove the elbow from the drain boss on the water extractor.

S 034-008

- (2) Remove the pack temperature sensor (AMM 21-51-08/401).

S 034-009

- (3) Remove the bolts from the coupling between the water extractor and the reheater.

S 034-010

- (4) Remove the bolts from the coupling between the water extractor and the condensor.

S 034-011

- (5) Remove the bolt from the rod support on the top of the water extractor.

S 024-012

- (6) Remove the water extractor.

S 034-013

- (7) Remove the packings from the couplings.

S 434-014

- (8) Put a cover on the duct openings.

TASK 21-51-04-404-015

3. Install the Water Extractor (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-51-08/401, Pack Temperature Sensor
- (3) AMM 24-22-00/201, Electric Power Control
- (4) AMM 36-00-00/201, Pneumatic General

B. Access

- (1) Location Zones
135/136 Environmental Control System (ECS) Bay
- (2) Access Panels
193NL/194LR ECS Bay Access Doors

C. Install the Water Extractor

S 034-016

- (1) Remove the covers from the duct openings.
 - (a) Make sure there is no unwanted material in the ducts.

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- S 434-017
- (2) Put a new packing in the couplings of the water extractor.
- S 424-018
- (3) Put the water extractor in its positions between the reheater and the condensor.
- S 434-019
- (4) Put the rod support into the bracket on the top of the water extractor.
- S 434-020
- (5) Install the bolt, washer, and nut to hold the rod support in the bracket.
- S 434-021
- (6) Install the bolts, washers, and nuts into the coupling between the water extractor and the reheater.
- S 434-022
- (7) Install the bolts, washers, and nuts into the coupling between the water extractor and the condensor.
- S 434-023
- (8) Install the pack temperature sensor (AMM 21-51-08/401).
- S 434-024
- (9) Install the elbow and O-ring to connect the drain boss to the water drain line.
- D. Do the Installation Test for the Water Extractor.
- S 864-025
- (1) Supply electrical power (AMM 24-22-00/201).
- S 864-026
- (2) Supply pneumatic pressure (AMM 36-00-00/201).

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- S 864-027
- (3) If the left pack water extractor was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the overhead circuit breaker panel, P11:
- (a) 11A13, PACK FLOW CONT L
- S 864-028
- (4) If the right pack water extractor was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the overhead circuit breaker panel, P11:
- (a) 11A26, R PACK FLOW CONT
- S 864-029
- (5) Remove the DO-NOT-OPERATE tag from the L and R PACK selectors, on the P5 panel.
- (a) Turn the applicable (L or R) PACK selector to the AUTO position.
- (b) Make sure the PACK OFF light goes off.
- S 794-031
- (6) Feel for air flow around the water extractor.
- (a) A small leak is permitted.
- (b) You must repair a large leak.
- E. Put the Airplane Back to Its Usual Condition
- S 864-032
- (1) Put the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.
- (a) Make sure the PACK OFF light comes on.
- S 414-034
- (2) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).
- S 864-035
- (3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).
- S 864-036
- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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COMPRESSOR OUTLET SENSOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has instruction to remove and install the temperature sensors at the compressor outlets of the air cooling packs. Each air cooling pack has two compressor outlet sensors. One sensor supplies input to the pack temperature controller (AUTO mode) and the other sensor supplies input to the standby temperature controller (STBY mode).

TASK 21-51-06-004-001

2. Remove the Compressor Outlet Sensor (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Standard Practices – Lockwires
- (3) AMM 24-22-00/201, Electrical Power Control.

B. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
 - 193NL/194LR ECS access doors

C. Prepare for the Removal

S 864-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-003

- (2) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.
 - (b) Put a DO-NOT-OPERATE tag on the selector.

S 864-005

- (3) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
 - (a) To remove the left sensors,
 - 1) 11N10, LEFT PACK AUTO PWR
 - 2) 11N11, LEFT PACK AUTO CONT
 - (b) To remove the right sensors,
 - 1) 11N19, RIGHT PACK AUTO PWR
 - 2) 11N20, RIGHT PACK AUTO CONT

S 014-006

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Sensor

S 034-007

- (1) Disconnect the electrical connector from the sensor.

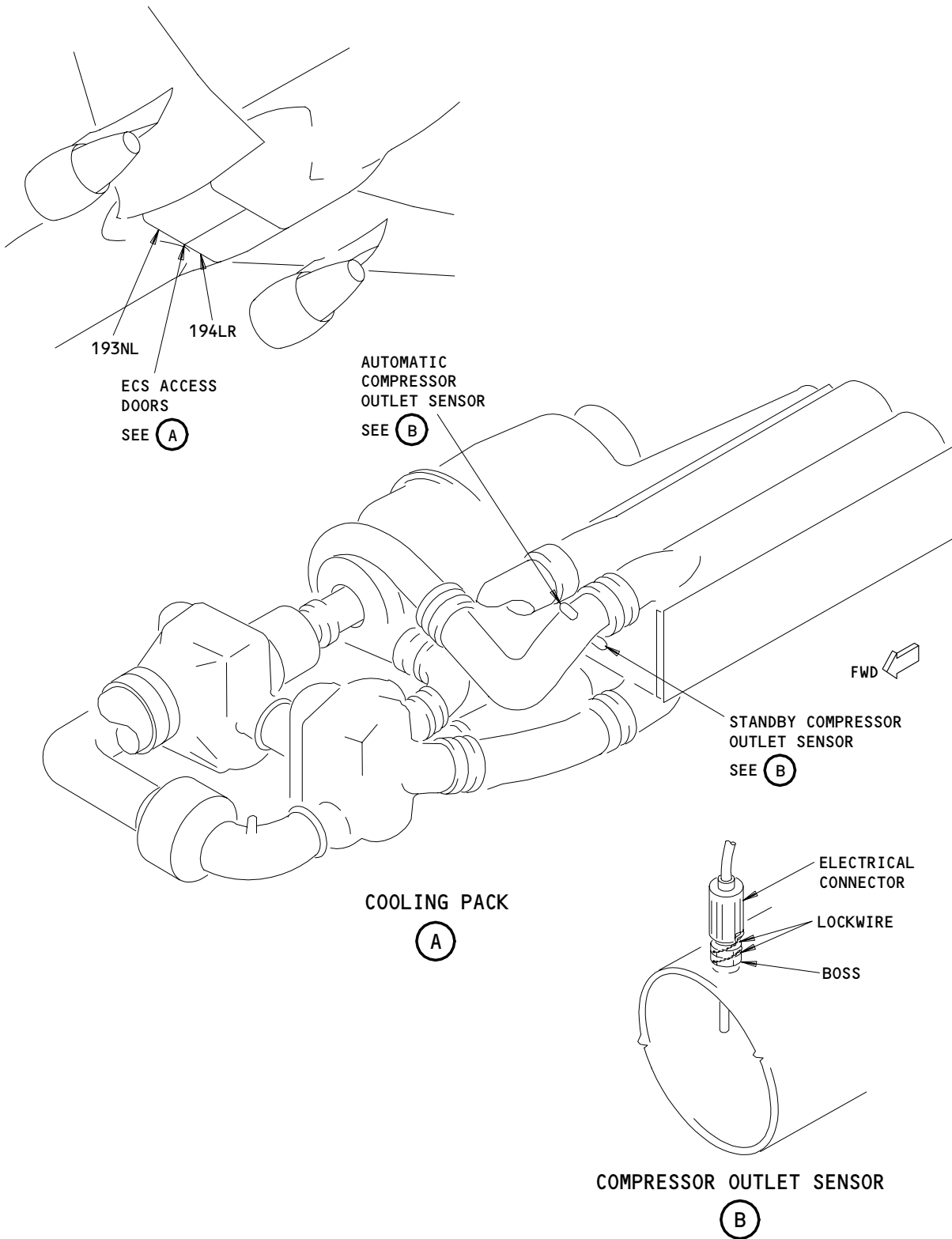
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Compressor Outlet Sensor
Figure 401

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S 034-008

- (2) Cut and remove the lockwire from the sensor.

S 024-009

CAUTION: USE TWO WRENCHES TO REMOVE THE SENSOR. IF YOU ONLY USE ONE WRENCH TO REMOVE THE SENSOR, YOU COULD CAUSE DAMAGE TO THE DUCT.

- (3) Use two wrenches to remove the sensor.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the sensor.

S 434-010

- (4) Install a plug in the boss.

TASK 21-51-06-404-011

3. Install Compressor Outlet Sensor (Fig. 401)

A. Consumable Materials

- (1) D00006 - Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)
- (2) C00852 - Antiseize Compound, Molybdenum Disulfide-Petrolatum,
MIL-PRF-83483 (preferred)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Standard Practices - Lockwires
- (3) AMM 21-51-14/501, Pack Temperature Controller
- (4) AMM 24-22-00/201, Electrical Power Control.

C. Access

- (1) Location Zones
135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
193NL/194LR ECS access doors

D. Install the Sensor

S 034-012

- (1) Remove the plug from the boss.

S 434-013

- (2) Install a new O-ring on the sensor.

S 164-014

- (3) Make sure the mating surfaces of the boss and the sensor nut are clean, to permit for an electrical ground.

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S 434-016

- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the sensor.

S 424-017

CAUTION: USE TWO WRENCHES TO INSTALL THE SENSOR IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE SENSOR, YOU CAN CAUSE DAMAGE TO THE DUCT.

- (5) Install the sensor in the boss.
 - (a) Tighten the sensor to a torque value of 210-240 pound-inches.

S 434-018

- (6) Install a lockwire on the sensor (AMM 20-10-23/401).

S 434-019

- (7) Connect the electrical connector to the sensor.
- E. Do the installation test for the sensor

S 864-020

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) If the left sensor was installed,
 - 1) 11N10, LEFT PACK AUTO PWR
 - 2) 11N11, LEFT PACK AUTO CONT
 - (b) If the right sensor was installed,
 - 1) 11N19, RIGHT PACK AUTO PWR
 - 2) 11N20, RIGHT PACK AUTO CONT

S 864-025

- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

S 744-021

- (3) If an auto sensor was installed, do the BITE test on the applicable (left or right) pack temperature controller (AMM 21-51-14/501).

S 744-022

- (4) If a standby sensor was installed, do the BITE test on the standby temperature controller (AMM 21-51-14/501).
- F. Put the airplane back to its usual condition

S 414-023

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-024

- (2) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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PACK REHEATER – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the pack reheaters. One reheater is installed in each air cooling pack.

TASK 21-51-07-004-001

2. Remove the Pack Reheater (Fig. 401)

A. Equipment

- (1) A21001-44, Hoist Adapter – Air Conditioning Pack, Used with applicable Hein-Werner or Blackhawk Jack.
- (2) A21001-45, Hoist Adapter – Air Conditioning Pack, Used with A71015 engine accessory hoist fixture.
- (3) A71015-87, Lift Fixture – Engine Accessory
- (4) Transmission Jack – Hein-Werner model 64, part No. 62005 Hein-Werner Corp., 1200 National Avenue, Waukesha, Wisconsin 53186
- (5) Transmission Jack – Blackhawk model 67554, General Service Equip. Div., Applied Power In., P.O. Box 27207, Milwaukee, Wisconsin 53227
- (6) Support block for the hoist adapter.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

C. Access

- (1) Location Zones
135/136 Environmental Control System (ECS) Bay
- (2) Access Panels
193NL/194LR ECS access doors

D. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).

E. Remove the Reheater

S 494-005

CAUTION: BEFORE YOU REMOVE THE REHEATER, INSTALL THE EQUIPMENT TO HOLD THE CONDENSER IN ITS POSITION. IF THE CONDENSER IS NOT HELD IN ITS POSITION WHEN THE REHEATER IS REMOVED, IT COULD CAUSE DAMAGE TO THE EQUIPMENT.

- (1) Put the hoist adapter and support block in its position to hold the weight of the condenser.

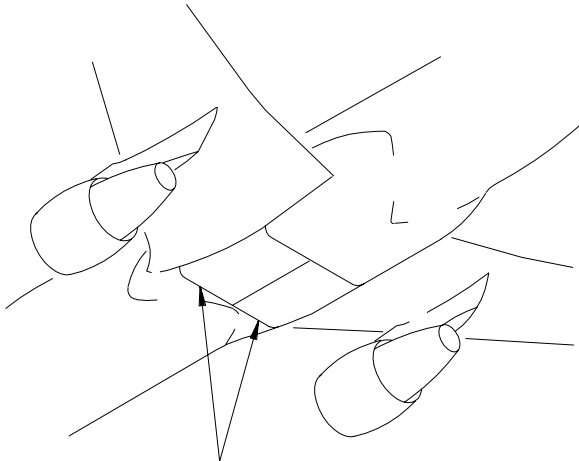
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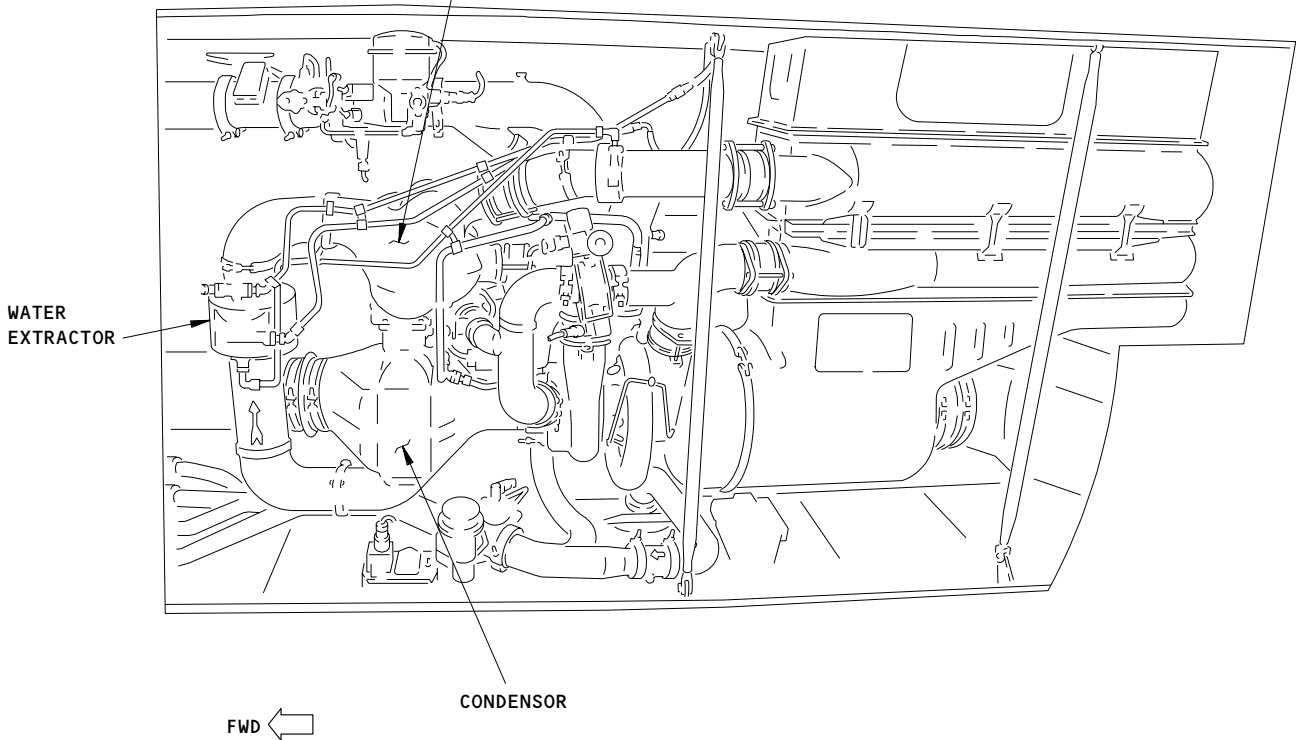
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ECS ACCESS DOORS,
193NL, 194LR

SEE (A)

REHEATER
SEE (B)



LEFT COOLING PACK
(RIGHT COOLING PACK EQUIVALENT)

(A)

Pack Reheater
Figure 401 (Sheet 1)

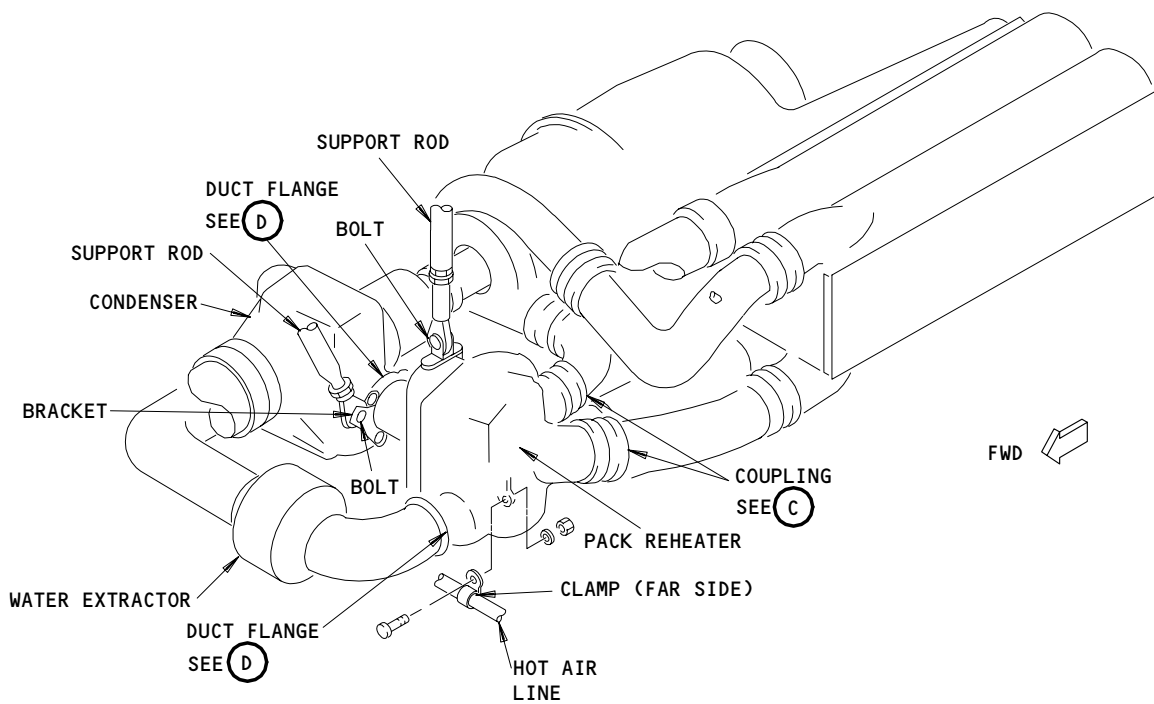
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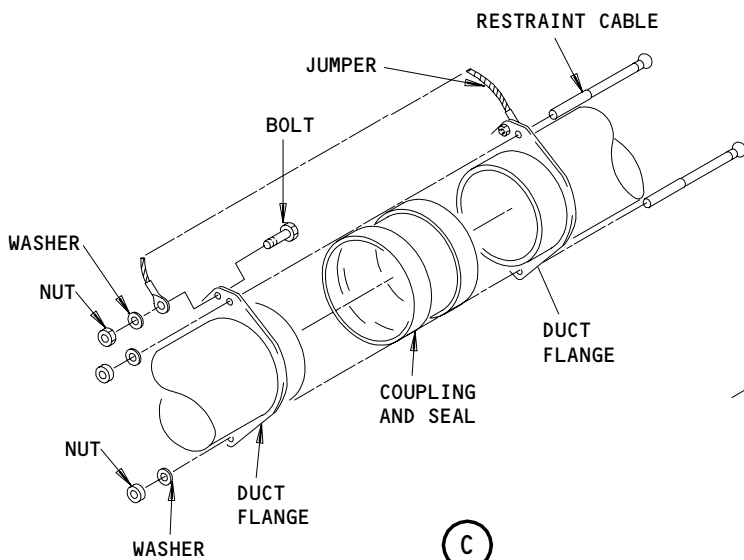
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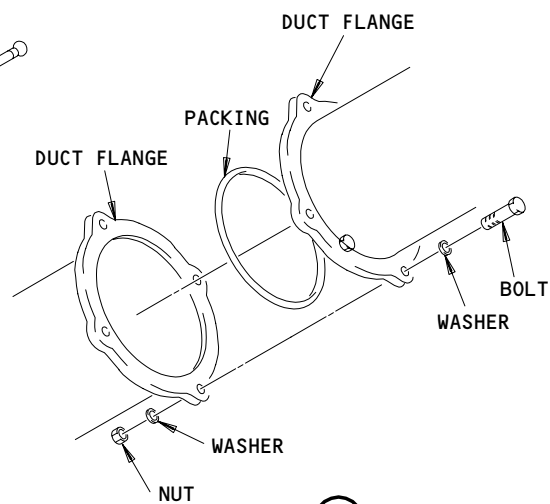
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(B)



(C)



(D)

Pack Reheater - Installation
Figure 401 (Sheet 2)

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S 034-006

- (2) Disconnect the reheater at the duct flange that is between the reheater and the condenser.
 - (a) Remove the support rod from the duct flange.
 - (b) Remove the bolts from the duct flange.
 - (c) Remove the bracket that holds the support rod to the duct flange.

S 034-007

- (3) Remove the bolts from the duct flange that is between the reheater and the water extractor.

S 034-008

- (4) Remove the clamp that holds the hot air line.

S 034-009

- (5) Remove the coupling ducts.
 - (a) Disconnect the bonding jumpers from the coupling ducts.
 - (b) Remove the restraint cables from the coupling ducts.
 - (c) Remove the coupling from each coupling duct.

S 034-010

- (6) Remove the support rod from the bracket on the top of the reheater.

S 024-011

- (7) Remove the reheater.

S 034-012

- (8) Remove the packing from the duct flanges.

S 434-013

- (9) Put a cover on the duct openings.

TASK 21-51-07-404-014

3. Install the Pack Reheater (Fig. 401)

A. Equipment

- (1) A21001-44, Hoist Adapter - Air Conditioning Pack,
Used with applicable Hein-Werner or Blackhawk Jack.

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- (2) A21001-45, Hoist Adapter - Air Conditioning Pack,
Used with A71015 engine accessory hoist fixture.
 - (3) A71015-87, Lift Fixture - Engine Accessory
 - (4) Transmission Jack - Hein-Werner model 64, part No. 62005
Hein-Werner Corp., 1200 National Avenue, Waukesha, Wisconsin 53186
 - (5) Transmission Jack - Blackhawk model 67554,
General Service Equip. Div., Applied Power In., P.O. Box 27207,
Milwaukee, Wisconsin 53227
 - (6) Support block for the hoist adapter.
- B. Consumables
- (1) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)
- C. References
- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
 - (2) AMM 24-22-00/201, Electric Power - Control
 - (3) AMM 36-00-00/201, Pneumatic-General
- D. Access
- (1) Location Zones
135/136 Environmental Control System (ECS) Bay
 - (2) Access Panels
193NL/194LR ECS access doors
- E. Install the Reheater
- S 034-015
 - (1) Remove the covers from the duct openings.
 - S 434-016
 - (2) Install the packings in the duct flanges.
 - S 424-017
 - (3) Put the reheater in its position in the air cooling pack.
 - (a) Make sure the duct joints are aligned correctly.
 - S 434-018
 - (4) Install the bolt in the support rod and the bracket on the top of the reheater.
 - S 434-019
 - (5) Install the coupling ducts.
 - (a) Put new seals in the couplings.
 - (b) Put the couplings in their positions in the ducts.

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- (c) Apply a thin layer of the anti-seize compound to the threads of the restraint cables.
- (d) Install the restraint cables.
 - 1) Do not tighten the restraint cables.
- (e) Connect the bonding jumpers to the coupling ducts.

S 434-020

- (6) Install the clamp that holds the hot air line.

S 434-021

- (7) Connect the reheater at the duct flange that is between the reheater and the condenser.
 - (a) Put the bracket in its position on the duct flange.
 - 1) Make sure the support rod can connect to the bracket.
 - (b) Install the bolts, washers, and nuts in the duct flange.
 - (c) Install the bolt, washer, and nut in the support rod and the bracket.

S 434-022

- (8) Install the bolts, washers and nuts in the duct flange that is between the reheater and the water extractor.

S 094-023

- (9) Remove the hoist adapter and the support block from the air cooling pack.

S 434-035

CAUTION: DO NOT TIGHTEN THE CABLE TOO MUCH. IF YOU TIGHTEN THE CABLE TOO MUCH, YOU CAN CAUSE DAMAGE TO THE COUPLING OR THE DUCT WHEN YOU PRESSURIZE THE SYSTEM.

- (10) Do these steps to tighten all the restraint cables:
 - (a) Tighten the restraint cables equally until only the slack is removed from the restraint cable.
 - (b) Make sure the distance between the duct flanges is less than 2.65 inches (67 mm).

F. Do the installation test for the reheater

S 864-025

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-026

- (2) Supply pneumatic power (AMM 36-00-00/201).

S 864-027

- (3) Turn the applicable (L or R) PACK selector, on the P5 panel to the AUTO position, and remove the DO-NOT-OPERATE tag.
 - (a) Make sure the PACK OFF light goes off.

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S 794-029

- (4) Feel for leaks around the reheater.
 - (a) Small leaks are permitted.
 - (b) You must repair a large leak.
- G. Put the airplane back to its usual condition

S 864-037

- (1) Turn the applicable (L or R) PACK selector to the OFF position and make sure that the PACK OFF light is on.

S 414-030

- (2) Close the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).

S 864-033

- (3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-034

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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PACK TEMPERATURE SENSOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the pack temperature sensors. Two pack temperature sensors are installed between the water extractor and the reheater of each air cooling pack. The auto sensor gives signals to the pack temperature controllers and the standby sensor gives signals to the standby temperature controller.

TASK 21-51-08-004-001

2. Remove the Pack Temperature Sensors (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power – Control

B. Access

- (1) Location Zones
135/136 Environmental Control System (ECS) Bay
(2) Access Panel
193NL/194LR ECS access doors

C. Prepare for the Removal

S 864-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-003

- (2) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the PACK OFF light comes on.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 864-005

- (3) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) To remove the left sensor,
1) 11N10, LEFT PACK AUTO PWR
2) 11N11, LEFT PACK AUTO CONT
(b) To remove the right sensor,
1) 11N19, RIGHT PACK AUTO PWR
2) 11N20, RIGHT PACK AUTO CONT

S 014-006

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

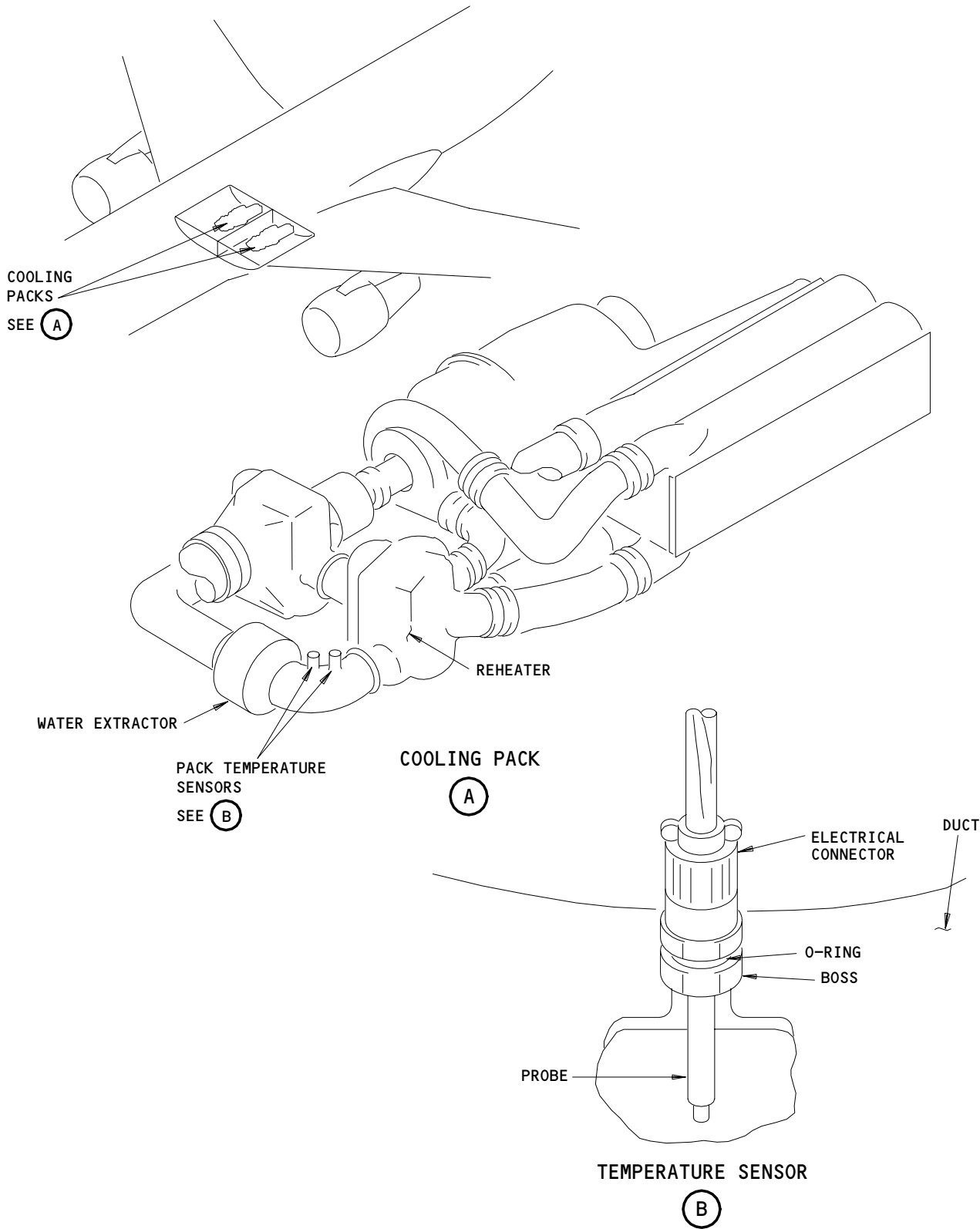
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Pack Temperature Sensor
Figure 401

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D. Remove the Sensor

S 034-007

- (1) Disconnect the electrical connector from the sensor.

S 034-008

- (2) Cut and remove the lockwire from the sensor.

S 024-009

CAUTION: USE TWO WRENCHES TO REMOVE THE SENSOR. IF YOU ONLY USE ONE WRENCH TO REMOVE THE SENSOR, YOU COULD CAUSE DAMAGE TO THE DUCT.

- (3) Use two wrenches to remove the sensor.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the sensor.

S 434-010

- (4) Put a plug in the boss.

TASK 21-51-08-404-011

3. Install the Pack Temperature Sensor (Fig. 401)

A. Consumable Materials

- (1) D00386, Lubricant, Anti-seize, MIL-L-23398 Solid Film
(2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-23/401, Standard Practices-Lockwire
(3) AMM 24-22-00/201, Electrical Power - Control

C. Access

- (1) Location Zones
135/136 Environmental Control System (ECS) Bay
(2) Access Panel
193NL/194LR ECS access doors

D. Install the Sensor

S 034-012

- (1) Remove the plug from the boss.

S 434-013

- (2) Install a new O-ring on the sensor.

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S 164-014

- (3) Make sure the mating surfaces of the boss and the sensor nut are clean, to permit for an electrical ground.

S 434-015

- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the sensor.

S 424-016

CAUTION: USE TWO WRENCHES TO INSTALL THE SENSOR. IF YOU ONLY USE ONE WRENCH TO INSTALL THE SENSOR, YOU COULD CAUSE DAMAGE TO THE DUCT.

- (5) Install the sensor in the boss.
(a) Tighten the sensor to a torque value of 210-240 pound-inches.

S 434-017

- (6) Install a lockwire on the sensor (AMM 20-10-23/401).

S 434-018

- (7) Connect the electrical connector to the sensor.

E. Do the installation test for the sensor

S 864-019

- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P11 panel:
- (a) If the left sensor was installed,
 - 1) 11N10, LEFT PACK AUTO PWR
 - 2) 11N11, LEFT PACK AUTO CONT
 - (b) If the right sensor was installed,
 - 1) 11N19, RIGHT PACK AUTO PWR
 - 2) 11N20, RIGHT PACK AUTO CONT

S 864-020

- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

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S 744-022

- (3) If an auto sensor was installed, do the BITE test on the applicable (left or right) pack temperature controller (AMM 21-51-14/501).

S 744-023

- (4) If a standby sensor was installed, do the BITE test on the standby temperature controller (AMM 21-51-14/501).

F. Put the airplane back to its usual condition

S 414-024

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-025

- (2) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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FLOW CONTROL CARD ASSEMBLY – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the flow control card for the right air cooling pack. The flow control card is installed in the electrical systems cardfile, P50. Flow for the left air cooling pack is controlled by the pack flow & cargo air conditioning controller.

TASK 21-51-09-004-001

2. Remove the Flow Control Card Assembly (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-01/401, E/E Rack Mounted Components
- (3) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices

B. Access

- (1) Location Zones
 - 118 Area above and outboard of the NLG wheel well (right)
- (2) Access Panel
 - 119AL Main equipment center access door

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (2) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
 - (a) 11A13, PACK FLOW CONT L
 - (b) 11A26, R PACK FLOW CONT

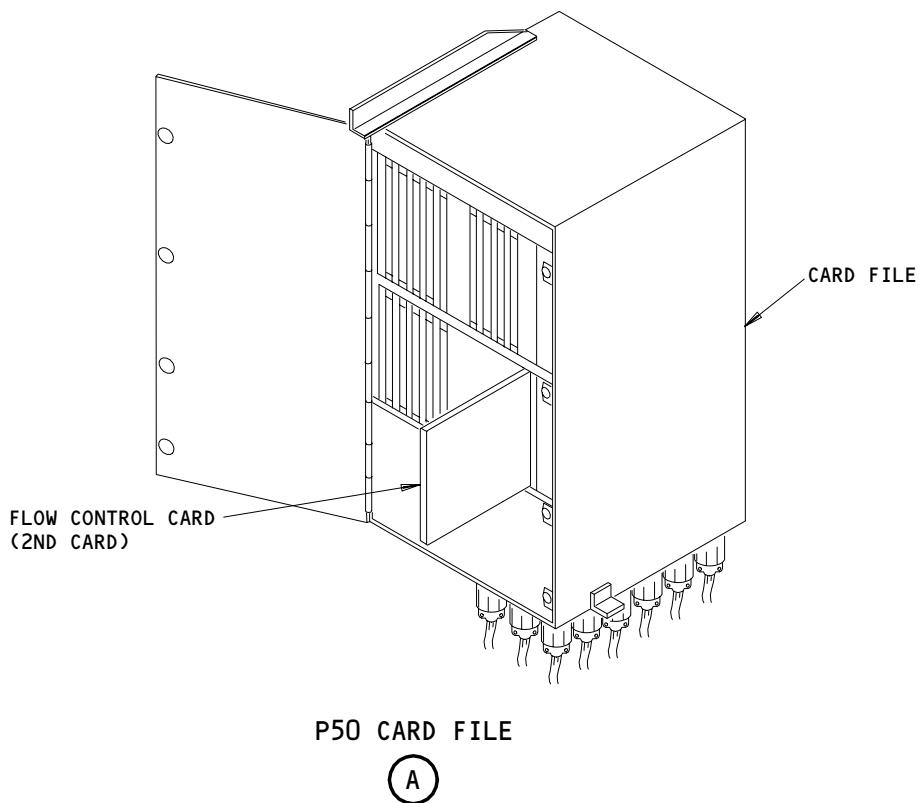
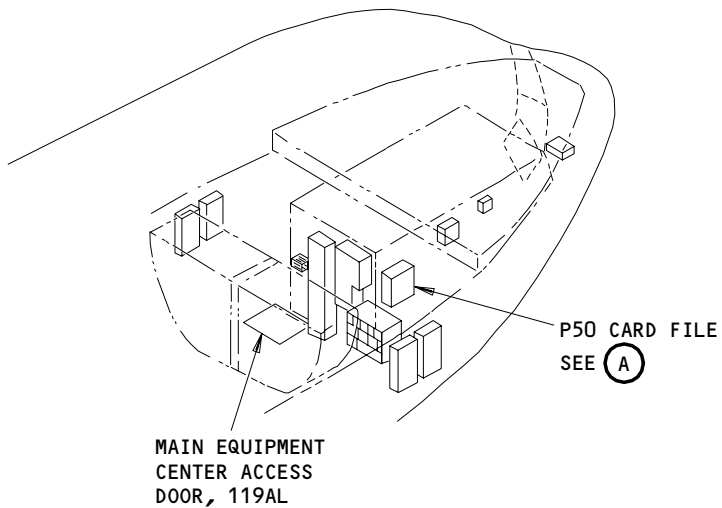
S 014-005

- (3) Open the access door for the main equipment center, 119AL (AMM 06-41-00/201).

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Flow Control Card Assembly - Installation
Figure 401

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D. Remove the Control Card

S 014-006

- (1) Open the door of the P50 cardfile.

S 914-007

CAUTION: DO NOT TOUCH THE CIRCUIT CARD BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CIRCUIT CARD.

- (2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 024-008

- (3) Remove the flow control card assembly, M864 (AMM 20-10-01/401).

S 414-010

- (4) Close the door of the P50 cardfile.

TASK 21-51-09-404-011

3. Install the Flow Control Card Assembly (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-01/401, E/E Rack Mounted Components
- (3) AMM 20-41-01/201, Electrostatic Discharge Sensitive Devices
- (4) AMM 24-22-00/201, Electric Power - Control
- (5) AMM 36-00-00/201, Pneumatic - General

B. Access

- (1) Location Zones
 - 118 Area above and outboard of the NLG wheel well (right)
- (2) Access Panel
 - 119AL Main equipment center access door

C. Install the Control Card

S 014-012

- (1) Open the door of the P50 cardfile.

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S 914-013

CAUTION: DO NOT TOUCH THE CIRCUIT CARD BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CIRCUIT CARD.

- (2) Do the procedure for devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 424-014

- (3) Install the flow control card in its correct position in the P50 cardfile (AMM 20-10-01/401).

S 414-015

- (4) Close the door of the P50 cardfile.
D. Do the installation test for the control card

S 864-016

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-017

- (2) Supply pneumatic power (AMM 36-00-00/201).

S 864-018

- (3) Remove DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
(a) 11A13, PACK FLOW CONT L
(b) 11A26, R PACK FLOW CONT

S 864-021

- (4) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

S 864-031

- (5) Turn the applicable (L or R) PACK selector to the AUTO position.
(a) Make sure the PACK OFF light goes off.

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- S 214-024
- (6) Make sure the PACK INOP light, on the P5 panel, does not come on.
- S 214-029
- (7) Make sure the applicable (L or R) pack operates (the flow control and shutoff valve opens).
- E. Put the airplane back to its usual condition
- S 864-030
- (1) Turn the applicable pack selector to off.
- S 414-026
- (2) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).
- S 864-027
- (3) Remove the pneumatic power, if it is not necessary (AMM 36-00-00/201).
- S 864-028
- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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CONDENSER - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Condenser Removal
 - (2) Condenser Installation
- B. A condenser is installed in each air cooling pack, between the turbine section of the air cycle machine (ACM) and the pack outlet conditioned air supply duct.

TASK 21-51-10-004-001

2. Condenser Removal (Fig. 401)

- A. References
 - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- B. Access
 - (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
 - (2) Access Panels
 - 193NL/194LR ECS access doors
- C. Prepare for the Removal
 - S 864-002
 - (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Put a DO-NOT-OPERATE tag on the selector.
 - S 014-004
 - (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).
- D. Remove the Condenser
 - S 034-005
 - (1) Loosen the locknuts in 4 locations to disconnect the pneumatic sense lines.
 - S 034-006
 - (2) Remove the clamp from the hot air line.
 - S 034-007
 - (3) Remove the clamp which connects the condenser to the turbine.
 - S 034-008
 - (4) Loosen/remove the clamps which connect the condenser outlet to the pack outlet conditioned air supply duct.

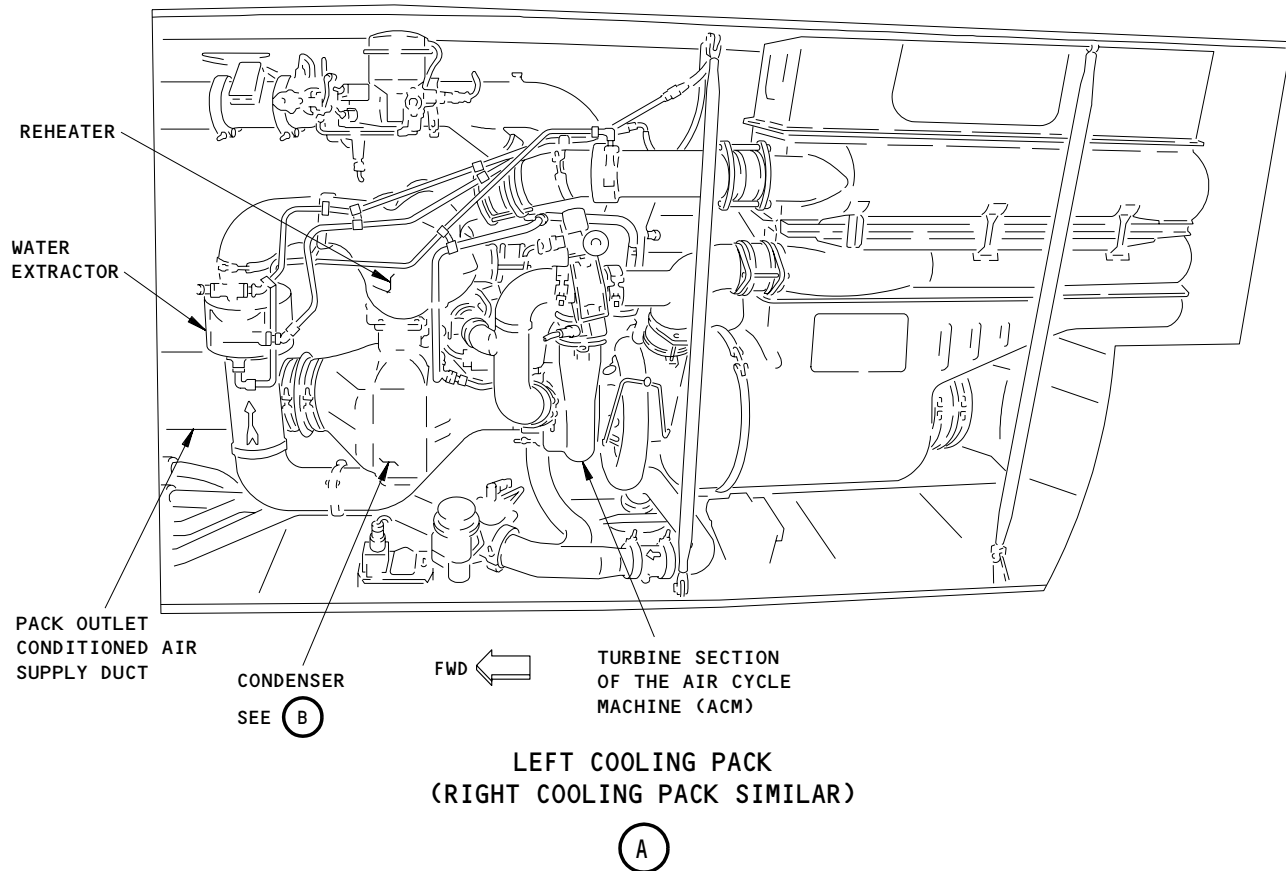
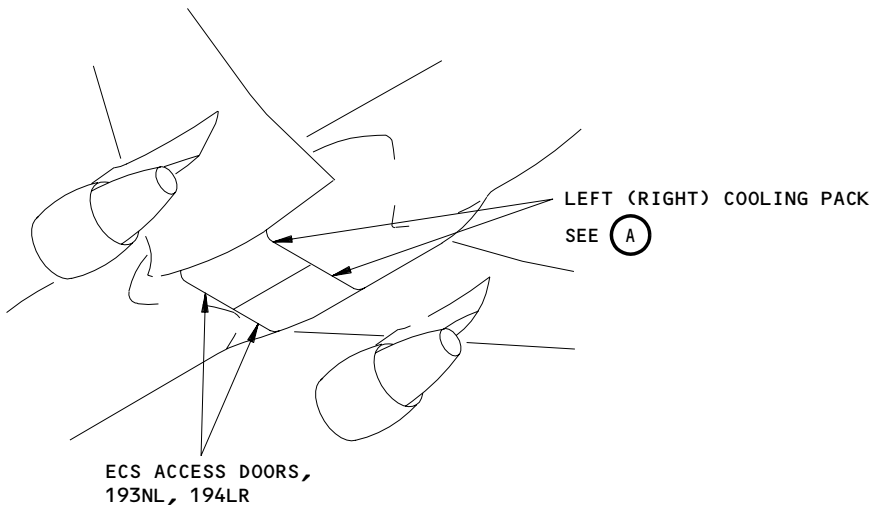
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Condenser Installation
Figure 401 (Sheet 1)

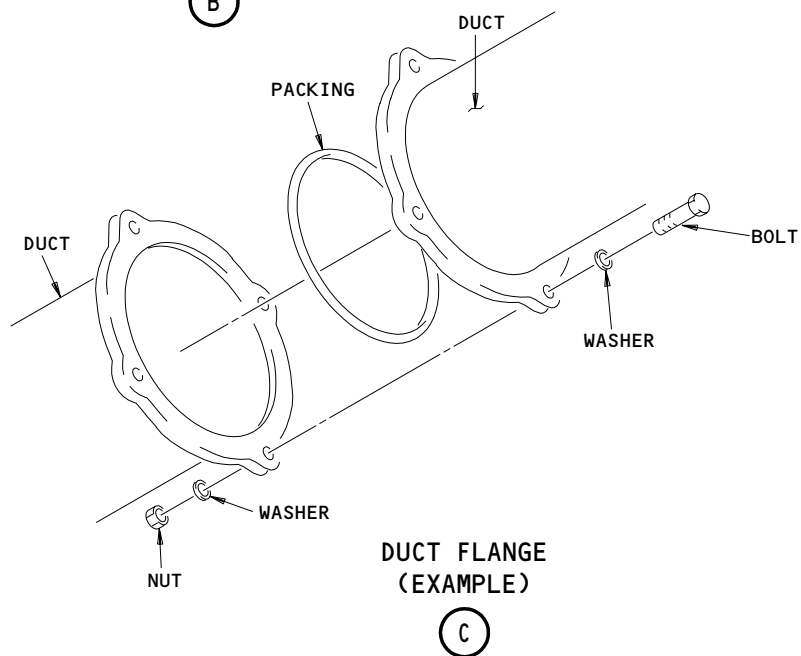
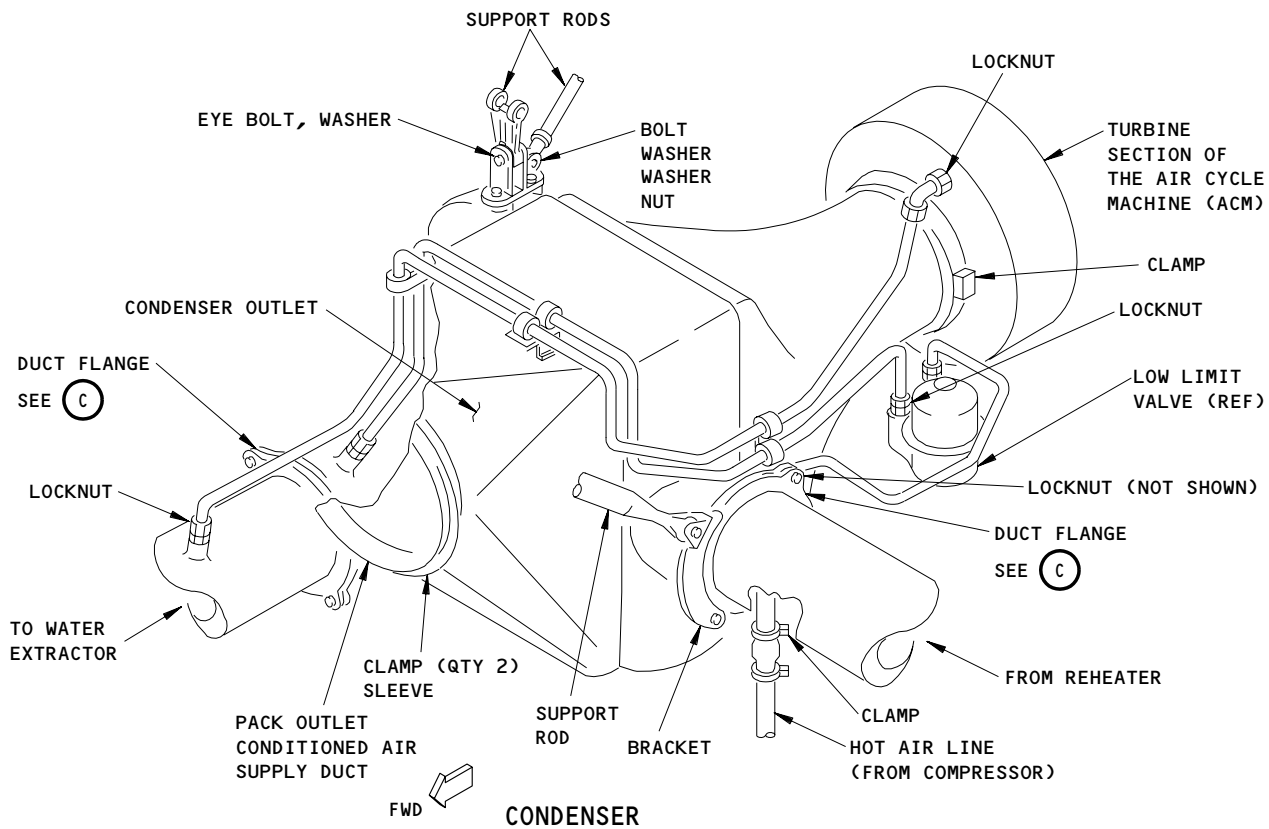
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Condenser Installation
Figure 401 (Sheet 2)

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- S 034-041
- (5) Move the rubber sleeve away from the condenser.

- S 034-009
- (6) Remove four bolts from the duct flange which is between the condenser and the water extractor.

- S 034-010
- (7) Remove the eyebolt from the mounting bracket on top of the condenser.

- S 034-011
- (8) Remove the bolt from the mounting bracket on top of the condenser.

- S 024-012
- (9) Slowly remove the condenser.

- S 034-013
- (10) Remove the packing from the duct flanges.

- S 434-014
- (11) Put a cover on the duct openings.

TASK 21-51-10-404-015

3. Condenser Installation (Fig. 401)

A. Consumable Materials

- (1) G02122 - Gauze sponge - dry, lint free, commercially available.
- (2) D00548, Lubricant (grease) - Fluorolube GR 660
 - (a) Lubricant (grease) - Fluorolube GR 544 (alternate)
 - (b) Lubricant (grease) - Fluorolube GR 470 (alternate)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power - Control
- (3) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
 - 193NL/194LR ECS access doors

D. Install the Condenser

- S 034-016
- (1) Remove the covers from the duct openings.

- S 424-017
- (2) Put the condenser in its position, forward of the air cycle machine.
 - (a) Make sure all the connections are aligned correctly.

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- S 434-018
- (3) Install the eyebolt and washer to attach the support rod to the mounting bracket on the top of the condenser.
- S 434-019
- (4) Install the bolt, washer, washer, and nut to attach the support rod to the mounting bracket on the top of the condenser.
- S 434-020
- (5) Install the clamp to connect the condenser to the turbine.
- (a) Tighten the clamp nut to 35-45 pound-inches.
- S 164-021
- (6) Rub the condenser outlet with the gauze sponge.
- S 434-043
- (7) Install the sleeve and the two clamps to connect the condenser outlet to the pack outlet conditioned air supply duct:
- (a) Move the sleeve so that it is seated evenly over the duct beads of the condenser outlet and the pack outlet conditioned air supply duct.
- (b) Apply a thin layer of the fluorolube lubricant (grease) to the faying surfaces of the sleeve and the two clamps.
- NOTE: The lubricant (grease) is only to help facilitate installation and it's use is optional.
- (c) Install the two clamps over the sleeve.
- (d) Tighten the nut on each clamp to 15-20 pound-inches (1.69-2.26 newton-meters).
- S 434-024
- (8) Install the packing in the duct flange which is between the condenser and the water extractor.
- S 434-025
- (9) Install and tighten the four bolts, washers, and nuts at the flange.
- S 434-026
- (10) Install the packing in the duct flange which is between the condenser and the reheater.
- S 434-027
- (11) Install and tighten the four bolts, washers, and nuts at the flange.
- S 434-028
- (12) Tighten the locknuts to connect the pneumatic sense lines (four places).

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S 434-029

(13) Install the clamp to connect the hot air line.

E. Do the installation test for the condenser

S 864-030

(1) Supply electrical power (AMM 24-22-00/201).

S 864-031

(2) Supply pneumatic power (AMM 36-00-00/201).

S 864-032

(3) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

(a) Turn the selector to the AUTO position.

(b) Make sure the PACK OFF light goes off.

S 794-034

(4) Feel for leaks around the condenser.

(a) Small leaks are permitted.

(b) You must repair a large leak.

S 794-035

(5) Make sure the connections of the pneumatic sense lines do not leak.

(a) Apply a solution of soap and water to the four connections of the pneumatic sense lines.

(b) If a bubble shows, repair the connection.

F. Put the airplane back to its usual condition

S 414-036

(1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-037

(2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

(a) Make sure the PACK OFF light comes on.

S 864-039

(3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-040

(4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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LOW LIMIT VALVE (LLV) – MAINTENANCE PRACTICES

1. General

- A. This procedure has these tasks:
 - (1) Low Limit Valve (LLV) Removal
 - (2) Low Limit Valve (LLV) Installation
 - (3) Low Limit Valve (LLV) Operational Test/Pneumatic Check
 - (4) Low Limit Valve (LLV) Leak Test
- B. One low limit valve (LLV) is installed in each air cooling pack, above the temperature control valve.

TASK 21-51-11-002-001

2. Low Limit Valve (LLV) Removal (Fig. 201)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
 - 193NL/194LR ECS access doors

C. Prepare for the Removal

S 862-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.

S 862-004

- (2) Open and attach a DO-NOT-CLOSE tag to the applicable (left or right) circuit breaker, on the overhead circuit breaker panel, P11:
 - (a) 11N10, LEFT PACK AUTO POWER
 - (b) 11N19, RIGHT PACK AUTO POWER

S 012-005

- (3) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

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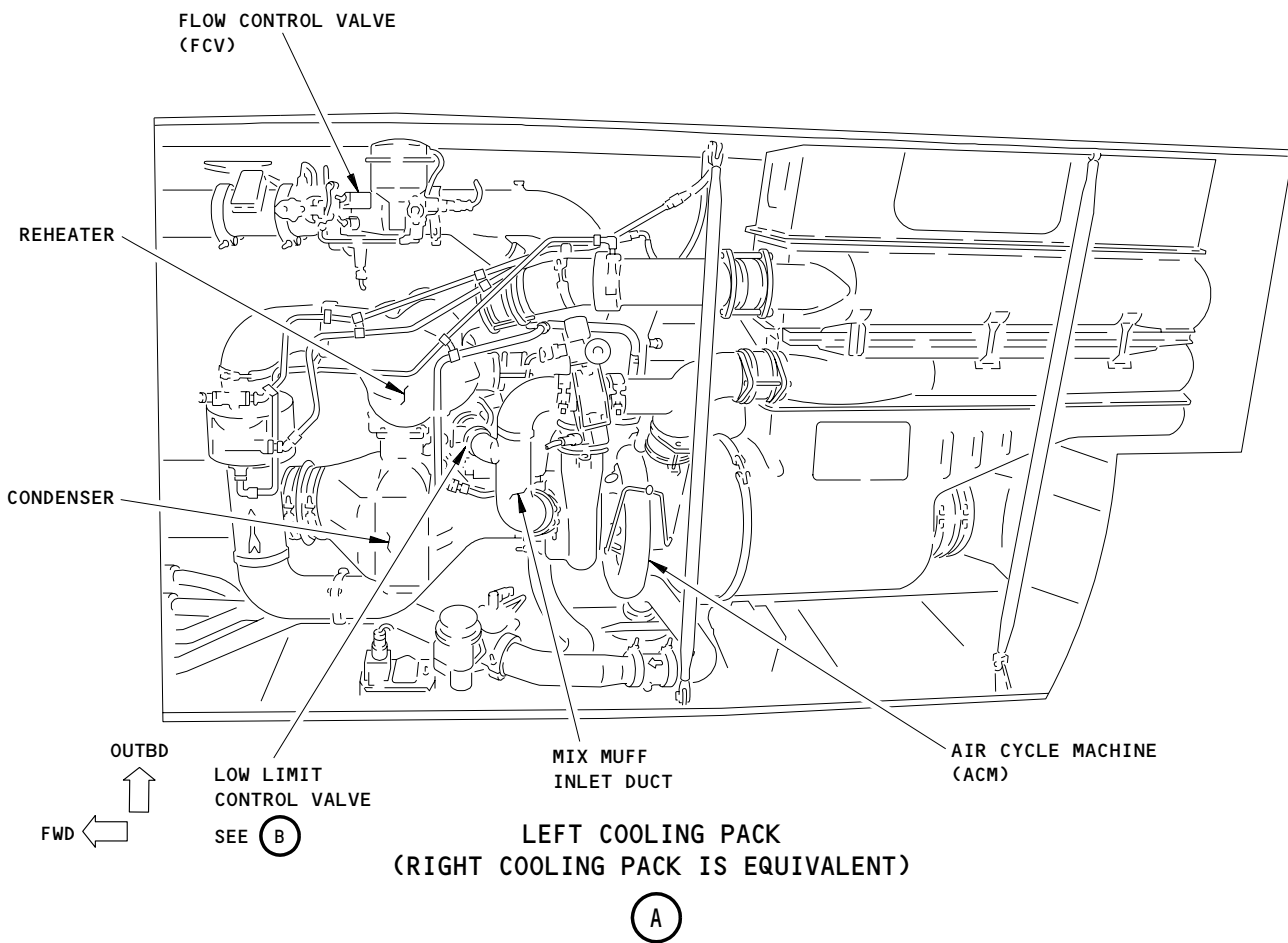
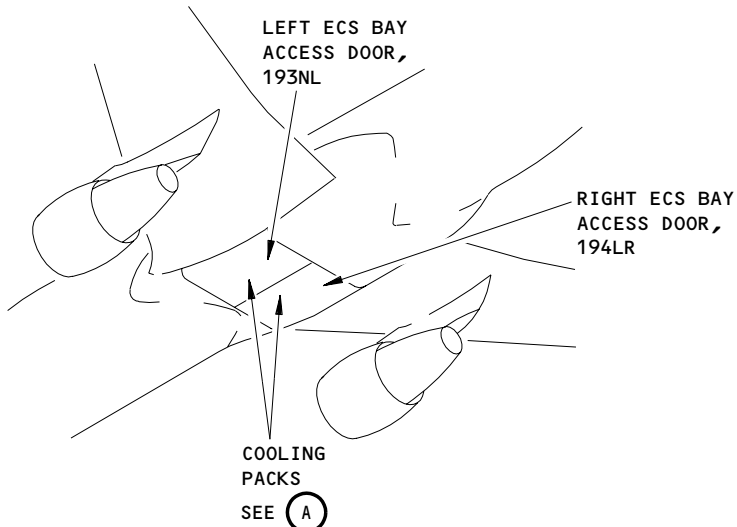
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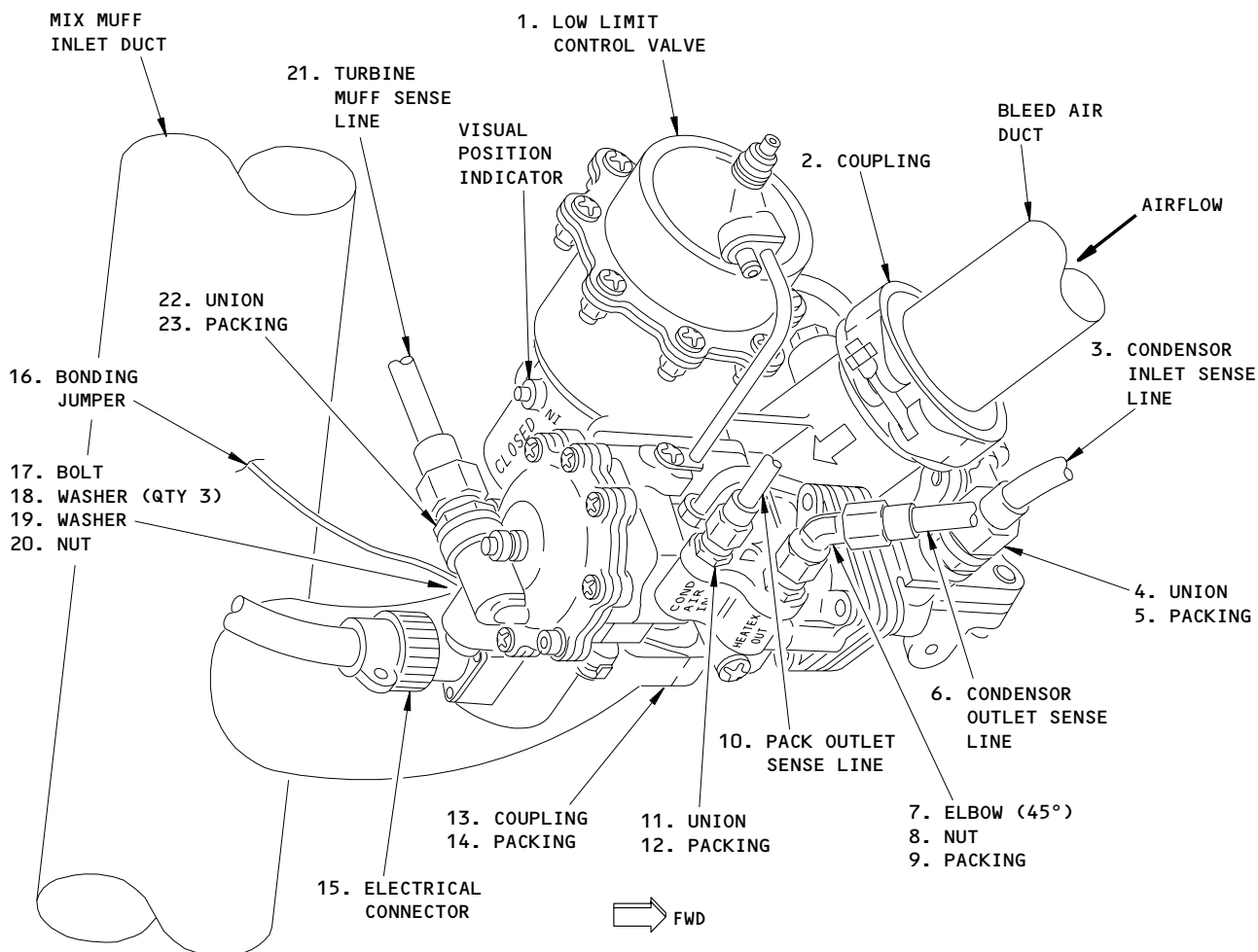
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Low Limit Control Valve Installation
Figure 201 (Sheet 1)

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LOW LIMIT CONTROL VALVE

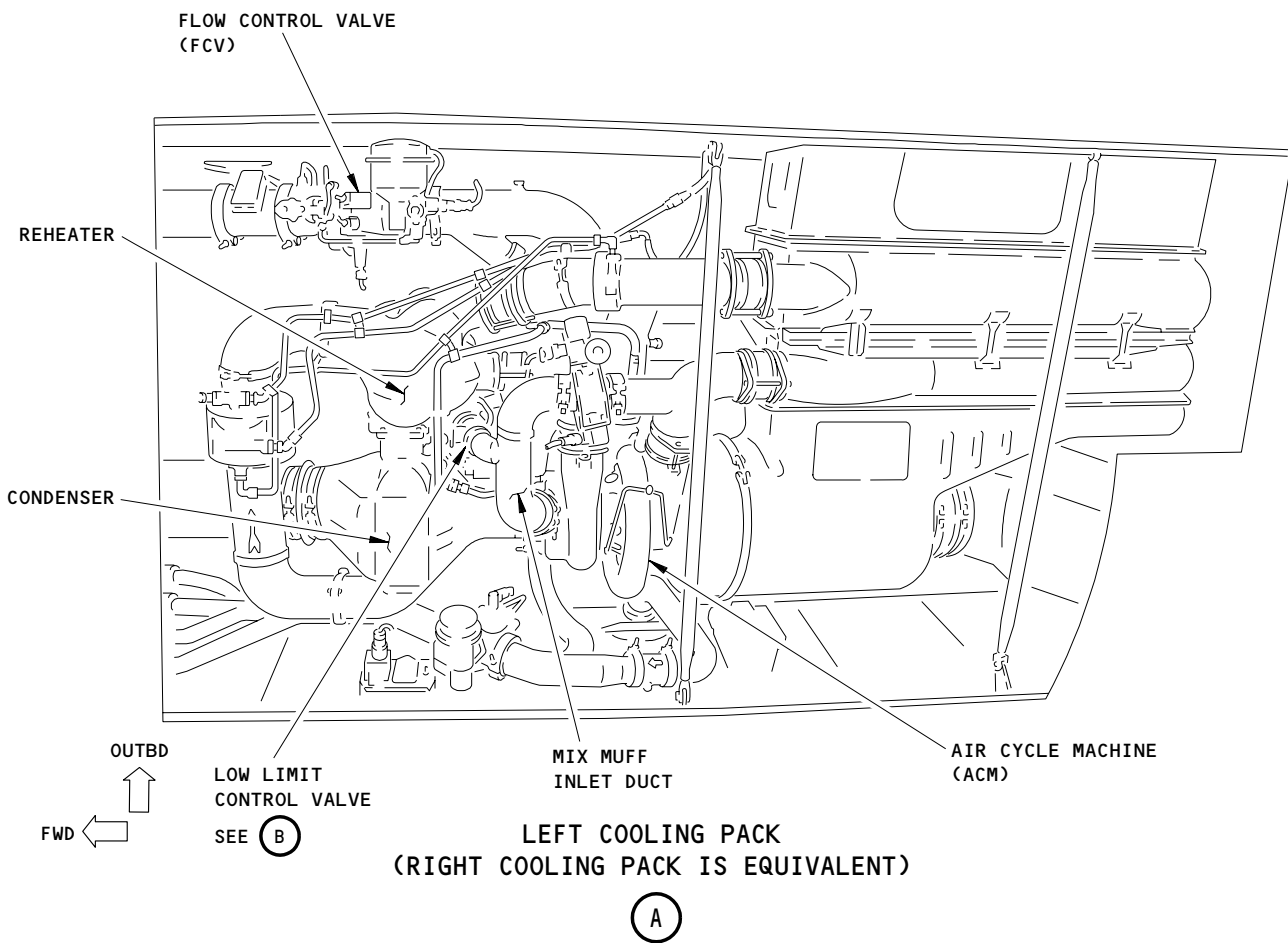
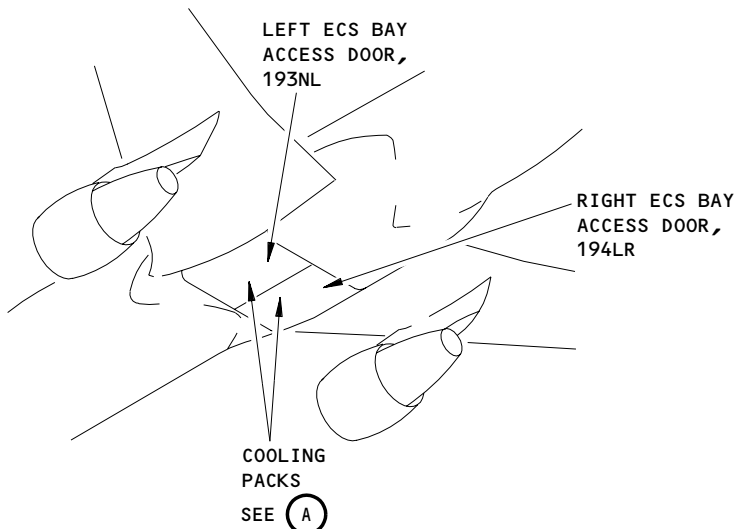
(B)

Low Limit Control Valve Installation
Figure 201 (Sheet 2)

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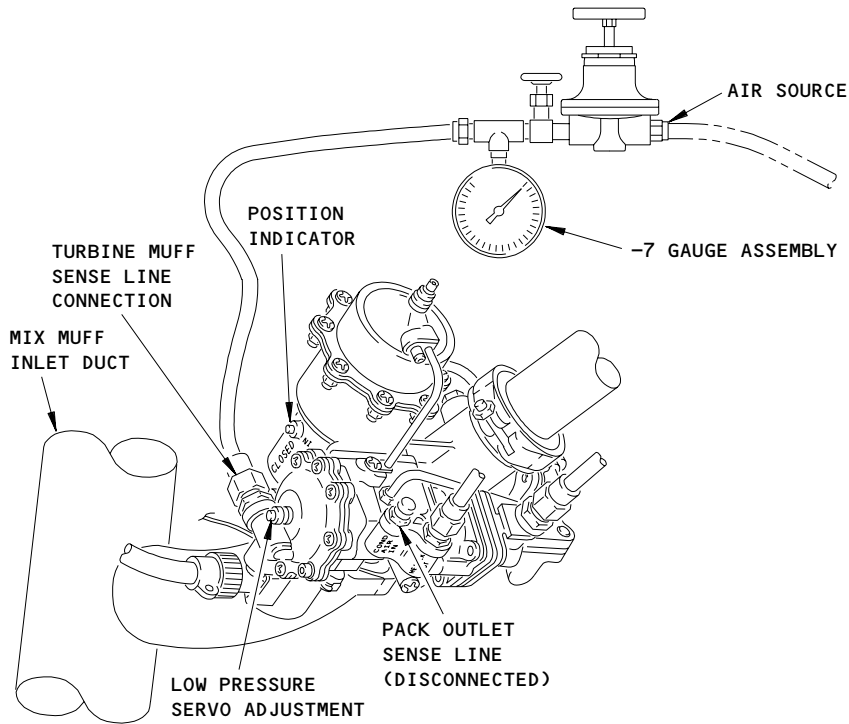
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MAINTENANCE MANUAL



Low Limit Control Valve - Low and High Pressure Servo Test
Figure 202 (Sheet 1)

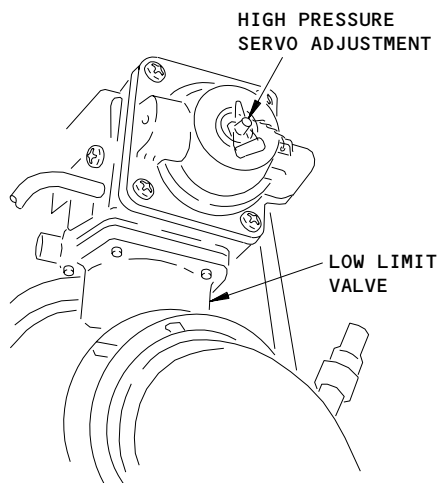
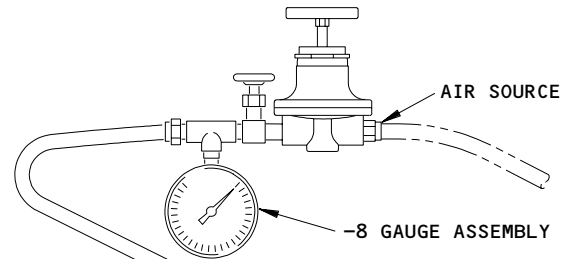
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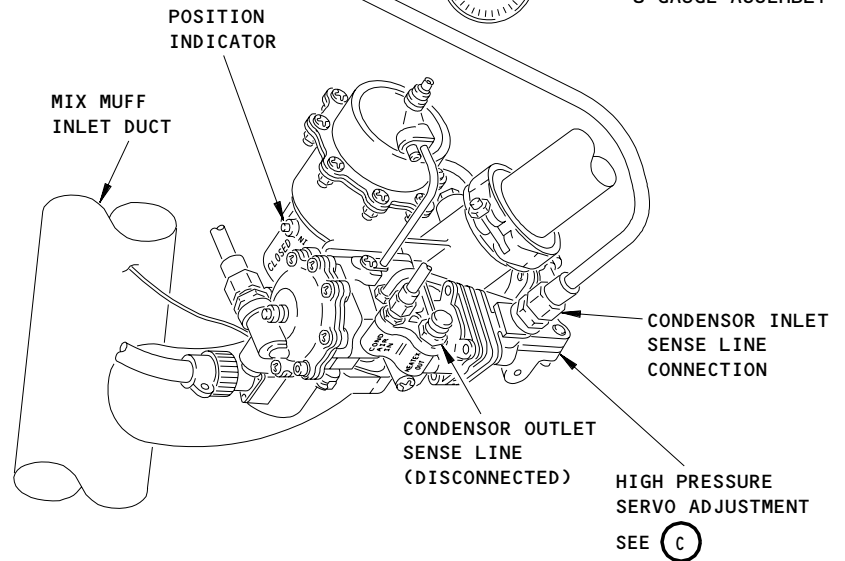
LOW LIMIT CONTROL VALVE TEST EQUIPMENT, A21011
(LOW PRESSURE SERVO TEST)

(B)



HIGH PRESSURE
SERVO ADJUSTMENT

(C)



LOW LIMIT CONTROL VALVE TEST EQUIPMENT, A21011
(HIGH PRESSURE SERVO TEST)

(B)

Low Limit Control Valve - Low and High Pressure Servo Test
Figure 202 (Sheet 2)

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D. Remove the Low Limit Valve (LLV)

S 032-006

- (1) Disconnect the electrical connector (15) from the LLV (1).

S 032-007

- (2) Disconnect the bonding jumper (16) from the LLV (1).
(a) Remove the bolt (17), the three washers (18), washer (19), nut (20) and bonding jumper (16).

S 032-008

- (3) Disconnect the condenser inlet sense-line (3) from the union (4).
(a) Remove the union (4) and the packing (5) from the LLV (1).
(b) Discard the packing (5).

S 032-009

- (4) Disconnect the condenser outlet sense-line (6) from the elbow (7).
(a) Loosen the nut (8) and remove the elbow (7), nut (8) and the packing (9) from the LLV (1).
(b) Discard the packing (9).

S 032-011

- (5) Disconnect the pack outlet sense-line (10) from the union (11).
(a) Remove the union (11) and the packing (12) from the LLV (1).
(b) Discard the packing (12).

S 032-010

- (6) Disconnect the turbine muff sense-line (21) from the union (22).
(a) Remove the union (22) and the packing (23) from the LLV (1).
(b) Discard the packing (23).

S 432-012

- (7) Put a tag on the pressure sense-lines (3, 6, 10, 21) to identify their installed location.

S 032-013

- (8) Remove the coupling (13) and the packing (14) from the LLV (1).

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S 032-082
(9) Remove the coupling (2) from the LLV (1).

S 022-014
(10) Remove the LLV (1) from the air cooling pack.

S 432-015
(11) Put a cover on all of the duct openings on the air cooling pack and the LLV (1).

TASK 21-51-11-002-016

3. Low Limit Valve (LLV) Installation (Fig. 201)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-51-00/501, Cooling Packs
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 36-00-00/201, Pneumatic - General

B. Consumables

- (1) D00130 - Lubricant-Dry film MIL-L-23398
- (2) B00058 - Soapy Water Solution - commercially available

C. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	1	Low Limit Valve (LLV)	21-51-01	10	215
201	1	Low Limit Valve (LLV)	21-51-01	10A	365
201	5	Packing	21-51-01	10	58
201	5	Packing	21-51-01	10A	150
201	9	Packing	21-51-01	10	58
201	9	Packing	21-51-01	10A	150
201	12	Packing (left pack)	21-51-52	01	210
201	12	Packing (left pack)	21-51-52	01A	210
201	12	Packing (right pack)	21-51-52	01	550
201	12	Packing (right pack)	21-51-52	01A	550
201	14	Packing	21-51-01	10	212
201	14	Packing	21-51-01	10A	360
201	23	Packing	21-51-01	10	58
201	23	Packing	21-51-01	10A	150

D. Access

- (1) Location Zones
135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
193NL/194LR ECS access doors

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E. Install the Low Limit Valve (LLV)

S 032-017

- (1) Remove the cover from the duct openings.

S 422-018

- (2) Put the valve in its position in the air cooling pack.
 - (a) Make sure the flow arrow points down.
 - (b) Make sure you can easily connect the pressure sense-lines.

S 432-019

- (3) Install the coupling (13) and the packing (14) on the LLV (1).

NOTE: Water can be used as a lubricant to help install the packing on the LLV.

- (a) Do not tighten the coupling (13).

S 422-083

- (4) Install the coupling (2) on to the LLV (1).
 - (a) Do not tighten the coupling (2).

S 422-084

- (5) Tighten the coupling (13) nut to 35-45 pound-inches (3.955-5.085 newton-meters).

S 422-085

- (6) Tighten the coupling (2) to 45-50 pound-inches (5.085-5.649 newton-meters).

S 432-020

CAUTION: MAKE SURE YOU CONNECT THE PRESSURE SENSE-LINES TO THE CORRECT PORTS ON THE LOW LIMIT VALVE. THE CORRECT PRESSURE FROM THE SENSE-LINES IS NECESSARY FOR THE OPERATION OF THE LOW LIMIT VALVE AND TO THE AIR COOLING PACK. IF THE PRESSURE SENSE-LINES ARE NOT CONNECTED CORRECTLY, IT COULD CAUSE DAMAGE TO THE AIR COOLING PACK.

- (7) Connect the pressure sense-lines to the LLV (1).
 - (a) Apply a light coat of dry lubricant to the unions (4, 11, 22) and the elbow (7).

NOTE: You can use acetone to dilute the dry lube if necessary.

- (b) To connect the condenser inlet sense-line (3) to the HEAT EX IN port, do these steps:
 - 1) Install the union (4) and new packing (5) on the LLV (1).
 - 2) Connect the condenser inlet sense-line (3) to the union (4) .

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- (c) To connect the condenser outlet sense-line (6) to the HEAT EX OUT port, do these steps:
 - 1) Install the elbow (7), nut (8) and new packing (9) on the LLV (1).
 - 2) Connect the condenser outlet sense-line (6) to the elbow (7).
- (d) To connect the pack outlet sense-line (10) to the COND AIR IN port, do these steps:
 - 1) Install the union (11) and new packing (12) on the LLV (1).
 - 2) Connect the pack outlet sense-line (10) to the union (11).
- (e) To connect the turbine muff sense-line (21) to the TURB MUFF port, do these steps:
 - 1) Install the union (22) and new packing (23) on the LLV (1).
 - 2) Connect the turbine muff sense-line (21) to the union (22).

S 032-022

- (8) Remove the identification tags from the sense-lines.

S 432-023

- (9) Connect the bonding jumper (16) to the LLV (1).
 - (a) Install the bolt (17), three washers (18), bonding jumper (16), washer (19) and nut (20).

S 432-024

- (10) Connect the electrical connector (15) to the LLV (1).
- F. Do the Installation Test for the Low Limit Valve (LLV)

S 862-026

- (1) Supply electrical power (AMM 24-22-00/201).

S 862-027

- (2) Supply pneumatic power (AMM 36-00-00/201).

S 862-025

- (3) Remove the DO-NOT-CLOSE tag and close the applicable (left or right) circuit breaker, on the P11 panel:
 - (a) 11N10, LEFT PACK AUTO POWER
 - (b) 11N19, RIGHT PACK AUTO POWER

S 862-028

- (4) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
 - (a) Turn the selector to the AUTO position.
 - (b) Make sure the PACK OFF light goes off.

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S 792-030

WARNING: DO NOT TOUCH THE HOT AIR DUCT. WHILE THE PACKS ARE ON, THE TEMPERATURE OF THIS DUCT CAN CAUSE INJURIES TO PERSONS.

- (5) Do a leak check of the LLV (1) flanges at the coupling (2, 13) locations.
 - (a) Apply the soapy water solution to the LLV (1) couplings (2, 13).
 - 1) If bubbles come slowly into view, the quantity of leakage is satisfactory.
 - 2) If bubbles come quickly into view, the quantity of leakage occurs, you must repair the cause of the leakage.

S 792-086

- (6) Do this task: Low Limit Valve Leak Test (AMM 21-51-11/201).

S 742-079

- (7) As an option do this task: Low Limit Valve Operational Test/Pneumatic Check (AMM 21-51-11/201).

NOTE: You do not have to do this test if the LLV is new or has been previously shop tested off-aircraft.

G. Put the airplane back to its usual condition

S 412-032

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 862-033

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.

S 862-035

- (3) Remove the pneumatic power, if it is not necessary (AMM 36-00-00/201).

S 862-036

- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

TASK 21-51-11-702-037

4. Low Limit Valve (LLV) Operational Test/Pneumatic Check (Fig. 201, 202)

A. Equipment

- (1) Portable source of air - commercially available.

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(2) A21011-7, -8, Low Limit Valve - Test Equipment (recommended)

NOTE: The following pressure gages are optional equipment to the gages included in the A21011 test equipment.

- (a) Pressure gage, 0 to 27.5 In-Hg (13.5 PSI) range and minimum accuracy of 0.5% - commercially available (optional)
- (b) Pressure gage, 0 to 95 In-H₂O (3.43 PSI) range and minimum accuracy of 0.5% - commercially available (optional)
- (c) Pressure gages, 0 to 100 kPa (14.5 PSI) range and minimum accuracy of +/- 0.25% of full scale displacement - commercially available (optional)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
201	5	Packing	21-51-01	10	58
201	5	Packing	21-51-01	10A	150
201	9	Packing	21-51-01	10	58
201	9	Packing	21-51-01	10A	150
201	12	Packing (left pack)	21-51-52	01	210
201	12	Packing (left pack)	21-51-52	01A	210
201	12	Packing (right pack)	21-51-52	01	550
201	12	Packing (right pack)	21-51-52	01A	550
201	23	Packing	21-51-01	10	58
201	23	Packing	21-51-01	10A	150

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-00-00/201, Air Conditioning General
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 36-00-00/201, Pneumatic - General

D. Consumables

- (1) D00130, Lubricant-Dry film MIL-L-23398

E. Access

- (1) Location Zones
135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
193NL/194LR ECS access doors

F. Prepare for the Test

S 862-038

- (1) Supply electrical power (AMM 24-22-00/201).

S 862-039

- (2) Supply pneumatic power (AMM 36-00-00/201).

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S 862-040

- (3) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.

S 012-042

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

G. Low Limit Valve (LLV) Torque Motor Test

S 712-070

- (1) Operate the air conditioning pack with the applicable PACK selector in the AUTO position (AMM 21-00-00/201).

S 212-071

- (2) Look at the visual position indicator on the LLV (1).

NOTE: The visual position indicator must show the LLV in the closed position.

S 022-089

- (3) Disconnect the electrical connector from the L/R pack standby temperature sensor (pack temperature 2 sensor) TS5132/TS5134 (WDM 21-51-13, WDM 21-51-23).
 - (a) The pack standby temperature sensor is found in the water extractor outlet duct of each cooling pack (AMM 21-51-08/401).

S 712-072

- (4) Move the applicable PACK selector to the STBY-N position.

S 212-073

- (5) Make sure the visual position indicator for the LLV (1) starts to move to the open position.

NOTE: It can take 5 minutes before the LLV starts to open. When the system is in the standby normal mode, the LLV is used to keep the pack outlet temperature at 40 deg. F until the compressor discharge temperature reaches 450 deg. F. When the compressor discharge temperature reaches 450 deg. F, the LLV will modulate to keep the compressor discharge temperature at 450 deg. F.

- (a) If the LLV (1) valve does not start to open after 5 minutes, then there is a problem with the torque motor circuit.

S 422-088

- (6) Connect the electrical connector to the L/R pack standby temperature sensor (pack temperature 2 sensor) TS5132/TS5134.

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S 712-074

- (7) Move the applicable PACK selector back to the AUTO position, and shut down the air conditioning pack (AMM 21-00-00/201).

H. Low Limit Valve (LLV) Pneumatic Check

S 782-043

- (1) Do the low pressure servo test.

WARNING: DO NOT TOUCH THE HOT AIR DUCT. WHILE THE PACKS ARE ON, THE TEMPERATURE OF THIS DUCT CAN CAUSE INJURIES TO PERSONS.

- (a) Disconnect the turbine muff sense-line (21) from the union (22).
 - 1) Remove the union (22) and the packing (23) from the LLV (1).
- (b) Disconnect the pack outlet sense-line (10) (COND AIR IN) from the union (11).
 - 1) Remove the union (11) and the packing (12) from the LLV (1).
- (c) Use the A21011-7 Low Limit Valve - Test Equipment, or equivalent to connect the source of air and the pressure gage to the turbine muff sense line connection (Fig. 202).
- (d) Turn the applicable (L or R) PACK selector, on the P5 panel, to the AUTO position.
 - 1) Make sure the PACK OFF light goes off.

CAUTION: DO NOT APPLY A PRESSURE OF MORE THAN 7.00 IN-Hg (95 IN-H₂O; 23.6 KPa). A PRESSURE LARGER THAN THIS CAN CAUSE DAMAGE TO THE VALVE.

- (e) Slowly increase the pressure at the turbine muff connection.
- (f) Look at or feel the visual position indicator on the LLV (1).

NOTE: To see the visual position indicator, use a flashlight or some other source of light. The valve position is shown by the direction of a small, red groove on the position indicator.

- (g) Make sure the LLV (1) starts to open when the pressure is at 1.69-1.84 In-Hg (23-25 In-H₂O; 5.7-6.2 kPa).
- (h) Make sure the LLV (1) is fully open when the pressure is at 6.12-6.56 In-Hg (83-89 In-H₂O; 20.7-22.1 kPa).

NOTE: The LLV is fully open when the butterfly is a minimum of 70 degrees from full closed.

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- (i) If the LLV (1) does not open correctly, do the steps that follow:
- 1) Feel for a leak at the mating surface of the cover assembly of the LLV (1).
 - 2) Turn the low pressure servo adjustment on the LLV (1).

NOTE: If you turn the low pressure servo adjustment in a clockwise direction, it will increase the pressure to the LLV (1).

- (j) Slowly decrease the pressure at the turbine muff connection to 0.00 In-Hg (0.0 In-H₂O; 0.0 kPa).
- (k) Make sure the LLV (1) is fully closed.
- (l) Disconnect the A21011-7 Low Limit Valve-Test Equipment, and source of air from the turbine muff sense line connection.
- (m) If the LLV (1) did not operate correctly, replace the LLV (1).
- (n) If the LLV (1) did operate correctly, do the steps that follow:
- 1) Apply a light layer of dry lubricant to the unions (22,11).

NOTE: You can use acetone to dilute the dry lube if necessary.

- 2) To connect the turbine muff sense-line (21) to the LLV (1), do these steps:
 - a) Install the union (22) and new packing (23) on the LLV (1).
 - b) Connect the turbine muff sense-line (21) to the union (22).
 - 3) To connect the pack outlet sense-line (10) (COND AIR IN) to the LLCV (1), do these steps:
 - a) Install the union (11) and new packing (12) on the LLV (1).
 - b) Connect the pack outlet sense-line (10) to the union (11).
- (o) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.
- 1) Make sure the PACK OFF light comes on.

S 782-044

- (2) Do the high pressure servo test.

WARNING: DO NOT TOUCH THE HOT AIR DUCT. WHILE THE PACKS ARE ON, THE TEMPERATURE OF THIS DUCT CAN CAUSE INJURIES TO PERSONS.

- (a) Disconnect the condenser inlet sense-line (3) from the union (4).
- 1) Remove the union (4) and the packing (5) from the LLV (1).
 - 2) Discard the packing (5).

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- (b) Disconnect the condensor outlet sense-line (6) from the elbow (7).
 - 1) Loosen the nut (8) and remove the elbow (7), nut (8) and packing (9) from the LLV (1).
 - 2) Discard the packing (9).
- (c) Use the A21011-8 Low Limit Valve - Test Equipment, or equivalent to connect the source of air and the pressure gage to the condensor inlet sense line connection (Fig. 202).
- (d) Turn the applicable (L or R) PACK selector, on the P5 panel, to the AUTO position.
 - 1) Make sure the PACK OFF light goes off.

CAUTION: DO NOT APPLY A PRESSURE MORE THAN 27.5 IN-Hg (373.2 IN-H₂O; 93.1 kPa). A PRESSURE LARGER THAN THIS CAN CAUSE DAMAGE TO THE VALVE.

- (e) Slowly increase the pressure at the condensor inlet connection.
- (f) Look at or feel the position indicator on the LLV (1)

NOTE: To see the valve position indicator, use a flashlight or some other source of light. The valve position is shown by the direction of a small, red groove on the position indicator.

- (g) Make sure the LLV (1) starts to open when the pressure is at 6.1-8.1 In-Hg (82.8-109.9 In-H₂O; 20.6-27.4 kPa).
- (h) Make sure the LLV (1) is fully open when the pressure is at 21.4-25.4 In-Hg (290.4-344.7 In-H₂O; 72.3-85.8 kPa).
- (i) If the LLV (1) does not operate correctly, do the steps that follow:
 - 1) Feel for a leak at the mating surface of the cover assembly of the LLV (1).
 - 2) Turn the high pressure servo adjustment on the LLV (1).
- (j) Slowly decrease the pressure at the condensor inlet connection to 0.0 In-Hg (0.0 In-H₂O; 0.0 kPa).
- (k) Make sure the LLV (1) is fully closed.
- (l) Disconnect the A21011-8 Low Limit Valve-Test Equipment, and source of air from the condensor inlet sense line connection.
- (m) If the LLV (1) did not operate correctly, replace the LLV (1).
- (n) If the LLV (1) did operate correctly, do the steps that follow:
 - 1) Apply a light coat of dry lubricant to the union (4) and the elbow (7).

NOTE: You can use acetone to dilute the dry lube if necessary.

- 2) To connect the condensor inlet sense-line (3) to the LLV (1), do these steps:
 - a) Install the union (4) and new packing (5) on the LLV (1).

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- b) Connect the condenser inlet sense-line (3) to the union (4).
- 3) To connect the condensor outlet sense-line (6) (HEAT EX OUT) to the LLV (1), do these steps:
 - a) Install the elbow (7), nut (8) and new packing (9) on the LLCV (1).
 - b) Connect the condenser outlet sense-line (6) to the elbow (7).

I. Put the airplane back to its usual condition

S 412-045

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 862-046

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.

S 862-048

- (3) Remove the pneumatic power, if it is not necessary (AMM 36-00-00/201).

S 862-049

- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

TASK 21-51-11-702-050

5. Low Limit Valve (LLV) Leak Test (Fig. 201)

A. Consumable Material

- (1) B00058 - Soapy Water Solution - commercially available

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power - Control
- (3) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
 - 193NL/194LR ECS access doors

D. Prepare for the test

S 862-051

- (1) Supply electrical power (AMM 24-22-00/201).

S 862-052

- (2) Supply pneumatic power (AMM 36-00-00/201).

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S 862-053

- (3) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the AUTO position.
 - (a) Make sure the PACK OFF light goes off.

S 012-055

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

E. Do the Test

S 792-056

WARNING: DO NOT TOUCH THE HOT AIR DUCT. WHILE THE PACKS ARE ON, THE TEMPERATURE OF THIS DUCT CAN CAUSE INJURIES TO PERSONS.

- (1) Apply the soapy water solution to the these connections on the LLV (1):
 - (a) Condensor inlet (HEAT EX IN) sense-line connection (3).
 - (b) Condensor outlet (HEAT EX OUT) sense-line connection (6).
 - (c) Pack outlet (COND AIR IN) sense-line connection (10).
 - (d) Turbine muff (TURB MUFF) sense-line connection (21).

S 212-057

- (2) If bubbles show, and break or blow away, repair the applicable connection.

F. Put the airplane back to its usual condition

S 412-058

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 862-059

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.

S 862-061

- (3) Remove the pneumatic power, if it is not necessary (AMM 36-00-00/201).

S 862-062

- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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PACK TEMPERATURE CONTROL VALVE - REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the temperature control valves. One temperature control valve is installed in each air cooling pack, between the primary heat exchanger and the condenser.

TASK 21-51-12-004-001

2. Remove the Pack Temperature Control Valve (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones

135/136 Environmental Control Systems (ECS) Bay

- (2) Access Panels

193NL/194LR ECS access door

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (2) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) To remove the left valve:
1) 11N10, LEFT PACK AUTO PWR
2) 11N11, LEFT PACK AUTO CONT
3) 11N24, LEFT PACK STANDBY PWR
(b) To remove the right valve:
1) 11N19, RIGHT PACK AUTO PWR
2) 11N20, RIGHT PACK AUTO CONT
3) 11N15, RIGHT PACK STANDBY PWR

S 014-005

- (3) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

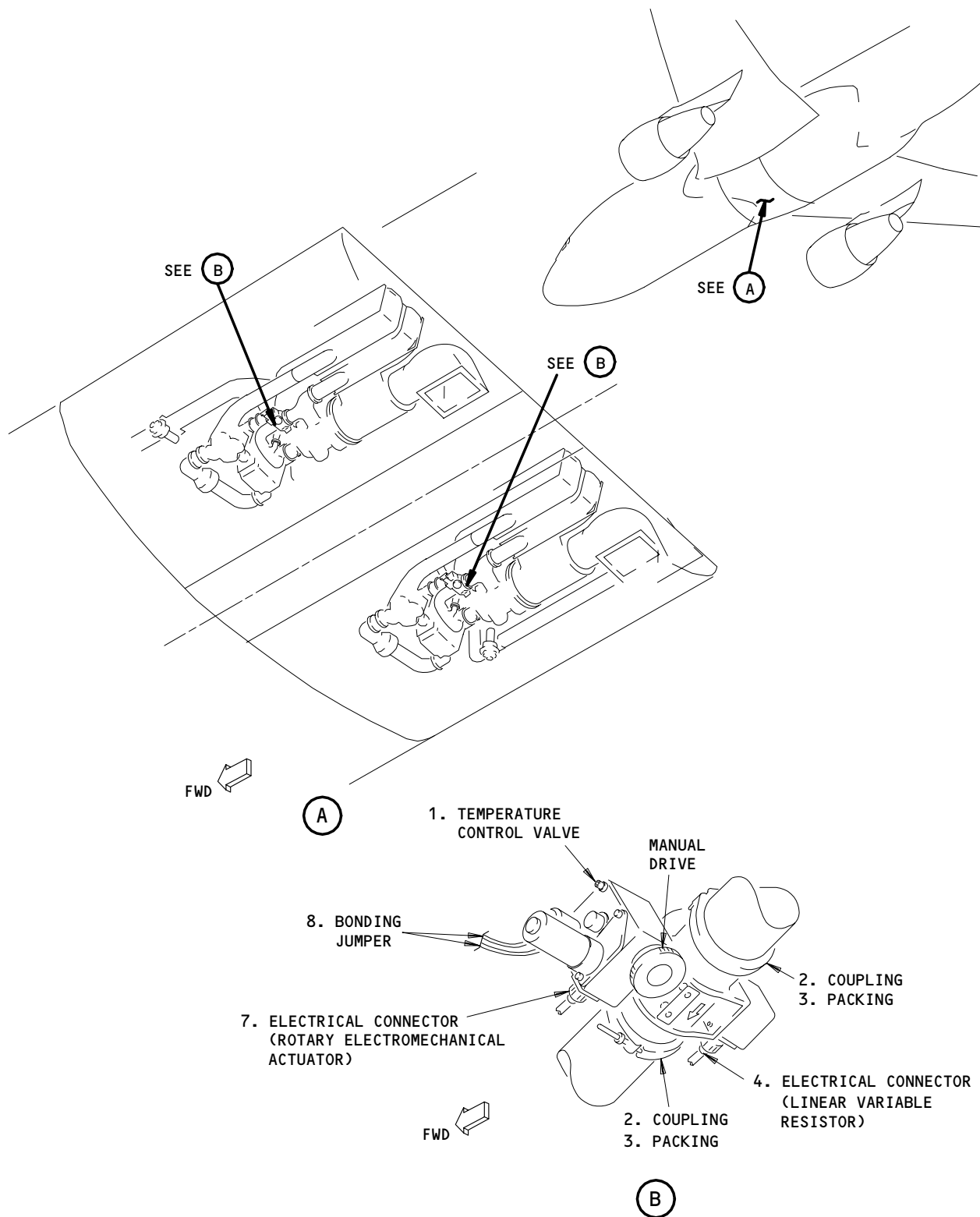
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Pack Temperature Control Valve
Figure 401

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D. Remove the Valve

- S 034-006
- (1) Disconnect two electrical connectors from the valve (1).

- S 434-007
- (2) Put a tag on the electrical connectors to show how they were installed.

- S 034-008
- (3) Disconnect the bonding jumpers (8) from the valve (1).

- S 034-009
- (4) Remove the couplings (2) from the two sides of the valve (1).

- S 034-010
- (5) Remove the packing (3) from the couplings (2).

- S 024-011
- (6) Remove the valve (1).

- S 434-012
- (7) Put a cover on the duct openings.

TASK 21-51-12-404-013

3. Install the Pack Temperature Control Valve (Fig. 401)

A. Parts

- (1) Refer to the Illustrated Parts Catalog (IPC) for the part numbers and the effectivities of the items in the table that follows:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Valve - Temperature Control	21-51-01	10	245
401	1	Valve - Temperature Control	21-51-01	10A	420
401	3	Packing	21-51-01	10	240
401	3	Packing	21-51-01	10A	400

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power - Control
- (3) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
 - 193NL/194LR ECS access door

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D. Install the Valve

S 034-014

- (1) Remove the covers from the duct openings.

S 424-015

- (2) Put the valve (1) in its position in the air cooling pack.
(a) Make sure the flow arrow points forward.

S 434-016

- (3) Install new packing (3) in the couplings (2).

S 434-017

- (4) Install the couplings (2) on the two sides of the valve (1).
(a) Tighten the couplings (2) to 50 pound-inches.

S 434-018

- (5) Connect the bonding jumpers (8) to the valve (1) with a bolt, washer, and nut.

S 434-019

- (6) On the left valve,
install the electrical connectors to the valve (1).
(a) The electrical connector D676 to the rotary electro-mechanical actuator (7).
(b) The electrical connector D678 to the linear variable resistor (4).

S 434-020

- (7) On the right valve,
install the electrical connectors to the valve (1).
(a) The electrical connector D722 to the rotary electro-mechanical actuator (7).
(b) The electrical connector D724 to the linear variable resistor (4).

S 034-021

- (8) Remove the tags from the electrical connectors.

E. Do the installation test for the valve

S 864-022

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-023

- (2) Supply pneumatic power (AMM 36-00-00/201).

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S 864-024

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
- (a) If the left valve was installed:
 - 1) 11N10, LEFT PACK AUTO PWR
 - 2) 11N11, LEFT PACK AUTO CONT
 - 3) 11N24, LEFT PACK STANDBY PWR
 - (b) If the right valve was installed:
 - 1) 11N19, RIGHT PACK AUTO PWR
 - 2) 11N20, RIGHT PACK AUTO CONT
 - 3) 11N15, RIGHT PACK STANDBY PWR
 - (c) EICAS circuit breakers (6 locations).

S 864-025

- (4) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
- (a) Turn the selector to the STBY-W position.

S 864-027

- (5) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 214-028

- (6) Make sure the TEMP VALVE indication, on the EICAS display, is at 1.00.

S 214-029

- (7) Make sure the position indicator on the valve is at the OPEN position.

S 794-030

- (8) Feel for leaks around the valve.
- (a) Small leaks are permitted.
 - (b) You must repair a large leak.

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F. Put the airplane back to its usual condition

S 414-031

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-032

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 864-034

- (3) Remove the pneumatic power, if it is not necessary (AMM 36-00-00/201).

S 864-035

- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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PACK TEMPERATURE CONTROLLER AND PACK STANDBY TEMPERATURE CONTROLLER –
REMOVAL/INSTALLATION

1. General

- A. This procedure has instruction to remove and install the three pack temperature controllers. The removal and installation procedure is the same for each controller. The three pack temperature controllers are:
- (1) The left pack temperature controller is installed in the E3-1 rack of the main equipment center.
 - (2) The right pack temperature controller is installed in the E3-1 rack of the main equipment center.
 - (3) The pack standby temperature controller is installed in the E3-2 rack of the main equipment center.

TASK 21-51-14-004-001

2. Pack Temperature Controller/Pack Standby Temperature Controller Removal

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-01/401, E/E Rack-Mounted Components

B. Access

- (1) Location Zones
119 Main equipment center (Right)
- (2) Access Panel
119AL Main equipment center access door

C. Prepare for the Removal

S 864-015

- (1) Make sure the L PACK and R PACK selectors, on the air conditioning control panel in the pilots' overhead panel, P5, are in the OFF position.

S 864-002

- (2) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
 - (a) To remove the left pack temperature controller:
 - 1) 11N10, LEFT PACK AUTO PWR
 - 2) 11N11, LEFT PACK AUTO CONT
 - (b) To remove the right pack temperature controller:
 - 1) 11N19, RIGHT PACK AUTO PWR
 - 2) 11N20, RIGHT PACK AUTO CONT
 - (c) To remove the pack standby temperature controller:
 - 1) 11N15, RIGHT PACK STANDBY PWR
 - 2) 11N16, RIGHT PACK STANDBY CONT

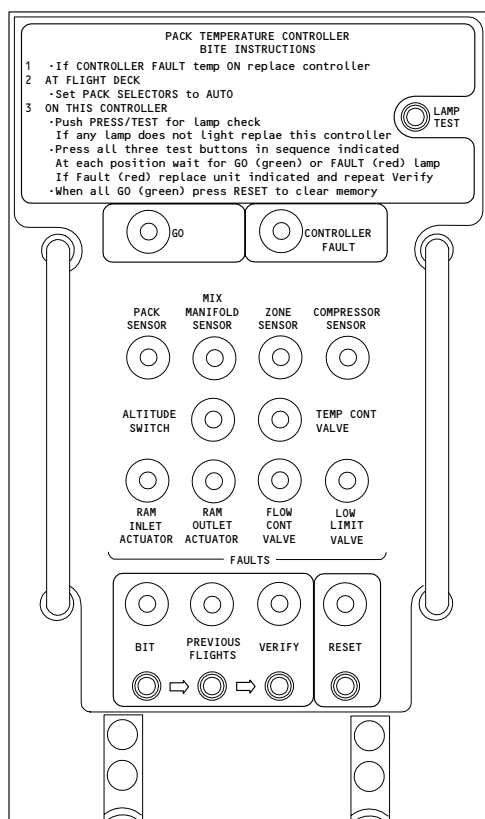
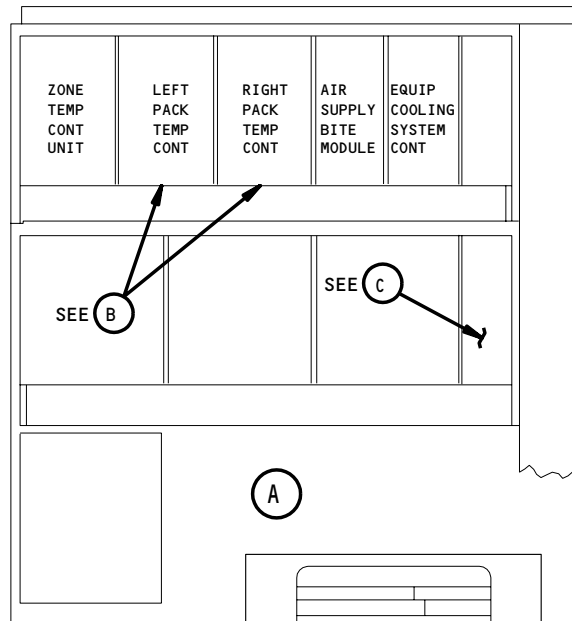
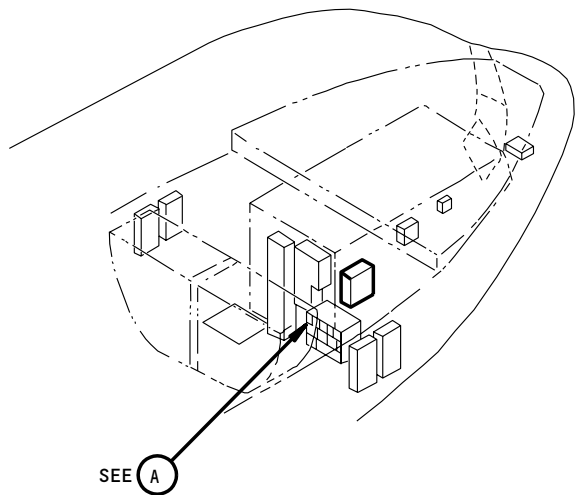
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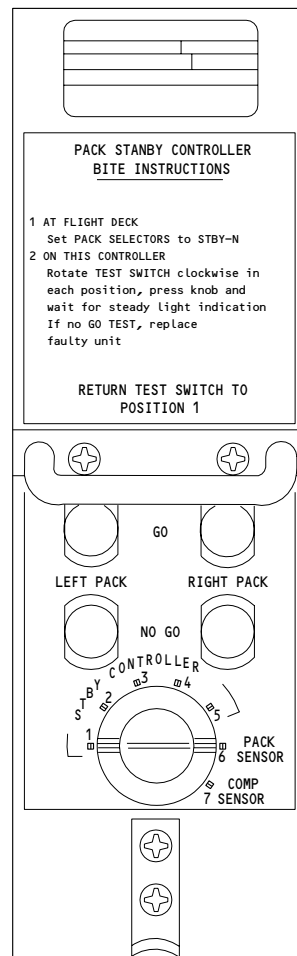
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B PACK TEMPERATURE CONTROLLER



C PACK STANDBY CONTROLLER

Pack Temperature Controller Installation
Figure 401

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- 3) 11N24, LEFT PACK STANDBY PWR
- 4) 11N25, LEFT PACK STANDBY CONT

S 014-003

- (3) Open the access door for the main equipment center, 119AL (AMM 06-41-00/201).

D. Remove the Controller

S 024-011

- (1) Remove the controller (AMM 20-10-01/401).

TASK 21-51-14-404-004

3. Pack Temperature Controller/Pack Standby Temperature Controller Installation

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-01/401, E/E Rack-Mounted Components
- (3) AMM 21-51-14/501, Pack Temperature Controller
- (4) AMM 24-22-00/201, Electrical Power - Control

B. Access

- (1) Location Zones
 - 119 Main equipment center (Right)
- (2) Access Panel
 - 119AL Main equipment center access door

C. Install the Controller

S 424-005

- (1) Install the controller in its position in the E3 rack (AMM 20-10-01/401).

D. Do the Installation Test on the Controller

S 864-006

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-007

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
 - (a) If you installed the left pack temperature controller:
 - 1) 11N10, LEFT PACK AUTO PWR
 - 2) 11N11, LEFT PACK AUTO CONT
 - (b) If you installed the right pack temperature controller:
 - 1) 11N19, RIGHT PACK AUTO PWR
 - 2) 11N20, RIGHT PACK AUTO CONT

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MAINTENANCE MANUAL

- (c) If you installed the pack standby temperature controller:
- 1) 11N15, RIGHT PACK STANDBY PWR
 - 2) 11N16, RIGHT PACK STANDBY CONT
 - 3) 11N24, LEFT PACK STANDBY PWR
 - 4) 11N25, LEFT PACK STANDBY CONT

S 744-012

- (3) If a pack temperature controller is installed from another airplane, do the steps that follow to clear the non-volatile memory in the pack temperature controller.

NOTE: If you install a pack temperature controller from a different airplane, you must reset the controller to clear the "PREVIOUS FLIGHTS" memory.

WARNING: MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE RAM-AIR INLET DOOR AND THE RAM-AIR OUTLET DOOR. WHEN YOU PUSH THE "VERIFY" SWITCH, THESE COMPONENTS WILL MOVE AND COULD CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (a) Push the VERIFY switch on the controller.
- (b) Make sure the green GO light comes on.
- (c) Push the RESET switch the pack temperature controller.

S 744-008

- (4) Do the BITE test on the applicable controller (AMM 21-51-14/501).
E. Put the airplane back to its usual condition

S 414-009

- (1) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

S 864-010

- (2) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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PACK TEMPERATURE CONTROLLER AND PACK STANDBY TEMPERATURE CONTROLLER –
ADJUSTMENT/TEST

1. General

- A. This procedure has instructions to do the BITE test on the left and right pack temperature controllers (Paragraph 2) and on the pack standby controller (Paragraph 3).

TASK 21-51-14-705-001

2. Do the Pack Temperature Controller BITE Test (Fig. 501)

A. General

- (1) The Built-In-Test Equipment (BITE) does an electrical check of these components:
- (a) pack temperature controller
 - (b) pack outlet temperature sensor
 - (c) compressor outlet temperature sensor
 - (d) mix manifold temperature sensor
 - (e) zone temperature sensors
 - (f) altitude switch
 - (g) flow control and shutoff valve
 - (h) low limit valve.
- (2) When the pneumatic power is off, the Built-In-Test Equipment (BITE) does an operational check of the following components by driving each one fully open and fully closed:
- (a) temperature control valve
 - (b) ram air inlet actuator
 - (c) ram air exhaust actuator.
- (3) When the pneumatic power is on, the Built-In-Test Equipment (BITE) does an operational check of the low limit valve by monitoring the pack outlet temperature as the valve is opened. An increase in the pack outlet temperature shows that the low limit valve has opened.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control
- (3) AMM 36-00-00/201, Pneumatic – General

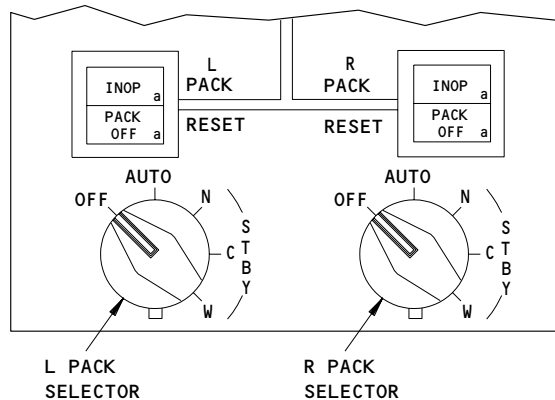
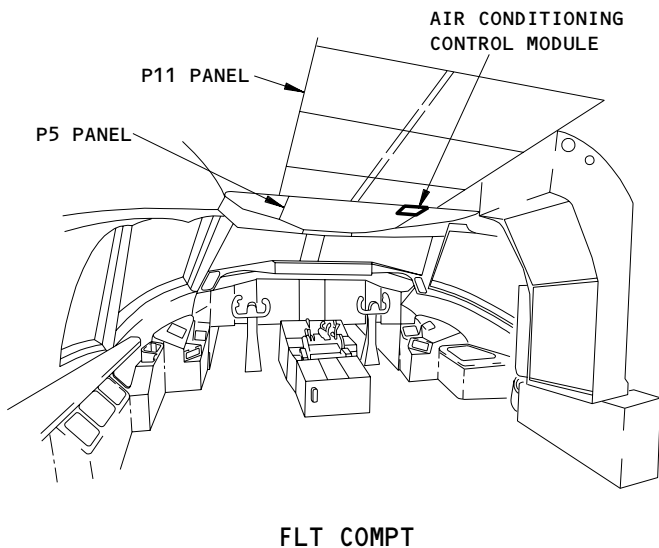
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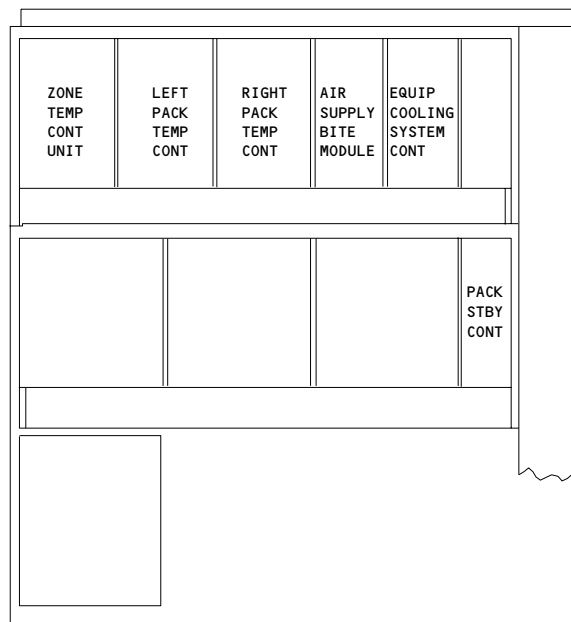
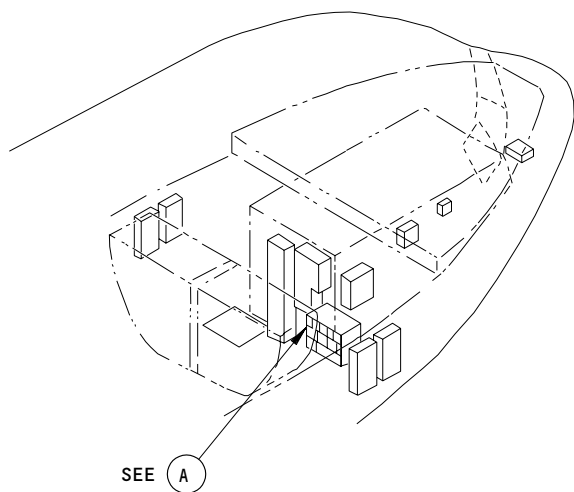
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AIR CONDITIONING CONTROL MODULE



E3 RACK

A

Pack Temperature Controller Adjustment Test
Figure 501

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- (4) FIM 21-51-00/101, Cooling Pack System
- C. Access
 - (1) Location Zones
 - 120 Main equipment center (Right)
 - (2) Access Panels
 - 119AL Main equipment center access door
- D. Prepare for the Test.
 - S 865-002
 - (1) Supply electrical power (AMM 24-22-00/201).
 - S 865-003
 - (2) Remove pneumatic power (AMM 36-00-00/201).
 - S 865-004
 - (3) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
 - (a) 11N10, LEFT PACK AUTO PWR
 - (b) 11N11, LEFT PACK AUTO CONT
 - (c) 11A13, LEFT PACK FLOW CONT
 - (d) 11A26, RIGHT PACK FLOW CONT
 - (e) 11N15, RIGHT PACK STANDBY PWR
 - (f) 11N16, RIGHT PACK STANDBY CONT
 - (g) 11N19, RIGHT PACK AUTO PWR
 - (h) 11N20, RIGHT PACK AUTO CONT
 - (i) 11N24, LEFT PACK STANDBY PWR
 - (j) 11N25, LEFT PACK STANDBY CONT
 - S 865-005
 - (4) Turn the zone temperature selectors, on the P5 panel, to the AUTO (12 o'clock) positions.
 - S 865-007
 - (5) Push the TRIM AIR switch-light, on the P5 panel, to the on position.
 - S 865-009
 - (6) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the AUTO position.
 - S 015-011
 - (7) Open the access door for the main equipment center, 119AL (AMM 06-41-00/201).

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E. Do the BITE Test on the left or right Pack Temperature Controller

NOTE: BITE will show the same indication for a component fault or an airplane wiring fault. Make sure the circuit is correct and the connector is in good condition before you replace a component.

S 745-012

(1) Do these steps on the face of the applicable (left or right) controller:

(a) Make sure the CONTROLLER FAULT light is not on.

- 1) If the CONTROLLER FAULT light is on, there is a problem with the pack temperature controller and/or a wiring problem with the temperature control valve or the ram air inlet/exhaust door actuators.

NOTE: An electrical short in the circuit wiring for the temperature control valve or the ram air inlet/exhaust door actuators can cause the pack temperature controller to blow a fuse. An electrical resistance check of the circuit wiring must be done first before you replace the PTC in order to isolate the cause of the electrical short to prevent future occurrences of a blown fuse in new PTCs (FIM 21-51-00/101 Figure 103).

AIRPLANES WITH PTC P/N S210T130-69 OR EARLIER PTC DASH NUMBERS;

If the pack temperature controller has a blown fuse, the CONTROLLER FAULT light will only show.

AIRPLANES WITH PTC P/N S210T130-79 AND SUBSEQUENT PTC DASH NUMBERS;

If the pack temperature controller has a blown fuse, the CONTROLLER FAULT light will illuminate in addition to the TEMP CONT VALVE, RAM INLET ACTR, or RAM OUTLET ACTR fault light.

(b) Push the PRESS/TEST button.

- 1) Make sure all of the lights on the controller face come on.

(c) Push the BIT button.

- 1) Make sure the BIT light comes on for 2 to 3 seconds.
- 2) Make sure that the GO light comes on and that none of the fault (red) lights come on.

NOTE: The GO light indicates that there are no controller faults and that no faults were detected the last time the pack was operated.

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- (d) Push the PREVIOUS FLIGHTS button.
 - 1) Make sure the PREVIOUS FLIGHTS light comes on for 2 to 3 seconds.
 - 2) Make sure the GO light comes on and that none of the fault (red) lights come on.

NOTE: The GO light indicates that no faults were detected during the previous nine flights.

WARNING: MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE RAM-AIR INLET DOOR, THE RAM-AIR OUTLET DOOR AND THE TEMPERATURE CONTROL VALVE. WHEN YOU PUSH THE "VERIFY" BUTTON, THESE COMPONENTS WILL MOVE AND COULD CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (e) Push the VERIFY button.
 - 1) Make sure the VERIFY light comes on for 25 to 35 seconds.
 - 2) Make sure the GO light comes on and that none of the fault (red) lights come on.

NOTE: The GO light indicates that no LRU faults were detected.

- (f) Push the RESET button while the VERIFY and GO lights are still on.

NOTE: Pushing the RESET button clears all of the faults from the controller memory.

- 1) Make sure the RESET light comes on for 6 to 10 seconds.

F. Do the Special BITE test for the low limit valve

S 865-023

- (1) Supply pneumatic power with the APU (AMM 36-00-00/201).
 - (a) If you do not use the APU to supply pneumatic power, make sure the APU air supply valve is locked in the open position.

S 745-013

- (2) Do these steps on the face of the applicable (left or right) controller:
 - (a) Make sure the CONTROLLER FAULT light is not on.
 - (b) Push the PRESS/TEST light, on the front of the controller.
 - 1) Make sure all the lights on the front of the controller come on.
 - (c) Before you do the next step, make sure the air cooling pack has operated for 5 minutes or more.
 - (d) Push the VERIFY button, on the front of the controller.
 - 1) Make sure the VERIFY light comes on for 80 to 120 seconds.

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- 2) Make sure the GO light comes on and the LOW LIMIT VALVE fault light does not come on.

NOTE: The GO light indicates that no fault was detected.

- (e) While the GO light is on, push the RESET button, on the front of the controller.

- 1) Make sure the RESET light comes on.

S 865-014

- (3) Remove the pneumatic power (AMM 36-00-00/201).

G. Put the airplane back to its usual condition

S 865-015

- (1) Turn the zone temperature selectors, on the P5 panel, to the OFF positions.

S 865-017

- (2) Push the TRIM AIR switch-light, on the P5 panel, to the off position.

S 865-019

- (3) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 415-021

- (4) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

TASK 21-51-14-705-022

3. Pack Standby Controller (BITE) Operational Test (Fig. 501)

A. General

- (1) There is one pack standby controller for the two cooling packs.
- (2) The pack standby controller BITE test can be done for a single pack or for both packs at the same time.

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- (3) The applicable pack selector switches must be in the STBY-N position to do the pack standby controller BITE test.
 - (4) The BITE test does an electrical check of these components:
 - (a) pack standby controller
 - (b) pack standby temperature 2 sensor (L/R)
 - (c) pack standby compressor outlet temperature 2 sensor (L/R).
- B. References
- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
 - (2) AMM 24-22-00/201, Electrical Power - Control
 - (3) AMM 36-00-00/201, Pneumatic - General
- C. Access
- (1) Location Zones
 - 120 Main equipment center (Right)
 - (2) Access Panels
 - 119AL Main equipment center access door
- D. Prepare for the Test.
- S 865-024
- (1) Supply electrical power (AMM 24-22-00/201).
- S 865-025
- (2) Remove pneumatic power (AMM 36-00-00/201).
- S 865-040
- (3) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
 - (a) 11A13, LEFT PACK FLOW CONT
 - (b) 11A26, RIGHT PACK FLOW CONT
 - (c) 11N10, LEFT PACK AUTO PWR
 - (d) 11N11, LEFT PACK AUTO CONT
 - (e) 11N15, RIGHT PACK STANDBY PWR
 - (f) 11N16, RIGHT PACK STANDBY CONT
 - (g) 11N19, RIGHT PACK AUTO PWR
 - (h) 11N20, RIGHT PACK AUTO CONT
 - (i) 11N24, LEFT PACK STANDBY PWR
 - (j) 11N25, LEFT PACK STANDBY CONT
 - (k) EICAS circuit breakers (6 locations)

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E. Do the Pack Standby Controller BITE Test

NOTE: BITE will show the same indication for a component fault or an airplane wiring fault. Make sure the wiring is correct and the connector is in good condition before you replace a component.

S 865-033

- (1) Turn the applicable L and R PACK selector switches, on the P5 panel, to the STBY-N position.

NOTE: The BITE test can be done for a single pack or for both packs at the same time. Turn the applicable selector switch to the STBY-N position to do the BITE test for a single pack. Turn both switches to the STBY-N position to do the BITE test for both packs at the same time. Refer to the applicable GO and NO GO lights for the pack or packs that are under test.

S 745-038

- (2) Push the GO and NO GO lamps on the pack standby controller.
- (a) If any lights do not come on, replace the lamps that do not come on.
 - (b) Push the GO and NO GO lamps on the pack standby controller.
 - (c) If any lights do not come on, replace the pack standby controller.

S 745-027

- (3) Do these steps for all seven (7) positions of the test switch on the pack standby controller:

NOTE: Switch positions one through five do a test of the circuits internal to the pack standby controller. Positions six and seven do a test of the pack standby temperature sensors.

- (a) Turn the test switch to the applicable position.
- (b) Push the test switch.
- (c) Make sure the applicable GO light comes on.
- (d) For test switch positions one through five, if the applicable NO-GO light comes on, then replace the pack standby temperature controller.

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- (e) For test switch positions six and seven,
if the applicable NO-GO light comes on, then replace the
applicable pack standby temperature sensor.

S 865-028

- (4) Turn the test switch to position 1.
- F. Put the airplane back to its usual condition

S 865-029

- (1) Turn the applicable (L or R) PACK selector, on the P5 panel, to the
OFF position.

S 415-031

- (2) Close the access door for the main equipment center, 119AL
(AMM 06-41-00/201).

S 865-032

- (3) Remove the electrical power, if it is not necessary
(AMM 24-22-00/201).

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CABIN AIR SUPPLY CHECK VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Cabin Air Supply Check Valve Removal
 - (2) Cabin Air Supply Check Valve Installation
- B. A cabin air supply check valve is installed downstream of the air cooling pack between the pack outlet duct and the forward spar bulkhead in the left and right ECS pack bays.

TASK 21-51-15-004-001

2. Cabin Air Supply Check Valve Removal (Fig. 401)

A. References

- (1) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (2) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

(1) Location Zones

- 125 Area Aft of Forward Cargo Compartment (Left)
- 126 Area Aft of Forward Cargo Compartment (Right)
- 135 Environmental control systems (ECS) bay (left)
- 136 Environmental control systems (ECS) bay (right)

(2) Access Panels

- 193GL Pressure Relief Panel (left)
- 193NL ECS Bay Access Panel (left)
- 194HR Pressure Relief Panel (right)
- 194LR ECS Bay Access Panel (right)
- 821R Forward Cargo Compartment Door (right)

C. Prepare for Removal

S 864-002

- (1) Set the L and R PACK selectors to the OFF position, on the P5 panel, and attach DO-NOT-OPERATE tags.
 - (a) Make sure the PACK OFF light is on.

S 864-094

- (2) Push the L and R RECIRC switch-lights to the off position, on the P5 panel, and attach DO-NOT-OPERATE tags.
 - (a) Make sure that the INOP light comes on and the ON light is off.

S 864-096

- (3) Do not supply conditioned air to the airplane with a low pressure ground air cart.

S 014-004

- (4) To get access to the check valve (2) in the left ECS pack bay, open the left pressure relief panel 193GL and the left ECS bay access panel 193NL.

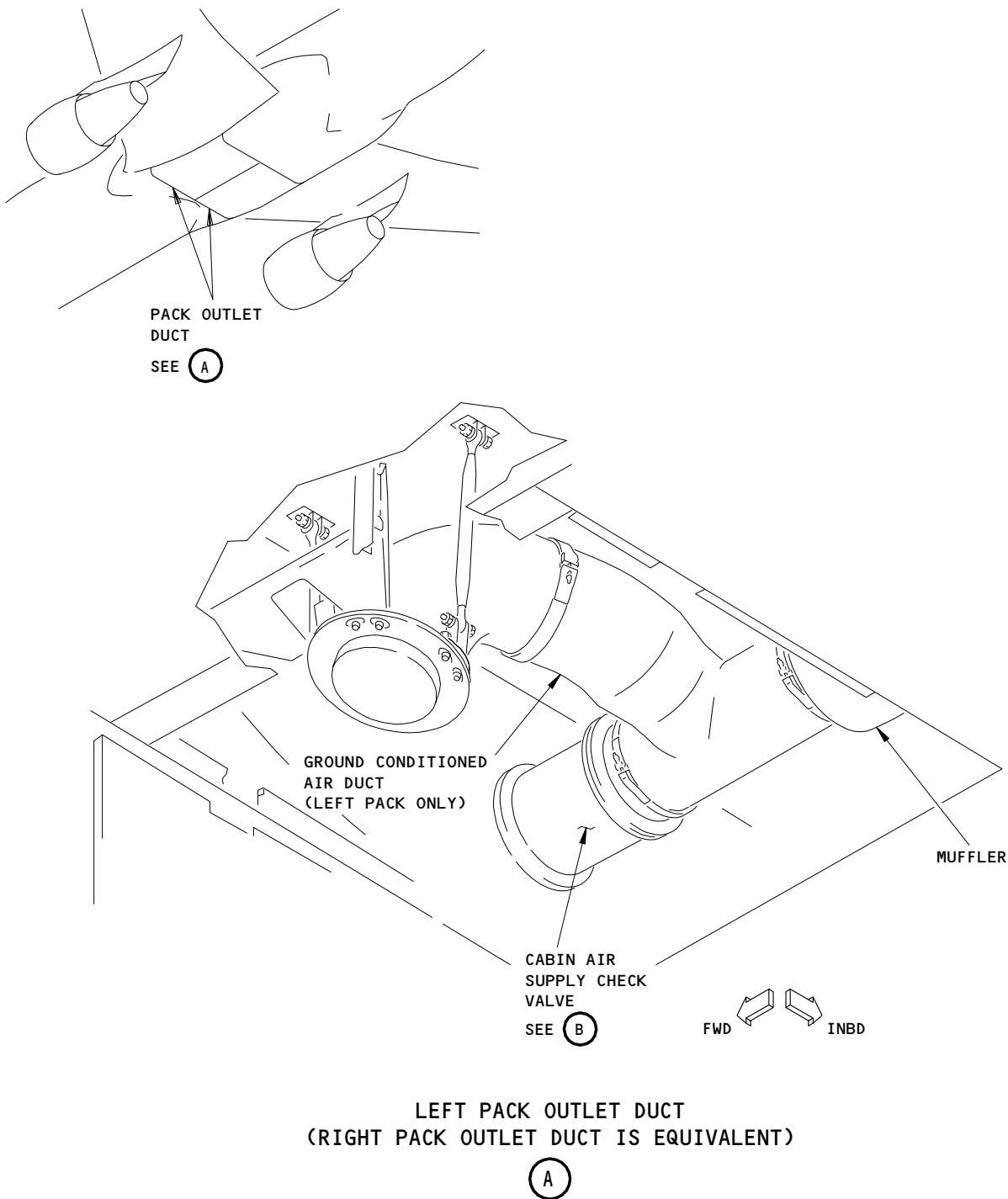
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Cabin Air Supply Check Valve Installation
Figure 401 (Sheet 1)

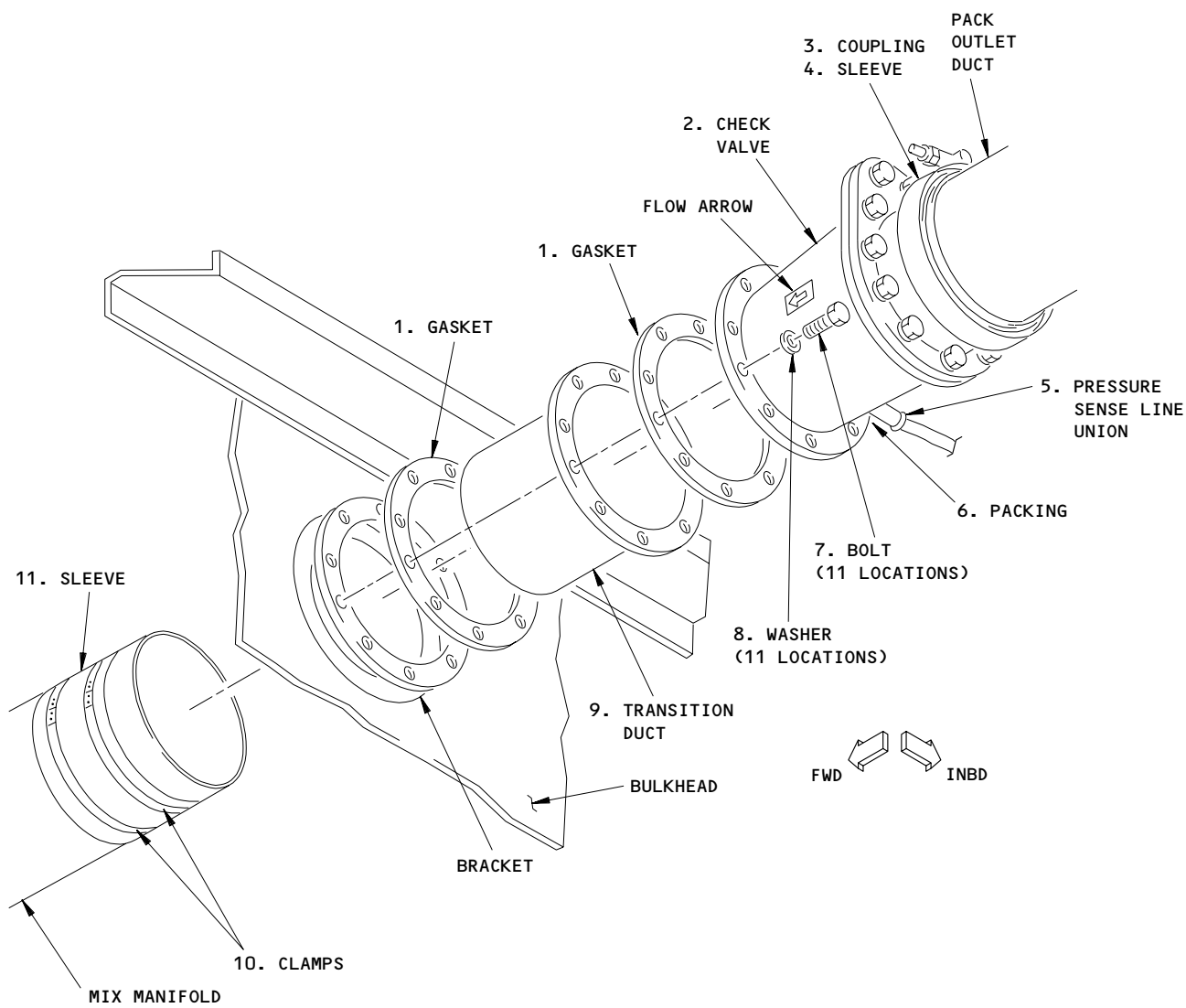
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CABIN AIR SUPPLY CHECK VALVE

(B)

Cabin Air Supply Check Valve Installation
Figure 401 (Sheet 2)

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S 014-005

- (5) To get access to the check valve (2) in the right ECS pack bay, open the right pressure relief panel 194HR and the right ECS bay access panel 194LR.

D. Check Valve Removal

S 034-009

- (1) Disconnect the pressure sense line from the union (5) on the check valve (2), then remove the union (5).
 - (a) Remove and discard the packing (6) from the union (5).

S 034-010

- (2) Remove the bolts (7) and washers (8) to disconnect the forward end of the check valve (2) from the transition duct (9) and the bulkhead bracket.

S 034-007

- (3) Remove the coupling (3) and the sleeve (4) to disconnect the aft end of the check valve (2) from the pack outlet duct.

S 024-011

- (4) Remove the check valve (2) from the transition duct (9).
 - (a) Remove and discard the gasket (1) between the check valve (2) and the transition duct (9).

S 434-117

- (5) Put a cover on the duct openings to keep out unwanted materials.

E. Transition Duct Removal

S 014-105

- (1) Get access to the transition duct (9) installed near the mix manifold assembly which is behind the aft endwall in the forward cargo compartment.

NOTE: The transition duct (9) is installed thru the forward spar bulkhead below the floor at the outboard side of the mix manifold assembly.

- (a) Open the large forward cargo door 821R (AMM 52-33-00/201).

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(b) Remove the aft endwall lining(s) (AMM 25-52-01/401).

S 034-115

(2) Loosen the clamps (10) that hold the sleeve (11) to the transition duct (9).

S 024-116

(3) Remove the transition duct (9) from the bulkhead bracket.

(a) Remove and discard the gasket (1) between the transition duct (9) and the bulkhead bracket.

S 434-015

(4) Put a cover on the duct openings to keep out unwanted materials.

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TASK 21-51-15-404-016

3. Cabin Air Supply Check Valve Installation (Fig. 401)

A. Consumables

- (1) D00548, Lubricant (grease) - Fluorolube GR 660
 - (a) Lubricant (grease) - Fluorolube GR 544 (alternate)
 - (b) Lubricant (grease) - Fluorolube GR 470 (alternate)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Gasket (LH/RH packs)	21-51-01	01	365
401	2	Check Valve (LH/RH packs)	21-51-01	01	504
401	6	Packing (LH pack)	21-51-52	01	215
401	6	Packing (RH pack)	21-51-52	01	555

C. References

- (1) AMM 21-00-00/201, Air Conditioning - General
- (2) AMM 24-22-00/201, Electric Power - Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (4) AMM 52-33-00/201, Large Forward Cargo Door

D. Access

- (1) Location Zones
 - 125 Area Aft of Forward Cargo Compartment (Left)
 - 126 Area Aft of Forward Cargo Compartment (Right)
 - 135 Environmental control systems (ECS) bay (left)
 - 136 Environmental control systems (ECS) bay (right)
- (2) Access Panels
 - 193GL Pressure Relief Panel (left)
 - 193NL ECS Bay Access Panel (left)
 - 194HR Pressure Relief Panel (right)
 - 194LR ECS Bay Access Panel (right)
 - 821R Forward Cargo Compartment Door (right)

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E. Prepare for Installation

S 034-017

- (1) Remove the covers from the duct openings.
 - (a) Make sure that there are no unwanted materials in the ducts.

S 214-145

- (2) Make sure that the flapper of the check valve (2) can open and close smoothly without binding.

F. Transition Duct Installation

S 434-018

- (1) Install a new gasket (1) and the transition duct (9) to the bracket on the bulkhead.
 - (a) Make sure that the gasket (1) is installed between the bracket and the flange of the transition duct (9).
 - (b) Align the holes in the flange of the transition duct (9) and the gasket (1) with the holes in the bracket.

S 424-046

- (2) Install the sleeve (11) and clamps (10) to the transition duct (9).

G. Check Valve Installation

S 434-139

- (1) Install a new packing (6) and the union (5) to the check valve (2).

S 434-137

- (2) Put the sleeve (4) onto the aft end of the check valve (2).

S 434-140

- (3) Install a new gasket (1) to the forward end of the check valve (2).
 - (a) Install one bolt (7) and washer (8) thru the hole at the 12 o'clock position on the flange of the check valve (2).

S 424-141

- (4) Install the check valve (2) and gasket (1) between the transition duct (9) and the pack outlet duct.
 - (a) Make sure that the airflow arrow on the check valve body points in the forward direction.

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- (b) Tighten the bolt (7) at the 12 o'clock position on the check valve flange.

S 434-138

- (5) Install the sleeve (4) and coupling (3) to connect the aft end of the check valve (2) to the pack outlet duct.
 - (a) Move the sleeve (4) so that it is seated evenly over the duct beads of the pack outlet duct and the check valve (2).
 - (b) Apply a thin layer of the fluorolube lubricant (grease) to the faying surfaces of the sleeve (4) and the coupling (3).

NOTE: The lubricant (grease) is only to help facilitate installation and it's use is optional.

- (c) Loosely install the coupling (3) over the sleeve (4).
- (d) Tighten the coupling (3) to 40-50 pound-inches (4.52-5.65 newton-meters).
- (e) Make sure that the sleeve (4) stays seated evenly over the duct beads.

S 434-021

- (6) Install the other bolts (7) and washers (8) to connect the forward end of the check valve (2) to the bulkhead bracket.

S 434-024

- (7) Connect the pressure sense line to the union (5) on the check valve (2).

H. Check Valve Post-Installation Test

S 864-025

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-027

- (2) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors, on the P5 panel.

S 864-142

- (3) Remove the DO-NOT-OPERATE tags from the L and R RECIRC switch-lights, on the P5 panel.

S 864-143

- (4) Operate the air conditioning pack or a low pressure ground air cart to supply conditioned air to the airplane (AMM 21-00-00/201).

S 794-031

- (5) Make sure that there are no air leaks at the check valve (2).

I. Put the Airplane Back to Its Usual Condition

S 864-032

- (1) Shutoff the supply of conditioned air to the airplane (AMM 21-00-00/201).

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- S 414-040
- (2) Close the ECS pack access panels 193GL and 193NL (194HR and 194LR).
- S 414-144
- (3) Close up the access to the mix manifold assembly in the forward cargo compartment:
- (a) Install the aft endwall lining(s) (AMM 25-52-01/401).
 - (b) Close the large forward cargo door 821R (AMM 52-33-00/201).
- S 864-037
- (4) Remove electrical power, if it is not needed (AMM 24-22-00/201).

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CABIN AIR SUPPLY CHECK VALVE – INSPECTION/CHECK

1. General

- A. This procedure has the following task:
 - (1) Cabin Air Supply Check Valve Inspection
 - (a) This task is for a scheduled maintenance task.
- B. There is one cabin air supply check valve installed downstream of the pack outlet duct of each air cooling pack in the ECS pack bays.

TASK 21-51-15-206-001

2. Cabin Air Supply Check Valve Inspection (Fig. 601)

- A. General
 - (1) This task is for a scheduled maintenance task.
- B. References
 - (1) AMM 21-51-15/401, Cabin Air Supply Check Valve
- C. Access
 - (1) Location Zones
 - 135/136 Environmental Control System (ECS) Bay
 - (2) Access Panels
 - 193NL/194LR ECS access doors
- D. Prepare to Examine the Check Valve

S 026-002

- (1) Remove the check valve for the cabin air supply (AMM 21-51-15/401).
- E. Examine the Check Valve

S 216-003

- (1) Examine the check valve for these conditions:
 - (a) Make sure there are no missing parts on the check valve.
 - (b) Make sure the check valve parts have no cracks.
 - (c) Make sure the check valve parts have no corrosion.
 - (d) Make sure there are no signs of leaks when the check valve flapper is in the closed position.
 - 1) Make sure the mating surfaces of the check valve flapper and the check valve body are symmetrically worn.
 - 2) Make sure there are no carbon particles near the mating surfaces of the check valve flapper and the check valve body.
 - (e) Make sure the thickness of the check valve flapper where it touches the flapper stop is more than 0.055-inches (1.4-millimeters).

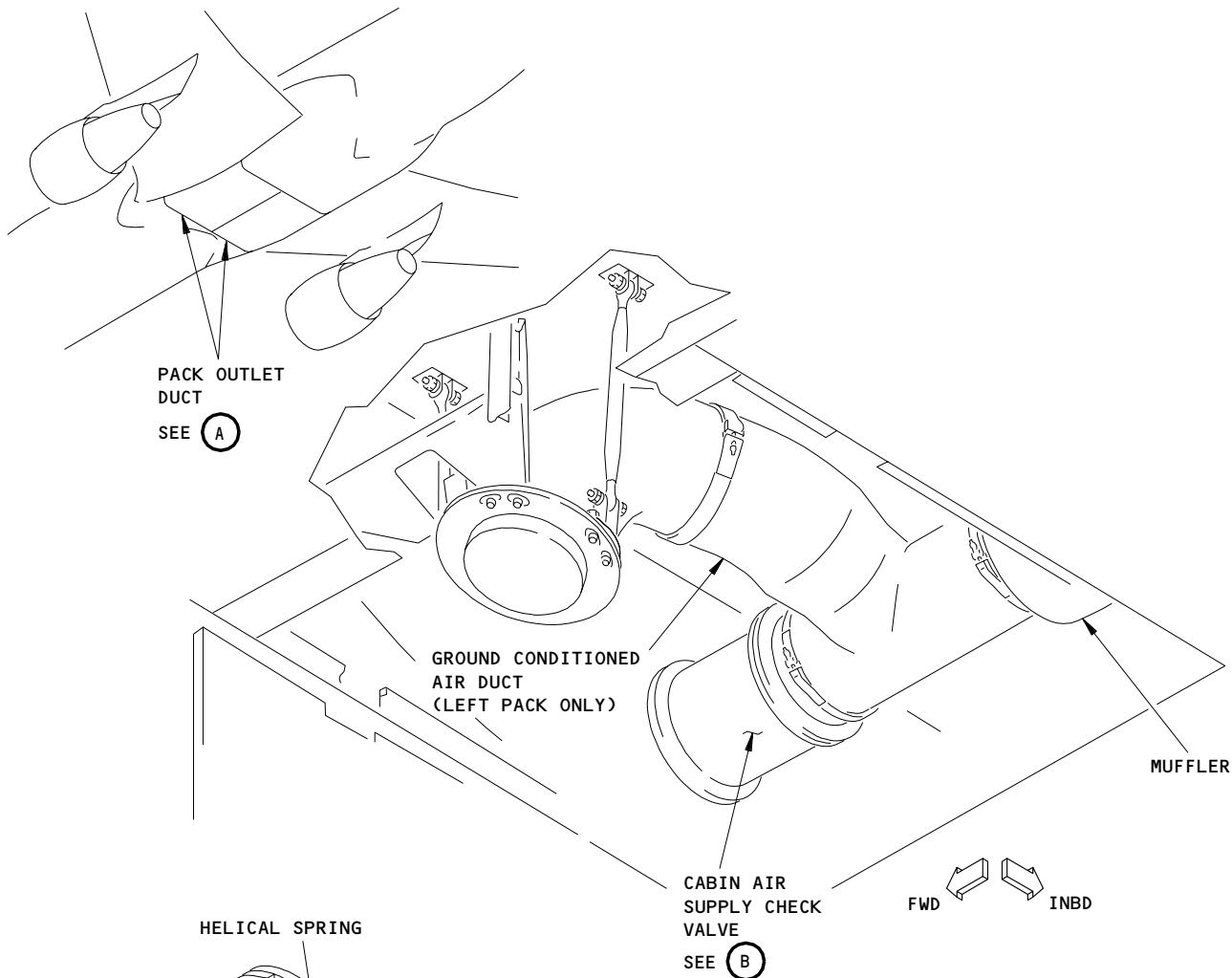
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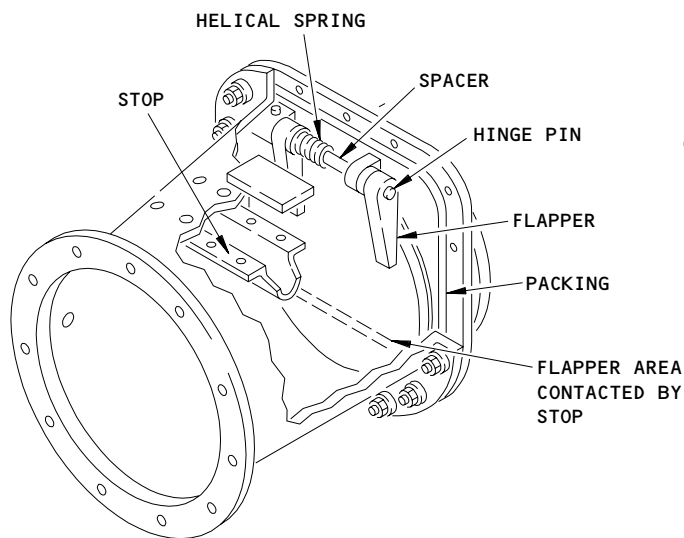
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LEFT PACK OUTLET DUCT
(RIGHT PACK OUTLET DUCT IS EQUIVALENT)

(A)



CABIN AIR SUPPLY CHECK VALVE

(B)

Cabin Air Supply Check Valve
Figure 601

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(f) Make sure the check valve flapper moves smoothly and easily.

S 966-004

(2) Replace the check valve with a serviceable check valve if any of the above conditions are not met (AMM 21-51-15/401).

F. Put the airplane back to its usual condition

S 426-005

(1) Install the check valve for the cabin air supply (AMM 21-51-15/401).

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ALTITUDE SWITCH – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the altitude switch for the air cooling packs. The altitude switch is installed on the keel beam in the left ECS bay, inboard of the bottom trim air modulating valve (AMM 21-61-07/401).

TASK 21-51-17-004-001

2. Remove the Altitude Switch (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels.

B. Access

- (1) Location Zone
135 Environmental Control Systems (ECS) Bay (Left)
(2) Access Panel
193NL ECS access door (Left)

C. Prepare for the Removal

S 864-002

- (1) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N10, LEFT PACK AUTO PWR
(b) 11N11, LEFT PACK AUTO CONT

S 014-003

- (2) Open the left ECS access door, 193NL (AMM 06-41-00/201).

D. Remove the Altitude Switch

S 034-004

- (1) Disconnect the electrical connector from the altitude switch.

S 034-005

- (2) Remove the bolts that attach the altitude switch to the keel beam.

S 024-006

- (3) Remove the altitude switch.

TASK 21-51-17-404-007

3. Install the Altitude Switch (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels.
(2) AMM 24-22-00/201, Electric Power – Control
(3) AMM 21-51-14/501, Pack Temperature Controller

B. Access

- (1) Location Zone
135 Environmental Control Systems (ECS) Bay (Left)
(2) Access Panel
193NL ECS access door (Left)

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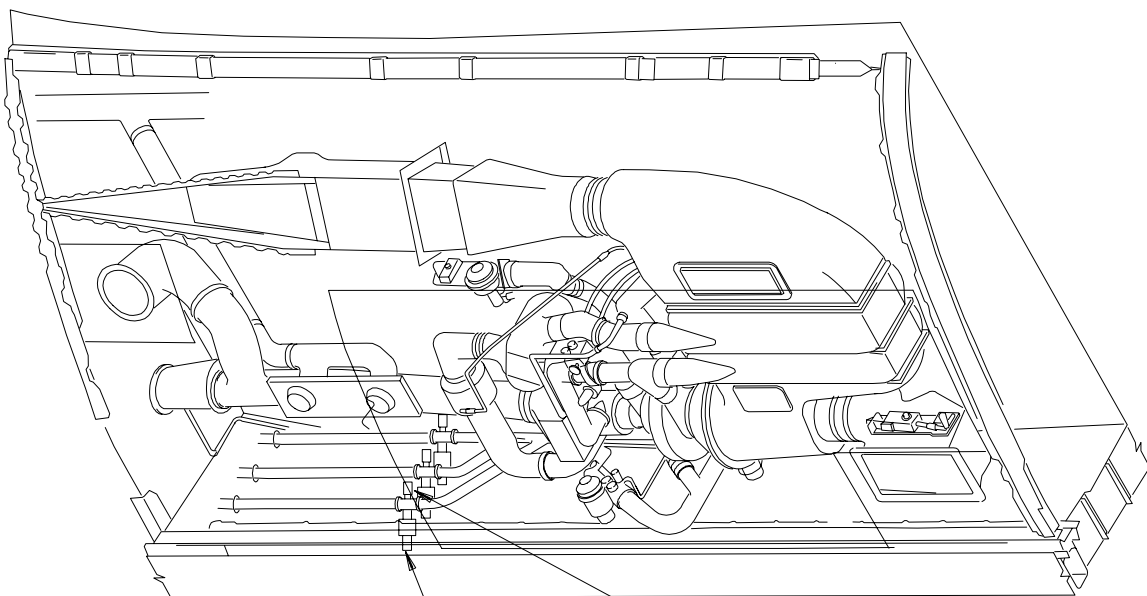
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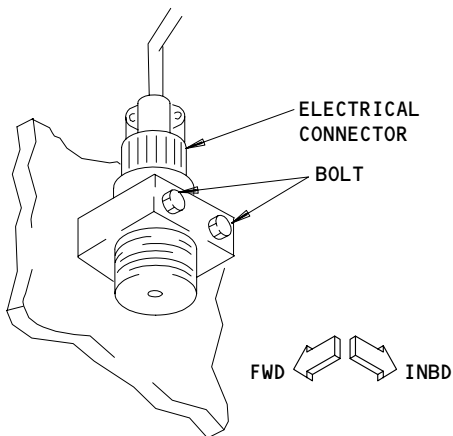
ECS ACCESS
DOOR, 193NL
SEE (A)



TRIM AIR
MODULATING
VALVES (REF)

ALTITUDE
SWITCH
SEE (B)

LEFT COOLING PACK
(A)



ALTITUDE SWITCH
(B)

Altitude Switch Installation
Figure 401

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C. Install the Altitude Switch

S 424-008

- (1) Put the altitude switch on the keel beam with the switch facing in the aft direction.

S 434-009

- (2) Install the bolts, washers and nuts to hold the altitude switch to the keel beam.

S 434-010

- (3) Connect the electrical connector to the altitude switch.

D. Do the installation test for the altitude switch

S 864-011

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-012

- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P11 panel:
 - (a) 11N10, LEFT PACK AUTO PWR
 - (b) 11N11, LEFT PACK AUTO CONT

S 744-013

- (3) Do the the BITE test on the left or the right pack temperature controller (AMM 21-51-14/501).

E. Put the airplane back to its usual condition

S 414-014

- (1) Close the left ECS access door, 193NL (AMM 06-41-00/201).

S 864-015

- (2) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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PACK OVERHEAT SWITCH – MAINTENANCE PRACTICES

1. General

- A. One pack overheat switch is installed at the outlet of each air cooling pack. This procedure has instructions to do the tasks that follow:
- (1) Remove the Pack Overheat Switch
 - (2) Install the Pack Overheat Switch
 - (3) Do the Pack Overheat Switch Test.

TASK 21-51-18-002-001

2. Remove the Pack Overheat Switch (Fig. 201)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
 - 193LL Ground Air Service Connection
 - 194HR ECS Components – Pressure Relief Panel

C. Prepare for the Removal

S 862-002

- (1) To remove the right pack overheat switch:
 - (a) Turn the R PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - 1) Make sure the pack is off.
 - 2) Put a DO-NOT-OPERATE tag on the selector.
 - (b) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
 - 1) 11A26, R PACK FLOW CONT
 - (c) Open the ECS components – Pressure Relief Panel, 194HR (AMM 06-41-00/201).

S 862-003

- (2) To remove the left pack overheat switch:
 - (a) Turn the L PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - 1) Make sure the pack is off.
 - 2) Put a DO-NOT-OPERATE tag on the selector.
 - (b) Open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
 - 1) 11A13, PACK FLOW CONT L
 - (c) Open the ground air service connection panel, 193LL (AMM 06-41-00/201).

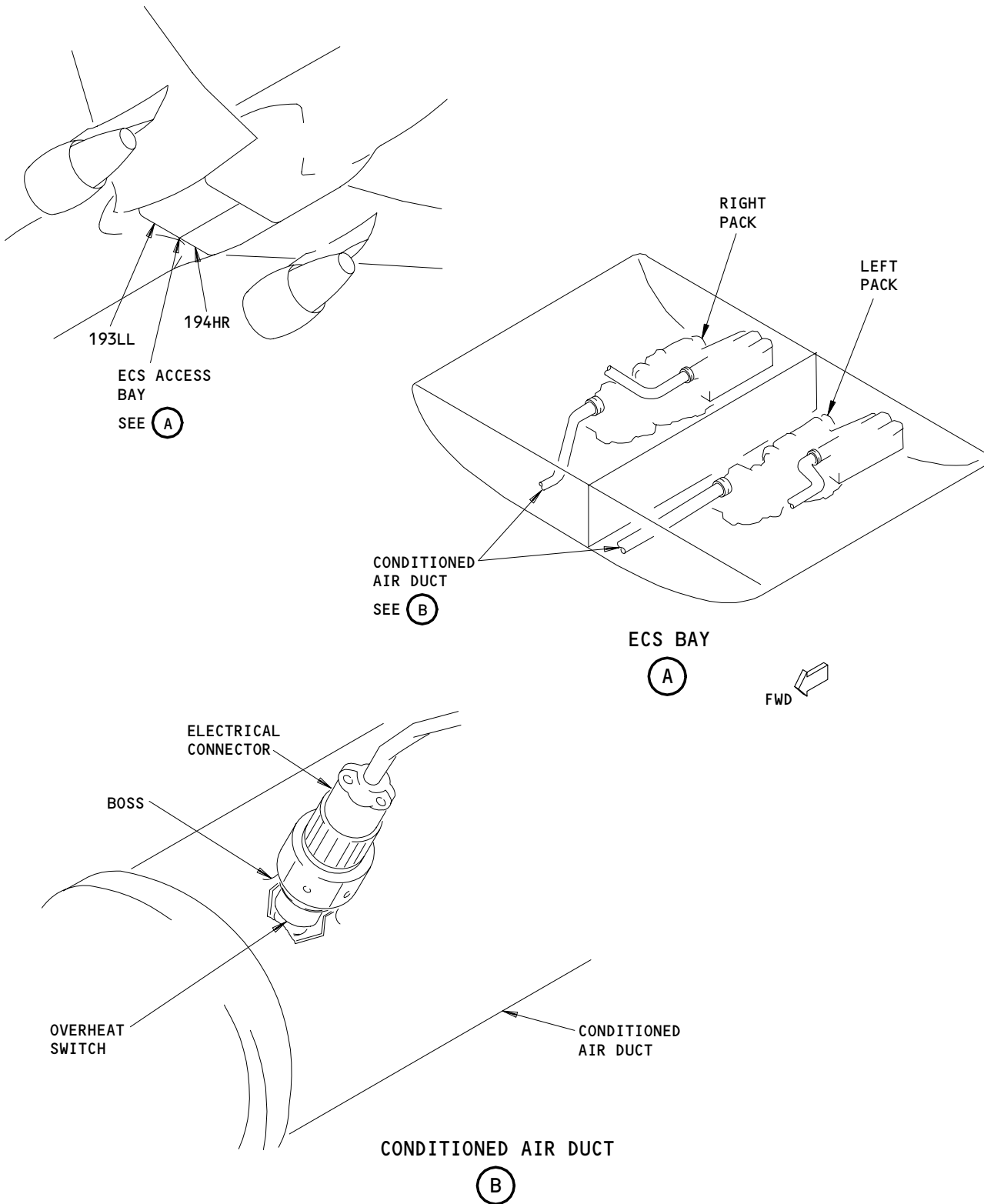
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Pack Overheat Switch Installation
Figure 201

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D. Remove the Overheat Switch

S 032-004

- (1) Disconnect the electrical connector from the switch.

S 032-005

- (2) Cut and remove the lockwire from the switch.

S 022-006

CAUTION: USE TWO WRENCHES TO REMOVE THE SWITCH. IF YOU ONLY USE ONE WRENCH TO REMOVE THE SWITCH, YOU COULD CAUSE DAMAGE TO THE DUCT.

- (3) Use two wrenches to remove the switch.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the switch.

S 432-007

- (4) Put a cover on the duct opening.

TASK 21-51-18-402-008

3. Install the Pack Overheat Switch (Fig. 201)

A. Consumable Materials

- (1) D00386, Lubricant, Anti-seize, MIL-L-23398 Solid Film
- (2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Standard Practices - Lockwire

C. Access

- (1) Location Zones
135/136 Environmental Control Systems (ECS) Bay
- (2) Access Panels
193LL Ground Air Service Connection
194HR ECS Componets - Pressure Relief Panel

D. Install the Overheat Switch

S 032-009

- (1) Remove the cover from the duct opening.

S 432-010

- (2) Put a new O-ring on the switch.

S 162-011

- (3) Clean the mating surfaces of the boss and the switch nut, to make sure there is an electrical ground.

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S 642-012

- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the switch.

S 422-013

CAUTION: USE TWO WRENCHES TO INSTALL THE SWITCH. IF YOU ONLY USE ONE WRENCH TO INSTALL THE SWITCH, YOU COULD CAUSE DAMAGE TO THE DUCT.

- (5) Use two wrenches to install the switch.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the switch.

- (a) Tighten the switch to a torque value of 210-240 pound-inches.

S 432-014

- (6) Put a lockwire on the switch (AMM 20-10-23/401).

S 432-015

- (7) Connect the electrical connector to the switch.

E. Put the airplane back to its usual condition

S 862-016

- (1) If the right pack overheat switch was installed, do these steps:
- (a) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P11 panel:
 - 1) 11A26, R PACK FLOW CONT
 - (b) Close the ECS components - pressure relief panel, 194HR (AMM 06-41-00/201).

S 862-017

- (2) If the left pack overheat switch was installed, do these steps:
- (a) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P11 panel:
 - 1) 11A13, PACK FLOW CONT L
 - (b) Close the ground air service connection panel, 193LL (AMM 06-41-00/201).

TASK 21-51-18-702-020

4. Pack Overheat Switch Test (Fig. 201)

A. General

- (1) This procedure does a test of the electrical circuit for the pack overheat switch. This procedure does not make sure that the pack overheat switch is calibrated correctly.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

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- (2) AMM 24-22-00/201, Electrical Power Control
- C. Access
 - (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) Bay
 - (2) Access Panels
 - 193LL Ground Air Service Connection
 - 194HR ECS Componets - Pressure Relief Panel
- D. Prepare for the Test
 - S 862-021
 - (1) Supply electrical power (AMM 24-22-00/201).
 - S 862-022
 - (2) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the AUTO position.
 - S 862-024
 - (3) Make sure the EICAS circuit breakers (6 places), on the overhead circuit breaker panel, P11, are closed.
 - S 862-026
 - (4) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.
 - S 412-027
 - (5) Open the ground air service connection panel 193LL, or the ECS components - pressure relief panel, 194HR (AMM 06-41-00/201).
- E. Procedure
 - S 712-028
 - (1) Do the Test
 - NOTE:** To do the test on the left pack overheat switch, ignore the data that is in the parentheses. To do the test on the right pack overheat switch, use the data that is in the parentheses.
 - (a) Disconnect the electrical connector from the left (right) pack overheat switch.
 - (b) Install a jumper wire between pin 1 and pin 2 of the electrical connector.
 - 1) Make sure the L (R) PACK INOP light, on the P5 panel, comes on.
 - 2) Make sure the EICAS message, L (R) PACK TEMP, shows on the top display.
 - (c) Make sure these values show on the bottom EICAS display:
 - 1) L (R) TEMP VALVE is between 0.00 and 0.05
 - 2) L (R) RAM IN DOOR is between 0.00 and 0.05
 - (d) Remove the jumper wire from the electrical connector.

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- (e) Connect the electrical wire to the left (right) pack overheat switch.
 - (f) Push the L (R) PACK RESET switch-light, on the P5 panel.
 - 1) Make sure the PACK INOP light goes off.
- F. Put the airplane back to its usual condition

S 412-032

- (1) Close the ground air service connection panel 193LL, or the ECS components - pressure relief panel, 194HR (AMM 06-41-00/201).

S 862-031

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 862-029

- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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COMPRESSOR OUTLET OVERHEAT SWITCH – MAINTENANCE PRACTICES

1. General

- A. This procedure has instructions to remove, install, and test the compressor outlet overheat switches. One overheat switch is installed in each air cooling pack.

TASK 21-51-19-002-001

2. Remove the Compressor Outlet Overheat Switches (Fig. 201)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
135/136 Environmental control system bay
- (2) Access Panels
193NL/194LR Environmental Control Systems (ECS) Bay

C. Prepare for the Removal

S 862-003

- (1) Turn the applicable (L or R) PACK selectors, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 012-005

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the switch

S 032-006

- (1) Disconnect the electrical connector from the switch.

S 032-007

- (2) Cut and remove the lockwire from the switch.

S 022-029

CAUTION: USE TWO WRENCHES TO REMOVE THE SWITCH. IF YOU ONLY USE ONE WRENCH TO REMOVE THE SWITCH, YOU COULD CAUSE DAMAGE TO THE DUCT.

- (3) Use two wrenches to remove the switch.

NOTE: Use one wrench to hold the boss and the other wrench to turn the switch.

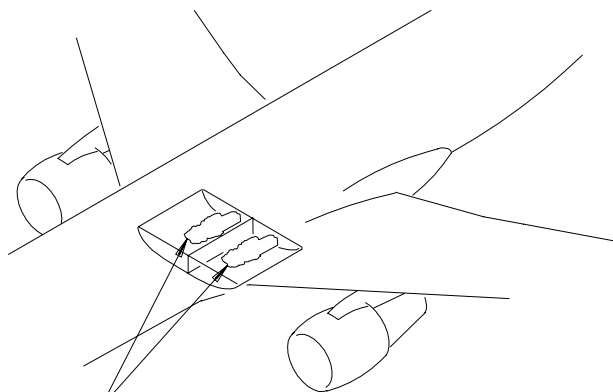
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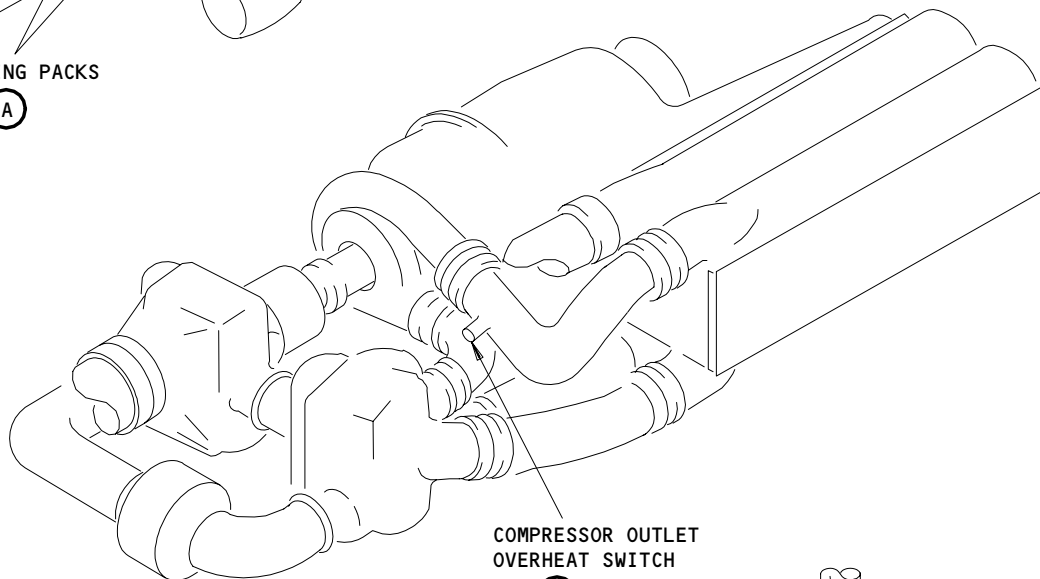
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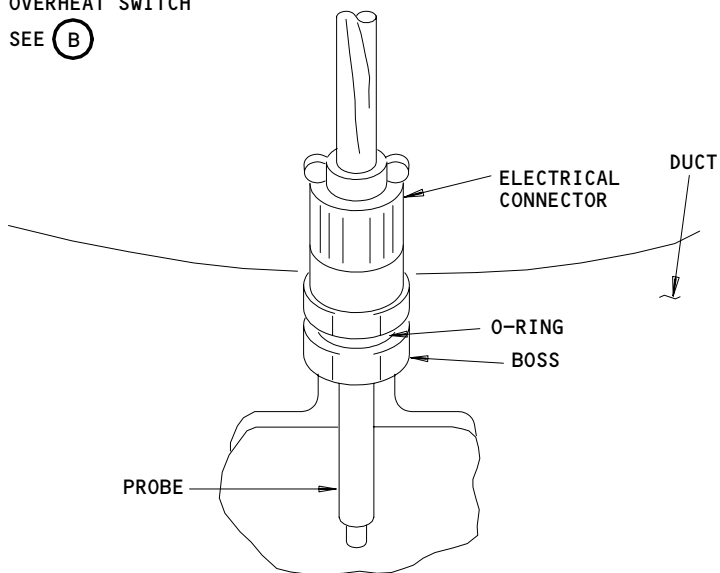


COOLING PACKS
SEE (A)



COMPRESSOR OUTLET
OVERHEAT SWITCH
SEE (B)

COOLING PACK
(A)



OVERHEAT SWITCH
(B)

Compressor Outlet Overheat Switch
Figure 201

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S 432-009

- (4) Put a cover on the duct opening.

TASK 21-51-19-402-009

3. Install the Compressor Outlet Overheat Switches (Fig. 201)

A. Consumable Materials

- (1) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)
- (2) C00852 - Antiseize Compound, Molybdenum Disulfide-Petrolatum,
MIL-PRF-83483 (preferred)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401 Standard Practices - Lockwire

C. Access

- (1) Location Zones
135/136 Environmental control system bay
- (2) Access Panels
193NL/194LR ECS bay access door

D. Install the switch

S 032-010

- (1) Remove the cover from the duct opening.

S 162-011

- (2) Clean the mating surfaces of the boss and the switch nut, to make sure there is an electrical ground.

S 642-012

- (3) Apply a thin layer of the anti-seize lubricant or compound to the threads of the switch.

S 432-013

- (4) Put a new packing on the switch.

S 422-030

CAUTION: USE TWO WRENCHES TO INSTALL THE SWITCH. IF YOU ONLY USE ONE WRENCH TO INSTALL THE SWITCH, YOU COULD CAUSE DAMAGE TO THE DUCT.

- (5) Use two wrenches to install the switch.

NOTE: Use one wrench to hold the boss and the other wrench to turn the switch.

- (a) Tighten the switch to a torque value of 210-240 pound-inches.

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- S 432-015
- (6) Install a lockwire on the switch (AMM 20-10-23/401).
- S 432-016
- (7) Connect the electrical connector to the switch.
- S 412-017
- (8) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

TASK 21-51-19-702-018

4. Compressor Outlet Overheat Switch Adjustment Test (Fig. 201)

A. General

- (1) This test makes sure that the electrical circuit for the compressor outlet overheat switch operates correctly. A calibration test of the overheat switch must be done off of the airplane.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power - Control

C. Prepare for the Test

- S 862-019
- (1) Supply electrical power (AMM 24-22-00/201).
- S 862-020
- (2) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
- (a) EICAS circuit breakers (6 places)
 - (b) 11A13, PACK FLOW CONT L
 - (c) 11A26, R PACK FLOW CONT
 - (d) 11N10, LEFT PACK AUTO PWR
 - (e) 11N11, LEFT PACK AUTO CONT
 - (f) 11N19, RIGHT PACK AUTO PWR
 - (g) 11N20, RIGHT PACK AUTO CONT
- S 012-021
- (3) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

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D. Procedure

S 732-024

- (1) Do the Compressor Outlet Overheat Switch Test
 - (a) Turn the applicable (L or R) PACK selector, on the P5 pilot's overhead panel, to the STBY-N or STBY-C position.
 - 1) Make sure that the position indicator on the applicable (left or right) pack temperature control valve moves to the CLOSE position.
 - (b) Remove the electrical connector from the compressor outlet overheat switch.
 - (c) Connect a jumper between pin 1 and pin 2 of the electrical connector.
 - (d) Make sure these conditions occur:
 - 1) The applicable PACK INOP light, on the P5 panel, comes on.
 - 2) The ram air inlet and exhaust doors remain open.
 - 3) The position indicator on the temperature control valve moves to the OPEN position.
 - 4) The solenoid plunger B, on the flow control valve, clicks off.
 - 5) The EICAS messages L (R) PACK TEMP shows on the upper display.
 - (e) Remove the jumper from the electrical connector.
 - (f) Connect the electrical connector to the overheat switch.
 - (g) Push the applicable PACK RESET switch-light, on the P5 panel.
 - (h) Make sure these conditions occur:
 - 1) The applicable PACK INOP light, on the P5 panel, goes off.
 - 2) The solenoid plunger B, on the flow control valve, moves to the ON position.
 - 3) The EICAS messages L (R) PACK TEMP does not show on the display.

E. Put the airplane back to its usual condition.

S 412-025

- (1) Close the ECS access doors, 193NL or 194LR (AMM 06-41-00/201).

S 862-026

- (2) Turn the L and R PACK selectors, on the P5 panel, to the OFF positions.

S 862-028

- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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SECONDARY WATER EXTRACTOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the secondary water extractor. One secondary water extractor is installed in each air cooling pack, between the reheater and the secondary heat exchanger.

TASK 21-51-21-004-001

2. Remove the Secondary Water Extractor (Fig. 401)

A. References

- (1) AMM 06-41-00/202, Fuselage Access Doors and Panels
(2) AMM 21-52-05/401, Secondary Heat Exchanger Temperature Bulb

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
(2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Secondary Water Extractor

S 034-005

- (1) Disconnect the electrical connector from the temperature bulb at the outlet of the secondary heat exchanger.
(a) If it is necessary, remove the temperature bulb for the secondary heat exchanger (AMM 21-52-05/401).

S 034-008

- (2) Disconnect the water drain line from the extractor.

S 034-009

- (3) Disconnect the clamp that holds the air line to the extractor.

S 034-010

- (4) Disconnect the clamps that hold the electrical wires to the extractor.

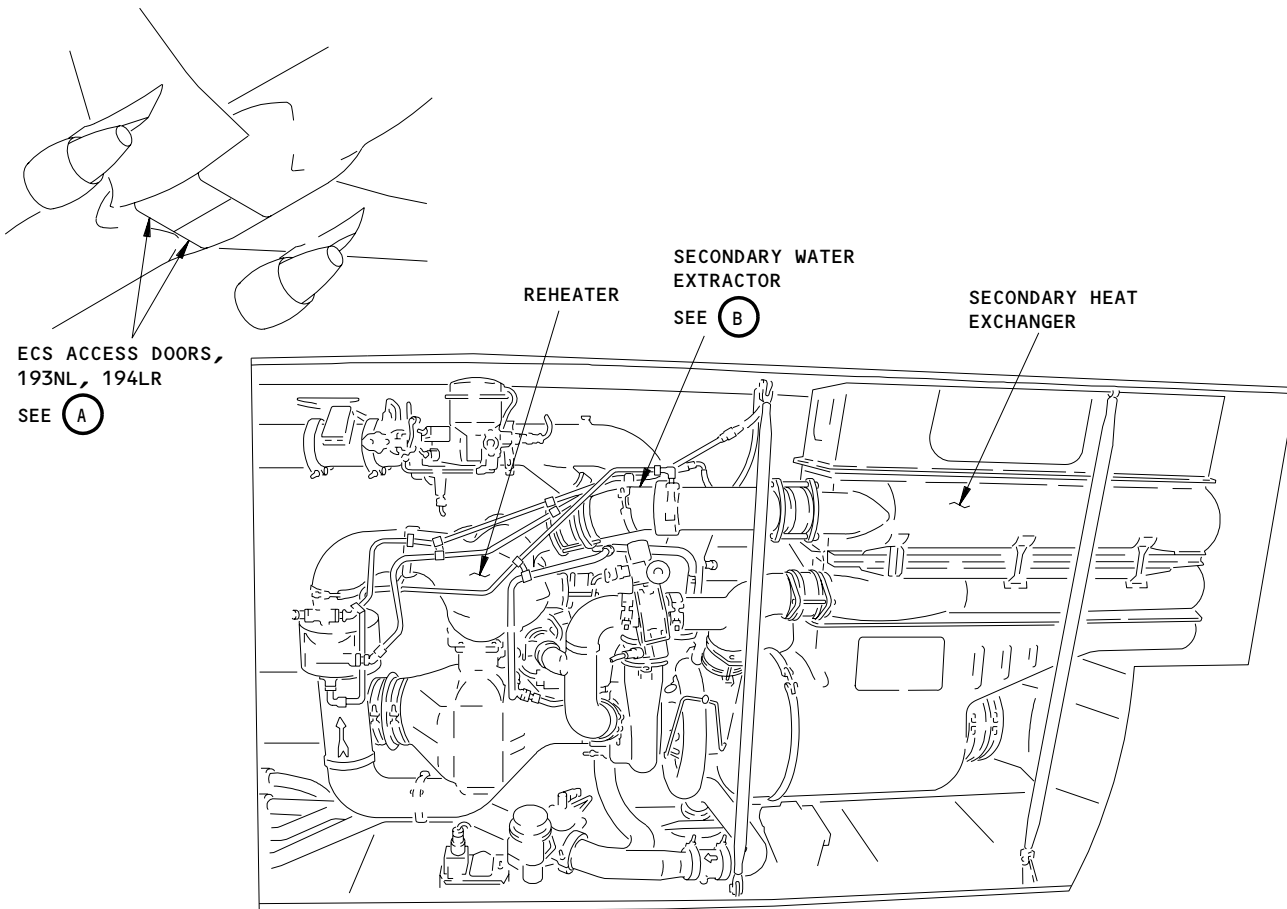
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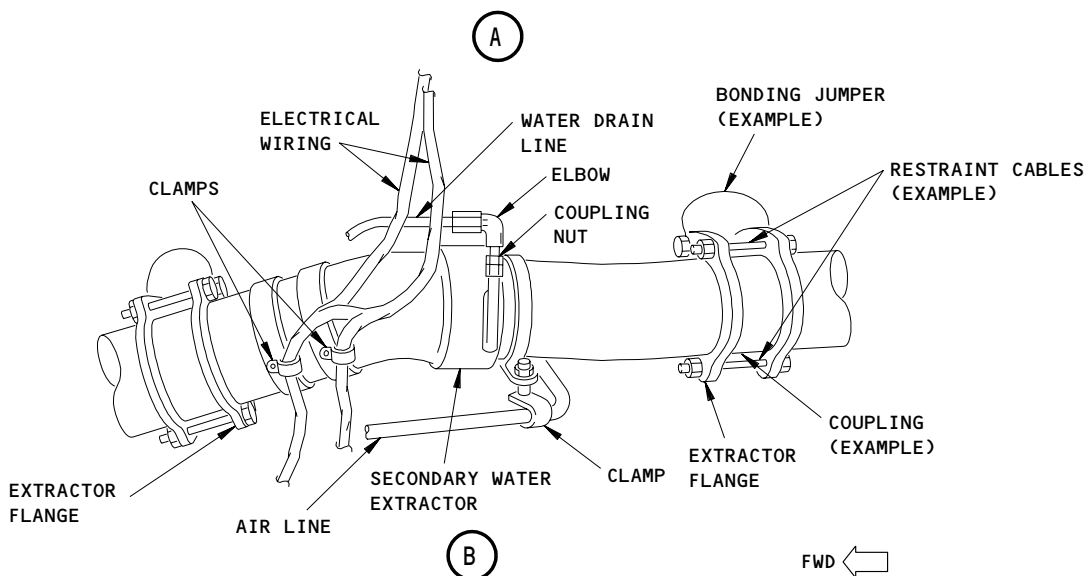
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FWD ←

**LEFT COOLING PACK
(RIGHT COOLING PACK EQUIVALENT)**



FWD ←

**Secondary Water Extractor
Figure 401**

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S 034-011

- (5) Remove the duct couplings at each end of the extractor.
 - (a) Disconnect the bonding jumpers from the duct flanges.
 - (b) Remove the restraint cables from the duct flanges.
 - (c) Remove the duct couplings.

S 024-012

- (6) Remove the secondary water extractor.

TASK 21-51-21-404-015

3. Install the Secondary Water Extractor (Fig. 401)

A. References

- (1) AMM 06-41-00/202, Fuselage Access Doors and Panels
- (2) AMM 21-52-05/401, Secondary Heat Exchanger Temperature Bulb
- (3) AMM 24-22-00/201, Electrical Power - Control
- (4) AMM 36-00-00/201, Pneumatic - General

B. Consumables

- (1) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

D. Install the Secondary Water Extractor

S 434-019

- (1) Install new seals in the duct couplings.

S 034-020

- (2) Remove the covers from the duct openings.
 - (a) Make sure there is no unwanted material in the ducts.

S 424-021

- (3) Put the extractor in its position, between the secondary heat exchanger and the reheater.

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S 434-022

- (4) Install the duct couplings on each end of the extractor.
 - (a) Put the duct couplings in their positions.
 - (b) Apply a thin layer of the anti-seize compound to the threads of the restraint cables.
 - (c) Install, but do not tighten, the restraint cables in the duct flanges.
 - (d) Connect the bonding jumpers to the duct flanges.

S 434-023

- (5) Connect the water drain line to the extractor.

S 434-024

- (6) Connect the clamp that holds the air line to the extractor.

S 434-025

- (7) Connect the clamps that hold the electrical wires to the extractor.

S 434-026

CAUTION: DO NOT TIGHTEN THE CABLE TOO MUCH. IF YOU TIGHTEN THE CABLE TOO MUCH, YOU CAN CAUSE DAMAGE TO THE COUPLING OR THE DUCT WHEN YOU PRESSURIZE THE SYSTEM.

- (8) Do these steps to tighten all the restraint cables:
 - (a) Tighten the restraint cables equally until only the slack is removed from the restraint cable.
 - (b) Make sure the distance between the extractor flanges is not more than 2.65 inches (67.3 mm).

S 434-016

- (9) Install the temperature bulb for the secondary heat exchanger in the extractor and reconnect its electrical connector (AMM 21-52-05/401).

E. Do the installation test for the secondary water extractor

S 864-028

- (1) Supply electrical power (AMM 24-22-00/201).

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- S 864-029
- (2) Supply pneumatic power (AMM 36-00-00/201).

- S 864-030
- (3) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
 - (a) Turn the selector to the AUTO position.
 - (b) Make sure the PACK OFF light goes off.

- S 794-032
- (4) Feel for leaks around the secondary water extractor.
 - (a) Small leaks are permitted.
 - (b) You must repair a large leak.
- F. Put the airplane back to its usual condition

- S 414-033
- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

- S 864-034
- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

- S 864-036
- (3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

- S 864-037
- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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OZONE (CATALYTIC) CONVERTER – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the left and right catalytic converters. One catalytic converter is installed upstream of each flow control valve, in the ECS bay.

TASK 21-51-22-004-001

2. Remove the Catalytic Converter (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 36-00-00/201, Pneumatic – General

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193ML Fuselage Structure (Left)
193NL ECS Bay Access Door (Left)
194HR ECS Components – Pressure Relief Panel (Right)
194LR ECS Bay Access Door (Right)
194NR ECS Components – Flow Control and Shutoff Valve (Right)

C. Prepare for the Removal

S 864-002

WARNING: REMOVE ALL THE PNEUMATIC POWER BEFORE YOU REMOVE OR INSTALL THE CATALYTIC CONVERTER. IF YOU DO NOT REMOVE ALL PNEUMATIC POWER, THEN IT COULD CAUSE INJURY TO PERSONS.

- (1) Remove the pneumatic power (AMM 36-00-00/201).

S 864-026

- (2) Make sure the L/R PACK selectors on the P5 overhead panel are OFF, and attach DO-NOT-OPERATE tags.

S 014-003

- (3) To get access to the catalytic converter for the left pack, open these access panels:
(a) 193ML Fuselage Structure (Left)

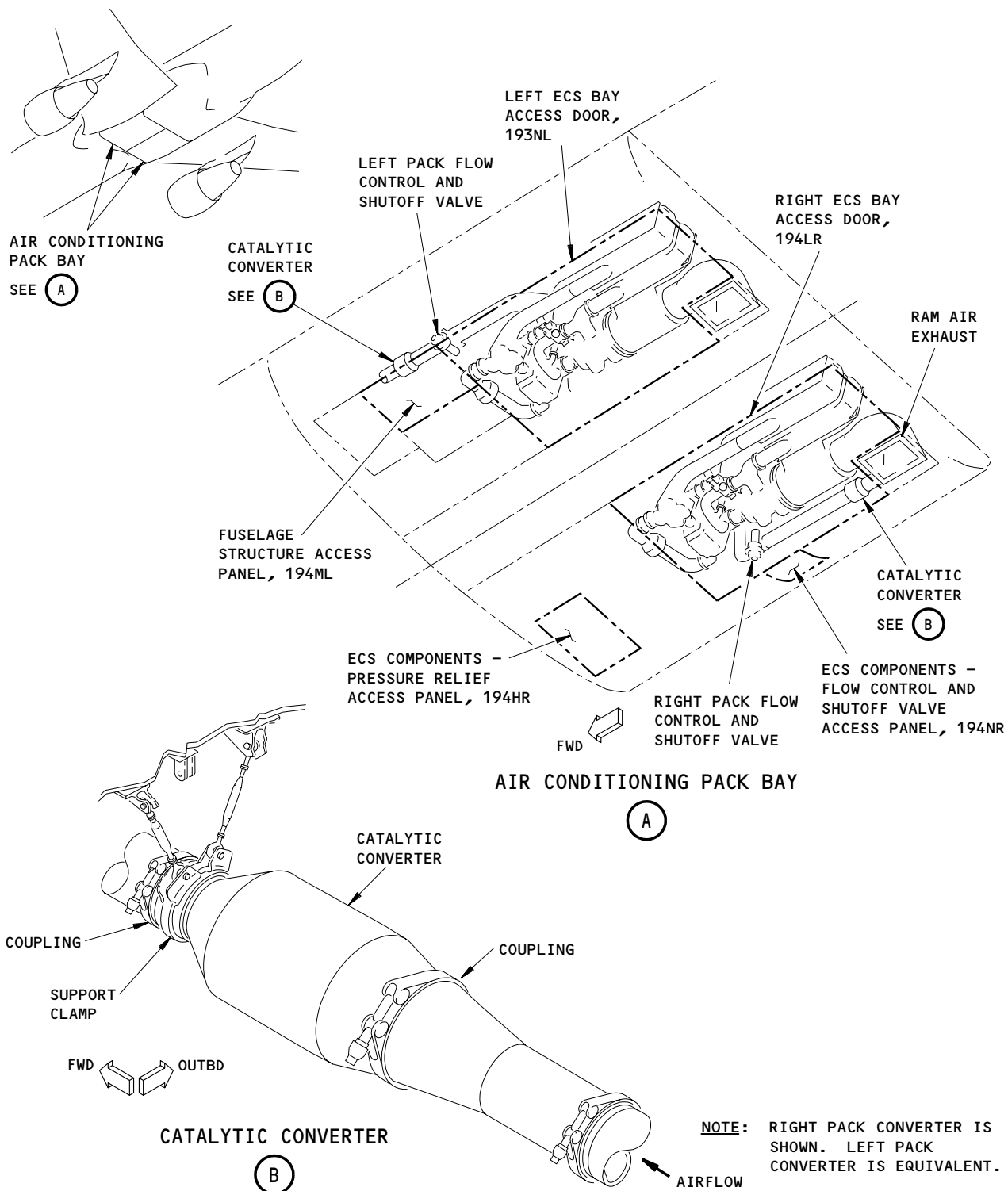
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Catalytic Converter
Figure 401

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(b) 193NL ECS Bay Access Door (Left)

S 014-027

(4) To get access the catalytic converter for the right pack, open/remove these access panels:

(a) 194HR ECS Components - Pressure Relief Panel

NOTE: The catalytic converter is removed through this access panel opening.

(b) 194LR ECS Bay Access Door (Right)

(c) 194NR ECS Components - Flow Control Valve and Shutoff Valve

D. Remove the Catalytic Converter

S 034-005

(1) Disconnect the support clamp from the converter.

S 034-004

(2) Remove the couplings from each end of the converter.

S 024-006

(3) Remove the catalytic converter.

(a) Move the right catalytic converter forward until it can be removed through the opening of the 194HR access panel.

S 434-007

(4) Put a cover on the duct openings.

TASK 21-51-22-404-008

3. Install the Catalytic Converter (Fig. 401)

A. References

(1) AMM 06-41-00/201, Fuselage Access Doors and Panels

(2) AMM 36-00-00/201, Pneumatic - General

B. Access

(1) Location Zones

135/136 Environmental control systems (ECS) bay

(2) Access Panels

193ML Fuselage Structure (Left)

193NL ECS Bay Access Door (Left)

194HR ECS Components - Pressure Relief Panel (Right)

194LR ECS Bay Access Door (Right)

194NR ECS Components - Flow Control and Shutoff Valve (Right)

C. Install the Catalytic Converter

S 034-009

(1) Remove the covers from the duct openings.

(a) Make sure there is no unwanted material in the ducts.

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- S 424-010
- (2) Put the catalytic converter in its position, upstream of the flow control valve.
 - (a) For the right catalytic converter, put it through the opening of the 194HR access panel and move it aft towards the flow control valve.
 - (b) Make sure the flow arrow points to the flow control valve.
- S 434-011
- (3) Connect the support clamp to the converter.
 - (a) Tighten the support clamp to 15-20 pound-inches.
- S 434-012
- (4) Install the couplings on each end of the converter.
 - (a) Tighten the coupling nuts to 50 pound-inches.
- D. Do the installation test for the catalytic converter
- S 864-013
- (1) Supply pneumatic power (AMM 36-00-00/201).
- S 794-014
- (2) Feel for leaks around the catalytic converter.
 - (a) Small leaks are permitted.
 - (b) You must repair a large leak.
- E. Put the airplane back to its usual condition
- S 414-015
- (1) Close/install the applicable access panels:
 - (a) 193ML Fuselage Structure (Left)
 - (b) 193NL ECS Bay Access Door (Left)
 - (c) 194HR ECS Components - Pressure Relief Panel (Right)
 - (d) 194LR ECS Bay Access Door (Right)
 - (e) 194NR ECS Components - Flow Control and Shutoff Valve (Right)
- S 864-016
- (2) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

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- S 864-028
- (3) Remove the DO-NOT-OPERATE tags from the L/R PACK selectors on the P5 overhead panel.

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PACK OUTLET CONDITIONED AIR SUPPLY DUCT -
REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Pack Outlet Conditioned Air Supply Duct Removal
 - (2) Pack Outlet Conditioned Air Supply Duct Installation
- B. The pack outlet conditioned air supply duct is installed downstream of each air conditioning pack between the condenser outlet and the cabin air supply check valve.
 - (1) A muffler is welded to the pack outlet conditioned air supply duct to reduce noise levels during pack operation.
- C. The pack outlet conditioned air supply duct will be called the pack outlet duct.

TASK 21-51-23-004-001

2. Pack Outlet Conditioned Air Supply Duct Removal (Fig. 401)

- A. References
 - (1) AMM 21-00-00/201, Air Conditioning - General
 - (2) AMM 21-51-18/201, Pack Overheat Switch
 - (3) AMM 21-52-06/401, Pack Outlet Temperature Bulb
- B. Access
 - (1) Location Zones
 - 135/136 Environmental control systems (ECS) bay
 - (2) Access Panels
 - 193FL ECS Components (Left)
 - 194GR ECS Components - Fuselage Structure (Right)
- C. Prepare for the Removal

S 864-070

- (1) Shutoff the supply of conditioned air to the airplane (AMM 21-00-00/201).

S 864-002

- (2) Set the L and R PACK selectors, on the P5 pilot's overhead panel, to the OFF position, and attach DO-NOT-OPERATE tags.

S 014-003

- (3) Open the ECS access panel 193FL(194GR) to get access to the pack outlet conditioned air supply duct in the left(right) ECS pack bay.

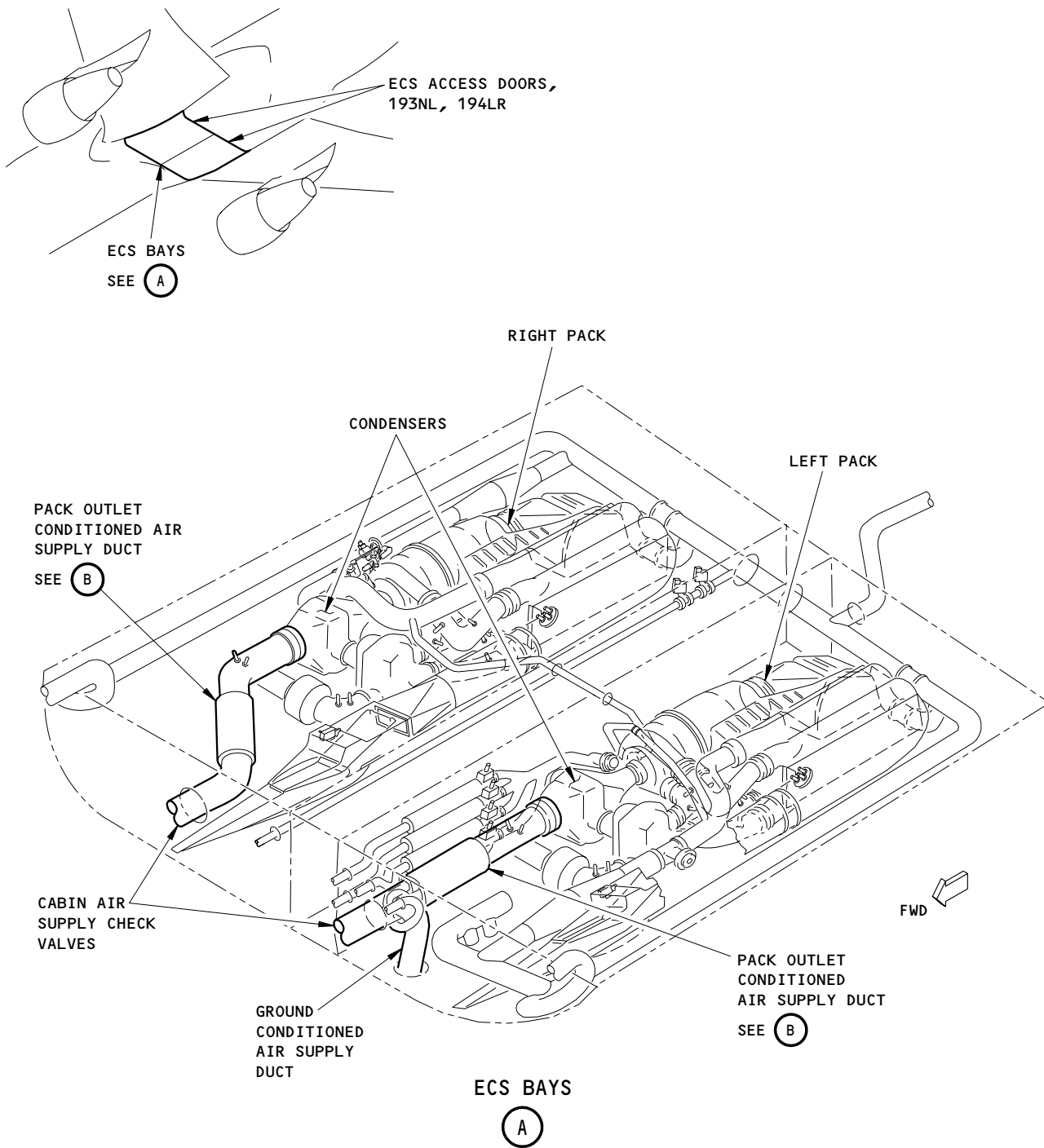
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Pack Outlet Conditioned Air Supply Duct Installation
Figure 401 (Sheet 1)

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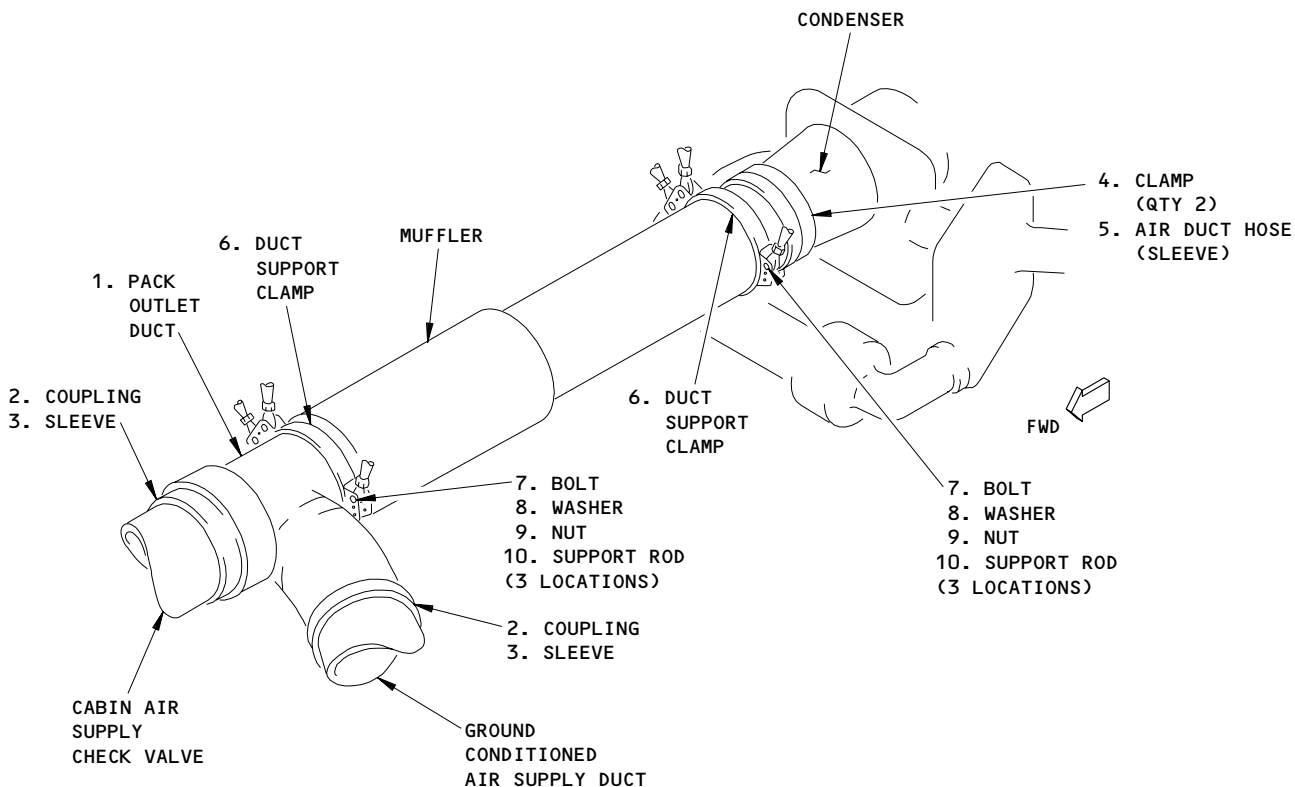
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PACK OUTLET CONDITIONED AIR SUPPLY DUCT
(LEFT IS SHOWN, RIGHT IS EQUIVALENT)

(B)

Pack Outlet Conditioned Air Supply Duct Installation
Figure 401 (Sheet 2)

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D. Pack Outlet Conditioned Air Supply Duct Removal

S 024-039

- (1) Remove the pack overheat switch (S48, S49) from the pack outlet duct (AMM 21-51-18/201).

S 024-040

- (2) Remove the pack outlet temperature bulb (TS39, TS40) from the pack outlet duct (AMM 21-52-06/401).

S 034-008

- (3) Remove the coupling that connects the forward end of the pack outlet duct to the cabin air supply check valve.
 - (a) Move the sleeve (which is under the coupling) forward onto the cabin air supply check valve.

S 034-010

- (4) For the left pack outlet duct, remove the coupling that connects the pack outlet duct to the ground conditioned air duct assembly.
 - (a) Move the sleeve (which is under the coupling) onto the ground conditioned air duct assembly.

S 034-009

- (5) Remove the two clamps and air duct hose (sleeve) that connects the the aft end of the pack outlet duct to the condenser outlet.
 - (a) Move the air duct hose (sleeve) onto the condenser outlet.

S 034-007

CAUTION: HOLD THE DUCT IN ITS POSITION WHEN YOU DISCONNECT THE ATTACH POINTS. IF YOU DO NOT HOLD THE DUCT IN ITS POSITION, IT COULD DROP AND CAUSE DAMAGE.

- (6) Remove the bolts, washers, and nuts to disconnect the three support rods from each of the two duct support clamps that support the pack outlet duct.

S 024-011

- (7) Remove the pack outlet duct.
 - (a) Remove the two duct support clamps from the pack outlet duct.
 - (b) Remove the sleeve from the cabin air supply check valve.
 - (c) For the left pack outlet duct, remove the sleeve from the ground conditioned air duct assembly.
 - (d) Remove the air duct hose (sleeve) from the condenser outlet.

S 434-012

- (8) Put a cover on the duct openings.

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TASK 21-51-23-404-013

3. Pack Outlet Conditioned Air Supply Duct Installation (Fig. 401)

A. Consumable Materials

- (1) D00548, Lubricant (grease) - Fluorolube GR 660
 - (a) Lubricant (grease) - Fluorolube GR 544 (alternate)
 - (b) Lubricant (grease) - Fluorolube GR 470 (alternate)

B. References

- (1) AMM 21-00-00/201, Air Conditioning - General
- (2) AMM 21-51-18/201, Pack Overheat Switch
- (3) AMM 21-52-06/401, Pack Outlet Temperature Bulb
- (4) AMM 24-22-00/201, Electrical Power - Control

C. Access

- (1) Location Zones
 - 135/136 Environmental control systems (ECS) bay
- (2) Access Panels
 - 193FL ECS Components (Left)
 - 194GR ECS Components - Fuselage Structure (Right)

D. Pack Outlet Conditioned Air Supply Duct Installation

S 034-014

- (1) Remove the covers from the duct openings.
 - (a) Make sure there is no unwanted material in the ducts.

S 434-051

- (2) Loosely install the two duct support clamps around the pack outlet duct.

S 434-053

- (3) Install the sleeve onto the cabin air supply check valve.

S 434-054

- (4) For the left pack outlet duct, install the sleeve onto the ground conditioned air duct assembly.

S 434-055

- (5) Install the air duct hose (sleeve) onto the condenser outlet.

S 424-017

CAUTION: HOLD THE DUCT IN ITS POSITION UNTIL YOU CONNECT THE SUPPORT RODS. IF YOU DO NOT HOLD THE DUCT IN ITS POSITION, IT COULD DROP AND CAUSE DAMAGE.

- (6) Put and hold the pack outlet duct in its position, between the condenser outlet and the cabin air supply check valve.

S 434-056

- (7) Install the bolts, washers, and nuts to connect the three support rods to each of the two duct support clamps on the pack outlet duct.

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S 434-052

- (8) Tighten the nut on each duct support clamp to 15-20 pound-inches (1.69-2.26 newton-meters).

S 434-063

- (9) Install the air duct hose (sleeve) and the two clamps to connect the aft end of the pack outlet duct to the condenser outlet.
- (a) Move the air duct hose (sleeve) so that it is seated evenly over the duct beads of the pack outlet duct and the condenser outlet.
- (b) Apply a thin layer of the fluorolube lubricant (grease) to the faying surfaces of the air duct hose (sleeve) and the two clamps.

NOTE: The lubricant (grease) is only to help facilitate installation and it's use is optional.

- (c) Install the two clamps over the air duct hose (sleeve).
- (d) Tighten the nut on each clamp to 15-20 pound-inches (1.69-2.26 newton-meters).

S 434-064

- (10) Install the sleeve and coupling to connect the forward end of the pack outlet duct to the cabin air supply check valve.
- (a) Move the sleeve so that it is seated evenly over the duct beads of the pack outlet duct and the cabin air supply check valve.
- (b) Apply a thin layer of the fluorolube lubricant (grease) to the faying surfaces of the sleeve and the coupling.

NOTE: The lubricant (grease) is only to help facilitate installation and it's use is optional.

- (c) Loosely install the coupling over the sleeve.
- (d) Tighten the coupling to 40-50 pound-inches (4.52- 5.65 newton-meters).
- (e) Make sure that the sleeve stays seated evenly over the duct beads.

S 434-065

- (11) For the left pack outlet duct, install the sleeve and coupling to connect the pack outlet duct to the ground conditioned air duct assembly.
- (a) Move the sleeve so that it is seated evenly over the duct beads of the pack outlet duct and the ground conditioned air duct assembly.

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- (b) Apply a thin layer of the fluorolube lubricant (grease) to the faying surfaces of the sleeve and the coupling.

NOTE: The lubricant (grease) is only to help facilitate installation and it's use is optional.

- (c) Loosely install the coupling over the sleeve.
- (d) Tighten the coupling to 40-50 pound-inches (4.52- 5.65 newton-meters).
- (e) Make sure that the sleeve stays seated evenly over the duct beads.

S 424-068

- (12) Install the pack overheat switch (S48, S49) to the pack outlet duct (AMM 21-51-18/201).

S 424-067

- (13) Install the pack outlet temperature bulb (TS39, TS40) to the pack outlet duct (AMM 21-52-06/401).

E. Post-Installation Test

S 864-022

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-023

- (2) Operate the air conditioning pack (AMM 21-00-00/201).

S 794-025

- (3) Make sure there are no air leaks at the pack outlet duct.

F. Put the airplane back to its usual condition

S 414-026

- (1) Close the access panel 193FL (194GR) for the left (right) ECS pack.

S 864-027

- (2) Shutoff the air conditioning pack (AMM 21-00-00/201).

S 864-029

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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PACK FLOW AND CARGO AIR CONDITIONING CONTROLLER (PFCAC) -
REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the pack flow and cargo air conditioning controller. The pack flow and cargo air conditioning controller is installed in the E1-5 rack of the main equipment center.

TASK 21-51-24-004-001

2. Remove the Pack Flow and Cargo Air Conditioning Controller (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 20-10-01/401, E/E Rack-Mounted Components

B. Access

- (1) Location Zones
 - 119 Main equipment center (Left)
- (2) Access Panels
 - 119AL Main equipment center access door

C. Prepare for Removal

S 864-002

- (1) Turn the L and R PACK selectors, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Put a DO-NOT-OPERATE tag on the selectors.

S 864-003

- (2) Push the FWD CARGO AC switch-light, on the P5 panel, to the off position.
 - (a) Put a DO-NOT-OPERATE tag on the switch-light.

S 864-004

- (3) Open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the pilot's overhead circuit breaker panel, P11:
 - (a) 11A13, LEFT PACK FLOW CONT

S 014-005

- (4) Open the access door for the main equipment center, 119AL (Ref 06-41-00).

D. Remove the Controller

S 024-006

- (1) Remove the controller (Ref 20-10-01).

TASK 21-51-24-404-007

3. Install the Pack Flow and Cargo Air Conditioning Controller (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels

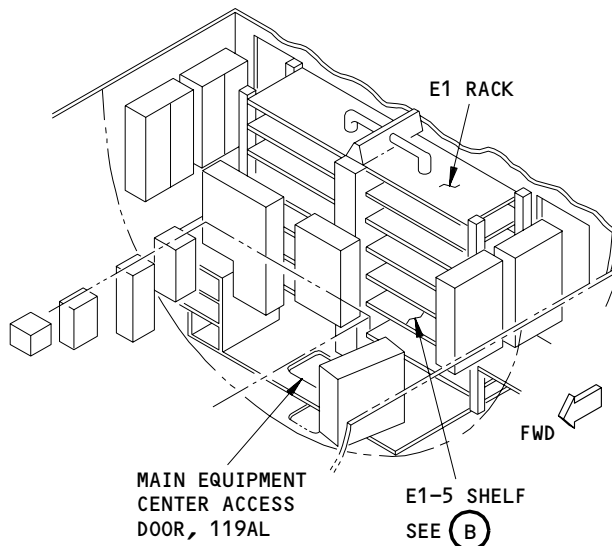
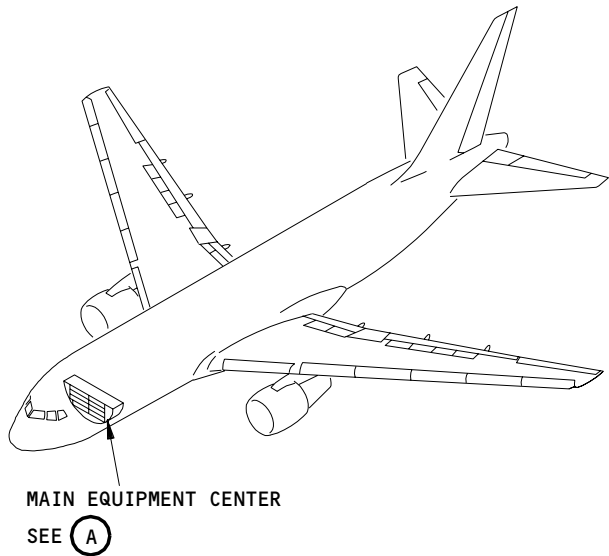
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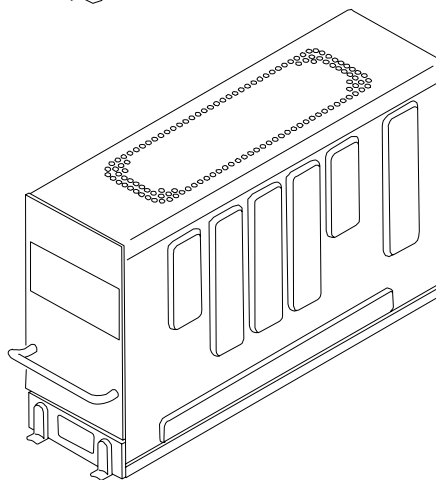
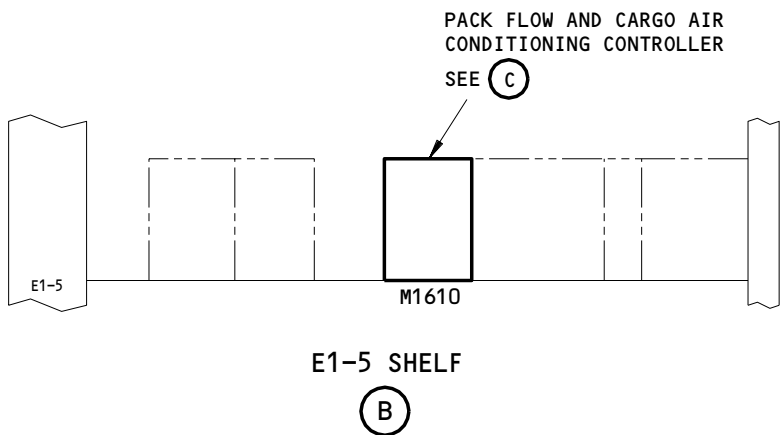
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MAIN EQUIPMENT CENTER
(A)



PACK FLOW AND CARGO AIR
CONDITIONING CONTROLLER
(C)

Pack Flow and Cargo Air Conditioning Controller Installation
Figure 401

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- (2) 20-10-01/401, E/E Rack-Mounted Components
- (3) 24-22-00/201, Electrical Power Control
- B. Access
 - (1) Location Zones
 - 119 Main equipment center (Left)
 - (2) Access Panels
 - 119AL Main equipment center access door
- C. Install the Controller
 - S 424-008
 - (1) Install the controller in the E1-5 rack (Ref 20-10-01).
- D. Do the installation test for the controller
 - S 864-009
 - (1) Supply the electrical power (Ref 24-22-00).
 - S 864-025
 - (2) Supply pneumatic power (Ref 36-00-00).
 - S 864-010
 - (3) Remove the DO-NOT-CLOSE tag and close this circuit breaker, on the P11 panel:
 - (a) 11A13, LEFT PACK FLOW CONT
 - S 864-011
 - (4) Remove the DO-NOT-OPERATE tag from the L and R PACK selectors, on the P5 panel.
 - (a) Turn the selectors to the AUTO position.
 - (b) Make sure the PACK OFF lights go off.
 - S 864-012
 - (5) Remove the DO-NOT-OPERATE tag from the FWD CARGO AC switch-light, on the P5 panel.
 - (a) Push the switch-light to the on position.
 - S 864-013
 - (6) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.
 - S 214-014
 - (7) SAS 150-154 WITHOUT SB 21-78 OR SB 31-33;
MTH 275 WITHOUT SB 21-78 OR SB 31-33;
Make sure the EICAS message, CARGO A/C CTRLR, does not show on the bottom display.

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- S 214-020
- (8) SAS 150-154 WITH SB 21-78 OR SB 31-33;
SAS 050-149, 155-999;
MTH 275 WITH SB 21-78 OR SB 31-33;
MTH 276-999;
Make sure the EICAS message, CARGO A/C CONT, does not show on the top or bottom display.
- E. Put the airplane back to its usual condition
- S 414-015
- (1) Close the access door for the main equipment center, 119AL (Ref 06-41-00).
- S 864-018
- (2) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.
- S 864-017
- (3) Push the FWD CARGO AC switch-light, on the P5 panel, to the off position.
- S 864-026
- (4) Remove the pneumatic power ,if it is not necessary (Ref 36-00-00).
- S 864-016
- (5) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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COOLING PACK INDICATION SYSTEM – DESCRIPTION AND OPERATION

1. General

- A. SAS 050, 051, 150-157, 162-167, 275-278, 280 PRE-SB 21-129;
- B. The cooling pack temperature indication system provides pack temperature and inlet flow information to the Engine Indicating and Crew Alerting System (EICAS) for display in the flight deck. The cooling pack system (AMM 21-51-00/001) provides control of pack airflow and valve positioning. The ram air system (AMM 21-53-00/001) controls pack operating temperature.
- C. SAS 050, 051, 150-157, 162-167, 275-278, 280 POST-SB 21-129; SAS 281-999;
- D. The cooling pack temperature indication system provides pack temperature information to the Engine Indicating and Crew Alerting System (EICAS) for display in the flight deck. The cooling pack system (AMM 21-51-00/001) provides control of pack airflow and valve positioning. The ram air system (AMM 21-53-00/001) controls pack operating temperature.

2. Component Details (Fig. 1)

A. Pack Temperature Bulbs

- (1) Temperature bulbs on the cooling packs provide EICAS indication of operating temperatures. Each bulb is a resistance type temperature probe extending into the duct. The electrical resistance of the temperature probe varies directly with the sensed air temperature. Each cooling pack has the following temperature bulbs in the indicated locations.
 - (a) The Pack Outlet Temperature Bulb is downstream (forward) of the condenser, beside the pack overheat switch.
 - (b) The Turbine Inlet Temperature Bulb is between the reheater and ACM turbine.
 - (c) The Compressor Outlet Temperature Bulb is between the ACM compressor and secondary heat exchanger inlet.
 - (d) The Primary Heat Exchanger Outlet (Compressor Inlet) Temperature Bulb is between the primary heat exchanger outlet and ACM compressor.
 - (e) The Primary Heat Exchanger Inlet (Pack Inlet) Temperature Bulb is downstream of the flow control and shutoff valve.
 - (f) The Secondary Heat Exchanger Outlet Temperature Bulb is between the secondary heat exchanger outlet and reheater.

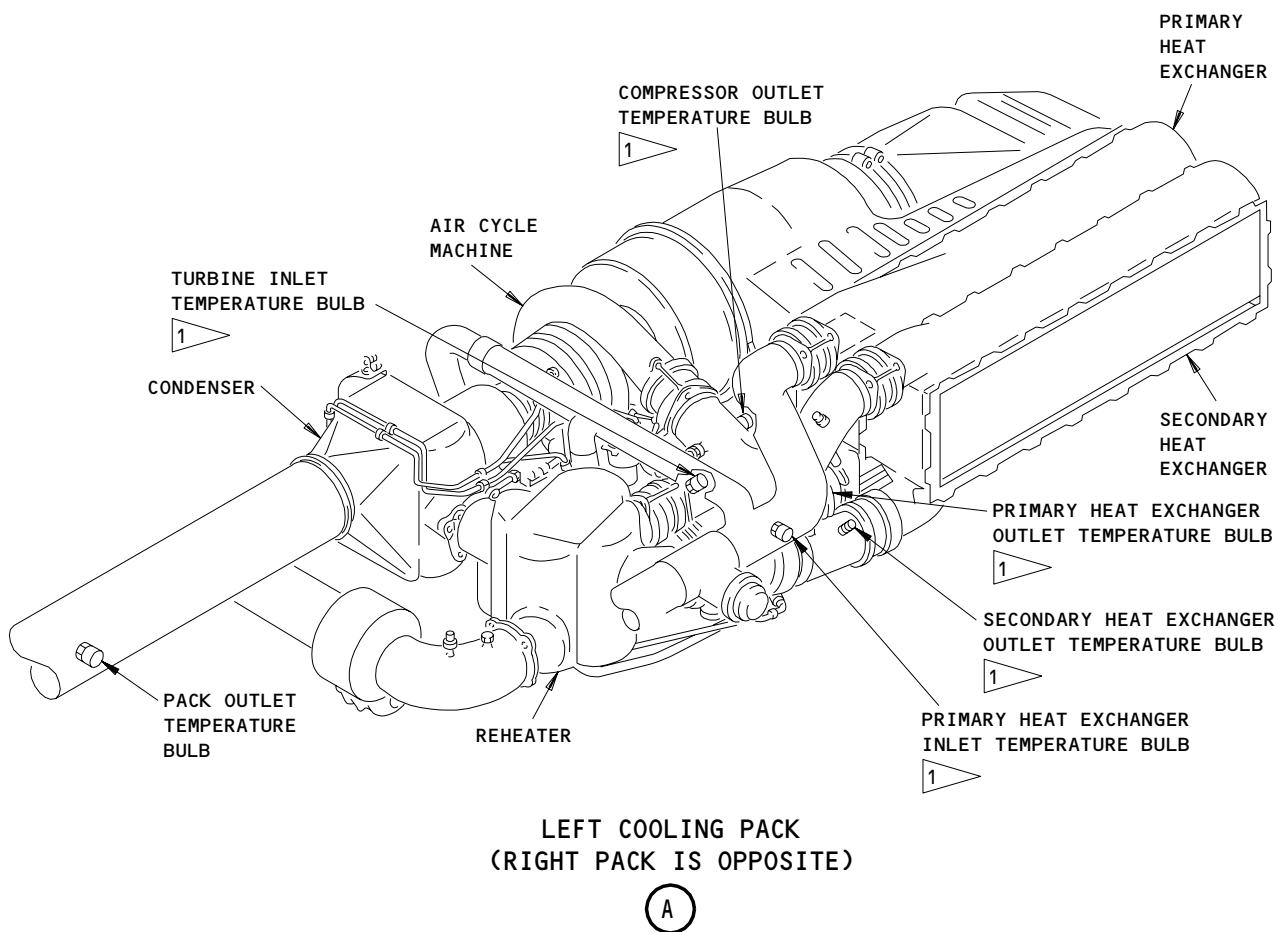
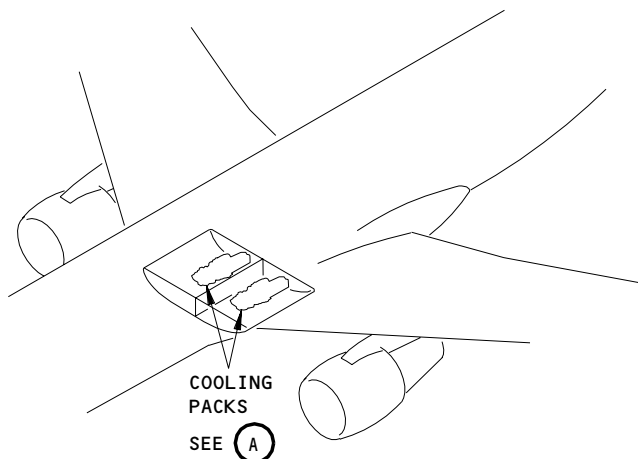
- B. SAS 050, 051, 150-157, 162-167, 275-278, 280 PRE-SB 21-129;

Pack Flow Sensor and Pack Flow Signal Processor

EFFECTIVITY

ALL

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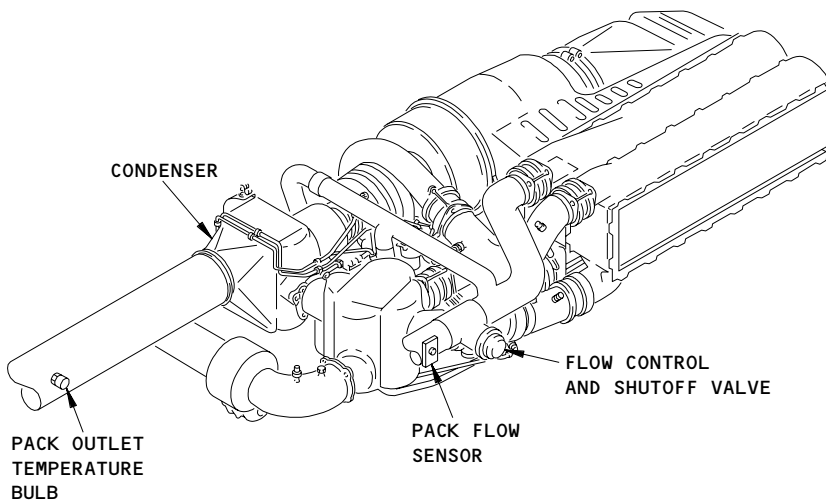
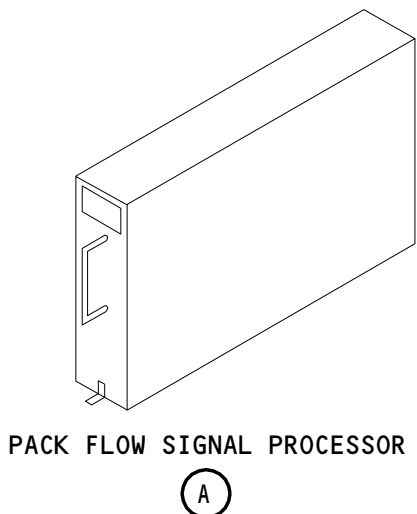
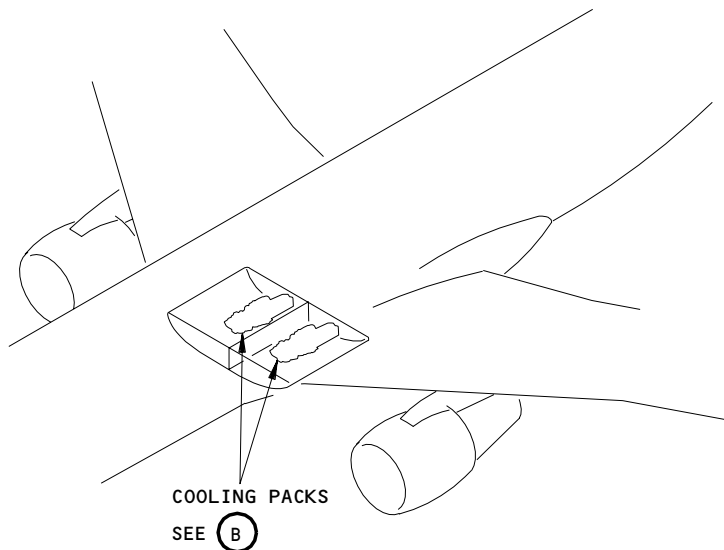
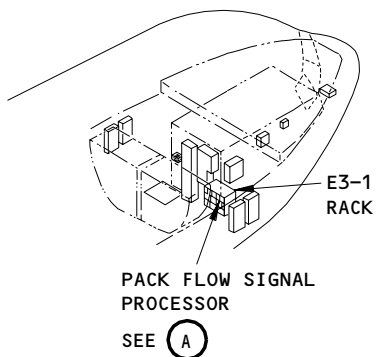


1 NOT INSTALLED ON ALL AIRPLANES

Cooling Pack Indication
Figure 1

EFFECTIVITY	ALL
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21-52-00



LEFT COOLING PACK
(RIGHT COOLING PACK IS OPPOSITE)

(B)

Cooling Pack Indication
Figure 1A

EFFECTIVITY
AIRPLANES WITH PACK FLOW
INDICATION SYSTEM
(PRE-SB 21-129)

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- (1) A pack flow sensor is located immediately upstream of each flow control and shutoff valve. Each sensor consists of a duct probe, integral electrical connector and mounting hardware. The probes contain two electrical resistance elements which vary directly with temperature. One resistance element contains an integral heater. The heater warms the element above the airstream temperature. The signals generated are used by the flow processor to calculate airflow rate.
- (2) The pack flow signal processor takes the signals from each pack flow sensor and calculates airflow velocity and rate for each pack. The processor is a microprocessor control unit located in the main equipment center's E-3 rack. The processor transmits the resultant airflow signal and displays it on the EICAS computer.

3. Operation

A. Pack Temperature Indication (Fig. 2, 3)

- (1) The pack temperature bulbs operate on 28v dc power. The bulbs sense airflow temperatures and provide EICAS indication on the ECS/MSG maintenance page. Pressing the EICAS ECS/MSG button on the right side of the P61 panel will display the following temperatures (in °C) on the lower CRT screen of pilot's center display panel P2:
 - (a) L and R PACK OUT
 - (b) L and R COMPR OUT
 - (c) L and R TURB IN
 - (d) L and R PRIM HX IN
 - (e) L and R PRIM HX OUT
 - (f) L and R SEC HX OUT

B. SAS 050, 051, 150-157, 162-167, 275-278, 280 PRE-SB 21-129; Pack Flow Indication (Fig. 3)

- (1) The pack flow indication system measures the amount of supply air entering the air cooling packs. The system uses 115VAC power supplied to the flow processor. The processor provides power to the pack flow sensor.
- (2) The pack flow sensor measures airflow temperature, heated element temperature and airflow pressure. The pack flow signal processor uses this information together with current drawn by the heater, to calculate airflow velocity and volume. The processor calculates this on a continuing real time basis for both left and right systems.

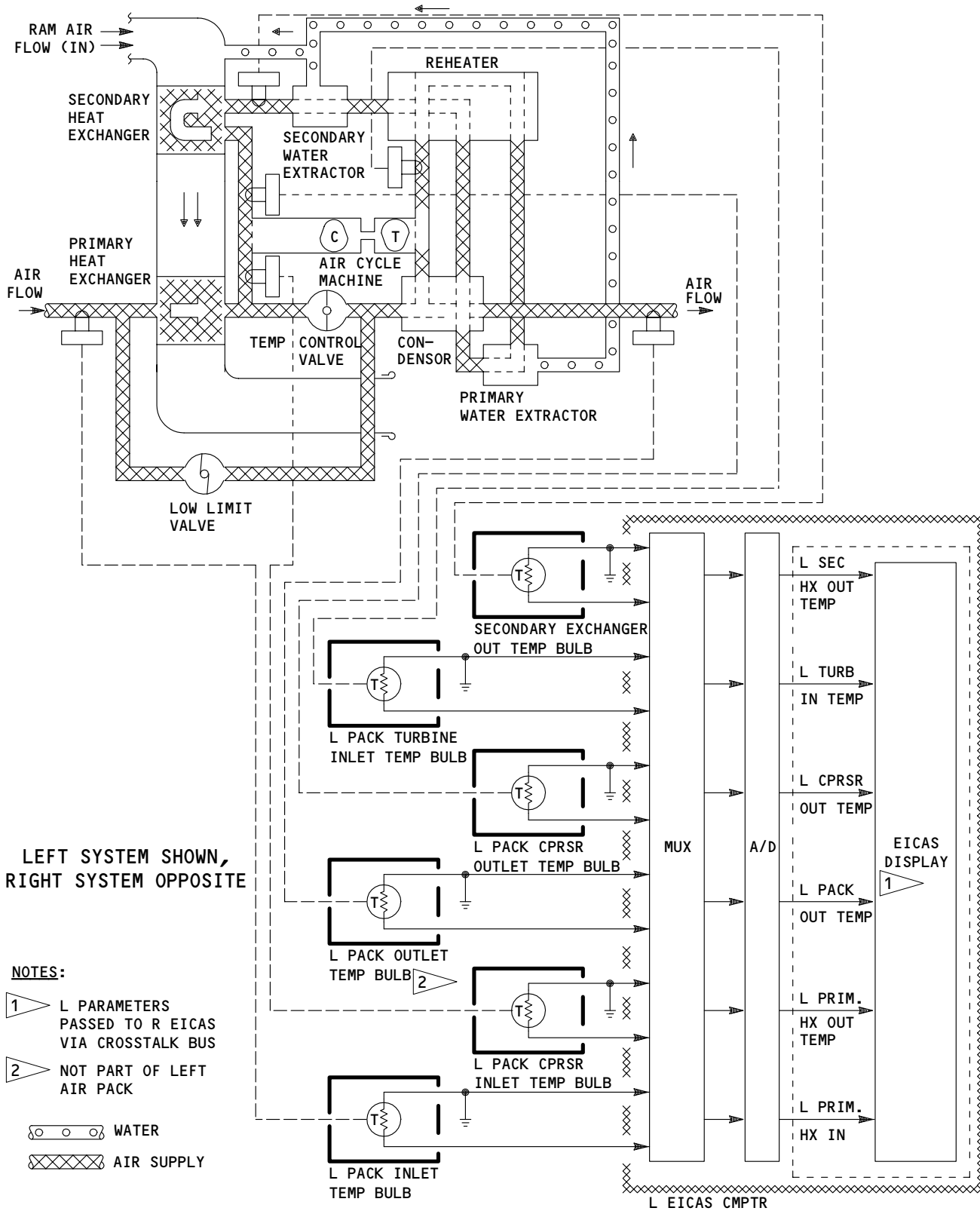
EFFECTIVITY

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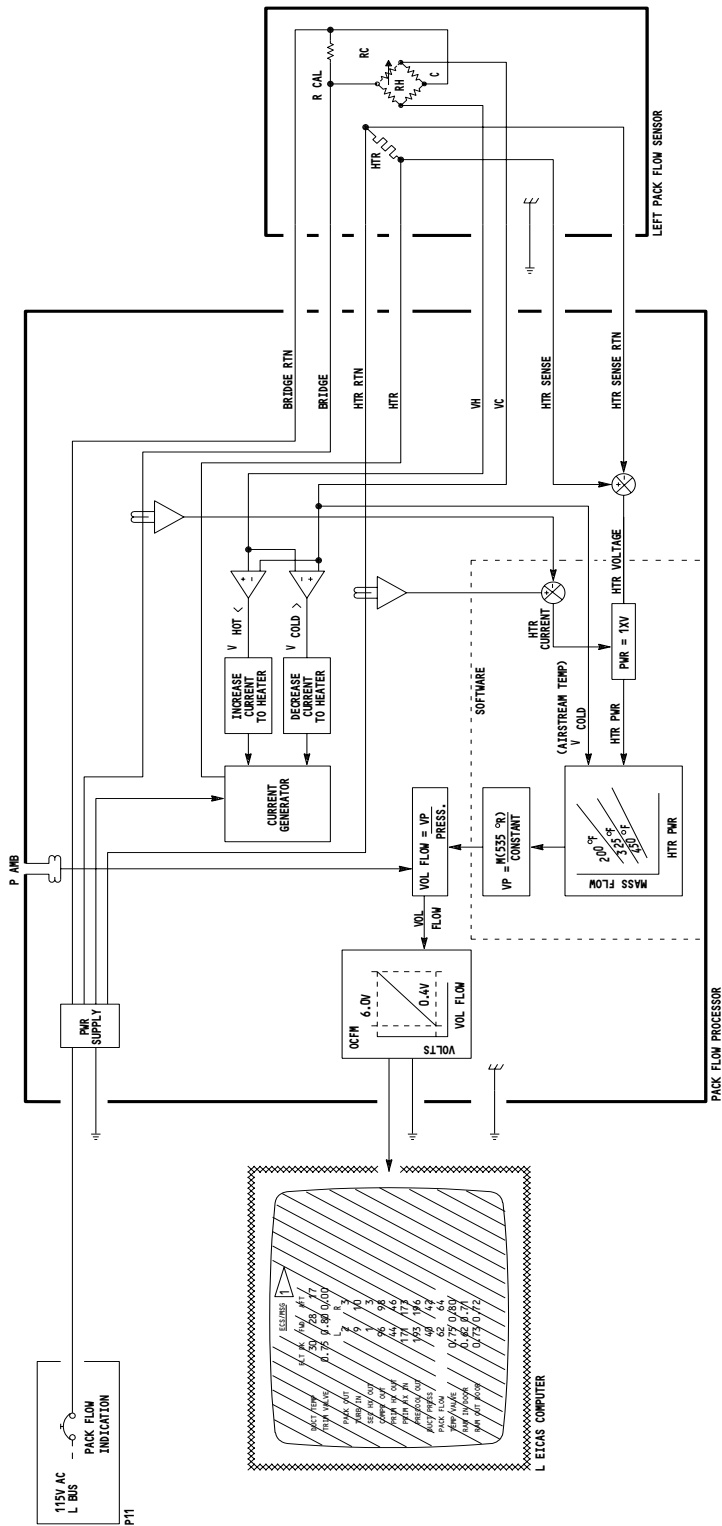


Pack Temperature Indication Schematic
Figure 2

EFFECTIVITY

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▲ L PACK AIR FLOW PASSED TO R ECAS
○PWR VIA CROSS-TALK BUS

LEFT SYSTEM SHOWN
RIGHT SYSTEM SIMILAR
Pack Flow Indication Schematic
Figure 3

EFFECTIVITY
SAS 050, 051, 150-157, 162-167,
275-278, 280 PRE-SB 21-129

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- (3) Pressing the EICAS ECS/MSG button on the P61 panel will display L and R PACK FLOW (cubic meters/minute) on the P2 lower CRT screen.

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COOLING PACK TEMPERATURE INDICATION

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
BULB - COMPRESSOR OUTLET TEMPERATURE L PACK, TS292 R PACK, TS293	2	2	193NL,194LR	21-52-01
BULB - PACK OUTLET TEMPERATURE L PACK, TS39 R PACK, TS40	2	2	193FL,194GR	21-52-06
BULB - PRIMARY HEAT EXCHANGER INLET (PACK INLET) TEMPERATURE L PACK, TS433 R PACK, TS432	2	2	193NL,194LR	21-52-08
BULB - PRIMARY HEAT EXCHANGER OUTLET (COMPRESSOR INLET) TEMPERATURE L PACK, TS290 R PACK, TS291	2	2	193NL,194LR	21-52-02
BULB - SECONDARY HEAT EXCHANGER OUTLET L PACK, TS431 R PACK, TS430	2	2	193NL,194LR	21-52-05
BULB - TURBINE INLET TEMPERATURE L PACK, TS294 R PACK, TS295	2	2	193NL,194LR	21-52-07
CIRCUIT BREAKER - L PACK FLOW CONT, C653 LEFT PACK AUTO CONT, C702 LEFT PACK AUTO PWR, C673 LEFT PACK STANDBY CONT, C4037 LEFT PACK STANDBY PWR, C4036 PACK FLOW IND, C709 R PACK FLOW CONT, C704 RIGHT PACK AUTO CONT, C703 RIGHT PACK AUTO PWR, C674 RIGHT PACK STANDBY CONT, C4038 RIGHT PACK STANDBY PWR, C4039	1		FLT COMPT, P11 11A13 11N11 11N10 11N25 11N24 11N17 11A26 11N20 11N19 11N16 11N15	* * * * * * * * * * *
COMPUTER - (FIM 31-41-00/101) EICAS L, M10181 EICAS R, M10182				
PROCESSOR - FLOW SENSOR SIGNAL, M916	1	1	119AL, MAIN EQUIP CTR, E3 RACK	21-52-04
SENSOR - PACK FLOW L PACK, TS285 R PACK, TS286	2	2	193NL,194LR	21-52-03

* SEE THE WDM EQUIPMENT LIST

SAS 050,051,150,157,162-167,275-278,280

Cooling Pack Temperature Indication - Component Index
Figure 101

EFFECTIVITY

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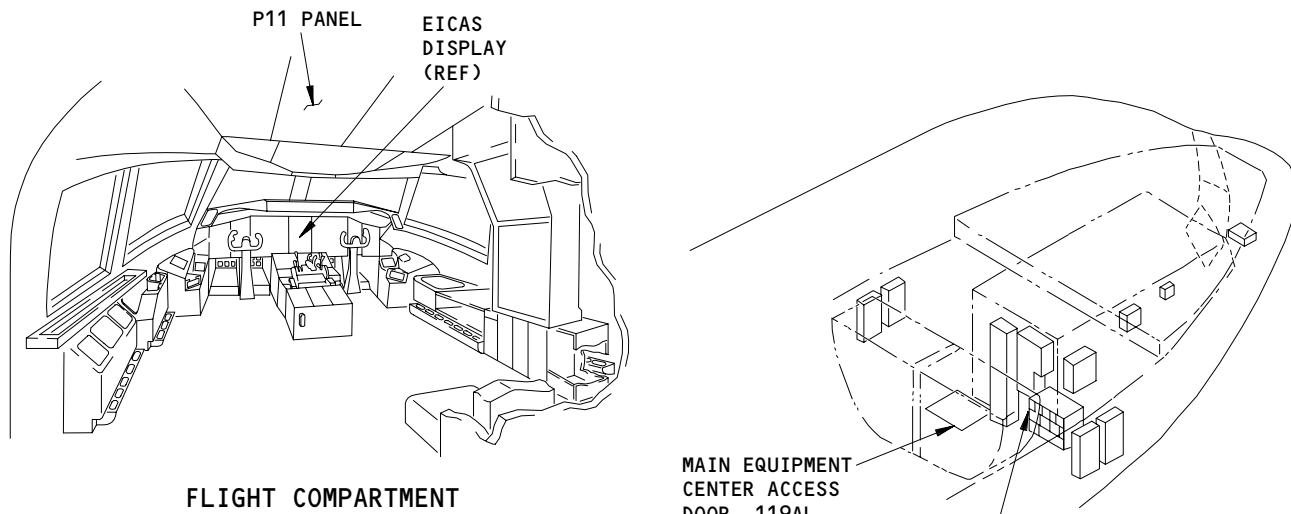
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FLIGHT COMPARTMENT

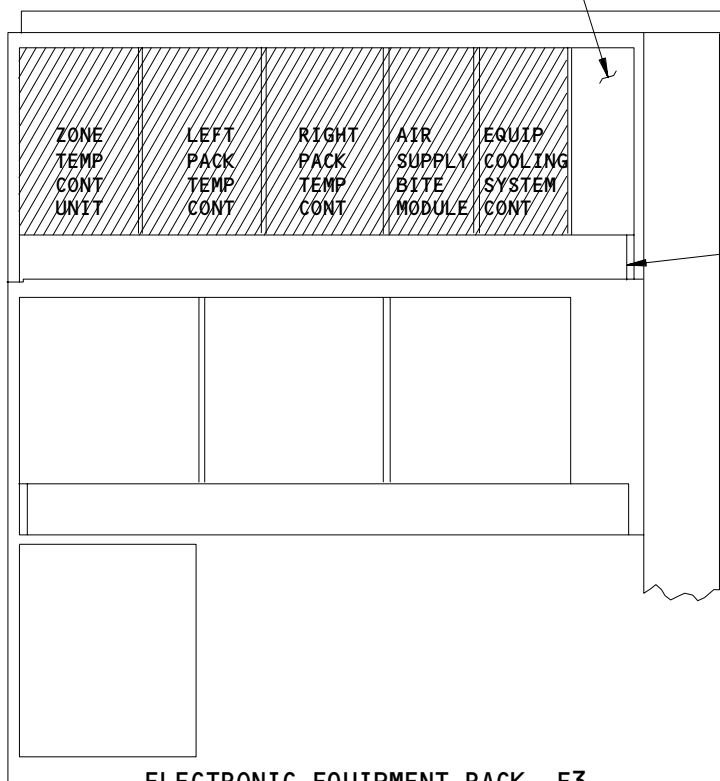
MAIN EQUIPMENT CENTER ACCESS DOOR, 119AL

ELECTRONIC EQUIPMENT RACK, E3

PACK FLOW SIGNAL PROCESSOR, M916

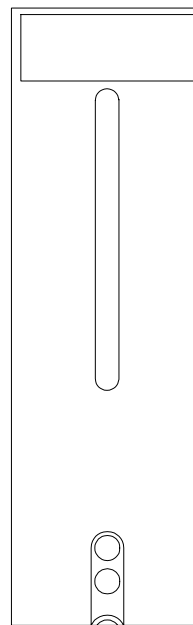
SEE (B) 1

SEE (A)



ELECTRONIC EQUIPMENT RACK, E3

E3-1 SHELF



PACK FLOW SIGNAL PROCESSOR, M916

(A)

(B) 1

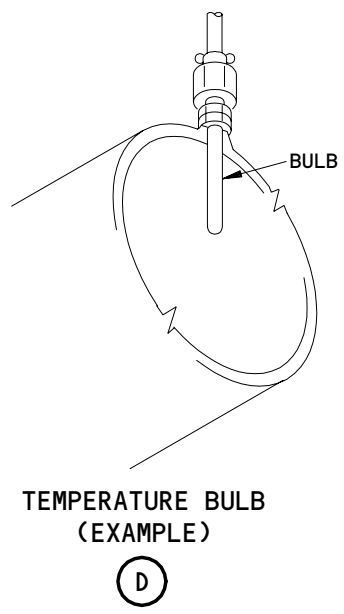
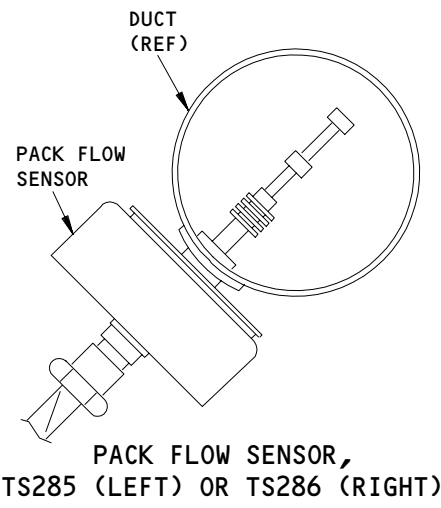
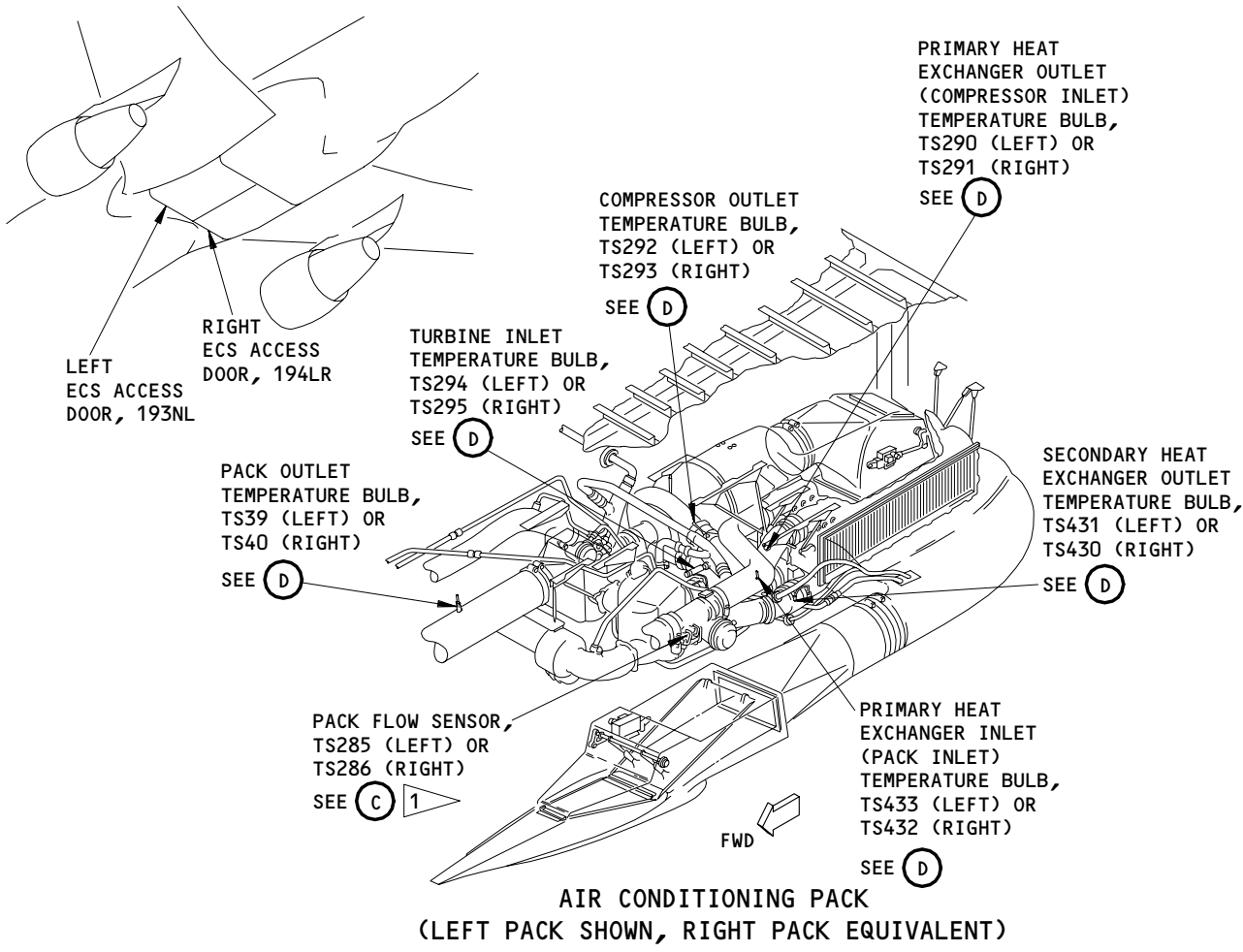
1 SAS 050,051,150-157,162-167,275-278,280

Cooling Pack Temperature Indication - Component Location
Figure 102 (Sheet 1)

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1 SAS 050,051,150-157, 162-167,275-278,280

(C) 1

(D)

Cooling Pack Temperature Indication - Component Location
Figure 102 (Sheet 2)

EFFECTIVITY	ALL
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COOLING PACK INDICATION SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure has instructions to do the system test of the indication system for the air cooling packs. The system test includes these tests:
- (1) The pack temperature bulb test.
 - (2) The pack position indication test.
 - (3) SAS 050, 051, 150-157, 162-167, 275-278, 280 PRE-SB 21-129;
The pack flow indication test.

TASK 21-52-00-005-001

2. System Test – Cooling Pack Indication System (Fig. 501)

A. Equipment

- (1) Thermometer – handheld, commercially available

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control
- (3) AMM 27-61-00/201 Spoiler/Speedbrake Control System
- (4) AMM 32-09-02/201, Air/Ground Relays
- (5) AMM 36-00-00/201, Pneumatic General

C. Prepare for the Test

S 865-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-003

- (2) Make sure these circuit breakers, on the overhead circuit breaker panel, P11, are closed:
 - (a) 11N10, LEFT PACK AUTO PWR
 - (b) 11N11, LEFT PACK AUTO CONT
 - (c) SAS 050, 051, 150-157, 162-167, 275-278, 280 PRE-SB 21-129;
11N17, PACK FLOW IND
 - (d) 11N19, RIGHT PACK AUTO PWR
 - (e) 11N20, RIGHT PACK AUTO CONT

S 865-004

- (3) Turn the L and R PACK selectors, on the pilots overhead panel, P5, to the OFF position.

S 865-006

- (4) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 015-007

- (5) Open the left and right ECS access doors, 193NL and 194LR (AMM 06-41-00/201).

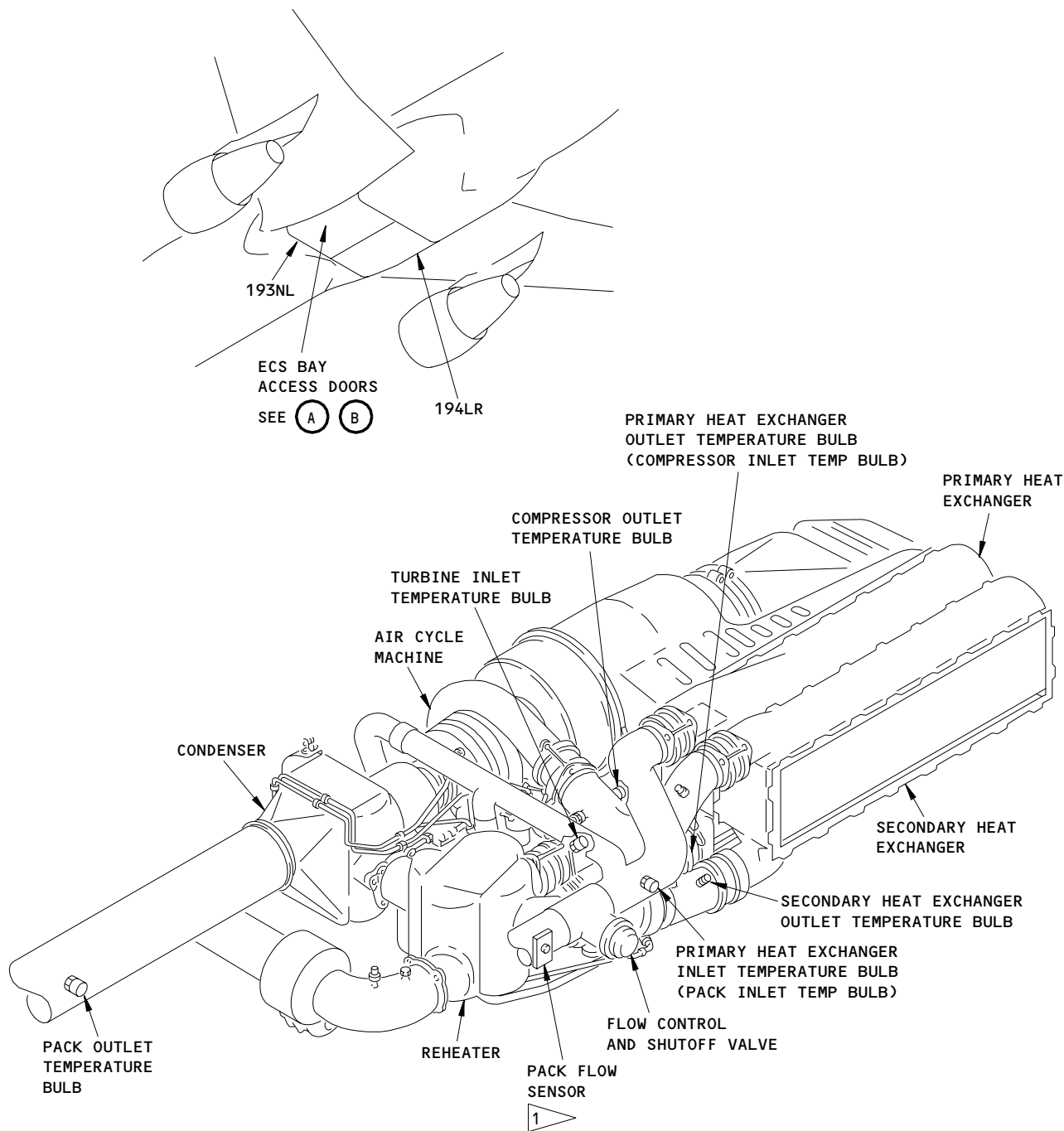
EFFECTIVITY

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LEFT AIR CONDITIONING PACK
(RIGHT PACK OPPOSITE)

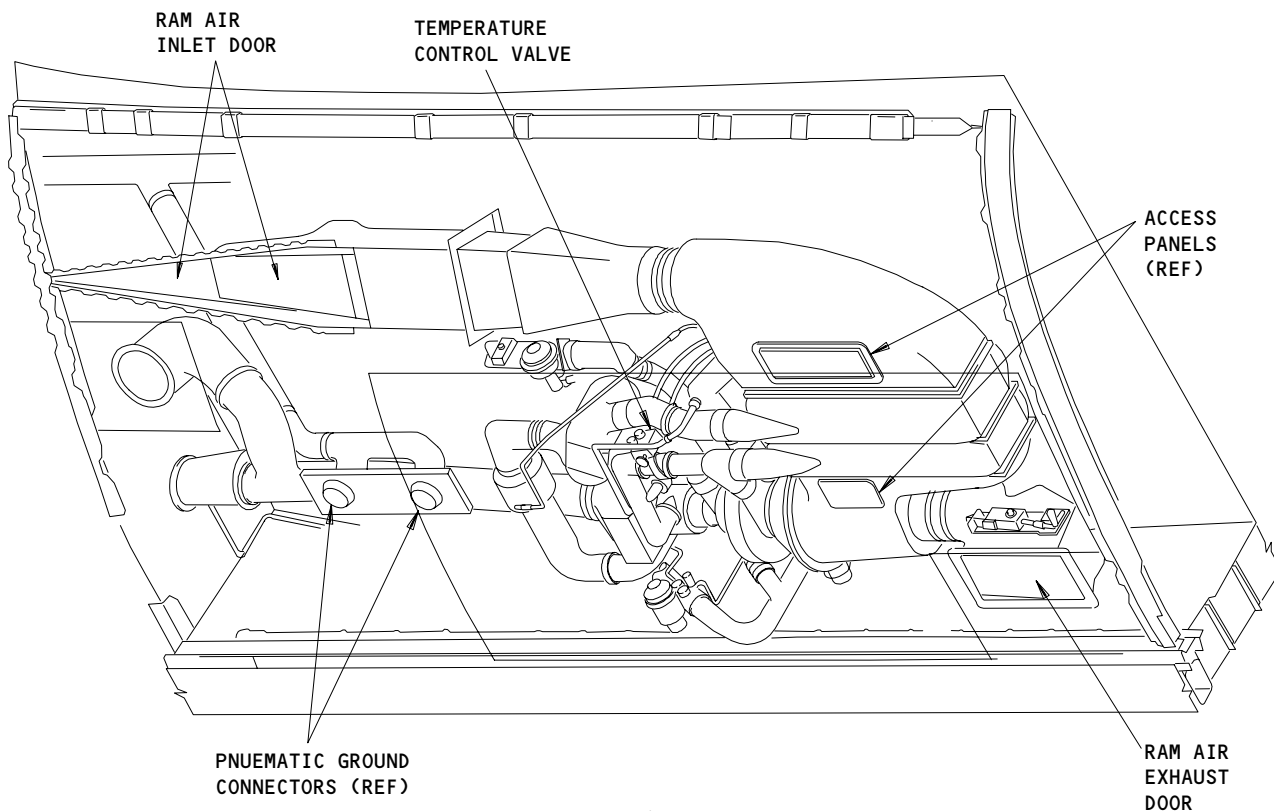
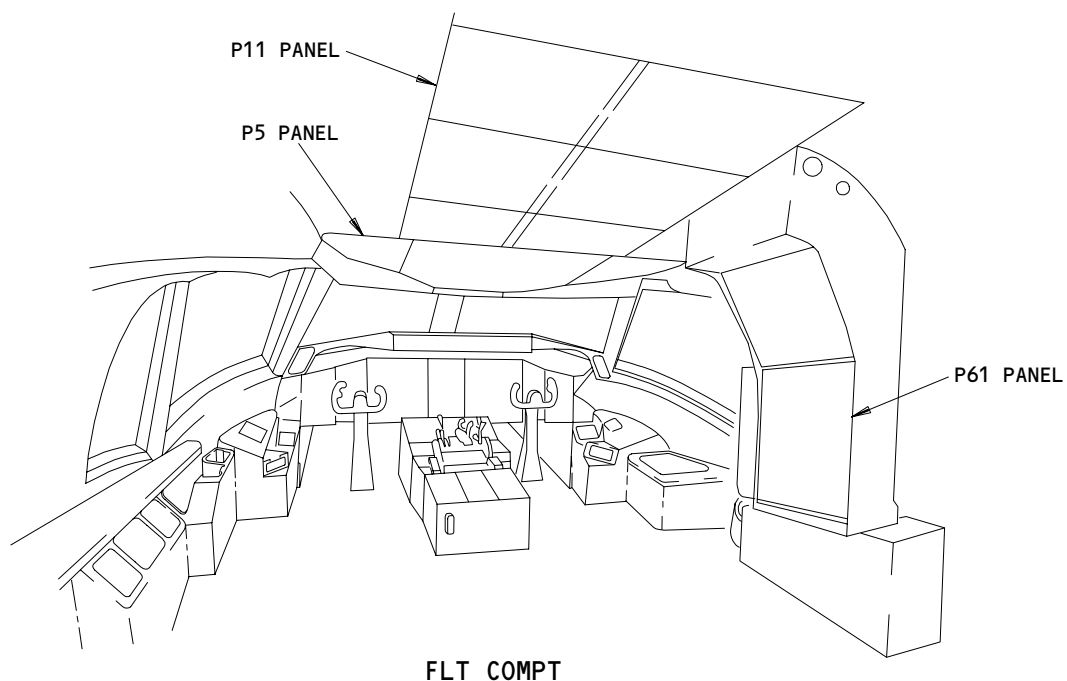
(A)

1 SAS 050,051,150-157,162-167,
275-278,280,281 PRE-SB 21-129

Cooling Pack Indication Test
Figure 501 (Sheet 1)

EFFECTIVITY	
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B

Cooling Pack Indication Test
Figure 501 (Sheet 2)

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D. Do the Test

S 735-008

- (1) Do the pack temperature bulb test.
- (a) Hold the thermometer less than two feet from each pack temperature bulb.
 - (b) In the table that follows, do the steps that follow:
 - 1) Make a record of the temperature near each pack temperature bulb.
 - 2) Make a record of the EICAS maintenance indications.
 - 3) Make sure the thermometer values are approximately equal to the EICAS values.

THERMOMETER VALUES	EICAS VALUES
Left Pack Outlet ____	L PACK OUT ____
Left Compressor Outlet ____	L COMPR OUT ____
Left Turbine Inlet ____	L TURB IN ____
Left Primary Heat Exchanger Inlet ____	L PRIM HX IN ____
Left Primary Heat Exchanger Outlet ____	L PRIM HX OUT ____
Left Secondary Heat Exchanger Outlet ____	L SEC HX OUT ____
Right Pack Outlet ____	R PACK OUT ____
Right Compressor Outlet ____	R COMPR OUT ____
Right Turbine Inlet ____	R TURB IN ____
Right Primary Heat Exchanger Inlet ____	R PRIM HX IN ____
Right Primary Heat Exchanger Outlet ____	R PRIM HX OUT ____
Right Secondary Heat Exchanger Outlet ____	R SEC HX OUT ____

S 735-009

- (2) Do the pack position indication test.
- (a) Make sure the EICAS maintenance display shows these indications:

	L	R
TEMP VALVE	0.00 to 0.05	0.00 to 0.05
RAM IN DOOR	0.00 to 0.05	0.00 to 0.05
RAM OUT DOOR	0.00 to 0.05	0.00 to 0.05

- (b) Make sure the EICAS messages, R PACK OFF and L PACK OFF, show on the top display.
- (c) Make sure the L and R PACK OFF lights, on the P5 panel, are on.

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WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (d) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (e) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (AMM 32-09-02/201).
(f) Make sure the left and right ram-air inlet doors move to the fully closed position.

NOTE: The ram-air inlet doors will not move until the temperature control valve moves to its position. The opening of the inlet doors will be between 0.35 and 0.50 inches.

- (g) Make sure the left and right ram-air exhaust doors move to the fully closed position.

NOTE: The ram-air exhaust doors will not move until the ram-air inlet doors move to their positions. The opening of the exit doors will be between 0.80 and 1.00 inches.

- (h) Turn the L and R PACK selectors, on the P5 panel, to the STBY-N position.
(i) Make sure the left and right temperature control valves move to the fully closed position.
(j) Make sure the left and right ram-air inlet doors move to the fully open position.
(k) Make sure the left and right ram-air exit doors move to the fully open position.
(l) Turn the L and R PACK selectors, on the P5 panel, to the OFF positions.
(m) Make sure the left and right temperature control valves move to the fully open position.
(n) Make sure the left and right ram-air inlet doors move to the fully closed position.
(o) Make sure the left and right ram-air exit doors move to the fully closed position.
(p) Make sure the EICAS messages, L PACK OFF and R PACK OFF, show on the top display.
(q) Make sure the L and R PACK OFF lights, on the P5 panel, are on.

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- (r) Put the No. 1 and No. 2 air/ground systems to the ground mode (Ref 32-09-02).
- (s) Make sure the left and right temperature control valves move to the fully closed position.
- (t) Make sure the left and right ram-air inlet doors move to the fully open position.
- (u) Make sure the left and right ram-air exhaust doors move to the fully open position.
- (v) Make sure the EICAS maintenance display shows these indications:

	L	R
TEMP VALVE	0.00 to 0.05	0.00 to 0.05
RAM IN DOOR	0.00 to 0.05	0.00 to 0.05
RAM OUT DOOR	0.00 to 0.05	0.00 to 0.05

- S 735-023
- (3) SAS 050, 051, 150-157, 162-167, 275-278, 280 PRE-SB 21-129;
Do the pack flow indication test:
- (a) Supply the pneumatic power (Ref 36-00-00).
 - 1) If the pneumatic power is supplied by the engines or by a pneumatic ground cart, make sure the L and R DUCT PRESS indications, on the bottom EICAS display, are between 30 and 50 and are approximately equal.
 - 2) If the pneumatic power is supplied by the APU, make sure the L and R DUCT PRESS indications, on the bottom EICAS display, are between 15 and 35 and are approximately equal.
 - (b) Make sure the L and R PACK FLOW indications, on the bottom EICAS display, are between 0 and 2.
 - (c) Turn the L and R PACK selectors, on the P5 panel, to the AUTO position.
 - 1) Make sure the PACK OFF lights go off.
 - (d) Make sure the L and R PACK FLOW indications, on the bottom EICAS display, become stable between 20 and 43.
 - (e) Make sure the difference between the L and R PACK FLOW indications is less than 6.
 - (f) Remove the pneumatic power, if it is not necessary (Ref 36-00-00).

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E. Put the airplane back to its usual condition

S 415-011

- (1) Close the left and right ECS access doors, 193NL and 194LR (AMM 06-41-00/201).

S 865-012

- (2) Turn the L and R PACK selectors, on the P5 panel, to the OFF positions.

S 865-014

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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COMPRESSOR OUTLET TEMPERATURE BULB – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the temperature bulb at the compressor outlet. One temperature bulb is installed in each air cooling pack, between the secondary heat exchanger and the air cycle machine.

TASK 21-52-01-004-001

2. Remove the Compressor Outlet Temperature Bulb (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
(2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Temperature Bulb

S 024-031

- (1) Disconnect the electrical connector, D1344 (left) or D1326 (right), from the applicable compressor outlet temperature bulb, TS292 (left) or TS293 (right), respectively.
(a) Attach a marker or a tag to the electrical connector to show that it mates with the applicable temperature bulb and to help prevent a potential cross-connection with an adjacent temperature bulb/sensor.

S 034-006

- (2) Cut and remove the lockwire from the temperature bulb.

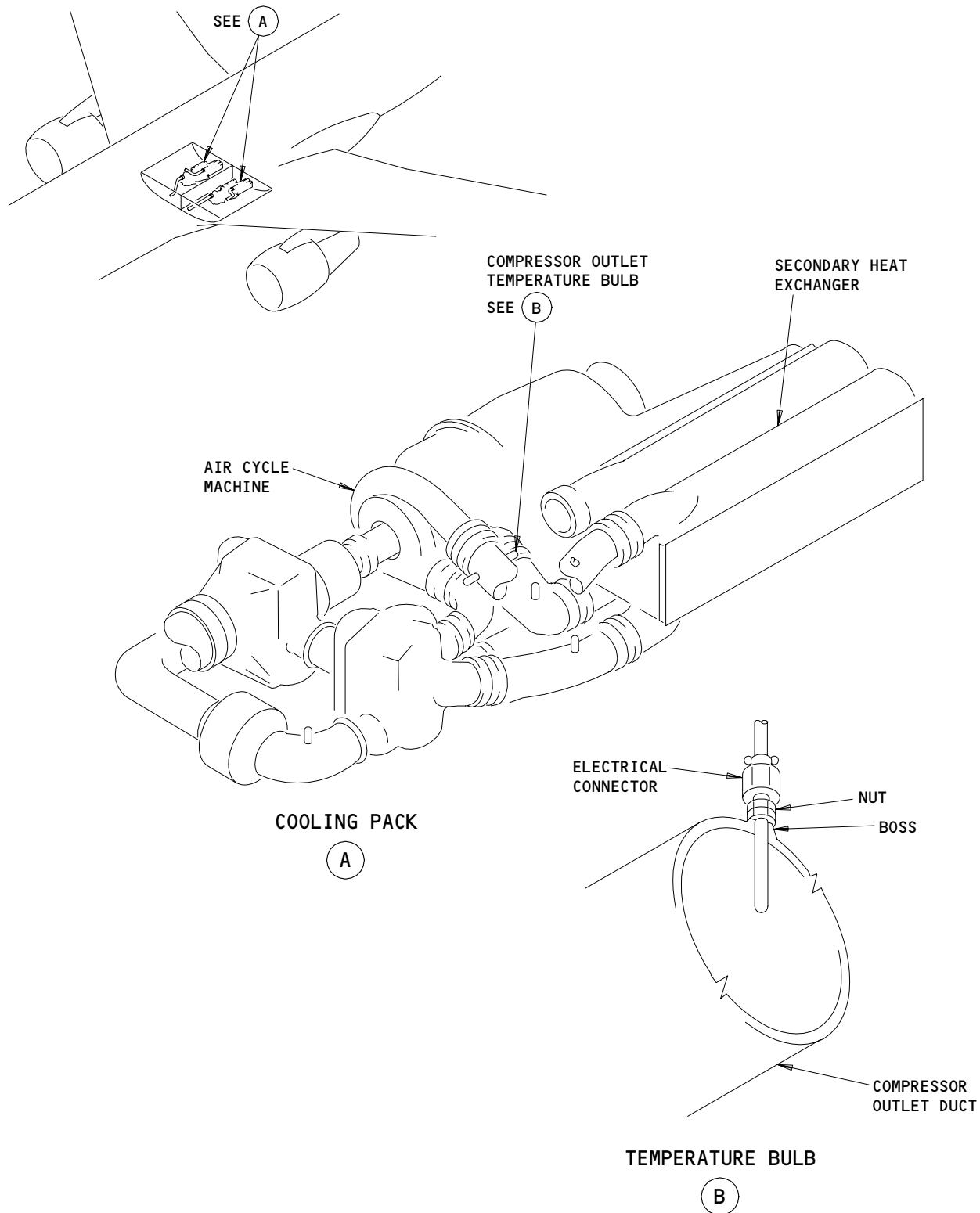
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Compressor Outlet Temperature Bulb Installation
Figure 401

EFFECTIVITY	
	ALL

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S 024-007

CAUTION: USE TWO WRENCHES TO REMOVE THE BULB FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (3) Use two wrenches to remove the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

S 034-008

- (4) Remove and discard the copper gasket or packing/o-ring from the temperature bulb.

S 434-009

- (5) Put a cover on the duct opening.

TASK 21-52-01-404-010

3. Install the Compressor Outlet Temperature Bulb (Fig. 401)

A. Consumable Materials

- (1) D00386, Lubricant, Anti-seize, MIL-L-23398, Solid Film
(2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-23/401, Standard Practices - Lockwire
(3) AMM 24-22-00/201, Electric Power - Control

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
(2) Access Panels
193NL/194LR ECS bay access doors

D. Install the Temperature Bulb

S 034-011

- (1) Remove the cover from the duct opening.

S 434-012

- (2) Discard the copper gasket p/n AN900-10 (AS35769-11) that comes with a new temperature bulb, and install a new packing/o-ring p/n BACP11K6 (AS9385-06) to the temperature bulb.

S 164-013

- (3) Make sure the mating surfaces of the boss and the bulb nut are clean, to make sure the bulb has an electrical ground.

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S 644-014

- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the bulb.

S 424-015

CAUTION: USE TWO WRENCHES TO INSTALL THE BULB IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (5) Use two wrenches to install the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

- (a) Tighten the temperature bulb to a torque value of 210-240 pound-inches.

S 434-016

- (6) Install a lockwire on the temperature bulb (AMM 20-10-23/401).

S 434-032

- (7) Connect the electrical connector, D1344 (left) or D1326 (right), from the applicable compressor outlet temperature bulb, TS292 (left) or TS293 (right), respectively.

- (a) Make sure you did not cross-connect the electrical connector for an adjacent temperature bulb/sensor to the compressor outlet temperature bulb.

- E. Do the installation test for the temperature bulb.

S 864-018

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-019

- (2) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 214-020

- (3) Make sure the applicable (L or R) COMPR OUT indication, on the bottom EICAS display, is approximately equal to the ambient temperature.

- F. Put the airplane back to its usual condition

S 414-021

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-022

- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

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- S 864-024
- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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PRIMARY HEAT EXCHANGER OUTLET (COMPRESSOR INLET) TEMPERATURE BULB -
REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the temperature bulb at the outlet of the primary heat exchanger. One temperature bulb is installed in each air cooling pack, between the primary heat exchanger and the air cycle machine.

TASK 21-52-02-004-001

2. Remove the Primary Heat Exchanger Outlet Temperature Bulb (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
(2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Temperature Bulb

S 024-032

- (1) Disconnect the electrical connector, D1338 (left) or D1296 (right), from the applicable primary heat exchanger outlet temperature bulb, TS290 (left) or TS291 (right), respectively.
(a) Attach a marker or a tag to the electrical connector to show that it mates with the applicable temperature bulb and to help prevent a potential cross-connection with an adjacent temperature bulb/sensor.

S 034-006

- (2) Cut and remove the lockwire from the temperature bulb.

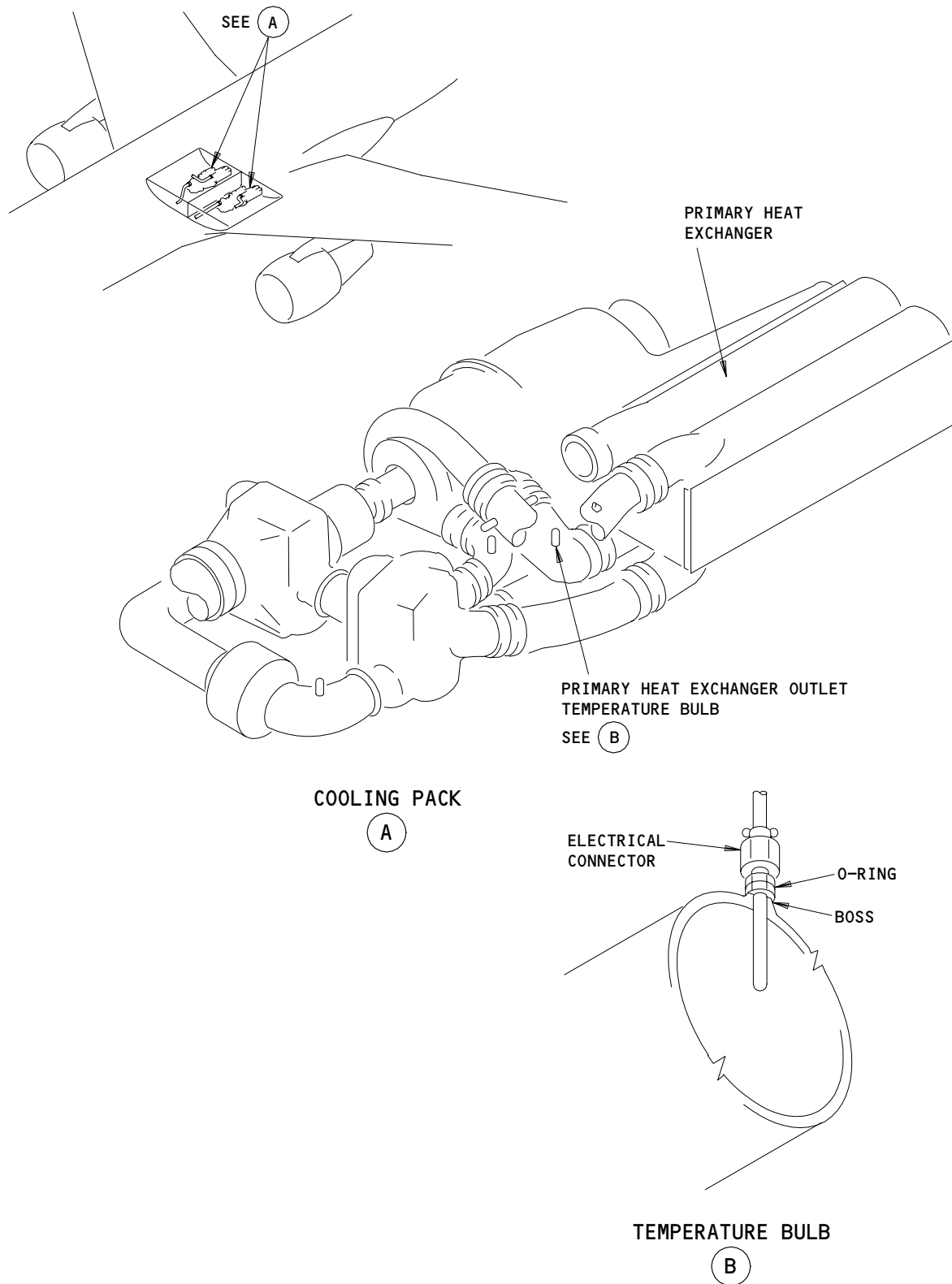
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Primary Heat Exchanger Outlet Temperature Bulb Installation
Figure 401

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S 024-007

CAUTION: USE TWO WRENCHES TO REMOVE THE BULB FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

(3) Use two wrenches to remove the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

S 034-008

(4) Remove and discard the copper gasket or packing/o-ring from the temperature bulb.

S 434-009

(5) Put a cover on the duct opening.

TASK 21-52-02-404-010

3. Install the Primary Heat Exchanger Outlet Temperature Bulb (Fig. 401)

A. Consumable Materials

- (1) D00386, Lubricant, Anti-seize, MIL-L-23398, Solid Film
- (2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Standard Practices - Lockwire
- (3) AMM 24-22-00/201, Electric Power - Control

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

D. Install the Temperature Bulb

S 034-011

(1) Remove the cover from the duct opening.

S 434-034

(2) Discard the copper gasket p/n AN900-10 (AS35769-11) that comes with a new temperature bulb, and install a new packing/o-ring p/n BACP11K6 (AS9385-06) to the temperature bulb.

S 164-013

(3) Make sure the mating surfaces of the boss and the bulb nut are clean, to make sure the bulb has an electrical ground.

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S 644-014

- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the temperature bulb.

S 424-015

CAUTION: USE TWO WRENCHES TO INSTALL THE BULB IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (5) Use two wrenches to install the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

- (a) Tighten the temperature bulb to a torque value of 210-240 pound-inches (23.7-27.1 newton-meters) (Service Letter SL-21-056-A).

S 434-016

- (6) Install a lockwire on the temperature bulb (AMM 20-10-23/401).

S 434-033

- (7) Connect the electrical connector, D1338 (left) or D1296 (right), from the applicable primary heat exchanger outlet temperature bulb, TS290 (left) or TS291 (right), respectively.

- (a) Make sure you did not cross-connect the electrical connector for an adjacent temperature bulb/sensor to the primary heat exchanger outlet temperature bulb.

- E. Do the installation test for the temperature bulb.

S 864-018

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-019

- (2) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 214-020

- (3) Make sure the applicable (L or R) PRIM HX OUT indication, on the bottom EICAS display, is approximately equal to the ambient temperature.

- F. Put the airplane back to its usual condition

S 414-021

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

EFFECTIVITY

ALL

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- S 864-022
- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

- S 864-024
- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

ALL

21-52-02

02.101

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PACK FLOW SENSOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the pack flow sensors. One sensor is installed upstream of each flow control valve.
- B. AIRPLANES WITH PACK FLOW SENSOR POST-SB 21-0129;
The pack flow sensor and indication system is deactivated and is not operational. The pack flow sensor stays installed in the duct boss but is not connected to the airplane's electrical wiring.

TASK 21-52-03-004-001

2. Remove the Pack Flow Sensor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 36-00-00/201, Pneumatic Power

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-030

- (1) Depressurize the pneumatic system (AMM 36-00-00/201).

S 864-002

- (2) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the pack is off.
 - (b) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (3) AIRPLANES WITH PACK FLOW SENSOR PRE-SB 21-0129;
Open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the overhead circuit breaker panel, P11:
 - (a) 11N17, PACK FLOW IND

S 014-005

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).

D. Remove the Sensor

S 034-006

- (1) AIRPLANES WITH PACK FLOW SENSOR PRE-SB 21-0129;
Disconnect the electrical connector from the sensor.

S 034-007

- (2) Remove the screws that attach the sensor flange to the duct flange.

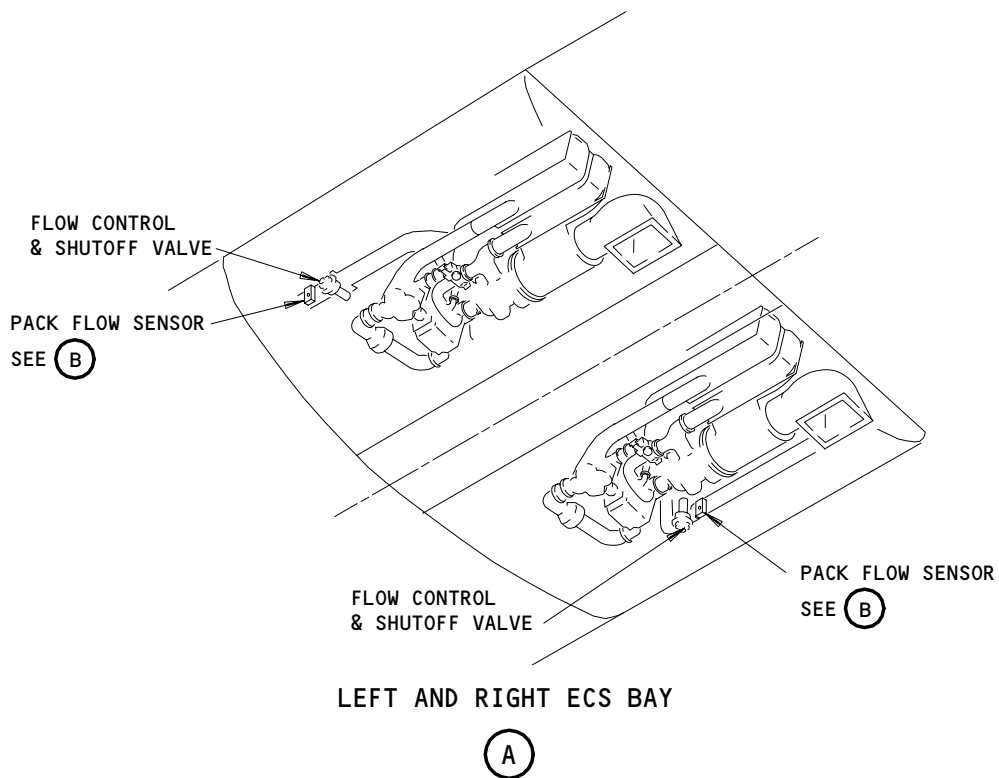
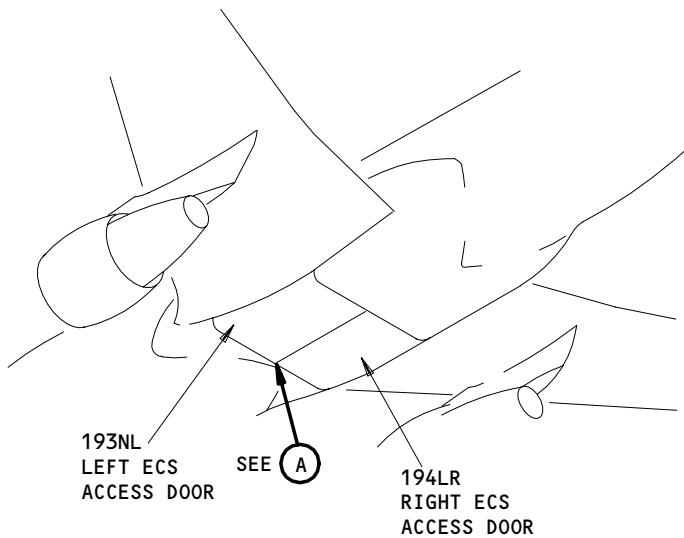
S 034-008

- (3) AIRPLANES WITH PACK FLOW SENSOR PRE-SB 21-0129;
Disconnect the bonding jumper from the sensor.

EFFECTIVITY

SAS 050,051,150-157,162-167,275-278,280

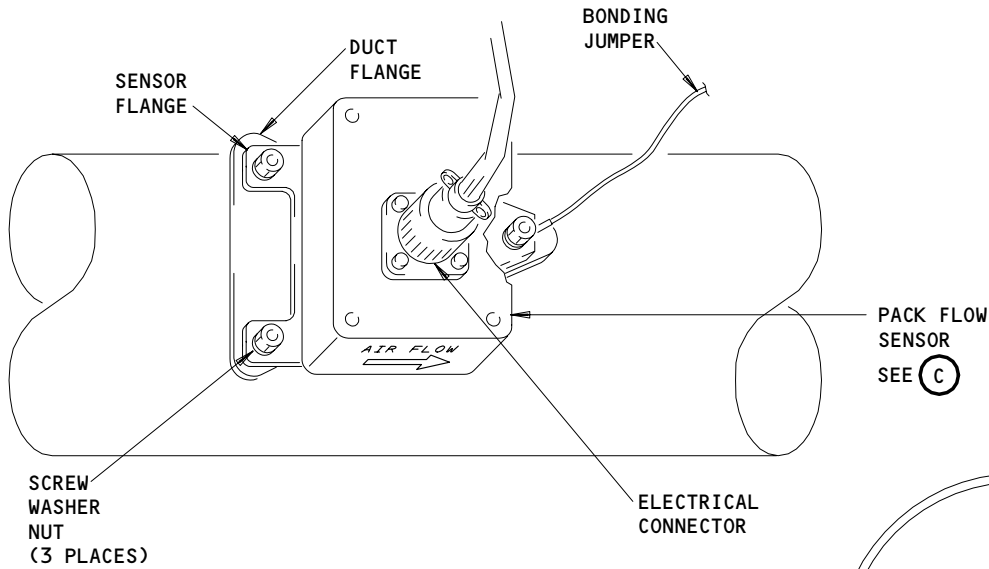
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Pack Flow Sensor Installation
Figure 401 (Sheet 1)

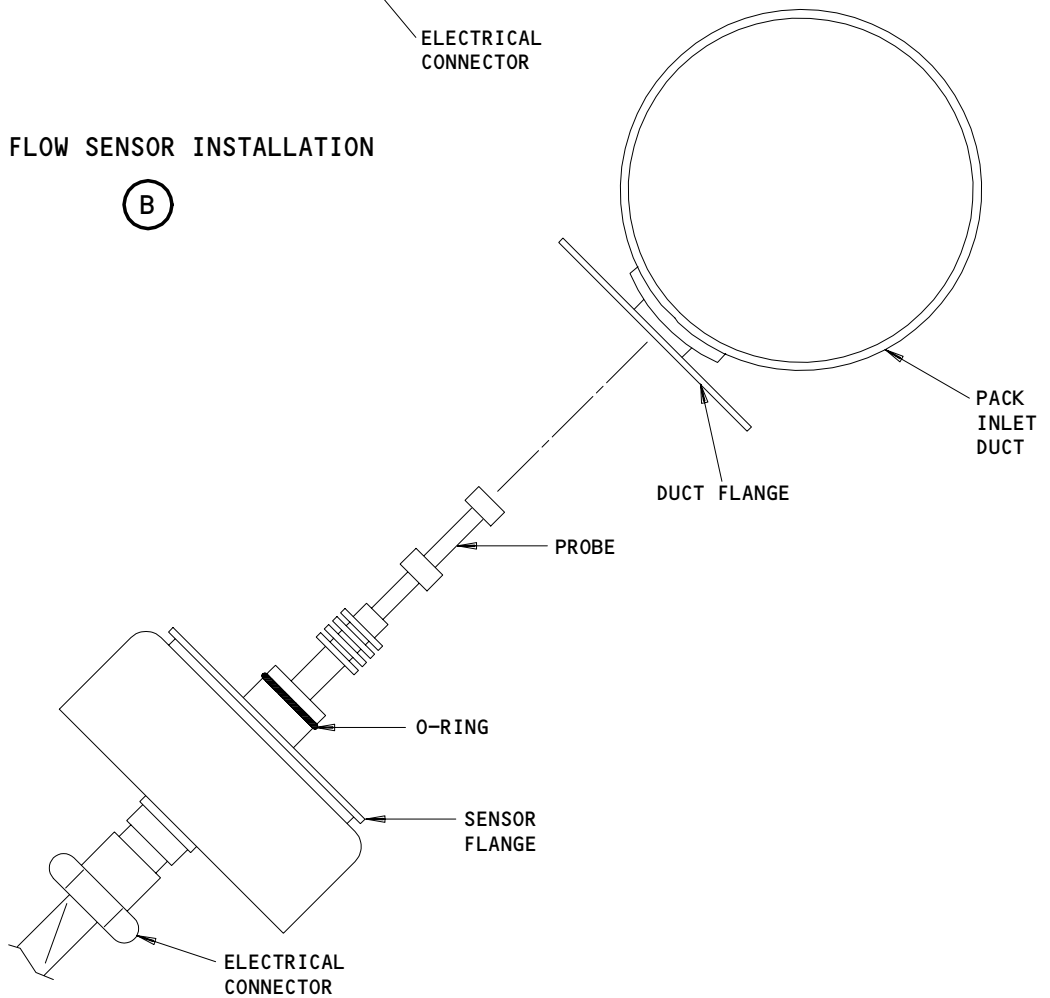
EFFECTIVITY
SAS 050,051,150-157,162-167,275-278,280

21-52-03



PACK FLOW SENSOR INSTALLATION

(B)



PACK FLOW SENSOR

(C)

Pack Flow Sensor Installation
Figure 401 (Sheet 2)

EFFECTIVITY
SAS 050,051,150-157,162-167,275-278,280

21-52-03

- S 024-009
(4) Remove the pack flow sensor.

- S 434-010
(5) Put a cover on the duct opening.

TASK 21-52-03-404-011

3. Install the Pack Flow Sensor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 24-22-00/201, Electric Power - Control
- (3) 36-00-00/201, Pneumatics - General

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

C. Install the Sensor

- S 034-012
(1) Remove the cover from the duct opening.
(a) Make sure there is no unwanted material in the duct.

- S 434-013
(2) Put a new O-ring on the sensor.

- S 424-014
(3) Put the sensor in its position, upstream of the flow control valve.
(a) Make sure the sensor flange is aligned with the duct flange.
(b) Make sure the AIR FLOW arrow points to the flow control valve.

- S 434-015
(4) Install the screws, washers, and nuts that hold the sensor flange to the duct flange.
(a) Make sure you install the washers between the nuts and the duct flange.
(b) AIRPLANES WITH PACK FLOW SENSOR PRE-SB 21-0129;
Make sure you connect the bonding jumper when you install the screws.

- S 434-016
(5) AIRPLANES WITH PACK FLOW SENSOR PRE-SB 21-0129;
Connect the electrical connector to the sensor.

D. Do the installation test for the sensor

S 864-017

- (1) Supply electrical power (Ref 24-22-00).

S 864-018

- (2) Supply pneumatic power (Ref 36-00-00).

S 864-019

- (3) AIRPLANES WITH PACK FLOW SENSOR PRE-SB 21-0129;
Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
(a) 11N17, PACK FLOW IND
(b) EICAS circuit breakers (6 locations).

S 864-020

- (4) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
(a) Turn the selector to the AUTO position.
(b) Make sure the PACK OFF light goes off.

S 864-022

- (5) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 214-023

- (6) AIRPLANES WITH PACK FLOW SENSOR PRE-SB 21-0129;
Make sure the applicable (L or R) PACK FLOW value, on the bottom EICAS display, shows a positive flow rate.

S 794-024

- (7) Make sure there are no air leaks around the sensor and boss.

E. Put the airplane back to its usual condition

S 414-025

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).

S 864-026

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

EFFECTIVITY
SAS 050,051,150-157,162-167,275-278,280

21-52-03

- S 864-028
- (3) Remove the pneumatic power, if it is not necessary (Ref 36-00-00).
- S 864-029
- (4) Remove the electrical power, if it is not necessary (Ref 24-22-00).

EFFECTIVITY
|SAS 050,051,150-157,162-167,275-278,280

21-52-03

PACK FLOW SIGNAL PROCESSOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the processor for the pack flow signal. The processor is installed in the E3-1 rack of the main equipment center.

TASK 21-52-04-004-001

2. Remove the Pack Flow Signal Processor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
(2) 20-10-01/401, E/E Rack Mounted Components

B. Access

- (1) Location Zone
120 Main equipment center (Right)
(2) Access Panel
119AL Main equipmnet center access door

C. Prepare for the Removal

S 864-002

- (1) Open and attach a DO-NOT-CLOSE tag to this circuit breaker, on the overhead circuit breaker panel, P11:
(a) 11N17, PACK FLOW IND

S 014-003

- (2) Open the access door for the main equipment center, 119AL (Ref 06-41-00).

D. Remove the Processor

S 024-004

- (1) Remove the pack flow signal processor (Ref 20-10-01).

TASK 21-52-04-404-005

3. Install the Pack Flow Signal Processor (Fig. 401)

A. References

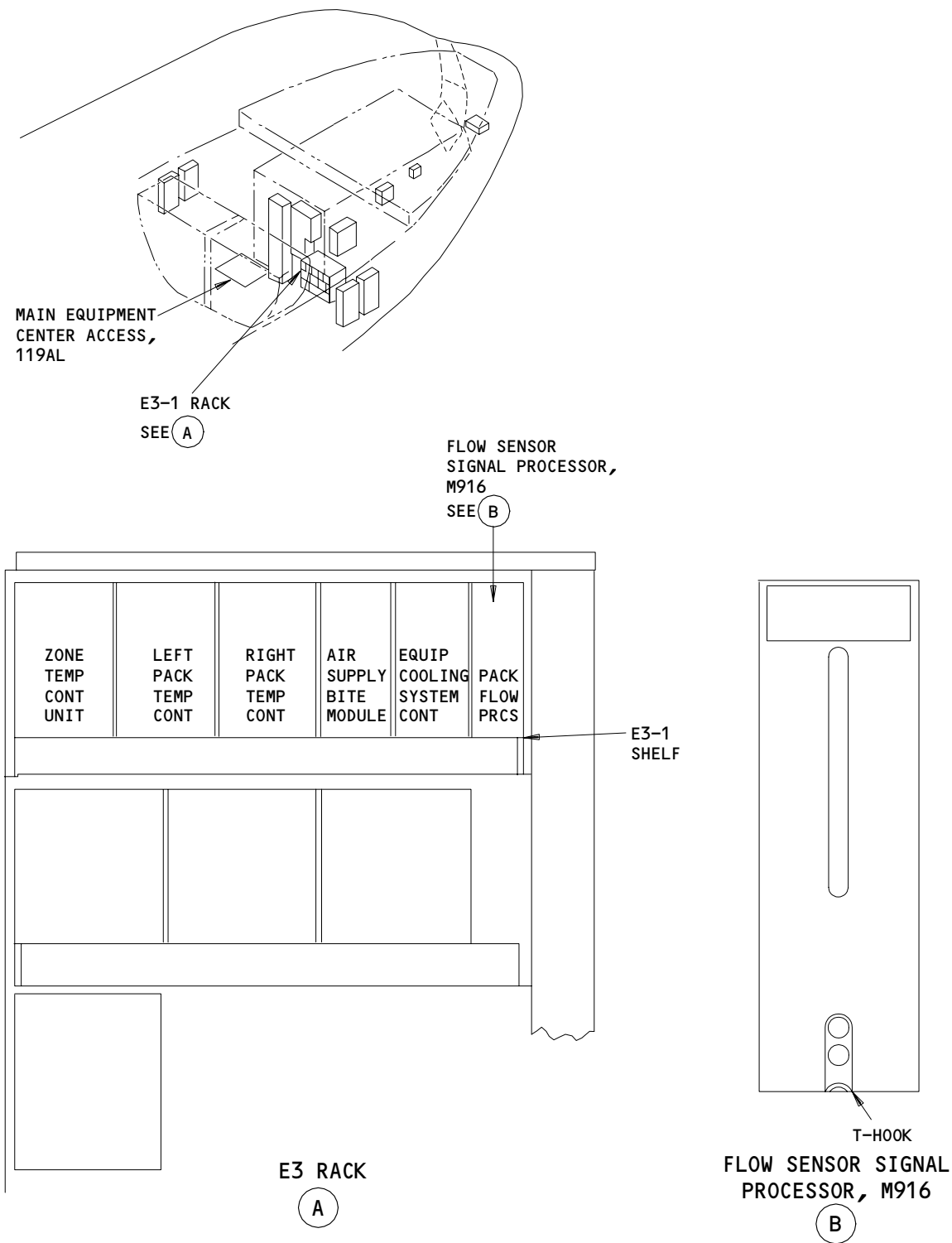
- (1) 06-41-00/201, Fuselage Access Doors and Panels
(2) 20-10-01/401, E/E Rack Mounted Components
(3) 24-22-00/201, Electric Power-Control
(4) 36-00-00/201, Pneumatic General

B. Access

- (1) Location Zone
120 Main equipment center (Right)
(2) Access Panel
119AL Main equipmnet center access door

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, 275-278,
280 PRE-SB 21-129

21-52-04



Flow Sensor Signal Processor Installation
Figure 401

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, 275-278,
280 PRE-SB 21-129

21-52-04

C. Install the Processor

S 424-006

- (1) Install the pack flow signal processor (Ref 20-10-01).

D. Do the installation test for the processor

S 864-007

- (1) Supply electrical power (Ref 24-22-00).

S 864-008

- (2) Supply pneumatic power (Ref 36-00-00).

S 864-009

- (3) Remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
 - (a) 11N17, PACK FLOW IND
 - (b) EICAS circuit breakers (6 locations).

S 864-010

- (4) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
 - (a) Turn the selector to the AUTO position.
 - (b) Make sure the PACK OFF light goes off.

S 864-012

- (5) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 214-013

- (6) Make sure the applicable (L or R) PACK FLOW values, on the bottom EICAS display, show a positive flow rate.

E. Put the airplane back to its usual condition

S 414-014

- (1) Close the access door for the main equipment center, 119AL (Ref 06-41-00).

S 864-015

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 864-018

- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, 275-278,
280 PRE-SB 21-129

21-52-04

SECONDARY HEAT EXCHANGER OUTLET TEMPERATURE BULB - REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the temperature bulb at the outlet of the secondary heat exchanger. One temperature bulb is installed in each air cooling pack, between the secondary heat exchanger and the reheater.

TASK 21-52-05-004-001

2. Remove the Secondary Heat Exchanger Outlet Temperature Bulb (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
(2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Temperature Bulb

S 024-026

- (1) Disconnect the electrical connector, D2144 (left) or D2142 (right), from the applicable secondary heat exchanger outlet temperature bulb, TS431 (left) or TS430 (right), respectively.
(a) Attach a marker or a tag to the electrical connector to show that it mates with the applicable temperature bulb and to help prevent a potential cross-connection with an adjacent temperature bulb/sensor.

S 034-006

- (2) Cut and remove the lockwire from the temperature bulb.

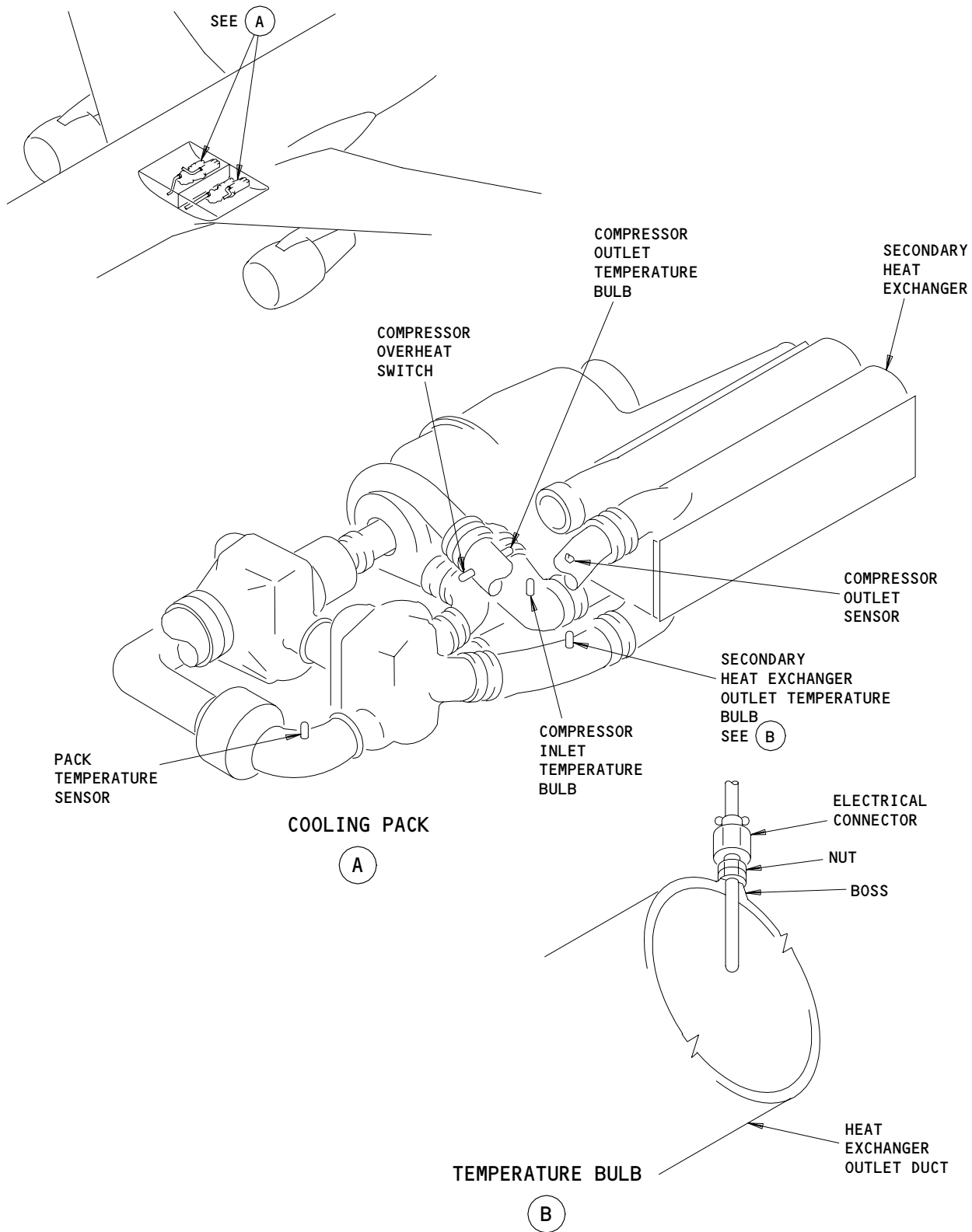
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Secondary Heat Exchanger Outlet Temperature Bulb Installation
Figure 401

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S 024-007

CAUTION: USE TWO WRENCHES TO REMOVE THE BULB FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

(3) Use two wrenches to remove the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

S 034-008

(4) Remove and discard the copper gasket or packing/o-ring from the temperature bulb.

S 434-009

(5) Put a cover on the duct opening.

TASK 21-52-05-404-010

3. Install the Secondary Heat Exchanger Outlet Temperature Bulb (Fig. 401)

A. Consumable Materials

- (1) D00386, Lubricant, Anti-seize, MIL-L-23398, Solid Film
- (2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Standard Practices - Lockwire
- (3) AMM 24-22-00/201, Electric Power - Control

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

D. Install the Temperature Bulb

S 034-011

(1) Remove the cover from the duct opening.

S 434-012

(2) Discard the copper gasket p/n AN900-10 (AS35769-11) that comes with a new temperature bulb, and install a new packing/o-ring p/n BACP11K6 (AS9385-06) to the temperature bulb.

S 164-013

(3) Make sure the mating surfaces of the boss and the bulb nut are clean, to make sure the bulb has an electrical ground.

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S 644-014

- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the temperature bulb.

S 424-015

CAUTION: USE TWO WRENCHES TO INSTALL THE BULB FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (5) Use two wrenches to install the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

- (a) Tighten the temperature bulb to a torque value of 210-240 pound-inches.

S 434-016

- (6) Install a lockwire on the temperature bulb (AMM 20-10-23/401).

S 434-017

- (7) Connect the electrical connector, D2144 (left) or D2142 (right), to the applicable secondary heat exchanger outlet temperature bulb, TS431 (left) or TS430 (right), respectively.

- (a) Make sure you did not cross-connect the electrical connector for an adjacent temperature bulb/sensor to the secondary heat exchanger outlet temperature bulb.

E. Do the installation test for the temperature bulb.

S 864-018

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-019

- (2) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 214-020

- (3) Make sure the applicable (L or R) SEC HX OUT indication, on the bottom EICAS display, is approximately equal to the ambient temperature.

F. Put the airplane back to its usual condition

S 414-021

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-022

- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

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- S 864-024
- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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PACK OUTLET TEMPERATURE BULB - REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the temperature bulb at the pack outlet. One temperature bulb is installed at the outlet of each air cooling pack.

TASK 21-52-06-004-001

2. Remove the Pack Outlet Temperature Bulb (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones

135/136 Environmental control systems (ECS) bay

- (2) Access Panels

193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Temperature Bulb

S 024-032

- (1) Disconnect the electrical connector, D680 (left) or D726 (right), from the applicable pack outlet temperature bulb, TS39 (left) or TS40 (right), respectively.
(a) Attach a marker or a tag to the electrical connector to show that it mates with the applicable temperature bulb and to help prevent a potential cross-connection with an adjacent temperature bulb/sensor.

S 034-006

- (2) Cut and remove the lockwire from the temperature bulb.

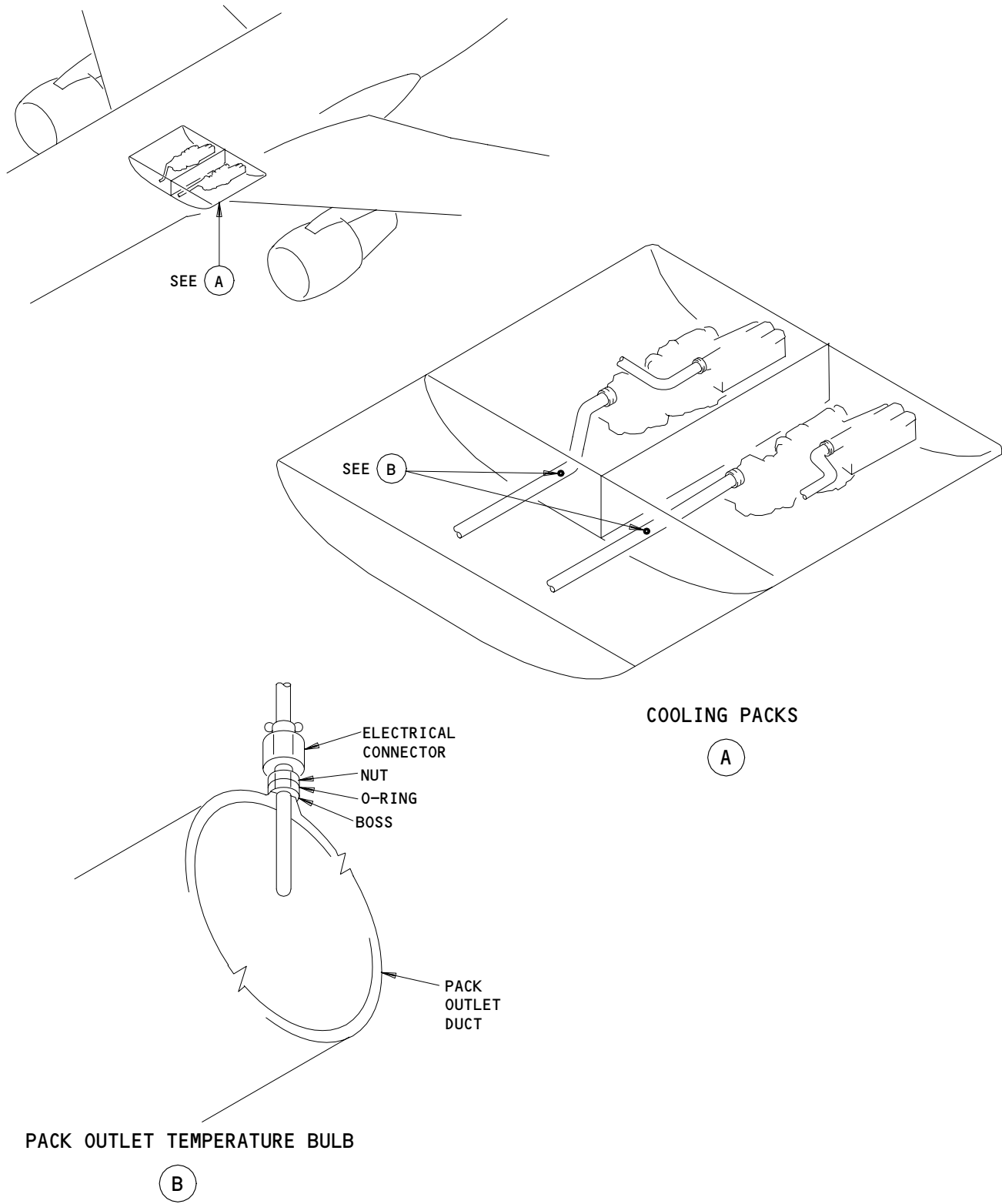
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Pack Outlet Temperature Bulb-Installation
Figure 401

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S 864-029

- (3) AIRPLANES WITH A ROUND BOSS ON THE DUCT;
Do the step that follows:

CAUTION: USE CARE WHEN REMOVING THE BULB FROM THE BOSS TO AVOID DAMAGING THE DUCT.

- (a) Use a wrench to remove the temperature bulb.

S 864-030

- (4) AIRPLANES WITH A HEXAGONAL BOSS ON THE DUCT;
Do the step that follows:

CAUTION: USE TWO WRENCHES TO REMOVE THE BULB FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (a) Use two wrenches to remove the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

S 034-008

- (5) Remove and discard the copper gasket or packing/o-ring from the temperature bulb.

S 434-009

- (6) Put a cover on the duct opening.

TASK 21-52-06-404-010

3. Install the Pack Outlet Temperature Bulb (Fig. 401)

A. Consumable Materials

- (1) D00386, Lubricant, Anti-seize, MIL-L-23398, Solid Film
(2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-23/401, Standard Practices - Lockwire
(3) AMM 24-22-00/201, Electric Power - Control

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
(2) Access Panels
193NL/194LR ECS bay access doors

D. Install the Temperature Bulb

S 034-011

- (1) Remove the cover from the duct opening.

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- S 434-012
- (2) Discard the copper gasket p/n AN900-10 (AS35769-11) that comes with a new temperature bulb, and install a new packing/o-ring p/n BACP11K6 (AS9385-06) to the temperature bulb.

- S 164-013
- (3) Make sure the mating surfaces of the boss and the bulb nut are clean, to make sure the bulb has an electrical ground.

- S 644-014
- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the temperature bulb.

- S 414-034
- (5) AIRPLANES WITH A ROUND BOSS ON THE DUCT;
Do the step that follows:

CAUTION: USE CARE WHEN YOU INSTALL THE BULB IN THE BOSS TO PREVENT DAMAGE TO THE DUCT.

- (a) Use a wrench to install the temperature bulb.

- S 414-035
- (6) AIRPLANES WITH A HEXAGONAL BOSS ON THE DUCT;
Do the step that follows:

CAUTION: USE TWO WRENCHES TO INSTALL THE BULB IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (a) Use two wrenches to install the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

- (b) Tighten the temperature bulb to a torque value of 210-240 pound-inches.

- S 434-016
- (7) Install a lockwire on the temperature bulb (AMM 20-10-23/401).

- S 434-033
- (8) Connect the electrical connector, D680 (left) or D726 (right), from the applicable pack outlet temperature bulb, TS39 (left) or TS40 (right), respectively.
- (a) Make sure you did not cross-connect the electrical connector for an adjacent temperature bulb/sensor to the pack outlet temperature bulb.

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E. Do the installation test for the temperature bulb.

S 864-018

(1) Supply electrical power (AMM 24-22-00/201).

S 864-019

(2) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 214-020

(3) Make sure the applicable (L or R) PACK OUT indication, on the bottom EICAS display, is approximately equal to the ambient temperature.

F. Put the airplane back to its usual condition

S 414-021

(1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-022

(2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

S 864-024

(3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

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TURBINE INLET TEMPERATURE BULB - REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the temperature bulb at the turbine inlet. One temperature bulb is installed in each air cooling pack, between the reheater and the air cycle machine.

TASK 21-52-07-004-001

2. Remove the Turbine Inlet Temperature Bulb (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
- (a) Make sure the pack is off.
- (b) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Temperature Bulb

S 024-028

- (1) Disconnect the electrical connector, D1352 (left) or D1336 (right), from the applicable turbine inlet temperature bulb, TS294 (left) or TS295 (right), respectively.
- (a) Attach a marker or a tag to the electrical connector to show that it mates with the applicable temperature bulb and to help prevent a potential cross-connection with an adjacent temperature bulb/sensor.

S 034-006

- (2) Cut and remove the lockwire from the temperature bulb.

S 024-007

CAUTION: USE TWO WRENCHES TO REMOVE THE BULB FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (3) Use two wrenches to remove the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

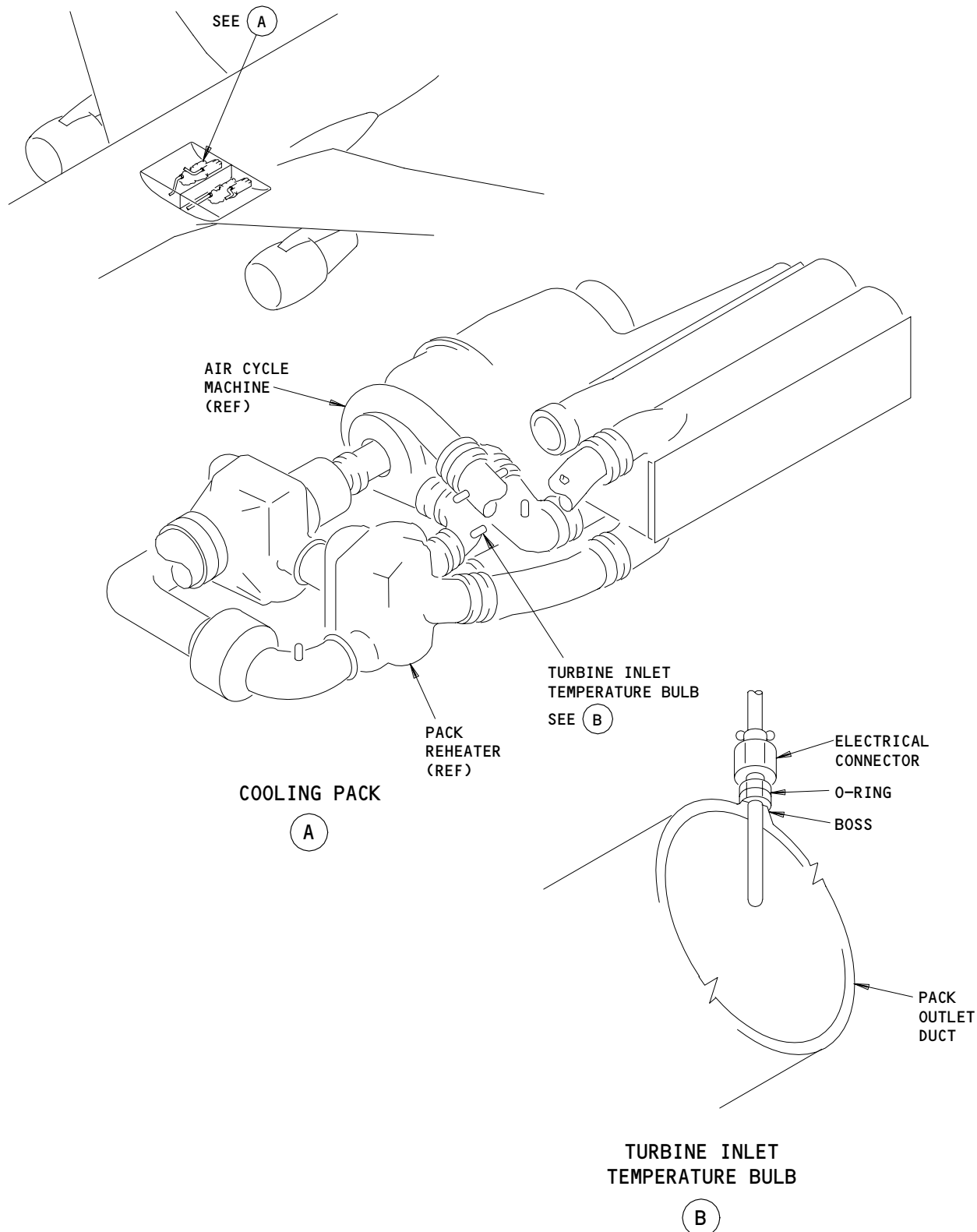
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Turbine Inlet Temperature Bulb Installation
Figure 401

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- S 034-008
- (4) Remove and discard the copper gasket or packing/o-ring from the temperature bulb.

- S 434-009
- (5) Put a cover on the duct opening.

TASK 21-52-07-404-010

3. Install the Turbine Inlet Temperature Bulb (Fig. 401)

A. Consumable Materials

- (1) D00386, Lubricant, Anti-seize, MIL-L-23398, Solid Film
- (2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Standard Practices - Lockwire
- (3) AMM 24-22-00/201, Electric Power - Control

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

D. Install the Temperature Bulb

- S 034-011
- (1) Remove the cover from the duct opening.
- S 434-012
- (2) Discard the copper gasket p/n AN900-10 (AS35769-11) that comes with a new temperature bulb, and install a new packing/o-ring p/n BACP11K6 (AS9385-06) to the temperature bulb.
- S 164-013
- (3) Make sure the mating surfaces of the boss and the bulb nut are clean, to make sure the bulb has an electrical ground.
- S 644-014
- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the temperature bulb.

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S 424-015

CAUTION: USE TWO WRENCHES TO INSTALL THE BULB IN THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

(5) Use two wrenches to install the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

(a) Tighten the temperature bulb to a torque value of 210-240 pound-inches.

S 434-016

(6) Install a lockwire on the temperature bulb (AMM 20-10-23/401).

S 434-029

(7) Connect the electrical connector, D1352 (left) or D1336 (right), from the applicable turbine inlet temperature bulb, TS294 (left) or TS295 (right), respectively.

(a) Make sure you did not cross-connect the electrical connector for an adjacent temperature bulb/sensor to the turbine inlet temperature bulb.

E. Do the installation test for the temperature bulb.

S 864-018

(1) Supply electrical power (AMM 24-22-00/201).

S 864-019

(2) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

S 214-020

(3) Make sure the applicable (L or R) TURB IN indication, on the bottom EICAS display, is approximately equal to the ambient temperature.

F. Put the airplane back to its usual condition

S 414-021

(1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-022

(2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

S 864-024

(3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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PRIMARY HEAT EXCHANGER INLET (PACK INLET) TEMPERATURE BULB -
REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the temperature bulb at the inlet of the primary heat exchanger. One temperature bulb is installed in each air cooling pack, between the primary heat exchanger and the flow control valve.

TASK 21-52-08-004-025

2. Remove the Primary Heat Exchanger Inlet Temperature Bulb (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
(2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Temperature Bulb

S 244-036

- (1) Disconnect the electrical connector, D2152 (left) or D2154 (right), from the applicable primary heat exchanger inlet temperature bulb, TS433 (left) or TS432 (right), respectively.
(a) Attach a marker or a tag to the electrical connector to show that it mates with the applicable temperature bulb and to help prevent a potential cross-connection with an adjacent temperature bulb/sensor.

S 034-006

- (2) Cut and remove the lockwire from the temperature bulb.

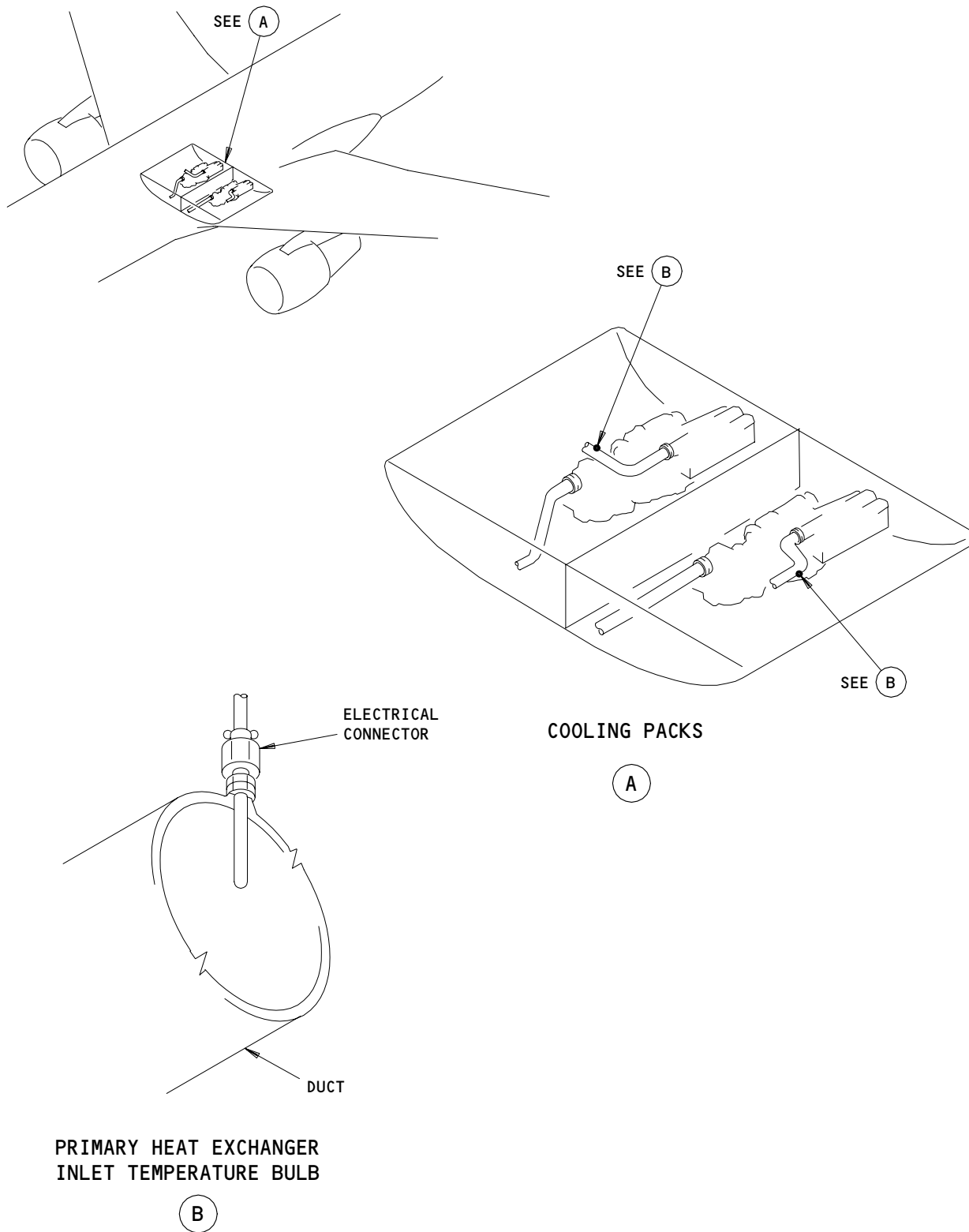
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Primary Heat Exchanger Inlet Temperature Bulb Installation
Figure 401

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S 864-031

- (3) AIRPLANES WITH A ROUND BOSS ON THE DUCT;
Do the step that follows:

CAUTION: USE CARE WHEN YOU REMOVE THE BULB FROM THE BOSS TO PREVENT DAMAGE TO THE DUCT.

- (a) Use a wrench to remove the temperature bulb.

S 864-030

- (4) AIRPLANES WITH A HEXAGONAL BOSS ON THE DUCT;
Do the step that follows:

CAUTION: USE TWO WRENCHES TO REMOVE THE BULB FROM THE BOSS. IF YOU USE ONLY ONE WRENCH TO REMOVE THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (a) Use two wrenches to remove the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

S 034-008

- (5) Remove and discard the copper gasket or packing/o-ring from the temperature bulb.

S 434-009

- (6) Put a cover on the duct opening.

TASK 21-52-08-404-010

3. Install the Primary Heat Exchanger Inlet Temperature Bulb (Fig. 401)

A. Consumable Materials

- (1) D00386, Lubricant, Anti-seize, MIL-L-23398, Solid Film
(2) D00006, Never-Seez, Pure Nickel Special, NSBT-8N
(High temperature anti-seize compound)

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-23/401, Standard Practices - Lockwire
(3) AMM 24-22-00/201, Electric Power - Control

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
(2) Access Panels
193NL/194LR ECS bay access doors

D. Install the Temperature Bulb

S 034-011

- (1) Remove the cover from the duct opening.

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- S 434-012
- (2) Discard the copper gasket p/n AN900-10 (AS35769-11) that comes with a new temperature bulb, and install a new packing/o-ring p/n BACP11K6 (AS9385-06) to the temperature bulb.

- S 164-013
- (3) Make sure the mating surfaces of the boss and the bulb nut are clean, to make sure the bulb has an electrical ground.

- S 644-014
- (4) Apply a thin layer of the anti-seize lubricant or compound to the threads of the temperature bulb.

- S 864-033
- (5) AIRPLANES WITH A ROUND BOSS ON THE DUCT;
Install the temperature bulb to the boss:

CAUTION: USE CARE WHEN YOU INSTALL THE BULB IN THE BOSS TO PREVENT DAMAGE TO THE DUCT.

- (a) Use a wrench to install the temperature bulb.
1) Tighten the temperature bulb to a torque value of 285-315 pound-inches (32.2-35.6 newton-meters) (Service Letter SL-767-21-056-A).

- S 864-034
- (6) AIRPLANES WITH A HEXAGONAL BOSS ON THE DUCT;
Install the temperature bulb to the boss:

CAUTION: USE TWO WRENCHES TO INSTALL THE BULB ON THE BOSS. IF YOU USE ONLY ONE WRENCH TO INSTALL THE BULB, IT CAN CAUSE DAMAGE TO THE DUCT.

- (a) Use two wrenches to install the temperature bulb.

NOTE: Use one wrench to hold the boss. Use the other wrench to turn the temperature bulb.

- (b) Tighten the temperature bulb to a torque value of 285-315 pound-inches (32.2-35.6 newton-meters) (Service Letter SL-767-21-056-A).

- S 434-016
- (7) Install a lockwire on the temperature bulb (AMM 20-10-23/401).

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- S 024-037
- (8) Connect the electrical connector, D2152 (left) or D2154 (right), from the applicable primary heat exchanger inlet temperature bulb, TS433 (left) or TS432 (right), respectively.
- (a) Make sure you did not cross-connect the electrical connector for an adjacent temperature bulb/sensor to the primary heat exchanger inlet temperature bulb.
- E. Do the installation test for the temperature bulb.
- S 864-018
- (1) Supply electrical power (AMM 24-22-00/201).
- S 864-019
- (2) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.
- S 214-020
- (3) Make sure the applicable (L or R) PRIM HX IN indication, on the bottom EICAS display, is approximately equal to the ambient temperature.
- F. Put the airplane back to its usual condition
- S 414-021
- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).
- S 864-022
- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
- S 864-024
- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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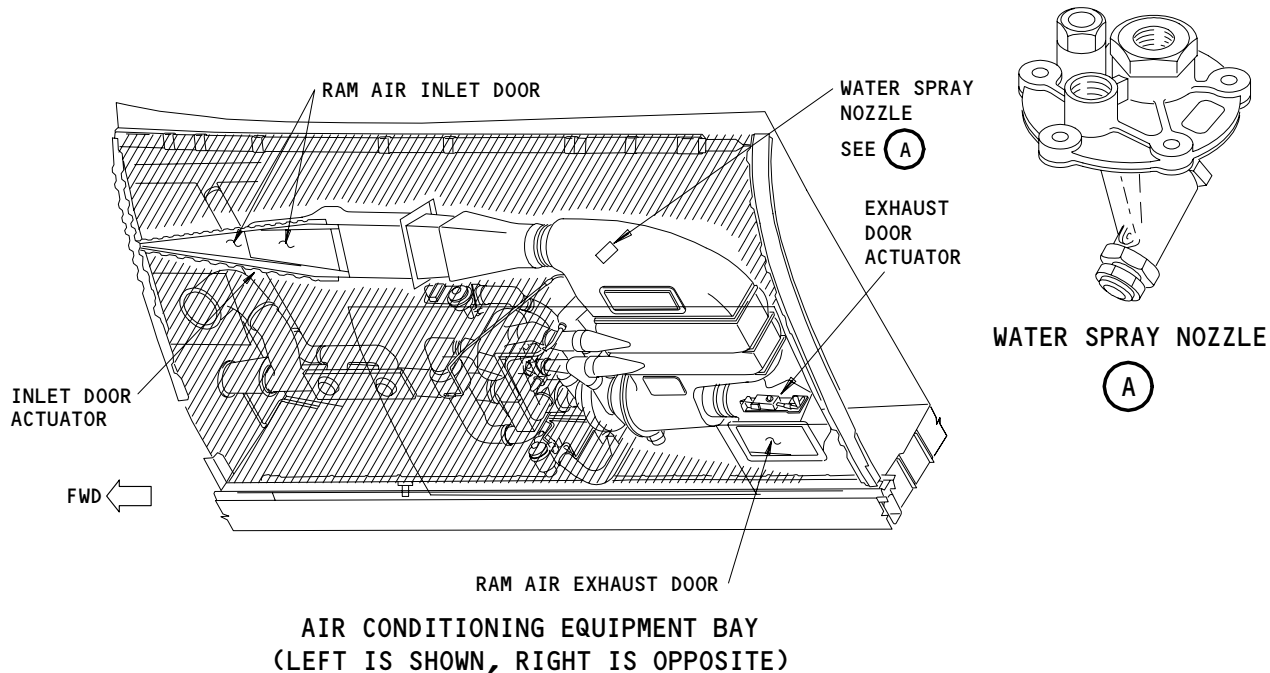
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RAM AIR SYSTEM - DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The ram air system provides cooling air for the cooling pack system (AMM 21-51-00/001). The ram air system controls the temperature of cooling air from the packs as required for use in the zone control system (AMM 21-61-00/001). The ram air system also responds to pack overheat conditions determined by the cooling pack system (AMM 21-51-00/001).
- B. The ram air system supplies cooling air for the two air cooling packs. The ram air system is an integral part of each cooling pack. There is a left ram air system and a right ram air system. Each ram air system has a ram air inlet door which has a forward and aft section, a ram air exhaust door, a water spray nozzle, and a backup temperature control card.



Ram Air System
Figure 1

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- C. Cooling ram air enters through the ram air inlet door. In flight, ambient air pressure aided by the air cycle machine fan provides flow through the system. On the ground, the fan provides all the airflow. After entering the system, ram air passes through the primary and secondary heat exchangers where it provides a heat sink for cooling pack supply air. Cooling ram air continues out of the airplane through the ram air exhaust duct.
- D. A water spray nozzle located on the ram air inlet duct sprays water extracted from cooling pack supply air, into the ram air inlet. The water extractor (AMM 21-51-00/001) removes water from the cooling pack supply air. A drain line from the water extractor to the nozzle transports the water to the inlet plenum. A second line from the water extractor brings pressurized air to the water spray nozzle. The pressurized air atomizes the spray from the nozzle as it enters the cooling ram air. The mist evaporates cooling the ram air. This increases the efficiency of the ram air system.
- E. The pack temperature controller controls the movement of the ram air inlet and exhaust doors when the system is in the AUTO mode and no overheat condition exists in the pack. The temperature control card controls the movement of the ram air inlet and exhaust doors when the system is in the STBY mode. The pack control selector on the P5 panel allows mode selection.

2. Component Details

A. Backup Temperature Control Card

- (1) The backup temperature control card is a printed circuit card located in the electrical/electronics bay. The card mounts in the right fwd equipment center card file on the P50 panel. It controls the ram air inlet door, ram air exhaust door, and pack temperature control valve when the system is in STBY mode or when an overheat condition exists in the cooling pack.

B. Water Spray Nozzle

- (1) The water spray nozzle consists of a mounting plate, with attached strut and a nozzle screwed into the strut end. Two ports on the mounting plate provide for attachment of oil and lines from the cooling pack water extractor.
- (2) Water and pressurized air mix in the strut and atomize the water which then sprays into the cooling ram air.

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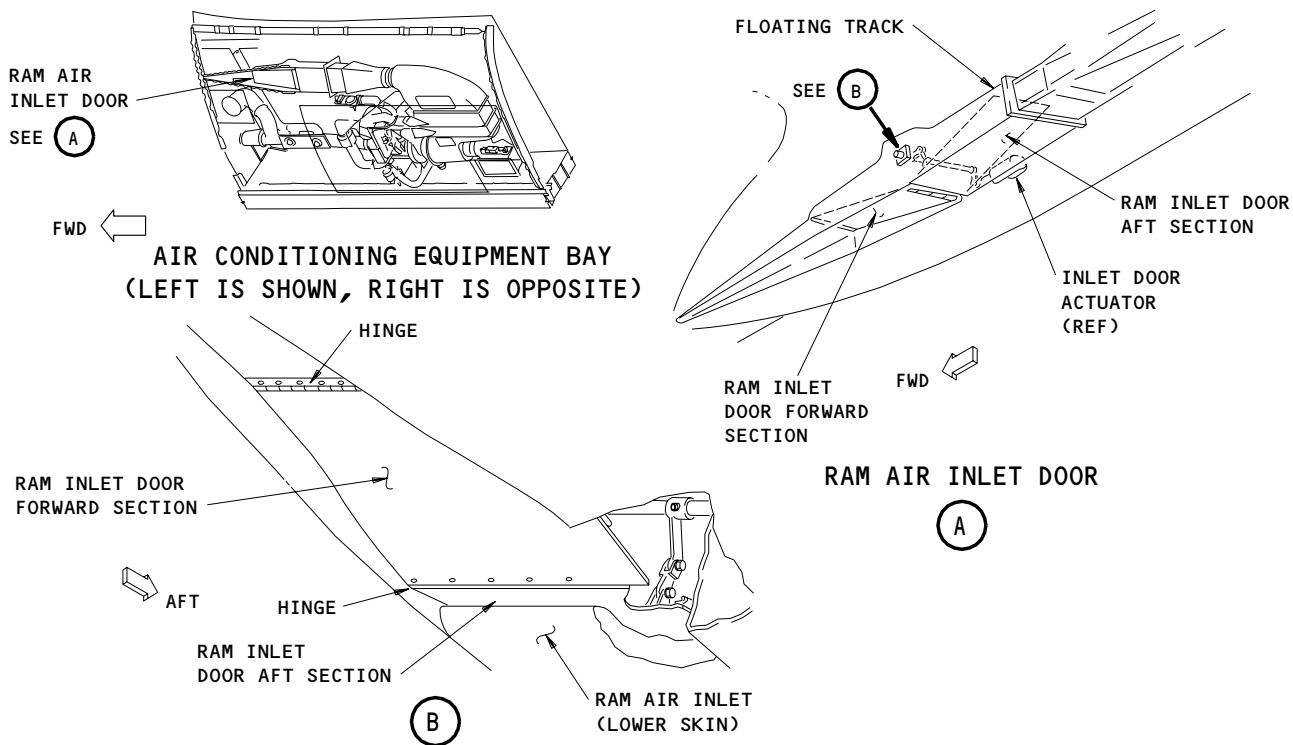
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C. Ram Air Inlet Door (Fig. 2)

- (1) Each ram air inlet door has a forward and an aft aluminum section which are hinged together. A hinge attaches the fwd portion of the door to the ram air inlet plenum. Slide blocks fit in tracks attached to the plenum. The blocks connect the aft end of the door to both sides of the plenum. A link assembly connects the door to a torque tube. The ram air inlet door actuator controls the rotation of the torque tube. When the actuator retracts, the torque tube rotates. This causes the link assembly to rotate about the torque tube. The door slides back in its track. This allows air to enter the system. Extension of the actuator closes the door.



Ram Air Inlet Door
Figure 2

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D. Ram Air Exhaust Door (Fig. 3)

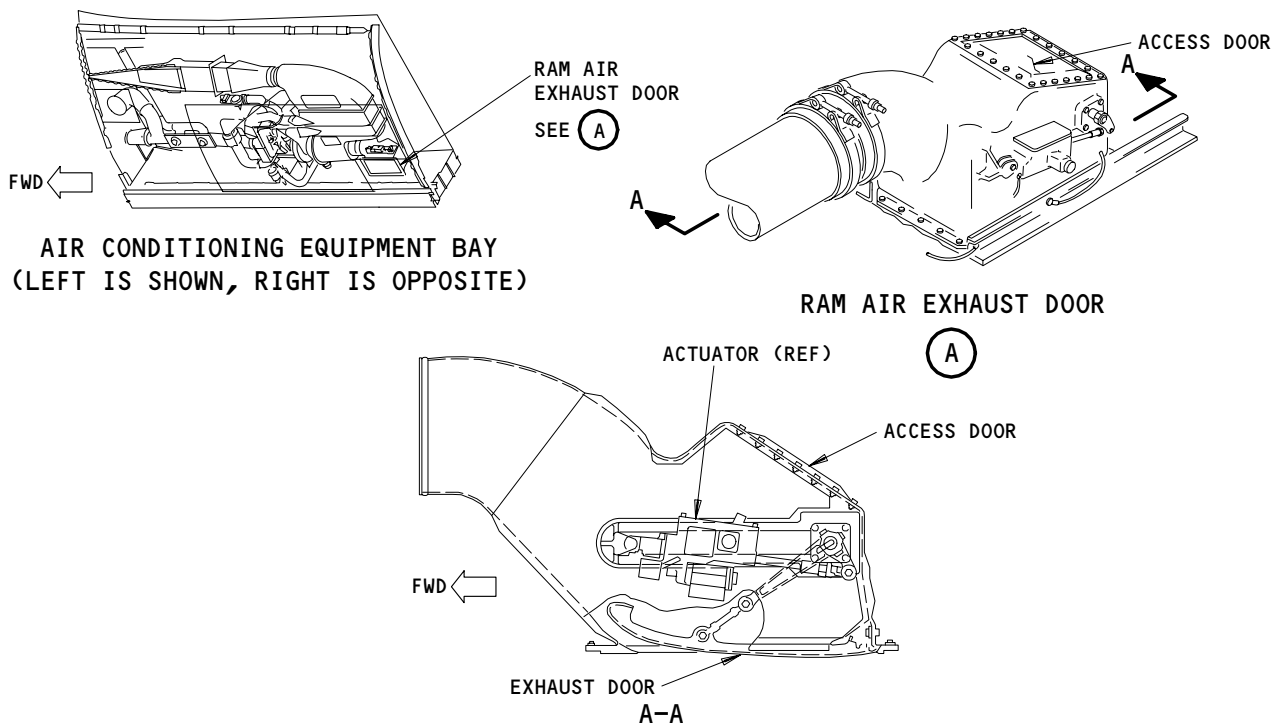
(1) The ram air exhaust door consists of an integral aluminum door hinged at the aft end to the ram air exhaust duct. A link assembly connects the door to a torque tube. The ram air exhaust door actuator controls the rotation of the torque tube. When the actuator retracts, the torque tube rotates. This causes the link assembly to rotate about the torque tube and the door to open. This allows ram air to exit to ambient. Extension of the actuator closes the door.

E. Ram Air Door Actuator (Fig. 4)

(1) The ram air inlet and exhaust door actuators are identical. The actuators consist of an all aluminum housing with a 115 VAC, 400 Hz, single phase electric motor. The motor drives a jackscrew through two stages of spur gear reduction. The jackscrew rotates within a traveling nut to extend and retract the ram air door actuator. Two double-pole, double throw position switches, one at each end of the actuator stroke, turn off the drive signals. The switches also sequence the operation of the ram air door and temperature control valve.

(2) A dual-position potentiometer provides a feed-back signal to the pack temperature controller. The signals from both the inlet and exhaust actuators are also used to display door position on EICAS.

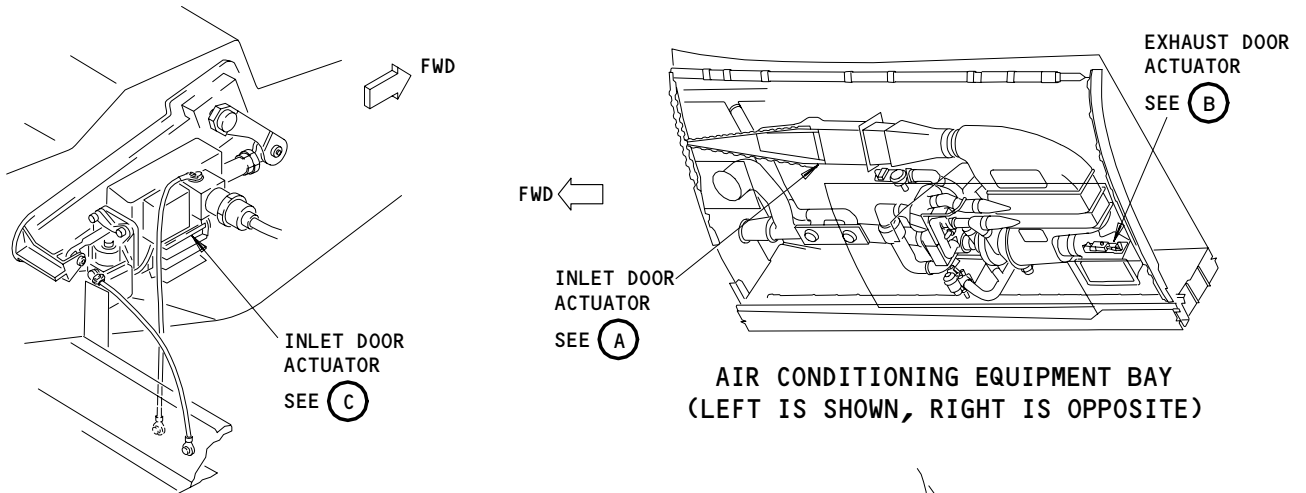
3. Operation (Fig. 5)



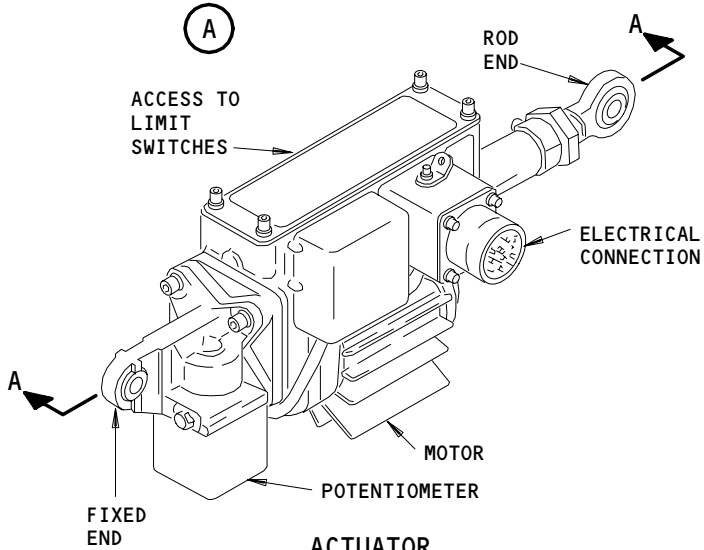
Ram Air Exhaust Door
Figure 3

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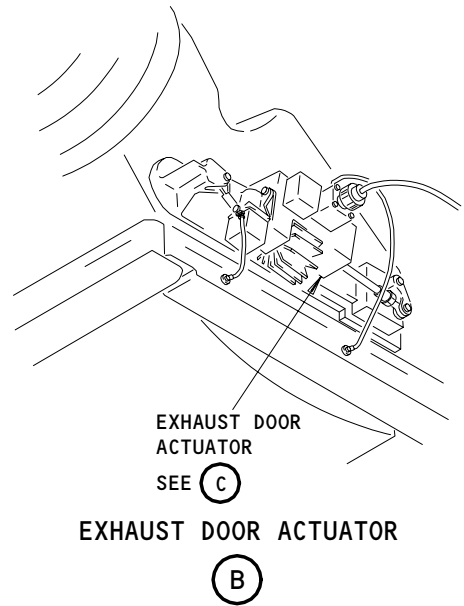
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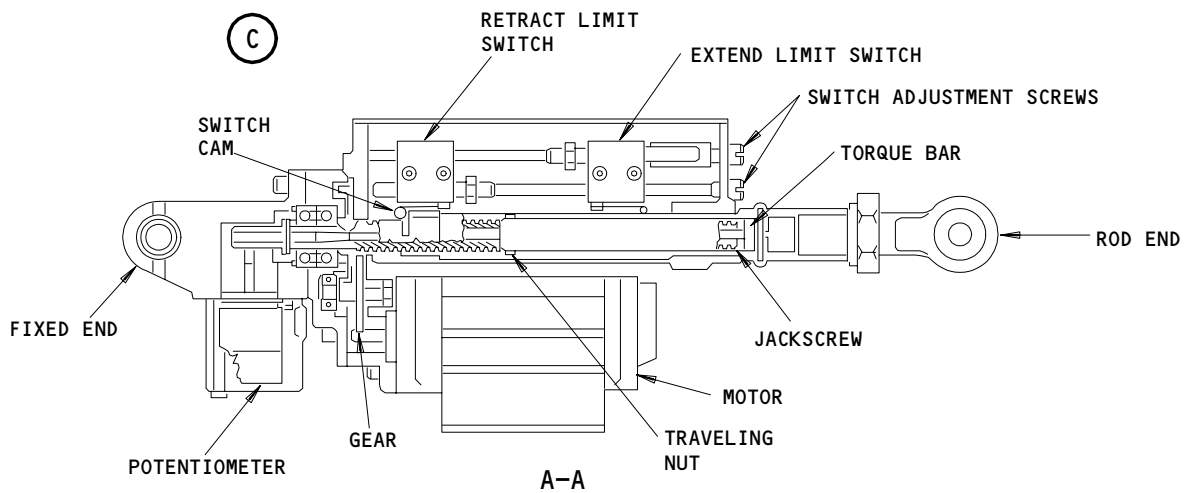
INLET DOOR ACTUATOR



ACTUATOR



EXHAUST DOOR ACTUATOR



**Ram Air Door Actuator
Figure 4**

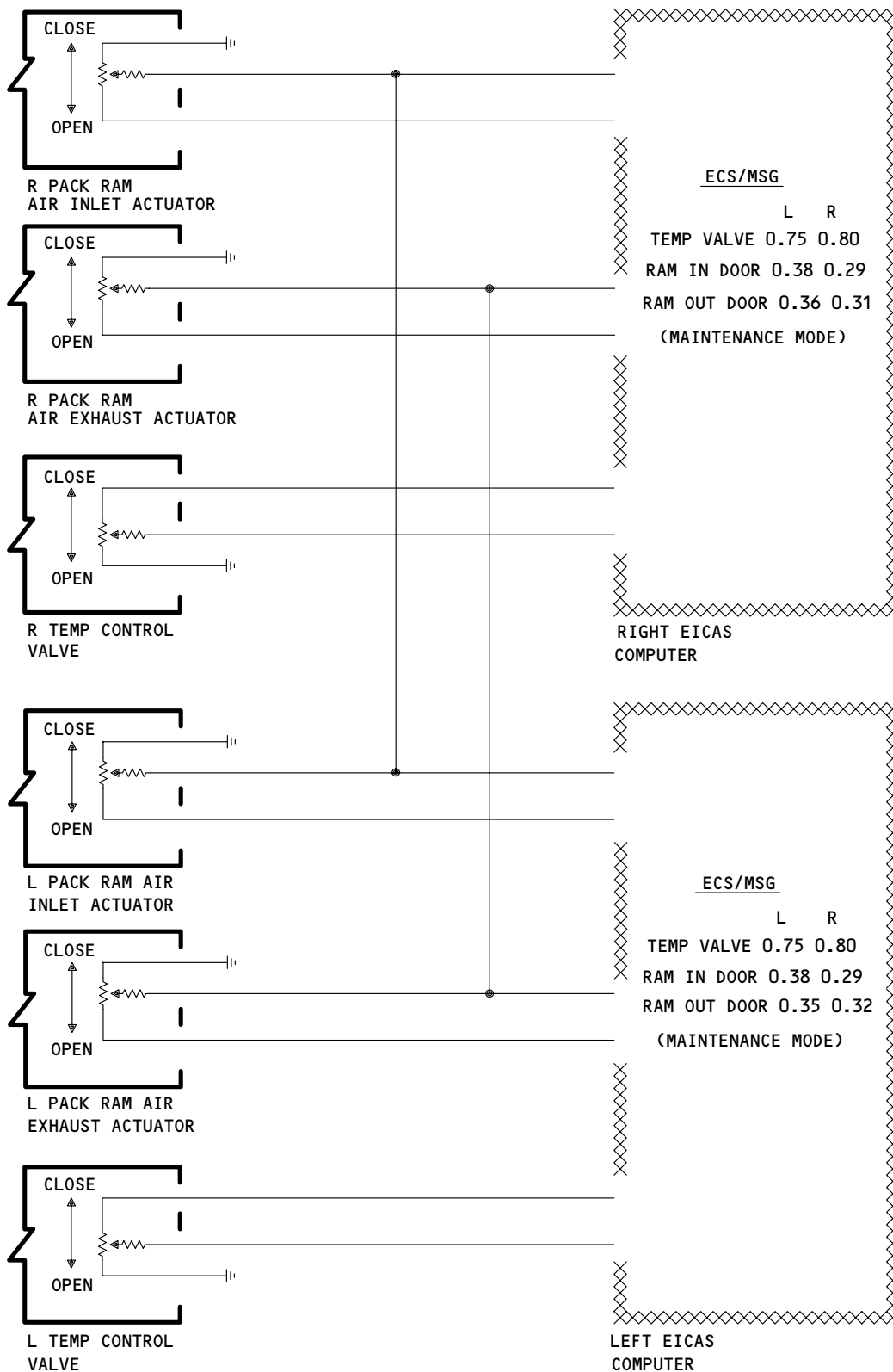
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Ram Air Door Position Indication Schematic
Figure 5

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MAINTENANCE MANUAL

- A. The ram air system operates as an integral part of the air cooling pack. For air cooling pack operation, see AMM 21-51-00/001.
- B. EICAS displays ram air inlet and exhaust door position. Door position indication is available on the ground, on the EICAS Maintenance Page (AMM 31-41-00/001). EICAS displays inlet and exhaust door position in percent closed, from 0.00 (full open) to 1.00 (full closed).

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FAULT ISOLATION/MAINT MANUAL

RAM AIR SYSTEM

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ACTUATOR - RAM AIR EXHAUST DOOR L DOOR, M320 R DOOR, M321	1	2	193NL, 194LR	21-53-04
ACTUATOR - RAM AIR INLET DOOR L DOOR, M322 R DOOR, M323	1	2	193NL, 193FL, 194GR	21-53-03
CARD - (FIM 21-51-00/101) FLOW CONTROL L PACK, M863 FLOW CONTROL R PACK, M864	3	2	119AL, MAIN EQUIP CTR, P50	21-53-06
CARD - TEMPERATURE CONTROL L PACK, M10403 R PACK, M10404	3	2	119AL, MAIN EQUIP CTR, P50	21-53-06
CIRCUIT BREAKER - L PACK AUTO CONT, C702 L PACK AUTO PWR, C673 L PACK STANDBY CONT, C4037 L PACK STANDBY PWR, C4036 R PACK AUTO CONT, C703 R PACK AUTO PWR, C674 R PACK STANDBY CONT, C4039 R PACK STANDBY PWR, C4038			FLT COMPT, P11 11N11 11N10 11N25 11N24 11N20 11N19 11N16 11N15	* * * * * * * *
COMPUTER - (FIM 31-41-00/101) EICAS L, M10181 EICAS R, M10182				
CONTROLLER - (FIM 21-51-00/101) PACK TEMPERATURE L, M126 PACK TEMPERATURE R, M127				
DOOR - RAM AIR EXHAUST	2	2	193NL, 194LR	21-53-02
DOOR - RAM AIR INLET	2	2		21-53-01
NOZZLE - WATER SPRAY	1	2	193NL, 194LR	21-53-05
PANEL - (FIM 21-51-00/101) AIR CONDITIONING CONTROL, M14				

* SEE THE WDM EQUIPMENT LIST

Ram Air System - Component Index
Figure 101 (Sheet 1)

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 FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY - (FIM 31-01-33/101) RIGHT PACK AUTO/MANUAL 1, K49 RIGHT PACK AUTO/MANUAL 2, K50 RIGHT PACK AUTO/MANUAL 3, K10316 RIGHT PACK EXIT DOOR CLOSE MANUAL, K52 RIGHT PACK EXIT DOOR OPEN MANUAL, K51 RIGHT PACK INLET DOOR CLOSE MANUAL, K54 RIGHT PACK INLET DOOR OPEN MANUAL, K53 RIGHT PACK TEMPERATURE CONTROL VALVE CLOSE MANUAL, K56 RIGHT PACK TEMPERATURE CONTROL VALVE OPEN MANUAL, K55 RELAY - (FIM 31-01-36/101) AIR/GND SYS NO. 1, K141 LEFT PACK AUTO/MANUAL 1, K57 LEFT PACK AUTO/MANUAL 2, K58 LEFT PACK AUTO/MANUAL 3, K10315 LEFT PACK EXIT DOOR CLOSE MANUAL, K60 LEFT PACK EXIT DOOR OPEN MANUAL, K59 LEFT PACK INLET DOOR CLOSE MANUAL, K62 LEFT PACK INLET DOOR OPEN MANUAL, K61 LEFT PACK TEMPERATURE CONTROL VALVE CLOSE MANUAL, K64 LEFT PACK TEMPERATURE CONTROL VALVE OPEN MANUAL, K63 RELAY - (FIM 31-01-37/101) AIR/GND SYS NO. 2, K210 VALVE - (FIM 21-51-00/101) TEMPERATURE CONTROL L PACK, V18 TEMPERATURE CONTROL R PACK, V19				

Ram Air System - Component Index
Figure 101 (Sheet 2)

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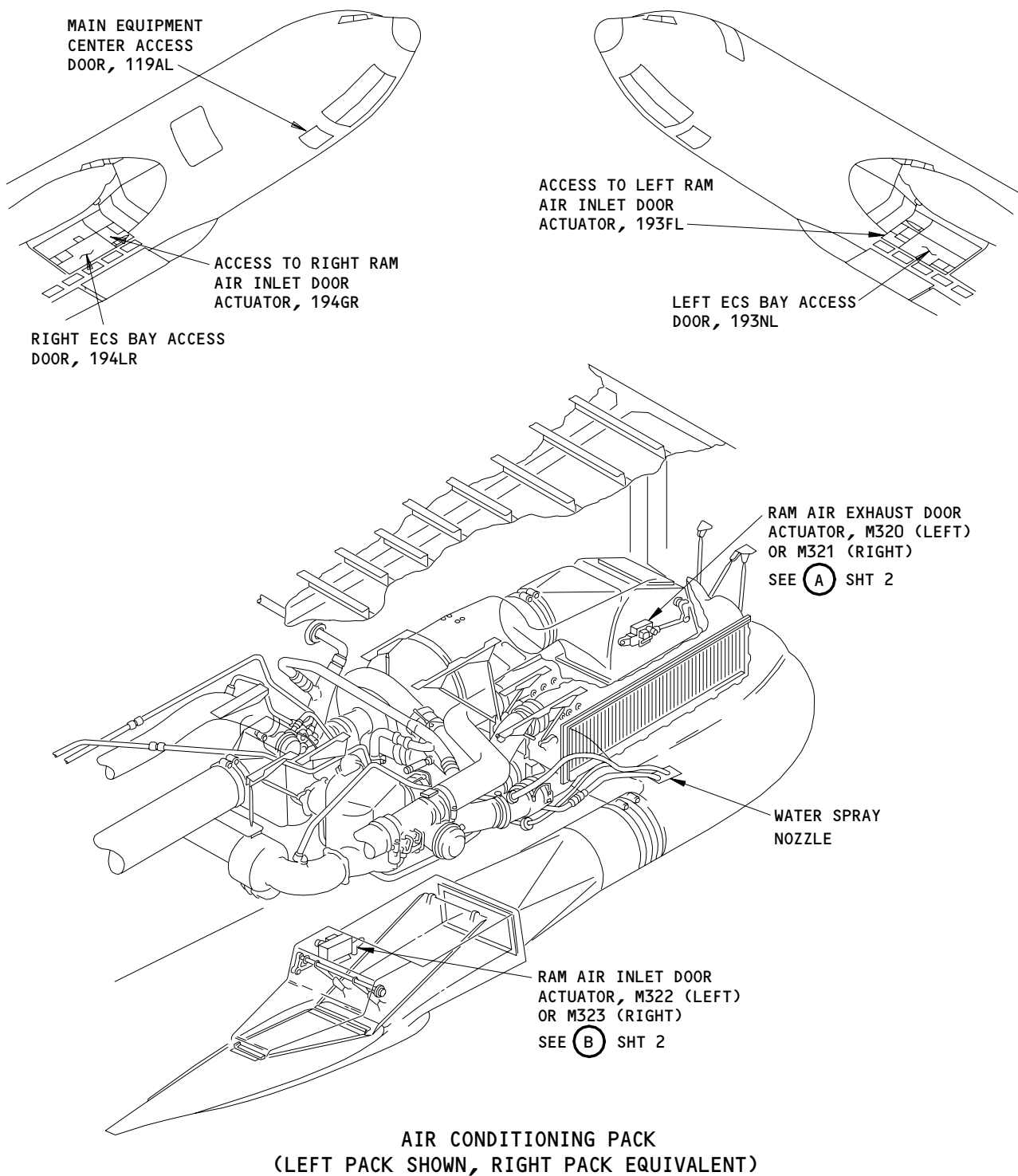
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FAULT ISOLATION/MAINT MANUAL



Ram Air System - Component Location
Figure 102 (Sheet 1)

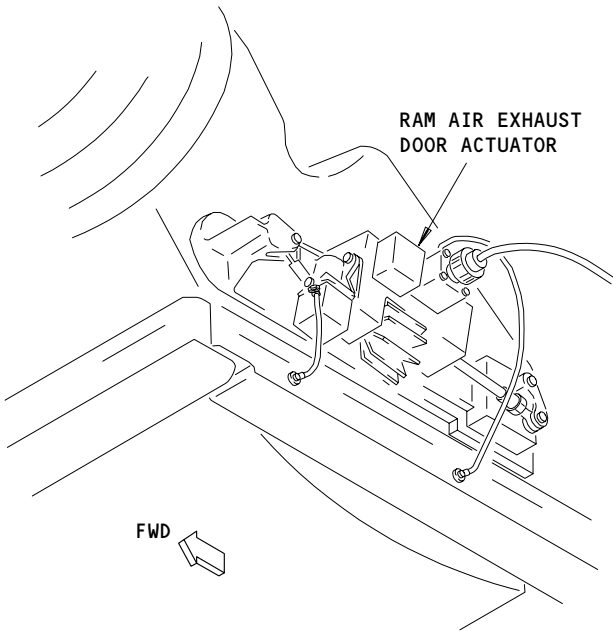
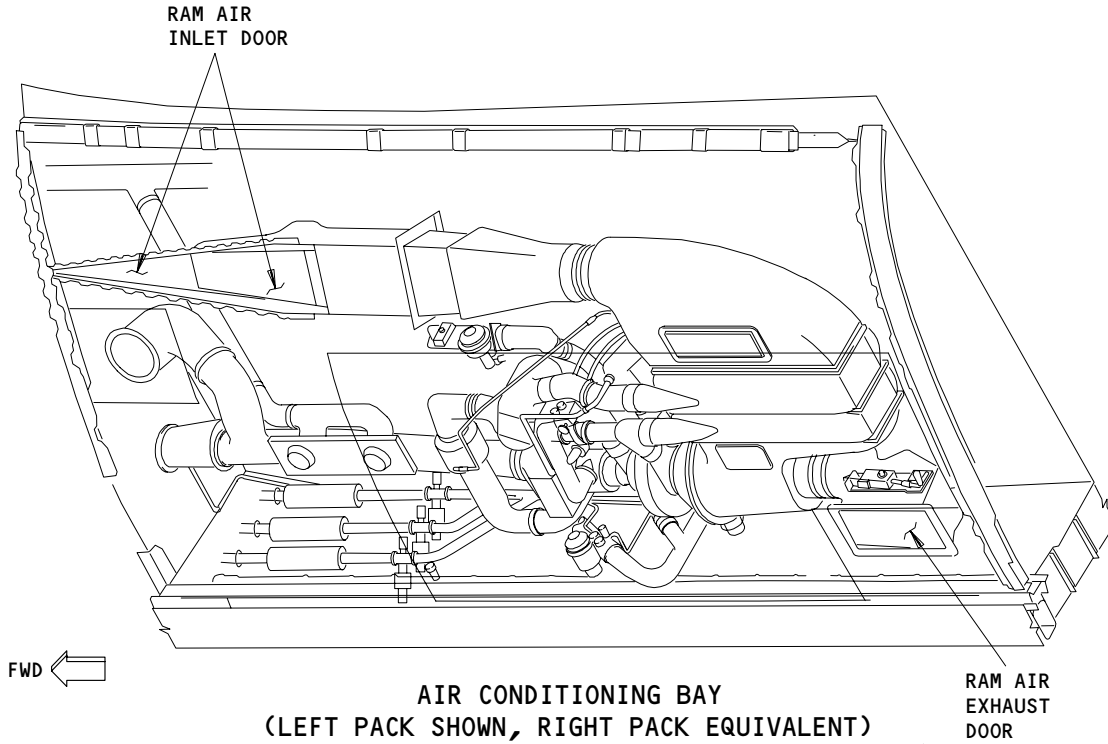
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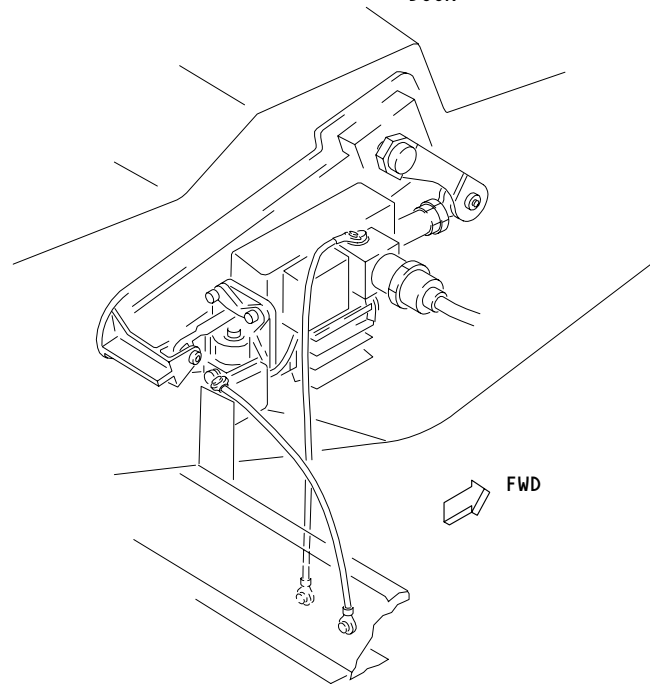
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FAULT ISOLATION/MAINT MANUAL



**RAM AIR EXHAUST DOOR ACTUATOR,
M320 (LEFT) OR M321 (RIGHT)**

(A)



**RAM AIR INLET DOOR ACTUATOR,
M322 (LEFT) OR M323 (RIGHT)**

(B)

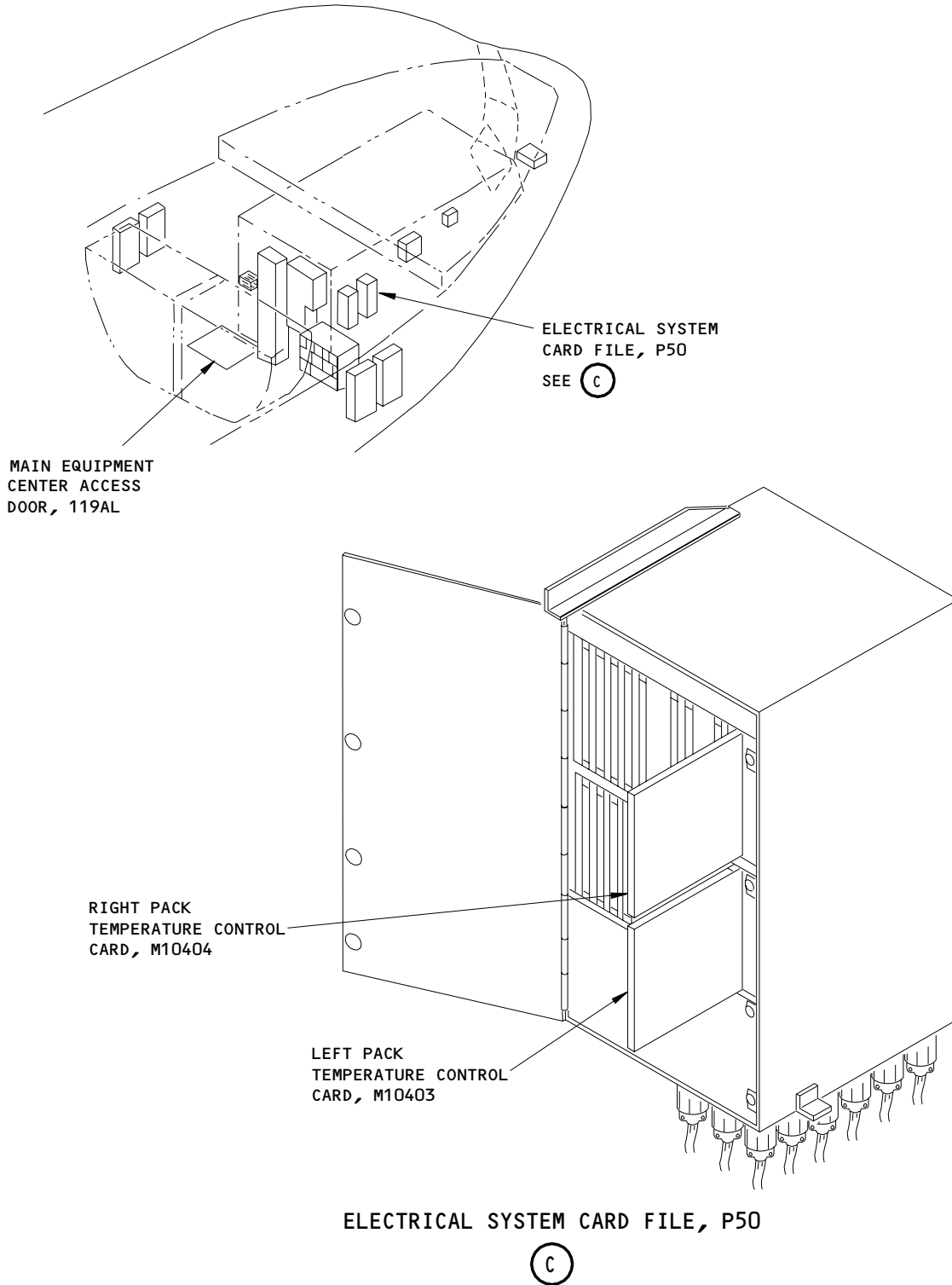
**Ram Air System - Component Location (Details from Sht 1)
Figure 102 (Sheet 2)**

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Ram Air System - Component Location
Figure 102 (Sheet 3)

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RAM-AIR INLET DOOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the ram-air inlet doors. One ram-air inlet door is installed forward of each air cooling pack.

TASK 21-53-01-004-001

2. Remove the Ram-Air Inlet Door (Fig. 401)

A. References

- (1) AMM 21-51-02/601, Heat Exchangers.

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bays

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 864-006

- (2) To remove the left ram-air inlet door, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N10, LEFT PACK AUTO PWR
(b) 11N11, LEFT PACK AUTO CONT
(c) 11N25, LEFT PACK STANDBY CONT
(d) 11N24, LEFT PACK STANDBY PWR

S 864-007

- (3) To remove the right ram-air inlet door, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N19, RIGHT PACK AUTO PWR

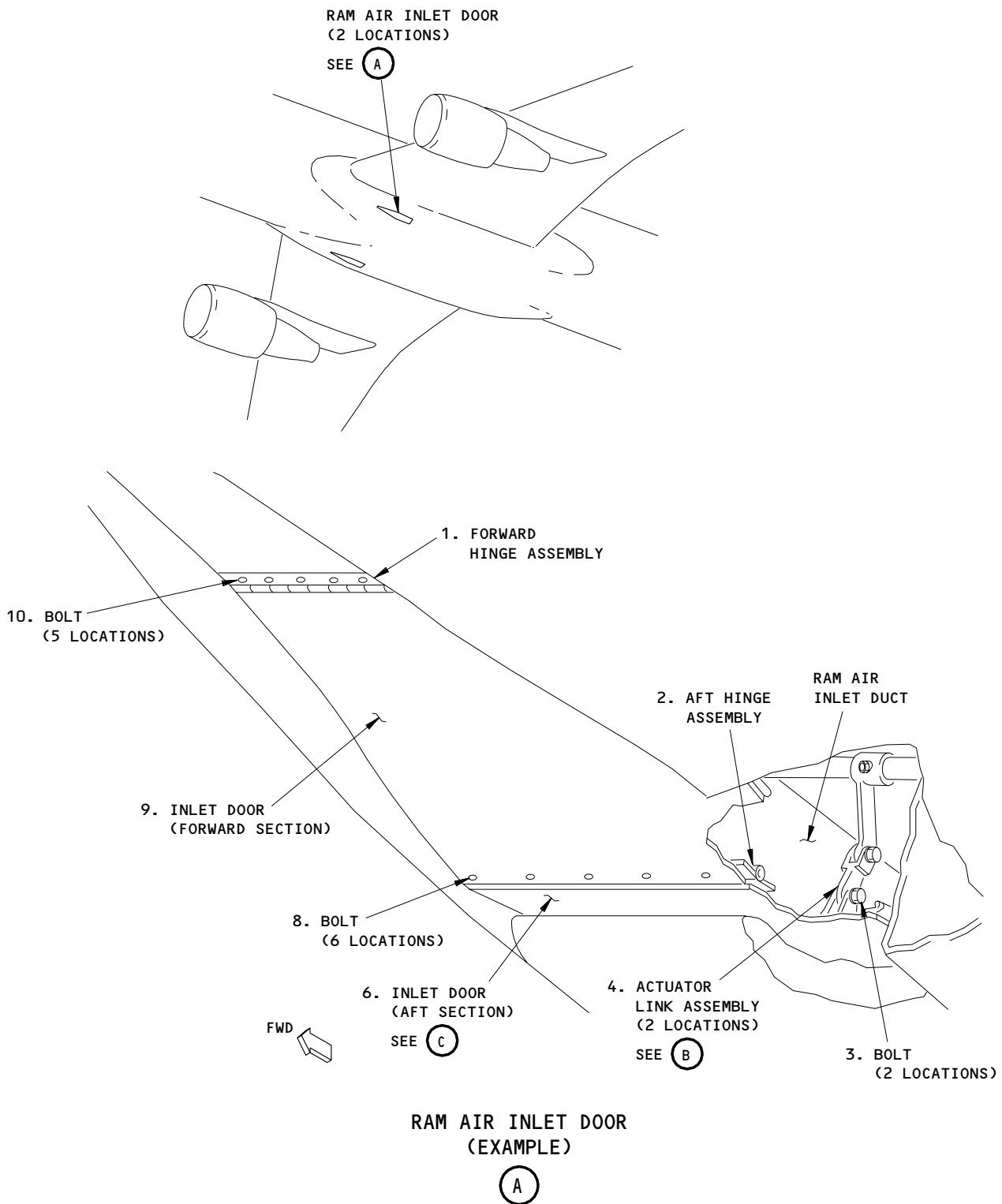
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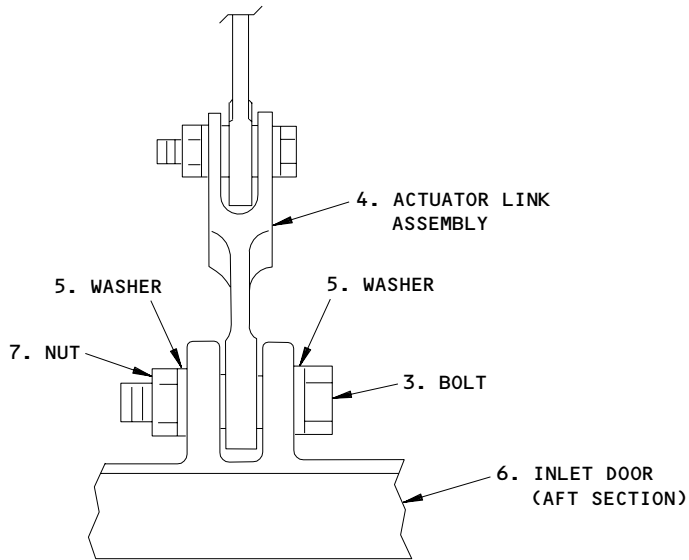
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Ram Air Inlet Door Installation
Figure 401 (Sheet 1)

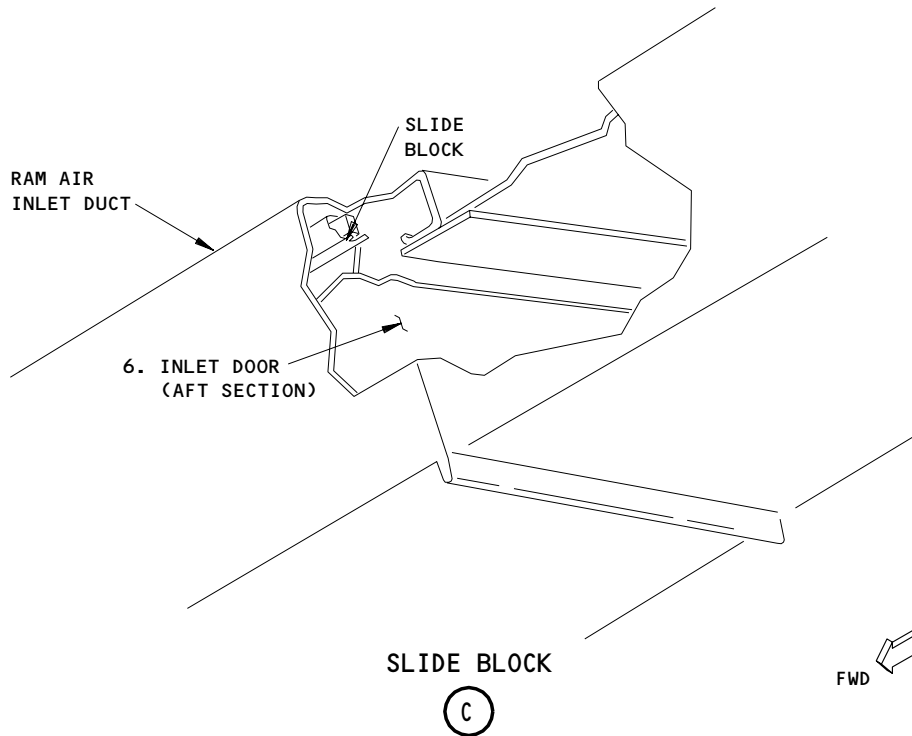
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ACTUATOR LINK ASSEMBLY
(EXAMPLE)

(B)



(C)

Ram Air Inlet Door Installation
Figure 401 (Sheet 2)

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- (b) 11N20, RIGHT PACK AUTO CONT
- (c) 11N15, RIGHT PACK STANDBY PWR
- (d) 11N16, RIGHT PACK STANDBY CONT

D. Remove the Door

NOTE: The ram-air inlet door has two sections. You must remove each section of the door independently.

S 024-004

- (1) Remove the forward door section (9).
 - (a) Remove the bolts (10) from the forward hinge assembly (1) of the forward door section (9).
 - (b) Remove the bolts (8) from the aft hinge assembly (2) of the forward door section (9).
 - (c) Remove the forward section of the door (9).

S 024-005

- (2) Remove the aft door section.
 - (a) Remove the bolts (3) that connect the actuator link assembly (4) to the aft door section (6).
 - (b) Pull the aft door section (6) forward and out of the ram-air inlet.

TASK 21-53-01-404-009

3. Install the Ram-Air Inlet Door (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	6	Aft Inlet Door Assy	21-53-61	05	310
401	9	Forward Inlet Door Assy	21-53-61	05	305
401	6	Aft Inlet Door Assy	21-53-61	05A	290
401	9	Forward Inlet Door Assy	21-53-61	05A	285

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B. References

- (1) AMM 24-22-00/201, Electric Power - Control
- (2) AMM 27-61-00/201 Spoiler/Speedbrake Control System
- (3) AMM 32-09-02/201, Air/Ground Relays

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bays

D. Install the Door

NOTE: The ram-air inlet door has two sections. You must install each section of the door independently.

S 034-010

- (1) If it is necessary, remove the bolts (8) to separate the forward door section (9) from the aft door section (6).

S 424-011

- (2) Install the aft door section (6).
 - (a) Put the aft door section (6) in its position in the ram-air inlet.
 - 1) Make sure the slide blocks are in the door tracks.
 - (b) Install the bolt (3), washers (5), and nut (7) to connect the actuator link assembly (4) to the aft door section (6).

S 424-012

- (3) Install the forward door section (9).
 - (a) Put the forward door section in its position in the ram-air inlet.
 - (b) Install, but do not tighten, the countersunk bolts (8), to connect the forward door section (9) to the aft door section (6).
 - (c) Install the bolts (10) to connect the forward door section (9) to the forward hinge assembly (1).
 - (d) Tighten the countersunk bolts (8).

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E. Do the installation test for the door

NOTE: If the left ram-air inlet door was installed, ignore the data in the parentheses. If the right ram-air inlet door was installed, use the data in the parentheses.

S 864-013

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-014

- (2) If the left ram-air inlet door was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the overhead circuit breaker panel, P11:
- (a) 11N10, LEFT PACK AUTO PWR
 - (b) 11N11, LEFT PACK AUTO CONT
 - (c) 11N24, LEFT PACK STANDBY PWR
 - (d) 11N25, LEFT PACK STANDBY CONT

S 864-015

- (3) If the right ram-air inlet door was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the overhead circuit breaker panel, P11:
- (a) 11N19, RIGHT PACK AUTO PWR
 - (b) 11N20, RIGHT PACK AUTO CONT
 - (c) 11N15, RIGHT PACK STANDBY PWR
 - (d) 11N16, RIGHT PACK STANDBY CONT

S 044-018

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

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S 864-019

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) Do the Flight Mode Simulation procedure for the No. 1 (No. 2) air/ground system (AMM 32-09-02/201).

S 214-028

- (6) Make sure the left (right) ram-air inlet door moves smoothly to the fully closed position.

NOTE: The ram-air inlet door will not move until the temperature control valve moves to its position. The opening of the ram-air inlet door will be between 0.35 and 0.50 inches.

S 864-020

- (7) Remove the DO-NOT-OPERATE tag from the L (R) PACK selector, on the P5 panel.
(a) Turn the selector to the STBY-N position.

S 214-022

- (8) Make sure the left (right) ram-air inlet door moves smoothly to the fully open position.

S 864-023

- (9) Turn the L (R) PACK selector, on the P5 panel, to the OFF position.

S 864-026

- (10) Put the No. 1 (No. 2) air/ground system to the ground mode (AMM 32-09-02/201).

F. Put the airplane back to its usual condition

S 864-027

- (1) Remove the electrical power, if it is not needed (AMM 24-22-00/201).

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RAM-AIR EXHAUST DOOR – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the ram-air exhaust doors. One ram-air exhaust door is installed aft of each air cooling pack.

TASK 21-53-02-004-001

2. Remove the Ram-Air Exhaust Door (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones

135/136 Environmental control systems (ECS) bay

- (2) Access Panels

193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (2) To remove the left ram-air exhaust door, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N10, LEFT PACK AUTO PWR
(b) 11N11, LEFT PACK AUTO CONT
(c) 11N24, LEFT PACK STANDBY PWR
(d) 11N25, LEFT PACK STANDBY CONT

S 864-005

- (3) To remove the right ram-air exhaust door, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N19, RIGHT PACK AUTO PWR
(b) 11N20, RIGHT PACK AUTO CONT
(c) 11N15, RIGHT PACK STANDBY PWR
(d) 11N16, RIGHT PACK STANDBY CONT

S 014-006

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 014-007

- (5) Remove the bolts from the access door that is on the top of the ram-air exhaust duct.

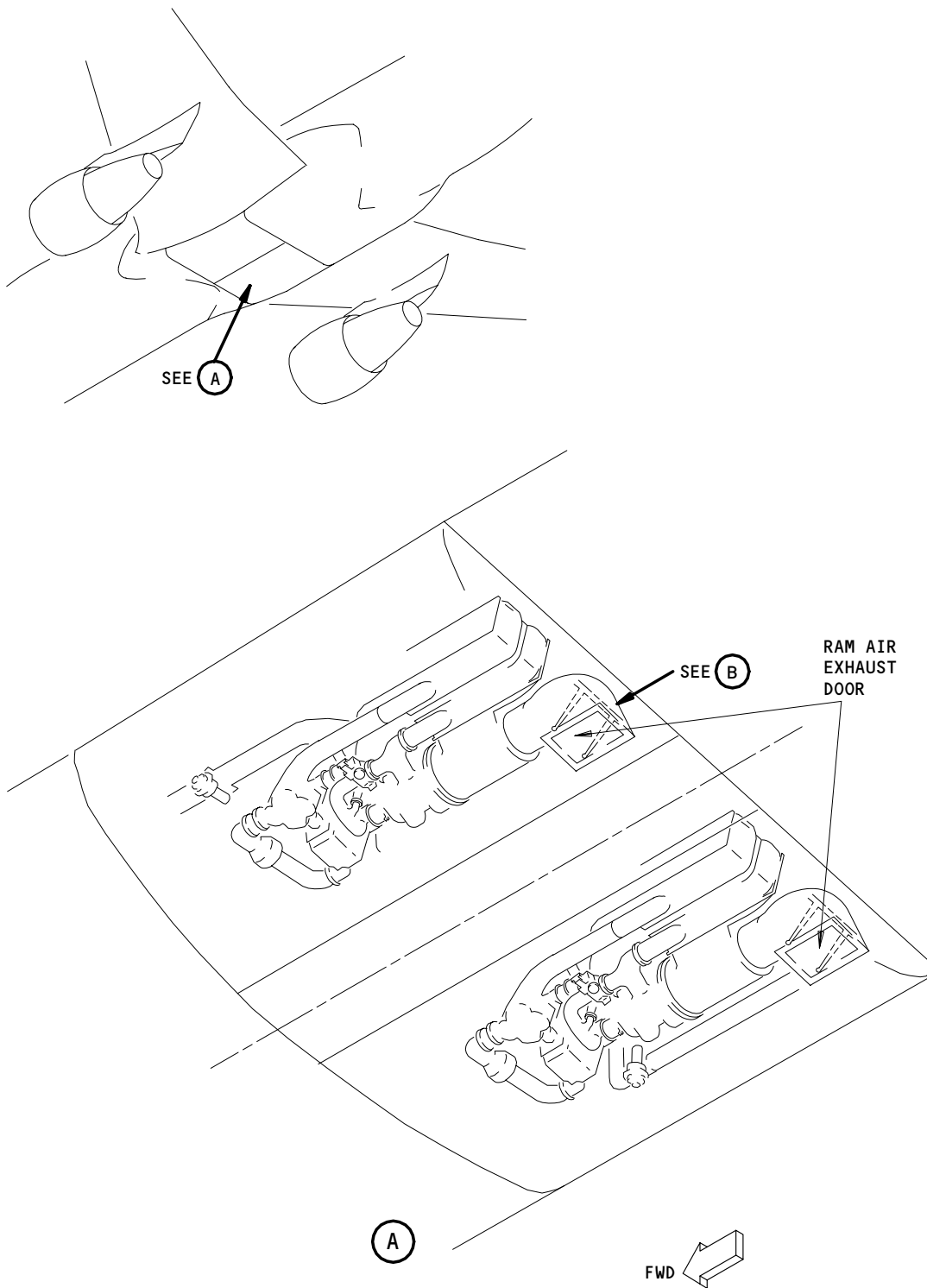
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Ram Air Exhaust Door Installation
Figure 401 (Sheet 1)

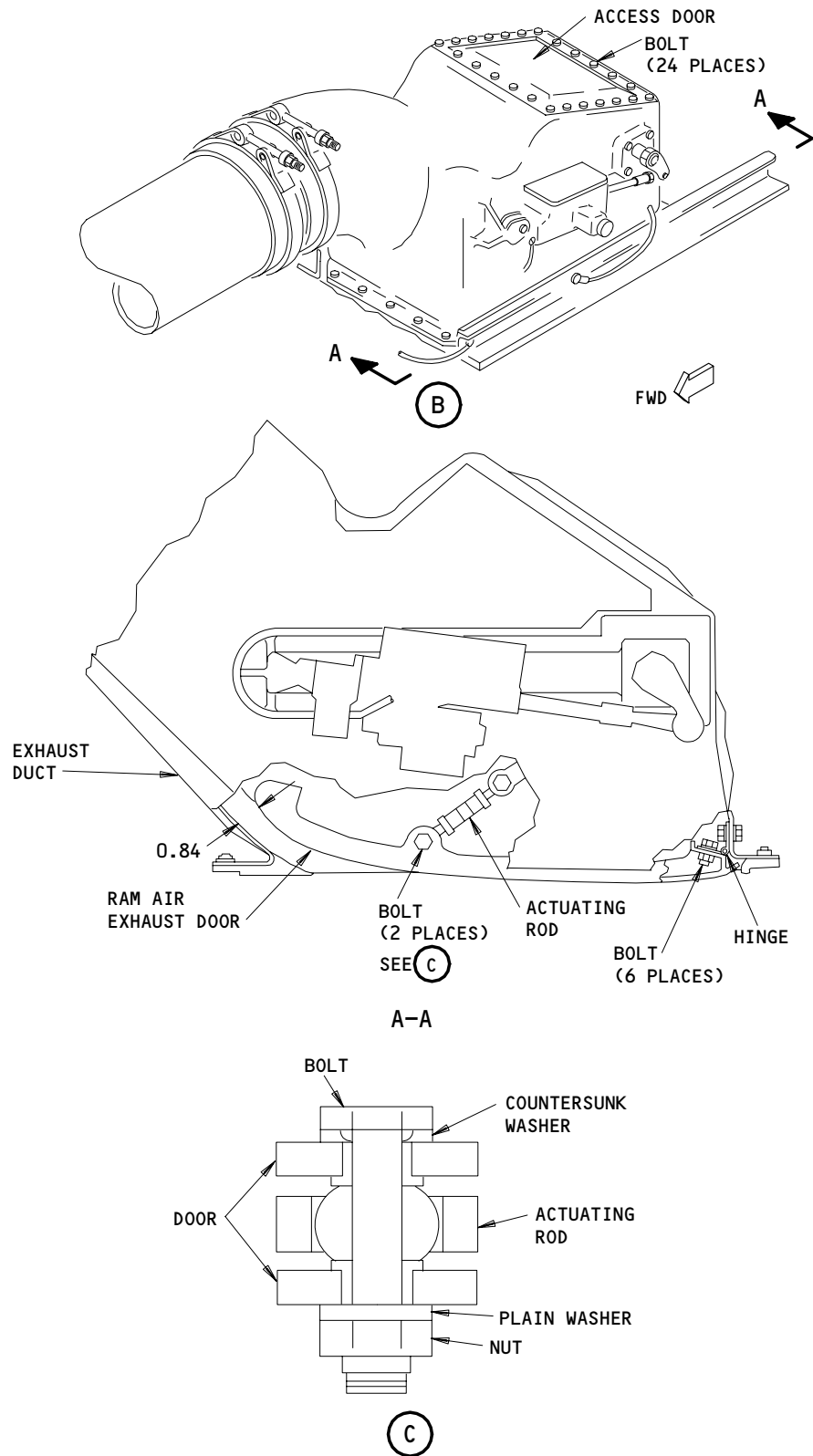
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Ram Air Exhaust Door Installation
Figure 401 (Sheet 2)

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S 014-008

- (6) Remove the access door that is on the top of the ram-air exhaust duct.

D. Remove the Door

S 034-009

- (1) Remove the bolts to disconnect the door from the actuator rod.

S 034-010

- (2) Hold the door and remove the bolts from the hinge.

S 024-011

- (3) Remove the door from the ram-air exhaust duct.

TASK 21-53-02-404-012

3. Install the Ram-Air Exhaust Door (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power - Control
- (3) AMM 32-09-02/201, Air/Ground Relays
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

C. Install the Door

S 424-013

- (1) Put the door in its position in the ram-air exhaust duct.

S 434-014

- (2) Install the bolts and nuts to connect the door to the hinge.

S 434-015

- (3) Install the bolts to connect the door to the actuator rod.
 - (a) Put the countersunk washer against the head of the bolt.

D. Do the installation test for the door.

NOTE: If the left ram-air exhaust door was installed, ignore the data in the parentheses. If the right ram-air exhaust door was installed, use the data in the parentheses.

S 864-016

- (1) Supply electrical power (AMM 24-22-00/201).

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S 864-017

- (2) If the left ram-air exhaust door was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the overhead circuit breaker panel, P11:
- (a) 11N11, LEFT PACK AUTO CONT
 - (b) 11N10, LEFT PACK AUTO PWR
 - (c) 11N25, LEFT PACK STANDBY CONT
 - (d) 11N24, LEFT PACK STANDBY PWR

S 864-018

- (3) If the right ram-air exhaust door was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the overhead circuit breaker panel, P11:
- (a) 11N20, RIGHT PACK AUTO CONT
 - (b) 11N19, RIGHT PACK AUTO PWR
 - (c) 11N16, RIGHT PACK STANDBY CONT
 - (d) 11N15, RIGHT PACK STANDBY PWR

S 044-019

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 864-020

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) Do the Flight Mode Simulation procedure for the No. 1 (No. 2) air/ground system (AMM 32-09-02/201).

S 214-021

- (6) Make sure the left (right) ram-air exhaust door moves smoothly to the fully closed position.

NOTE: The ram-air exhaust door will not move until the ram-air inlet door moves to its position. The opening of the ram-air exhaust door will be between 0.80 and 1.00 inches.

S 864-022

- (7) Remove the DO-NOT-OPERATE tag from the L (R) PACK selector, on the P5 panel.
- (a) Turn the selector to the STBY-N position.

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- S 214-024
- (8) Make sure the left (right) ram-air exhaust door moves smoothly to the fully open position.
- S 864-025
- (9) Turn the L (R) PACK selector, on the P5 panel, to the OFF position.
- S 864-027
- (10) Put the No. 1 (No. 2) air/ground system to the ground mode (AMM 32-09-02/201).
- E. Put the airplane back to its usual condition
- S 414-028
- (1) Put the access door in its position on the top of the ram-air exhaust duct.
- S 414-029
- (2) Install the bolts to hold the access door in its position.
- S 414-030
- (3) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).
- S 864-031
- (4) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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RAM AIR EXHAUST DOOR – ADJUSTMENT/TEST

1. General

- A. This procedure has instructions to do a system test of the ram-air exhaust doors. This system test will measure the opening of the exhaust doors when they are fully closed and, if it is necessary, adjust the exhaust doors.

TASK 21-53-02-705-001

2. Ram-Air Exhaust Door System Test (Fig. 501)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power – Control
- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (4) AMM 32-09-02/201, Air/Ground Relays

B. Access

- (1) Location Zones
135/136 Environmental control system (ECS) bays
- (2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Test

S 865-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-003

- (2) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.
 - (b) Put a DO-NOT-OPERATE tag on the selector.

S 045-005

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

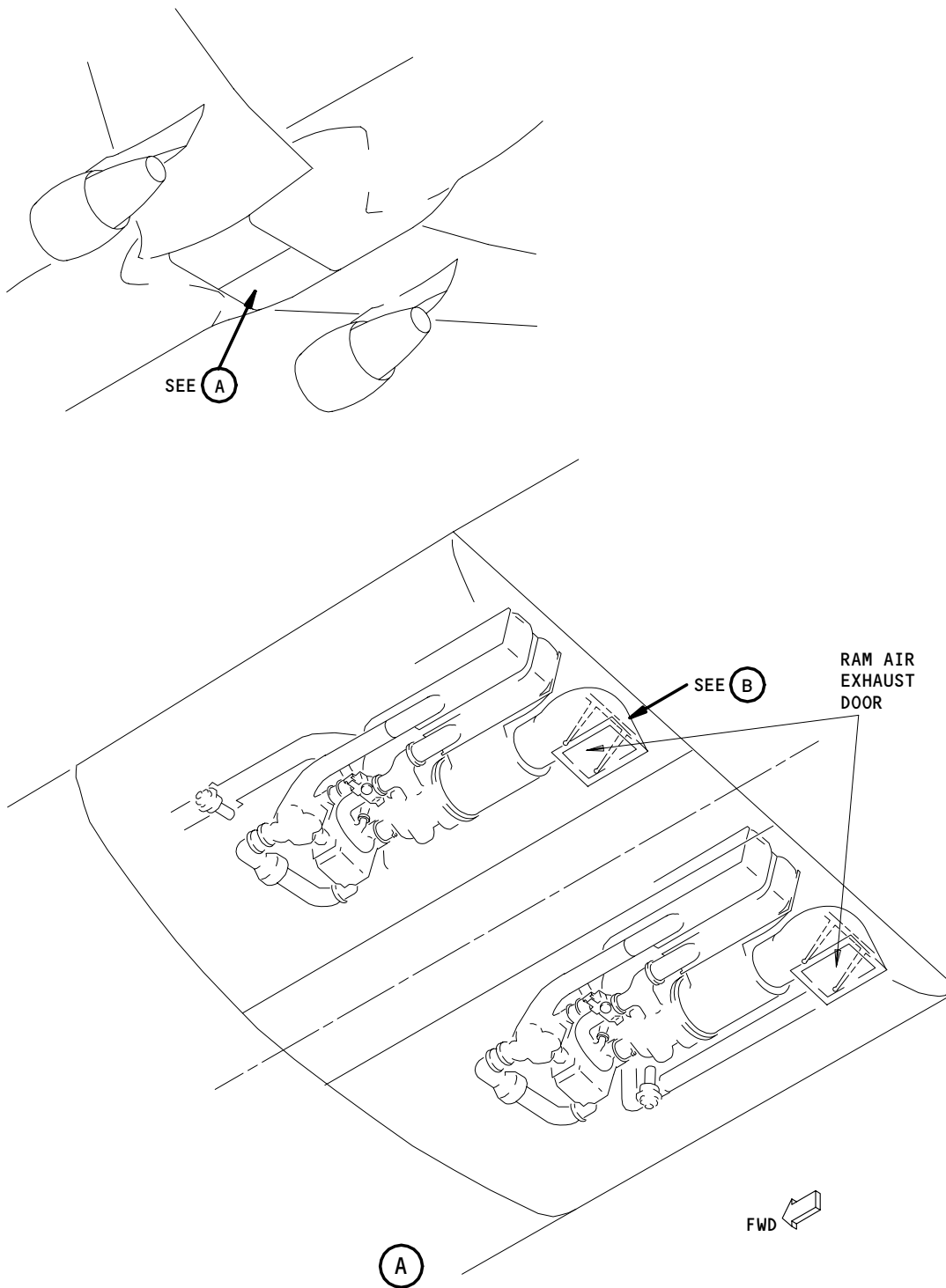
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Ram Air Exhaust Door Adjustment
Figure 501 (Sheet 1)

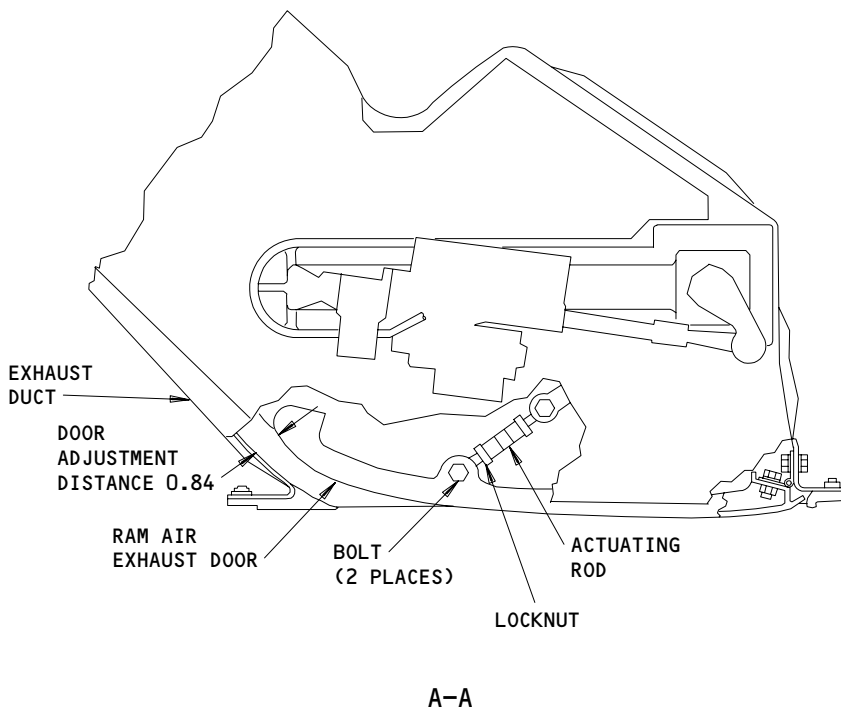
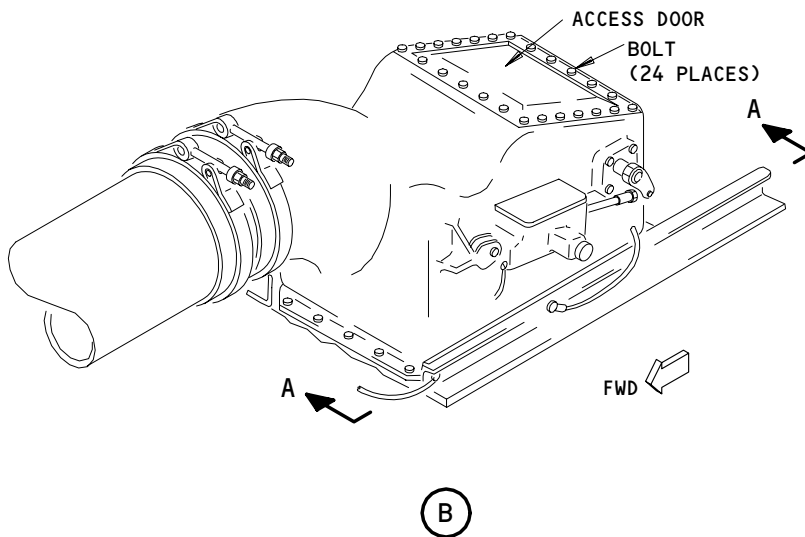
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Ram Air Exhaust Door Adjustment
Figure 501 (Sheet 2)

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S 865-006

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (4) To do the test on the left ram-air exhaust door, do the Flight Mode Simulation procedure for the No. 1 air/ground systems (AMM 32-09-02/201).

S 865-015

- (5) To do the test on the right ram-air exhaust door, do the Flight Mode Simulation procedure for the No. 2 air/ground systems (AMM 32-09-02/201).

S 015-007

- (6) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Do the Test

S 735-008

- (1) Measure the distance between the edge of the exhaust duct and the bottom of the door.

S 735-009

- (2) If the gap is not 0.84 +/-0.03 inches, then adjust the door.
- (a) Remove the bolts from the access door that is on the top of the ram-air exhaust duct.
 - (b) Remove the access door that is on the top of the ram-air exhaust duct.
 - (c) Loosen the locknut on the actuating rod that connects to the ram-air exhaust door.
 - (d) Adjust the length of the actuating rod until the distance between the exhaust door and the exhaust duct is 0.84 +/-0.03.
 - (e) Tighten the locknut on the actuating rod.
 - (f) Put the access door in its position on the top of the ram-air exhaust duct.

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- (g) Install the bolts to hold the access door in its position.
E. Put the airplane back to its usual condition

S 415-010

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).

S 865-011

- (2) Put the applicable (No. 1 or No. 2) air/ground systems to the ground mode (Ref 32-09-02).

S 865-012

- (3) Remove the DO-NOT-OPERATE tags from the applicable (L or R) PACK selectors, on the P5 panel.

S 865-014

- (4) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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RAM-AIR INLET DOOR ACTUATOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the actuators for the ram-air inlet doors. One actuator is installed on the right side of each ram-air inlet door.

TASK 21-53-03-004-001

2. Remove the Ram-Air Inlet Door Actuator (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones

135/136 Environmental control systems (ECS) bay

- (2) Access Panels

193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (2) To remove the left actuator, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N11, LEFT PACK AUTO CONT
(b) 11N10, LEFT PACK AUTO PWR
(c) 11N25, LEFT PACK STANDBY CONT
(d) 11N24, LEFT PACK STANDBY PWR

S 864-005

- (3) To remove the right actuator, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N20, RIGHT PACK AUTO CONT

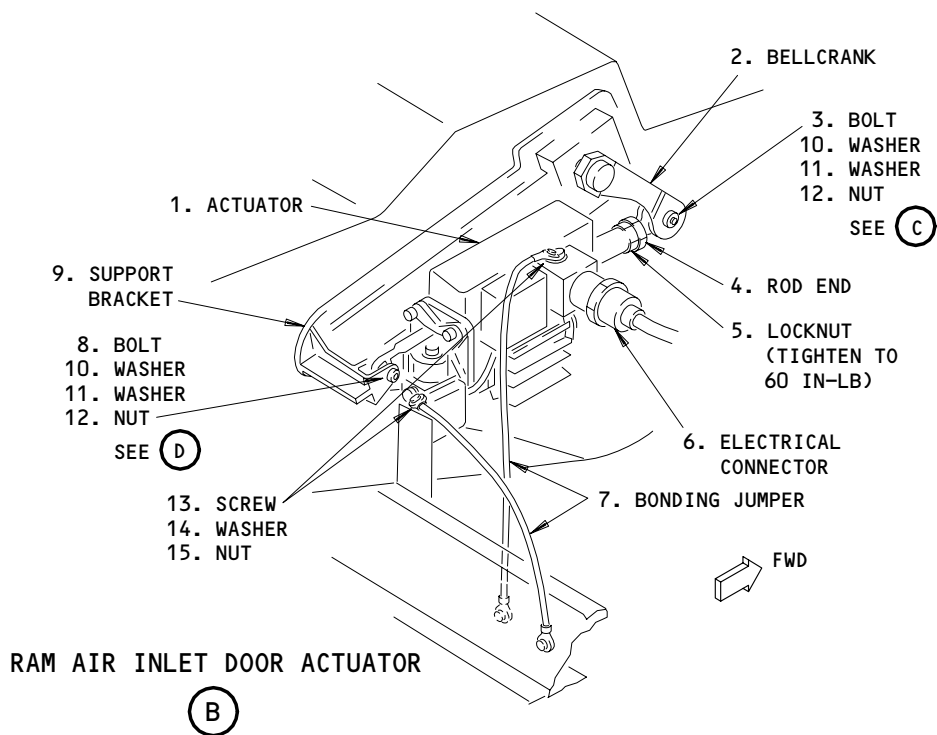
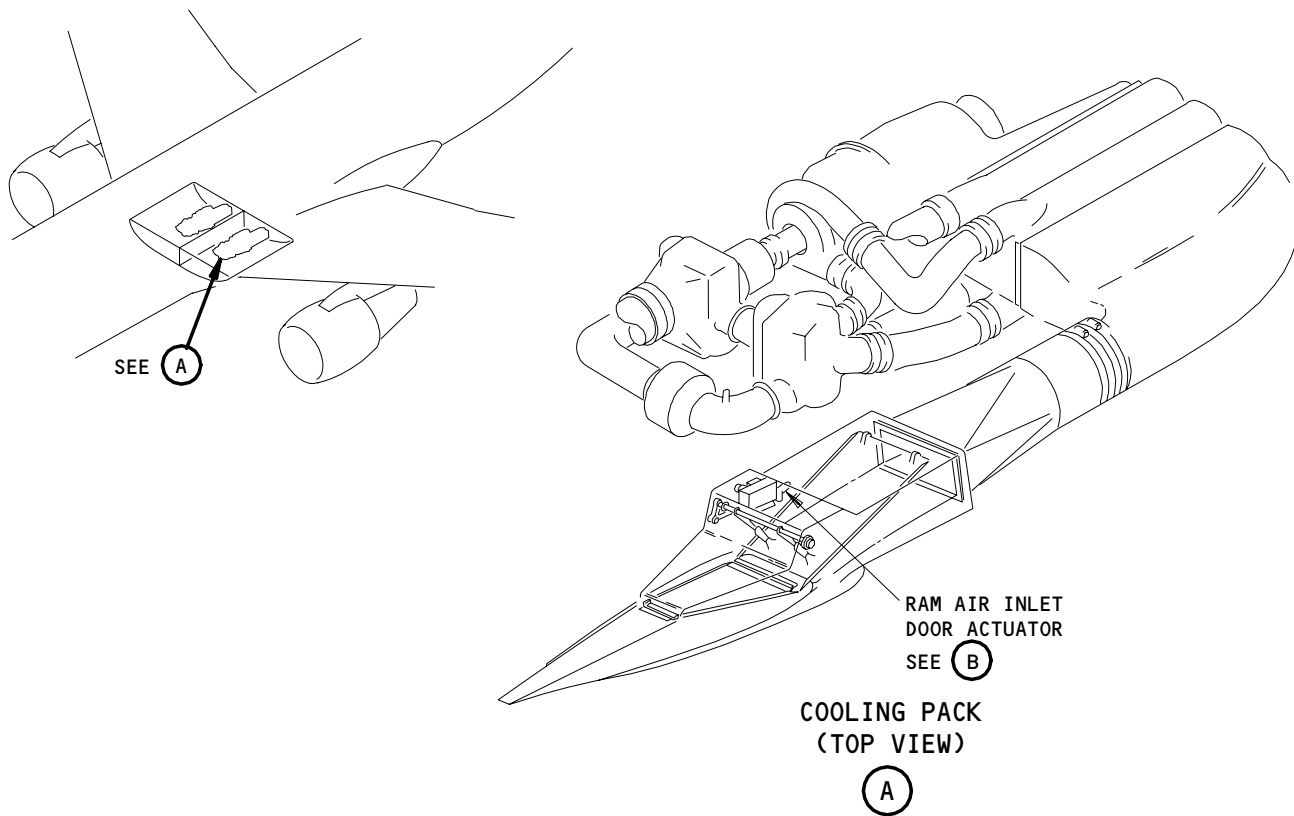
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Ram Air Inlet Door Actuator - Installation
Figure 401 (Sheet 1)

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- (b) 11N19, RIGHT PACK AUTO PWR
- (c) 11N16, RIGHT PACK STANDBY CONT
- (d) 11N15, RIGHT PACK STANDBY PWR

S 014-006

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Actuator

S 034-007

- (1) Disconnect the electrical connector (6) from the actuator (1).

S 034-008

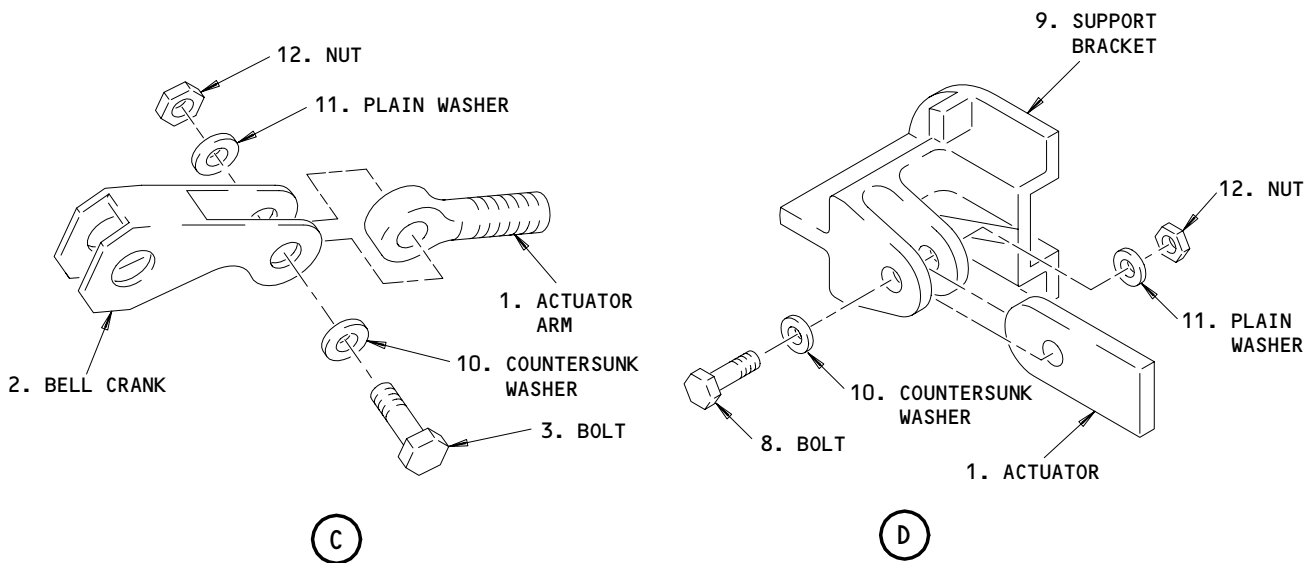
- (2) Remove the screws (13), washers (14), and nuts (15) to disconnect the two bonding jumpers (7) from the actuator (1).

S 034-009

- (3) Remove the bolt (3) to disconnect the actuator (1) from the bellcrank (2).

S 034-010

- (4) Remove the bolt (8) to disconnect the actuator (1) from the support bracket (9).



Ram Air Inlet Door Actuator - Installation
Figure 401 (Sheet 2)

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S 024-011

- (5) Remove the actuator (1).

TASK 21-53-03-404-012

3. Install the Ram-Air Inlet Door Actuator (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Actuator - Inlet Door	21-53-61	05	95
401	1	Actuator - Inlet Door	21-53-61	05A	80

B. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
 (2) 24-22-00/201, Electrical Power - Control
 (3) 27-61-00/201, Spoiler Speedbrake Control System
 (4) 32-09-02/201, Air/Ground Relays

C. Access

- (1) Location Zones
 135/136 Environmental control systems (ECS) bay
 (2) Access Panels
 193NL/194LR ECS bay access doors

D. Install the Actuator

S 424-013

- (1) Put the actuator (1) in its position between the bellcrank (2) and the support bracket (9).

S 434-014

- (2) Install, but do not tighten, the bolt (8), washers (10, 11) and nut (12) to connect the actuator (1) to the support bracket (9).
 (a) Put the countersunk washer against the head of the bolt.

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- S 434-015
- (3) Push the ram-air inlet door to the open position until the actuator is in the bellcrank.
- S 434-016
- (4) Install the bolt (3), washers (10, 11) and nut (12) to connect the actuator to the bellcrank (2).
(a) Put the countersunk washer (10) against the head of the bolt (3).
- S 434-019
- (5) Tighten the nut (12) at the support bracket (9).
- S 434-018
- (6) Install the screws (13), washers (14), and nuts (15) to connect the two bonding jumpers (7) to the actuator (1).
- S 434-017
- (7) Connect the electrical connector (6) to the actuator (1).
- E. Do the installation test for the actuator
- S 864-036
- (1) Supply pneumatic power (AMM 36-00-00/201).
- S 864-020
- (2) Supply electrical power (AMM 24-22-00/201).
- S 864-021
- (3) If the left actuator was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
(a) 11N11, LEFT PACK AUTO CONT
(b) 11N10, LEFT PACK AUTO PWR
(c) 11N25, LEFT PACK STANDBY CONT

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(d) 11N24, LEFT PACK STANDBY PWR

S 864-022

- (4) If the right actuator was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
- (a) 11N20, RIGHT PACK AUTO CONT
 - (b) 11N19, RIGHT PACK AUTO PWR
 - (c) 11N16, RIGHT PACK STANDBY CONT
 - (d) 11N15, RIGHT PACK STANDBY PWR

S 044-023

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (5) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 864-024

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (6) If the left actuator was installed, do the Flight Mode Simulation procedure for the No. 1 air/ground system (AMM 32-09-02/201).

S 864-025

- (7) If the right actuator was installed, do the Flight Mode Simulation procedure for the No. 2 air/ground system (AMM 32-09-02/201).

S 214-026

- (8) Make sure the applicable (left or right) ram-air inlet door moves to the fully closed position.

NOTE: The ram-air inlet door will not move until the temperature control valve moves to its position. The opening at the inlet door will be between 0.35 and 0.50 inches.

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S 864-027

- (9) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
 - (a) Turn the selector to the STBY-N position.
 - (b) Make sure the PACK OFF light goes off.

S 214-029

- (10) Make sure the applicable (left or right) ram-air inlet door moves to the fully open position.

S 864-030

- (11) Put the applicable (No. 1 or No. 2) air/ground system to the ground mode (AMM 32-09-02/201).

F. Put the airplane back to its usual condition

S 414-031

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

S 864-032

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 864-034

- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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RAM-AIR EXHAUST DOOR ACTUATOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the actuators for the ram-air exhaust doors. One actuator is installed on the left side of each ram-air exhaust duct.

TASK 21-53-04-004-001

2. Remove the Ram-Air Exhaust Door Actuator (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bays
(2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (2) To remove the left actuator, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N11, LEFT PACK AUTO CONT
(b) 11N10, LEFT PACK AUTO PWR
(c) 11N24, LEFT PACK STANDBY PWR
(d) 11N25, LEFT PACK STANDBY CONT

S 864-005

- (3) To remove the right actuator, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11:
(a) 11N20, RIGHT PACK AUTO CONT
(b) 11N15, RIGHT PACK STANDBY PWR
(c) 11N16, RIGHT PACK STANDBY CONT

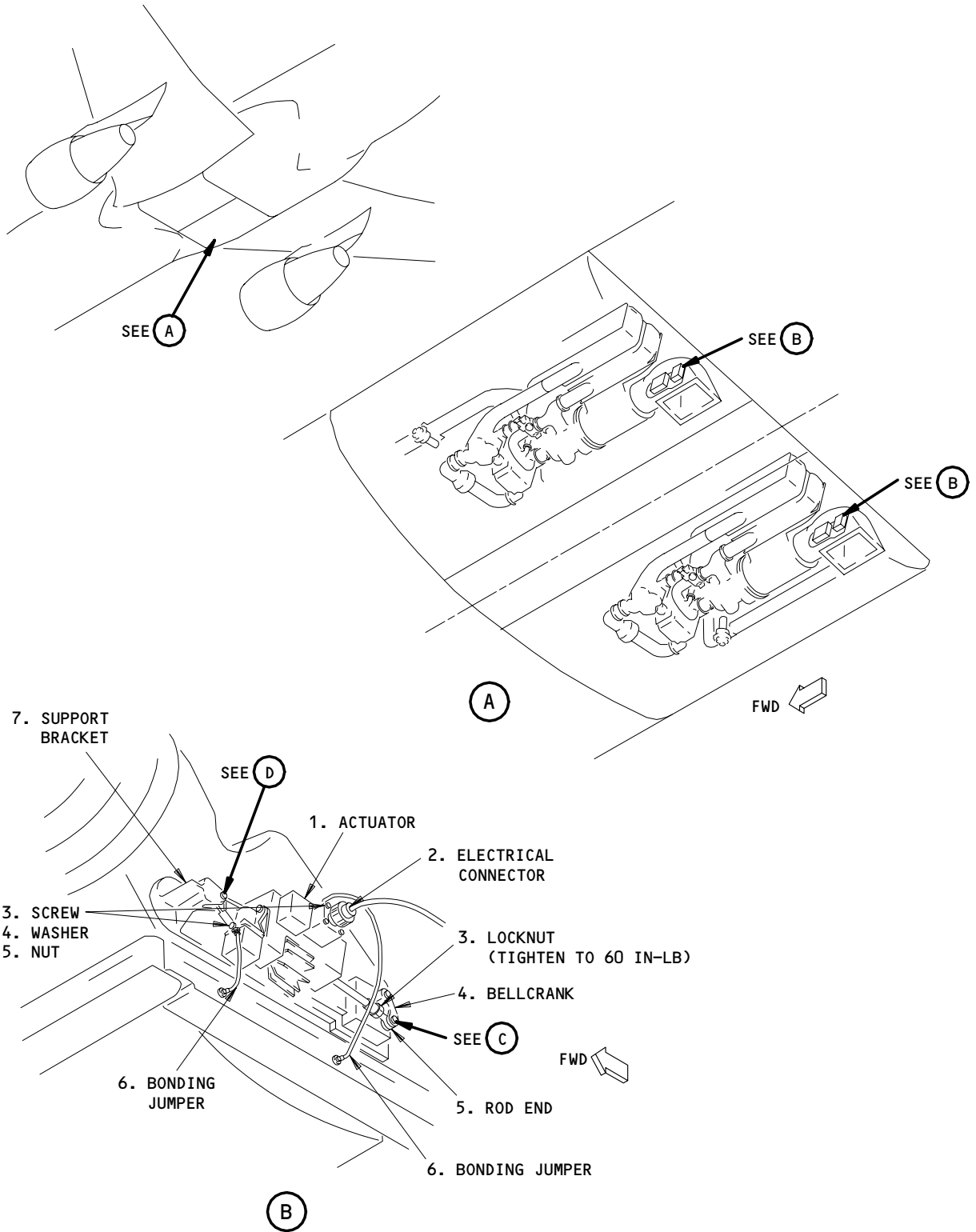
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Ram Air Exhaust Door Actuator Installation
Figure 401 (Sheet 1)

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(d) 11N19, RIGHT PACK AUTO PWR

S 014-006

- (4) Open the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

D. Remove the Actuator

S 034-007

- (1) Disconnect the electrical connector (2) from the actuator (1).

S 034-008

- (2) Remove the screws (13), washers (14), and nuts (15) to disconnect the two bonding jumpers (6) from the actuator (1).

S 034-009

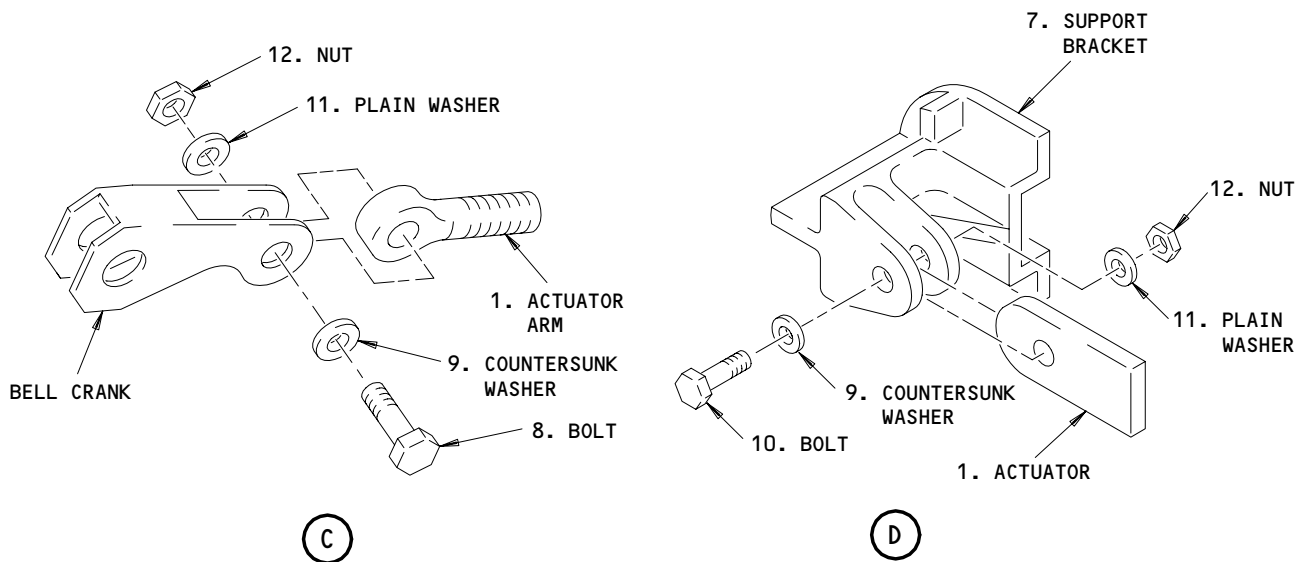
- (3) Remove the bolt (8) to disconnect the actuator rod (5) from the bellcrank (4).

S 034-010

- (4) Remove the bolt (10) to disconnect the actuator (1) from the support bracket (7).

S 024-011

- (5) Remove the actuator (1).



Ram Air Exhaust Door Actuator Installation
Figure 401 (Sheet 2)

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TASK 21-53-04-404-012

3. Install the Ram-Air Exhaust Door Actuator (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Actuator - Exhaust Door	21-53-02	01	235
401	1	Actuator - Exhaust Door	21-53-02	01A	325

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 27-61-00/201 Spoiler/Speedbrake Control System
- (4) AMM 32-09-02/201, Air/Ground Relays

C. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bays
- (2) Access Panels
193NL/194LR ECS bay access doors

D. Install the Actuator

S 424-013

- (1) Put the actuator (1) in its position, between the support bracket (7) and the bellcrank (4).

S 434-014

- (2) Install the bolt (10), washers (9, 11), and nut (12) to connect the actuator (1) to the support bracket (7).
 - (a) Put the countersunk washer against the head of the bolt.

S 434-015

- (3) Push the ram-air exhaust door to the open position until the actuator (1) is in the bellcrank (4).

S 434-016

- (4) Install the bolt (8), washers (9, 11), and nut (12) to connect the actuator (1) to the bellcrank (4).
 - (a) Put the countersunk washer against the head of the bolt.

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S 434-017

- (5) Install the screws (13), washers (14), and nuts (15) to connect the two bonding jumpers (6) to the actuator (1).

S 434-018

- (6) Connect the electrical connector (2) to the actuator (1).
- E. Do the installation test for the actuator

S 864-019

- (1) Supply electrical power (AMM 24-22-00/201)

S 864-020

- (2) If the left actuator was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
 - (a) 11N11, LEFT PACK AUTO CONT
 - (b) 11N10, LEFT PACK AUTO PWR
 - (c) 11N24, LEFT PACK STANDBY PWR
 - (d) 11N25, LEFT PACK STANDBY CONT

S 864-021

- (3) If the right actuator was installed, remove the DO-NOT-CLOSE tags and close these circuit breakers, on the P11 panel:
 - (a) 11N20, RIGHT PACK AUTO CONT
 - (b) 11N15, RIGHT PACK STANDBY PWR
 - (c) 11N16, RIGHT PACK STANDBY CONT
 - (d) 11N19, RIGHT PACK AUTO PWR

S 044-022

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

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S 864-023

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF YOU DO THE PROCEDURE INCORRECTLY, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (5) If the left actuator was installed, do the Flight Mode Simulation procedure for the No. 1 air/ground system (AMM 32-09-02/201).

S 864-024

- (6) If the right actuator was installed, do the Flight Mode Simulation procedure for the No. 2 air/ground system (AMM 32-09-02/201).

S 214-025

- (7) Make sure the applicable (left or right) ram-air exhaust door moves to the fully closed position.

NOTE: The ram-air exhaust door will not move until the ram-air inlet door moves to its position. The opening at the exhaust door will be between 0.80 and 1.00 inches.

S 864-026

- (8) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
(a) Turn the selector to the STBY-N position.

S 214-028

- (9) Make sure the applicable (left or right) ram-air exhaust door moves to the fully open position.

S 864-029

- (10) Put the applicable (No. 1 or No. 2) air/ground system to the ground mode (AMM 32-09-02/201).

F. Put the airplane back to its usual condition

S 414-030

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (AMM 06-41-00/201).

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S 864-031

- (2) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 864-033

- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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WATER SPRAY NOZZLE – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the water spray nozzles. One nozzle is installed in each ram-air inlet duct, near the secondary heat exchanger.

TASK 21-53-05-004-001

2. Remove the Water Spray Nozzle (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bays
(2) Access Panels
193NL/194LR ECS bay access doors

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
(a) Make sure the pack is off.
(b) Put a DO-NOT-OPERATE tag on the selector.

S 014-004

- (2) Open the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).

D. Remove the Nozzle

S 034-005

- (1) Loosen the jamnuts to disconnect the supply tubes from the nozzle.

S 434-019

- (2) Put a tag on the tubes to show their correct installation.

S 034-006

- (3) Remove the bolts from the nozzle.

S 024-007

- (4) Carefully remove the nozzle from the ram-air inlet duct.
(a) Make sure you do not bend the spray nozzles.

S 434-008

- (5) Put a cover on the duct opening.

TASK 21-53-05-404-009

3. Install the Water Spray Nozzle (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels

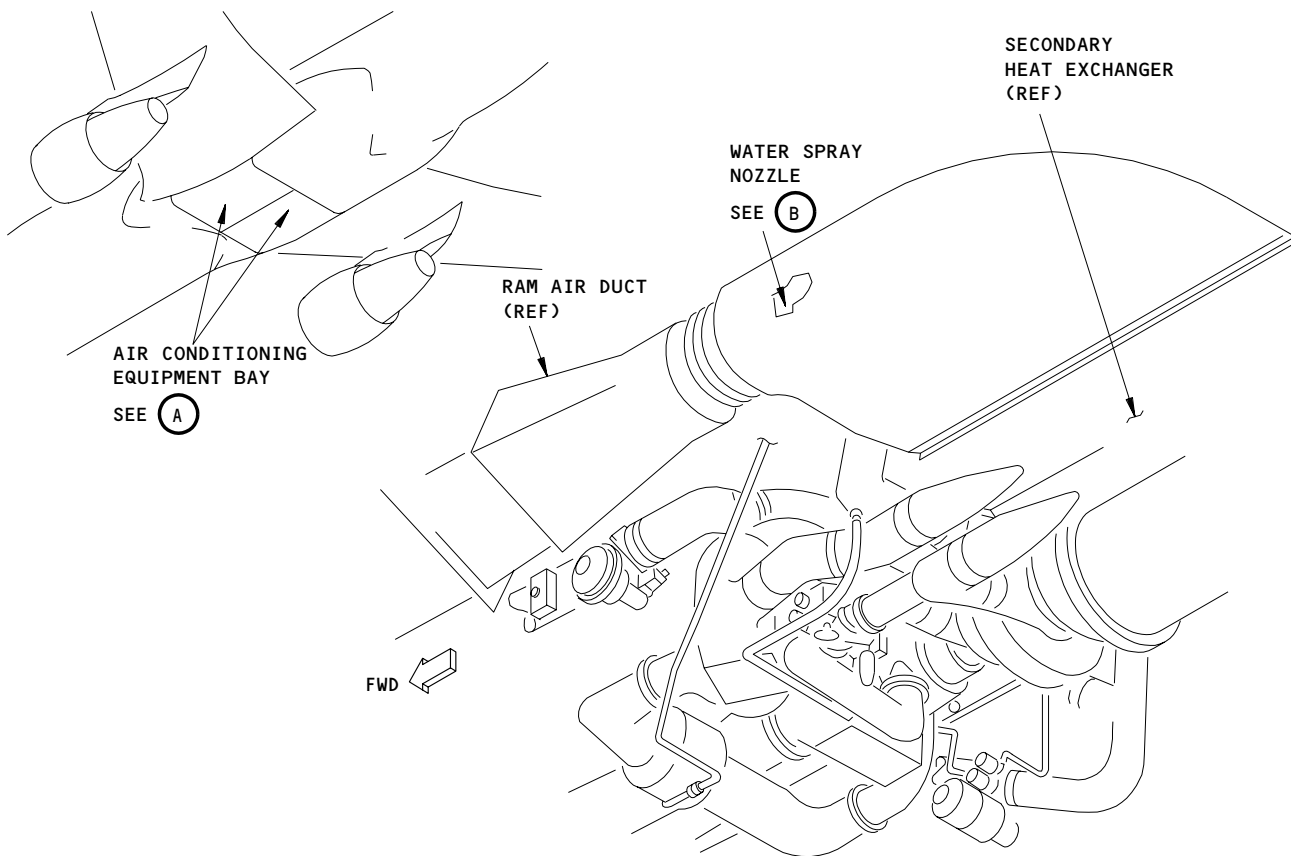
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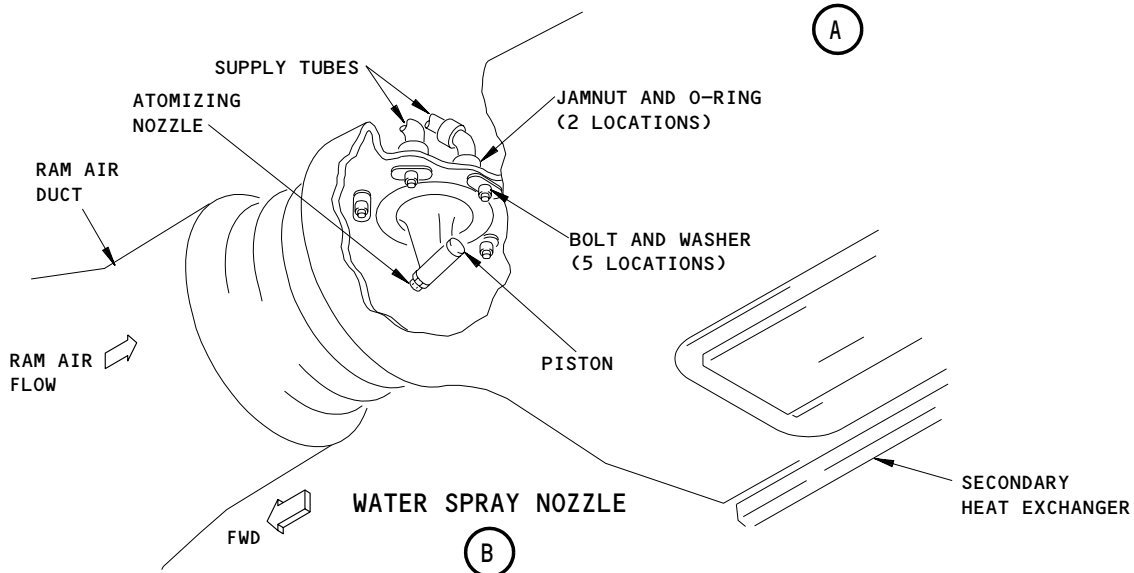
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AIR CONDITIONING EQUIPMENT BAY
(LEFT IS SHOWN, RIGHT IS OPPOSITE)



Water Spray Nozzle Installation
Figure 401

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B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bays
- (2) Access Panels
193NL/194LR ECS bay access doors

C. Install the Nozzle

S 034-010

- (1) Remove the cover from the duct opening.
 - (a) Make sure there is no unwanted material in the duct.

S 424-011

- (2) Carefully put the nozzle in its position in the ram-air inlet duct.
 - (a) Make sure you do not bend the spray nozzles.
 - (b) Make sure the nozzle points in the forward direction toward the ram air inlet door.

S 434-012

- (3) Install the bolts and washers to hold the nozzle in its position.

S 434-013

- (4) Put new O-rings in the supply tubes.

S 434-014

- (5) Use the jamnut to connect the supply tubes to the nozzle.

NOTE: The 3/8-inch tube is the air inlet. The 1/2-inch tube is the water inlet.

S 034-015

- (6) Remove the installation tags from the supply tubes.

D. Put the airplane back to its usual condition

S 414-016

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).

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- S 864-017
- (2) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.

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WATER SPRAY NOZZLE – INSPECTION/CHECK

1. General

- A. This procedure has instructions to do a check for blockage in the water spray system of each pack. Blockage in the water spray system can cause ice to occur in the Air Cycle Machine (ACM) which can damage the ACM.

TASK 21-53-05-206-001

2. Water Spray Nozzle Check (Fig. 601)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 36-00-00/201, Pneumatic – General

B. Access

- (1) Location Zones
135/136 Environmental control systems (ECS) bay
- (2) Access Panels
193NL/194LR ECS bay access doors

C. Spray Nozzle System Inspection

S 866-019

- (1) Supply electrical power (AMM 24-22-00/201).

S 866-002

- (2) Supply pneumatic power to the air conditioning packs using the APU or an equivalent pneumatic source (AMM 36-00-00/201).

S 866-003

- (3) Turn the L and R PACK selectors to the AUTO position.
 - (a) Make sure that the PACK OFF light goes off.

S 866-004

- (4) Put the TRIM AIR switch to the ON position.

S 866-005

- (5) Turn all the zone temperature selectors to the AUTO-C (fully cold) position.

S 016-002

- (6) Open the ECS bay doors 193NL and 194LR to get access to the water spray system (AMM 06-41-00/201).

S 016-006

- (7) Remove the access panel on the bottom of each ram air inlet duct adjacent to each secondary heat exchanger.

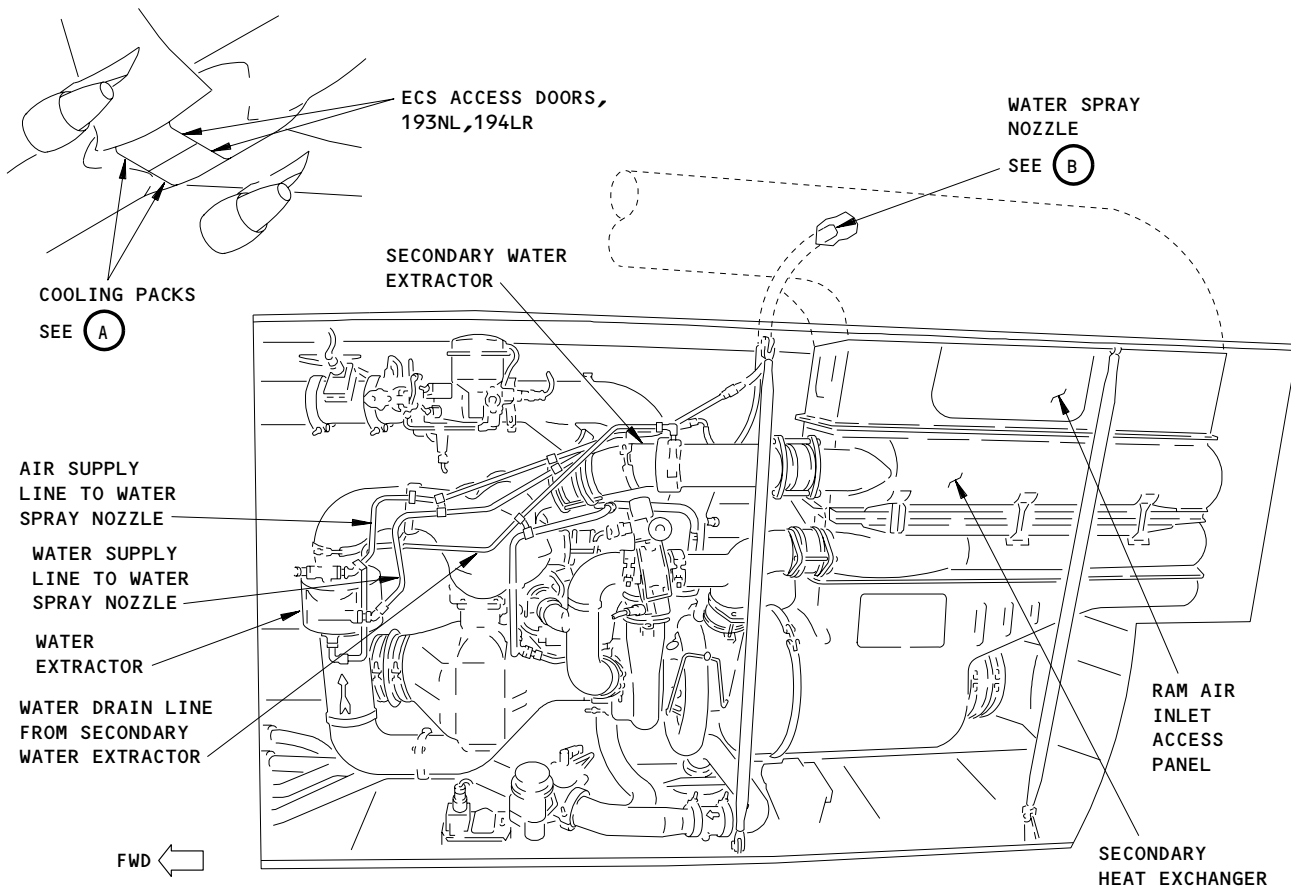
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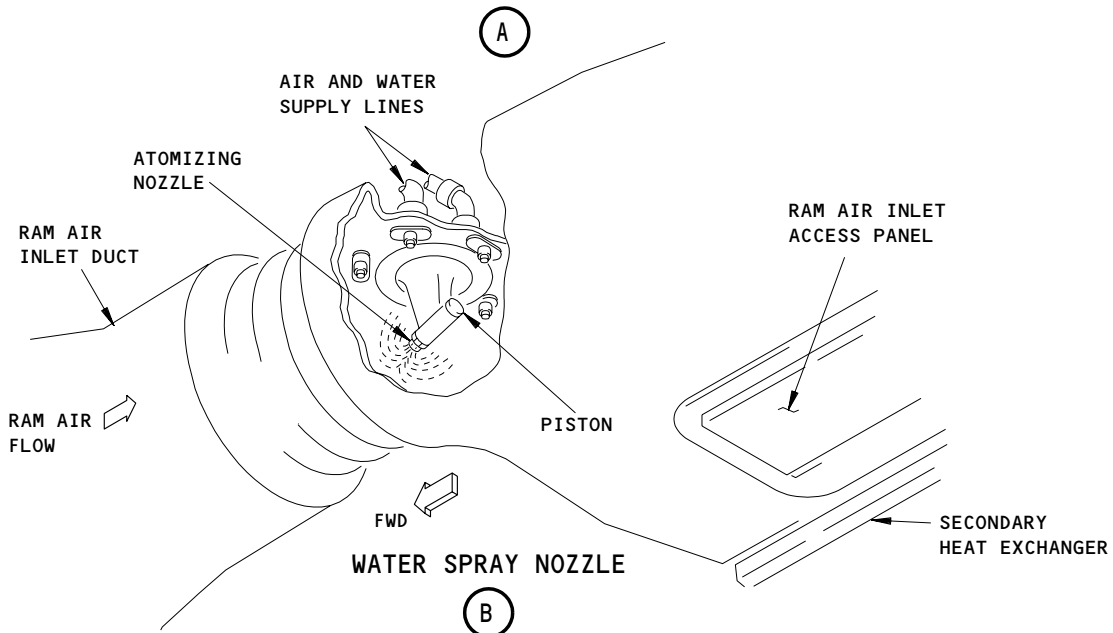
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**LEFT COOLING PACK
(RIGHT COOLING PACK IS EQUIVALENT)**



**Water Spray System Inspection
Figure 601**

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S 216-007

- (8) Use a flashlight and look at the water spray pattern from the water spray nozzle in each ram air inlet duct.

NOTE: The quantity of the water is a function of the air humidity and the pack air flow.

- (a) Make sure the water spray pattern from each water spray nozzle is approximately the same.
- (b) Make sure the water spray patterns are approximately circular and not a jet blast.
- (c) If the water spray patterns are not satisfactory, examine these parts for leakage or blockage:
 - 1) The water spray nozzle
 - 2) The air and water supply lines from the water extractor to the water spray nozzle
 - 3) The water extractor

S 866-008

- (9) Turn the L and R PACK selectors to the OFF position.

S 016-009

- (10) Remove the water drain line at the bottom of each water extractor that comes from the secondary water separator.

S 866-010

- (11) Turn the L and R PACK selectors to the AUTO position.

S 216-011

- (12) Feel for air or water to come out of the water drain line that you disconnected.

S 216-012

- (13) Feel for air or water to come out of the hole in the water extractor where you disconnected the water drain line.

S 216-013

- (14) If you did not feel air or water, examine these parts for leakage or blockage:
- (a) The water extractor
 - (b) The water drain line from the water extractor to the secondary water extractor
 - (c) The secondary water extractor

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D. Put the airplane back to its usual condition

S 866-014

- (1) Turn the L and R PACK selectors to the OFF position.

S 866-020

- (2) Put the TRIM AIR switch to the OFF position.

S 416-015

- (3) Install the access panels on the bottom of the ram air inlet ducts.

S 416-016

- (4) Close the ECS bay doors 193NL and 194LR (AMM 06-41-00/201).

S 866-017

- (5) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 866-018

- (6) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TEMPERATURE CONTROL CARD ASSEMBLY – REMOVAL/INSTALLATION

1. General

- A. This procedure has instructions to remove and install the temperature control card for each air cooling pack. The temperature control cards are installed in the electrical systems cardfile, P50.

TASK 21-53-06-004-001

2. Remove the Temperature Control Card Assembly (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 20-10-01/401, E/E Rack Mounted Components
- (3) 20-41-01/201, Electro-Static Sensitive Devices.

B. Access

- (1) Location Zone
118 Area outboard and above the NLG wheel well (Right)
- (2) Access Panels
119AL Main equipment center access door

C. Prepare for the Removal

S 864-002

- (1) Turn the applicable (L or R) PACK selector, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the pack is off.
 - (b) Put a DO-NOT-OPERATE tag on the selector.

S 864-004

- (2) To remove the left temperature control card, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11.
 - (a) 11N25, LEFT PACK STANDBY CONT
 - (b) 11N24, LEFT PACK STANDBY PWR

S 864-005

- (3) To remove the right temperature control card, open and attach a DO-NOT-CLOSE tag to these circuit breakers, on the overhead circuit breaker panel, P11.
 - (a) 11N16, RIGHT PACK STANDBY CONT
 - (b) 11N15, RIGHT PACK STANDBY PWR

S 014-006

- (4) Open the access door for the main equipment center, 119AL (Ref 06-41-00).

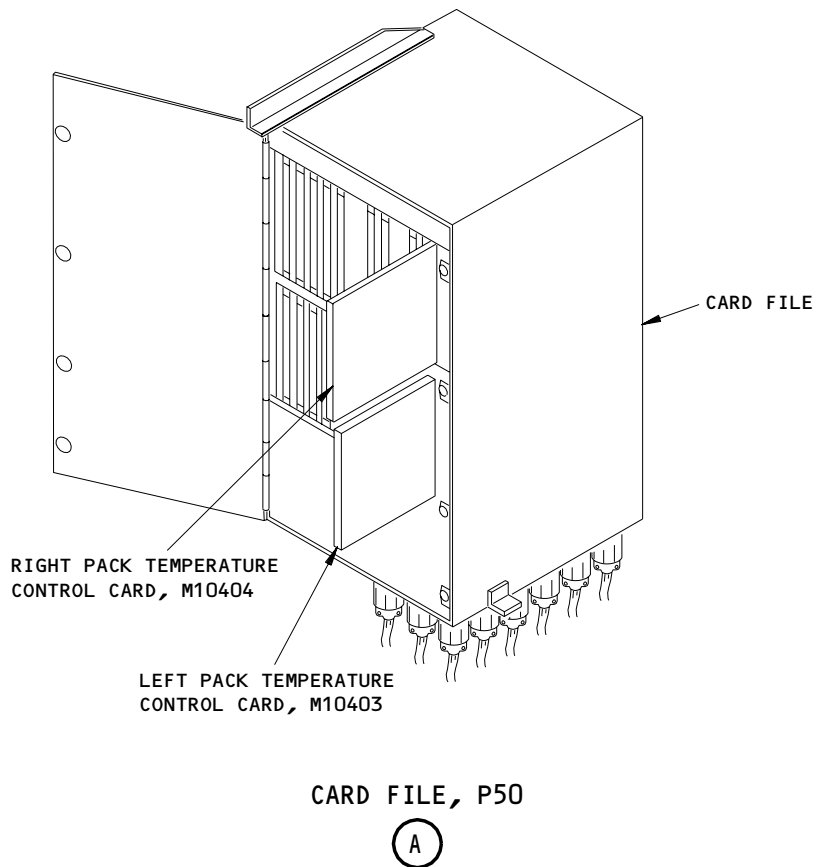
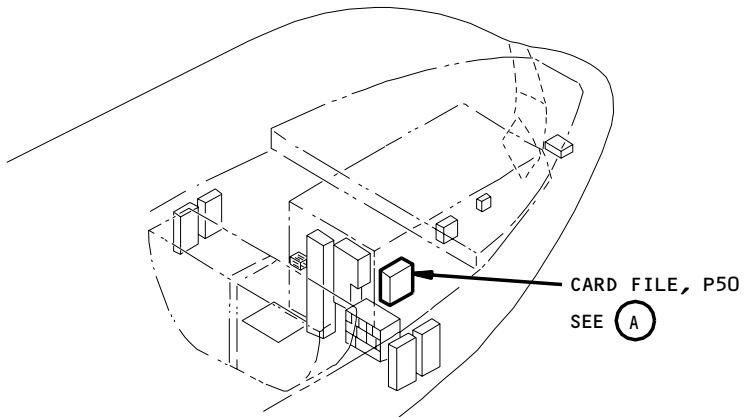
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Temperature Control Card Assembly
Figure 401

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D. Remove the Control Card

S 014-007

- (1) Open the door of the P50 cardfile.

S 914-008

CAUTION: DO NOT TOUCH THE CIRCUIT CARD BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CIRCUIT CARD.

- (2) Do the procedure for devices that are sensitive to electrostatic discharge (Ref 20-41-01).

S 024-009

- (3) Remove the applicable (left or right) temperature control card assembly, M10403 or M10404 (Ref 20-10-01).

S 414-010

- (4) Close the door of the P50 cardfile.

TASK 21-53-06-404-011

3. Install the Temperature Control Card Assembly (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 20-10-01/401, E/E Rack Mounted Components
- (3) 20-41-01/201, Electro-Static Sensitive Devices.
- (4) 24-22-00/201, Electric Power - Control

B. Access

- (1) Location Zone
118 Area outboard and above NLG wheel well (Right)
- (2) Access Panels
119AL Main equipment center access door

C. Install the Control Card

S 014-012

- (1) Open the door of the P50 cardfile.

S 914-013

CAUTION: DO NOT TOUCH THE CIRCUIT CARD BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CIRCUIT CARD.

- (2) Do the procedure for devices that are sensitive to electrostatic discharge (Ref 20-41-01).

S 424-014

- (3) Install the applicable (left or right) temperature control card assembly, M10403 or M10404 (Ref 20-10-01).

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- S 414-015
- (4) Close the door of the P50 cardfile.
- D. Do the installation test for the control card
- S 864-016
- (1) Supply electrical power (Ref 24-22-00).
- S 864-017
- (2) If the left temperature control card was installed, remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P11 panel:
- (a) 11N25, LEFT PACK STANDBY CONT
- (b) 11N24, LEFT PACK STANDBY PWR
- S 864-018
- (3) If the right temperature control card was installed, remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P11 panel:
- (a) 11N16, RIGHT PACK STANDBY CONT
- (b) 11N15, RIGHT PACK STANDBY PWR
- S 864-019
- (4) Remove the DO-NOT-OPERATE tag from the applicable (L or R) PACK selector, on the P5 panel.
- (a) Turn the selector to the STBY-W position.
- S 014-021
- (5) Open the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).
- S 214-022
- (6) Make sure the temperature control valve moves to the fully open position.

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S 864-023

- (7) Turn the applicable (L or R) PACK selector, on the P5 panel, to the OFF position.

S 214-025

- (8) Make sure the temperature control valve moves to the fully closed position.

E. Put the airplane back to its usual condition

S 414-026

- (1) Close the applicable (left or right) ECS access door, 193NL or 194LR (Ref 06-41-00).

S 414-028

- (2) Close the access door for the main equipment center, 119AL, (AMM 06-41-00/201).

S 864-027

- (3) Remove the electrical power, if it is not necessary, (AMM 24-22-00/201).

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RAM AIR DUCTS – REPAIRS

1. General

- A. This procedure has one task. The task is to repair non-structural damage on the ram air duct.
- B. This procedure is written for minor repairs with the following maximum damage:
 - (1) Cracks less than 8 inches long.
 - (2) Punctures through the fiberglass laminate less than 1.0 inch in diameter.
 - (3) For repairs with damage limits greater than specified in this procedure refer to Structural Repair Manual (SRM 51-70-06, SRM 51-70-07, SRM 51-70-08, Glass Fabric Reinforced Epoxy Laminates Repairs).

TASK 21-53-07-208-003

2. Ram Air Duct Repair (Fig. 801)

A. Consumable Materials

- (1) B00148 Cleaning Solvent – Methyl Ethyl Keytone (MEK) – ASTM D740
- (2) G00316 Fiberglass Cloth– BMS 9-3, Type: H, H2, or H3, Class: any
- (3) A000276 Adhesive – BMS 5-126, Type II
- (4) B00138 Abrasive Cloth, 400 grit
- (5) A00448 Adhesive Tape – 1 inch wide, No. 474 Vynil Plastic Tape, Minnesota Mining & Manufacturing Co.
- (6) G02396 Polyvinyl Chloride (PVC) Parting Film, Reynolds Metal Co.
- (7) G00033 Gause (Cheese Cloth) – BMS 5-15B, Class A (Woven)

B. Access

- (1) Location Zones
 - 135/136 Environmental Control Systems (ECS) bay
- (2) Access Panels
 - 193NL/194LR ECS bay access doors

C. Duct Repair Procedure

S 028-024

- (1) Remove the ram air duct that has the defect.

S 348-025

- (2) Drill the ends of the cracks with a number 30 drill to make sure the cracks do not become larger.

S 118-026

- (3) Do these steps to clean the damaged area and the area that is adjacent to the damage:

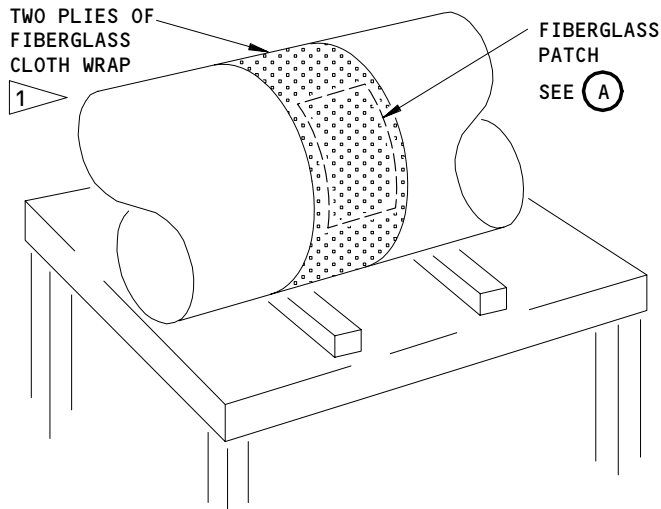
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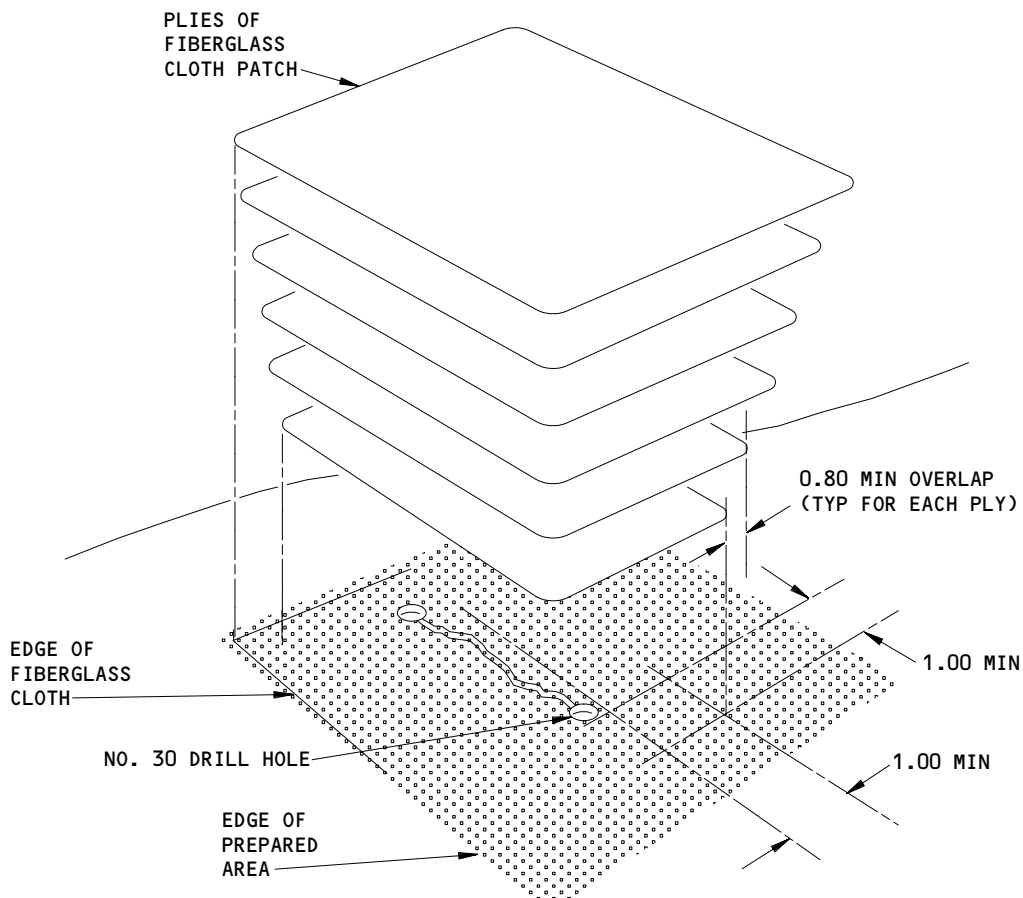
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FIBERGLASS DUCT REPAIR



1 THE TWO PLYS OF FIBERGLASS CLOTH ARE COMPLETELY WRAPPED AROUND THE DUCT AND COVER THE FIBERGLASS PATCH.

FIBERGLASS PATCH

(A)

Ram Air Ducts - Repair
Figure 801

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WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (a) Apply solvent, Series 91 (AMM 20-30-91/201) with the cheese cloth.
- (b) Remove the solvent with the cheese cloth before the solvent becomes a gas.

S 348-027

- (4) Do these steps to prepare the surface of the damaged area:
 - (a) Make the damaged area lightly rough with the abrasive cloth.
 - (b) Make the damaged area rough one inch more than the area to be repaired.
 - (c) Clean the rough area with the solvent , Series 91 (AMM 20-30-91/201) and cheese cloth.
 - (d) Remove the solvent with the cheese cloth before the solvent becomes a gas.

S 348-028

- (5) Do these steps to prepare the fiberglass cloth for the patch and wrap:
 - (a) Cut six pieces of fiberglass cloth with these dimensions:
 - 1) Cut the smallest piece of fiberglass cloth to so that the edge of the cloth is a minimum of 1-inch from the defect.
 - 2) Cut five more pieces and make sure each piece is 0.80 inch larger than the piece you cut before.
 - (b) Cut a piece of fiberglass cloth long enough to wrap completely around the duct and make an overlap of 0.80 inch on the six pieces under it.
 - (c) Cut one more piece of fiberglass cloth long enough to wrap completely around the duct and make an overlap of 0.80 inch on the largest piece under it.
 - (d) Prepare the adhesive BMS 5-126, Type II with the manufacturer's instructions.
 - (e) Soak the pieces of fiberglass cloth in the adhesive.

NOTE: The amount of adhesive necessary to soak the fiberglass cloth is approximately equal to the weight of the dry fiberglass cloth.

- (f) Put each of the pieces of the fiberglass cloth between two pieces of PVC parting film.

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S 348-004

- (6) Do these steps to install the fiberglass patch and wrap on the damaged duct:
- (a) Apply the BMS 5-126, Type II, adhesive on the repair area.
 - (b) Remove the parting film from one side of the smallest piece of the patch and put that side against the repair area.
 - (c) Use a squeegee on the parting film on the top of the patch and remove wrinkles and caught air.
 - (d) Remove the parting film from the first piece of the patch installed.
 - (e) Remove the parting film from one side of the next smallest piece of fiberglass cloth not installed.
 - (f) Put this piece of the patch against the repair area with a minimum of 0.80 inch of overlap.
 - (g) Use a squeegee on the parting film on the top of the repair area and remove wrinkles and caught air.
 - (h) Install the subsequent six pieces of fiberglass cloth, removing the parting film, as shown in Figure 801 and as specified in the steps before this step.

NOTE: Wind the last two pieces of fiberglass cloth completely around the ram air duct. Use adhesive tape to attach the last two plies of this wrap.

- (i) Install a piece of parting film on the top of the full patch to make sure you have an overlap of 0.50 inch on the edges of the patch.
- (j) Push the unwanted adhesive to the edges of the parting film to smoothly connect the edges of the patch to the contour of the repair surface.
- (k) Make sure that all loose threads of fiberglass cloth are in the adhesive.
- (l) Remove all unwanted adhesive that has been pushed out at the edges of the parting film.

S 348-005

- (7) Do these steps to let the fiberglass patch/wrap and damaged duct repair cure:
- (a) Let the patch cure for 12 hours at 70 degrees F. or 6 hours at 130 degrees F.

NOTE: The duct is serviceable when the patch hard.

- (b) Remove the parting film from the patch after it cures at the specified conditions.
- (c) Make sure that the patch is free from pits, blisters, areas without adhesive, and unwanted adhesive resin material.

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EQUIPMENT COOLING SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

A. Equipment Cooling System

- (1) Two electrical/electronic (E/E) equipment cooling systems provide cooling air to the E/E equipment. The forward system cools the forward racks (E1-E5), power shields, miscellaneous E/E equipment (electrical system card file, warning electronics unit, power panels, weather radars) and the flight deck instruments and panels. The aft system draws cool air through the aft equipment rack (E6) (Ref 21-26-00). Cooling air ducting is equipped with water traps and drains to clear the system of any water that may accumulate.
- (2) Controls on the pilot's overhead panel P5 operate the equipment cooling system. The system operates in three distinct cooling modes. The AUTO mode automatically regulates the system depending upon ambient air temperature, air/ground mode, and engine operation. The STBY mode, a back up mode to the AUTO mode, provides a secondary circuit for system control. The OVRD mode configures the system to vent smoke overboard.
- (3) One supply fan and one exhaust fan induce airflow into the system. The number of operating fans depends upon the cooling mode selected. A conical screen upstream of each fan prevents foreign materials from entering the fan.
- (4) Amber lights, on the P5 panel, indicate conditions of system overheat (OVHT) and smoke detection (SMOKE). A VALVE light indicates the failure of the electrically actuated valves to respond to commands. A NO COOLING light indicates that lack of effective cooling exists in the system. The Engine Indicating and Crew Alerting System (EICAS)(Ref 31-41-00) provides warning, caution, advisory, status, and maintenance messages relating to system operation and malfunctions.

B. Equipment Center Cooling

- (1) The forward equipment cooling system provides cooling air to the main and mid equipment center. The main equipment center cooling air cools the E1, E2, E3, E8, racks and the P31, P32, P33, P34, P36, P37, P50, P51, and P54 panels. The mid equipment center cooling air cools the E5 rack.
- (2) Equipment cooling air cools the weather radar in the forward equipment center.
- (3) Equipment cooling air cools the P1, P2, P3, P5, P6, P8, P11, P26, and P54 panels in the flight compartment.
- (4) Cooling air is provided to electronic boxes mounted in the equipment racks through holes in metering plates located directly under each unit. Some of the holes in the metering plates are blocked with rubber plugs depending on the cooling air requirements of the unit being cooled. A decal is affixed to the equipment racks showing which holes are to remain open.

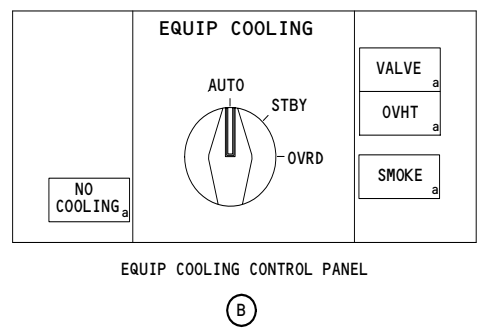
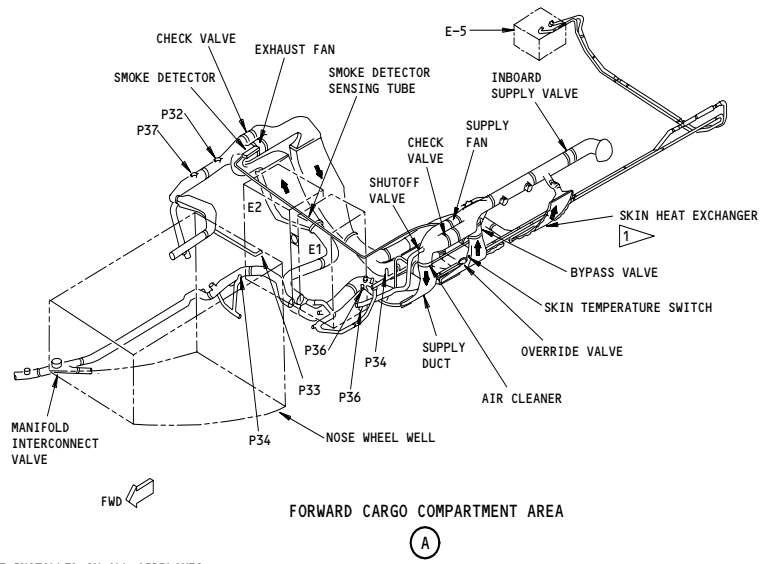
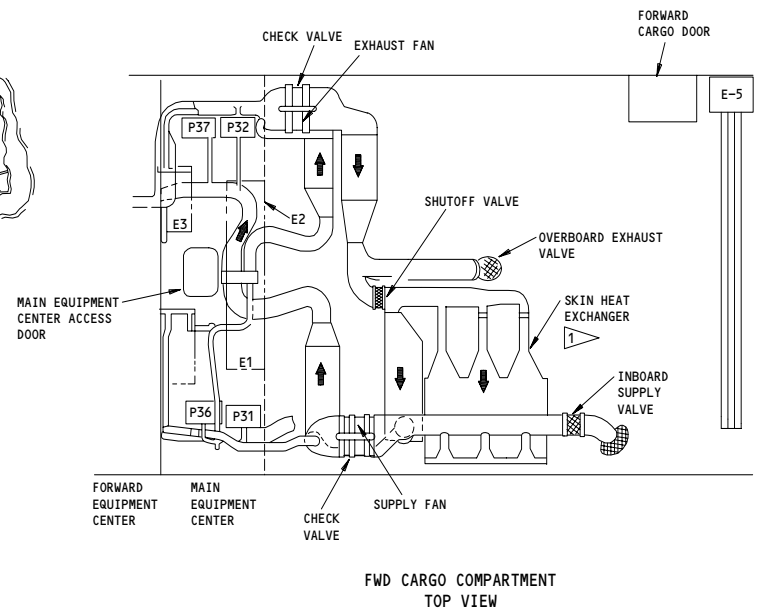
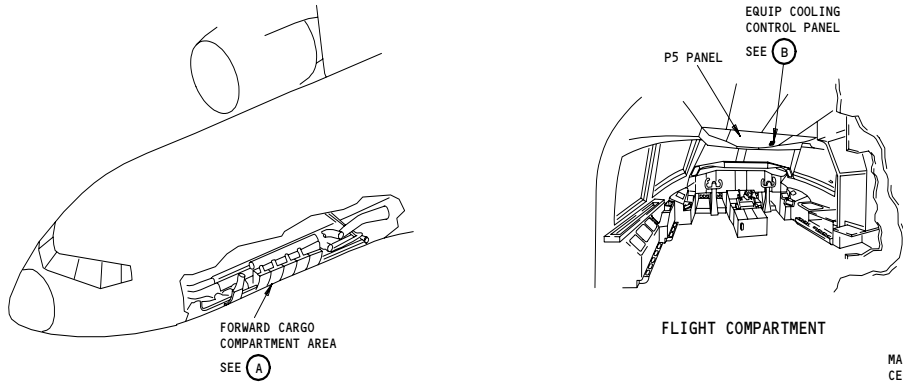
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Equipment Cooling System
Figure 1

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- (5) In the aft system, the lavatory and galley ventilation fans (Ref 21-26-00) draw cargo compartment air through the aft equipment center (E6 rack).

2. Component Details

A. Inboard Valves (Fig. 2)

(1) Description

- (a) The forward equipment cooling system uses two inboard valves, all of which are nine-inch-diameter electric-shutoff valves. The inboard supply valve is installed behind the forward cargo compartment left sidewall, approximately 13 feet (4 meters) aft of forward endwall. The shutoff valve is installed below the forward cargo compartment floor, 6 feet (2 meters) aft of forward endwall and 1 foot (0.3 meters) left of center line. Both valves are identical. Each valve consists of an actuator mounted on a valve body.
- (b) The actuator contains an electrical connector, filter, two limit switches, motor, visual position indicator, and a manual override.
- 1) The filter prevents other electronic equipment from receiving motor induced interference.
- 2) The split phase induction motor drives the output shaft in either direction. A reduction gear connects the output shaft to the primary worm gear shaft. Coupled through a slip clutch to the secondary worm gear shaft, the primary worm gear shaft drives a sector gear which is pinned to the output shaft. Two cams for tripping the full open and full close limit switches mount on the output shaft.
- 3) The visual position indicator consists of a pointer attached to the end of the output shaft. The manual override consists of a knob pinned to the secondary worm gear shaft.
- (c) The valve flow section consists of a valve housing, butterfly plate, and a butterfly shaft. Within the valve housing, the butterfly plate bolts to the shaft.

(2) Function

- (a) With 115 vac, 400 Hz, single phase power applied to the open side of the valve, the motor drives the reduction gear which drives the primary worm gear shaft. The secondary worm gear shaft drives the sector gear and the output shaft. The output shaft rotates the butterfly plate until the cam actuates the full open limit switch. This removes power from the actuator.
- (b) The slip clutch holds the butterfly plate in place if a power loss to the actuator occurs. Applying power to the open or close side of the valve drives the butterfly plate accordingly.

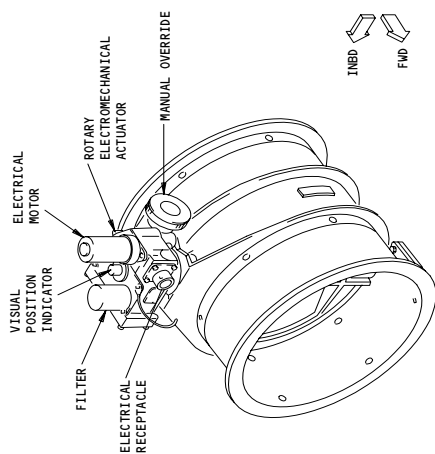
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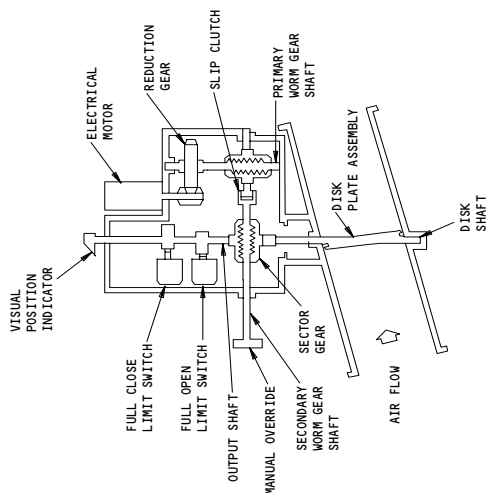
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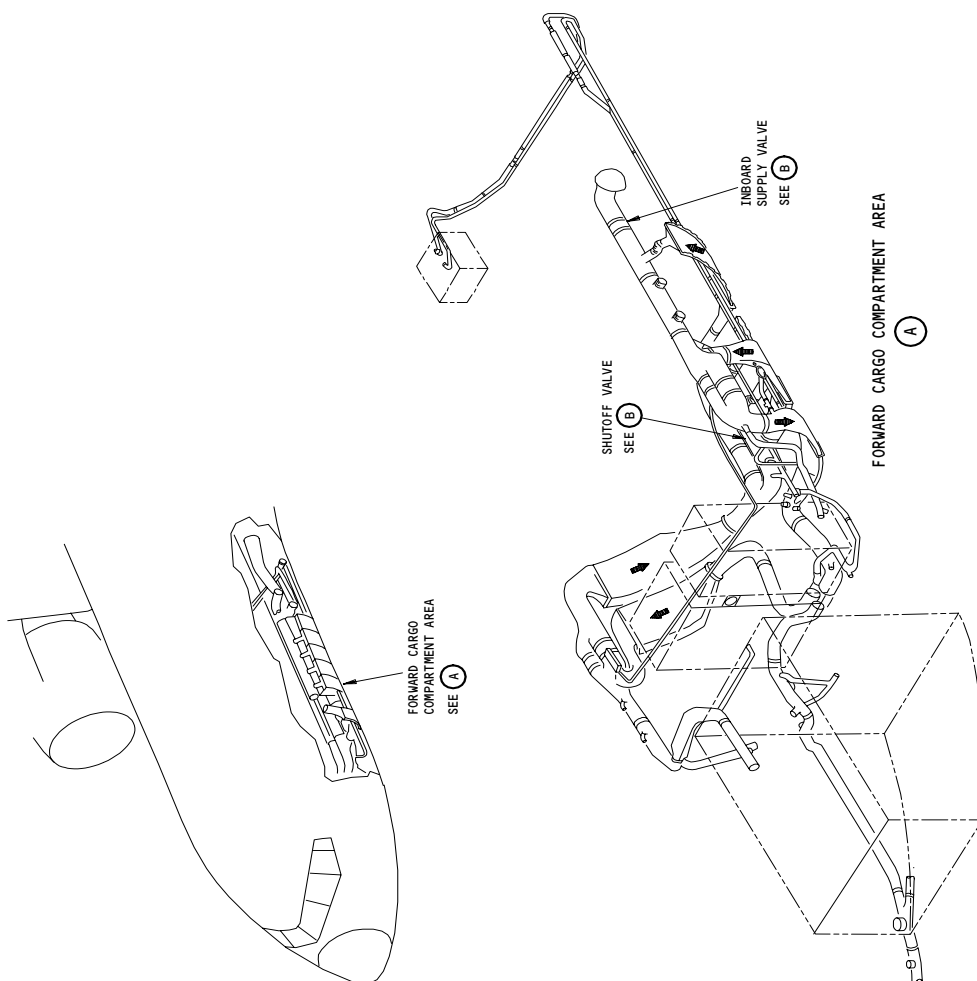
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INBOARD SUPPLY VALVE AND SHUTOFF VALVE (B)



VALVE - SCHEMATIC



Inboard Supply Valve and Shutoff Valve
Figure 2

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- (c) Rotating the manual override knob clockwise opens the valve. Rotating the manual override knob counterclockwise closes the valve.

B. Overboard Exhaust Valve (Fig. 3)

(1) Description

- (a) The equipment cooling system uses a motor actuated flapper valve as an overboard exhaust valve (located beneath the forward cargo compartment floor 12 feet [4 meters] aft of the forward endwall). The valve consists of a flapper operated by an electrical actuator. A manual override socket allows manual flapper positioning. When open, the flapper retracts inside the airplane skin. The flapper closes flush with the airplane skin.

(2) Function

- (a) The actuator, attached to a clutch, opens or closes the valve. Two adjustable stops on the clutch permit drive train disengagement if a failure of the actuator power interruption switches occurs. The clutch also allows manual valve positioning. Inserting a 3/8 in. drive wrench into the manual override socket and pushing the torque tube in about 3/8 of an inch, engages the drive train. The flapper valve moves to the opposite position by rotating the drive wrench about 300°. When closing the valve, the linkage must be driven past the point where resistance is first felt, and on until the stop is reached, thus locking the linkage in the closed position. The adjustable stops also prevent flapper over-travel.
- (b) Limit switches provide travel limit control and position indication.
- (c) An over-center linkage system on the flapper provides positive mechanical locking in the closed position. The actuator first unlocks the over-center linkage when opening the valve. Conversely, valve internal pressure and the over-center linkage combine to hold the flapper closed.
- (d) The actuator drives the short, upper link on the flapper. The actuator rotates about 100°, turning the upper link and pulling the lower link up. The flapper then opens to about 40°. When the actuator linkage closes the flapper, the flapper bottoms on the valve body and the linkage assumes the over-center position. The close limit switch then interrupts power to the actuator.

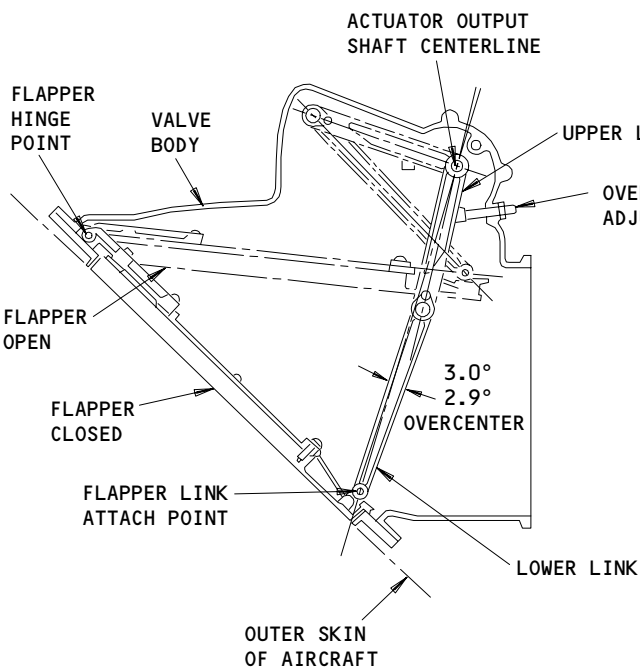
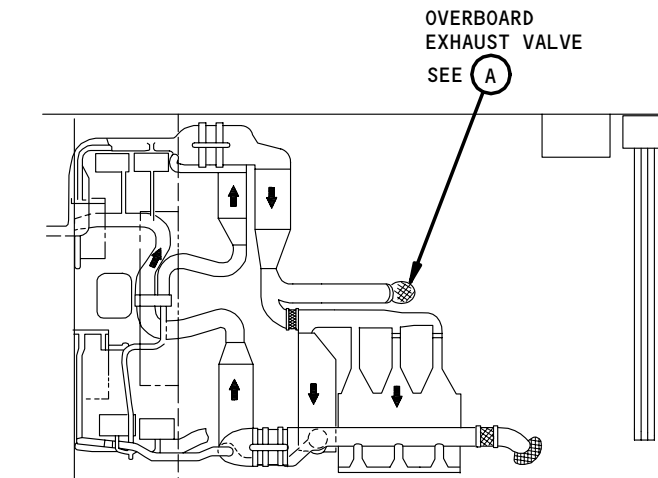
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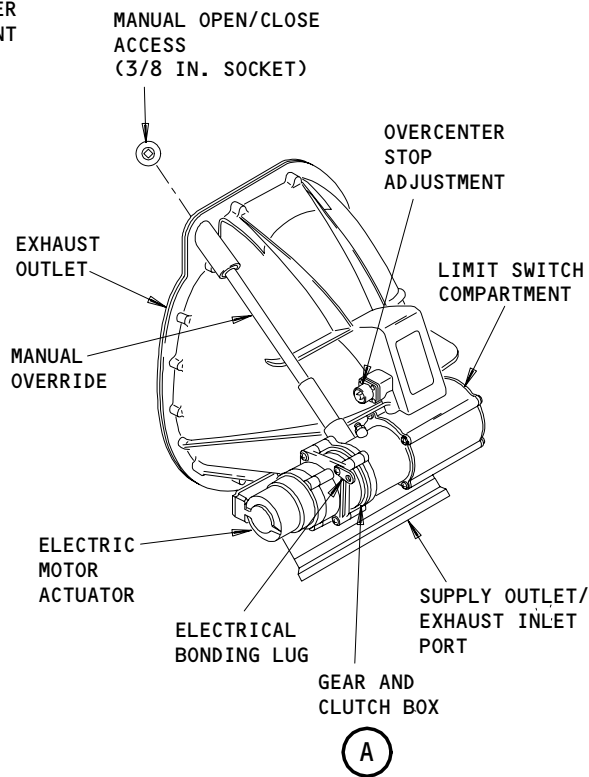
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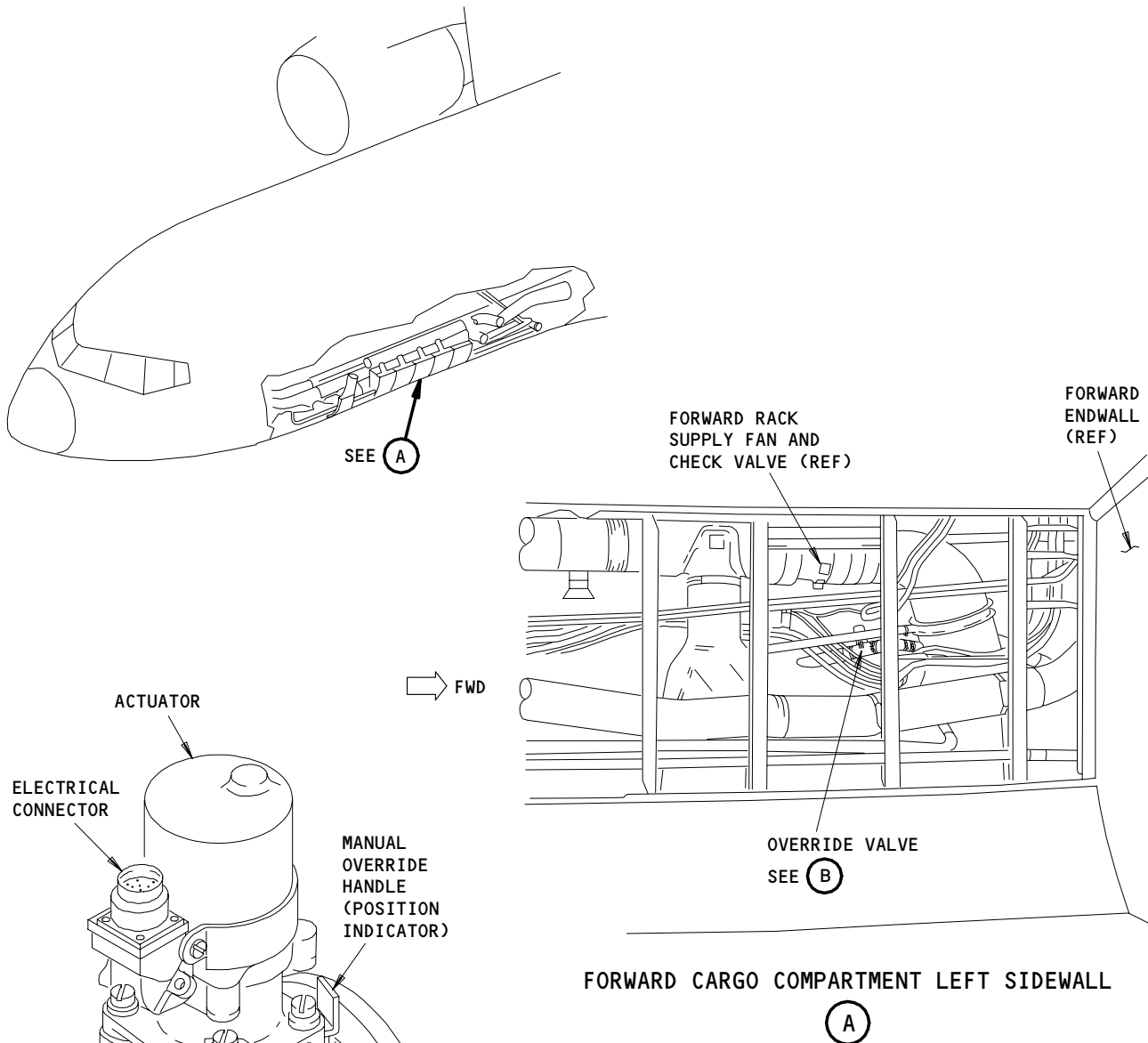
VALVE LINKAGE-OPEN AND CLOSED POSITIONS



Overboard Exhaust Valve
Figure 3

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Override Valve
Figure 4

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C. Override Valve (Fig. 4)

(1) Description

(a) The override valve is located behind the forward cargo compartment left sidewall about 3 feet (1 meter) aft of the forward endwall. The valve consists of an actuator mounted on a valve body. The actuator output shaft controls the butterfly plate. When the plate is rotated parallel to the air stream, the valve is open. The valve is closed when the plate is perpendicular to the air stream. A manual override also functions as a position indicator.

(2) Function

- (a) With 28 vdc power applied to either the open or close side (windings) of the actuator motor, the valve plate rotates accordingly.
- (b) Moving the manual override handle to the open or close position on the actuator positions the plate accordingly.

D. Manifold Interconnect Valve (Fig. 5)

(1) Description

- (a) The manifold interconnect valve is located forward of the forward E/E racks along the right side of the nose gear wheel well. The valve consists of a two position, 3-way flapper operated by an electrical actuator with a split phase induction motor. The actuator has a manual override lever which also acts as a position indicator.
- (b) The valve contains two inlet ports, A and C, and one outlet port, B. The flapper controls which inlet port is open to the outlet port.

(2) Function

- (a) The valve operates on 115 vac power. Through a clutch, the actuator drives the flapper. The clutch allows manual positioning of the valve and prevents the actuator from driving a stalled flapper. Actuator power is interrupted when the flapper reaches its commanded position. At the same time adjustable limit screws disengage the clutch. The manual override attaches to the clutch release.
- (b) An over-center linkage system provides positive mechanical locking in the commanded positions. When the valve operates, the first force from the actuator (or manual override) unlocks the linkage before flapper motion begins.
- (c) The flapper lever and bearing receive the actuator output. The actuator shaft rotates about 95°, turning the lever and bearing which rotate the lower lever. This causes the flapper to rotate about 120°. When the actuator linkage moves the flapper, the flapper seats against the selected inlet port and the over-center linkage locks in position. The close limit switch then interrupts power to the actuator.

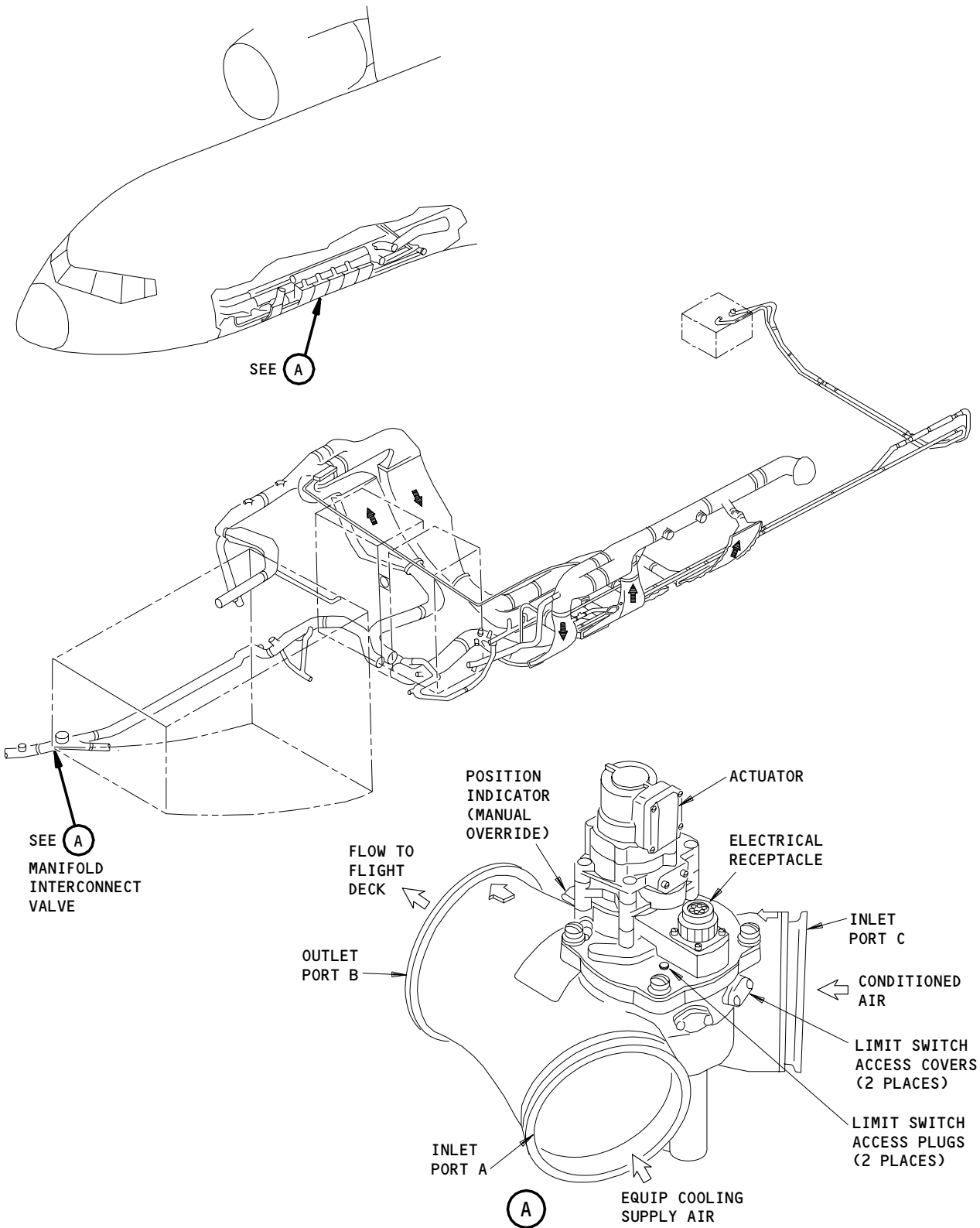
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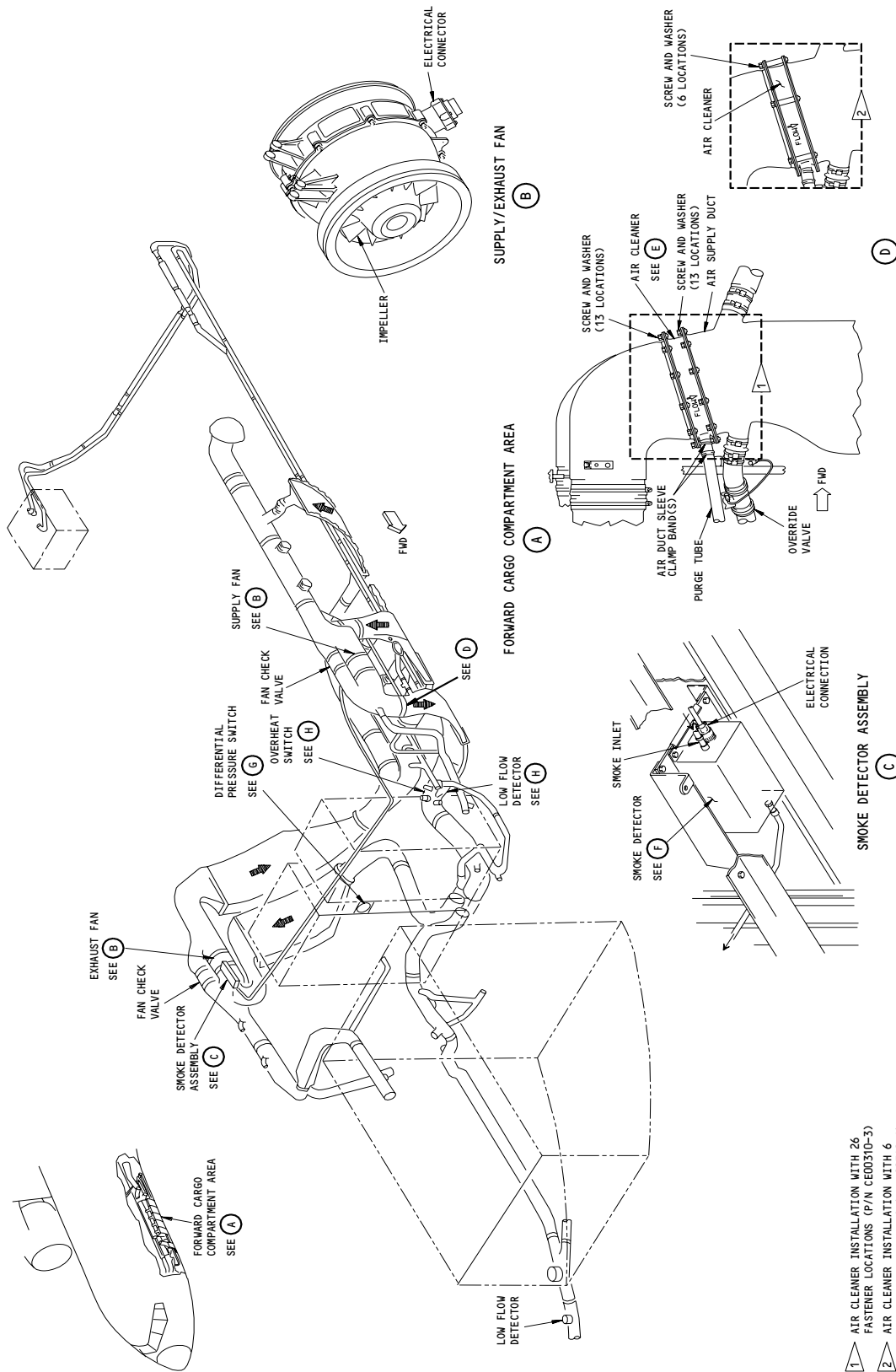
Manifold Interconnect Valve
Figure 5

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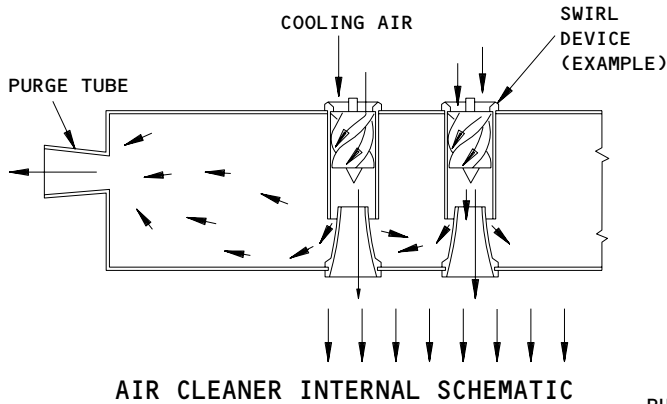
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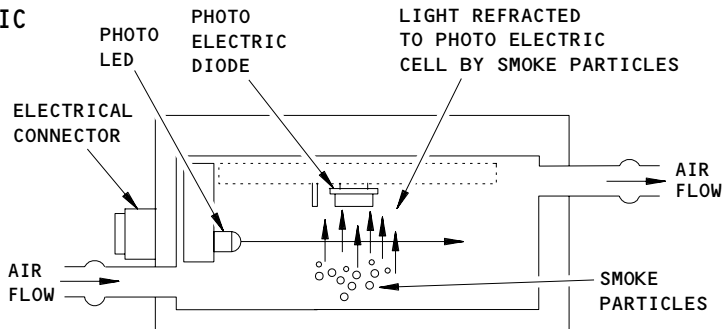
1 AIR CLEANER INSTALLATION WITH 26 FASTENER LOCATIONS (P/N CE00310-3)
2 AIR CLEANER INSTALLATION WITH 6 FASTENER LOCATIONS (P/N CE00310-4)
Equipment Cooling System Components
Figure 6 (Sheet 1)

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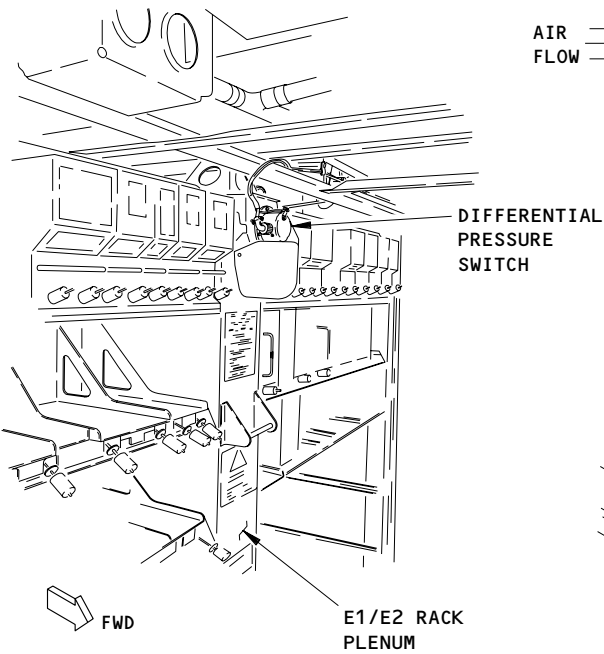
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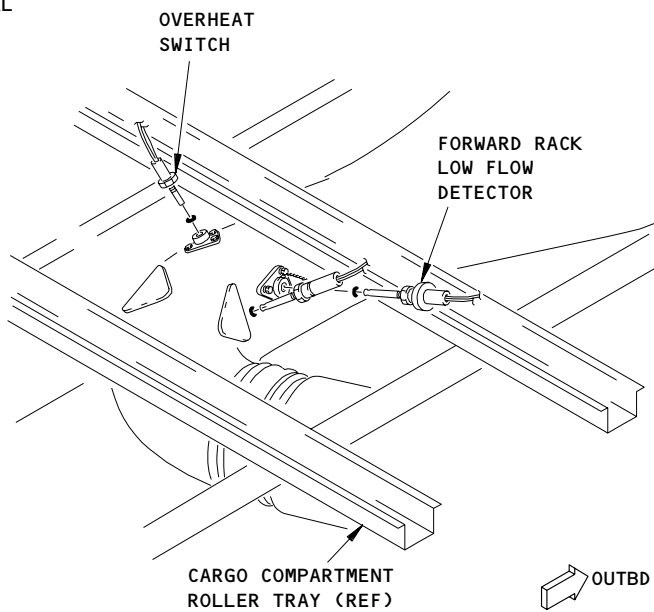
(E)



(F)



(G)



(H)

Equipment Cooling System Components
Figure 6 (Sheet 2)

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E. Forward Rack Supply and Exhaust Fans (Fig. 6)

(1) Description

(a) The forward cargo compartment contains two identical fans, a supply fan (left side just below the passenger cabin floor) and an exhaust fan (right side just below the passenger cabin floor). The fan is a single stage mixed flow type with an integral squirrel cage induction motor.

(2) Function

(a) With 115 vac, 400 Hz, three phase electrical power supplied, the fan operates at about 11,400 rpm. Three thermal switches serve as thermal protectors. The switches are connected in series, and located in the fan stator windings. If the temperature of a winding reaches 400°F (204°C), the associated thermal switch opens the fan circuit, interrupting power to the fan. When the temperature decreases to 340°F (171°C), the thermal switch resets.

F. Fan Check Valves

(1) Description

(a) The valve contains two semi-circular check valve flappers hinged about a pin. The pin fits through the center of the valve body, normal to the body axis. The flappers, hinge pin, torsion spring, and a flapper stop pin attach to the valve body.

(2) Function

(a) The check valve is in parallel with the fan. Airflow through a fan that is not running will cause the fan to windmill, which shortens fan life. When the fan is off, the check valve provides an airflow path of least resistance.

(b) Reverse airflow aids the torsion spring in closing the flappers, thus preventing reverse airflow through the check valve.

(c) Airflow in the direction of the arrow on the airflow indicator plate overcomes the torsion spring and drives the flappers open until the flappers contact the stop pin.

G. Air Cleaner (Fig. 6)

(1) The air cleaner is located just downstream of the forward rack supply fan. It is a centrifugal swirl device, using inertia to separate particulate matter from the E/E cooling air. Foreign material suspended in the airflow is thrown outward and exhausted via a purge duct to the forward cargo compartment sidewall area.

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H. Equipment Cooling Low Flow Detectors

- (1) Two low flow detectors, a forward rack detector (located in the input duct to the E1/E2 rack) and a flight deck detector (located in the flight deck supply duct just forward of the manifold interconnect valve) consist of a probe-like element with a self-heating thermistor. Airflow through the duct cools the heated detector probe. Low airflow in the duct cannot sufficiently cool the heated probe and indicates inadequate cooling.
- (2) The low flow detectors contain a test circuit. When a ground signal is provided to the test terminal, a switch within the detector closes to provide an alternate means of activating the low flow alarm output.

I. Equipment Cooling Smoke Detector (Fig. 6)

- (1) The smoke detector mounts near the ceiling and on the right side of the forward cargo compartment, just forward of the forward rack exhaust fan. The smoke detector operates on an optical principle and consists of a photodiode and an LED light-source contained in a light-tight housing with two electronic printed circuit boards and a mounting bracket. An air inlet and outlet tube protrudes from two sides of the housing which permit connection to the airplane's smoke sampling tubes.
- (2) A beam of light is generated by the LED at one end of the housing which gets aimed onto a non-reflective surface at the opposite end of the housing. A photodiode is mounted perpendicular and parallel to the beam of light so that little or no light is detected by the photodiode when no smoke particles are inside of the housing. Clean air without any smoke particles creates little or no internal reflection of the light beam onto the photodiode. In clean air, the photodiode has a high resistive value and the photodiode current is at a minimum. As smoke enters the housing, a portion of the beam of light gets reflected onto the photodiode. When smoke is present, the photodiode has a low resistive value and the photodiode current increases proportionally to the amount of smoke that gets reflected onto the photodiode. Amplifiers increase the photodiode current to a more detectable voltage level which when exceeded signals a relay driver to energize an output relay to provide a ground signal for smoke warning annunciation (SMOKE light on the Equipment Cooling control panel comes on and EICAS advisory message FWD EQPT SMOKE shows).

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- (3) The smoke detector has a remotely-operated self-test circuit which operates when the EQUIP COOL test switch on the P61 right side miscellaneous equipment panel is selected. The self-test circuitry checks that the LED light-source is not burned out and that the smoke detector has a minimum sensitivity (background voltage) due to either degradation of the light-source or blockage of the light beam path. The self-test passes if the smoke warning annunciations come on when the EQUIP COOL test switch (P61) is selected. The self-test fails if the smoke warning annunciations do not come on when the EQUIP COOL test switch is selected to indicate a problem with the smoke detector.
- J. Differential Pressure Switch
- (1) The differential pressure switch is located on the forward side of the E1/E2 rack plenum. The pressure switch has two pressure sense tubes. One tube is open to ambient, the other is tied into the equipment cooling air duct. When airflow is present, a differential pressure exists between the two sense tubes. When the pressure difference exceeds 1.5 in. water, a pressure plate moves to actuate the electrical switch element. When the pressure difference decreases below 1.5 in. water, the pressure plate returns to its original position and the electrical switch element relaxes.
- K. Equipment Cooling Skin Temperature Switch
- (1) The skin temperature switch mounts on the forward cargo compartment left side skin near the override valve (smoke clearance). The skin temperature switch measures skin ambient temperature and trips at 45°F (7°C).
- L. Overheat Switch
- (1) The overheat switch mounts on the main E/E cooling duct downstream of the forward rack supply fans. The overheat switch closes when the duct temperature reaches 140°F (60°C) and opens again when the temperature decreases below 130°F (54°C).
- M. Fan Control Card
- (1) The P50 card file in the E/E equipment bay houses three ECS fan control cards (L, C, and R). The L control card contains the control logic necessary to operate and control the supply fan. The C control card contains the control logic to operate and control the exhaust fan. The R control card contains the control logic to operate and control the aft equipment/ lavatory/galley ventilation fan (Ref 21-26-00). All three control cards are printed circuit cards.

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- N. Equipment Cooling Indication Card
 - (1) The P50 card file in the E/E equipment bay houses the equipment cooling indication card. The printed circuit card contains logic for providing indications for equipment cooling system malfunctions.
- O. Fan Current Sensors
 - (1) One forward rack supply fan current sensor and one exhaust fan current sensor check for current flow to the supply fan and exhaust fan, respectively. The P37 miscellaneous electrical equipment panel houses the forward rack exhaust fan current sensor. The P36 miscellaneous electrical equipment panel houses the forward rack supply fan No. 1 current sensor.
- P. Equipment Cooling Airflow Monitor
 - (1) Nine sense tubes transmit pressure in the flight deck, main E/E bay and mid equipment center equipment cooling air ducting. The sense tubes connect to a monitor mounted on the P61 panel. The monitor has nine caged flow balls which indicate sufficient airflow in each of the monitored ducts.

3. Operation

A. Functional Description

- (1) The equipment cooling system is controlled by a mode selector located on the pilot's overhead panel P5. The three modes of equipment cooling are AUTO, STBY, and OVRD. In all modes of operation, the system is continually monitored by two low flow detectors and a smoke detector for low flow and smoke conditions.
- (2) Equipment Cooling Low Flow Detection (Fig. 7)
 - (a) The equipment cooling low flow detectors and overheat switch provide low airflow (inadequate cooling) warning. The indication circuit contains a 30 second time delay to eliminate spurious low flow/overheat indication.
 - (b) If a low flow detector (TS104 or TS163) senses a low flow condition or the overheat switch (S41) senses an overheat condition, an "alarm" signal inputs into the equipment cooling indication card (M867). After 30 seconds, the indication card sends a ground signal through the relaxed contacts of the Equip Cool OVHT Indication Relay (K699) (relaxed only when the mode selector is not in STBY) to illuminate the OVHT light on the P5 panel and cause EICAS to display the advisory message FWD EQPT OVHT. If the mode selector is in STBY, the Equip Cool OVHT Time Delay Relay (K700) energizes after 5 minutes to provide a secondary path for the overheat indications.

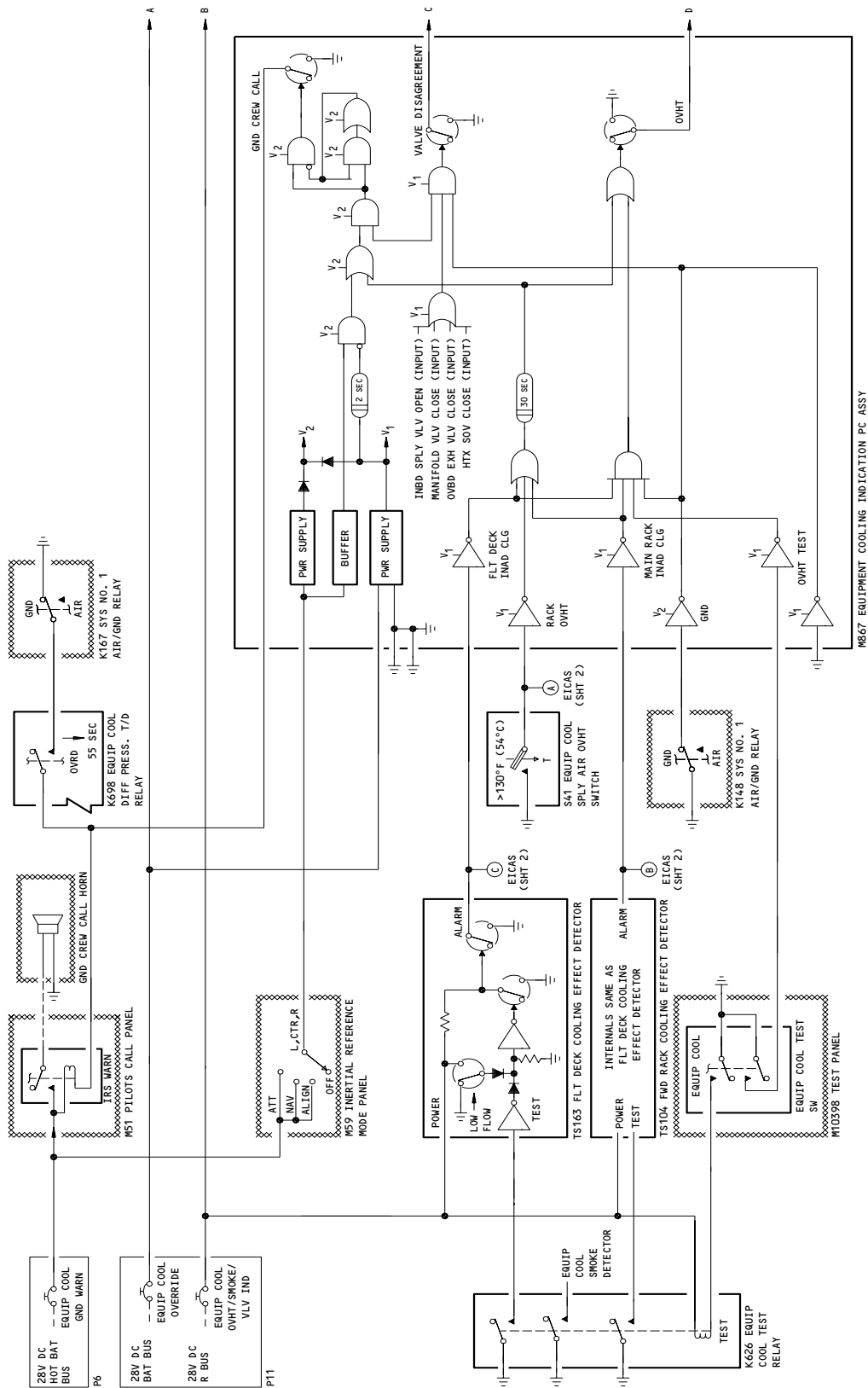
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Equipment Cooling Control and Indication Schematic
Figure 7 (Sheet 1)

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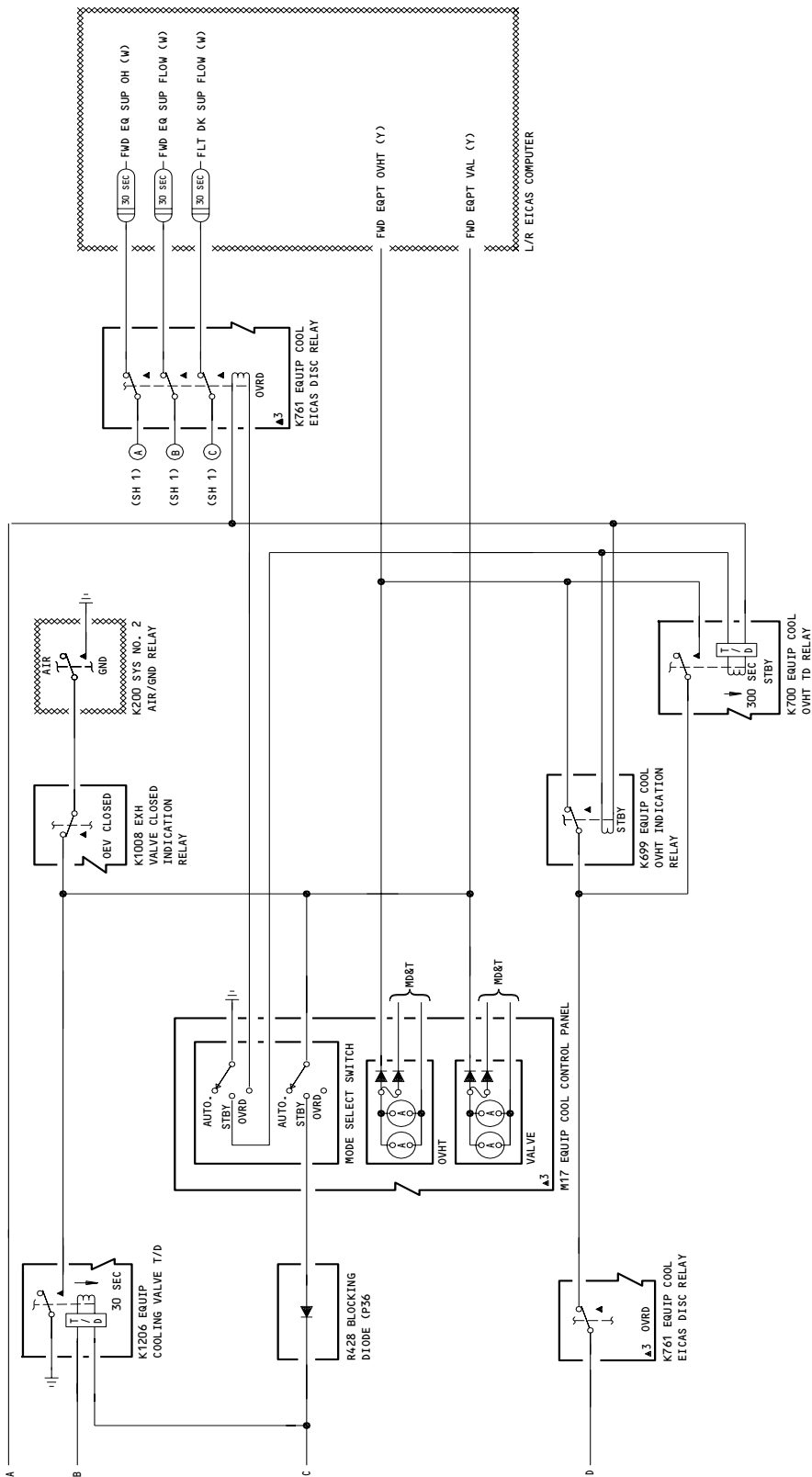
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Equipment Cooling Control and Indication Schematic
Figure 7 (Sheet 2)

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MAINTENANCE MANUAL

- (c) If a low flow detector (TS104 or TS163) senses a low flow condition or an overheat switch (S41) senses an overheat condition, an "alarm" signal is input into the equipment cooling indication card (M867). After 30 seconds, the indication card sends a ground signal through the relaxed contacts of the Equip Cool OVHT Indication Relay (K699) (relaxed only when the mode selector is not in STBY) to illuminate the OVHT light on the P5 panel and cause EICAS to display the advisory message FWD EQPT OVHT. If the mode selector is in STBY, the Equip Cool OVHT Time Delay Relay (K700) energizes after 5 minutes to provide a secondary path for the overheat indications.
 - (d) If the Forward Rack Low Flow Detector (TS104) senses a low flow condition for at least 30 seconds, the EICAS maintenance message FWD EQ SUP FLOW is stored in EICAS memory.
 - (e) If the Flight Deck Low Flow Detector (TS163) senses a low flow condition for at least 30 seconds, the EICAS maintenance message FLT DK SUP FLOW is stored in EICAS memory.
 - (f) If the Overheat Switch (S41) senses an overheat condition for at least 30 seconds, the EICAS maintenance message FWD EQ SUP OH is stored in EICAS memory.
 - (g) If the overheat switch (S41) senses an overheat condition for at least 30 seconds, the EICAS maintenance message FWD EQ SUP OH is stored in EICAS memory.
 - (h) If the airplane is on the ground when a low flow detector or overheat switch senses a low flow condition, the indication card sends a ground signal to sound the ground crew call warning chime in the nose gear wheel well after 30 seconds.
- (3) Equipment Cooling Smoke Detection (Fig. 8)
- (a) When the equipment cooling smoke detector (TS164) senses smoke it provides a ground for smoke indications. The detector ground causes the SMOKE light on the P5 panel to illuminate and the EICAS advisory message FWD EQPT SMOKE to be displayed.
- (4) AUTO Mode
- (a) Operation in the AUTO mode requires that the EQUIP COOLING mode selector on the pilot's overhead P5 panel is positioned to AUTO. The exact configuration of the equipment cooling system depends upon inputs from air/ground relays, engine running signals, and ambient air temperature.

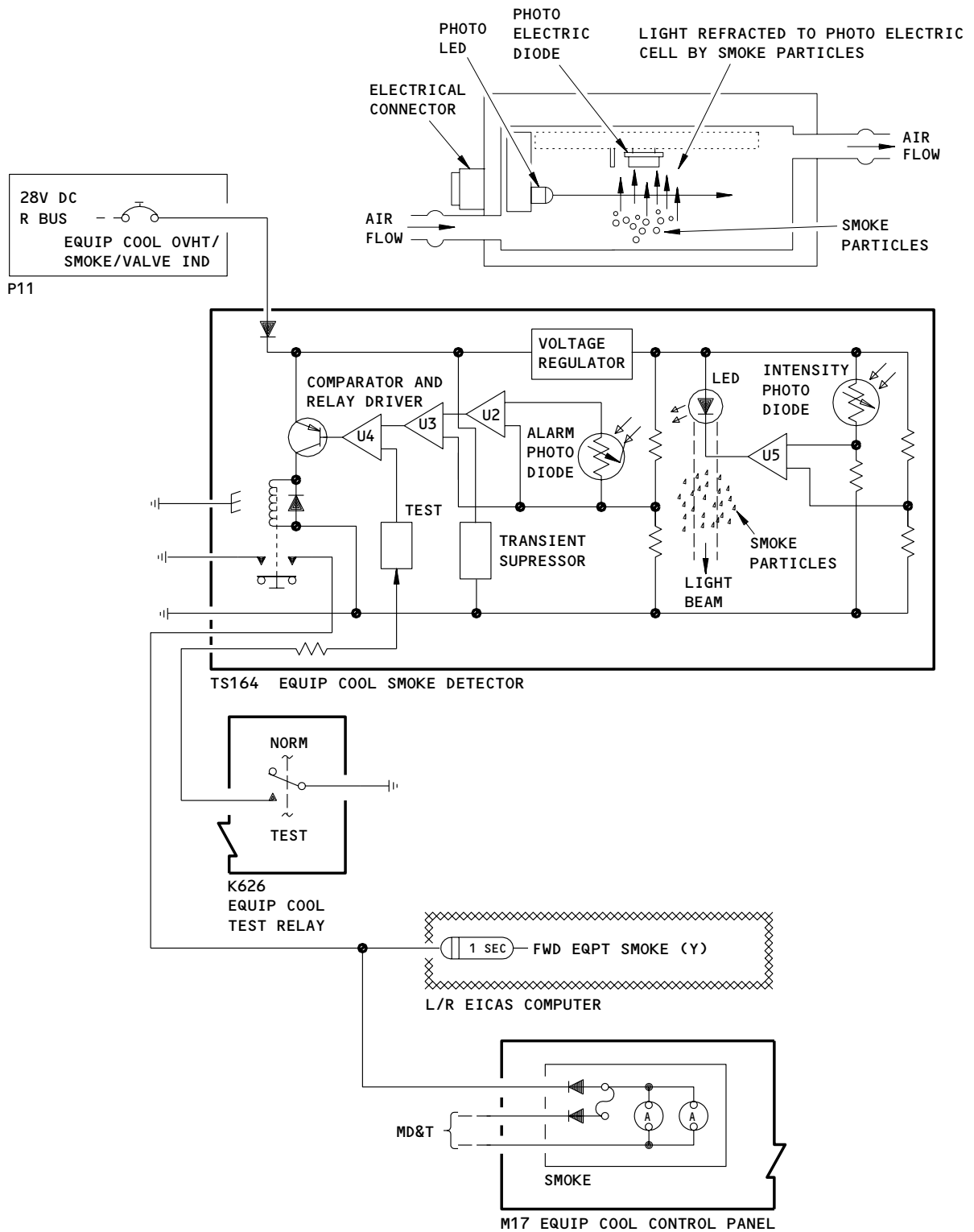
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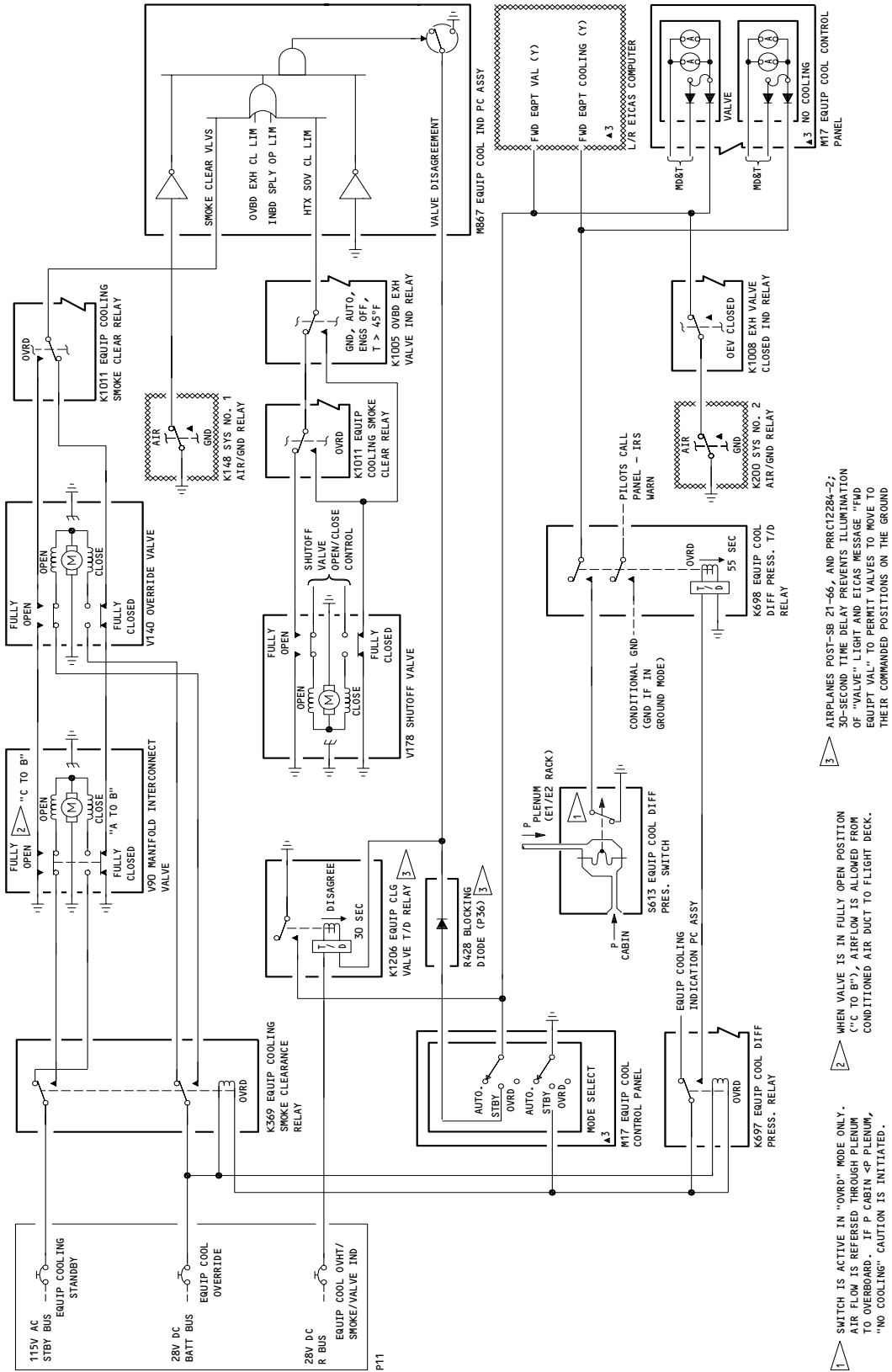
Equipment Cooling Smoke Clearance Schematic
Figure 8 (Sheet 1)

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1 SWITCH IS ACTIVE IN "OVBD" MODE ONLY. AIR FLOW IS REFERRED THROUGH PLENUM TO OVERBOARD. IF P CABIN <P PLENUM, "NO COOLING" CAUTION IS INITIATED.

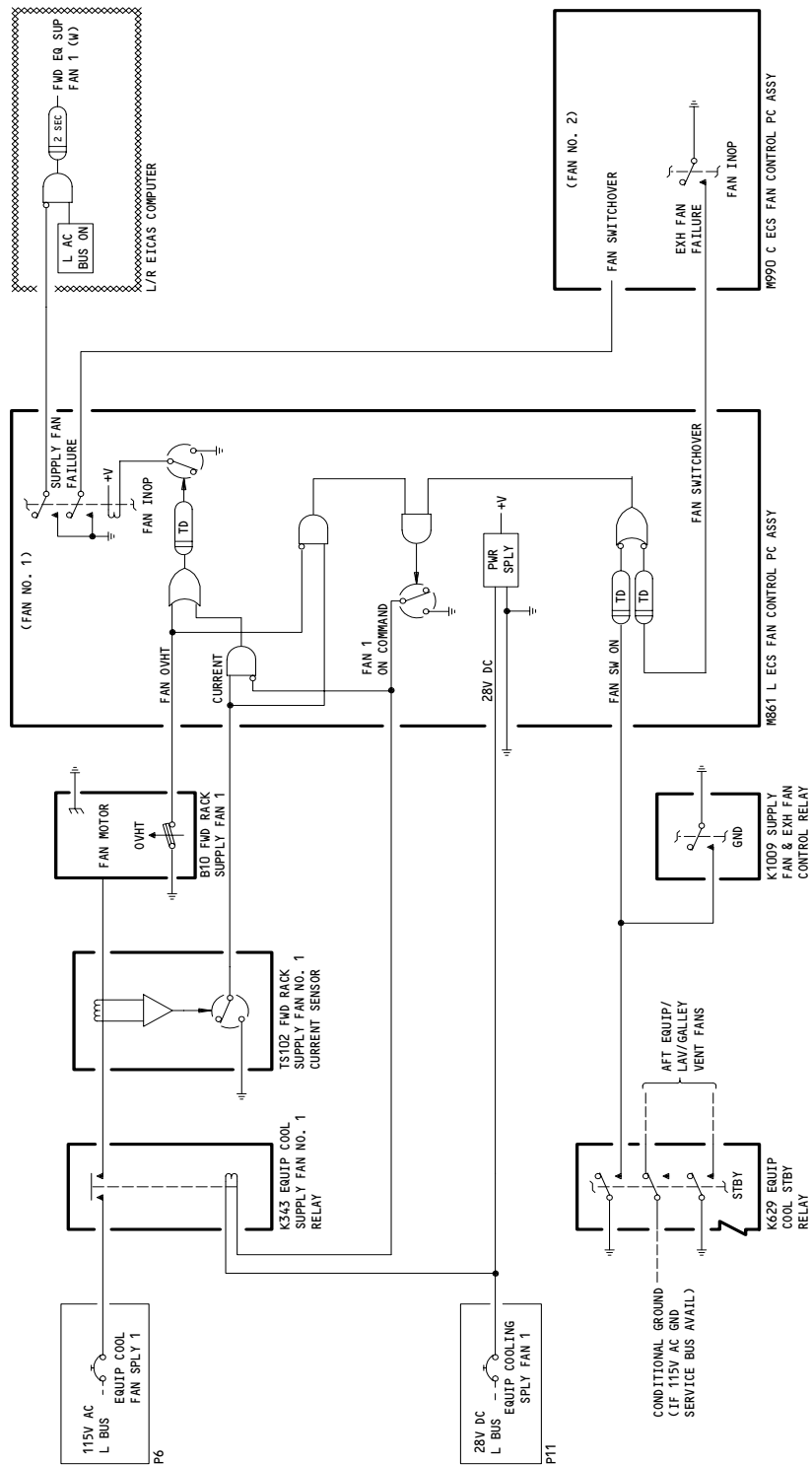
2 WHEN VALVE IS IN FULLY OPEN POSITION ("C TO B"), AIRFLOW IS ALLOWED FROM CONDITIONED AIR DUCT TO FLIGHT DECK.

3 AIRPLANES POST-SB 21-66, AND PRC12284-2: 30-SECOND TIME DELAY PREVENTS ILLUMINATION OF "VALVE" LIGHT AND EICAS MESSAGE "FND EQUIPT VAL" TO PERMIT VALVES TO MOVE TO THEIR COMMANDED POSITIONS ON THE GROUND

Equipment Cooling Smoke Clearance Schematic
Figure 8 (Sheet 2)

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Equipment Cooling Supply Fan Schematic
Figure 9

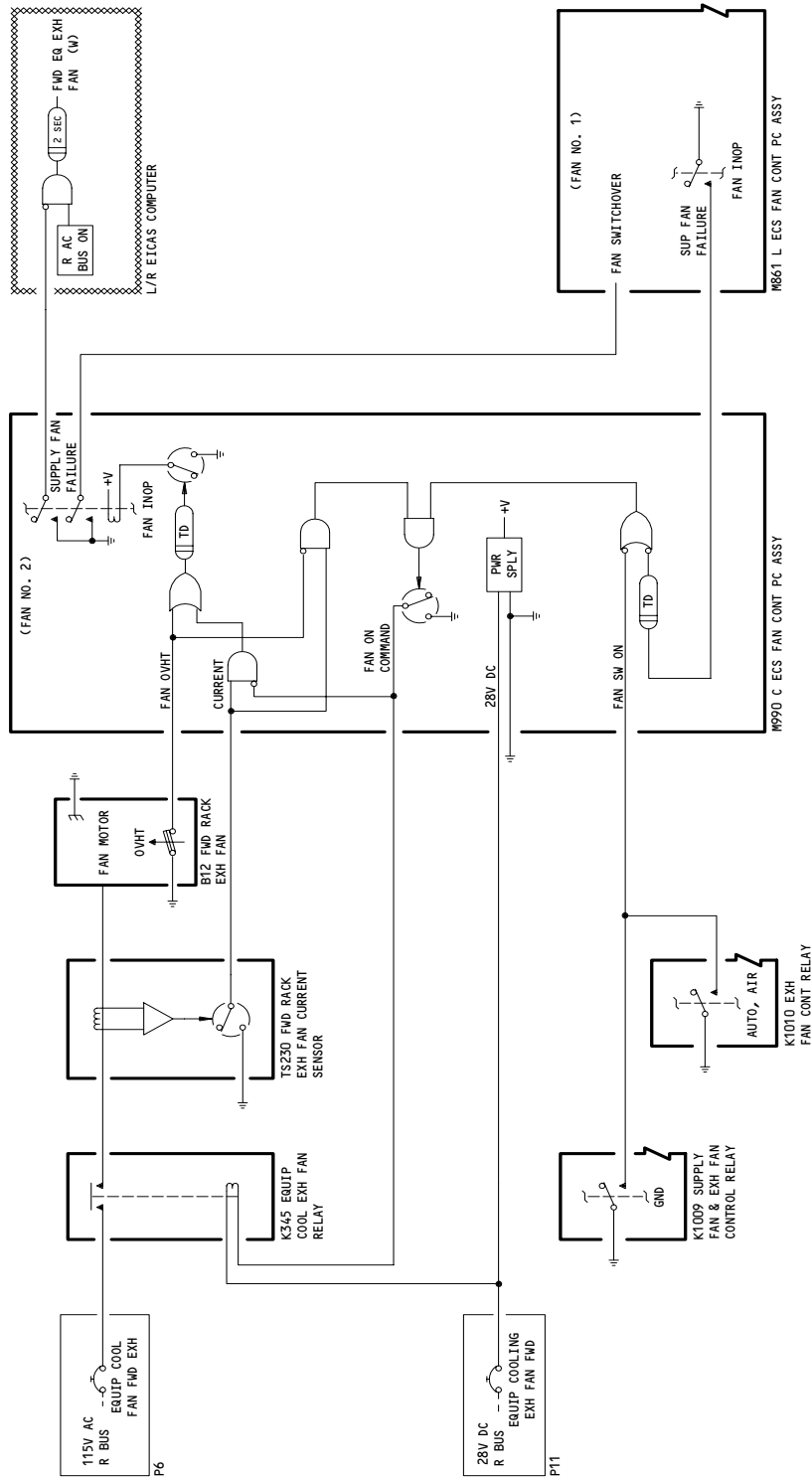
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Equipment Cooling Exhaust Fan Schematic
Figure 10

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- (b) On Ground Operation
 - 1) Fan Operation (Figs. 9, and 10)
 - a) The forward rack supply fan (B10) operates whenever the Equip Cooling Sply Fan No. 1 Relay (K343) is energized. The supply fan 1 relay energizes when a fan on command is sent from the L Fan Control Card (M861). The fan on command is sent when the card receives the following inputs: fan thermal switch has not tripped while on the ground or while in STBY mode, or exhaust fan is off.
 - b) The forward rack exhaust fan (B12) operates whenever the Equip Cooling Exh Fan Relay (K345) is energized. The C Fan Control Card (M990) sends a fan on command similar to that sent by the L Fan Control Card to the supply fan. The fan on command is sent when the card receives the following inputs: fan thermal switch has not tripped while on the ground or while in AUTO mode in the air, or supply fan is off.
 - c) Both fan control cards contain the same fan fail circuit. Two seconds after detecting a fan motor overheat, or 2.0 seconds after FAN SW ON is grounded and the fan current sensor detects no current, the FAN INOP signal latches on providing a ground for failure indication. If the supply fan fails, the EICAS maintenance message FWD EQ SUP FAN 1 is displayed. If the exhaust fan fails, the EICAS maintenance message FWD EQ EXH FAN is displayed.
 - 2) Ambient Air Temperature Less Than 45°F (7°C) (Fig. 11)
 - a) When the equipment cooling skin temperature switch detects temperature below 45°F (7°C), the switch's contacts close to energize the Skin Temp Switch Relay (K1068) which causes the Overboard Exhaust Valve Relay (K340) to relax. Power is supplied through the relaxed contacts of the Overboard Exhaust Valve Relay to cause the overboard exhaust valve (V12) to drive closed.

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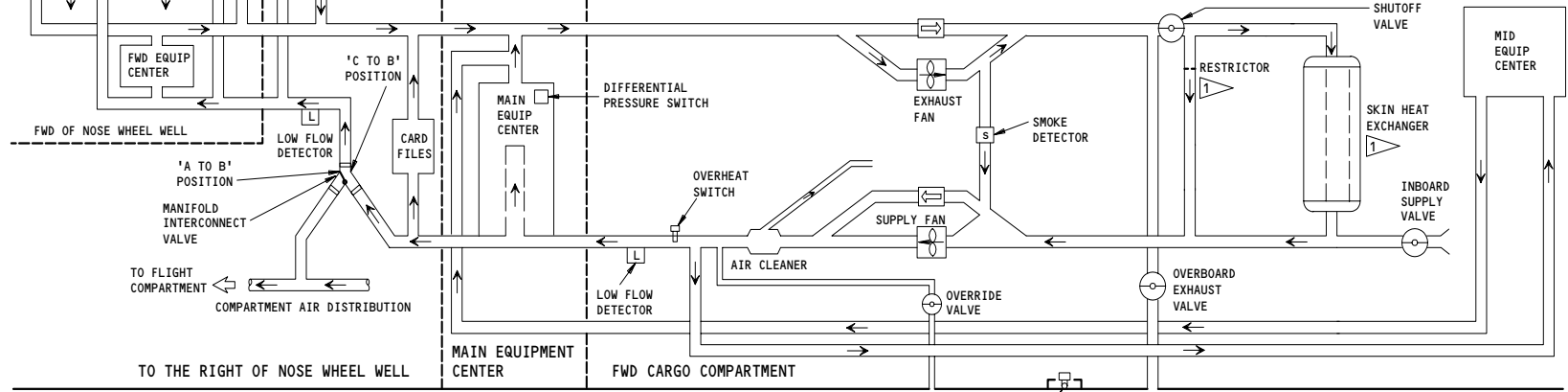
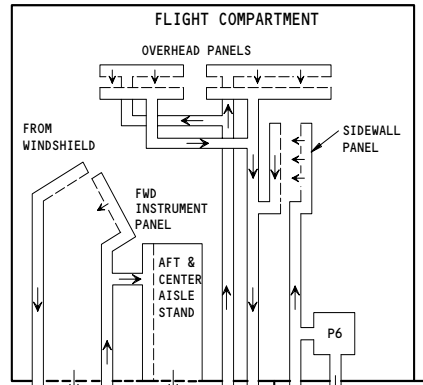
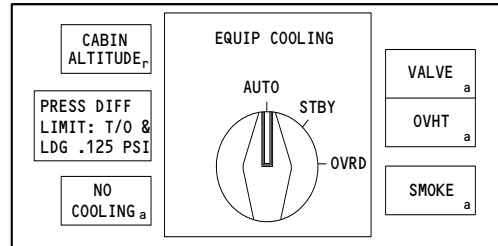
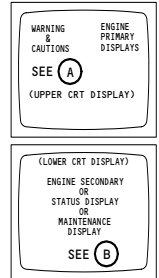
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- EICAS MESSAGES**
- CAUTION**
FWD EQPT COOLING
ADVISORY
FWD EQPT VAL
FWD EQPT SMOKE
FWD EQPT OVHT
- (A)
- STATUS**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
- MAINTENANCE**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
FWD EQ SUP FLOW
FWD EQ SUP OH
FWD EQ EXH FLOW
- (B)



OPERATIONAL MODE	INBD SUP VALVE	OVBD EXH VALVE	OVRD VALVE	MAN. INT VALVE	SHUT-OFF VALVE	SUP FAN	EXH FAN
"AUTO"-GND, OAT < 45°F (7°C)	O	C	C	A TO B	O	ON	ON
"AUTO"-GND, OAT > 45°F (7°C)	O	O	C	A TO B	C	ON	ON
"AUTO"-GND, BOTH ENGINES RUNNING	C	E	C	A TO B	O	ON	ON
"AUTO"-FLIGHT	C	C	C	A TO B	B	OFF	ON
"STBY"-GND	E	C	C	A TO B	O	ON	ON
"STBY"-FLIGHT	C	E	C	A TO B	S	ON	OFF
"OVRD"-FLIGHT	C	E	O	C TO B	C	OFF	OFF

AUTO - Ground With No Packs/No External Conditioned Air Cart Operation
Figure 11

1 NOT INSTALLED ON ALL AIRPLANES

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- b) In AUTO on the ground, the Override Valve is closed and the Manifold Interconnect Valve is in the A TO B position. The position of the Override Valve (V140) and Manifold Interconnect Valve (V90) is determined by the Equip Cooling Smoke Clear Relay (K369). The smoke clear relay is energized only when in the OVRD mode.
 - c) In this configuration, the supply fan draws air from the forward cargo compartment sidewall area through the Inboard Supply Valve. The supply fan forces air through the air cleaner then through the E/E equipment and flight deck instruments. Air from the flight deck and forward rack areas is drawn through the panels and E/E equipment by the exhaust fan. Cooling air then flows through the Shutoff Valve into the skin heat exchanger to join with air flowing through the Inboard Supply Valve.
- 3) Ambient Air Temperature Greater Than 45°F (7°C) (Figs. 12 and 13)
- a) When the equipment cooling skin temperature switch detects temperature above 45°F (7°C), its contacts open to relax the Skin Temp Switch Relay (K1068) which provides a ground signal to energize the Ovbd Exh Valve Relay (K340). Power is supplied through the energized contacts of the Ovbd Exh Valve Relay to drive the overboard exhaust valve (V12) open and the shutoff valve (V10) closed. This is the only time the overboard exhaust valve is commanded open.
 - b) In this configuration, the equipment cooling air is exhausted overboard through the overboard exhaust valve in order to prevent condensation and water drippage from the P5 and P11 panels.
- 4) Engines Running (Figs. 14 and 15)
- a) If both engines are running, the Inboard Supply Valve (V91) is closed. The valve opens when the Inbd Sply Valve Relay (K336) is energized. The valve relay energizes when on the ground, in AUTO, and at least one engine is off. When the valve is closed, the equipment cooling air is circulated in a closed loop or vented overboard if the overboard exhaust valve is open.

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EICAS MESSAGES

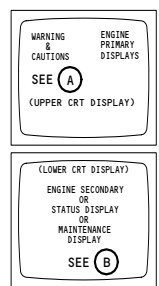
CAUTION
FWD EQPT COOLING
ADVISORY
FWD EQPT VAL
FWD EQPT SMOKE
FWD EQPT OVHT

(A)

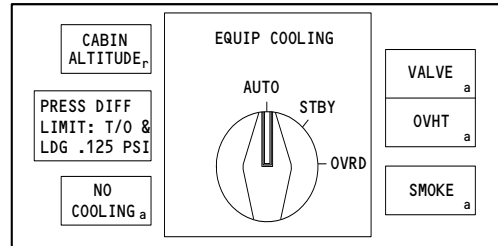
STATUS
FWD EQ SUP FAN 1
FWD EQ EXH FAN

MAINTENANCE
FWD EQ SUP FAN 1
FWD EQ EXH FAN
FWD EQ SUP FLOW
FWD EQ SUP OH
FWD EQ EXH FLOW

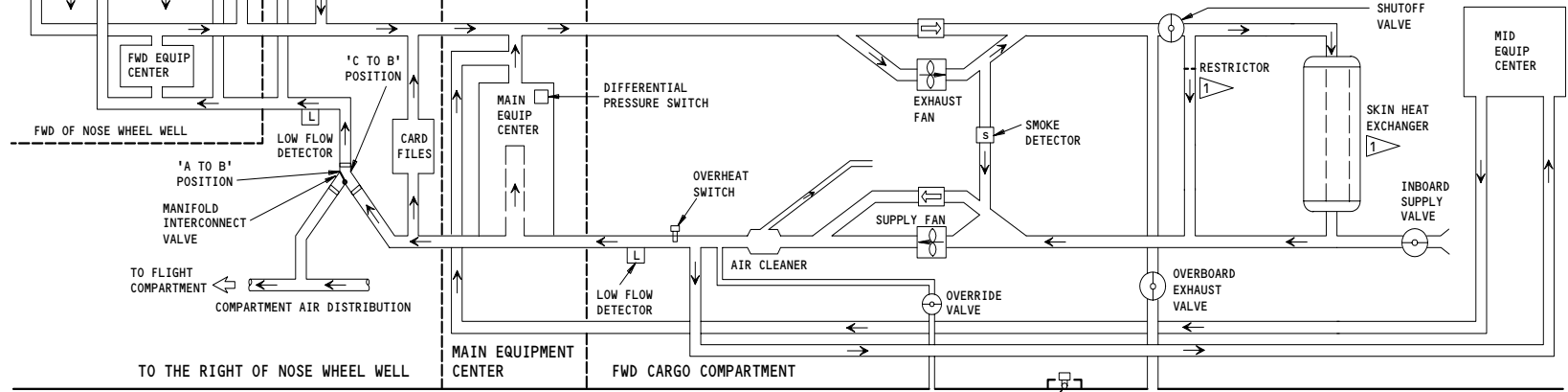
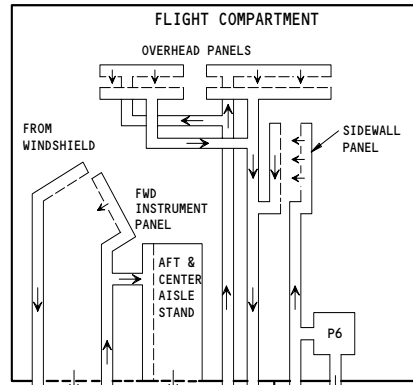
(B)



PILOT'S CENTER INSTRUMENT PANEL (P2)



M17 EQUIPMENT COOLING CONTROL PANEL



OPERATIONAL MODE	INBD SUP VALVE	OVBD EXH VALVE	OVRD VALVE	MAN. INT VALVE	SHUT-OFF VALVE	SUP FAN	EXH FAN
"AUTO"-GND, OAT < 45°F (7°C)	B	C	C	A TO B	O	ON	ON
"AUTO"-GND, OAT > 45°F (7°C)	O	O	C	A TO B	C	ON	ON
"AUTO"-GND, BOTH ENGINES RUNNING	C	C	C	A TO B	O	ON	ON
"AUTO"-FLIGHT	C	C	C	A TO B	B	OFF	ON
"STBY"-GND	C	C	C	A TO B	O	ON	ON
"STBY"-FLIGHT	C	C	C	A TO B	S	ON	OFF
"OVRD"-FLIGHT	C	C	O	C TO B	C	OFF	OFF

AUTO - Ground With Pack On/External Conditioned Air Cart On Operation
Figure 12

1 NOT INSTALLED ON ALL AIRPLANES

EFFECTIVITY

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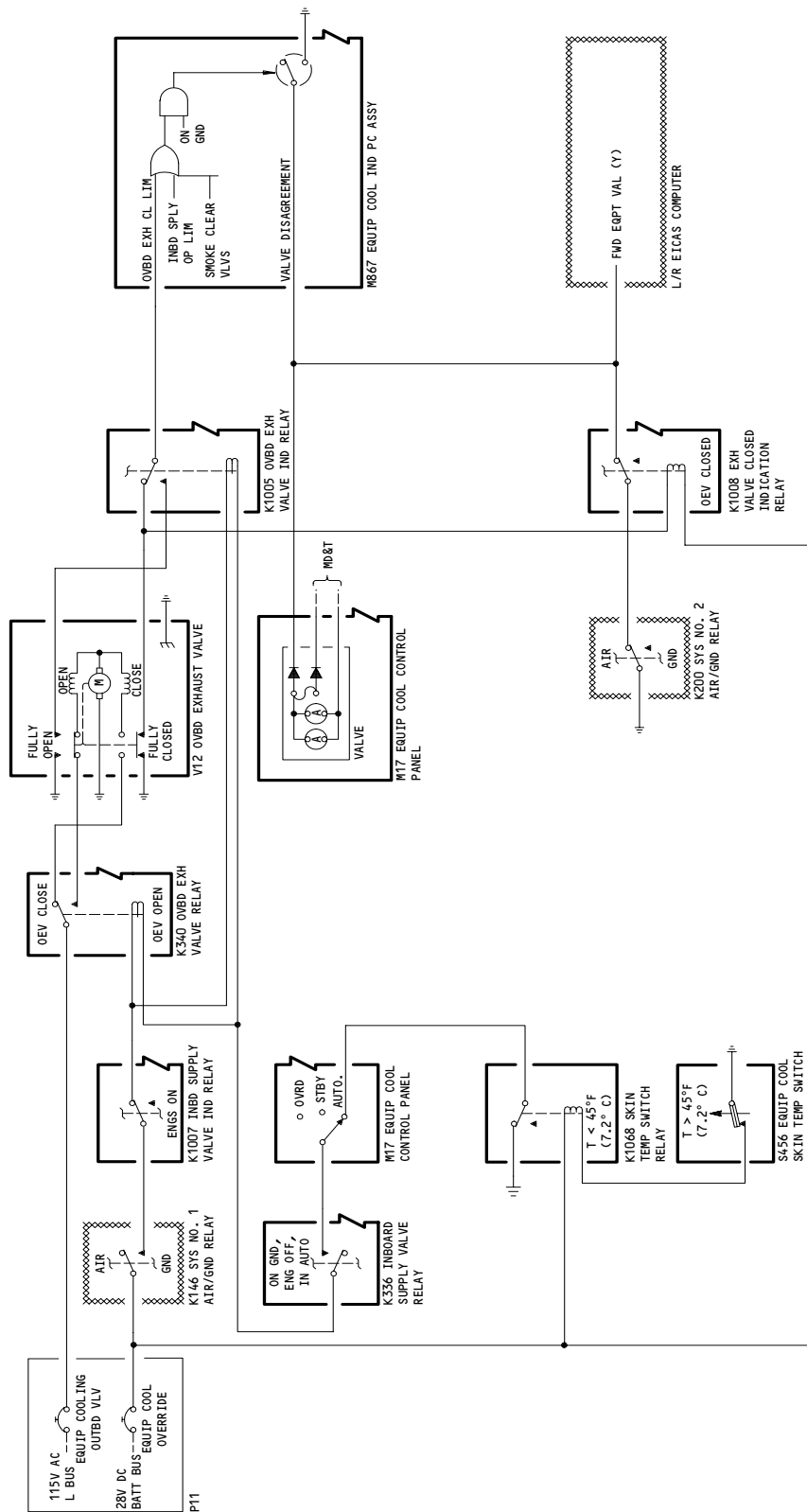
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Equipment Cooling Overboard Exhaust Valve Schematic
Figure 13

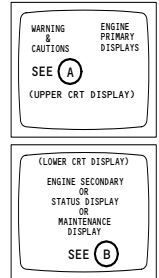
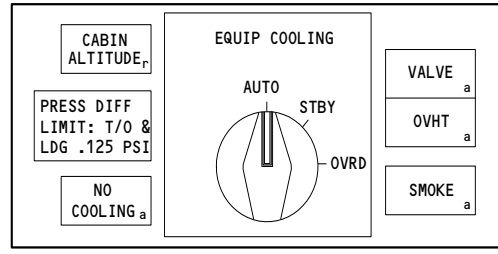
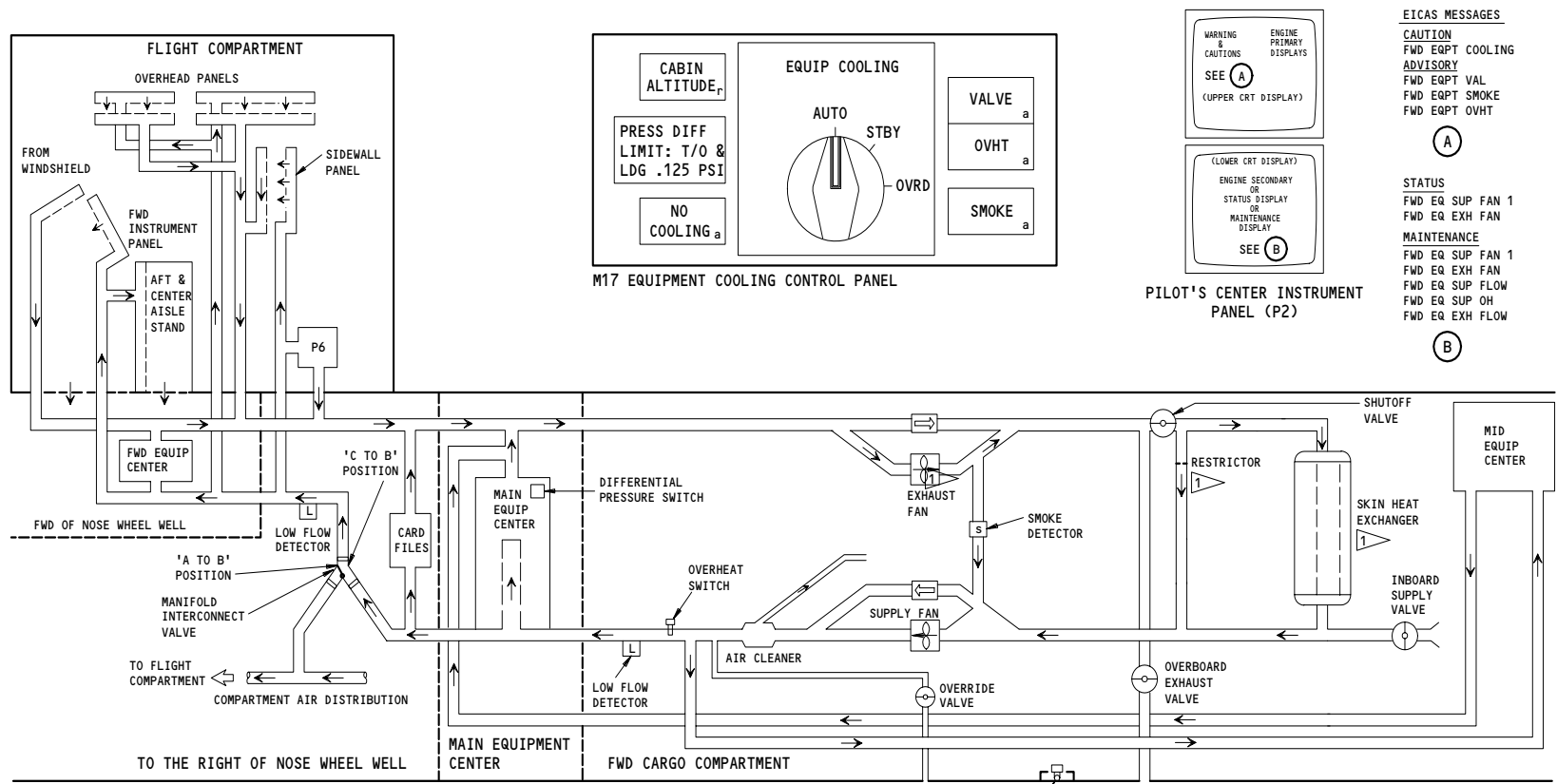
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- EICAS MESSAGES**
- CAUTION**
FWD EQPT COOLING
ADVISORY
FWD EQPT VAL
FWD EQPT SMOKE
FWD EQPT OVHT
- (A)
- STATUS**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
- MAINTENANCE**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
FWD EQ SUP FLOW
FWD EQ SUP OH
FWD EQ EXH FLOW
- (B)

OPERATIONAL MODE	INBD SUP VALVE	OVBD EXH VALVE	OVRD VALVE	MAN. INT VALVE	SHUT-OFF VALVE	SUP FAN	EXH FAN
"AUTO"-GND, OAT < 45°F (7°C)	O	C	C	A TO B	O	ON	ON
"AUTO"-GND, OAT > 45°F (7°C)	O	A	E	A TO B	S	ON	ON
"AUTO"-GND, BOTH ENGINES RUNNING	C	C	C	A TO B	O	ON	ON
"AUTO"-FLIGHT	C	C	E	A TO B	B	OFF	ON
"STBY"-GND	E	C	C	A TO B	O	ON	ON
"STBY"-FLIGHT	E	E	E	A TO B	S	ON	OFF
"OVRD"-FLIGHT	C	E	O	C TO B	C	OFF	OFF

AUTO - Ground With Both Engines Running Operation
Figure 14

1 NOT INSTALLED ON ALL AIRPLANES

EFFECTIVITY

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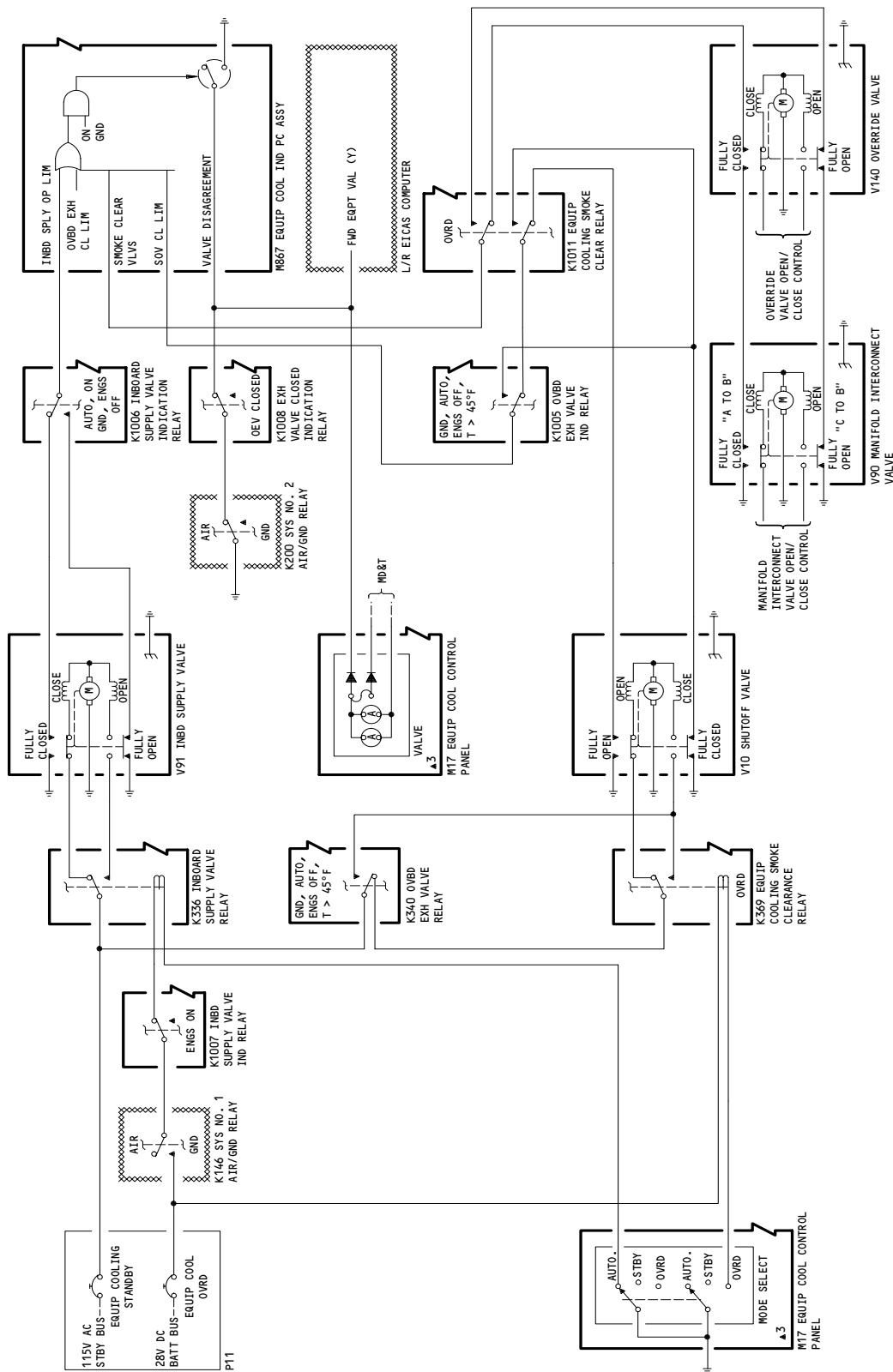
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Equipment Cooling Inboard Valves Schematic
Figure 15

EFFECTIVITY

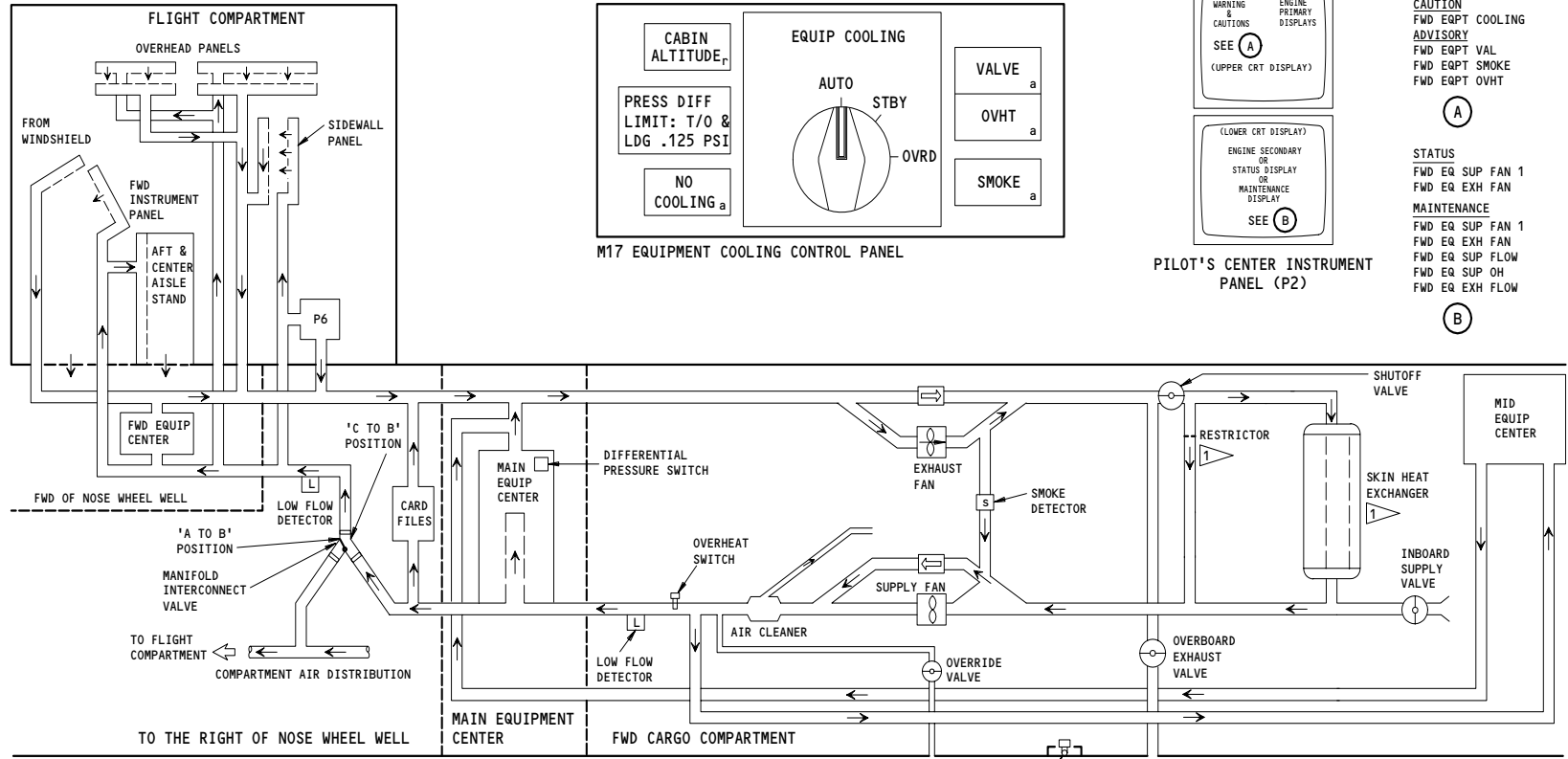
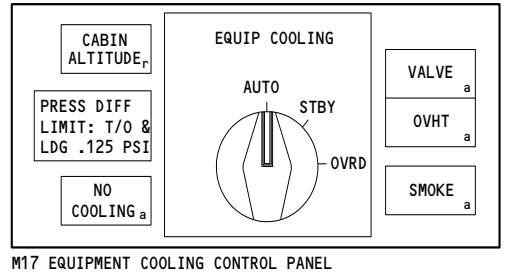
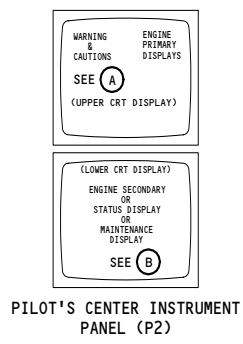
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- EICAS MESSAGES**
- CAUTION**
FWD EQPT COOLING
ADVISORY
FWD EQPT VAL
FWD EQPT SMOKE
FWD EQPT OVHT
- (A)
- STATUS**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
- MAINTENANCE**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
FWD EQ SUP FLOW
FWD EQ SUP OH
FWD EQ EXH FLOW
- (B)



OPERATIONAL MODE	INBD SUP VALVE	OVBD EXH VALVE	OVRD VALVE	MAN. INT VALVE	SHUT-OFF VALVE	SUP FAN	EXH FAN
"AUTO"-GND, OAT < 45°F (7°C)	0	C	C	A TO B	0	ON	ON
"AUTO"-GND, OAT > 45°F (7°C)	0	0	E	A TO B	C	ON	ON
"AUTO"-GND, BOTH ENGINES RUNNING	C	E	C	A TO B	0	ON	ON
"AUTO"-FLIGHT	C	C	C	A TO B	0	OFF	ON
"STBY"-GND	E	C	C	A TO B	0	ON	ON
"STBY"-FLIGHT	E	C	E	A TO B	C	ON	OFF
"OVRD"-FLIGHT	C	C	0	C TO B	C	OFF	OFF

AUTO - Flight Operation
Figure 16

1 NOT INSTALLED ON ALL AIRPLANES

- (c) In Air Operation (Fig. 16)
 - 1) When in the AUTO mode and in the air, the Forward Rack Supply Fan (B10) is commanded off. The exhaust fan remains on.
 - 2) The Inboard Supply Valve (V91), Overboard Exhaust Valve (V12), and Override Valve (V140) are closed. The Shutoff Valve (V10) is open. The Manifold Interconnect valve (90) is in the A to B position.
 - 3) The exhaust fan draws air from the flight deck and forward rack areas through the panels and E/E equipment. Cooling air is then ducted through the Shutoff Valve into the skin heat exchanger. The air then flows through the forward rack supply fan check valve, the air cleaner, and through the flight deck instruments and E/E equipment into the flight deck and forward rack areas.
 - 4) If the Overboard Exhaust Valve is not closed, the Exh Valve Closed Ind Relay (K1008) is relaxed, allowing a ground signal to be sent through its contacts to illuminate the VALVE light on the P5 panel and cause EICAS to display FWD EQPT VAL.
- (d) Failure Indications (VALVE light and FWD EQPT VAL message)
 - 1) In the air, if the position of the overboard exhaust valve, override valve, manifold interconnect valve, inboard supply valve, heat exchanger shutoff valve, or forward overboard valve (on some 767-300 airplanes only, see AMM 21-23-08) disagrees with its commanded position, the Equipment Cooling Indication Card (M867) sends a ground signal to illuminate the equipment cooling VALVE light on the P5 panel and to display the EICAS advisory message FWD EQPT VAL. The VALVE light and FWD EQPT VAL message will extinguish after the valves have reached their commanded positions.
 - 2) AIRPLANES POST-SB 21-66, AND PRR C12284-2;
On the ground, the Equip-Cooling-Valve-T/D relay (K1206) prevents the illumination of the VALVE light and FWD EQPT VAL message for approximately 30 seconds to permit the valves to move to their commanded positions. The VALVE light and FWD EQPT VAL advisory message will illuminate if the valves fail to move to their commanded positions after 30 seconds.
- (5) STBY Mode (Figs. 17 and 18)
 - (a) Selecting STBY on the mode selector provides a secondary circuit for system control. STBY should be selected whenever the amber VALVE or OVHT lights on the P5 panel remain illuminated. The configuration of the equipment cooling system in STBY depends upon inputs from air/ground relays.

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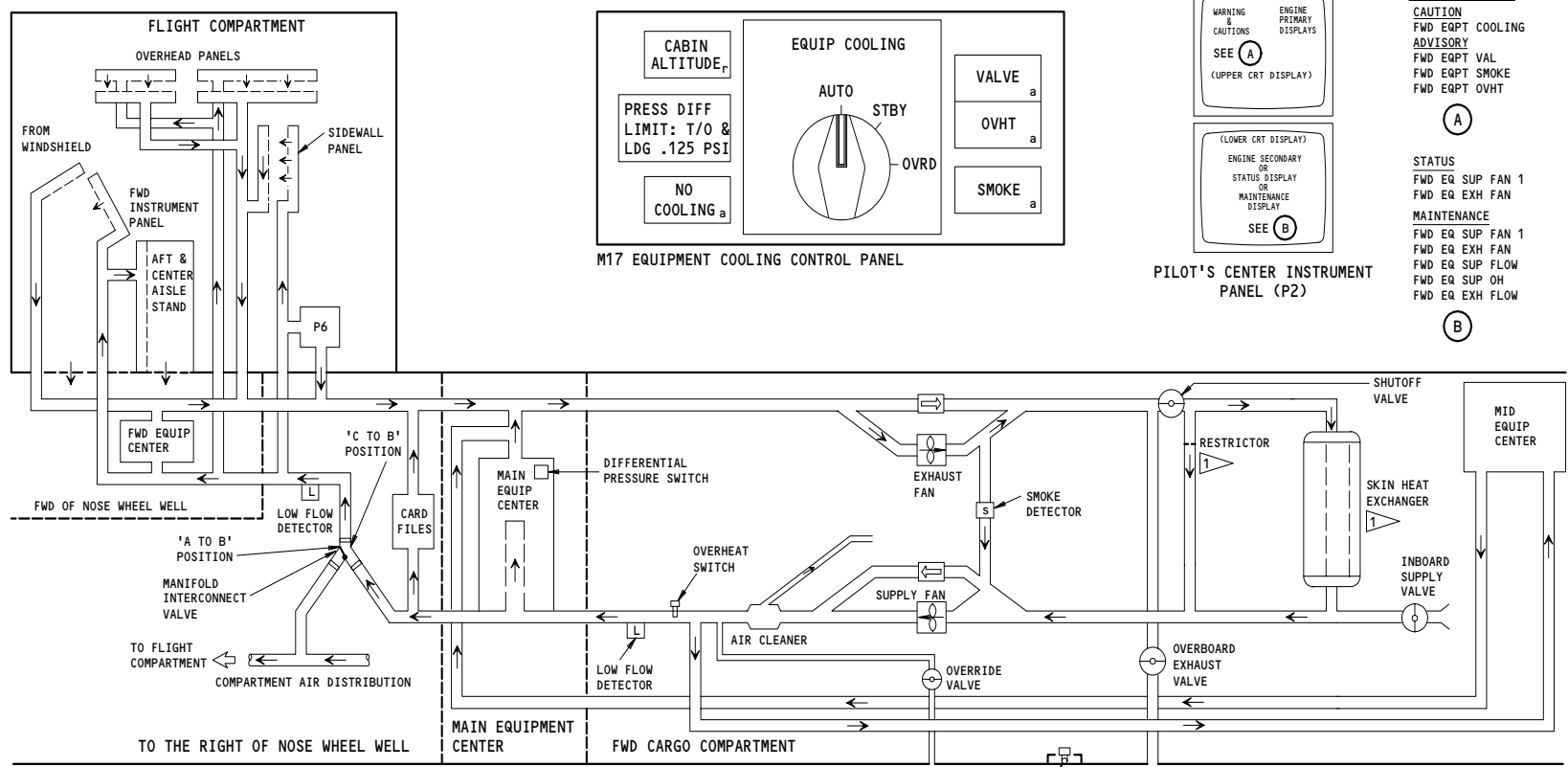
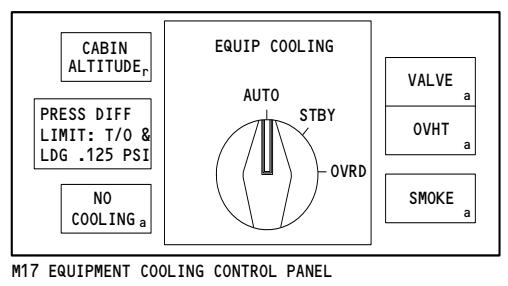
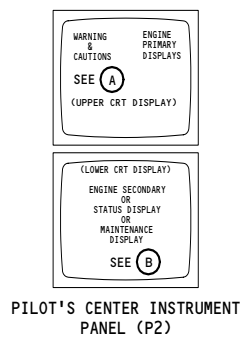
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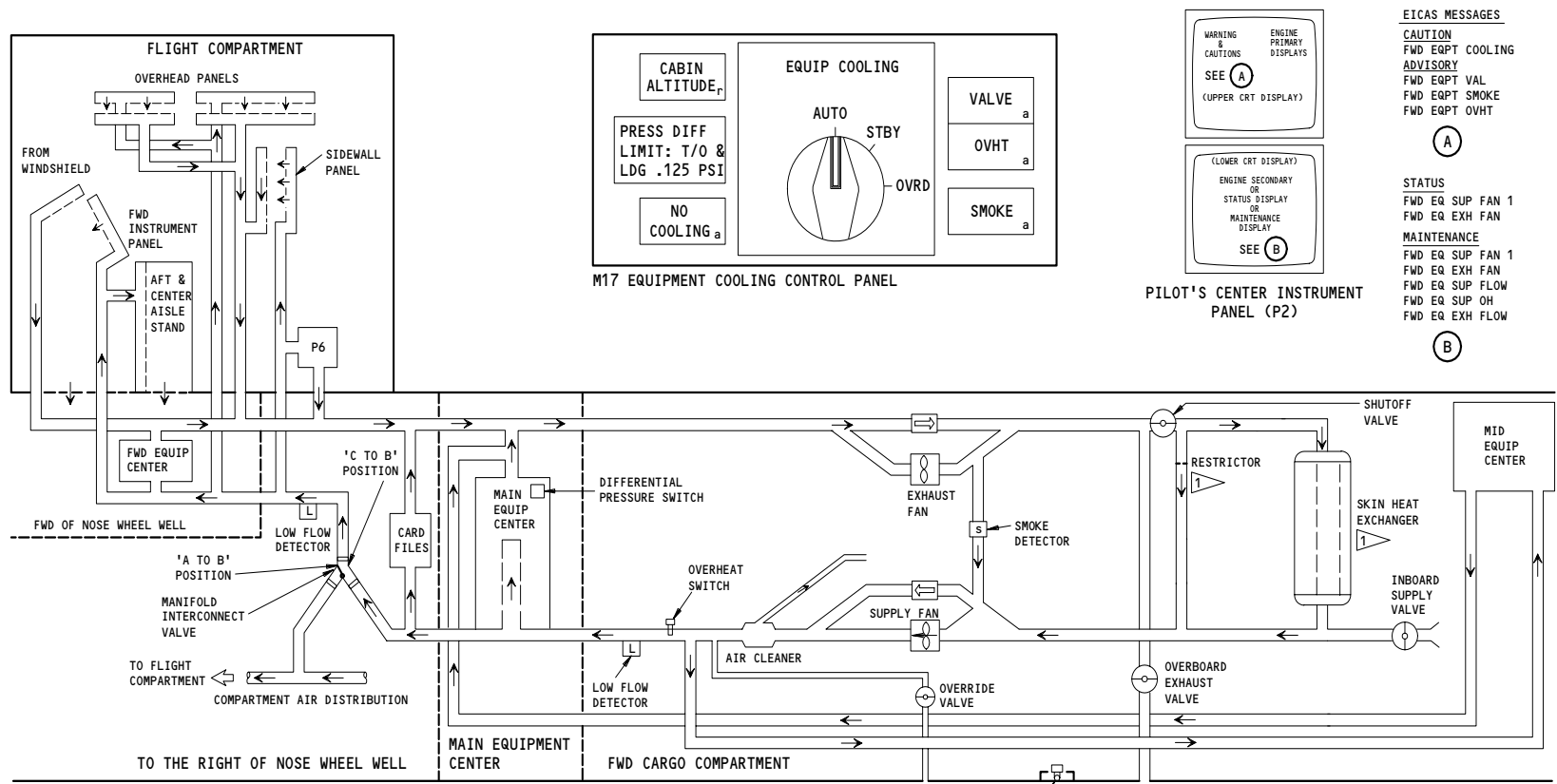
- EICAS MESSAGES**
- CAUTION**
FWD EQPT COOLING
ADVISORY
FWD EQPT VAL
FWD EQPT SMOKE
FWD EQPT OVHT
- (A)
- STATUS**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
- MAINTENANCE**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
FWD EQ SUP FLOW
FWD EQ SUP OH
FWD EQ EXH FLOW
- (B)



OPERATIONAL MODE	INBD SUP VALVE	OVBD EXH VALVE	OVRD VALVE	MAN. INT VALVE	SHUT-OFF VALVE	SUP FAN	EXH FAN
"AUTO"-GND, OAT < 45°F (7°C)	C	C	C	A TO B	O	ON	ON
"AUTO"-GND, OAT > 45°F (7°C)	B	S	C	A TO B	C	ON	ON
"AUTO"-GND, BOTH ENGINES RUNNING	C	C	C	A TO B	O	ON	ON
"AUTO"-FLIGHT	C	E	C	A TO B	O	OFF	ON
"STBY"-GND	C	C	C	A TO B	O	ON	ON
"STBY"-FLIGHT	E	C	C	A TO B	S	ON	OFF
"OVRD"-FLIGHT	C	C	O	C TO B	C	OFF	OFF

STBY - Ground Operation
Figure 17

NOT INSTALLED ON ALL AIRPLANES



- EICAS MESSAGES**
- CAUTION**
FWD EQPT COOLING
ADVISORY
FWD EQPT VAL
FWD EQPT SMOKE
FWD EQPT OVHT
- (A)
- STATUS**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
- MAINTENANCE**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
FWD EQ SUP FLOW
FWD EQ SUP OH
FWD EQ EXH FLOW
- (B)

OPERATIONAL MODE	INBD SUP VALVE	OVBD EXH VALVE	OVRD VALVE	MAN. INT VALVE	SHUT-OFF VALVE	SUP FAN	EXH FAN
"AUTO"-GND, OAT < 45°F (7°C)	S	E	C	A TO B	O	ON	ON
"AUTO"-GND, OAT > 45°F (7°C)	O	O	C	A TO B	E	ON	ON
"AUTO"-GND, BOTH ENGINES RUNNING	E	C	C	A TO B	O	ON	ON
"AUTO"-FLIGHT	C	E	S	A TO B	S	OFF	ON
"STBY"-GND	C	C	C	A TO B	O	ON	ON
"STBY"-FLIGHT	C	C	C	A TO B	O	ON	OFF
"OVRD"-FLIGHT	C	C	O	C TO B	C	OFF	OFF

STBY - Flight Operation
Figure 18

1 NOT INSTALLED ON ALL AIRPLANES

- (b) If on the ground, the forward rack supply and exhaust fans (B10 and B12) operate.
 - (c) If in the air, the exhaust fan (B12) is commanded off. Only the supply fan (B10) operates. In the event of a supply fan failure, the fan control cards command the exhaust fan to operate.
 - (d) The Inboard Supply Valve (V91), Overboard Exhaust Valve (V12), and Override Valve (V140) are closed. The Shutoff Valve (V10) is open. The Manifold Interconnect Valve (V90) is in the A TO B position.
 - (e) In the STBY mode, the operating fan draws air from the flight deck and forward rack areas through the panels and E/E equipment. Cooling air is then ducted through the Shutoff Valve. The air then flows through the forward rack supply fan check valve, the air cleaner, and through the flight deck instruments and E/E equipment into the flight deck and forward rack areas.
 - (f) Indication for the standby mode is the same as in AUTO except a time delay of five minutes exists for display of EICAS advisory message FWD EQPT OVHT.
- (6) OVRD Mode (Fig. 19)

CAUTION: DO NOT LEAVE MODE SELECTOR IN "OVRD" ON THE GROUND FOR MORE THAN FIVE MINUTES. EXTENDED OPERATION OF AVIONICS EQUIPMENT WITHOUT ADEQUATE COOLING AIR MAY DAMAGE EQUIPMENT.

- (a) When the smoke detector senses smoke in the equipment cooling ducting, the SMOKE light on the P5 panel comes on and the EICAS advisory message FWD EQPT SMOKE appears. Positioning the EQUIP COOLING mode selector on the P5 panel to OVRD configures the system to a smoke clearance mode.
- (b) If OVRD is selected in the air, the supply and exhaust fans are commanded off.
- (c) The Inboard Supply Valve (V91), Overboard Exhaust Valve (V12), Shutoff Valve (V10) are closed. The Override Valve (V140) is open. The Manifold Interconnect Valve (V90) is commanded to the C TO B position.

EFFECTIVITY

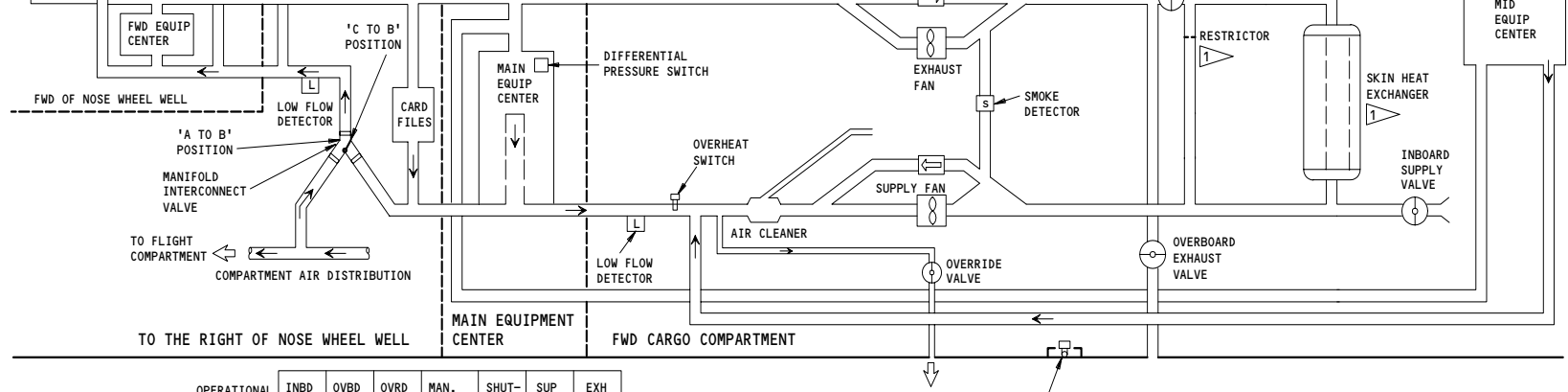
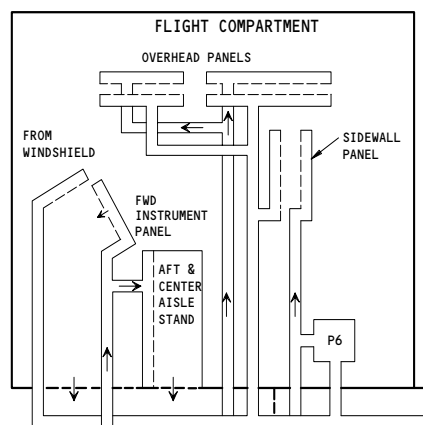
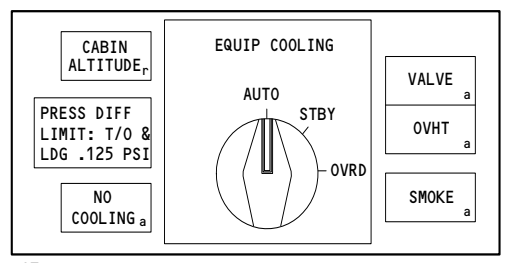
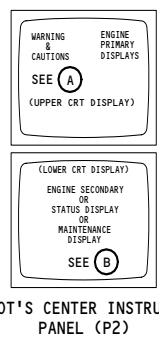
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- EICAS MESSAGES**
- CAUTION**
FWD EQPT COOLING
ADVISORY
FWD EQPT VAL
FWD EQPT SMOKE
FWD EQPT OVHT
- (A)
- STATUS**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
- MAINTENANCE**
FWD EQ SUP FAN 1
FWD EQ EXH FAN
FWD EQ SUP FLOW
FWD EQ SUP OH
FWD EQ EXH FLOW
- (B)



OPERATIONAL MODE	INBD SUP VALVE	OVBD EXH VALVE	OVRD VALVE	MAN. INT VALVE	SHUT-OFF VALVE	SUP FAN	EXH FAN
"AUTO"-GND, OAT < 45°F (7°C)	O	C	C	A TO B	O	ON	ON
"AUTO"-GND, OAT > 45°F (7°C)	S	B	C	A TO B	C	ON	ON
"AUTO"-GND, BOTH ENGINES RUNNING	C	C	C	A TO B	O	ON	ON
"AUTO"-FLIGHT	E	C	C	A TO B	O	OFF	ON
"STBY"-GND	C	C	C	A TO B	O	ON	ON
"STBY"-FLIGHT	S	E	C	A TO B	O	ON	OFF
"OVRD"-FLIGHT	C	C	O	C TO B	C	OFF	OFF

OVRD - Flight Operation
Figure 19

1 NOT INSTALLED ON ALL AIRPLANES

- (d) The manifold interconnect valve is positioned so that conditioned air from the mix manifold (Ref 21-21-00) supplies cooling air to the flight compartment. Air flow in the E/E compartment is reversed with respect to when fans are operating. Air is drawn through the forward and main equipment centers then exhausted overboard through the override valve.
 - (e) If the differential pressure in the equipment cooling supply ducting goes below 1.5 in. water, the Differential Pressure Switch (S613) closes, providing a ground to illuminate the NO COOLING light on the P5 panel and display the EICAS caution message FWD EQPT COOLING after a 55 second time delay.
 - (f) In the OVRD mode, the Equip Cooling EICAS Disc Relay (K761) energizes to inhibit OVHT indications and the EICAS maintenance messages FWD EQ SUP FLOW, FLT DK SUP FLOW, and FWD EQ SUP OH from being displayed.
- (7) Equipment Cooling Manual Test
- (a) The EQUIP COOL TEST switch on the P61 panel provides a means of manually testing the low flow detectors and the smoke detector of the equipment cooling system .
 - (b) Holding the EQUIP COOL TEST switch on the P61 panel to EQUIP COOL provides a ground signal to the Equipment Cooling Indication Card (M867) and a ground signal to energize the Equip Cooling Test Relay (K626). Once the test relay energizes, a ground signal is supplied to the test terminal of the forward rack low flow detector (TS104), flight deck low flow detector (TS163), and the smoke detector (TS164) to simulate low flow and smoke conditions. Satisfactory response of the smoke detector test results in the following:
 - 1) SMOKE light on the P5 panel illuminates.
 - 2) EICAS advisory message FWD EQPT SMOKE is displayed.
 - (c) Satisfactory response of the low flow detectors test results in the following:
 - 1) OVHT light on the P5 panel illuminates.
 - 2) EICAS advisory message FWD EQPT OVHT is displayed.
 - 3) EICAS maintenance messages FWD EQ SUP FLOW and FLT DK SUP FLOW are stored in EICAS memory after 30 seconds.

EFFECTIVITY

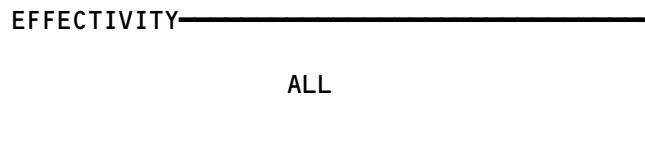
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Not Used
Figure 20



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F36934

- 4) Ground warning chime in nose gear wheel well sounds after 30 seconds.
- (d) When the EQUIP COOL TEST switch is released, the test signal is removed, and the low flow and smoke conditions are no longer simulated.
- (8) E/E Cooling Airflow Monitor (Fig. 21)
 - (a) An airflow monitoring system provides a method of manually checking airflow in the flight deck, main equipment center, and mid equipment center ducting. The monitor has nine caged flow balls enclosed in individual tubes connected to each monitored duct by aluminum or tygon tubing.
 - (b) The air flow monitor is on the right side panel, P61, in the flight compartment.
 - (c) There are nine sense tubes throughout the forward section of the airplane.
 - (d) Most of the sense tubes are below the floor of the flight compartment and the passenger compartment except where the tubes connect to the captain's instruments, and to the airflow monitor.
 - (e) The air flow monitor system has clear flexible tubes of Tygon, and aluminum tubes.
 - (f) The tubes are attached to nipples that are on the equipment cooling supply air plenums for these nine components:
 - 1) The captain's EADI
 - 2) The captain's EHSI
 - 3) The left VOR
 - 4) The left FMC display unit (DU)
 - 5) The E1/E2 racks
 - 6) The left inertial reference unit (IRU)
 - 7) The center IRU
 - 8) The right IRU
 - 9) The E5 rack
 - (g) The positive pressure of the cooling air that is supplied to these nine components is also supplied to the airflow monitor through the sense tubes.

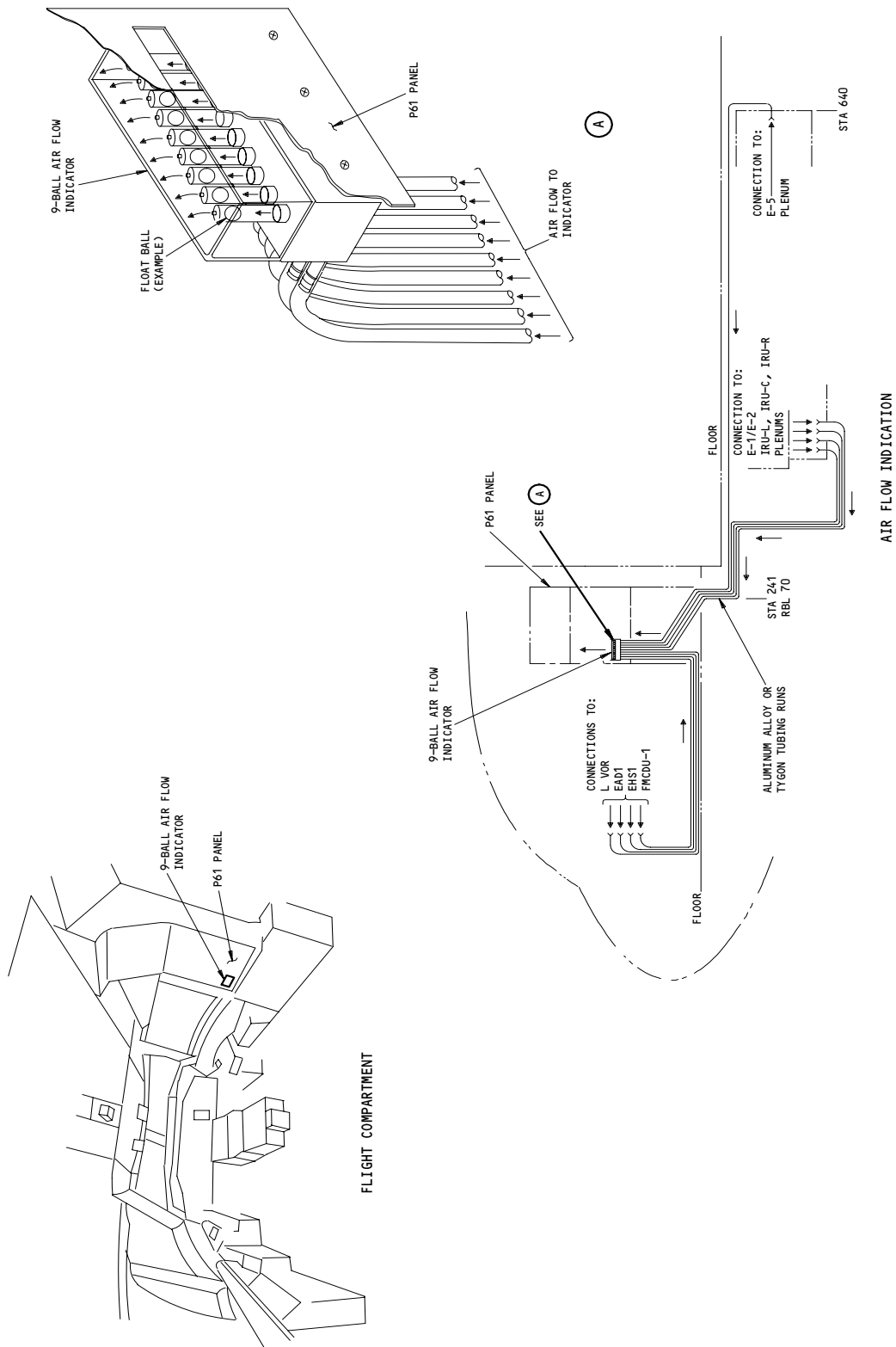
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Equipment Cooling Monitor Schematic
Figure 21

EFFECTIVITY

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- (h) When you lift the LIFT TO TEST lever and hold it up, the airflow monitor allows this positive pressure to enter the glass tubes of the monitor.
- (i) If there is sufficient cooling air to the nine components, there will be sufficient positive pressure in the monitor to produce airflow that will move the flow balls up so you can see them.
- (j) If you cannot see one or more of the flow balls, there may be one of these conditions:
 - 1) The applicable component does not have sufficient cooling.
 - 2) The tube from the component to the air flow monitor has a leak or is not connected properly.
 - 3) The airflow monitor is faulty.
- (k) Positioning the INDICATOR-9 BALL, E/E COOLING MONITOR switch on the P61 panel to the test position allows airflow, if present, to reach the flow balls. Adequate airflow is indicated in each monitored duct by the corresponding flow ball rising to the top of its cage. If a low flow condition exists in any monitored duct, the corresponding flow ball will remain at the bottom of its cage.

B. Control

- (1) To place the equipment cooling system in operation, provide electrical power (Ref 24-22-00).
- (2) Check that the following circuit breakers are closed on the overhead circuit breaker panel P11.

EQUIP COOL OVHT/SMOKE/VALVE IND
EQUIP COOLING FWD EXH FAN
EQUIP COOLING SUPPLY FAN 1
OVRD, EQUIP COOL
STANDBY, EQUIPMENT COOLING
VALVES, EQUIPMENT COOLING OUTBD

- (3) Providing power to the airplane automatically provides cooling to the equipment bays and panels. The mode of cooling is dependent on the selector position in the flight compartment. Functional description describes how the system works in each selector position.
- (4) Placing the EQUIP COOLING mode selector on the pilot's overhead P5 panel to AUTO, STBY, or OVRD should not display any indication lights.

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EQUIPMENT COOLING

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
CARD - (FIM 73-21-00/101) L N2 ENGINE SPEED, M1093 R N2 ENGINE SPEED, M1092				
CARD - EQUIPMENT COOLING INDICATION, M867	7	1	119AL, MAIN EQUIP CTR, P50	21-26-05
CARD - FAN CONTROL C, M990	7	1	119AL, MAIN EQUIP CTR, P50	21-26-05
CARD - FAN CONTROL L, M861	7	1	119AL, MAIN EQUIP CTR, P50	21-26-05
CIRCUIT BREAKER - EQUIP COOL GND WARN, C711		1	FLT COMPT, P6 6D6	*
EQUIP COOL SUPPLY FAN 1, C331		1	6H18	*
FWD EXH EQUIP COOL FAN, C335		1	6H21	*
CIRCUIT BREAKER - EQUIP COOL OVHT/SMOKE VALVE IND, C656		1	FLT COMPT, P11 11P21	*
EQUIP COOL OVRD, C679		1	11C19	*
EQUIPMENT COOLING EXH FAN FWD, C687		1	11P22	*
EQUIPMENT COOLING OUTBD VALVES, C651		1	11P13	*
EQUIPMENT COOLING STANDBY, C688		1	11B8	*
EQUIPMENT COOLING SUPPLY FAN 1, C654		1	11P11	*
CLEANER - AIR	4	1	821, FWD CARGO COMPT	21-58-30
COMPUTER - (FIM 31-41-00/101) L EICAS, M10181 R EICAS, M10182				
DETECTOR - EQUIPMENT COOLING LOW FLOW FLIGHT DECK, TS163	1	1	119AL, MAIN EQUIP CTR	21-58-17
FORWARD RACK, TS104	5	1	821, FWD CARGO COMPT	21-58-17
DETECTOR - EQUIPMENT COOLING SMOKE, TS164	1	1	821, FWD CARGO COMPT	21-58-19
DIODE - (FIM 31-01-36/101) R330,R331,R561				
DIODE - (FIM 31-01-37/101) R270,R271,R272,R273				
FAN - FORWARD RACK EXHAUST, B12	1	1	821, FWD CARGO COMPT	21-58-06
FAN - FORWARD RACK SUPPLY, B10	1	1	821, FWD CARGO COMPT	21-58-06
INDICATOR - E/E COOLING AIR FLOW MONITOR	8	1	FLT COMPT, P61	21-58-34
LIGHT - NO COOLING, YDAL5	8	1	FLT COMPT, P5, EQUIP COOL CONT PNL, M17	*
LIGHT - OVERHEAT, YDAL2	8	1	FLT COMPT, P5, EQUIP COOL CONT PNL, M17	*
LIGHT - SMOKE, YDAL3	8	1	FLT COMPT, P5, EQUIP COOL CONT PNL, M17	*
LIGHT - VALVE, YDAL4	8	1	FLT COMPT, P5, EQUIP COOL CONT PNL, M17	*
PANEL - (FIM 23-42-00/101) PILOTS' CALL, M51				
PANEL - (FIM 28-43-00/101) MISC TEST, M10398				
PANEL - (FIM 34-21-00/101) INERTIAL REFERENCE MODE, M59				
PANEL - EQUIP COOL CONT, M17	8	1	FLT COMPT, P5	*

* SEE THE WDM EQUIPMENT LIST

Equipment Cooling - Component Index
Figure 101 (Sheet 1)

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COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
RELAY - (FIM 31-01-36/101) AIR/GROUND SYS NO. 1, K146 AIR/GROUND SYS NO. 1, K167 EQUIP COOL EICAS DISC, K761 EQUIP COOL OVERHEAT INDICATION, K699 EQUIP COOL OVERHEAT TIME DELAY, K700 EQUIP COOL PRESS DIFF TIME DELAY, K698 EQUIP COOL SMOKE CLEARANCE, K369, K1011 EQUIP COOL STANDBY, K629 EQUIP COOL SUPPLY FAN NO. 1, K343 EQUIP COOL VALVE T/D, K1206 EXHAUST FAN CONTROL, K1010 EXHAUST VALVE CLOSED INDICATION, K1008 INBOARD SUPPLY VALVE, K336 INBOARD SUPPLY VALVE INDICATION, K1006, K1007 OVERBOARD EXHAUST VALVE, K340 OVERBOARD EXHAUST VALVE INDICATION, K1005 SKIN TEMP SWITCH, K1068 SUPPLY AND EXHAUST FAN CONTROL, K1009				
RELAY - (FIM 31-01-37/101) AIR/GROUND SYS NO. 1, K148 AIR/GROUND SYS NO. 2, K200, K206 EQUIP COOL FWD EXHAUST FAN, K345 EQUIP COOL TEST, K626				
SCREEN - CONICAL	1	2	821, FWD CARGO COMPT	21-58-22
SENSOR - (FIM 31-01-36/101) SUPPLY FAN 1 CURRENT, TS102				21-58-11
SENSOR - (FIM 31-01-37/101) EXHAUST FAN CURRENT, TS230				21-58-11
SWITCH - EQUIP COOLING DIFFERENTIAL PRESSURE, S613	1	1	821, FWD CARGO COMPT	21-58-29
SWITCH - EQUIP COOLING MODE SELECT, YDAS1	8	1	FLT COMPT, P5, EQUIP COOL CONT PNL, M17	*
SWITCH - EQUIP COOLING SUPPLY AIR OVERHEAT, S41	5	2	821, FWD CARGO COMPT	21-58-26
SWITCH - EQUIP COOLING TEST, YEIS8	8	1	FLT COMPT, P61, TEST PNL, M10398	*
SWITCH - EQUIPMENT COOLING SKIN TEMPERATURE, S456	6	1	821, FWD CARGO COMPT	21-58-21
VALVE - FAN CHECK	1	2	821, FWD CARGO COMPT	21-58-02
VALVE - INBOARD SUPPLY, V91	1	1	821, FWD CARGO COMPT	21-58-07
VALVE - MANIFOLD INTERCONNECT, V90	1	1	119AL, MAIN EQUIP CTR, RIGHT SIDE OUTBOARD OF NOSE WHEEL WELL COMPARTMENT	21-58-01
VALVE - OVERBOARD EXHAUST, V12	5	1	821, FWD CARGO COMPT	21-58-05
VALVE - OVERRIDE, V140	4	1	821, FWD CARGO COMPT	21-58-20
VALVE - SHUTOFF, V10	5	1	821, FWD CARGO COMPT	21-58-13

* SEE THE WDM EQUIPMENT LIST

Equipment Cooling - Component Index
Figure 101 (Sheet 2)

EFFECTIVITY

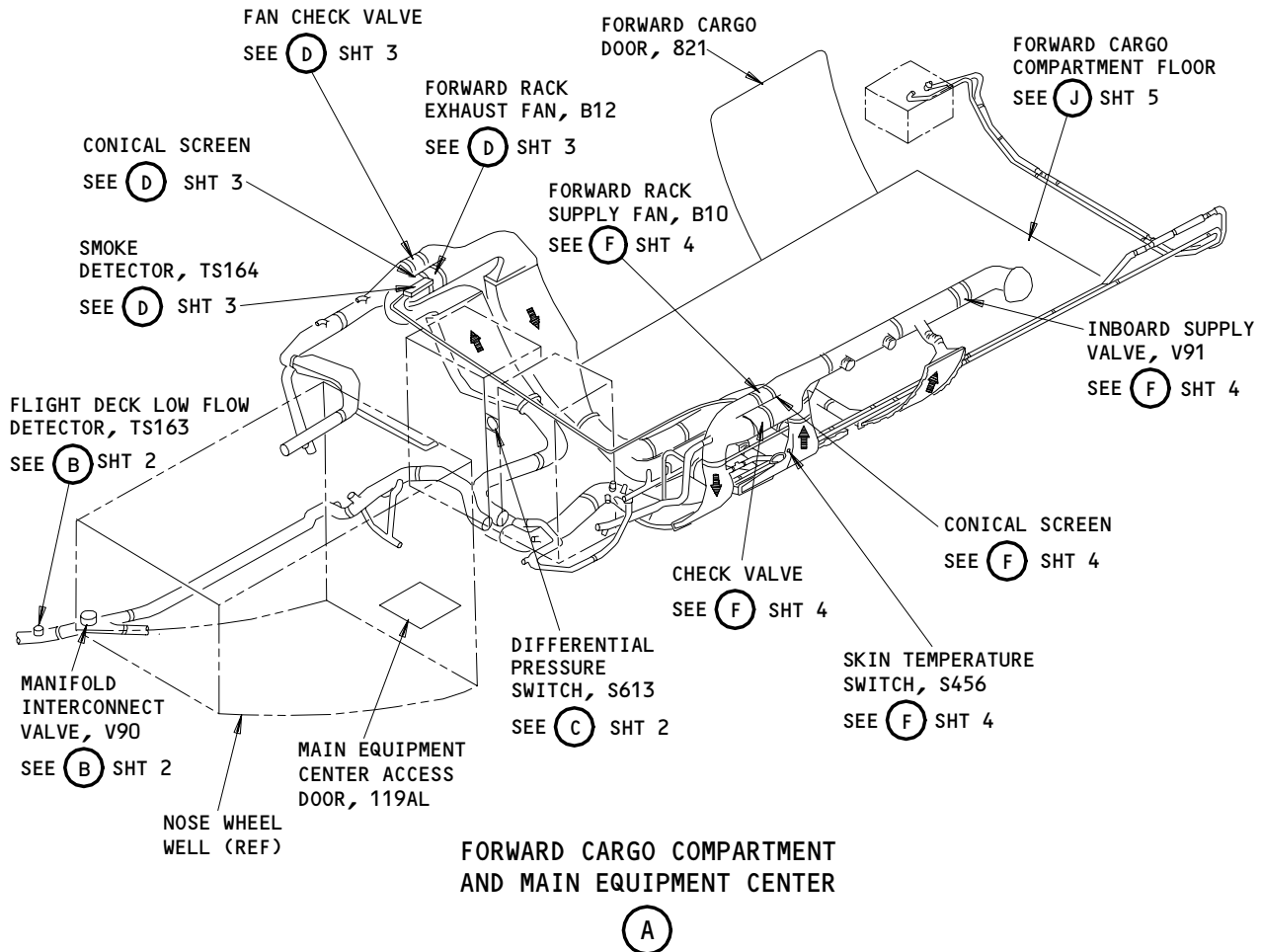
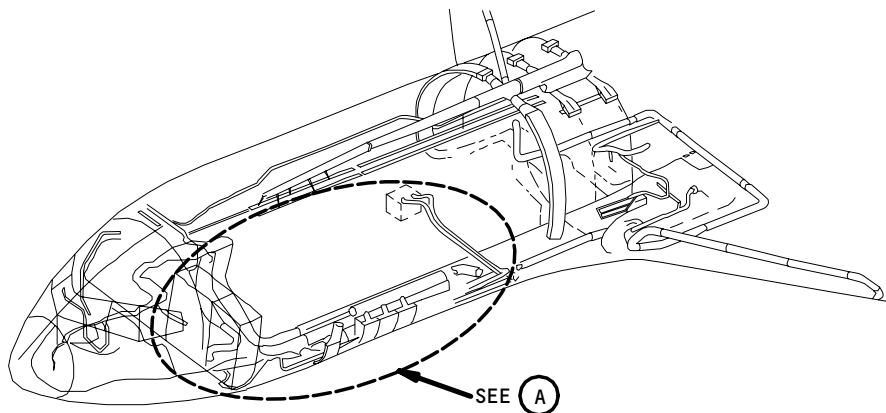
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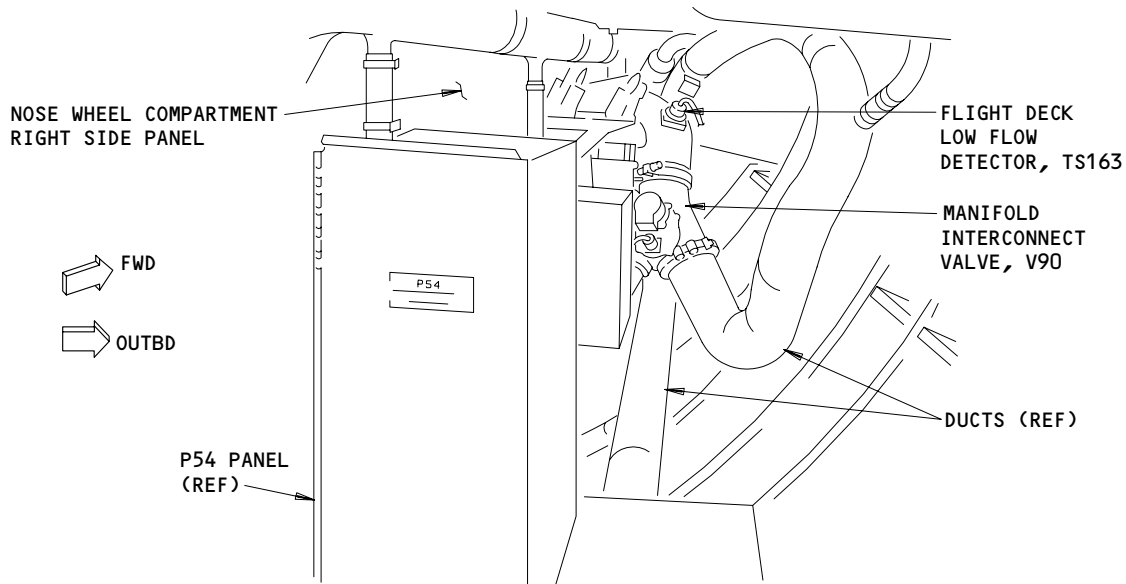
Equipment Cooling - Component Location
Figure 102 (Sheet 1)

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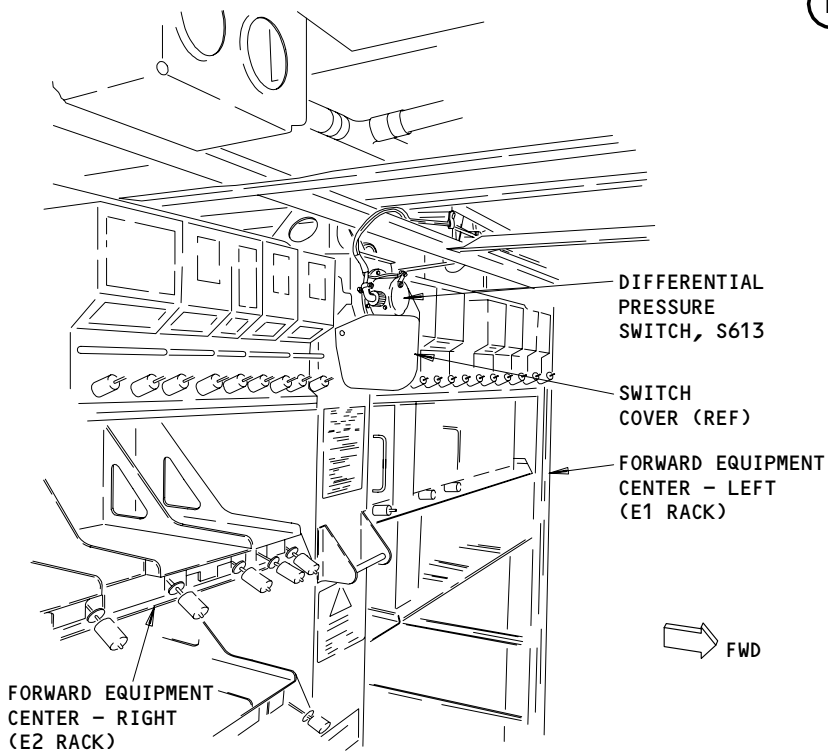
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AREA OUTBOARD OF NOSE WHEEL WELL COMPARTMENT

(B)



MAIN EQUIPMENT CENTER

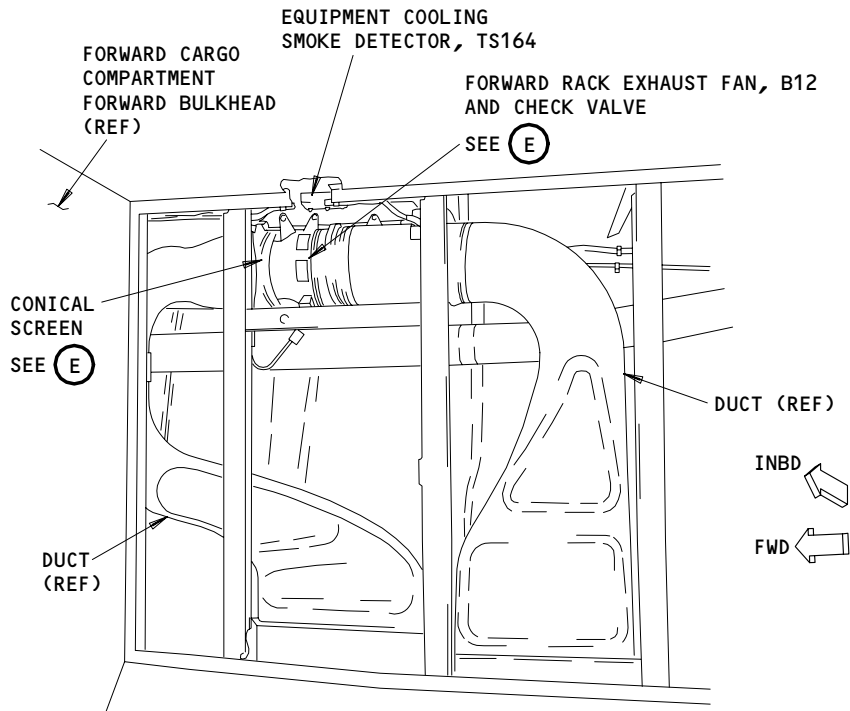
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Equipment Cooling - Component Location (Details from Sht 1)
Figure 102 (Sheet 2)

EFFECTIVITY	
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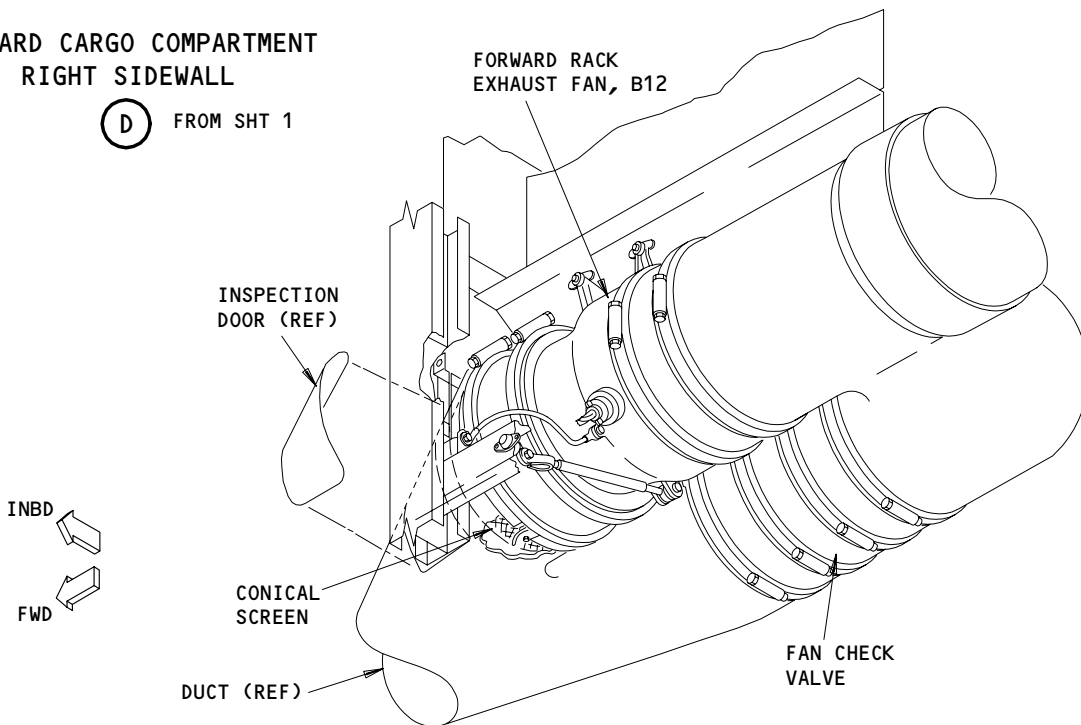
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FORWARD CARGO COMPARTMENT
RIGHT SIDEWALL

(D) FROM SHT 1



FORWARD RACK EXHAUST FAN, CHECK VALVE,
AND CONICAL SCREEN

(E)

Equipment Cooling - Component Location
Figure 102 (Sheet 3)

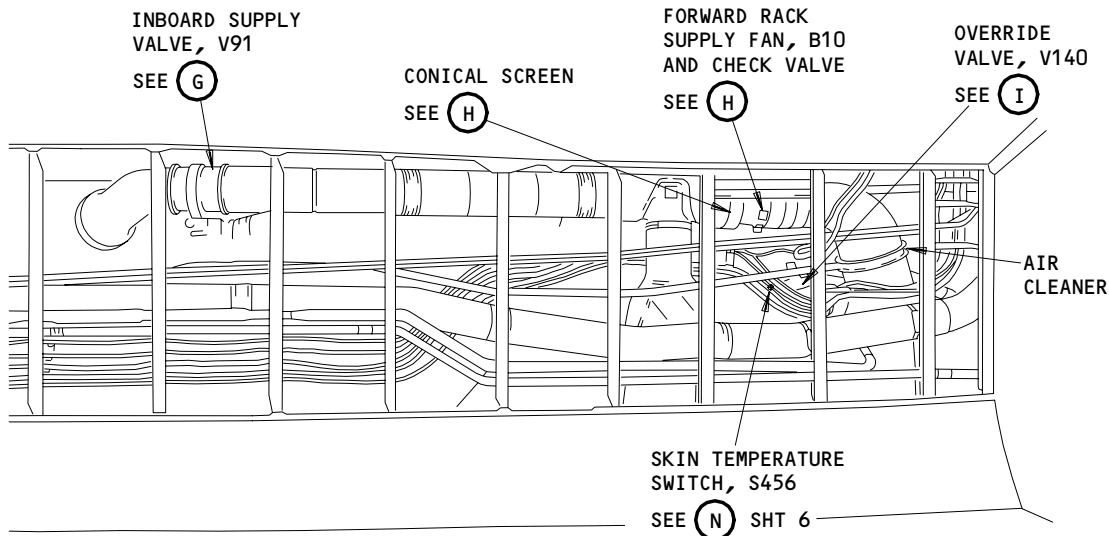
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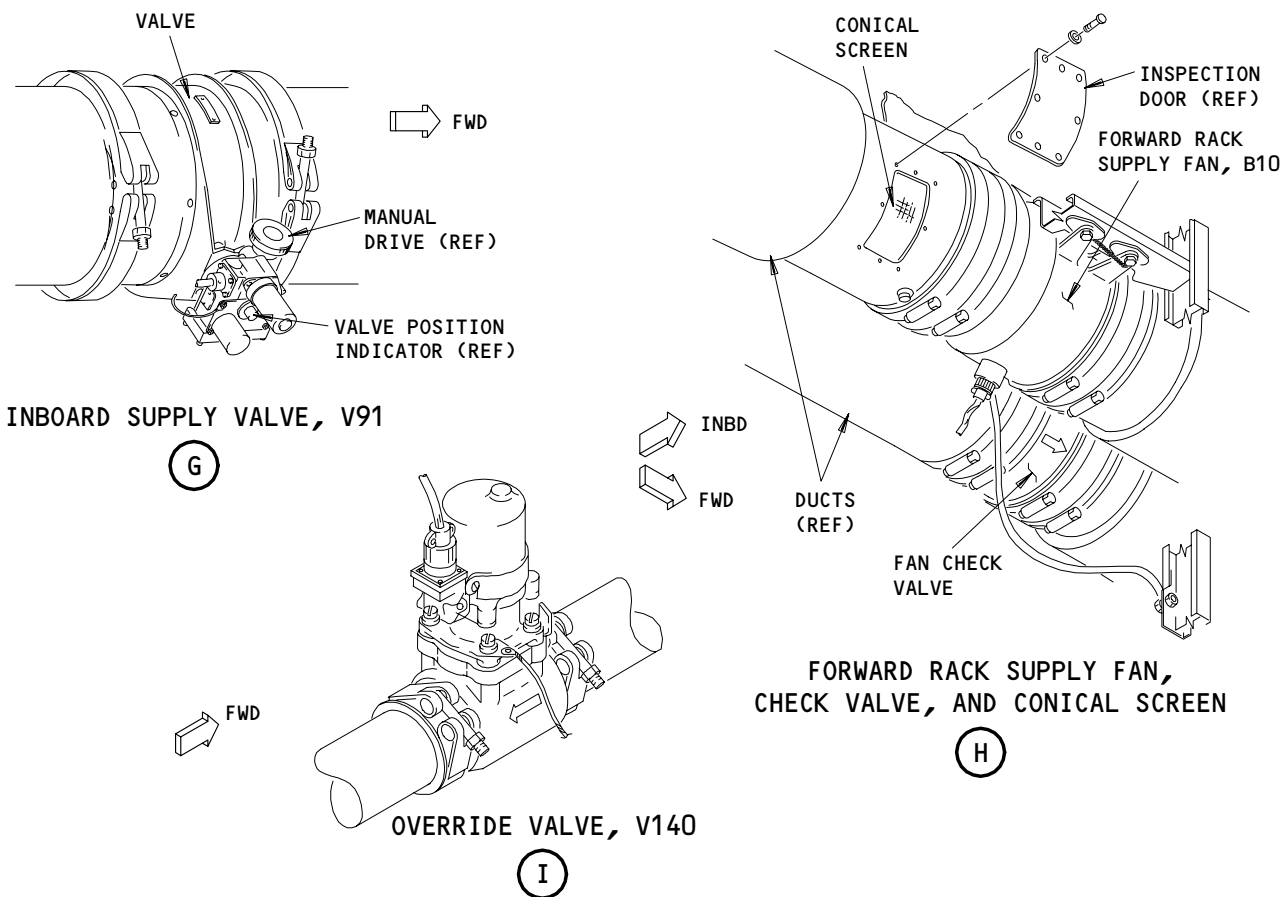
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→ FWD

FORWARD CARGO COMPARTMENT LEFT SIDEWALL

(F) FROM SHT 1



Equipment Cooling - Component Location
Figure 102 (Sheet 4)

EFFECTIVITY

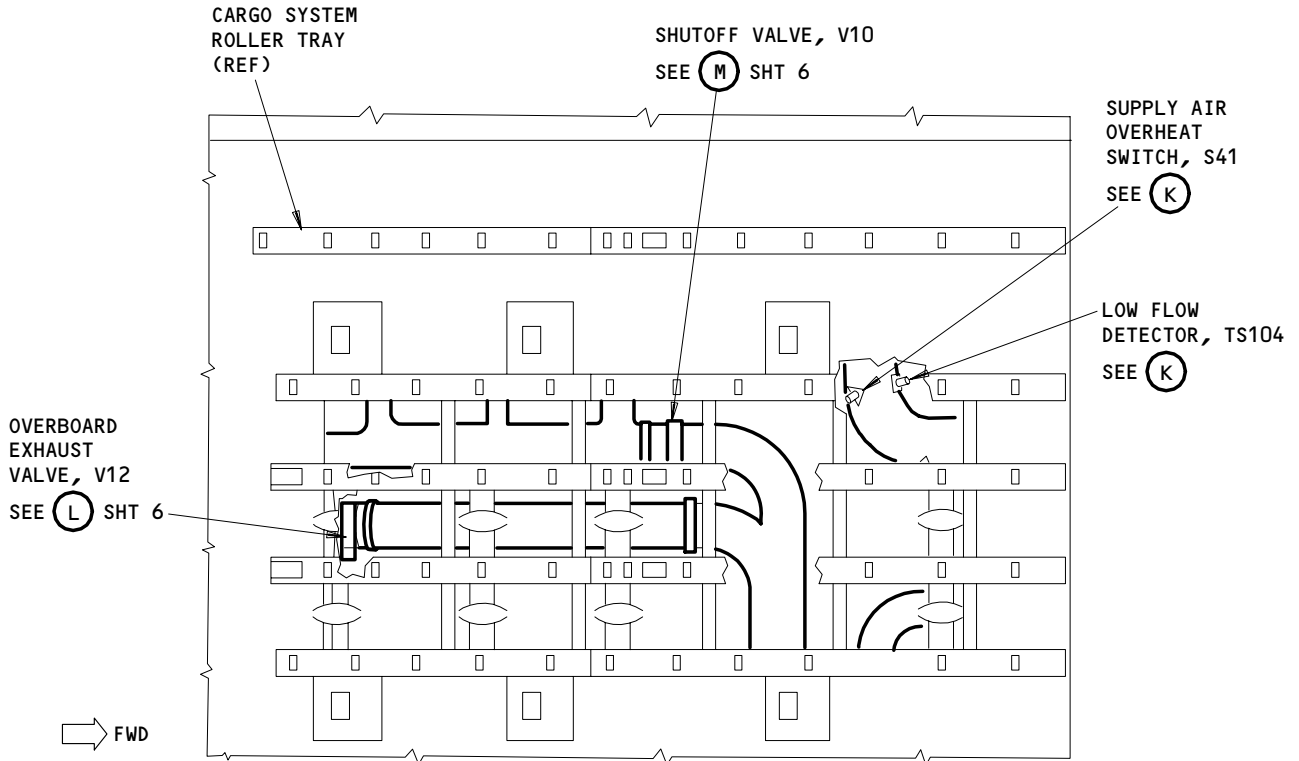
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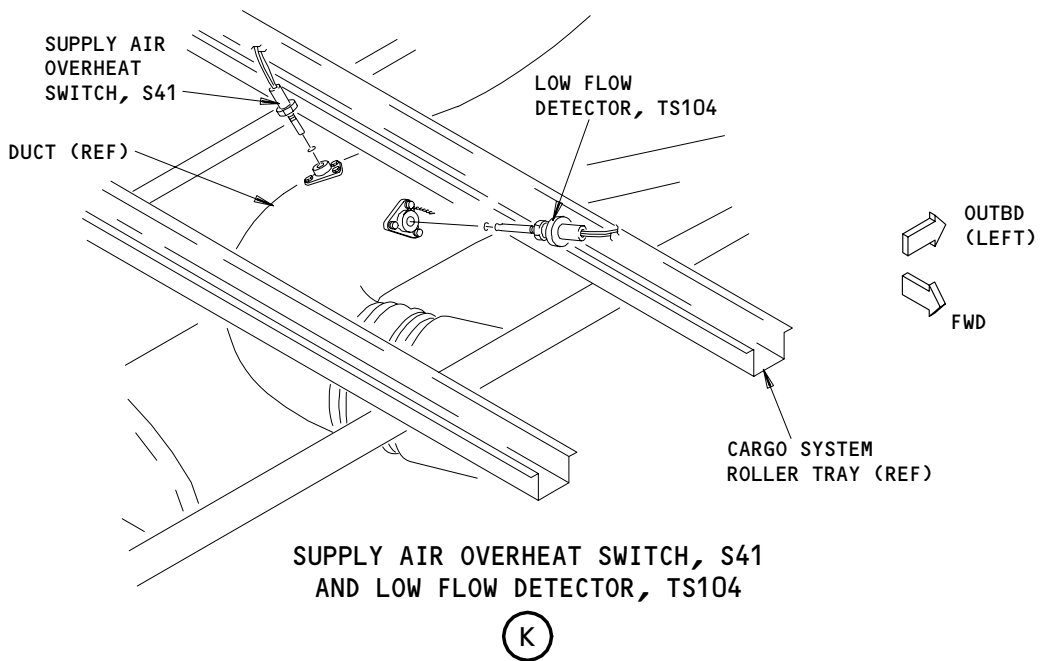
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FORWARD CARGO COMPARTMENT FLOOR

(J) FROM SHT 1



**SUPPLY AIR OVERHEAT SWITCH, S41
AND LOW FLOW DETECTOR, TS104**

(K)

**Equipment Cooling - Component Location
Figure 102 (Sheet 5)**

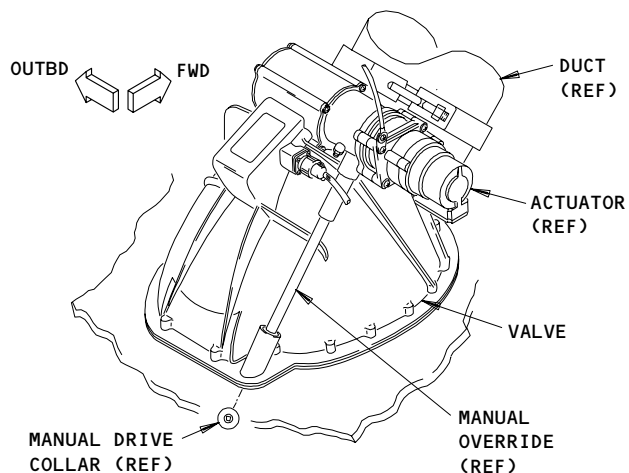
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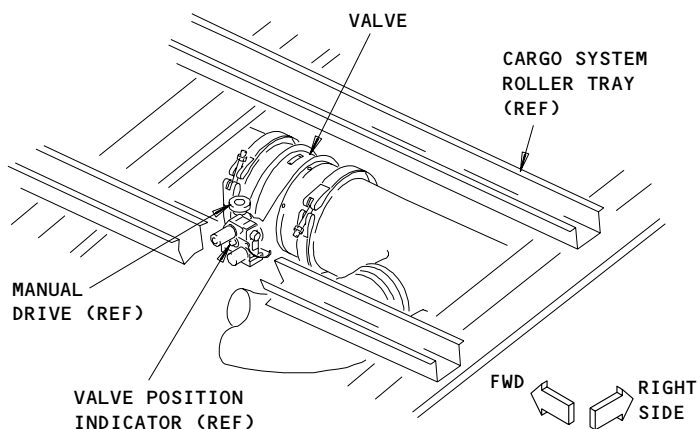
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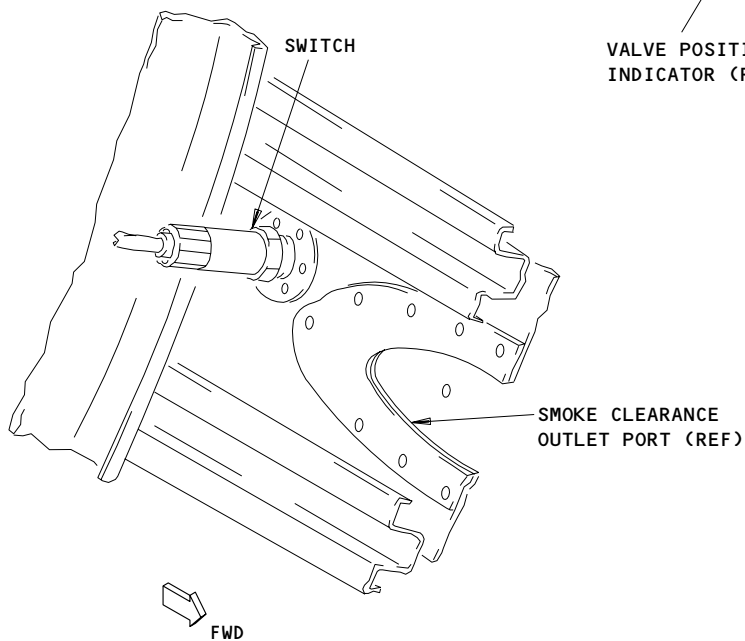
OVERBOARD EXHAUST VALVE, V12

(L) FROM SHT 5



SHUTOFF VALVE, V10

(M) FROM SHT 5



SKIN TEMPERATURE SWITCH, S456

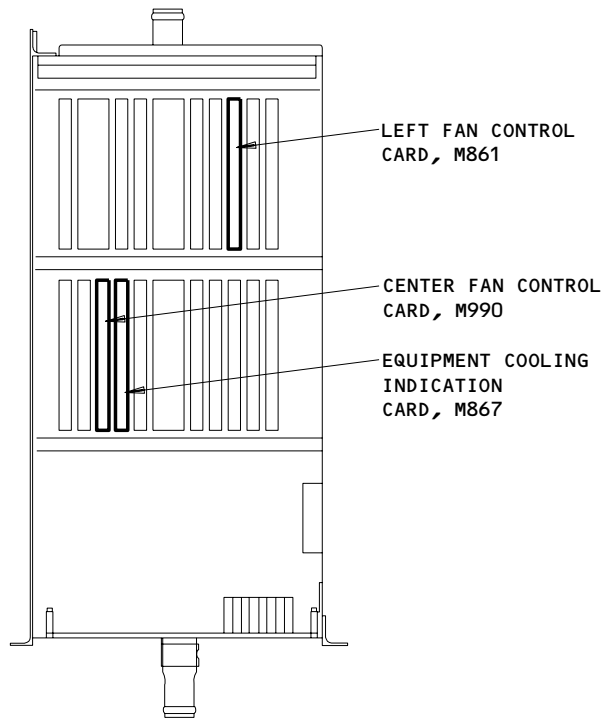
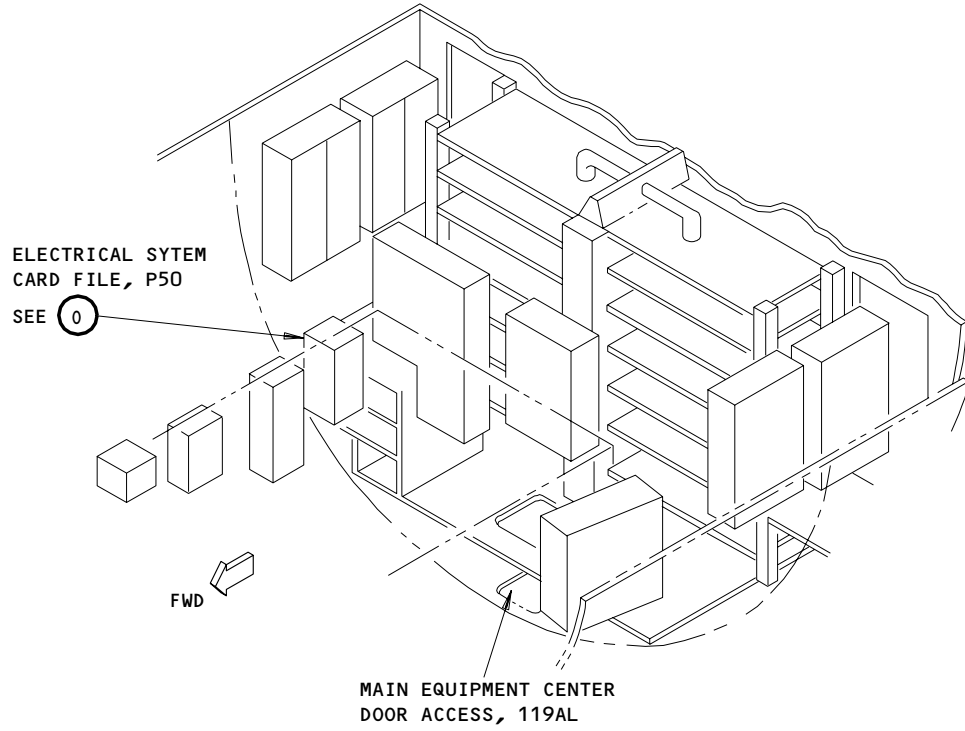
(N) FROM SHT 4

**Equipment Cooling - Component Location
Figure 102 (Sheet 6)**

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ELECTRICAL SYSTEM CARD FILE, P50

①

Equipment Cooling - Component Location
Figure 102 (Sheet 7)

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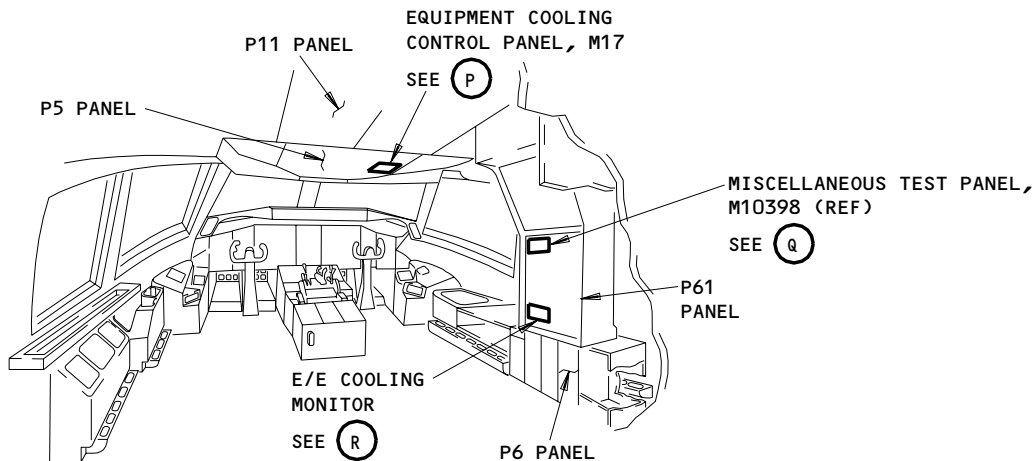
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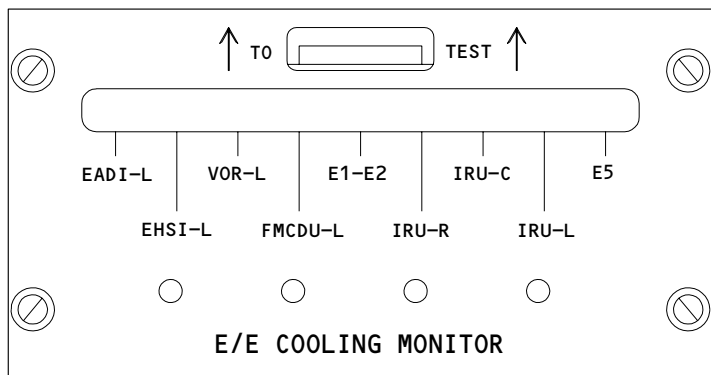
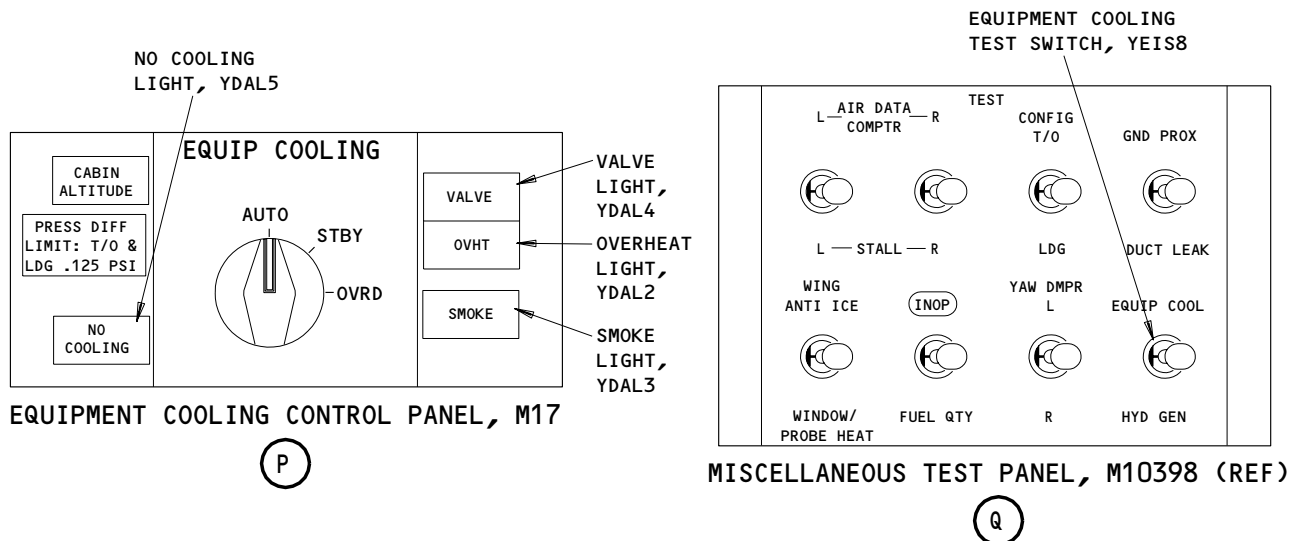
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FLIGHT COMPARTMENT



E/E COOLING MONITOR INDICATOR

(R)

Equipment Cooling - Component Location
Figure 102 (Sheet 8)

EFFECTIVITY	
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EQUIPMENT COOLING SYSTEM – MAINTENANCE PRACTICES

1. General

- A. There is one task in this procedure. This procedure gives the instructions to operate the equipment cooling system on the ground during hot weather conditions.

TASK 21-58-00-802-001

2. Supply Equipment Cooling

A. References

- (1) AMM 21-00-00/201, Air Conditioning

B. Access

- (1) Location Zones
211 Control Cabin, Left
212 Control Cabin, Right

C. Procedure

S 862-019

- (1) When the ambient air temperature is more than 110°F (43°C), do the steps that follow:
(a) Put the EQUIP COOLING selector, on the pilot's overhead panel P5, to AUTO.
(b) Operate the left and right air conditioning packs or supply equivalent ground cooling (AMM 21-00-00/201).

TASK 21-58-00-732-032

3. System Test – E1/E2 Electronic Equipment Rack Pressure

A. General

- (1) This test makes sure that each self in the E1/E2 electronic equipment racks have sufficient pressure to cool the electronic equipment.

B. Special Tools and Equipment

- (1) G21003-1 – Recirculation Fan Filter Differential Gauge
or the equivalent tools listed below:
(a) Portable differential pressure gage – 0 to 10 inches of water
Wallace and Tiernan Model FA141710, P/N 62C-4C-0010
Belleville, New Jersey

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(b) Static pressure probe (0.20 inch maximum diameter)

C. References

- (1) AMM 21-58-22/201, Conical Screen - Maintenance Practices
- (2) AMM 21-58-30/201, Equipment Cooling Air Cleaner - Maintenance Practices.
- (3) AMM 24-22-00/201, Manual Control

D. Access

- (1) Location Zone
 - 117 Main Equipment Center, Left
 - 118 Main Equipment Center, Right

E. Prepare for the Test

S 862-033

- (1) Supply electrical power (AMM 24-22-00/201).

S 862-034

- (2) Make sure the EQUIP COOLING selector on the pilot's overhead panel, P5, is in the AUTO position.

F. E1/E2 Rack Pressure Test

S 732-035

- (1) Put the static pressure probe into the test port on the front of each shelf in the E1/E2 rack.
 - (a) Make sure that each shelf has a minimum pressure of 2.0 inches of water.

NOTE: The above minimum pressure is for standard pressure and temperature. Acceptable conditions for measurement are an ambient temperature of 40°F (4°C) to 90°F (32°C) and -1000 to 2000 feet altitude. If the ambient temperature and altitude are outside of this range then the measured pressure value must be corrected to standard conditions.

- (b) If the pressure at one or more shelves is less than 2.0 inches of water, then do these steps:
 - 1) Make sure there are no leaks at the pressure gauge and the static probe connections.
 - 2) Make sure all the rack mounted equipment is installed.
 - 3) Make sure there are no leaks in and around the shelves.
 - 4) Do an inspection of the conical screens to make sure the conical screens are clean (AMM 21-58-22/201).
 - 5) Clean the equipment cooling air cleaner (AMM 21-58-30/201).
 - 6) Make sure there are no leaks in any equipment cooling air supply ducts.

G. Put the Airplane to its Usual Condition

S 862-036

- (1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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EQUIPMENT COOLING SYSTEM – ADJUSTMENT/TEST

1. General

A. This procedure has these tasks:

- (1) Operational Test – Forward Equipment Cooling System
- (2) Operational Test – Manifold Interconnect Valve and Override Valve
- (3) Operational Test – Differential Pressure Switch
- (4) Operational Test – EQUIP COOL Switch (Manual Test)
- (5) Operational Test – Equipment Cooling Ground Warning Test thru IRS
- (6) System Test – Forward Equipment Cooling System

TASK 21-58-00-705-161

2. Operational Test – Forward Equipment Cooling System

A. Procedure

S 715-160

- (1) Do these tasks for an operational test of the forward equipment cooling system:
 - (a) Operational Test – Manifold Interconnect Valve and Override Valve (para. 3)
 - (b) Operational Test – Differential Pressure Switch (para. 4)
 - (c) Operational Test – EQUIP COOL Switch (Manual test) (para. 5)
 - (d) Operational Test – Equipment Cooling Ground Warning Test thru IRS (para. 6)
 - (e) Operational Test – E/E Cooling Monitor Indicator (AMM 21-58-34/201)

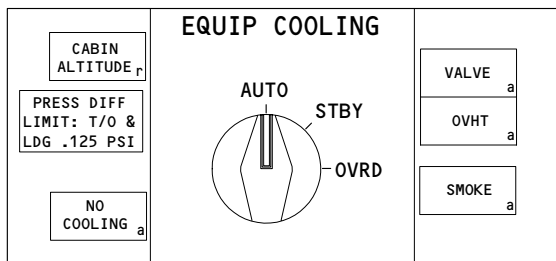
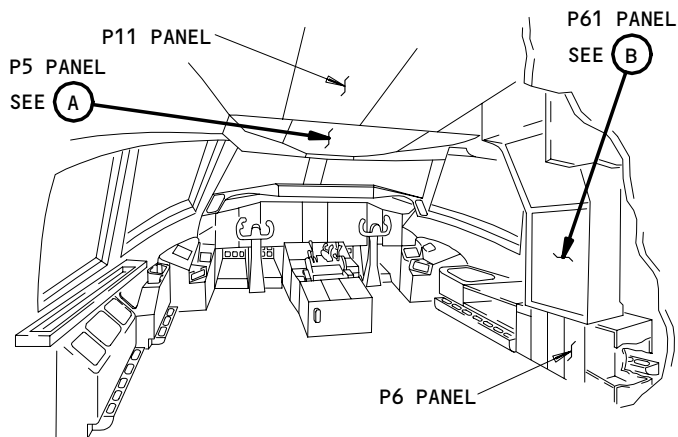
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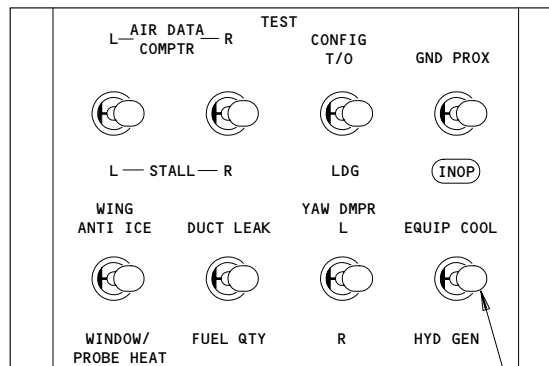
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EQUIPMENT COOLING CONTROL MODULE

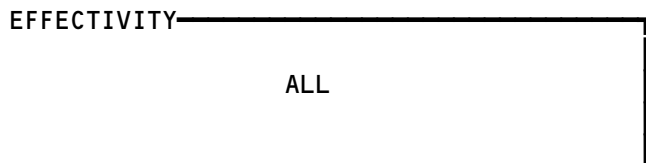
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EQUIPMENT
COOLING TEST
SWITCH

B

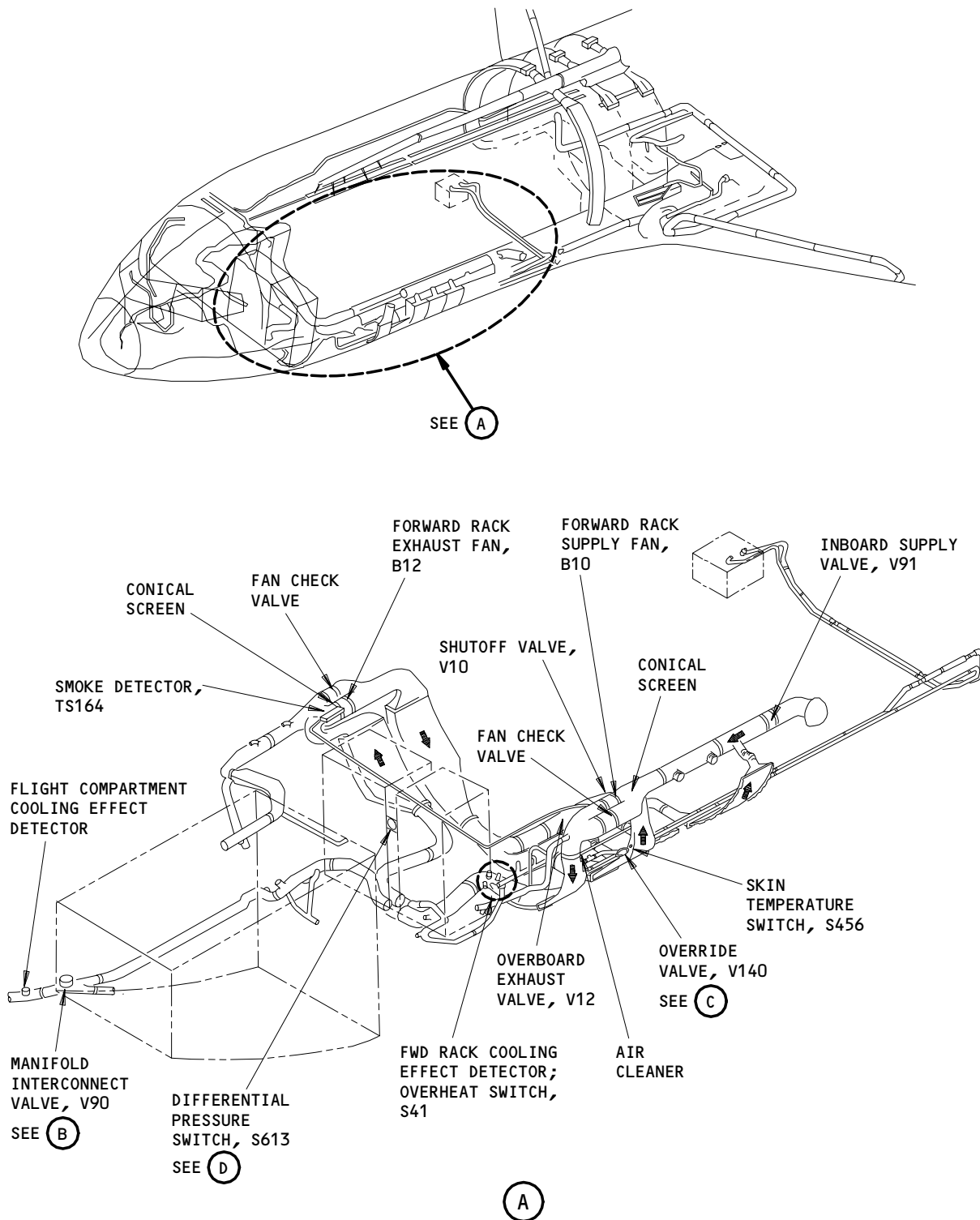
**Equipment Cooling System Flight Deck Test Components
Figure 501**



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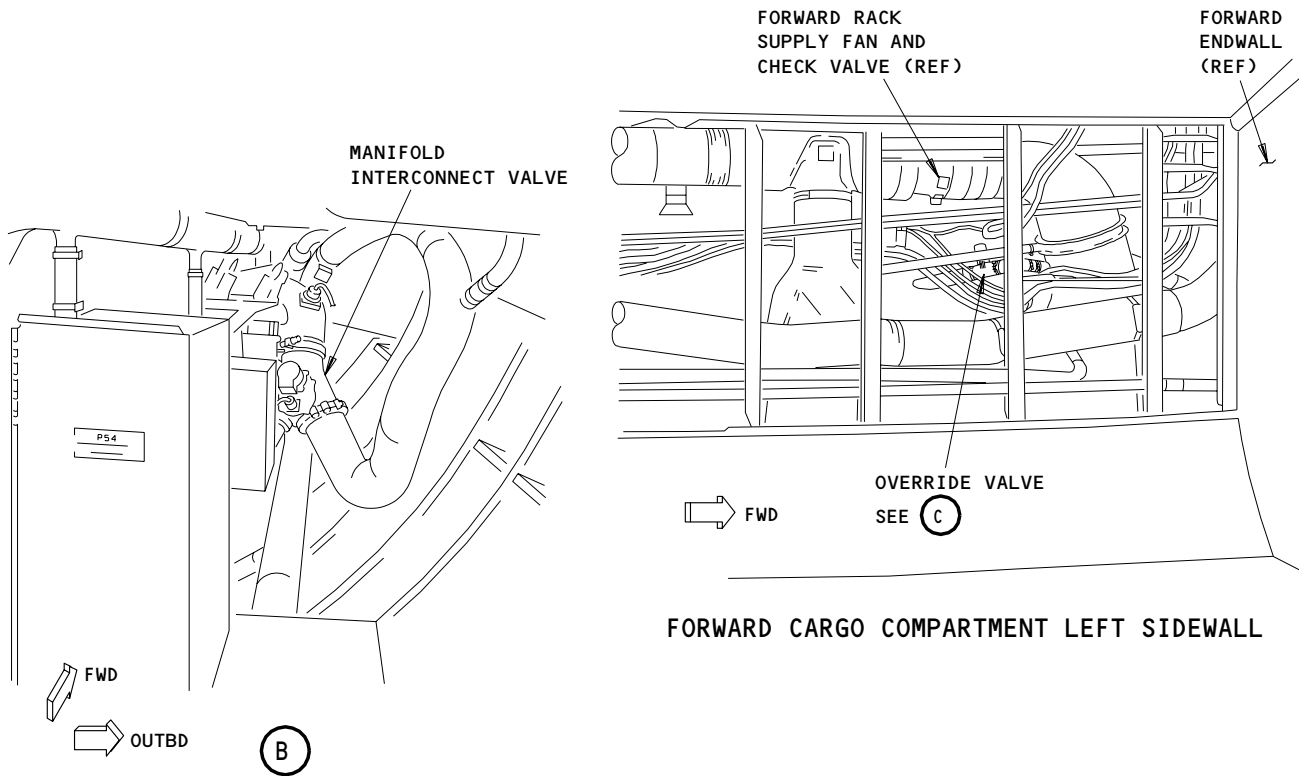
Equipment Cooling System Test Components
Figure 502 (Sheet 1)

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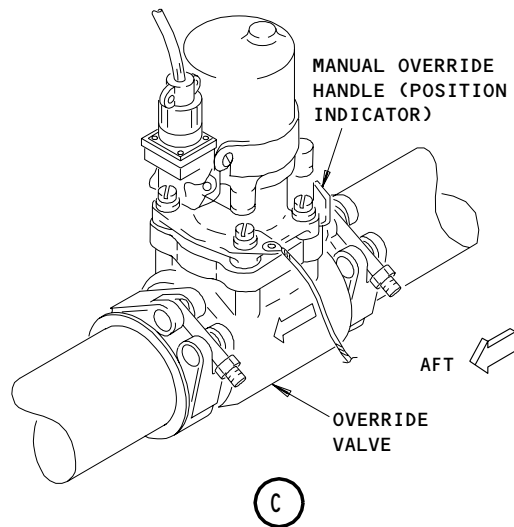
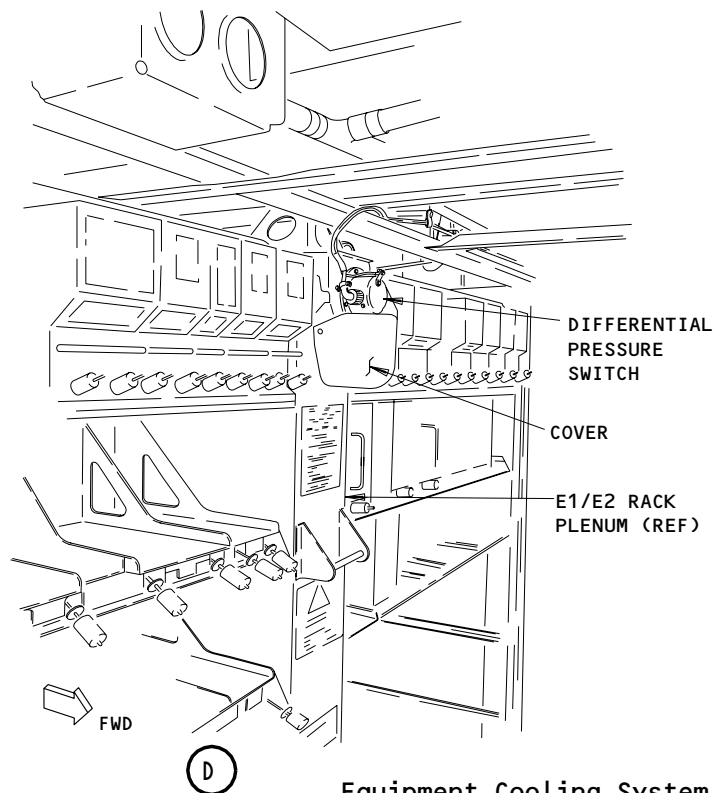
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FORWARD CARGO COMPARTMENT LEFT SIDEWALL



Equipment Cooling System Test Components
Figure 502 (Sheet 2)

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TASK 21-58-00-705-162

3. Operational Test - Manifold Interconnect Valve and Override Valve

A. General

(1) This operational test is for a scheduled maintenance task.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (4) AMM 52-33-00/201, Large Forward Cargo Door

C. Access

(1) Location Zones

- 118 Area Outbd and Above NLG Wheel Well, Right
- 121 Forward Cargo Compartment, Left
- 212 Flight Compartment, Right

(2) Access Panels

- 119AL Main Equipment Center Access Door
- 821 Forward Cargo Compartment Door

D. Prepare for Test

S 865-163

- (1) Make sure these circuit breakers on the main power distribution panel P6 are closed:
 - (a) 6D6, EQUIP COOL GND WARN
 - (b) 6H18, EQUIP COOL SUPPLY FAN 1
 - (c) 6H21, FWD EXH EQUIP COOL FAN

S 865-164

- (2) Make sure these circuit breakers on the overhead circuit breaker panel P11 are closed:
 - (a) 11B8, STBY EQUIP COOL
 - (b) 11C19, EQUIP COOL OVRD
 - (c) 11D15, ENGINE SPEED SENSE L2
 - (d) 11D16, ENGINE SPEED SENSE R2
 - (e) 11D23, ENGINE SPEED SENSE L1
 - (f) 11D24, ENGINE SPEED SENSE R1
 - (g) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
 - (h) 11P13, EQUIPMENT COOLING OUTBD VALVES
 - (i) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND
 - (j) 11P22, EQUIPMENT COOLING EXH FAN FWD
 - (k) EICAS circuit breakers (6 places)

S 865-165

- (3) Put the EQUIP COOLING mode selector on the pilots' overhead P5 panel to AUTO.

S 865-166

- (4) Supply electrical power (AMM 24-22-00/201).

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S 015-167

- (5) Get access to the manifold interconnect valve (V90) along the right sidewall in the main equipment center.
 - (a) Open the main equipment center door 119AL (AMM 06-41-00/201).
 - (b) Find the manifold interconnect valve on the right side of the nose gear wheel well bulkhead.
 - (c) Make sure the manifold interconnect valve position indicator is in the "A TO B" (closed) position.

S 015-168

- (6) Get access to the smoke clearance/override valve (V140) along the left sidewall in the forward cargo compartment.
 - (a) Open the forward cargo door (AMM 52-33-00/201).
 - (b) Remove the left cargo compartment sidewall lining approximately four feet aft of forward bulkhead (AMM 25-52-01/401).
 - (c) Find the override valve.
 - (d) Make sure the override valve manual override handle is in CLOSE.

E. Do a Test of the Manifold Interconnect Valve and Override Valve

S 715-169

CAUTION: DO NOT KEEP THE EQUIP COOLING MODE SELECTOR IN "OVRD" POSITION FOR MORE THAN FIVE (5) MINUTES. IN "OVRD" POSITION, THE EQUIPMENT COOLING FANS STOP OPERATING. EXTENDED OPERATION OF THE AVIONICS ELECTRICAL EQUIPMENT WITHOUT SUFFICIENT COOLING AIR FROM THE EQUIPMENT COOLING FANS CAN CAUSE DAMAGE TO THE AVIONICS ELECTRICAL EQUIPMENT.

- (1) Put the EQUIP COOLING mode selector on P5 panel to OVRD.
 - (a) After one minute, make sure the following occurs:
 - 1) Override valve manual override handle has moved to OPEN.
 - 2) Manifold interconnect valve position indicator is in the "C TO B" (open) position.

S 715-170

- (2) Put the EQUIP COOLING mode selector on the P5 panel to AUTO.
 - (a) After one minute, make sure the following occurs:
 - 1) Override valve manual override handle has moved to CLOSE.
 - 2) Manifold interconnect valve position indicator is in the "A TO B" (closed) position.

F. Put the Airplane Back to Its Usual Condition

S 415-171

- (1) Install the cargo compartment sidewall lining that was removed (AMM 25-52-01/401).

S 415-172

- (2) Close the forward cargo door (AMM 52-33-00/201).

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- S 415-173
- (3) Close the main equipment center door, 119AL.
- S 865-174
- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-58-00-705-175

4. Operational Test - Differential Pressure Switch

A. General

(1) This operational test is for a scheduled maintenance task.

B. Equipment

(1) Vacuum source with gauge, capacity: 0 to 2.0 inch water differential pressure minimum, commercially available.

C. References

(1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electrical Power Control

D. Access

(1) Location Zones

119 Main Equipment Center, Left
120 Main Equipment Center, Right
212 Flight Compartment, Right

(2) Access Panels

119AL Main Equipment Center Access Door

E. Prepare for Test

S 865-176

(1) Make sure these circuit breakers on the main power distribution panel P6 are closed:

(a) 6D6, EQUIP COOL GND WARN
(b) 6H18, EQUIP COOL SUPPLY FAN 1
(c) 6H21, FWD EXH EQUIP COOL FAN

S 865-177

(2) Make sure these circuit breakers on the overhead circuit breaker panel P11 are closed:

(a) 11B8, STBY EQUIP COOL
(b) 11C19, EQUIP COOL OVRD
(c) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
(d) 11P13, EQUIPMENT COOLING OUTBD VALVES
(e) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND
(f) 11P22, EQUIPMENT COOLING EXH FAN FWD
(g) EICAS circuit breakers (6 places)

S 865-178

(3) Put the EQUIP COOLING mode selector on the pilots' overhead P5 panel to AUTO.

S 865-179

(4) Supply electrical power (AMM 24-22-00/201).

S 015-180

(5) Get access to the differential pressure switch (S613) in the main equipment center.

(a) Open the main equipment center door 119AL (AMM 06-41-00/201).

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- (b) Find the differential pressure switch on the air plenum of E1/E2 rack.
 - (c) Remove the cover from the differential pressure switch.
- F. Test the Differential Pressure Switch

S 025-181

- (1) Disconnect the sense tube at the differential pressure switch.

S 485-182

- (2) Connect the vacuum source to the differential pressure switch at the sense tube connection.

S 715-183

CAUTION: DO NOT KEEP THE EQUIP COOLING MODE SELECTOR IN "OVRD" POSITION FOR MORE THAN FIVE (5) MINUTES. IN "OVRD" POSITION, THE EQUIPMENT COOLING FANS STOP OPERATING. EXTENDED OPERATION OF THE AVIONICS ELECTRICAL EQUIPMENT WITHOUT SUFFICIENT COOLING AIR FROM THE EQUIPMENT COOLING FANS CAN CAUSE DAMAGE TO THE AVIONICS ELECTRICAL EQUIPMENT.

- (3) Put the EQUIP COOLING mode selector on the P5 panel to OVRD.
 - (a) After one minute, make sure the following occurs:
 - 1) Equip Cooling NO COOLING light on P5 panel comes on
 - 2) Ground crew call horn operates
 - 3) EICAS caution message FWD EQPT COOLING shows.

S 715-184

CAUTION: APPLY A VACUUM SLOWLY TO AVOID DAMAGE TO THE PRESSURE SWITCH.

- (4) Slowly apply a vacuum of 2.0 inches water differential pressure to the differential pressure switch.
 - (a) Make sure that the NO COOLING light on the P5 panel goes off.
 - (b) Make sure that the ground crew call horn still operates.

S 715-185

- (5) Reduce the vacuum and make sure that the NO COOLING light comes on.

S 715-186

- (6) Put the EQUIP COOLING mode selector on the P5 panel to AUTO.
 - (a) After one minute, make sure the following occurs:
 - 1) Equip Cooling NO COOLING light goes off
 - 2) Ground crew call horn shuts off
 - 3) EICAS caution message FWD EQPT COOLING does not show.

S 085-187

- (7) Disconnect the vacuum source from the differential pressure switch.

S 425-188

- (8) Connect the sense tube to the differential pressure switch.

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S 425-189

(9) Install the cover for the differential pressure switch.

G. Put the Airplane Back to Its Usual Condition

S 415-190

(1) Close the main equipment center door 119AL (AMM 06-41-00/201).

S 865-191

(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-58-00-705-192

5. Operational Test - EQUIP COOL Switch (Manual Test)

A. General

(1) This operational test is for a scheduled maintenance task.

B. References

(1) AMM 24-22-00/201, Electrical Power Control

(2) AMM 31-41-00/201, Engine Indication and Crew Alerting System.

C. Access

(1) Location Zones

212 Flight Compartment, Right

D. Prepare for Test

S 865-193

(1) Make sure these circuit breakers on the main power distribution panel P6 are closed:

(a) 6D6, EQUIP COOL GND WARN

(b) 6H18, EQUIP COOL SUPPLY FAN 1

(c) 6H21, FWD EXH EQUIP COOL FAN

S 865-194

(2) Make sure these circuit breakers on the overhead circuit breaker panel P11 are closed:

(a) 11B8, STBY EQUIP COOL

(b) 11C19, EQUIP COOL OVRD

(c) 11D15, ENGINE SPEED SENSE L2

(d) 11D16, ENGINE SPEED SENSE R2

(e) 11D23, ENGINE SPEED SENSE L1

(f) 11D24, ENGINE SPEED SENSE R1

(g) 11P11, EQUIPMENT COOLING SUPPLY FAN 1

(h) 11P13, EQUIPMENT COOLING OUTBD VALVES

(i) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND

(j) 11P22, EQUIPMENT COOLING EXH FAN FWD

(k) EICAS circuit breakers (6 places)

S 865-195

(3) Put the EQUIP COOLING mode selector on the pilots' overhead P5 panel to AUTO.

S 865-196

(4) Supply electrical power (AMM 24-22-00/201).

E. Test the EQUIP COOL Switch (Manual Test)

S 865-197

(1) Push the EICAS MAINT ECS/MSG switch on the P61 panel.

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S 715-198

- (2) Move the EQUIP COOL test switch on the right side P61 panel to the EQUIP COOL position and hold.
 - (a) Make sure these indications show:
 - 1) OVHT and SMOKE lights on P5 panel come on.
 - 2) EICAS advisory messages, FWD EQPT OVHT and FWD EQPT SMOKE show.
 - 3) EICAS maintenance messages, FWD EQ SUP FLOW and FLT DK SUP FLOW show after 30 seconds.
 - 4) After 30 seconds you hear the ground crew call horn.

S 715-199

- (3) Release the EQUIP COOL test switch.
 - (a) Make sure these conditions occur:
 - 1) OVHT and SMOKE lights on the P5 panel go off.
 - 2) EICAS advisory messages, FWD EQPT OVHT and FWD EQPT SMOKE do not show.
 - 3) You do not hear the ground-crew-call horn.

S 715-200

- (4) Do the EICAS maintenance message erase procedure for these EICAS messages (AMM 31-41-00/201):
 - (a) EICAS maintenance messages, FWD EQ SUP FLOW and FLT DK SUP FLOW

S 865-215

- (5) AIRPLANES PRE-SB 21-105;
Open and close the following circuit breaker on the P6 panel to restore fan operation, if the galley chiller exhaust fan, aft equip/lav/galley vent fans or bulk cargo vent fan have shutdown when airplane is in SMOKE mode.
 - (a) 6B7, CHILLER SHUTDOWN CONT

F. Put the Airplane Back to Its Usual Condition

S 865-201

- (1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-58-00-705-202

6. Operational Test - Equipment Cooling Ground Warning Test thru IRS

A. References

- (1) AMM 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zones
211 Flight Compartment, Left

C. Prepare for Test

S 865-203

CAUTION: WHEN THE IRU MODE SELECT SWITCH IS IN THE "NAV" POSITION, YOU MUST PULL AND TURN IT TO SET IT TO A NEW POSITION. THIS PREVENTS DAMAGE TO THE SWITCH.

- (1) Make sure the IRS MODE SEL switches (L,C,R) are set to OFF at the Inertial Reference Mode Panel/IRMP (M59, P5 panel).

S 865-204

- (2) Make sure this circuit breaker is closed on the P6 panel:
(a) 6D6, EQUIP COOL GND WARN

S 865-205

- (3) Supply electrical power (AMM 24-22-00/201).

S 865-206

- (4) Open these circuit breakers on the P11 panel and attach DO-NOT-CLOSE tags:
(a) 11C19, EQUIP COOL OVRD
(b) 11P21, EQUIP COOL OVHT/SMOKE/VALVE IND

D. Equipment Cooling Ground Warning Test thru IRS

S 715-207

CAUTION: WHEN THE IRU MODE SELECT SWITCH IS IN THE "NAV" POSITION, YOU MUST PULL AND TURN IT TO SET IT TO A NEW POSITION. THIS PREVENTS DAMAGE TO THE SWITCH.

- (1) Turn the L(C,R) IRS MODE SEL switch to the ALIGN position.
(a) After two seconds, make sure you hear the ground-crew call horn.

S 715-208

- (2) Turn the L(C,R) IRS MODE SEL switch to the OFF position.
(a) Make sure you do not hear the ground-crew call horn.

S 715-209

- (3) Do the test again but use the C IRS MODE SEL switch.

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S 715-210

- (4) Do the test again but use the R IRS MODE SEL switch.
E. Put the Airplane Back to Its Usual Condition

S 865-211

- (1) Remove the DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:
(a) 11C19, EQUIP COOL OVRD
(b) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND

S 865-212

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-58-00-705-105

7. System Test – Equipment Cooling System

A. General

- (1) The task contains the following tests for the Forward Equipment Cooling System:
 - (a) Supply Fan/Exhaust Fan Test
 - (b) Overheat, Low Flow, and Smoke Indication Test
 - (c) EQUIP COOL Switch Test (Manual test)
 - (d) STBY Mode Test
 - (e) OVRD Mode Test (Smoke Clearance)
 - (f) Fuel Jettison Test
 - (g) AUTO Mode Tests
 - 1) AUTO Mode Test with simulated engine run
 - 2) Pre-flight cooling failure indication test
 - (h) E/E Cooling Monitor Indicator Test
 - (i) Air Cleaner Test (purge tube airflow check)
 - (j) Duct Air Leakage Test

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 32-09-02/201, Air/Ground Relays
- (6) AMM 52-33-00/201, Large Forward Cargo Door

C. Access

- (1) Location Zone
821, Forward cargo door

D. Prepare to Test

S 865-020

- (1) Put the EQUIP COOLING selector on pilots' overhead P5 panel to AUTO.

S 865-021

- (2) Supply electrical power (Ref 24-22-00).

S 865-022

- (3) Make sure that these circuit breakers on the main power distribution panel P6 are closed:
 - (a) 6D6, EQUIP COOL GND WARN
 - (b) 6H18, EQUIP COOL SUPPLY FAN 1
 - (c) 6H21, FWD EXH EQUIP COOL FAN

S 865-023

- (4) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11B8, STBY EQUIP COOL
 - (b) 11C19, EQUIP COOL OVRD
 - (c) 11D15, SPEED SENSE L2
 - (d) 11D16, SPEED SENSE R2
 - (e) 11D23, ENGINE SPEED SENSE L1

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- (f) 11D24, ENGINE SPEED SENSE R1
- (g) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
- (h) 11P13, EQUIPMENT COOLING OUTBD VALVES
- (i) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND
- (j) 11P22, EQUIPMENT COOLING EXH FAN FWD

S 865-024

- (5) Make sure that these EICAS circuit breakers (6 places) on P11 panel are closed.

S 865-027

- (6) Push the EICAS MAINT ESC/MSG switch on the right side P61 panel.

S 015-028

- (7) Open the main equipment center door 119AL (AMM 06-41-00/201).

S 015-029

- (8) Open the forward cargo door (AMM 52-33-00/201).

S 015-030

- (9) Open the forward equipment bay access door 113AL (AMM 06-41-00/201).

S 715-147

- (10) Put the EQUIP COOLING mode selector on the P5 panel to AUTO.

S 715-148

- (11) Disconnect the electrical connector D3074 from skin temperature switch (S456) to simulate an outside ambient temperature condition more than 45F (7C).

NOTE: Skin temperature switch (S456) is located along left forward cargo compartment sidewall aft of the smoke clearance/override valve (V140).

- (a) Make sure that the supply and exhaust fans operate.

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E. Supply Fan/Exhaust Fan Test

S 715-145

- (1) Fan failure and overheat test (STBY mode):
- (a) Put the EQUIP COOLING switch on the P5 panel to STBY.
 - (b) Make sure that the following fan and valve conditions occur:

NOTE: The VALVE light on the Equipment Cooling module (M17, P5 panel) and the EICAS advisory message FWD EQPT VAL will show when the valves move and will extinguish after 10-20 seconds.

- 1) Supply Fan (B10) - ON
 - 2) Exhaust Fan (B12) - ON
 - 3) Shutoff Valve (V178) - OPEN
 - 4) Inboard Supply Valve (V91) - CLOSED
 - 5) Overboard Exhaust Valve (V12) - CLOSED
 - 6) Smoke Clearance/Override Valve (V140) - CLOSED
 - 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)
- (c) Disconnect electrical connector D446 from supply fan to simulate a fan failure/overheat condition.
- (d) Make sure that the following fan and valve conditions occur:
- 1) Supply Fan (B10) - OFF
 - 2) Exhaust Fan (B12) - ON
 - 3) Shutoff Valve (V178) - OPEN
 - 4) Inboard Supply Valve (V91) - CLOSED
 - 5) Overboard Exhaust Valve (V12) - CLOSED
 - 6) Smoke Clearance/Override Valve (V140) - CLOSED
 - 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)
- (e) Connect the electrical connector D446 to the supply fan.
- (f) To unlatch the supply fan, open and close this circuit breaker on the P11 panel:
- 1) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
- (g) Make sure that the following fan and valve conditions occur:
- 1) Supply Fan (B10) - ON
 - 2) Exhaust Fan (B12) - ON
 - 3) Shutoff Valve (V178) - OPEN
 - 4) Inboard Supply Valve (V91) - CLOSED
 - 5) Overboard Exhaust Valve (V12) - CLOSED
 - 6) Smoke Clearance/Override Valve (V140) - CLOSED
 - 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)

S 715-144

- (2) Fan failure and overheat test (AUTO mode):
- (a) Put the EQUIP COOLING switch on the P5 panel to AUTO.
 - (b) Disconnect the electrical connector D446 from the supply fan to simulate a fan failure/overheat condition.
 - (c) Make sure that within 1 minute the Equip Cooling OVHT light on the P5 panel comes on and the EICAS advisory message FWD EQPT OVHT shows.
 - (d) Connect the electrical connector D446 to the supply fan.

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- (e) Make sure that the Equip Cooling OVHT light on the P5 panel stay on and EICAS advisory message FWD EQPT OVHT continue to show.
- (f) To unlatch the supply fan, open and close this circuit breaker on the P11 panel:
 - 1) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
- (g) Make sure that the Equip Cooling OVHT light on the P5 panel goes off and the EICAS advisory message FWD EQPT OVHT does not show.
- (h) Make sure that the following fan and valve conditions occur:
 - 1) Supply Fan (B10) - ON
 - 2) Exhaust Fan (B12) - ON
 - 3) Inboard Supply Valve (V91) - OPEN
 - 4) Overboard Exhaust Valve (V12) - OPEN
 - 5) Smoke Clearance/Override Valve (V140) - CLOSED
 - 6) Shutoff Valve (V178) - CLOSED
 - 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)
- (i) Install a jumper wire between pins 1 and 2 of electrical connector D3074 for the skin temperature switch (S456) to simulate an outside ambient temperature less than 45F (7C).
- (j) Make sure that the following fan and valve conditions occur:
 - 1) Supply Fan (B10) - ON
 - 2) Exhaust Fan (B12) - ON
 - 3) Inboard Supply Valve (V91) - OPEN
 - 4) Shutoff Valve (V178) - OPEN
 - 5) Overboard Exhaust Valve (V12) - CLOSED
 - 6) Smoke Clearance/Override Valve (V140) - CLOSED
 - 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)

CAUTION: DO NOT SIMULATE A DUAL FAILURE CONDITION OF THE SUPPLY AND EXHAUST FANS FOR MORE THAN FIVE (5) MINUTES. IF THE SUPPLY AND EXHAUST FANS ARE INOPERATIVE FOR MORE THAN FIVE (5) MINUTES DURING THE TEST, DAMAGE AND FAILURE OF THE ELECTRONIC EQUIPMENT CAN OCCUR DUE TO OVERHEATING CAUSED BY NO COOLING AIRFLOW SUPPLIED FROM THE FANS TO THE ELECTRONIC EQUIPMENT.

- (k) Disconnect the electrical connector D446 from the supply fan and electrical connector D544 from the exhaust fan to simulate a dual fan failure/overheat condition.
- (l) Make sure that within 1 minute the Equip Cooling OVHT light on P5 panel comes on and the EICAS advisory message FWD EQPT OVHT shows.
- (m) Connect the electrical connector D446 to the supply fan and D544 to the exhaust fan.
- (n) Make sure that the Equip Cooling OVHT light on P5 panel is on and the EICAS advisory message FWD EQPT OVHT continues to show.
- (o) To unlatch the supply fan and exhaust fan, open and close these circuit breakers on the P11 panel:
 - 1) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
 - 2) 11P22, EQUIPMENT COOLING EXH FAN FWD

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- (p) Make sure that the Equip Cooling OVHT light on the P5 panel goes off and the EICAS advisory message FWD EQPT OVHT does not show.
- (q) Make sure that the following fan and valve conditions occur:
 - 1) Supply Fan (B10) - ON
 - 2) Exhaust Fan (B12) - ON
 - 3) Inboard Supply Valve (V91) - OPEN
 - 4) Shutoff Valve (V178) - OPEN
 - 5) Overboard Exhaust Valve (V12) - CLOSED
 - 6) Smoke Clearance/Override Valve (V140) - CLOSED
 - 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)

S 715-146

- (3) Fan failure and automatic fan switchover test (Air mode):

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (b) Do the flight mode simulation procedure for the No. 1 and 2 air/ground relay systems (AMM 32-09-02/201).
- (c) Make sure that the following fan and valve conditions occur:
 - 1) Exhaust Fan (B12) - ON
 - 2) Supply Fan (B10) - OFF
 - 3) Shutoff Valve (V178) - OPEN
 - 4) Inboard Supply Valve (V91) - CLOSED
 - 5) Overboard Exhaust Valve (V12) - CLOSED
 - 6) Smoke Clearance/Override Valve (V140) - CLOSED
 - 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)
- (d) Disconnect the exhaust fan ground wire from GD1264-DC to simulate a fan failure/overheat condition.

NOTE: GD1264-DC is located on burndy block inboard of exhaust fan, at ceiling level, on the back side of sidewall lining frame.

- 1) Make sure that the exhaust fan stops and within 15 seconds, supply fan operates.
- 2) Make sure that the EICAS status and maintenance messages FWD EQ EXH FAN show.

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- (e) Connect the exhaust fan ground wire to GD1264-DC to remove the fan failure/overheat simulate condition.
 - 1) Make sure that the exhaust fan does not operate, and the supply fan operates.
 - 2) Make sure that the EICAS status and maintenance messages FWD EQ EXH FAN show.
- (f) Put the EQUIP COOLING selector on the P5 panel to STBY.
 - 1) Make sure that the exhaust fan does not operate, and the supply fan operates.
 - 2) Make sure that the EICAS status and maintenance messages FWD EQ EXH FAN do not show.
- (g) To unlatch the exhaust fan, put the EQUIP COOLING selector on the P5 panel to AUTO.
 - 1) Make sure that the exhaust fan operates and supply fan stops.
- (h) Put the EQUIP COOLING selector on the P5 panel to STBY.
 - 1) Make sure that the supply fan operates and exhaust fan stops.
- (i) Disconnect the supply fan ground wire from GD3980-DC to simulate a fan failure/overheat condition.

NOTE: GD3980-DC is located on burndy block below the skin temperature switch (S456) on airplane rib.

- 1) Make sure that the supply fan stops and exhaust fan operates within 15 seconds.
 - 2) Make sure that the EICAS status and maintenance messages FWD EQ SUP FAN 1 show.
- (j) Connect supply fan ground wire to GD 3980-DC.
 - 1) Make sure that the exhaust fan operates and the supply fan does not operate.
 - 2) Make sure that the EICAS status and maintenance messages FWD EQ SUP FAN 1 show.
 - (k) Put the EQUIP COOLING mode selector on P5 panel to AUTO.
 - 1) Make sure that the exhaust fan operates and the supply fan does not operate.
 - 2) Make sure that the EICAS status and maintenance messages FWD EQ SUP FAN 1 do not show.
 - (l) To unlatch the supply fan, put the EQUIP COOLING mode selector to STBY.
 - 1) Make sure the supply fan operates and the exhaust fan does not operate.
 - (m) Make sure that the No. 1 and 2 air/ground relay systems are still in the air (flight) mode.
 - (n) Put the EQUIP COOLING mode selector to AUTO.
 - (o) Make sure that the following fan and valve conditions occur:
 - 1) Exhaust fan (B12) - ON
 - 2) Supply fan (B10) - OFF
 - 3) Shutoff Valve (V178) - OPEN
 - 4) Inboard Supply Valve (V91) - CLOSED
 - 5) Overboard Exhaust Valve (V12) - CLOSED

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- 6) Smoke Clearance/Override Valve (V140) - CLOSED
- 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)
- (p) Open this P6 panel circuit breaker and attach DO-NOT-CLOSE tag, to simulate an exhaust fan current sensor failure condition:
 - 1) 6H21, FWD EXH EQUIP COOL FAN
- (q) Make sure that the exhaust fan stops and the supply fan operates in less than 15 seconds.
- (r) Make sure that the EICAS status and maintenance messages FWD EQ EXH FAN show.
- (s) Remove DO-NOT-CLOSE tag and close this P6 panel circuit breaker to remove the simulated exhaust fan current sensor failure condition:
 - 1) 6H21, FWD EXH EQUIP COOL FAN
- (t) Make sure that the exhaust fan does not operate, and supply fan operates.
- (u) Make sure that the EICAS status and maintenance messages FWD EQ EXH FAN show.
- (v) Put the EQUIP COOLING selector on P5 panel to STBY.
 - 1) Make sure that the supply fan operates and the exhaust fan does not operate.
 - 2) Make sure that the EICAS status and maintenance messages FWD EQ EXH FAN do not show.
- (w) To unlatch the exhaust fan, put the EQUIP COOLING mode selector on the P5 panel to AUTO.
 - 1) Make sure that the exhaust fan operates and supply fan stops.
- (x) Put the EQUIP COOLING selector on the P5 panel to STBY.
 - 1) Make sure that the supply fan operates and exhaust fan stops.
- (y) Open this P6 panel circuit breaker and attach DO-NOT-CLOSE tag to simulate a supply fan current sensor failure condition:
 - 1) 6H18, EQUIP COOL SUPPLY FAN 1
- (z) Make sure that the supply fan stops and exhaust fan operates in less than 15 seconds.
- (aa) Make sure that the EICAS status and maintenance messages FWD EQ SUP FAN 1 show.
- (ab) Remove the DO-NOT-CLOSE tag and close this P6 panel circuit breaker to remove the simulated supply fan current sensor failure condition:
 - 1) 6H18, EQUIP COOL SUPPLY FAN 1
- (ac) Make sure that the exhaust fan operates and supply fan does not operate.
- (ad) Make sure that the EICAS status and maintenance messages FWD EQ SUP FAN 1 show.
- (ae) Put the EQUIP COOLING selector on the P5 panel to AUTO.
 - 1) Make sure that the exhaust fan operates and supply fan does not operate.
 - 2) Make sure that the EICAS status and maintenance messages FWD EQ SUP FAN 1 do not show.

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(af) To unlatch the supply fan, put the EQUIP COOLING selector on the P5 panel to STBY.

- 1) Make sure that the supply fan operates and exhaust fan stops.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(ag) Put the No.1 and 2 air/ground relay systems to the ground mode (AMM 32-09-02/201).

(ah) Put the EQUIP COOLING selector on the P5 panel to AUTO.

(ai) Make sure that the supply fan and exhaust fan operate.

(aj) Make sure that the following fan and valve conditions occur:

- 1) Supply Fan (B10) - ON
- 2) Exhaust Fan (B12) - ON
- 3) Inboard Supply Valve (V91) - OPEN
- 4) Shutoff Valve (V178) - OPEN
- 5) Overboard Exhaust Valve (V12) - CLOSED
- 6) Smoke Clearance/Override Valve (V140) - CLOSED
- 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)

(ak) Remove the jumper wire between pins 1 and 2 from the skin temperature switch electrical connector D3074 to simulate an outside ambient temperature more than 45F (7C).

(al) Make sure that the following fan and valve conditions occur:

- 1) Supply Fan (B10) - ON
- 2) Exhaust Fan (B12) - ON
- 3) Inboard Supply Valve (V91) - OPEN
- 4) Overboard Exhaust Valve (V12) - OPEN
- 5) Smoke Clearance/Override Valve (V140) - CLOSED
- 6) Shutoff Valve (V178) - CLOSED
- 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)

F. Overheat, Low Flow, and Smoke Indication Test

S 715-153

(1) Do the Overheat, Low Flow, and Smoke Indication Systems Test

(a) Make sure that the EQUIP COOLING selector is set to AUTO.

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- (b) Make sure that the following circuit breakers are closed:
 - 1) P11 Overhead Circuit Breaker Panel
 - a) 11P21, EQUIPMENT COOLING OVHT/SMOKE VLV IND
 - 2) P6 Main Power Distribution Panel
 - a) 6D6, EQUIP COOL GND WARN
- (c) Make sure that the Equip Cooling OVHT and SMOKE lights on the P5 panel do not come on.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (d) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (e) Do the flight mode simulation procedure for the No. 1 and 2 air/ground relay systems (AMM 32-09-02/201).
- (f) Disconnect the electrical connector, D644, from the equipment cooling overheat switch (S41).

NOTE: Switch location is underneath the floor, approximately 2-1/2 feet aft of forward bulkhead, and twenty inches left of the center in the forward cargo compartment.

- 1) To simulate an overheat condition, install a jumper wire between pins 1 and 2 of connector D644.
- (g) After 30 seconds, make sure that these conditions occur:
 - 1) Make sure that the Cooling OVHT light on the P5 panel comes on.

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- 2) Make sure that the EICAS advisory message FWD EQPT OVHT shows.
- 3) Make sure that the EICAS maintenance message FWD EQ SUP OH shows and kept in EICAS memory.
- 4) Make sure you hear the sound from ground crew call horn
- (h) Put the EQUIP COOLING selector on the P5 panel to STBY.
 - 1) Make sure that the OVHT light on the P5 panel goes off and EICAS advisory message FWD EQPT OVHT does not show.
- (i) After 5 minutes, make sure that these conditions occur:
 - 1) Equip Cooling OVHT light on the P5 panel comes on.
 - 2) EICAS advisory message FWD EQPT OVHT shows.
- (j) Remove the jumper wire from overheat switch (S41) electrical connector D644, and connect the electrical connector to overheat switch (S41).
 - 1) Make sure that the Equip Cooling OVHT light on the P5 panel goes off.
 - 2) Make sure that the EICAS advisory message FWD EQPT OVHT does not show.
- (k) Put the EQUIP COOLING selector on the P5 panel to AUTO.
 - 1) Make sure that the Equip Cooling OVHT light remains off and that the ground crew call horn remains silenced.
 - 2) Make sure that the EICAS advisory message FWD EQPT OVHT remains extinguished.
- (l) Put the No.1 and 2 air/ground relay systems to the ground mode (AMM 32-09-02/201).
- (m) Disconnect the electrical connector, D3066, from the forward rack low flow detector (TS104).

NOTE: Detector location is underneath the floor approximately 1-1/2 feet aft of forward bulkhead in the forward bulkhead and 1-1/2 feet left of the center in the forward cargo compartment.

- 1) Install the jumper wire between pins 2 and 3 of connector D3066.

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- (n) After 30 seconds, make sure that these conditions occur:
- 1) Equip Cooling OVHT light on the P5 panel comes on.
 - 2) You hear the Ground crew call horn in the nose gear wheel well.
 - 3) EICAS advisory message FWD EQPT OVHT shows.
 - 4) EICAS maintenance message FWD EQ SUP FLOW shows.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (o) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (p) Do the Flight Mode Simulation Procedure for the No. 1 and 2 air/ground relay systems (AMM 32-09-02/201).
- 1) Make sure that the ground crew call horn is silenced.
 - 2) Make sure that the Equip Cooling OVHT light remains illuminated.
 - 3) Make sure that the EICAS advisory message FWD EQPT OVHT remains illuminated.
- (q) Remove the jumper wire from forward rack low flow detector electrical connector D3066, and reconnect the connector D3066 to the forward rack low flow detector (TS104).
- 1) Make sure that the ground crew call horn does not sound.
 - 2) Make sure the equip Cooling OVHT light on the P5 panel goes off.
 - 3) Make sure the EICAS advisory message FWD EQPT OVHT does not show.

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- (r) Put the No. 1 and 2 air/ground relay system to the ground mode (AMM 32-09-02/201).
- (s) Disconnect the electrical connector, D3068, from the flight deck low flow detector (TS163).

NOTE: Detector location is on the duct sections that exits forward from the manifold interconnect valve.

- 1) Install the jumper wire between pins 2 and 3 of electrical connector D3068.
- (t) After 30 seconds, make sure that these conditions occur:
 - 1) Equip Cooling OVHT light on P5 panel shows.
 - 2) You hear Ground crew call horn in the nose gear wheel well.
 - 3) EICAS advisory message FWD EQPT OVHT shows.
 - 4) EICAS maintenance message FLT DK SUP FLOW shows.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (u) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (v) Do the flight mode simulation procedure for the No. 1 and 2 air/ground relay systems (AMM 32-09-02/201).
 - 1) Make sure the ground call horn is silenced.
 - 2) Make sure that the Equip Cooling OVHT light remains illuminated.
 - 3) Make sure that the EICAS advisory message FWD EQPT OVHT remains illuminated.

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- (w) Remove jumper wire from the flight deck low flow detector electrical connector D3068, and reconnect the electrical connector to the flight deck low flow detector (TS163).
 - 1) Make sure that the ground crew call horn is silenced.
 - 2) Make sure that the Equip Cooling OVHT light is extinguished.
 - 3) Make sure that the EICAS advisory message FWD EQPT OVHT is extinguished.
- (x) Put the No. 1 and 2 air/ground relay systems to the ground mode (AMM 32-09-02/201).

G. EQUIP COOL Switch Test (Manual test)

S 755-154

- (1) Do a test of the EQUIP COOL test switch (Manual Test):
 - (a) Put the EQUIP COOL test switch on P61 panel to EQUIP COOL and hold.
 - 1) Make sure that these indications show:
 - a) OVHT and SMOKE lights on the P5 panel come on.
 - b) EICAS advisory messages, FWD EQPT OVHT and FWD EQPT SMOKE, show.
 - c) EICAS maintenance messages, FWD EQ SUP FLOW and FLT DK SUP FLOW show after 30 seconds.
 - d) After 30 seconds you hear the ground crew call horn.
 - (b) Release the EQUIP COOL test switch.
 - 1) Make sure these conditions occur:
 - a) OVHT and SMOKE lights on the P5 panel go off.
 - b) EICAS advisory messages, FWD EQPT OVHT and FWD EQPT SMOKE do not show.
 - c) You do not hear the ground-crew-call horn.
 - (c) Do the EICAS maintenance message erase procedure (AMM 31-41-00/201).
 - 1) EICAS maintenance messages, FWD EQ SUP FLOW and FLT DK SUP FLOW
 - (d) AIRPLANES PRE-SB 21-105;
Open and close the following circuit breaker on the P6 panel to restore fan operation, if the galley chiller exhaust fan, aft equip/lav/galley vent fans or bulk cargo vent fan have shutdown when airplane is in SMOKE mode.
 - 1) 6B7, CHILLER SHUTDOWN CONT

H. STBY Mode Test

S 715-041

- (1) Do the Standby (STBY) Cooling Mode Test
 - (a) Put the EQUIP COOLING mode selector on P5 panel to STBY.

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(b) Make sure that the following fan and valve conditions occur:

NOTE: The VALVE light on the Equipment Cooling module (M17, P5 panel) and the EICAS advisory message FWD EQPT VAL will show when the valves move and will extinguish after 10-20 seconds.

- 1) Supply Fan (B10) - ON
- 2) Exhaust Fan (B12) - ON
- 3) Shutoff Valve (V178) - OPEN
- 4) Inboard Supply Valve (V91) - CLOSED
- 5) Overboard Exhaust Valve (V12) - CLOSED
- 6) Smoke Clearance/Override Valve (V140) - CLOSED
- 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(c) Do the deactivation procedure for the spoilers (AMM 27-61-00/201)) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

(d) Do the Flight Mode Simulation procedure for the No. 1 and 2 air/ground relay systems (AMM 32-09-02/201).

(e) Make sure that the following fan and valve conditions occur:

- 1) Supply Fan (B10) - ON
- 2) Exhaust Fan (B12) - OFF
- 3) Shutoff Valve (V178) - OPEN
- 4) Inboard Supply Valve (V91) - CLOSED
- 5) Overboard Exhaust Valve (V12) - CLOSED
- 6) Smoke Clearance/Override Valve (V140) - CLOSED
- 7) Manifold Interconnect Valve (V90) - "A TO B" (Closed)

(f) Put the No. 1 and 2 air/ground relay systems to the ground mode (AMM 32-09-02/201).

I. OVRD Mode Test (Smoke Clearance mode)

S 715-158

- (1) Do the Smoke Clearance/Override (OVRD) Cooling Mode Test (Air Mode)

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WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (b) Do the flight mode simulation procedure for the No. 1 and 2 air/ground relay systems (AMM 32-09-02/201).

CAUTION: DO NOT KEEP THE EQUIP COOLING MODE SELECTOR IN "OVRD" POSITION FOR MORE THAN FIVE (5) MINUTES. IN "OVRD" POSITION, THE EQUIPMENT COOLING FANS STOP OPERATING. EXTENDED OPERATION OF THE AVIONICS ELECTRICAL EQUIPMENT WITHOUT SUFFICIENT COOLING AIR FROM THE EQUIPMENT COOLING FANS CAN CAUSE DAMAGE TO THE AVIONICS ELECTRICAL EQUIPMENT.

- (c) Put the EQUIP COOLING selector on P5 panel to OVRD.
- 1) After one minute, make sure that the following fan and valve conditions occur:
 - a) Supply Fan (B10) - OFF
 - b) Exhaust Fan (B12) - OFF
 - c) Shutoff Valve (V178) - CLOSED
 - d) Overboard Exhaust Valve (V12) - CLOSED
 - e) Manifold Interconnect Valve (V90) - "C TO B" (Open)
 - f) Inboard Supply Valve (V91) - CLOSED
 - g) Smoke Clearance/Override Valve (V140) - OPEN
 - 2) Within 60 seconds after you put the selector to OVRD, make sure that the Equip Cooling NO COOLING light on the P5 panel is illuminated.
 - 3) Make sure that the EICAS caution message FWD EQPT COOLING is illuminated.
- (d) Put the EQUIP COOLING selector on the P5 panel to AUTO.
- 1) Make sure that airflow can be felt at the top of the E/E plenum (STA 335, WL 190, BL 0)
 - 2) Make sure that the Equip Cooling NO COOLING light is extinguished.
 - 3) Make sure that the EICAS caution message FWD EQPT COOLING is extinguished.
- (e) Put the No. 1 and 2 air/ground relay systems to the ground mode (AMM 32-09-02/201).
- (f) Put the EQUIP COOLING selector to STBY position.

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S 715-159

- (2) Do the Smoke Clearance/Override (OVRD) Configuration Test (Gnd Mode)

CAUTION: DO NOT KEEP THE EQUIP COOLING MODE SELECTOR IN "OVRD" POSITION FOR MORE THAN FIVE (5) MINUTES. IN "OVRD" POSITION, THE EQUIPMENT COOLING FANS STOP OPERATING. EXTENDED OPERATION OF THE AVIONICS ELECTRICAL EQUIPMENT WITHOUT SUFFICIENT COOLING AIR FROM THE EQUIPMENT COOLING FANS CAN CAUSE DAMAGE TO THE AVIONICS ELECTRICAL EQUIPMENT.

- (a) Put the EQUIP COOLING selector on P5 panel to OVRD.
- 1) After one minute, make sure that the following fan and valve conditions occur:
 - a) Supply Fan (B10) - OFF
 - b) Exhaust Fan (B12) - OFF
 - c) Shutoff Valve (V178) - CLOSED
 - d) Overboard Exhaust Valve (V12) - CLOSED
 - e) Manifold Interconnect Valve (V90) - "C TO B" (Open)
 - f) Inboard Supply Valve (V91) - CLOSED
 - g) Smoke Clearance/Override Valve (V140) - OPEN
 - 2) Within 60 seconds after you put the selector to OVRD, make sure that the Equip Cooling NO COOLING light on the P5 panel is illuminated, the EICAS caution message FWD EQPT COOLING is illuminated, and that the ground crew call horn is activated.
- (b) Put the EQUIP COOLING selector on the P5 panel to AUTO.
- 1) Make sure that the ground crew call horn is silenced.
 - 2) Make sure that airflow can be felt at the top of the E/E plenum (STA 335, WL 190, BL 0)
 - a) Disconnect the sense tube between equipment cooling differential pressure switch and E1/E2 rack plenum at switch.
 - b) Feel for the airflow at sense tube.
 - c) Connect the sense tube between the differential pressure switch and E1/E2 rack plenum.
 - 3) Make sure that the Equip Cooling NO COOLING light is extinguished.
 - 4) Make sure that the EICAS caution message FWD EQPT COOLING is extinguished.

- J. SAS 050-149, 155-999;
MTH 276-999;
Fuel Jettison Test

S 735-217

- (1) Fuel Jettison Test (Aft E/E Equipment Cooling system):
- (a) Refer to AMM 21-26-00/501 for the fuel jettison test of the aft E/E equipment cooling/lavatory/galley ventilation system fans.

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S 735-216

- (2) Fuel Jettison Test (Forward E/E Equipment Cooling system):
- (a) Make sure that these circuit breakers are closed on the P11 circuit breaker panel:
 - 1) 11D15 or 11D16, ENGINE SPEED SENSE L2
 - 2) 11D16 or 11D17, ENGINE SPEED SENSE R2
 - 3) 11M13, LEFT FUEL JETTISON CNTRL
 - 4) 11M22, RIGHT FUEL JETTISON CNTRL
 - 5) 11P10, EQUIPMENT COOLING AFT FAN EXH 2
 - (b) Make sure that the main AC buses are powered by either external ground power or the APU (AMM 24-22-00/201).

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (c) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoilers.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (d) Do the flight mode simulation procedure for the No. 1 and 2 air/ground system (Ref 32-09-02).
- (e) Make sure the fuel jettison nozzle switches on the P5 panel are in the OFF position.
- (f) Put the fuel jettison switch on the P5 panel to the ON position.
- (g) Make sure that after one minute the NO COOLING light on the P5 panel comes on and the OVHT light on the P5 panel does not come on.
- (h) Make sure that the following fan and valve conditions occur:
 - 1) Make sure the forward supply fan does not operate.

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- 2) Make sure the forward exhaust fan does not operate.
 - 3) Make sure the override valve is open.
 - 4) Make sure the inboard supply valve is closed.
 - 5) Make sure the overboard exhaust valve is closed.
 - 6) Make sure the shutoff valve is closed.
 - 7) Make sure the manifold interconnect valve is in the OPEN (C-B) position.
- (i) Put the fuel jettison switch on the P5 panel to the OFF position.
 - (j) Make sure that after 30 seconds no equipment cooling lights on the P5 panel are on.
 - (k) Put the airplane back to the ground mode (Ref 32-09-02).
 - (l) Do the activation procedure for the spoilers if you did the deactivation procedure (Ref 32-09-02).

K. AUTO Mode Tests

S 715-047

- (1) AUTO Mode Test with simulated engine run condition:
 - (a) Put the No. 1 and 2 air/ground relay systems in the ground mode (AMM 32-09-02/201).
 - (b) Make sure that the EQUIP COOLING selector on the P5 panel is in AUTO.
 - (c) In the main equipment center, in the P50 panel, locate the Left and Right engine speed cards. Push and hold CHANNEL 2 test switches on both cards.
 - 1) Make sure that the VALVE light and the EICAS advisory message FWD EQPT VAL do not show for a period of one (1) minute after actuation of the N2 Engine Speed Card test switches.
 - 2) Make sure the following fan and valve conditions occur:
 - a) Supply Fan (B10) - ON
 - b) Exhaust Fan (B12) - ON
 - c) Shutoff Valve (V178) - OPEN
 - d) Inboard Supply Valve (V91) - CLOSED
 - e) Overboard Exhaust Valve (V12) - CLOSED

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- f) Smoke Clearance/Override Valve (V140) - CLOSED
- g) Manifold Interconnect Valve (V90) - "A TO B" (Closed)

S 715-155

- (2) Pre-Flight Cooling Failure Indication Test
 - (a) Disconnect the electrical connector D3076 from inboard supply valve (V91).
 - 1) AIRPLANES POST-SB 21-66 AND PRR C12284-2;
Make sure that the Equip Cooling VALVE light comes on and EICAS advisory message FWD EQPT VAL shows after 30-seconds.
 - (b) Connect the electrical connector D3076 to inboard supply valve.
 - 1) Make sure that Equip Cooling VALVE light goes off and EICAS advisory message FWD EQPT VAL does not show.
 - (c) Disconnect the electrical connector D654 from overboard exhaust valve (V12).
 - 1) AIRPLANES POST-SB 21-66 AND PRR C12284-2;
Make sure that the Equip Cooling VALVE light comes on and EICAS advisory message FWD EQPT VAL shows after 30-seconds.
 - (d) Connect the electrical connector D654 to overboard exhaust valve.
 - 1) Make sure that the Equip Cooling VALVE light goes off and EICAS advisory message FWD EQPT VAL does not show.
 - (e) Disconnect the electrical connector D652 from the shutoff valve (V10).
 - 1) AIRPLANES POST-SB 21-66 AND PRR C12284-2;
Make sure that the Equip Cooling VALVE light comes on and EICAS advisory message FWD EQPT VAL shows after 30-seconds.
 - (f) Connect the electrical connector D652 to shutoff valve.
 - 1) Make sure that the Equip Cooling VALVE light goes off and EICAS advisory message FWD EQPT VAL does not show.
 - (g) In the main equipment center, on the P50 panel, release the CHANNEL 2 test switches on the Left and Right engine speed cards.

S 425-156

- (3) Reconnect the electrical connector D3074 to equipment cooling skin temperature switch (S456).
- L. E/E Cooling Monitor Indicator Test

S 715-055

- (1) Do a Test of the E/E Cooling Monitor Indicator
 - (a) Make sure that the EQUIP COOL selector on the P5 panel is in AUTO.

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- (b) Make sure that all nine flow balls go out of view.
- (c) Position the LIFT TO TEST lever on E/E COOLING MONITOR on the P61 panel to the up position.
- (d) Make sure that all the nine flow balls on the Low Flow Monitor, on the P61 panel, rise to top of the cages within 15 seconds.

CAUTION: DO NOT LEAVE MODE SELECTOR IN OVRD FOR MORE THAN FIVE MINUTES. EXTENDED OPERATION OF AVIONICS EQUIPMENT WITHOUT SUFFICIENT COOLING MAY DAMAGE EQUIPMENT.

- (e) Put the EQUIP COOLING selector on the P5 panel to OVRD.
- (f) Make sure that all the nine flow balls on the Low Flow Monitor fall to bottom of the cages.
- (g) Put the EQUIP COOLING selector on the P5 panel to AUTO.
- (h) Make sure that all the nine flow balls are visible after 15 seconds.
- (i) Set the LIFT TO TEST lever on E/E COOLING MONITOR on P61 panel to a down position.
- (j) Check that all the nine flow balls go out of view.

NOTE: If the flow balls do not go out of view, hit the indicator lightly.

M. Air Cleaner Test (purge tube airflow check)

S 715-056

- (1) Do a check of the Air Cleaner.
 - (a) Make sure that the EQUIP COOLING selector on the P5 panel is in AUTO.
 - (b) Disconnect the air cleaner purge tube at aft end.
 - (c) Do a check for steady airflow coming from the air cleaner.
 - (d) Connect the air cleaner purge tube.

N. Duct Air Leakage Test

S 715-057

- (1) Do a Cooling System Air Leakage Test:
 - (a) Make sure that the EQUIP COOLING selector on the P5 panel is in AUTO.
 - (b) Do a check for leakage at all the duct sections and clamps.
 - 1) Some leakage is permitted.
 - 2) If the leakage is strong, align the joint and tighten the clamp or replace the duct section.

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0. Return the Airplane to Normal Condition

S 415-058

- (1) Install the cargo compartment sidewall lining (AMM 25-52-01/401).

S 415-149

- (2) Close the forward cargo door (AMM 52-33-00/201).

S 415-152

- (3) Close the access doors 113AL, 119AL (AMM 06-41-00/201).

S 865-133

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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EQUIPMENT COOLING SYSTEM – INSPECTION/CHECK

1. General

A. This procedure contains the following task(s):

- (1) E/E Cooling Supply/Exhaust Duct Smoke Barrier Seal Inspection

TASK 21-58-00-206-001

2. E/E Cooling Supply/Exhaust Duct Smoke Barrier Seal Inspection (Fig. 601)

A. General

- (1) This task has instructions to inspect the smoke barrier seals installed around the E/E cooling supply and exhaust ducts just below the supply/exhaust fans near the floor.
- (2) The smoke barrier seals are composed of a fire retardant silicone foam rubber material (BMS 1-68) which helps prevent smoke and fire extinguishing agent from leaking out of the forward cargo compartment. One side of the silicone foam rubber has adhesive on it to permit connection to the duct surface. When the seals are installed correctly, the silicone foam rubber will fill the air gaps between the ducts, frames, and sidewall liner stabilization straps.
- (3) If a cargo compartment fire occurs and the smoke barrier seals are not installed incorrectly, smoke and fire extinguishing agent can leak out of the cargo compartment. Smoke can cause injury to persons in the main compartment. If sufficient fire extinguishing agent leaks out of the cargo compartment, the fire may not be extinguished.

B. Consumable Materials

- (1) G02186, Silicone Foam Rubber – Fire Retardant, BMS 1-68, Form III, (1-inch thick by 2-inch wide)
 - (a) BF-1005 (A), Rogers Corporation
 - (b) MFSiltec-P, Magnifoam Delaware, Inc.

C. References

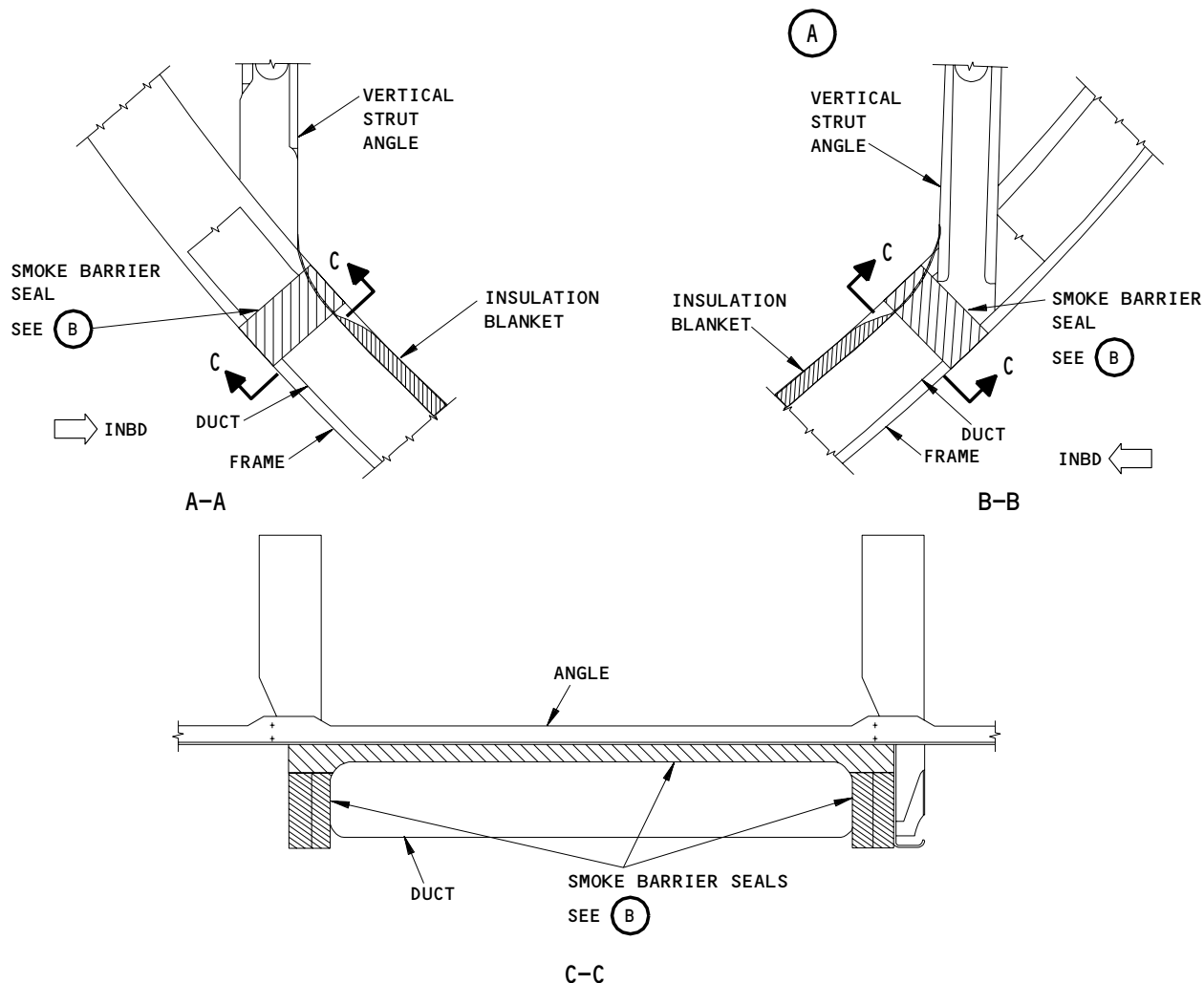
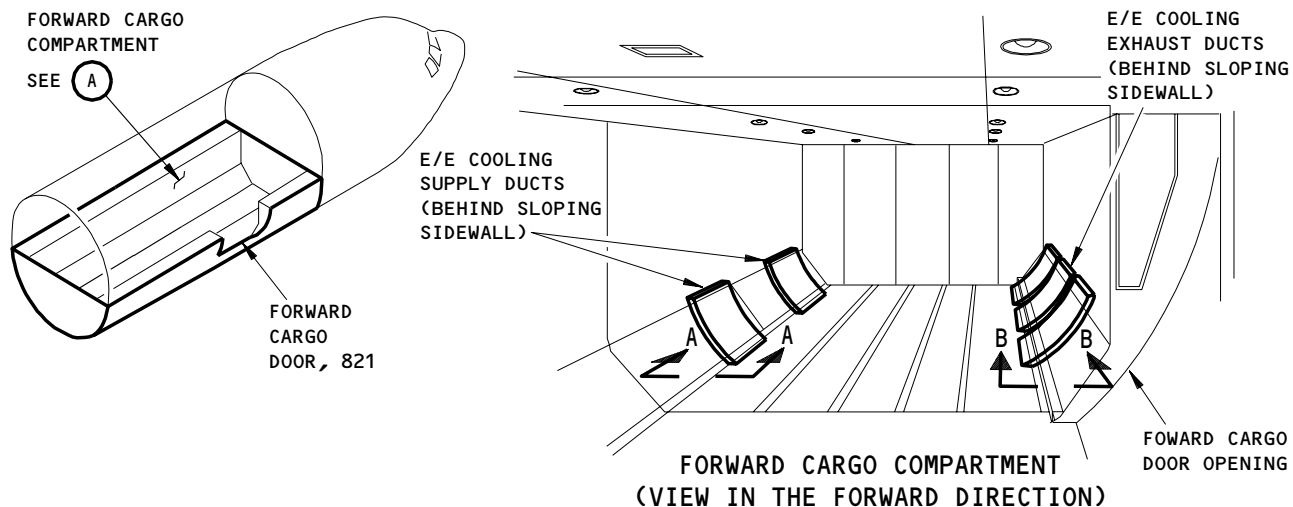
- (1) AMM 24-22-00/201, Electrical Power
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (3) AMM 52-33-00/201, Large Forward Cargo Door

D. Access

- (1) Location Zones
 - 121 Forward Cargo Compartment, Left
 - 122 Forward Cargo Compartment, Right
- (2) Access Panels
 - 821 Forward Cargo Door

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AIRPLANES POST-SB 26A0119;
AIRPLANES POST-PRR B13299

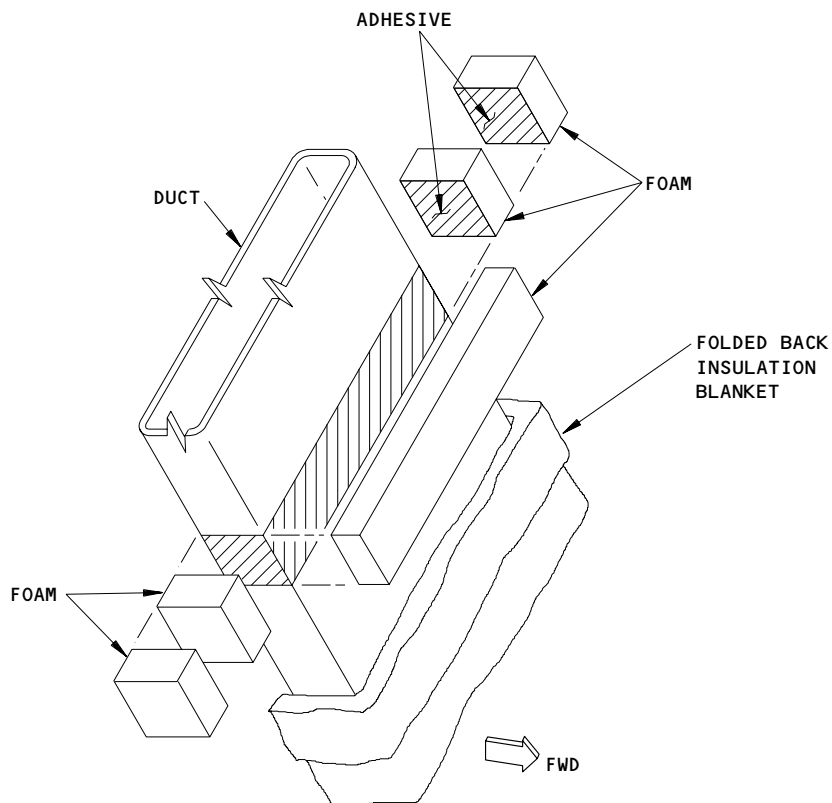
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E/E Cooling Ducts Smoke Barrier Seals - Inspection
Figure 601 (Sheet 1)

EFFECTIVITY
AIRPLANES POST-SB 26A0119;
AIRPLANES POST-PRR B13299

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SMOKE BARRIER SEAL
(EXAMPLE)

(B)

E/E Cooling Ducts Smoke Barrier Seals - Inspection
Figure 601 (Sheet 2)

EFFECTIVITY
AIRPLANES POST-SB 26A0119;
AIRPLANES POST-PRR B13299

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E. Prepare for Inspection

S 866-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 016-003

- (2) Get access to the smoke barrier seals for the E/E cooling system supply and exhaust ducts which are behind the left and right sloping sidewall linings in the forward cargo compartment, respectively:
 - (a) Open the forward cargo door, 821 (AMM 52-33-00/201).
 - (b) Remove the left and right hand sloping sidewall lining(s) just forward of the forward cargo door opening and immediately aft of the forward bulkhead (AMM 25-52-01/401).
 - (c) Fold back the insulation blanket on the e/e cooling duct(s) to get access to the smoke barrier seals.

F. Smoke Barrier Seal Inspection (Fig. 601)

S 216-004

- (1) Inspect the smoke barrier seals that are installed at the E/E cooling supply and exhaust ducts:
 - (a) If the smoke barrier seals are missing or have damage (cuts, tears, holes, etc.), replace the seals with new silicone foam rubber material.
 - 1) Use the original seals as a template and cut the new silicone foam rubber material to same dimensions.
 - 2) Make sure the adhesive side of the silicone foam rubber is attached only to the surface of the ducts.
 - (b) Make sure the silicone foam rubber is attached to the duct such that it completely fills all air gaps between the duct and the adjacent frames and sidewall liner stabilization strap.

G. Put the Airplane Back to Its Usual Condition

S 416-005

- (1) Close up the access to the E/E cooling supply and exhaust ducts:
 - (a) Fold the insulation blanket back into position on the E/E cooling duct(s).
 - (b) Install the left and right hand sloping sidewall lining(s) (AMM 25-52-01/401).
 - (c) Close the forward cargo door, 821 (AMM 52-33-00/201).

S 866-006

- (2) Remove electrical power if it is not needed (AMM 24-22-00/201).

EQUIPMENT COOLING SYSTEM – CLEANING/PAINTING

1. General

- A. This procedure has these tasks for the equipment cooling system:
- (1) Equipment Cooling System Cleaning
 - (2) Equipment Cooling System Ground Cleaning Procedure (Reverse Airflow)

TASK 21-58-00-107-022

2. Equipment Cooling System Cleaning

A. General

- (1) Over time, normal airplane operations can result in the accumulation of dust and lint behind the left sidewall in the forward cargo compartment near the air inlet of the forward equipment cooling system ducting. Without periodic cleaning and maintenance, this dust and lint can enter the equipment cooling system ducting and get distributed downstream to the flight deck avionics display units and other electronic equipment on the E/E racks. A build-up of contaminants in the equipment cooling system can cause blockages and reduce system cooling capability which can cause the display units and electronic equipment to overheat and result in reduced reliability and increased failure rates of the equipment (Service Letter 767-SL-21-071).
- (2) To prevent the entry and distribution of contaminants to the flight deck display units and electronic equipment, foreign object debris (FOD) screens and an air cleaner are installed in the equipment cooling system ducting.
 - (a) FOD screens are installed upstream of the equipment cooling system supply fan and exhaust fan.
 - (b) An air cleaner is installed downstream of the equipment cooling system supply fan to separate particulates out of the air stream. Particulates that are greater than 400 microns in size are separated from the air stream and then deposited behind the left sidewall near the equipment cooling system air inlet grille via a purge line connected to the air cleaner.

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- (c) If the left sidewall area has a substantial accumulation of dust and debris, the equipment cooling system may not be able to prevent the downstream contamination of the flight deck display units and electronic equipment. The cooling air inlet screens on the flight deck display units and electronic equipment can become clogged with the contaminants which reduces cooling capability and can cause overheating and failure of the equipment.

B. References

- (1) AMM 20-10-01/401, E/E Rack-Mounted Components
- (2) AMM 20-60-02/201, Cleaning to Remove Combustible Material Around Wiring
- (3) AMM 20-60-06/201, Electronic Line Replaceable Unit Cleaning
- (4) AMM 21-22-02/401, Air Conditioning Restrictor (Flow Control Orifice)
- (5) AMM 21-23-05/201, Return Air Grilles
- (6) AMM 21-58-06/701, Forward Rack Supply and Exhaust Fans
- (7) AMM 21-58-10/201, Equipment Cooling Supply Air Inlet Grille
- (8) AMM 21-58-17/201, Equipment Cooling Low Flow Detectors
- (9) AMM 21-58-19/201, E/E Equipment Cooling Smoke Detector
- (10) AMM 21-58-22/201, Supply/Exhaust Fan Screens
- (11) AMM 21-58-30/201, Equipment Cooling Air Cleaner
- (12) AMM 21-58-34/201, E/E Cooling Monitor Indicator
- (13) AMM 24-22-00/201, Control (Supply Power)
- (14) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (15) AMM 52-33-00/201, Large Forward Cargo Door
- (16) AMM 52-34-00/201, Standard Forward Cargo Door

C. Access

- (1) Location Zones
 - 121 Forward Cargo Compartment (Left)
 - 122 Forward Cargo Compartment (Right)
 - 123 Area below forward cargo compartment (Left)
 - 124 Area below forward cargo compartment (Right)
 - 221 Passenger Cabin - Section 41, (Left)
 - 222 Passenger Cabin - Section 41, (Right)
- (2) Access Panels
 - 821 Forward Cargo Door

D. Prepare for Cleaning

- S 867-026
- (1) Supply electrical power (AMM 24-22-00/201).
- S 017-025
- (2) Get access to the equipment cooling system components in the forward cargo compartment:
 - (a) Open the forward cargo compartment door, 821 (AMM 52-33-00/201, AMM 52-34-00/201).
 - (b) Remove the left sidewall linings aft of the forward endwall to get access to the equipment cooling 'supply' system components (AMM 25-52-01/401).

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- (c) Remove the right sidewall linings aft of the forward endwall to get access to the equipment cooling 'exhaust' system components (AMM 25-52-01/401).

S 867-027

- (3) Remove electrical power (AMM 24-22-00/201).

E. Equipment Cooling System Cleaning

S 167-028

- (1) Clean the left sidewall area near and around the equipment cooling supply air inlet grille to remove any foreign object debris, accumulated dust or contaminants.
 - (a) Clean the equipment cooling supply air inlet grille (AMM 21-58-10/201).
 - (b) Use a vacuum or cloth to clean the cargo insulation blankets.
 - (c) Clean and remove any combustible material around the electrical wiring (AMM 20-60-02/201).

S 167-029

- (2) Clean the equipment cooling system components to remove any foreign object debris, accumulated dust or contaminants.
 - (a) Clean the air cleaner (AMM 21-58-30/201).
 - (b) Clean the FOD screens for the supply fan and exhaust fan (AMM 21-58-22/201).
 - (c) Clean the supply fan and exhaust fan (AMM 21-58-06/701).
 - (d) Clean the low flow detectors (AMM 21-58-17/201).
 - (e) Clean the smoke detector and tubing (AMM 21-58-19/201).
 - (f) ETOPS AIRPLANES;
Clean the E/E cooling monitor indicator (AMM 21-58-34/201).

S 167-030

- (3) Clean the main cabin return air grilles between STA390 to STA522 to remove any foreign object debris, accumulated dust or contaminants (AMM 21-23-05/201).
 - (a) Make sure to clean sidewall areas behind the return air grilles to remove any foreign object debris, accumulated dust or contaminants.

S 167-031

- (4) Clean the E/E equipment racks (shelves and trays) to remove any foreign object debris, accumulated dust or contaminants.
 - (a) Remove the electronic equipment (LRU) from the E/E rack (AMM 20-10-01/401).
 - 1) Install protective caps/plugs to the LRU pin connectors to prevent pin contamination from dust and FOD which could cause potential shorting between pins when LRU is re-installed.
 - 2) Clean the electronic equipment (LRU) (AMM 20-60-06/201).

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- (b) Use a temporary covering over the cooling duct metering plates at each electronic equipment (LRU) slot on the E/E rack to prevent the entry of loosened contaminants into the E/E cooling plenum which could cause a blockage or reduce cooling capability.
- (c) Use a vacuum or a soft, lint-free cloth to clean the surfaces of the E/E rack shelves and trays to remove any foreign object debris, accumulated dust or contaminants.
- (d) Remove the temporary covering from the cooling duct metering plates.
 - 1) Make sure the metering plates are positioned correctly to ensure proper LRU cooling.
- (e) Remove the protective caps/plugs from the electronic equipment (LRU) pin connectors.
- (f) Re-install the electronic equipment (LRU) to the E/E rack (AMM 20-10-01/401).

S 167-032

- (5) Clean the cooling air inlet screens of the flight deck display units and electronic equipment to remove any foreign object debris, accumulated dust or contaminants.

S 167-033

- (6) Clean the duct orifices (airflow restrictors) installed in the equipment cooling system ducting and flight deck air distribution ducting to remove any foreign object debris, accumulated dust or contaminants (AMM 21-22-02/401).

F. Post-Cleaning Check

S 417-040

- (1) Make sure all flight deck display units, electronic equipment and equipment cooling system components have been re-installed.

S 867-034

- (2) Supply electrical power (AMM 24-22-00/201).

S 717-035

- (3) Let the equipment cooling system operate to purge any residual contamination from the airstream that might have been loosened during cleaning.

S 167-039

- (4) Repeat the cleaning instructions if necessary.

G. Return the Airplane to Normal Configuration

S 417-038

- (1) Re-install the cargo sidewall linings (AMM 21-52-01/401).

S 417-037

- (2) Close the forward cargo compartment door, 821 (AMM 52-33-00/201, AMM 52-34-00/201).

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- S 867-036
(3) Remove electrical power if no longer required (AMM 24-22-00/201).

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TASK 21-58-00-107-001

3. Equipment Cooling System Ground Cleaning Procedure (Reverse Airflow)

A. General

- (1) This ground cleaning procedure uses reverse airflow to dislodge and expel contamination build up from equipment. This procedure replaces the manual cleaning requirement for the flight deck avionics cooling inlet screens (Service Letter 767-SL-21-074).
- (2) Dust, lint and debris can be distributed by the equipment cooling system which can accumulate on the inlet screens of avionics boxes in the flight deck and main E/E equipment racks. Overtime this accumulated debris can harden and subsequently reduce the amount of equipment cooling airflow to the avionics boxes, which can cause the avionics boxes to overheat and fail.
- (3) This ground cleaning procedure causes the airflow in the equipment cooling system to be reversed and then exhausted overboard out through the override valve (smoke clearance) port on the left side of the fuselage. This reverse airflow cleaning method will purge any loose debris that has accumulated on the inlet screens of the avionics boxes and in the equipment cooling system ducting.
- (4) To enable the reverse airflow cleaning of the avionics boxes and the equipment cooling system:
 - (a) Electrical connector for the manifold interconnect valve is disconnected
 - (b) Fuselage is pressurized to a 4 PSI cabin differential pressure.
 - (c) Equipment cooling system is configured to OVRD mode.

B. References

- (1) AMM 05-51-24/201, Excessive Cabin Pressure Leakage
- (2) AMM 24-22-00/201, Control (Supply Power)

C. Access

- (1) Location Zones
 - 118 Area Outbd and Above NLG Wheel Well, Right
 - 212 Control Cabin - Section 41, Right
- (2) Access Panels
 - 119AL Main Equipment Center Access Door

D. Prepare for Cleaning

- S 867-002
- (1) Supply electrical power (AMM 24-22-00/201).
- S 867-003
- (2) Make sure the EQUIP COOLING mode selector, on the equipment cooling control module (P5 panel), is set to AUTO position.
- S 867-017
- (3) Make sure the L and R PACK selectors, on the air conditioning control module (P5 panel), are set to OFF position.

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S 867-018

- (4) Make sure the air/ground relay systems are set to 'Ground' mode (AMM 32-09-02/201).

S 017-004

- (5) Get access to the main equipment center:
- (a) Open the main equipment center access door, 119AL.
 - (b) Find the manifold interconnect valve (MIV) along the right sidewall outboard of the nose landing gear wheel well.
 - (c) Make sure the position indicator (manual override lever) on the manifold interconnect valve (MIV) shows that the valve is at the 'A-B' (closed) position.

E. Ground Cleaning Procedure

S 867-005

- (1) Open this circuit breaker:
- (a) P11 overhead circuit breaker panel:
 - 1) 11B8, EQUIP COOL STBY

S 037-006

- (2) Disconnect the electrical connector (D3058) from the manifold interconnect valve (MIV).

NOTE: This will enable the ground cleaning of the flight deck instruments with the equipment cooling system in OVRD mode.

- (a) Make sure the position indicator (manual override lever) on the manifold interconnect valve (MIV) shows that the valve is at the 'A-B' (closed) position.

S 867-007

- (3) Close this circuit breaker:
- (a) P11 overhead circuit breaker panel:
 - 1) 11B8, EQUIP COOL STBY

S 867-008

- (4) Do the instructions in the Excessive Cabin Pressure Leakage task to pressurize the airplane to a 4 PSI cabin differential pressure (AMM 05-51-24/201).

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S 867-009

- (5) Set the EQUIP COOLING mode selector to OVRD position.

NOTE: The VALVE light will illuminate on the Equipment Cooling control module and the EICAS message FWD EQPT VAL (advisory) will show due to disconnection of the electrical connector from the manifold interconnect valve (MIV) in prior step.

- (a) Make sure that the E/E cooling air is exhausted overboard out through the override valve (smoke clearance) port on the left side of the fuselage (STA400, LBL89, WL166).
(b) Let the equipment cooling system operate in OVRD mode for 3 minutes to permit reverse airflow cleaning of the flight deck instruments and main E/E rack equipment.

S 867-010

- (6) Set the EQUIP COOLING mode selector to AUTO position.

NOTE: The VALVE light will extinguish and the EICAS message FWD EQPT VAL (advisory) will go out.

S 867-011

- (7) Do the instructions in the External Cabin Pressure Leakage task to depressurize the airplane and return airplane systems to normal configuration (AMM 05-51-24/201).

S 867-012

- (8) Open this circuit breaker:
(a) P11 overhead circuit breaker panel:
1) 11B8, EQUIP COOL STBY

S 437-013

- (9) Reconnect the electrical connector (D3058) to the manifold interconnect valve (MIV).

S 867-014

- (10) Close this circuit breaker:
(a) P11 overhead circuit breaker panel:
1) 11B8, EQUIP COOL STBY

F. Return the Airplane to Normal Configuration

S 417-019

- (1) Close the main equipment center access door, 119AL.

S 867-020

- (2) Remove electrical power (AMM 24-22-00/201).

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MANIFOLD INTERCONNECT VALVE - REMOVAL/INSTALLATION

1. General

- A. There are two tasks in this procedure. The first task is the removal of the manifold interconnect valve. The second task is the installation of the manifold interconnect valve.
- B. The manifold interconnect valve is on the right side of the airplane and just forward of the E/E racks. You can get access to the manifold interconnect valve through the main equipment center access door, 119AL.
- C. The manifold interconnect valve controls the source of cooling air to the electronic equipment in the flight compartment. The manifold interconnect valve lets the cooling air from the packs cool the electronic equipment when there is a smoke condition in the equipment cooling system.

TASK 21-58-01-004-002

2. Manifold Interconnect Valve Removal (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power

B. Access

- (1) Location Zones
118 Area Outbd and Above NLG Wheel Well, Right

C. Procedure

S 864-003

- (1) Remove electrical power (AMM 24-22-00/201).

S 014-004

- (2) Open the main equipment center access door, 119AL (AMM 06-41-00/201).

S 214-005

- (3) Find the manifold interconnect valve on the right side of nose landing gear wheel well.

S 034-006

- (4) Disconnect the electrical connector from the manifold interconnect valve.

S 034-007

- (5) Disconnect the bonding jumper from the manifold interconnect valve.

S 034-008

- (6) Support the manifold interconnect valve and remove the couplings which attach the duct flanges to the flanges of the manifold interconnect valve.

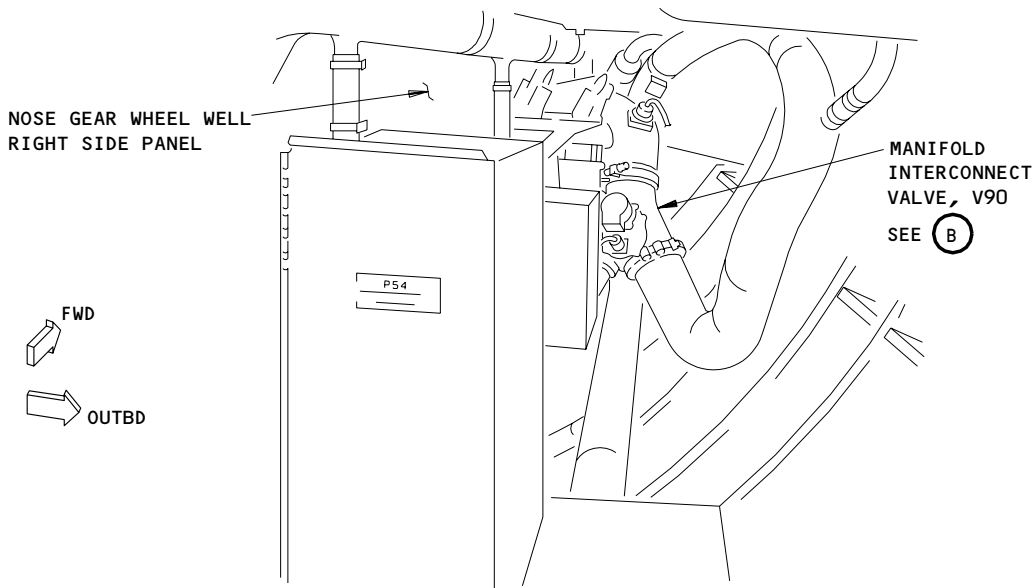
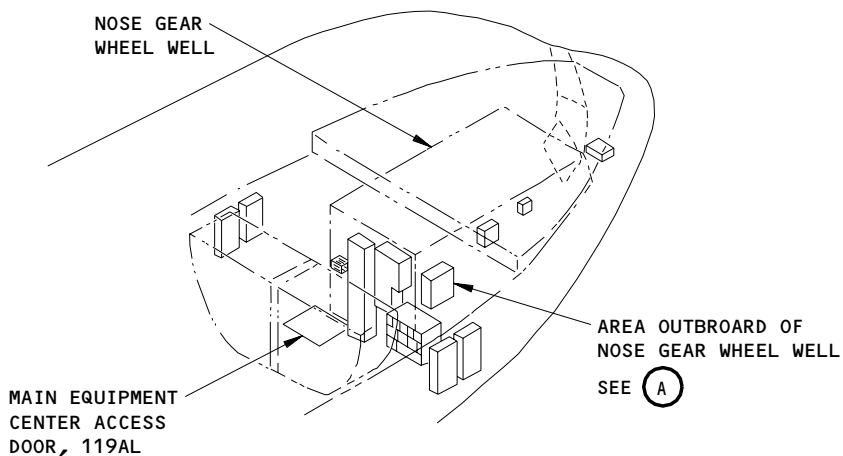
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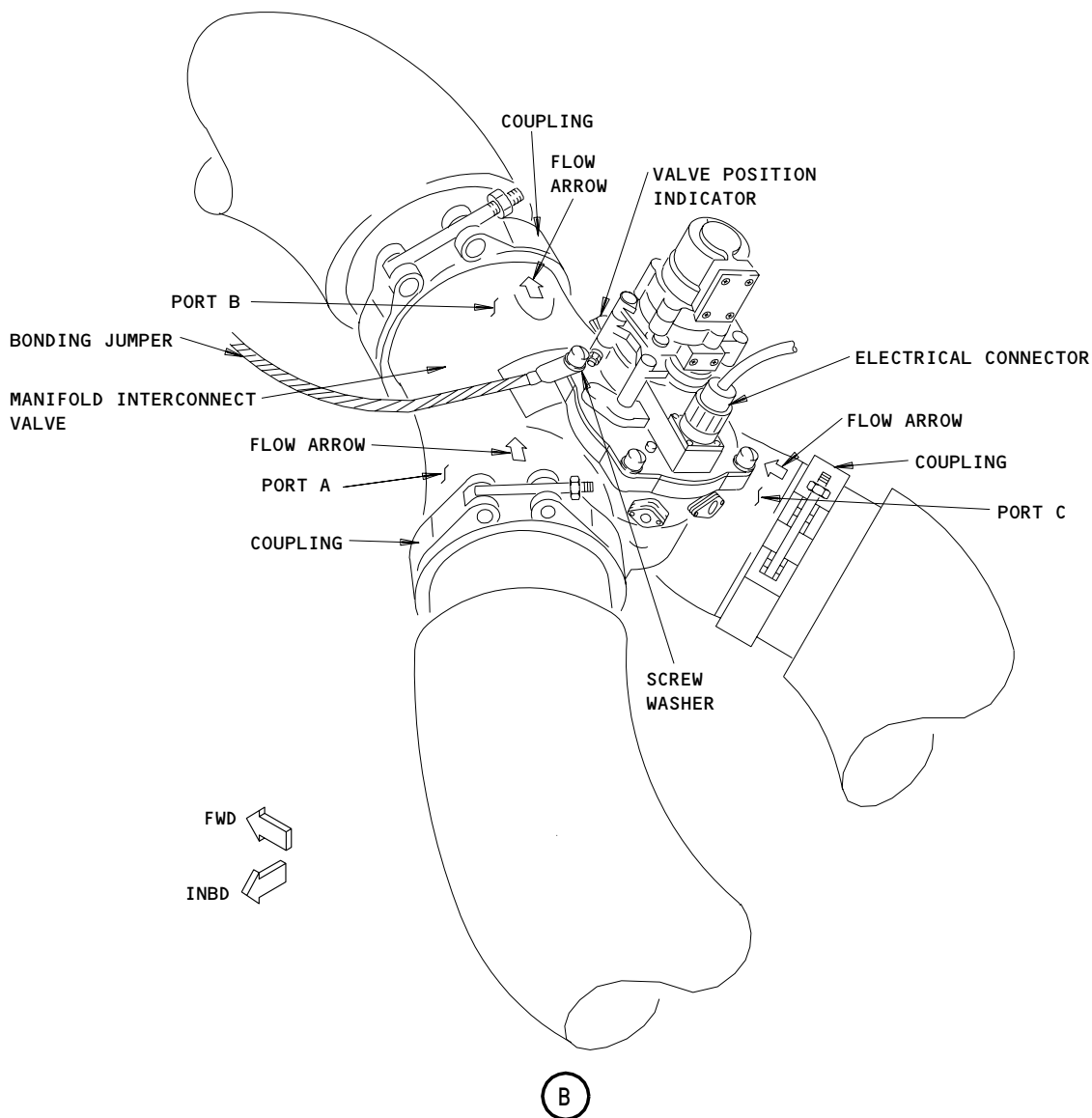


AREA OUTBOARD OF NOSE GEAR WHEEL WELL
(A)

Manifold Interconnect Valve Installation
Figure 401 (Sheet 1)

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Manifold Interconnect Valve Installation
Figure 401 (Sheet 2)

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S 024-009
(7) Remove the manifold interconnect valve.

S 434-010
(8) Put a cover in the duct openings to keep unwanted material out of the ducts.

TASK 21-58-01-404-011

3. Manifold Interconnect Valve Installation (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power

B. Access

- (1) Location Zones
118 Area Outbd and Above NLG Wheel Well, Right

C. Install the Manifold Interconnect Valve

S 034-012
(1) Remove the covers from the ducts.

S 424-013
(2) Align the manifold interconnect valve with the ducts and make sure that the valve actuator points up and aft.

S 434-014
(3) Attach the couplings to the manifold interconnect valve and the ducts, and tighten the couplings.

S 434-015
(4) Attach the bonding jumper to the manifold interconnect valve.

S 434-016
(5) Connect the electrical connector to the manifold interconnect valve.

D. Do a Test of the Manifold Interconnect Valve

S 864-014
(1) Supply electrical power (AMM 24-22-00/201).

S 864-015
(2) Put the EQUIP COOLING mode selector, on the pilot's overhead panel P5, to STBY.

S 794-017
(3) Do a check for leakage at the joints of the manifold interconnect valve and the ducts.
(a) Some leakage is permitted.
(b) If the leakage is strong, align the manifold interconnect valve with the ducts and tighten the couplings again.

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- S 214-028
- (4) Make sure that the manifold interconnect valve is in the A TO B position.

NOTE: To find the position of the valve, look at the valve position indicator. The "A TO B" and "C TO B" markings are on the valve body below the position indicator.

- S 864-020
- (5) Put the EQUIP COOLING mode selector to OVRD.

- S 214-029
- (6) Make sure that the manifold interconnect valve is in the C TO B position.

- S 864-023
- (7) Put the EQUIP COOLING mode selector to AUTO.

- S 864-024
- (8) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

- S 414-025
- (9) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

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SUPPLY/EXHAUST FAN CHECK VALVES – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Supply/Exhaust Fan Check Valve Removal
 - (2) Supply/Exhaust Fan Check Valve Installation
- B. The supply and exhaust fans for the equipment cooling system have a check valve installed adjacent to each fan.
- C. The check valve for the supply fan is installed behind the left sidewall lining in the forward cargo compartment between the forward cargo door opening and the forward bulkhead (Fig. 401).
- D. The check valve for the exhaust fan is installed behind the right sidewall lining in the forward cargo compartment between the forward cargo door opening and the forward bulkhead (Fig. 402).

TASK 21-58-02-004-075

2. Supply/Exhaust Fan Check Valve Removal (Fig. 401, 402)

- A. References
 - (1) AMM 24-22-00/201, Electric Power Control
 - (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
 - (3) AMM 52-33-00/201, Large Forward Cargo Door
- B. Access
 - (1) Location Zones
 - 121 Forward Cargo Compartment (Left)
 - 122 Forward Cargo Compartment (Right)
 - (2) Access Panels
 - 821 Forward Cargo Door
- C. Prepare for Removal
 - S 864-004
 - (1) Remove electrical power from the airplane to shutoff the supply and exhaust fans for the equipment cooling system (AMM 24-22-00/201).

NOTE: The supply/exhaust fans must be off before you remove the fan check valve.
 - S 014-002
 - (2) Open the forward cargo compartment door (AMM 52-33-00/201).
 - S 014-077
 - (3) To get access to the supply fan check valve, remove the left sidewall lining between the forward cargo door opening and the forward bulkhead (AMM 25-52-01/401).

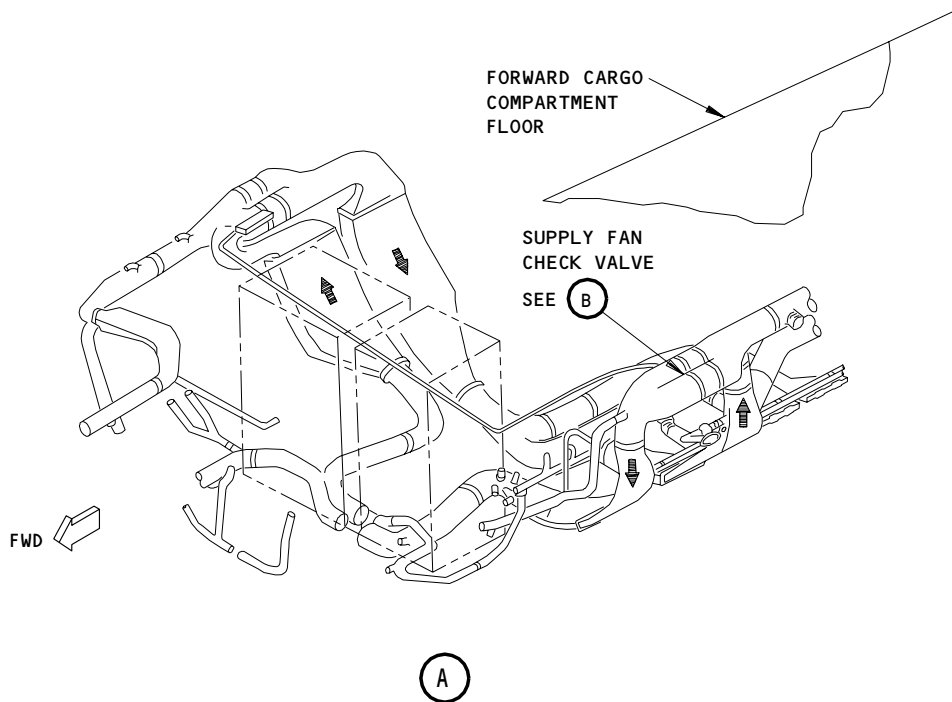
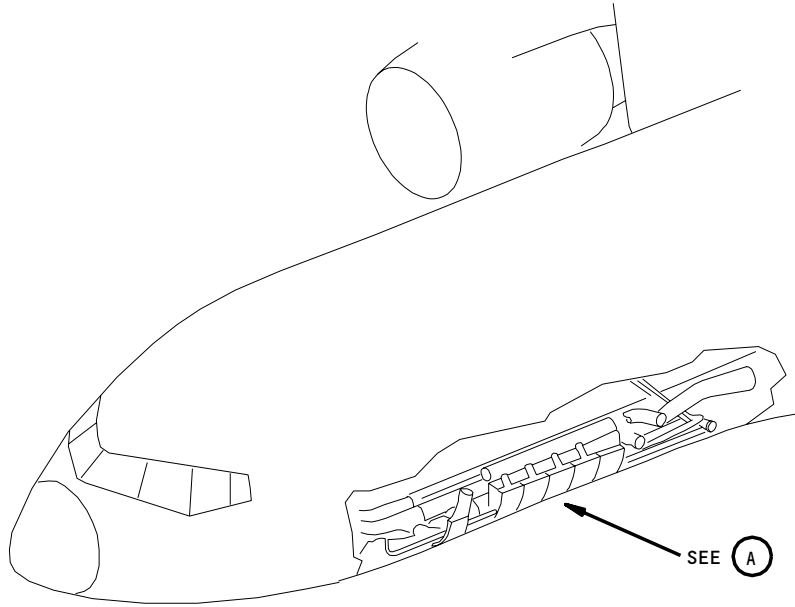
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Supply Fan Check Valve Installation
Figure 401 (Sheet 1)

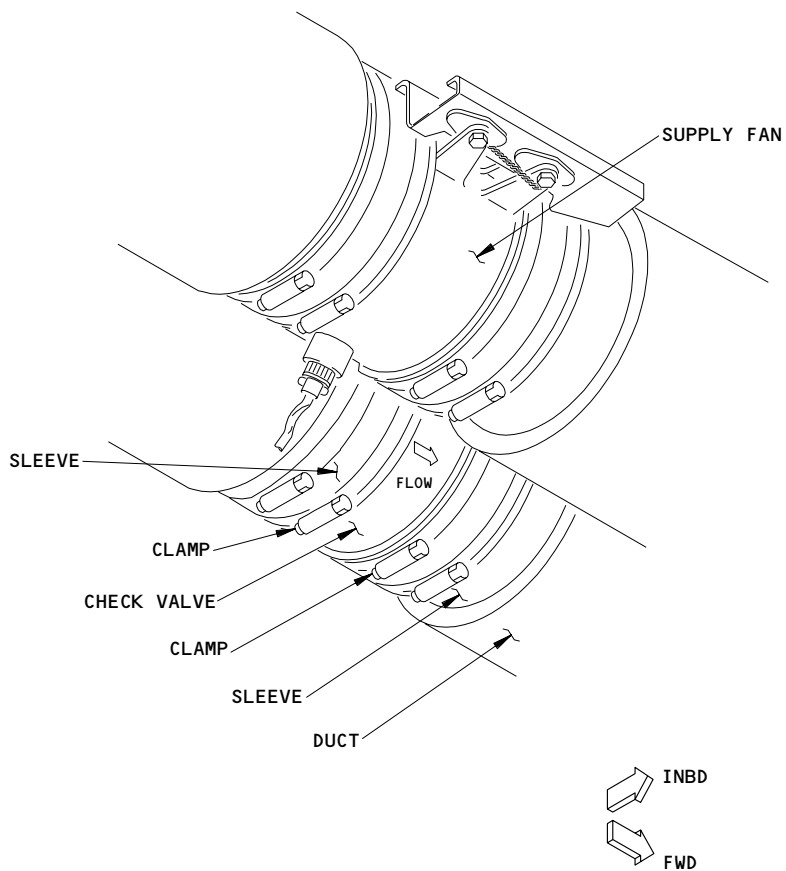
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SUPPLY FAN CHECK VALVE

(B)

Supply Fan Check Valve Installation
Figure 401 (Sheet 2)

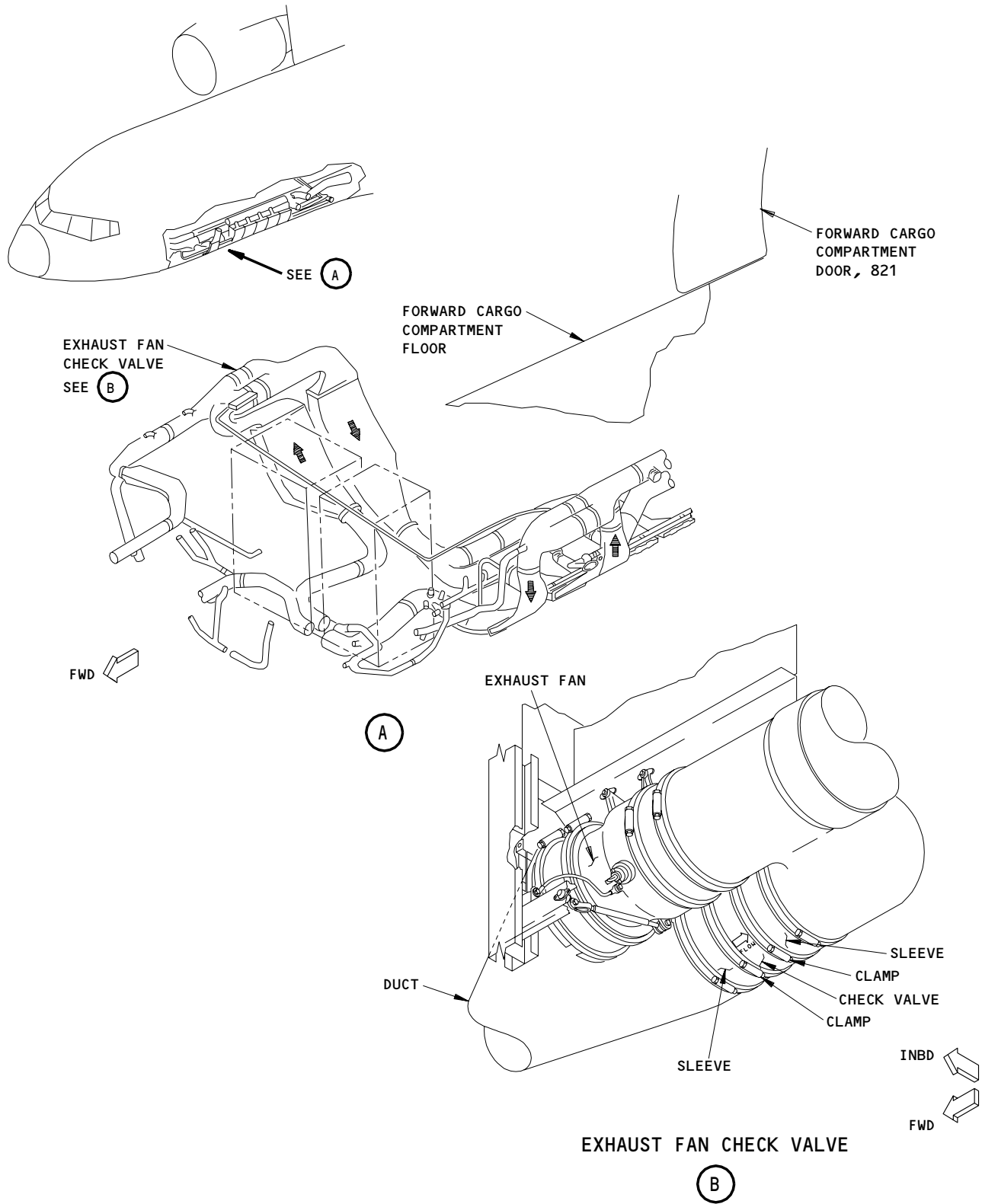
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Exhaust Fan Check Valve Installation
Figure 402

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S 014-078

- (4) To get access to the exhaust fan check valve, remove the right sidewall lining between the forward cargo door opening and the forward bulkhead (AMM 25-52-01/401).

S 014-079

- (5) AIRPLANES WITH EXHAUST DUCT INSULATION (POST-SB 21-63, PRR B11754); Remove the insulation that covers the check valve and exhaust duct.

S 864-067

- (6) Make sure the supply/exhaust fans are not in operation.

D. Check Valve Removal

S 024-065

- (1) Remove the two clamps which hold the check valve to the two sleeves.

S 024-066

- (2) Move the sleeves away from the check valve.

S 024-011

- (3) Remove the check valve.

S 484-080

- (4) Install a duct cover on the sleeve openings to keep out unwanted materials in the ducts.

TASK 21-58-02-404-076

3. Supply/Exhaust Fan Check Valve Installation (Fig. 401, 402)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (3) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

(1) Location Zones

- | | |
|-----|-----------------------------------|
| 121 | Forward Cargo Compartment (Left) |
| 122 | Forward Cargo Compartment (Right) |

(2) Access Panels

- | | |
|-----|--------------------|
| 821 | Forward Cargo Door |
|-----|--------------------|

C. Check Valve Installation

S 084-081

- (1) Remove the duct covers.

S 424-082

- (2) Install the check valve between the two sleeves.
 - (a) For the supply fan check valve, make sure the flow arrow on the check valve points forward away from the supply fan.

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- (b) For the exhaust fan check valve, make sure the flow arrow on the check valve points aft away from the exhaust fan.
- (c) Make sure the ends of the sleeves are fully engaged all around the ends of the check valve to prevent air leaks.

S 424-083

- (3) Install and tighten the two clamps to hold the two sleeves to the check valve.

D. Check Valve Post-Installation Test

S 864-072

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-084

- (2) Move the EQUIP COOL selector to AUTO or STBY position, on the Equipment Cooling control panel (M17, P5 panel).

S 724-073

- (3) Make sure you the applicable supply/exhaust fan operates.

S 794-074

- (4) Make sure there is no air leakage between the sleeves and the check valve.

E. Put the Airplane Back to Its Usual Condition

S 424-069

- (1) AIRPLANES WITH EXHAUST DUCT INSULATION (POST-SB 21-63, PRR B11754); Install the insulation to cover the check valve and exhaust duct.

S 414-071

- (2) Install the sidewall lining (AMM 25-52-01/401).

S 414-059

- (3) Close the forward cargo door (AMM 52-33-00/201).

S 864-061

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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SUPPLY EXHAUST FAN CHECK VALVES – INSPECTION/CHECK

1. General

- A. There is one task in this procedure. This procedure gives the instructions to examine the fan check valves for damage and correct operation.

TASK 21-58-02-206-001

2. Fan Check Valve Inspection

A. References

- (1) AMM 21-58-02/401, Fan Check Valves

B. Access

- (1) Location Zones

121 Forward Cargo Compartment, Left
122 Forward Cargo Compartment, Right

C. Procedure

S 026-004

- (1) Remove the fan check valve (AMM 21-58-02/401).

S 216-003

- (2) Examine the fan check valve as follows:

NOTE: You must replace the fan check valve if you find that the fan check valve does not satisfactorily meet the conditions which follow (AMM 21-58-02/401).

- (a) Make sure that all of the check valve parts are installed.
- (b) Make sure there are no cracks or corrosion in the check valve housing.
- (c) Make sure there is no damage to the mating surfaces of the check valve flapper and the check valve housing.
- (d) Make sure that the check valve flapper can move smoothly and freely.
- (e) Make sure there is no damage to the check valve stop pin.
- (f) Make sure there is no damage to the check valve flapper, torsion spring or the hinge pin.

S 426-005

- (3) Install the fan check valve if it is satisfactory (AMM 21-58-02/401).

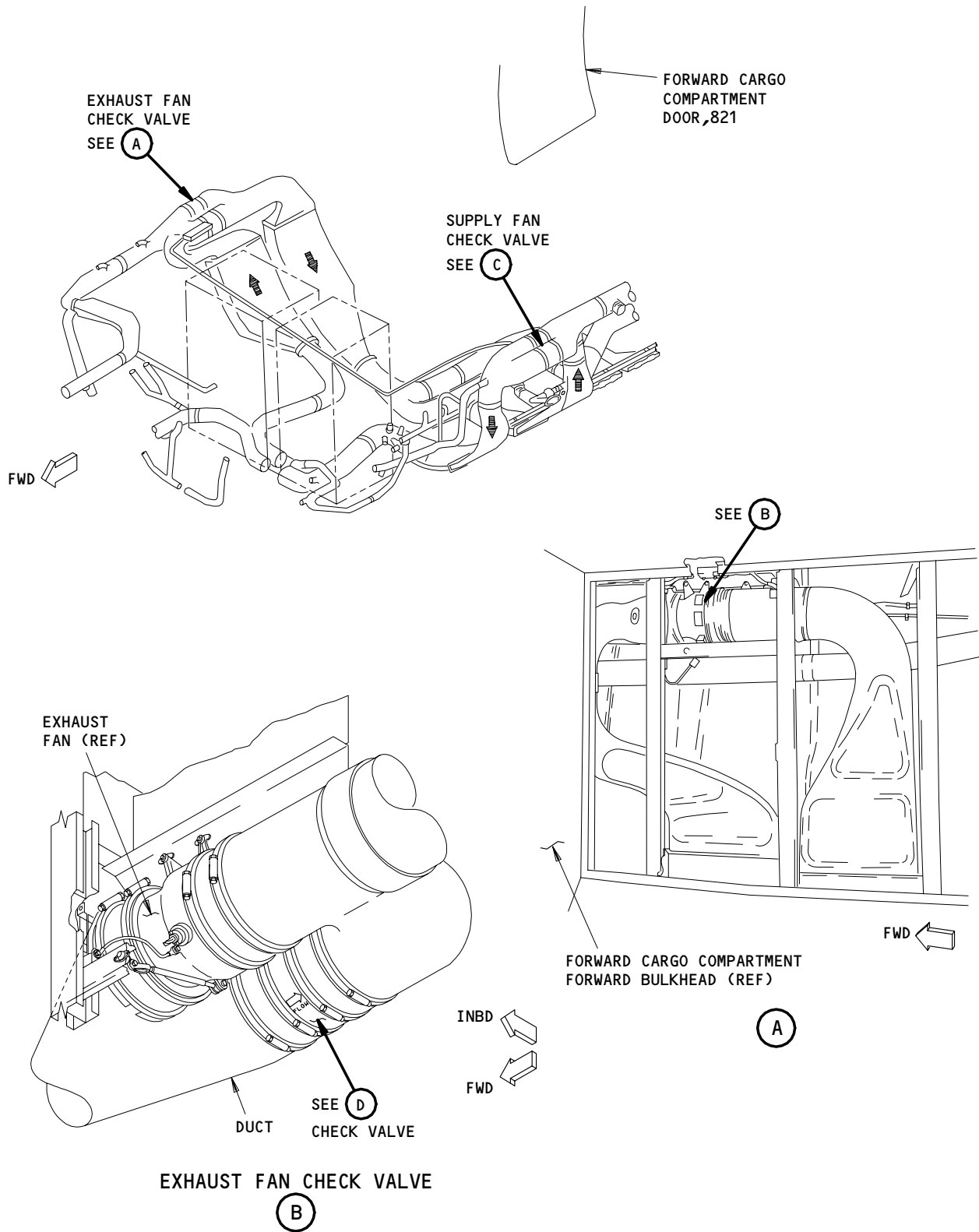
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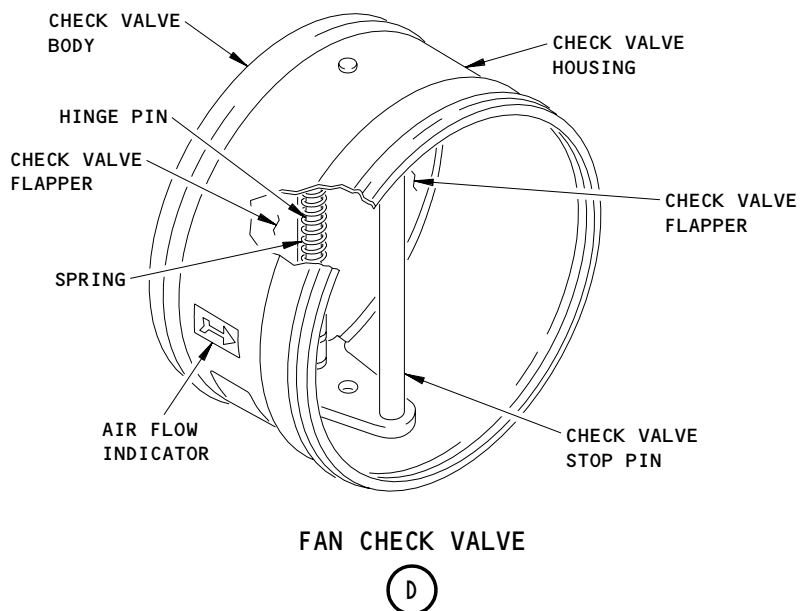
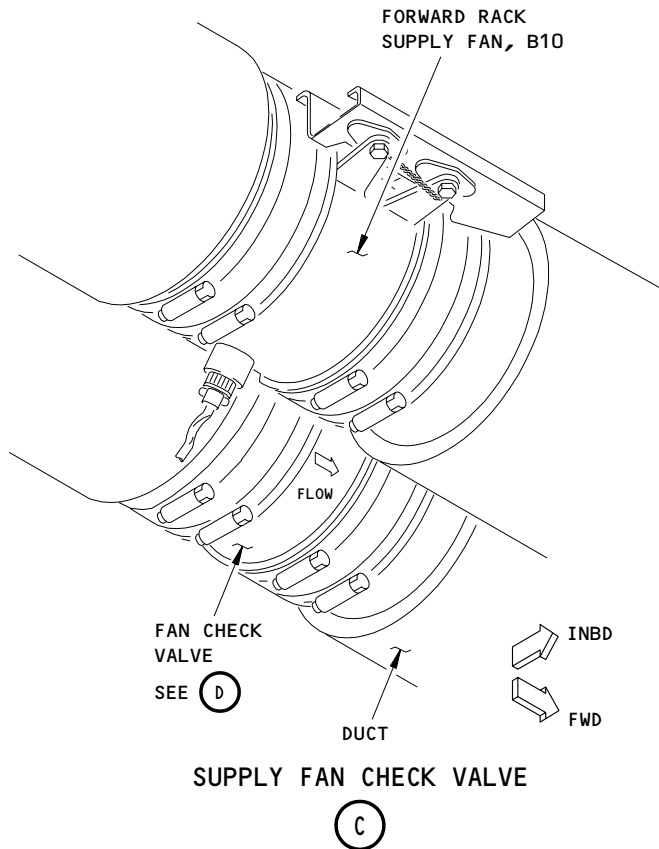


Fan Check Valve Inspection
Figure 601 (Sheet 1)

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Fan Check Valve Inspection
Figure 601 (Sheet 2)

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OVERBOARD EXHAUST VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure has four tasks:
- (1) Overboard Exhaust Valve Removal
 - (2) Overboard Exhaust Valve Actuator Removal
 - (3) Overboard Exhaust Valve Actuator Installation
 - (4) Overboard Exhaust Valve Installation
- B. The overboard exhaust valve is attached to the airplane skin below the forward cargo compartment floor. The valve lets the air from the electronic equipment to flow overboard. The valve is operated by an electrically operated actuator assembly.

TASK 21-58-05-014-001

2. Remove Overboard Exhaust Valve (Fig. 401)

A. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control
- (3) AMM 25-53-02/401, Roller Tray
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zone
821 Forward Cargo Compartment (Left)

C. Procedure to remove the overboard exhaust valve

S 014-016

- (1) Open the forward cargo compartment door (AMM 52-33-00/201).

S 014-031

- (2) Find the overboard exhaust valve below floor in the center of cargo compartment.

S 864-003

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (3) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

S 034-004

- (4) Remove electrical power (AMM 24-22-00/201).

S 034-005

- (5) Remove the roller tray on the right side of overboard exhaust valve (11) (AMM 25-53-02/401).

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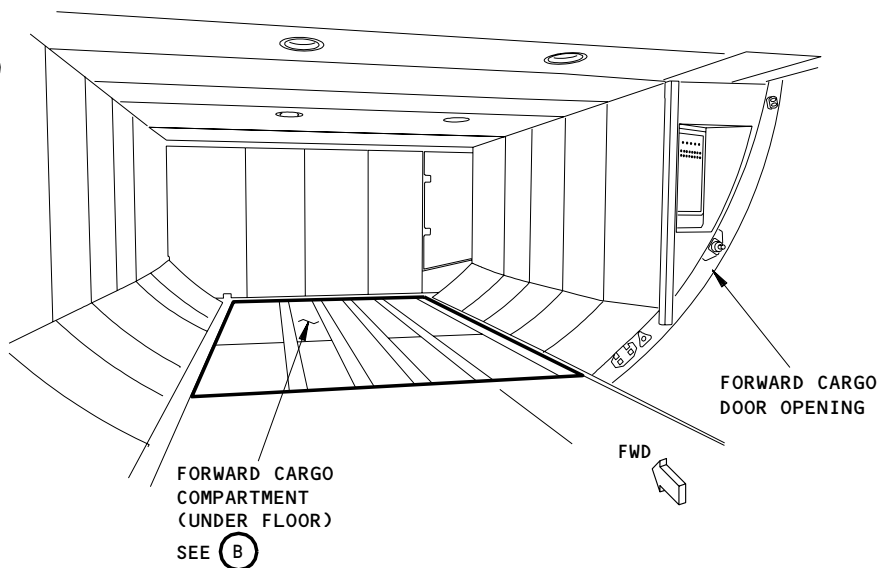
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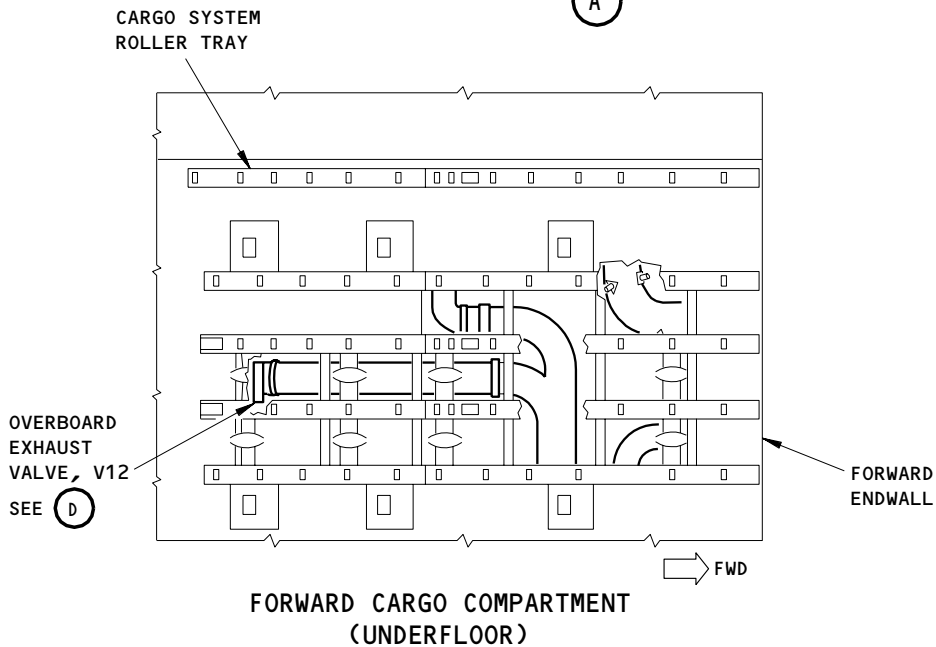
FORWARD CARGO DOOR, 821
FORWARD CARGO COMPARTMENT
SEE (A)

OVERBOARD EXHAUST VALVE, V12
SEE (C)



FORWARD CARGO COMPARTMENT

(A)



FORWARD CARGO COMPARTMENT
(UNDERFLOOR)

(B)

Overboard Exhaust Valve Installation
Figure 401 (Sheet 1)

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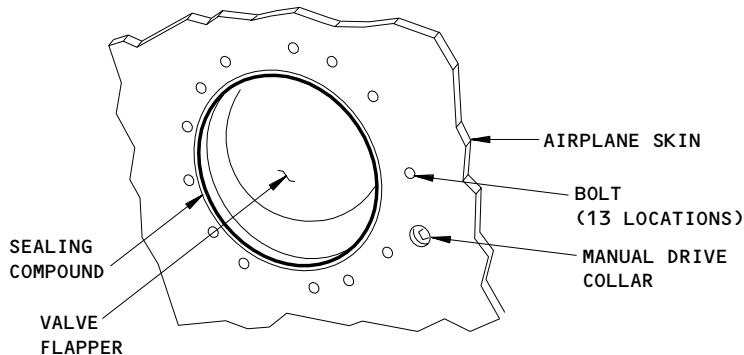
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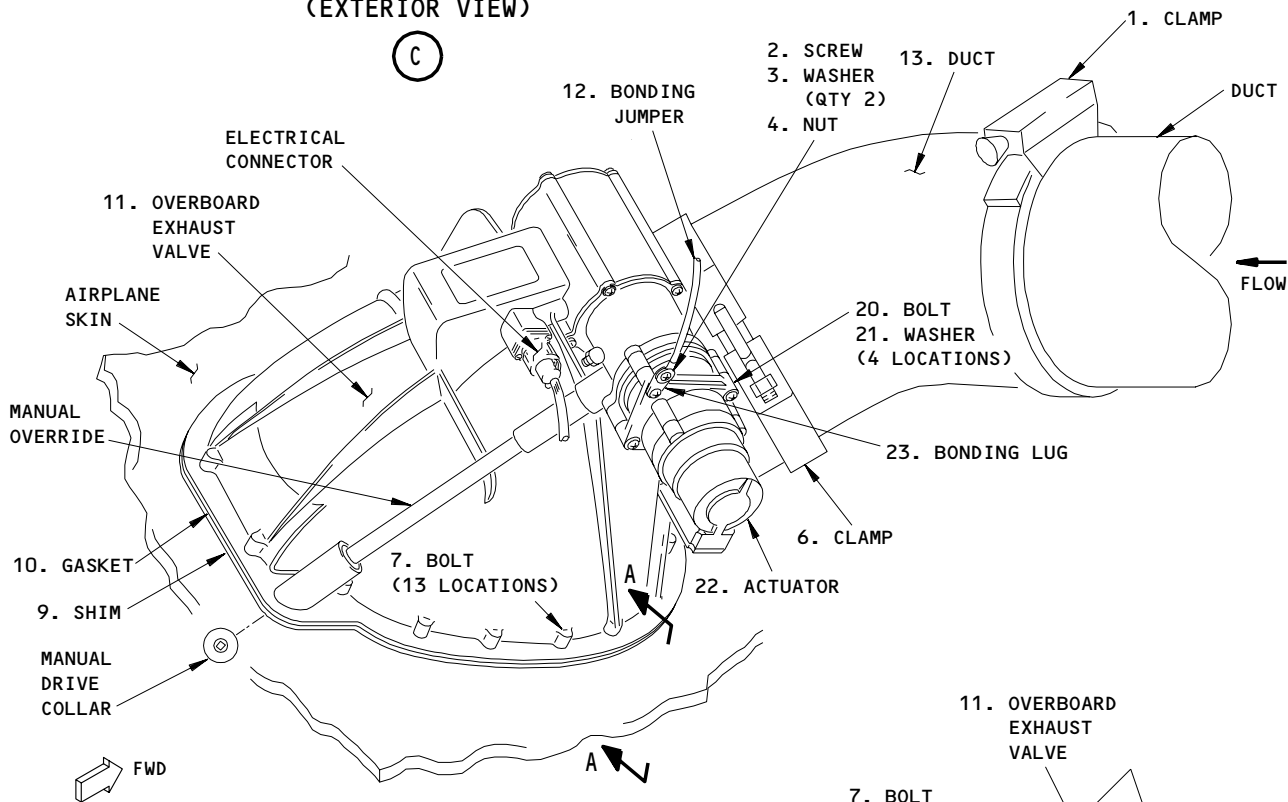
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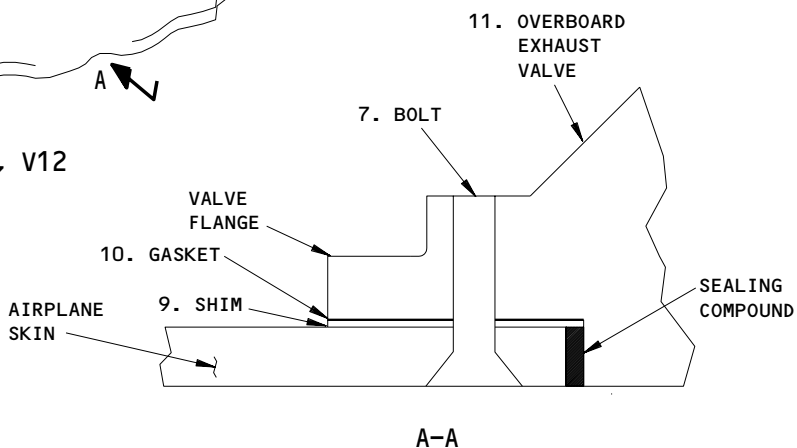
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OVERBOARD EXHAUST VALVE, V12
(EXTERIOR VIEW)



OVERBOARD EXHAUST VALVE, V12
(INTERIOR VIEW)



Overboard Exhaust Valve Installation
Figure 401 (Sheet 2)

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- S 034-006
(6) Disconnect the electrical connector.
- S 034-007
(7) Disconnect the bonding jumper (12).
- S 014-008
(8) Use the plastic (non-metallic) knife to remove fillet seal along the valve flange and aerodynamic seal around the edge of valve.
- S 014-009
(9) Remove the bolts (7) that connect the bolt housing to skin.
- S 014-010
(10) Remove the clamp (6) between valve (11) and cooling air duct (13).
- S 014-011
(11) Loosen duct (13) at the nearest clamp (1).
- S 024-012
(12) Lift the valve (11) and the gasket (10) of the skin.
- S 554-013
(13) Leave the shim and manual drive collar in the same location on the skin.
- S 014-014
(14) Use the plastic (non-metallic) knife and remove the sealant from sealing surface of airplane skin.
- S 954-015
(15) Put a cover in opening in the duct to prevent the entry of unwanted objects.

TASK 21-58-05-004-035

3. Remove Overboard Exhaust Valve Actuator (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
(2) AMM 25-53-02/401, Roller Tray
(3) AMM 27-61-00/201, Spoiler/Speedbrake Control System

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- (4) AMM 52-33-00/201, Large Forward Cargo Door
- B. Access
 - (1) Location Zone
 - 821 Forward Cargo Compartment (Left)
- C. Procedure to remove the overboard exhaust valve actuator

S 014-038

- (1) Open the forward cargo compartment door.

S 014-039

- (2) Remove the floor panel that is in the center of the airplane aft of the forward endwall.

S 014-040

- (3) Find the overboard exhaust valve below floor in the center of cargo compartment.

S 864-041

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (4) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

S 864-042

- (5) Remove electrical power (AMM 24-22-00/201).

S 024-043

- (6) Remove the roller tray on the right side of overboard exhaust valve (11) (AMM 25-53-02/401).

S 864-044

- (7) Disconnect the electrical connector from the valve.

S 024-045

- (8) Disconnect the bonding jumper (12) from the bonding lug (23) by Removing the screw (2), washer (3) and nut (4) from the bonding lug (23).

S 024-046

- (9) Remove the bolt (20) and washer (21) that connect the actuator (22) to the valve.

S 024-036

- (10) Lift the actuator (22) away from the overboard exhaust valve body.

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S 434-049

- (11) Install one bolt (20) and washer (21) in place of removed bolts to hold the actuator assembly on the housing and prevent turning of the actuator assembly.

S 014-037

- (12) Put a cover in the opening of the duct to prevent the entry of unwanted objects.

TASK 21-58-05-404-050

4. Install Overboard Exhaust Valve Actuator (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	22	Actuator	21-58-13	01	825
401	22	Actuator	21-58-13	02	660
401	22	Actuator	21-58-05	03	65

B. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-53-02/401, Roller Tray
- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (4) AMM 52-33-00/201, Large Forward Cargo Door

C. Access

- (1) Location Zone
821 Forward Cargo Compartment (Left)

D. Procedure to install overboard exhaust valve actuator.

S 954-051

- (1) Remove the duct covering.

S 014-063

- (2) Remove single bolt (20) and washer (21) from actuator assembly that prevented assembly from rotating.
 - (a) Install actuator (22) onto overboard exhaust valve.

NOTE: Make sure output shaft of actuator aligns with internal splines of clutch drum.

S 434-053

- (3) Install the bolts (20) and washers (21) that connect the actuator (22) to the valve (11) and torque bolts 14 to 18 inch-pounds.

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- S 434-054
- (4) Connect the bonding jumper (12) to bonding lug (23) using the screw (2), washer (3) and nut (4).
- S 434-055
- (5) Connect the electrical connector to the valve.
- S 714-056
- (6) Do the steps that follow to do a test of the overboard exhaust valve actuator.
- S 864-057
- (7) Supply electrical power (AMM 24-22-00/201).
- (a) Turn the EQUIP COOLING mode selector to the STBY position.
- 1) Make sure the valve position indicator shows that the valve is closed:
- NOTE: This step makes sure that the valve starts in the closed position.
- (b) Turn the EQUIP COOLING mode selector to the AUTO position.
- (c) If the outside ambient temperature is less than 45°F, supply heat to the skin temperature switch.
- (d) Make sure that the valve position indicator shows that the valve is open.
- (e) Turn the EQUIP COOLING mode selector to the STBY position.
- 1) Make sure the valve position indicator shows that the valve is closed.
- (f) Turn the EQUIP COOLING mode selector to the AUTO position.
- S 434-058
- (8) Install the removed roller tray (AMM 25-53-02/401).
- S 434-059
- (9) Install the removed floor panel.
- S 414-060
- (10) Close the forward cargo compartment door (AMM 52-33-00/201).
- S 864-061
- (11) Do the activation procedure for the spoilers if the spoilers were previously deactivated (AMM 27-61-00/201).
- S 864-062
- (12) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-58-05-424-015

5. Install Overboard Exhaust Valve (Fig. 401)

A. Consumable Materials

- (1) A00247 Compound - Sealing BMS 5-95 Class B-2
(AMM 20-30-01/201)

B. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	10	Gasket	21-58-13	01	815
401	10	Gasket	21-58-13	02	650
401	10	Gasket	21-58-05	03	55
401	11	Valve	21-58-13	01	820
401	11	Valve	21-58-13	02	655
401	11	Valve	21-58-05	03	60

C. References

- (1) AMM 20-30-01/201, Adhesives, Cement, Sealers
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 25-53-02/401, Roller Tray
(4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
(5) AMM 51-31-01/201, Seals and Sealing
(6) AMM 52-33-00/201, Large Forward Cargo Door

D. Access

- (1) Location Zone
821 Forward Cargo Compartment (Left)

E. Procedure to install overboard exhaust valve.

S 954-016

- (1) Remove the duct covering.

S 434-017

- (2) Put the new gasket (10) in position against the shim at body skin.
Make sure that the manual drive collar is in correct location.

S 434-018

- (3) Put the valve (11) against the skin.

S 434-019

- (4) Install the bolts (7) from the airplane skin into bolt housing.

S 434-020

- (5) Tighten the bolts.

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S 434-021
(6) Align the duct (13) with the valve (11).

S 424-022
(7) Install the valve and tighten the clamp (6).

S 434-023
(8) Tighten the clamp (1).

S 424-072

CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE SEALANT.
IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE
SURFACE CAN OCCUR.

(9) Apply sealing compound to the valve, and the gap between valve and
airplane skin (AMM 51-31-01/201).

S 434-025
(10) Connect the bonding jumper (12) to bonding lug using the screw (2),
washer (3) and nut (4).

S 434-026
(11) Connect the electrical connector to the valve (11).

S 714-027
(12) Do the steps that follow to do a test of the overboard exhaust
valve.

S 864-028
(13) Supply electrical power (AMM 24-22-00/201).
(a) Continue to do a test of the overboard exhaust valve.
(b) Turn the EQUIP COOLING mode selector to the STBY position.
1) Make sure the valve position indicator shows that the valve
is closed:

NOTE: This step makes sure that the valve starts in the
closed position.

- (c) Turn the EQUIP COOLING mode selector to the AUTO position.
- (d) If the outside ambient temperature is less than 45°F, supply
heat to the skin temperature switch.
- (e) Make sure that the valve position indicator shows that the
valve is open.
- (f) Turn the EQUIP COOLING mode selector to the STBY position.
1) Make sure the valve position indicator shows that the valve
is closed.
- (g) Do a check for leaks at the joints of the valve and the duct.
1) Some leakage is permitted.

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- (h) If the leakage is strong, align the joint and tighten the clamp.
- (i) Turn the EQUIP COOLING mode selector to the AUTO position.

S 434-029

- (14) Install the removed roller tray (AMM 25-53-02/401).

S 414-031

- (15) Close the forward cargo compartment door 821 (AMM 52-33-00/201).

S 864-018

- (16) Do the activation procedure for the spoilers if the spoilers were previously deactivated (AMM 27-61-00/201).

S 864-014

- (17) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FORWARD RACK SUPPLY AND EXHAUST FANS – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks EE cooling system supply/exhaust fans:
- (1) Forward Rack Supply Fan Removal
 - (2) Forward Rack Supply Fan Installation
 - (3) Forward Rack Exhaust Fan Removal
 - (4) Forward Rack Exhaust Fan Installation
 - (5) AIR COOLING FAN (HAMILTON SUNDSTRAND P/N 732591) POST-SB 21-0215;
Forward Rack Exhaust Fan Vibration Monitor Removal
 - (6) AIR COOLING FAN (HAMILTON SUNDSTRAND P/N 732591) POST-SB 21-0215;
Forward Rack Exhaust Fan Vibration Monitor Installation
- B. The supply and exhaust fans are located in the forward cargo compartment behind the left and right sidewalls near the forward end of the compartment. The EE cooling supply system is behind the left sidewall and the EE cooling exhaust system is behind the right sidewall.

TASK 21-58-06-004-100

2. Forward Rack Supply Fan Removal (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Control (Supply Power)
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (4) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zones
 - 121 Forward Cargo Compartment (left)
- (2) Access Panels
 - 821 Forward Cargo Door

C. Prepare for Removal

S 014-164

- (1) Get access to the EE cooling supply system behind the left sidewall in the forward cargo compartment:
 - (a) Open the forward cargo door, 821 (AMM 52-33-00/201).

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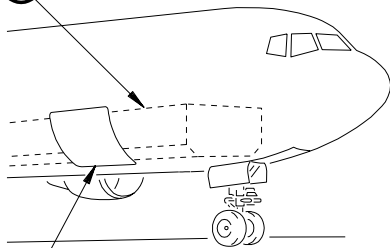
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BOEING

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FORWARD CARGO
COMPARTMENT

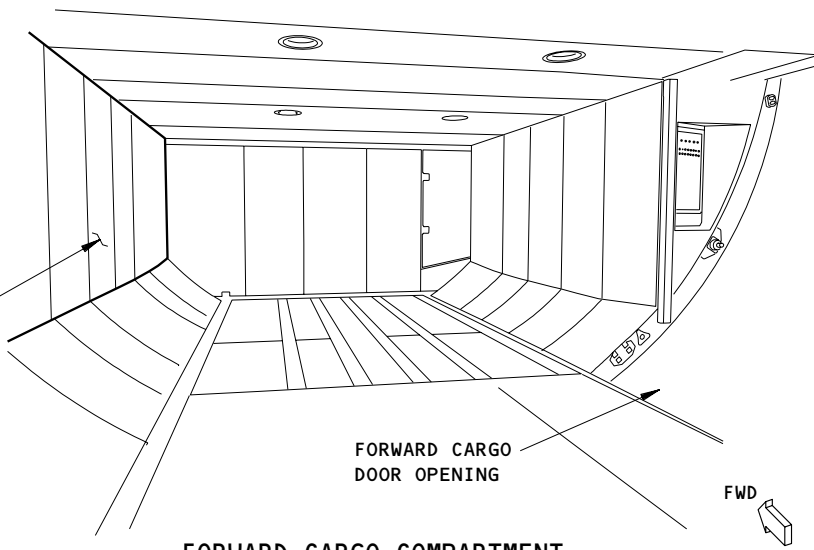
SEE (A)



FORWARD CARGO
DOOR, 821

FORWARD CARGO
COMPARTMENT
(LEFT SIDEWALL)

SEE (B)



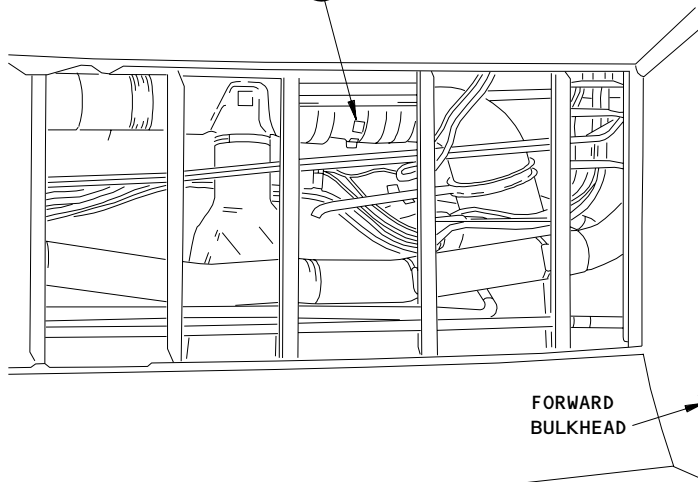
FORWARD CARGO
DOOR OPENING

FORWARD CARGO COMPARTMENT

(A)

FORWARD RACK
SUPPLY FAN, B10

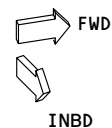
SEE (C)



FORWARD
BULKHEAD

FORWARD CARGO COMPARTMENT
(LEFT SIDEWALL)

(B)

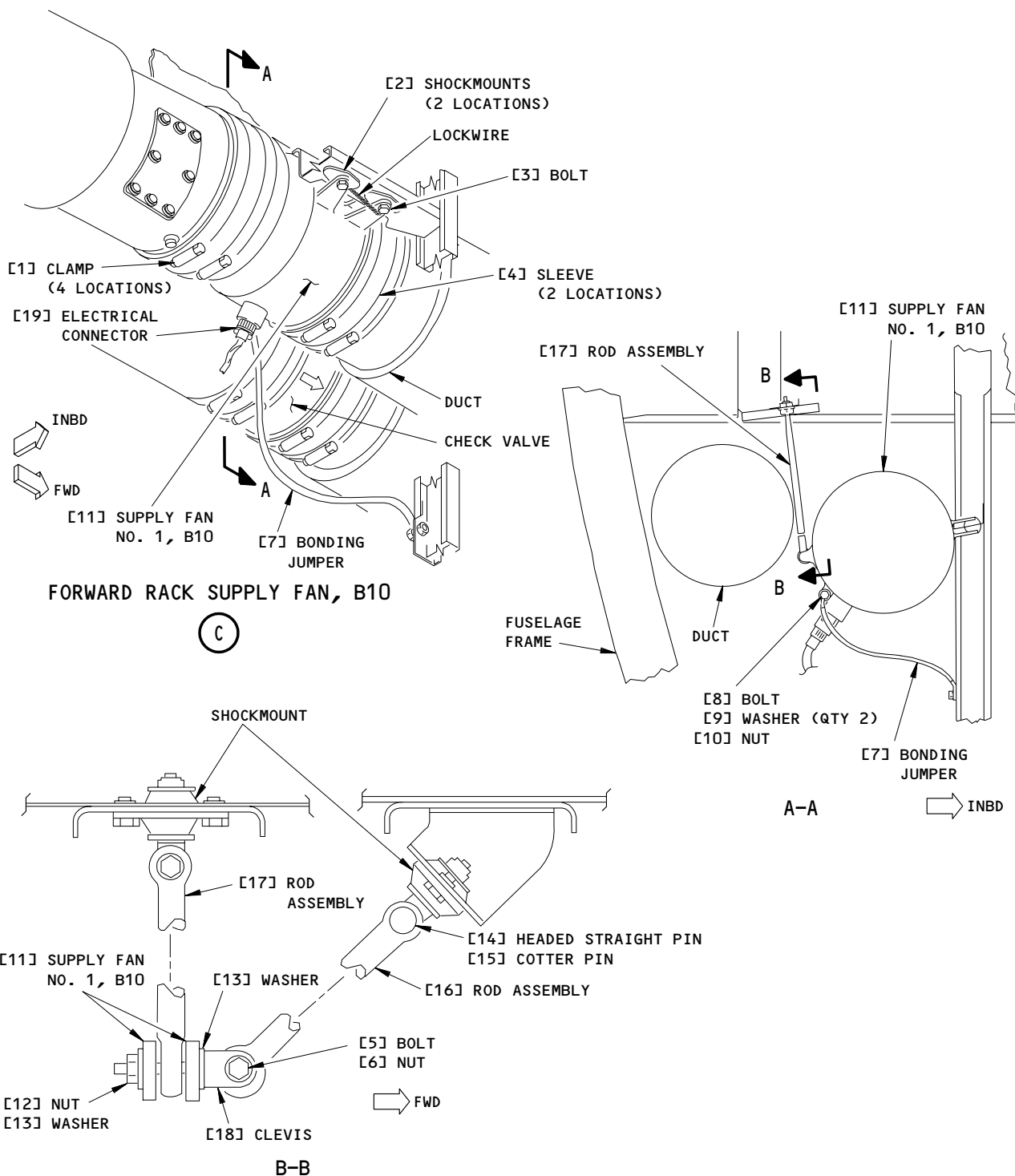


Forward Rack Supply Fan Installation
Figure 401 (Sheet 1)

EFFECTIVITY

ALL

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Forward Rack Supply Fan Installation
Figure 401 (Sheet 2)

EFFECTIVITY

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- (b) Remove the left sidewall lining aft of the forward bulkhead (AMM 25-52-01/401).

S 864-102

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

S 864-103

- (3) Remove electrical power (AMM 24-22-00/201).

S 864-165

- (4) For supply fan 1, open these circuit breakers and install collars and DO-NOT-CLOSE tags:
 - (a) P6 Main Power Distribution Panel
 - 1) 6H18, EQUIP COOL SUPPLY FAN 1
 - (b) P11 Overhead Circuit Breaker Panel
 - 1) 11P11, EQUIPMENT COOLING SUPPLY FAN 1

D. Supply Fan Removal

S 034-106

- (1) Disconnect the electrical connector [19] from the supply fan [11].

S 034-107

- (2) Remove the bolt [8], washers [9] (qty 2), and nut [10] to disconnect the bonding jumper [7] from the supply fan [11].

S 034-108

- (3) Remove the clamps [1] that attach the sleeves [4] at each end of the supply fan [11].

EFFECTIVITY

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S 034-168

- (4) For supply fan 1, disconnect the rod assembly [16] and the rod assembly [17] from the supply fan [11].
 - (a) Remove the bolt [5] and nut [6] to disconnect the rod assembly [16] from the clevis [18].
 - (b) Remove the nut [12], washers [13] (qty 2), and clevis [18] to disconnect the rod assembly [17] from the supply fan [11].
 - (c) If necessary, remove the headed straight pin [14] and cotter pin [15] from rod assembly [16], discard the cotter pin [15].

S 034-111

- (5) Cut the lockwire and remove the bolts [3] from the supply fan [11] and the shockmounts [2].

S 024-167

- (6) Remove the supply fan [11].

S 954-113

- (7) Put a cover on the sleeve openings to keep out unwanted objects.

EFFECTIVITY

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TASK 21-58-06-404-114

3. Forward Rack Supply Fan Installation (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	11	Supply Fan 1 (B10)	21-58-06	01	145
401	11	Supply Fan 1 (B10)	21-58-06	01	180
401	11	Supply Fan 1 (B10)	21-58-06	01A	125
401	11	Supply Fan 1 (B10)	21-58-06	01A	200
401	11	Supply Fan 1 (B10)	21-58-06	06	120
401	11	Supply Fan 1 (B10)	21-58-06	06	150
401	11	Supply Fan 1 (B10)	21-58-06	06A	145
401	11	Supply Fan 1 (B10)	21-58-06	11	165

B. References

- (1) AMM 20-10-23/401, Lockwires
- (2) AMM 24-22-00/201, Control (Supply Power)
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (4) AMM 52-33-00/201, Large Forward Cargo Door
- (5) SWPM 20-20-00, Electrical Bonds and Grounds (D6-54446)

C. Access

- (1) Location Zones
 - 121 Forward Cargo Compartment (Left)
- (2) Access Panels
 - 821 Forward Cargo Door

D. Supply Fan Installation

S 434-218

- (1) Remove the cover from each sleeve opening and make sure there is no unwanted materials inside of the ducts.
 - (a) Clean the screen inside of the duct if it has contamination.

S 424-219

- (2) Put the supply fan [11] into position between the sleeves [4], and align the fan mounting lugs with the shockmounts [2].
 - (a) Make sure the flow arrow on the supply fan [11] points in the forward direction.

S 434-220

- (3) Install and tighten the bolts [3] to connect the supply fan [11] to the shockmounts [2].
 - (a) Tighten the bolts [3] to 30-35 pound-inches (3.39-3.95 newton-meters).

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(b) Install a lockwire between the bolts [3] (AMM 20-10-23/401).

S 434-242

- (4) For supply fan 1, connect the rod assembly [16] and the rod assembly [17] to the supply fan [11]:
- (a) Install the nut [12], washers [13] (qty 2), and clevis [18] to connect the rod assembly [17] to the supply fan [11].
 - (b) Install the bolt [5] and nut [6] to connect the rod assembly [16] to the clevis [18].
 - (c) If removed, install the headed straight pin [14] and new cotter pin [15] to the rod assembly [16].

S 434-222

- (5) Move each sleeve [4] onto the supply fan [11].
- (a) Install and tighten the clamps [1] to the sleeves [4].
 - (b) Make sure the sleeves [4] are fully engaged all around the supply fan [11] in order to prevent air leaks.

S 434-223

- (6) Install the bolt [8], washers [9] (qty 2), and nut [10] to connect the bonding jumper [7] to the supply fan [11].
- (a) Do an electrical bonding and resistance check of the supply fan [11] (SWPM 20-20-00, Electrical Bonds and Grounds, D6-54446).
 - 1) Make sure the electrical resistance is not more than 0.005 ohms (5 milliohms).

S 434-224

- (7) Connect the electrical connector [19] to the supply fan [11].

E. Supply Fan Post-Installation Test

S 864-322

- (1) Do these steps to restore electrical power.
- (a) For supply fan 1, close these circuit breakers and remove the collars and DO-NOT-CLOSE tags:
 - 1) P6 Main Power Distribution Panel
 - a) 6H18, EQUIP COOL SUPPLY FAN 1
 - 2) P11 Overhead Circuit Breaker Panel
 - a) 11P11, EQUIPMENT COOLING SUPPLY FAN 1

WARNING: DO THE ACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (b) Do the activation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.
- (c) Supply electrical power (AMM 24-22-00/201).

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S 714-332

- (2) For supply fan 1 (B10), do these steps to test the fan operation:
 - (a) Make sure the EQUIP COOLING mode selector is set to AUTO position, on the pilot's P5 overhead panel.
 - 1) Make sure that supply fan 1 operates.
 - 2) Make sure there are no air leaks around the sleeves and the supply fan 1.

F. Put the Airplane Back to Its Usual Condition

S 414-243

- (1) Close up the access to the supply fan:
 - (a) Install the left sidewall lining (AMM 25-52-01/401).
 - (b) Close the forward cargo door, 821 (AMM 52-33-00/201).

S 864-132

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

ALL

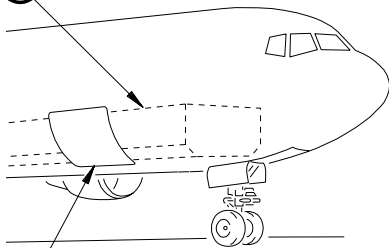
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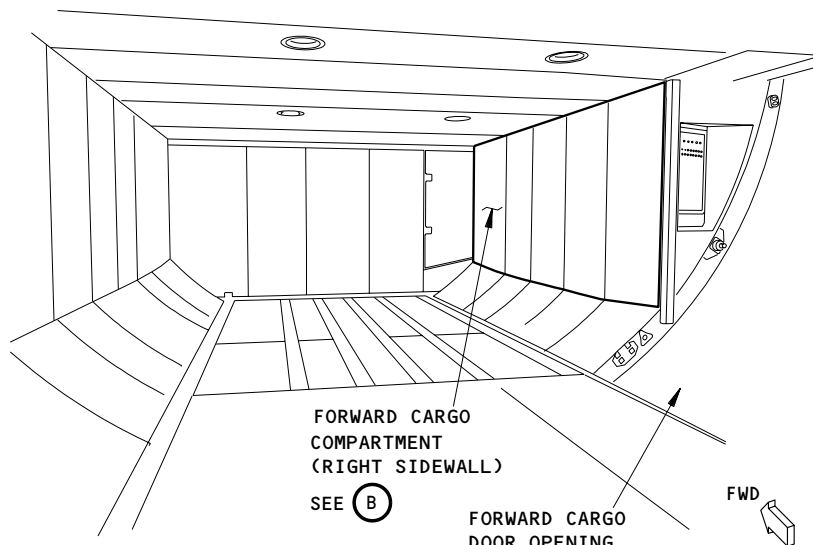
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FORWARD CARGO
COMPARTMENT

SEE (A)



FORWARD CARGO
DOOR, 821



FORWARD CARGO
COMPARTMENT
(RIGHT SIDEWALL)

SEE (B)

FORWARD CARGO
DOOR OPENING

FWD

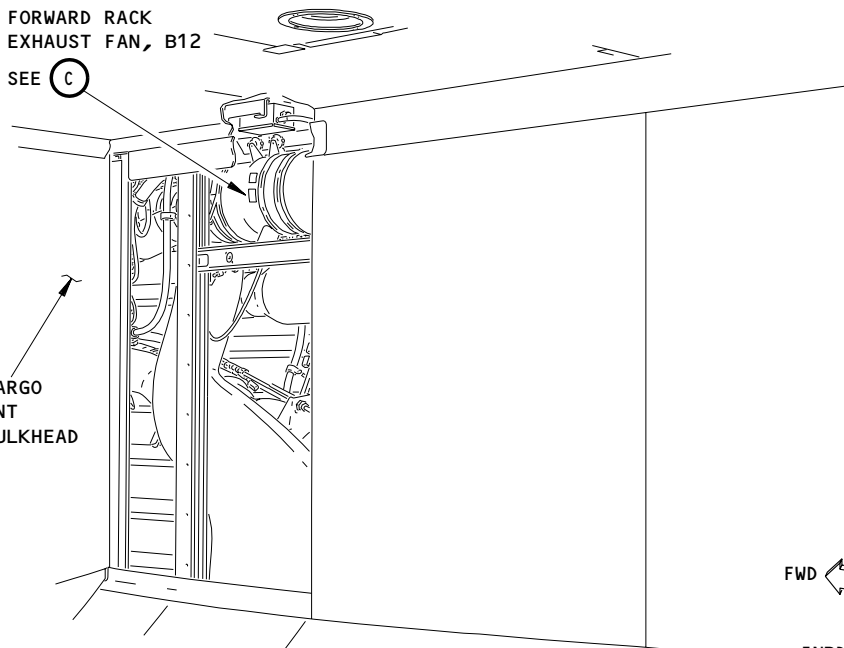
FORWARD CARGO COMPARTMENT

(A)

FORWARD RACK
EXHAUST FAN, B12

SEE (C)

FORWARD CARGO
COMPARTMENT
FORWARD BULKHEAD



FORWARD CARGO COMPARTMENT
(RIGHT SIDEWALL)

(B)

Forward Rack Exhaust Fan Installation
Figure 402 (Sheet 1)

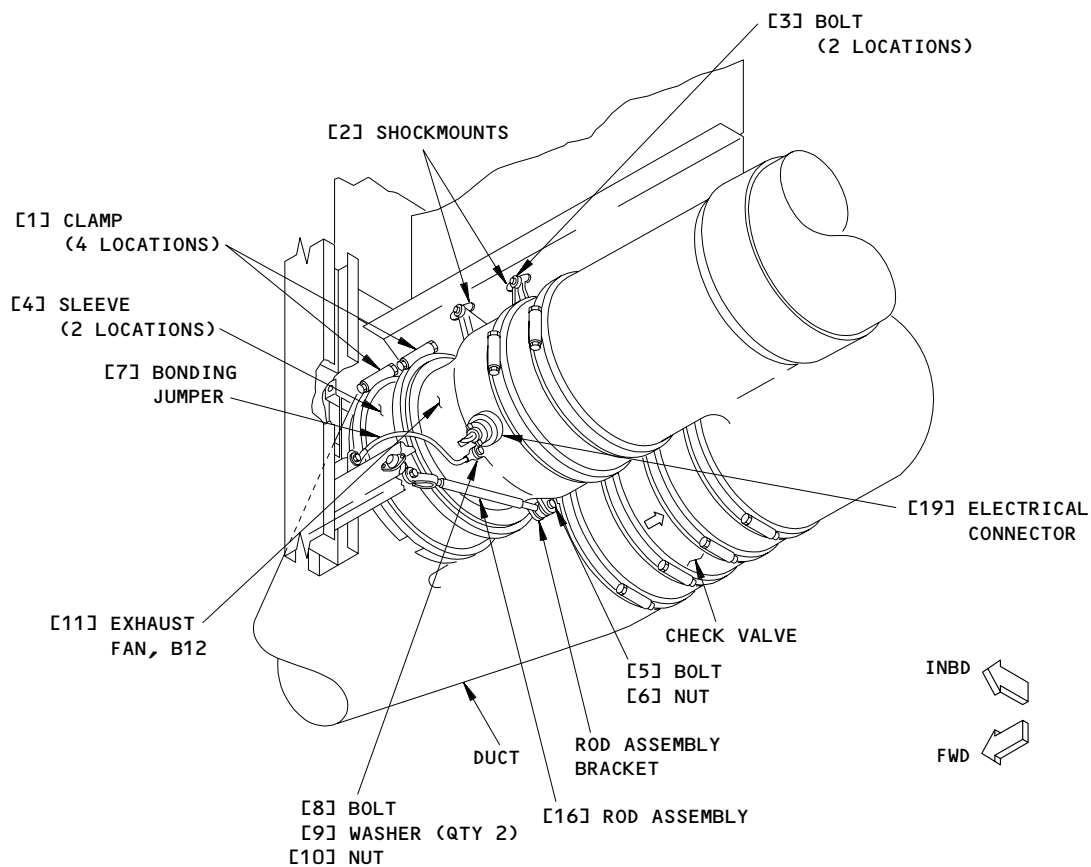
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FORWARD RACK EXHAUST FAN, B12

(C)

Forward Rack Exhaust Fan Installation
Figure 402 (Sheet 2)

EFFECTIVITY	
	ALL

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TASK 21-58-06-004-133

4. Forward Rack Exhaust Fan Removal (Fig. 402)

A. References

- (1) AMM 21-58-09/401, E/E Cooling Exhaust Duct Insulation
- (2) AMM 24-22-00/201, Control (Supply Power)
- (3) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (4) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zones
 - 122 Forward Cargo Compartment (right)
- (2) Access Panels
 - 821 Forward Cargo Door

C. Prepare for Removal

S 014-212

- (1) Get access to the EE cooling exhaust system behind the right sidewall in the forward cargo compartment:
 - (a) Open the forward cargo door, 821 (AMM 52-33-00/201).
 - (b) Remove the right sidewall lining aft of the forward bulkhead (AMM 25-52-01/401).
 - (c) Remove the insulation blanket from the exhaust fan (B12), if installed (AMM 21-58-09/401).

S 864-135

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

S 864-136

- (3) Remove electrical power (AMM 24-22-00/201).

S 864-206

- (4) Open these circuit breakers and install collars and DO-NOT-CLOSE tags:
 - (a) P6 Main Power Distribution Panel
 - 1) 6H21, FWD EXH EQUIP COOL FAN
 - (b) P11 Overhead Circuit Breaker Panel
 - 1) 11P22, EQUIPMENT COOLING EXH FAN FWD

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D. Exhaust Fan Removal

S 034-207

- (1) AIR COOLING FAN (HAMILTON SUNSTRAND P/N 732591) PRE-SB 21-0215;
Disconnect the electrical connector [19] from the exhaust fan [11]
(Fig. 402).

S 034-286

- (2) AIR COOLING FAN (HAMILTON SUNSTRAND P/N 732591) POST-SB 21-0215;
Disconnect the fan electrical connector plug [24] from the vibration
monitor [21] (Fig. 403).
 - (a) Do the removal task in this procedure to remove the vibration
monitor [21] from the exhaust fan [11] (TASK 21-58-06-004-289).

S 034-208

- (3) Remove the bolt [8], washers [9] (qty 2), and nut [10] to disconnect
the bonding jumper [7] from the exhaust fan [11].

S 034-209

- (4) Remove the clamps [1] that attach the sleeves [4] at each end of the
exhaust fan [11].

S 034-210

- (5) Remove the bolt [5] and nut [6] to disconnect the rod assembly [16]
from the exhaust fan [11].

S 034-211

- (6) Cut the lockwire and remove the bolts [3] from the exhaust fan [11]
and the shockmounts [2].

S 024-144

- (7) Remove the exhaust fan [11].

S 954-145

- (8) Put a cover on the sleeve openings to keep out unwanted objects.

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TASK 21-58-06-404-146

5. Forward Rack Exhaust Fan Installation (Fig. 402)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
402	11	Exhaust Fan (B12)	21-58-06	02	150
402	11	Exhaust Fan (B12)	21-58-06	04	120
402	11	Exhaust Fan (B12)	21-58-06	04	121
402	11	Exhaust Fan (B12)	21-58-06	07	120
402	11	Exhaust Fan (B12)	21-58-06	07A	120

B. References

- (1) AMM 21-58-09/401, E/E Cooling Exhaust Duct Insulation
- (2) AMM 20-10-23/401, Lockwires
- (3) AMM 24-22-00/201, Control (Supply Power)
- (4) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (5) AMM 52-33-00/201, Large Forward Cargo Door
- (6) SWPM 20-20-00, Electrical Bonds and Grounds (D6-54446)

C. Access

- (1) Location Zones
 - 122 Forward Cargo Compartment (right)
- (2) Access Panels
 - 821 Forward Cargo Door

D. Exhaust Fan Installation

S 414-147

- (1) Remove the cover from each sleeve opening and make sure there is no unwanted materials inside of the ducts.
 - (a) Clean the screen inside of the duct if it has contamination.

S 424-213

- (2) Put the exhaust fan [11] into position between the sleeves [4], and align the fan mounting lugs with the shockmounts [2].
 - (a) Make sure the flow arrow on the exhaust fan [11] points in the aft direction.

S 434-214

- (3) Install and tighten the bolts [3] to connect the exhaust fan [11] to the shockmounts [2].
 - (a) Tighten the bolts [3] to 30-35 pound-inches (3.39-3.95 newton-meters).
 - (b) Install a lockwire between the bolts [3] (AMM 20-10-23/401).

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- S 434-151
- (4) Install the bolt [5] and nut [6] to connect the rod assembly [16] to the exhaust fan [11].

- S 434-152
- (5) Move each sleeve [4] onto the exhaust fan [11].
- (a) Install and tighten the clamps [1] to the sleeves [4].
 - (b) Make sure the sleeves [4] are fully engaged all around the exhaust fan [11] in order to prevent air leaks.

- S 434-154
- (6) Install the bolt [8], washers [9] (qty 2), and nut [10] to connect the bonding jumper [7] to the exhaust fan [11].
- (a) Do an electrical bonding and resistance check of the exhaust fan [11] (SWPM 20-20-00, Electrical Bonds and Grounds, D6-54446).
 - 1) Make sure the electrical resistance is not more than 0.005 ohms (5 milliohms).

- S 434-155
- (7) AIR COOLING FAN (HAMILTON SUNDSTRAND P/N 732591) PRE-SB 21-0215; Connect the electrical connector [19] to the exhaust fan [11] (Fig. 402).

- S 424-320
- (8) AIR COOLING FAN (HAMILTON SUNDSTRAND P/N 732591) POST-SB 21-0215; Do the installation task in this procedure to install the vibration monitor [21] to the exhaust fan [11] (TASK 21-58-06-404-299).
- (a) Connect the fan electrical connector plug [24] to the vibration monitor [21] (Fig. 403).

E. Exhaust Fan Post-Installation Test

- S 864-321
- (1) Do these steps to restore electrical power.
- (a) Close these circuit breakers and remove the collars and DO-NOT-CLOSE tags:
 - 1) P6 Main Power Distribution Panel
 - a) 6H21, FWD EXH EQUIP COOL FAN
 - 2) P11 Overhead Circuit Breaker Panel
 - a) 11P22, EQUIPMENT COOLING EXH FAN FWD

WARNING: DO THE ACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (b) Do the activation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.
- (c) Supply electrical power (AMM 24-22-00/201).

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S 714-287

- (2) AIR COOLING FAN (HAMILTON SUNDSTRAND P/N 732591) PRE-SB 21-0215;
Do these steps to test the operation of the exhaust fan [11]:
- (a) Make sure the EQUIP COOLING mode selector is set to AUTO position, on the pilot's P5 overhead panel.
 - 1) Make sure the exhaust fan [11] operates.
 - 2) Make sure there are no air leaks around the sleeves [4] and the exhaust fan [11].

S 714-288

- (3) AIR COOLING FAN (HAMILTON SUNDSTRAND P/N 732591) POST-SB 21-0215;
Do these steps to reset the vibration monitor [21] and to test the operation of the exhaust fan [11]:
- (a) Open this circuit breaker for the exhaust fan:
 - 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11P22, EQUIPMENT COOLING EXH FAN FWD
 - (b) Make sure the EQUIP COOLING mode selector is set to AUTO position, on the pilot's P5 overhead panel.

NOTE: The exhaust fan should still be off. The EICAS message FWD EQ EXH FAN (Status and Maintenance) will also show.

- (c) Push and hold the RESET button on the vibration monitor while you restore electrical power to the exhaust fan [11] in the next step.

NOTE: This is a two person operation. One person to push the RESET button while a second person restores electrical power.

- (d) Close this circuit breaker for the exhaust fan [11]:
 - 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11P22, EQUIPMENT COOLING EXH FAN FWD
- (e) Make sure the exhaust fan [11] now operates.

NOTE: The EICAS message FWD EQ EXH FAN (Status and Maintenance) should not show.

- (f) Release the RESET button on the vibration monitor after the fan operates, then within ten (10) seconds push and hold the RESET button again for three (3) to five (5) seconds until the STATUS light (LED) on the vibration monitor changes to 'green'.
- (g) Release the RESET button on the vibration monitor.

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- (h) Make sure the exhaust fan continues to operate for up to seven (7) minutes and that the fan does not shutdown.

NOTE: During the seven (7) minutes, the STATUS light (LED) may blink 'amber' (yellow) on occasion which is acceptable. If the STATUS light (LED) blinks 'red' during the seven (7) minutes, the vibration monitor will initiate a shutdown of the fan. This is an indication that the fan should be replaced.

- (i) After the seven (7) minutes, make sure the exhaust fan [11] continues to operate without a shutdown, and that the STATUS light (LED) on the vibration monitor is blinking 'green' every two (2) seconds.
- (j) Make sure there are no air leaks around the sleeves [4] and the exhaust fan [11].

F. Put Airplane Back to Its Usual Condition

S 414-217

- (1) Close up the access to the exhaust fan:
 - (a) Install the insulation blanket around the exhaust fan, if removed previously (AMM 21-58-09/401).
 - (b) Install the right sidewall lining (AMM 25-52-01/401).
 - (c) Close the forward cargo door, 821 (AMM 52-33-00/201).

S 864-163

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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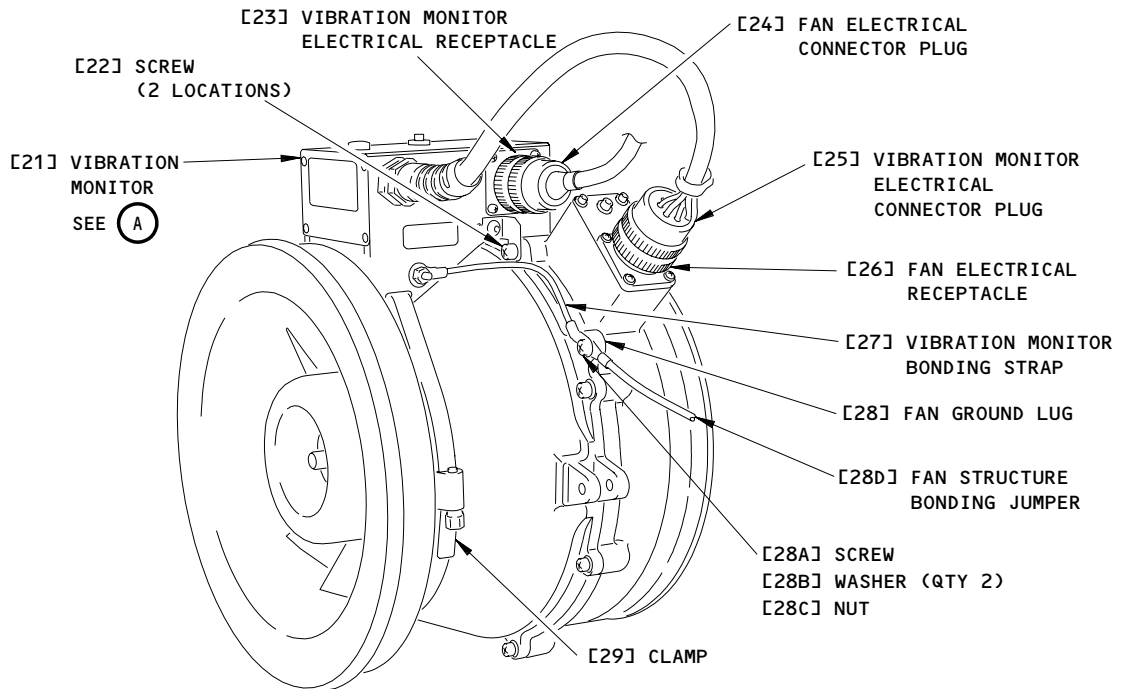
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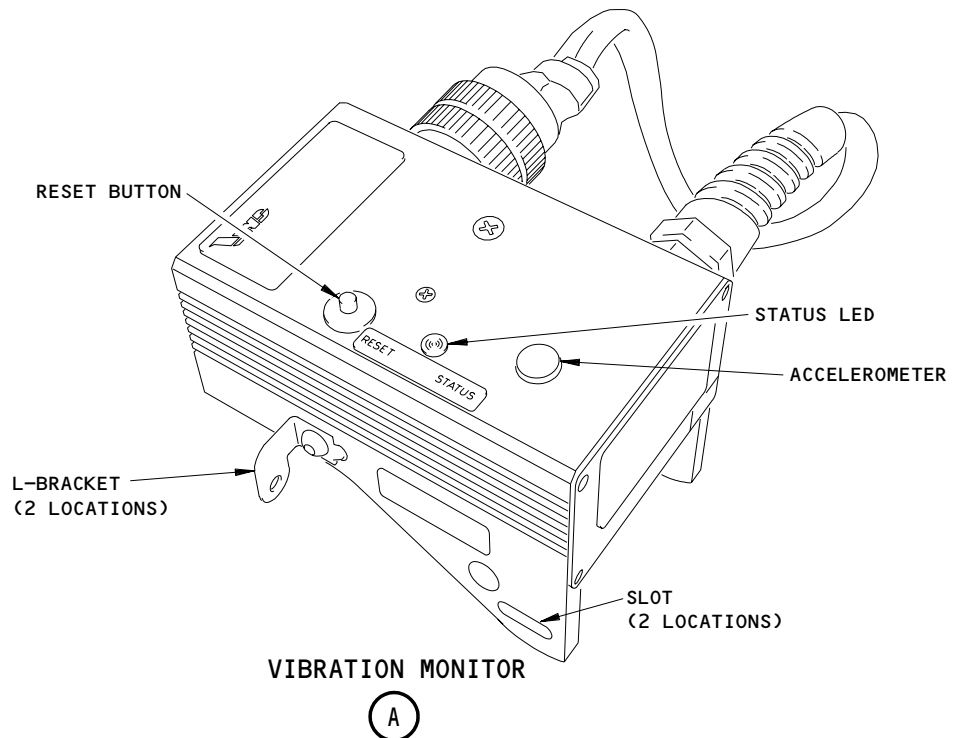
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FAN P/N 732591 WITH VIBRATION MONITOR
(EXAMPLE)



Forward Rack Exhaust Fan Vibration Monitor Installation
Figure 403

EFFECTIVITY
AIR COOLING FAN (HAMILTON SUNDSTRAND
P/N 732591) POST-SB 21-0215

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TASK 21-58-06-004-289

6. AIR COOLING FAN (HAMILTON SUNDSTRAND P/N 732591) POST-SB 21-0215;
Forward Rack Exhaust Fan Vibration Monitor Removal (Fig. 403)

A. References

- (1) AMM 21-58-09/401, E/E Cooling Exhaust Duct Insulation
- (2) AMM 24-22-00/201, Control (Supply Power)
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (4) AMM 52-33-00/201, Large Forward Cargo Door
- (5) SWPM 20-20-00, Electrical Bonds and Grounds (D6-54446)

B. Access

- (1) Location Zones
 - 122 Forward Cargo Compartment (right)
- (2) Access Panels
 - 821 Forward Cargo Door

C. Prepare for Removal

S 014-310

- (1) Get access to the EE cooling exhaust system behind the right sidewall in the forward cargo compartment:
 - (a) Open the forward cargo door, 821 (AMM 52-33-00/201).
 - (b) Remove the right sidewall lining aft of the forward bulkhead (AMM 25-52-01/401).

S 864-311

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

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- S 864-312
(3) Remove electrical power (AMM 24-22-00/201).

- S 864-313
(4) Open these circuit breakers and install collars and DO-NOT-CLOSE tags:
(a) P6 Main Power Distribution Panel
1) 6H21, FWD EXH EQUIP COOL FAN
(b) P11 Overhead Circuit Breaker Panel
1) 11P22, EQUIPMENT COOLING EXH FAN FWD

D. Vibration Monitor Removal

- S 024-293
(1) Disconnect the fan electrical connector plug [24] from the vibration monitor [21].

- S 024-294
(2) Disconnect the vibration monitor electrical connector plug [25] from the exhaust fan [11].

- S 024-295
(3) Remove the bolt [28A], washers [28B] (qty 2), and nut [28C] to disconnect the vibration monitor bonding strap [27] and the fan-structure bonding jumper [28D] from the fan ground lug [28].

- S 024-314
(4) Remove the two screws [22] that hold the vibration monitor [21] to the exhaust fan [11].

- S 024-296
(5) Remove the band clamp [29] that holds the vibration monitor [21] to the exhaust fan [11].

- S 024-297
(6) Remove the vibration monitor [21].

E. Exhaust Fan Restoration after Vibration Monitor Removal

- S 904-298
(1) If you do not plan to re-install the vibration monitor [21], do these steps to restore the exhaust fan [11] to the PRE-SB 21-0215 configuration:
(a) Re-install the two screws [22] with a new flat washer (p/n AN960-10L) into the fan splitline holes, and tighten each screw [22] to 51-56 pound-inches (5.76-6.32 newton-meters).

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- (b) Re-install the bolt [28A], washers [28B] (qty 2), and nut [28C] to connect the fan-structure bonding jumper [28D] to the fan ground lug [28] on the exhaust fan [11].
 - 1) Do an electrical bonding and resistance check of the exhaust fan [11] (SWPM 20-20-00, Electrical Bonds and Grounds, D6-54446).
 - a) Make sure the electrical resistance is not more than 0.005 ohms (5 milliohms).
- (c) Reconnect the fan electrical connector plug [24] to the fan electrical receptacle [26] on the exhaust fan [11].
- (d) Close these circuit breakers and remove the collars and the DO-NOT-CLOSE tags:
 - 1) P6 Main Power Distribution Panel
 - a) 6H21, FWD EXH EQUIP COOL FAN
 - 2) P11 Overhead Circuit Breaker Panel
 - a) 11P22, EQUIPMENT COOLING EXH FAN FWD

WARNING: DO THE ACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (e) Do the activation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.
- (f) Supply electrical power (AMM 24-22-00/201).
- (g) Make sure the EQUIP COOLING mode selector is set to AUTO position, on the pilot's P5 overhead panel.
 - 1) Make sure the exhaust fan [11] operates.
- (h) Close up the access to the exhaust fan:
 - 1) Install the insulation blanket around the exhaust fan, if removed previously (AMM 21-58-09/401)
 - 2) Install the right sidewall lining (AMM 25-52-01/401).
 - 3) Close the forward cargo door, 821 (AMM 52-33-00/201).
- (i) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-58-06-404-299

7. AIR COOLING FAN (HAMILTON SUNDSTRAND P/N 732591) POST-SB 21-0215;
Forward Rack Exhaust Fan Vibration Monitor Installation (Fig. 403)

A. References

- (1) AMM 24-22-00/201, Control (Supply Power)
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (3) AMM 52-33-00/201, Large Forward Cargo Door
- (4) SWPM 20-20-00, Electrical Bonds and Grounds (D6-54446)

B. Access

- (1) Location Zones
 - 122 Forward Cargo Compartment (right)
- (2) Access Panels
 - 821 Forward Cargo Door

C. Vibration Monitor Installation

S 424-300

- (1) Install the vibration monitor [21] to the exhaust fan [11].
 - (a) Put the band clamp [29] thru the slot in each side of the vibration monitor [21], then loosely install the band clamp [29] around the fan housing.
 - (b) Align the L-brackets on each side of the vibration monitor [21] with the two splitline holes on the fan housing.
 - (c) Install the two screws [22] to secure the vibration monitor L-brackets to the fan housing.
 - 1) Tighten each screw [22] to 51-56 pound-inches (5.76-6.32 newton-meters).
 - (d) Tighten the band clamp [29] to 12-15 pound-inches (1.35-1.69 newton-meters).
 - 1) Make sure the band clamp [29] engages fully around the entire circumference of the fan housing.
 - 2) Make sure both legs of the vibration monitor [21] are in full contact with the fan housing.

S 434-301

- (2) Install the bolt [28A], washers [28B] (qty 2), and nut [28C] to connect the vibration monitor bonding strap [27] and the fan-structure bonding jumper [28D] to the fan ground lug [28].
 - (a) Do an electrical bonding and resistance check of the exhaust fan [11] and the vibration monitor [21] (SWPM 20-20-00, Electrical Bonds and Grounds, Standard Wiring Practice Manual, D6-54446).
 - 1) Make sure the electrical resistance is not more than 0.005 ohms (5 milliohms).

S 434-302

- (3) Connect the vibration monitor electrical connector plug [25] to the fan electrical receptacle [26] on the exhaust fan [11].

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S 434-303

- (4) Connect the fan electrical connector plug [24] to the vibration monitor electrical receptacle [23].

D. Post-Installation Test - Vibration Monitor and Exhaust Fan

S 864-316

- (1) Do these steps to restore electrical power.
 - (a) Close these circuit breakers and remove the collars and the DO-NOT-CLOSE tags:
 - 1) P6 Main Power Distribution Panel
 - a) 6H21, FWD EXH EQUIP COOL FAN
 - 2) P11 Overhead Circuit Breaker Panel
 - a) 11P22, EQUIPMENT COOLING EXH FAN FWD

WARNING: DO THE ACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (b) Do the activation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.
- (c) Supply electrical power (AMM 24-22-00/201).

S 724-315

- (2) Do these steps to reset the vibration monitor and test the operation of the exhaust fan:
 - (a) Open this circuit breaker for the exhaust fan:
 - 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11P22, EQUIPMENT COOLING EXH FAN FWD
 - (b) Make sure the EQUIP COOLING mode selector is set to AUTO position, on the pilot's P5 overhead panel.

NOTE: The exhaust fan should still be off. The EICAS message FWD EQ EXH FAN (Status and Maintenance) will also show.

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- (c) Push and hold the RESET button on the vibration monitor while you restore electrical power to the exhaust fan [11] in the next step.

NOTE: This is a two person operation. One person to push the RESET button while a second person restores electrical power.

- (d) Close this circuit breaker for the exhaust fan [11]:
 - 1) P11 Pilot's Overhead Circuit Breaker Panel
 - a) 11P22, EQUIPMENT COOLING EXH FAN FWD
- (e) Make sure the exhaust fan [11] now operates.

NOTE: The EICAS message FWD EQ EXH FAN (Status and Maintenance) should not show.

- (f) Release the RESET button on the vibration monitor after the fan operates, then within ten (10) seconds push and hold the RESET button again for three (3) to five (5) seconds until the STATUS light (LED) on the vibration monitor changes to 'green'.
- (g) Release the RESET button on the vibration monitor.
- (h) Make sure the exhaust fan continues to operate for up to seven (7) minutes and that the fan does not shutdown.

NOTE: During the seven (7) minutes, the STATUS light (LED) may blink 'amber' (yellow) on occasion which is acceptable. If the STATUS light (LED) blinks 'red' during the seven (7) minutes, the vibration monitor will initiate a shutdown of the fan. This is an indication that the fan should be replaced.

- (i) After the seven (7) minutes, make sure the exhaust fan [11] continues to operate without a shutdown, and that the STATUS light (LED) on the vibration monitor is blinking 'green' every two (2) seconds.

E. Put the Airplane Back to Its Usual Configuration

S 414-317

- (1) Close up the access to the exhaust fan:
 - (a) Install the right sidewall lining (AMM 25-52-01/401).
 - (b) Close the forward cargo door, 821 (AMM 52-33-00/201).

S 864-318

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FORWARD RACK SUPPLY AND EXHAUST FANS – CLEANING

1. General

- A. The forward equipment cooling supply/exhaust fans can become contaminated with unwanted materials which can prevent correct fan operation. This procedure gives instructions to clean the fan impeller and the air passages only. It is necessary to remove the fan rotor housing and impeller to do this procedure. If it is necessary to disassemble the fan more to clean it, you must return the fan to the shop for an overhaul (off-aircraft). This procedure is only applicable to the forward equipment cooling supply/exhaust fans with p/n 732591 series.

TASK 21-58-06-107-026

2. Forward Equipment Cooling Supply/Exhaust Fans Cleaning

A. General

- (1) This task is only applicable to the forward equipment cooling supply and exhaust fans with p/n 732591 series (CMM 21-58-02). The following instructions are based on the supplier component maintenance manual CMM 21-58-02.

B. Equipment

- (1) Clean, Lint-free Absorbent Cloths, commercially available
(2) Stiff-bristled, Non-metallic Brush, commercially available
(3) Wooden dowel, 0.5 inch (12.7 millimeters) in diameter by 6 inches (142 millimeters) in length

C. Consumable Materials

- (1) Isopropyl Alcohol (Federal Specification TT-I-735), commercially available
(2) Cleaning Compound Alkaline Cleaner (pH 8-9.5), commercially available
(3) Mobil Grease 28 (Military Specification MIL-G-81322A), Mobil Oil Corp.

D. Parts

- (1) Self-locking nut, p/n MS21043-6 (quantity 1), commercially available
(2) Screw-Cap-Socket Head, p/n NAS1351-3-10P (quantity 8), commercially available

E. References

- (1) AMM 21-58-06/401, Forward Rack Supply and Exhaust Fans

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F. Access

(1) Location Zones

- 121 Forward Cargo Compartment (left)
- 122 Forward Cargo Compartment (right)

G. Prepare for Cleaning

S 027-017

- (1) Remove the supply/exhaust fan (AMM 21-58-06/401).

H. Fan Disassembly

S 037-018

- (1) Disassemble the fan rotor housing from the fan stator housing as follows:
- (a) Remove the eight (8) screws and washers at the split-line between the fan rotor housing and the fan stator housing.
 - 1) Discard the eight (8) screws.
 - (b) Carefully separate the fan rotor housing from the fan stator housing and be careful as you remove the fan rotor housing over the impeller, because the clearances between the impeller blades and the fan rotor housing are within just a few thousandths of an inch.

S 037-019

- (2) Disassemble the fairing and impeller from the shaft of the fan rotor assembly:
- (a) To prevent rotation of the impeller and the fan, insert (wedge) a wooden dowel, approximately 0.5 inch (12.7 millimeters) in diameter by 6 inches (142 millimeters) in length, between any two blades of the impeller and the vanes in the stator housing.
 - 1) Make sure the wooden dowel contacts the blades of the impeller and the vanes of the stator housing assembly in such a position that the dowel will minimize the stresses transferred to the blades and vanes in order to prevent potential fan damage.
 - (b) Remove the self-locking nut and washer from the shaft of the rotor assembly.
 - 1) Discard the self-locking nut.
 - (c) Remove the fairing, impeller, rectangular key, and shims (if installed) from the shaft of the rotor assembly.
 - (d) Remove the wooden dowel.

I. Fan Cleaning

S 117-020

- (1) Clean the metal non-electrical parts as follows:
- (a) Wash all metal non-electrical parts with cleaning solution of alkaline cleaner or isopropyl alcohol and water.
 - (b) Use a stiff-bristled, non-metallic brush to loosen caked dirt from exterior surfaces.
 - (c) Rinse the parts with clean cold water.

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- (d) Dry all parts using clean, lint-free cloths and/or compressed, clean, dry air.

S 117-021

- (2) Clean the electrical parts as follows:
 - (a) Wipe all electrical parts with clean, lint-free cloth moistened with isopropyl alcohol.
 - (b) Dry all parts using clean, lint-free cloths and/or compressed, clean, dry air.

J. Fan Assembly

S 437-023

- (1) Assemble the impeller and fairing to the shaft of the fan rotor assembly as follows:
 - (a) Install the shims (if removed), rectangular key, and impeller onto the shaft of the fan rotor assembly.
 - (b) Install the fairing onto the hub of the impeller, and align the timing marks on the fairing and impeller to within 0.030 inch (0.76 millimeter).
 - (c) To prevent rotation of the impeller and the fan, insert (wedge) a wooden dowel, approximately 0.5 inch (12.7 millimeters) in diameter by 6 inches (142 millimeters) in length, between any two blades of the impeller and the vanes in the stator housing.
 - 1) To prevent potential fan damage, make sure the wooden dowel contacts the blades of the impeller and the vanes of stator housing assembly in such a position that the dowel will minimize the stresses transferred to the blades and vanes.
 - (d) Lubricate the threads of a new self-locking nut (p/n MS21043-6) with Mobil Grease 28.
 - (e) Install the new self-locking nut (p/n MS21043-6) and washer to secure the fairing and impeller to the shaft of the rotor assembly.
 - 1) Tighten the new self-locking nut 80-100 pound-inches (9.04-11.30 newton-meters).
 - 2) Remove the wooden dowel.

S 437-024

- (2) Assemble the fan rotor housing to the fan stator housing as follows:
 - (a) Be careful as you install the fan rotor housing over the impeller, because the clearances between the impeller blades and the fan rotor housing are within just a few thousandths of an inch.
 - (b) Carefully push the fan rotor housing towards the fan stator housing, then align and press the mounting flanges of each housing together in a simulated torque condition.
 - (c) Install eight (8) new screws (p/n NAS1351-3-10P) and washers to secure the fan rotor housing to the fan stator housing, but do not tighten the screws.

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- (d) Use a feeler gauge to measure the clearances between the inside of the fan rotor housing at the leading edge, mid-point, and trailing edge of each impeller blade.
 - 1) For fan p/n 732591/E/F/G, make sure the clearance at the leading edge of the impeller blade is 0.020+/-0.005 inch (0.508+/-0.127 millimeter)
 - 2) For fan p/n 732591/A/B/C/D, make sure the clearance at the leading edge of the impeller blade is 0.015+/-0.005 inch (0.381+/-0.127 millimeter).
 - (e) Make sure the timing marks on the fairing and the impeller are still within 0.030 inch (0.76 millimeter).
 - (f) Tighten the eight (8) new screws 51-56 pound-inches (5.8-6.3 newton-meters) to secure the fan rotor housing to the fan stator housing.
- K. Return the Airplane to Normal Configuration

S 427-025

- (1) Install the supply/exhaust fan (AMM 21-58-06/401).

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INBOARD SUPPLY VALVE – REMOVAL/INSTALLATION

1. General

- A. The inboard supply valve permits the cooling air to flow into the equipment cooling duct from the forward cargo compartment. The inboard supply valve is behind the left sidewall in the forward cargo compartment across from the forward cargo door.

TASK 21-58-07-024-001

2. Remove Inboard Supply Valve (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (3) AMM 27-61-00/201 Spoiler/Speedbrake Control System
- (4) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zone
121 Forward Cargo Compt, Left

C. Procedure for the Removal of Inboard Supply Valve

S 014-076

- (1) Open the forward cargo door, 821 (AMM 52-33-00/201).

S 864-002

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

S 864-003

- (3) Remove the electrical power (AMM 24-22-00/201).

S 034-061

- (4) Remove the left sidewall lining(s) across from the forward cargo door to get access to the inboard supply valve (AMM 25-52-01/401).

S 034-057

- (5) Disconnect the electrical connector from the valve.

S 034-023

- (6) Disconnect the bonding jumper from the valve.

S 034-024

- (7) Loosen the coupling at each side of the valve. Move the coupling along the duct.

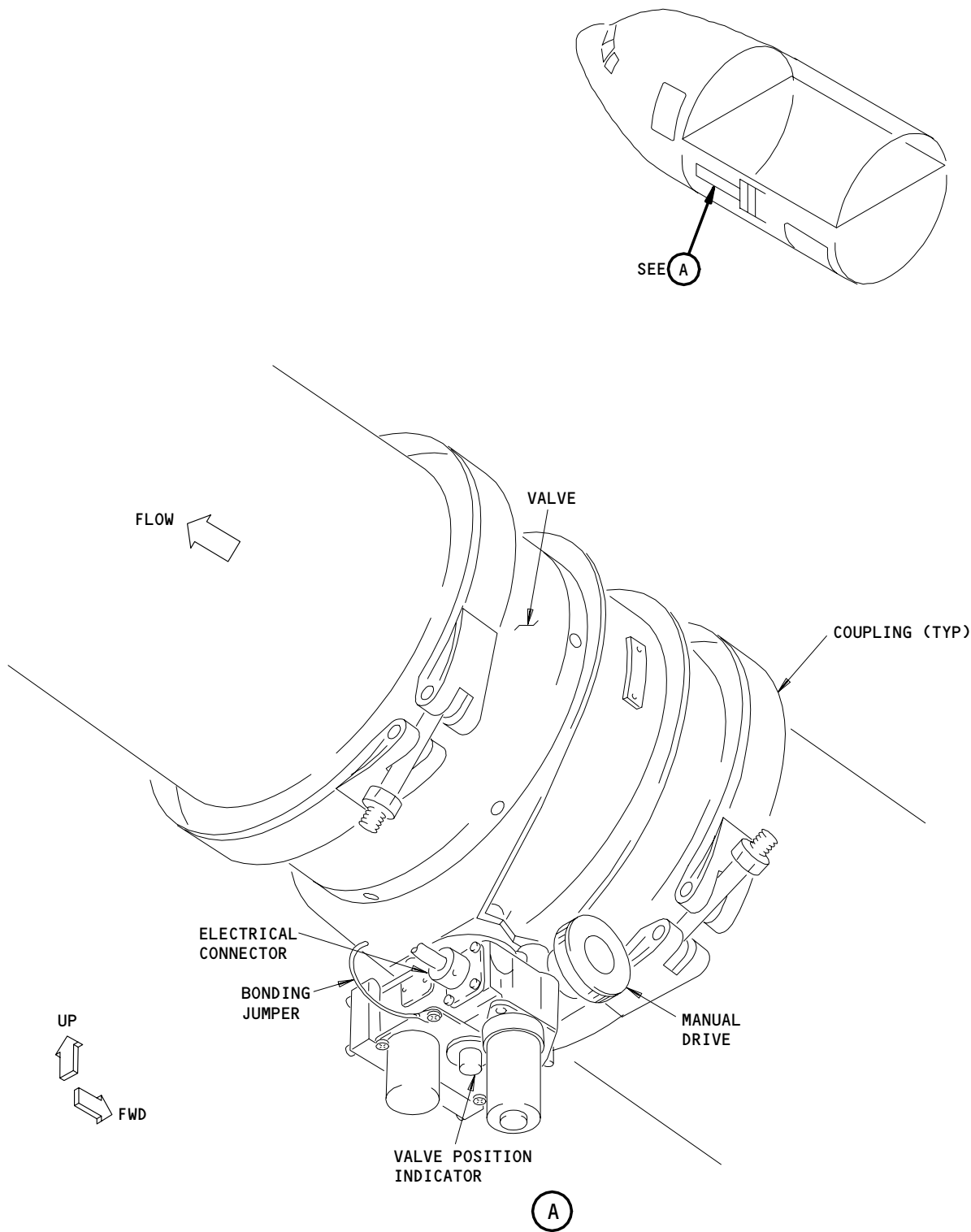
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Inboard Supply Valve Installation
Figure 401

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S 024-025
(8) Remove valve.

S 954-026
(9) Put covers in openings in the duct to prevent the entry of unwanted objects.

TASK 21-58-07-424-027

3. Install Inboard Supply Valve (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (3) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zone
121 Forward Cargo Compt, Left

C. Procedure to Install Inboard Supply Valve

S 414-028
(1) Remove the duct cover.

S 434-029
(2) Align the valve with the duct. Install and tighten the coupling on each side of the valve.

S 434-030
(3) Connect the bonding jumper to the valve.

S 434-031
(4) Connect the electrical connector to the valve.

S 714-003
(5) Do the steps that follow to do a test of the inboard supply valve:
(a) Make sure that the engines are not in operation and that engine operation is not simulated.
(b) Supply the electrical power (Ref 24-22-00).
(c) Make sure the selector switch for EQUIP COOLING is in the AUTO position.
1) Make sure the valve position indicator shows that the valve is open.

NOTE: This step makes sure that the inboard supply valve starts in the open position.

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CAUTION: DO NOT KEEP THE SELECTOR SWITCH FOR EQUIP COOLING IN THE OVRD POSITION FOR MORE THAN 5 MINUTES. HEAT CAN DAMAGE THE ELECTRICAL EQUIPMENT.

- (d) Turn the selector switch for EQUIP COOLING to the OVRD position.
 - 1) Make sure the valve position indicator shows that the valve is closed.
- (e) Turn the selector switch for EQUIP COOLING to the AUTO position.
 - 1) Make sure the valve position indicator shows that the valve is open.

S 794-008

- (6) Do a check for leaks at the joints of the valve and the duct.
 - (a) Some leakage is permitted.
 - (b) If the leakage is strong, align the joint and tighten the coupling.

D. Put the Airplane Back to Its Usual Condition

S 414-010

- (1) Install the sidewall lining (AMM 25-52-01/401).

S 414-078

- (2) Close the forward cargo door, 821 (AMM 52-33-00/201).

S 864-055

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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E/E COOLING EXHAUST DUCT INSULATION – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) E/E Cooling Exhaust Duct Insulation Blanket Removal
 - (2) E/E Cooling Exhaust Duct Insulation Blanket Installation
- B. Insulation blankets are installed around the E/E cooling exhaust ducts, exhaust fan and check valve located behind the right sidewall in the forward cargo compartment. The insulation blankets help reduce the E/E cooling system exhaust fan noise which can radiate into the main compartment through the lower right sidewall return air grilles.

TASK 21-58-09-004-021

2. E/E Cooling Exhaust Duct Insulation Blanket Removal (Fig. 401)

- A. General
 - (1) The insulation blankets are secured to the exhaust ducts with velcro hook and loop tape strips sewed into the insulation blankets. Insulation blanket tape is also installed around the insulation blanket ends to secure the blankets to the exhaust ducts.
- B. References
 - (1) AMM 24-22-00/201, Electrical Power
 - (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
 - (3) AMM 52-33-00/201, Large Forward Cargo Door
- C. Access
 - (1) Location Zones
 - 122 Forward Cargo Compartment, Right
 - (2) Access Panels
 - 821 Forward Cargo Door
- D. Prepare for Removal
 - S 864-022
 - (1) Supply electrical power (AMM 24-22-00/201).

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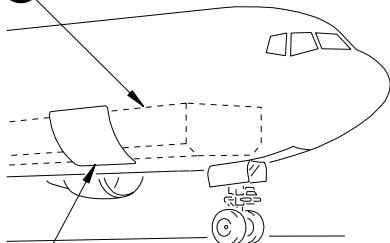
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FORWARD CARGO
COMPARTMENT

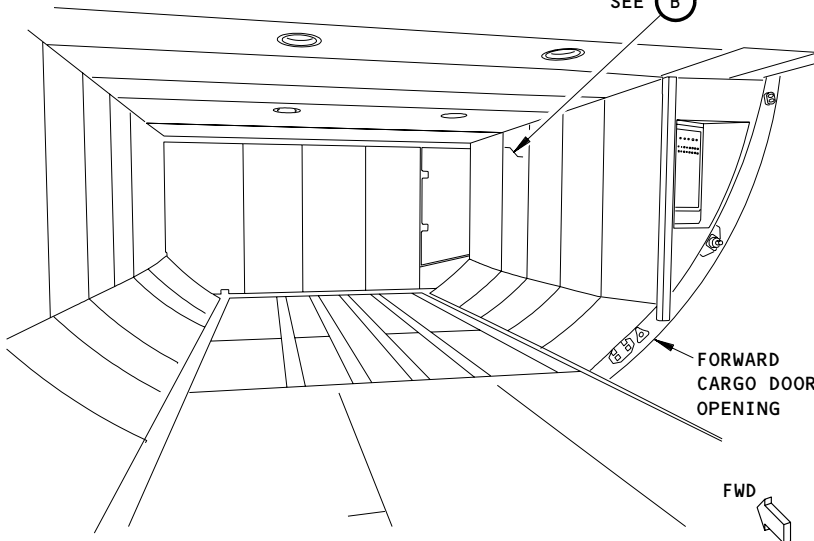
SEE (A)



FORWARD CARGO
DOOR, 821

FORWARD CARGO
COMPARTMENT
(RIGHT SIDEWALL)

SEE (B)



FORWARD
CARGO DOOR
OPENING

FWD

FORWARD CARGO COMPARTMENT

(A)

EXHAUST FAN, B12

FORWARD CARGO
COMPARTMENT
FORWARD BULKHEAD

INSULATION
BLANKETS
SEE (C)

FWD

INBD

FORWARD CARGO COMPARTMENT
(RIGHT SIDEWALL)

(B)

E/E Cooling Exhaust Duct Insulation Installation
Figure 401 (Sheet 1)

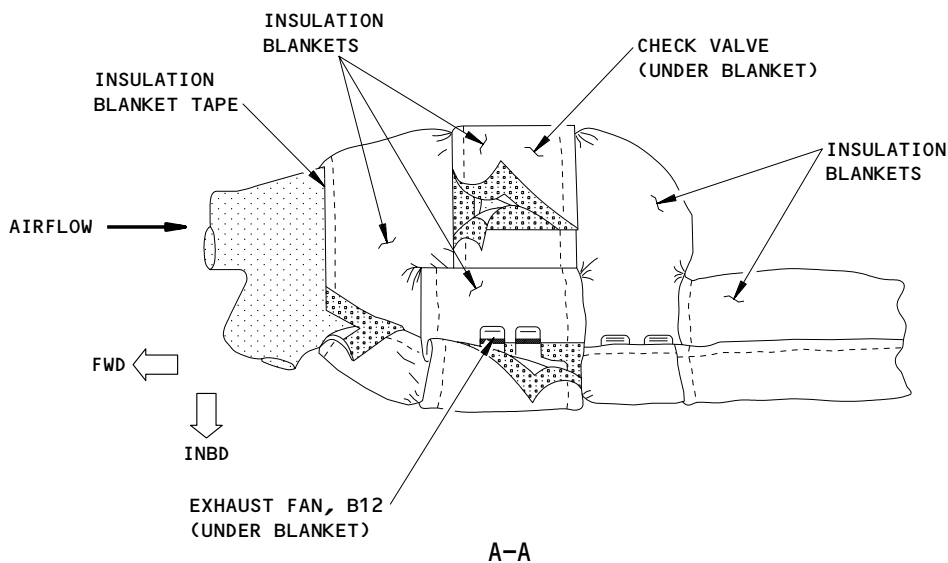
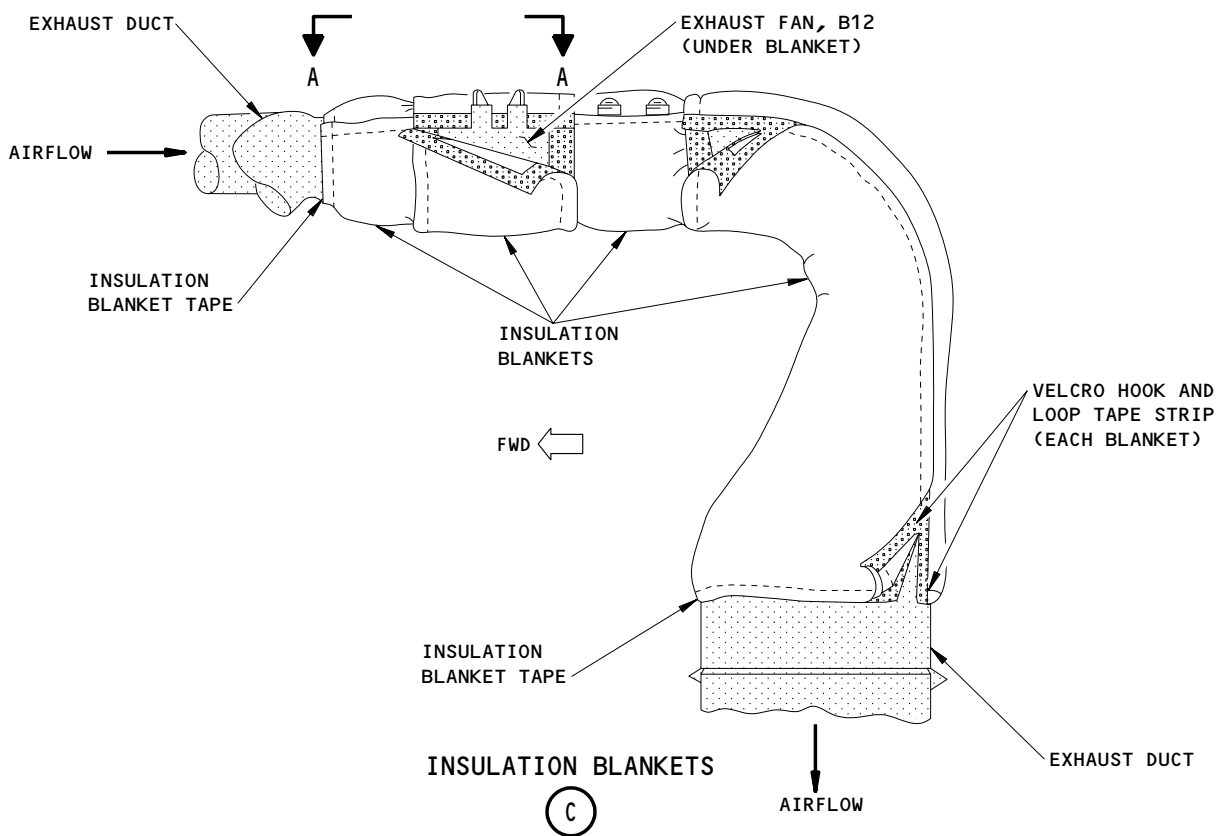
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E/E Cooling Exhaust Duct Insulation Installation
Figure 401 (Sheet 2)

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S 014-023

- (2) Get access to the E/E cooling system exhaust ducts behind the right sidewall linings in the forward cargo compartment:
 - (a) Open the forward cargo door, 821 (AMM 52-33-00/201).
 - (b) Remove the right hand sidewall lining(s) just forward of the forward cargo door opening and immediately aft of the forward bulkhead (AMM 25-52-01/401).

E. Insulation Blanket Removal

S 024-025

- (1) Remove and discard the insulation blanket tape used to secure the ends of the insulation blankets to the exhaust ducts.

S 024-026

- (2) Pull apart the velcro hook and loop tape strips at the seam of each insulation blanket.

S 024-027

- (3) Remove each insulation blanket.

TASK 21-58-09-404-037

3. E/E Cooling Exhaust Duct Insulation Blanket Installation (Fig. 401)

A. Consumables

- (1) G50327, Tape - Advanced Insulation Blanket, 2-inch, 3-inch, or 12-inch wide (BMS 5-157, Type I, Class 1, Grade B, Form 1, Composition MPVF) (AMM 20-30-07/201)
 - (a) E and H 743-MT
E and H Laminating, 138 Grand Street,
Paterson, NJ 07501
 - (b) SF65003100
Bekaert Speciality Films LLC, 4540 Viewridge Ave.,
San Diego, CA 92123
 - (c) Orcotape OT-157
Orcon Corporation, 1570 Atlantic Street,
Union City, CA 94587

B. References

- (1) AMM 20-30-07/201, Miscellaneous Materials
- (2) AMM 24-22-00/201, Electrical Power
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (4) AMM 52-33-00/201, Large Forward Cargo Door

C. Access

- (1) Location Zones
 - 122 Forward Cargo Compartment, Right
- (2) Access Panels
 - 821 Forward Cargo Door

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D. Insulation Blanket Installation

S 424-030

- (1) Wrap each insulation blanket around the exhaust fan, check valve, and exhaust ducts as shown in Figure 401.

S 424-029

- (2) Press the velcro hook and loop tape strips together along the seams of each insulation blanket.

S 424-028

- (3) Install new insulation blanket tape (2-inches wide) around the ends of the insulation blankets to secure the blankets to the ducts.

E. Put the Airplane Back to Its Usual Condition

S 414-036

- (1) Close up the access to the E/E cooling exhaust ducts:
 - (a) Install the right hand sidewall lining(s) (AMM 25-52-01/401).
 - (b) Close the forward cargo door, 821 (AMM 52-33-00/201).

S 864-032

- (2) Remove electrical power if it is not needed (AMM 24-22-00/201).

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EQUIPMENT COOLING SUPPLY AIR INLET GRILLE - MAINTENANCE PRACTICES

1. General

- A. There are three tasks in this procedure:
 - (1) Equipment Cooling Supply Air Inlet Grille Removal
 - (2) Equipment Cooling Supply Air Inlet Grille Cleaning
 - (3) Equipment Cooling Supply Air Inlet Grille Installation
- B. The equipment cooling supply air inlet grille is found behind the left sidewall in the forward cargo compartment and is aft of the inboard supply valve.

TASK 21-58-10-002-002

2. Equipment Cooling Supply Air Inlet Grille Removal

- A. References
 - (1) AMM 24-22-00/201, Electric Power Control
 - (2) AMM 25-52-01/401, Sidewall Panels
 - (3) AMM 52-33-00/201, Large Forward Cargo Door
- B. Access
 - (1) Location Zone
121 Forward Cargo Compartment, Left

C. Procedure

- S 012-034
 - (1) Open the forward cargo door (AMM 52-33-00/201).
- S 862-006
 - (2) Remove electrical power (AMM 24-22-00/201).
- S 012-005
 - (3) Remove the left sidewall panel in the forward cargo compartment to get access to the inlet grille (AMM 25-52-01/401).
- S 022-026
 - (4) Remove the bolt, washer, and nut that attaches the rod to the inlet grille.
- S 022-004
 - (5) Remove the screws and washers that attach the inlet grille to the duct.
- S 022-003
 - (6) Remove the inlet grille from the duct.

TASK 21-58-10-102-012

3. Equipment Cooling Supply Air Inlet Grille Cleaning

- A. References
 - (1) AMM 25-52-01/401, Sidewall Panels

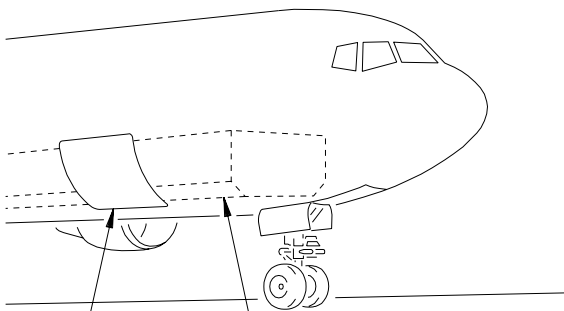
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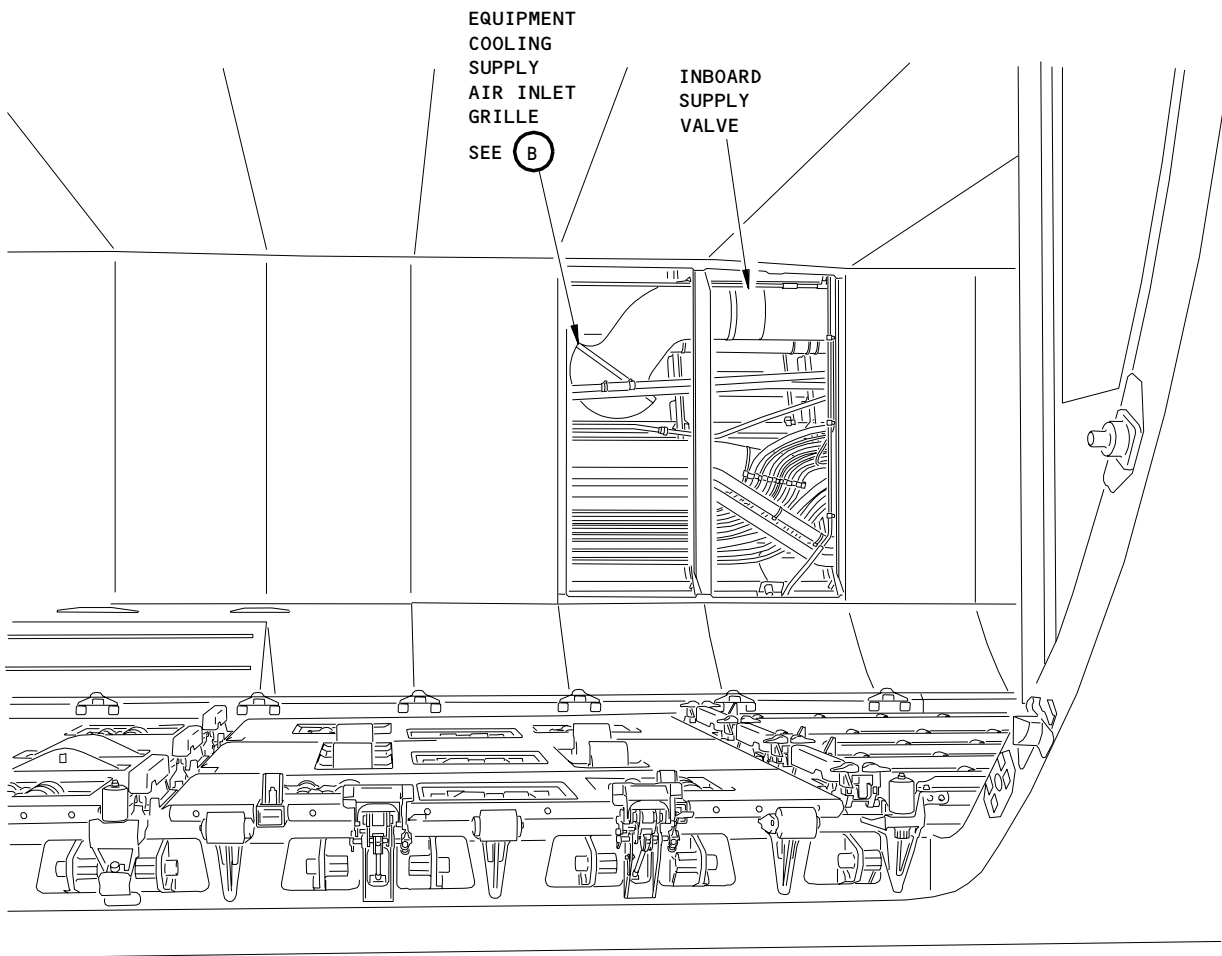
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FORWARD CARGO
DOOR, 821

FORWARD CARGO
COMPARTMENT

SEE (A)



EQUIPMENT
COOLING
SUPPLY
AIR INLET
GRILLE
SEE (B)

INBOARD
SUPPLY
VALVE

FORWARD CARGO COMPARTMENT
(LEFT SIDEWALL)



(A)

Equipment Cooling Supply Air Inlet Grille
Figure 201 (Sheet 1)

EFFECTIVITY

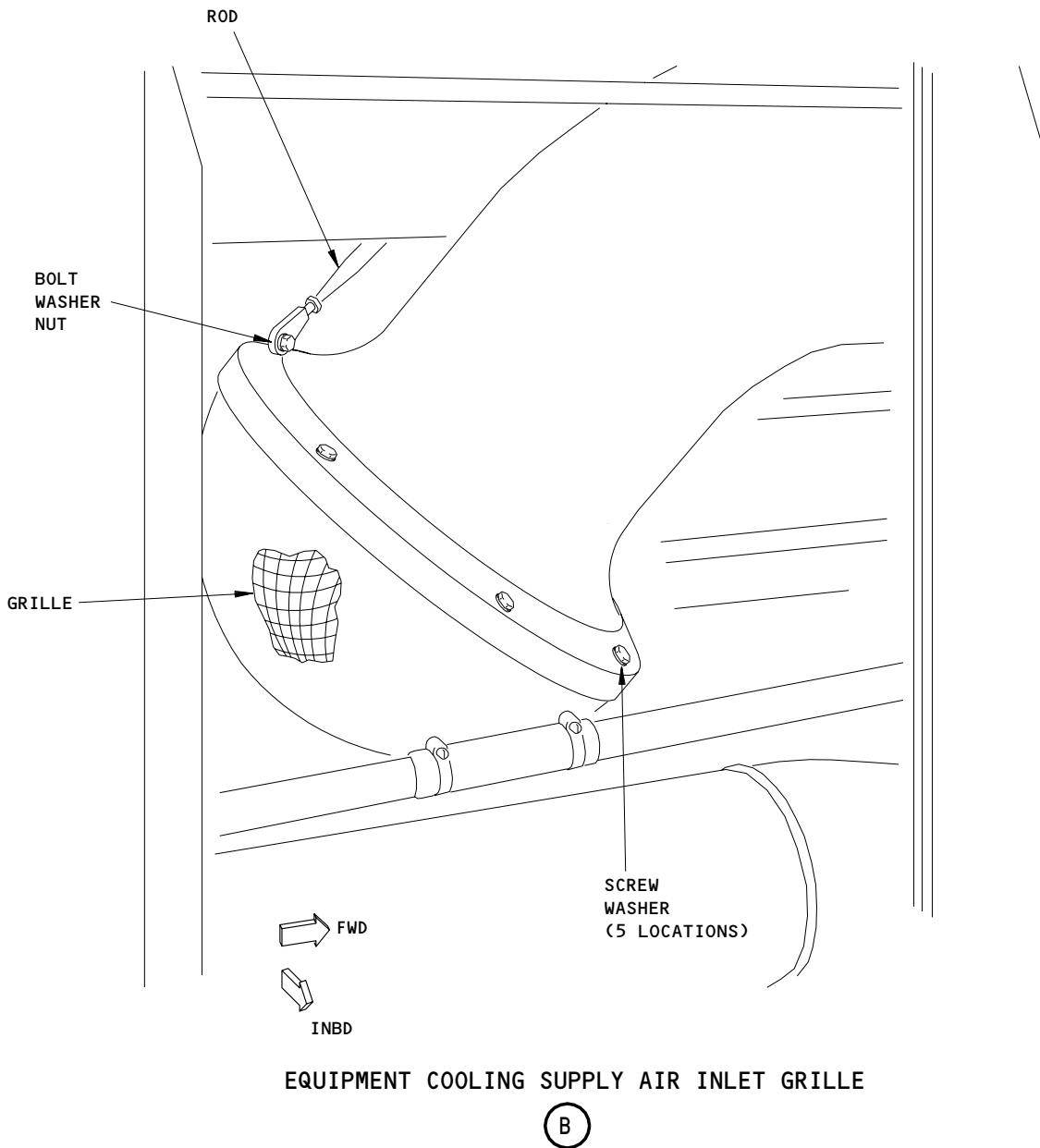
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Equipment Cooling Supply Air Inlet Grille
Figure 201 (Sheet 2)

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K18037

- (2) AMM 52-33-00/201, Large Forward Cargo Door
- B. Access
 - (1) Location Zone
121 Forward Cargo Compartment, Left

C. Procedure

- S 012-007
 - (1) Open the forward cargo door (AMM 52-33-00/201).
- S 012-008
 - (2) Remove the left sidewall panel in the forward cargo compartment to get access to the inlet grille (AMM 25-52-01/401).
- S 162-009
 - (3) Remove the lint and other unwanted material from the inlet grille which can limit the flow of air through the inlet grille.
- S 412-010
 - (4) Install the left sidewall panel (AMM 25-52-01/401).
- S 412-037
 - (5) Close the forward cargo door (AMM 52-33-00/201).

TASK 21-58-10-402-013

4. Equipment Cooling Supply Air Inlet Grille Installation

- A. References
 - (1) AMM 25-52-01/401, Sidewall Panels
 - (2) AMM 52-33-00/201, Large Forward Cargo Door
- B. Access
 - (1) Location Zone
121 Forward Cargo Compartment, Left

C. Procedure

- S 422-014
 - (1) Put the inlet grille on the duct.
- S 422-015
 - (2) Install the screws and washers that attach the inlet grille to the duct.

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- S 422-027
- (3) Install the rod with the bolt, washer, and nut.
- S 412-016
- (4) Install the left sidewall panel (AMM 25-52-01/401).
- S 412-040
- (5) Close the forward cargo door (AMM 52-33-00/201).

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SUPPLY/EXHAUST FAN CURRENT SENSORS – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Supply/Exhaust Fan Current Sensor Removal
 - (2) Supply/Exhaust Fan Current Sensor Installation
- B. A current sensor is installed inside of the P36 and P37 Miscellaneous Electrical Equipment panels for each of the equipment cooling system's supply/exhaust fans (Fig. 401, 402).

TASK 21-58-11-004-044

2. Supply/Exhaust Fan Current Sensor Removal (Fig. 401, 402)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control
- (3) WDM 21-58-14
- (4) WDM 21-58-15

B. Access

- (1) Location Zones
 - 119 Main Equipment Center (Left and Right)
- (2) Access Panels
 - 119AL Main Equipment Center Access Door

C. Prepare for Removal

- S 864-002
 - (1) Remove all electrical power from the airplane before you remove the current sensor (AMM 24-22-00/201).
- S 014-003
 - (2) Open the main equipment center access door, 119AL (AMM 06-41-00/201).
- S 014-005
 - (3) Open the doors of the applicable left (right) miscellaneous electrical equipment panel, P36 (P37), to get access to the current sensor.

NOTE: The current sensor is installed to a dripshield at the top of the electrical equipment panel.

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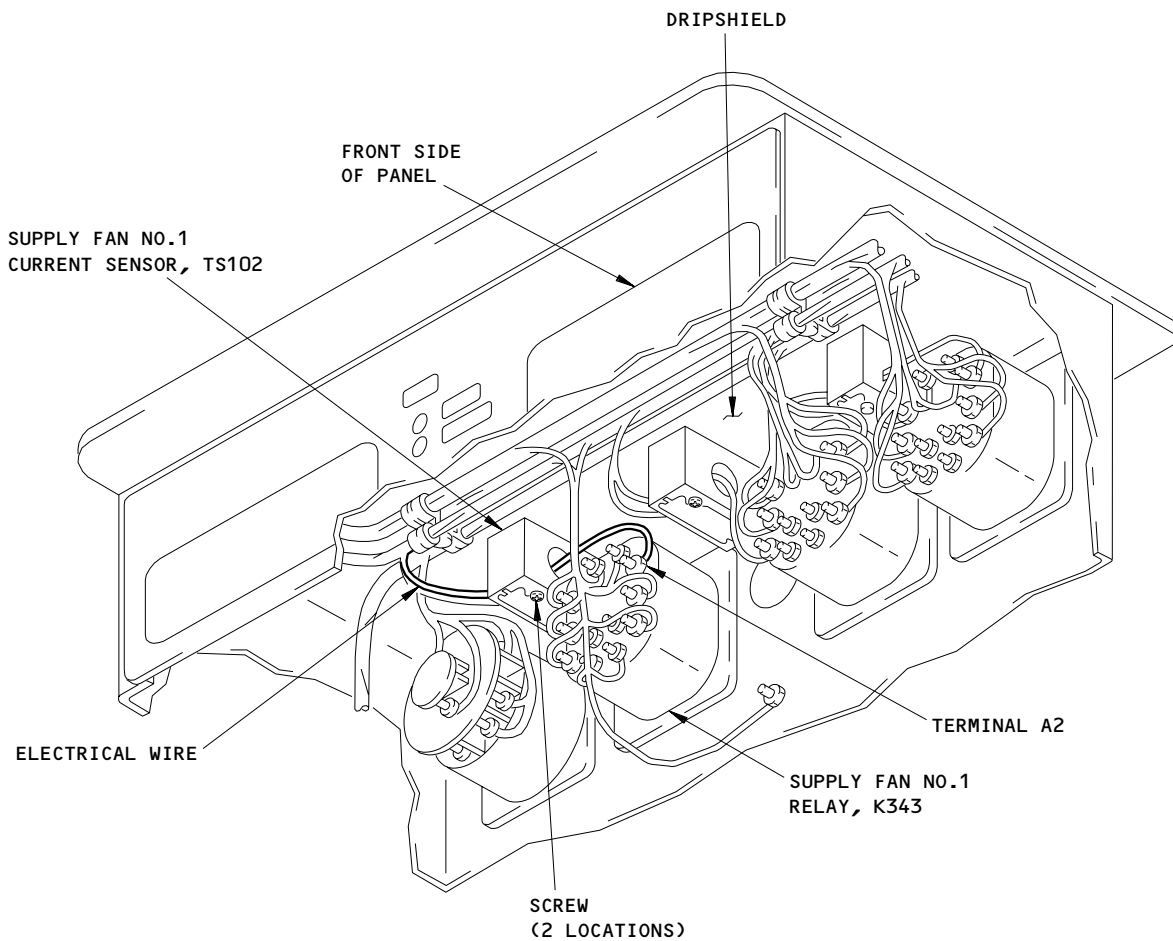
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LEFT MISCELLANEOUS
ELECTRICAL EQUIPMENT
PANEL, P36

SEE (A)

MAIN EQUIPMENT CENTER
ACCESS DOOR, 119AL



LEFT MISCELLANEOUS ELECTRICAL
EQUIPMENT PANEL, P36

(A)

Fan Current Sensor (P36 Panel) Installation
Figure 401

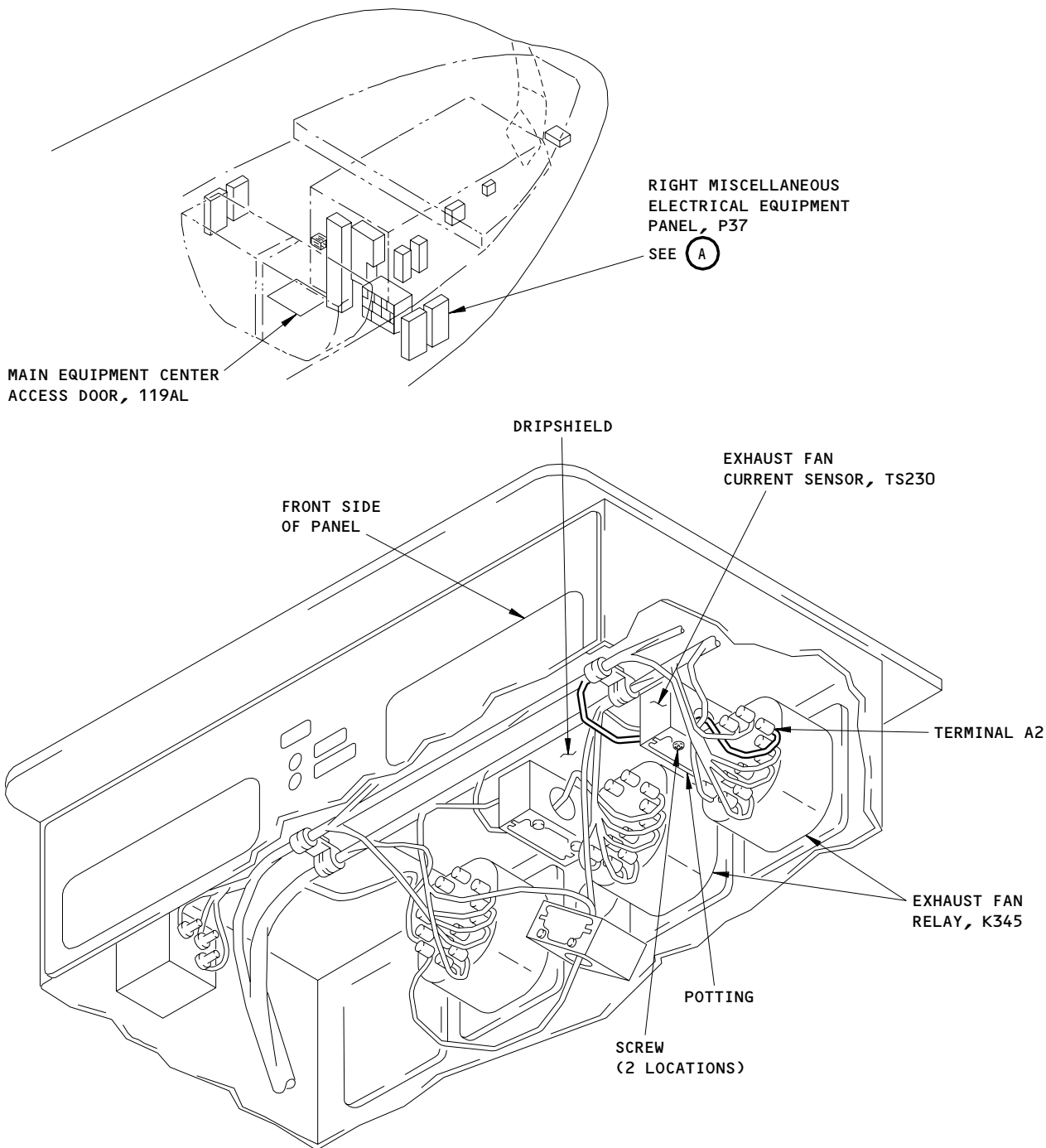
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RIGHT MISCELLANEOUS ELECTRICAL EQUIPMENT PANEL, P37

(A)

Fan Current Sensor (P37 Panel) Installation
Figure 402

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K33082

D. Current Sensor Removal

S 024-049

- (1) Disconnect the two electrical wires (DC ground) at the splices on each side of the current sensor (WDM 21-58-14, 21-58-15).

S 024-048

- (2) Disconnect the electrical wire (fan AC power) that goes through the hole in the current sensor from the supply/exhaust fan relay (WDM 21-58-14, 21-58-15):
 - (a) Attach clip(s) to the electrical wire (fan AC power).
 - (b) Disconnect the electrical wire (fan AC power) from the terminal A2 on the supply/exhaust fan relay.
 - (c) Pull the electrical wire (fan AC power) through the hole in the current sensor.

S 024-047

- (3) Remove the two screws that hold the current sensor to the lower surface of the dripshield.

S 024-012

- (4) Remove the current sensor.

TASK 21-58-11-404-045

3. Supply/Exhaust Fan Current Sensor Installation (Fig. 401, 402)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control
- (3) SWPM 20-30-12, Assembly of Splices
- (4) WDM 21-58-14
- (5) WDM 21-58-15

B. Access

- (1) Location Zones
 - 119 Main Equipment Center (Left and Right)
- (2) Access Panels
 - 119AL Main Equipment Center Access Door

C. Current Sensor Installation

S 424-046

- (1) Install the current sensor to the lower surface of the dripshield with the two screws, and tighten the screws.

NOTE: The potted side of the current sensor must point downward.

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S 424-050

- (2) Connect the electrical wire (fan AC power) to supply/exhaust fan relay (WDM 21-58-14, 21-58-15):
 - (a) Put the electrical wire (fan AC power) through the hole in the current sensor.
 - (b) Connect the electrical wire (fan AC power) to the terminal A2 on the supply/exhaust fan relay.

S 424-051

CAUTION: ALIGN THE WIRES WITH THE IDENTICAL NUMBERS. MAKE SURE THE POLARITY IS CORRECT. INCORRECT POLARITY CAN CAUSE DAMAGE TO EQUIPMENT.

- (3) Install splices to connect the two electrical wires (DC ground) on each side of the current sensor to the wiring inside of the electrical equipment panel (SWPM 20-30-12) (WDM 21-58-14, 21-58-15).

D. Current Sensor Post-Installation Test

S 864-019

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-052

- (2) Move the EQUIP COOL selector to AUTO or STBY position, on the Equipment Cooling control panel (M17, P5 panel).

S 724-053

- (3) Make sure the applicable supply/exhaust fan operates in the forward cargo compartment.

E. Put the Airplane Back to Its Usual Condition

S 414-056

- (1) Close the doors to the left (right) miscellaneous equipment panel, P36 (P37).

S 414-055

- (2) Close the main equipment center access door, 119AL (AMM 06-41-00/201).

S 864-054

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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SHUTOFF VALVE - REMOVAL/INSTALLATION

TASK 21-58-13-024-001

1. Shutoff Valve Removal (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (3) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zone
800 Entry, Service and Cargo Doors

C. Procedure for the Removal of Shutoff Valve

S 014-002

- (1) Open the forward cargo compartment door 821 (AMM 52-33-00/201).

S 864-047

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 864-058

- (3) Remove the electrical power (AMM 24-22-00/201).

S 014-005

- (4) Find the shutoff valve approximately 7 feet (2.2 meters) aft of the forward end panel and left of center line.

S 034-006

- (5) Disconnect the electrical connector from the shutoff valve.

S 034-007

- (6) Disconnect the bonding jumper from the shutoff valve.

S 034-008

- (7) Loosen the clamps on each side of the shutoff valve.

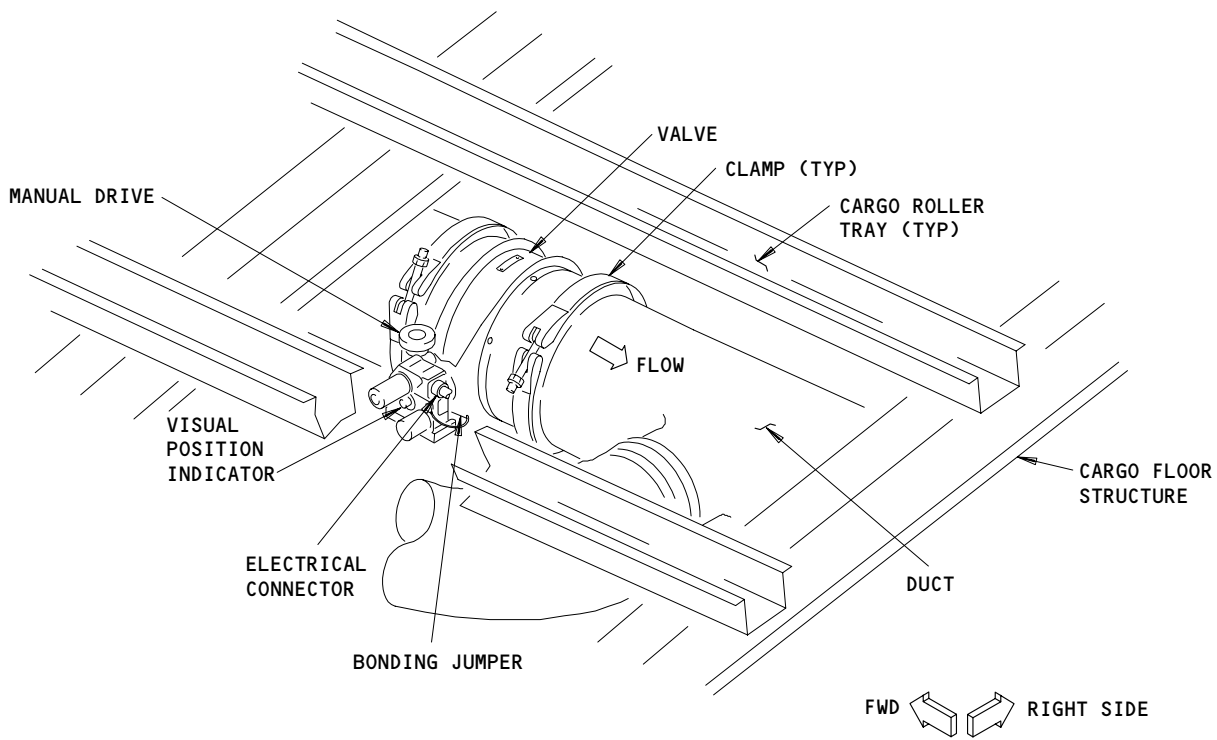
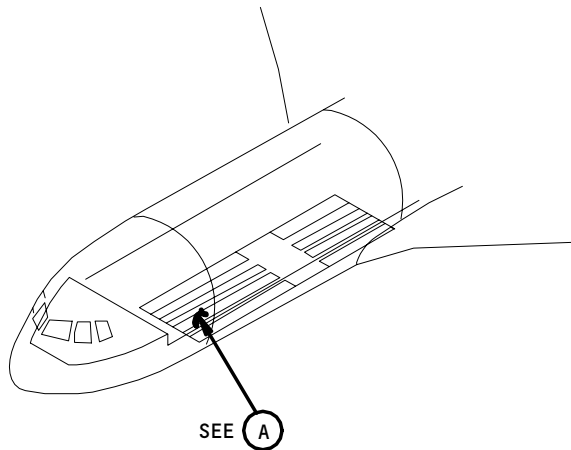
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A

Shutoff Valve Installation
Figure 401

EFFECTIVITY	
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- S 034-041
- (8) Hold the shutoff valve in position and move the clamps along duct.
- S 024-042
- (9) Remove shutoff valve.
- S 954-043
- (10) Put covers in the openings of the duct to prevent the entry of unwanted objects.

TASK 21-58-13-424-009

2. Shutoff Valve Installation (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zone
800 Entry Service and Cargo Doors

C. Procedure for the Installation of Shutoff Valve

- S 414-010
- (1) Remove the duct covers.
- S 434-011
- (2) Align the shutoff valve with the duct.
- S 434-044
- (3) Install and tighten the clamp on each side of shutoff valve.
- S 434-012
- (4) Connect the bonding jumper to the shutoff valve.
- S 434-013
- (5) Connect the electrical connector to the shutoff valve.
- S 714-034
- (6) Do the steps that follow to do a test of the shutoff valve:
 - (a) Make sure that the engines are not in operation and that engine operation is not simulated.
 - (b) Supply electrical power (AMM 24-22-00/201).

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(c) If the ambient temperature is more than 45-degrees Fahrenheit, do the steps which follow:

- 1) Make sure the selector switch for EQUIP COOLING is in the STBY position.

NOTE: This step makes sure that the shutoff valve starts in the open position.

- 2) Make sure the valve position indicator shows that the shutoff valve is open.
- 3) Turn the selector switch for EQUIP COOLING to the AUTO position.
- 4) Make sure the shutoff valve position indicator shows that the valve is closed.
- 5) Turn the selector switch for EQUIP COOLING to the STBY position.
- 6) Make sure the valve position indicator shows that the shutoff valve is open.

(d) If the ambient temperature is less than 45-degrees Fahrenheit, do the steps which follow:

- 1) Make sure the selector switch for EQUIP COOLING is in the AUTO position.

NOTE: This step makes sure that the shutoff valve starts in the open position.

- 2) Make sure the valve position indicator shows that the shutoff valve is open.

CAUTION: DO NOT KEEP THE SELECTOR SWITCH FOR EQUIP COOLING IN THE OVRD POSITION FOR MORE THAN 5 MINUTES. HEAT CAN DAMAGE THE ELECTRICAL EQUIPMENT.

- 3) Turn the selector switch for EQUIP COOLING to the OVRD position.
- 4) Make sure the valve position indicator shows that the shutoff valve is closed.
- 5) Turn the selector switch for EQUIP COOLING to the AUTO position.
- 6) Make sure the valve position indicator shows that the shutoff valve is open.

(e) Do a check for leaks at the joints of the shutoff valve and the duct.

- 1) Some leakage is permitted.
- 2) If the leakage is strong, align the joint and tighten the coupling again.

S 414-039

- (7) Close the forward cargo compartment door, 821 (AMM 52-33-00/201).

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S 864-040

- (8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

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EQUIPMENT COOLING LOW FLOW DETECTORS – MAINTENANCE PRACTICES

1. General

- A. Two equipment cooling low flow detectors, a forward rack detector and a flight deck detector, finds if there is sufficient flow of cooling air to the E/E equipment.

TASK 21-58-17-022-001

2. Remove the Equipment Cooling Low Flow Detector (Fig. 201 or 202)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels.
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 52-33-00/201, Large Forward Cargo Door.

B. Access

- (1) Location Zones
118 Area outboard and above NLG wheel well (Right)
123 Area below forward cargo compartment (Left)
- (2) Access Panels
113AL Fwd equip. bay door

C. Procedure to remove the low flow detector

S 862-002

- (1) Remove the electrical power (AMM 24-22-00/201).

S 012-003

- (2) Get access to the low flow detector.
(a) For removal of the forward rack detector open the large forward cargo door 821 (AMM 52-33-00/201).
1) Find the detector below the cargo floor approximately two feet aft of the forward endliner panel.
(b) For the removal of flight compartment detector, open the forward door 113AL and find the detector (AMM 06-41-00/201).

S 022-004

- (3) Remove the electrical connector from the low flow detector.

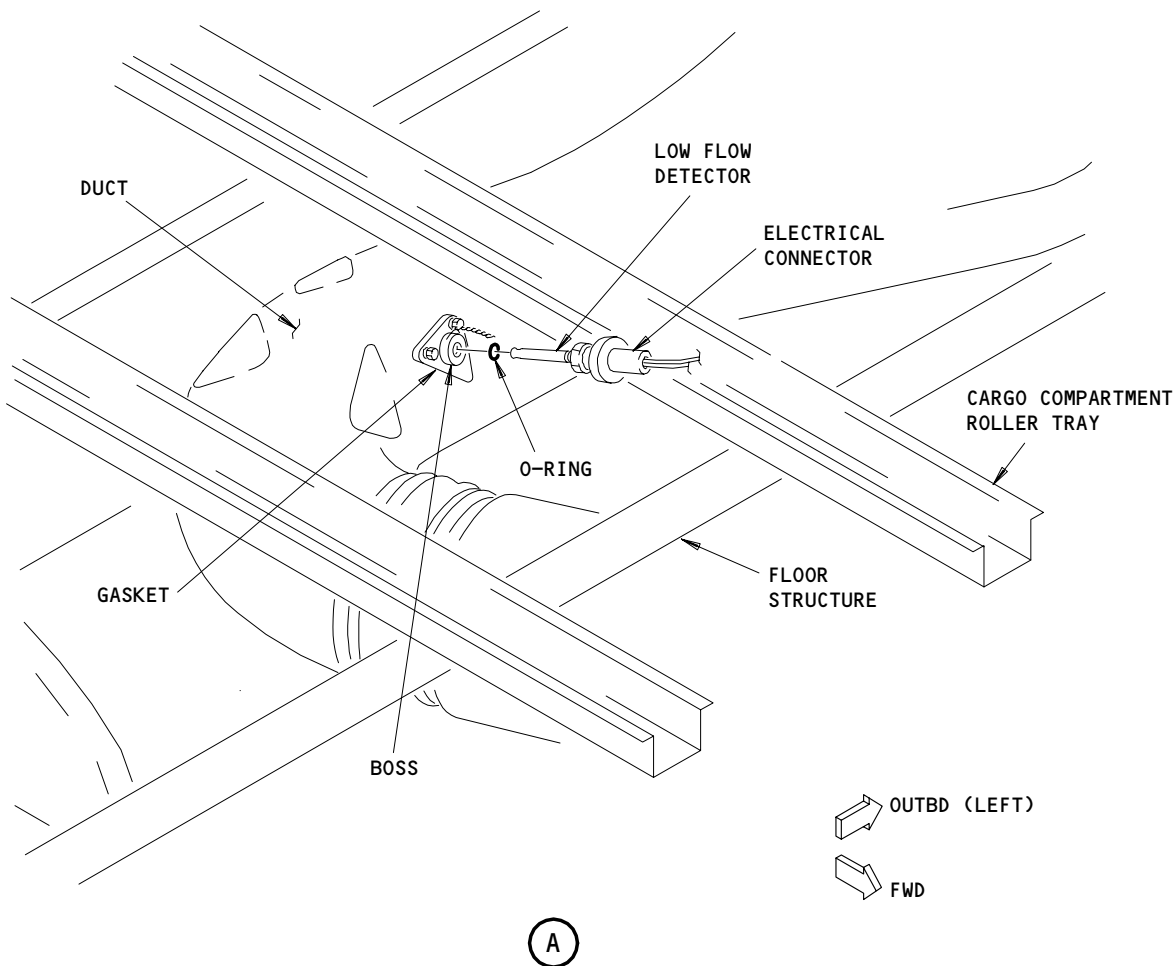
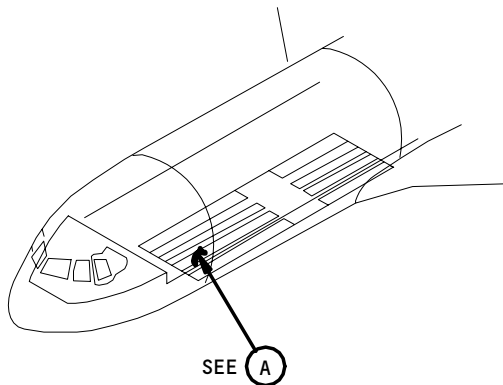
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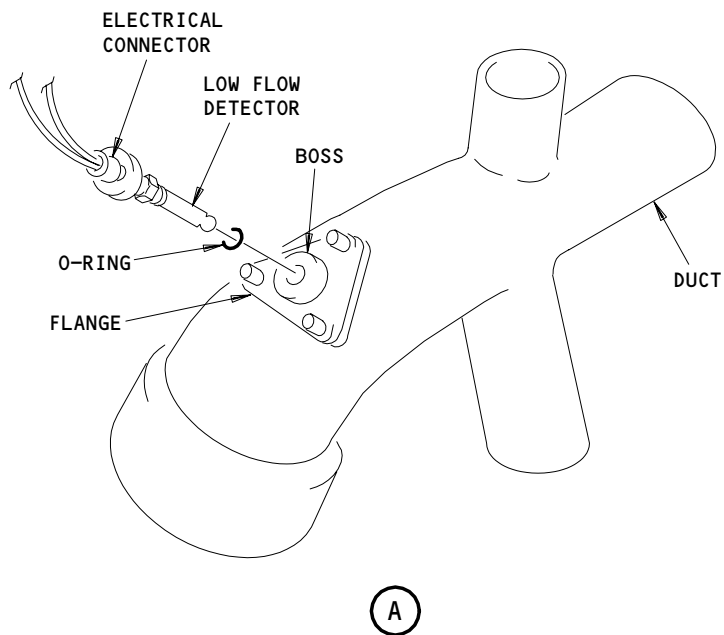
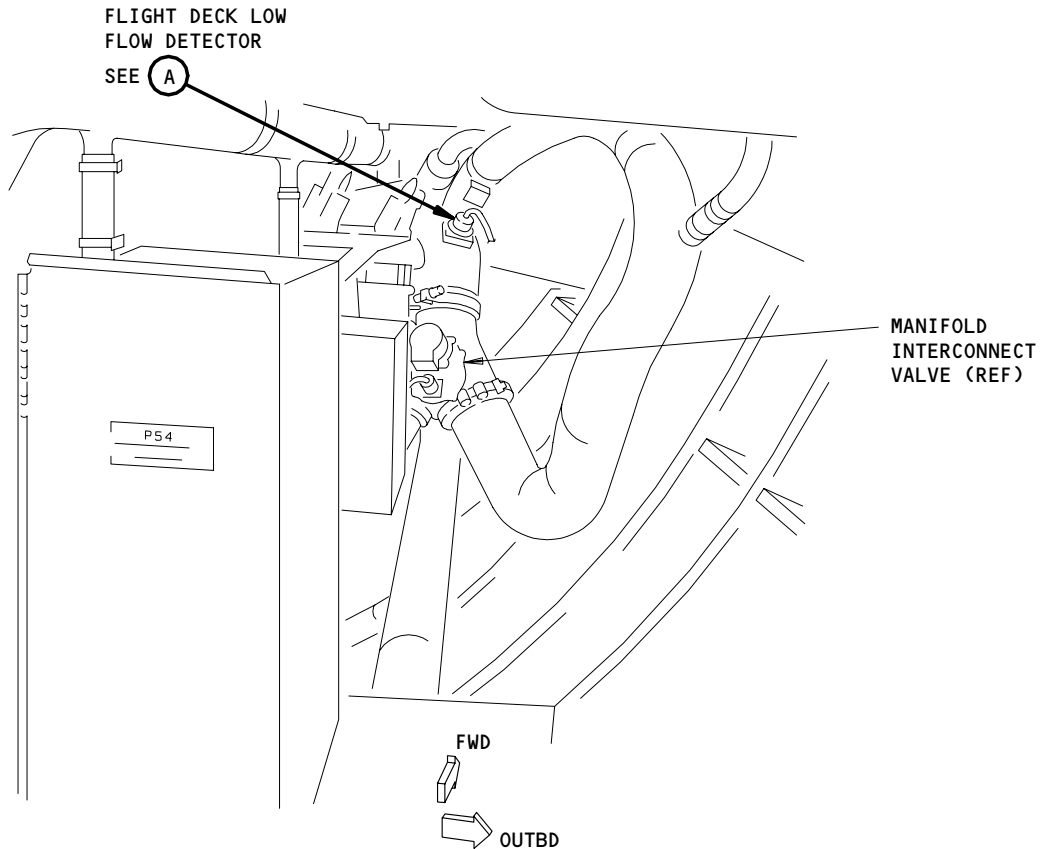
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Equipment Cooling Forward Rack Low Flow Detector Installation
Figure 201

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Equipment Cooling Flight Deck Low Flow Detector Installation
Figure 202

EFFECTIVITY	
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- S 022-030
- (4) Remove the low flow detector from the boss.
- S 022-031
- (5) Remove and discard the O-ring from the low flow detector.
- S 952-006
- (6) Put a cover on the hole in the duct to prevent the entry of unwanted objects.
- S 162-015
- (7) Do the steps that follow to clean the Low Flow Detector.
- CAUTION: BE CAREFUL WITH THE SENSOR. IF YOU ARE NOT CAREFUL WITH THE SENSOR YOU CAN DAMAGE IT.
- (a) Remove the dirt from the low flow detector.
- (b) Use a wet cloth over the probe end of the low flow detector.

TASK 21-58-17-422-008

3. Install Equipment Cooling Low Flow Detector

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels.
- (2) AMM 24-22-00/201, Electric Power Control
- (3) AMM 52-33-00/201, Large Forward Cargo Door.

B. Access

- (1) Location Zone
821 No. 1 Cargo Door

C. Procedure to install the low flow detector

- S 022-009
- (1) Remove the cover from the low flow detector boss.
- S 422-010
- (2) Use a new O-ring and install the detector into the boss. Tighten and install the lockwire (AMM 20-10-23/401).
- S 422-016
- (3) Attach the electrical connector to the low flow detector.
- S 862-011
- (4) Supply the electrical power (AMM 24-22-00/201).
- S 862-012
- (5) Put the EQUIP COOLING mode selector on the pilot's overhead P5 panel to AUTO.

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- S 862-014
- (6) Push and hold the EQUIP COOL test switch on the P61 panel to EQUIP COOL position. Make sure the EQUIP COOLING OVHT light on the P5 panel comes on.
- S 862-018
- (7) Release EQUIP COOL test switch on the P61 panel.
- S 412-017
- (8) Close the forward access door 113AL (AMM 06-41-00/201) or the forward cargo door 821 (AMM 52-33-00/201).
- (a) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

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E/E EQUIPMENT COOLING SMOKE DETECTOR – MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks for the E/E equipment cooling smoke detector:

- (1) Equipment Cooling Smoke Detector Removal
- (2) Equipment Cooling Smoke Detector Installation
- (3) Equipment Cooling Smoke Detector Operational Test

TASK 21-58-19-002-042

2. Equipment Cooling Smoke Detector Removal (Fig. 201)

A. References

- (1) AMM 24-22-00/201, Electric Power – Control
- (2) AMM 25-52-01/401, Sidewall Panels.
- (3) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zone
122 Forward Cargo Compartment (Right)

C. Prepare for Removal

S 862-001

- (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND

S 012-002

- (2) Open the forward cargo compartment door 821 (AMM 52-33-00/201).

S 012-003

- (3) Remove the right sidewall panel (AMM 25-52-01/401) and find the smoke detector.

D. Remove the Smoke Detector (Fig. 201)

S 032-006

- (1) Disconnect the electrical connector from the smoke detector.

S 032-007

- (2) Loosen the clamps on the two sense tubes.

S 032-008

- (3) Disconnect the sense tubes from the detector.

S 032-009

- (4) Remove the four bolts and washers that attach the smoke detector to the mounting bracket.

EFFECTIVITY

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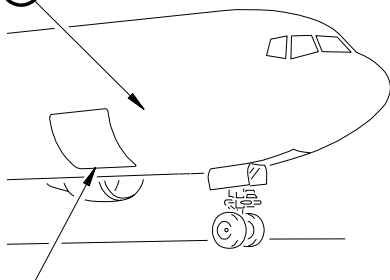
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BOEING

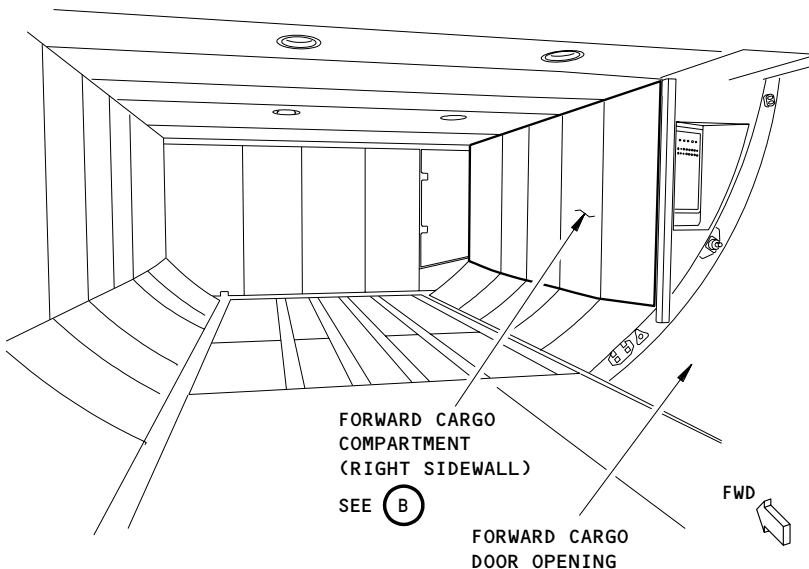
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FORWARD CARGO
COMPARTMENT

SEE (A)



FORWARD CARGO
DOOR, 821



FORWARD CARGO
COMPARTMENT
(RIGHT SIDEWALL)

SEE (B)

FORWARD CARGO
DOOR OPENING

FWD

FORWARD CARGO COMPARTMENT

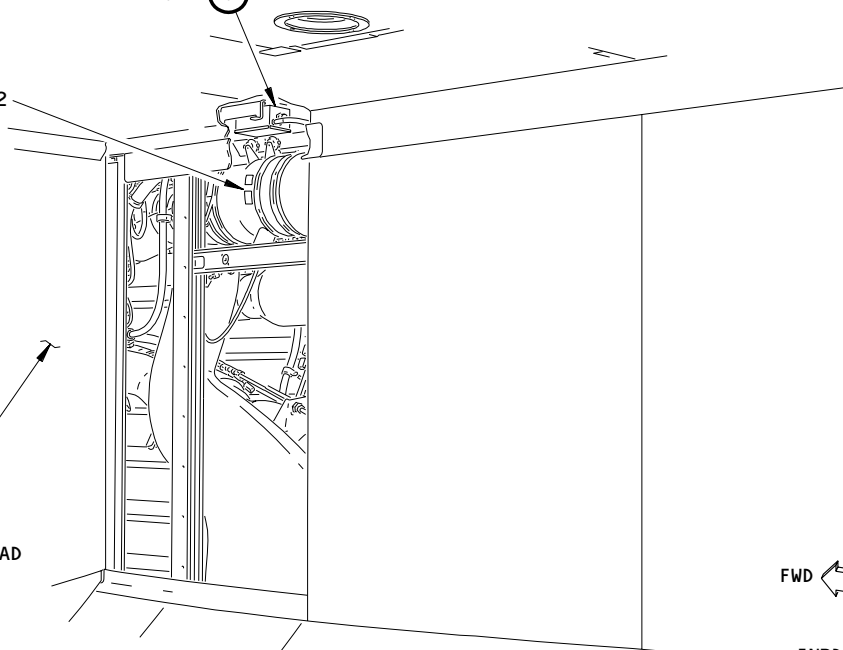
(A)

EQUIPMENT COOLING
SMOKE DETECTOR, TS164

SEE (C)

FORWARD RACK
EXHAUST FAN, B12

FORWARD CARGO
COMPARTMENT
FORWARD BULKHEAD



FWD
INBD

FORWARD CARGO COMPARTMENT (RIGHT SIDEWALL)

(B)

Equipment Cooling Smoke Detector Installation
Figure 201 (Sheet 1)

EFFECTIVITY

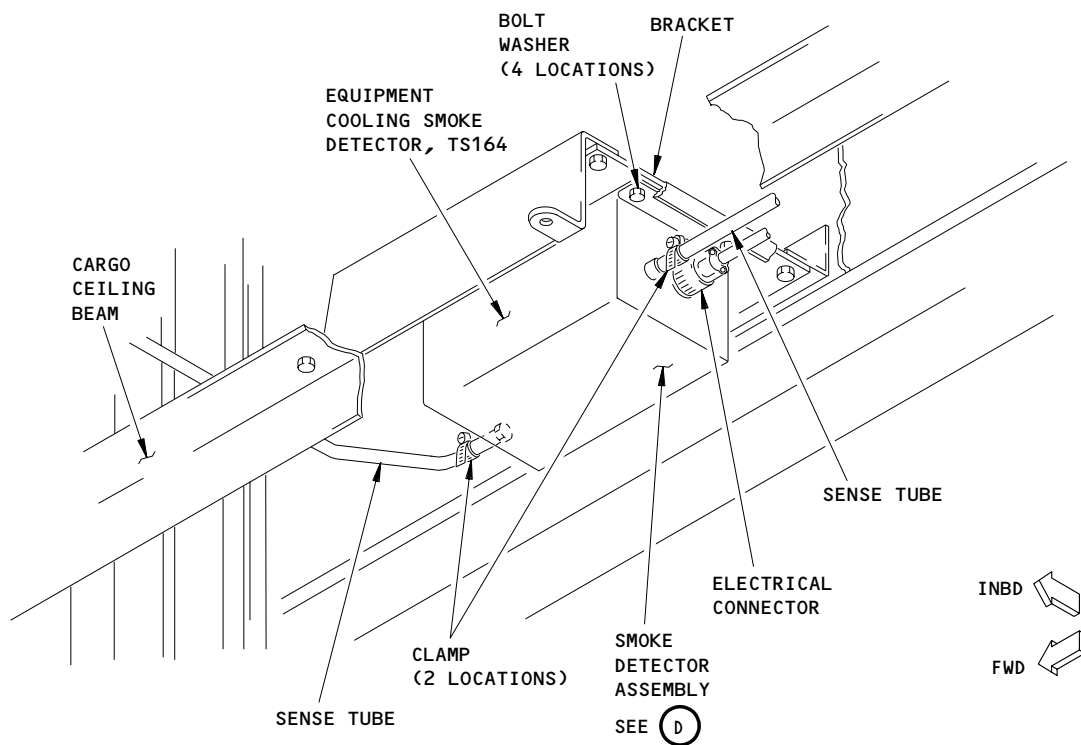
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EQUIPMENT COOLING SMOKE DETECTOR

(C)

Equipment Cooling Smoke Detector Installation
Figure 201 (Sheet 2)

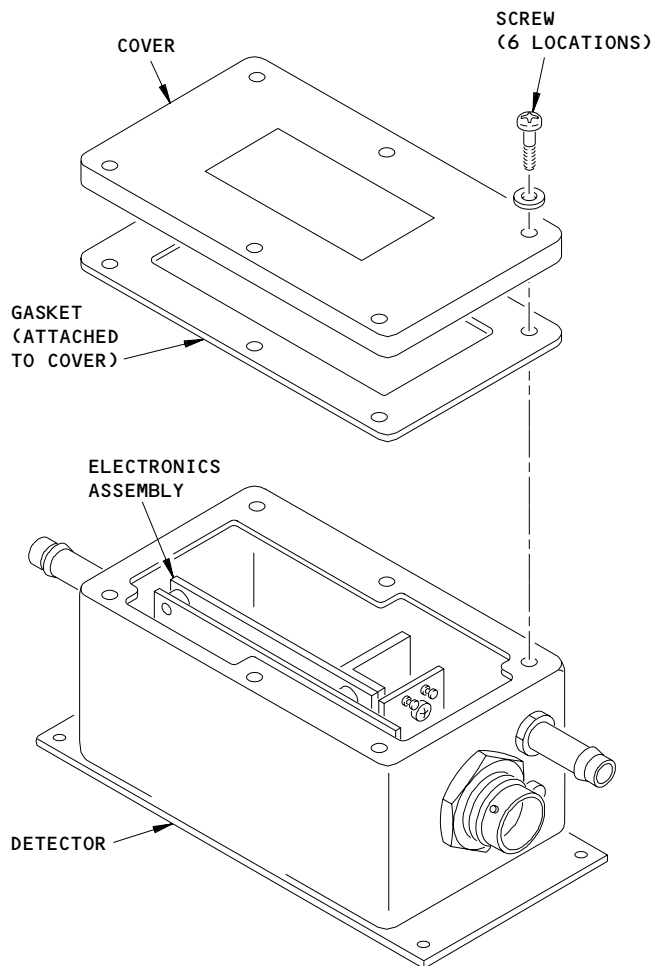
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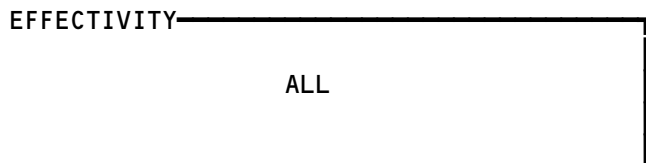
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SMOKE DETECTOR ASSEMBLY
(WITH L.E.D.)

(D)

Equipment Cooling Smoke Detector Installation
Figure 201 (Sheet 3)



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- S 022-010
- (5) Remove the smoke detector.

TASK 21-58-19-422-011

3. Equipment Cooling Smoke Detector Installation (Fig. 201)

A. Access

- (1) Location Zone
122 Forward Cargo Compartment (Right)

B. Install the smoke detector

- S 412-012
- (1) Put the smoke detector on the mounting bracket above the forward rack exhaust fan.
- S 432-013
- (2) Install the four bolts and washers that hold the smoke detector to the mounting bracket.
- S 432-019
- (3) Tighten the bolts.
- S 212-049
- (4) Do a visual inspection of the smoke detector tygon tubes to determine if there are unwanted materials which could prevent airflow thru the smoke detector.
- S 022-050
- (5) Remove the unwanted materials that you find.
- S 432-014
- (6) Install the sense tubes on both sides of the smoke detector.
- S 422-015
- (7) Install the clamps on the sense tubes.
- S 432-020
- (8) Tighten the clamps.
- S 432-016
- (9) Connect the electrical connector to the smoke detector.
- S 712-017
- (10) Do a test of the Smoke Detector.

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TASK 21-58-19-712-032

4. Equipment Cooling Smoke Detector Operational Test

A. References

- (1) AMM 24-22-00/201, Electric Power - Control
- (2) AMM 25-52-01/401, Sidewall Panels.
- (3) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zone
122 Forward Cargo Compartment

C. Procedure

S 862-033

- (1) Make sure this circuit breaker on the P11 panel is closed and remove the DO-NOT-CLOSE tag as necessary:
 - (a) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND

S 862-034

- (2) Supply electrical power (AMM 24-22-00/201).

S 862-035

- (3) Push and hold the EQUIP COOL test switch on the right side P61 panel.

S 862-036

- (4) Make sure the EQUIP COOLING SMOKE light on the P5 panel comes on.

D. Put the Airplane Back to Its Usual Condition

S 412-039

- (1) Install the sidewall panel (AMM 25-52-01/401).

S 412-040

- (2) Close the forward cargo compartment door 821 (AMM 52-33-00/201).

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S 862-041

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

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OVERRIDE VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure has these four tasks:
 - (1) Override Valve Removal
 - (2) Override Valve Actuator Removal
 - (3) Override Valve Actuator Installation
 - (4) Override Valve Installation
- B. The override valve is located just forward and below the forward rack supply fan in the left sidewall. The valve consists of a butterfly valve, operated by an electrical actuator. The valve has an exhaust port for the removal of smoke from the equipment cooling ducts.

TASK 21-58-20-024-035

2. Remove Override Valve (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-52-01/401, Sidewall Panels
- (3) AMM 27-61-00/201 Spoiler/Speedbrake Control System
- (4) AMM 52-33-00/201, Large Forward Cargo Door.

B. Access

- (1) Location Zone
121 Forward Cargo Compt, Left

C. Procedure for the removal of the override valve.

S 014-001

- (1) Open forward cargo compartment door 821 (AMM 52-33-00/201).

S 864-035

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

S 864-002

- (3) Remove electrical power (AMM 24-22-00/201).

S 014-003

- (4) Remove left sidewall panel approximately three feet aft of forward endliner panel (AMM 25-52-01/401).

S 014-033

- (5) Find the override valve (1).

S 034-004

- (6) Disconnect the electrical connector from valve.

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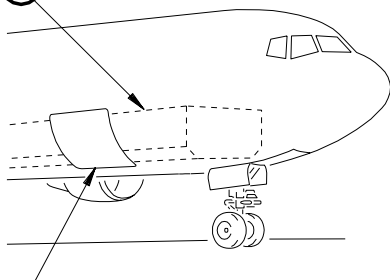
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FORWARD CARGO
COMPARTMENT

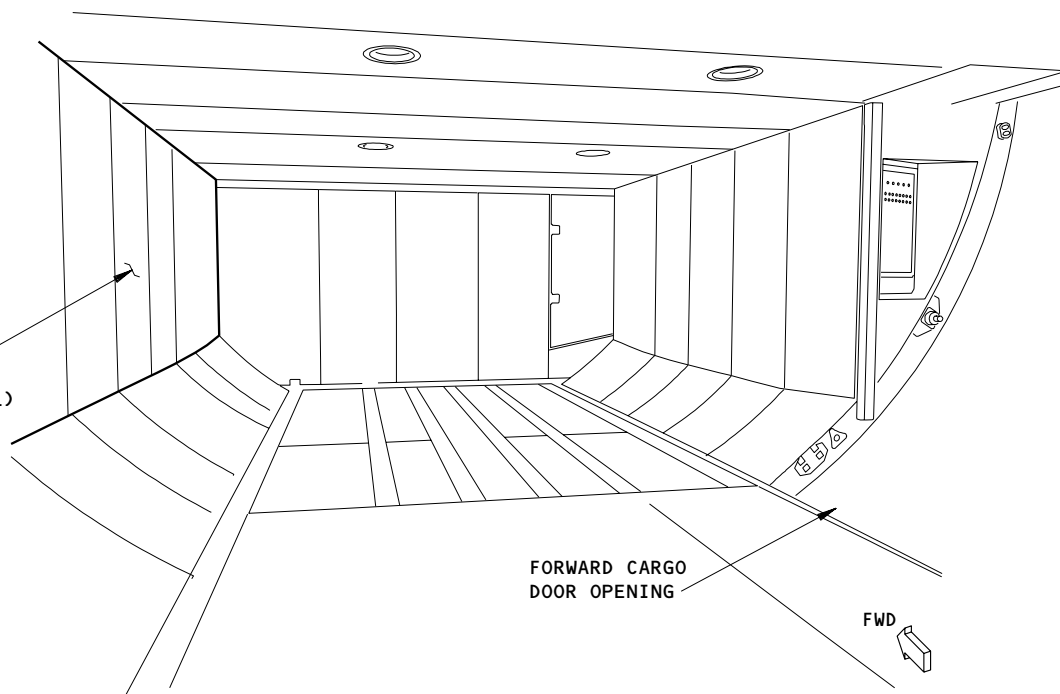
SEE (A)



FORWARD CARGO
DOOR, 821

FORWARD CARGO
COMPARTMENT
(LEFT SIDEWALL)

SEE (B)



FORWARD CARGO COMPARTMENT

(A)

Override Valve Installation
Figure 401 (Sheet 1)

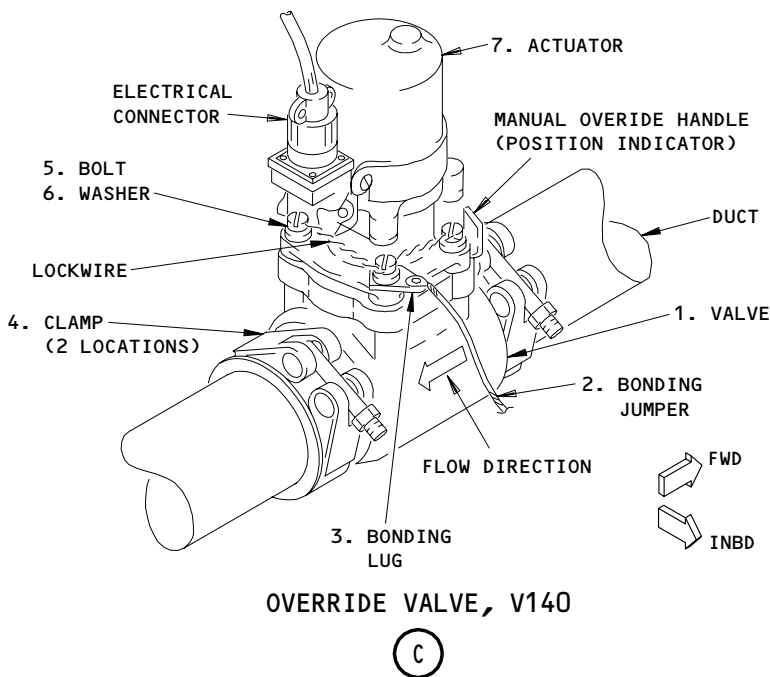
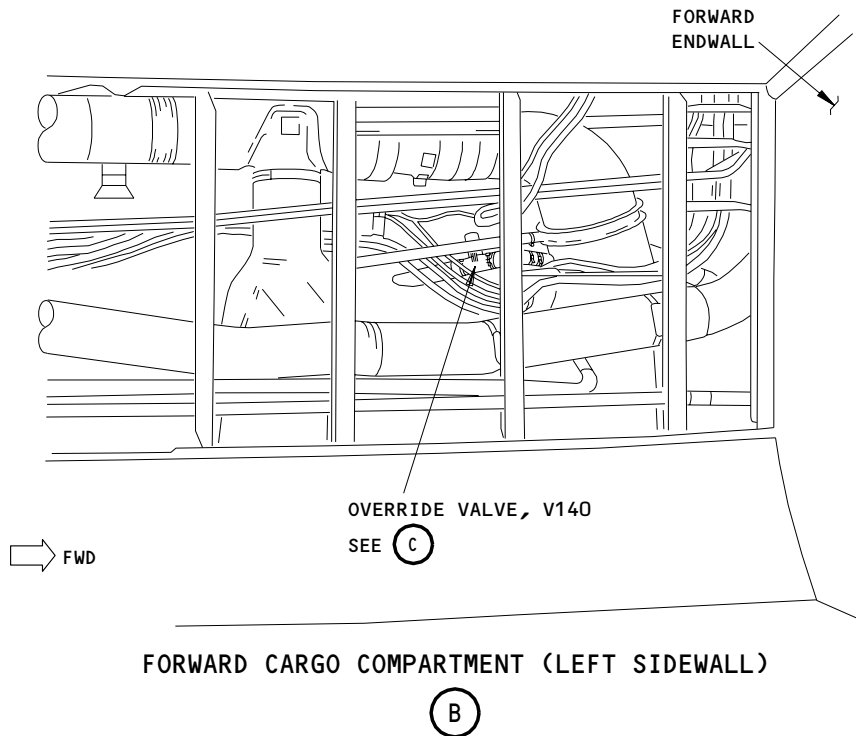
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Override Valve Installation
Figure 401 (Sheet 2)

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- S 034-005
(7) Disconnect the bonding jumper (2) from the valve.
- S 034-034
(8) Loosen the clamp (4) at each side of the valve.
- S 034-007
(9) Hold the valve in position and move the clamps along the duct.
- S 024-006
(10) Remove valve.
- S 954-008
(11) Put cover in the openings in duct to prevent the entry of unwanted objects.

TASK 21-58-20-024-040

3. Remove Override Valve Actuator (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-52-01/401, Sidewall Panels
- (3) AMM 27-61-00/201 Spoiler/Speedbrake Control System
- (4) AMM 52-33-00/201, Large Forward Cargo Door.

B. Access

- (1) Location Zone
121 Forward Cargo Compt, Left

C. Procedure for the removal of the override valve actuator.

- S 014-064
(1) Open forward cargo compartment door 821 (AMM 52-33-00/201).

S 864-041

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoiler panels.

- S 864-042
(3) Remove electrical power (AMM 24-22-00/201).

- S 014-043
(4) Remove left sidewall panel approximately three feet aft of forward endliner panel (AMM 25-52-01/401).

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- S 014-044
 (5) Find the override valve actuator (7).
- S 024-045
 (6) Disconnect the electrical connector from valve.
- S 024-046
 (7) Disconnect the bonding jumper (2) from the actuator.
- S 024-047
 (8) Remove safety wire from bolt heads (5) that connect actuator(7) to valve body.
- S 024-048
 (9) Remove bolts(5), washer(6) and bonding lug (3) from actuator.
- S 024-049
 (10) Remove actuator (7).
- S 954-050
 (11) Put cover in the openings in duct to prevent the entry of unwanted objects.

TASK 21-58-20-424-051

4. Install Override Valve Actuator (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	7	Actuator	21-58-05	01	95
401	7	Actuator	21-58-05	01A	55
401	7	Actuator	21-58-05	06	55
401	7	Actuator	21-58-05	06A	55

B. References

- (1) AMM 24-22-00/201, Electric Power Control
 (2) AMM 25-52-01/401, Sidewall Panels

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- (3) AMM 52-33-00/201, Large Forward Cargo Door.
- C. Access
- (1) Location Zone
121 Forward Cargo Compt, Left
- D. Procedure to install the override valve actuator.
- S 014-052
- (1) Remove the duct covers.
- S 434-053
- (2) Install bolts (5), washers (6) and bonding lug (3) to valve body and torque to 9 to 11 inch-pounds.
- S 424-055
- (3) Install safety wire on bolt heads (5) that hold actuator to valve.
- S 424-056
- (4) Connect the bonding jumper(2) to valve.
- S 424-057
- (5) Connect the electrical connector to valve.
- S 714-058
- (6) Do the steps that follow to test the override valve actuator.
- (a) Supply electrical power (AMM 24-22-00/201).
- (b) Put the EQUIP COOLING selector on pilot's overhead P5 panel to AUTO.
- (c) Make sure that the override valve position indicator shows valve CLOSED.
- (d) Put the EQUIP COOLING selector on the P5 panel to OVRD.
- (e) Make sure that the override valve position indicator shows valve OPEN.
- (f) Put the EQUIP COOLING selector on the P5 panel to AUTO.
- (g) Make sure that override valve position indicator shows valve CLOSED.
- S 424-059
- (7) Replace the sidewall panel (AMM 25-52-01/401).

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- S 414-067
(8) Close forward cargo compartment door 821 (AMM 52-33-00/201).

- S 864-061
(9) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-58-20-424-033

5. Install Override Valve (Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Valve	21-58-05	01	60
401	1	Valve	21-58-05	01A	35
401	1	Valve	21-58-05	06	35
401	1	Valve	21-58-05	06A	35

B. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-52-01/401, Sidewall Panels
- (3) AMM 52-33-00/201, Large Forward Cargo Door.

C. Access

- (1) Location Zone
121 Forward Cargo Compt, Left

D. Procedure to install the override valve

- S 014-009
(1) Remove the duct covers.
- S 434-010
(2) Align valve with the duct with flow arrow points aft.

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S 434-021

CAUTION: DO NOT INSTALL THE VALVE OR CLAMPS SO THE ELECTRICAL WIRES TOUCH THEM. THE VALVE OR CLAMPS CAN RUB THE WIRES AND CAUSE DAMAGE.

- (3) Turn the valve actuator (7) inboard until you can install the connector wire easily.

NOTE: Make sure that the connector wire makes a loop from the wire bundle to the valve. Make sure that the connector wire does not touch the valve when the valve is in the correct position.

S 434-022

- (4) Install the two clamps (4) on the valve.

S 434-023

- (5) Turn the clamps until they will not touch the wire bundle when the clamps are tightened.

S 434-024

- (6) Tighten the clamps (4).

S 434-025

- (7) Connect the bonding jumper (2) to valve.

S 714-026

- (8) Do the steps that follow to test the override valve:
- (a) Supply electrical power (AMM 24-22-00/201).
 - (b) Turn the manual override handle until the arrow on the handle aligns with OPEN arrow on the valve.
 - (c) Put the EQUIP COOLING selector on pilot's overhead P5 panel to AUTO.
 - (d) Do a check for leaks at the joints of the check valve and the duct.
 - 1) Some leakage is permitted.
 - 2) If the leakage is strong, align the joint and tighten the coupling.
 - (e) Connect the electrical connector to the valve.
 - (f) Make sure that the override valve position indicator shows valve CLOSED.
 - (g) Put the EQUIP COOLING selector on the P5 panel to OVRD.
 - (h) Make sure that the override valve position indicator shows valve OPEN.
 - (i) Put the EQUIP COOLING selector on the P5 panel to AUTO.
 - (j) Make sure that override valve position indicator shows valve CLOSED.

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- S 414-029
(9) Replace the sidewall panel (AMM 25-52-01/401).
- S 414-070
(10) Close forward cargo compartment door 821 (AMM 52-33-00/201).
- S 864-036
(11) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

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EQUIPMENT COOLING SKIN TEMPERATURE SENSOR – REMOVAL/INSTALLATION

1. General

- A. The skin temperature sensor is located in the forward cargo compartment on the airplane skin just aft of the override (smoke clearance) valve. The sensor provides ambient temperature readings for equipment cooling mode selection.

TASK 21-58-21-024-001

2. Remove Equipment Cooling Skin Temperature Sensor (Fig. 401)

A. References

- (1) AMM 52-33-00/201, Large Forward Cargo Door.
(2) AMM 25-52-01/401, Sidewall Panels

B. Access

- (1) Location Zone
800 Entry, Service, and Cargo doors.

C. Procedure for the Removal of Skin Temperature Sensor

S 864-059

- (1) Open this circuit breaker on the overhead panel P11 and attach DO-NOT-CLOSE tag:
(a) 11C19, EQUIP COOL OVRD

S 014-116

- (2) Open forward cargo compartment door 821 (AMM 52-33-00/201).

S 014-014

- (3) Remove the left sidewall panel approximately four feet aft of the forward endliner and find the sensor (AMM 25-52-01/401).

S 034-016

- (4) Remove the electrical connector from the temperature sensor.

S 024-017

- (5) Remove the skin temperature sensor and O-ring from the boss.

TASK 21-58-21-424-052

3. Install Equipment Cooling Skin Temperature Sensor (Fig. 401)

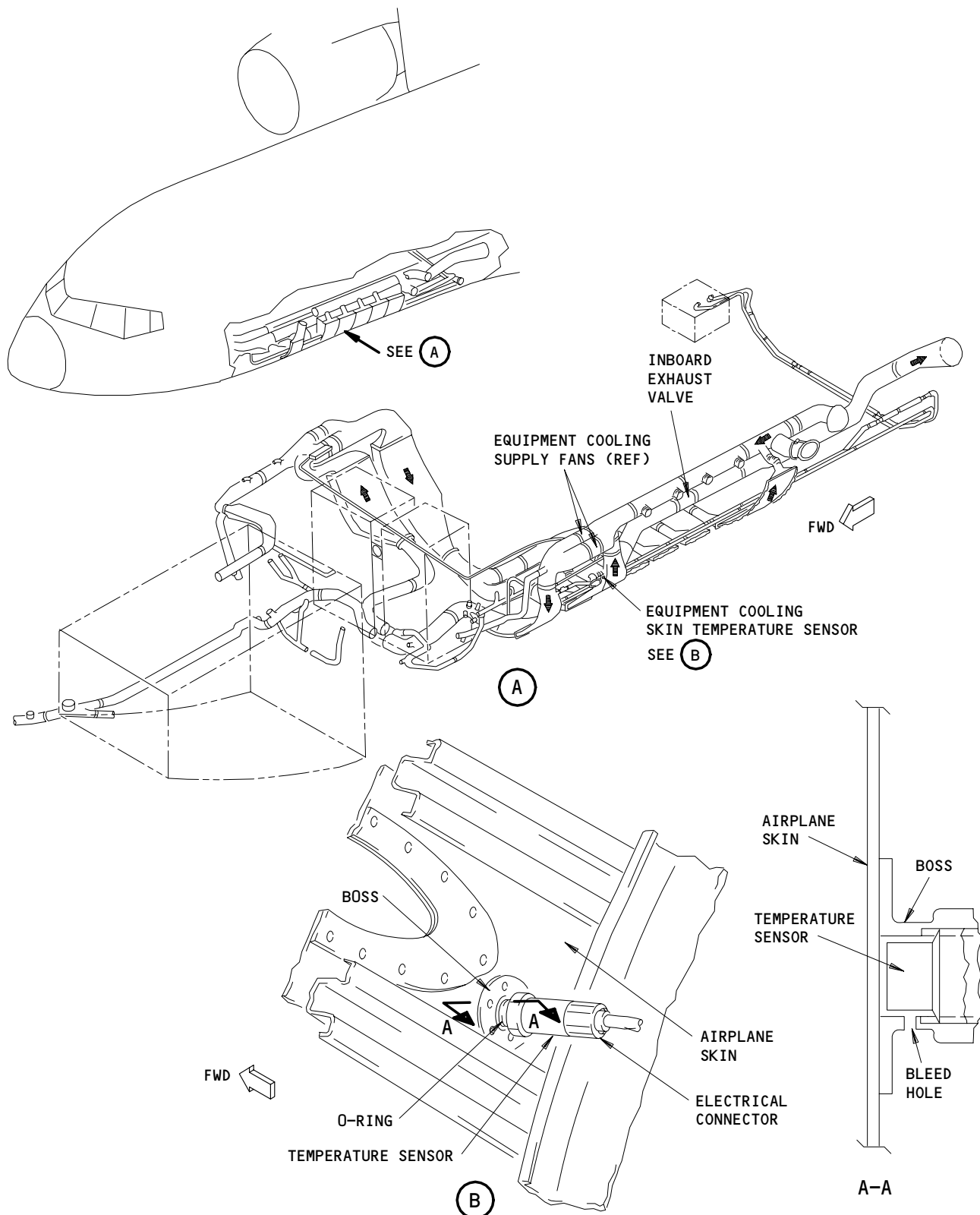
A. Consumable Materials

- (1) A00062 Sealant – DC 340, (AMM 20-30-04/201).

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Equipment Cooling Skin Temperature Sensor Installation
Figure 401

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B. References

- (1) AMM 24-22-00/201, Electric Power Control
- (2) AMM 25-52-01/401, Sidewall Panels
- (3) AMM 20-10-23/401, Lockwires
- (4) AMM 52-33-00/201, Large Forward Cargo Door.

C. Access

- (1) Location Zone
800 Entry, Service, and Cargo doors.

D. Procedure to install Skin Temperature Sensor

S 414-018

- (1) Install sealant into boss just above the level of the bleed hole.

S 414-020

- (2) Put a new O-ring onto the skin temperature sensor and install temperature sensor into boss.
 - (a) Tighten the skin temperature sensor 10-15 pound-inches (1.13-1.70 Newton-meters).

S 414-019

- (3) Make sure the sealant comes through the bleed hole when you tighten the temperature sensor.

S 434-053

- (4) Install the lockwire (AMM 20-10-23/401).

S 414-021

- (5) Attach electrical connector to skin temperature sensor.

E. Procedure to do a Test on Sensor (Circuit)

NOTE: Make sure that the calibration testing of the skin temperature sensor is done by a bench test.

S 714-050

- (1) For ambient temperatures greater than 45°F (7.2°C) do the steps that follow:
 - (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - 1) 11C19, EQUIP COOL OVRD
 - (b) Open this P11 panel circuit breaker and attach DO-NOT-CLOSE tag:
 - 1) 11P13, EQUIPMENT COOLING OUTBD VALVES

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- (c) Insert a 3/8 inch drive wrench into the overboard exhaust valve manual drive collar.
- (d) Push the manual drive collar in approximately 3/8 inch.
- (e) Rotate the manual drive wrench counterclockwise to close the valve.
- (f) Do a visual check of the valve flapper position and make sure the valve closes.
- (g) Supply electrical power (AMM 24-22-00/201).
- (h) Put the EQUIP COOLING selector on P5 panel in AUTO.
- (i) Remove DO-NOT-CLOSE tag and close circuit breaker on the P11 panel:
 - 1) 11P13, EQUIPMENT COOLING OUTBD VALVES
- (j) Make sure that the overboard exhaust valve flapper has opened.

S 714-051

- (2) For ambient temperature less than 45°F (7.2°C) do the steps that follow:
 - (a) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - 1) 11C19, EQUIP COOL OVRD
 - (b) Open this P11 panel circuit breaker and attach DO-NOT-CLOSE tag:
 - 1) 11P13, EQUIPMENT COOLING OUTBD VALVES
 - (c) Put a 3/8 inch drive wrench into the overboard exhaust valve manual drive collar.
 - (d) Push the manual drive collar in approximately 3/8 inch.
 - (e) Rotate the manual drive wrench clockwise to open the valve.
 - (f) Do a visual check of the flapper position and make sure the valve opens.
 - (g) Supply electrical power (AMM 24-22-00/201).
 - (h) Put the EQUIP COOLING selector on the P5 panel in AUTO.
 - (i) Remove DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - 1) 11P13, EQUIPMENT COOLING OUTBD VALVES
 - (j) Make sure that the overboard exhaust valve flapper has closed.

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- S 414-047
- (3) Replace the sidewall panel (AMM 25-52-01/401).
- S 414-113
- (4) Close forward cargo compartment door 821 (AMM 52-33-00/201).
- S 864-049
- (5) Remove the electrical power if it is not necessary (AMM 24-22-00/201).

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EQUIPMENT COOLING SKIN TEMPERATURE SENSOR – AJUSTMENT/TEST

1. General

- A. This procedure has a circuit verification test for the equipment cooling skin temperature sensor, S456.

TASK 21-58-21-715-001

2. Test Equipment Cooling Skin Temperature Sensor Circuit

A. References

- (1) AMM 24-22-00/201, Electrical Power Control
- (2) AMM 25-52-01/401, Sidewall Panels
- (3) AMM 52-33-00/201, Large Forward Cargo Door.

B. Access

- (1) Location Zone
121 Forward Cargo Compartment (Left)

C. Do a Test of the Skin Temperature Sensor

S 015-023

- (1) Open forward cargo compartment door 821 (AMM 52-33-00/201).

S 015-003

- (2) Remove the left sidewall panel approximately 4 feet aft of the forward end liner (AMM 25-52-01/401).

S 035-004

- (3) Remove the electrical connector, D3074, from the skin temperature sensor, S456.

S 865-005

- (4) Supply electrical power (AMM 24-22-00/201).

S 865-006

- (5) Put the EQUIP COOL mode switch, on the pilots' P5 overhead panel, to the AUTO position.

S 865-007

- (6) Make sure that the flapper of the overboard exhaust valve, V12, is in the open position.

S 865-015

- (7) Make sure that the flapper of the shutoff valve, V10 or V178, is in the closed position.

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S 435-009

- (8) Install a jumper wire between pins 1 and 2 of the electrical connector, D3074.
 - (a) Make sure the flapper of the overboard exhaust valve, V12, moves to the closed position.
 - (b) Make sure the flapper of the shutoff valve, V10 or V178, moves to the open position.

S 035-010

- (9) Remove the jumper wire from the electrical connector, D3074.

S 435-011

- (10) Install the electrical connector, D3074, to the skin temperature sensor, S456.

D. Put the Airplane Back to Its Usual Condition

S 415-012

- (1) Install the sidewall panel (AMM 25-52-01/401).

S 415-024

- (2) Close forward cargo compartment door 821 (AMM 52-33-00/201).

S 865-014

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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SUPPLY/EXHAUST FAN SCREENS – MAINTENANCE PRACTICES

1. General

- A. This procedure has these tasks:
 - (1) Supply Fan Screen Inspection
 - (2) Exhaust Fan Screen Inspection
 - (3) Supply/Exhaust Fan Screen Removal
 - (4) Supply/Exhaust Fan Screen Cleaning
 - (5) Supply/Exhaust Fan Screen Installation
- B. The supply and exhaust fans for the equipment cooling system have a screen installed upstream of each fan to prevent contamination and damage to the fans caused from unwanted materials which can get into the supply/exhaust ducts.
- C. The screen for the supply fan is installed behind the left sidewall lining in the forward cargo compartment between the forward cargo door opening and the forward bulkhead. The screen for the supply fan is installed inside of the supply duct which is adjacent to the aft end of the supply fan. The supply duct has access provisions installed to permit a visual inspection of the screen for contamination or damage.
- D. The screen for the exhaust fan is installed behind the right sidewall lining in the forward cargo compartment between the forward cargo door opening and the forward bulkhead. The screen for the exhaust fan is installed inside of the exhaust duct which is adjacent to the forward end of the exhaust fan. On some airplanes, the exhaust duct has access provisions installed (access door or window) to permit a visual inspection of the screen for contamination or damage.

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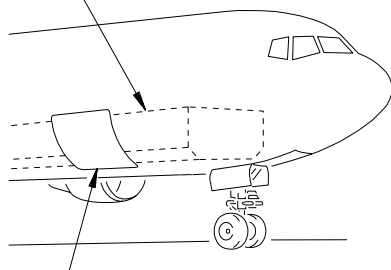
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FORWARD CARGO
COMPARTMENT
(LEFT SIDEWALL)

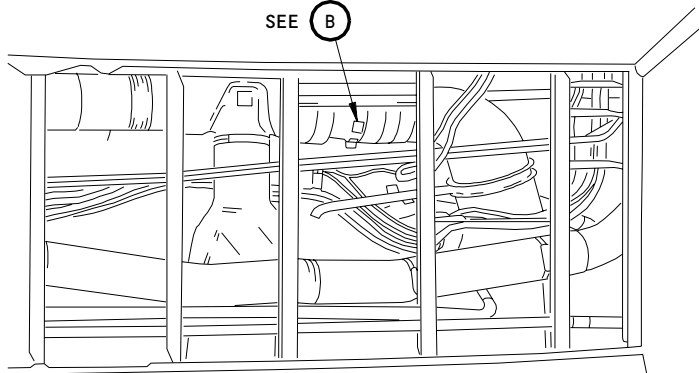
SEE (A)



FORWARD CARGO
DOOR, 821

SUPPLY FAN SCREEN

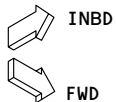
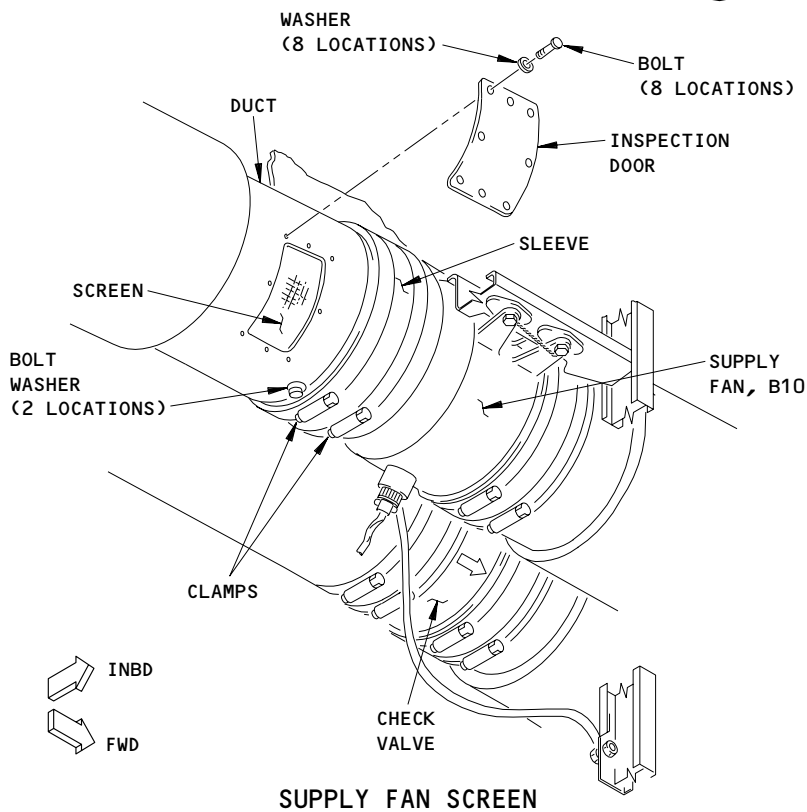
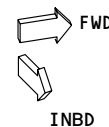
SEE (B)



FORWARD
BULKHEAD

FORWARD CARGO COMPARTMENT
(LEFT SIDEWALL)

(A)



SUPPLY FAN SCREEN

(B)

Supply Fan Screen - Maintenance Practices
Figure 201

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TASK 21-58-22-202-038

2. Supply Fan Screen Inspection

A. References

- (1) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (2) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zones
 - 121 Forward Cargo Compartment (Left)
- (2) Access Panels
 - 821 Forward Cargo Door

C. Supply Fan Screen Inspection (Fig. 201)

S 012-093

- (1) Open forward cargo compartment door 821 (AMM 52-33-00/201).

S 012-040

- (2) To get access to the supply fan screen,
 - (a) Remove the left sidewall lining between the forward cargo door opening and the forward bulkhead (AMM 25-52-01/401).
 - (b) Remove the inspection door from the duct which is adjacent to the fan.
 - 1) Remove the eight bolts and washers that hold the inspection door to the duct.

S 212-070

- (3) Use a flashlight to inspect the condition of the screen through the inspection door opening in the supply duct.

NOTE: If you are not able to sufficiently inspect the condition of the screen, you will need to remove the screen from the duct.

S 212-071

- (4) After inspecting the screen, do the following steps:
 - (a) Clean the screen if there are unwanted materials that prevent airflow movement through the screen mesh.
 - (b) Replace the screen if there are holes in the screen mesh larger than 3/4-inch (1.9-cm) diameter.
 - (c) Small dents which do not stop the airflow are satisfactory.

S 862-072

- (5) Put the Airplane Back to Its Usual Condition
 - (a) Install the inspection door to the duct with the eight bolts and washers.
 - (b) Install the applicable left sidewall linings (AMM 25-52-01/401).

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(c) Close forward cargo compartment door 821 (AMM 52-33-00/201).

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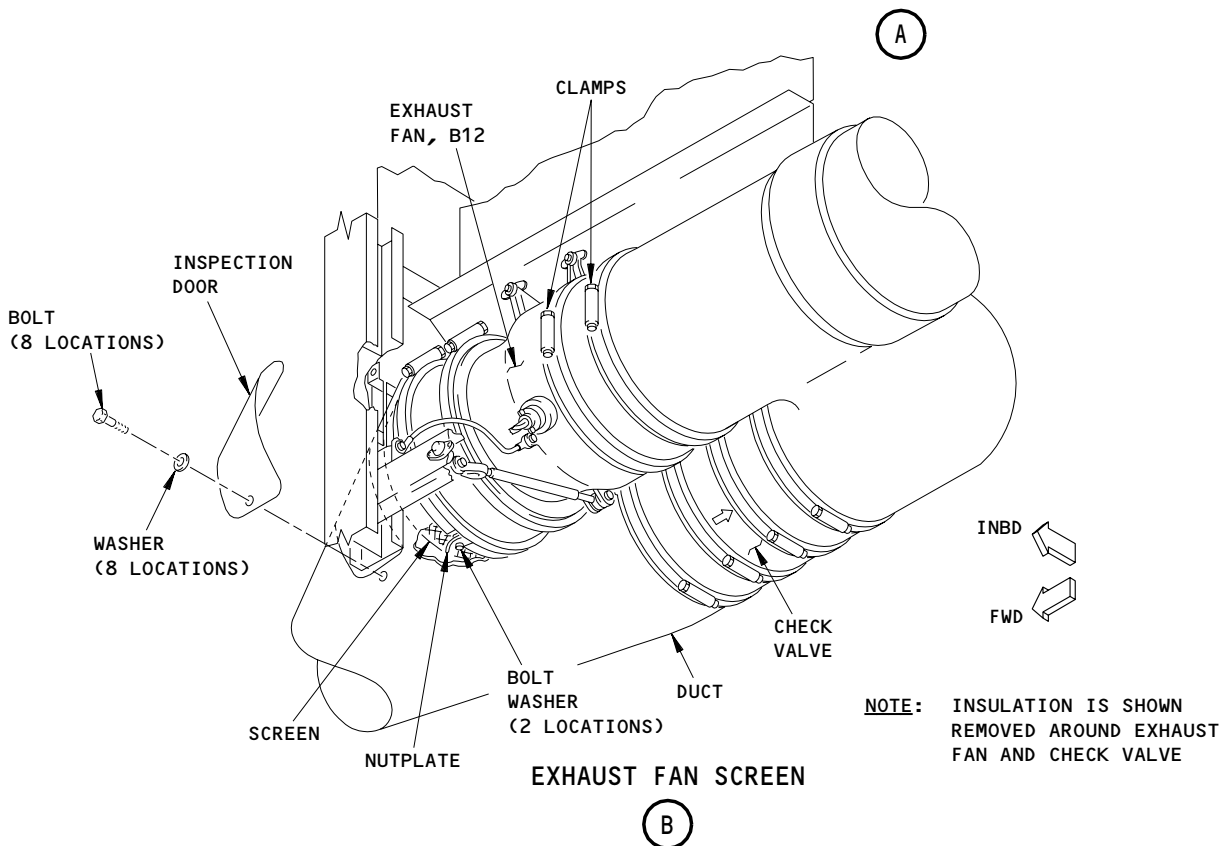
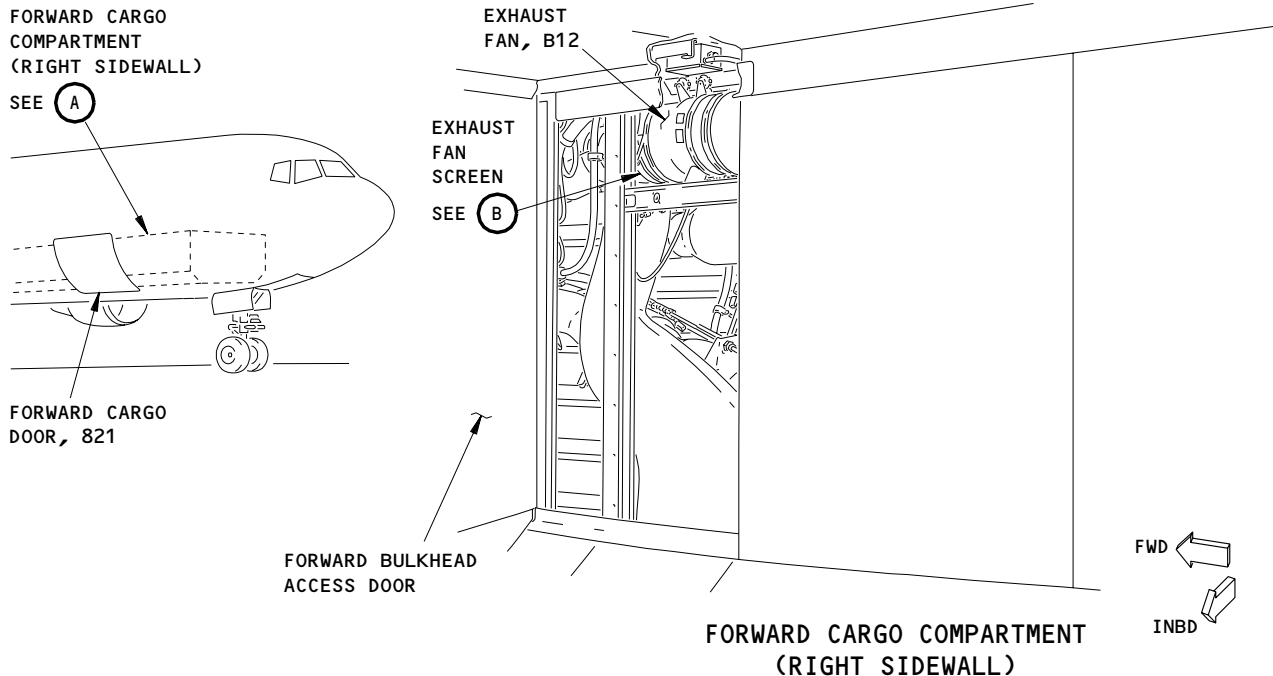
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Exhaust Fan Screen - Maintenance Practices
Figure 202A

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TASK 21-58-22-202-092

3. Exhaust Fan Screen Inspection

A. References

- (1) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (2) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

(1) Location Zones

122 Forward Cargo Compartment (Right)

(2) Access Panels

821 Forward Cargo Door

(a) Replace the screen if there are holes in the screen mesh larger than 3/4-inch (1.9-cm) diameter.

(b) Close forward cargo compartment door 821 (AMM 52-33-00/201).

C. Exhaust Fan Screen Inspection (Fig. 202A)

S 012-081

- (1) Open the forward cargo compartment door, 821.

S 012-082

- (2) To get access to the exhaust fan screen,

(a) Remove the right sidewall lining between the forward cargo door opening and the forward bulkhead (AMM 25-52-01/401).

(b) Remove the insulation that covers the exhaust fan and exhaust duct forward the exhaust fan.

(c) Remove the inspection door from the duct which is adjacent to the fan.

- 1) Remove the eight bolts and washers that hold the inspection door to the duct.

S 212-083

- (3) Use a flashlight to inspect the condition of the screen through the inspection door opening in the supply/exhaust duct.

NOTE: If you are not able to sufficiently inspect the condition of the screen, you will need to remove the screen from the duct.

S 212-084

- (4) After inspecting the screen, do the following steps:

(a) Clean the screen if there are unwanted materials that prevent airflow movement through the screen mesh.

(b) Replace the screen if there are holes in the screen mesh larger than 3/4-inch (1.9-cm) diameter.

(c) Small dents which do not stop the airflow are satisfactory.

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S 862-085

- (5) Put the Airplane Back to Its Usual Condition
- (a) Install the inspection door to the duct with the eight bolts and washers.
 - (b) Install the insulation that was removed from the exhaust duct.
 - (c) Install the applicable right sidewall linings (AMM 25-52-01/401).
 - (d) Close the forward cargo compartment door, 821.

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TASK 21-58-22-002-047

4. Supply/Exhaust Fan Screen Removal (Fig. 201)

A. References

- (1) AMM 21-58-06/401, Forward Rack Supply and Exhaust Fans
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (3) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Locator Zones
 - 121 Forward Cargo Compartment (left)
 - 122 Forward Cargo Compartment (right)

- (2) Access Panels

- 821 Forward Cargo Door

C. Prepare for Removal

S 012-102

- (1) Open forward cargo compartment door 821 (AMM 52-33-00/201).

S 012-048

- (2) To get access to the supply fan screen, remove the left sidewall lining between the forward cargo door opening and the forward bulkhead (AMM 25-52-01/401).

S 012-049

- (3) To get access to the exhaust fan screen, remove the right sidewall lining between the forward cargo door opening and the forward bulkhead (AMM 25-52-01/401).

S 012-050

- (4) AIRPLANES WITH EXHAUST DUCT INSULATION (POST-SB 21-63, PRR B11754); To get access to the exhaust fan screen, remove the insulation that covers the exhaust fan and the exhaust duct forward of the exhaust fan.

S 012-005

- (5) Remove the supply/exhaust fan that is adjacent to the screen that will be removed (AMM 21-58-06/401)

D. Screen Removal

S 022-052

- (1) Remove the clamp and the sleeve from the duct that has the screen.

S 022-051

- (2) Remove the bolts and washers that attach the screen to the duct.

S 022-008

- (3) Remove the screen.

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TASK 21-58-22-212-091

5. Supply/Exhaust Fan Screen Cleaning (Fig. 201)

A. Consumable Materials

- (1) B00148, Solvent - Methyl Ethyl Ketone TT-M-261

B. References

- (1) AMM 20-30-80/201, Airplane Structure Cleaning Solvents (Series 80)

C. Access

(1) Location Zones

- 121 Forward Cargo Compartment (Left)
- 122 Forward Cargo Compartment (Right)

(2) Access Panels

- 821 Forward Cargo Door

D. Prepare for Cleaning

S 022-016

- (1) Remove the screen from the inside of the supply/exhaust duct.

E. Screen Cleaning

S 162-017

- (1) If the unwanted material is dust and loose material, clean the screen with a vacuum cleaner.

S 112-032

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (2) If the unwanted material is bonded to the screen, wash the screen with the solvent, Series 80 (AMM 20-30-80/201) and then dry the screen with a cloth.

F. Put the Airplane Back to Its Usual Condition

S 422-046

- (1) Install the screen to the inside of the supply/exhaust duct.

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TASK 21-58-22-402-039

6. Supply/Exhaust Fan Screen Installation (Fig. 201)

A. References

- (1) AMM 21-58-06/401, Forward Rack Supply and Exhaust Fans
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- (3) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

(1) Location Zones

- | | |
|-----|-----------------------------------|
| 121 | Forward Cargo Compartment (Left) |
| 122 | Forward Cargo Compartment (Right) |

(2) Access Panels

- | | |
|-----|--------------------|
| 821 | Forward Cargo Door |
|-----|--------------------|

C. Screen Installation

S 212-054

- (1) Make sure there are no unwanted materials inside of the duct before you install the screen.

S 422-053

- (2) Install the screen into the duct.
 - (a) Turn the screen until the bolt holes in the duct align with the nutplate holes in the screen.
 - (b) Install the bolts and washers to hold the screen to the duct.

S 432-012

- (3) Put the sleeve on the duct.

S 432-035

- (4) Install and tighten the clamp that holds the sleeve to the duct.

S 212-057

- (5) Make sure there are no unwanted materials inside of the screen before you install the supply/exhaust fan.

D. Put the Airplane Back to Its Usual Condition

S 412-056

- (1) Install the supply/exhaust fan that was removed for the screen (AMM 21-58-06/401).

S 412-055

- (2) AIRPLANES WITH EXHAUST DUCT INSULATION (POST-SB 21-63, PRR B11754); Install the insulation that was removed from the exhaust duct.

S 412-014

- (3) Install the applicable left (right) sidewall linings (AMM 25-52-01/401).

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- S 412-015
- (4) Close the forward cargo compartment door, 821.
- S 412-105
- (5) Close forward cargo compartment door 821 (AMM 52-33-00/201).

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EQUIPMENT COOLING INDICATION CARD – REMOVAL/INSTALLATION

1. General

- A. The indication card is in the P50 box/card file in the electronics bay. The card supplies the logic necessary for the indication of defective operation of the cooling system.

TASK 21-58-24-004-002

2. Equipment Cooling Indication Card Removal (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-01/401, E/E Rack Mounted Components
- (3) AMM 20-41-01/201, Electro Static Sensitive Devices
- (4) AMM 24-22-00/201, Electric Power Control
- (5) AMM 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
119/120 Main equipment center
- (2) Access Panel
119AL Main equipment center

C. Prepare for the Removal

S 864-003

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL THE PERSONS AND THE EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT.

- (1) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all the persons and the equipment away from the spoilers.

S 864-004

- (2) Remove the electrical power (AMM 24-22-00/201).

S 014-005

- (3) Open the access door for the main equipment center, 119AL (AMM 06-41-00/201).

D. Remove the card

S 014-006

- (1) Loosen the fasteners on the door of the P50 cardfile.

S 014-007

- (2) Open the door of the P50 cardfile.

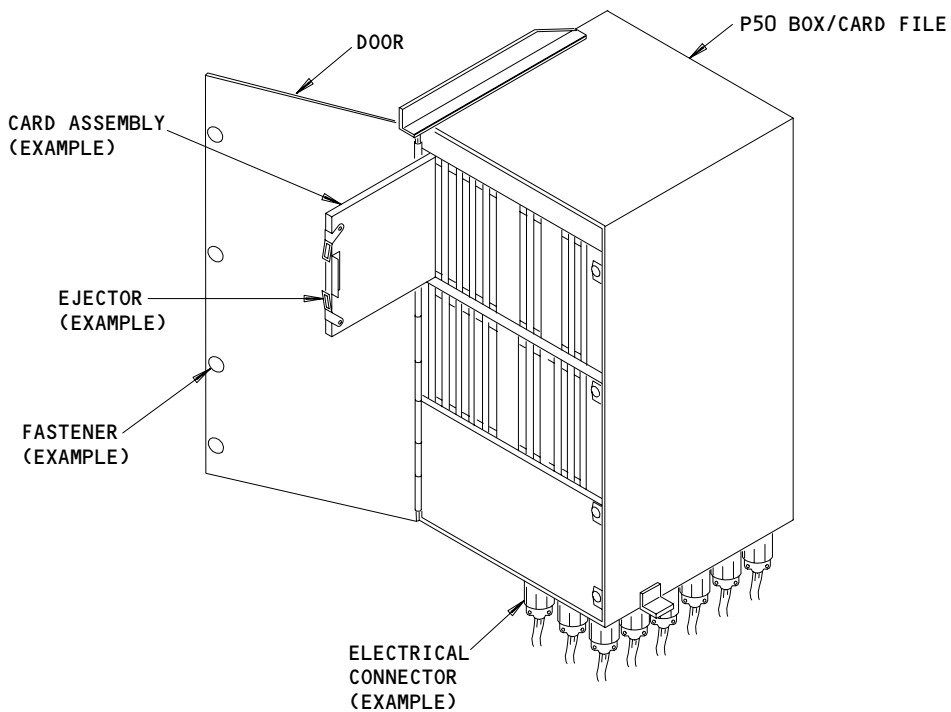
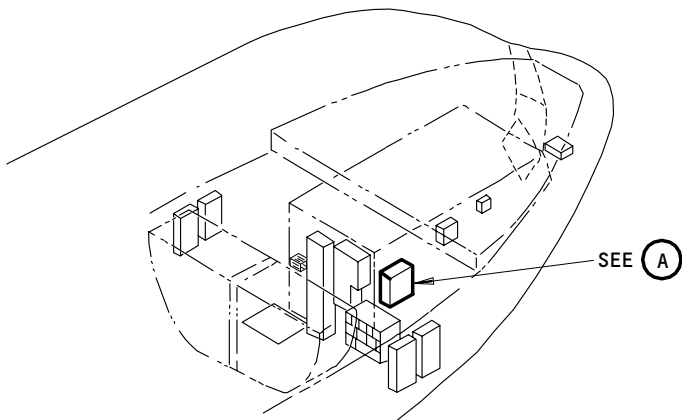
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(A)

Equipment Cooling Indication Card Assembly Installation
Figure 401

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S 864-008

CAUTION: DO NOT TOUCH THE CONTROL CARDS BEFORE YOU DO THE PROCEDURE FOR THE DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. AN ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CONTROL CARDS.

- (3) Do the procedure for the devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 024-009

- (4) Remove the card (AMM 20-10-01/401).

NOTE: A diagram of the card positions is on the inner side of the door.

TASK 21-58-24-404-010

3. Equipment Cooling Indication Card Installation (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-01/401, E/E Rack Mounted Components
- (3) AMM 20-41-01/201, Electro Static Sensitive Devices
- (4) AMM 24-22-00/201, Electric Power Control
- (5) AMM 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zones
119/120 Main equipment center
- (2) Access Panel
119AL Main equipment center

C. Install the card

S 914-011

CAUTION: DO NOT TOUCH THE CONTROL CARDS BEFORE YOU DO THE PROCEDURE FOR THE DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. AN ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE CONTROL CARDS.

- (1) Do the procedure for the devices that are sensitive to electrostatic discharge (AMM 20-41-01/201).

S 424-012

- (2) Install the card (AMM 20-10-01/401).

NOTE: A diagram of the card positions is on the inner side of the door.

S 414-013

- (3) Close the door for the electrical system cardfile, P50.

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S 414-014

- (4) Tighten the fasteners on the door of the P50 cardfile.
D. Do the installation test for the card.

S 864-015

- (1) Supply electrical power (AMM 24-22-00/201).

S 714-025

- (2) Make sure no equipment cooling EICAS messages show.
E. Put the airplane back to its usual condition.

S 864-022

- (1) Do the activation procedure for the spoilers if you did the deactivation procedure (AMM 27-61-00/201).

S 414-023

- (2) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

S 864-024

- (3) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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EQUIPMENT COOLING OVERHEAT SWITCH – MAINTENANCE PRACTICES

1. General

- A. The switch is to make sure that the cooling air supply does not operate above the safe limit.

TASK 21-58-26-902-001

2. Remove/Install The Overheat Switch (Fig. 201)

A. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) AMM 52-33-00/201, Large Forward Cargo Door.
- (3) AMM 20-10-23/401, Standard Practices – Lockwires
- (4) AMM 24-22-00/201, Electric Power – Control
- (5) AMM 27-61-00/201, Spoiler/Speedbrake Control System

B. Access

- (1) Location Zone
123 Area Below Forward Cargo Compartment (left)

C. Prepare for Removal

S 012-022

- (1) Open forward cargo compartment door 821 (AMM 52-33-00/201).

S 012-017

- (2) Find the switch below the cargo floor.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (a) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 862-002

- (3) Remove electrical power (AMM 24-22-00/201).

D. Remove the Switch.

S 032-003

- (1) Remove the electrical connector from the switch.

S 032-004

- (2) Remove the switch from the boss.

S 032-018

- (3) Discard the O-ring.

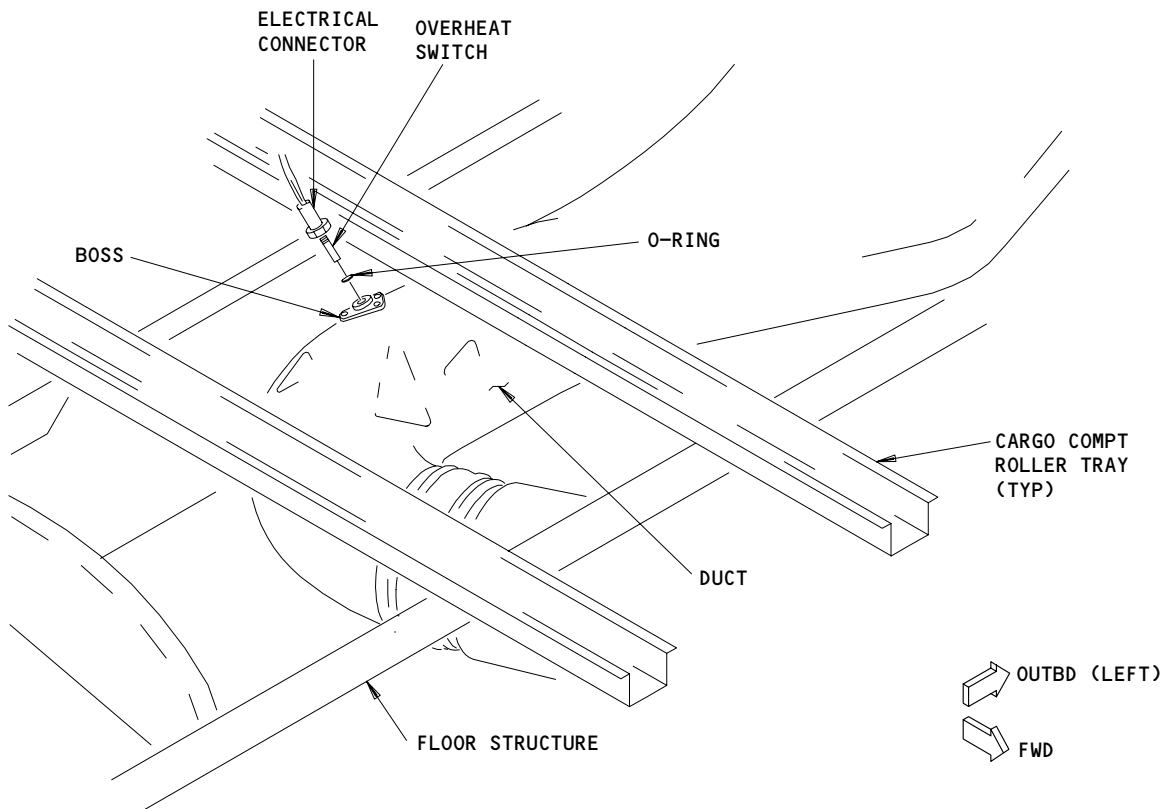
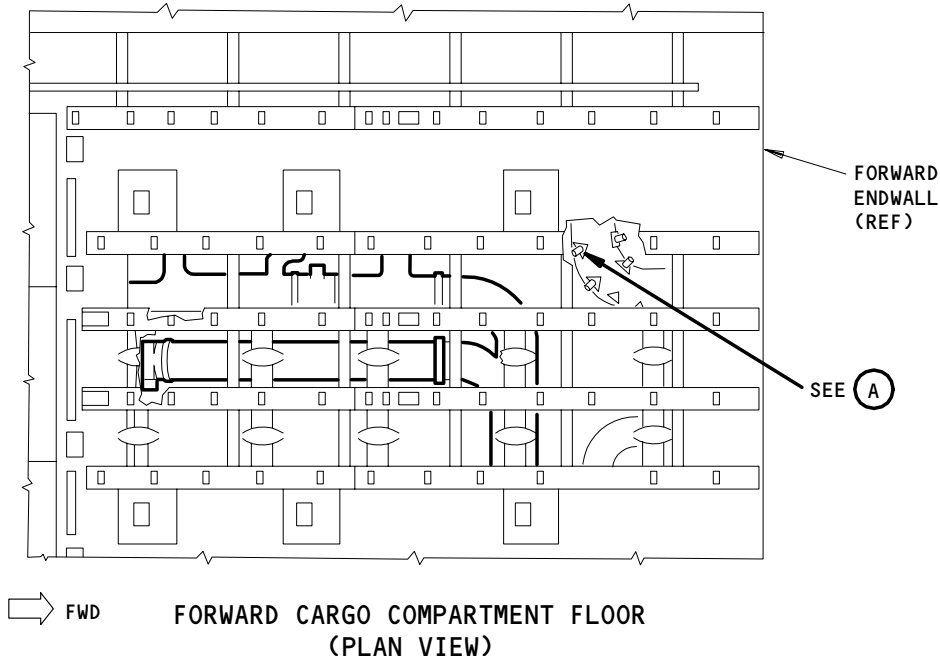
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(A)

**E/E Cooling Overheat Switch Installation
Figure 201**

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- S 952-005
- (4) Put a cover in the hole in the duct to prevent the entry of unwanted objects.
- E. Install the Overheat Switch
 - S 412-006
 - (1) Remove the cover from the switch hole.
 - S 412-007
 - (2) Put a new O-ring on the switch.
 - S 422-008
 - (3) Install the switch into the boss on the duct and tighten the switch.
 - S 432-019
 - (4) Install lockwire (AMM 20-10-23/401).
 - S 432-009
 - (5) Install the electrical connector to the switch.
- F. Put the Airplane Back to its Usual Condition.
 - S 412-024
 - (1) Close forward cargo compartment door 821 (AMM 52-33-00/201).

TASK 21-58-26-162-011

3. Clean the Overheat Switch

A. Access

- (1) Location Zone
123 Area Below Forward Cargo Compartment (left)

B. Procedure to Clean the Switch

- S 022-012
- (1) Do the procedure to remove the overheat switch.

S 162-013

CAUTION: BE CAREFUL WHEN YOU REMOVE THE SWITCH. DAMAGE TO THE SWITCH CAN OCCUR, IF YOU ARE NOT CAREFUL.

- (2) Remove the dirt from the switch.

S 162-014

- (3) Clean the probe end of the switch with a wet cloth.

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- S 422-015
(4) Do the procedure to install the switch.

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SKIN HEAT EXCHANGER DIFFUSER AND COVER – REMOVAL/INSTALLATION

1. General

- A. This procedure gives the steps that are necessary to remove and install the diffuser and cover for the skin heat exchanger.

TASK 21-58-28-004-088

2. Skin Heat Exchanger Diffuser and Cover Removal (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power – Control
(2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zone
821 Forward Cargo Door

C. Prepare for Removal

S 024-002

- (1) Remove the electrical power (AMM 24-22-00/201).

S 014-003

- (2) Open the forward cargo door, 821.

S 014-004

- (3) Remove the sidewall lining on the left wall that is approximately 15 feet aft of the forward wall (AMM 25-52-01/401).

S 014-005

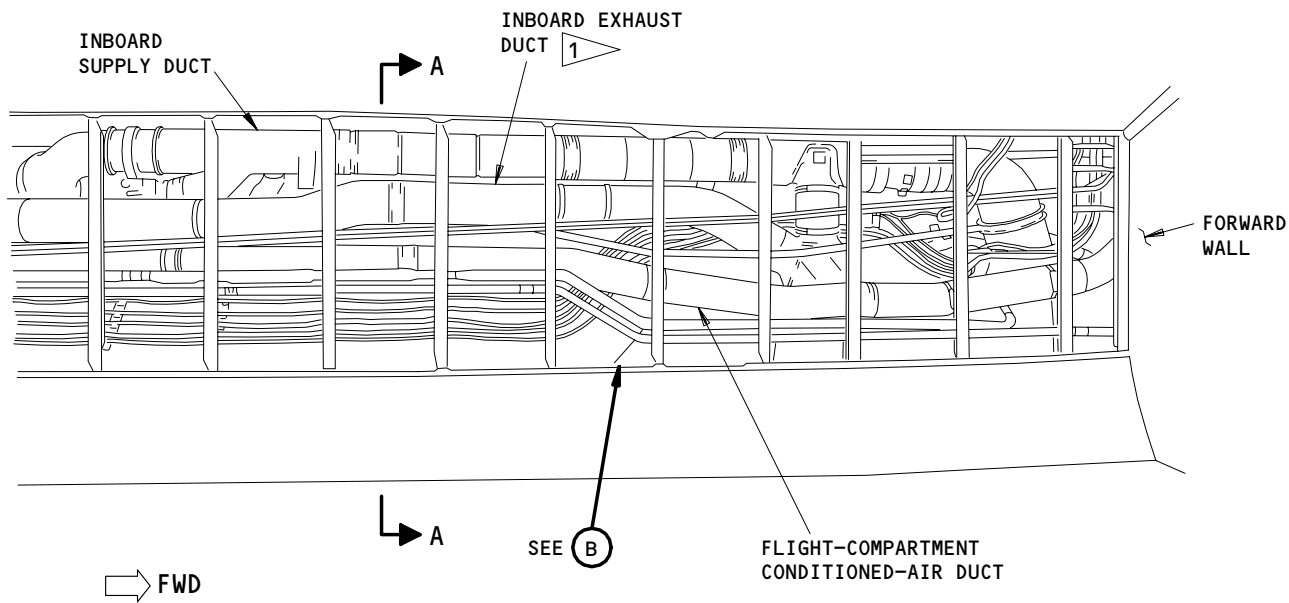
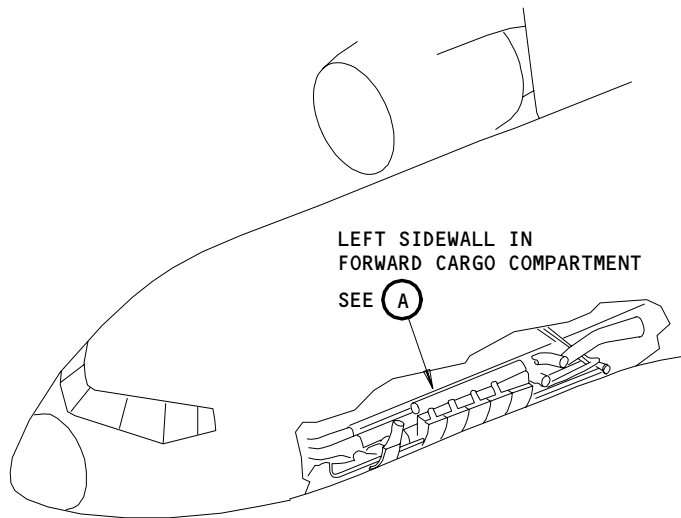
- (4) Remove the floor panels on the left side that are approximately 15 feet aft of the forward wall (above the diffusers).

S 024-006

- (5) To remove the flight-compartment conditioned-air duct that is in front of the covers, do the steps that follow:
(a) To make the installation easier, mark the pieces of the duct to show the location and direction of the each piece.
(b) Remove the plastic straps from the joints of the pieces.
(c) Fold and pull the rubber sleeve away from each piece.
(d) Pull the piece away from the joint.

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, AND
SAS 275-278, 280

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LEFT SIDEWALL IN FORWARD CARGO COMPARTMENT

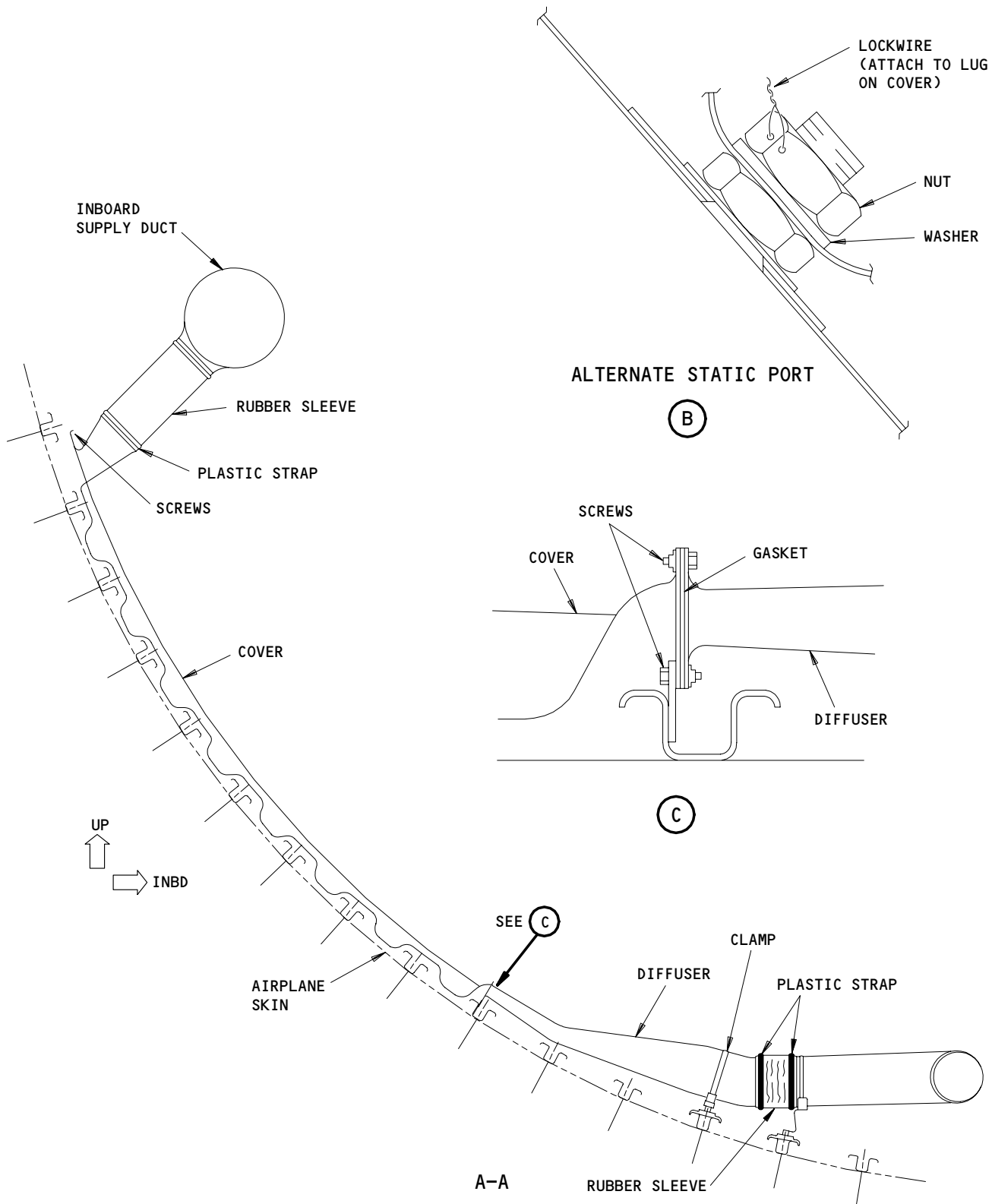
(A)

1 NOT INSTALLED ON ALL AIRPLANES

Skin Heat Exchanger Diffuser Installation
Figure 401 (Sheet 1)

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, AND
SAS 275-278, 280

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Skin Heat Exchanger Diffuser Installation
Figure 401 (Sheet 2)

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, AND
SAS 275-278, 280

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S 014-043

CAUTION: DO NOT TWIST THE STATIC LINE DURING INSTALLATION.
KINKS IN THE LINE CAN STOP THE OPERATION OF THE ALTERNATE
STATIC SYSTEM.

- (6) Remove the line that goes to the alternate static port.
 - (a) Remove the lockwire on the nut for the alternate static port.
 - (b) Remove the nut.
 - (c) Remove the washer.

D. Procedure for the Removal

S 024-022

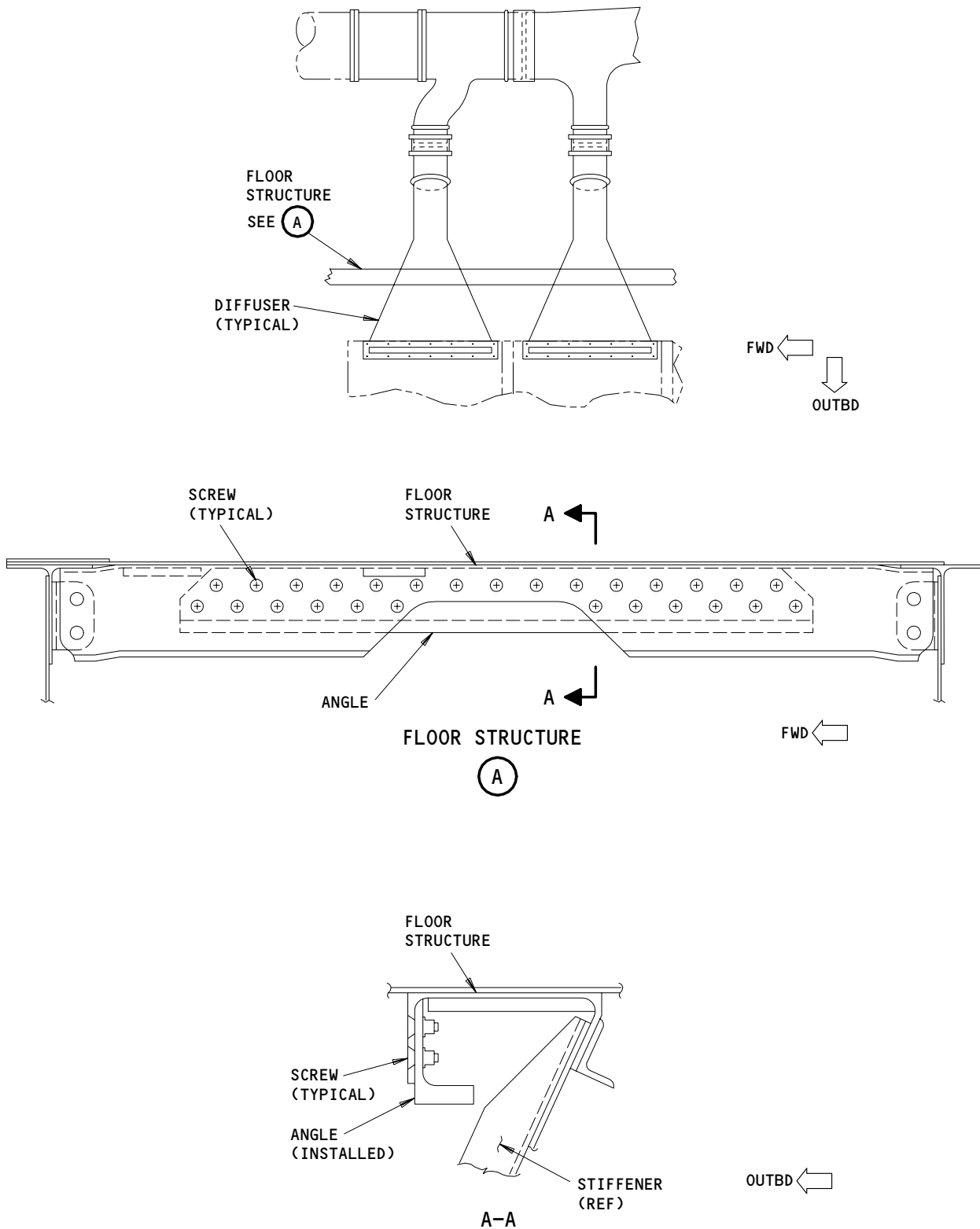
- (1) Do the steps that follow for each cover:
 - (a) To remove the insulation from the cover, do the steps that follow:
 - 1) If necessary, remove the brackets that hold the wire bundles.
 - 2) Remove the plastic disks that keep the insulation on the plastic supports.
 - 3) Lift the insulation off of the supports.
 - 4) Carefully pull the insulation away from the covers.
 - (b) Remove the screws from each side, the top, and the bottom of the cover.
 - (c) Remove the plastic clamp that attaches the cover to the upper duct.
 - (d) Fold and pull the rubber sleeve away from the cover.
 - (e) Move the cover up.

S 024-023

- (2) Do the steps that follow for each of the diffusers:
 - (a) Remove the screws that attach the diffuser to the structure at the bottom of the covers.

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, AND
SAS 275-278, 280

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Cargo Floor Support Structure
Figure 402

EFFECTIVITY
AIRPLANES WITH LARGE CARGO DOOR

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- (b) AIRPLANES WITH PLASTIC CLAMPS;
Remove the plastic clamp that holds the diffuser to the structure.
- (c) AIRPLANES WITH STEEL CLAMPS;
Loosen the clamp that holds the diffuser to the structure until you can remove the diffuser from the clamp.
- (d) AIRPLANES WITH LARGE CARGO DOORS;
Remove the screws that hold the angle piece to the floor structure (Fig. 402).
 - 1) Remove the angle piece.
- (e) Remove the plastic strap from the diffuser at the joint.
- (f) Fold and pull the rubber sleeve away from the diffuser.
- (g) Pull the diffuser away from the duct.

TASK 21-58-28-404-069

3. Skin Heat Exchanger Diffuser and Cover Installation (Fig. 401)

A. References

- (1) AMM 25-52-01/401, Sidewall Panels
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 34-11-03/401, Alternate Static Port

B. Access

- (1) Location Zone
821 Forward Cargo Door

C. Do the steps that follow for each of the diffusers:

S 864-025

- (1) Put the diffuser in position adjacent to the duct.

S 864-026

- (2) Pull the rubber sleeve on to the diffuser.

S 424-027

- (3) Install a plastic strap to hold the rubber sleeve on the diffuser.

S 424-028

- (4) Install the clamp that holds the diffuser to the structure.
 - (a) Tighten the clamp.

S 424-029

- (5) Install the screws that attach the diffuser to the structure at the bottom of the covers.

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, AND
SAS 275-278, 280

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- S 424-030
- (6) AIRPLANES WITH LARGE CARGO DOORS;
Put the angle piece into position (Fig. 402).
(a) Install the screws.
- D. Do the steps that follow for each cover:
- S 864-031
- (1) Move the cover down.
- S 864-032
- (2) Pull the rubber sleeve from the duct on to the cover.
- S 424-033
- (3) Install a plastic clamp to hold the rubber sleeve on the cover.
- S 424-034
- (4) Install the screws on each side, the top, and the bottom of the cover.
- S 424-035
- (5) To install the insulation on the cover, do the steps that follow:
(a) Carefully put the insulation on the covers.
(b) Push the supports through the holes in the insulation.
(c) Install the plastic disks that keep the insulation on the plastic supports.
(d) Attach the brackets that hold the wire bundles to the structure, if you removed them.
- E. Put the Airplane Back to Its Usual Condition
- S 424-037
- (1) To install the pieces of the flight-compartment conditioned-air duct, do the steps that follow:
(a) Put the piece of duct in position at the joint.
(b) Pull the rubber sleeve on to the piece.
(c) Install the plastic straps that hold the rubber sleeve on the duct.

EFFECTIVITY

SAS 050, 051, 150-157, 162-167, AND SAS 275-278, 280

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S 424-011

CAUTION: DO NOT TWIST THE STATIC LINE DURING INSTALLATION.
KINKS IN THE LINE CAN STOP THE OPERATION OF THE ALTERNATE
STATIC SYSTEM.

(2) Install the washer, nut, lockwire, and line on the alternate static
port (AMM 34-11-03/401).

S 714-039

(3) Do this procedure: Alternate Static Port Test (AMM 34-11-03/401).

S 414-040

(4) Install the floor panels.

S 414-041

(5) Install the sidewall lining on the left wall (AMM 25-52-01/401).

S 414-042

(6) Close the forward cargo door, 821.

EFFECTIVITY
SAS 050, 051, 150-157, 162-167, AND
SAS 275-278, 280

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DIFFERENTIAL PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

- A. The Differential Pressure Switch for the E/E Equipment Cooling is found on the forward side of the E1/E2 rack plenum.

TASK 21-58-29-004-001

2. Remove the Differential Pressure Switch (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zones

119 Main Equipment Center, Left
120 Main Equipment Center, Right

C. Prepare for Removal

S 864-002

- (1) Put the EQUIP COOLING mode selector switch, on the P5 panel to AUTO.
(a) Put a DO-NOT-OPERATE tag on the switch.

S 014-004

- (2) Open the E/E bay access door 119AL (AMM 06-41-00/201).

S 024-005

- (3) Find the differential pressure switch and the cover on the forward side E1/E2 rack plenum.

S 034-006

- (4) Remove the screws and the washers that hold the cover in its position.

S 034-024

- (5) Remove the cover.

S 034-007

- (6) Disconnect the electrical connector.

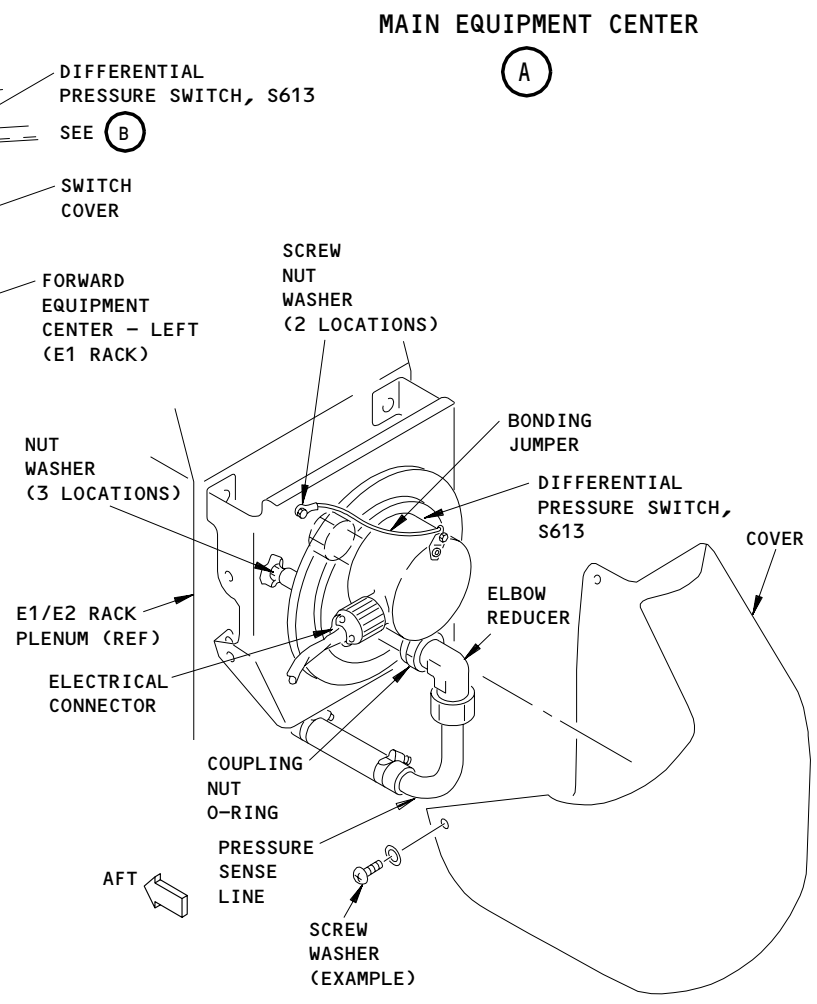
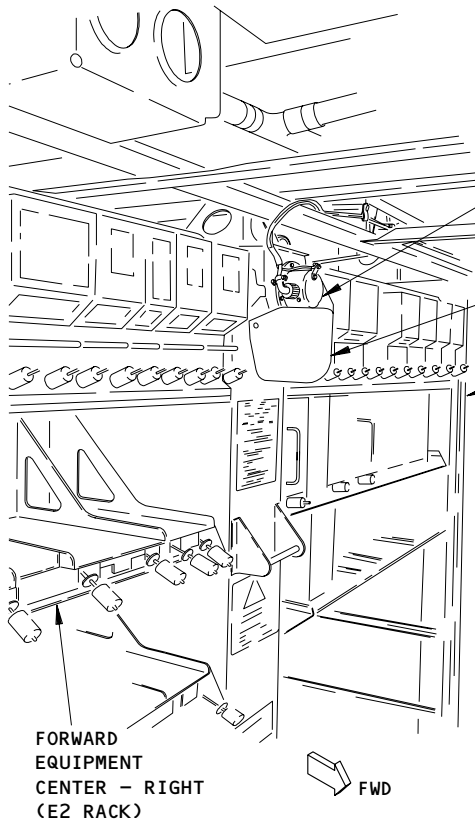
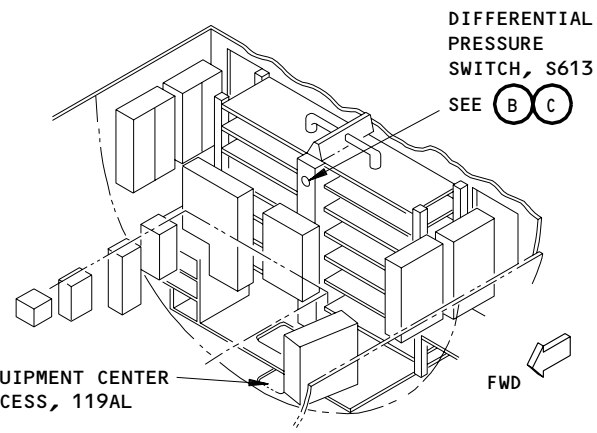
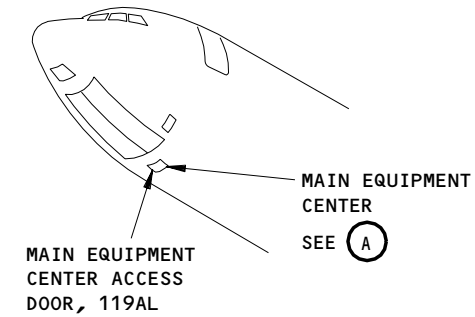
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DIFFERENTIAL PRESSURE SWITCH (B)

DIFFERENTIAL PRESSURE SWITCH, S613 (C)

Differential Pressure Switch Installation
Figure 401

EFFECTIVITY	
ALL	

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94921

- S 034-026
- (7) Remove the screws, nuts, and washers that attach the bonding jumper to the airplane structure and the differential pressure switch.
- S 034-008
- (8) Remove the bonding jumper from the switch.
- S 034-009
- (9) Disconnect the pressure sense line from the elbow on the switch.
- S 034-010
- (10) Remove the coupling nut, the O-ring and the elbow from the switch.
(a) Discard the O-ring.
- S 034-011
- (11) Remove the three nuts and washers from the mounting plate.
- S 024-012
- (12) Remove the switch.

TASK 21-58-29-404-013

3. Install the Differential Pressure Switch (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

(1) Location Zones

- | | |
|-----|------------------------------|
| 119 | Main Equipment Center, Left |
| 120 | Main Equipment Center, Right |

C. Procedure

- S 424-014
- (1) Put the switch on the mounting plate with the threaded studs in the holes of the plate.
- S 434-015
- (2) Install the washers and the nuts on the studs.
(a) Tighten the nuts.
- S 434-016
- (3) Install the bonding jumper using the screws, nuts, and washers.
- NOTE:** Make sure the bonding jumper connection is clean.
- S 434-017
- (4) Install the electrical connector.
- S 434-018
- (5) Install the coupling nut, a new O-ring, and the elbow to the switch.

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S 434-019

- (6) Connect the pressure sense line to the elbow.
 - (a) Tighten the fitting.

S 434-020

- (7) Put the cover over the switch and install the screws and washers.
 - (a) Tighten the screws.

D. Put the Airplane Back to Its Usual Condition

S 414-021

- (1) Close the E/E bay access door 119AL, (AMM 06-41-00/201).

S 864-022

- (2) Remove the DO-NOT-OPERATE tag from the EQUIP COOLING mode selector on the P5 panel.

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EQUIPMENT COOLING AIR CLEANER – MAINTENANCE PRACTICES

1. General

- A. This procedure contains four tasks:
- (1) The first task has instructions to remove the equipment cooling air cleaner.
 - (2) The second task has instructions to install the equipment cooling air cleaner.
 - (3) The third task is to test the equipment cooling air cleaner.
 - (4) The fourth task has instructions to clean the equipment cooling air cleaner.
- B. The cooling air cleaner for the E/E equipment is found below and forward of the air supply fans for the E/E equipment, just outside of the forward left corner of the forward cargo compartment.

TASK 21-58-30-002-001

2. Remove the Equipment Cooling Air Cleaner (Fig. 201)

A. References

- (1) AMM 52-33-00/201, Large Forward Cargo Door.
- (2) AMM 24-22-00/201, Electrical Power Control
- (3) AMM 25-52-01/401, Sidewall Panels

B. Access

- (1) Location Zone
121 Forward Cargo Compartment (Left)

C. Prepare for Removal

S 012-045

- (1) Open forward cargo compartment door 821 (AMM 52-33-00/201).

S 862-002

- (2) Remove electrical power (AMM 24-22-00).

S 012-004

- (3) Remove the sidewall panel that is found approximately 2 feet aft of the E/E bay on the left side of the cargo compartment (AMM 25-52-01).

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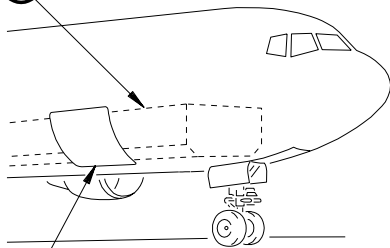
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FORWARD CARGO
COMPARTMENT

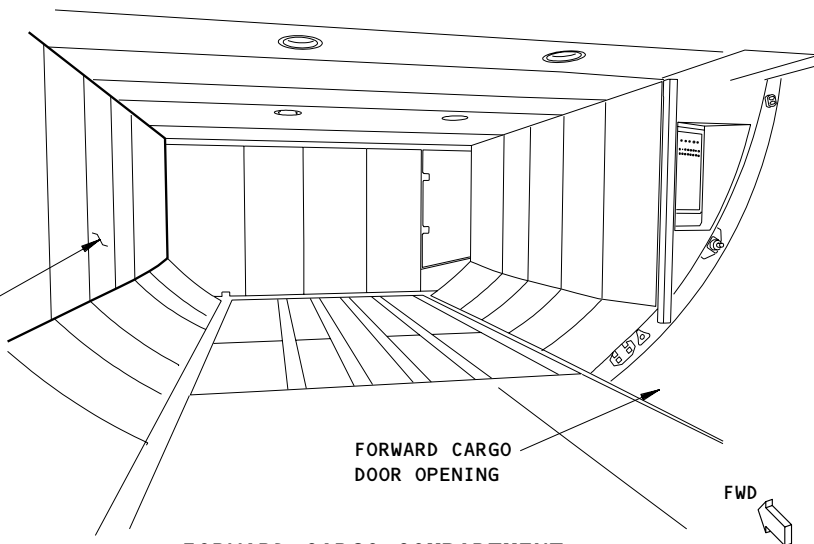
SEE (A)



FORWARD CARGO
DOOR, 821

FORWARD CARGO
COMPARTMENT
(LEFT SIDEWALL)

SEE (B)



FORWARD CARGO
DOOR OPENING

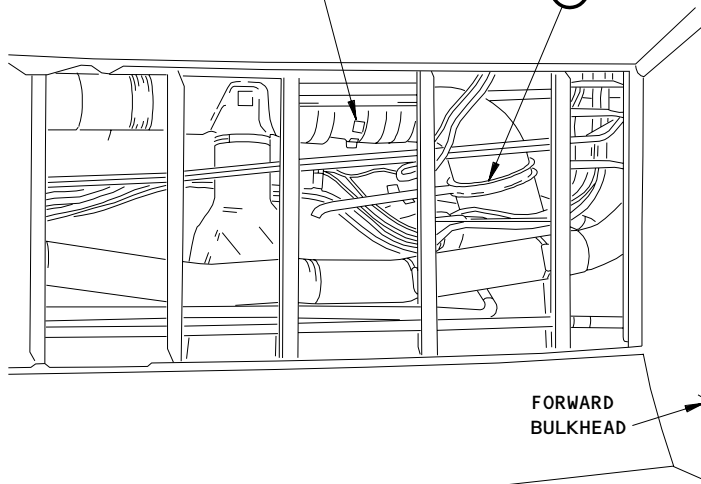
FORWARD CARGO COMPARTMENT

(A)

FORWARD RACK
SUPPLY FAN, B10

AIR CLEANER

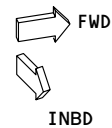
SEE (C)



FORWARD
BULKHEAD

FORWARD CARGO COMPARTMENT
(LEFT SIDEWALL)

(B)



Equipment Cooling Air Cleaner Installation
Figure 201 (Sheet 1)

EFFECTIVITY

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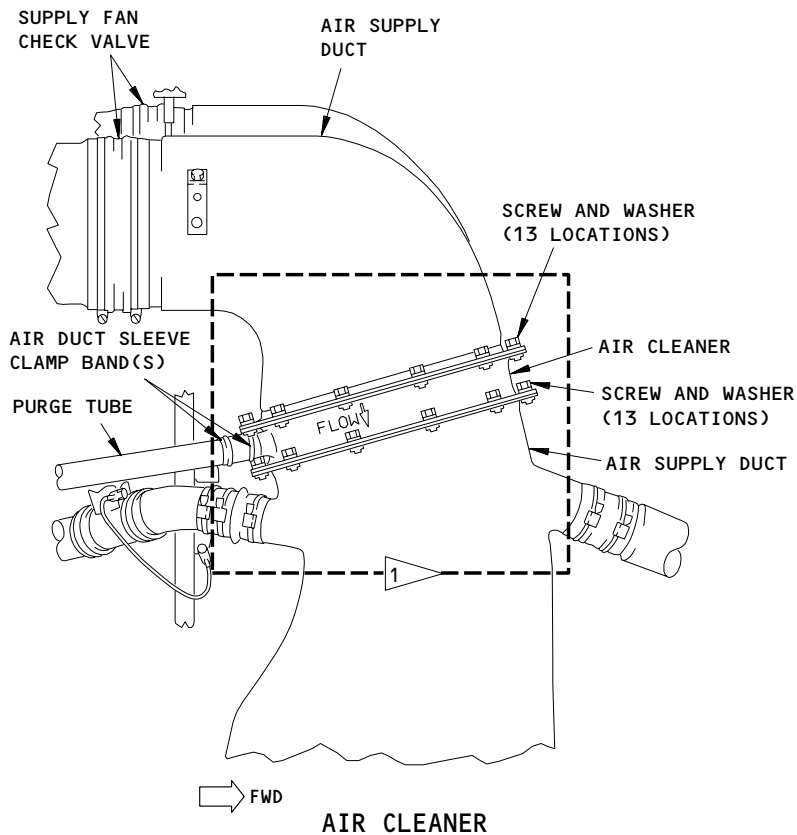
02

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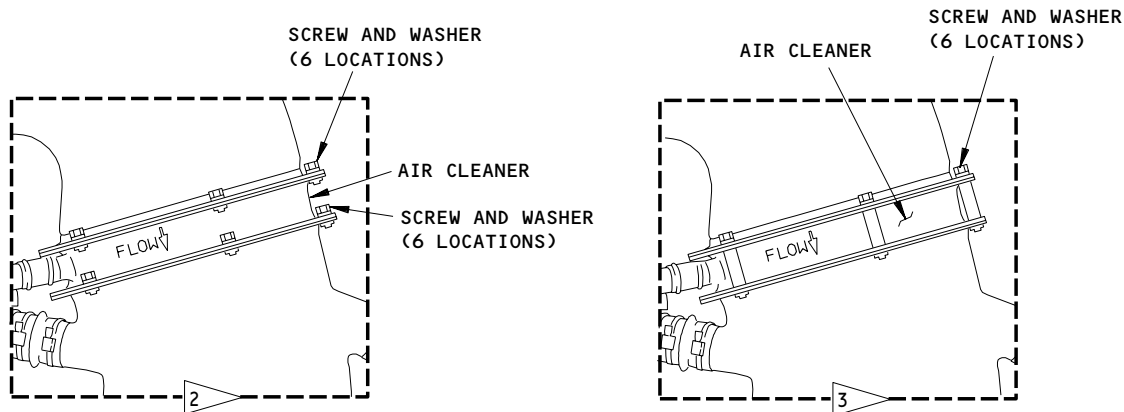
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(C)



NOTE: AIR CLEANERS CE00310-3 AND CE00310-4 ARE INTERCHANGEABLE, PROVIDED THE CORRECT INSTALLATION HARDWARE IS USED.

- 1 AIR CLEANER INSTALLATION WITH 26 FASTENER LOCATIONS (P/N CE00310-3)
- 2 AIR CLEANER INSTALLATION WITH 12 FASTENER LOCATIONS (P/N CE00310-3)
- 3 AIR CLEANER INSTALLATION WITH 6 FASTENER LOCATIONS (P/N CE00310-4)

Equipment Cooling Air Cleaner Installation
Figure 201 (Sheet 2)

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D. Remove the Air Cleaner (Fig. 201)

S 032-005

- (1) Remove the air duct sleeve that secures the purge tube to the air cleaner.

S 032-006

- (2) Remove the screws and the washers securing the air cleaner to the air supply ducts.

S 022-007

- (3) Remove the air cleaner.

S 022-008

- (4) Put a cover on all the tube and the duct openings.

NOTE: Electrical power can be supplied to the airplane while the air cleaner is removed if the ducts are taped together and the EQUIP COOLING selector on the P5 panel is selected to AUTO. However, continued operation of the equipment cooling system without the air cleaner installed could increase dirt and lint contamination of installed avionics equipment.

TASK 21-58-30-402-009

3. Install the Equipment Cooling Air Cleaner

A. References

- (1) 06-46-00/201, Entry, Service, Cargo Doors Access Doors and Panels
- (2) AMM 52-33-00/201, Large Forward Cargo Door.
- (3) AMM 24-22-00/201, Electrical Power Control
- (4) AMM 25-52-01/401, Sidewall Panels

B. Access

- (1) Location Zone
121 Forward Cargo Compartment (Left)

C. Procedure

S 212-041

- (1) Make sure the gasket(s) are not damaged or removed from the air cleaner flanges.
 - (a) If the gasket(s) are damaged or missing, replace the air cleaner or bond the gasket(s) to the air cleaner with adhesive per BAC 5010, Type 77.

S 032-010

- (2) Remove the covers from the tube and duct openings.

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S 422-011

- (3) Put the air cleaner in the air supply ducts.
(a) As an option, you can replace the CE-00310-3 air cleaner with a CE-00310-4 air cleaner, or you can replace the -4 air cleaner with a -3 air cleaner.

NOTE: The -3 air cleaner uses a 13 hole pattern with 26 short screws (p/n NAS1801-3-13), while the -4 air cleaner uses a 6 hole pattern with 12 longer screws (p/n NAS6603-46).

To install a -3 air cleaner in the place where a -4 air cleaner was installed, you will need to get 12 short screws (p/n NAS1801-3-13) to replace the longer screws used with the -4 air cleaner. The longer screws from the -4 air cleaner cannot be used with a -3 air cleaner. Install the -3 air cleaner with 6 short screws in the upper flange of the air cleaner and the remaining 6 short screws in the lower flange (refer to Fig. 201).

To install a -4 air cleaner in the place where a -3 air cleaner was installed, you will need to get 6 long screws (p/n NAS6603-46) to replace the shorter screws used with the -3 air cleaner. The shorter screws from the -3 air cleaner cannot be used a -4 air cleaner. Install the -4 air cleaner with the 6 long screws (refer to Fig. 201).

S 422-038

- (4) Attach the air cleaner to the ducts with the screws and the washers.
(a) Tighten the screws, in a diagonal pattern, 25 to 35 inch-pounds.

S 432-012

- (5) Attach the purge tube to the air cleaner with the air duct sleeve and the two clamp bands.

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D. Air Cleaner Post-Installation Test.

S 862-014

- (1) Supply electrical power (AMM 24-22-00).

S 862-015

- (2) Make sure these circuit breakers on the main power distribution panel, P6, are closed:
- (a) 6H18, EQUIP COOL SUPPLY FAN 1
 - (b) 6H21, FWD EXH EQUIP COOL FAN

S 862-016

- (3) Make sure these circuit breakers on the overhead panel P11 are closed:
- (a) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
 - (b) 11P22, EQUIPMENT COOLING EXH FAN FWD

S 862-017

- (4) Put the EQUIP COOLING mode selector switch on the P5 panel to AUTO.

S 782-039

- (5) Do a check for air leakage around the air cleaner flanges and at the sleeve on the purge tube:
- (a) Hold your hand about 6-inches away from the air cleaner flanges and the sleeve on the purge tube to feel for air leakage.
 - (b) If you can feel air leakage, do these steps:
 - 1) Make sure the gaskets on the air cleaner are not damaged or missing. If the gasket(s) are damaged or missing, replace the air cleaner or bond the gasket(s) to the air cleaner with adhesive per BAC 5010, Type 77.
 - 2) Make sure the fasteners on the air cleaner are tightened 25 to 35 inch-pounds.
 - 3) Make sure the air cleaner flanges are not bent.
 - 4) Tighten the clamps on the sleeve.

E. Put the Airplane Back to Its Usual Condition.

S 412-020

- (1) Install the sidewall panel (AMM 25-52-01).

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- S 412-048
- (2) Close forward cargo compartment door 821 (AMM 52-33-00/201).
- S 862-022
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-58-30-102-023

4. Clean the Equipment Cooling Air Cleaner (Fig. 201)

A. General

- (1) Two methods are given to clean the air cleaner:
 - (a) The first method removes most of the loose dirt and other unwanted materials.
 - (b) The second method cleans the air cleaner fully, but special equipment and material are necessary.

B. Equipment

- (1) Vacuum cleaner - commercially available
- (2) Dryer - Oven, capable of 140° F (60° C)
(for method 2)
- (3) Bath - Parts, sufficient in size to soak the air cleaner, and capable of 130° F (54° C)
(for method 2)

C. Consumable Materials

- (1) Use one of these:
 - (a) B00615, Degreaser - Solvent Emulsion, NEUGENIC 4177 (method 2)
 - (b) Dishwashing Soap, Commercially Available

D. Clean the air cleaner (method 1).

S 022-024

- (1) Remove the air cleaner.

S 162-025

- (2) Use the vacuum cleaner or use compressed air to remove unwanted material from the swirl devices and plenum.

S 162-026

- (3) Wash all of the surfaces of the air cleaner with the soap and water.

S 172-027

- (4) Flush the air cleaner with water.

S 162-028

- (5) Dry the air cleaner fully with compressed air until you can not see any water.

S 422-040

- (6) Install the Equipment Cooling Air Cleaner.

E. Clean the air cleaner (method 2).

S 022-029

- (1) Remove the air cleaner.

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- S 162-030
- (2) Use the vacuum cleaner or use compressed air to remove unwanted material from the swirl devices and the plenum.
- S 162-031
- (3) Soak the air cleaner in the cleaning solution, at 130° F (54° C) for one hour.
- S 172-032
- (4) Shake and flush the air cleaner in the cleaning solution bath.
(a) Use a brush to loosen and remove remaining unwanted material.
- S 172-033
- (5) Use pressurized water to remove remaining unwanted material.
- S 172-034
- (6) Flush the air cleaner with clean water.
- S 162-035
- (7) Dry the air cleaner with compressed air.
- S 162-036
- (8) Dry the air cleaner in an oven for one hour at 140° F (60° C).
- S 422-039
- (9) Install the Equipment Cooling Air Cleaner.

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E/E COOLING MONITOR INDICATOR – MAINTENANCE PRACTICES

1. General

- A. This procedure gives the instructions to remove, install, clean, and do a check of the Monitor Indicator for the E/E Cooling.

TASK 21-58-34-002-001

2. Remove the Monitor Indicator for the E/E Cooling Air

A. References

- (1) AMM 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zone
212 Control Cabin – Section 41 (Right)

C. Prepare for Removal

S 862-002

- (1) Open these circuit breakers on the overhead panel P11 and attach DO-NOT-CLOSE tags:
(a) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
(b) 11P14, EQUIPMENT COOLING CONT
(c) 11P20, EQUIPMENT COOLING SUPPLY FAN 2
(d) 11P22, EQUIPMENT COOLING EXH FAN FWD

D. Remove the Indicator (Fig. 201)

S 032-003

- (1) Loosen the 1/4-turn screws on the monitor and carefully move the indicator inboard.

S 022-004

- (2) Put the identifier tags on the inlet tubes.

S 022-005

- (3) Put tape on the inlet tubes to the side of the P61 panel.

S 032-006

- (4) Loosen the clamps on the inlet tubes and remove the tubes from the indicator.

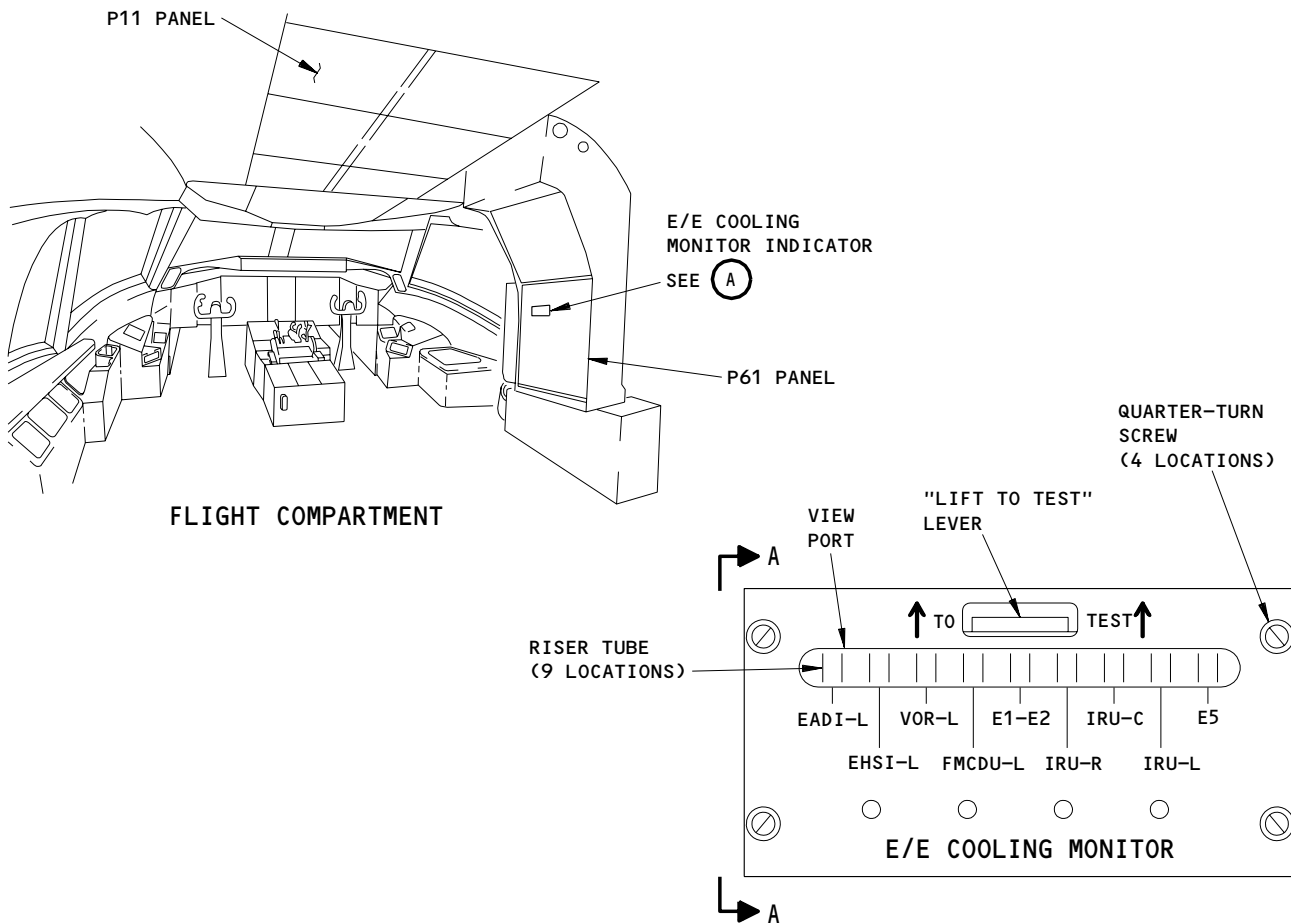
S 022-007

- (5) Put a cover on the inlet tube openings to prevent unwanted material from entering.

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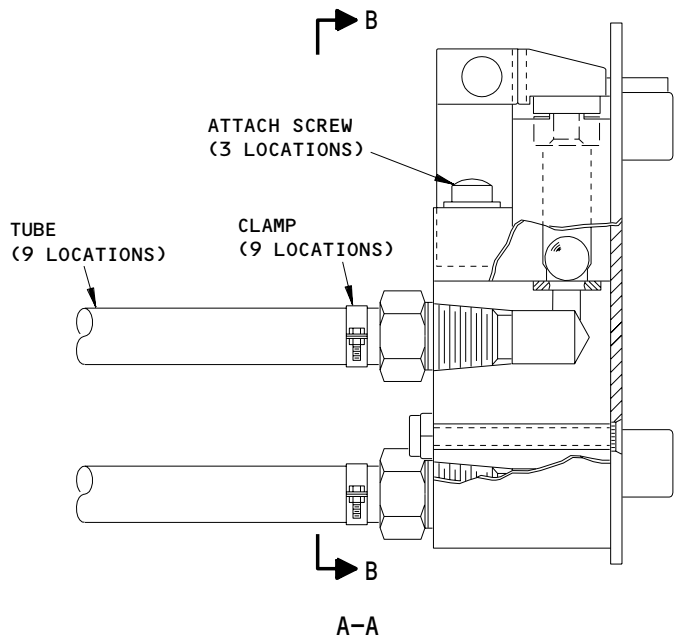
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E/E COOLING MONITOR INDICATOR

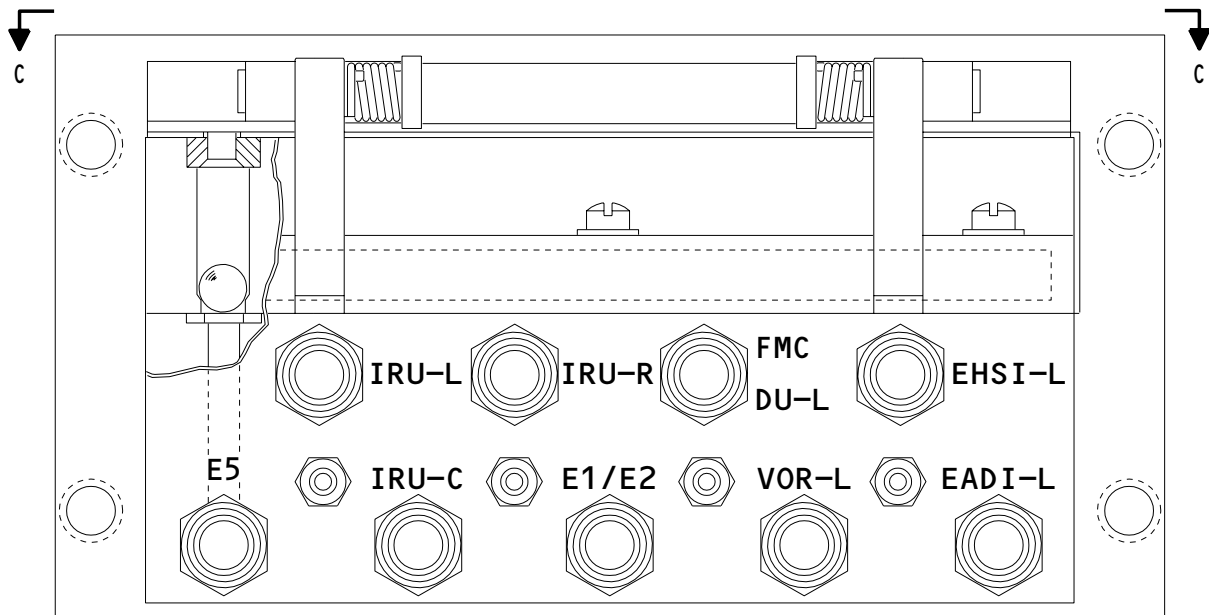
(A)



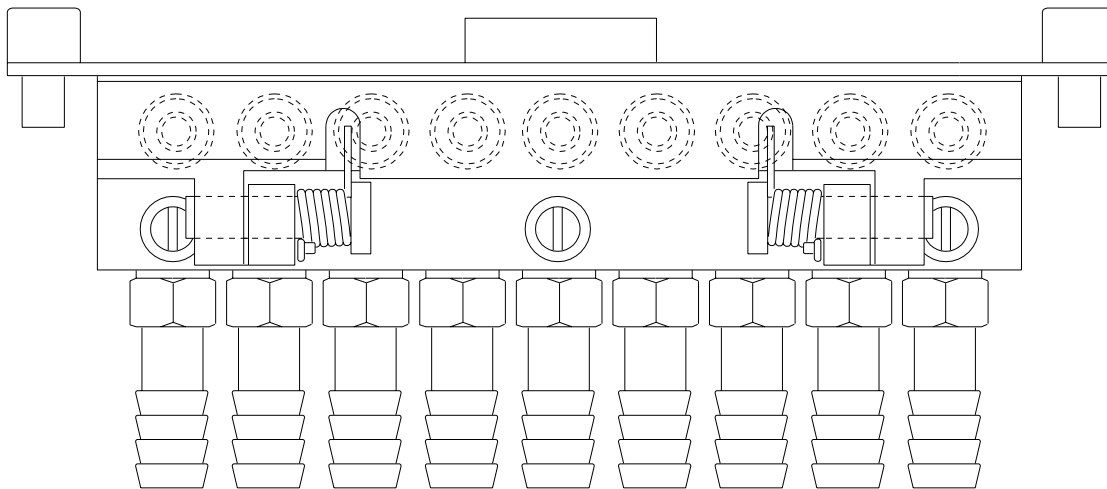
E/E Cooling Monitor Indicator Installation
Figure 201 (Sheet 1)

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B-B



C-C

E/E Cooling Monitor Indicator Installation
Figure 201 (Sheet 2)

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S 862-008

- (6) If there is electrical power on the airplane, close the equipment cooling circuit breakers that were opened before.

NOTE: This is necessary to supply cold air to the equipment as you remove the indicator.

TASK 21-58-34-402-009

3. Install the Monitor Indicator for the E/E Cooling Air

A. References

- (1) AMM 24-22-00/201, Electrical Power Control

B. Access

- (1) Location Zone
Control Cabin - Section 41 (Right)

C. Install the Indicator (Fig. 201)

S 422-011

- (1) Remove the covers from the inlet tubes.

S 432-037

CAUTION: MAKE SURE THE INLET TUBES ARE INSTALLED AT THE CORRECT LOCATION. IF THE INLET TUBES ARE INSTALLED IN THE INCORRECT LOCATION THE MONITOR WILL NOT OPERATE CORRECTLY.

- (2) Put the inlet tubes in the applicable nipple and tighten the clamp.

S 422-013

- (3) Remove the tape that holds the inlet tubes to the side of the P61 panel.

S 422-014

- (4) Move the indicator into the P61 panel and tighten the four 1/4-turn fasteners.

S 862-010

- (5) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead panel P11:
 - (a) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
 - (b) 11P22, EQUIPMENT COOLING EXH FAN FWD

S 722-015

- (6) Do the check of the E/E-Cooling-Monitor system.

TASK 21-58-34-102-016

4. Clean the Monitor Indicator for the E/E Cooling (Fig. 201)

A. References

- (1) AMM 24-22-00/201, Electrical Power Control

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B. Equipment

- (1) A21009-1, Blanking Plate - Equipment Cooling Monitor

C. Consumable Materials

- (1) B00309, Diluted Rubbing Alcohol (commercially available)
(2) B00058, Dishwashing Soap (commercially available)

D. Access

- (1) Location Zone
212 Control Cabin - Section 41 (Right)

E. Procedure

S 022-034

- (1) Remove the indicator.

S 032-017

- (2) Remove the attach screws and move apart the upper and the lower halves of the indicator.

S 162-018

- (3) Clean the bottom unit with a cloth and the diluted rubbing alcohol or the soap and water.

S 432-019

- (4) Install the Blanking Plate.

S 412-038

- (5) If there is electrical power on the airplane, close the equipment cooling circuit breakers that were opened before.

NOTE: This is necessary to supply cold air to the equipment as you remove the indicator.

S 162-020

- (6) Clean the top half of the indicator with a cloth and the diluted rubbing alcohol or the soap and water.

S 162-021

- (7) Let the top half of the indicator dry.

S 032-022

- (8) Remove the Equipment Cooling Monitor Blanking Plate from the bottom half of the indicator.

S 432-023

- (9) Align the top and the bottom halves of the indicator and install the attach screws.

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S 422-024

(10) Install the indicator.

TASK 21-58-34-702-025

5. Do the Check of the Monitor System for the E/E Cooling

A. References

(1) AMM 24-22-00/201, Electrical Power Control

B. Access

(1) Location Zone
212 Control Cabin - Section 41 (Right)

C. Procedure

S 862-035

(1) Supply electrical power (AMM 24-22-00/201).

S 862-036

(2) Make sure the EQUIP COOLING switch on the P5 panel is in the AUTO position.

S 862-026

(3) Make sure these circuit breakers on the main power distribution panel P6 are closed:
(a) 6H18, EQUIP COOL SUPPLY FAN 1
(b) 6H21, FWD EXH EQUIP COOL FAN

S 862-027

(4) Make sure these circuit breakers on the overhead circuit breaker panel P11 are closed:
(a) 11B8, STBY EQUIP COOL
(b) 11P11, EQUIPMENT COOLING SUPPLY FAN 1
(c) 11P13, EQUIPMENT COOLING OUTBD VALVES
(d) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND
(e) 11P22, EQUIPMENT COOLING EXH FAN FWD

S 722-028

(5) Make sure that you cannot see all nine flow balls.

S 862-029

(6) Put the LIFT TO TEST lever on the indicator to the UP position.

S 722-030

(7) Make sure that you can see all nine (9) flow balls after 15 seconds.

S 862-031

(8) Put the LIFT TO TEST lever to the down position.

S 722-032

(9) Make sure that you cannot see all nine flow balls.

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S 862-033

(10) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-58-34-702-051

6. Equipment Cooling Monitor Pressure Test (A21012 Test Gauge) (Fig. 202)

A. References

(1) AMM 24-22-00/201, Electrical Power Control

B. Equipment

(1) A21012, Test Gauge - Equipment Cooling Monitor

C. Access

(1) Location Zone

212 Control Cabin - Section 41 (Right)

D. Prepare for the Test

S 862-054

(1) Make sure these circuit breakers on the main power distribution panel P6 are closed:

(a) 6H18, EQUIP COOL SUPPLY FAN 1

(b) 6H21, FWD EXH EQUIP COOL FAN

S 862-055

(2) Make sure these circuit breakers on the overhead circuit breaker panel P11 are closed:

(a) 11B8, STBY EQUIP COOL

(b) 11P11, EQUIPMENT COOLING SUPPLY FAN 1

(c) 11P13, EQUIPMENT COOLING OUTBD VALVES

(d) 11P21, EQUIP COOL OVHT/SMOKE VALVE IND

(e) 11P22, EQUIPMENT COOLING EXH FAN FWD

S 862-068

(3) Supply electrical power (AMM 24-22-00/201).

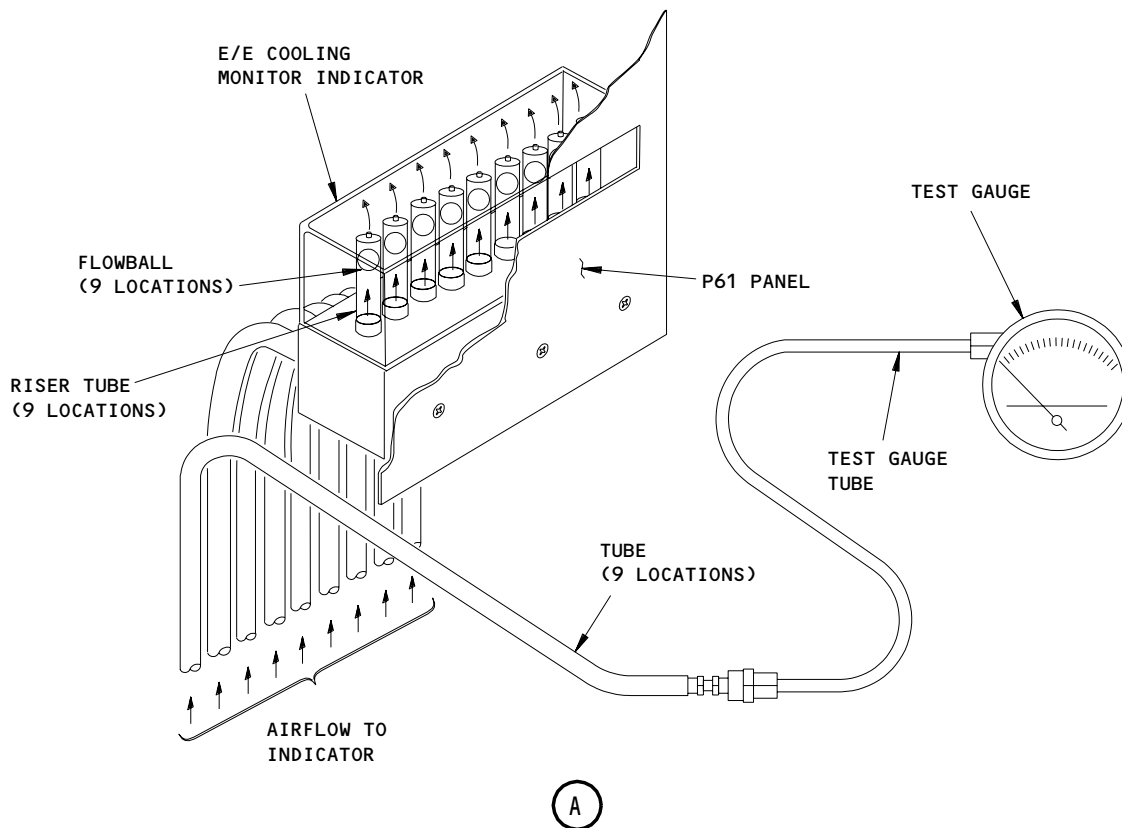
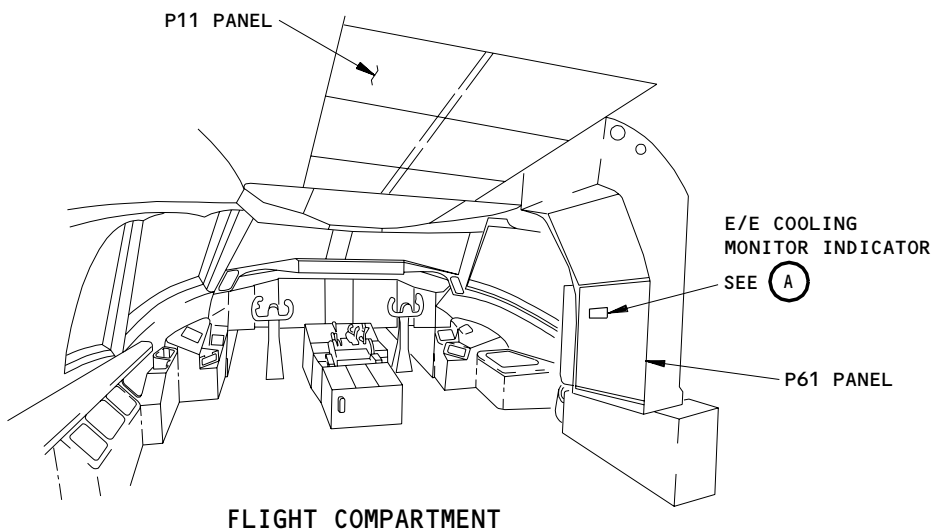
S 862-067

(4) Make sure the EQUIP COOLING switch on the P5 panel is in the AUTO position.

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E/E Cooling Monitor System Test Gauge, A21012
Figure 202

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S 022-064

- (5) Loosen the 1/4-turn screws on the indicator and carefully move the indicator inboard until you have access to the inlet tubes on the backside of the indicator.

E. Do the Pressure Test

S 022-065

- (1) Loosen the clamp at one of the inlet tubes and remove only that inlet tube from the indicator.

NOTE: Do not remove the other inlet tubes from the indicator at this time. To prevent cross-connection of an inlet tube to an incorrect nipple on the indicator, only remove and test one inlet tube at a time.

S 482-066

- (2) Attach the end of the inlet tube to the end of the test gauge tube.

S 862-085

- (3) Make sure there are no kinks in the inlet tube and test gauge tube which could cause an incorrect pressure measurement.

S 782-070

- (4) Hold the test gauge in the vertical position while you measure the pressure.
 - (a) Make sure the test gauge measures a minimum pressure of 0.8-inches of water (0.03 psi) or higher (minimum static pressure on the ground).

S 082-087

- (5) Disconnect the test gauge tube from the inlet tube.

S 082-071

- (6) Connect the inlet tube to the nipple on the indicator and tighten the clamp.

S 772-072

- (7) Do the above steps again for each inlet tube on the backside of the indicator.

F. Put the Airplane Back to It's Usual Condition

S 422-073

- (1) Carefully put the indicator into the P61 panel and tighten the 1/4-turn screws.

S 862-061

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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FAULT ISOLATION/MAINT MANUAL

TEMPERATURE CONTROL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
BULB - COMPARTMENT TEMPERATURE				21-65-03
AFT, TS183	5	1	PASSENGER COMPT CEILING	
FWD, TS182	5	1	PASSENGER COMPT CEILING	
FWD CARGO, TS497	9	1	FWD CARGO DOOR, 821	
MID, TS375	5	1	PASSENGER COMPT CEILING	
BULB - DUCT TEMPERATURE				21-65-04
AFT, TS186	4	1	PASS COMPT SCULPTURED CEILING PANEL	
AUX FWD, TS471	3	1	PASS COMPT SCULPTURED CEILING PANEL	
AUX MID, TS472	4	1	PASS COMPT SCULPTURED CEILING PANEL	
FLT COMPT, TS184	3	1	119AL, MAIN EQUIP CTR	
FWD, TS185	4	1	PASS COMPT SCULPTURED CEILING PANEL	
MID, TS376	4	1	PASS COMPT SCULPTURED CEILING PANEL	
CIRCUIT BREAKERS	1		FLT COMPT, P11	*
AUX ZONE CNTLR, C668		1	11R11	*
FWD CARGO DUCT OVHT, C4025		1	11N22	*
FWD CARGO TEMP CONT VLV CLOSE, C4180		1	11N21	*
TRIM AIR, C670		1	11C33	*
ZONE CNTLR, C667		1	11R15	*
ZONE DUCT OVHT AFT, C4031		1	11R27	*
ZONE DUCT OVHT AUX FWD, C4026		1	11H5	*
ZONE DUCT OVHT AUX MID, C4027		1	11H6	*
ZONE DUCT OVHT FLT DK, C4029		1	11R24	*
ZONE DUCT OVHT FWD, C4030		1	11R25	*
ZONE DUCT OVHT MID, C4028		1	11R26	*
ZONE TEMP CONT MAN FLT DK, C4184		1	11P24	*
ZONE TEMP CONT VLV CLOSE AFT, C4186		1	11P27	*
ZONE TEMP CONT VLV CLOSE AUX FWD, C4181		1	11H2	*
ZONE TEMP CONT VLV CLOSE AUX MID, C4182		1	11H3	*
ZONE TEMP CONT VLV CLOSE FWD, C4185		1	11P25	*
ZONE TEMP CONT VLV CLOSE MID, C4183		1	11P26	*
ZONE TEMP IND, C4019		1	11R16	*
CIRCUIT BREAKERS			119AL, MAIN EQUIP CENTER, P36	
AFT LH CBN CREW REST AREA HEAT, C403 2		1	36B4	*
AFT LH CBN CREW REST AREA TEMP CONT, C919 2		1	36D6	*
FLT DK CREW REST AREA HEAT, C400 2		1	36C4	
FLT DK CREW REST AREA TEMP CONT, C916 2		1	36D3	
CIRCUIT BREAKERS			119AL, MAIN EQUIP CENTER, P37	
AFT RH CBN CREW REST AREA HEAT, C404 2		1	37B6	*
AFT RH CBN CREW REST AREA TEMP CONT, C920 2		1	37H5	*
FWD CBN CREW REST AREA HEAT, C402 2		1	37B4	
FWD CBN CREW REST AREA TEMP CONT, C918 2		1	37H4	

* SEE THE WDM EQUIPMENT LIST

- 1 767-300 AIRPLANES
- 2 ALL SAS AIRPLANES

Temperature Control - Component Index
Figure 101 (Sheet 1)

EFFECTIVITY

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FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
COMPUTERS - (31-41-00/101) L EICAS, M10181 R EICAS, M10182				
CONTROLLERS - (21-51-00/101) L PACK TEMPERATURE, M126 R PACK TEMPERATURE, M127				
CONTROLLER - (49-61-00/101) AUX POWER, M206				
CONTROLLER - AUX ZONE TEMPERATURE, M1609	2	1	119AL, MAIN EQUIP CTR	21-61-12
CONTROLLERS - CREW REST TEMPERATURE	2			
AFT LH CABIN, M1771	11	1	AFT PASS. COMPT CEILING	21-66-01
AFT RH CABIN, M1772	11	1	AFT PASS. COMPT CEILING	21-66-01
FLT DECK, M1769	11	1	FWD PASS. COMPT CEILING	21-66-01
FWD CABIN, M1770	11	1	FWD PASS. COMPT CEILING	21-66-01
CONTROLLER - ZONE TEMPERATURE, M195	1	1	119AL, MAIN EQUIP CTR	21-61-03
DIODES -			119AL, MAIN EQUIP CTR, P37	
AFT ZONE INOP, R212		1		
AUX FWD ZONE INOP, R630		1		
AUX MID ZONE INOP, R633		1		
FLT DK CREW REST AREA, R273		1		
FWD ZONE INOP, R211		1		
FWD CARGO ZONE INOP, R638		1		
MID ZONE INOP, R250		1		
32K ALT SUPPRESSOR, R447,R446		1		
FILTER - ZONE TEMPERATURE SENSOR	3	4	LEFT SIDE FLT COMPT CEILING PANEL AND PASS COMPT CEILING	21-61-09
HEATER - AFT LH CREW REST, B429	10	1	AFT PASS. COMPT CEILING	21-66-01
HEATER - AFT RH CREW REST, B430	10	1	AFT PASS. COMPT CEILING	21-66-01
HEATER - FLT DK CREW REST, B427	10	1	FWD PASS. COMPT CEILING	21-66-01
HEATER - FWD CBN CREW REST, B428	10	1	FWD PASS. COMPT CEILING	21-66-01
INDICATOR - COMPARTMENT TEMPERATURE, M10078	1	1	FLT COMPT, P5	21-65-01
INDICATOR - VALVE POSITION, YBFN1	1	1	FLT COMPT, P5, AIR COND CONT PNL	21-64-01
LIGHTS -				
AFT ZONE INOP, YBFL3	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	*
FLT DECK INOP, YBFL1	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	*
FWD CARGO A/C FAULT, YIHL1	2	1	FLT COMPT, P5, FWD CARGO A/C CONT PANEL, M1619	*
FWD ZONE INOP, YBFL2	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	*
MID ZONE INOP, YBFL4	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	*
MUFFLER - TRIM AIR	1	6	193FL, LEFT ECS BAY	21-61-11
PANEL - AIR CONDITIONING CONTROL, M14	1	1	FLT COMPT, P5	*
PANEL - (31-41-00/101) EICAS MAINTENANCE, M10372				
PANEL - FWD CARGO A/C CONTROL, M1619	2	1	FLT COMPT, P5	*
RELAYS - (31-01-36/101) AIR/GROUND SYS 1, K141 AIR/GROUND SYS 1, K1219 CARGO AIR COND STATUS, K2058				

* SEE THE WDM EQUIPMENT LIST

Temperature Control - Component Index
Figure 101 (Sheet 2)

EFFECTIVITY

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FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
RELAYS -			119AL, MAIN EQUIP CTR, P37	
AFT ZONE AUTO/OFF, K10313		1		
AFT ZONE DUCT OVHT, K240		1		
AFT ZONE INOP, K10364		1		
AUX FWD ZONE AUTO/OFF, K2060		1		
AUX FWD ZONE DUCT OVHT, K2059		1		
AUX FWD ZONE INOP, K2061		1		
AUX MID ZONE AUTO/OFF, K2063		1		
AUX MID ZONE DUCT OVHT, K2062		1		
AUX MID ZONE INOP, K2064		1		
FLT COMPT ZONE DUCT OVHT, K238		1		
FWD CARGO AUTO/OFF, K1221		1		
FWD CARGO DUCT OVHT, K1222		1		
FWD CARGO INOP, K1217		1		
32K ALT, K2123		1		
FWD ZONE AUTO/OFF, K10312		1		
FWD ZONE DUCT OVHT, K239		1		
FWD ZONE INOP, K10363		1		
MID ZONE AUTO/OFF, K831		1		
MID ZONE DUCT OVHT, K833		1		
MID ZONE INOP, K832		1		
RESISTORS - FWD CARGO TEMPERATURE				
CARGO DUCT TEMP, R656		1		
L PACK TEMP, R657		1		
SELECTORS - ZONE TEMPERATURE				21-61-04
AFT, YBFR517	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	
AUX FWD, YBFR516	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	
AUX MID, YBFR571	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	
FLT COMPT, YBFR515	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	
FWD CARGO, R634	2		FLT COMPT, P5, FWD CARGO A/C CONT PANEL, M1619	
SELECTORS - CREW REST TEMPERATURE				
AFT LH CABIN, M1766	11	1	AFT LH CREW REST AREA	21-66-02
AFT RH CABIN, M1767	11	1	AFT RH CREW REST AREA	21-66-02
FLT DECK, M1764	11	1	FLT DK CREW REST AREA	21-66-02
FWD CABIN, M1768	11	1	FWD CREW REST AREA	21-66-02
SENSORS - CREW DUCT TEMPERATURE				
AFT LH CREW REST, TS517	12	1	AFT PASS. COMPT CEILING	21-66-03
AFT RH CREW REST, TS519	12	1	AFT PASS. COMPT CEILING	21-66-03
FLT DK CREW REST, TS516	12	1	FWD PASS. COMPT CEILING	21-66-03
FWD CREW REST, TS521	12	1	FWD PASS. COMPT CEILING	21-66-03

Temperature Control - Component Index
Figure 101 (Sheet 3)

EFFECTIVITY

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FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
SENSOR - CREW REST ZONE TEMPERATURE 2				
AFT LH CREW REST, TS518	12	1	AFT LH CREW REST AREA	21-66-04
AFT RH CREW REST, TS520	12	1	AFT RH CREW REST AREA	21-66-04
FLT DK CREW REST, TS515	12	1	FLT DK CREW REST AREA	21-66-04
FWD CREW REST, TS522	12	1	FWD CREW REST AREA	21-66-04
SENSOR - DUCT AIR TEMPERATURE AFT, TS179	4	1	PASSENGER COMPT SCULPTURED CEILING PANEL	21-61-02
AUX FWD, TS468	3	1	PASSENGER COMPT SCULPTURED CEILING PANEL	
AUX MID, TS476	4	1	PASSENGER COMPT SCULPTURED CEILING PANEL	
FLT COMPT, TS175	3	1	119AL, MAIN EQUIP CTR	
FWD, TS177	4	1	PASSENGER COMPT SCULPTURED CEILING PANEL	
FWD CARGO, TS495	9	1	FORWARD CARGO DOOR, 821	
MID, TS372	4	1	PASSENGER COMPT SCULPTURED CEILING PANEL	
SENSOR - DUCT AIR (MIX MANIFOLD) TEMPERATURE, TS200, TS201	6	2	821, FWD CARGO, MIX BAY MANIFOLD	21-61-02
SENSOR - SKIN TEMPERATURE, TS523 2	11	1	821, FWD CARGO COMPT	21-66-05
SENSOR - ZONE TEMPERATURE				21-61-08
AFT CABIN, TS180	6	1	PASSENGER COMPT CEILING	
AUX FWD CABIN, TS469	6	1	PASSENGER COMPT CEILING	
AUX MID CABIN, TS470	6	1	PASSENGER COMPT CEILING	
FLT COMPT, TS176	5	1	LEFT SIDE FLT COMPT CEILING PANEL	
FWD CABIN, TS178	6	1	PASSENGER COMPT CEILING	
FWD CARGO, TS496	9	1	FORWARD CARGO DOOR, 821	
MID CABIN, TS373	6	1	PASSENGER COMPT CEILING	
SWITCH - ZONE DUCT OVERHEAT AFT CABIN, S23	4	1	PASSENGER COMPT SCULPTURED CEILING PANEL	21-61-01
AUX FWD CABIN, S791	3	1	PASSENGER COMPT SCULPTURED CEILING PANEL	
AUX MID CABIN, S792	4	1	PASSENGER COMPT SCULPTURED CEILING PANEL	
FLT COMPT, S21	3	1	119AL, MAIN EQUIP CTR	
FWD CABIN, S22	4	1	PASSENGER COMPT SCULPTURED CEILING PANEL	
FWD CARGO COMPT, S793	9	1	FORWARD CARGO DOOR, 821	
MID CABIN, S635	4	1	PASSENGER COMPT SCULPTURED CEILING PANEL	
SWITCH/LIGHT - FWD CARGO A/C, YIHS1	2	1	FLT COMPT, P5, FWD CARGO A/C CONT PANEL, M1619	*
SWITCH/LIGHT - TRIM AIR, YBFS1	1	1	FLT COMPT, P5, AIR COND CONT PANEL, M14	*

SEE THE WDM EQUIPMENT LIST

Temperature Control - Component Index
Figure 101 (Sheet 4)

EFFECTIVITY

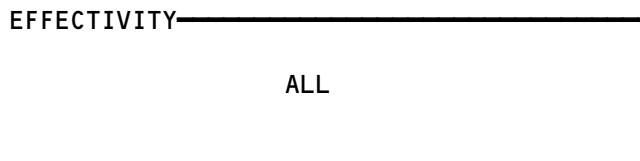
ALL

21-60-00


BOEING
 767
 FAULT ISOLATION/MAINT MANUAL

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	REFERENCE
UNIT - (REF 31-31-00, FIG. 101) DIGITAL FLIGHT DATA ACQUISITION, M138				
VALVE - DUAL MODULATING, V163	11	1	FWD PASS COMPT CEILING	21-66-06 21-61-07
VALVE - TRIM AIR MODULATING				
AFT CABIN ZONE, V3	8	1	193FL, LEFT ECS BAY	
AUX FWD CABIN ZONE, V152	8	1	193FL, LEFT ECS BAY	
AUX MID CABIN ZONE, V153	8	1	193FL, LEFT ECS BAY	
FLT COMPT ZONE, V1	8	1	193FL, LEFT ECS BAY	
FWD CABIN ZONE, V2	8	1	193FL, LEFT ECS BAY	
FWD CARGO ZONE, V385	10	1	821, FWD CARGO, MIX BAY	
MID CABIN ZONE, V145	8	1	193FL, LEFT ECS BAY	
VALVE - TRIM AIR PRESSURE REGULATING, V4	8	1	193NL, LEFT ECS BAY	21-61-06
VALVE - TRIM AIR SUPPLY CHECK	8	2	193NL, LEFT ECS BAY	21-61-05

Temperature Control - Component Index
Figure 101 (Sheet 5)



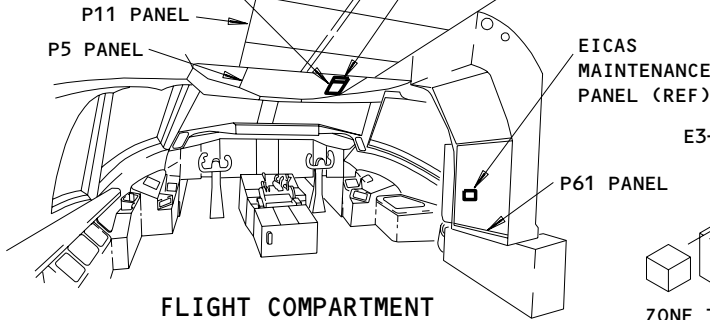
21-60-00

BOEING

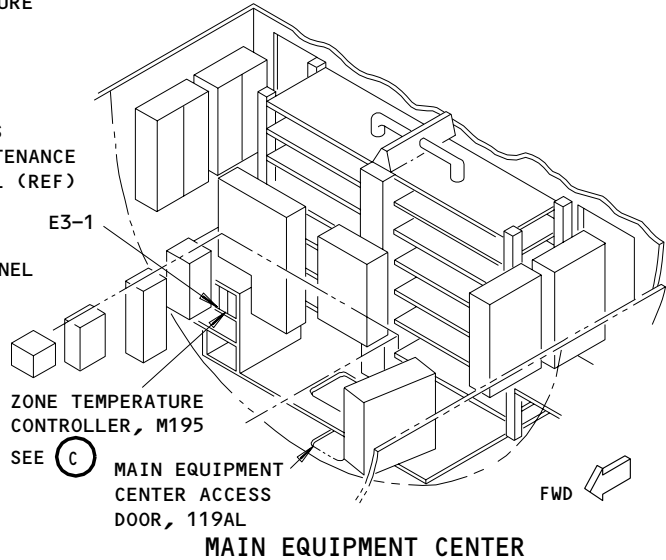
767 FAULT ISOLATION/MAINT MANUAL

AIR CONDITIONING CONTROL PANEL, M14
SEE (B)

COMPARTMENT TEMPERATURE INDICATOR, M10078
SEE (A)



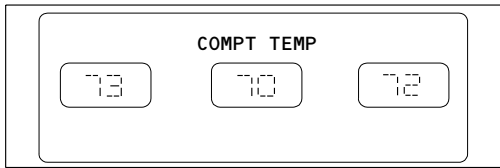
FLIGHT COMPARTMENT



ZONE TEMPERATURE CONTROLLER, M195
SEE (C)

MAIN EQUIPMENT CENTER ACCESS DOOR, 119AL

MAIN EQUIPMENT CENTER

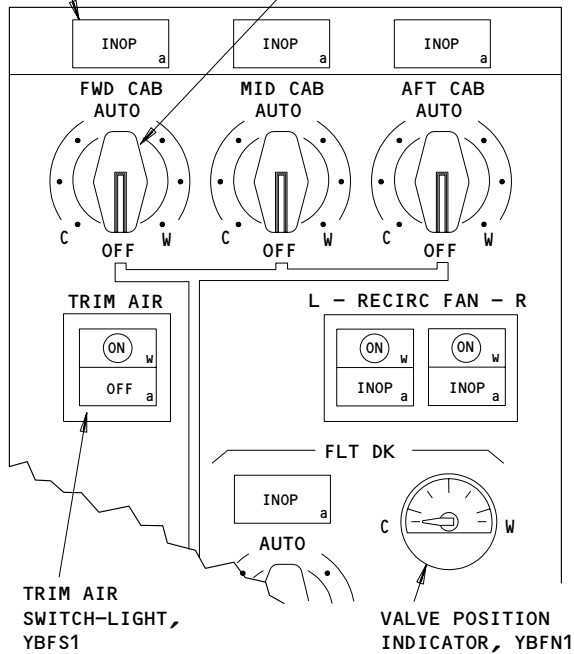


COMPARTMENT TEMPERATURE INDICATOR, M10078

(A)

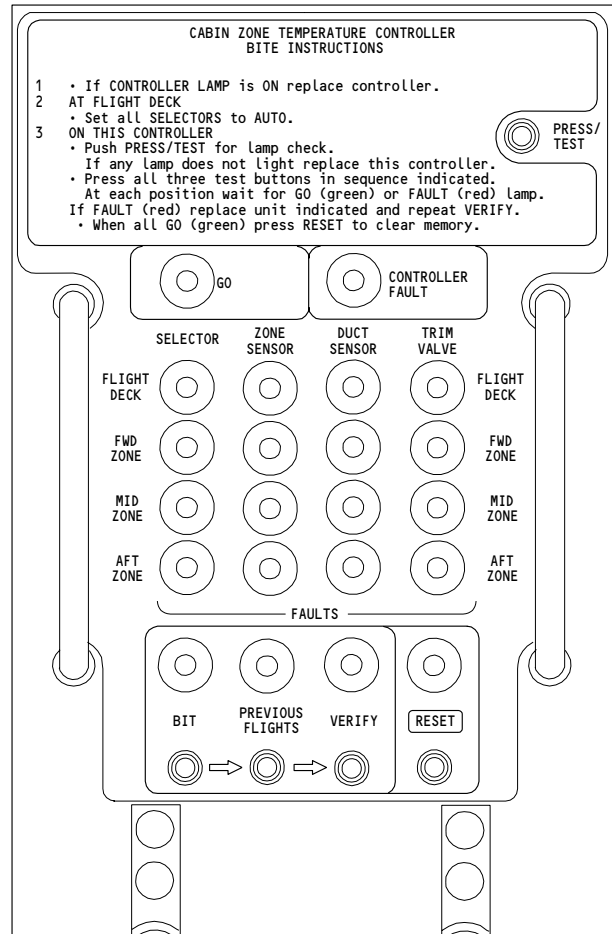
ZONE INOP LIGHT, YBFL1, YBFL2, YBFL3, YBFL4 (4 LOCATIONS)

ZONE TEMPERATURE SELECTOR, YBFR515, YBFR516, YBFR517, YBFR571 (4 LOCATIONS)



AIR CONDITIONING CONTROL PANEL, M14

(B)



ZONE TEMPERATURE CONTROLLER, M195

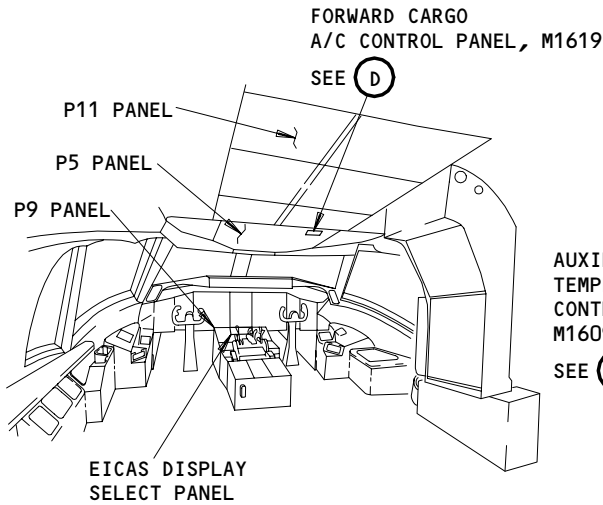
(C)

Component Location
Figure 102 (Sheet 1)

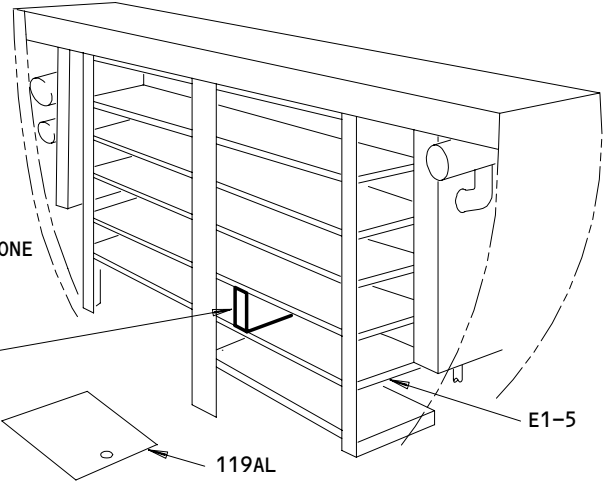
EFFECTIVITY

ALL

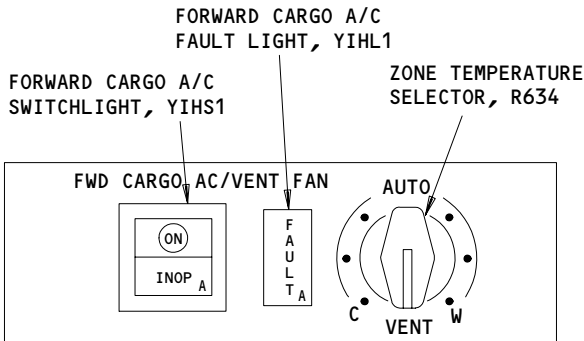
21-60-00



FLIGHT COMPARTMENT

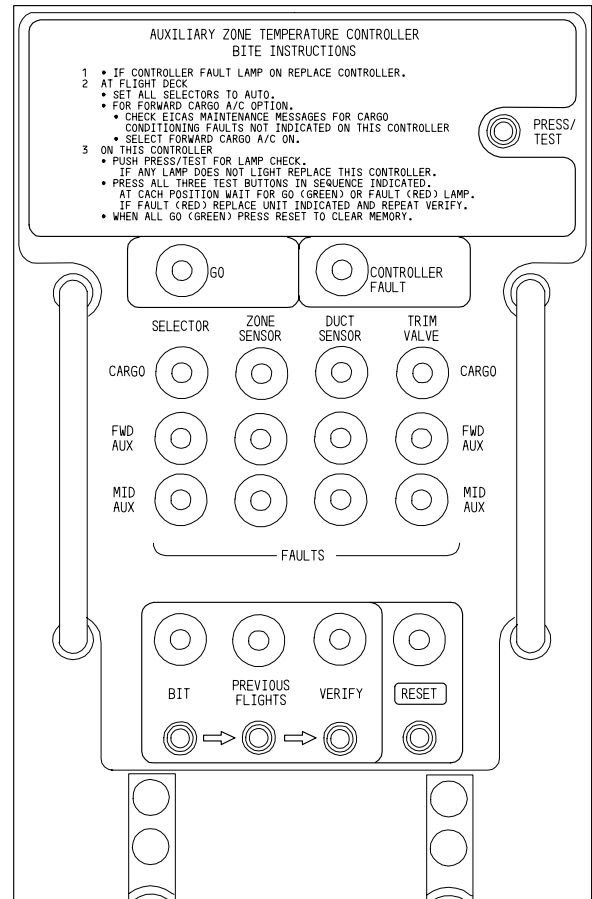


MAIN EQUIPMENT CENTER



FORWARD CARGO A/C CONTROL PANEL, M1619

(D)



AUXILIARY ZONE TEMPERATURE CONTROLLER, M1609

(E)

Temperature Control - Component Location
Figure 102 (Sheet 2)

EFFECTIVITY

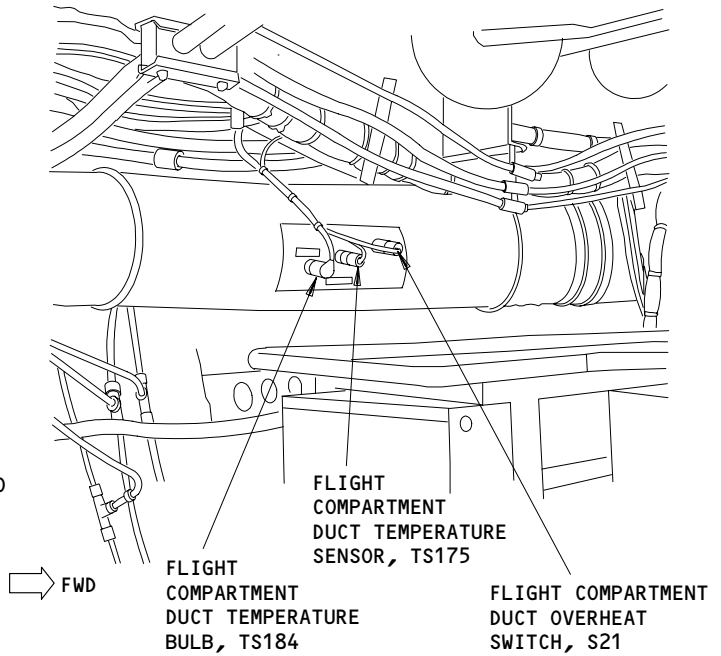
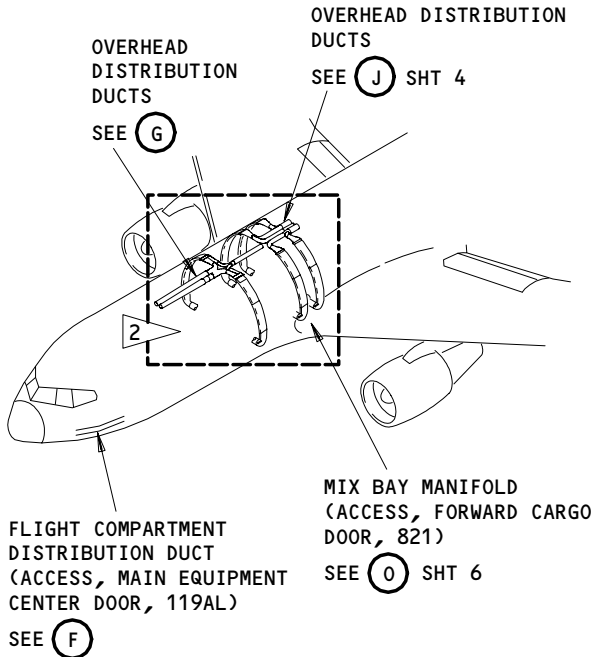
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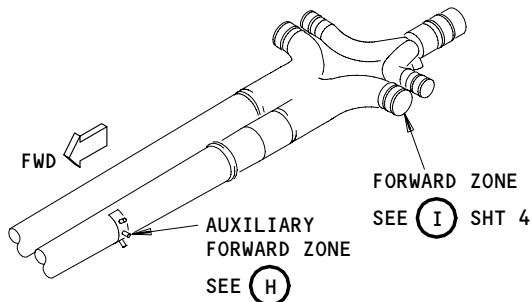
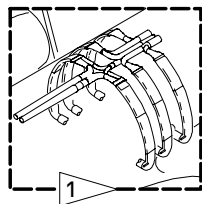
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FAULT ISOLATION/MAINT MANUAL

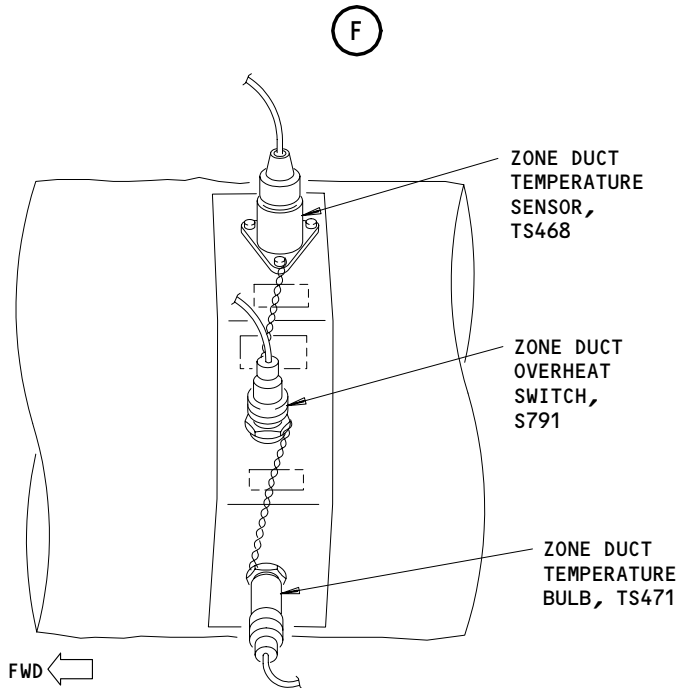


FLIGHT COMPARTMENT DISTRIBUTION DUCT



OVERHEAD DISTRIBUTION DUCT

(G)



AUXILIARY FORWARD ZONE DUCT SENSORS

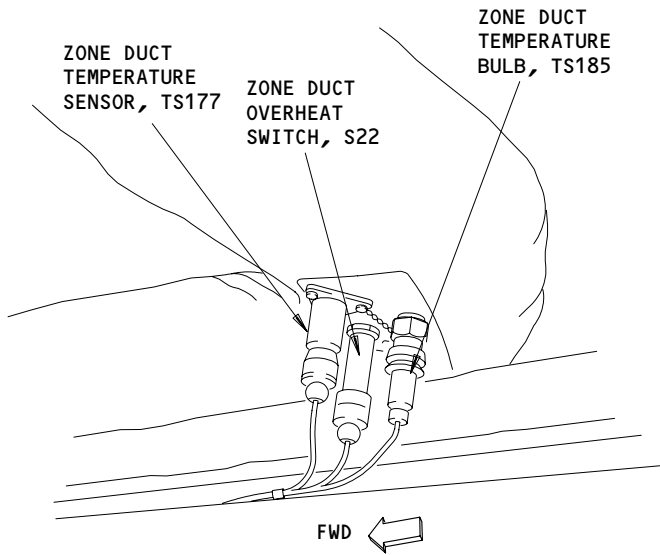
(H)

- 1 767-200 AIRPLANES
- 2 767-300 AIRPLANES

Temperature Control - Component Location
Figure 102 (Sheet 3)

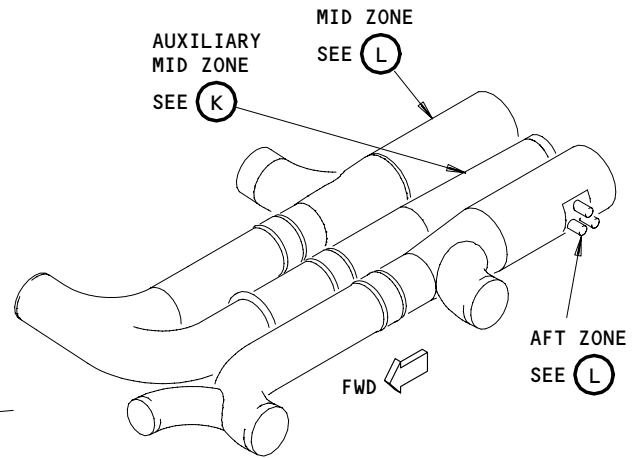
EFFECTIVITY	
	ALL

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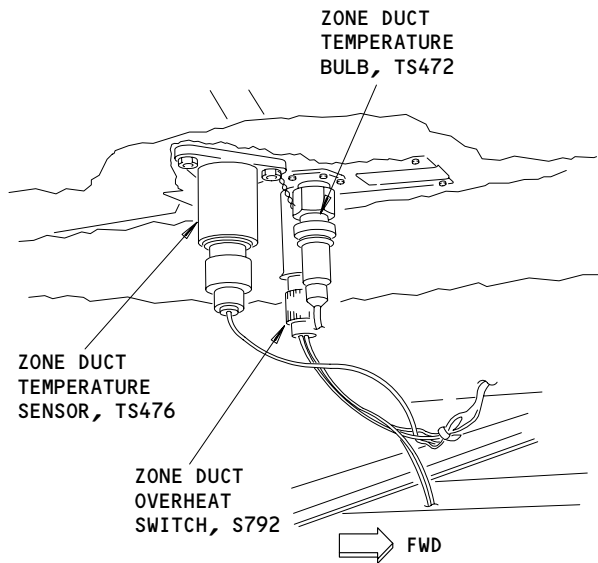
FORWARD ZONE DUCT SENSORS

I FROM SHT 3



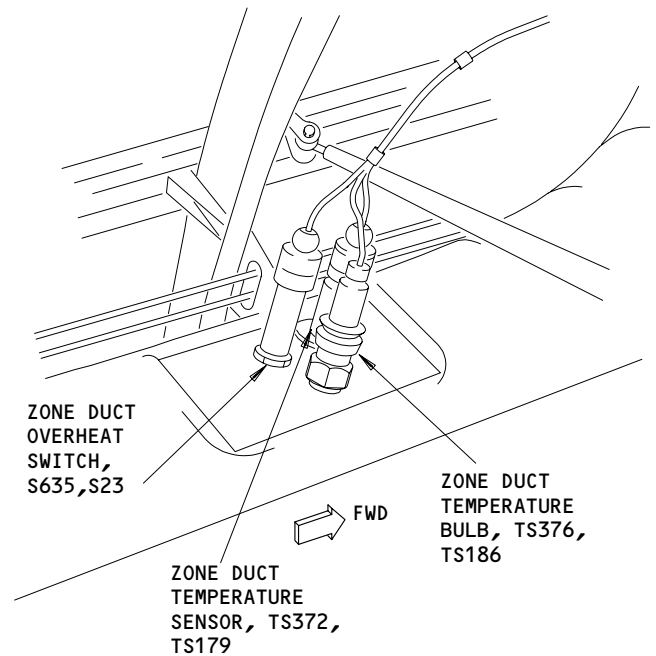
OVERHEAD DISTRIBUTION DUCT

J



AUXILIARY MID ZONE DUCT SENSORS

K



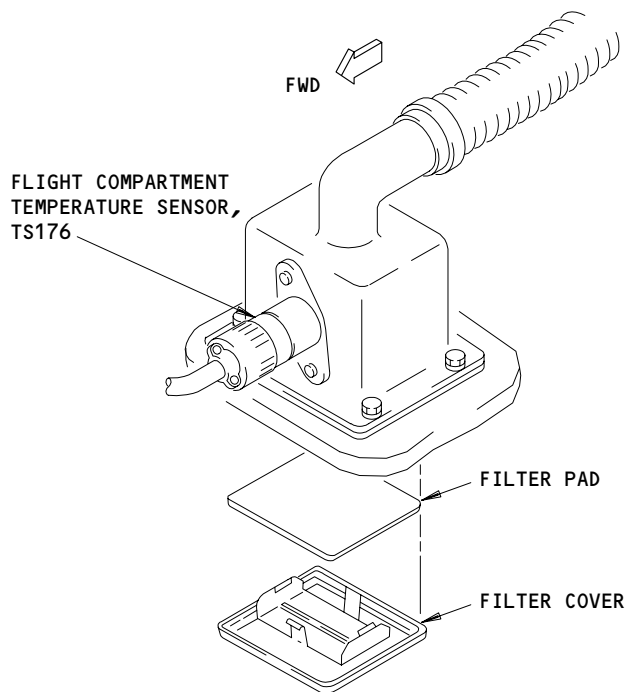
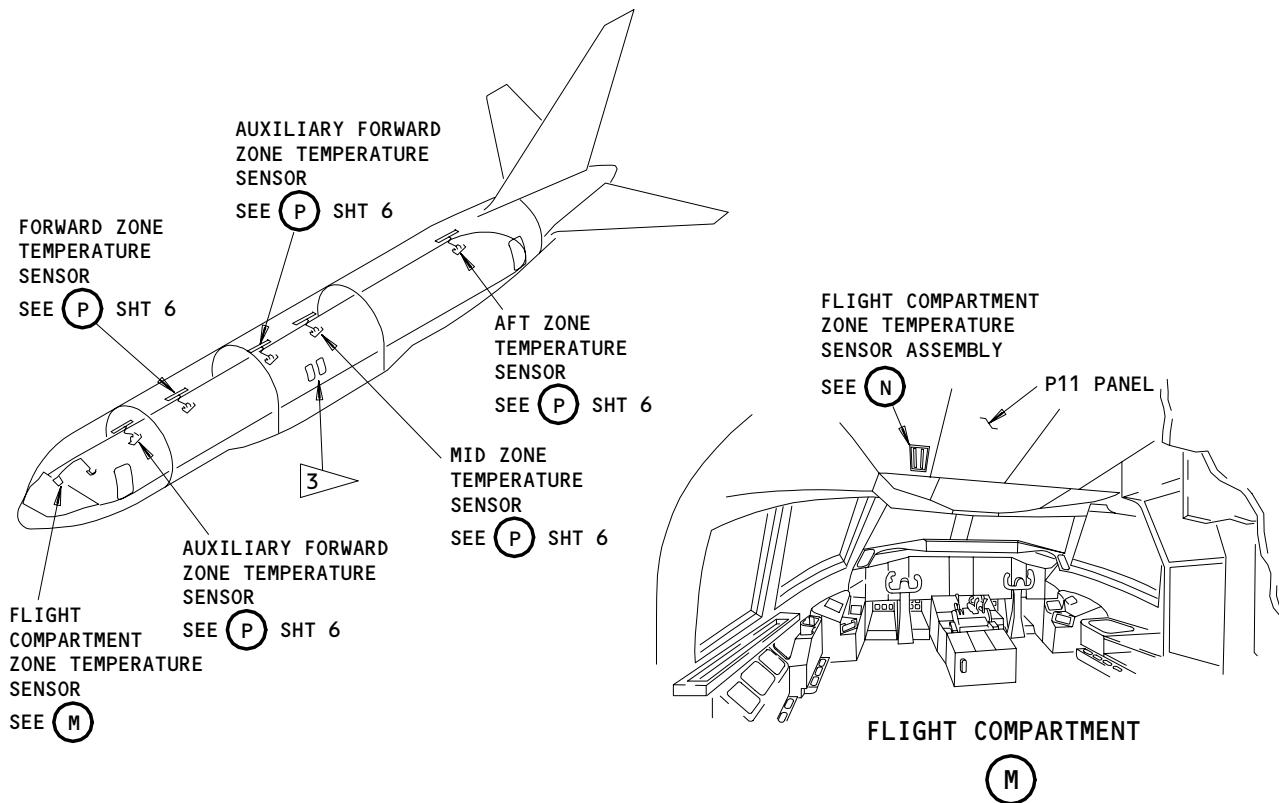
**MID AND AFT ZONE DUCT SENSORS
(EXAMPLE - MID ZONE SHOWN)**

L

Temperature Control - Component Location
Figure 102 (Sheet 4)

EFFECTIVITY	
	ALL

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FLIGHT COMPARTMENT ZONE TEMPERATURE SENSOR ASSEMBLY

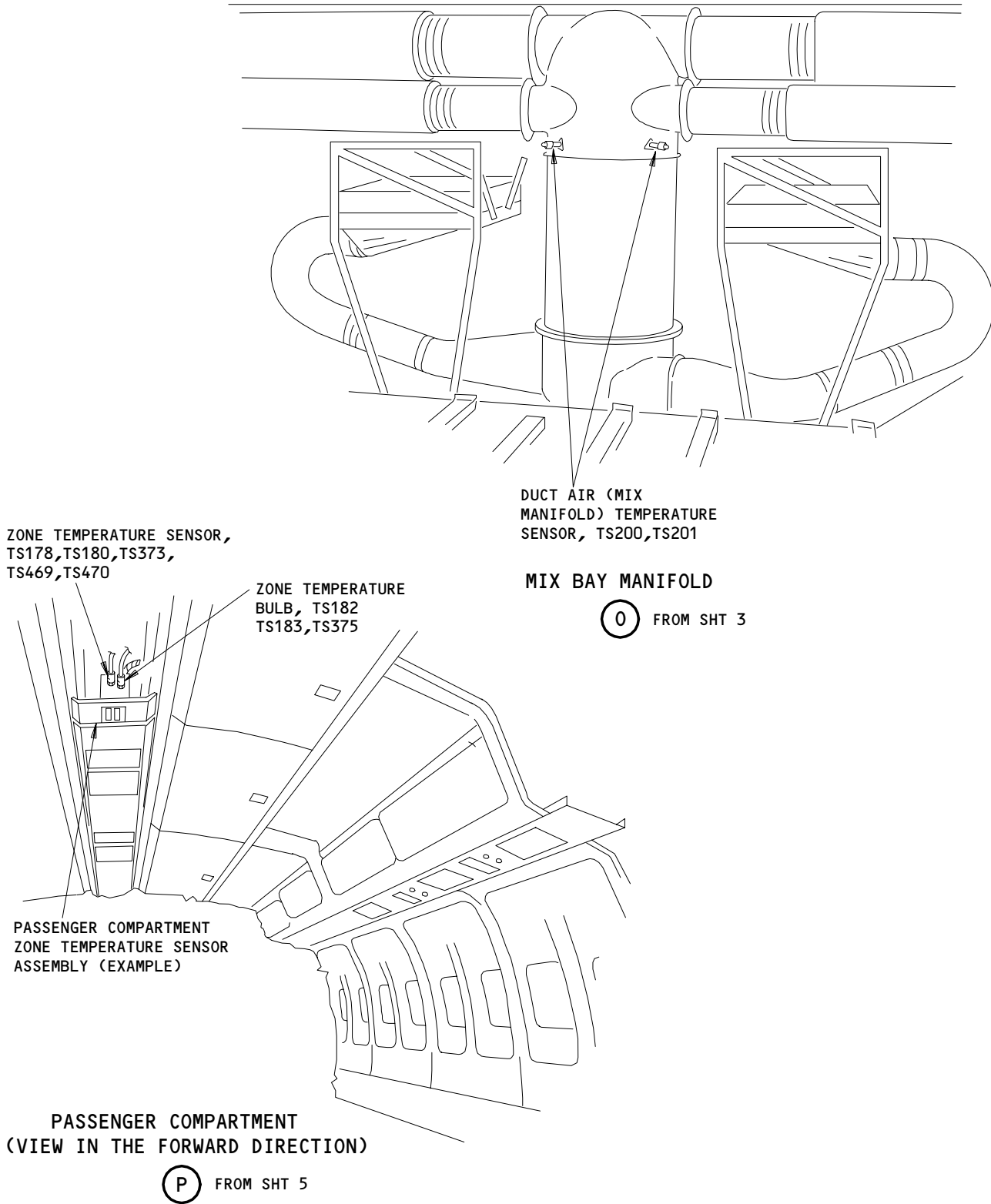
3 ON SAS 150-999; AND ALL MTH AIRPLANES, DUAL OVERWING ESCAPE HATCHES

(N)

Temperature Control - Component Location
Figure 102 (Sheet 5)

EFFECTIVITY	ALL
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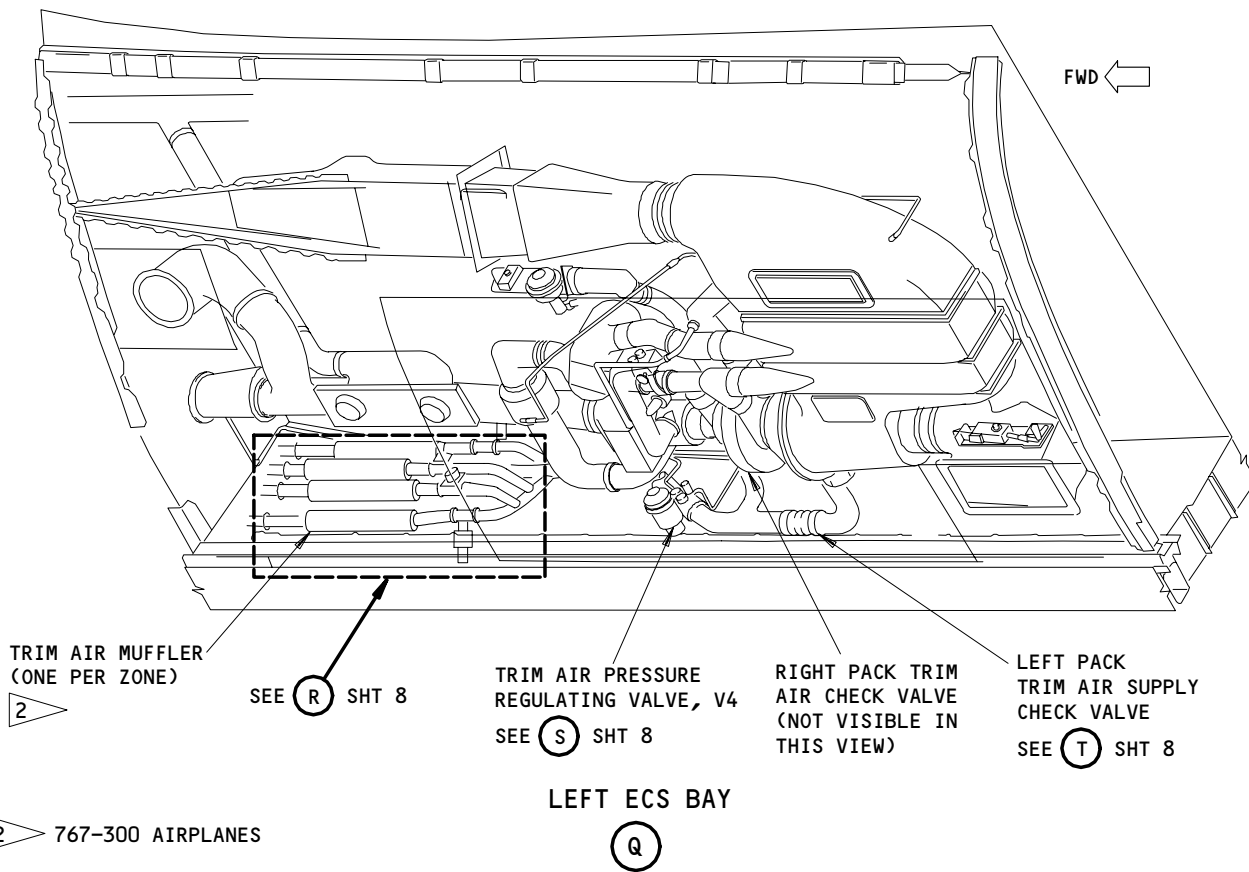
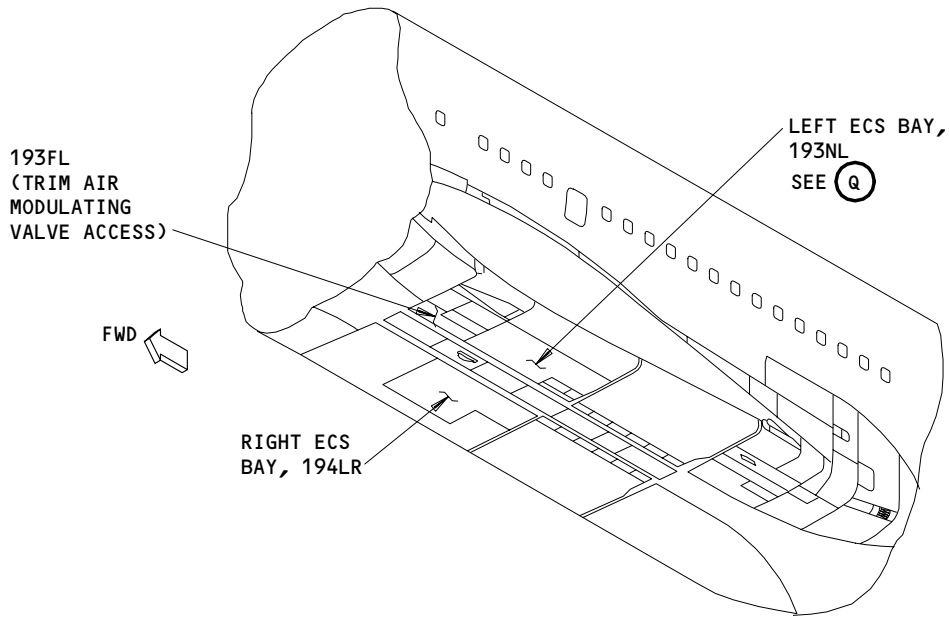


Temperature Control - Component Location
Figure 102 (Sheet 6)

EFFECTIVITY	
	ALL

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FAULT ISOLATION/MAINT MANUAL

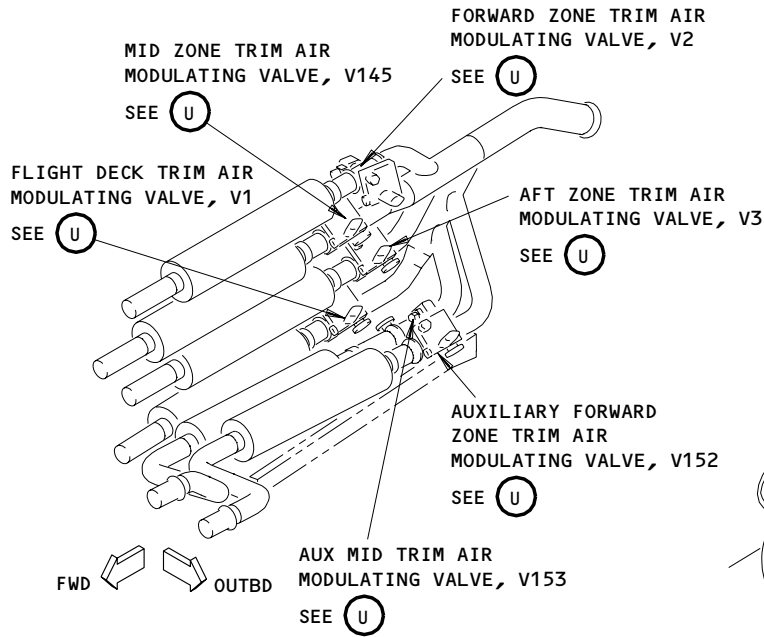


Temperature Control - Component Location
Figure 102 (Sheet 7)

EFFECTIVITY	
	ALL

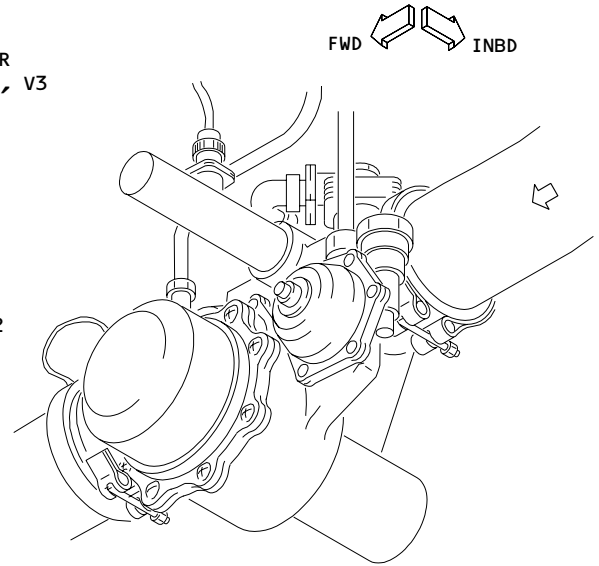
21-60-00

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FAULT ISOLATION/MAINT MANUAL



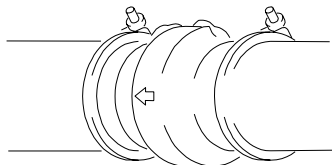
TRIM AIR MODULATING VALVES

(R)



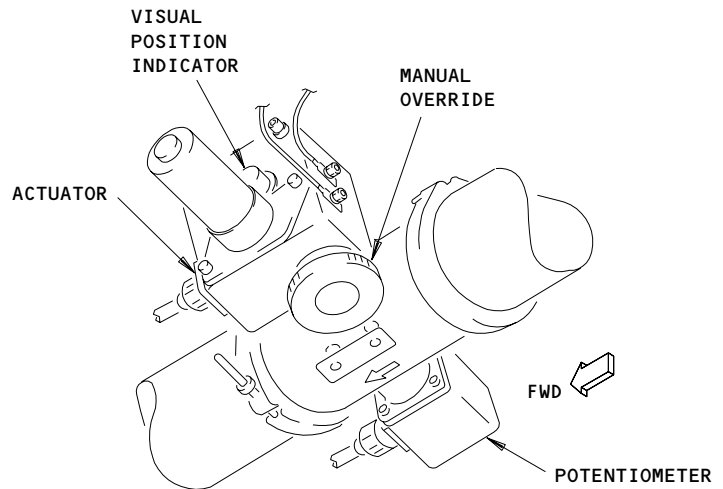
TRIM AIR PRESSURE REGULATING VALVE, V4

(S)



TRIM AIR SUPPLY CHECK VALVE
(EXAMPLE)

(T)



TRIM AIR MODULATING VALVE (EXAMPLE)
V1, V2, V3, V145, V152, V153

(U)

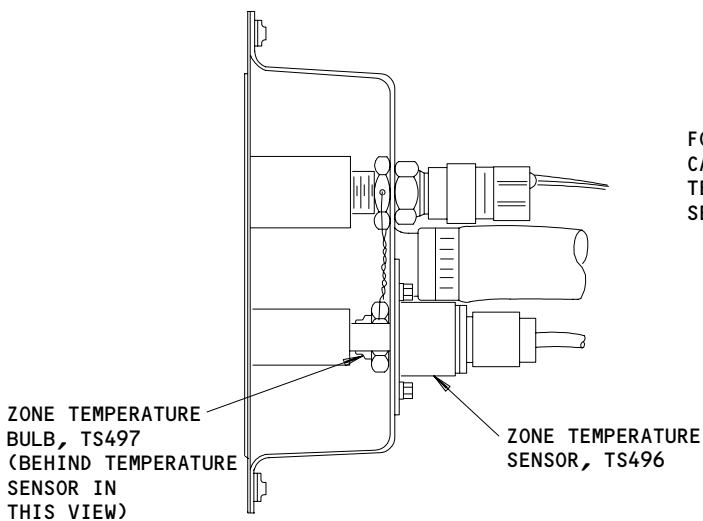
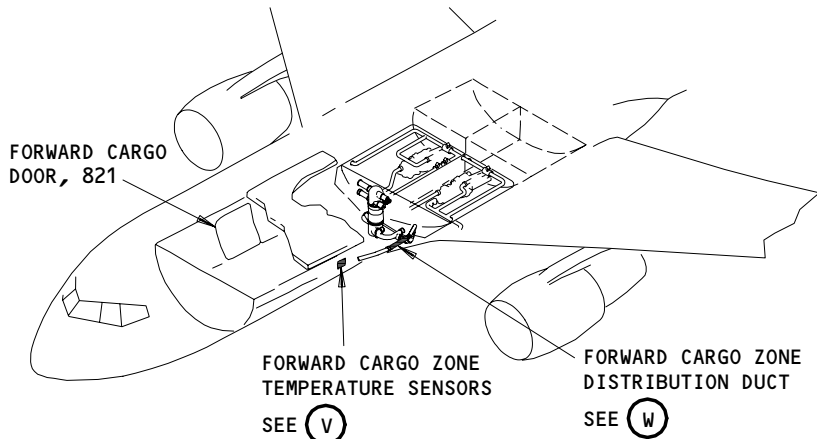
Temperature Control - Component Location (Details from Sht 7)
Figure 102 (Sheet 8)

EFFECTIVITY

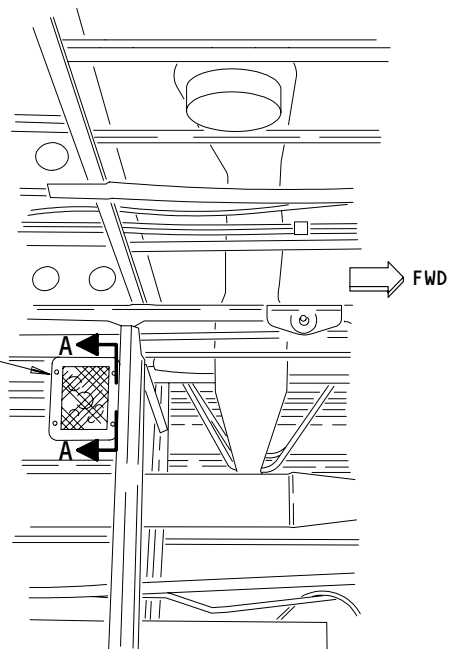
ALL

21-60-00

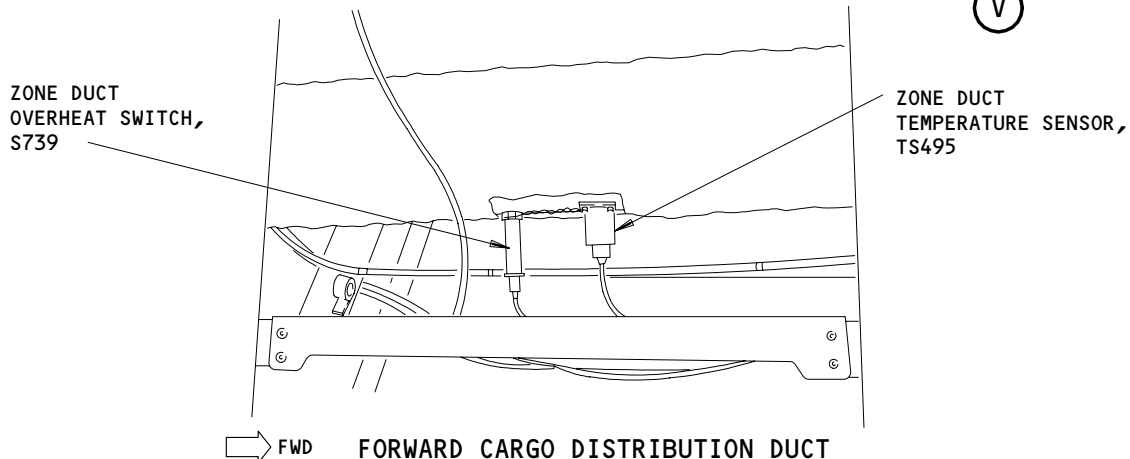
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FAULT ISOLATION/MAINT MANUAL



FORWARD CARGO ZONE TEMPERATURE SENSORS
A-A



FORWARD CARGO COMPARTMENT

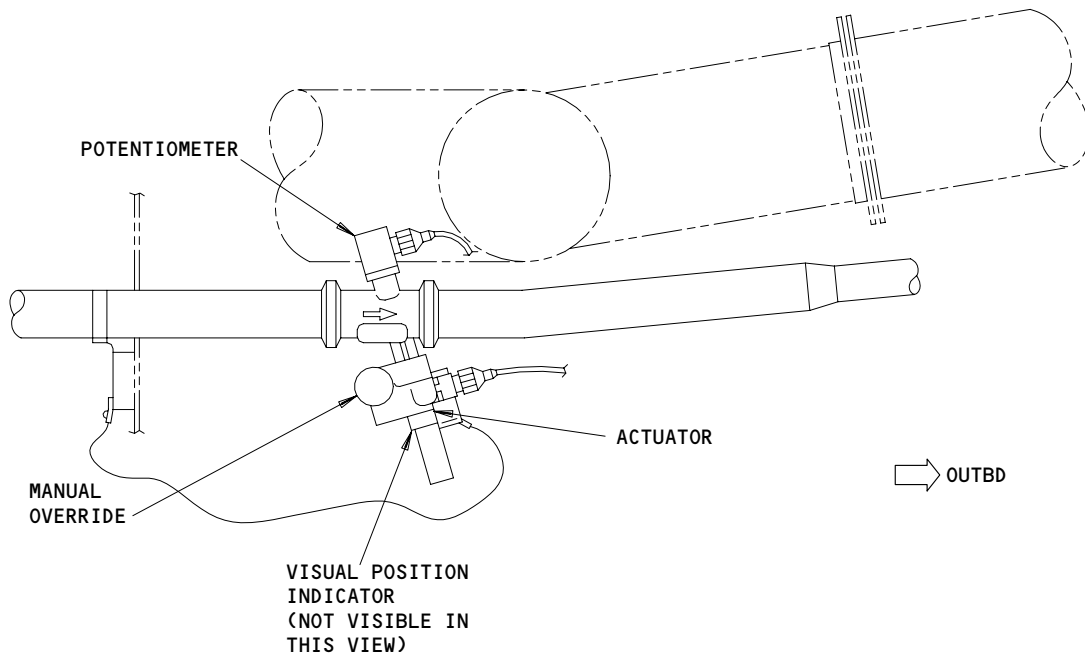
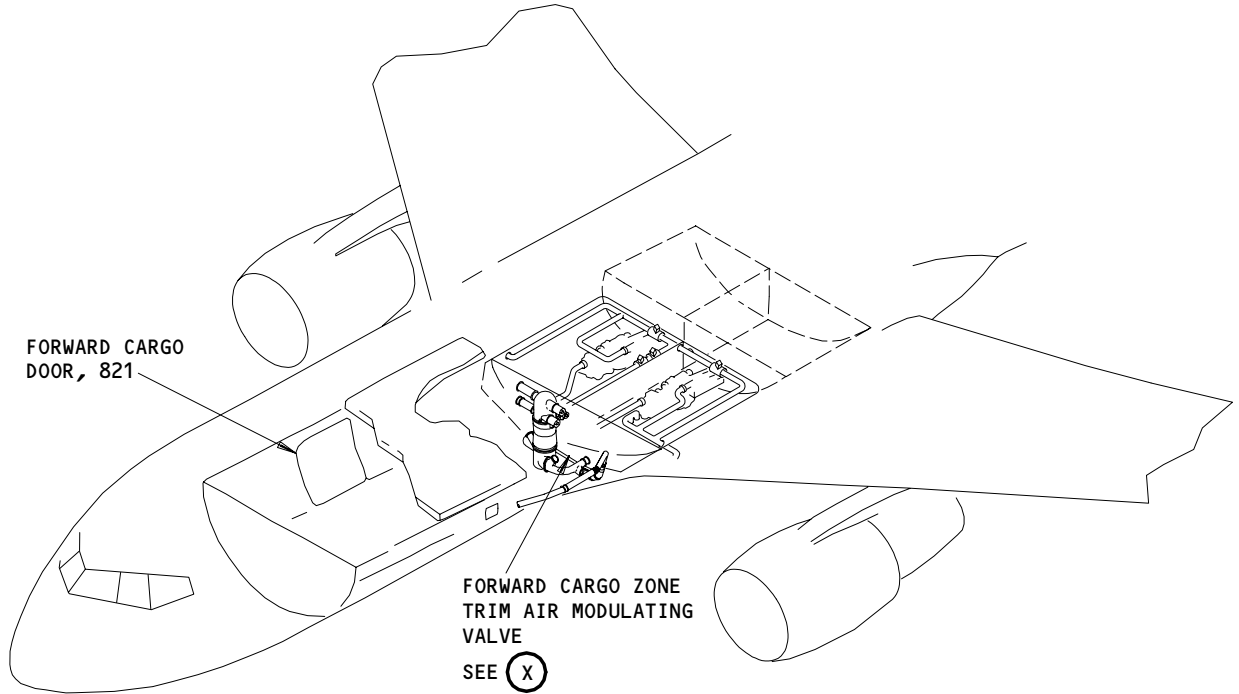


Temperature Control - Component Location
Figure 102 (Sheet 9)

EFFECTIVITY	
ALL	

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FAULT ISOLATION/MAINT MANUAL



TRIM AIR MODULATING VALVE, V385
(VIEW IN THE AFT DIRECTION)

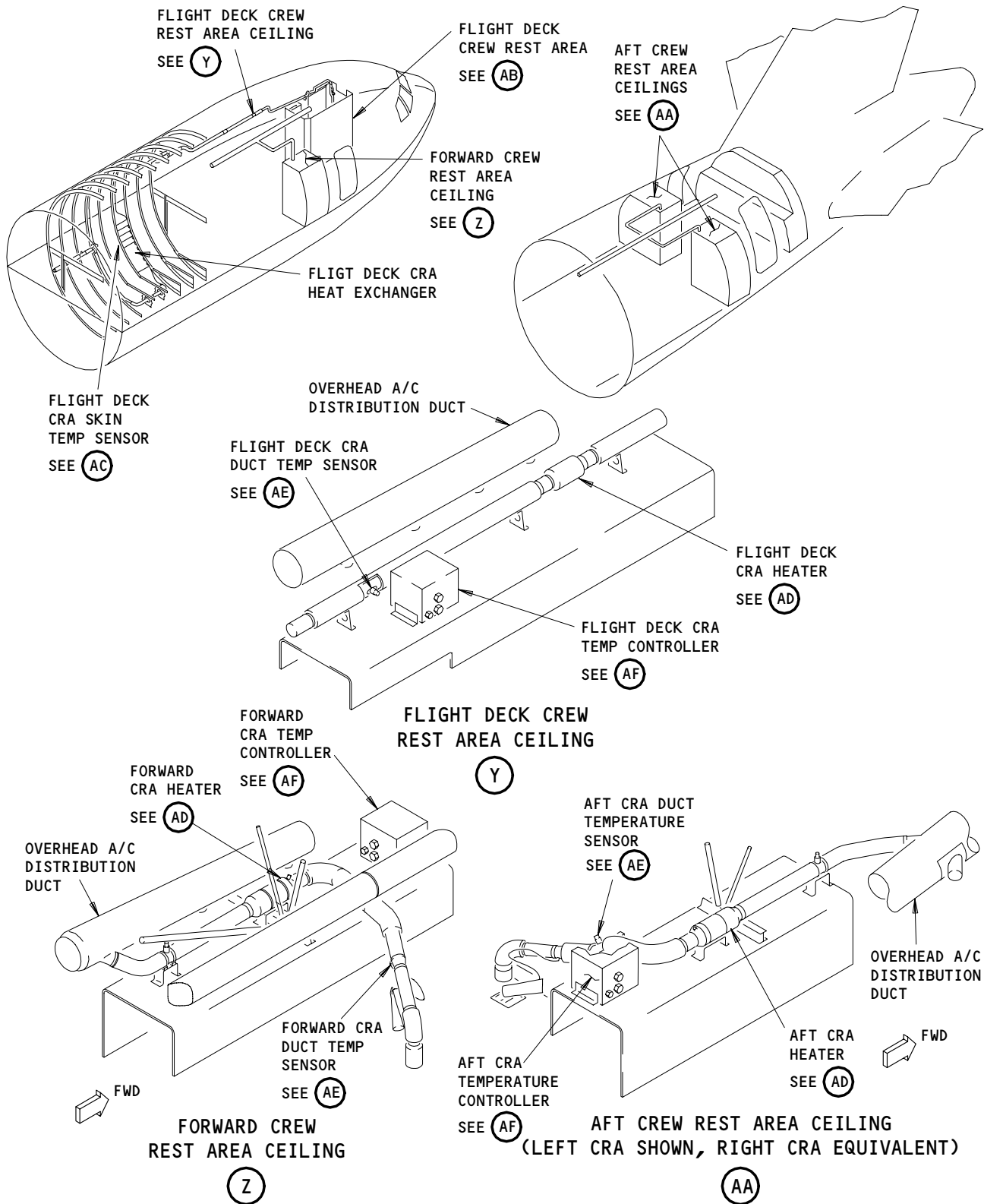
(X)

Temperature Control - Component Location
Figure 102 (Sheet 10)

EFFECTIVITY	
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FAULT ISOLATION/MAINT MANUAL

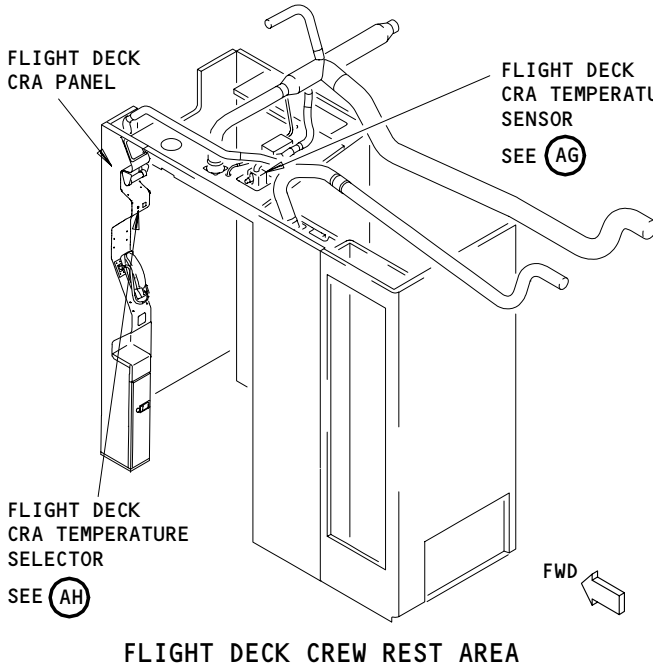


Temperature Control - Component Location
Figure 102 (Sheet 11)

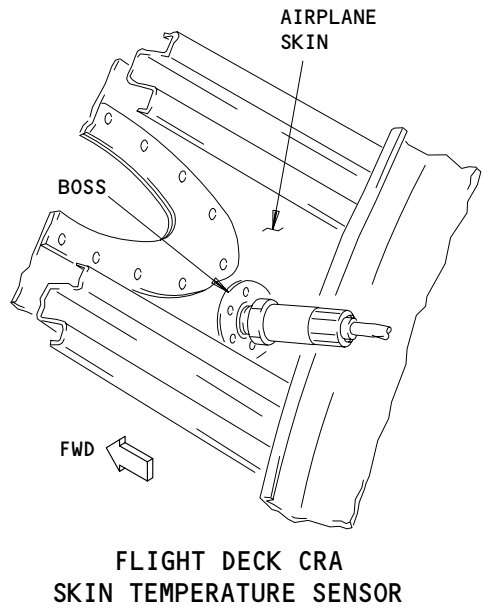
EFFECTIVITY

ALL

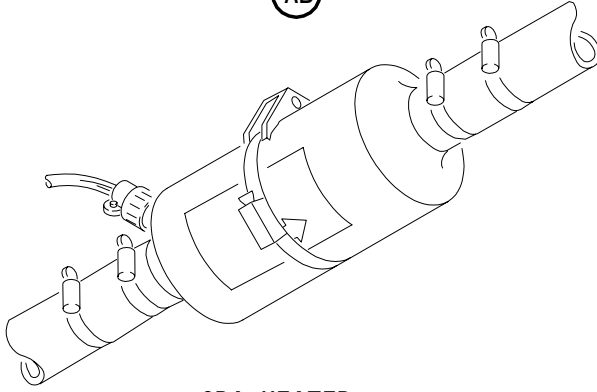
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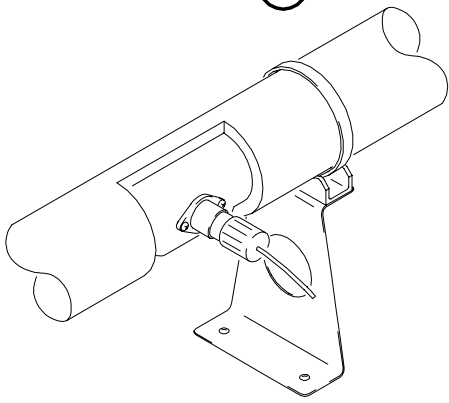
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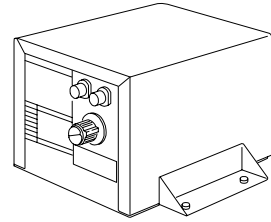
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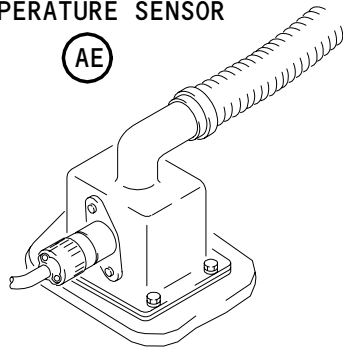
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(AE)



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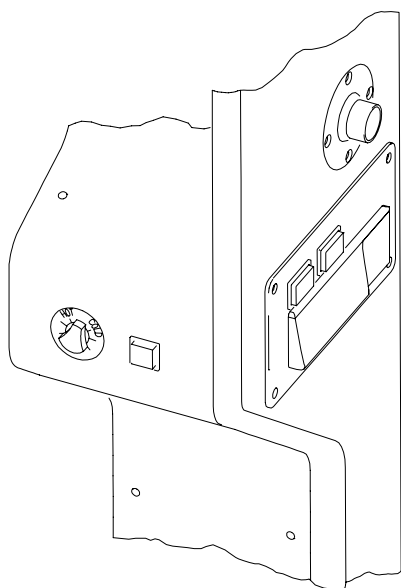


(AG)

Temperature Control - Component Location
Figure 102 (Sheet 12)

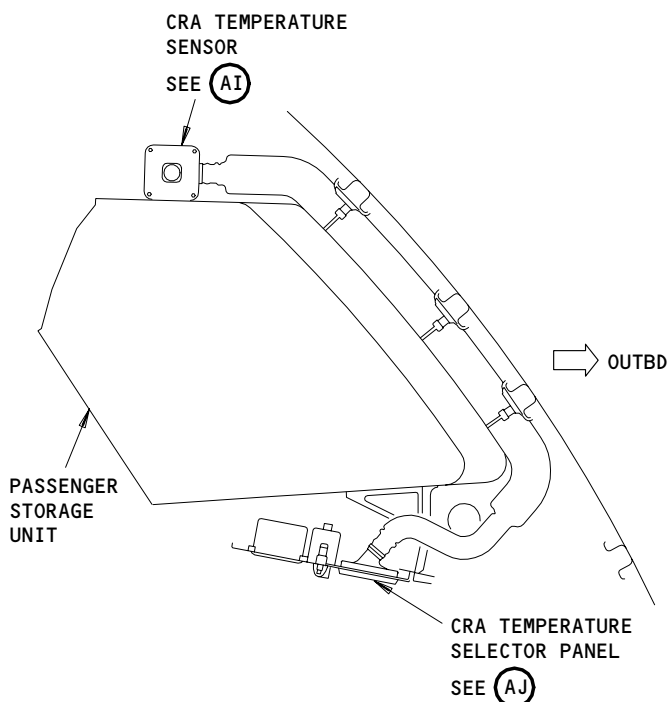
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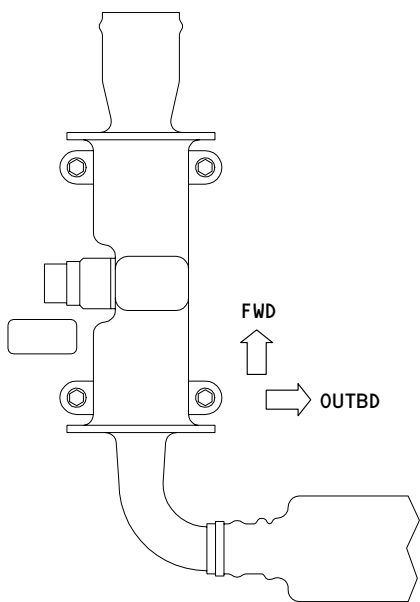


FLIGHT DECK CRA
TEMPERATURE SELECTOR

(AH)

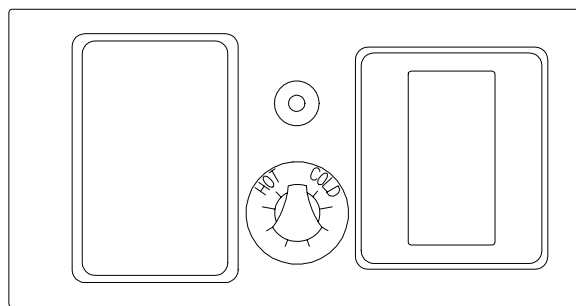


FORWARD/AFT CREW
REST AREA CEILING



FORWARD/AFT CRA
TEMPERATURE SENSOR

(AI)



FORWARD/AFT CRA
TEMPERATURE SELECTOR PANEL

(AJ)

Temperature Control - Component Location
Figure 102 (Sheet 13)

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TEMPERATURE CONTROL SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1, 1A)

A. The primary (zone) temperature control system controls the temperature of the air supplied to each cabin zone (Ref 21-22-00, 21-23-00) and the forward cargo compartment . The system mixes warm pneumatic air with cool air from the air cooling packs (Ref 21-51-00). This mixture makes the air around the passengers and crew comfortable in the cabin zones. It also creates a desirable environment for the preservation of cargo in the forward cargo compartment.

B. Zone Temperature Control System Description:

- (1) The cabin zone temperature control system has the components that follow:
 - (a) Zone temperature controller
 - (b) Auxiliary-zone-temperature controller
 - (c) Six trim-air-modulating valves
 - (d) Two trim-air-supply-check valves
 - (e) A trim-air-pressure-regulating valve
 - (f) Six zone temperature sensors
 - (g) Six zone-duct-overheat switches
 - (h) Eight duct-air-temperature sensors
 - (i) Four zone temperature selectors
 - (j) Four amber INOP warning lights.
- (2) The cabin-zone-temperature-control system uses trim air from downstream of the flow-control-and-shutoff valve (Ref 21-51-00) to control the temperature of the conditioned air supplied to each cabin zone. The trim air mixes with cooling pack air (Ref 21-51-00) and recirculation air (Ref 21-25-00) to give the set air temperature. Air temperature is controlled for each of the airplane's cabin zones; flight deck, forward and aux forward passenger cabin, mid and aux mid passenger cabin, and aft passenger cabin.
- (3) The zone temperature controller operates automatically, based on the demand temperature of the flight deck, forward, mid and aft zones. The controller modulates the four individual trim-air-modulating valves. The valves regulate the amount of warm air added to the cooled air distributed to each zone.

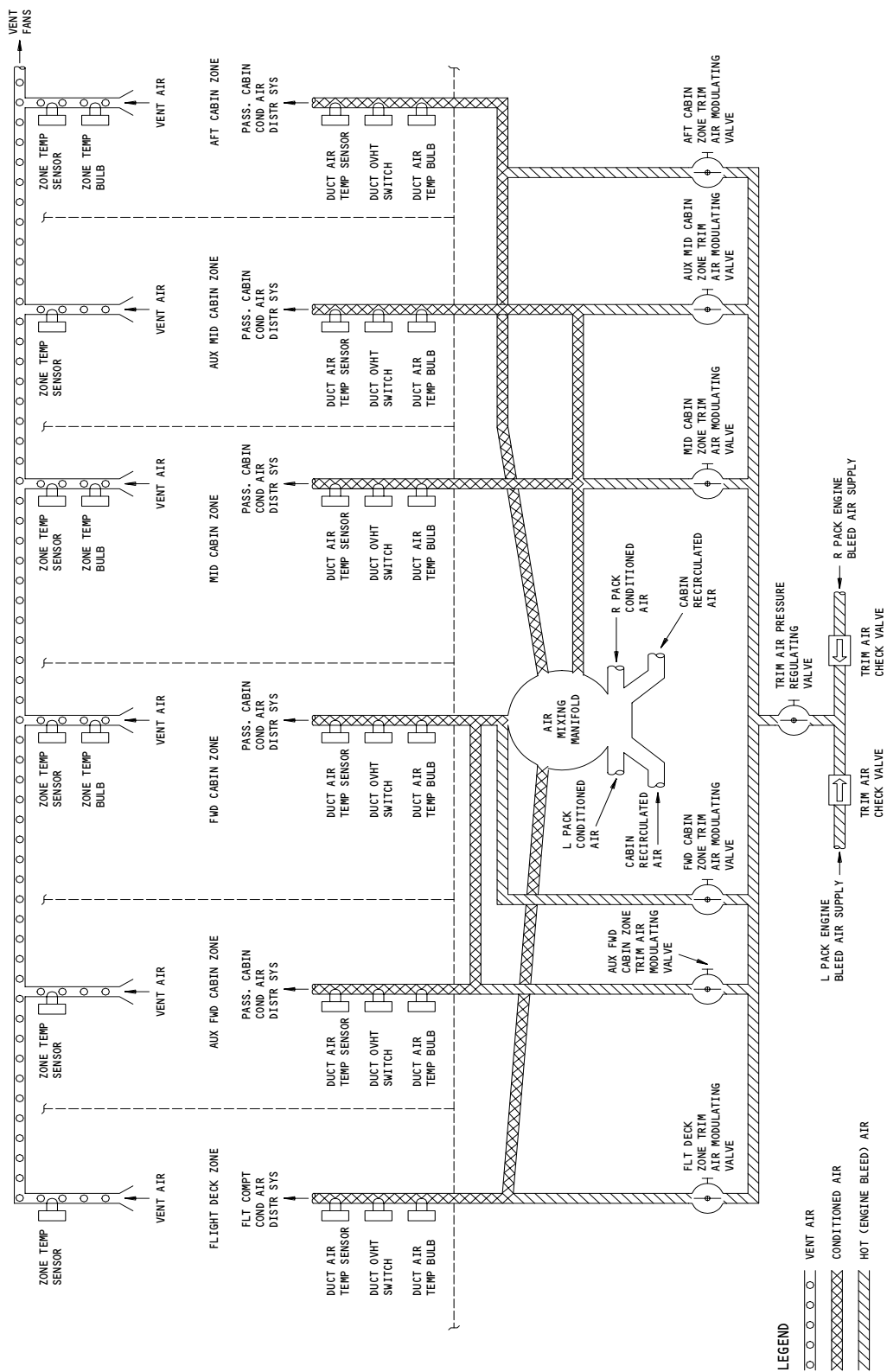
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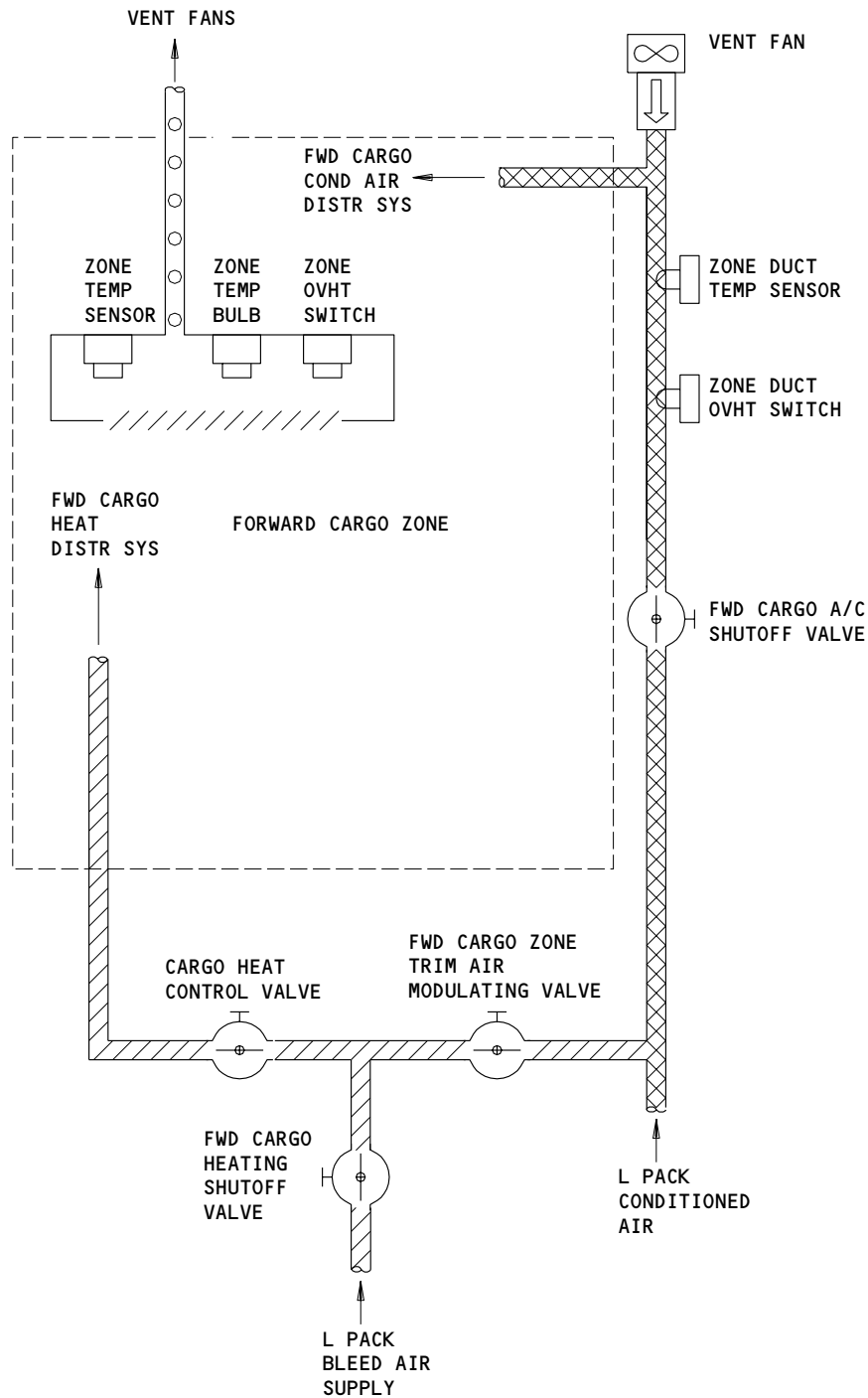
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Cabin Zone Temperature Control System
Figure 1

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Forward Cargo Zone Temperature Control System
Figure 1A

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- (4) The auxiliary-zone-temperature controller operates with the zone temperature controller. They control the aux forward and aux mid cabin zone temperature automatically, based on the demand temperature of the forward and mid zones. The auxiliary zone controller controls the aux forward and aux mid zone trim air modulating valves. The valves control the quantity of warm air added to the conditioned air sent to the aux forward and aux mid zones.
- (5) The flight deck zone portion of the temperature control system can also be operated manually. Manual operation bypasses the zone temperature controller. Positioning the flight deck zone temperature selector momentarily to cool or warm positions the corresponding trim air modulating valve. The primary (zone) temperature indication system (Ref 21-65-00) provides visual monitoring of the zone temperature control system.
- (6) The six cabin-zone-trim-air-modulating valves are in the zone trim air ducts, downstream of the trim-air-pressure-regulating valve. They are electrically moved to give the desired temperature to the cabin zones that follow:
 - (a) Flight deck zone
 - (b) Forward passenger zone
 - (c) Aux forward passenger zone
 - (d) Mid passenger zone
 - (e) Aux mid passenger zone
 - (f) Aft passenger zone.
- (7) The temperature control system contains two trim air supply check valves installed in the zone trim air ducts. The check valves prevent trim air from flowing into the pack inlet if the air cooling pack shuts down.
- (8) The trim-air-pressure-regulating valve controls the pressure of the pneumatic system air supplied to the cabin-zone-trim-air-modulating valves. A TRIM AIR switchlight on the pilot's overhead panel P5 controls the valve position.
- (9) A zone duct overheat switch is installed in each duct that goes to the six cabin zones. The overheat switch operates as a thermal protective device to close the related trim-air-modulating valve if the zone duct temperature is more than 190°F (88°C).
- (10) There are eight duct-air-temperature sensors. The sensors sense the temperature of supply air that goes into the zone ducts and the two mix manifold outlets. The mix manifold, flight deck, forward, mid and aft zone temperature sensors send their inputs to the zone temperature controller. The aux forward and aux mid zone temperature sensors send their inputs to the aux-zone-temperature controller.

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- (11) There is one cabin-zone-temperature sensor for each of the six cabin zones. The flight deck, forward, mid and aft zone temperature sensors each send a temperature signal to the zone temperature controller. The aux forward and aux mid zone temperature sensors each send a temperature signal to the aux zone temperature controller. The forward cabin zone temperature sensor also sends a temperature signal to the left pack temperature controller. The aft cabin-zone-temperature sensor also sends a temperature signal to the right pack temperature controller (Ref 21-51-00).
- (12) Four cabin zone temperature selectors, located on the pilots' overhead panel P5, allow selection of manual or automatic control of the zone temperature control system.
- C. Forward Cargo Zone Temperature Control System Description:
- (1) The forward-cargo-zone-temperature-control system has the components that follow:
- (a) Auxiliary-zone-temperature controller
 - (b) Pack flow controller (Ref 21-28-00 and 21-51-00)
 - (c) Cargo heating shutoff valve (Ref 21-43-00)
 - (d) Cargo-trim-air-modulating valve
 - (e) Cargo-air-conditioning-shutoff valve (Ref 21-28-00)
 - (f) Zone-duct-overheat switch
 - (g) Zone-duct-temperature sensor
 - (h) Zone temperature sensor
 - (i) Zone temperature bulb (Ref 21-65-00)
 - (j) Zone temperature selector
 - (k) Amber FAULT warning light.
- (2) The forward-cargo-temperature-control system uses trim air from downstream of the cargo heating shutoff valve (Ref 21-43-00) to control the temperature of conditioned air supplied to the forward cargo compartment. The trim air mixes with cooling pack air (Ref 21-25-00) to give the set air temperature. Air temperature in the forward cargo compartment is controlled automatically by the auxiliary-zone-temperature controller.
- (3) The aux-zone-temperature controller operates the forward cargo zone control system automatically based on the demand temperature of the forward cargo zone. The aux controller controls the forward cargo trim-air-modulating valve.
- (4) The forward-cargo-trim-air-modulating valve mounts in the forward cargo zone trim air duct, downstream of the cargo heating shutoff valve. It is electrically positioned to provide the desired air temperature to the forward cargo compartment.
- (5) A zone-duct-overheat switch is installed in the forward cargo compartment conditioned air duct. The overheat switch functions as a thermal protective device and completes circuitry to close the cargo-trim-air-modulating valve if the zone duct temperature exceeds 190°F (88°C).
- (6) A zone-duct-air-temperature sensor is installed in the forward cargo compartment conditioned air duct. The sensor senses the temperature of supply air entering the zone duct and provides an input to the aux-zone-temperature controller.

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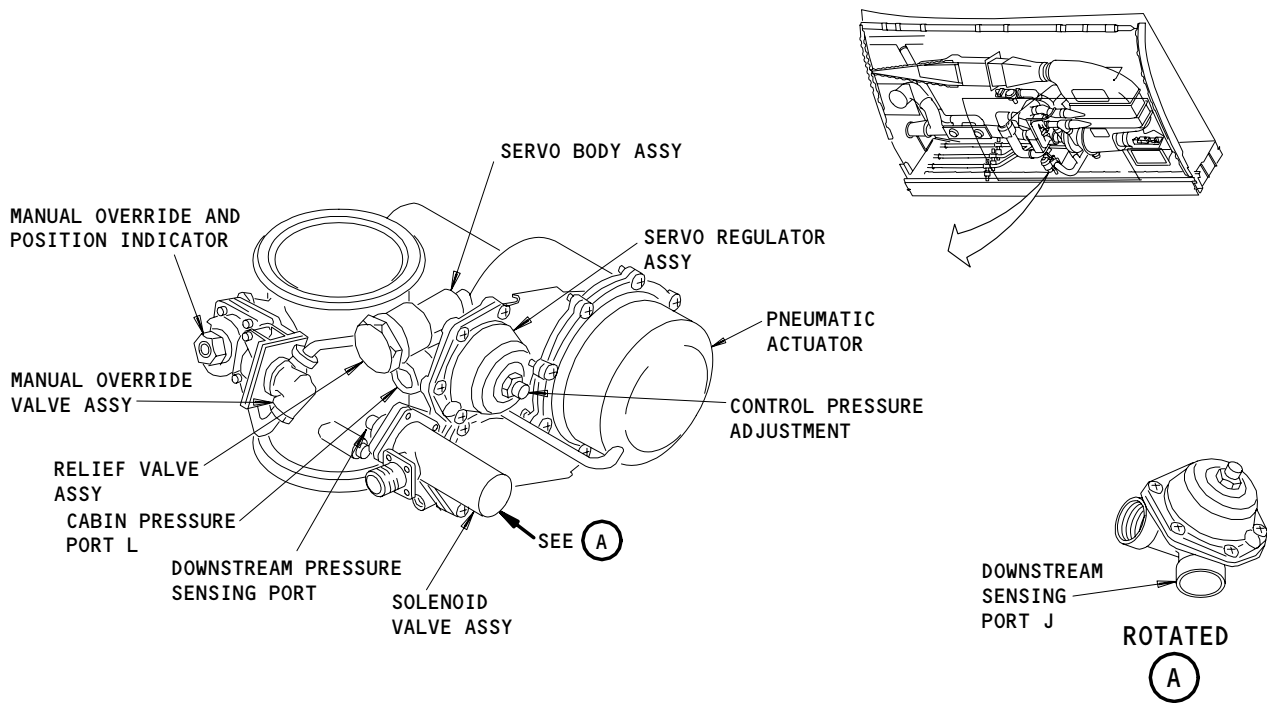
- (7) A zone temperature sensor is installed in the forward cargo compartment. The sensor sends a temperature signal to the aux zone temperature controller and the left and right pack temperature controllers (Ref 21-51-00).
- (8) The forward-cargo-zone-temperature selector, located on the pilots' overhead panel P5, allows selection of automatic control of the zone temperature control system or cargo compartment ventilation..

2. Component Details

A. Trim Air Pressure Regulating Valve (Fig. 2)

(1) Description

- (a) The trim air pressure regulating valve is a three inch diameter butterfly valve. The valve is electrically controlled and pneumatically actuated. The valve consists of a servo regulator assembly, a solenoid valve assembly, a relief valve assembly, a pneumatic actuator, a valve flow section, and a manual override valve assembly.
- (b) The servo regulator assembly consists of a servo cover, two air diaphragms mounted on a valve seat, and a housing. The diaphragms divide the assembly into three chambers. One chamber senses cabin pressure, a second chamber senses downstream pressure, and the third chamber senses servo regulator assembly supply pressure. A spring retainer provides for control pressure adjustment.



Trim Air Pressure Regulating Valve
Figure 2

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- (c) The solenoid valve assembly consists of a solenoid and a ball valve . The relief valve assembly consists of a spring-loaded closed poppet valve in a housing.
 - (d) The pneumatic actuator is made up of a cover, a spring-loaded closed diaphragm which divides the actuator into two chambers, actuator linkage, and a housing. The diaphragm bolts to the linkage attached to the butterfly plate.
 - (e) The valve flow section consists of a butterfly plate attached to a shaft within a housing.
 - (f) The manual override valve assembly consists of a ball valve, actuator, and a cam. The actuator is a spring-loaded rod that contacts the ball of the ball valve. The rod is also spring-loaded against a cam on the end of the butterfly shaft. A pin attached to the cam provides position indication.
- (2) Function (Fig. 3)
- (a) Applying 28v dc power to the valve coil unseats the solenoid valve assembly ball valve. If the cabin pressure plus the spring force exceeds the opposing combined downstream and upstream pressure in the servo regulator assembly, upstream air routes through the unseated ball valve to the opening side of the pneumatic actuator. If the combined downstream and upstream pressure is greater, the downstream pressure will vent to ambient. If the pressure in the opening chamber of the pneumatic actuator exceeds the opposing downstream pressure plus spring force, the actuator linkage opens the butterfly plate. The butterfly plate then modulates to maintain a constant downstream pressure.
 - (b) If the smaller diaphragm in the servo regulator assembly fails, the downstream pressure regulates at a lower pressure. If the larger diaphragm fails, the servo regulator valve regulates at a higher pressure. If both diaphragms in the servo regulator assembly fail, the relief assembly poppet valve unseats when the upstream pressure exceeds the opposing cabin pressure plus spring force. This limiting of the control pressure prevents rupturing of the actuator diaphragm.

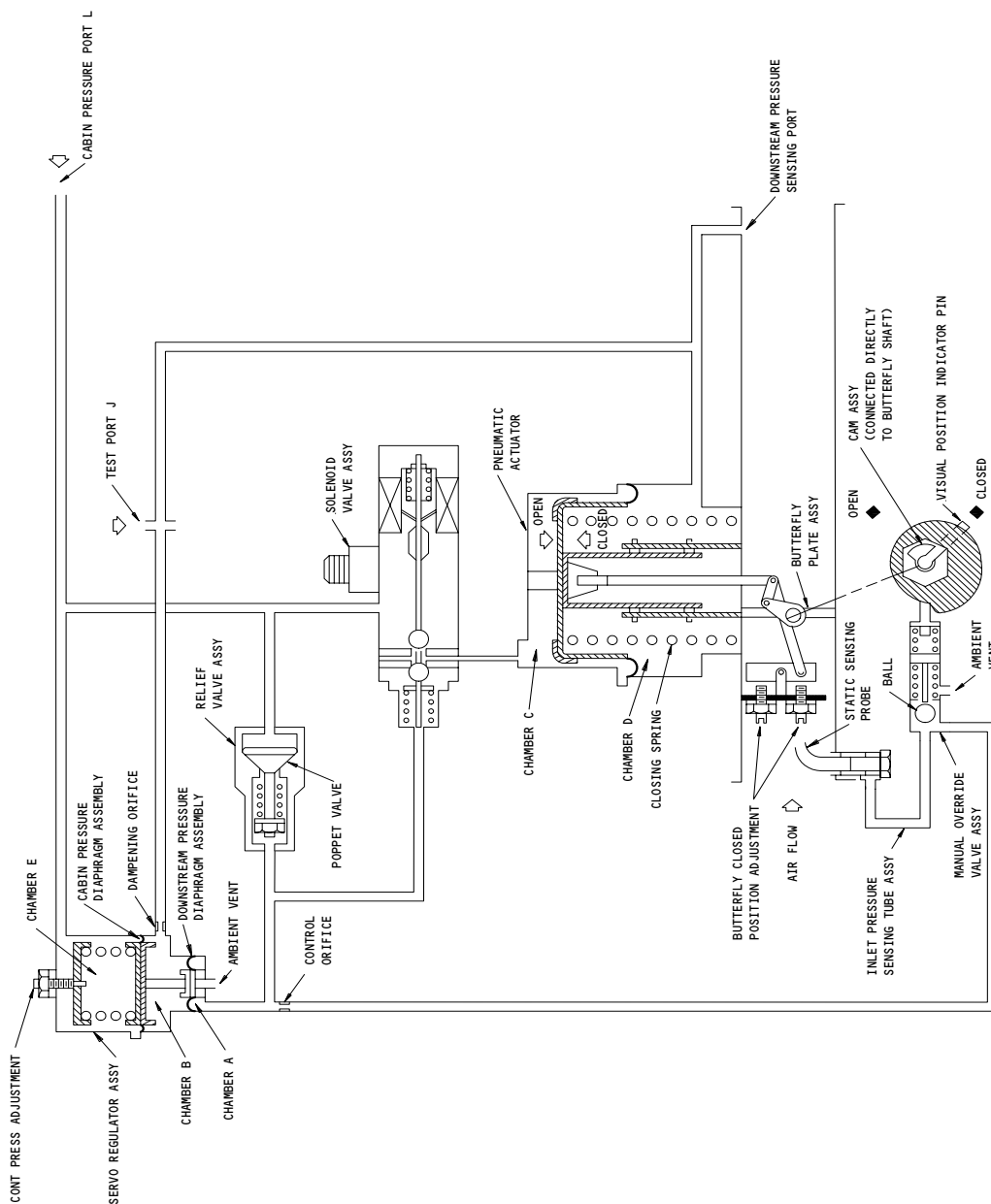
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Trim Air Pressure Regulating Valve Operation
Figure 3

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- (c) Removing 28v dc power from the valve coil in the solenoid valve assembly, seats the ball valve. The opening chamber of the pneumatic actuator then vents to the cabin pressure port and the butterfly plate closes.
- (d) The valve may be manually opened by rotating the cam CCW. The cam must be lockwired in place if the valve is to remain in the manually selected position. Rotating the cam CCW seats the ball in the manual override valve assembly, thus directing upstream air to the servo regulator assembly.
- (e) The valve may be manually closed by rotating the cam CW. The cam must be lockwired in place if the valve is to remain in this position. Rotating the cam CW allows the ball to seat on the opposite seat as that for manually opening the valve. The upstream air is thus vented to ambient.

B. Trim Air Modulating Valve (Fig. 4)

(1) Description

- (a) The trim air modulating valve is a 1.75 inch diameter, electrically actuated valve. The valve consists of an actuator, a valve flow section, and a linear variable resistor in a housing. The actuator consists of a connector, two limit switches, a motor, position indicator, and a manual override. The actuator bolts to the valve flow section.
- (b) The position indicator consists of a pointer attached to the end of an output shaft. The manual override consists of a knob pinned to the secondary worm gear shaft.
- (c) The valve flow section consists of a valve body, butterfly plate, and a butterfly shaft. The butterfly plate mounts in the valve body and bolts to the butterfly shaft. One end of the butterfly shaft attaches to the actuator output shaft.
- (d) The linear variable resistor mounts on the resistor adaptor. The resistor wiper arm engages a slot in the butterfly shaft.

(2) Function

- (a) When 115v ac, 400 Hz, single phase power is applied to the open side of the valve motor, the motor drives a primary worm gear shaft through a reduction gear. The secondary worm gear shaft drives the sector gear and the output shaft. The output shaft rotates the butterfly plate and the position indicator CW toward open until the cam causes the full open limit switch to actuate. The cam also allows the full close limit switch to reset. The butterfly shaft rotates the wiper arm of the linear variable resistor to provide an output signal proportional to the butterfly plate position. A slip clutch will hold the butterfly plate in position if power is removed.

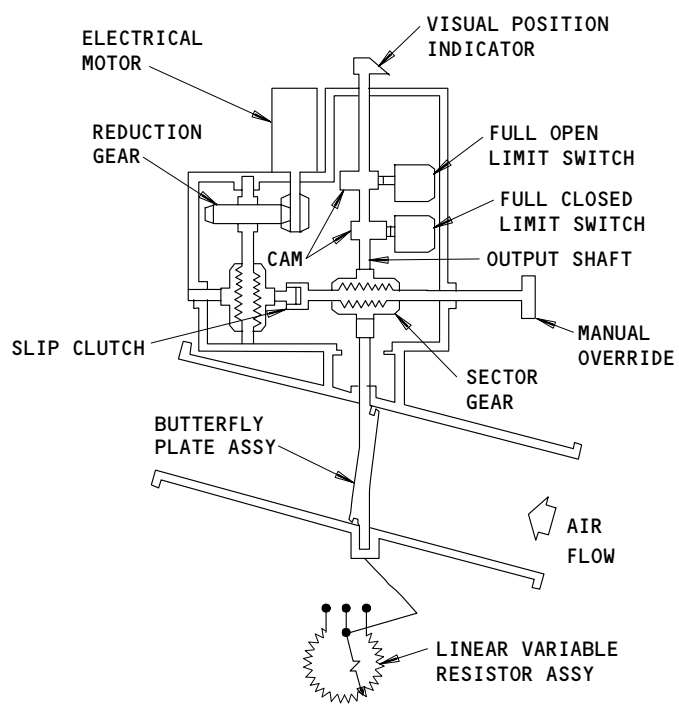
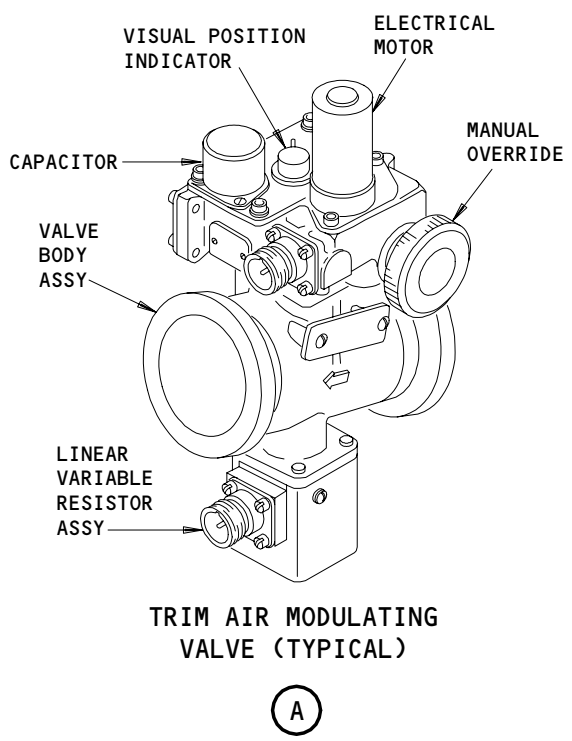
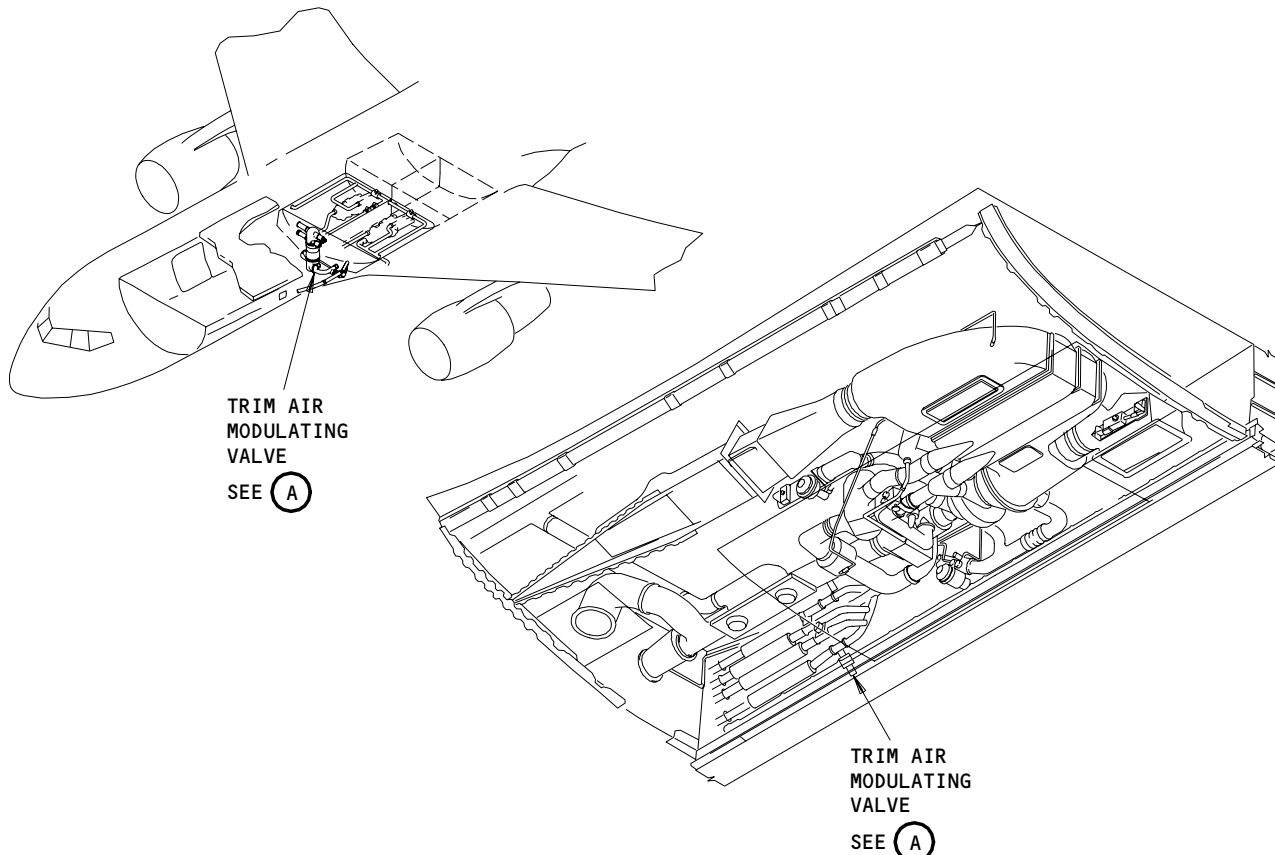
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Trim Air Modulating Valve
Figure 4

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- (b) When power is applied to close the valve, the valve internals operate similarly with the exception of a CCW motion and a cam causing the full close limit switch actuation. The cam also allows the full open limit switch to reset.
 - (c) The valve may be manually opened or closed by rotating the manual override CW to open and CCW to close. Rotating the manual override causes the clutch to slip, turning the secondary worm gear shaft to rotate the butterfly shaft to open or close the butterfly plate.
- C. Zone Temperature Controller (Fig. 5)
- (1) Description
 - (a) The zone temperature controller, a rectangularly boxed microcomputer, contains all of the built-in-test-equipment (BITE) pushbuttons, fault indicating lights, and BITE instructions for the primary (zone) temperature control system. Two handles at the front of the unit ease removal/installation. Three polarizing posts in the 125-pin connector at the rear of the unit prevent installation of the controller at the wrong place. Nine circuit cards on a mother-board contain the circuitry for the unit.
 - (2) Function
 - (a) The controller, through three servo loops, separately regulates the temperature in each cabin zone according to AUTO setting of the zone temperature selectors.
 - (b) The controller also provides automatic and continuous fault monitoring and initiated BITE features. These features provide indication of internal controller faults, as well as fault isolation and monitoring of temperature control system LRUs. Red indication lights show faulty LRUs during a BITE check. An internal non-volatile memory stores on-line BITE information for later interrogation. BITE monitors and stores LRU faults for 10 flights.
- D. Auxiliary Zone Temperature Controller (Fig. 5, 5A)
- (1) Description
 - (a) The auxiliary zone temperature controller is a rectangularly boxed microcomputer. It contains all of the built-in-test equipment (BITE) pushbuttons, fault indicating lights, and BITE instructions for the aux forward, aux mid, and forward cargo zone temperature control system. Two handles at the front of the unit ease removal/installation. Three polarizing posts in the 125-pin connector at the rear of the unit prevent installation of the controller at the wrong place. Nine circuit cards on a mother-board contain circuitry for the unit.

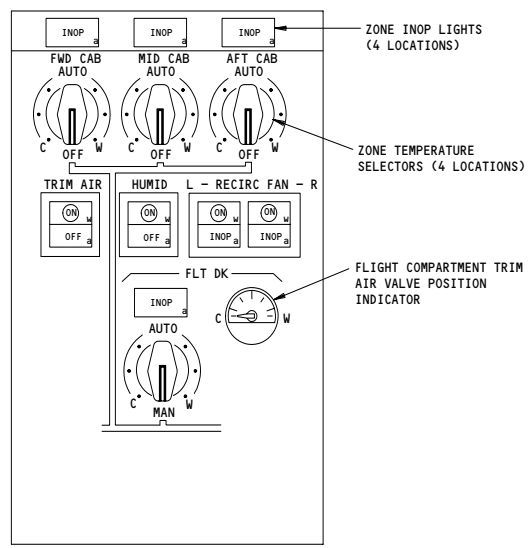
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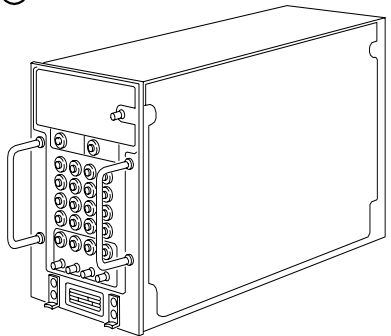
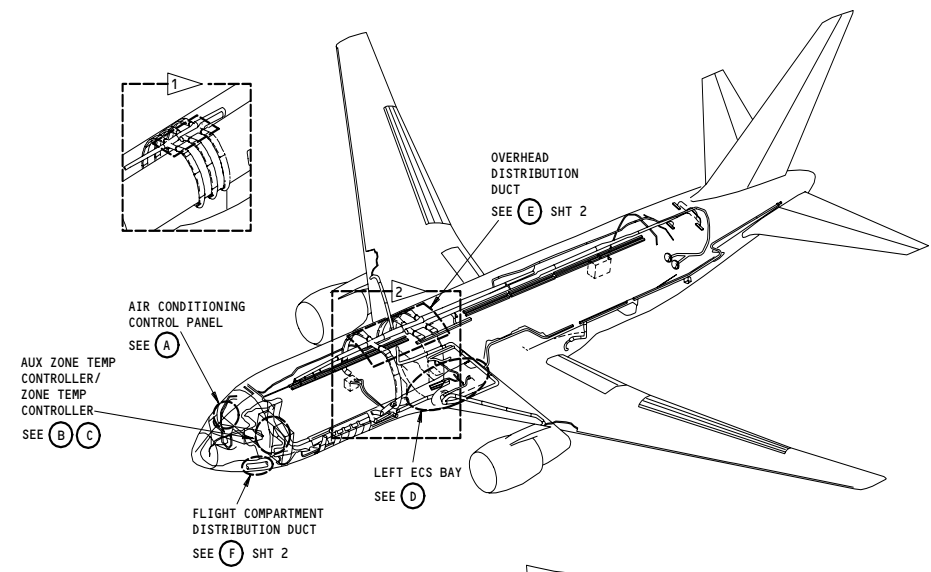
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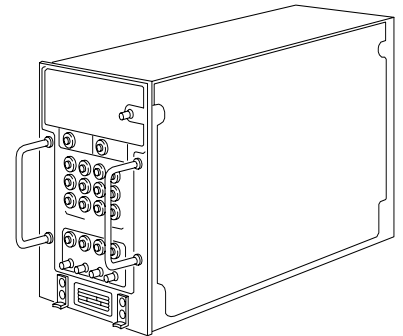
AIR CONDITIONING CONTROL PANEL (PILOT'S OVERHEAD PANEL P5)

(A)



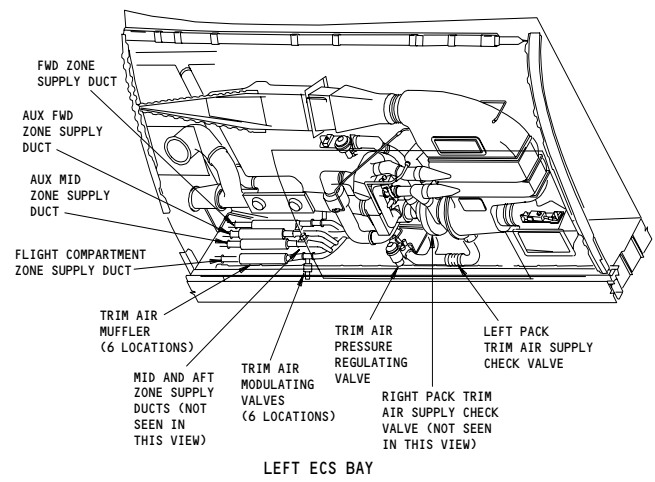
ZONE TEMPERATURE CONTROLLER (E3-1) (MAIN EQUIPMENT CENTER)

(B)



AUX ZONE TEMPERATURE CONTROLLER (E1-5)

(C)

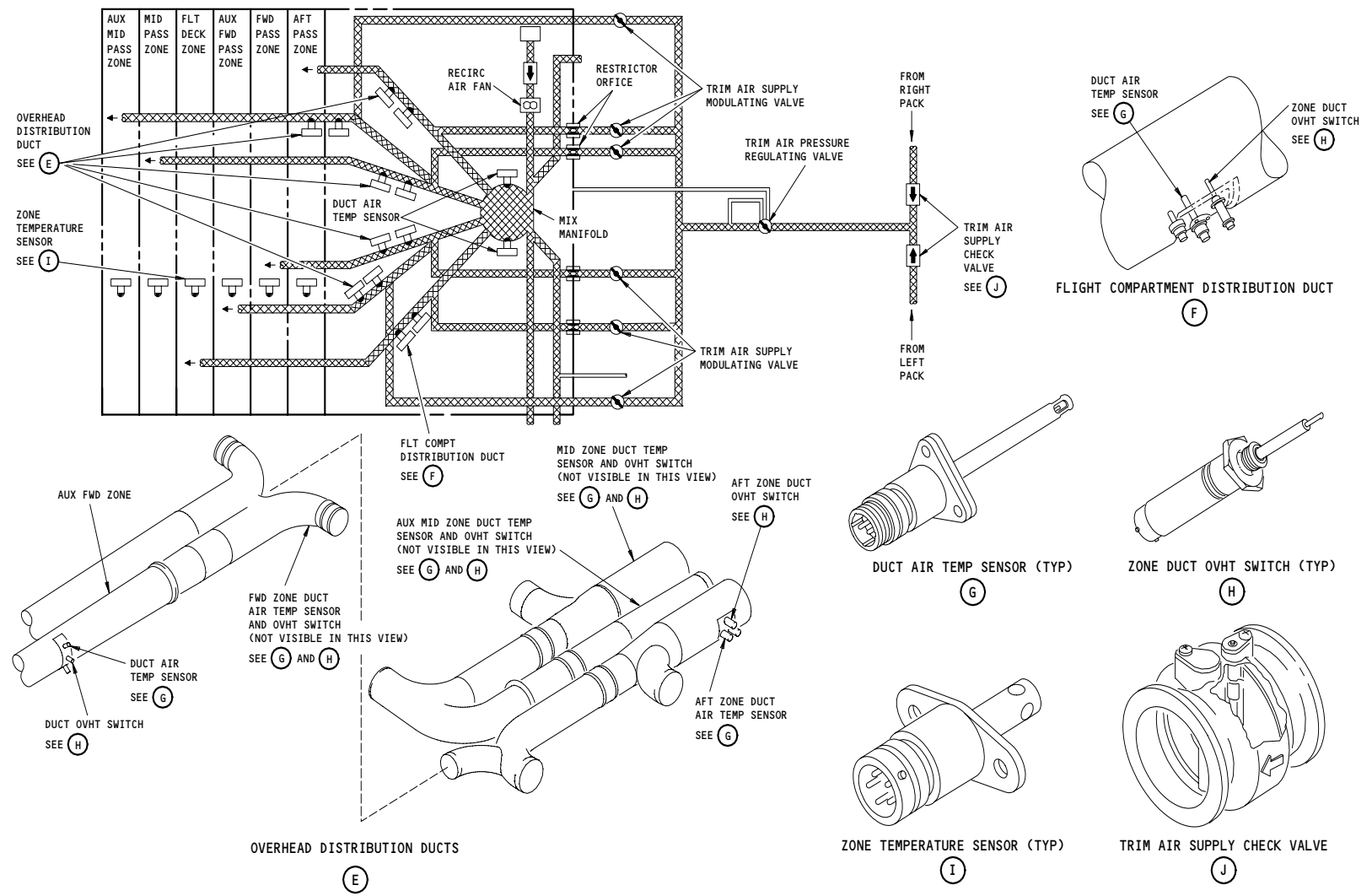


LEFT ECS BAY

(D)

Cabin Zone Temperature Control System Components
Figure 5 (Sheet 1)

- 1 767-200 AIRPLANES
- 2 767-300 AIRPLANES



Cabin Zone Temperature Control System Components
Figure 5 (Sheet 2)

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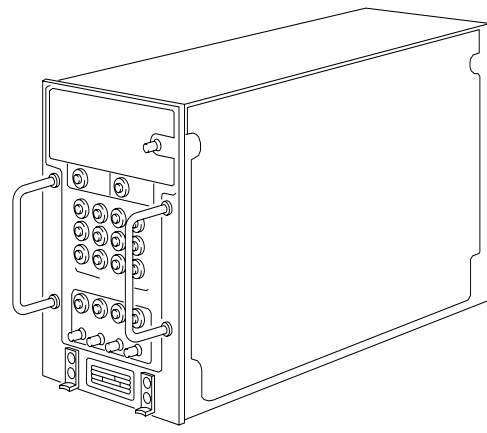
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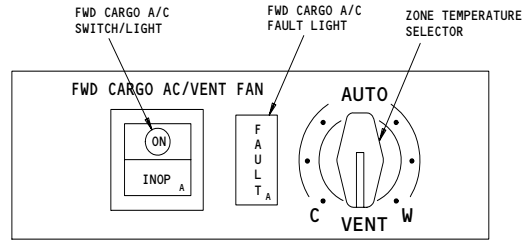
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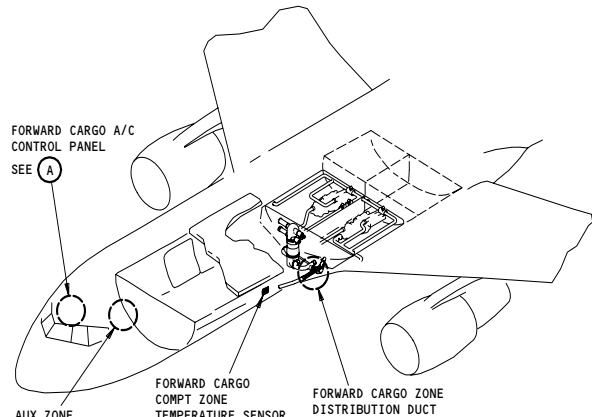
AUX ZONE TEMPERATURE CONTROLLER (E1-5)

(B)



FORWARD CARGO AIR CONDITIONING CONTROL PANEL
(PILOT'S OVERHEAD CONTROL PANEL, P5)

(A)

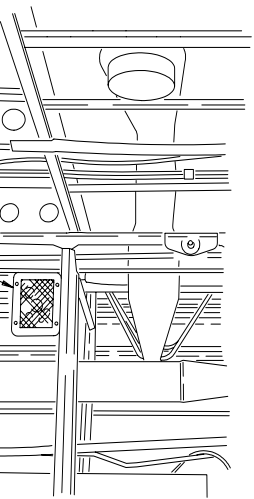


FORWARD CARGO A/C CONTROL PANEL

SEE (A)

AUX ZONE TEMPERATURE CONTROLLER (MAIN EQUIP CTR)

SEE (B)

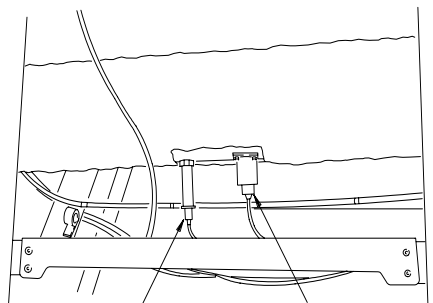


ZONE TEMPERATURE SENSOR

SEE (G)

FORWARD CARGO COMPARTMENT ZONE TEMPERATURE SENSOR

(C)



ZONE DUCT OVERHEAT SWITCH

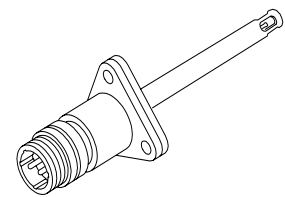
SEE (F)

ZONE DUCT AIR TEMP SENSOR

SEE (E)

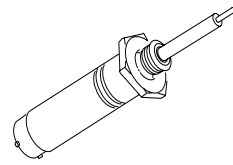
FORWARD CARGO ZONE DISTRIBUTION DUCT

(D)



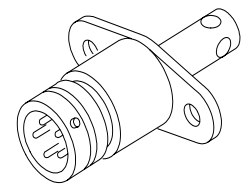
DUCT AIR TEMP SENSOR

(E)



ZONE DUCT OVHT SWITCH

(F)



ZONE TEMPERATURE SENSOR

(G)

Forward Cargo Zone Temperature Control System Components
Figure 5A

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- (b) The aux controller also does automatic and continuous fault monitoring and initiated BITE for the aux forward, aux mid, and forward cargo zones. These qualities give an indication of internal controller faults, as well as fault isolation and monitoring of temperature control system LRUs. Red lights show defective LRUs during a BITE check. An internal non-volatile memory keeps on-line BITE data for later interrogation. BITE monitors and keeps LRU faults for 10 flights.

E. Zone Temperature Sensors (Fig. 5, 5A)

(1) Description

- (a) The cabin and cargo zone temperature sensors are dual-element sensors. Each element consists of two series-connected glass-sealed thermistors environmentally sealed in a stainless steel probe-type housing.

(2) Function

- (a) The temperature sensor measures cabin and cargo zone air temperature. The thermistor beads operate at low current levels to minimize temperature offset due to self heating effects. The resistance in each thermistor bead varies inversely with the sensed temperature.
- (b) The sensed temperature is sent electrically to the zone temperature controller, the aux zone temperature controller, and to the pack temperature controllers (Ref 21-51-00).

F. Duct Air Temperature Sensors (Fig. 5, 5A)

(1) Description

- (a) The duct air temperature sensors are single-element sensors consisting of two series-connected, glass-sealed, thermistors. The thermistors are hermetically sealed in a probe-type housing with an integral electrical connector. The sensor mounts to a three-hole flange with an integral gasket. The sensor has a temperature control range of 35°F (2°C) to 180°F (82°C) and an operating temperature range of -65°F (-54°C) to 350°F (177°C).

(2) Function

(a) Cabin Zone Inlet Duct Air Temperature Sensors

- 1) A duct air temperature sensor is mounted in each cabin zone inlet duct. The flight deck, forward, mid, and aft zone sensors send temperature signals to the zone temperature controller. The aux forward and aux mid sensors send temperature signals to the aux zone temperature controller.

(b) Mix Manifold Duct Air Temperature Sensors

- 1) Two duct air temperature sensors mount on the mix manifold. Each sensor provides a temperature signal to a pack temperature controller.

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- (c) Forward Cargo Zone Duct Air Temperature Sensor
 - 1) A duct air temperature sensor is mounted in the forward cargo zone inlet duct. The sensor sends a temperature signal to the aux zone temperature controller.

G. Zone Duct Overheat Switches (Fig. 5, 5A)

(1) Description

- (a) The zone duct overheat switch consists of a fluid-filled probe, a housing, and an electrical connector. The housing consists of a diaphragm welded to the housing, a spring and retainer, and a switch. The spring completely supports the diaphragm. The retainer provides protection from spring over-travel.

(2) Function

- (a) Upon a rise in duct temperature, the fluid in the probe expands with the generated pressure being proportional to the sensed temperature. The diaphragm senses the generated pressure and at 190°F (88°C) the pressure exceeds the spring force and activates the switch. When the temperature decreases to 160°F (71°C) the switch resets due to the spring force. Actuating the switch on increasing duct temperature activates circuitry to close the associated trim air modulating valve. The cabin zone duct overheat switches turn on an amber INOP light on the pilot's overhead panel P5. The forward cargo zone duct overheat switch turns on an amber FAULT light on the pilot's overhead panel.

H. Trim Air Supply Check Valves (Fig. 5, 5A)

(1) Description

- (a) The trim air supply check valve consists of two semi-circular flappers hinged about a hinge pin running through the center of the valve body, normal to the body axis. The flappers, hinge pin, and flapper stop pin/post fit into the one-piece valve body. A torsion spring reduces the flapper movement during low or no flow conditions. A flow arrow on the side of the valve body indicates direction of normal airflow.

(2) Function

- (a) Airflow in the direction of the flow arrow drives the flappers open until the flappers contact the stop pin. Reverse airflow drives the flappers closed. Once closed, the valve prevents airflow in the reverse direction.

I. Zone Temperature Selectors (Fig. 5, 5A)

(1) Description

- (a) Each zone temperature selector consists of a cylindrical housing having a protruding selector shaft at one end. A knob and a twelve-pin connector secured with a hexagon nut, mount on opposite ends of the selector shaft. A nameplate and a schematic diagram label are attached to the housing. The unit contains potentiometer(s), switches, and a cam assembly.

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(2) Function

(a) Cabin Zone Temperature Selector

1) Rotating the temperature selector shaft selects either an automatic, manual, or off temperature control mode. The selector's potentiometer controls the automatic mode temperature selection between 63°F (17°C) and 85°F (29°C) while switch logic controls manual temperature selection. Only the flight deck zone has the manual mode. In the manual mode three control positions are available: MANUAL, COOL, and WARM, with the selector spring-loaded to the MANUAL position. The passenger cabin zone temperature selectors have AUTO and OFF modes.

(b) Forward Cargo Zone Temperature Selector

1) Rotating the temperature selector shaft selects either an automatic or vent temperature control mode. The selector's potentiometer controls the automatic mode temperature selection between 40°F (4°C) and 77°F (25°C). In the vent mode the forward cargo air conditioning is shutdown.

J. Trim Air Muffler (Installed on 767-300 Airplanes)

(1) The 4 1/2 inch diameter, 22 inch long mufflers are located in the left ECS bay. The mufflers are mounted in the section of ducting just downstream of the trim air modulating valves. The mufflers reduce the level of noise in the trim air ducts, which lead to each of the cabin zones and the flight compartment.

(2) The muffler assemblies consist of a perforated center tube wrapped with Nomex acoustic batting, and enclosed with a tubular housing. The muffler housing is commercially pure titanium sheet.

3. Operation

A. Functional Description (Fig. 6)

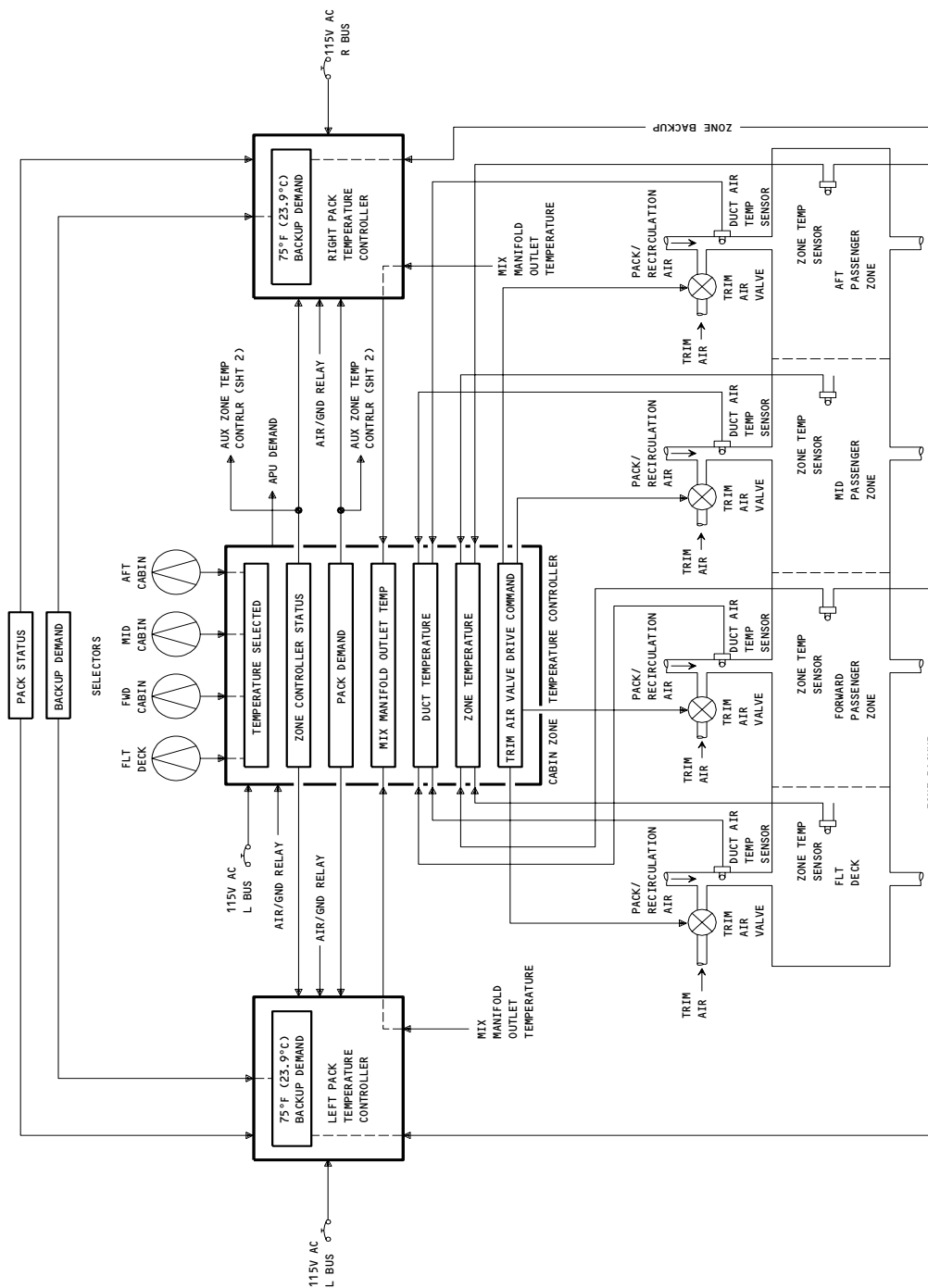
(1) System Temperature Integration

(a) The zone temperature controller determines a pack temperature demand signal by comparing the zone temperature selector inputs to the zone temperature sensor inputs. The zone temperature controller selects the lowest zone temperature demand and sends that signal to the pack temperature controllers as pack demand. The pack temperature controllers receive the temperature inputs from the mix manifold duct air temperature sensors and send the signals to the zone controller. The zone controller determines the lowest of the two mix manifold temperature signals and uses that signal as a reset temperature for the pack demand signal. The reset temperature corrects the basic pack demand signal to include the effect of recirculated air mixed with conditioned air from the packs. The pack demand resets until the sensed mix manifold temperature equals the temperature demand from the zone requiring the greatest cooling. The zone controller then closes the trim air modulating valve for the coolest zone and modulates the trim air modulating valves for the other zones to satisfy the required zone inlet temperatures.

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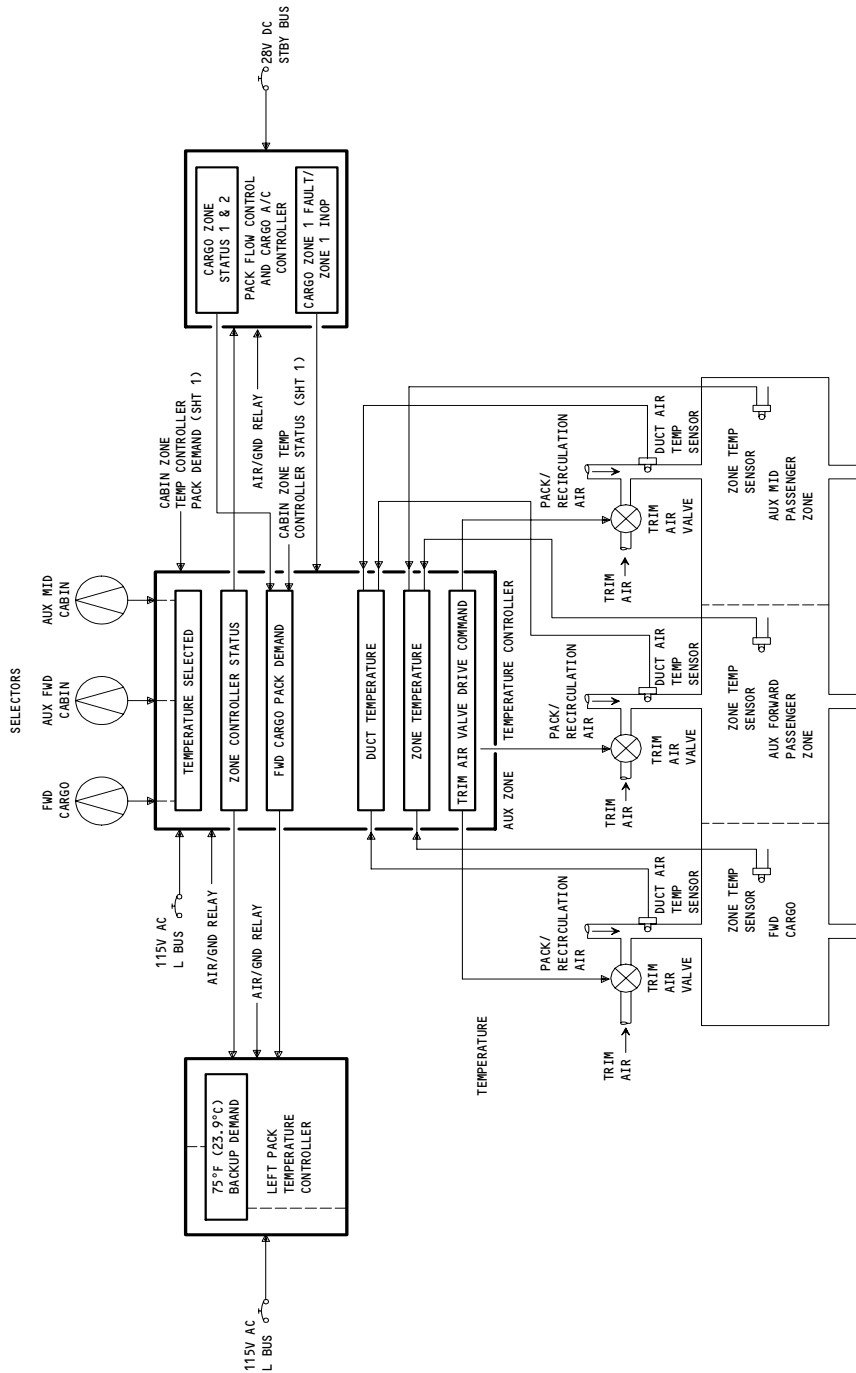


System Temperature Integration
Figure 6 (Sheet 1)

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System Temperature Integration
Figure 6 (Sheet 2)

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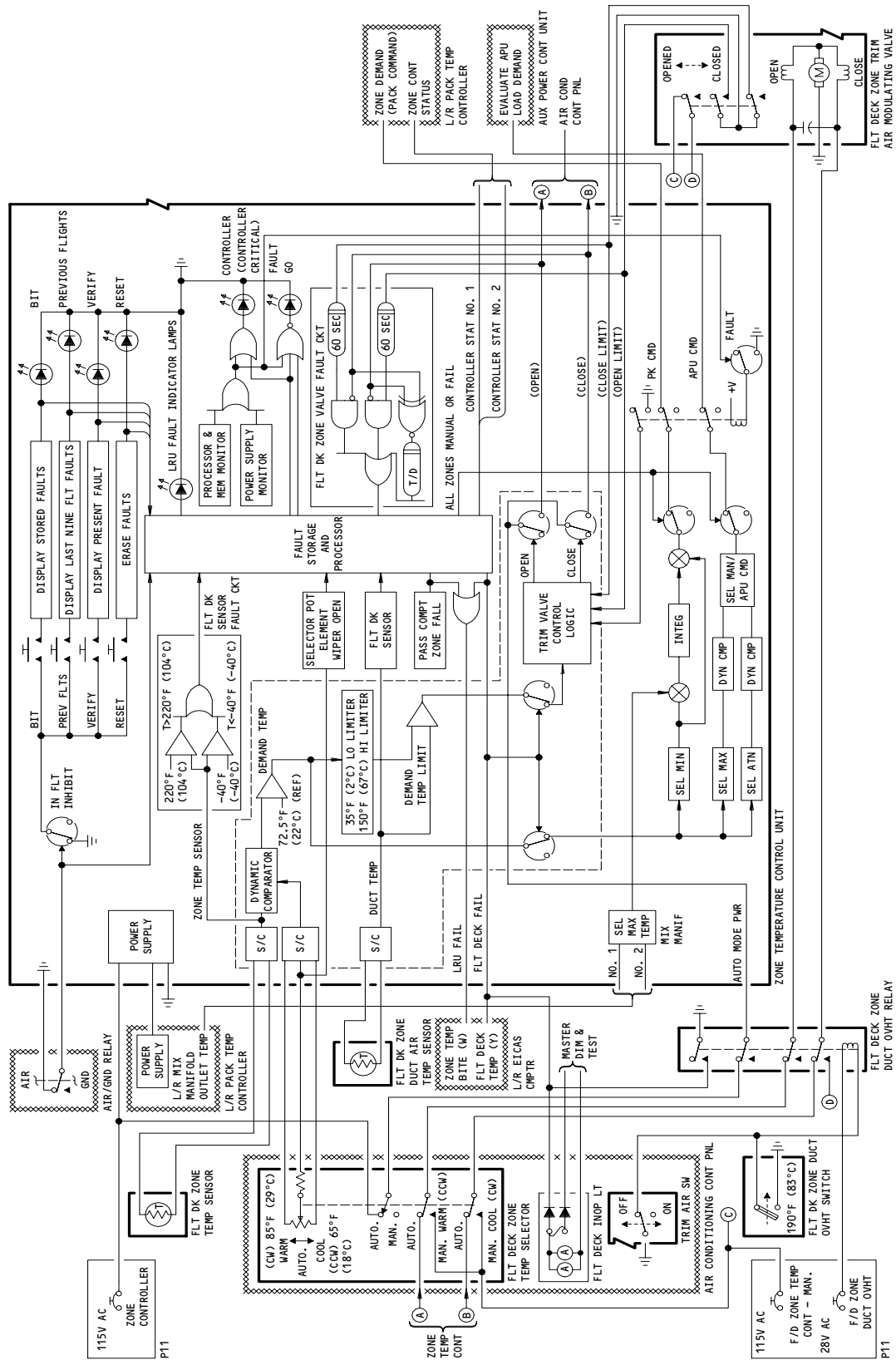
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- (b) Losing the pack demand signal (zone controller failure or all zone temperature selectors switched out of AUTO) switches the pack controllers to a 75°F (24°C) backup mode. In the backup mode the zone demand signal is the error between the averaged sensed cabin temperature and a 75°F (24°C) setpoint.
 - (c) The APU controller uses the supply temperature demand signal generated by the zone controller to determine APU output. The demand signal remains at minimum until the pack and trim controls produce maximum available heating or cooling. The APU command signal increases with greater demand to provide the required output.
- (2) Temperature Control (Fig. 7, 8, 8A, 8B)
- (a) Auto Mode
 - 1) Flight Deck Zone
 - a) The zone temperature controller operates on 115v ac power. Placing the zone temperature selectors to AUTO, the pack mode selector to AUTO, and the TRIM AIR switch ON provides complete automatic temperature control through the zone controller. The AUTO input controls the temperature between 65°F (18°C) and 85°F (29°C).
 - b) During normal auto mode operation, the zone temperature controller modulates the trim air supply modulating valve corresponding to the flight deck zone. The controller commands the valve to the proper position to permit just enough trim air to mix with conditioned air from the mix manifold to supply the demanded air temperature in the flight deck. The zone temperature selector may be placed in AUTO (12 o'clock position), AUTO W, or AUTO C or anywhere in between for temperature control in the AUTO mode. The AUTO position sends a temperature signal equivalent to 75°F (24°C) to the zone temperature controller for its use in providing a pack or APU temperature demand signal. The AUTO W position sends a temperature signal equivalent to 85°F (29°C) and the AUTO C sends a temperature signal equivalent to 63°F (17°C) to the zone temperature controller for the same purpose.

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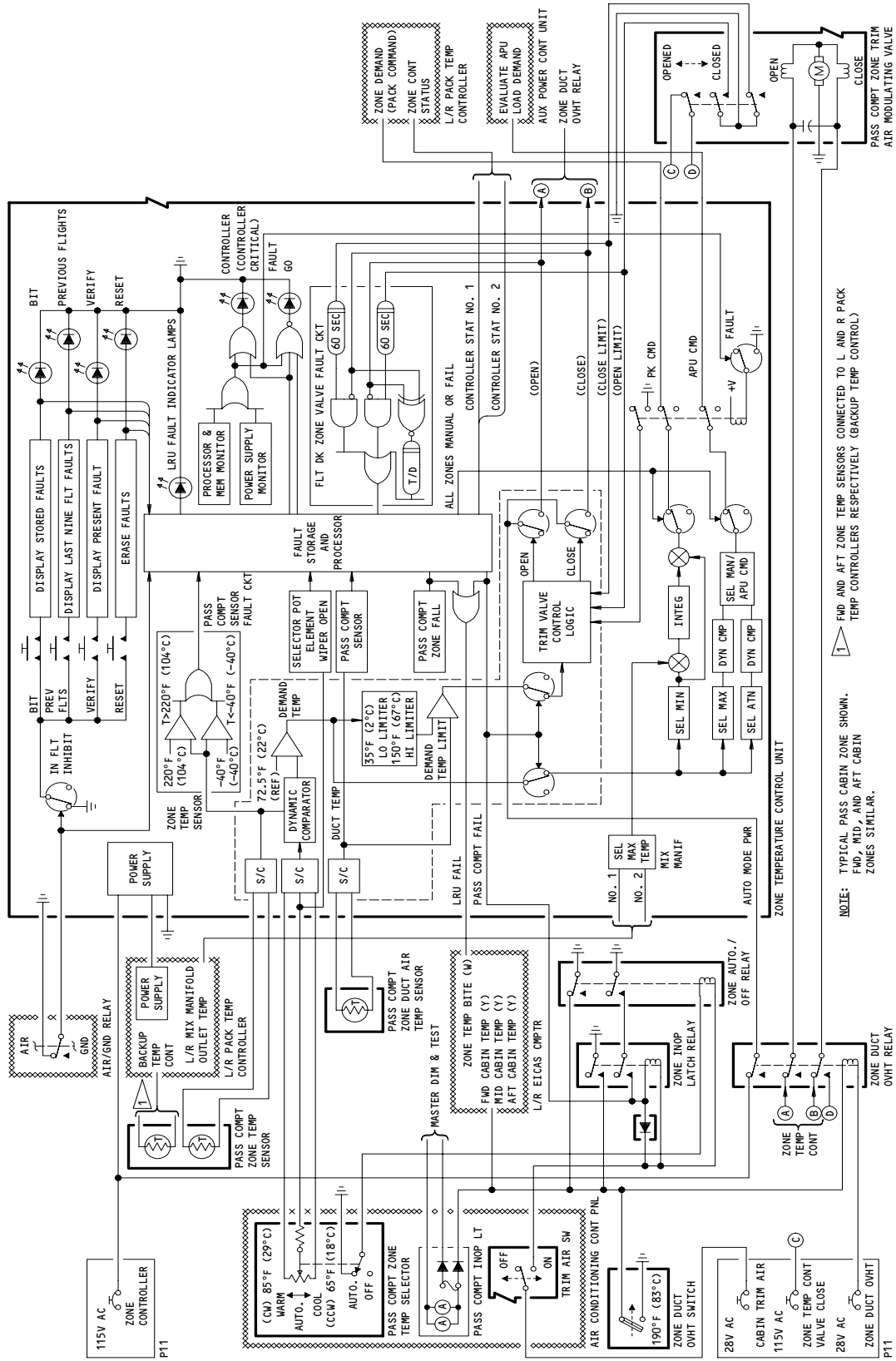


Temperature Control - Flight Deck Zone
Figure 7

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NOTE: TYPICAL PASS CABIN ZONE SHOWN. FWD, MID, AND AFT CABIN ZONES SIMILAR.

▲ FWD AND AFT ZONE TEMP SENSORS CONNECTED TO L AND R PACK TEMP CONTROLLERS RESPECTIVELY (BACKUP TEMP CONTROL)

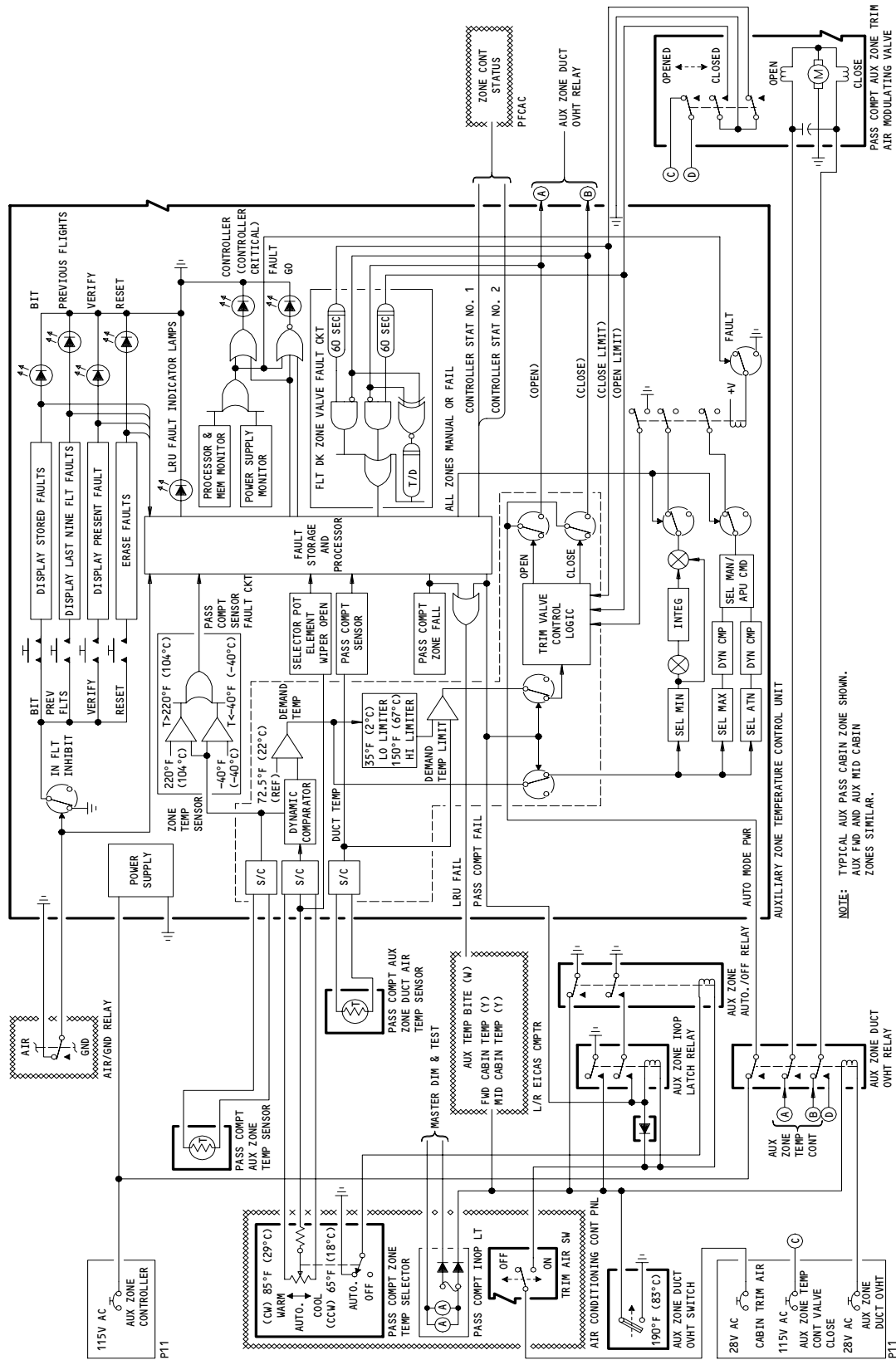
Temperature Control - Main Passenger Cabin Zone
Figure 8

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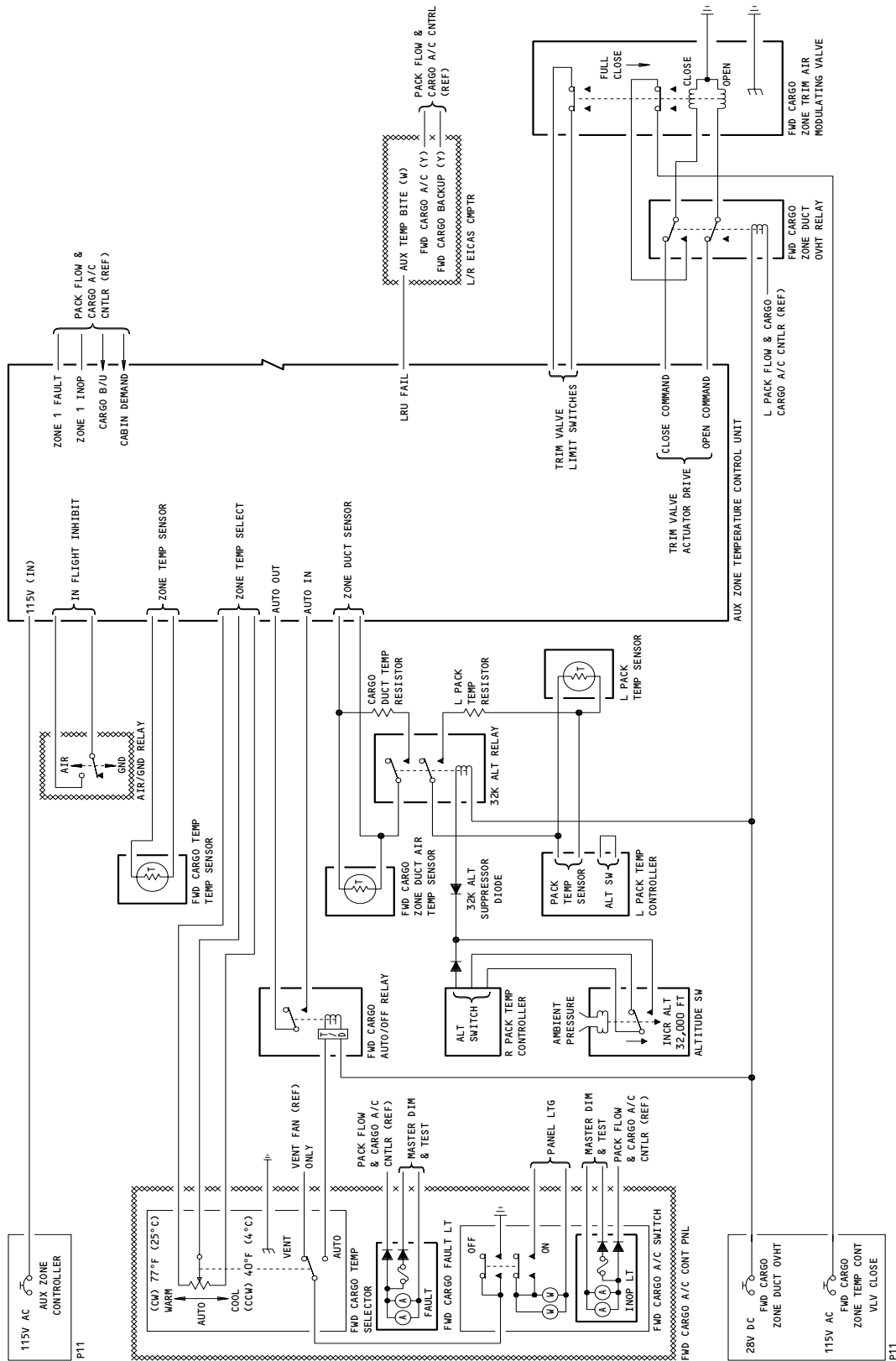
NOTE: TYPICAL AUX PASS CABIN ZONE SHOWN.
AUX FWD AND AUX MID CABIN
ZONES SIMILAR.

Temperature Control - Aux Passenger Cabin Zone
Figure 8a

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Temperature Control - Forward Cargo Zone
Figure 88

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- c) In an overheat condition (190°F (88°C)) the flight deck zone overheat relay energizes. The energized overheat relay prevents the zone temperature controller from modulating the trim air supply modulating valve and allows the valve to be powered closed directly by 115vac. The overheat causes the INOP light on the pilot's overhead panel to come on and the EICAS displays FLT DECK TEMP Level C caution message. FLT DECK TEMP is an ECS auto event. An overheat prevents zone temperature controller monitoring of flight deck zone temperature control components.
 - d) An INOP condition may also occur. An INOP condition consists of a fault within the flight deck zone control loop detected by the zone temperature controller. An INOP condition eliminates the flight deck zone temperature demand signal from pack and APU command discrimination. The zone temperature controller provides a ground to allow the INOP light to come on and the EICAS FLT DECK TEMP message to be displayed. The INOP condition shuts off the drive signals from the zone temperature controller to the trim air modulating valve. The trim valve remains in its last position before the INOP occurred. The zone temperature controller still monitors LRUs for this zone.
- 2) Passenger Cabin Zones
- a) The zone temperature controller operates on 115v ac power. Placing the zone temperature selectors to AUTO, the pack mode selector to AUTO, and the TRIM AIR switch ON provides complete automatic temperature control through the zone controller. The AUTO input controls the temperature between 65°F (18°C) and 85°F (29°C).
 - b) During normal auto mode operation, the zone temperature controller modulates the trim air supply modulating valve corresponding to the selected zone. The controller commands the valve to the proper position to permit just enough trim air to mix with conditioned air from the mix manifold to supply the demanded air temperature in each cabin zone. The zone temperature selector may be placed in AUTO (12 o'clock position), AUTO W, or AUTO C, or anywhere in between for temperature control in the AUTO mode. The AUTO mode sends a temperature signal equivalent to 75°F (24°C) to the zone temperature controller for its use in providing a pack or APU demand signal. The AUTO W position sends a temperature signal equivalent to 85°F (29°C) and the AUTO C position sends a temperature signal equivalent to 63°F (17°C) to the zone temperature controller for the same purpose.

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- c) In an overheat condition (190°F (88°C)) the appropriate zone duct overheat relay energizes. The energized overheat relay prevents the zone temperature controller from modulating the trim air supply modulating valves and allows the valves to be powered closed directly by 115vac. The overheat causes the INOP light on the pilot's overhead panel P5 to come on for the appropriate zone. EICAS also displays CABIN TEMP Level C caution message for each zone. Both messages are ECS auto events (Ref 31-41-00). An overheat prevents zone temperature controller monitoring of the affected cabin zone temperature control components.
 - d) An INOP condition may also occur. An INOP condition consists of a fault within a cabin zone control loop detected by the zone temperature controller. An INOP condition eliminates the affected zone temperature demand signal from pack and APU command discrimination. The zone temperature controller provides a ground to allow the INOP light to come on and the EICAS CABIN TEMP message to be displayed for the respective zone. The zone duct overheat relay also energizes to allow the corresponding trim air supply modulating valve to be powered closed directly by 115vac. The zone temperature controller still monitors LRUs for the affected zone.
- 3) Aux Forward and Aux Mid Passenger Cabin Zones
- a) The aux zone temperature controller operates on 115v ac power. Placing the FWD and MID zone temperature selectors to AUTO, the pack mode selector to AUTO, and the TRIM AIR switch ON provides complete automatic temperature control for the aux forward and aux mid zones through the aux zone controller. The AUTO input controls the temperature between 65°F (18°C) and 85°F (29°C).
 - b) During normal auto mode operation, the aux zone temperature controller modulates the aux forward and aux mid zone trim air supply modulating valves. The controller commands these valves to the proper position. This permits just enough trim air to mix with conditioned air from the mix manifold to supply the demanded air temperature in the aux cabin zones. The demanded air temperature comes from the FWD and MID zone temperature selectors. The zone temperature selector may be placed in AUTO (12 o'clock position), AUTO W, or AUTO C, or anywhere in between for temperature control in the AUTO mode.

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- c) In an overheat condition (190°F (88°C)) the appropriate zone duct overheat relay energizes. The energized overheat relay prevents the aux zone temperature controller from modulating the trim air supply modulating valves and allows the valves to be powered closed directly by 115vac. An aux forward zone overheat causes the forward zone INOP light on the pilot's overhead panel P5 to come on. An aux mid zone overheat causes the mid zone INOP light on the pilot's overhead P5 panel to come on. EICAS also displays FWD CABIN TEMP or MID CABIN TEMP level C caution message for the affected zone. Both messages are ECS auto events (Ref 31-41-00). There are no special messages for aux forward or aux mid zone overheat. An overheat prevents aux zone temperature controller monitoring of the affected aux cabin zone temperature control components.
 - d) An INOP condition may also occur. A forward or mid INOP condition could be caused by a fault within an aux cabin zone control loop detected by the aux zone temperature controller. The aux zone temperature controller provides a ground to allow the forward or mid zone INOP light to come on and the EICAS CABIN TEMP message to be displayed for either the forward or mid zone. The aux zone duct overheat relay also energizes to allow the corresponding trim air supply modulating valve to be powered closed directly by 115vac. The aux zone temperature controller still monitors LRUs for the affected zone.
- 4) Forward Cargo Compartment Zone
- a) The aux zone temperature controller operates on 115v ac power. When the FWD CARGO A/C temperature selector is in AUTO, the pack mode selector is in AUTO, and the FWD CARGO A/C switch is ON, complete automatic temperature control for the forward cargo zone is provided through the aux zone controller. The AUTO input controls the temperature between 40°F (4°C) and 77°F (25°C).

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- b) During normal auto mode operation, the aux zone temperature controller modulates the forward cargo zone trim air supply modulating valve. The controller commands the valve to the proper position. This permits just enough trim air to mix with conditioned air from the left air conditioning pack (Ref 21-28-00) to supply the demanded air temperature in the forward cargo zone. The demanded air temperature comes from the FWD CARGO A/C temperature selector. The zone temperature selector may be placed in AUTO (12 o'clock position), AUTO W, or AUTO C, or anywhere in between for temperature control in the AUTO mode. When the VENT position is selected or forward cargo air conditioning is inhibited (Ref 21-28-00) the temperature control system is shutdown.
 - c) In an overheat condition (190°F (88°C)) the fwd cargo zone duct overheat relay energizes. The energized overheat relay prevents the aux zone temperature controller from modulating the forward cargo zone trim air supply modulating valve and allows the valve to be powered closed directly by 115vac. A forward cargo zone overheat causes the forward cargo zone FAULT light on the pilot's overhead panel P5 to come on. EICAS also displays a FWD CARGO BACKUP level C advisory message. Forward-cargo-zone-temperature-control components are no longer monitored by the aux zone temperature controller when an overheat occurs.
 - d) An INOP condition may also occur. An INOP condition could be caused by a failed temperature selector , a failed aux zone temperature controller , or no power through the aux zone temperature controller. The aux zone temperature controller provides a ground to allow the forward cargo zone INOP light to come on and the EICAS CARGO A/C INOP level C advisory message to be displayed. The fwd cargo zone duct overheat relay also energizes to allow the trim air supply modulating valve to be powered closed directly by 115vac. If the aux zone temperature controller has not failed, it still monitors LRUs for the forward cargo zone.
- (b) Manual Mode
- 1) The manual mode bypasses the zone temperature controller control function. This mode also prevents the zone temperature controller from monitoring flight deck zone line replaceable units. The flight deck zone overheat relay allows 115vac to power the valve open or closed directly as commanded by the selector position. A valve position indicator just above the flight deck zone temperature selector allows observation of trim valve position (Ref 21-64-00).

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- 2) In an overheat condition (190°F) (88°C) the flight deck zone overheat relay energizes. The energized relay allows the trim air supply modulating valve to be powered closed directly by 115vac. The flight deck INOP light also comes on and the EICAS displays the FLT DECK TEMP message. FLT DECK TEMP is an ECS auto event (Ref 31-41-00).
- (c) OFF Mode
 - 1) The OFF mode prevents any trim air from entering the corresponding cabin zones. The corresponding zone overheat relays power the trim valves closed. The zone temperature selector selected to OFF causes the INOP light for that zone to come on. The EICAS CABIN TEMP message also comes on for that zone. These messages are ECS auto events (Ref 31-41-00). The off mode prevents zone temperature controller monitoring of components for that zone.
- (3) Trim Air Pressure Regulation (Fig. 9)
 - (a) Trim air for the cabin zones passes through the flow control and shutoff valves (Ref 21-51-00) and forces the trim air supply check valves open. The hot air then flows to the trim air pressure regulating valve. The trim air pressure regulating valve controls the pressure of the trim air to between 3 and 5 psi above cabin pressure. Limiting the trim air pressure reduces noise of the air passing through the trim air modulating valve and associated ducting by reducing trim air flow velocity.
 - (b) Forward cargo zone trim air passes through the cargo heating shutoff valve (Ref 21-43-00). The cargo heating shutoff valve is opened and closed by the FWD CARGO A/C switch on the pilot's overhead panel P5. Trim air pressure for the forward cargo compartment is not regulated.
 - (c) The TRIM AIR switchlight on the pilot's overhead panel P5, controls the trim air pressure regulating valve. The valve operates on 28v dc power. Pushing the switchlight ON allows the valve to receive power and the valve is driven open. The trim air modulating valves are commanded to the position which correlates with their zone temperature selector position. Pushing the TRIM AIR switchlight OFF prevents 28v dc power from reaching the trim air pressure regulating valve. The trim air pressure regulating valve closes, all zone INOP lights come on and the TRIM AIR OFF light comes on. The TRIM AIR level C caution message and each zones TEMP maintenance message are displayed on the EICAS display screen.

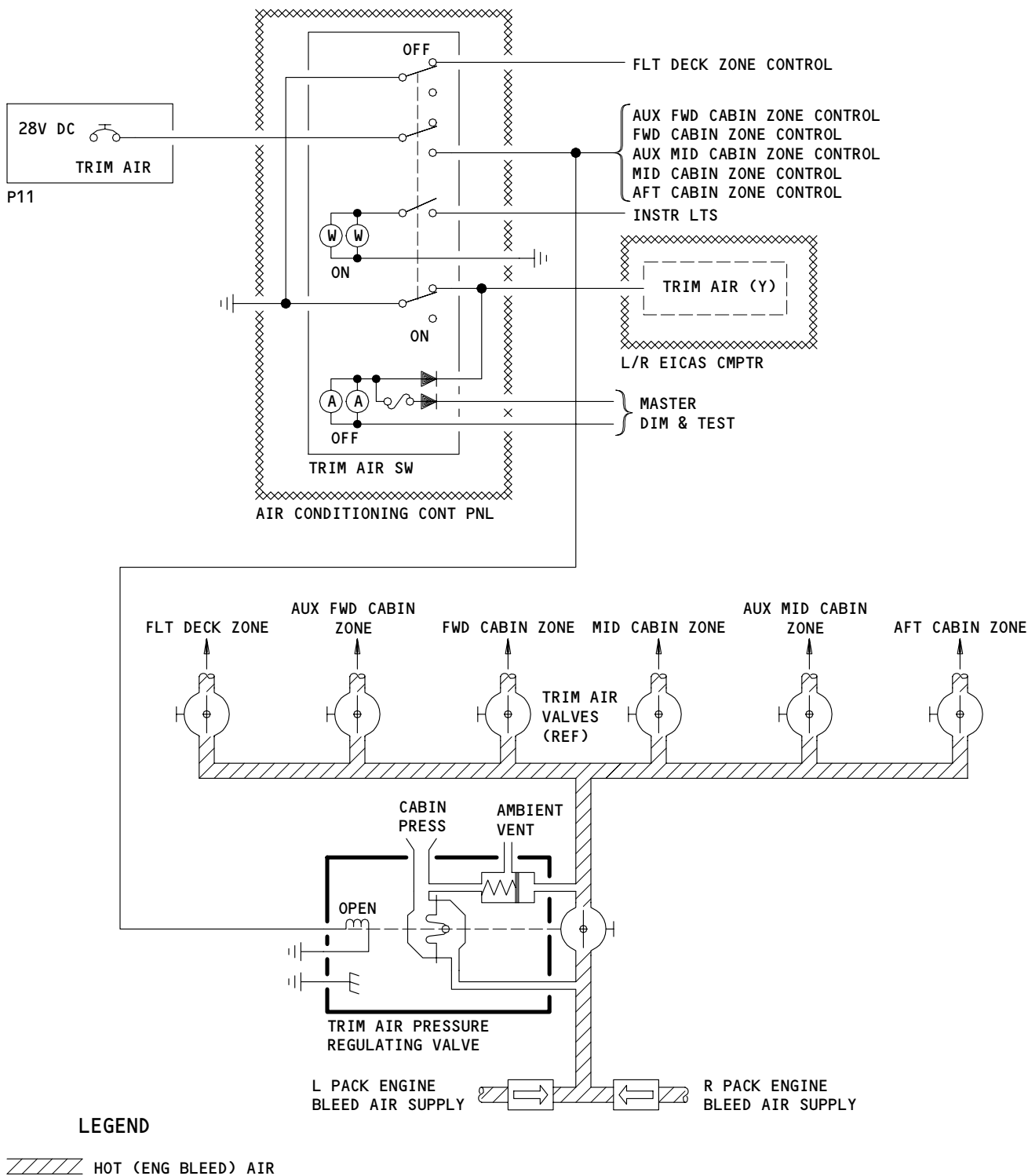
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Trim Air Pressure Regulation Schematic
Figure 9

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(4) Indication

(a) The Engine Indicating and Crew Alerting System (EICAS) provides indication of zone temperature control system malfunctions (Ref 31-41-00). Two display screens display the following system failure messages:

LEVEL	MESSAGE	NOTES
C	FLT DECK TEMP	ECS AUTO EVENT
C	AFT CABIN TEMP	ECS AUTO EVENT
C	FWD CABIN TEMP	ECS AUTO EVENT
C	MID CABIN TEMP	ECS AUTO EVENT
C	TRIM AIR	
C	FWD CARGO BACKUP	
S	CARGO A/C TEMP	
M	ZONE TEMP BITE	
M	AUX TEMP BITE	

- (b) EICAS also displays the trim air modulating valve position (Ref 21-64-00) and zone duct temperature (Ref 21-65-00) for each zone on the ECS/MSG (maintenance) page. These indications can be viewed only on the ground.
- (c) EICAS also displays zone temperature control system quantities as follows:
- 1) Trim air modulating valve position (Ref 21-64-00) for each cabin zone; viewed only on the ground
 - 2) Zone duct temperature (Ref 21-65-00) for each cabin zone, viewed only on the ground
 - 3) Zone temperature (Ref 21-65-00) for the forward cargo compartment on the EICAS STATUS page.
- (d) A compartment temperature indicator is located above the air conditioning control panel on the P5 panel and displays the temperature of each zone (Ref 21-65-00).

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B. Built-in-Test Equipment (BITE)

(1) Zone Temperature Controller

(a) The zone temperature controller contains the BITE for each of the zones. BITE includes an automatic and continuous monitoring mode and an initiated mode. The BITE will provide indication of an internal controller fault as well as faults with line replaceable units (LRUs) within the primary (zone) temperature control system. An internal non-volatile memory stores LRU fault information for later use. If a fault occurs within a cabin zone control loop or within the temperature controller itself, only the faults stored in the memory up to the time of failure remain in the memory. All fault monitoring within the affected loop or within the controller stops. Setting any cabin zone temperature selector out of the AUTO position also stops monitoring of that zone. BITE is used in the following manner.

- 1) Look at the zone temperature controller front panel and make sure that the CONTROLLER FAULT lamp is off. If the lamp is on, push the RESET pushbutton. If the lamp comes on again, replace the controller. If the lamp did not come on to begin with or after the RESET, continue the test.

NOTE: If the CONTROLLER FAULT light stays on, there is a problem with the zone temperature controller and/or a wiring problem with the trim air modulating valves.

An electrical short in the circuit wiring for the trim air modulating valve can cause the zone temperature controller to blow a fuse. An electrical resistance check of the circuit wiring must be done first before you replace the ZTC in order to isolate the cause of the electrical short to prevent future occurrences of a blown fuse in new ZTCs (FIM 21-60-00/101 Figure 104).

AIRPLANES WITH ZTC P/N S210T130-67,-68 OR EARLIER ZTC DASH NUMBERS;

If the zone temperature controller has a blown fuse, the CONTROLLER FAULT light will only show.

AIRPLANES WITH ZTC P/N S210T130-77,-78 AND SUBSEQUENT ZTC DASH NUMBERS;

If the zone temperature controller has a blown fuse, the CONTROLLER FAULT light will illuminate in addition to the TRIM VALVE fault light for FLIGHT DECK, FWD ZONE, MID ZONE, or AFT ZONE.

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- 2) Put all cabin zone temperature selectors on the pilot's overhead panel P5 to AUTO. Push the PRESS/TEST pushbutton on the controller. Make sure all indicator lamps come on. If any lamp does not come on, replace the controller and begin sequence again. If all lamps come on, continue the test.
- 3) Push the BIT pushbutton on the controller and make sure the green GO lamp comes on within 30 seconds. If the green GO lamp fails to come on, a faulty component monitored by the controller is indicated by a red lamp coming on. Replace the corresponding component. If the green GO lamp came on initially or a faulty component was replaced, continue the test.
- 4) Push the PREVIOUS FLIGHTS pushbutton. Make sure the green GO lamp to come on within 30 seconds. If the green GO lamp fails to come on, replace the faulty component indicated by the red lamp coming on. If the green GO lamp came on initially or a faulty component was replaced, continue the test.
- 5) Push the VERIFY pushbutton. Make sure the green GO lamp to come on within 30 seconds. If the green GO lamp fails to come on, replace the faulty component indicated by the red lamp coming on. If the green GO lamp came on initially or a faulty component was replaced, continue the test.
- 6) Push the RESET pushbutton. The test is complete.
- 7) An internal fault indication in the zone temperature controller can also occur from signals that are external to the controller. Fault indication can be caused by a short to ground in the wiring from external components that send signals to the zone temperature controller. A wiring check must be done if the internal fault indication(s) continues after the controller has been replaced.

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(2) Auxiliary Zone Temperature Controller

(a) The aux zone temperature controller contains the BITE for the aux forward, aux mid, and forward cargo zones. BITE includes an automatic and continuous monitoring mode and an initiated mode. The BITE will provide indication of an internal controller fault as well as faults with line replaceable units (LRUs') within the primary (zone) temperature control system. An internal non-volatile memory stores LRU fault information for later use. If a fault occurs within a zone control loop or within the aux temperature controller itself, only the faults stored in the memory up to the time of failure remain in the memory. All fault monitoring within the affected loop or within the controller stops. Setting the FWD cabin zone temperature selector out of the AUTO position stops monitoring of the forward and aux forward zones. Setting the MID cabin zone temperature selector out of the AUTO position stops monitoring of the mid and aux mid zones. Setting the FWD CARGO A/C temperature selector out of the AUTO position stops monitoring of the forward cargo zone. BITE is used in the following manner.

- 1) Look at the aux-zone-temperature controller front panel and make sure that the CONTROLLER FAULT lamp is off. If the lamp is on, push the RESET pushbutton. If the lamp comes on again, replace the controller. If the lamp did not come on to begin with or after the RESET, continue the test.

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NOTE: If the CONTROLLER FAULT light stays on, there is a problem with the auxiliary zone temperature controller and/or a wiring problem with the trim air modulating valves.

An electrical short in the circuit wiring for the trim air modulating valve can cause the auxiliary zone temperature controller to blow a fuse. An electrical resistance check of the circuit wiring must be done first before you replace the AZTC in order to isolate the cause of the electrical short to prevent future occurrences of a blown fuse in new AZTCs (FIM 21-60-00/101 Figure 104A).

AIRPLANES WITH AZTC P/N S210T130-72 OR EARLIER AZTC DASH NUMBERS;

If the auxiliary zone temperature controller has a blown fuse, the CONTROLLER FAULT light will only show.

AIRPLANES WITH AZTC P/N S210T130-80 AND SUBSEQUENT AZTC DASH NUMBERS;

If the auxiliary zone temperature controller has a blown fuse, the CONTROLLER FAULT light will illuminate in addition to the TRIM VALVE fault light for FWD AUX, MID AUX, or CARGO.

- 2) Put the FWD and MID cabin-zone-temperature selectors on the pilot's overhead panel P5 to AUTO. Put the FWD CARGO A/C temperature selector on the pilot's overhead P5 panel to AUTO. Put the TRIM AIR switch-light, on the P5 panel, to on. Put the FWD CARGO A/C switch-light, on the P5 panel, to ON. Push the PRESS/TEST pushbutton on the controller. Make sure all indicator lamps come on. If any lamp does not come on, replace the controller and begin sequence again. If all lamps come on, continue the test.
- 3) Push the BIT pushbutton on the controller and make sure the green GO lamp comes on within 30 seconds. If the green GO lamp fails to come on, a faulty component monitored by the controller is indicated by a red lamp coming on. Replace the corresponding component. If the green GO lamp came on initially or a faulty component was replaced, continue the test.
- 4) Push the PREVIOUS FLIGHTS pushbutton. Make sure the green GO lamp to come on within 30 seconds. If the green GO lamp fails to come on, replace the faulty component indicated by the red lamp coming on. If the green GO lamp came on initially or a faulty component was replaced, continue the test.

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- 5) Push the VERIFY pushbutton. Make sure the green GO lamp to come on within 30 seconds. If the green GO lamp fails to come on, replace the faulty component indicated by the red lamp coming on. If the green GO lamp came on initially or a faulty component was replaced, continue the test.
- 6) Push the RESET pushbutton. The test is complete.

C. Control

- (1) Provide electrical power (Ref 24-22-00).
- (2) For the cabin zone temperature control system, check that these circuit breakers on the overhead circuit breaker panel P11 are closed:
 - (a) TRIM AIR
 - (b) ZONE TEMP CONTROL MAN FLT DK
 - (c) ZONE DUCT OVHT FLT DK
 - (d) ZONE TEMP CONT VALVE CLOSE FWD
 - (e) ZONE TEMP CONT VLV CLOSE AUX FWD
 - (f) ZONE DUCT OVHT FWD
 - (g) ZONE DUCT OVHT AUX FWD
 - (h) ZONE TEMP CONT VALVE CLOSE MID
 - (i) ZONE TEMP CONT VLV CLOSE AUX MID
 - (j) ZONE DUCT OVHT MID
 - (k) ZONE DUCT OVHT AUX MID
 - (l) ZONE TEMP CONT VALVE CLOSE AFT
 - (m) ZONE DUCT OVHT AFT
 - (n) ZONE CNTLR
 - (o) AUX ZONE CNTLR
 - (p) ZONE TEMP IND
- (3) For the forward cargo zone temperature control system, check that these circuit breakers on the overhead circuit breaker panel P11 are closed:
 - (a) FWD CARGO ZONE DUCT OVHT
 - (b) FWD CARGO ZONE TEMP CONT VLV CLOSE
 - (c) ZONE CNTLR
 - (d) AUX ZONE CNTLR
- (4) Manual Operation
 - (a) Press TRIM AIR switchlight on P5 panel to ON position. Check that ON indicator comes into view and all zone INOP lights go out.
 - (b) Place FLT DK zone temperature selector, on pilot's overhead panel P5, to MAN position.
- (5) Automatic Operation
 - (a) For the cabin zone temperature control system,
 - 1) Push the TRIM AIR switchlight on the P5 panel to the ON position.
 - a) Make sure the ON indicator comes into view and all the cabin zone INOP lights go out.
 - 2) Put all the cabin zone temperature selectors, on the P5 panel, to the AUTO position.

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- (b) For the forward cargo zone temperature control system,
 - 1) Push the FWD CARGO A/C switchlight on the P5 panel to the ON position.
 - a) Make sure the ON indicator comes into view and the forward cargo zone INOP light goes out.
 - 2) Put the FWD CARGO zone temperature selector, on the P5 panel, to the AUTO position.

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TEMPERATURE CONTROL SYSTEM – ADJUSTMENT/TEST

1. General

A. This procedure has these tasks for a test of the zone temperature control system:

- (1) Operational Test – Zone Temperature Controller BITE
- (2) Operational Test – Auxiliary Zone Temperature Controller BITE
- (3) System Test – Flight Deck/Cabin Zone Temperature Control System
- (4) Operational Test – Flight Deck/Cabin Zone Duct Overheat Switches (Functional Check of Overheat Indication Circuit)
- (5) Operational Test (Alternate) – Flight Deck/Cabin Zone Duct Overheat Switches (Functional Check of Overheat Switch Setting and Overheat Indication Circuit)
- (6) System Test – Forward Cargo Zone Temperature Control System
- (7) Operational Test – Forward Cargo Zone Duct Overheat Switches (Functional Check of Overheat Indication Circuit)
- (8) Operational Test (Alternate) – Forward Cargo Zone Duct Overheat Switches (Functional Check of Overheat Switch Setting and Overheat Indication Circuit)

TASK 21-61-00-705-783

2. Operational Test – Zone Temperature Controller BITE

A. References

- (1) AMM 21-61-03/501, Zone Temperature Controller

B. Procedure

S 745-782

- (1) Do this task: Zone Temperature Controller BITE Test (AMM 21-61-03/501).

TASK 21-61-00-705-786

3. Operational Test – Auxiliary Zone Temperature Controller BITE

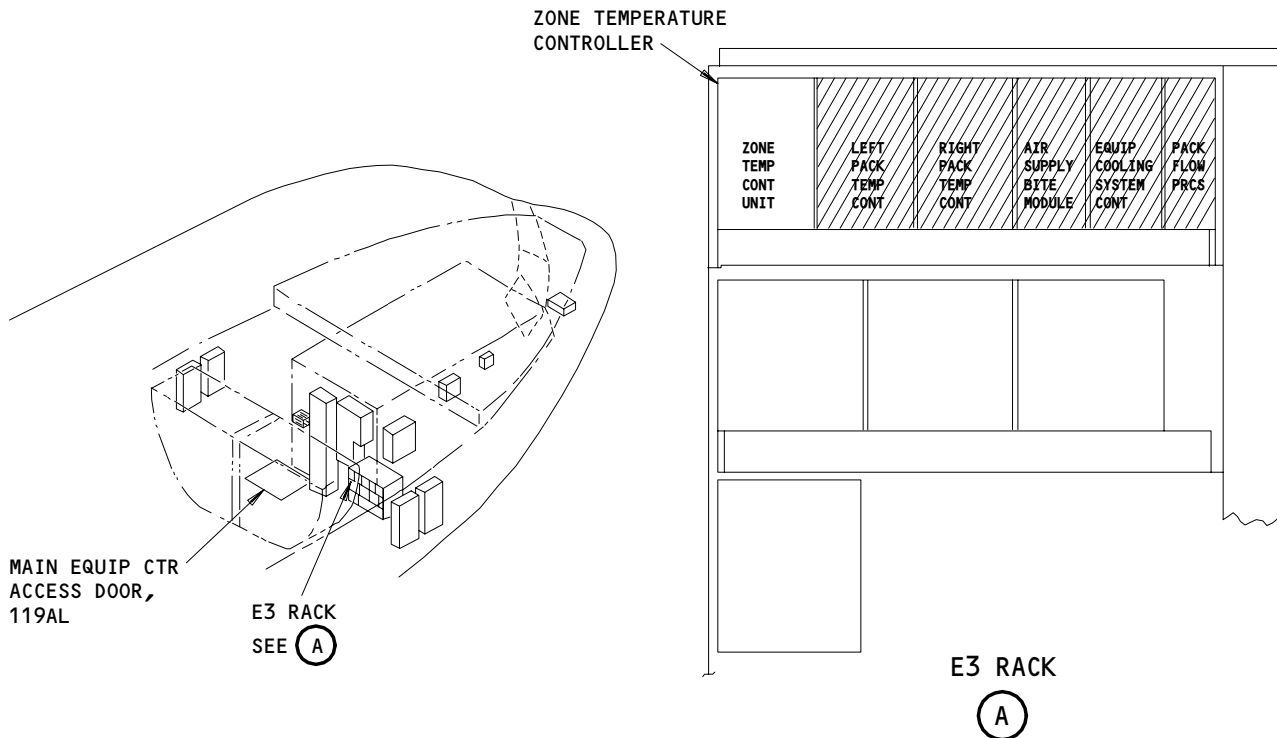
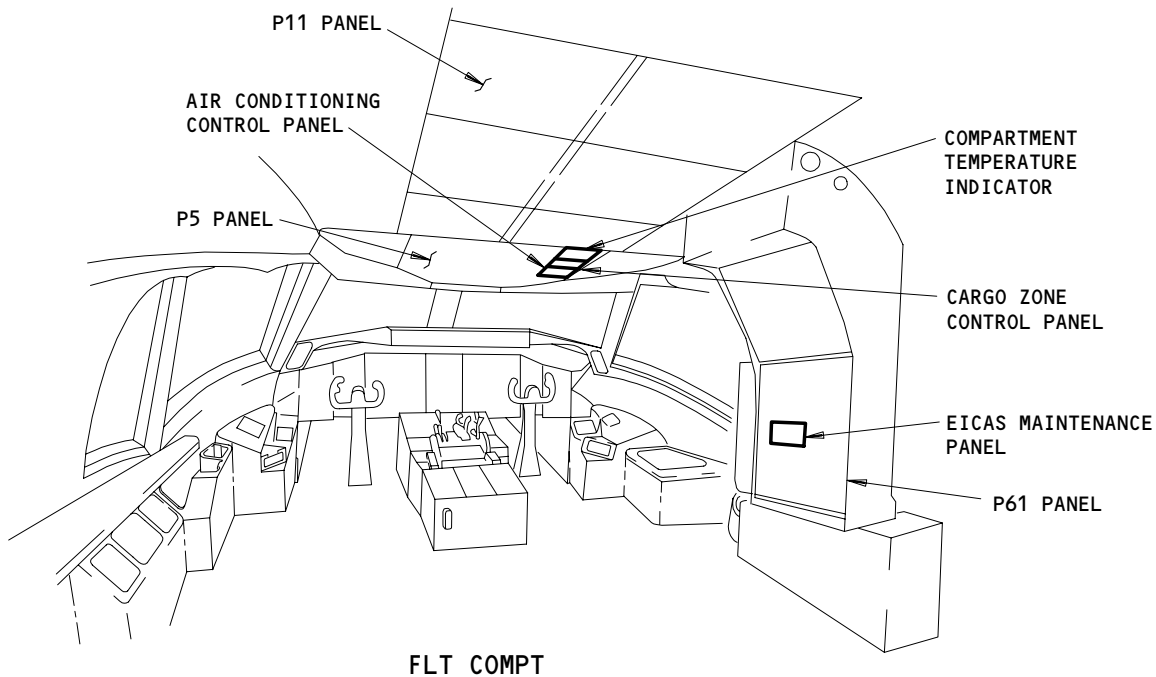
A. References

- (1) AMM 21-61-12/501, Auxiliary Zone Temperature Controller

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Zone Temperature Control Panels and Controller
Figure 501 (Sheet 1)

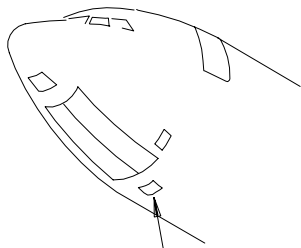
EFFECTIVITY

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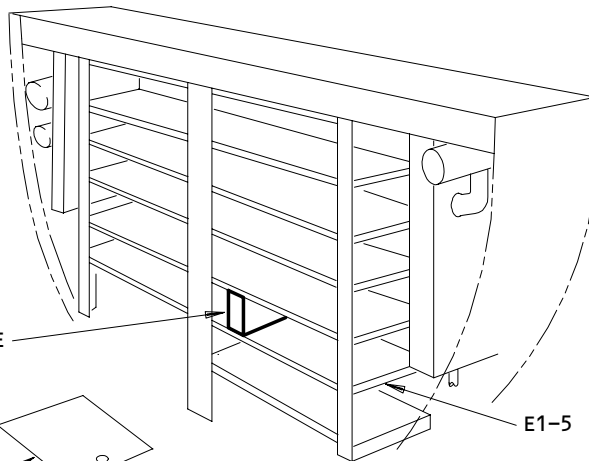
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03

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MAIN EQUIP CTR
ACCESS, 119AL



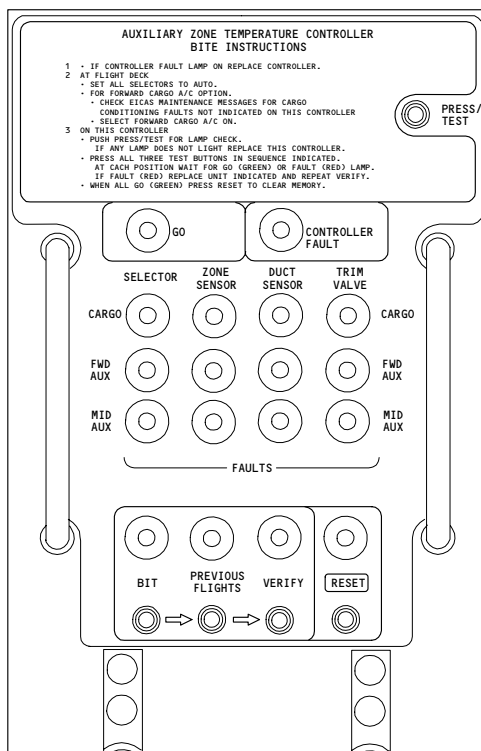
AUXILIARY ZONE
TEMPERATURE
CONTROLLER

SEE (B)

119AL

E1-5

MAIN EQUIP CTR



AUXILIARY ZONE TEMPERATURE CONTROLLER

(B)

Zone Temperature Control Panels and Controller
Figure 501 (Sheet 2)

EFFECTIVITY

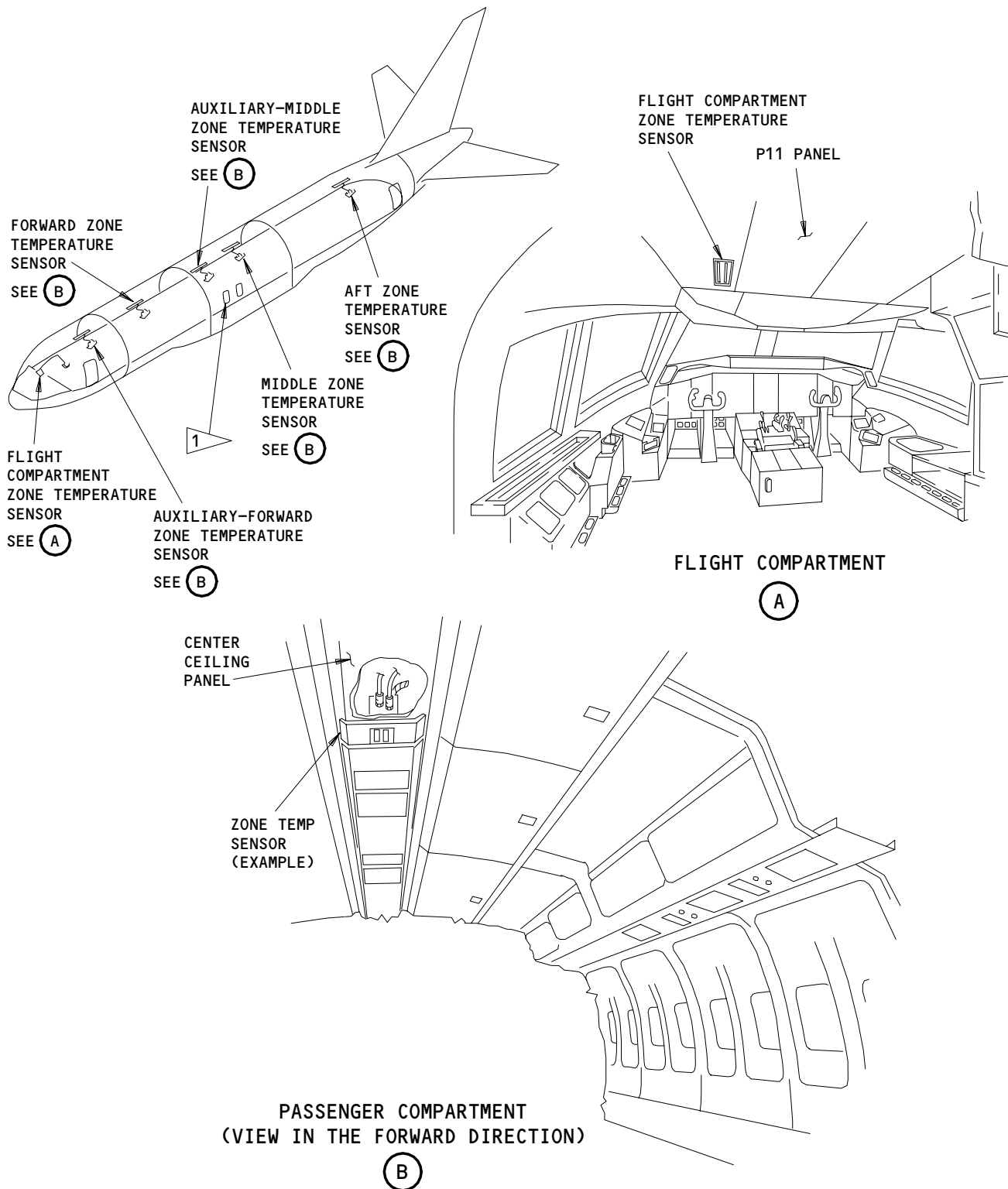
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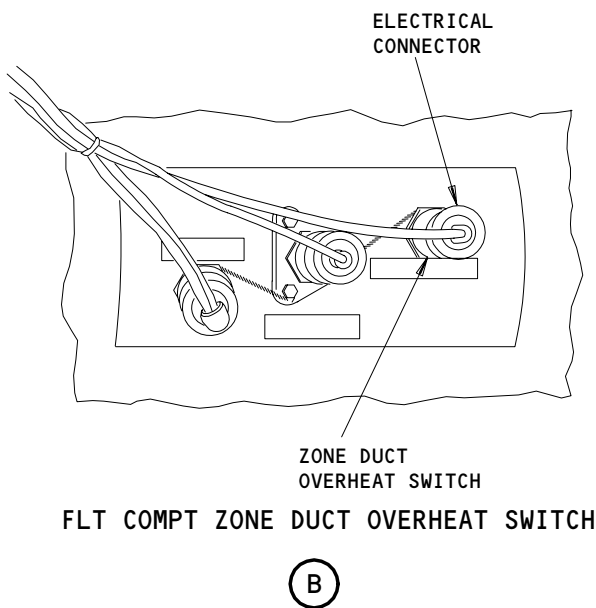
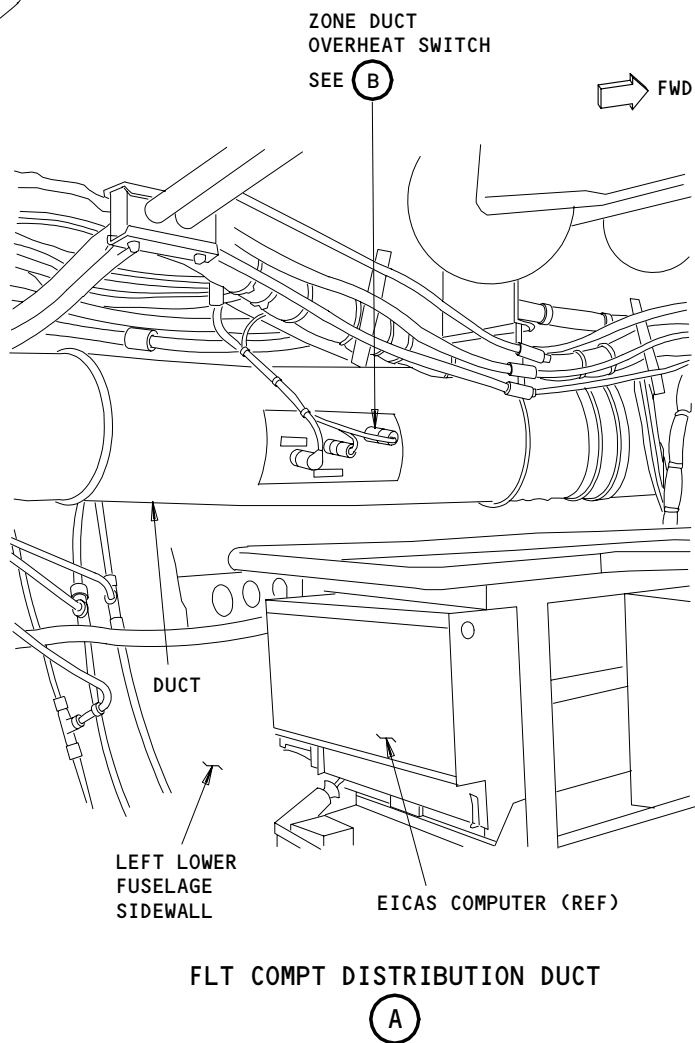
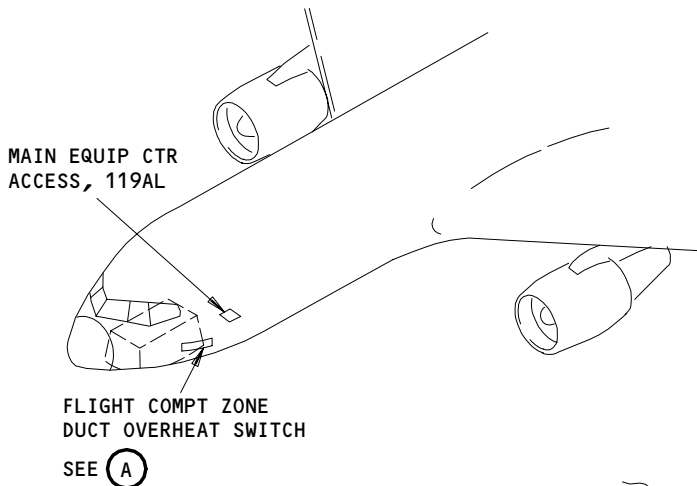
1 DUAL OVERWING ESCAPE HATCHES ON SAS 150-999, AND ALL MTH AIRPLANES

Zone Temperature Sensors
Figure 502

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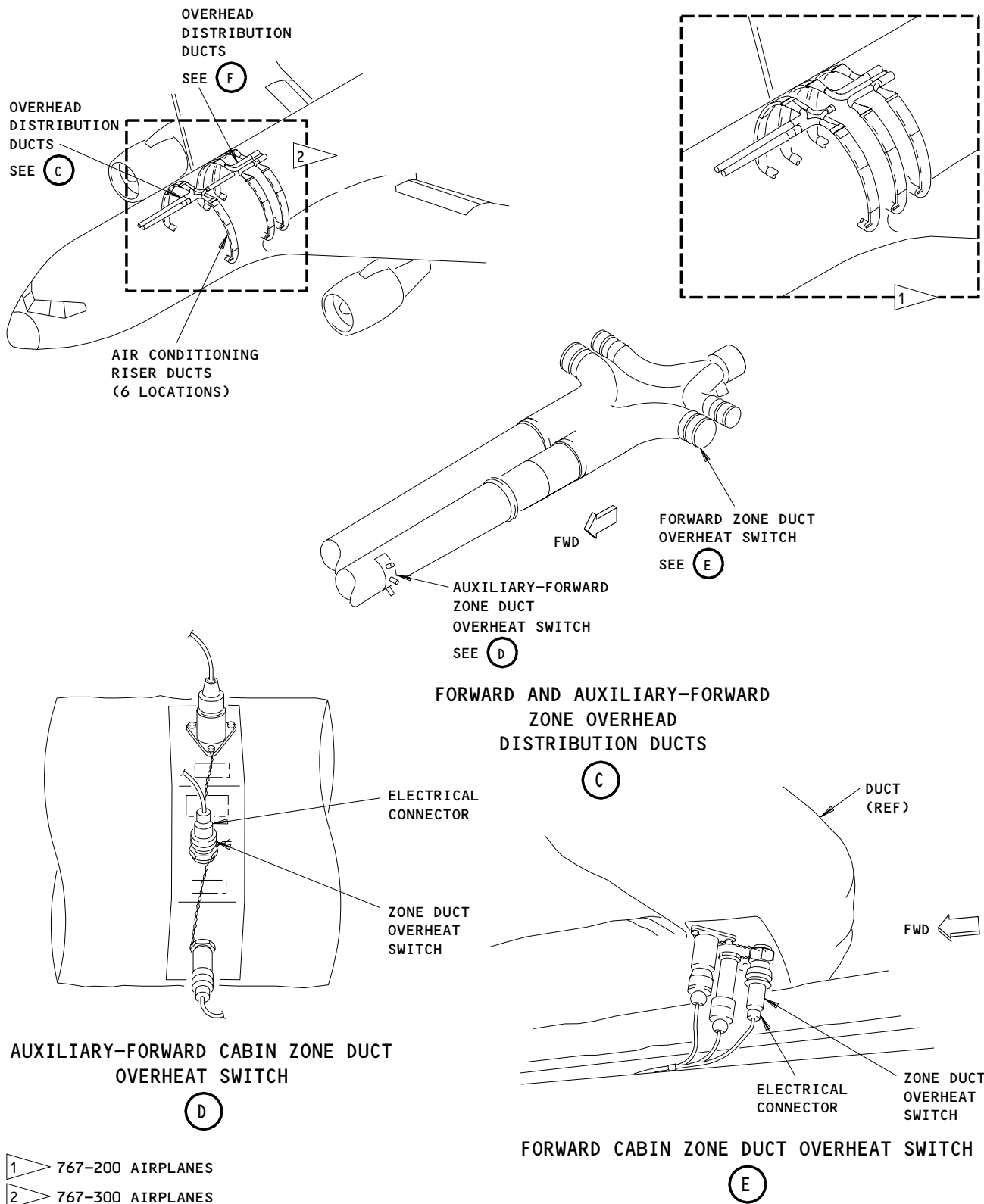
637857



Zone Duct Overheat Switch
Figure 503 (Sheet 1)

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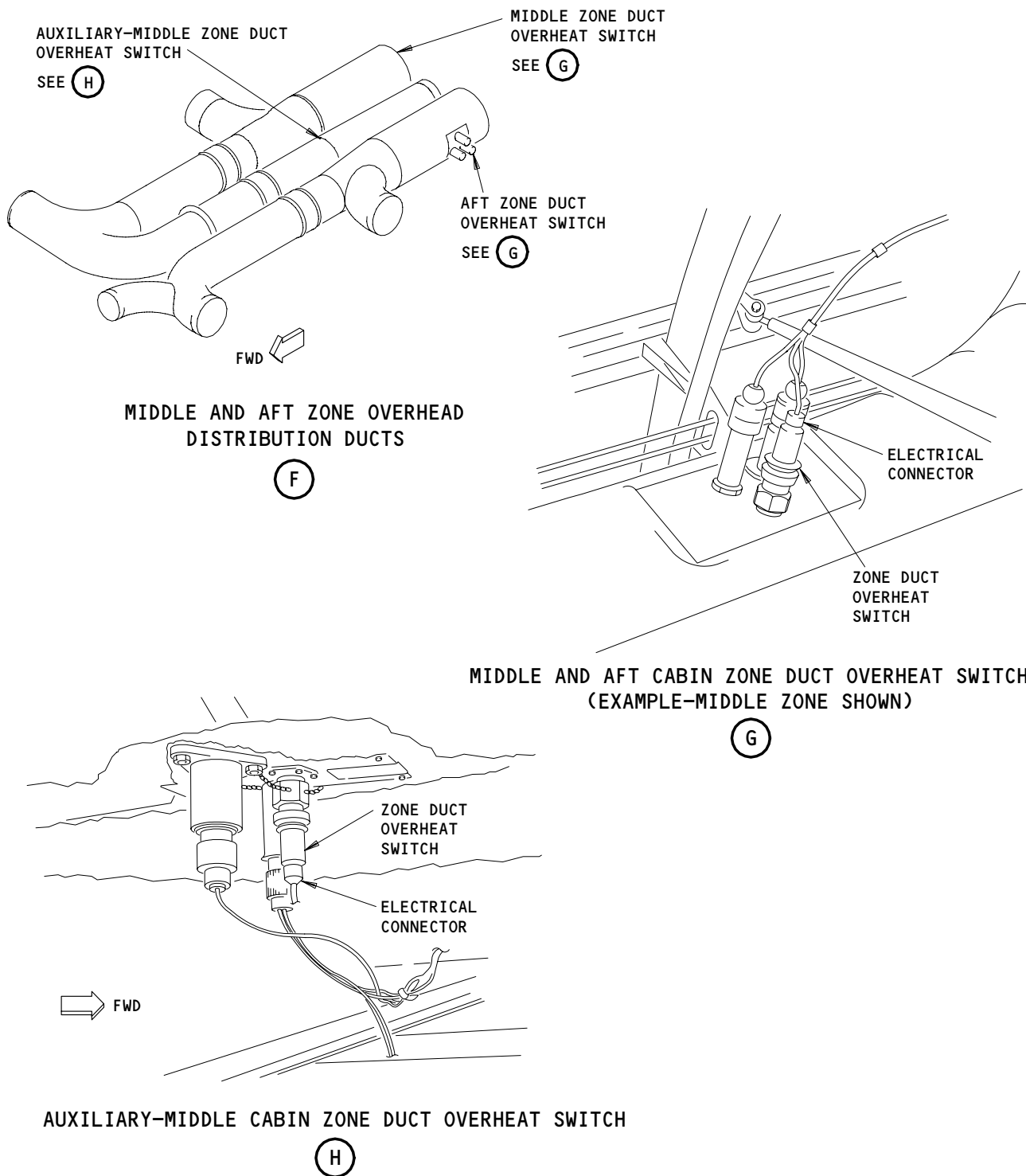
21-61-00



Zone Duct Overheat Switch
Figure 503 (Sheet 2)

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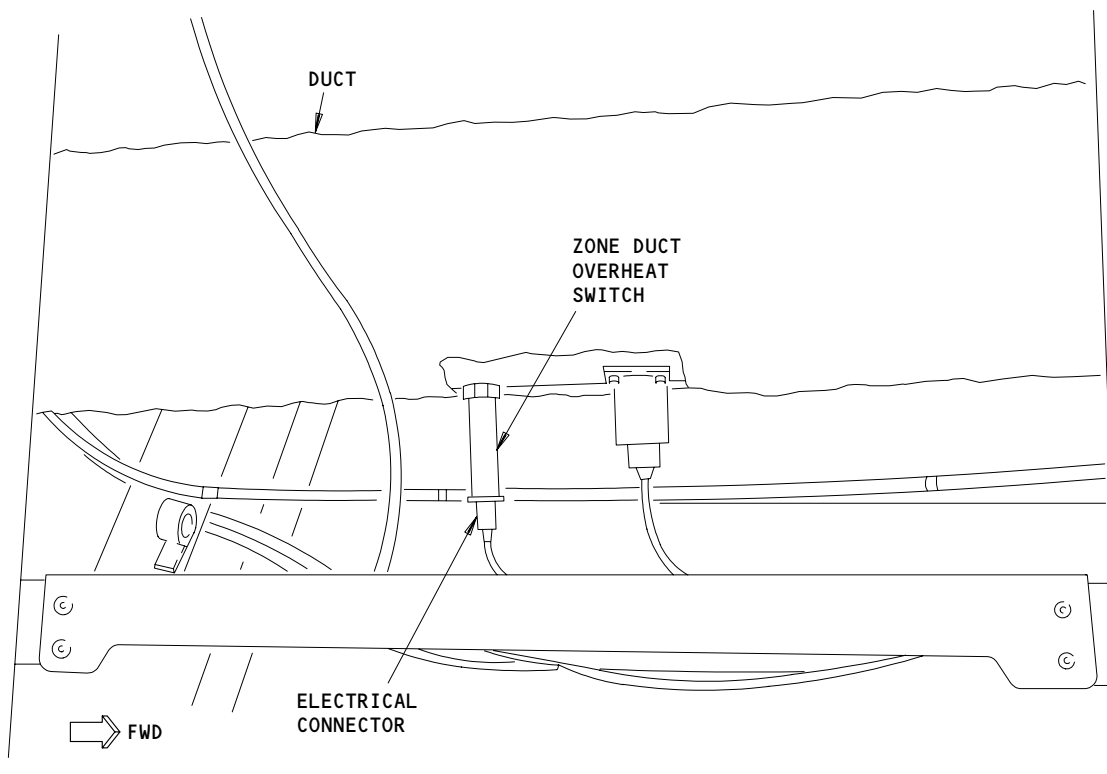
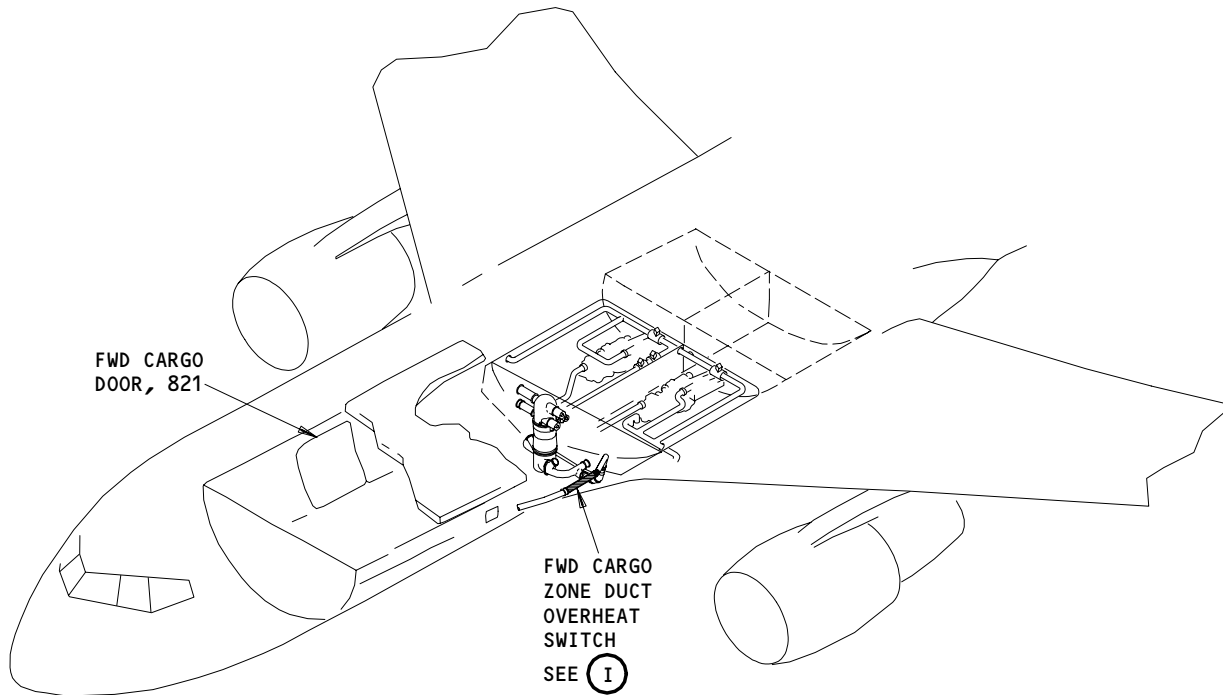
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Zone Duct Overheat Switch
Figure 503 (Sheet 3)

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FWD CARGO ZONE DUCT OVERHEAT SWITCH

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Zone Duct Overheat Switch
Figure 503 (Sheet 4)

EFFECTIVITY

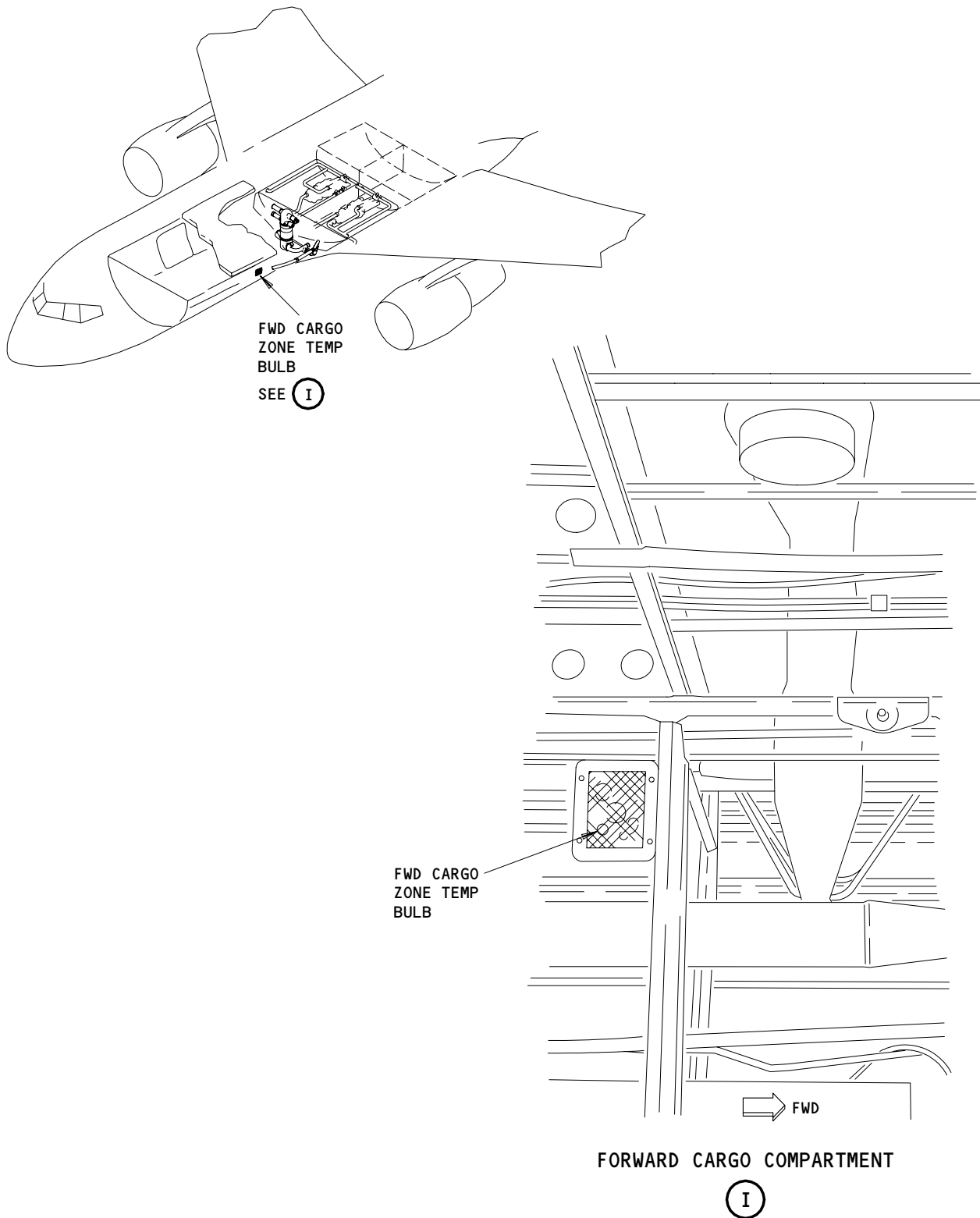
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637871



Forward Cargo Zone Temperature Indication Sensor
Figure 504

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B. Procedure

S 745-785

- (1) Do this task: Auxiliary Zone Temperature Controller BITE Test (AMM 21-61-12/501).

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TASK 21-61-00-735-033

4. System Test - Flight Deck/Cabin Zone Temperature Control System

A. General

- (1) The system test includes these electrical, pneumatic, and thermal performance tests of the temperature control system for the cabin zones:
- (a) Pneumatic Duct Leakage Check
 - (b) Zone Temperature Controller BITE Test
 - (c) Auxiliary Zone Temperature Controller BITE Test
 - (d) Zone Temperature Indication Test
 - (e) Flight Compartment Temperature Manual Control Test
 - (f) Flight Compartment Trim Air Modulating Valve Position Indication Test
 - (g) Zone Temperature Controller Simulated Failure Test
 - (h) Auxiliary Zone Temperature Controller Simulated Failure Test
 - (i) TRIM AIR Switch Test
 - (j) Zone Duct Overheat Indication Circuit Test
 - (k) Cabin Zone Temperature Control Test
 - (l) Cabin Zone Temperature Backup Control Test

B. Equipment

- (1) Hand-held thermometer, commercially available

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-61-03/501, Zone Temperature Controller
- (3) AMM 21-61-12/501, Auxiliary Zone Temperature Controller
- (4) AMM 24-22-00/201, Electric Power - Control
- (5) AMM 36-00-00/201, Pneumatic General

D. Access

(1) Location Zones

117	Area Outboard and Above NLG Wheel Well (Left)
119/120	Main Equipment Center
135	Environmental Control System Bay (Left)
211/212	Control Cabin
223/224	Area Above Passenger Cabin Ceiling
233/234	Area Above Passenger Cabin Ceiling
243/244	Area Above Passenger Cabin Ceiling
253/254	Area Above Passenger Cabin Ceiling

(2) Access Panels

119AL	Main Equipment Center Access Door
193FL	ECS Components Access Door

E. Prepare for the Test

S 865-034

- (1) Supply electrical power (AMM 24-22-00/201).

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S 865-838

- (2) Make sure these circuit breakers on the P11 overhead circuit breaker panel are closed:
- (a) 11C33, TRIM AIR
 - (b) 11P24, ZONE TEMP CONT MAN FLT DK
 - (c) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - (d) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - (e) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - (f) 11R15, ZONE CNTLR
 - (g) 11R16, ZONE TEMP IND
 - (h) 11R24, ZONE DUCT OVHT FLT DK
 - (i) 11R25, ZONE DUCT OVHT FWD
 - (j) 11R26, ZONE DUCT OVHT MID
 - (k) 11R27, ZONE DUCT OVHT AFT

S 865-845

- (3) Make sure these additional circuit breakers on the P11 overhead circuit breaker panel are closed:
- (a) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - (b) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - (c) 11H5, ZONE DUCT OVHT AUX FWD
 - (d) 11H6, ZONE DUCT OVHT AUX MID
 - (e) 11R11, AUX ZONE CNTLR

S 865-861

- (4) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
- (a) 11A13, PACK FLOW CONT L
 - (b) 11A26, PACK FLOW CONT R
 - (c) 11N10, LEFT PACK AUTO PWR
 - (d) 11N11, LEFT PACK AUTO CONT
 - (e) 11N15, RIGHT PACK STANDBY PWR
 - (f) 11N16, RIGHT PACK STANDBY CONT
 - (g) PRE-SB 21-129;
11N17, PACK FLOW IND

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- (h) 11N19, RIGHT PACK AUTO PWR
- (i) 11N20, RIGHT PACK AUTO CONT
- (j) 11N24, LEFT PACK STANDBY PWR
- (k) 11N25, LEFT PACK STANDBY CONT
- (l) 11R14, L RECIRC FAN
- (m) 11R23, R RECIRC FAN

F. Pneumatic Duct Leakage Check

S 865-036

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-046

- (2) Supply pneumatic power (AMM 36-00-00/201).

S 725-038

- (3) Put your hand 2 inches (5 centimeters) from the external surfaces of each duct joint you can get access to. Use your hand to feel for air leakage. Make sure no air velocity is felt by your hand.
 - (a) Use your hand to feel for air leakage.
 - (b) Make sure your hand does not feel air.

S 865-039

- (4) Remove the pneumatic power.

G. Zone Temperature Controller BITE Test

S 745-798

- (1) Do this task: Zone Temperature Controller BITE Test (AMM 21-61-03/501).

H. Auxiliary Zone Temperature Controller BITE Test

S 745-799

- (1) Do this task: Auxiliary Zone Temperature Controller BITE Test (AMM 21-61-12/501).

I. Zone Temperature Indication Test

S 725-061

- (1) Do the Zone Temperature Indication Test (Fig. 502)
 - (a) Hold a thermometer approximately 2.0 feet (0.6 meter) from the temperature sensor in the flight compartment and each temperature sensor in the passenger cabin.
 - 1) Make sure the applicable compartment temperature indication, on P5 panel, is within ± 1.0 degrees C of the temperature measured near the applicable temperature sensor.

J. Flight Compartment Temperature Manual Control Test

S 725-385

- (1) Flight Compartment Temperature Manual Control Test
 - (a) Turn the temperature selector switch for the flight compartment, on the pilot's overhead panel, P5, to the MAN position.

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- (b) Turn the temperature selector switch for the flight compartment to the C and then to the W position.
- (c) Make sure the valve position indication moves to the C and then to the W position.

K. Flight Compartment Trim Air Modulating Valve Position Indication Test

S 725-380

- (1) Do a check of the flight compartment trim air modulating valve position indication:
 - (a) Turn the temperature selector switch for the flight compartment to the MAN-W position.

NOTE: Keep it there until the valve position indication stops at 0-3 needle widths from the W mark.

- (b) Go to where the trim air modulating valve for the flight compartment is installed.
- (c) Make sure the modulating valve is in the full open position.
- (d) With the modulating valve in the full open position, make sure the indication reads on the full "W" mark.
 - 1) Adjust the trim resistor (R3 FLT DK) in the temperature module M14 on the P5 panel if the indication is not in the correct position.
- (e) Turn the temperature selector switch for the flight compartment to the MAN-C position.

NOTE: Keep it there until the valve position indication stops on the C mark.

- (f) Make sure the trim air modulating valve for the flight compartment is in the fully closed position.
- (g) With the modulating valve in the full closed position, make sure the indication reads on the full "C" mark.
 - 1) Adjust the trim resistor (R2 FLT DK) in the temperature module M14 on the P5 panel if the indication is not in the correct position.
- (h) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.
- (i) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-FLT DK indication reads 0.00 to 0.05.
 - 1) Keep the selector switch in the "MAN" position.

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L. Zone Temperature Controller Simulated Failure Test

S 755-070

- (1) Do the simulated failure of the zone temperature controller.
 - (a) Disconnect the connector D8050J at the E3-1 shelf.
 - (b) Apply ground pin 47.
 - (c) Make sure the EICAS maintenance message, ZONE TEMP BITE, shows on the bottom display.
 - (d) Install the connector D8050J on the zone temperature controller.
 - (e) Push the VERIFY button on the zone temperature controller.
 - (f) When the green GO light comes on, push the RESET button to remove the BITE memory.

M. Auxiliary Zone Temperature Controller Simulated Failure Test

S 755-762

- (1) Do the steps that follow to simulate the failure of the auxiliary zone temperature controller:
 - (a) Disconnect the connector D5525P, at the E1-5 shelf, and apply ground to pin 16 of D5525J (WDM 21-61-51).
 - (b) Make sure this EICAS message, AUX TEMP BITE, shows on the bottom display.
 - (c) Remove the ground from pin 16 of D5525J.
 - (d) Install the connector D5525P.
 - (e) Make sure the EICAS message, AUX TEMP BITE, does not show on the bottom display.

N. TRIM AIR Switch Test

S 725-079

- (1) Do the Trim air control switch test.
 - (a) Push the TRIM AIR switch-light on the P5 panel to the ON position.
 - 1) Make sure the ON indication is seen and each zone INOP light goes off.
 - (b) Push the TRIM AIR switch to the OFF position.
 - 1) Make sure the switch goes back to the UP position, the ON legend is covered, and the amber OFF light comes on.

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- 2) Listen and feel the solenoid, on the pressure regulating valve, for plunger operation.
- 3) Make sure the zone INOP lights come on.

S 755-033

- (2) Do a check of the EICAS displays that follow:
 - (a) Push the ECS MSG switch on the EICAS MAINT panel on the right side panel, P61.
 - (b) Maintenance display:

	FLT DK	AUX FWD	FWD	AUX MID	MID	AFT
TRIM VALVE	0.00-0.05	0.00-0.05	0.00-0.05	0.00-0.05	0.00-0.05	0.00-0.05

- 1) EICAS advisory display:
 - FLT DECK TEMP
 - FWD CABIN TEMP
 - MID CABIN TEMP
 - AFT CABIN TEMP
 - TRIM AIR

- (c) Make sure all the zone modulating valves for the trim air system are closed.

O. Zone Duct Overheat Indication Circuit Test

S 725-759

- (1) Do a Test of the Zone Duct Overheat Indication Circuit (Fig. 503)
 - (a) Do this task: Operational Test - Flight Deck/Cabin Zone Duct Overheat Switches (Functional Check of Overheat Indication Circuit) (TASK 21-61-00-705-504).

P. Cabin Zone Temperature Control Test

S 725-081

- (1) Do a test of the cabin zone temperature control.
 - (a) Supply pneumatic power (AMM 36-00-00/201).

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- (b) Push the TRIM AIR switch-light, on the P5 panel, to the on position.
- (c) Turn all the zone selector switches to the auto full C position on the air conditioning and temperature control panel.
- (d) Turn the selector switch for the flight compartment to the MAN position. Turn the selector switch to C until the valve position indication is at the full C position.
- (e) Turn the selector switch for the flight compartment to the W position and keep it there. Make sure the valve position indication stops at 0-3 needle widths from the full W position.
- (f) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-FLT DK indication reads 0.90 to 1.00, and that the DUCT TEMP-FLT DK indication increases.
- (g) After the valve position indication has stopped at 0-3 needle widths of W, put the FLT DECK selector switch in the C position.
- (h) Make sure the needle moves to the C position, or near the C position, in 30 to 120 seconds.
- (i) Turn the temperature selector switch for the flight compartment to the full W position and look to see:
 - 1) The modulating valve indication moves to W.
 - 2) The DUCT TEMP-FLT DK indication increases.
- (j) Turn the temperature selector switch for the flight compartment to the full auto C position.
 - 1) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-FLT DK indication decreases.
- (k) Turn the selector switch for the flight compartment to the MAN position.
- (l) Move the temperature selector switch to the C position until the indication for the modulating valve is at C. It is not necessary to move the selector switch if the indication is initially at C.
- (m) Turn the temperature selector switch for the forward zone to the full AUTO W position.
- (n) Make sure the EICAS ECS/MSG Maintenance page shows:
 - 1) The TRIM VALVE-AUX FWD and the TRIM VALVE-FWD indications increase (the valves move to the open position).

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- 2) DUCT TEMP-AUX FWD and DUCT TEMP-FWD indications increase.
- (o) Turn the temperature selector switch for the forward zone to the full auto C position.
- (p) Turn the temperature selector switch for the aft zone to the full auto W position.
- (q) Make sure the EICAS ECS/MSG Maintenance page shows:
 - 1) The TRIM VALVE-AFT indication increases.
 - 2) The DUCT TEMP-AFT indication increases.

Q. Cabin Zone Temperature Backup Control Test

S 725-082

- (1) Do a test of the cabin zone temperature backup control
 - (a) Turn the left and right pack selector switches to the AUTO position.
 - (b) Turn the temperature selector switch for the flight compartment to the MAN position, and each temperature selector switch for the passenger cabin zones to the OFF position.
 - (c) Make sure the INOP lights, above the temperature selector switches for the passenger cabin zones, come on.
 - (d) Make sure these EICAS messages, FWD CABIN TEMP, MID CABIN TEMP and AFT CABIN TEMP, show on the top display.
 - (e) Do a check of the EICAS ECS/MSG Maintenance page as follows:
 - 1) The L and R TEMP VALVE indications move to +/-0.05 of each other.
 - 2) The L and R RAM IN DOOR indications move to +/-0.05 of each other.
 - (f) Let the temperature indications for each passenger cabin zone (on the P5 panel) and the pack output temperatures become stable.
 - 1) Make sure the temperature indication for each passenger cabin zone is between 23 and 25-degrees C (73 and 77-degrees F).
 - (g) Turn the temperature selector switch for each passenger cabin zone to the AUTO position.
 - (h) Make sure the amber INOP light, above the temperature selector switch for each passenger cabin zone, goes out.

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- (i) Push the trim air switch-light to the OFF position.
 - (j) Make sure the amber off light and the amber zone INOP lights come on.
 - (k) Make sure the temperature indication for each passenger cabin zone stays between 23 and 25-degrees C (73 and 77-degrees F).
- R. Put the Airplane Back to Its Usual Condition

S 415-092

- (1) Install the sculptured ceiling panels.

S 415-093

- (2) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

S 865-094

- (3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 865-095

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-61-00-705-504

5. Operational Test – Flight Deck/Cabin Zone Duct Overheat Switches
(Functional Check of Overheat Indication Circuit)

A. General

- (1) This procedure is for a scheduled maintenance task.
- (2) This task will perform a functional check of the overheat indication circuit for the flight deck and main cabin zone duct overheat switches.
- (3) This task simulates an overheat condition of zone duct overheat switch. The overheat simulation is accomplished by installing a jumper wire to the overheat switch's electrical connector to simulate closing of the switch contacts. The test then verifies that the appropriate overheat indications (INOP light and EICAS message) occur in the flight deck during the overheat simulation.
- (4) This task does not functionally check the switch setting for the actuation temperature and reset temperature of the overheat switch. Refer to the supplier CMM for an off-aircraft check of the overheat switch temperature settings. Alternatively, an on-aircraft check of the overheat switch temperature settings can also be performed with special test equipment (TASK 21-61-00-705-403).

B. References

- (1) AMM 24-22-00/201, Electric Power – Control
- (2) AMM 25-22-01/401, Sculptured Ceiling Panel
- (3) AMM 31-41-00/201, Engine Indicating and Crew Alerting System (EICAS)

C. Access

(1) Location Zones

117	Area Outboard and Above NLG Wheel Well (Left)
119/120	Main Equipment Center
135	Environmental Control System Bay (Left)
211/212	Control Cabin
223/224	Area Above Passenger Cabin Ceiling – Section 41
233/234	Area Above Passenger Cabin Ceiling – Section 43
243/244	Area Above Passenger Cabin Ceiling – Section 45
253/254	Area Above Passenger Cabin Ceiling – Section 46

(2) Access Panels

119AL	Main Equipment Center Access Door
193FL	ECS Components Access Panel

D. Prepare for the Test

S 865-515

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-514

- (2) Make sure these circuit breakers on the P11 overhead circuit breaker panel are closed:
 - (a) 11C33, TRIM AIR
 - (b) 11P24, ZONE TEMP CONT MAN FLT DK

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- (c) 11P25, ZONE TEMP CONT VLV CLOSE FWD
- (d) 11P26, ZONE TEMP CONT VLV CLOSE MID
- (e) 11P27, ZONE TEMP CONT VLV CLOSE AFT
- (f) 11R15, ZONE CNTLR
- (g) 11R16, ZONE TEMP IND
- (h) 11R24, ZONE DUCT OVHT FLT DK
- (i) 11R25, ZONE DUCT OVHT FWD
- (j) 11R26, ZONE DUCT OVHT MID
- (k) 11R27, ZONE DUCT OVHT AFT

S 865-645

- (3) Make sure these additional circuit breakers on the P11 overhead circuit breaker panel are closed:
 - (a) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - (b) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - (c) 11H5, ZONE DUCT OVHT AUX FWD
 - (d) 11H6, ZONE DUCT OVHT AUX MID
 - (e) 11R11, AUX ZONE CNTLR

S 015-639

- (4) Open the left ECS pack components access panel, 193FL, to get access to the zone trim air modulating valves.

S 215-622

- (5) Make sure the temperature indications that show on the compartment temperature indicator, on the P5 panel, are less than 30-degrees C (85-degrees F).
 - (a) If a zone temperature is more than 30-degrees C (85-degrees F), apply a cooling source temporarily to the zone temperature sensor to lower its temperature.

S 865-531

- (6) Set each PACK selector to the AUTO position on the P5 panel.

S 865-532

- (7) Set each zone temperature selector to the mid AUTO position on the P5 panel.

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S 865-641

- (8) Get access to the EICAS ECS/MSG maintenance page (AMM 31-41-00/201).
E. Flight Deck Zone – Duct Overheat Switch Circuit Verification Test

S 015-516

- (1) Get access to the flight deck zone duct overheat switch (S21) in the air distribution duct on the left side of the main equipment center:
(a) Open the access door for the main equipment center, 119AL.

S 865-517

- (2) Open this circuit breaker on the P11 circuit breaker panel:
(a) 11R24, ZONE DUCT OVHT FLT DK

S 035-518

- (3) Disconnect the electrical connector (D3838) from the duct overheat switch (S21).

S 485-520

- (4) Install a jumper wire between pins 1 and 2 of the electrical connector (D3838) to simulate closing of the duct overheat switch (WDM 21-61-11).

S 865-522

- (5) Close this circuit breaker on the P11 panel:
(a) 11R24, ZONE DUCT OVHT FLT DK

S 865-555

- (6) Set the FLT DK zone temperature selector to the full AUTO-W position on the P5 panel.

S 865-542

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

S 215-524

- (8) Make sure these zone overheat indications occur in the flight deck:
(a) FLT DK INOP light illuminates on the P5 panel.

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- (b) EICAS message FLT DK TEMP shows on the top display.
- (c) On the P5 panel, the FLT DK visual position indicator for the flight deck zone trim air modulating valve is at the full cool 'C' position.
- (d) TRIM VALVE-FLT DK indication is 0.00 to 0.05, on EICAS ECS/MSG maintenance page.
- (e) Visual position indicator for the flight deck zone trim air modulating valve (V1, in left ECS pack bay) at CLOSE position.

S 865-525

- (9) Open this circuit breaker on the P11 panel:
 - (a) 11R24, ZONE DUCT OVHT FLT DK

S 085-526

- (10) Remove the jumper wire from the electrical connector (D3838).

S 435-527

- (11) Reconnect the electrical connector (D3838) to the duct overheat switch (S21).

S 865-528

- (12) Close this circuit breaker on the P11 panel:
 - (a) 11R24, ZONE DUCT OVHT FLT DK

S 215-529

- (13) Make sure these flight deck indications occur:
 - (a) FLT DK INOP light goes off on the P5 panel.
 - (b) EICAS message FLT DECK TEMP does not show on the top display.
 - (c) On the P5 panel, the FLT DK visual position indicator for the flight deck zone trim air modulating valve is at the full warm 'W' position.
 - (d) TRIM VALVE-FLT DK indication is 0.95 to 1.00, on EICAS ECS/MSG maintenance page.
 - (e) Visual position indicator for the flight deck zone trim air modulating valve (V1, in left ECS pack bay) at OPEN position.

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S 865-530

- (14) Push the TRIM AIR switch-light on the P5 panel to the off position.

S 865-623

- (15) Set the FLT DK zone temperature selector to the MAN (off) position on the P5 panel.

S 415-537

- (16) Close the access door to the main equipment center, 119AL.

F. Forward Zone - Duct Overheat Switch Circuit Verification Test

S 015-727

- (1) Get access to the forward zone duct overheat (S22) in the air distribution duct above the main cabin ceiling:
(a) Open/remove the sculptured ceiling panel(s) on the left side of the main cabin near STA 650 (AMM 25-22-01/401).

S 865-728

- (2) Open this circuit breaker on the P11 circuit breaker panel:
(a) 11R25, ZONE DUCT OVHT FWD

S 035-729

- (3) Disconnect the electrical connector (D3824) from the duct overheat switch (S22).

S 485-730

- (4) Install a jumper wire between pins 1 and 2 of the electrical connector (D3824) to simulate closing of the duct overheat switch (WDM 21-61-21).

S 865-731

- (5) Close this circuit breaker on the P11 panel:
(a) 11R25, ZONE DUCT OVHT FWD

S 865-732

- (6) Set the FWD CAB zone temperature selector to the full AUTO-W position on the P5 panel.

S 865-733

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

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S 215-734

- (8) Make sure these zone overheat indications occur in the flight deck:
- (a) FWD CAB INOP light illuminates on the P5 panel.
 - (b) EICAS message FWD CABIN TEMP shows on the top display.
 - (c) TRIM VALVE-FWD indication is 0.00 to 0.05, on the EICAS ECS/MSG maintenance page.
 - (d) Visual position indicator for the forward zone trim air modulating valve (V2, in left ECS pack bay) at CLOSE position.

S 865-735

- (9) Open this circuit breaker on the P11 panel:
- (a) 11R25, ZONE DUCT OVHT FWD

S 085-736

- (10) Remove the jumper wire from the electrical connector (D3824).

S 435-737

- (11) Reconnect the electrical connector (D3824) to the duct overheat switch (S22).

S 865-738

- (12) Close this circuit breaker on the P11 panel:
- (a) 11R25, ZONE DUCT OVHT FWD

S 215-739

- (13) Make sure these flight deck indications occur:
- (a) FWD CAB INOP light goes off on the P5 panel.
 - (b) EICAS message FWD CABIN TEMP does not show on the top display.
 - (c) TRIM VALVE-FWD indication is 0.95 to 1.00, on EICAS ECS/MSG maintenance page.
 - (d) Visual position indicator for the forward zone trim air modulating valve (V2, in left ECS pack bay) at OPEN position.

S 865-740

- (14) Push the TRIM AIR switch-light on the P5 panel to the off position.

S 865-741

- (15) Set the FWD CAB zone temperature selector to the OFF position on the P5 panel.

S 415-742

- (16) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

G. Aft Zone - Duct Overheat Switch Circuit Verification Test

S 015-711

- (1) Get access to the aft zone duct overheat switch (S23) in the air distribution duct above the main cabin ceiling:
- (a) Open/remove the sculptured ceiling panel(s) on the left side of the main cabin near STA 770 (AMM 25-22-01/401).

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- S 865-712
- (2) Open this circuit breaker on the P11 circuit breaker panel:
(a) 11R27, ZONE DUCT OVHT AFT
- S 035-713
- (3) Disconnect the electrical connector (D3826) from the duct overheat switch (S23).
- S 485-714
- (4) Install a jumper wire between pins 1 and 2 of the electrical connector (D3826) to simulate closing of the duct overheat switch (WDM 21-61-31).
- S 865-715
- (5) Close this circuit breaker on the P11 panel:
(a) 11R27, ZONE DUCT OVHT AFT
- S 865-716
- (6) Set the AFT CAB zone temperature selector to the full AUTO-W position on the P5 panel.
- S 865-717
- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.
- S 215-718
- (8) Make sure these zone overheat indications occur in the flight deck:
(a) AFT CAB INOP light illuminates on the P5 panel.
(b) EICAS message AFT CABIN TEMP shows on the top display.
(c) TRIM VALVE-AFT indication is 0.00 to 0.05, on EICAS ECS/MSG maintenance page.
(d) Visual position indicator for the aft zone trim air modulating valve (V3, in left ECS pack bay) at CLOSE position.
- S 865-719
- (9) Open this circuit breaker on the P11 panel:
(a) 11R27, ZONE DUCT OVHT AFT
- S 085-720
- (10) Remove the jumper wire from the duct overheat switch (S23).
- S 435-721
- (11) Reconnect the electrical connector (D3826) to the duct overheat switch (S23).
- S 865-722
- (12) Close this circuit breaker on the P11 panel:
(a) 11R27, ZONE DUCT OVHT AFT

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S 215-723

- (13) Make sure these flight deck indications occur:
- (a) AFT CAB INOP light goes off on the P5 panel.
 - (b) EICAS message AFT CABIN TEMP does not show on the top display.
 - (c) TRIM VALVE-AFT indication is 0.95 to 1.00, on EICAS ECS/MSG maintenance page.
 - (d) Visual position indicator for the aft zone trim air modulating valve (V3, in left ECS pack bay) at OPEN position.

S 865-724

- (14) Push the TRIM AIR switch-light on the P5 panel to the off position.

S 865-725

- (15) Set the AFT CAB zone temperature selector to the OFF position on the P5 panel.

S 415-726

- (16) Install/close the sculptured ceiling panels (AMM 25-22-01/401).
- H. Mid Zone - Duct Overheat Switch Circuit Verification Test

S 015-695

- (1) Get access to the mid zone duct overheat switch (S635) in the air distribution duct above the main cabin ceiling:
- (a) Open/remove the sculptured ceiling panel(s) on the right side of the main cabin near STA 770 (AMM 25-22-01/401).

S 865-696

- (2) Open this circuit breaker on the P11 circuit breaker panel:
- (a) 11R26, ZONE DUCT OVHT MID

S 035-697

- (3) Disconnect the electrical connector (D10712) from the duct overheat switch (S635).

S 485-698

- (4) Install a jumper wire between pins 1 and 2 of the electrical connector (D10712) to simulate closing of the duct overheat switch (WDM 21-61-41).

S 865-699

- (5) Close this circuit breaker on the P11 panel:
- (a) 11R26, ZONE DUCT OVHT MID

S 865-700

- (6) Set the MID CAB zone temperature selector to the full AUTO-W position on the P5 panel.

S 865-701

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

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- S 215-702
- (8) Make sure these zone overheat indications occur in the flight deck:
- (a) MID CAB INOP light illuminates on the P5 panel.
 - (b) EICAS message MID CABIN TEMP shows on the top display.
 - (c) TRIM VALVE-MID indication is 0.00 to 0.05, on EICAS ECS/MSG maintenance page.
 - (d) Visual position indicator for the mid zone trim air modulating valve (V145, in left ECS pack bay) at CLOSE position.
- S 865-703
- (9) Open this circuit breaker on the P11 panel:
- (a) 11R26, ZONE DUCT OVHT MID
- S 085-704
- (10) Remove the jumper wire from the duct overheat switch (S635).
- S 435-705
- (11) Reconnect the electrical connector (D10712) to the duct overheat switch (S635).
- S 865-706
- (12) Close this circuit breaker on the P11 panel:
- (a) 11R26, ZONE DUCT OVHT MID
- S 215-707
- (13) Make sure these flight deck indications occur:
- (a) MID CAB INOP light goes off on the P5 panel.
 - (b) EICAS message MID CABIN TEMP does not show on the top display.
 - (c) TRIM VALVE-MID indication is 0.95 to 1.00, on EICAS ECS/MSG maintenance page.
 - (d) Visual position indicator for the mid zone trim air modulating valve (V145, in left ECS pack bay) at OPEN position.
- S 865-708
- (14) Push the TRIM AIR switch-light on the P5 panel to the off position.
- S 865-709
- (15) Set the MID CAB zone temperature selector to the OFF position on the P5 panel.
- S 415-710
- (16) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

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I. Aux-Forward Zone – Duct Overheat Switch Circuit Verification Test

S 015-533

- (1) Get access to the aux-forward zone duct overheat switch (S791) in the air distribution duct above the main cabin ceiling:
 - (a) Open/remove the sculptured ceiling panel(s) on the left side of the main cabin near STA 560 (AMM 25-22-01/401).

S 865-535

- (2) Open this circuit breaker on the P11 circuit breaker panel:
 - (a) 11H5, ZONE DUCT OVHT AUX FWD

S 035-536

- (3) Disconnect the electrical connector (D13470) from the duct overheat switch (S791).

S 485-538

- (4) Install a jumper wire between pins 1 and 2 of the electrical connector (D13470) to simulate closing of the duct overheat switch (WDM 21-61-61).

S 865-539

- (5) Close these circuit breakers on the P11 panel:
 - (a) 11H5, ZONE DUCT OVHT AUX FWD

S 865-554

- (6) Set the FWD CAB zone temperature selector to the full AUTO-W position on the P5 panel.

S 865-541

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

S 215-543

- (8) Make sure these zone overheat indications occur in the flight deck:
 - (a) FWD CAB INOP light illuminates on the P5 panel.
 - (b) EICAS message FWD CABIN TEMP shows on the top display.
 - (c) TRIM VALVE-AUX FWD indication is 0.00 to 0.05, on EICAS ECS/MSG maintenance page.
 - (d) Visual position indicator for the aux-forward zone trim air modulating valve (V152, in left ECS pack bay) at CLOSE position

S 865-544

- (9) Open this circuit breaker on the P11 panel:
 - (a) 11H5, ZONE DUCT OVHT AUX FWD

S 085-545

- (10) Remove the jumper wire from the electrical connector (D13470).

S 435-546

- (11) Reconnect the electrical connector (D13470) to the duct overheat switch (S791).

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S 865-547

- (12) Close this circuit breaker on the P11 panel:
(a) 11H5, ZONE DUCT OVHT AUX FWD

S 215-548

- (13) Make sure these flight deck indications occur:
(a) FWD CAB INOP light goes off on the P5 panel.
(b) EICAS message FWD CABIN TEMP does not show on the top display.
(c) TRIM VALVE-AUX FWD indication is 0.95 to 1.00, on EICAS ECS/MSG maintenance page.
(d) Visual position indicator for the aux-forward zone trim air modulating valve (V152, in left ECS pack bay) at OPEN position.

S 865-549

- (14) Push the TRIM AIR switch-light on the P5 panel to the off position.

S 865-553

- (15) Set the FWD CAB zone temperature selector to the OFF position on the P5 panel.

S 415-550

- (16) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

J. Aux-Mid Zone - Duct Overheat Switch Circuit Verification Test

S 015-573

- (1) Get access to the aux-mid zone duct overheat switch (S792) in the air distribution duct above the main cabin ceiling:
(a) Open/remove the sculptured ceiling panel(s) on the left side of the main cabin near STA 760 (AMM 25-22-01/401).

S 865-574

- (2) Open this circuit breaker on the P11 circuit breaker panel:
(a) 11H6, ZONE DUCT OVHT AUX MID

S 035-575

- (3) Disconnect the electrical connector (D13472) from the duct overheat switch (S792).

S 485-576

- (4) Install a jumper wire between pins 1 and 2 of the electrical connector (D13472) to simulate closing of the duct overheat switch (WDM 21-61-71).

S 865-577

- (5) Close this circuit breaker on the P11 panel:
(a) 11H6, ZONE DUCT OVHT AUX MID

S 865-578

- (6) Set the MID CAB zone temperature selector to the full AUTO-W position on the P5 panel.

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S 865-579

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

S 215-580

- (8) Make sure these zone overheat indications occur in the flight deck:
- (a) MID CAB INOP light illuminates on the P5 panel.
 - (b) EICAS message MID CABIN TEMP shows on the top display.
 - (c) TRIM VALVE-AUX MID indication is 0.00 to 0.05, on EICAS ECS/MSG maintenance page.
 - (d) Visual position indicator for the aux-mid zone trim air modulating valve (V153, in left ECS pack bay) at CLOSE position

S 865-581

- (9) Open this circuit breaker on the P11 panel:
- (a) 11H6, ZONE DUCT OVHT AUX MID

S 085-582

- (10) Remove the jumper wire from the duct overheat switch (S792).

S 435-583

- (11) Reconnect the electrical connector (D13472) to the duct overheat switch (S792).

S 865-584

- (12) Close this circuit breaker on the P11 panel:
- (a) 11H6, ZONE DUCT OVHT AUX MID

S 215-585

- (13) Make sure these flight deck indications occur:
- (a) MID CAB INOP light goes off on the P5 panel.
 - (b) EICAS message MID CABIN TEMP does not show on the top display.
 - (c) TRIM VALVE-AUX MID indication is 0.95 to 1.00, on EICAS ECS/MSG maintenance page.
 - (d) Visual position indicator for the aux-mid zone trim air modulating valve (V153, in left ECS pack bay) at OPEN position.

S 865-586

- (14) Push the TRIM AIR switch-light on the P5 panel to the off position.

S 865-587

- (15) Set the MID CAB zone temperature selector to the OFF position on the P5 panel.

S 415-588

- (16) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

K. Put the Airplane Back to Its Usual Condition

S 865-621

- (1) Set each PACK selector to the OFF position on the P5 panel.

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- S 415-640
- (2) Close the left ECS pack components access panel, 193FL.
- S 865-512
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-61-00-705-403

6. Operational Test (Alternate) - Flight Deck/Cabin Zone Duct Overheat Switches (Functional Check of Overheat Switch Setting and Overheat Indication Circuit)

A. General

- (1) This procedure is for a scheduled maintenance task.
- (2) This task does an on-wing operational test of the zone duct overheat switches for the flight deck and main cabin zones. This task will confirm that the overheat switches actuate (open/close) at prescribed temperatures when heat is applied to the overheat switch to simulate an overheat condition, and verifying that the associated flight deck overheat indications (INOP lights and EICAS messages) occur.
- (3) With increasing temperature, the overheat switch closes at a temperature of $190\pm 10^{\circ}\text{F}$ ($88\pm 5^{\circ}\text{C}$). With decreasing temperature, the overheat switch opens at minimum 150°F (66°C).

B. Equipment

- (1) Tester, TEMPCAL - Howell Instruments (either of the following):
 - (a) H394R Tester - Thermo Switch, K-Type Thermocouple Switches (recommended)
Howell Instruments, Inc. (Vendor Code 98869)
3479 West Vickery Blvd., Fort Worth, TX 76107-5722
 - (b) H394 Tester - Thermo Switch, K-Type Thermocouple and Thermo Switches (alternative)
Howell Instruments, Inc. (Vendor Code 98869)
3479 West Vickery Blvd., Fort Worth, TX 76107-5722
 - (c) H294 Tester - Thermo Switch, Thermocouple and Thermo Switches (alternative)
Howell Instruments, Inc. (Vendor Code 98869)
3479 West Vickery Blvd., Fort Worth, TX 761070-5722
- (2) BH27956 - TEMPCAL Heater Probe (for overheat switch p/n 641121-1)
Howell Instruments, Inc. (Vendor Code 98869)
3479 West Vickery Blvd., Fort Worth, TX 761070-5722

C. References

- (1) AMM 21-61-01/401, Zone Duct Overheat Switch
- (2) AMM 24-22-00/201, Electric Power Control

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- (3) AMM 25-22-01/401, Sculptured Ceiling Panels
- (4) AMM 31-41-00/201, Engine Indicating and Crew Alerting System (EICAS)

D. Access

(1) Location Zones

- 117 Area Outboard and Above NLG Wheel Well (Left)
- 119/120 Main Equipment Center
- 135 Environmental Control System Bay (Left)
- 211/212 Control Cabin
- 223/224 Area Above Passenger Cabin Ceiling - Section 41
- 233/234 Area Above Passenger Cabin Ceiling - Section 43
- 243/244 Area Above Passenger Cabin Ceiling - Section 45
- 253/254 Area Above Passenger Cabin Ceiling - Section 46

(2) Access Panels

- 119AL Main Equipment Center Access Door
- 193FL ECS Components Access Panel

E. Prepare for Test

S 865-404

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-769

- (2) Make sure these circuit breakers on the P11 overhead circuit breaker panel are closed:
 - (a) 11C33, TRIM AIR
 - (b) 11P24, ZONE TEMP CONT MAN FLT DK
 - (c) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - (d) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - (e) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - (f) 11R15, ZONE CNTLR
 - (g) 11R16, ZONE TEMP IND
 - (h) 11R24, ZONE DUCT OVHT FLT DK
 - (i) 11R25, ZONE DUCT OVHT FWD
 - (j) 11R26, ZONE DUCT OVHT MID
 - (k) 11R27, ZONE DUCT OVHT AFT

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S 865-770

- (3) Make sure these additional circuit breakers on the P11 overhead circuit breaker panel are closed:
 - (a) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - (b) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - (c) 11H5, ZONE DUCT OVHT AUX FWD
 - (d) 11H6, ZONE DUCT OVHT AUX MID
 - (e) 11R11, AUX ZONE CNTLR

S 015-637

- (4) Open the left ECS pack components access panel, 193FL, to get access to the zone trim air modulating valves.

S 865-642

- (5) Get access to the EICAS ECS/MSG maintenance page (AMM 31-41-00/201).
- F. Flight Deck Zone Duct Overheat Switch Test

S 015-625

- (1) Get access to the flight deck zone duct overheat switch (S21) in the air distribution duct on the left side of the main equipment center:
 - (a) Open the access door for the main equipment center, 119AL.

S 025-406

- (2) Remove the flight deck zone duct overheat switch (S21) but keep the airplane electrical connector still attached to the switch (AMM 21-61-01/401).

S 485-407

- (3) Connect the TEMPCAL tester H394R (or alternative) and associated TEMPCAL heater probe BH27956 to the overheat switch.

S 865-743

- (4) Make sure this circuit breaker is closed on the P11 circuit breaker panel:
 - (a) 11R24, ZONE DUCT OVHT FLT DK

S 865-409

- (5) Set the FLT DK zone temperature selector on the P5 panel to the full AUTO-W position.

S 865-410

- (6) Set the L/R PACK selectors to AUTO position on the P5 panel.

S 865-411

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

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S 715-412

- (8) Do these steps to check the overheat switch's actuation "closed" temperature:
- (a) Use the TEMPCAL tester H394R (or alternative) to apply heat to the overheat switch.
 - (b) Increase the temperature of the overheat switch to 170°F (77°C) and maintain this temperature for 5 minutes.
 - (c) Slowly increase the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the FLT DK INOP light comes on at the P5 panel.
 - 1) Make sure the FLT DK INOP light came on at an overheat switch temperature of 190±10°F (88±5°C).
 - 2) Make sure the EICAS message, FLT DECK TEMP, shows on the EICAS top display.
 - 3) Make sure the FLT DK position indicator on the P5 panel for the flight deck zone trim air modulating valve goes to full cool 'C' mark.
 - 4) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-FLT DK indication reads 0.00 to 0.05
 - 5) Make sure the visual position indicator for the flight deck zone trim air modulating valve (V1, in left ECS pack bay) is at CLOSE position.

S 715-413

- (9) Do these steps to check the overheat switch's actuation "open" temperature:
- (a) Slowly decrease the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the FLT DK INOP light goes out at the P5 panel.
 - 1) Make sure the FLT DK INOP light went out at an overheat switch temperature of no less than 150°F (66°C) and at least 10°F (5°C) less than the temperature at which the switch closed at.
 - 2) Make sure the EICAS message, FLT DECK TEMP, does not show on the EICAS top display.
 - 3) Make sure the FLT DK position indicator on the P5 panel for the flight deck zone trim air modulating valve goes to full warm 'W' mark.
 - 4) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-FLT DK indication reads 0.95 to 1.00
 - 5) Make sure the visual position indicator for the flight deck zone trim air modulating valve (V1, in left ECS pack bay) is at OPEN position.

S 865-414

- (10) Push the TRIM AIR switch-light on the P5 panel to the OFF position.

S 865-415

- (11) Set the L/R PACK selectors to OFF position on the P5 panel.

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S 865-416

- (12) Set the FLT DK zone temperature selector on the P5 panel to the MAN (off) position.

S 085-417

- (13) Let the overheat switch become cool then remove the TEMPCAL tester H394R (or alternative) and heater probe BH27956 from the overheat switch.

S 425-418

- (14) Reinstall the overheat switch if it tested okay or replace the overheat switch if found unsatisfactory (AMM 21-61-01/401).

S 415-626

- (15) Close the access door to the main equipment center, 119AL.

G. Forward Zone Duct Overheat Switch Test

S 015-680

- (1) Get access to the forward zone duct overheat (S22) in the air distribution duct above the main cabin ceiling:
 - (a) Open/remove the sculptured ceiling panel(s) on the left side of the main cabin near STA 650 (AMM 25-22-01/401).

S 025-681

- (2) Remove the forward zone duct overheat switch (S22) but keep the airplane electrical connector still attached to the switch (AMM 21-61-01/401).

S 485-682

- (3) Connect the TEMPCAL tester H394R (or alternative) and associated TEMPCAL heater probe BH27956 to the overheat switch.

S 865-683

- (4) Make sure this circuit breaker is closed on the P11 circuit breaker panel:
 - (a) 11R25, ZONE DUCT OVHT FWD

S 865-684

- (5) Set the FWD CAB zone temperature selector on the P5 panel to the full AUTO-W position.

S 865-685

- (6) Set the L/R PACK selectors to AUTO position on the P5 panel.

S 865-686

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

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S 715-687

- (8) Do these steps to check the overheat switch's actuation "closed" temperature:
- (a) Use the TEMPCAL tester H394R (or alternative) to apply heat to the overheat switch.
 - (b) Increase the temperature of the overheat switch to 170°F (77°C) and maintain this temperature for 5 minutes.
 - (c) Slowly increase the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the FWD CAB INOP light comes on at the P5 panel.
 - 1) Make sure the FWD CAB INOP light came on at an overheat switch temperature of 190±10°F (88±5°C).
 - 2) Make sure the EICAS message, FWD CABIN TEMP, shows on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-FWD indication reads 0.00 to 0.05
 - 4) Make sure the visual position indicator for the forward zone trim air modulating valve (V2, in left ECS pack bay) is at CLOSE position.

S 715-688

- (9) Do these steps to check the overheat switch's actuation "open" temperature:
- (a) Slowly decrease the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the FWD CAB INOP light goes out at the P5 panel.
 - 1) Make sure the FWD CAB INOP light went out at an overheat switch temperature of no less than 150°F (66°C) and at least 10°F (5°C) less than the temperature at which the switch closed at.
 - 2) Make sure the EICAS message, FWD CABIN TEMP, does not show on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-FWD indication reads 0.95 to 1.00
 - 4) Make sure the visual position indicator for the forward zone trim air modulating valve (V2, in left ECS pack bay) is at OPEN position.

S 865-689

- (10) Push the TRIM AIR switch-light on the P5 panel to the OFF position.

S 865-690

- (11) Set the L/R PACK selectors to OFF position on the P5 panel.

S 865-691

- (12) Set the FWD CAB zone temperature selector on the P5 panel to the OFF position.

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S 085-692

- (13) Let the overheat switch become cool then remove the TEMPCAL tester H394R (or alternative) and heater probe BH27956 from the overheat switch.

S 425-693

- (14) Reinstall the overheat switch if it tested okay or replace the overheat switch if found unsatisfactory (AMM 21-61-01/401).

S 415-694

- (15) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

H. Aft Zone Duct Overheat Switch Test

S 015-665

- (1) Get access to the aft zone duct overheat switch (S23) in the air distribution duct above the main cabin ceiling:
 - (a) Open/remove the sculptured ceiling panel(s) on the left side of the main cabin near STA 770 (AMM 25-22-01/401).

S 025-666

- (2) Remove the aft zone duct overheat switch (S23) but keep the airplane electrical connector still attached to the switch (AMM 21-61-01/401).

S 485-667

- (3) Connect the TEMPCAL tester H394R (or alternative) and associated TEMPCAL heater probe BH27956 to the overheat switch.

S 865-668

- (4) Make sure this circuit breaker is closed on the P11 circuit breaker panel:
 - (a) 11R27, ZONE DUCT OVHT AFT

S 865-669

- (5) Set the AFT CAB zone temperature selector on the P5 panel to the full AUTO-W position.

S 865-670

- (6) Set the L/R PACK selectors to the AUTO position on the P5 panel.

S 865-671

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

S 715-672

- (8) Do these steps to check the overheat switch's actuation "closed" temperature:
 - (a) Use the TEMPCAL tester H394R (or alternative) to apply heat to the overheat switch.
 - (b) Increase the temperature of the overheat switch to 170°F (77°C) and maintain this temperature for 5 minutes.

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- (c) Slowly increase the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the AFT CAB INOP light comes on at the P5 panel.
- 1) Make sure the AFT CAB INOP light came on at an overheat switch temperature of 190±10°F (88±5°C).
 - 2) Make sure the EICAS message, AFT CABIN TEMP, shows on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-AFT indication reads 0.00 to 0.05
 - 4) Make sure the visual position indicator for the aft zone trim air modulating valve (V3, in left ECS pack bay) is at CLOSE position.

S 715-673

- (9) Do these steps to check the overheat switch's actuation "open" temperature:
- (a) Slowly decrease the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the AFT CAB INOP light goes out at the P5 panel.
- 1) Make sure the AFT CAB INOP light went out at an overheat switch temperature of no less than 150°F (66°C) and at least 10°F (5°C) less than the temperature at which the switch closed at.
 - 2) Make sure the EICAS message, AFT CABIN TEMP, does not show on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-AFT indication reads 0.95 to 1.00
 - 4) Make sure the visual position indicator for the aft zone trim air modulating valve (V3, in left ECS pack bay) is at OPEN position.

S 865-674

- (10) Push the TRIM AIR switch-light on the P5 panel to the OFF position.

S 865-675

- (11) Set the L/R PACK selectors to the OFF position on the P5 panel.

S 865-676

- (12) Set the AFT CAB zone temperature selector on the P5 panel to the OFF position.

S 085-677

- (13) Let the overheat switch become cool then remove the TEMPCAL tester H394R (or alternative) and heater probe BH27956 from the overheat switch.

S 425-678

- (14) Reinstall the overheat switch if it tested okay or replace the overheat switch if found unsatisfactory (AMM 21-61-01/401).

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S 415-679

(15) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

I. Mid Zone Duct Overheat Switch Test

S 015-650

- (1) Get access to the mid zone duct overheat switch (S635) in the air distribution duct above the main cabin ceiling:
- (a) Open/remove the sculptured ceiling panel(s) on the right side of the main cabin near STA 770 (AMM 25-22-01/401).

S 025-651

- (2) Remove the mid zone duct overheat switch (S635) but keep the airplane electrical connector still attached to the switch (AMM 21-61-01/401).

S 485-652

- (3) Connect the TEMPCAL tester H394R (or alternative) and associated TEMPCAL heater probe BH27956 to the overheat switch.

S 865-653

- (4) Make sure this circuit breaker is closed on the P11 circuit breaker panel:
- (a) 11R26, ZONE DUCT OVHT MID

S 865-654

- (5) Set the MID CAB zone temperature selector on the P5 panel to the full AUTO-W position.

S 865-655

- (6) Set the L/R PACK selectors to the AUTO position on the P5 panel.

S 865-656

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

S 715-657

- (8) Do these steps to check the switch's actuation "closed" temperature:
- (a) Use the TEMPCAL tester H394R (or alternative) to apply heat to the overheat switch.
 - (b) Increase the temperature of the overheat switch to 170°F (77°C) and maintain this temperature for 5 minutes.
 - (c) Slowly increase the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the MID CAB INOP light comes on at the P5 panel.
 - 1) Make sure the MID CAB INOP light came on at an overheat switch temperature of 190±10°F (88±5°C).
 - 2) Make sure the EICAS message, MID CABIN TEMP, shows on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-MID indication reads 0.00 to 0.05

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- 4) Make sure the visual position indicator for the mid zone trim air modulating valve (V145, in left ECS pack bay) is at CLOSE position.

S 715-658

- (9) Do these steps to check the overheat switch's actuation "open" temperature:
 - (a) Slowly decrease the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the MID CAB INOP light goes out at the P5 panel.
 - 1) Make sure the MID CAB INOP light went out at an overheat switch temperature of no less than 150°F (66°C) and at least 10°F (5°C) less than the temperature at which the switch closed at.
 - 2) Make sure the EICAS message, MID CABIN TEMP, does not show on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-MID indication reads 0.95 to 1.00
 - 4) Make sure the visual position indicator for the mid zone trim air modulating valve (V145, in left ECS pack bay) is at OPEN position.

S 865-659

- (10) Push the TRIM AIR switch-light on the P5 panel to the OFF position.

S 865-660

- (11) Set the L/R PACK selectors to OFF position on the P5 panel.

S 865-661

- (12) Set the MID CAB zone temperature selector on the P5 panel to the OFF position.

S 085-662

- (13) Let the overheat switch become cool then remove the TEMPCAL tester H394R (or alternative) and heater probe BH27956 from the overheat switch.

S 425-663

- (14) Reinstall the overheat switch if it tested okay or replace the overheat switch if found unsatisfactory (AMM 21-61-01/401).

S 415-664

- (15) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

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J. Aux-Forward Zone Duct Overheat Switch Test

S 015-627

- (1) Get access to the aux-forward zone duct overheat switch (S791) in the air distribution duct above the main cabin ceiling:
 - (a) Open/remove the sculptured ceiling panel(s) on the left side of the main cabin near STA 560 (AMM 25-22-01/401).

S 025-419

- (2) Remove the aux-forward zone duct overheat switch (S791) but keep the airplane electrical connector still attached to the switch (AMM 21-61-01/401).

S 485-420

- (3) Connect the TEMPCAL tester H394R (or alternative) and associated TEMPCAL heater probe BH27956 to the overheat switch.

S 865-421

- (4) Make sure this circuit breaker is closed on the P11 circuit breaker panel:
 - (a) 11H5, ZONE DUCT OVHT AUX FWD

S 865-422

- (5) Set the FWD CAB zone temperature selector on the P5 panel to the full AUTO-W position.

S 865-423

- (6) Set the L/R PACK selectors to AUTO position on the P5 panel.

S 865-424

- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.

S 715-425

- (8) Do these steps to check the overheat switch's actuation "closed" temperature:
 - (a) Use the TEMPCAL tester H394R (or alternative) to apply heat to the overheat switch.

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- (b) Increase the temperature of the overheat switch to 170°F (77°C) and maintain this temperature for 5 minutes.
- (c) Slowly increase the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the FWD CAB INOP light comes on at the P5 panel.
 - 1) Make sure the FWD CAB INOP light came on at an overheat switch temperature of 190±10°F (88±5°C).
 - 2) Make sure the EICAS message, FWD CABIN TEMP, shows on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-AUX FWD indication reads 0.00 to 0.05
 - 4) Make sure the visual position indicator for the aux-forward zone trim air modulating valve (V152, in left ECS pack bay) is at CLOSE position.

S 715-426

- (9) Do these steps to check the overheat switch's actuation "open" temperature:
 - (a) Slowly decrease the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the FWD CAB INOP light goes out at the P5 panel.
 - 1) Make sure the FWD CAB INOP light went out at an overheat switch temperature of no less than 150°F (66°C) and at least 10°F (5°C) less than the temperature at which the switch closed at.
 - 2) Make sure the EICAS message, FWD CABIN TEMP, does not show on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-AUX FWD indication reads 0.95 to 1.00
 - 4) Make sure the visual position indicator for the aux-forward zone trim air modulating valve (V152, in left ECS pack bay) is at OPEN position.

S 865-427

- (10) Push the TRIM AIR switch-light on the P5 panel to the OFF position.

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S 865-428

- (11) Set the L/R PACK selectors to OFF position on the P5 panel.

S 865-429

- (12) Set the FWD CAB zone temperature selector on the P5 panel to the OFF position.

S 085-430

- (13) Let the overheat switch become cool then remove the TEMPCAL tester H394R (or alternative) and heater probe BH27956 from the overheat switch.

S 425-431

- (14) Reinstall the overheat switch if it tested okay or replace the overheat switch if found unsatisfactory (AMM 21-61-01/401).

S 415-628

- (15) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

K. Aux-Mid Zone - Duct Overheat Switch Test

S 015-631

- (1) Get access to the aux-mid zone duct overheat switch (S792) in the air distribution duct above the main cabin ceiling:
(a) Open/remove the sculptured ceiling panel(s) on the left side of the main cabin near STA 760 (AMM 25-22-01/401).

S 025-445

- (2) Remove the aux-mid zone duct overheat switch (S792) but keep the airplane electrical connector still attached to the switch (AMM 21-61-01/401).

S 485-446

- (3) Connect the TEMPCAL tester H394R (or alternative) and associated TEMPCAL heater probe BH27956 to the overheat switch.

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- S 865-447
- (4) Make sure this circuit breaker is closed on the P11 circuit breaker panel:
- (a) 11H6, ZONE DUCT OVHT AUX MID
- S 865-448
- (5) Set the MID CAB zone temperature selector on the P5 panel to the full AUTO-W position.
- S 865-449
- (6) Set the L/R PACK selectors to the AUTO position on the P5 panel.
- S 865-450
- (7) Push the TRIM AIR switch-light on the P5 panel to the ON position.
- S 715-451
- (8) Do these steps to check the overheat switch's actuation "closed" temperature:
- (a) Use the TEMPCAL tester H394R (or alternative) to apply heat to the overheat switch.
- (b) Increase the temperature of the overheat switch to 170°F (77°C) and maintain this temperature for 5 minutes.
- (c) Slowly increase the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the MID CAB INOP light comes on at the P5 panel.
- 1) Make sure the MID CAB INOP light came on at an overheat switch temperature of 190±10°F (88±5°C):
- 2) Make sure the EICAS message, MID CABIN TEMP, shows on the EICAS top display.
- 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-AUX MID indication reads 0.00 to 0.05
- 4) Make sure the visual position indicator for the aux-mid zone trim air modulating valve (V153, in left ECS pack bay) is at CLOSE position.

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S 715-452

- (9) Do these steps to check the overheat switch's actuation "open" temperature:
- (a) Slowly decrease the temperature of the overheat switch at a rate of 2°F (1°C) per minute until the MID CAB INOP light goes out at the P5 panel.
- 1) Make sure the MID CAB INOP light went out at an overheat switch temperature of no less than 150°F (66°C) and at least 10°F (5°C) less than the temperature at which the switch closed at.
 - 2) Make sure the EICAS message, MID CABIN TEMP, does not show on the EICAS top display.
 - 3) Make sure on the EICAS ECS/MSG Maintenance page that the TRIM VALVE-AUX MID indication reads 0.95 to 1.00
 - 4) Make sure the visual position indicator for the aux-mid zone trim air modulating valve (V153, in left ECS pack bay) is at OPEN position.

S 865-453

- (10) Push the TRIM AIR switch-light on the P5 panel to the OFF position.

S 865-454

- (11) Set the L/R PACK selectors to OFF position on the P5 panel.

S 865-455

- (12) Set the MID CAB zone temperature selector on the P5 panel to the OFF position.

S 085-456

- (13) Let the overheat switch become cool then remove the TEMPCAL tester H394R (or alternative) and heater probe BH27956 from the overheat switch.

S 425-457

- (14) Reinstall the overheat switch if it tested okay or replace the overheat switch if found unsatisfactory (AMM 21-61-01/401).

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S 415-632

(15) Install/close the sculptured ceiling panels (AMM 25-22-01/401).

L. Put the Airplane back to Its Usual Condition

S 415-638

(1) Close the left ECS pack components access panel, 193FL.

S 865-484

(2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-61-00-735-096

7. System Test – Forward Cargo Zone Temperature Control System

(Fig. 501, 503, 504)

A. General

- (1) The system test that follows includes electrical, pneumatic, and thermal performance tests of the temperature control system for the forward cargo zone.

B. Equipment

- (1) Hand-held thermometer, commercially available
- (2) Two (2) Digital Multimeters, commercially available

C. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-46-00/201, Entry, Service, and Cargo Access Doors and Panels
- (3) AMM 21-61-12/501, Auxiliary Zone Temperature Controller
- (4) AMM 24-22-00/201, Electric Power – Control
- (5) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall
- (6) AMM 27-51-00/201, Trailing Edge Flap System
- (7) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (8) AMM 32-09-02/201, Air/Ground Relays
- (9) AMM 36-00-00/201, Pneumatic General

D. Access

(1) Location Zones

- 119 Main Equipment Center (Left)
- 121/122 Forward Cargo Compartment
- 125 Area Aft of Forward Cargo Compartment (Left)
- 135/136 Environmental Control Systems (ECS) Bay
- 211/212 Control Cabin

(2) Access Panels

- 119AL Main Equipment Center Access Door
- 193NL Environmental Control System Access Door
- 194LR Environmental Control Systems (ECS) Bay Access Door
- 194NR Flow Control and Shutoff Valve (Right)

E. Prepare for Test

S 865-097

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-098

- (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11A13, L PACK FLOW CONT
 - (b) 11A26, R PACK FLOW CONT
 - (c) 11N10, L PACK AUTO POWER
 - (d) 11N11, L PACK AUTO CONT
 - (e) 11N15, R PACK PWR STBY
 - (f) 11N16, R PACK CONT STBY

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- (g) 11N18, CARGO EXH VALVE
- (h) 11N19, R PACK AUTO POWER
- (i) 11N20, R PACK AUTO CONT
- (j) 11N21, FWD CARGO CONT VLV CLOSE
- (k) 11N22, FWD CARGO DUCT OVHT
- (l) 11N24, L PACK PWR STBY
- (m) 11N25, L PACK CONT STBY
- (n) 11P21, FWD CARGO A/C & VENT CONT
- (o) 11R11, AUX ZONE CONTROLLER
- (p) 11R14, CABIN RECIRC FAN L
- (q) 11R15, ZONE CONTROLLER
- (r) 11R19, FWD CARGO HEAT CONT
- (s) 11R21, CARGO HEAT OVERRIDE
- (t) 11R23, CABIN RECIRC FAN R
- (u) 11R24, F/D ZONE DUCT OVHT

S 865-099

- (3) Make sure these circuit breakers on the miscellaneous electrical equipment panel, P36, are closed:
 - (a) 36E4 or 36K3, CGO GND EXH B/U VAL
 - (b) 36F2 or 36F4, RECIRC FAN L
 - (c) 36L2 or 36K5, FWD CARGO HT CONT VLV

S 865-100

- (4) Make sure these circuit breakers on the miscellaneous electrical equipment panel, P37, are closed:
 - (a) 37E3 or 37K7, CARGO GND EXH VALVE
 - (b) 37E4 or 37K6, CARGO A/C SOV
 - (c) 37G4 or 37C4, RECIRC FAN 2
 - (d) 37J3 or 37G1, FWD CARGO VENT FAN
 - (e) 37J6 or 37F1, CGO GND EXH FAN

S 865-388

- (5) Make sure that the flaps are in the retracted position (AMM 27-51-00/201).

S 865-394

- (6) To simulate right and left engines "ON", hold the Channel 2 switches on the N2 engine speed card assemblies (M1092 and M1093, P50 panel) to the TEST position, then set the L and R FUEL control switches to the RUN position.

NOTE: There is a 3-5 minute time delay after setting fuel switches.

S 865-389

- (7) Make sure that the system No.1 and No. 2 air/ground relays are set to ground mode (AMM 32-09-02/201).

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S 865-390

- (8) To simulate that the left and right engine bleed air PRSOV's are in the open position, open these circuit breakers and attach DO-NOT-CLOSE tags:
- (a) Pilot's Overhead Circuit Breaker Panel, P11
 - 1) 11S10, L AIR SUP ENG IND
 - 2) 11S11, L AIR SUP ENG BLEED CONT
 - 3) 11S19, R AIR SUP ENG IND
 - 4) 11S20, R AIR SUP ENG BLEED CONT

S 865-391

- (9) To simulate that the left and right pack flow control valves (FCV) are in the open position, do these steps:
- (a) Disconnect the electrical connector D2770 from the left pack FCV (V16).
 - (b) Disconnect the electrical connector D1276 from the right pack FCV (V17).

S 865-392

- (10) Set the position of the air conditioning flight deck control panel switches as follows, on the P5 pilot's overhead panel:
- (a) FWD CARGO AIR COND zone temperature selector at AUTO position.
 - (b) FLT DK zone temperature selector at AUTO position.
 - (c) FWD CAB, MID CAB, and AFT CAB zone temperature selectors at OFF position.
 - (d) L PACK and R PACK selectors at AUTO position.
 - (e) L-RECIRC FAN and R-RECIRC FAN switch-lights at ON position.
 - (f) FWD CARGO AIR COND switch-light set to ON position.
 - (g) EQUIP COOLING mode selector at AUTO position.
- F. Electrical Modulation Test (Air Off Test)

S 745-800

- (1) Do this task: Auxiliary Zone Temperature Controller BITE Test (AMM 21-61-12/501).

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S 725-109

- (2) Do these steps to check the INOP and FAULT signal wires for continuity between the aux-zone temperature controller (AZTC, M1609) and the pack flow and cargo air conditioning controller (PFCACC, M1610):
- (a) Set the FWD CARGO AIR COND switch-light to the OFF position.
 - (b) Open these circuit breakers on the P11 overhead circuit breaker panel and attach DO-NOT-CLOSE tags:
 - 1) 11A13, L PACK FLOW CONT
 - 2) 11R11, AUX ZONE CONTROLLER
 - (c) Remove the aux zone temperature controller (AZTC, M1609) from the E1-5 shelf (AMM 21-61-12/401).
 - (d) Remove the pack flow and cargo air conditioning controller (PFCACC, M1610) from the E1-5 shelf (AMM 21-51-24/401).
 - (e) Do these wiring checks for the STATUS 1 and STATUS 2 signals between the AZTC and PFCACC:
 - 1) For the STATUS 1 signal, make sure that continuity exists between the AZTC connector plug D13460A, pin D10, and PFCACC connector plug D13560B, pin B2 (SSM 21-60-08, WDM 21-61-81).
 - 2) For the STATUS 2 signal, make sure that continuity exists between the AZTC connector plug D13460A, pin D12, and PFCACC connector plug D13560B, pin B3 (SSM 21-60-08, WDM 21-61-81).
 - (f) Install the aux-zone temperature controller (AZTC, M1609) (AMM 21-61-12/401).
 - (g) Install the pack flow and cargo air conditioning controller (PFCACC, M1610) (AMM 21-51-24/401).
 - (h) Close these circuit breakers and remove the DO-NOT-CLOSE tags on the P11 overhead circuit breaker panel:
 - 1) 11A13, L PACK FLOW CONT
 - 2) 11R11, AUX ZONE CONTROLLER
 - (i) Set the FWD CARGO AIR COND switch-light to the ON position.
 - (j) Set the FWD CARGO AIR COND temperature selector to the VENT position.

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S 725-393

- (3) To test the operation of the forward cargo trim heat shutoff valve (V89), do the system test in AMM 21-43-00/501.

S 725-110

- (4) Do the steps that follow to make sure the modulating valve for the forward cargo compartment operates correctly:
- (a) If the temperature in the forward cargo compartment is more than 19 degrees C or less than 11 degrees C, do the steps that follow:
 - 1) Open the forward cargo door 821 (AMM 06-46-00/201) and find the temperature sensor for the forward cargo zone.
 - 2) Install a jumper, with 6.0K ohm resistance, between pins 1 and 2 of the connector D13586 on the temperature sensor.
 - (b) Turn the temperature selector switch for the forward cargo zone to the AUTO full "C" position.
 - (c) Use the Flight Management Computer (FMC) Control Display Unit (CDU) to bring up the ANALOG DISCR page 1/2 to display left and right pack flow mode.
 - 1) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (high flow).
 - (d) Remove the aft end lining of the forward cargo compartment (AMM 25-52-01/401).
 - 1) Find the modulating valve for the forward cargo zone.
 - (e) Make sure the modulating valve goes to the full closed position or is in the full closed position.
 - (f) Turn the temperature selector switch for the forward cargo zone to the AUTO full "W" position.
 - (g) Make sure the modulating valve goes to the full open position or is in the full open position.
 - (h) Turn the temperature selector switch for the forward cargo zone to the VENT position.
 - (i) Use the Flight Management Computer (FMC) Control Display Unit (CDU) to bring up the ANALOG DISCR page 1/2 to display left and right pack flow mode.
 - 1) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows LO (low flow).

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- (j) Remove the jumper between pins 1 and 2 of the connector D13586, on the temperature sensor, if installed.
- (k) Turn the temperature selector switch for the forward cargo zone to the AUTO position.
- (l) Use the Flight Management Computer (FMC) Control Display Unit (CDU) to bring up the ANALOG DISCR page 1/2 to display left and right pack flow mode.
 - 1) Make sure the LEFT (RIGHT) ECS PACK H/L entry on the ANALOG DISCR page shows HI (high flow).
- (m) Install the aft-end lining for the forward cargo compartment (AMM 25-52-01/401).

S 725-111

- (5) Do these steps to make sure the temperature indication for the forward cargo zone operates correctly.
 - (a) Open the forward cargo door 821 (AMM 06-46-00/201).
 - (b) Find the temperature bulb for the forward cargo zone.
 - (c) Hold a thermometer approximately 2 feet (0.6 meter) from the temperature bulb.
 - (d) Look at the EICAS status page.
 - 1) Make sure the temperature indication for the forward cargo zone is ± 1 degree C of the actual temperature.

S 725-112

- (6) Do a test of the forward cargo duct overheat switch (S793) and the forward cargo compartment overheat switch (S794):
 - (a) Set the FWD CARGO AIR COND switch-light to the OFF position.
 - (b) Get access to the forward cargo overheat switches (S793 and S794) in the forward cargo compartment:
 - 1) Open the forward cargo door 821 (AMM 52-33-00/201).
 - 2) Remove the left sidewall linings near STA580 and STA740 in the forward cargo compartment (AMM 25-52-01/401).

NOTE: The forward cargo duct overheat switch (S793) is at STA734. The forward cargo compartment overheat switch (S794) is at STA660.

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- (c) Make sure that these circuit breakers are open on the P11 overhead circuit breaker panel to simulate that the left/right engine bleed air PRSOVs are open:
 - 1) 11S10, LEFT ENG BLEED IND
 - 2) 11S11, LEFT ENG BLEED CONT
 - 3) 11S19, RIGHT ENGINE BLEED IND
 - 4) 11S20, RIGHT ENG BLEED CONT
- (d) Make sure that these electrical connectors are disconnected to simulate that both the left/right pack flow control valves are open.
 - 1) Connector D2770 (left pack flow control valve, V16).
 - 2) Connector D1276 (right pack flow control valve, V17).
- (e) Make sure that the FWD/AFT CARGO FIRE switches on the P8 panel are not armed.
- (f) Set the FWD CARGO AIR COND switch-light to the ON position, and make a record of the current time of day.
- (g) Make sure that the FWD CARGO AIR COND temperature selector is set to the AUTO position.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (h) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (i) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground system (AMM 32-09-02/201).
- (j) Disconnect the electrical connector D13596 from the forward cargo duct overheat switch (S793), and install a jumper wire between pins 1 and 2 of the connector D13596 to simulate an overheat condition.
 - 1) Make sure that the EICAS status and maintenance messages CARGO A/C TEMP show.
 - 2) Make sure that the EICAS advisory message FWD CGO BACKUP shows.
 - 3) Make sure that the FAULT light on the FWD CARGO AIR COND temperature control module (M1619, P5 panel) is on.
- (k) Remove the jumper wire from pins 1 and 2 of the connector D13596, and reconnect the electrical connector D13596 to the forward cargo duct overheat switch (S793).
 - 1) Make sure that the EICAS advisory message FWD CGO BACKUP does not show.

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- 2) Make sure that the FAULT light on the FWD CARGO AIR COND temperature control module (M1619, P5 panel) is off.
 - 3) Do the Maintenance Message Erase Procedure to clear the EICAS display (AMM 31-41-00/201).
 - a) Make sure that the EICAS status and maintenance messages CARGO A/C TEMP do not show.
- (l) Disconnect the electrical connector D14594 from the forward cargo compartment overheat switch (S794) and install a jumper wire between pins 1 and 2 of the connector D13594 to simulate an overheat condition.
- 1) Make sure that the FAULT light on the FWD CARGO AIR COND temperature control module (M1619, P5 panel) is on.
 - 2) Make sure that the EICAS advisory message FWD CARGO BACKUP shows.
 - 3) Wait for 30 minutes to pass after the time which you set the FWD CARGO AIR COND switch-light to the ON position in the prior step above.
 - 4) Make sure that the EICAS maintenance message CARGO ZONE OVHT shows.
- (m) Remove the jumper wire from pins 1 and 2 of the connector D13594, and reconnect the electrical connector D13594 to the forward cargo compartment overheat switch (S794).
- 1) Make sure that the EICAS advisory message FWD CARGO BACKUP does not show.
 - 2) Make sure that the FAULT light on the FWD CARGO AIR COND temperature control module (M1619, P5 panel) is off.
 - 3) Do the Maintenance Message Erase Procedure to clear the EICAS display (AMM 31-41-00/201).
 - a) Make sure that the EICAS maintenance message CARGO ZONE OVHT does not show.
- (n) Put the No. 1 and 2 air/ground relay systems to the ground mode (AMM 32-09-02/201).
- (o) Do the activation procedure for the spoilers if you did the deactivation procedure (AMM 27-61-00/201).
- (p) To stop the open simulation of the left/right engine bleed air PRSOV's, close these circuit breakers on the P11 pilot's overhead circuit breaker panel and remove the DO-NOT-CLOSE tags:
- 1) 11S10, L ENG BLEED IND
 - 2) 11S11, L ENG BLEED CONT
 - 3) 11S19, R ENG BLEED IND
 - 4) 11S20, R ENG BLEED CONT
- (q) To stop the open simulation of the left/right pack flow control valves (FCVs), reconnect these electrical connectors:
- 1) Connector D2770 (left pack flow control valve, V16).
 - 2) Connector D1276 (right pack flow control valve, V17).
- (r) To stop the simulation of the left/right engines "ON", release the Channel 2 switches on the N2 engine speed card assemblies (M1092 and M1093, P50 panel) from the the TEST position, and set the L and R FUEL control switches to the OFF position.

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G. Pneumatic Test (Air On Test)

S 725-113

(1) Start Test Setup:

- (a) Put a person in the forward cargo compartment with a thermometer and a headset.
- (b) Supply electrical power (AMM 24-22-00/201).
- (c) Make sure that the circuit breakers listed in the Prepare for Test paragraph at beginning of this task are still closed.
- (d) Make sure the flight compartment controls on the pilots overhead panel, P5, are in the positions that follow:
 - 1) Set the EQUIP COOLING mode selector to the AUTO position.
 - 2) Set the HYD PUMPS-C DEMAND AIR selecto to the OFF position (air-driven hydraulic pump selected off).
 - 3) Set the FWD/AFT/BULK CARGO HEAT switches to the OFF position.
 - 4) Push the WING ANTI-ICE switch to the OFF position.
 - 5) Set the FLT DK, FWD CAB, MID CAB, and AFT CAB zone temperature selectors to the AUTO position.
 - 6) Push the TRIM AIR switch to the OFF position.
 - 7) Push L and R RECIRC FAN switches to the ON position.
 - 8) Set the L PACK and R PACK selectors to the OFF position.
 - 9) Set the FWD CARGO AIR COND switch to the OFF position.
 - 10) Set the FWD CARGO AIR COND temperature selector to the AUTO-MID position.
- (e) Close the forward cargo door 821 (AMM 52-33-00/201).

S 725-397

(2) Start Air Supply Distribution:

- (a) Make sure that the flaps are in the retracted position (AMM 27-51-00/201).
- (b) Supply pneumatic power with either the engines, the APU, or a pneumatic ground source (AMM 36-00-00/201):
- (c) Do these steps when you use the APU or pneumatic ground source:
 - 1) Simulate the right and left engines "ON", by holding the Channel 2 switches on the N2 engine speed card assemblies (M1092 and M1093, P50 panel) to the TEST position, then set the L and R FUEL control switches to the RUN position.

NOTE: There is a 3-5 minute time delay after setting fuel switches.

- 2) Simulate the left and the right engine bleed air PRSOV's are in the open position, by opening these circuit breakers on the P11 pilot's overhead circuit breaker panel and attach DO-NOT-CLOSE tags:
 - a) 11S10, L ENG BLEED IND
 - b) 11S11, L ENG BLEED CONT
 - c) 11S19, R ENG BLEED IND
 - d) 11S20, R ENG BLEED CONT

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- (d) For the engines or pneumatic ground source, make sure that the left and right pneumatic duct pressure indications read approximately the same pressure between 30-50 PSI.
- (e) For the APU, make sure that the left and right pneumatic duct pressure indications read approximately the same pressure between 15-35 PSI.

S 725-398

(3) Start Flow and Temperature Checks:

- (a) Set the L PACK and R PACK selectors to the AUTO position.
- (b) Push the TRIM AIR switch to the ON position.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (c) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (d) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground system (AMM 32-09-02/201).
- (e) Push the FWD CARGO A/C switch-light to the ON position.
 - 1) Make sure the ON light comes on.
 - 2) Make a record of the current time of day that FWD CARGO A/C was selected ON.
 - 3) Make sure air flows equally out of each ceiling diffuser into the forward cargo compartment.
- (f) Set the FWD CARGO AIR COND zone temperature selector to the VENT position.
 - 1) Make sure air flows equally out of each ceiling diffuser into the forward cargo compartment.
- (g) Set the FWD CARGO AIR COND selector to the AUTO-MID position.
 - 1) Make sure that the forward cargo exhaust valve (V382) is in the OPEN position, butterfly-vane should be fully open, and that air flows out of the exhaust outlet port on the airplane fuselage (AMM 21-26-10/401).

NOTE: The forward cargo exhaust valve (V382) is located at STA 395, WL 117, LBL 25.

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- (h) Put the system No. 1 and No. 2 air/ground relays back to the ground mode (AMM 32-09-02/201).
 - 1) Make sure air flows out of the airplane through the ground exhaust outlets on the fuselage under the forward cargo floor.

S 725-399

(4) Check Temperature Control:

- (a) Set the FWD CARGO AIR COND selector to the AUTO "C" position.
 - 1) Look at the EICAS status page and make sure the temperature indication for the forward cargo compartment decreases.

NOTE: If the outside ambient temperature is moderate, the forward cargo temperature will decrease and become stable at 6 ± 2 degrees C.

- (b) Set the FWD CARGO AIR COND selector to the AUTO "W" position.
 - 1) Look at the EICAS status page and make sure the temperature indication for the forward cargo compartment increases.

NOTE: If the outside ambient temperature is moderate, the forward cargo temperature will decrease and become stable at 25 ± 2 degrees C.

- (c) Set the FWD CARGO AIR COND selector to the AUTO (12-o'clock) position.
 - 1) Make sure the temperature indication for the forward cargo compartment decreases and becomes stable at 16 ± 3 deg C.

S 725-400

(5) Check Backup Control:

- (a) Remove the connector D13596 from the forward cargo duct overheat switch (S793).
- (b) Install a jumper wire between pins 1 and 2 of the connector, D13596.
 - 1) Make sure the shutoff valve closes for the forward cargo heat.
 - 2) Make sure this EICAS status message, CARGO A/C TEMP, shows on the bottom display.
 - 3) Wait until 30 minutes has elapsed since the current time of day was recorded when FWD CARGO AIR COND switch was set to the ON position in earlier step.
 - 4) After 30 minutes has elapsed, make sure that the FAULT light on the Forward Cargo A/C control panel comes on, and that the EICAS advisory message FWD CARGO BACKUP shows.
 - 5) Make sure the modulating valve for the forward cargo zone goes to the closed position or is in the closed position.
 - 6) Make sure the outlet temperature for the left pack, on the EICAS ECS MSG page, is $21 \pm 3^{\circ}\text{C}$.

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- (c) Remove the jumper wire from pins 1 and 2 of the connector, D13596.
- (d) Install the connector D13596 to the forward cargo duct overheat switch (S793).
 - 1) Make sure the FAULT light on the FWD CARGO A/C control panel is not on.
 - 2) Make sure the EICAS message, FWD CGO BACKUP, does not show on the top display.
 - 3) Do the Maintenance Message Erase Procedure to clear the EICAS display (AMM 31-41-00/201).
 - a) Make sure the EICAS status and maintenance message, CARGO A/C TEMP, does not show on the bottom display.
- (e) Push the VERIFY and the RESET switches on the aux-zone temperature controller.

S 725-401

- (6) Stop Flow and Temperature Checks:
 - (a) Set the FWD CARGO AIR COND switch to the OFF position.
 - (b) Set the L PACK and R PACK selectors to the OFF position.
 - (c) Push the TRIM AIR switch to the OFF position.
 - (d) To stop the open simulation of the left/right engine bleed air PRSOV's, close these circuit breakers on the P11 pilot's overhead circuit breaker panel and remove the DO-NOT-CLOSE tags:
 - 1) 11S10, L ENG BLEED IND
 - 2) 11S11, L ENG BLEED CONT
 - 3) 11S19, R ENG BLEED IND
 - 4) 11S20, R ENG BLEED CONT
 - (e) To stop the simulation of the left/right engines "ON", release the Channel 2 switches on the N2 engine speed card assemblies (M1092 and M1093, P50 panel) from the the TEST position, and set the L and R FUEL control switches to the OFF position.

H. Put the Airplane Back to Its Usual Condition

S 415-114

- (1) Install the side lining for the forward cargo compartment (AMM 25-52-01/401).

S 415-115

- (2) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

S 865-116

- (3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 865-292

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-61-00-705-500

8. Operational Test – Forward Cargo Zone Duct Overheat Switches
(Functional Check of Overheat Indication Circuit)

A. General

- (1) This procedure is for a scheduled maintenance task.
- (2) This task will perform a functional check of the overheat indication circuit for the forward cargo zone duct overheat switches.
- (3) This task simulates an overheat condition of zone duct overheat switch. The overheat simulation is accomplished by installing a jumper wire to the overheat switch's electrical connector to simulate closing of the switch contacts. The test then verifies that the appropriate overheat indications (FAULT light and EICAS messages) occur in the flight deck during the overheat simulation.
- (4) This task does not functionally check the switch setting for the actuation temperature and reset temperature of the overheat switch. Refer to the supplier CMM for an off-aircraft check of the overheat switch temperature settings. Alternatively, an on-aircraft check of the overheat switch temperature settings can also be performed with special test equipment (TASK 21-61-00-705-505).

B. References

- (1) AMM 24-22-00/201, Electric Power – Control
- (2) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall
- (3) AMM 27-51-00/201, Trailing Edge Flap System
- (4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (5) AMM 32-09-02/201, Air/Ground Relays
- (6) AMM 36-00-00/201, Pneumatic General
- (7) AMM 52-33-00/201, Large Forward Cargo Door

C. Access

- (1) Location Zones

119	Main Equipment Center (Left)
121/122	Forward Cargo Compartment
125	Area Aft of Forward Cargo Compartment (Left)
135/136	Environmental Control Systems (ECS) Bay
211/212	Control Cabin
- (2) Access Panels

119AL	Main Equipment Center Access Door
193NL	Environmental Control System Access Door
194LR	Environmental Control Systems (ECS) Bay Access Door
194NR	Flow Control and Shutoff Valve (Right)

D. Prepare for Test

S 865-490

- (1) Supply electrical power (AMM 24-22-00/201).

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S 865-491

- (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
- (a) 11A13, L PACK FLOW CONT
 - (b) 11A26, R PACK FLOW CONT
 - (c) 11N10, L PACK AUTO POWER
 - (d) 11N11, L PACK AUTO CONT
 - (e) 11N15, R PACK PWR STBY
 - (f) 11N16, R PACK CONT STBY
 - (g) 11N18, CARGO EXH VALVE
 - (h) 11N19, R PACK AUTO POWER
 - (i) 11N20, R PACK AUTO CONT
 - (j) 11N21, FWD CARGO CONT VLV CLOSE
 - (k) 11N22, FWD CARGO DUCT OVHT
 - (l) 11N24, L PACK PWR STBY
 - (m) 11N25, L PACK CONT STBY
 - (n) 11P21, FWD CARGO A/C & VENT CONT
 - (o) 11R11, AUX ZONE CONTROLLER
 - (p) 11R14, CABIN RECIRC FAN L
 - (q) 11R15, ZONE CONTROLLER
 - (r) 11R19, FWD CARGO HEAT CONT
 - (s) 11R21, CARGO HEAT OVERRIDE
 - (t) 11R23, CABIN RECIRC FAN R
 - (u) 11R24, F/D ZONE DUCT OVHT

S 865-492

- (3) Make sure these circuit breakers on the miscellaneous electrical equipment panel, P36, are closed:
- (a) 36E4 or 36K3, CGO GND EXH B/U VAL
 - (b) 36F2 or 36F4, RECIRC FAN L
 - (c) 36L2 or 36K5, FWD CARGO HT CONT VLV

S 865-493

- (4) Make sure these circuit breakers on the miscellaneous electrical equipment panel, P37, are closed:
- (a) 37E3 or 37K7, CARGO GND EXH VALVE
 - (b) 37E4 or 37K6, CARGO A/C SOV
 - (c) 37G4 or 37C4, RECIRC FAN 2
 - (d) 37J3 or 37G1, FWD CARGO VENT FAN
 - (e) 37J6 or 37F1, CGO GND EXH FAN

S 865-494

- (5) Make sure that the flaps are in the retracted position (AMM 27-51-00/201).

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S 865-495

- (6) To simulate right and left engines "ON", hold the Channel 2 switches on the N2 engine speed card assemblies (M1092 and M1093, P50 panel) to the TEST position, then set the L and R FUEL control switches to the RUN position.

NOTE: There is a 3-5 minute time delay after setting fuel switches.

S 865-496

- (7) Make sure that the system No.1 and No. 2 air/ground relays are set to ground mode (AMM 32-09-02/201).

S 865-497

- (8) To simulate that the left and right engine bleed air PRSOV's are in the open position, open these circuit breakers and attach

DO-NOT-CLOSE tags:

(a) Pilot's Overhead Circuit Breaker Panel, P11

- 1) 11S10, L AIR SUP ENG IND
- 2) 11S11, L AIR SUP ENG BLEED CONT
- 3) 11S19, R AIR SUP ENG IND
- 4) 11S20, R AIR SUP ENG BLEED CONT

S 865-498

- (9) To simulate that the left and right pack flow control valves (FCV) are in the open position, do these steps:

- (a) Disconnect the electrical connector D2770 from the left pack FCV (V16).
- (b) Disconnect the electrical connector D1276 from the right pack FCV (V17).

S 865-499

- (10) Set the position of the air conditioning flight deck control panel switches as follows, on the P5 pilot's overhead panel:

- (a) FWD CARGO AIR COND zone temperature selector at AUTO position.
- (b) FLT DK zone temperature selector at AUTO position.
- (c) FWD CAB, MID CAB, and AFT CAB zone temperature selectors at OFF position.
- (d) L PACK and R PACK selectors at AUTO position.
- (e) L-RECIRC FAN and R-RECIRC FAN switch-lights at ON position.
- (f) FWD CARGO AIR COND switch-light set to ON position.
- (g) EQUIP COOLING mode selector at AUTO position.

E. Functional Check of Overheat Indication Circuit

S 725-489

- (1) Do a test of the forward cargo duct overheat switch (S793) and the forward cargo compartment overheat switch (S794):

- (a) Set the FWD CARGO AIR COND switch-light to the OFF position.

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- (b) Get access to the forward cargo overheat switches (S793 and S794) in the forward cargo compartment:
- 1) Open the forward cargo door 821 (AMM 52-33-00/201).
 - 2) Remove the left sidewall linings near STA580 and STA740 in the forward cargo compartment (AMM 25-52-01/401).

NOTE: The forward cargo duct overheat switch (S793) is at STA734. The forward cargo compartment overheat switch (S794) is at STA660.

- (c) Make sure that these circuit breakers are open on the P11 overhead circuit breaker panel to simulate that the left/right engine bleed air PRSOVs are open:
- 1) 11S10, LEFT ENG BLEED IND
 - 2) 11S11, LEFT ENG BLEED CONT
 - 3) 11S19, RIGHT ENGINE BLEED IND
 - 4) 11S20, RIGHT ENG BLEED CONT
- (d) Make sure that these electrical connectors are disconnected to simulate that both the left/right pack flow control valves are open.
- 1) Connector D2770 (left pack flow control valve, V16).
 - 2) Connector D1276 (right pack flow control valve, V17).
- (e) Make sure that the FWD/AFT CARGO FIRE switches on the P8 panel are not armed.
- (f) Set the FWD CARGO AIR COND switch-light to the ON position, and make a record of the current time of day.
- (g) Make sure that the FWD CARGO AIR COND temperature selector is set to the AUTO position.

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (h) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (i) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground system (AMM 32-09-02/201).
- (j) Disconnect the electrical connector D13596 from the forward cargo duct overheat switch (S793), and install a jumper wire between pins 1 and 2 of the connector D13596 to simulate an overheat condition.
- 1) Make sure that the EICAS status and maintenance messages CARGO A/C TEMP show.

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- 2) Make sure that the EICAS advisory message FWD CGO BACKUP shows.
 - 3) Make sure that the FAULT light on the FWD CARGO AIR COND temperature control module (M1619, P5 panel) is on.
- (k) Remove the jumper wire from pins 1 and 2 of the connector D13596, and reconnect the electrical connector D13596 to the forward cargo duct overheat switch (S793).
- 1) Make sure that the EICAS advisory message FWD CGO BACKUP does not show.
 - 2) Make sure that the FAULT light on the FWD CARGO AIR COND temperature control module (M1619, P5 panel) is off.
 - 3) Do the Maintenance Message Erase Procedure to clear the EICAS display (AMM 31-41-00/201).
 - a) Make sure that the EICAS status and maintenance messages CARGO A/C TEMP do not show.
- (l) Disconnect the electrical connector D14594 from the forward cargo compartment overheat switch (S794) and install a jumper wire between pins 1 and 2 of the connector D13594 to simulate an overheat condition.
- 1) Make sure that the FAULT light on the FWD CARGO AIR COND temperature control module (M1619, P5 panel) is on.
 - 2) Make sure that the EICAS advisory message FWD CARGO BACKUP shows.
 - 3) Wait for 30 minutes to pass after the time which you set the FWD CARGO AIR COND switch-light to the ON position in the prior step above.
 - 4) Make sure that the EICAS maintenance message CARGO ZONE OVHT shows.
- (m) Remove the jumper wire from pins 1 and 2 of the connector D13594, and reconnect the electrical connector D13594 to the forward cargo compartment overheat switch (S794).
- 1) Make sure that the EICAS advisory message FWD CARGO BACKUP does not show.
 - 2) Make sure that the FAULT light on the FWD CARGO AIR COND temperature control module (M1619, P5 panel) is off.
 - 3) Do the Maintenance Message Erase Procedure to clear the EICAS display (AMM 31-41-00/201).
 - a) Make sure that the EICAS maintenance message CARGO ZONE OVHT does not show.
- (n) Put the No. 1 and 2 air/ground relay systems to the ground mode (AMM 32-09-02/201).
- (o) Do the activation procedure for the spoilers if you did the deactivation procedure (AMM 27-61-00/201).
- (p) To stop the open simulation of the left/right engine bleed air PRSOV's, close these circuit breakers on the P11 pilot's overhead circuit breaker panel and remove the DO-NOT-CLOSE tags:
- 1) 11S10, L ENG BLEED IND
 - 2) 11S11, L ENG BLEED CONT
 - 3) 11S19, R ENG BLEED IND
 - 4) 11S20, R ENG BLEED CONT

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- (q) To stop the open simulation of the left/right pack flow control valves (FCVs), reconnect these electrical connectors:
 - 1) Connector D2770 (left pack flow control valve, V16).
 - 2) Connector D1276 (right pack flow control valve, V17).
 - (r) To stop the simulation of the left/right engines "ON", release the Channel 2 switches on the N2 engine speed card assemblies (M1092 and M1093, P50 panel) from the the TEST position, and set the L and R FUEL control switches to the OFF position.
- F. Put the Airplane Back to Its Usual Condition

S 415-485

- (1) Install the side lining for the forward cargo compartment (AMM 25-52-01/401).

S 415-486

- (2) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

S 865-487

- (3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 865-488

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TASK 21-61-00-705-189

9. Operational Test (Alternate) - Forward Cargo Zone Duct Overheat Switches
(Functional Check of Overheat Switch Setting and Overheat Indication Circuit)

A. General

- (1) This procedure is for a scheduled maintenance task.
- (2) This task does an on-wing operational test of the zone duct overheat switch for the forward cargo compartment zone. This task will confirm that the overheat switch actuates (open/close) at prescribed temperatures when heat is applied to the overheat switch to simulate an overheat condition, and verifying that the associated flight crew overheat indications (FAULT light and EICAS messages) operate.
- (3) With increasing temperature, the overheat switch closes at a temperature of 190±10°F (88±5°C). With decreasing temperature, the overheat switch opens at minimum 150°F (66°C).

B. Equipment

- (1) Tester, TEMPCAL - Howell Instruments (either of the following):
 - (a) H394R Tester - Thermo Switch, K-Type Thermocouple Switches (recommended)
 Howell Instruments, Inc. (Vendor Code 98869)
 3479 West Vickery Blvd., Fort Worth, TX 76107-5722
 - (b) H394 Tester - Thermo Switch, K-Type Thermocouple and Thermo Switches (alternative)
 Howell Instruments, Inc. (Vendor Code 98869)
 3479 West Vickery Blvd., Fort Worth, TX 76107-5722
 - (c) H294 Tester - Thermo Switch, Thermocouple and Thermo Switches (alternative)
 Howell Instruments, Inc. (Vendor Code 98869)
 3479 West Vickery Blvd., Fort Worth, TX 761070-5722
- (2) BH27956 - TEMPCAL Heater Probe (for overheat switch p/n 641121-1)
 Howell Instruments, Inc. (Vendor Code 98869)
 3479 West Vickery Blvd., Fort Worth, TX 761070-5722

C. References

- (1) AMM 21-61-01/401, Zone Duct Overheat Switch
- (2) AMM 24-22-00/201, Electric Power Control
- (3) AMM 27-61-00/201, Spoiler Speed Brake Control System
- (4) AMM 31-41-00/201, EICAS
- (5) AMM 32-09-02/201, Air Ground Relays

D. Access

- (1) Location Zones

119	Main Equipment Center (Left)
121/122	Forward Cargo Compartment
125	Area Aft of Forward Cargo Compartment (Left)
135/136	Environmental Control Systems (ECS) Bay
211/212	Control Cabin

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(2) Access Panels

- 119AL Main Equipment Center Access Door
- 193NL Environmental Control System Access Door
- 194LR Environmental Control Systems (ECS) Bay Access Door
- 194NR Flow Control and Shutoff Valve (Right)

E. Prepare For The System Test

S 865-190

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-285

- (2) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
- (a) 11A13, L PACK FLOW CONT
 - (b) 11A26, R PACK FLOW CONT
 - (c) 11N10, L PACK AUTO POWER
 - (d) 11N11, L PACK AUTO CONT
 - (e) 11N15, R PACK PWR STBY
 - (f) 11N16, R PACK CONT STBY
 - (g) 11N18, CARGO EXH VALVE
 - (h) 11N19, R PACK AUTO POWER
 - (i) 11N20, R PACK AUTO CONT
 - (j) 11N24, L PACK PWR STBY
 - (k) 11N25, L PACK CONT STBY
 - (l) 11P21, FWD CARGO A/C & VENT CONT
 - (m) 11R11, AUX ZONE CONTROLLER
 - (n) 11R14, CABIN RECIRC FAN L
 - (o) 11R15, ZONE CONTROLLER
 - (p) 11R19, FWD CARGO HEAT CONT
 - (q) 11R21, CARGO HEAT OVERRIDE
 - (r) 11R23, CABIN RECIRC FAN R
 - (s) 11R24, F/D ZONE DUCT OVHT

S 865-286

- (3) Make sure these circuit breakers on the miscellaneous electrical equipment panel, P36, are closed:
- (a) 36E4 or 36K3, CGO GND EXH B/U VAL
 - (b) 36F2 or 36F4, RECIRC FAN L
 - (c) 36L2 or 36K5, FWD CARGO HT CONT VLV

S 865-287

- (4) Make sure these circuit breakers on the miscellaneous electrical equipment panel, P37, are closed:
- (a) 37E3 or 37K7, CARGO GND EXH VALVE
 - (b) 37E4 or 37K6, CARGO A/C SOV
 - (c) 37G4 or 37C4, RECIRC FAN 2
 - (d) 37J3 or 37G1, FWD CARGO VENT FAN
 - (e) 37J6 or 37F1, CGO GND EXH FAN

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S 865-298

- (5) Turn temperature selector switch for the F/D zone to the AUTO position.

S 865-299

- (6) Turn the temperature selector switches for the forward, mid, and aft zones to the OFF position.

S 865-288

- (7) Turn the selector switch for the left pack on the P5 panel to the AUTO position.

S 865-300

- (8) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the ON position.

S 725-254

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (9) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all persons and equipment away from the spoilers.

S 865-261

- (10) Open these circuit breakers on the overhead circuit breaker panel, P11 and attach DO-NOT-CLOSE tags:
- (a) 11S10, LEFT ENG BLEED IND
 - (b) 11S11, LEFT ENG BLEED CONT
 - (c) 11S19, RIGHT ENGINE BLEED IND
 - (d) 11S20, RIGHT ENG BLEED CONT

S 015-262

- (11) Open the left ECS bay access door, 193NL.

S 025-263

- (12) Remove the connector, D2770, from the left flow control valve to simulate left pack flow valve is open.

S 015-282

- (13) Open the right ECS bay door, 194LR.

S 025-265

- (14) Remove the connector, D1276, from the right flow control valve to simulate the right pack flow valve is open.

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S 865-266

- (15) Make sure the Cargo Fire arming switches on the P8 panel are not armed.

S 865-296

- (16) Turn the temperature selector switch for the forward cargo zone on the P5 panel to the AUTO position.

S 865-302

- (17) Push the FWD CARGO A/C switch-light on the pilots' overhead panel, P5, to the ON position.

S 865-268

WARNING: MAKE SURE YOU DO THE FLIGHT MODE SIMULATION CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

- (18) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground system (AMM 32-09-02/201).

NOTE: Simulation of the Flight Mode is optional. If you don't simulate the flight mode, you will need to wait 30 minutes after the time that the FWD CARGO A/C switch-light was selected ON to permit the forward cargo air conditioning system to go into its backup control mode.

S 015-253

- (19) Remove the forward cargo compartment duct overheat switch (AMM 21-61-01/401).

S 425-256

- (20) Connect the electrical connector to the zone duct overheat switch.

S 865-297

- (21) Make sure these circuit breakers are closed on the P11 panel:
(a) 11N21, FWD CARGO CONT VLV CLOSE
(b) 11N22, FWD CARGO DUCT OVHT

F. Forward Cargo Compartment Zone Duct Overheat Switch Test

S 715-332

- (1) Do these steps to check the switch's actuation "closed" temperature:
(a) Connect the Howell TEMPCAL tester to the overheat switch.
(b) Increase the temperature of the overheat switch probe to 170°F (77°C) and maintain this temperature for 5 minutes.
(c) Slowly increase the temperature of the overheat switch probe at 2°F (1°C) per minute.
(d) Make sure this EICAS status message, CARGO A/C TEMP, shows on the bottom display.

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- (e) Make sure this EICAS advisory message, FWD CGO BACKUP, shows on the top display.
- (f) Make sure the FAULT light on the Forward Cargo A/C control panel comes on.

S 715-333

- (2) Do these steps to check the overheat switch's actuation "open" temperature:
 - (a) Slowly decrease the temperature of the overheat switch probe at 2°F (1°C) per minute.
 - (b) Make sure that the overheat switch opens at a temperature no less than 150°F (66°C)
 - (c) Make sure that the temperature at which the overheat switch opens at is at least 10°F (4.72°C) less than the temperature at which the switch closed at.
 - (d) Make sure the EICAS advisory message, FWD CGO BACKUP, does not show on the top display.
 - (e) Do the Maintenance Message Erase Procedure to clear the EICAS display (AMM 31-41-00/201).
 - (f) Make sure the EICAS status and maintenance message, CARGO A/C TEMP, does not show on the bottom display.
 - (g) Make sure the FAULT light on the FORWARD CARGO A/C control panel does not come on.
 - (h) Remove the Howell tester from the overheat switch.
- G. Put the Airplane Back to Its Usual Condition

S 425-258

- (1) Install the forward cargo compartment zone duct overheat switch (AMM 21-61-01/401).

S 865-270

- (2) If you put the airplane in the flight mode, put it back to the ground mode (AMM 32-09-02/201).

S 865-304

- (3) Push the FWD CARGO A/C switch-light on the pilots' overhead panel, P5, to the OFF position.

S 865-267

- (4) Turn the temperature selector switch for the forward cargo zone on the P5 panel to the OFF position.

S 425-295

- (5) Connect the connector D2770(D1276) to the left(right) flow control valve.

S 415-294

- (6) Close the left(right) ECS bay access door, 193NL(194LR).

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S 865-293

- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the overhead circuit breaker panel, P11:
- (a) 11S10, LEFT ENG BLEED IND
 - (b) 11S11, LEFT ENG BLEED CONT
 - (c) 11S19, RIGHT ENGINE BLEED IND
 - (d) 11S20, RIGHT ENG BLEED CONT

S 865-259

- (8) If you did the deactivation procedure for the spoilers, do the activation procedure (AMM 27-61-00/201).

S 865-303

- (9) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the OFF position.

S 865-291

- (10) Turn the selector switch for the left pack on the P5 panel to the OFF position.

S 865-305

- (11) Turn temperature selector switch for the F/D zone to the OFF position.

S 865-257

- (12) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TEMPERATURE CONTROL SYSTEM - CLEANING/PAINTING

1. General

- A. This procedure cleans the zone temperature sensors and the zone temperature filters in the passenger cabin and the control cabin. You can also use this procedure to clean the temperature bulbs in the passenger cabin.

TASK 21-61-00-107-027

2. Clean the Components

A. Standard Tools and Equipment

- (1) Soft bristle brush

B. Consumable Materials

- (1) G02472, Filter Material - Scott Filter Foam, 3/16 inch thickness, porosity grade 45 PPI, color - grey, flame retardant, Scott Paper Co. (Foam Div), 1500 E. 2nd St., Chester, PA

NOTE: Use filter P/N 69B42967-1 when filter raw material is not available.

- (2) Detergents (AMM 20-30-02/201):

(a) B00541 - General Purpose Detergent (commercially available) - diluted as required with water.

- (3) B00309 - Isopropyl Alcohol

- (4) Clean and dry cheesecloth or cotton cloths and lint-free tissue

C. References

- (1) AMM 21-61-08/401, Zone Temperature Sensors

- (2) AMM 21-61-09/401, Zone Temperature Sensor Filter

- (3) AMM 21-65-03/401, Compartment Temperature Bulb

D. Access

- (1) Location Zones

211	Control Cabin (Left)
233/234	Area Above Passenger Cabin Ceiling - Section 43
243/244	Area Above Passenger Cabin Ceiling - Section 45
253/254	Area Above Passenger Cabin Ceiling - Section 46

E. Prepare to Clean the Components

S 037-023

- (1) Remove the filter from the zone temperature sensor (AMM 21-61-09/401).

S 027-029

- (2) Remove the temperature sensor and/or the temperature bulb (AMM 21-61-08/401 and/or 21-65-03/401).

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F. Clean the Components

S 117-028

- (1) Do these steps to clean the temperature sensor and/or the temperature bulb.
 - (a) Clean the sensor and/or bulb with a cloth that is moist with the detergent solution.
 - (b) Clean the sensor and/or bulb with the isopropyl alcohol if the detergent does not remove the dirt.

NOTE: Clean the sensor and/or bulb again with the detergent solution after you use the isopropyl alcohol.

- (c) Flush the sensor and/or bulb with a clean cloth that is moist with clean water.

S 117-024

- (2) Do these steps to clean the filter cover and the filter:
 - (a) Clean the filter cover and the filter with a mild soap and water mixture.
 - (b) Flush the filter cover and the filter with clean water.
 - (c) Dry the filter cover with a clean dry cloth.
 - (d) Dry the filter with compressed air or a clean dry cloth.

NOTE: Replace the filter if it is necessary. You can use the old filter as a template to make the new filter.

G. Put the Airplane Back to Its Usual Condition

S 437-025

- (1) Install the filter for the zone temperature sensor (AMM 21-61-09/401).

S 427-030

- (2) Install the temperature sensor and/or the temperature bulb (AMM 21-61-08/401 and/or 21-65-03/401).

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ZONE DUCT OVERHEAT SWITCH - REMOVAL/INSTALLATION

1. General

- A. A zone duct overheat switch is installed in the air supply duct for the flight compartment and in the overhead distribution ducts for each of the temperature control zones in the passenger cabin. The zone duct overheat switch for the flight compartment can be found on the left sidewall of the nose wheel well, in the aft corner. The zone duct overheat switches for the passenger cabin zones can be found above the passenger compartment ceiling where the air conditioning riser ducts attach to the overhead distribution ducts.
- B. The zone duct overheat switches when actuated will cause an INOP light, on the P5 pilot's overhead panel, to come on.
- C. A zone duct overheat switch is also installed in the air supply duct which is for the forward cargo air conditioning system. The zone duct overheat switch can be found behind the aft left sidewall lining in the forward cargo compartment. The zone duct overheat switch when actuated will cause a FAULT light, on the P5 pilot's overhead panel, to come on.

TASK 21-61-01-004-048

2. Zone Duct Overheat Switch Removal (Fig. 401, 402)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (3) AMM 24-22-00/201, Electric Power Control
- (4) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zones
 - 121 Forward Cargo Compartment (Left)
 - 211/212 Control Cabin
 - 223/224 Area Above Passenger Cabin Ceiling - Section 41
 - 233/234 Area Above Passenger Cabin Ceiling - Section 43
 - 243/244 Area Above Passenger Cabin Ceiling - Section 45
 - 253/254 Area Above Passenger Cabin Ceiling - Section 46

C. Prepare for the Removal

S 864-001

- (1) Supply electrical power (AMM 24-22-00/201).

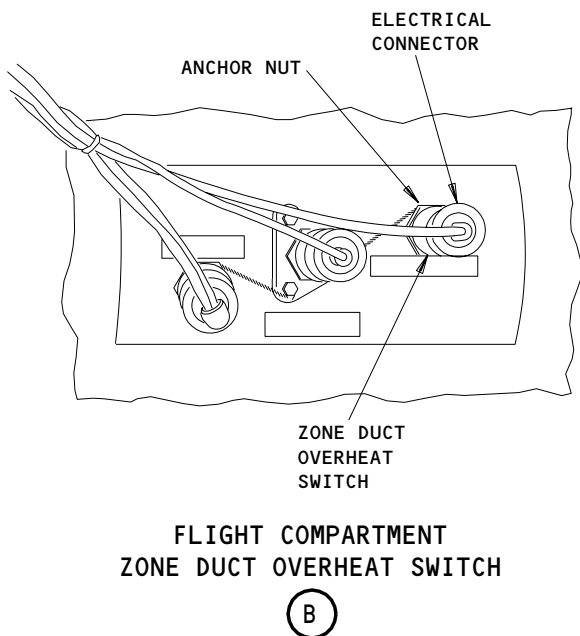
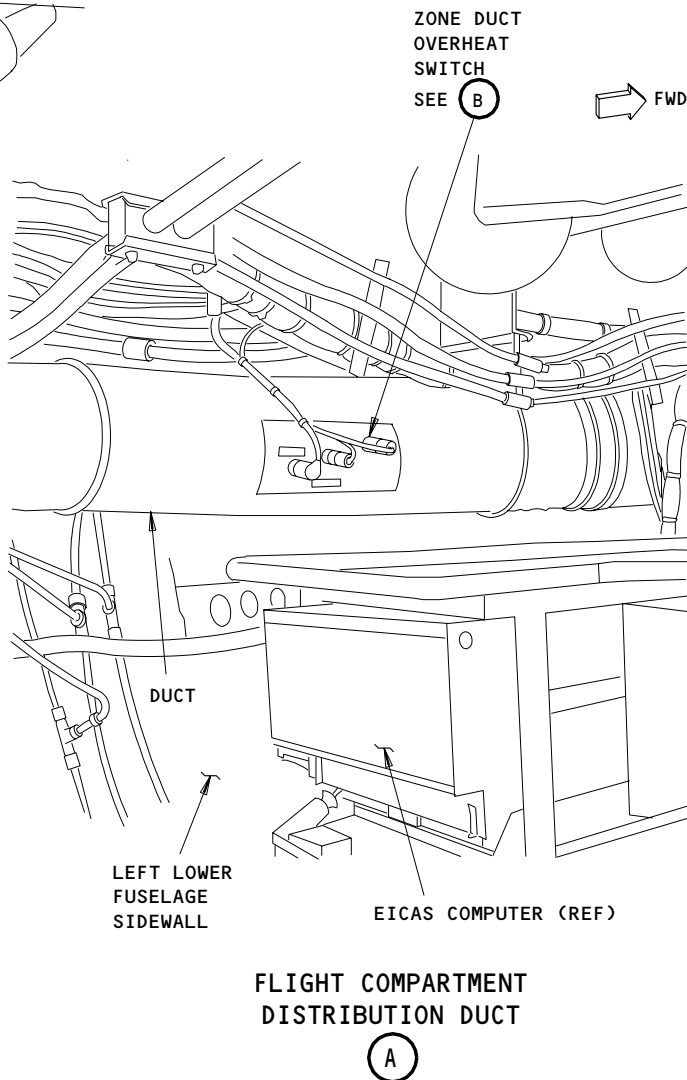
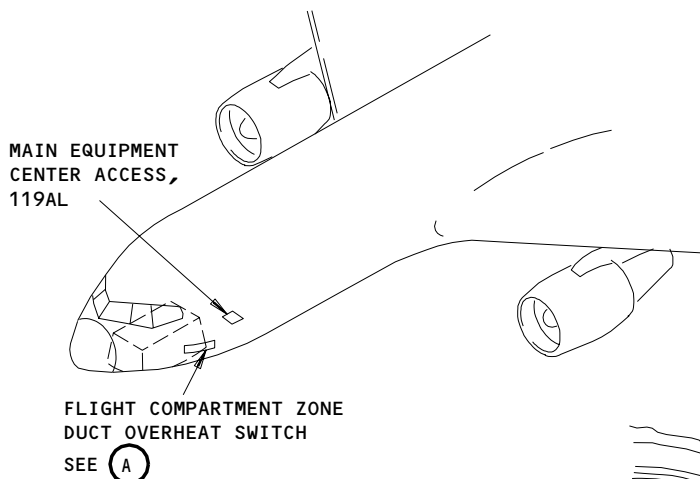
S 864-002

- (2) Push the L and R RECIRC FAN switch-lights, on the pilot's overhead panel P5, to the off position.
 - (a) Attach a DO-NOT-OPERATE tag to the switch-light.

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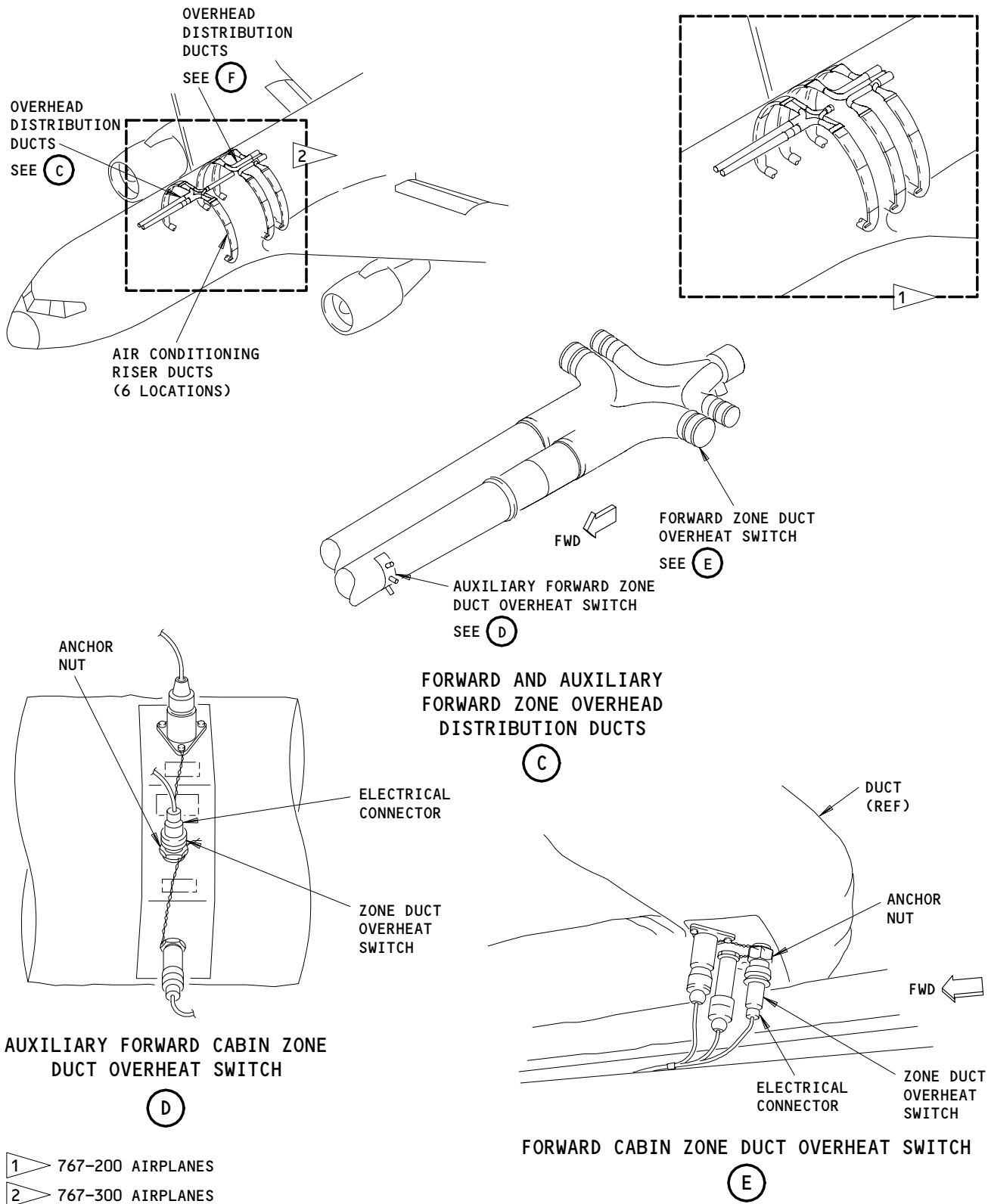
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Zone Duct Overheat Switch Installation
Figure 401 (Sheet 1)

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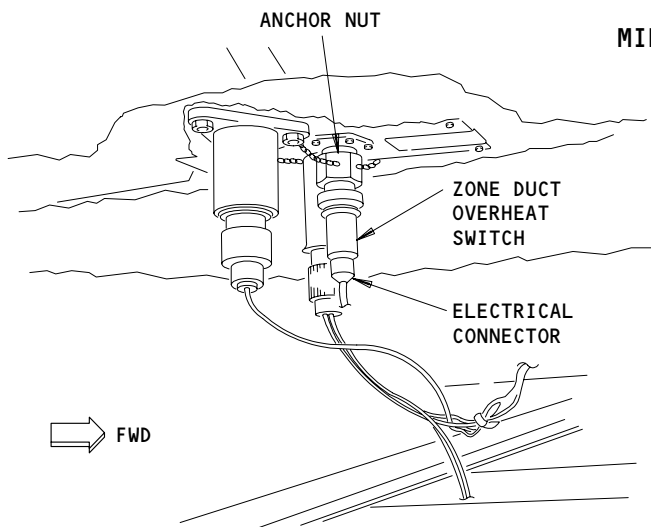
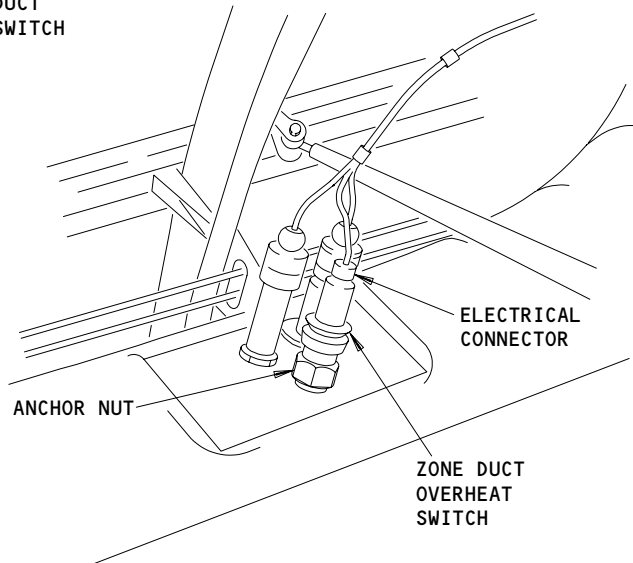
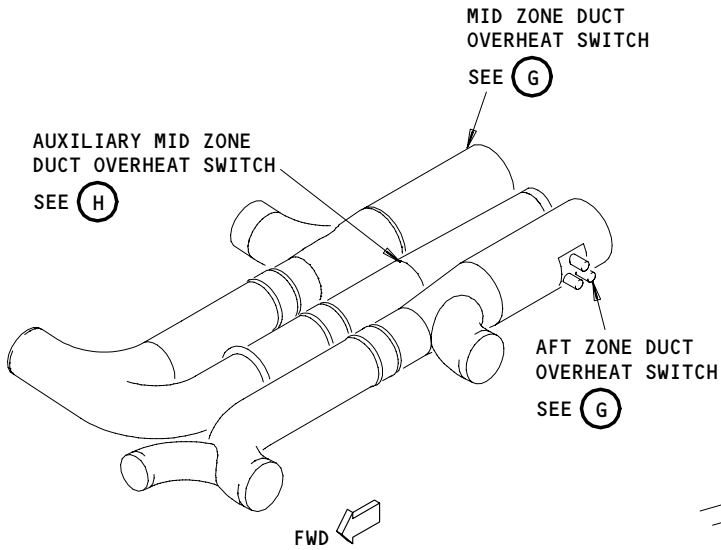


Zone Duct Overheat Switch Installation
Figure 401 (Sheet 2)

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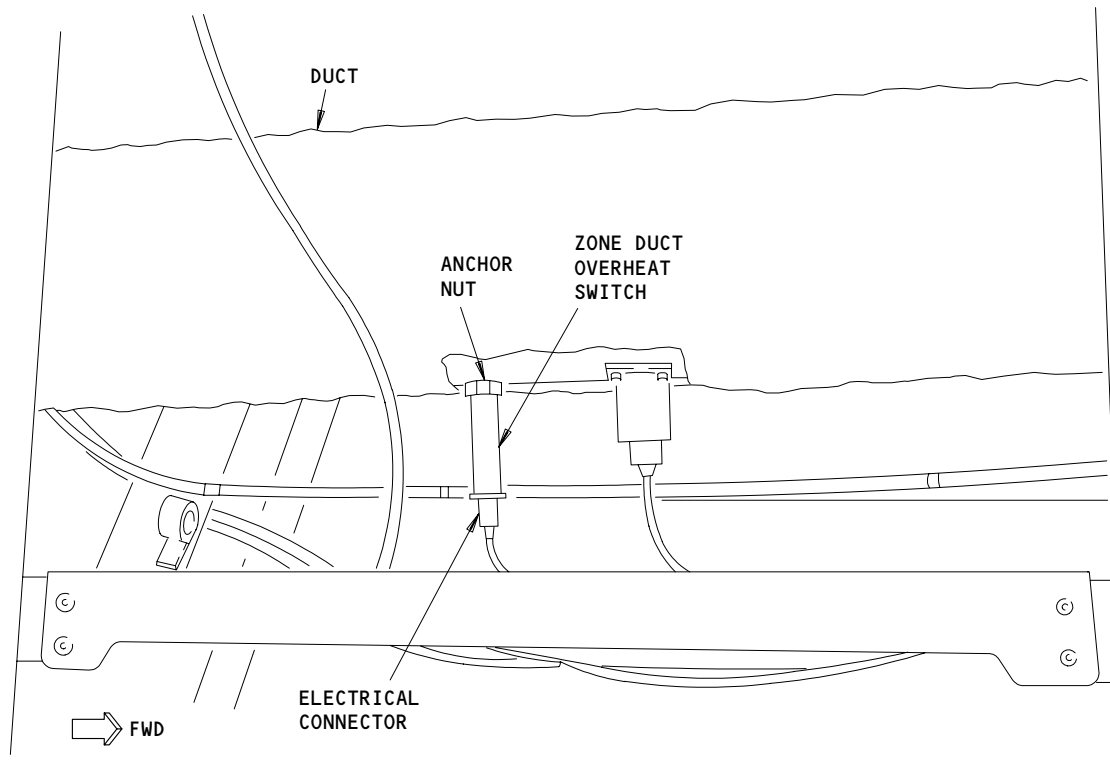
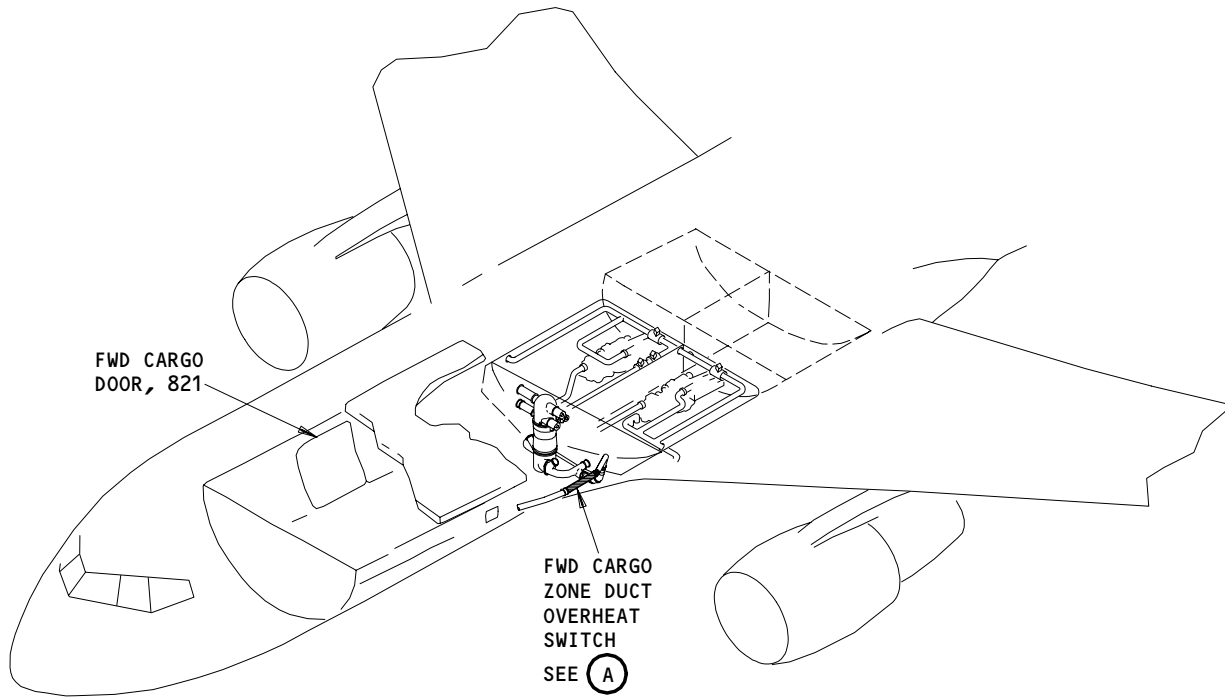
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Zone Duct Overheat Switch Installation
Figure 401 (Sheet 3)

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FWD CARGO ZONE DUCT OVERHEAT SWITCH

(A)

Forward Cargo Zone Duct Overheat Switch Installation
Figure 402

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S 864-003

- (3) Turn the L and R PACK selectors, on the P5 panel, to the OFF position.
(a) Attach a DO-NOT-OPERATE tag to each PACK selector.

S 864-006

- (4) Open these circuit breakers on the overhead circuit breaker panel, P11 and attach DO-NOT-CLOSE tags:
- (a) 11C33, TRIM AIR
 - (b) The flight compartment switch:
 - 1) 11P24, ZONE TEMP CONT MAN FLT DK
 - 2) 11R24, ZONE DUCT OVHT FLT DK
 - (c) The forward zone switch:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - 2) 11R25, ZONE DUCT OVHT FWD
 - 3) 11H5, ZONE DUCT OVHT AUX FWD
 - (d) The aux-forward zone switch:
 - 1) 11H2, ZONE TEMP CONT AUX FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
 - 3) 11R25, ZONE DUCT OVHT FWD
 - (e) The mid zone switch:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID
 - 3) 11H6, ZONE DUCT OVHT AUX MID
 - (f) The aux-mid zone switch:
 - 1) 11H3, ZONE TEMP CONT AUX MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
 - 3) 11R26, ZONE DUCT OVHT MID
 - (g) The aft zone switch:
 - 1) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - 2) 11R27, ZONE DUCT OVHT AFT
 - (h) The switch in the forward cargo zone:
 - 1) 11N22, FWD CARGO DUCT OVHT/INOP
 - 2) 11N21, FWD CARGO TEMP CONT VLV CLOSE

S 014-024

- (5) Get access to the zone duct overheat switch for the flight compartment as follows:
(a) Open the access door for the main equipment center 119AL (AMM 06-41-00/201).

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- (b) Find the duct overheat switch on the left sidewall near the aft end of the nose wheel well.

S 014-099

- (6) Get access to the zone duct overheat switch for the applicable passenger cabin zone as follows:
 - (a) Open the sculptured ceiling panels on the left or right side of the passenger cabin in the area where the air conditioning riser ducts connect to the overhead distribution ducts.

S 014-040

- (7) Find the duct overheat switch for the forward cargo zone as follows:
 - (a) Open the forward cargo door 821 (AMM 06-46-00/201).
 - (b) Remove the side lining for the forward cargo compartment (AMM 25-52-01/401) from the left side.
 - 1) The lining can be found approximately one foot forward of the aft end.

D. Duct Overheat Switch Removal

S 034-182

- (1) Disconnect the electrical connector from the duct overheat switch.

S 024-183

- (2) Turn the duct overheat switch counterclockwise to remove it from the anchor-nut on the duct.

S 024-184

- (3) Remove and discard the O-ring from the duct overheat switch.

TASK 21-61-01-404-186

3. Zone Duct Overheat Switch Installation (Fig. 401, 402)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels

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- (3) AMM 20-10-23/401, Standard Practices - Lockwires.
- (4) AMM 24-22-00/201, Electric Power Control
- (5) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

(1) Location Zones

- 121 Forward Cargo Compartment (Left)
- 211/212 Control Cabin
- 223/224 Area Above Passenger Cabin Ceiling - Section 41
- 233/234 Area Above Passenger Cabin Ceiling - Section 43
- 243/244 Area Above Passenger Cabin Ceiling - Section 45
- 253/254 Area Above Passenger Cabin Ceiling - Section 46

C. Duct Overheat Switch Installation

S 424-187

- (1) Install a new O-ring onto the duct overheat switch.

S 424-053

- (2) Install the duct overheat switch into the anchor-nut on the duct.

S 424-188

- (3) Tighten the duct overheat switch 15+/-5 pound-inches (1.7+/-0.6 newton-meters).

S 434-055

- (4) Install a new lockwire to the duct overheat switch (AMM 20-10-23/401).

S 434-056

- (5) Connect the electrical connector to the duct overheat switch.

D. Put the Airplane Back to Its Usual Condition

S 864-057

- (1) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11C33, TRIM AIR
 - (b) The flight compartment switch:
 - 1) 11P24, ZONE TEMP CONT MAN FLT DK
 - 2) 11R24, ZONE DUCT OVHT FLT DK
 - (c) The forward zone switch:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD

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- 2) 11R25, ZONE DUCT OVHT FWD
- 3) 11H5, ZONE DUCT OVHT AUX FWD
- (d) The aux-forward zone switch:
 - 1) 11H2, ZONE TEMP CONT AUX FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
 - 3) 11R25, ZONE DUCT OVHT FWD
- (e) The mid zone switch:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID
 - 3) 11H6, ZONE DUCT OVHT AUX MID
- (f) The aux-mid zone switch:
 - 1) 11H3, ZONE TEMP CONT AUX MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
 - 3) 11R26, ZONE DUCT OVHT MID
- (g) The aft zone switch:
 - 1) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - 2) 11R27, ZONE DUCT OVHT AFT
- (h) The duct overheat switch in the forward cargo zone:
 - 1) 11N22, FWD CARGO DUCT OVHT/INOP
 - 2) 11N21, FWD CARGO TEMP CONT VLV CLOSE

S 864-074

- (2) Remove the DO-NOT-OPERATE tags from the control selector switches for the air conditioning packs, on the P5 panel.

S 864-075

- (3) Remove the DO-NOT-OPERATE tags from the RECIRC FAN switch-lights on the P5 panel.

S 414-076

- (4) Close the access door to the main equipment center 119AL (AMM 06-41-00/201).

S 414-077

- (5) Close the applicable sculptured ceiling panel.

S 414-079

- (6) Install the left side lining in the forward cargo compartment (AMM 25-52-01/401).

S 414-080

- (7) Close the forward cargo door 821 (AMM 06-46-00/201).

S 864-081

- (8) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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DUCT AIR TEMPERATURE AND MIX MANIFOLD TEMPERATURE SENSORS -
REMOVAL/INSTALLATION

1. General

- A. A duct air temperature sensor is installed in the air supply duct for the flight compartment and in the overhead distribution ducts for each of the temperature control zones in the passenger cabin. The duct air temperature sensor for the flight compartment can be found on the left sidewall of the nose wheel well, in the aft corner. The duct air temperature sensors for the passenger cabin zones can be found above the passenger compartment ceiling where the air conditioning riser ducts attach to the overhead distribution ducts.
- B. Two duct air temperature sensors are also installed on the mix manifold in the aft end of the forward cargo compartment.
- C. A duct air temperature sensor is also installed in the air supply duct which is for the forward cargo air conditioning system. The duct air temperature sensor can be found behind the aft left sidewall lining in the forward cargo compartment.

TASK 21-61-02-004-003

2. Remove the Duct Air Temperature Sensor (Fig. 401, 402, 403)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (4) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

(1) Location Zones

- 117 Area outboard and above NLG wheel well (Left)
- 125/126 Area aft of forward cargo compartment
- 233/234 Area above passenger cabin ceiling - section 43
- 243/244 Area above passenger cabin ceiling - section 45
- 253/254 Area above passenger cabin ceiling - section 46

(2) Access Panel

- 119AL Main equipment center access door

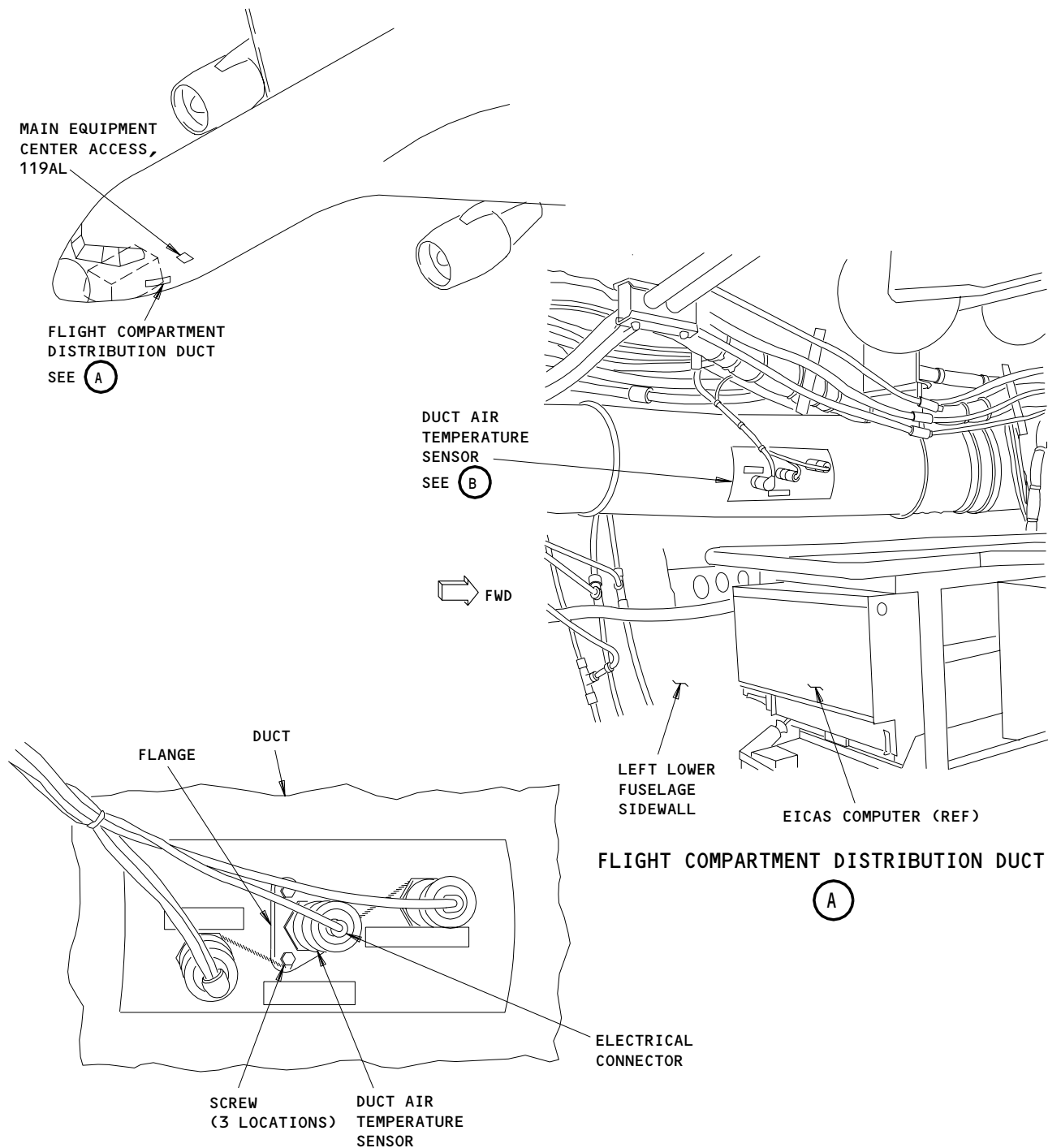
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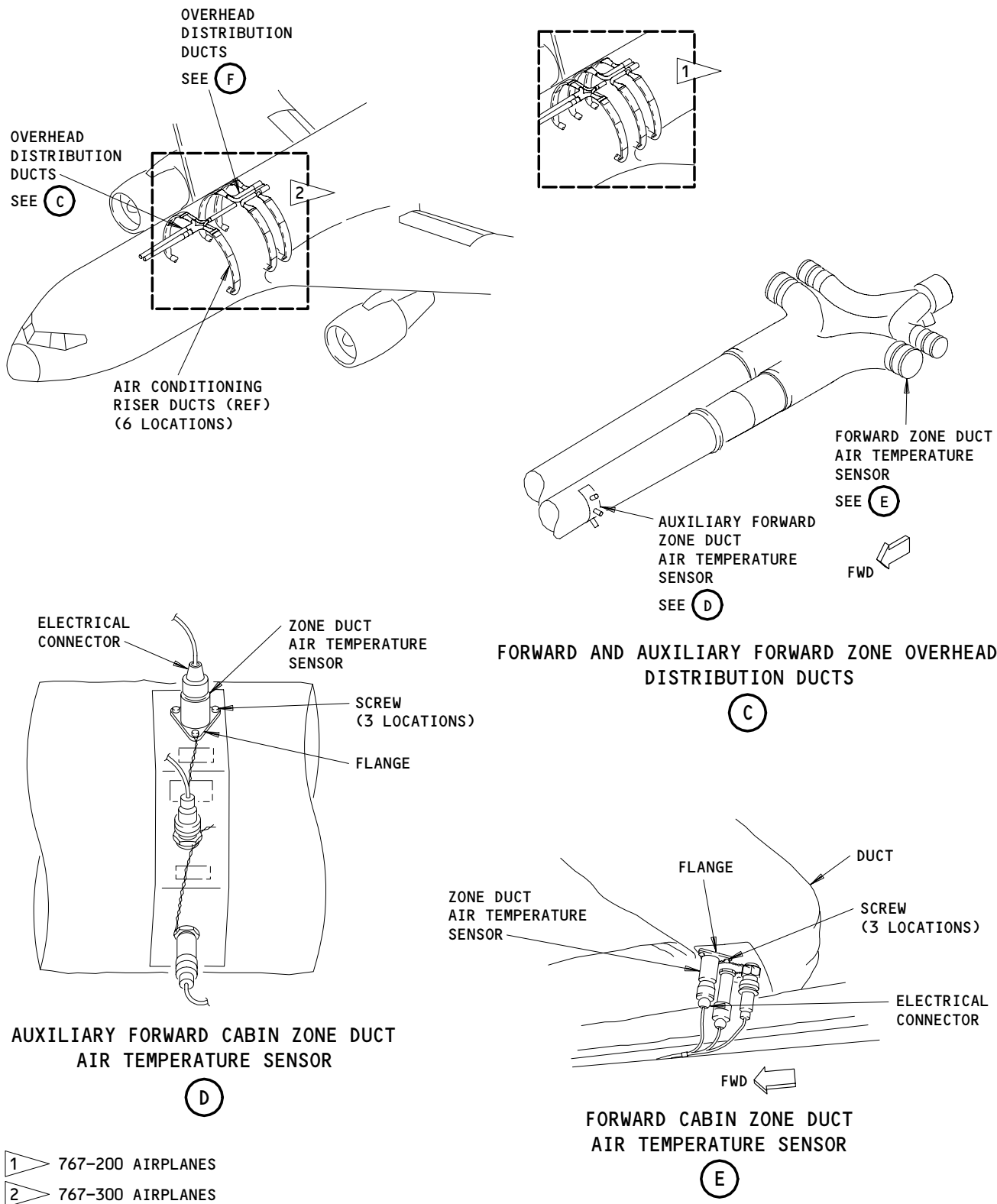
FLIGHT COMPARTMENT DUCT AIR TEMPERATURE SENSOR

(B)

Duct Air Temperature Sensor Installation
Figure 401 (Sheet 1)

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	ALL

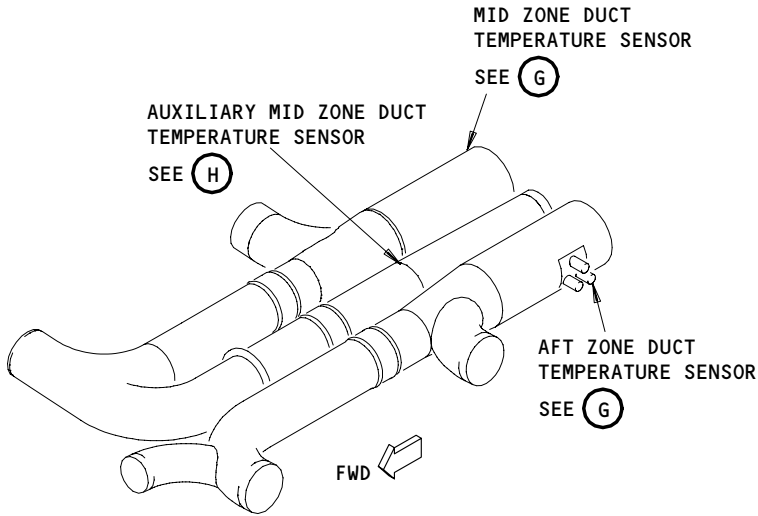
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Zone Duct Air Temperature Sensor Installation
Figure 401 (Sheet 2)

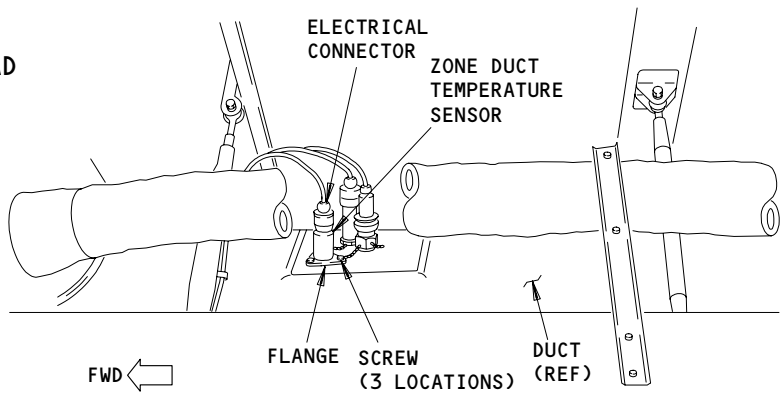
EFFECTIVITY	ALL
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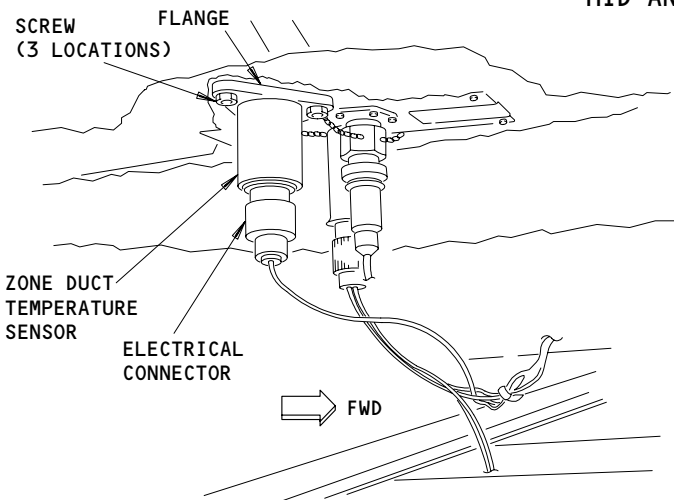
MID AND AFT ZONE OVERHEAD DISTRIBUTION DUCTS

(F)



MID AND AFT CABIN ZONE DUCT TEMPERATURE SENSOR (EXAMPLE AFT ZONE SHOWN)

(G)



AUXILIARY MID CABIN ZONE DUCT TEMPERATURE SENSOR

(H)

Zone Duct Air Temperature Sensor Installation
Figure 401 (Sheet 3)

EFFECTIVITY	ALL
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C. Prepare for Removal

S 864-132

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-135

- (2) Push the L and R RECIRC FAN switch-lights on the pilot's overhead panel, P5, to the off position.
(a) Attach a DO-NOT-OPERATE tag to the two switch-lights.

S 864-136

- (3) Put the two control selectors for the air conditioning pack on the P5 panel to the OFF position.
(a) Attach a DO-NOT-OPERATE tag to the two selectors.

S 864-137

- (4) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C33, TRIM AIR
 - (b) For the duct temperature sensor in the flight compartment:
 - 1) 11P24, ZONE TEMP CONT MAN FLT DK
 - 2) 11R24, ZONE DUCT OVHT FLT DK
 - (c) For the duct temperature sensor in the forward cabin:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - 2) 11R25, ZONE DUCT OVHT FWD
 - (d) For the duct temperature sensor in the aux-forward cabin:
 - 1) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
 - (e) For the duct temperature sensor in the mid cabin:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID
 - (f) For the duct temperature sensor in the aux-mid cabin:
 - 1) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
 - (g) For the duct temperature sensor in the aft cabin:
 - 1) 11P27, ZONE TEMP CONT VLV CLOSE AFT

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- 2) 11R27, ZONE DUCT OVHT AFT
- (h) For the duct temperature sensor in the mix-manifold:
 - 1) 11N10, L PACK AUTO PWR
 - 2) 11N19, R PACK AUTO PWR
- (i) For the duct temperature sensor in the forward cargo zone:
 - 1) 11N22, FWD CARGO DUCT OVHT/INOP
 - 2) 11N21, FWD CARGO TEMP CONT VLV CLOSE

S 014-004

- (5) Get access to the duct air temperature sensor for the flight compartment as follows:
 - (a) Open the main equipment center access door, 119AL (AMM 06-41-00/201).
 - (b) Find the duct air temperature sensor on the left sidewall near the aft end of the nose wheel well.

S 014-207

- (6) Get access to the duct air temperature sensor for the applicable passenger cabin zone as follows:
 - (a) Open the sculptured ceiling panels on the left or right side of the passenger cabin in the area where the air conditioning riser ducts connect to the overhead distribution ducts.

S 014-208

- (7) Get access to the duct temperature sensors for the mix manifold as follows:
 - (a) Open the forward cargo door, 821 (AMM 06-46-00/201).
 - (b) Remove the aft end lining in the forward cargo compartment (AMM 25-52-01/401).

S 014-214

- (8) Get access to the duct air temperature sensor for the forward cargo zone as follows:
 - (a) Open the forward cargo door (AMM 52-33-00/201).
 - (b) Remove the aft left lining in the forward cargo compartment (AMM 25-52-01/401).

D. Remove the Temperature Sensor

S 034-089

- (1) Disconnect the electrical connector from the temperature sensor.

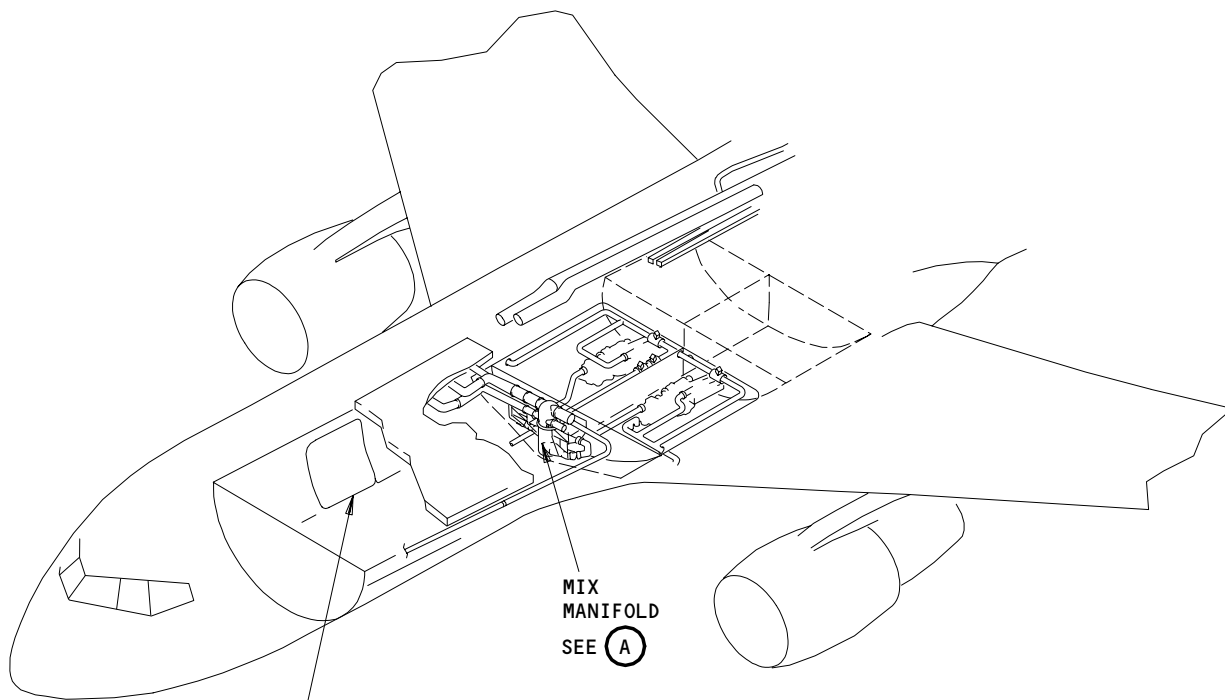
EFFECTIVITY

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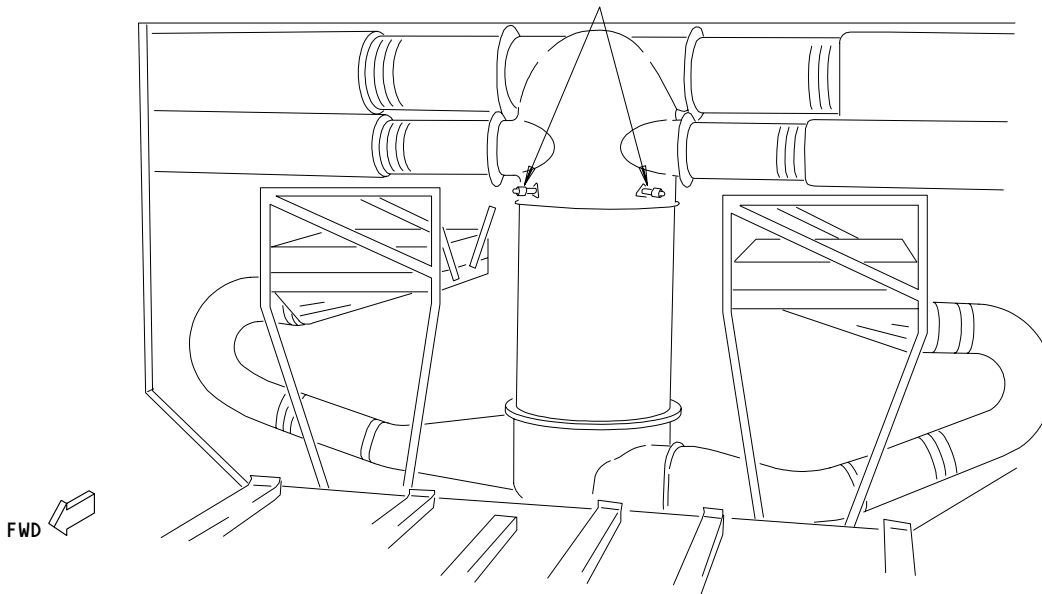
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FWD CARGO DOOR,
821

MIX
MANIFOLD
SEE (A)

DUCT AIR
(MIX MANIFOLD)
TEMPERATURE
SENSOR



FWD

MIX MANIFOLD

(A)

Duct Air Temperature Sensor Installation
Figure 402

EFFECTIVITY

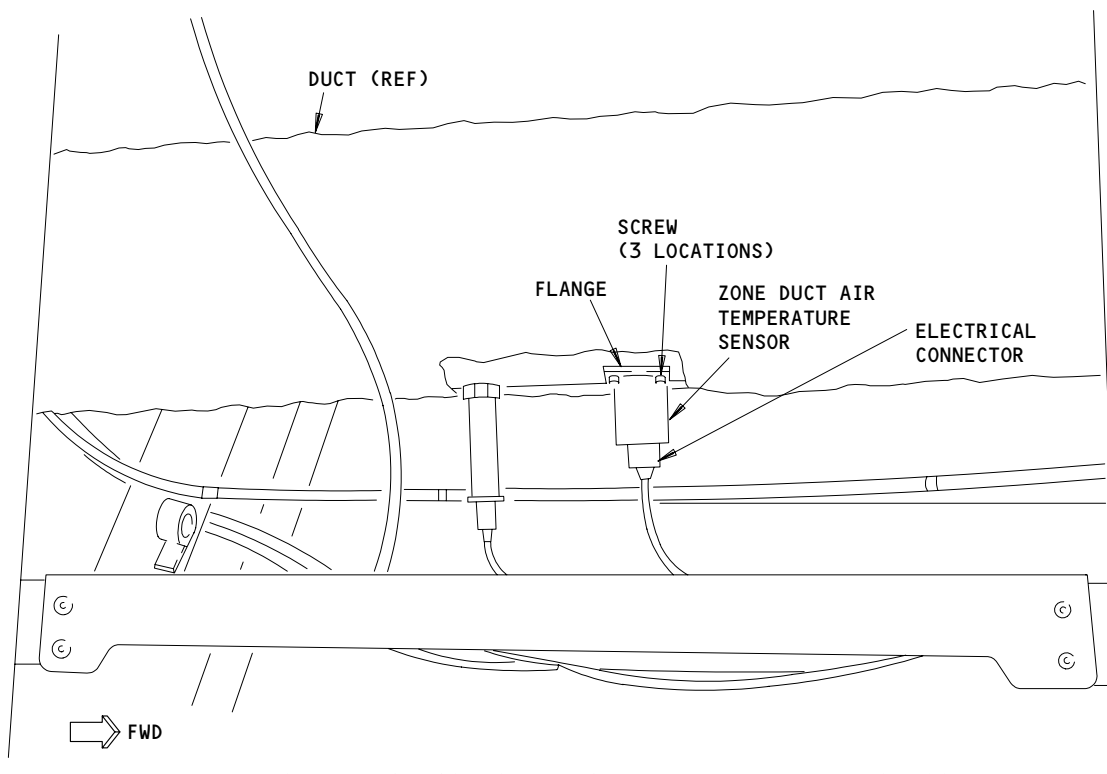
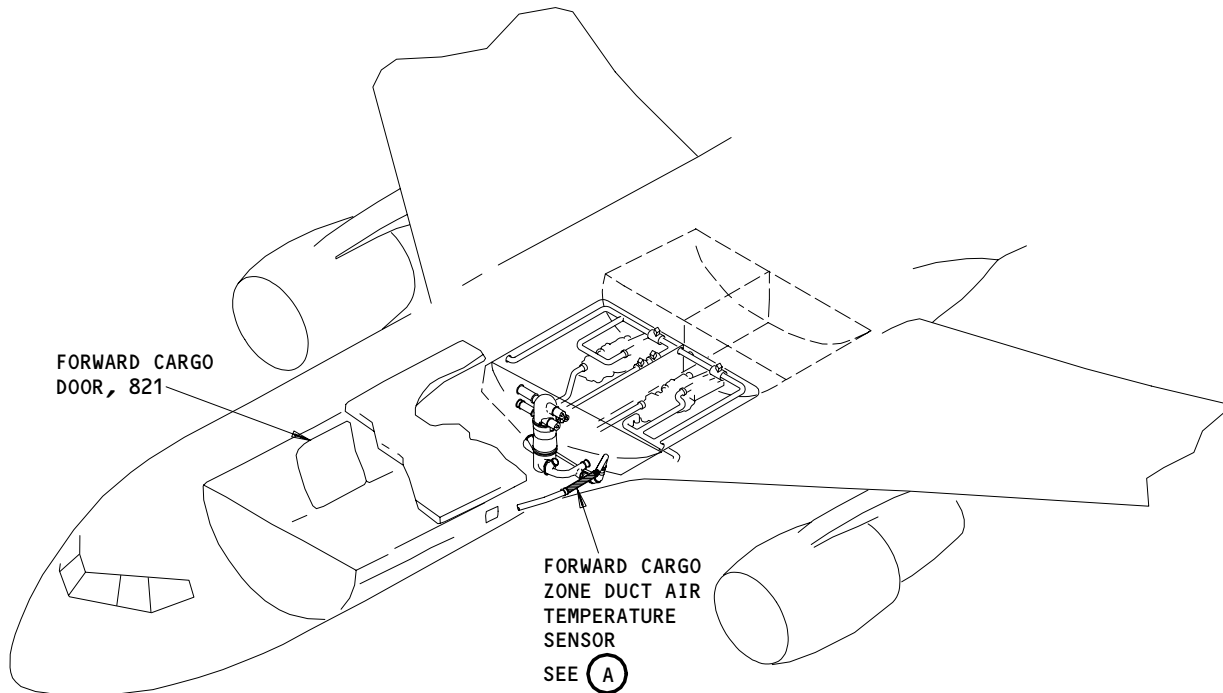
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FORWARD CARGO ZONE DUCT AIR TEMPERATURE SENSOR

(A)

Forward Cargo Zone Duct Air Temperature Installation
Figure 403

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605943

- S 014-090
- (2) Remove the screws that hold the sensor in the duct.

- S 024-091
- (3) Remove the sensor.

- S 494-092
- (4) Put a cover on the duct hole to keep out unwanted objects.

TASK 21-61-02-404-095

3. Install the Duct Air Temperature Sensor (Fig. 401, 402, 403)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Standard Practices - Lockwire
- (3) AMM 24-22-00/201, Electric Power Control
- (4) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (5) AMM 52-33-00/201, Large Forward Cargo Door

B. Access

- (1) Location Zones
 - 117 Area outboard and above NLG wheel well (Left)
 - 125/126 Area aft of forward cargo compartment
 - 233/234 Area above passenger cabin ceiling - section 43
 - 243/244 Area above passenger cabin ceiling - section 45
 - 253/254 Area above passenger cabin ceiling - section 46

C. Procedure

- S 094-096
- (1) Remove the covers on the duct.

- S 424-099
- (2) Install the sensor into the duct or mix manifold and align the flange holes.

- S 434-098
- (3) Install and tighten the screws.

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- S 434-097
- (4) Lockwire the screws if the sensor is not a duct temperature sensor for the mix manifold (AMM 20-10-23/401).
- S 434-100
- (5) Attach the electrical connector to the sensor.
- S 864-101
- (6) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C33, TRIM AIR
 - (b) For the duct temperature sensor in the flight compartment:
 - 1) 11P24, ZONE TEMP CONT MAN FLT DK
 - 2) 11R24, ZONE DUCT OVHT FLT DK
 - (c) For the duct temperature sensor in the forward cabin:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - 2) 11R25, ZONE DUCT OVHT FWD
 - (d) For aux-forward-cabin-duct-air-temperature sensor:
 - 1) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
 - (e) For the duct temperature sensor in the mid cabin:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID
 - (f) For the duct temperature sensor in the aux-mid cabin:
 - 1) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
 - (g) For the duct temperature sensor in the aft cabin:
 - 1) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - 2) 11R27, ZONE DUCT OVHT AFT
 - (h) For the duct temperature sensor in the mix-manifold:
 - 1) 11N10, L PACK AUTO PWR
 - 2) 11N19, R PACK AUTO PWR
 - (i) For the duct temperature sensor in the forward cargo zone:
 - 1) 11N22, FWD CARGO DUCT OVHT/INOP
 - 2) 11N21, FWD CARGO TEMP CONT VLV CLOSE
- S 864-114
- (7) Supply electrical power (AMM 24-22-00/201).
- S 864-115
- (8) Push the L RECIRC FAN switch-light on the P5 panel to the ON position.

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S 724-117

- (9) Do a check of the sensor flange for air leakage.
 - (a) Small leakage is permitted.
 - (b) You must repair large leakage with flange adjustment.

S 864-118

- (10) Push the L RECIRC FAN switch-light on the P5 panel to the off position.
- D. Do a Test of the Zone Temperature Sensor.

S 744-121

- (1) Do a BITE test at the zone temperature controller in the E3 rack. This will test the duct temperature sensor installation for the flt compt, fwd cabin, mid cabin, and aft cabin.
 - (a) Make sure the CONTROLLER FAULT light is off.
 - (b) Put all the zone temperature selectors on the P5 panel to the AUTO position,
 - (c) Push the PRESS/TEST switch on the zone temperature controller.
 - 1) Make sure all the indicator lights come on.
 - (d) Push the BIT switch on the controller.
 - 1) Make sure the GO and BIT lights come on for 25-35 seconds.
 - 2) Make sure no fault light comes on.
 - 3) Make sure the DUCT SENSOR lights do not come on.

S 744-122

- (2) Do a BITE test at the aux-zone temperature controller in the E1 rack. This will test the duct temperature sensors for the aux-forward or aux-mid or forward cargo zone.
 - (a) Make sure the CONTROLLER FAULT light is off.
 - (b) Put the temperature selectors for the forward and mid zone, on the P5 panel, to the AUTO position.
 - (c) Put the temperature selector for the forward cargo zone, on the P5 panel, to the AUTO position.
 - (d) Push the PRESS/TEST switch, on the aux-zone temperature controller.
 - 1) Make sure all the indicator lights on the controller come on.
 - (e) Push the BIT switch on the controller.
 - 1) Make sure the GO and BIT lights come on for 25-35 seconds.

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- 2) Make sure the fault lamps do not come on.
- 3) Make sure the DUCT SENSOR lights do not come on.

S 744-124

- (3) Do a BITE test at the left and right pack temperature controllers in the E3 rack. This will test the duct temperature sensor installation for the left and right side mix-manifold.
 - (a) Make sure the CONTROLLER FAULT light is off.
 - (b) Put the two temperature selectors for the air conditioning pack in the AUTO position.
 - (c) Push the PRESS/TEST switch on the pack temperature controller.
 - 1) Make sure all the indicator lights come on.
 - (d) Push the BIT switch on the controller.
 - 1) Make sure the GO and BIT lights come on for 25-35 seconds.
 - 2) Make sure the fault lights do not come on.
 - 3) Make sure the MIX MANF SENSOR lights do not come on.

E. Put the Airplane Back to Its Usual Condition

S 414-125

- (1) Install the aft end lining of the forward cargo compartment (AMM 25-52-01/401) and close the forward cargo door (AMM 52-33-00/201) for the mix-manifold sensor installation.

S 414-126

- (2) Close the main equipment center access door 119AL (AMM 06-41-00/201) for the duct temperature sensor installation in the flight compartment.

S 414-166

- (3) Close the applicable sculptured ceiling panel for the duct temperature sensor installation in the passenger cabin.

S 414-130

- (4) Install the aft left side lining of the forward cargo compartment (AMM 25-52-01/401) and close the forward cargo door (AMM 52-33-00/201) for the duct temperature sensor in the forward cargo compartment.

S 864-131

- (5) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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ZONE TEMPERATURE CONTROLLER – REMOVAL/INSTALLATION

1. General

- A. The zone temperature controller is in the right side of the main equipment center. The controller is on the E3-1 shelf of the E3 rack. The zone temperature controller operates the temperature control system in the AUTO mode.

TASK 21-61-03-004-001

2. Remove the Zone Temperature Controller (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 20-10-01/401, Standard Practices – E/E Rack Mounted Components

B. Access

- (1) Location Zone
120 Main Equipment Center
- (2) Access Panel
119AL Main Equipment Center Access Door

C. Prepare for the Removal

S 864-002

- (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11R15, ZONE CNTLR

S 014-003

- (2) Open the access door for the main equipment center 119AL (AMM 06-41-00/201).
(a) Find the zone temperature controller.

S 024-004

- (3) Remove the zone temperature controller (AMM 20-10-01/401).

TASK 21-61-03-404-005

3. Install the Zone Temperature Controller (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

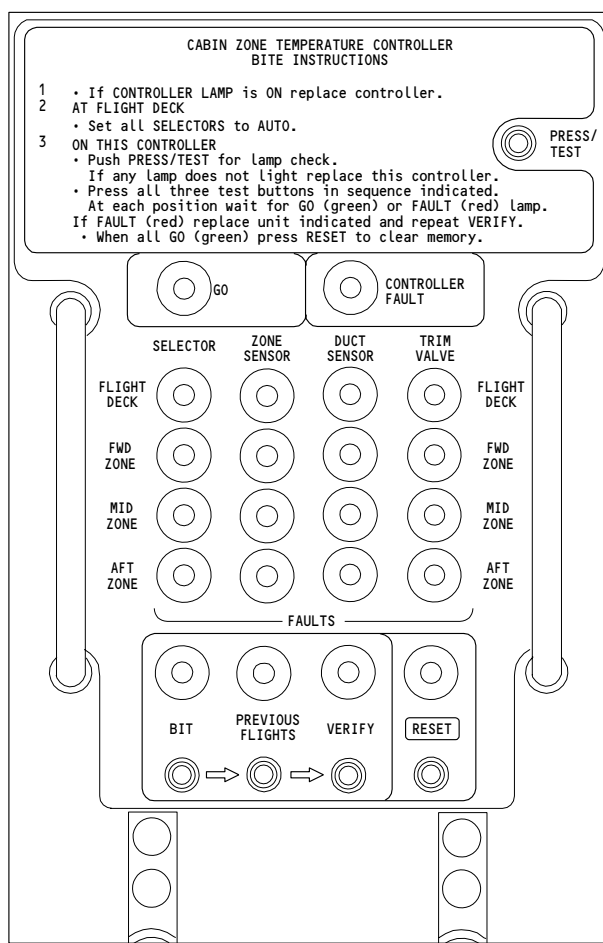
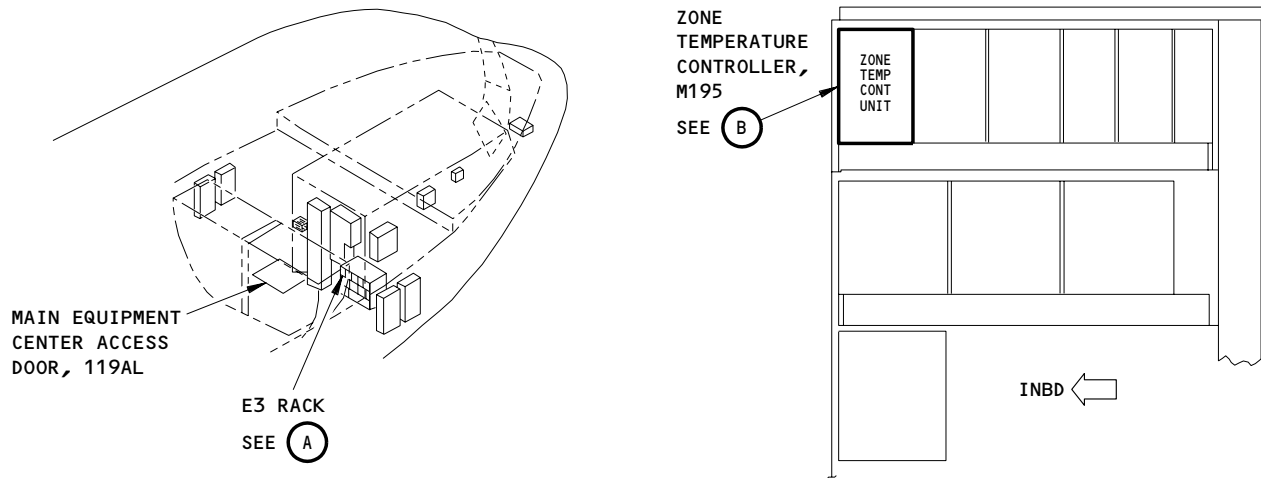
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E3 RACK
(A)

ZONE TEMPERATURE CONTROLLER, M195

(B)

Zone Temperature Controller
Figure 401

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- (2) AMM 20-10-01/401, Standard Practices - E/E Rack Mounted Components
 - (3) AMM 24-22-00/201, Electric Power Control
- B. Access
- (1) Location Zone
120 Main Equipment Center
 - (2) Access Panel
119AL Main Equipment Center Access Door
- C. Procedure
- S 424-006
 - (1) Install the zone temperature controller (AMM 20-10-01/401).
 - S 864-007
 - (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - (a) 11R15, ZONE CNTLR
 - S 864-008
 - (3) Supply electrical power (AMM 24-22-00/201).
 - S 864-013
 - (4) If a zone temperature controller is installed from another airplane, do the steps that follow to clear the non-volatile memory in the zone temperature controller.

NOTE: If you install a zone temperature controller from a different airplane, you must reset the controller to clear the "PREVIOUS FLIGHTS" and the "BIT" memory.
 - (a) Push the VERIFY button on the controller.
 - (b) Make sure the green GO light comes on.
 - (c) Push the RESET button on the controller.
 - S 864-009
 - (5) Push the PRESS TEST switch for the controller.
 - (a) Make sure all the indicator lights come on and go off when the switch is released.
 - (b) If a light does not come on, replace the controller.
- D. Put the Airplane Back to Its Usual Condition
- S 414-010
 - (1) Close the access door for the main equipment center (AMM 06-41-00/201).
 - S 864-011
 - (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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ZONE TEMPERATURE CONTROLLER – ADJUSTMENT/TEST

1. General

- A. This procedure has the following task:
(1) Zone Temperature Controller BITE Test

TASK 21-61-03-715-022

2. Zone Temperature Controller BITE Test

A. General

- (1) This task provides instructions to perform a Built-In Test Equipment (BITE) test of the Zone Temperature Controller.
(2) The zone temperature controller is installed on the E3 rack in the main equipment center.

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 21-61-03/401, Zone Temperature Controller
(3) AMM 24-22-00/201, Electrical Power – Control
(4) FIM 21-61-00/101, Temperature Control System

C. Access

- (1) Location Zone
120 Main Equipment Center (Right)

(2) Access Panel
119AL Main Equipment Center Access Door

D. Prepare for Test

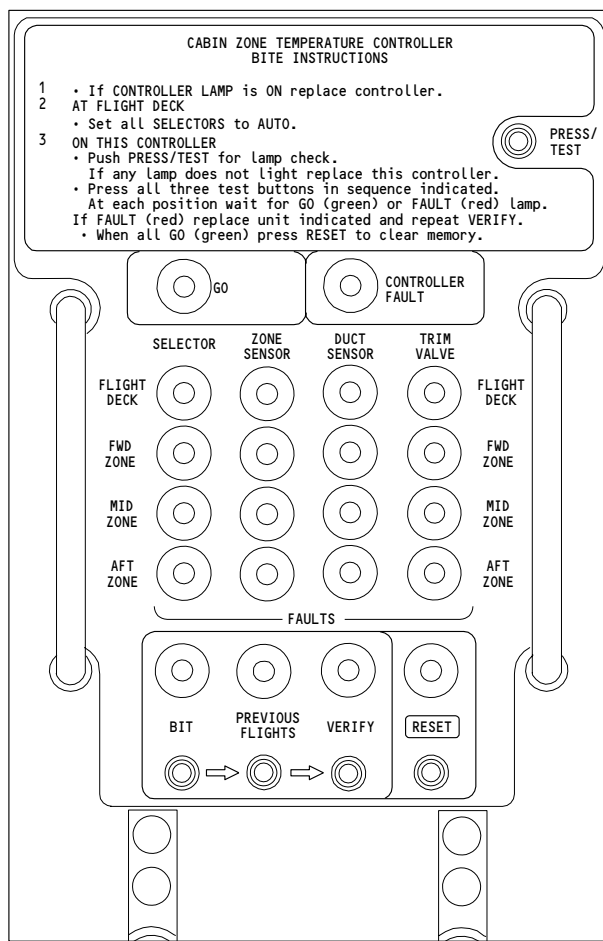
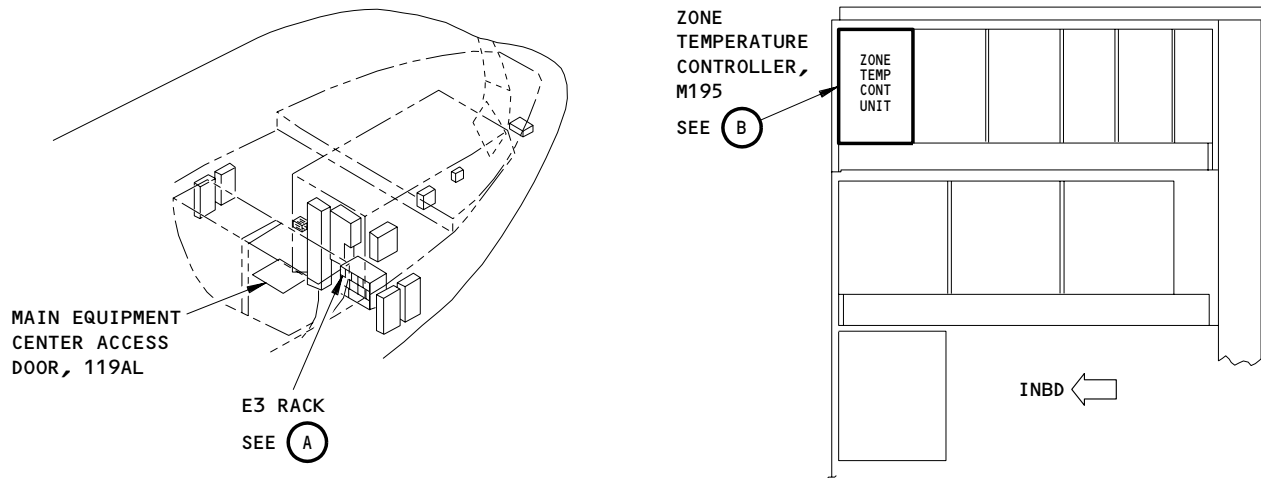
S 865-021

- (1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
(a) 11A13, L PACK FLOW CONT
(b) 11A26, R PACK FLOW CONT
(c) 11N10, LEFT PACK AUTO PWR
(d) 11N11, LEFT PACK AUTO CONT
(e) 11N15, RIGHT PACK STANDBY PWR
(f) 11N16, RIGHT PACK STANDBY CONT
(g) SAS 050, 051, 150-157, 162-167, 275-278, 280;
11N17, PACK FLOW IND
(h) 11N19, RIGHT PACK AUTO PWR
(i) 11N20, RIGHT PACK AUTO CONT
(j) 11N24, LEFT PACK STANDBY PWR
(k) 11N25, LEFT PACK STANDBY CONT
(l) 11P24, ZONE TEMP CONT MAN FLT DK
(m) 11P25, ZONE TEMP CONT VLV CLOSE FWD
(n) 11P26, ZONE TEMP CONT VLV CLOSE MID
(o) 11P27, ZONE TEMP CONT VLV CLOSE AFT

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E3 RACK
(A)

ZONE TEMPERATURE CONTROLLER, M195

(B)

Zone Temperature Controller
Figure 501

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- (p) 11R14, L RECIRC FAN
- (q) 11R15, ZONE CNTLR
- (r) 11R16, ZONE TEMP IND
- (s) 11R23, R RECIRC FAN
- (t) 11R24, ZONE DUCT OVHT FLT DK
- (u) 11R25, ZONE DUCT OVHT FWD
- (v) 11R26, ZONE DUCT OVHT MID
- (w) 11R27, ZONE DUCT OVHT AFT

E. Procedure

S 865-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 015-006

- (2) Open the access door (119AL) for the main equipment center (AMM 06-41-00/201).

S 215-023

- (3) Find the zone temperature controller on the E3 rack of the main equipment center.

S 745-007

- (4) Do the BITE instructions found on the top front face of the zone temperature controller.

NOTE: The BITE does not know the difference between an LRU fault and an airplane wiring fault. If a fault light(s) comes on, do a check for correct power and a correct electrical connection at the LRU electrical. Do the check before the LRU is replaced.

- (a) Look at the front panel on the zone temperature controller.
 - 1) Make sure the CONTROLLER FAULT light is off.
 - 2) If the CONTROLLER FAULT light is on, there is a problem with the zone temperature controller and/or a wiring problem with the trim air modulating valves.

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- (b) Turn the temperature selector switches for all the zones to the AUTO position.
 - (c) Push and hold the PRESS/TEST button on the zone temperature controller.
 - 1) Make sure that all the indication lights come on.
 - 2) If a light does not come on, replace the zone temperature controller (AMM 21-61-03/401).
 - (d) Push and release the BIT button on the zone temperature controller.
 - 1) Make sure the yellow BIT light comes on.
 - 2) Red lights come on to show the faults from the last flight.
 - 3) A green GO light shows no fault.
 - 4) Monitor the faults.
 - (e) Push and release the PREVIOUS FLIGHTS button on the zone temperature controller.
 - 1) Make sure the yellow PREVIOUS FLIGHTS light comes on.
 - 2) Red lights come on to show the faults from the last nine flights.
 - 3) A green GO light shows no fault.
 - 4) Monitor the faults.
 - (f) Push and release the VERIFY button on the zone temperature controller.
 - 1) Make sure the yellow VERIFY light comes on.
 - 2) Red lights come on to show the faults found during this test.
 - 3) A green GO light shows no faults.
 - (g) Replace all the components that show as faulty (with a red light on) during the BIT, PREVIOUS FLIGHTS and VERIFY tests.
 - 1) Push and release the VERIFY button on the zone temperature controller.
 - (h) Make sure the green GO light comes on.
 - (i) Push and release the RESET button on the zone temperature controller while the GO and the VERIFY lights are on.
- F. Put the Airplane Back to Its Usual Condition

S 415-018

- (1) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

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S 865-020

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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ZONE TEMPERATURE SELECTOR – REMOVAL/INSTALLATION

1. General

- A. The temperature selector switches for each zone are on the temperature control panel of the pilot's overhead panel, P5.
- B. The temperature selector switch for the forward cargo zone is on the temperature control panel for the forward cargo air conditioning. The control panel is on the pilot's overhead panel, P5.
- C. Different procedures are given for the removal/installation of the temperature selector for the cabin zone and the cargo zone.

TASK 21-61-04-004-002

2. Remove the Cabin Zone Temperature Selector Switch (Fig. 401)

A. Access

(1) Location Zones

211/212	Control Cabin
120	Main Equipment Center (Right)

B. Prepare for the Removal

S 864-003

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) The temperature selector switch for the flight compartment:
 - 1) 11P24, ZONE TEMP CONT MAN FLT DK
 - 2) 11R24, ZONE DUCT OVHT FLT DK
 - (b) The temperature selector switch for the forward zone:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - 2) 11R25, ZONE DUCT OVHT FWD
 - 3) SAS 153-999, AND ALL MTH AIRPLANES;
11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
11H5, ZONE DUCT OVHT AUX FWD
 - (c) The temperature selector switch for the mid zone:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID
 - 3) SAS 153-999, AND ALL MTH AIRPLANES;
11H3, ZONE TEMP CONT VLV CLOSE AUX MID
11H6, ZONE DUCT OVHT AUX MID
 - (d) The temperature selector switch for the aft zone:
 - 1) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - 2) 11R27, ZONE DUCT OVHT AFT

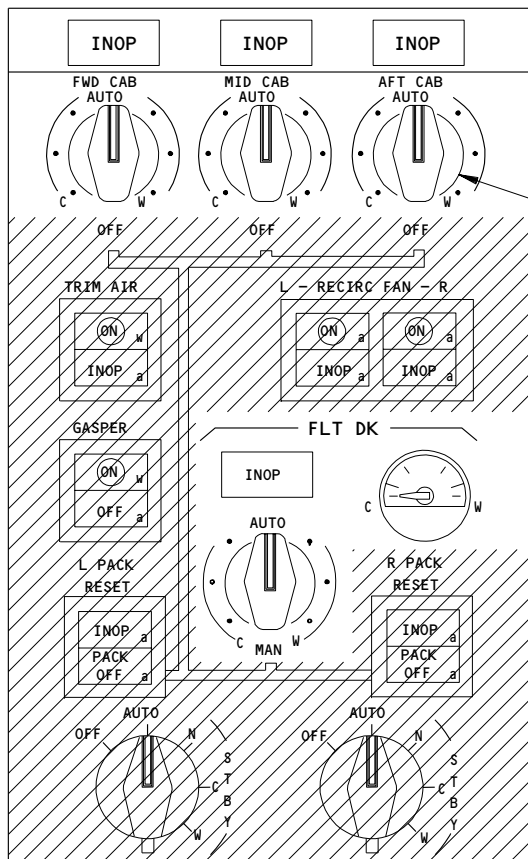
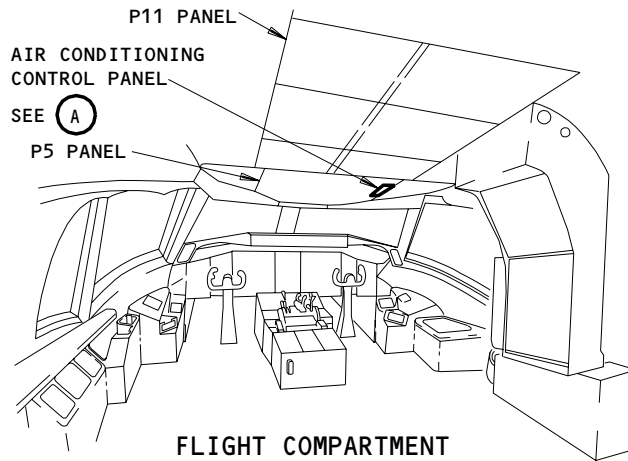
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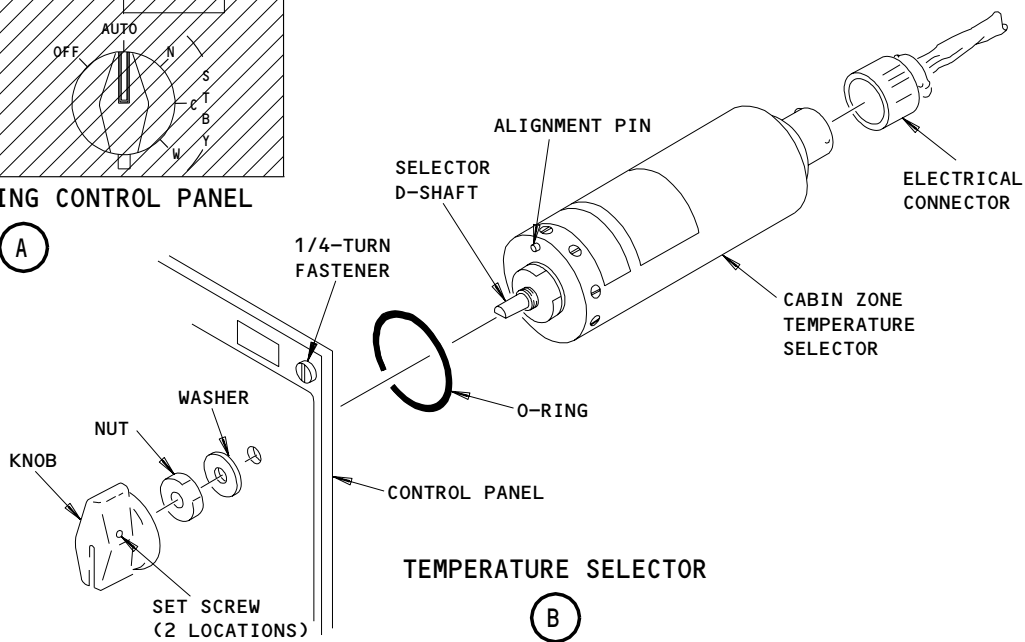
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TEMPERATURE SELECTOR (4 LOCATIONS)
SEE (B)

AIR CONDITIONING CONTROL PANEL

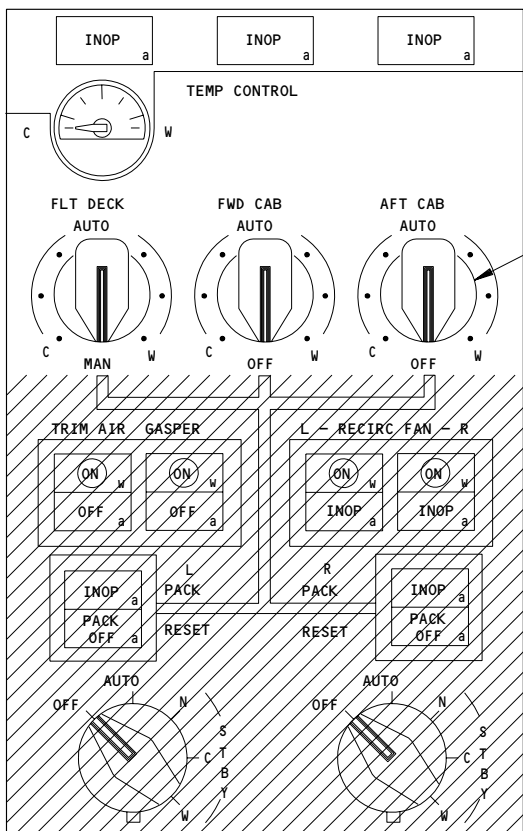
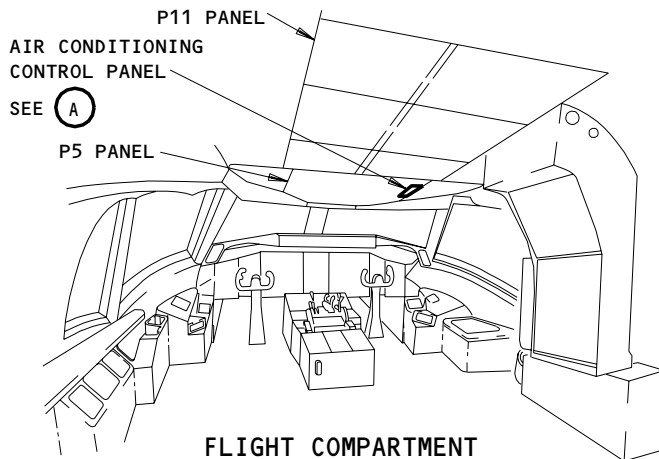
(A)



Cabin Zone Temperature Selector Installation
Figure 401

EFFECTIVITY
AIRPLANES WITH FOUR ZONE TEMPERATURE SELECTORS ON AIR CONDITIONING CONTROL PANEL

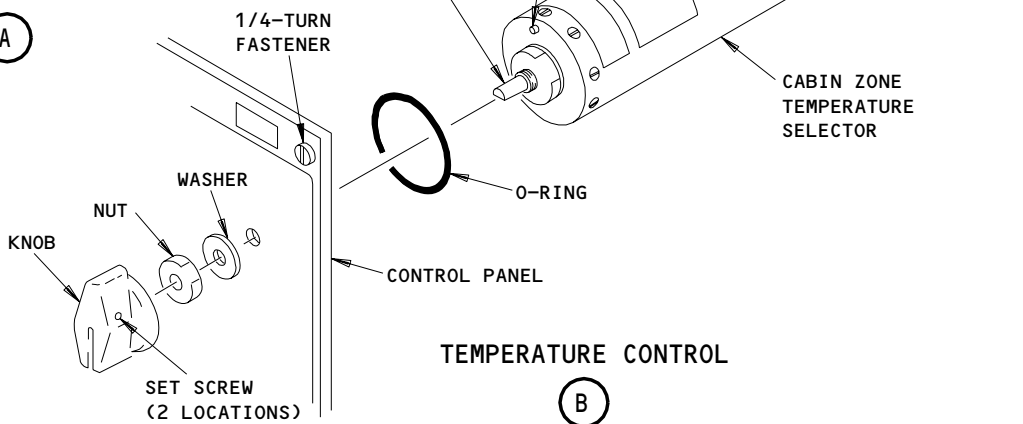
21-61-04



TEMPERATURE SELECTOR (3 LOCATIONS)
SEE (B)

AIR CONDITIONING CONTROL PANEL

(A)



(B)

Cabin Zone Temperature Selector Installation
Figure 401A

EFFECTIVITY
AIRPLANES WITH THREE ZONE TEMPERATURE SELECTORS ON AIR CONDITIONING CONTROL PANEL

21-61-04

C. Remove the Temperature Selector Switch

S 034-010

- (1) Loosen the setscrews from the knob on the temperature selector switch.

S 034-071

- (2) Pull the knob off the shaft.

S 034-011

- (3) Loosen the 1/4-turn fasteners that hold the temperature control module on the P5 panel.

S 014-014

- (4) Pull the module out but do not disconnect the wires.

S 034-015

- (5) Disconnect the electrical connector from the applicable temperature selector switch.

S 034-016

- (6) Remove the retainer nut and washer from the shaft.

S 024-017

- (7) Remove the selector switch from behind the temperature control module.

S 034-078

- (8) Remove the O-ring from the selector switch.

TASK 21-61-04-004-018

3. Remove the Forward Cargo Zone Temperature Selector Switch (Fig. 402)

A. Access

- (1) Location Zones
211/212 Control Cabin

B. Prepare for the Removal

S 864-019

- (1) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11N21, FWD CARGO TEMP CONT VLV CLOSE
 - (b) 11N22, FWD CARGO DUCT OVHT
 - (c) 11P21, FWD CARGO A/C VENT CONT

C. Remove the Temperature Selector

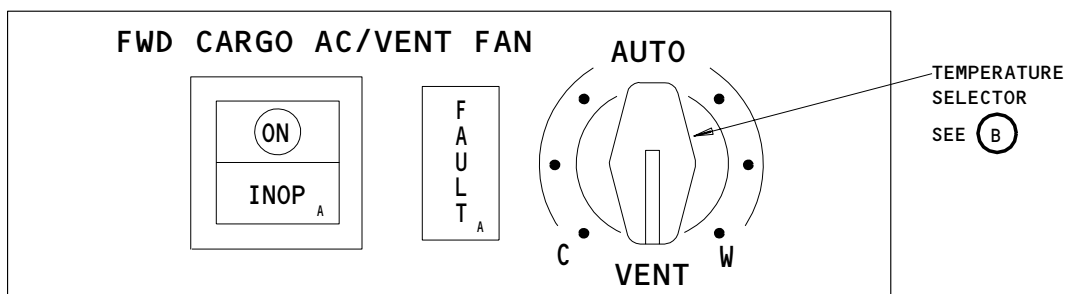
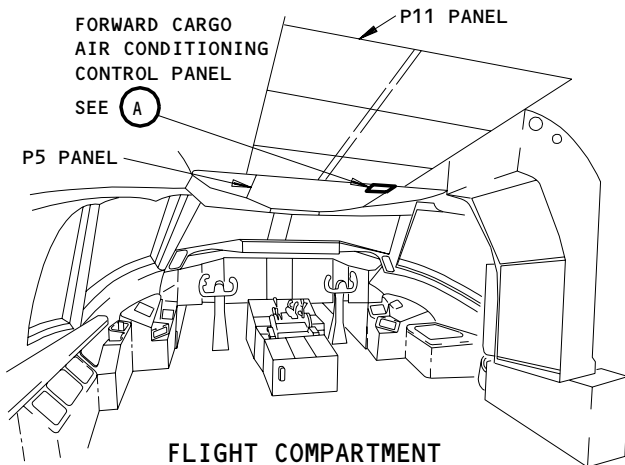
S 034-020

- (1) Loosen the setscrews from the knob on the temperature selector switch.

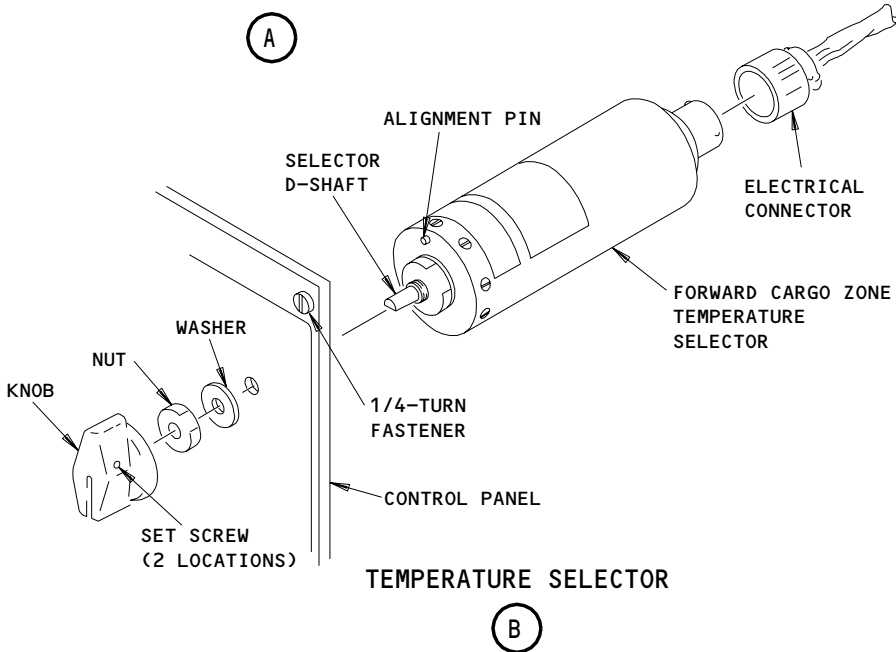
EFFECTIVITY

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FORWARD CARGO AIR CONDITIONING CONTROL PANEL



Forward Cargo Air Conditioning Temperature Selector Installation
Figure 402

EFFECTIVITY

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- S 034-070
- (2) Pull the knob off the shaft.

- S 034-021
- (3) Loosen the 1/4-turn fasteners that hold the temperature control module, for the cargo air conditioning, to the P5 panel.

- S 014-022
- (4) Pull the module out but do not disconnect the wires.

- S 034-023
- (5) Disconnect the electrical connector from the temperature selector switch.

- S 034-024
- (6) Remove the retainer nut and washer from the shaft.

- S 024-025
- (7) Remove the selector switch from behind the air conditioning control module.

TASK 21-61-04-404-026

4. Install the Cabin Zone Temperature Selector Switch (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zones
 - 211/212 Control Cabin
 - 120 Main Equipment Center (Right)

- (2) Access Panel
 - 119AL Main Equipment Center Access Door

C. Procedure

- S 434-027
- (1) Install a new O-ring between the selector switch and the rear of the temperature control module.

- S 424-028
- (2) Put the shaft of the selector switch through the hole in the module.
 - (a) Make sure the alignment pin goes into the correct position behind the panel.

- S 434-031
- (3) Install the washer and the retainer nut on the shaft.

- S 434-072
- (4) Tighten the retainer nut onto the shaft.

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- S 434-032
- (5) Install the electrical connector to the selector switch.
- S 434-035
- (6) Install the temperature control module into the P5 panel.
- S 434-036
- (7) Install the 1/4-turn fasteners.
- S 434-074
- (8) Tighten the 1/4-turn fasteners.
- S 434-037
- (9) Put the knob on the selector switch shaft.
- (a) Make sure some clearance is between the knob and the panel to let the knob turn.
- S 434-075
- (10) Tighten the setscrews on the selector switch knob.
- S 864-038
- (11) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) The temperature selector switch for the flight compartment:
- 1) 11P24, ZONE TEMP CONT MAN FLT DK
- 2) 11R24, ZONE DUCT OVHT FLT DK
- (b) The temperature selector switch for the forward zone:
- 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
- 2) 11R25, ZONE DUCT OVHT FWD
- 3) SAS 153-999, AND ALL MTH AIRPLANES;
11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
11H5, ZONE DUCT OVHT AUX FWD
- (c) The temperature selector switch for the mid zone:
- 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
- 2) 11R26, ZONE DUCT OVHT MID
- 3) SAS 153-999, AND ALL MTH AIRPLANES;
11H3, ZONE TEMP CONT VLV CLOSE AUX MID
11H6, ZONE DUCT OVHT AUX MID
- (d) The temperature selector switch for the aft zone:
- 1) 11P27, ZONE TEMP CONT VLV CLOSE AFT
- 2) 11R27, ZONE DUCT OVHT AFT
- S 864-045
- (12) Supply electrical power (AMM 24-22-00/201).
- S 864-047
- (13) Turn all the temperature selector switches, on the P5 panel, to the AUTO position.

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S 014-048

- (14) Open the access door for the main equipment center 119AL (AMM 06-41-00/201).
(a) Find the zone temperature controller in the E3-1 rack.

S 214-049

- (15) Make sure the CONTROLLER FAULT light on the controller front panel is off.

S 214-050

- (16) Push the PRESS/TEST switch on the controller.
(a) Make sure that all indicator lights come on.

S 214-051

- (17) Push the VERIFY switch.
(a) Make sure the SELECTOR fault light does not come on before the green GO light comes on.

D. Put the Airplane Back to Its Usual Condition

S 414-052

- (1) Close the access door for the main equipment center 119AL (AMM 06-41-00/201).

S 864-053

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-61-04-404-082

5. Install the Forward Cargo Zone Temperature Selector (Fig. 402)

A. Access

(1) Location Zones

211/212	Control Cabin
120	Main Equipment Center (Right)

(2) Access Panel

119AL	Main Equipment Center Access Door
-------	-----------------------------------

B. Procedure

S 424-054

- (1) Put the shaft of the selector switch through the hole in the control module for the forward cargo air conditioning.
(a) Make sure the alignment pin goes into the correct position behind the panel.

S 434-055

- (2) Install the washer and the retainer nut on the shaft.

S 434-076

- (3) Tighten the retainer nut on the shaft.

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- S 434-056
- (4) Install the electrical connector to the selector switch.
- S 434-057
- (5) Put the control module for the forward cargo air conditioning into the P5 panel.
- S 434-058
- (6) Install the 1/4-turn fasteners.
- S 434-077
- (7) Tighten the 1/4-turn fasteners.
- S 434-059
- (8) Put the knob on the selector switch shaft.
- (a) Make sure some clearance is between the knob and the panel to let the knob turn.
- S 434-060
- (9) Tighten the setscrews.
- S 864-061
- (10) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11N21, FWD CARGO TEMP CONT VLV CLOSE
- (b) 11N22, FWD CARGO DUCT OVHT
- (c) 11P21, FWD CARGO A/C VENT CONT
- S 864-062
- (11) Supply electrical power (Ref 24-22-00).
- S 864-063
- (12) Turn the temperature selector switch for the forward cargo zone, on the P5 panel, to the AUTO position.
- S 014-064
- (13) Open the access door for the main equipment center 119AL (Ref 06-41-00).
- (a) Find the temperature controller for the auxiliary zones in the E1-5 rack.
- S 214-065
- (14) Make sure the CONTROLLER FAULT light on the controller front panel is off.
- S 214-066
- (15) Push the PRESS/TEST switch on the controller.
- (a) Make sure that all the CARGO indicator lights come on.

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S 214-067

(16) Push the VERIFY switch.

(a) Make sure the CARGO SELECTOR fault light does not come on before the green GO light comes on.

C. Put the Airplane Back to Its Usual Condition

S 414-068

(1) Close the access door for the main equipment center 119AL.

S 864-069

(2) Remove electrical power if it is not necessary (Ref 24-22-00).

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TRIM AIR SUPPLY CHECK VALVES – REMOVAL/INSTALLATION

1. General

- A. This procedure has these two tasks:
 - (1) Trim Air Supply Check Valve Removal
 - (2) Trim Air Supply Check Valve Installation
- B. There are two trim air supply check valves installed. One for the left A/C pack and one for the right A/C pack. The check valves prevent the reverse flow of trim air from flowing into the opposite pack.
 - (1) The check valves for both packs are installed in the left Environmental Control System (ECS) pack bay near the trim air pressure regulating and shutoff valve and the air cycle machine by the keel beam.

TASK 21-61-05-004-001

2. Trim Air Supply Check Valve Removal (Fig. 401)

- A. References
 - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
 - (2) AMM 24-22-00/201, Electric Power Control
 - (3) AMM 36-00-00/201, Pneumatic – General
- B. Access
 - (1) Location Zone
135 Environmental control system (ECS) bay, Left
- C. Prepare for Removal

S 864-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-030

- (2) Depressurize the pneumatic system (AMM 36-00-00/201).

S 864-003

- (3) Make sure the L and R PACK selectors, on the P5 panel, are set to OFF and attach DO-NOT-OPERATE tags.

S 864-004

- (4) Push the TRIM AIR switch-light, on the P5 panel, momentarily to ON then push the switch to OFF and attach a DO-NOT-OPERATE tag.

NOTE: This will release any pneumatic pressure trapped between the trim air supply check valves and the trim air pressure regulating shutoff valve.

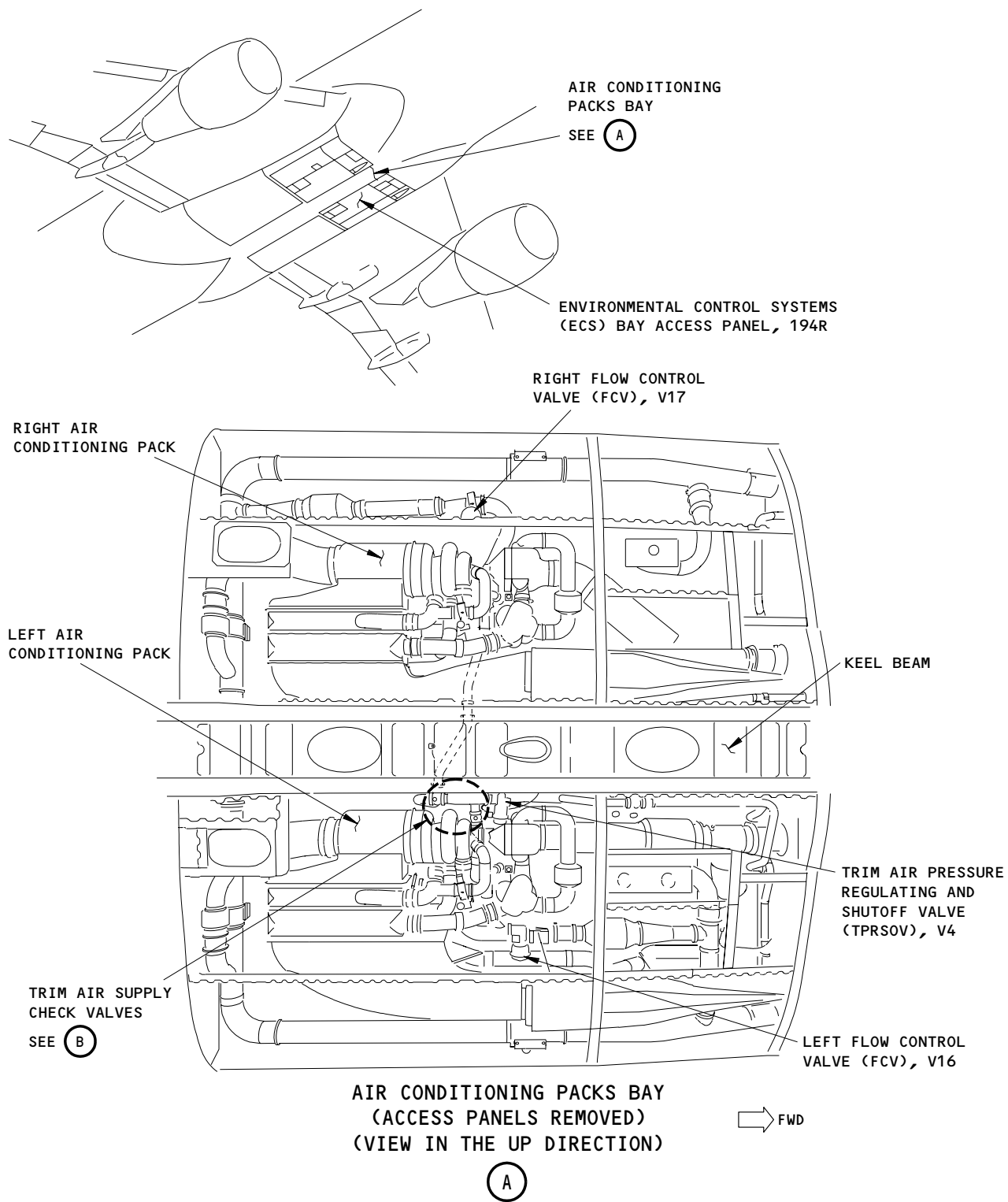
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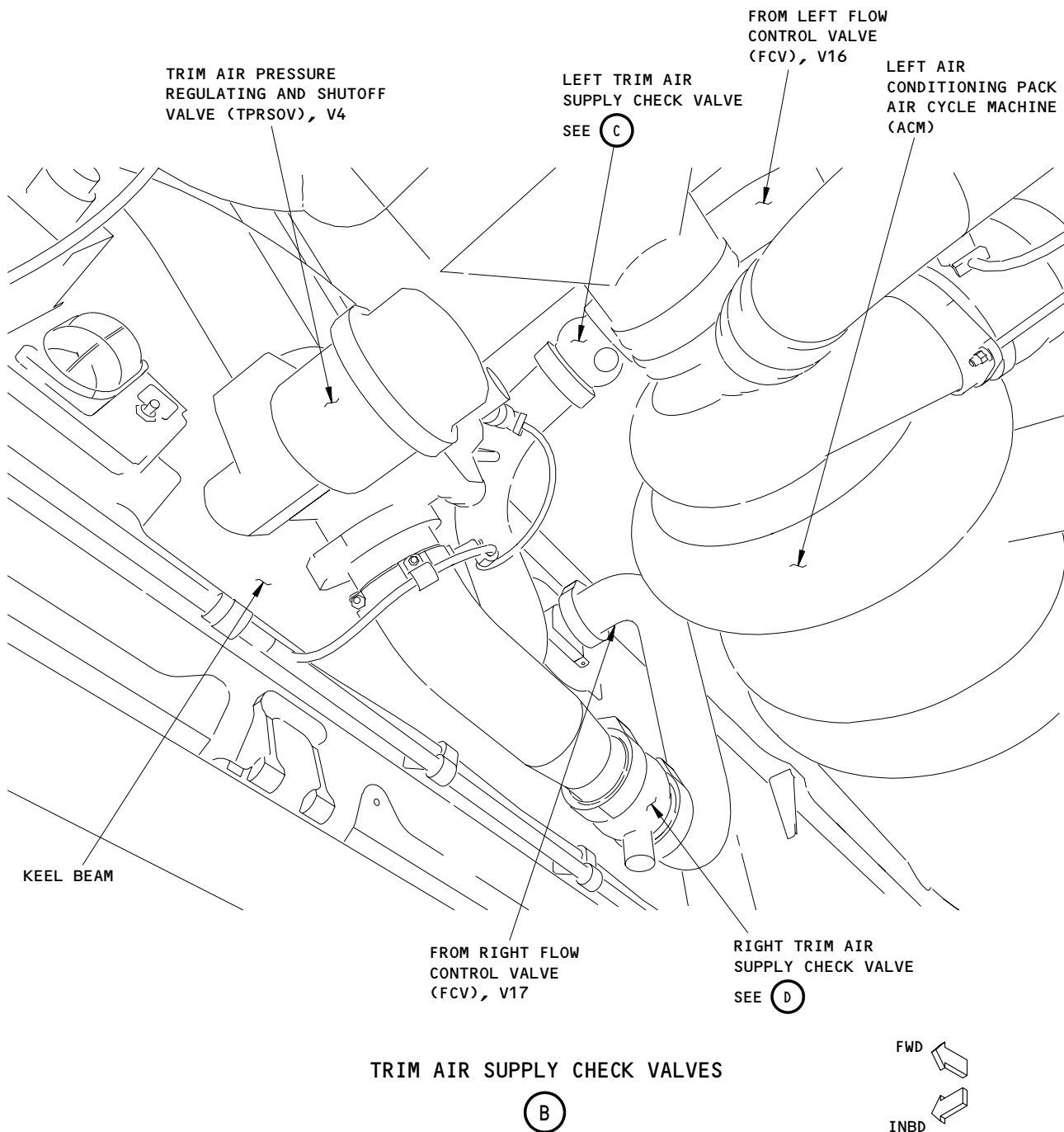
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Trim Air Supply Check Valve Installation
Figure 401 (Sheet 1)

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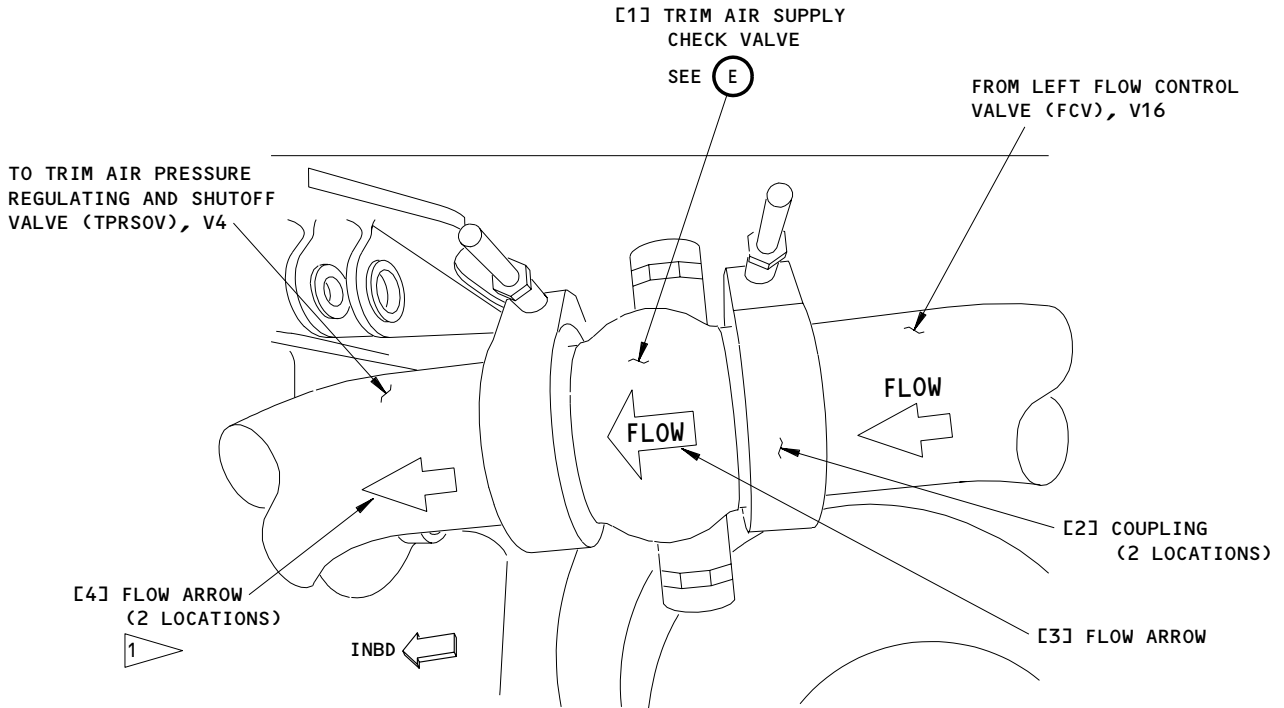
Trim Air Supply Check Valve Installation
Figure 401 (Sheet 2)

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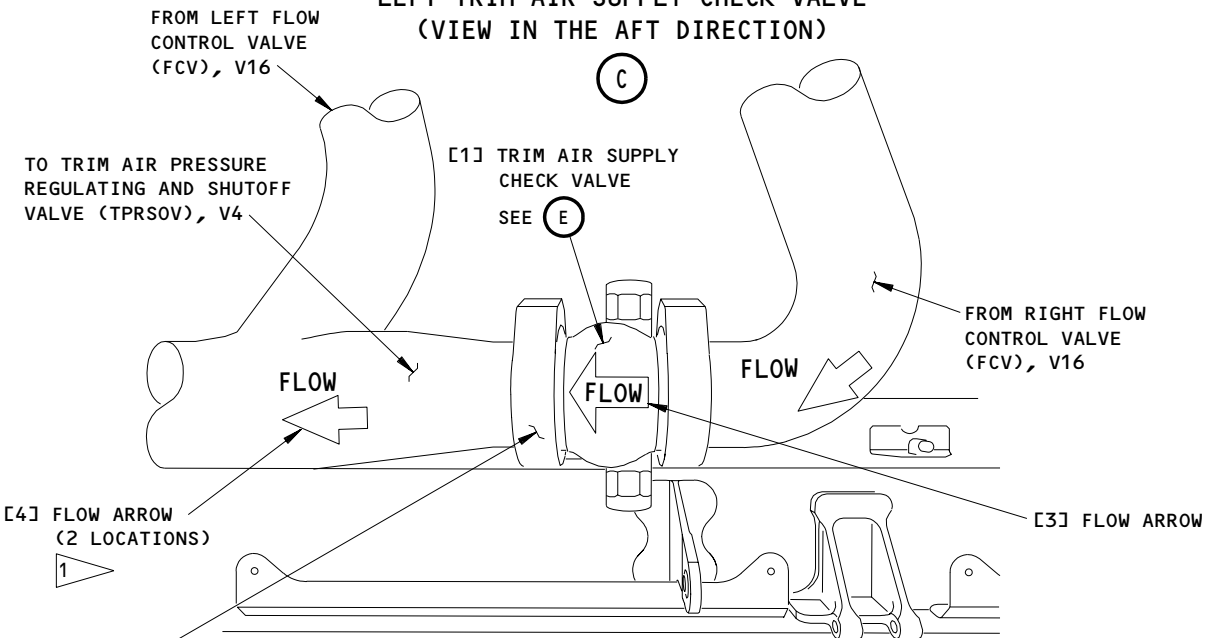
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LEFT TRIM AIR SUPPLY CHECK VALVE
(VIEW IN THE AFT DIRECTION)



RIGHT TRIM AIR SUPPLY CHECK VALVE
(VIEW IN THE INBOARD DIRECTION)

1 NOT ON ALL AIRPLANES

Trim Air Supply Check Valve Installation
Figure 401 (Sheet 3)

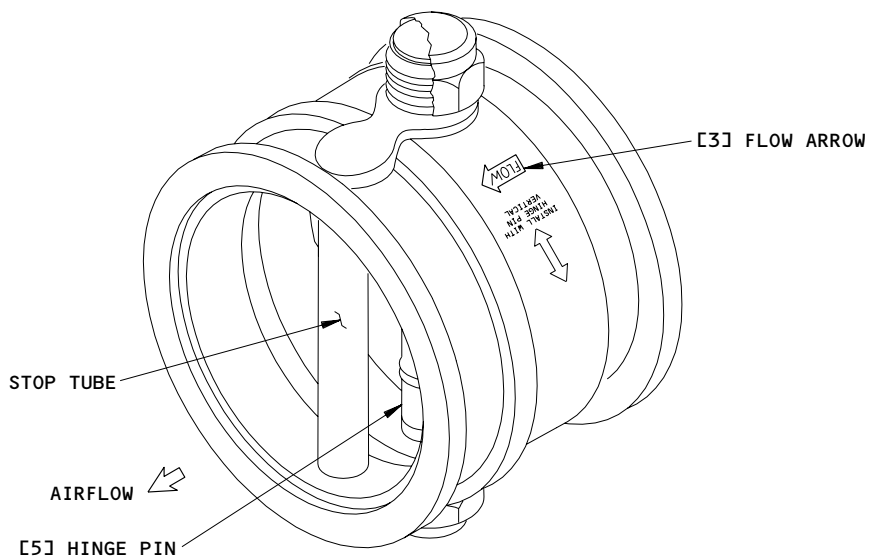
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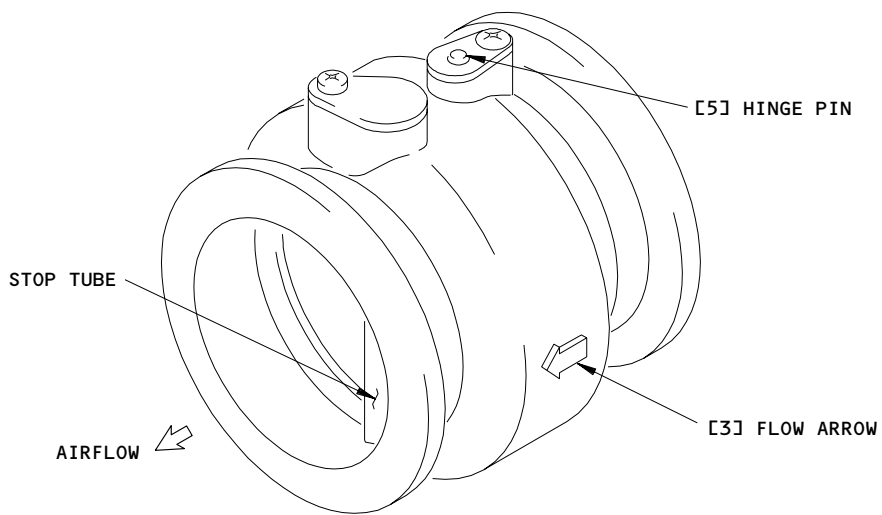
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TRIM AIR SUPPLY CHECK VALVE
(P/N S210T130-76)

(E)



TRIM AIR SUPPLY CHECK VALVE
(P/N S210T130-71)

(E)

Trim Air Supply Check Valve Installation
Figure 401 (Sheet 4)

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S 014-007

- (5) Open the ECS bay access door, 193NL, to get access to the trim air supply check valve for the left pack or right (AMM 06-41-00/201).

D. Remove the Check Valve

S 034-009

- (1) Remove the coupling (2) on the two sides of the check valve (1).

S 024-011

- (2) Remove the check valve (1).

S 214-025

- (3) Make sure the flappers are not missing from the check valve (1).
(a) If the flappers are missing from the check valve (1), look for them in the ducts which were connected to the check valve (1).

S 424-012

- (4) Put a cover on the duct openings to keep out unwanted material.

TASK 21-61-05-404-013

3. Trim Air Supply Check Valve Installation (Fig. 401)

A. Parts

- (1) Refer to IPC for part numbers and effectivities of items in the table that follows:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Valve Coupling	21-61-05	02	430
	2				175

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 36-00-00/201, Pneumatic - General

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C. Access

- (1) Location Zone
135 Environmental control system (ECS) bay, Left

D. Install the Check Valve

S 024-014

- (1) Remove the duct covers.

S 424-015

- (2) Install the check valve (1) between the ducts.
(a) Make sure the flow arrow (3) on the left check valve points inboard and aligns with the flow arrow(s) (4) painted on the duct(s).

NOTE: Flow arrows may not be painted on all ducts.

- (b) Make sure the flow arrow (3) on the right check valve points forward and aligns with the flow arrow(s) (4) painted on the duct(s).

NOTE: Flow arrows may not be painted on all ducts.

- (c) Turn the check valve so that the flapper hinge pin is in the vertical position or is as near to the vertical position as possible.

S 424-022

- (3) Install the coupling (2) on the two sides of the check valve (1).
(a) Tighten the coupling nuts to 45 pound-inches.

E. Check Valve Post-Installation Leakage Check

S 864-026

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-027

- (2) Supply pneumatic power (AMM 36-00-00/201).

S 864-045

- (3) Remove the DO-NOT-OPERATE tags from the L and R PACK selectors and the TRIM AIR switch-light, on the P5 panel.
(a) Make sure the L and R PACK selectors and the TRIM AIR switch-light are in the OFF positions.

NOTE: With the TRIM AIR switch-light in the OFF position, this will permit pressurization of the ducts upstream of the trim air pressure regulating shutoff valve to do a leakage check of the check valve.

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S 864-046

- (4) Turn the R (L) PACK selector to the AUTO position, if you installed the check valve for the left (right) pack.

NOTE: This step pressurizes the duct downstream of the check valve.

S 794-032

- (5) Do a check of the downstream flange for air leakage.
 - (a) Leakage that is found over a large area is satisfactory.
 - (b) Align the joint or coupling to repair leakage that is found in an isolated area.

S 864-048

- (6) Turn the L (R) PACK selector to the AUTO position.

NOTE: This step pressurizes the duct upstream of the check valve.

S 284-024

- (7) Do a check of the upstream flange for air leakage.
 - (a) Small air leakage is satisfactory.
 - (b) Repair large air leakage by joint or coupling adjustment.

F. Put the Airplane Back to Its Usual Condition.

S 864-024

- (1) Turn the L and R PACK selectors to the OFF position.

S 414-033

- (2) Close the ECS bay access door which you opened in the removal task (AMM 06-41-00/201).

S 864-035

- (3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-037

- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TRIM AIR SUPPLY CHECK VALVES – INSPECTION/CHECK

TASK 21-61-05-206-001

1. Trim Air Supply Check Valve Inspection (Fig. 601)

A. References

- (1) AMM 21-61-05/401, Trim Air Supply Check Valves

B. Access

- (1) Location Zone
135 Environmental control system (ECS) bay, Left
- (2) Access Panel
193NL ECS bay access door, Left

C. Prepare for Inspection

S 026-002

- (1) Remove the trim air supply check valve (AMM 21-61-05/401).

D. Do a check of the Trim Air Supply Check Valve

S 216-003

- (1) Make sure the valve body does not have a crack.

S 216-009

- (2) Make sure the valve body does not have corrosion.

S 726-004

- (3) Manually open and close the flappers.
(a) Make sure the flappers are free to move.
(b) Make sure the flappers touch equally with the valve body in the closed position.

S 216-006

- (4) Open the flappers.
(a) Make sure the surfaces of the valve body, and the flappers that touch those surfaces, do not have damage.
(b) Make sure there is no sign of leakage.

S 216-007

- (5) Make sure the flappers are not bent.

S 216-010

- (6) Make sure the flappers do not have cracks.

S 426-008

- (7) Install the trim air supply check valve (AMM 21-61-05/401).

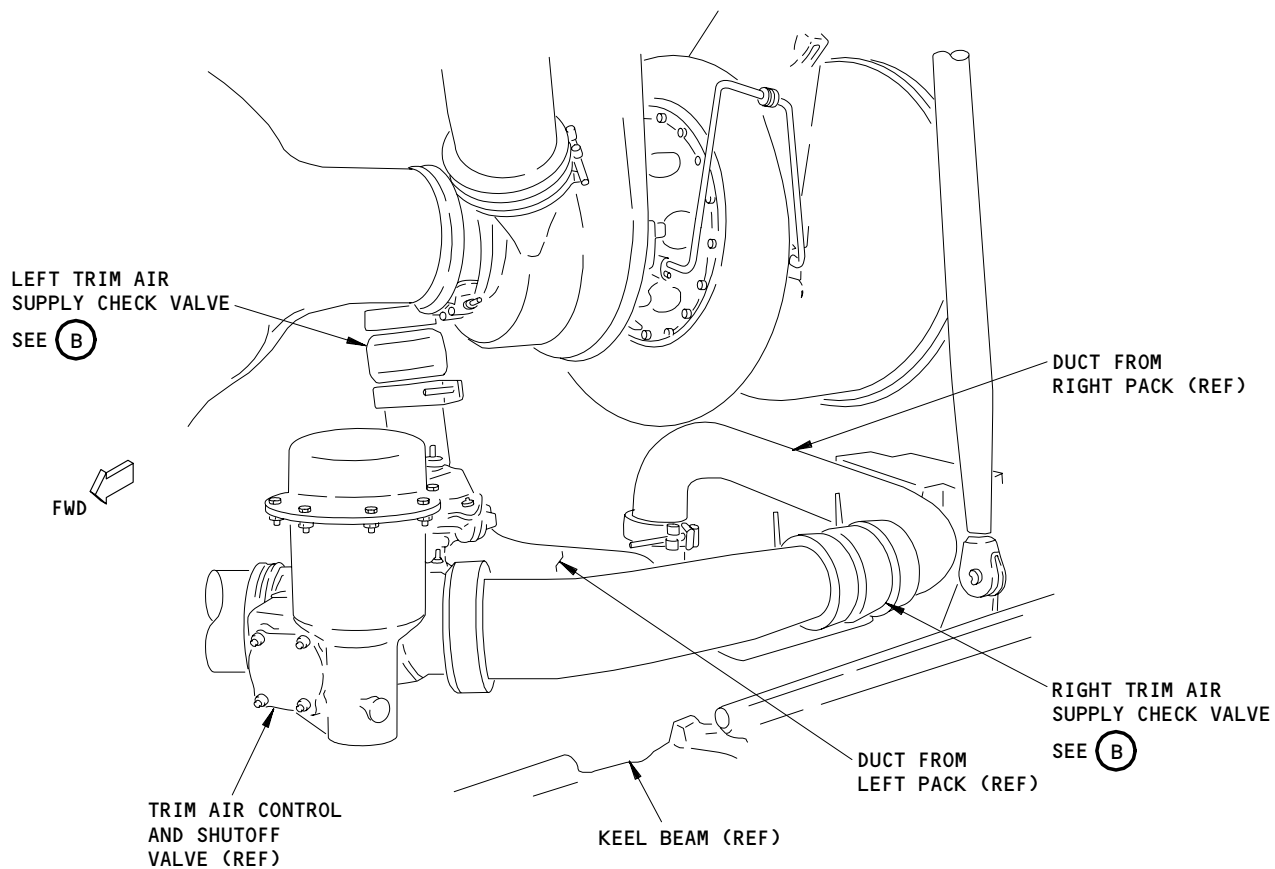
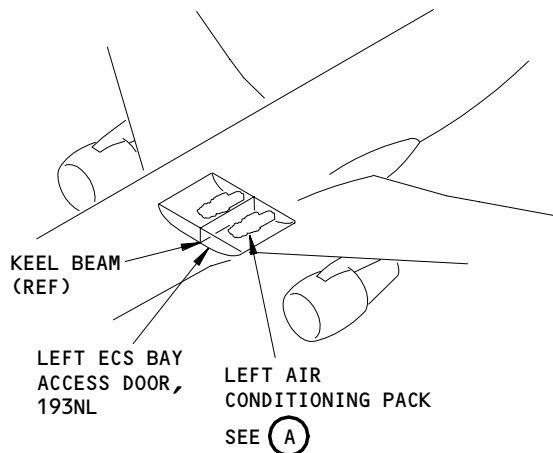
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LEFT AIR CONDITIONING PACK
(THE VIEW WHEN YOU LOOK UP INTO THE ECS BAY)

(A)

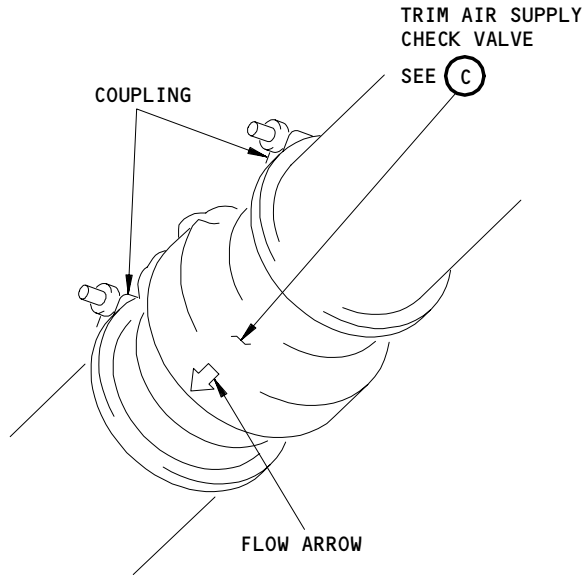
Trim Air Supply Check Valve
Figure 601 (Sheet 1)

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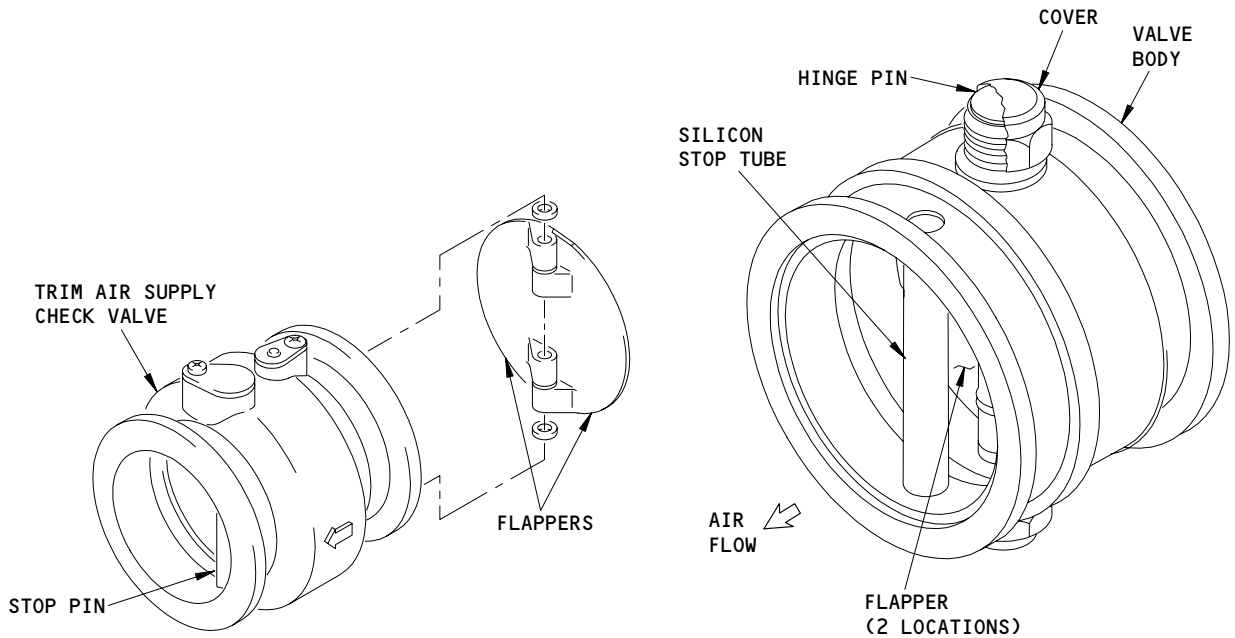
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TRIM AIR SUPPLY CHECK VALVE

(B)

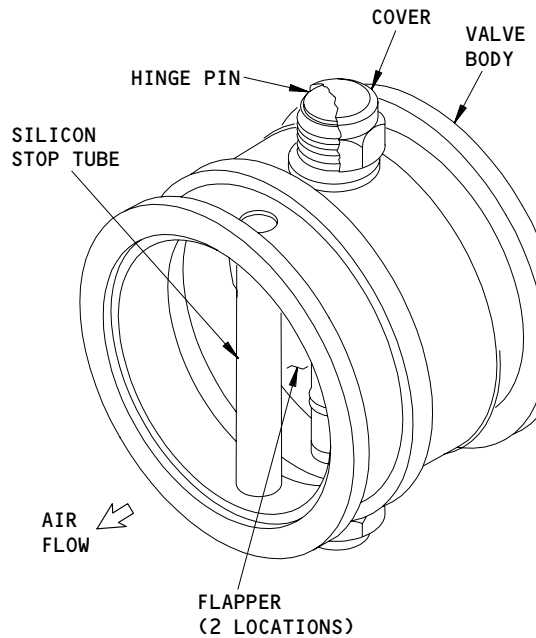


TRIM AIR SUPPLY CHECK VALVE

STOP PIN

TRIM AIR SUPPLY CHECK VALVE
(P/N S210T130-71)

(C)



TRIM AIR SUPPLY CHECK VALVE
(P/N S210T130-76)

(C)

Trim Air Supply Check Valve
Figure 601 (Sheet 2)

EFFECTIVITY	ALL
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21-61-05

TRIM AIR PRESSURE REGULATING AND SHUTOFF VALVE (PRSOV) –
REMOVAL/INSTALLATION

1. General

- A. The pressure regulating and shutoff valve (PRSOV) for the trim air system is installed aft and inboard of the pneumatic ground connectors in the left environmental control system (ECS) bay. The PRSOV controls the pressure of pneumatic system air that is supplied to the trim-air modulating valves.

TASK 21-61-06-004-001

2. Trim Air Pressure Regulating and Shutoff Valve (PRSOV) Removal (Fig. 401)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zones
135 Environmental control system bay (Left)
(2) Access Panels
193NL ECS components access door

C. Prepare for Removal

S 864-002

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-003

- (2) Put the two control switches for the air-conditioning packs on the pilot's overhead panel, P5, to the OFF position. Attach DO-NOT-OPERATE tags on the two switches.

S 864-004

- (3) Push the TRIM AIR switchlight on the P5 panel to the ON position. Make sure that the ON indicator light comes on. Attach DO-NOT-OPERATE tag to the switchlight.

S 014-007

- (4) Open the left ECS access door 193NL (AMM 06-41-00/201). Find the modulating valves for the trim-air system installed forward of the left air-conditioning pack.

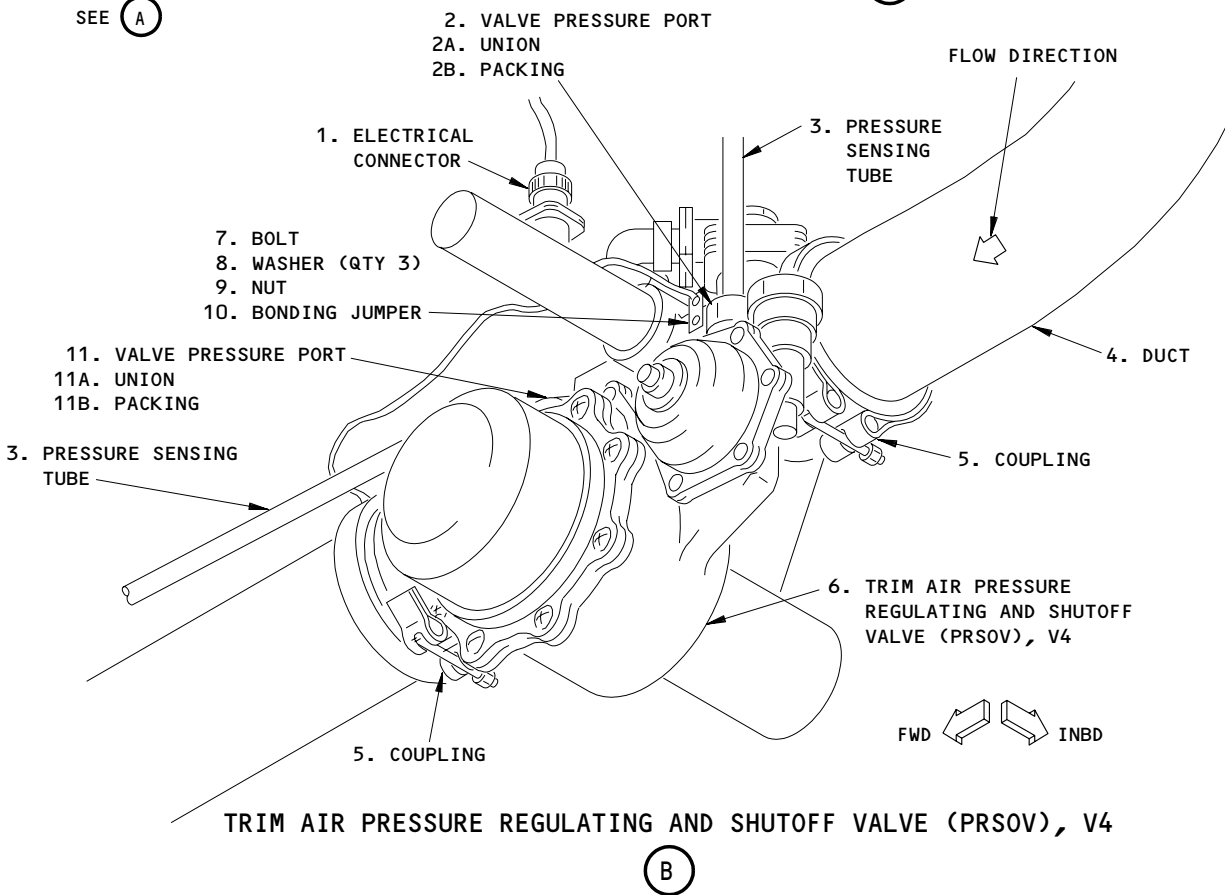
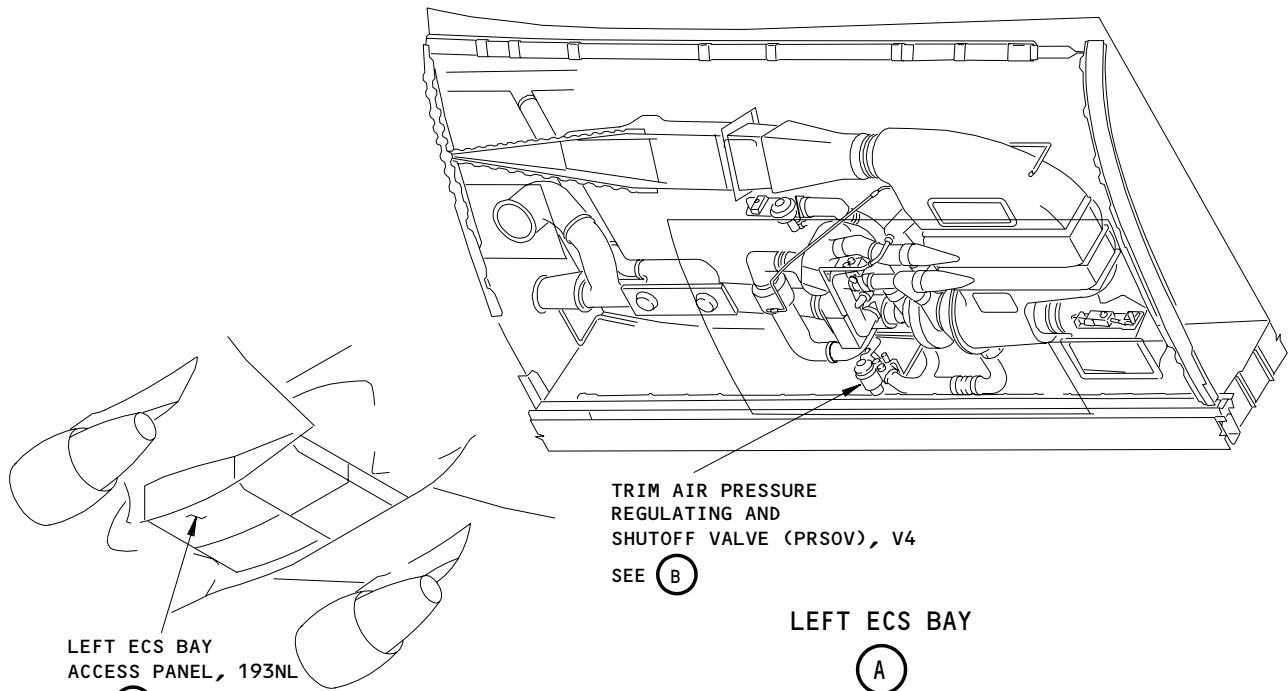
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Trim Air Pressure Regulating and Shutoff Valve (PRSOV)
Figure 401

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	ALL

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S 864-071

- (5) Do one of these steps:
- (a) Turn the manual-override knob on a modulating valve clockwise until the visual position display shows that the modulating valve is open.
 - (b) Turn the FWD Zone Temperature Selector Switch to the AUTO position on the P5 panel on the Flight Deck. Attach a DO-NOT-OPERATE tag to that switch.

S 864-009

- (6) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C33, TRIM AIR
 - (b) 11P24, ZONE TEMP CONT MAN FLT DK
 - (c) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - (d) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - (e) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - (f) 11R24, ZONE DUCT OVHT FLT DK
 - (g) 11R25, ZONE DUCT OVHT FWD
 - (h) 11R26, ZONE DUCT OVHT MID
 - (i) 11R27, ZONE DUCT OVHT AFT

D. Remove the Trim Air PRSOV

S 034-014

- (1) Disconnect the pressure sensing tubes (3) at the valve pressure ports (2, 11).
- (a) Remove the union (2A), packing (2B), union (11A) and packing (11B) from the valve pressure ports (2) and (11).
 - (b) Discard the packing (2B) and packing (11B).

S 034-015

- (2) Disconnect the electrical connector (1) at the valve connection.

S 034-025

- (3) Remove the bolts (7), washers (8) and nuts (9) that hold the bonding jumpers to the valve (6).

S 034-016

- (4) Disconnect the bonding jumpers (10) at the valve (6).

S 034-017

- (5) Loosen the couplings (5) and move them along the duct (4) away from the valve (6).

S 024-018

- (6) Remove the valve (6).

S 494-019

- (7) Put a cover over the ducts to keep out unwanted objects.

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TASK 21-61-06-404-020

3. Trim Air Pressure Regulating and Shutoff Valve (PRSOV) Installation
(Fig. 401)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	2B	Packing	21-61-05	01	260
401	2B	Packing	21-61-05	01A	145
401	2B	Packing	21-61-05	02	400
401	2B	Packing	21-61-05	03	515
401	2B	Packing	21-61-05	04	75
401	2B	Packing	21-61-05	04A	40
401	6	Valve - Pressure Regulating	21-61-05	01	263
401	6	Valve - Pressure Regulating	21-61-05	01A	335
401	6	Valve - Pressure Regulating	21-61-05	02	425
401	6	Valve - Pressure Regulating	21-61-05	03	510
401	6	Valve - Pressure Regulating	21-61-05	04	585
401	11B	Packing	21-61-05	01	260
401	11B	Packing	21-61-05	01A	145
401	11B	Packing	21-61-05	02	400
401	11B	Packing	21-61-05	03	515
401	11B	Packing	21-61-05	04	75
401	11B	Packing	21-61-05	04A	40
401	11B	Packing	21-61-05	05	70
401	11B	Packing	21-61-05	06	80

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control
- (3) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
135 Environmental control system bay (Left)
- (2) Access Panels
193NL ECS components access door

D. Install the Trim Air PRSOV

S 094-021

- (1) Remove the covers over the ducts.

S 424-073

- (2) Install the union (2A), new packing (2B), union (11A), and new packing (11B) into the valve pressure ports (2) and (11).

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- S 424-020
- (3) Align the valve (6) with the duct (4) and move the couplings (5) into position.
- S 434-021
- (4) Tighten the couplings (5) to 50 pounds-inch.
- S 434-022
- (5) Attach and tighten the bonding jumpers (10) to the valve (6) with the bolt (7), washer (8), and nut (9).
- S 434-023
- (6) Attach the electrical connector (1) to the valve (6).
- S 434-024
- (7) Attach the pressure sensing tubes (3) to the valve pressure ports (2, 11).
- S 864-025
- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C33, TRIM AIR
 - (b) 11P24, ZONE TEMP CONT MAN FLT DK
 - (c) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - (d) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - (e) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - (f) 11R24, ZONE DUCT OVHT FLT DK
 - (g) 11R25, ZONE DUCT OVHT FWD
 - (h) 11R26, ZONE DUCT OVHT MID
 - (i) 11R27, ZONE DUCT OVHT AFT
- S 864-054
- (9) Supply electrical power (AMM 24-22-00/201).
- S 864-055
- (10) Remove the DO-NOT-OPERATE tag from the TRIM AIR switchlight on the P5 panel.
- S 864-043
- (11) Supply pneumatic power (AMM 36-00-00/201).
- S 864-072
- (12) Do one of these steps:
- (a) Turn the manual-override knob for each modulating valve counterclockwise until the valve position display shows that each valve is closed.
 - (b) Remove the DO-NOT-OPERATE tag from the FWD Zone Temperature Selector Switch. Turn all the Zone Temperature Selector Switches to the OFF position on the P5 panel on the Flight Deck.

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S 864-044

- (13) Remove the DO-NOT-OPERATE tags from the control switches on the P5 panel. Put the left or right control switch to the AUTO position.

S 794-036

- (14) Do a leak test of the trim air PRSOV at the flange and sensing tube connections.
- (a) Leakage along a large area is permitted.
 - (b) Use joint or coupling adjustment to repair leakage from a small area.

S 714-037

- (15) Make sure the trim air PRSOV operates correctly.

S 864-038

- (16) Remove the DO-NOT-OPERATE tag from the TRIM AIR switchlight on the P5 panel. Push the switchlight to the OFF position. Make sure the OFF light comes on.

S 414-040

- (17) Close the ECS access door 193NL (AMM 06-41-00/201).

S 864-041

- (18) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-042

- (19) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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TRIM AIR MODULATING VALVE – REMOVAL/INSTALLATION

1. General

- A. The modulating valves for the cabin zones are forward of the left air conditioning pack. Each cabin zone has a modulating valve in the supply duct for the trim air.
- B. The modulating valve for the forward cargo zone is in the mix manifold bay.

TASK 21-61-07-004-006

2. Trim Air Modulating Valve Removal

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power – Control

B. Access

- (1) Location Zone
135 Environmental Control System Bay (Left)
- (2) Access Panel
193FL ECS Components Access Panel

C. Prepare for the Removal

S 864-009

- (1) Supply electrical power (AMM 24-22-00/201).

S 214-010

- (2) Turn the two control selector switches for the air conditioning packs, on the pilot's overhead panel P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.
 - (b) Attach the DO-NOT-OPERATE tags to the two pack control switches.

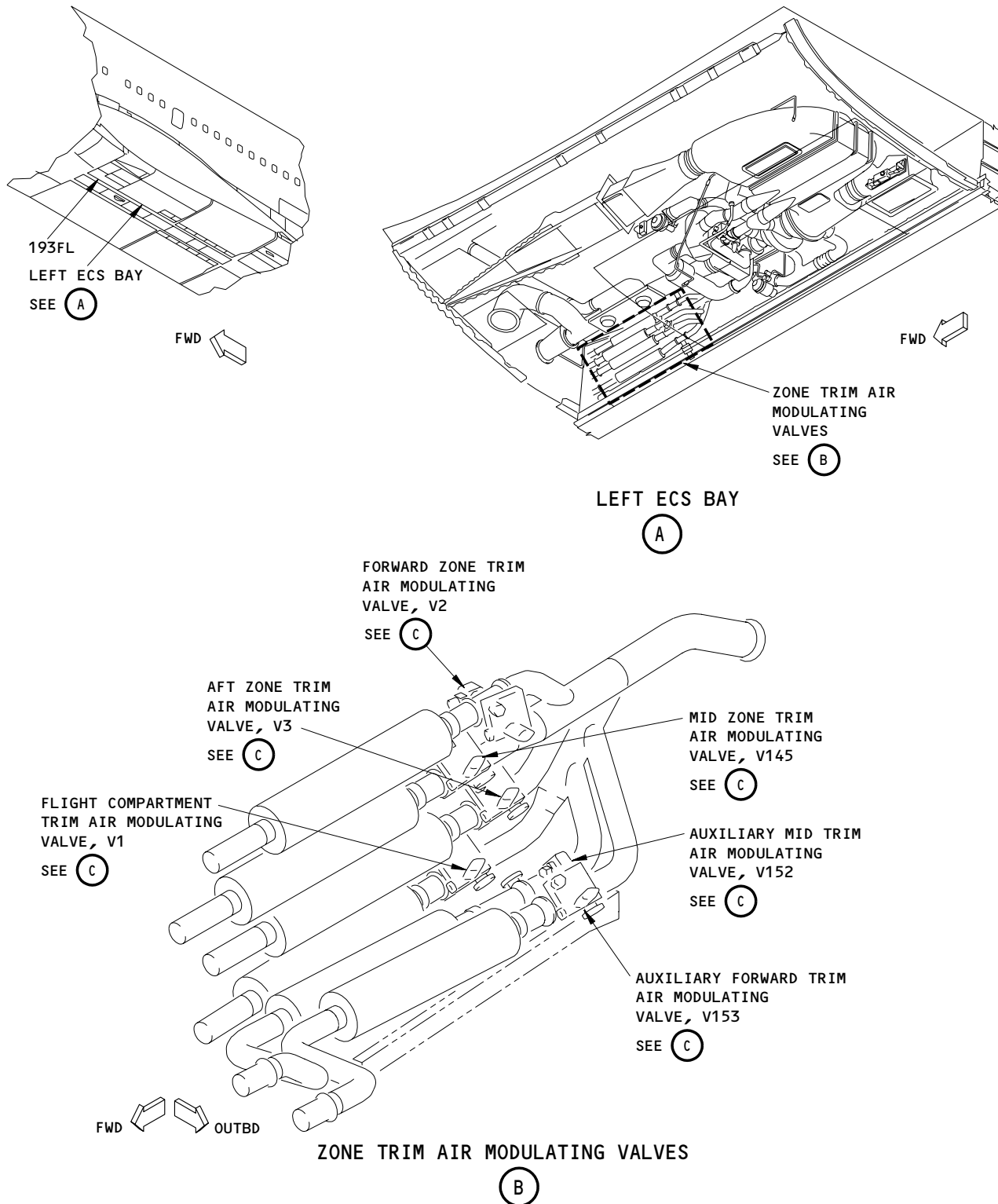
S 864-026

- (3) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11C33, TRIM AIR

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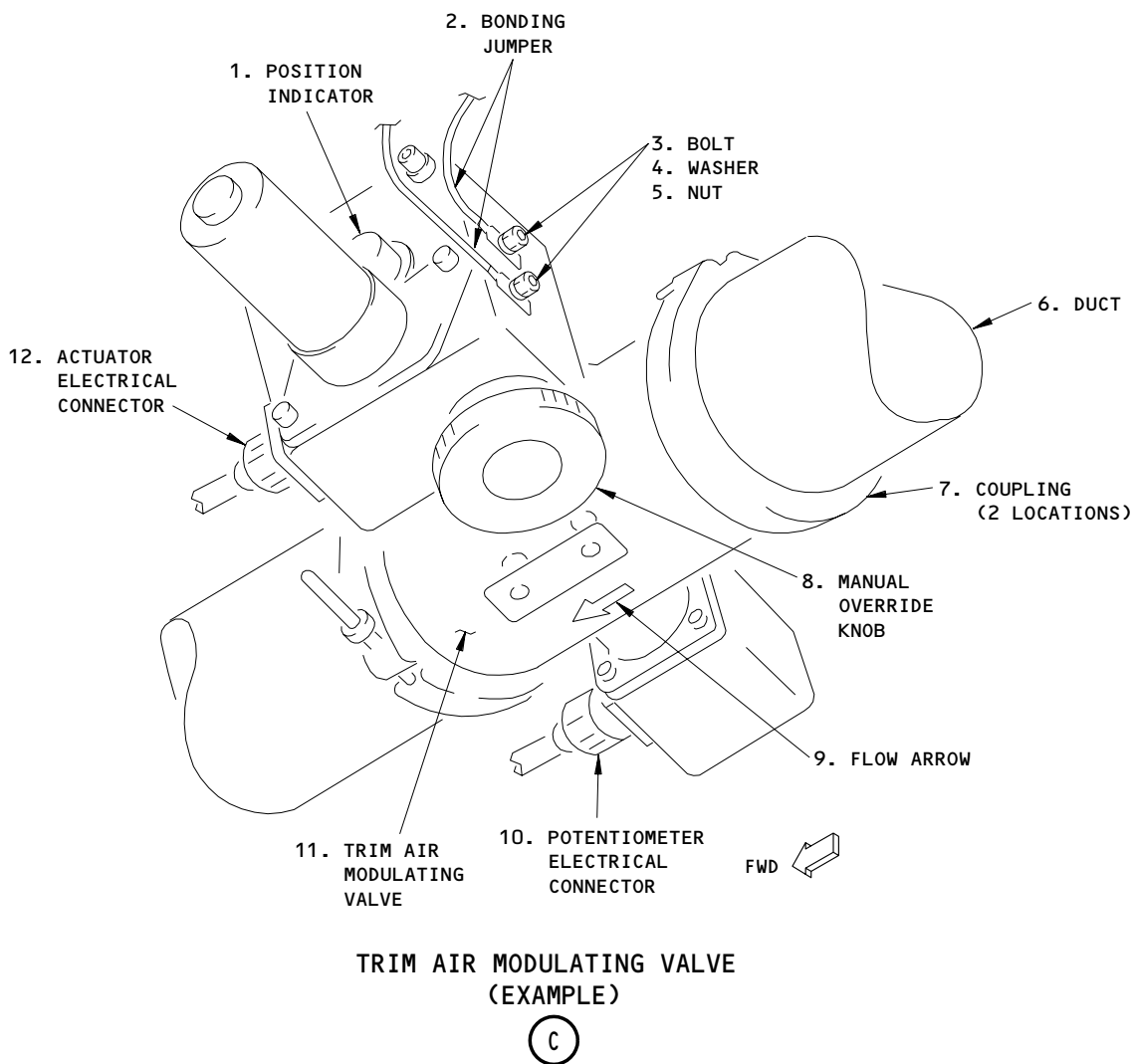
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Trim Air Modulating Valve Installation
Figure 401 (Sheet 1)

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Trim Air Modulating Valve Installation
Figure 401 (Sheet 2)

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- (b) 11P24, ZONE TEMP CONT MAN FLT DK
- (c) 11P25, ZONE TEMP CONT VLV CLOSE FWD
- (d) 11P26, ZONE TEMP CONT VLV CLOSE MID
- (e) 11P27, ZONE TEMP CONT VLV CLOSE AFT
- (f) SAS 153-999, AND ALL MTH AIRPLANES;
 - 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - 11H5, ZONE DUCT OVHT AUX FWD
 - 11H6, ZONE DUCT OVHT AUX MID
- (g) 11R24, ZONE DUCT OVHT FLT DK
- (h) 11R25, ZONE DUCT OVHT FWD
- (i) 11R26, ZONE DUCT OVHT MID
- (j) 11R27, ZONE DUCT OVHT AFT

S 014-020

- (4) Open the access panel 193FL, forward of the left Environmental Control System (ECS) bay door 193NL (AMM 06-41-00/201).

(a) Find the modulating valve (11).

D. Remove the Modulating Valve

S 034-022

- (1) Disconnect the electrical connectors (10, 12) from the valve (11).

S 034-023

- (2) Disconnect the bonding jumpers (2) from the valve (11).

S 034-024

- (3) Loosen the couplings (7) on the two sides of the valve (11).

(a) Move the couplings (7) away from the valve (11).

S 024-025

- (4) Remove the valve (11).

S 094-026

- (5) Put a cover on the duct holes to keep out unwanted objects.

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TASK 21-61-07-404-041

3. Trim Air Modulating Valve Installation

A. Parts

- (1) Refer to the parts table which follows to find the Illustrated Parts Catalog (IPC) item numbers which correspond to the AMM item numbers in this procedure:

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	3	Bolt	21-61-05	02	105
	4	Washer			110
	5	Nut			115
	7	Coupling (Clamp)			170
	11	Valve			435
402	3	Bolt	21-61-05	02	105
	4	Washer			110
	5	Nut			115
	7	Coupling (Clamp)			170
	11	Valve			435

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
 (2) AMM 24-22-00/201, Electrical Power - Control
 (3) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zone
 135 Environmental Control System Bay (Left)
- (2) Access Panel
 193FL ECS Components Access Panel

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D. Procedure

- S 494-044
- (1) Remove the covers on the ducts.
- S 424-045
- (2) Install the modulating valve (11) into the duct (6).
(a) Make sure the flow arrow (9) points forward.
- S 434-046
- (3) Move each coupling (7) into its position on each side of the valve (11).
- S 434-001
- (4) Tighten the couplings 45 +5/-0 pound-inches.
- S 434-048
- (5) Install the bonding jumpers (2) to the valve (11) with a bolt (3), washer (4), and nut (5).
- S 434-049
- (6) Install the electrical connectors (10, 12) to the valve (11).
- S 864-050
- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C33, TRIM AIR
 - (b) 11P24, ZONE TEMP CONT MAN FLT DK
 - (c) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - (d) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - (e) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - (f) SAS 153-999, AND ALL MTH AIRPLANES;
11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
11H3, ZONE TEMP CONT VLV CLOSE AUX MID
11H5, ZONE DUCT OVHT AUX FWD
11H6, ZONE DUCT OVHT AUX MID
 - (g) 11R24, ZONE DUCT OVHT FLT DK

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- (h) 11R25, ZONE DUCT OVHT FWD
 - (i) 11R26, ZONE DUCT OVHT MID
 - (j) 11R27, ZONE DUCT OVHT AFT
- E. Do the trim air modulating valve operational test.
- S 864-057
 - (1) Supply electrical power (AMM 24-22-00/201).
 - S 864-058
 - (2) Supply pneumatic power (AMM 36-00-00/201).
 - S 214-059
 - (3) Push the TRIM AIR switch-light, on the P5 panel, to the ON position.
 - (a) Make sure the ON light comes on.
 - S 864-060
 - (4) Remove the DO-NOT-OPERATE tags from the two control selector switches for the air conditioning packs.
 - S 864-061
 - (5) Turn the two control selector switches for the air conditioning packs, on the P5 panel, to the AUTO position.
 - S 864-065
 - (6) Turn the temperature selector switch, for the applicable zone, to the AUTO W position.
 - S 714-066
 - (7) Do a check of the valve flanges for leakage.
 - (a) Some leakage is permitted.
 - (b) If the leakage is strong, align the joint and tighten the coupling.
 - S 864-067
 - (8) Push the ECS MSG switch on the EICAS MAINT panel on the right side panel, P61.
 - S 214-068
 - (9) Make sure the applicable TRIM VALVE position shows between 0.90 and 1.00 on the EICAS display.

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S 214-069

- (10) Turn the two pack control switches, on the P5 panel, to the OFF position.

- (a) Make sure the PACK OFF light comes on.

F. Put the Airplane Back to Its Usual Condition

S 414-071

- (1) Close the access panel 193FL (AMM 06-41-00/201).

S 864-072

- (2) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).

S 864-073

- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-61-07-004-143

4. Forward Cargo Zone Trim Air Modulating Valve Removal (Fig. 402)

A. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zone
125 Area aft of the Forward Cargo Compartment (Left)

C. Prepare for the Removal

S 864-149

- (1) Supply electrical power (AMM 24-22-00/201).

S 214-150

- (2) Turn the two control selector switches for the air conditioning packs, on the pilot's overhead panel P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.
 - (b) Attach the DO-NOT-OPERATE tags on the two pack control switches.

S 214-151

- (3) Push the FWD CARGO A/C switch-light on the P5 panel to the OFF position.
 - (a) Make sure the INOP light comes on.
 - (b) Attach a DO-NOT-OPERATE tag on the switch-light.

S 864-152

- (4) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
 - (a) 11C33, TRIM AIR
 - (b) 11N21, FWD CARGO TEMP CONT VLV CLOSE
 - (c) 11N22, FWD CARGO DUCT OVHT/INOP

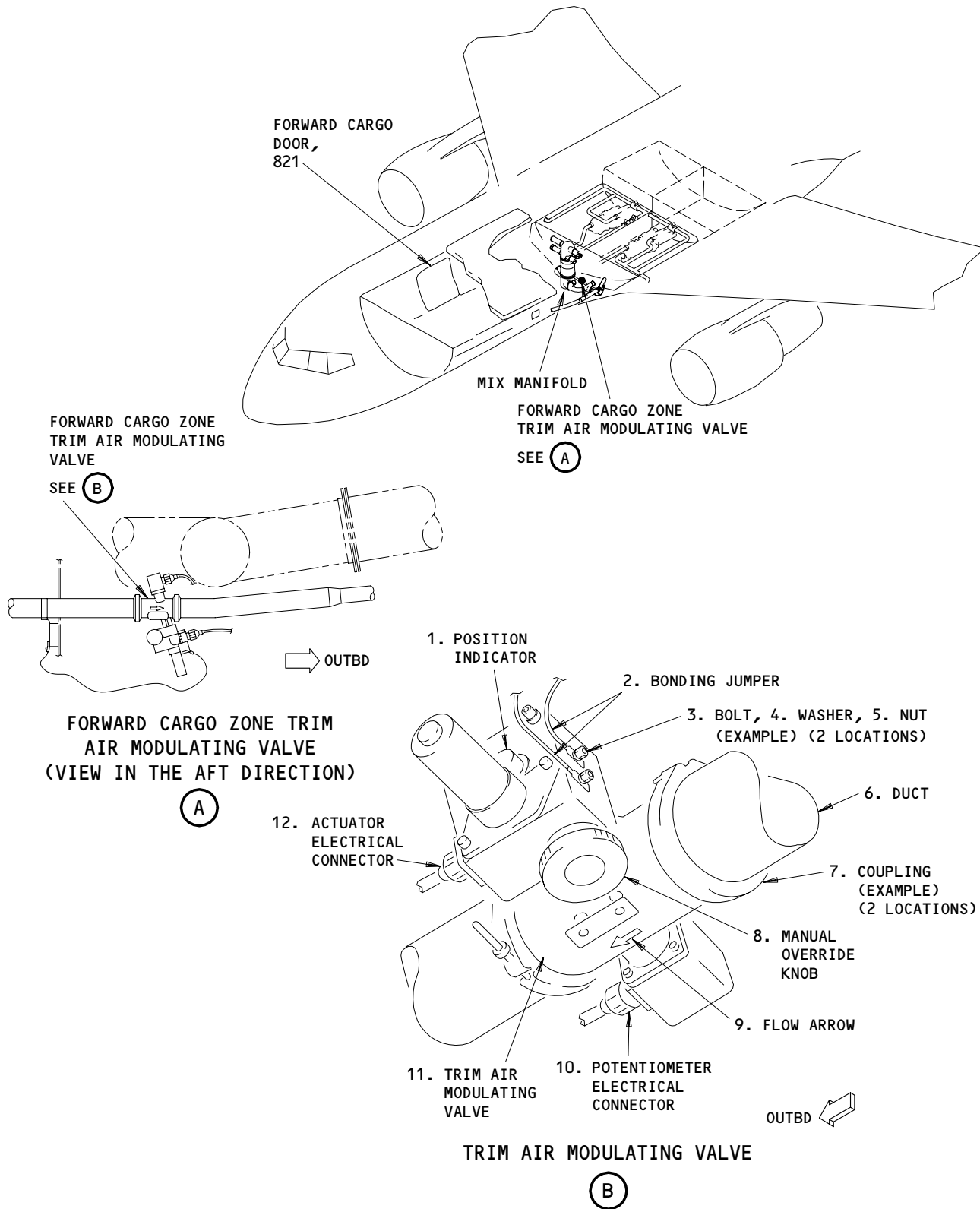
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Forward Cargo Trim Air Modulating Valve Installation
Figure 402

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- S 014-153
(5) Open the forward cargo door 821 (Ref 06-46-00).

- S 014-154
(6) Remove the aft end lining of the forward cargo compartment (Ref 25-52-01).
(a) Find the modulating valve (11).

D. Remove the Modulating Valve

- S 034-155
(1) Disconnect the electrical connectors (10, 12) from the valve (11).

- S 034-156
(2) Disconnect the bonding jumpers (2) from the valve (11).

- S 034-157
(3) Loosen the couplings (7) on the two sides of the valve (11).

- S 034-158
(4) Move the couplings (7) away from the valve (11).

- S 024-159
(5) Remove the valve (11).

- S 094-160
(6) Put a cover on the duct holes to keep out unwanted objects.

TASK 21-61-07-404-074

5. Install the Forward Cargo Zone Trim Air Modulating Valve (Fig. 402)

A. Parts

AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	3	Bolt	21-61-05	02	105
	4	Washer			110
	5	Nut			115
	7	Coupling (Clamp)			170
	11	Valve			435
402	3	Bolt	21-61-05	02	105
	4	Washer			110
	5	Nut			115
	7	Coupling (Clamp)			170
	11	Valve			435

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B. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Lining
- (4) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zone
125 Area aft of Forward Cargo Compartment (Left)

D. Procedure

S 494-075

- (1) Remove the covers on the duct.

S 424-076

- (2) Install the valve (11) into the duct (6).
 - (a) Make sure the flow arrow (9) points forward.

S 434-077

- (3) Move each coupling (7) into its position on each side of the valve (11).

S 434-078

- (4) Tighten the couplings to 45 pound-inches.

S 434-079

- (5) Install the bonding jumpers (2) to the valve (11) with a bolt (3), washer (4), and nut (5).

S 434-080

- (6) Install the electrical connectors (10, 12) to the valve (11).

S 864-081

- (7) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
 - (a) 11C33, TRIM AIR
 - (b) 11N21, FWD CARGO TEMP CONT VLV CLOSE
 - (c) 11N22, FWD CARGO DUCT OVHT/INOP

E. Do the trim air modulating valve operational test.

S 864-082

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-083

- (2) Supply pneumatic power (AMM 36-00-00/201).

S 214-084

- (3) Push the TRIM AIR switch-light, on the P5 panel, to the ON position.
 - (a) Make sure the ON light comes on.

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- S 864-085
- (4) Remove the DO-NOT-OPERATE tags from the two control selector switches for the air conditioning packs, on the P5 panel.
- S 864-086
- (5) Put the two control selector switches for the air conditioning packs, on the P5 panel, to the AUTO position.
- S 864-087
- (6) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C switch-light.
- S 214-088
- (7) Push the FWD CARGO A/C switch-light to the ON position.
(a) Make sure that the ON light comes on.
- S 864-089
- (8) Turn the temperature selector switch for the FWD CARGO A/C zone, on the P5 panel, to the AUTO W position.
- S 714-090
- (9) Do a check of the valve flanges for leakage.
(a) Some leakage is permitted.
(b) If the leakage is strong align the joint and tighten the coupling.
- S 214-091
- (10) Turn the two control selector switches for the air conditioning packs, on the P5 panel, to the OFF position.
(a) Make sure the PACK OFF light comes on.
- F. Put the Airplane Back to Its Usual Condition
- S 414-092
- (1) Install the aft end lining of the forward cargo compartment (Ref 25-52-01).
- S 414-093
- (2) Close the forward cargo door 821 (AMM 06-46-00/201).
- S 864-094
- (3) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).
- S 864-095
- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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ZONE TEMPERATURE SENSORS – REMOVAL/INSTALLATION

1. General

- A. There is a zone temperature sensor installed in each temperature control zone in the passenger cabin. The zone temperature sensors are installed above the center PSU run. Look for an air inlet grille in the center PSU run to find the zone temperature sensor for the passenger cabin zones.

NOTE: See Fig. 401 (or 401A) for the approximate locations of the applicable compartment temperature sensor assemblies.

- B. The flight compartment zone temperature sensor is installed immediately left of the overhead circuit breaker panel, P11.
- C. The temperature sensor for the forward cargo zone can be found behind a grill on the left cargo compartment sidewall. The grill can be found directly opposite the forward cargo door.

TASK 21-61-08-004-003

2. Remove the Cabin Zone Temperature Sensor (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zones

211	Control Cabin (Left)
233/234	Area Above Passenger Cabin Ceiling – Section 43
243/244	Area Above Passenger Cabin Ceiling – Section 45
253/254	Area Above Passenger Cabin Ceiling – Section 46

C. Prepare for the Removal

S 864-004

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-008

- (2) Turn the control selector switch for the APU, on the pilot's overhead panel P5, to the OFF position.
- (a) Attach a DO-NOT-OPERATE tag on the selector switch.

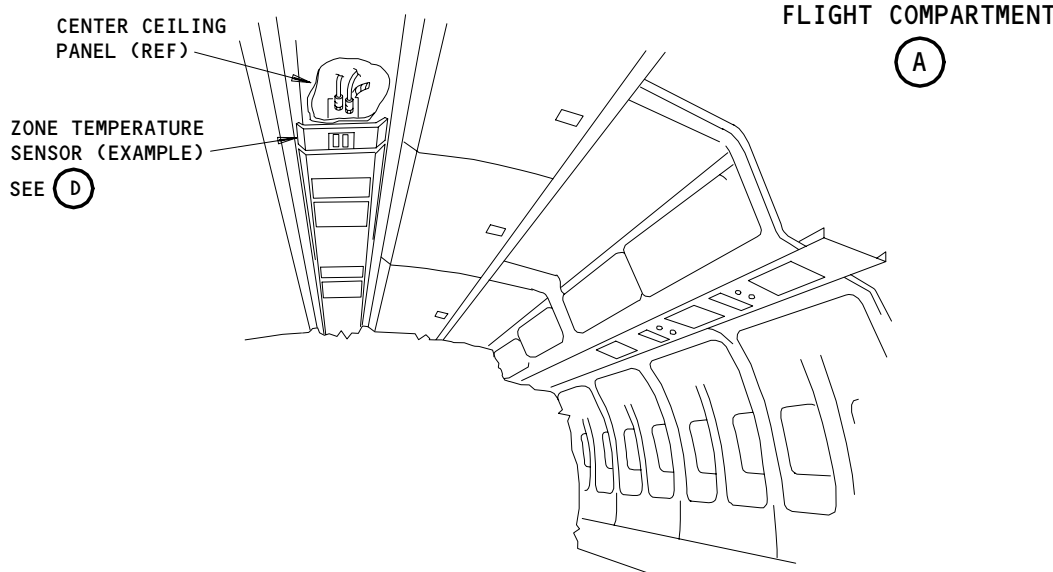
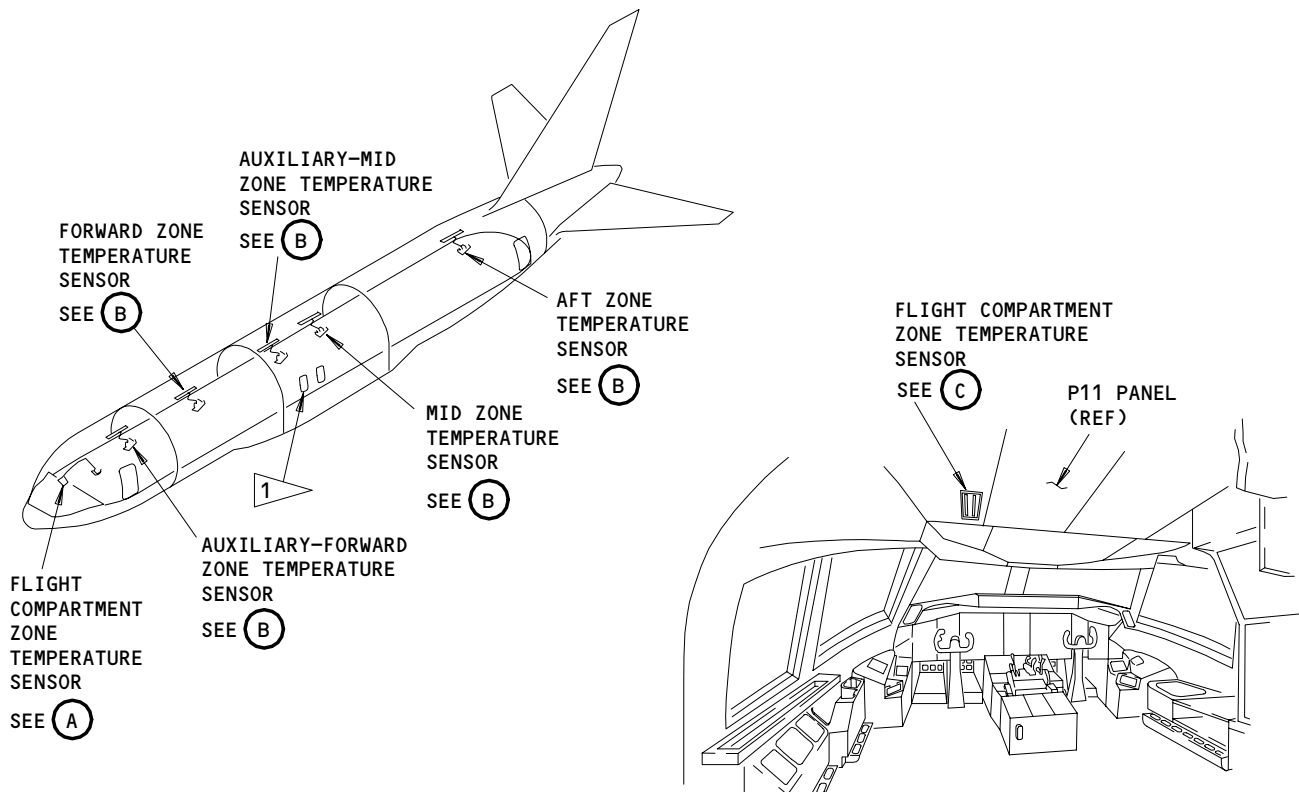
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**PASSENGER COMPARTMENT
(VIEW IN THE FORWARD DIRECTION)**

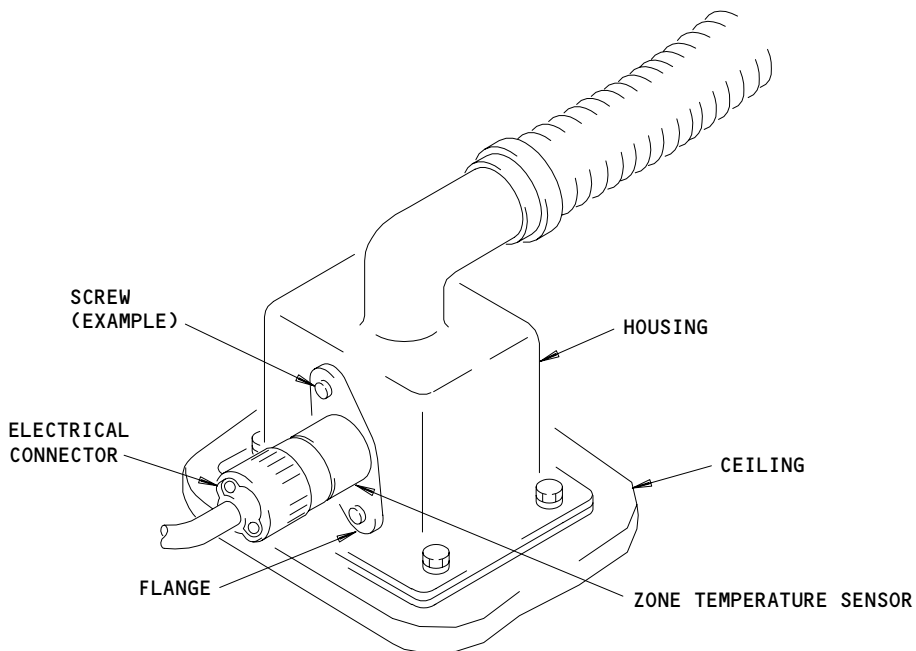
1 DUAL OVERWING ESCAPE HATCHES ON SAS 150-999 AND ALL MTH AIRPLANES

**Zone Temperature Sensor Installation
Figure 401 (Sheet 1)**

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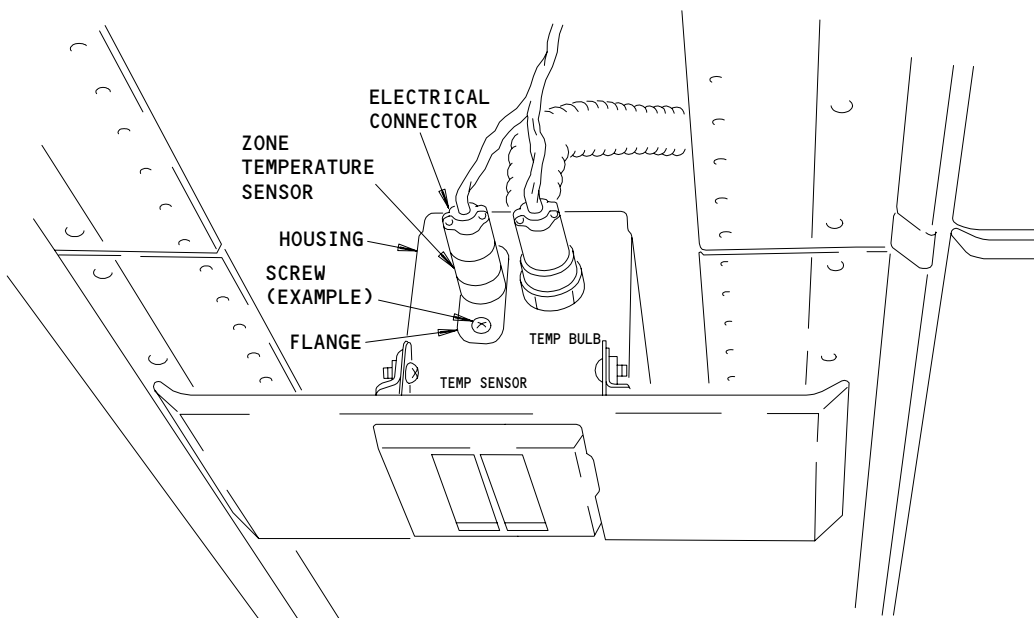
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FLIGHT COMPARTMENT ZONE TEMPERATURE SENSOR

(C)



PASSENGER COMPARTMENT ZONE TEMPERATURE SENSOR (EXAMPLE)

(D)

Zone Temperature Sensor Installation
Figure 401 (Sheet 2)

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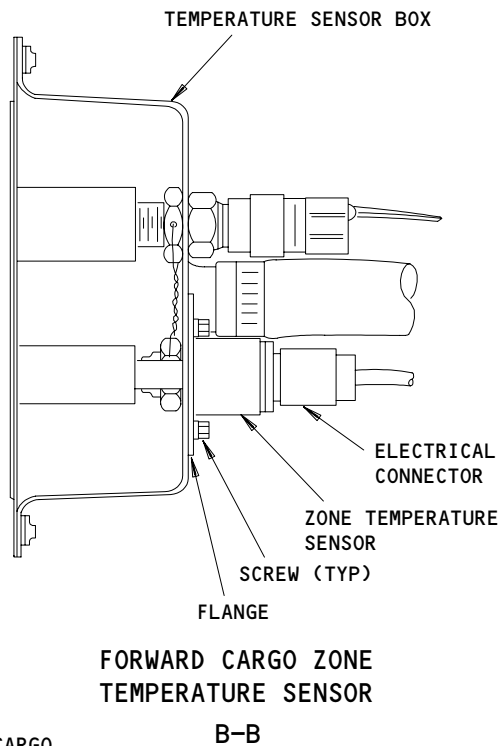
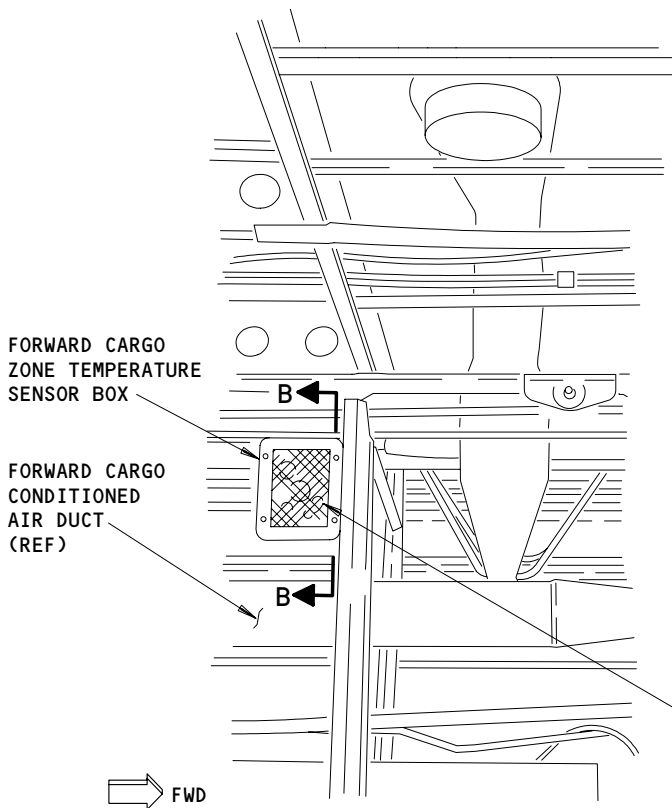
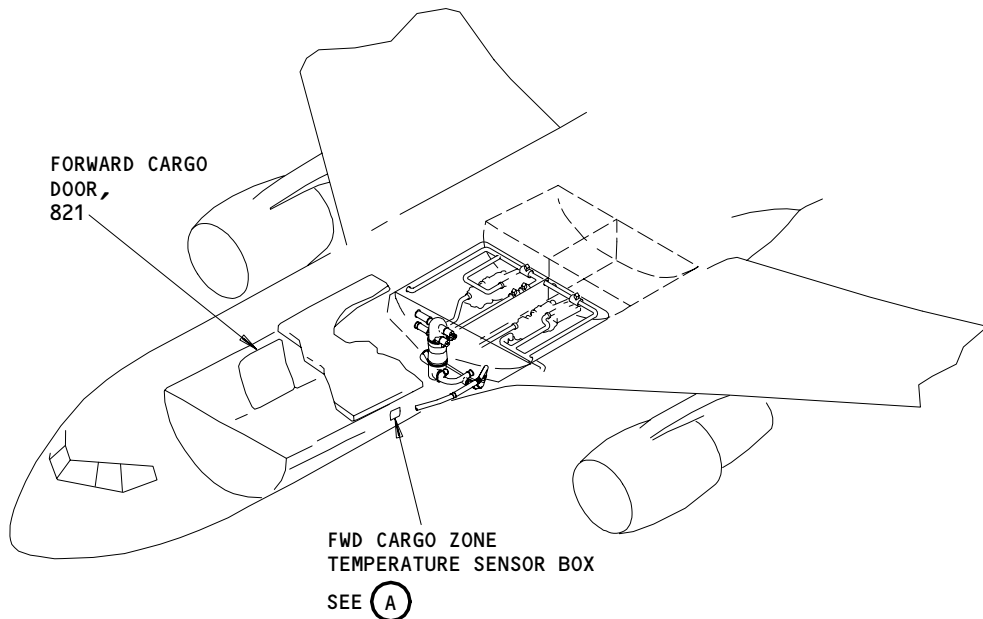
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FORWARD CARGO ZONE TEMPERATURE SENSOR BOX

(A)

Forward Cargo Zone Temperature Sensor Installation
Figure 402

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S 864-009

- (3) Push the two RECIRC FAN switch-lights, on the P5 panel, to the off position.
(a) Attach a DO-NOT-OPERATE tag to the switch-lights.

S 864-010

- (4) Turn the two control selector switches for the air conditioning packs, on the P5 panel, to the OFF position.
(a) Attach a DO-NOT-OPERATE tag to the two selector switches.

S 864-011

- (5) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11C33, TRIM AIR
 - (b) The flight compartment sensor:
 - 1) 11P24, ZONE TEMP CONT MAN FLT DK
 - 2) 11R24, ZONE DUCT OVHT FLT DK
 - (c) The forward zone sensor:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - 2) 11R25, ZONE DUCT OVHT FWD
 - (d) The aux-forward zone sensor:
 - 1) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
 - (e) The mid zone sensor:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID
 - (f) The aux-mid zone sensor:
 - 1) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
 - (g) The aft zone sensor:
 - 1) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - 2) 11R27, ZONE DUCT OVHT AFT

S 014-026

- (6) Open the ceiling panel to find the flight compartment sensor.

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S 014-126

- (7) Get access to the zone temperature sensor for the applicable passenger cabin zone as follows:
 - (a) See Figure 401 for the approximate location of the applicable zone temperature sensor.
 - (b) Look for the air inlet grille of the zone temperature sensor along the center PSU run.
 - (c) Open the panel that is immediately aft of the zone temperature sensor.

D. Remove the Temperature Sensor

S 034-032

- (1) Remove the electrical connector from the temperature sensor.

S 034-033

- (2) Remove the screws from the sensor.

S 024-034

- (3) Remove the sensor.

TASK 21-61-08-004-036

3. Remove the Forward Cargo Zone Temperature Sensor (Fig. 402)

A. References

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels
- (2) AMM 24-22-00/201, Electric Power Control

B. Access

- (1) Location Zone
121 Forward Cargo Compartment (Left)

C. Prepare for the Removal

S 864-037

- (1) Supply electrical power (AMM 24-22-00/201).

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- S 864-038
- (2) Turn the control selector switch for the APU, on the P5 panel, to the OFF position.
- (a) Attach a DO-NOT-OPERATE tag on the selector switch.
- S 864-039
- (3) Push the two RECIRC FAN switch-lights, on the P5 panel, to the OFF position.
- (a) Attach a DO-NOT-OPERATE tag to switch-lights.
- S 864-040
- (4) Turn the two control selector switches for the air conditioning pack, on the P5 panel, to the OFF position.
- (a) Attach a DO-NOT-OPERATE tag to the two selector switches.
- S 214-041
- (5) Push the FWD CARGO A/C switch-light, on the P5 panel, to the off position.
- (a) Make sure the yellow INOP light comes on.
- (b) Attach a DO-NOT-OPERATE tag on the switch-light.
- S 864-042
- (6) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
- (a) 11N21, FWD CARGO TEMP CONT VLV CLOSE
- (b) 11N22, FWD CARGO DUCT OVHT
- S 014-045
- (7) Open the forward cargo door, 821 (AMM 06-46-00/201).
- (a) Find the temperature sensor for the forward cargo zone in the temperature sensor box.
- S 014-046
- (8) Remove the sensor box cover.

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S 014-047

(9) Remove the cargo lining around the temperature sensor box.

D. Remove the Temperature Sensor

S 034-048

(1) Disconnect the electrical connector from the sensor.

S 034-049

(2) Remove the screws from the sensor.

S 024-050

(3) Remove the sensor.

TASK 21-61-08-404-053

4. Install the Cabin Zone Temperature Sensor (Fig. 401)

A. References

(1) AMM 06-41-00/201, Fuselage Access Doors and Panels

(2) AMM 20-10-23/401, Standard Practices - Lockwire.

(3) AMM 24-22-00/201, Electric Power Control

B. Access

(1) Location Zones

120 Main Equipment Center (Right)

211 Control Cabin (Left)

233/234 Area Above Passenger Cabin Ceiling - Section 43

243/244 Area Above Passenger Cabin Ceiling - Section 45

253/254 Area Above Passenger Cabin Ceiling - Section 46

(2) Access Panel

119AL Main Equipment Center Access Door

C. Procedure

S 094-054

(1) Remove the cover on the duct hole.

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- S 424-055
- (2) Put the temperature sensor in the housing.
- S 824-056
- (3) Align the flange holes to the housing.
- S 434-057
- (4) Install the washers and screws.
- S 434-058
- (5) Tighten the sensor.
- S 434-110
- (6) Put a lockwire on the sensor (AMM 20-10-23/401).
- S 434-059
- (7) Install the electrical connector on the temperature sensor.
- S 864-060
- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11C33, TRIM AIR
 - (b) For the flight compartment sensor:
 - 1) 11P24, FLT DK ZONE TEMP CONT MAN
 - 2) 11R24, ZONE DUCT OVHT FLT DK
 - (c) The forward zone sensor:
 - 1) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - 2) 11R25, ZONE DUCT OVHT FWD
 - (d) The aux-forward zone sensor:
 - 1) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
 - (e) The mid zone sensor:
 - 1) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - 2) 11R26, ZONE DUCT OVHT MID

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- (f) The aux-mid zone sensor:
 - 1) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
- (g) The aft zone sensor:
 - 1) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - 2) 11R27, ZONE DUCT OVHT AFT

S 864-075

- (9) Remove the DO-NOT-OPERATE tag from the APU control switch on the P5 panel.

S 864-077

- (10) Remove the DO-NOT-OPERATE tags from the two RECIRC FAN switch-lights on the P5 panel.

S 864-079

- (11) Remove the DO-NOT-OPERATE tags from the two selector switches for pack control, on the P5 panel.

D. Do a Test of the Zone Temperature Sensor

S 864-081

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-082

- (2) Turn the temperature selector switches for all the zones, on the P5 panel, to the AUTO position.

S 014-084

- (3) Open the access door for the main equipment center 119AL (AMM 06-41-00/201).

S 744-127

- (4) Do a BITE test of the zone temperature controller in the E3 rack or the aux-zone temperature controller in the E1 rack.
 - (a) Make sure the CONTROLLER FAULT light is not on.

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- (b) Push the PRESS/TEST switch to do a light check.
 - 1) Make sure all the indication lights come on.
- (c) Push the VERIFY switch.
 - 1) Make sure the ZONE SENSOR lights do not come on before the GO light comes on.

TASK 21-61-08-404-086

5. Install the Forward Cargo Zone Temperature Sensor (Fig. 402)

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 20-10-23/401, Standard Practices - Lockwire.
- (3) AMM 24-22-00/201, Electric Power Control

B. Access

(1) Location Zones

120	Main Equipment Center (Right)
211	Control Cabin (Left)
233/234	Area Above Passenger Cabin Ceiling - Section 43
243/244	Area Above Passenger Cabin Ceiling - Section 45
253/254	Area Above Passenger Cabin Ceiling - Section 46

(2) Access Panel

119AL	Main Equipment Center Access Door
-------	-----------------------------------

C. Procedure

S 424-087

- (1) Install the temperature sensor in the sensor box assembly.

S 824-088

- (2) Align the sensor flange holes with the sensor box.

S 434-107

- (3) Install the washers and screws.

S 434-111

- (4) Tighten the washers and screws.

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- S 434-089
- (5) Put a lockwire on the sensor as shown in Fig. 402 (AMM 20-10-23/401).
- S 434-090
- (6) Install the electrical connector on the temperature sensor.
- S 414-091
- (7) Put the sensor cover on the box.
- S 864-092
- (8) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
- (a) 11N21, FWD CARGO TEMP CONT VLV CLOSE
 - (b) 11N22, FWD CARGO DUCT OVHT
- S 864-095
- (9) Remove the DO-NOT-OPERATE tag from the APU control switch, on the P5 panel.
- S 864-096
- (10) Remove the DO-NOT-OPERATE tags from the two RECIRC FAN switch-lights on the P5 panel.
- S 864-097
- (11) Remove the DO-NOT-OPERATE tags from the two selector switches for pack control, on the P5 panel.
- S 864-098
- (12) Remove the DO-NOT-OPERATE tags from the FWD CARGO A/C switch-light, on the P5 panel.
- D. Do a Test of the Zone Temperature Sensor
- S 864-099
- (1) Supply electrical power (AMM 24-22-00/201).

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- S 864-100
- (2) Turn the temperature selector switch for the forward cargo zone, on the P5 panel, to the AUTO position.
- S 014-101
- (3) Open the access door for the main equipment center 119AL (AMM 06-41-00/201).
- S 744-102
- (4) Do the BITE test of the aux-zone temperature controller in the E1 rack.
- (a) Make sure the CONTROLLER FAULT light is not on.
- (b) Push the PRESS/TEST switch to do a light check.
- 1) Make sure all the indication lights come on.
- (c) Push the VERIFY switch.
- 1) Make sure the ZONE SENSOR light does not come on before the GO light comes on.
- E. Put the Airplane Back to Its Usual Condition
- S 414-103
- (1) Install the applicable access panels.
- S 414-104
- (2) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).
- S 414-105
- (3) Close the forward cargo door, 821, if it was opened.
- S 864-106
- (4) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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ZONE TEMPERATURE SENSOR FILTERS - REMOVAL/INSTALLATION

1. General

- A. This procedure supplies the instructions to remove and install the zone temperature sensor filters. The filters are used to keep contamination out of the lavatory and galley ducts. Each filter is installed with a cover and is found at the same location as the zone temperature sensor. Find the filters behind a small cover in the ceiling (Fig. 401).

TASK 21-61-09-004-001

2. Remove the Zone Temperature Sensor Filter (Fig. 401)

A. Access

(1) Location Zones

- | | |
|---------|---|
| (a) 211 | Control Cabin - sect 41 (Left) |
| 233/234 | Area Above Passenger Cabin Ceiling - Section 43 |
| 243/244 | Area Above Passenger Cabin Ceiling - Section 45 |
| 253/254 | Area Above Passenger Cabin Ceiling - Section 46 |

B. Prepare for Removal

S 024-012

- (1) Locate the filter.

C. Remove the zone temperature sensor filter.

S 014-004

- (1) Hold the filter cover and pull it down to remove. The cover will unsnap.

S 024-005

- (2) Remove the filter.

TASK 21-61-09-404-006

3. Install the Zone Temperature Sensor Filter (Fig. 401)

A. Consumable Materials

- (1) Filter Material (Scott Paper Co.(Foam Div),
1500 East Second Street, Chester, PA):
- (a) G02123 - Scott filter foam, 3/16 inch thick, Porosity grade 45
PPI, Grey color, Flame resistant

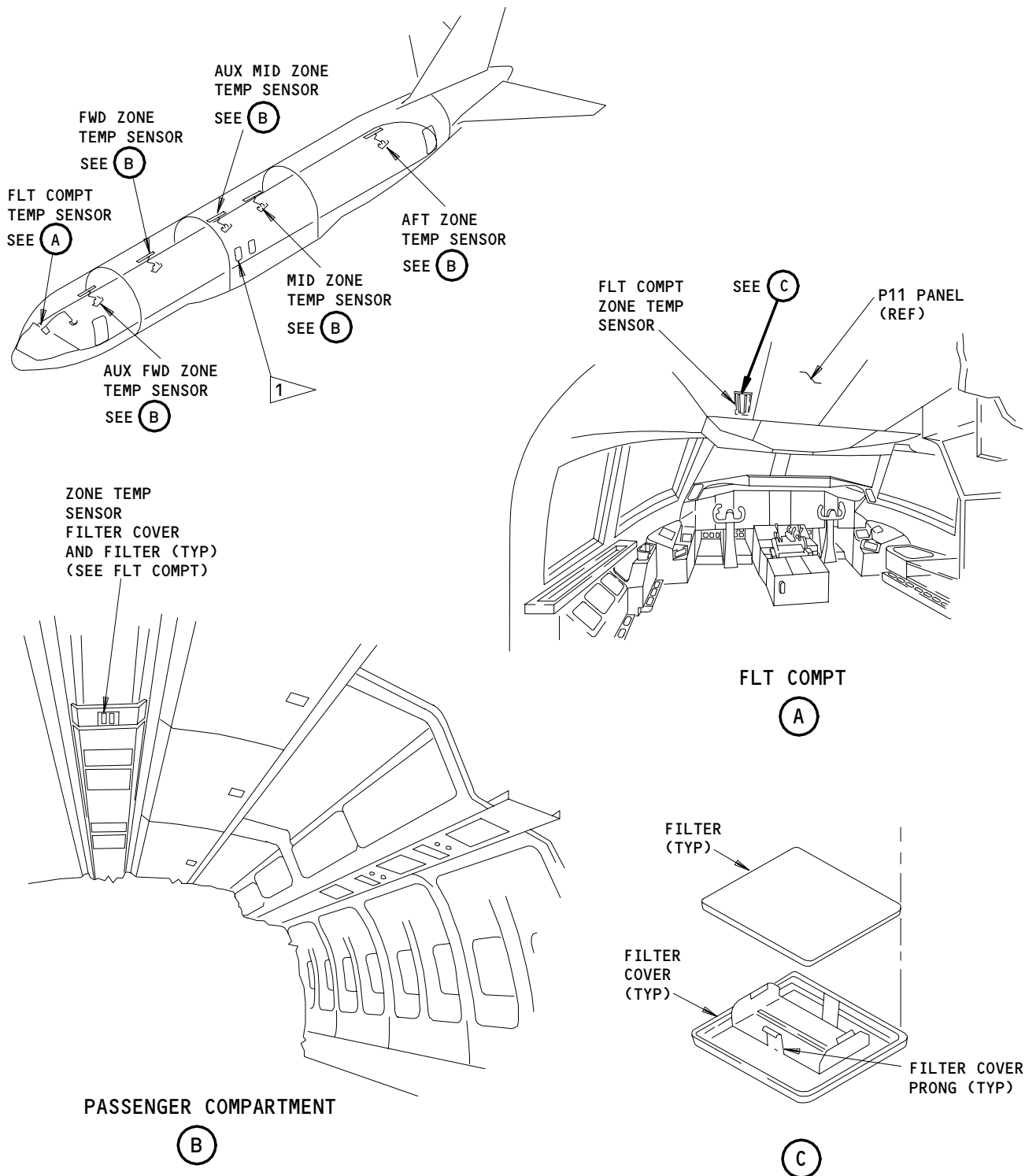
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1 DUAL OVERWING ESCAPE HATCHES ON SAS 150-999 AND ALL MTH AIRPLANES

Zone Temperature Sensor Filter Installation
Figure 401

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21-61-09

B. Access

(1) Location Zones

- | | |
|-------------|---|
| (a) 233/234 | Area Above Passenger Cabin Ceiling - Section 43 |
| 243/244 | Area Above Passenger Cabin Ceiling - Section 45 |
| 253/254 | Area Above Passenger Cabin Ceiling - Section 46 |

C. Procedure

S 864-011

- (1) Cut the new filter from the foam filter material. Make sure the new filter is the same size as the old filter.

NOTE: Filter size - 3.2 X 4.0 inches. Cut holes in the filter foam to let the filter cover clips come through.

S 424-007

- (2) Position the filter over the filter cover clips.

S 414-008

- (3) Install the filter cover into position.

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TRIM AIR MUFFLER – REMOVAL/INSTALLATION

1. General

- A. Six trim air mufflers are found in the left Environmental Control System (ECS) bay. The mufflers are installed on the supply duct for the trim air system, just forward of the modulating valves. The mufflers are part of the duct assemblies attached to each modulating valve.
- B. The mufflers will decrease the noise of the conditioned air that goes to the six temperature zones.
- C. The removal/installation procedure for each muffler is almost the same.

TASK 21-61-11-004-023

2. Remove the Trim Air Muffler

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels

B. Access

- (1) Location Zone
135 Environmental Control System Bay (Left)
- (2) Access Panel
193FL ECS Components Access Door

C. Prepare for the Removal

S 214-003

- (1) Turn the control selector switch for the left air conditioning pack, on the pilot's overhead panel, P5, to the OFF position.
 - (a) Make sure the PACK OFF light comes on.
 - (b) Attach a DO-NOT-OPERATE tag to the pack selector switch.

S 014-004

- (2) Remove the left ECS access panel 193FL (AMM 06-41-00/201).
 - (a) Find the mufflers immediately forward of the modulating valves.

D. Remove the Muffler

S 034-005

- (1) Remove the clamps from the keel beam on the two sides of the muffler.

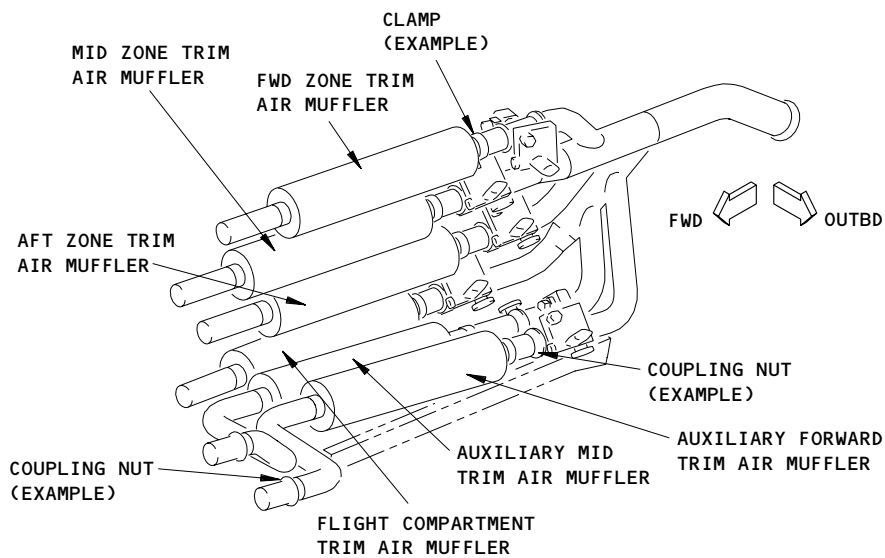
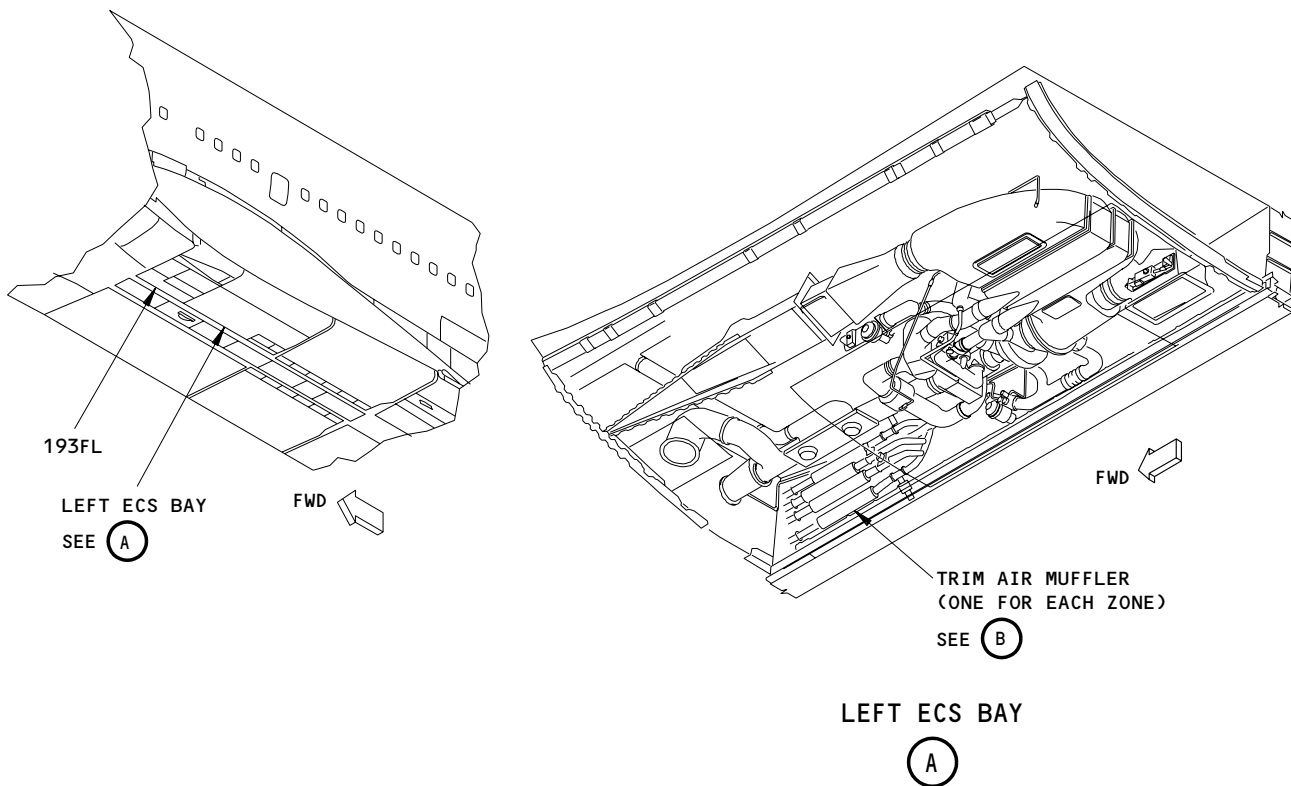
S 034-019

CAUTION: HOLD THE MUFFLER DURING THE REMOVAL. THIS WILL PREVENT DAMAGE TO THE MUFFLER AND DUCTS.

- (2) Remove the coupling which connects the muffler duct assembly to the modulating valve.

S 034-007

- (3) Remove the coupling on the downstream side of the muffler duct assembly.



TRIM AIR MUFFLERS

(B)

Trim Air Muffler Installation
Figure 401

EFFECTIVITY
767-300 AIRPLANES

21-61-11

- S 024-008
(4) Remove the muffler duct assembly from the duct.

- S 494-009
(5) Put a cover on the duct holes to keep out unwanted objects.

TASK 21-61-11-404-020

3. Install the Trim Air Muffler

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 24-22-00/201, Electrical Power - Control
- (3) AMM 36-00-00/201, Pneumatic - General

B. Access

- (1) Location Zone
 - 135 Environmental Control System Bay (Left)
- (2) Access Panel
 - 193FL ECS Components Access Door

C. Procedure

- S 094-010
(1) Remove the covers on the ducts.
- S 424-011
(2) Install the muffler duct assembly.
(a) Align the muffler duct assembly with the ducts.

S 434-021

CAUTION: HOLD THE MUFFLER UNTIL THE COUPLINGS ARE INSTALLED AND TIGHTENED. THIS WILL PREVENT DAMAGE TO THE MUFFLER AND DUCTS.

- (3) Install the coupling on the downstream side of the muffler duct assembly.

S 434-001

- (4) Tighten the coupling nut to 50 pound-inches.

S 434-013

- (5) Install the coupling which connects the muffler duct assembly to the modulating valve.

- S 434-002
- (6) Tighten the coupling nut to 50 pound-inches.
- S 434-014
- (7) Install the clamps on the two sides of the muffler to hold the muffler duct assembly to the keel beam.
- S 864-015
- (8) Supply electrical power (AMM 24-22-00/201).
- S 864-016
- (9) Supply pneumatic power (AMM 36-00-00/201).
- S 864-017
- (10) Remove the DO-NOT-OPERATE tag from the pack selector switch.
- S 214-018
- (11) Turn the pack selector switch, on the P5 panel, to the AUTO position.
- (a) Make sure the PACK OFF light goes out.
- S 794-018
- (12) Do a leak check of the duct connection.
- (a) Some leakage is permitted.
- (b) If the leakage is strong, align the joint and tighten the coupling.
- S 214-019
- (13) Turn the pack selector switch, on the P5 panel, to the OFF position.
- (a) Make sure the PACK OFF light comes on.
- D. Put the Airplane Back to Its Usual Condition
- S 414-022
- (1) Install the access panel for the ECS bay 193FL (AMM 06-41-00/201).
- S 864-020
- (2) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).
- S 864-021
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

AUXILIARY ZONE TEMPERATURE CONTROLLER – REMOVAL/INSTALLATION

1. General

- A. The controller for the auxiliary temperature zones is installed in the left side of the main equipment center on the E1 rack.

TASK 21-61-12-004-010

2. Remove the Auxiliary Zone Temperature Controller (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
(2) 20-10-01/401, Standard Practices – E/E Rack Mounted Components

B. Access

- (1) Location Zone
120 Main Equipment Center (Right)
- (2) Access Panel
119AL Main Equipment Center Access Door

C. Prepare for Removal

S 864-001

- (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
(a) 11R11, AUX ZONE CNTLR

S 014-002

- (2) Open the access door (119AL) for the main equipment center (Ref 06-41-00) and find the controller for the auxiliary temperature zones.

D. Procedure

S 024-003

- (1) Remove the controller (Ref 20-10-01).

TASK 21-61-12-404-011

3. Install the Auxiliary Zone Temperature Controller (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
(2) 20-10-01/401, Standard Practices – E/E Rack Mounted Components
(3) 24-22-00/201, Electric Power Control

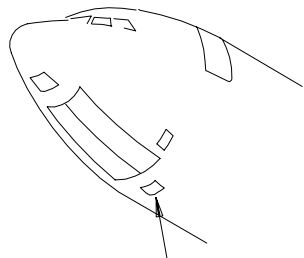
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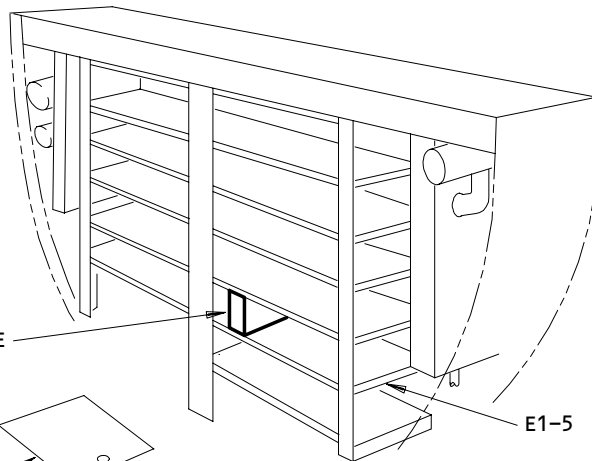
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MAIN EQUIP CTR
ACCESS, 119AL



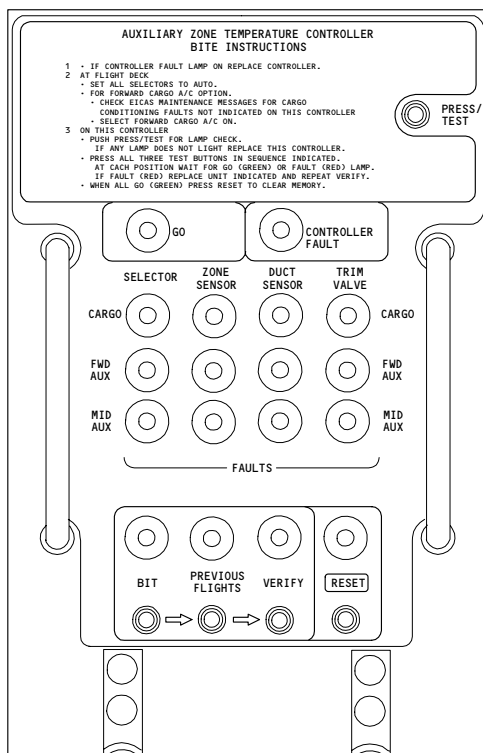
AUXILIARY ZONE
TEMPERATURE
CONTROLLER

SEE (A)

119AL

E1-5

MAIN EQUIP CTR



AUXILIARY ZONE TEMPERATURE CONTROLLER

(A)

Auxiliary Zone Temperature Controller Installation
Figure 401

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605013

B. Access

- (1) Location Zone
120 Main Equipment Center (Right)
- (2) Access Panel
119AL Main Equipment Center Access Door

C. Procedure

- S 424-004
- (1) Install the controller (Ref 20-10-01).
- S 864-005
- (2) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - (a) 11R11, AUX ZONE CNTLR
- S 864-006
- (3) Supply electrical power (Ref 24-22-00).
- S 214-007
- (4) Push the controller LAMP TEST switch.
 - (a) Make sure that all the indicator lights come on. Make sure they go off when the switch is released.
 - (b) Make sure all the indicator lights go off when the switch is released.

D. Put the Airplane Back to Its Usual Condition

- S 414-008
- (1) Close the access door for the main equipment center (Ref 06-41-00).
- S 864-009
- (2) Remove electrical power if it is not necessary (24-22-00).

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AUXILIARY ZONE TEMPERATURE CONTROLLER – ADJUSTMENT/TEST

1. General

A. This procedure has the following task:

- (1) Auxiliary Zone Temperature Controller BITE Test

TASK 21-61-12-715-030

2. Auxiliary Zone Temperature Controller BITE Test

A. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- (2) AMM 21-61-12/401, Aux Zone Temperature Controller
- (3) AMM 24-22-00/201, Electrical Power – Control

B. Access

- (1) Location Zone
120 Main Equipment Center (Right)

- (2) Access Panel
119AL Main Equipment Center Access Door

C. Prepare for Test

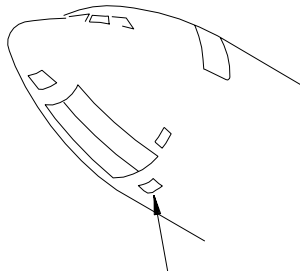
S 865-031

- (1) Make sure these circuit breakers on the overhead circuit breaker panel, P11, are closed:
 - (a) 11A13, L PACK FLOW CONT
 - (b) 11A26, R PACK FLOW CONT
 - (c) 11H2, ZONE TEMP CONT VLV CLOSE AUX FWD
 - (d) 11H3, ZONE TEMP CONT VLV CLOSE AUX MID
 - (e) 11H5, ZONE DUCT OVHT AUX FWD
 - (f) 11H6, ZONE DUCT OVHT AUX MID
 - (g) 11N10, LEFT PACK AUTO PWR
 - (h) 11N11, LEFT PACK AUTO CONT
 - (i) 11N15, RIGHT PACK STANDBY PWR
 - (j) 11N16, RIGHT PACK STANDBY CONT
 - (k) 11N17, PACK FLOW IND
 - (l) 11N19, RIGHT PACK AUTO PWR
 - (m) 11N20, RIGHT PACK AUTO CONT
 - (n) 11N24, LEFT PACK STANDBY PWR
 - (o) 11N25, LEFT PACK STANDBY CONT
 - (p) 11P24, ZONE TEMP CONT MAN FLT DK
 - (q) 11P25, ZONE TEMP CONT VLV CLOSE FWD
 - (r) 11P26, ZONE TEMP CONT VLV CLOSE MID
 - (s) 11P27, ZONE TEMP CONT VLV CLOSE AFT
 - (t) 11R11, AUX ZONE CNTLR
 - (u) 11R14, L RECIRC FAN

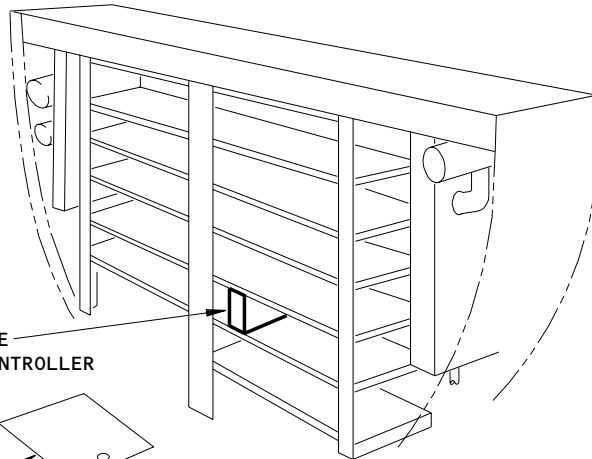
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MAIN EQUIPMENT CENTER ACCESS, 119AL

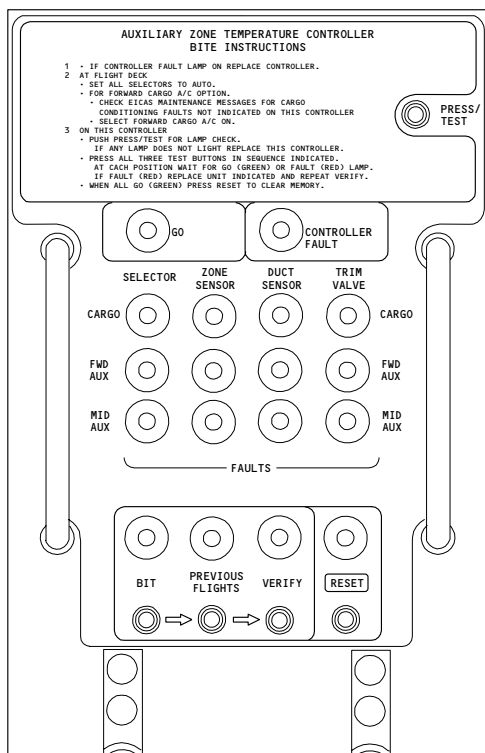


AUXILIARY ZONE TEMPERATURE CONTROLLER (E1-5)

SEE (A)

119AL

MAIN EQUIPMENT CENTER



AUXILIARY ZONE TEMPERATURE CONTROLLER

(A)

Auxiliary Zone Temperature Controller
Figure 501

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- (v) 11R15, ZONE CNTLR
- (w) 11R16, ZONE TEMP IND
- (x) 11R23, R RECIRC FAN
- (y) 11R24, ZONE DUCT OVHT FLT DK
- (z) 11R25, ZONE DUCT OVHT FWD
- (aa) 11R26, ZONE DUCT OVHT MID
- (ab) 11R27, ZONE DUCT OVHT AFT

D. Procedure

S 865-012

- (1) Supply electrical power (AMM 24-22-00/201).

S 015-016

- (2) Open the access door for the main equipment center, 119AL (AMM 06-41-00/201).
 - (a) Find the Aux-Zone Temperature Controller on the E1 rack.

S 745-017

- (3) Do the BITE instructions found on the top front face of the auxiliary zone temperature controller.

NOTE: The BITE does not know the difference between an LRU fault and an airplane wiring fault. If a fault light(s) comes on, do a check for correct power and a correct electrical connection at the LRU electrical. Do the check before the LRU is replaced.

- (a) Look at the front panel on the auxiliary zone temperature controller.
 - 1) Make sure the CONTROLLER FAULT light is off.
 - 2) If the CONTROLLER FAULT light is on, there is a problem with the auxiliary zone temperature controller and/or a wiring problem with the trim air modulating valves.

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NOTE: An electrical short in the circuit wiring for the trim air modulating valves can cause the auxiliary zone temperature controller to blow a fuse. An electrical resistance check of the circuit wiring must be done first before you replace the AZTC in order to isolate the cause of the electrical short to prevent future occurrences of a blown fuse in new AZTCs (FIM 21-61-00/101 Figure 104).

AIRPLANES WITH AZTC P/N S210T130-72 OR EARLIER AZTC DASH NUMBERS;

If the auxiliary zone temperature controller has a blown fuse, the CONTROLLER FAULT light will only show.

AIRPLANES WITH AZTC P/N S210T130-80 AND SUBSEQUENT AZTC DASH NUMBERS;

If the auxiliary zone temperature controller has a blown fuse, the CONTROLLER FAULT light will illuminate in addition to the TRIM VALVE fault light for FWD AUX, MID AUX, or CARGO.

- (b) Turn the temperature selector switches for all the zones to the AUTO position.
- (c) Push and hold the PRESS/TEST button on the auxiliary zone temperature controller.
 - 1) Make sure that all the indication lights come on.
 - 2) If a light does not come on, replace the auxiliary zone temperature controller (AMM 21-61-12/401).
- (d) Push and release the BIT button on the auxiliary zone temperature controller.
 - 1) Make sure the yellow BIT light comes on.
 - 2) Red lights come on to show the faults from the last flight.
 - 3) A green GO light shows no fault.
 - 4) Monitor the faults.
- (e) Push and release the PREVIOUS FLIGHTS button on the auxiliary zone temperature controller.
 - 1) Make sure the yellow PREVIOUS FLIGHTS light comes on.
 - 2) Red lights come on to show the faults from the last nine flights.
 - 3) A green GO light shows no fault.
 - 4) Monitor the faults.
- (f) Push and release the VERIFY button on the auxiliary zone temperature controller.
 - 1) Make sure the yellow VERIFY light comes on.

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- 2) Red lights come on to show the faults found during this test.
 - 3) A green GO light shows no faults.
 - (g) Replace all the components that show as faulty (with a red light on) during the BIT, PREVIOUS FLIGHTS and VERIFY tests.
 - 1) Push and release the VERIFY button on the auxiliary zone temperature controller.
 - (h) Make sure the green GO light comes on.
 - (i) Push and release the RESET button on the auxiliary zone temperature controller while the GO and the VERIFY lights are on.
- E. Put the Airplane Back to Its Usual Condition

S 415-010

- (1) Close the access door for the main equipment center, 119AL (AMM 06-41-00/201).

S 865-029

- (2) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

ALL

21-61-12

TRIM AIR MODULATING VALVE POSITION INDICATION SYSTEM -
DESCRIPTION/OPERATION

1. General (Fig. 1)

- A. Trim air modulating valves are electrically positioned to add warm air to the cooling pack and recirculation air in order to obtain the desired air temperature in each zone.
- B. One gage on the pilot's overhead panel P5, gives position indication for the flight-deck-zone-trim-air-modulating valve (Ref 21-61-00). Trim-air-modulating valve position is shown on EICAS, for each cabin zone on the EICAS maintenance pages (Ref 31-41-00).
- C. A valve position indicator displays relative position of the flight deck trim air supply modulating valve. The indicator shows how the trim valve modulation affects the flight deck temperature. Extreme position markings of C and W, for cold and warm, appear on the circular faceplate of the gage. Manual operation of the flight deck temperature selector requires monitoring of the trim air supply modulating valve position.
- D. Potentiometers on the flight deck and cabin zone trim-air-modulating valves give the EICAS computers trim-air-modulating valve position signals. The potentiometers are connected directly to the shaft that controls the valve-butterfly-plate position.
- E. When you push the ECS/MSG maintenance pushbutton, with the airplane on the ground, the cabin-zone-trim-air-supply-modulating-valve positions can be seen. The display pages shows the percentage of open position for each valve. The indicated values range from 0.00 (full closed) to 1.00 (full open).
- F. A visual position indicator located on the valve is linked to the same shaft as the potentiometers and can be used to verify EICAS indication.

2. Operation (Fig. 2)

- A. The EICAS computer supplies a dc reference voltage to the valve position potentiometer and interprets return voltage as percent valve open.
- B. The flight deck, forward and aux mid zone trim valves send their signal to the left EICAS computer. The aux forward, mid and aft zone valves send their signal to the right EICAS computer. The information is shared by both computers through the crosstalk bus.

EFFECTIVITY

ALL

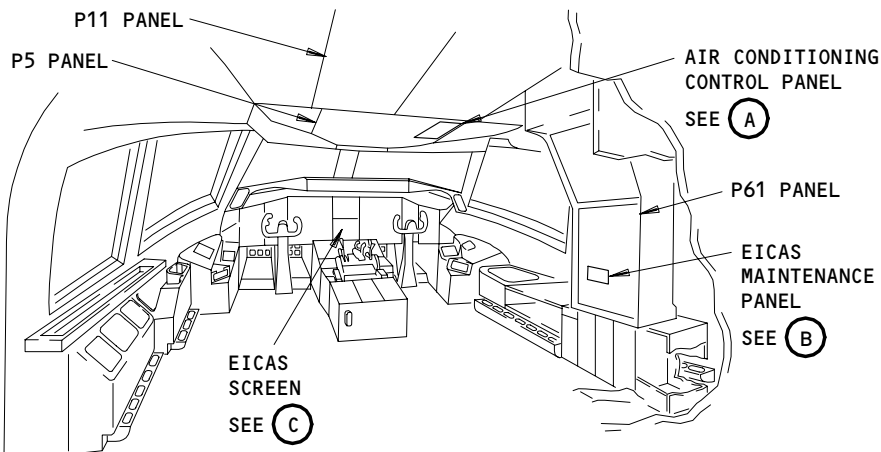
21-64-00

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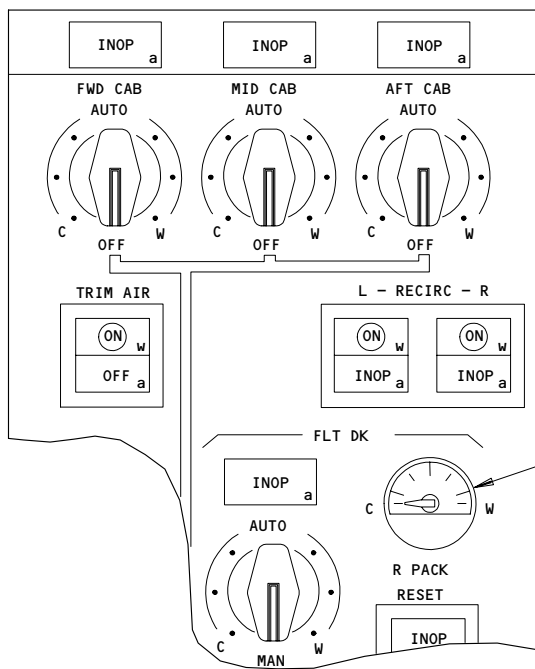
Page 1
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BOEING

767 MAINTENANCE MANUAL

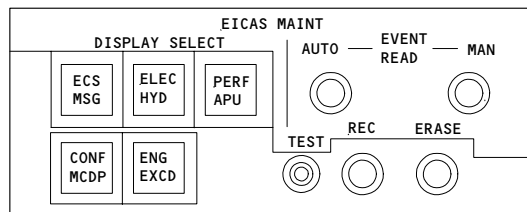


FLT COMPT



AIR CONDITIONING CONTROL PANEL

(A)



EICAS MAINTENANCE PANEL

(B)

		ECS/MSG				
		L	R	3	FWD EQUIP FAN 1 ZONE TEMP BITE	
PACK OUT						
DUCT PRESS		40	42			
PACK FLOW		62	64			
TEMP VALVE		0.75	0.80			
RAM IN DOOR		0.62	0.71			
PAGE 2						
		FLT DK	FWD	AUX	FWD	MID
		AFT	AUX	MID	AFT	AFT
DUCT TEMP		30	28	28	17	17
TRIM VALVE		0.75	0.80	0.80	0.00	0.00
AFT CABIN TEMP		AUTO EVENT				

EICAS SCREEN
(MAINTENANCE FORMAT)

(C)

Zone Trim Valve Position Indication
Figure 1 (Sheet 1)

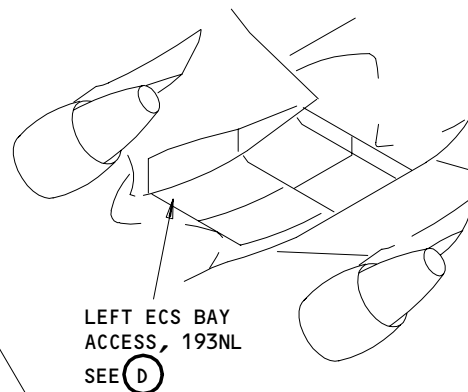
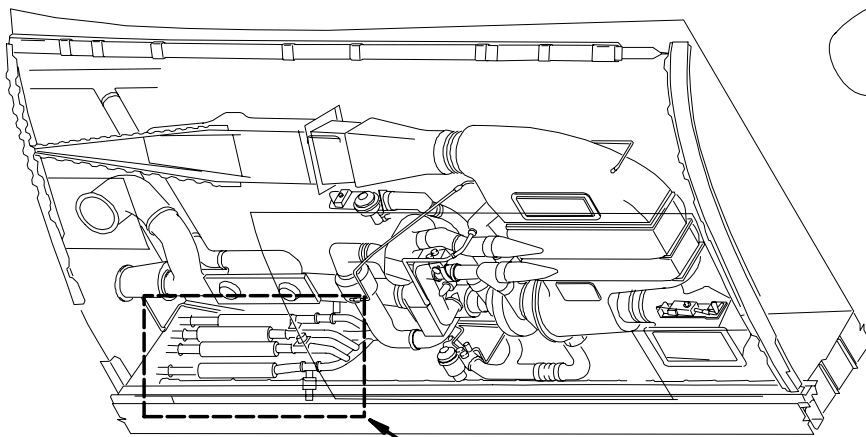
EFFECTIVITY

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21-64-00

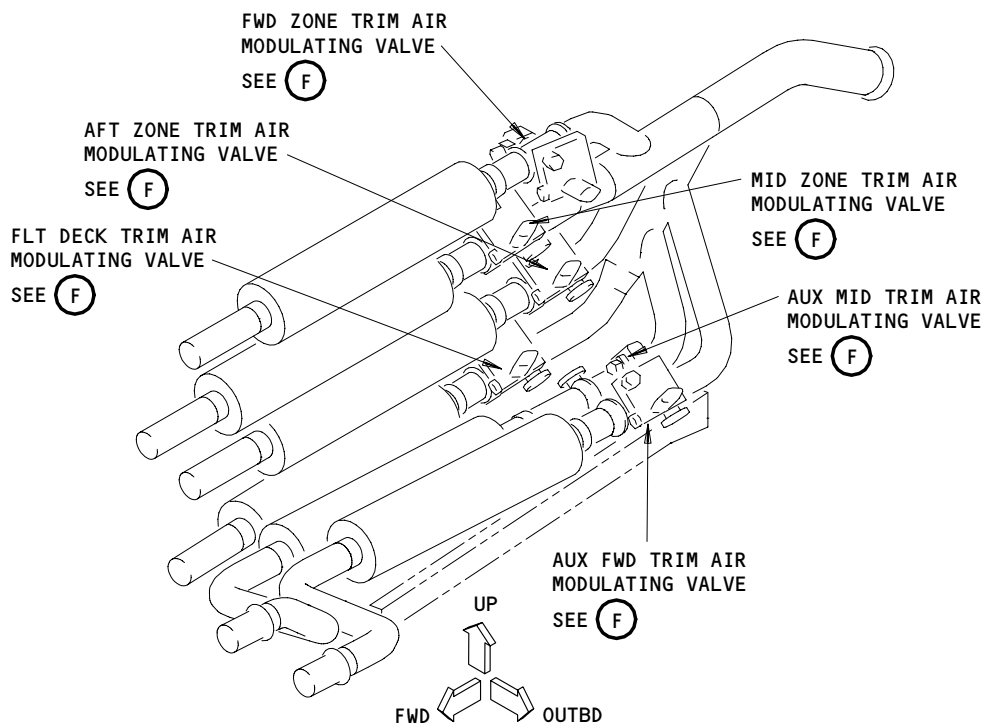
07

Page 2
May 10/89



SEE E

(D)



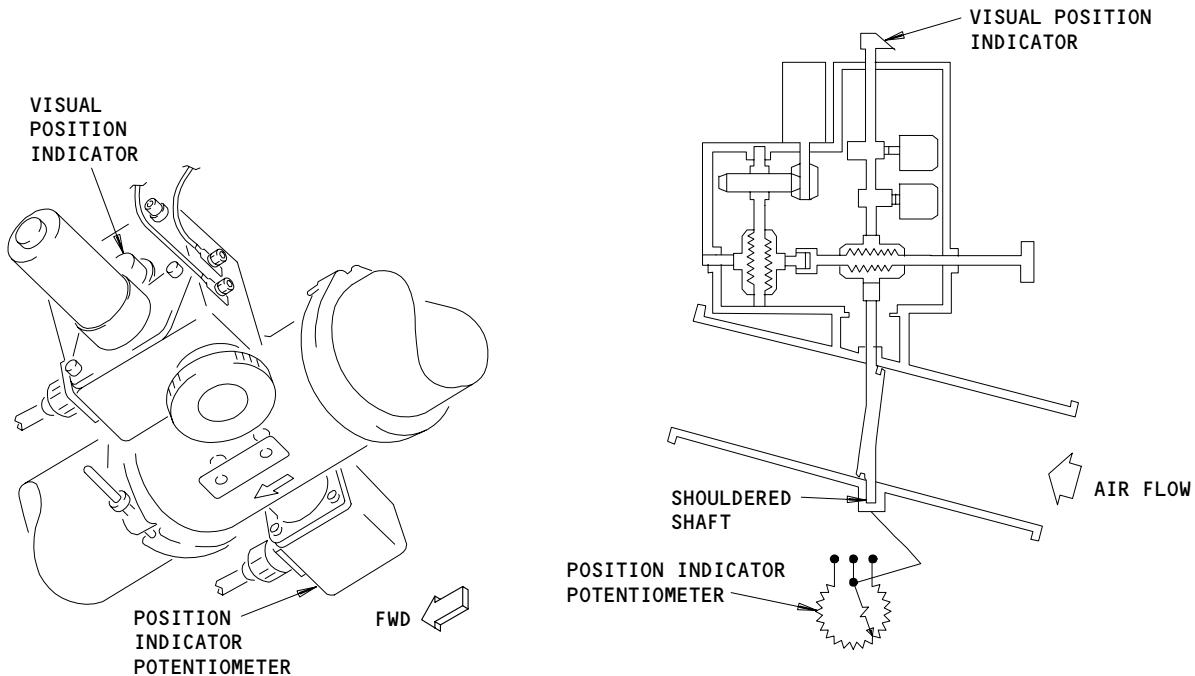
CABIN ZONE TRIM AIR MODULATING VALVES

(E)

Zone Trim Valve Position Indication
Figure 1 (Sheet 2)

EFFECTIVITY	ALL
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21-64-00



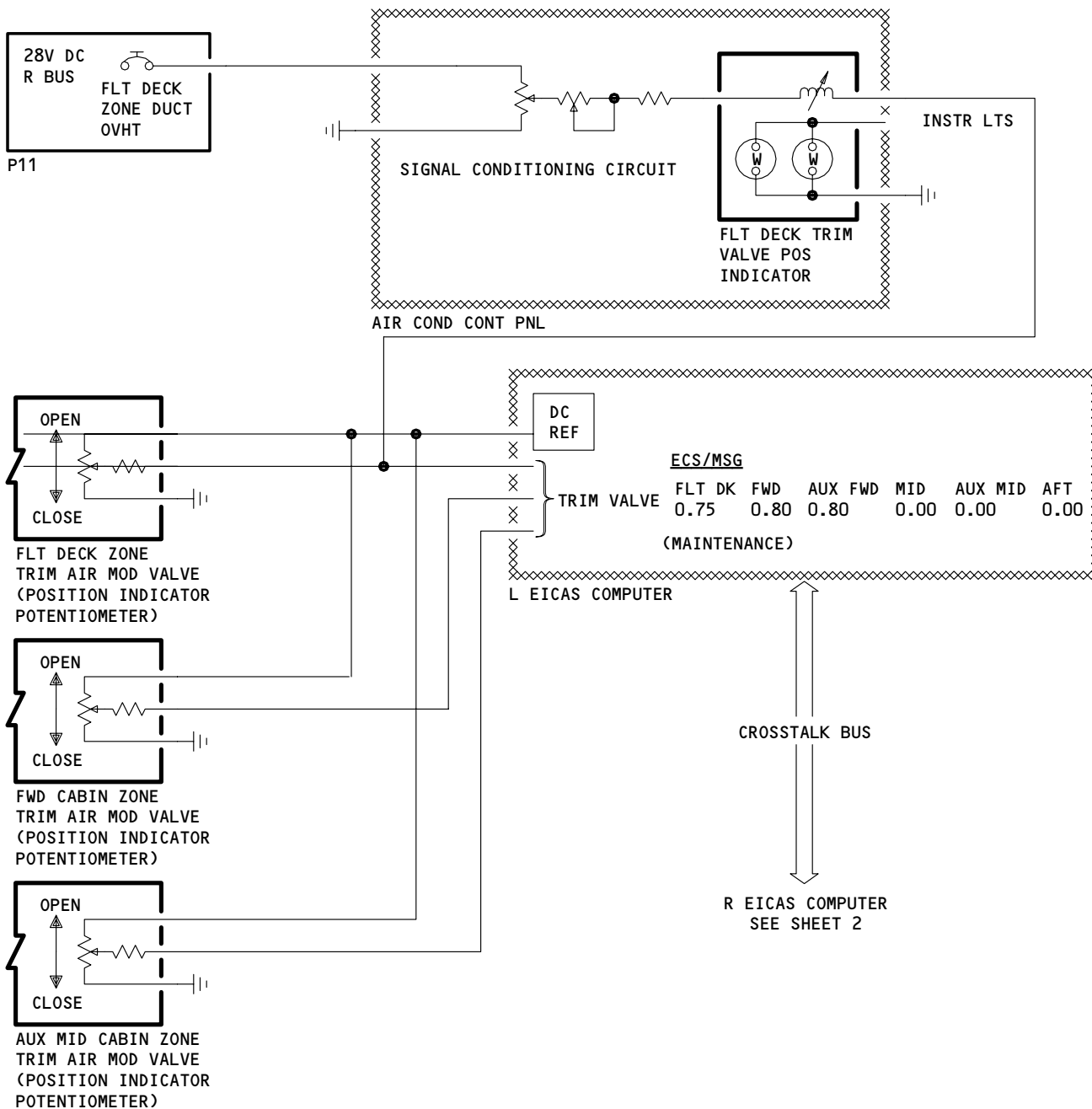
TRIM AIR MODULATING VALVE (TYP)

(F)

Zone Trim Valve Position Indication
Figure 1 (Sheet 3)

EFFECTIVITY	ALL
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21-64-00



Zone Trim Valve Position Indication Schematic
Figure 2 (Sheet 1)

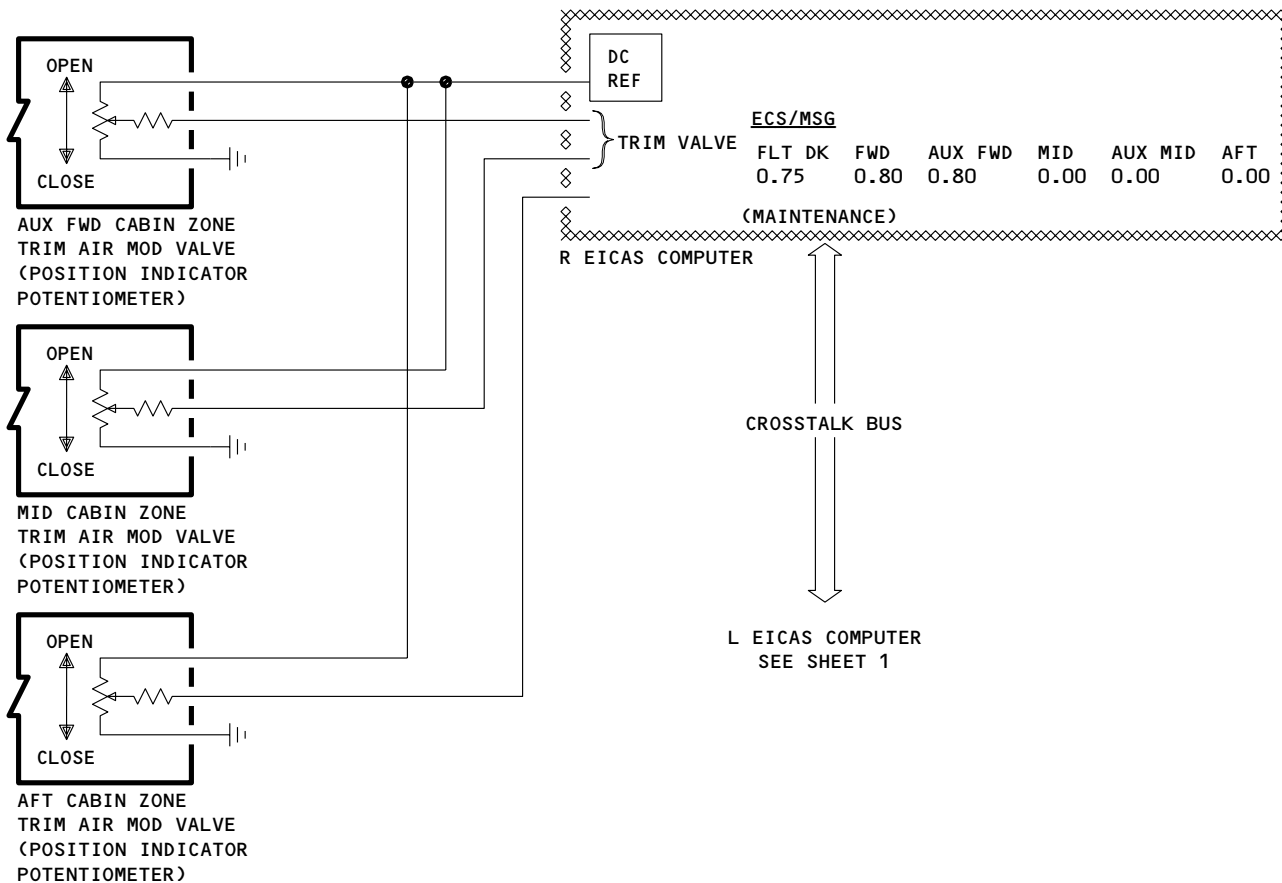
EFFECTIVITY

ALL

21-64-00

02

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Feb 10/89



Zone Trim Valve Position Indication Schematic
 Figure 2 (Sheet 2)

EFFECTIVITY

ALL

21-64-00

C. The flight deck trim valve position indicator receives the same output from the flight deck trim valve potentiometer as EICAS. The indication needle moves toward the cold or warm side of the gage depending on trim valve position. Driving the trim valve open moves the indicator needle toward W. Driving the trim valve closed moves the indicator needle toward C.

3. Control

- A. Provide electrical power (Ref 24-22-00).
- B. Check that EICAS circuit breakers on overhead circuit breaker panel P5 are closed.
- C. Check that FLT DECK ZONE DUCT OVHT circuit breaker on P5 panel is closed.
- D. Press ECS/MSG pushbutton on EICAS Maintenance Panel on P61 panel and see EICAS display screen for trim valve position indication.

EFFECTIVITY

ALL

21-64-00

FLIGHT COMPARTMENT TRIM AIR MODULATING VALVE POSITION INDICATOR -
REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) Valve Position Indicator Removal
 - (2) Valve Position Indicator Installation
- B. A valve position indicator for the flight compartment trim air modulating valve is installed on the air conditioning control panel, which is on the pilot's overhead panel, P5.

TASK 21-64-01-004-027

2. Valve Position Indicator Removal (Fig. 401)

- A. References
 - (1) AMM 24-22-00/201, Electric Power Control
- B. Access
 - (1) Location Zone
212 Control Cabin (Right)
- C. Procedure
 - S 864-030
 - (1) Remove electrical power (AMM 24-22-00/201).
 - S 024-031
 - (2) Loosen the clamp adjustment screw adjacent to the indicator until the valve position indicator can be removed from the control panel.
 - S 024-004
 - (3) Pull the indicator out from the control panel until you get access to the electrical wires at the end of the indicator.
 - S 934-005
 - (4) Put a tag on each of the four electrical wires that are connected to the indicator to help identify which terminal the wire connects to.
 - S 024-041
 - (5) Remove the screws and washers to disconnect the four electrical wires from the terminals on the indicator.

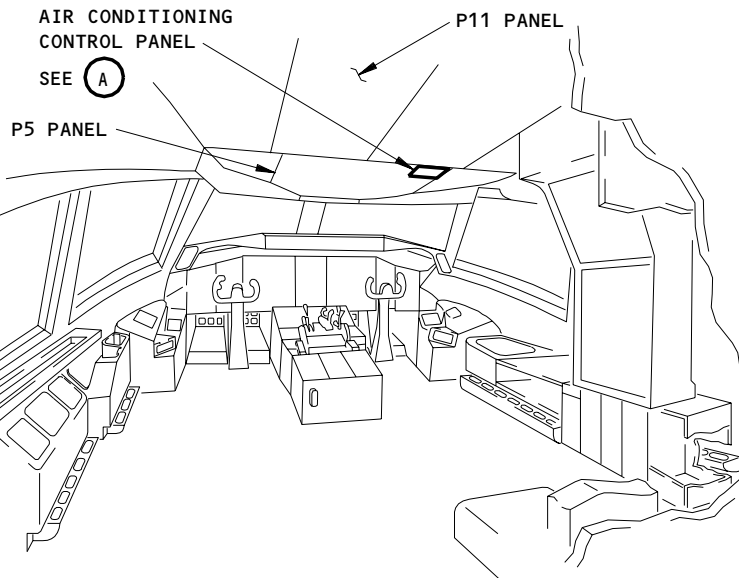
EFFECTIVITY

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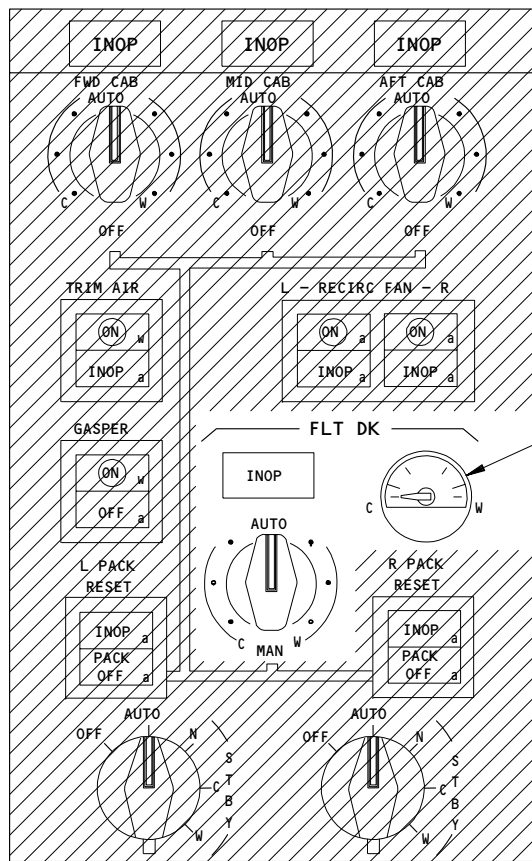
21-64-01

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FLIGHT COMPARTMENT



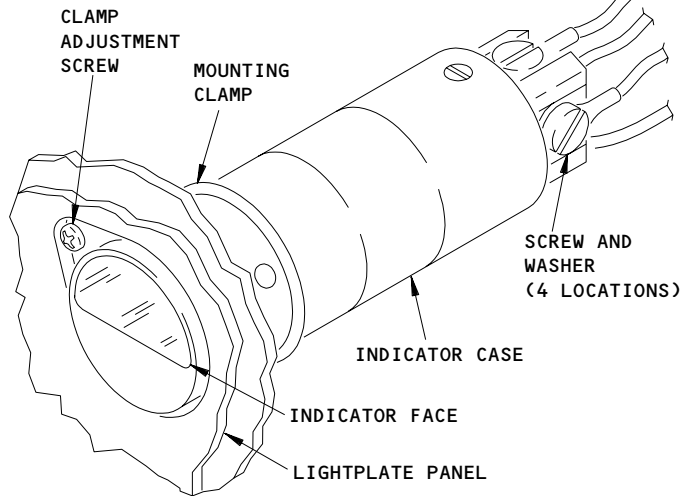
AIR CONDITIONING CONTROL PANEL

(A)

VALVE POSITION INDICATOR

SEE (B)

ELECTRICAL WIRE
(4 LOCATIONS)



VALVE POSITION INDICATOR

(B)

Flight Compartment Trim Air Modulating Valve Position Indicator Installation
Figure 401

EFFECTIVITY

ALL

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05

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TASK 21-64-01-404-028

3. Valve Position Indicator Installation (Fig. 401)

A. References

- (1) AMM 24-22-00/201, Electric Power Control

B. Access

(1) Location Zones

- 135 Environmental Control System Bay (Left)
212 Control Cabin (Right)

(2) Access Panels

- 193NL ECS Bay Access Door (Left)

C. Valve Position Indicator Installation

S 424-039

- (1) Install the screws and washers to connect the four electrical wires to the terminals on the indicator.

S 424-009

- (2) Install the indicator into the control panel.

S 424-040

- (3) Tighten the clamp adjustment screw adjacent to the indicator to 5-8 pound-inches.

D. Valve Position Indicator Post-Installation Test (Fig. 402)

S 864-011

- (1) Make sure this circuit breaker is closed on the P11 panel:
(a) 11R24, ZONE DUCT OVHT FLT DK

S 864-012

- (2) Supply electrical power (AMM 24-22-00/201).

S 014-016

- (3) Open the left ECS bay access door, 193NL, to get access to the flight compartment trim air modulating valve (Fig. 402).

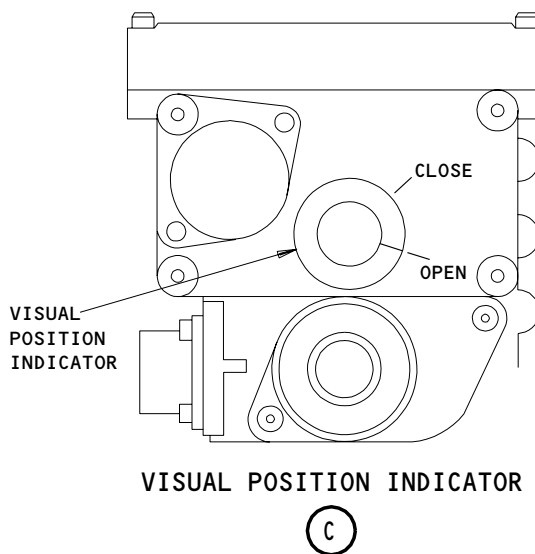
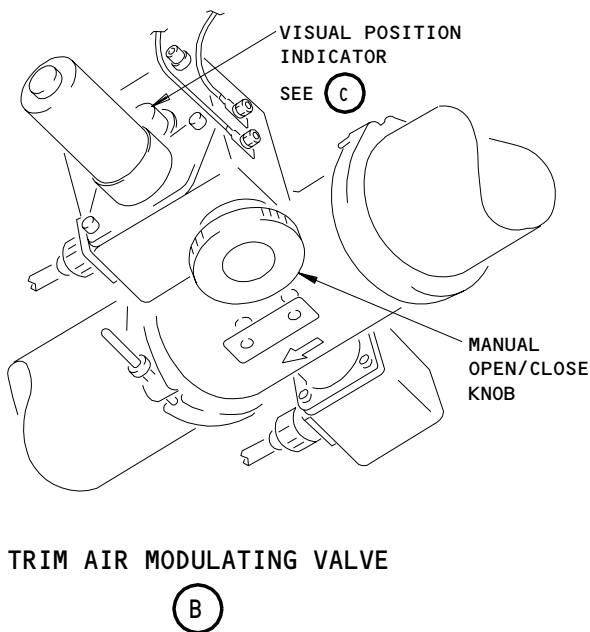
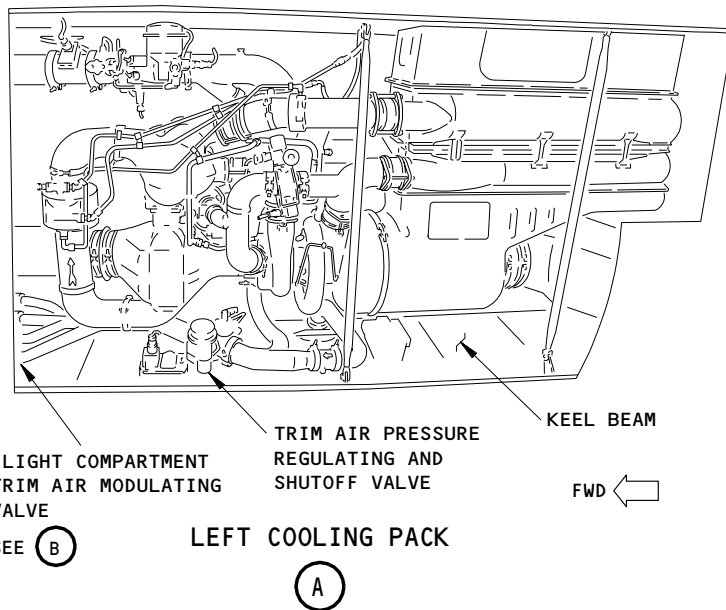
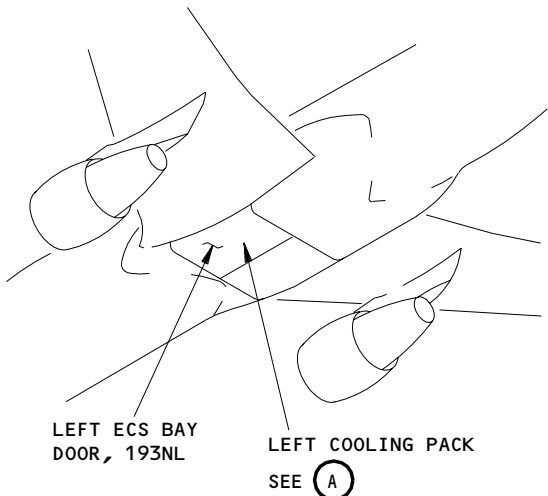
EFFECTIVITY

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21-64-01

03

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Flight Compartment Trim Air Modulating Valve Visual Position Indicator
Figure 402

EFFECTIVITY	
	ALL

21-64-01

S 864-033

- (4) Push the ECS/MSG switch on the EICAS MAINT panel, on the P61 right side panel, to view the ECS maintenance page on one of the EICAS screens.

NOTE: The ECS maintenance page will be used to view the FLT DK TRIM VALVE position indication.

S 864-014

- (5) Turn and hold the FLT DECK temperature selector, on the air conditioning control panel (P5), at the MAN-W position.
- (a) Make sure the valve position indicator needle points to the "W" mark on the air conditioning control panel.
- 1) If the indicator needle does not point to the "W" mark, do the valve position indicator adjustment steps at the end of this procedure.
- (b) Make sure the ECS maintenance page shows that the FLT DK TRIM VALVE position indication is between 0.95-1.00.
- (c) Make sure the visual position indicator on the flight compartment trim air modulating valve points to the "OPEN" position.

S 864-035

- (6) Turn and hold the FLT DECK temperature selector, on the air conditioning control panel, at the "MAN-C" position.
- (a) Make sure the valve position indicator needle points to the "C" mark on the air conditioning control panel.
- 1) If the indicator needle does not point to the "C" mark, do the valve position indicator adjustment steps at the end of this procedure.
- (b) Make sure the ECS maintenance page shows that the FLT DK TRIM VALVE position indication is between 0.00-0.05.
- (c) Make sure the visual position indicator on the flight compartment trim air modulating valve points to the "CLOSE" position.

E. Valve Position Indicator Adjustment

S 824-037

- (1) If the valve position indicator needle does not point to the "W" mark, on the air conditioning control panel, do these steps:
- (a) Turn and hold the FLT DECK temperature selector, on the air conditioning control panel, at the "MAN-W" position.
- 1) Make sure the visual position indicator on the flight compartment trim air modulating valve points to the "OPEN" position.

EFFECTIVITY

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- (b) Release the FLT DECK temperature selector to the MAN (6 o'clock) position.
- (c) Remove the air conditioning control panel from the pilot's overhead panel until you have access to the trim resistors (R2 and R3) for the indicator at backside of the control panel.
- (d) Adjust the R3 trim resistor until the valve position indicator needle points to the full "W" mark.

NOTE: The resistor may require many turns for adjustment.

S 824-038

- (2) If the valve position indicator needle does not point to the "C" mark, on the air conditioning control panel, do these steps:
 - (a) Turn and hold the FLT DECK temperature selector, on the air conditioning control panel, at the "MAN-C" position.
 - 1) Make sure the visual position indicator on the flight compartment trim air modulating valve points to the "CLOSE" position.
 - (b) Release the FLT DECK temperature selector to the MAN (6 o'clock) position.
 - (c) Remove the air conditioning control panel from the pilot's overhead panel until you have access to the trim resistors (R2 and R3) for the indicator at backside of the control panel.
 - (d) Adjust the R2 trim resistor until the valve position indicator needle points to the full "C" mark.

NOTE: The resistor may require many turns for adjustment.

S 424-046

- (3) Install the air conditioning control panel back into the pilot's overhead panel.
- F. Put the Airplane Back to Its Usual Condition

S 864-036

- (1) Turn the FLT DECK temperature selector to the AUTO (12 o'clock) position.

EFFECTIVITY

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S 414-024

(2) Close the left ECS bay access door, 193NL.

S 864-025

(3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

ALL

21-64-01

02

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Apr 22/99

TEMPERATURE INDICATION SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1, 2)

- A. The primary (zone) temperature indication system shows duct and compartment temperatures for the cabin zones and the forward cargo zone. The primary (zone) temperature control system controls the temperature in each zone (Ref 21-61-00).
- B. Primary (Zone) Temperature Indication System
- (1) AIRPLANES WITH THREE TEMPERATURE CONTROL ZONES;
The primary (zone) temperature indication system is used to display the compartment and duct temperatures for the flight deck zone, forward zone, and aft zone.
 - (2) AIRPLANES WITH FOUR AND/OR SIX TEMPERATURE CONTROL ZONES;
The primary (zone) temperature indication system is used to display the compartment and duct temperatures for the forward zone, mid zone, and aft zone.
 - (3) The temperature indication system for each zone consists of a compartment temperature indicator, a compartment temperature bulb, a duct temperature bulb, and a DUCT TEMP readout on the EICAS ECS/MSG maintenance page (AMM 31-41-00/001).
 - (4) The compartment temperature indicator is located in the flight compartment near the air conditioning control panel, and has three liquid-crystal-display (LCD) readouts to display the temperature (1 to 99-degrees) in each of the three zones.
 - (5) Duct temperature may be read, on the ground only, from the lower EICAS display panel. Pressing the ECS/MSG pushbutton on the EICAS maintenance panel provides current duct temperature readings for each cabin zone.
 - (6) The compartment temperature bulbs and duct temperature bulbs send electrical signals to the indicator and EICAS computer, respectively. The electrical resistance type temperature bulbs vary the strength of the signal sent to the indicator and EICAS computer based on the sensed temperature.
 - (7) Auxiliary Cabin Zone Temperature Indication
 - (a) The indication system of the aux forward and aux mid cabin zones has these components:
 - 1) Duct temperature bulb
 - 2) Engine Indication and Crew Alerting System (Ref 31-41-00) maintenance display page.
 - (b) Duct temperature may be read, on the ground only, from the lower EICAS display panel. The current zone duct temperatures for the aux forward and aux mid cabin zones are shown on the EICAS maintenance pages.
 - (c) The duct temperature bulbs send electrical signals to the EICAS computer. The electrical resistance type temperature bulbs vary the strength of the signal sent to the EICAS computer based on the sensed temperature.

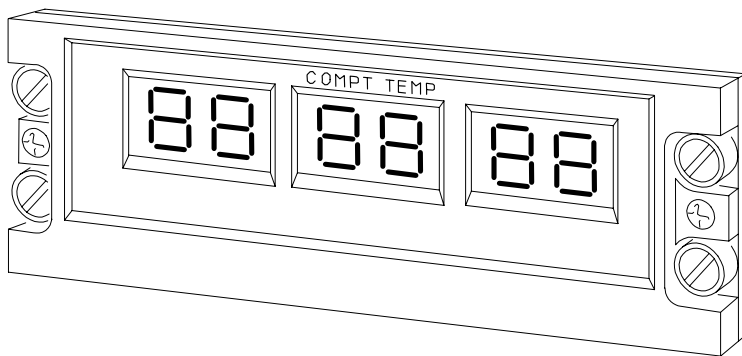
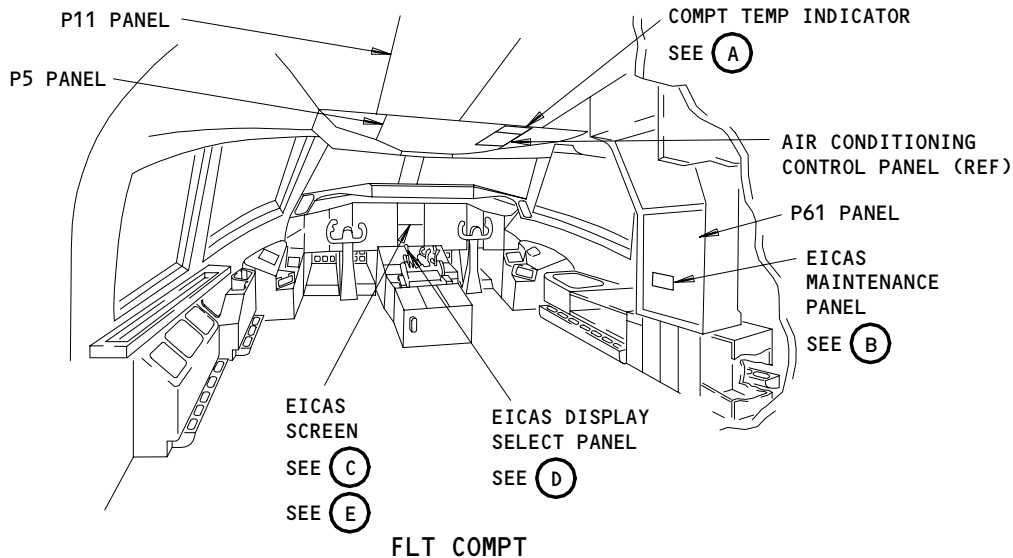
EFFECTIVITY

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21-65-00

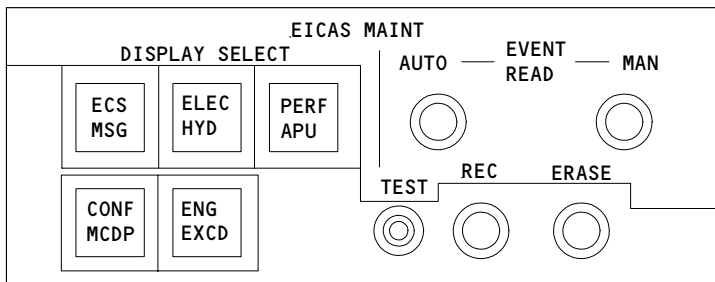
BOEING

767 MAINTENANCE MANUAL



COMPT TEMP INDICATOR

(A)



EICAS MAINTENANCE PANEL

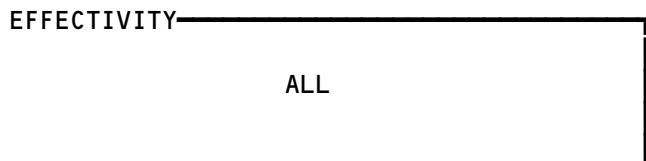
(B)

ECS/MSG						
PACK OUT	L	R	FWD EQUIP FAN 1			
DUCT PRESS	40	42	ZONE TEMP BITE			
PACK FLOW	62	64				
TEMP VALVE	0.75	0.80				
RAM IN DOOR	0.62	0.71				
PAGE 2						
FLT DK	FWD	AUX FWD	MID	AUX MID	AFT	
DUCT TEMP	30	28	28	17	17	17
TRIM VALVE	0.75	0.80	0.80	0.00	0.00	0.00
AFT CABIN TEMP						AUTO EVENT

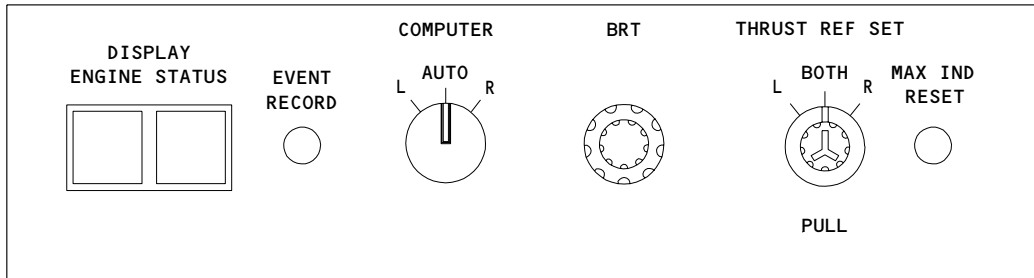
EICAS SCREEN
(MAINTENANCE FORMAT)

(C)

Zone Temperature Indication
Figure 1 (Sheet 1)

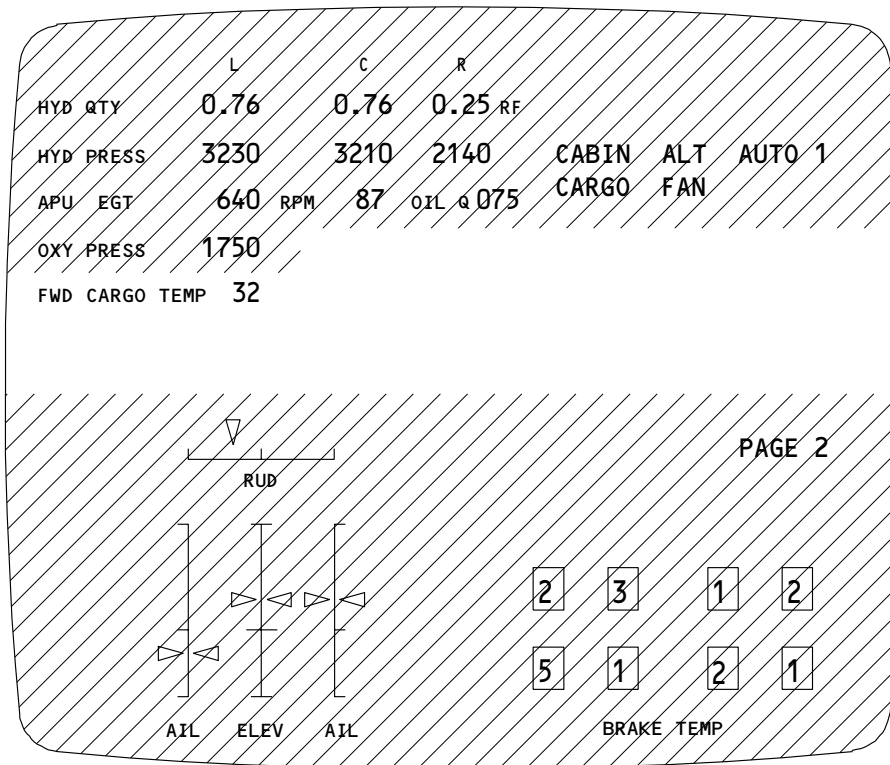


21-65-00



EICAS DISPLAY SELECT PANEL

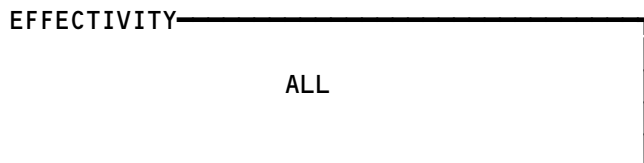
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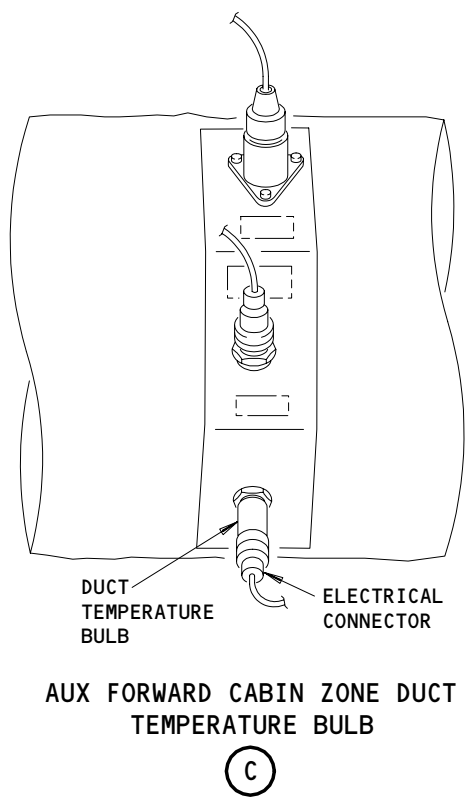
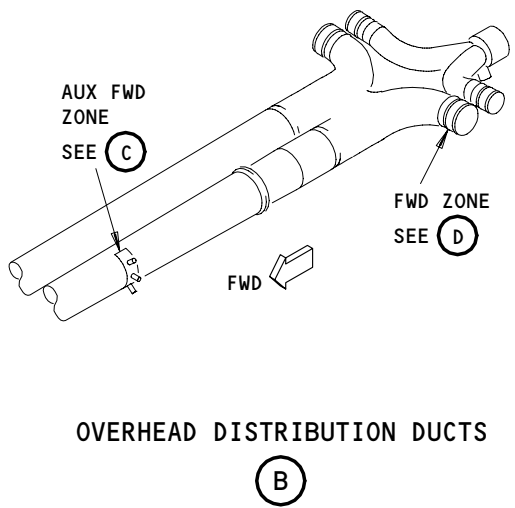
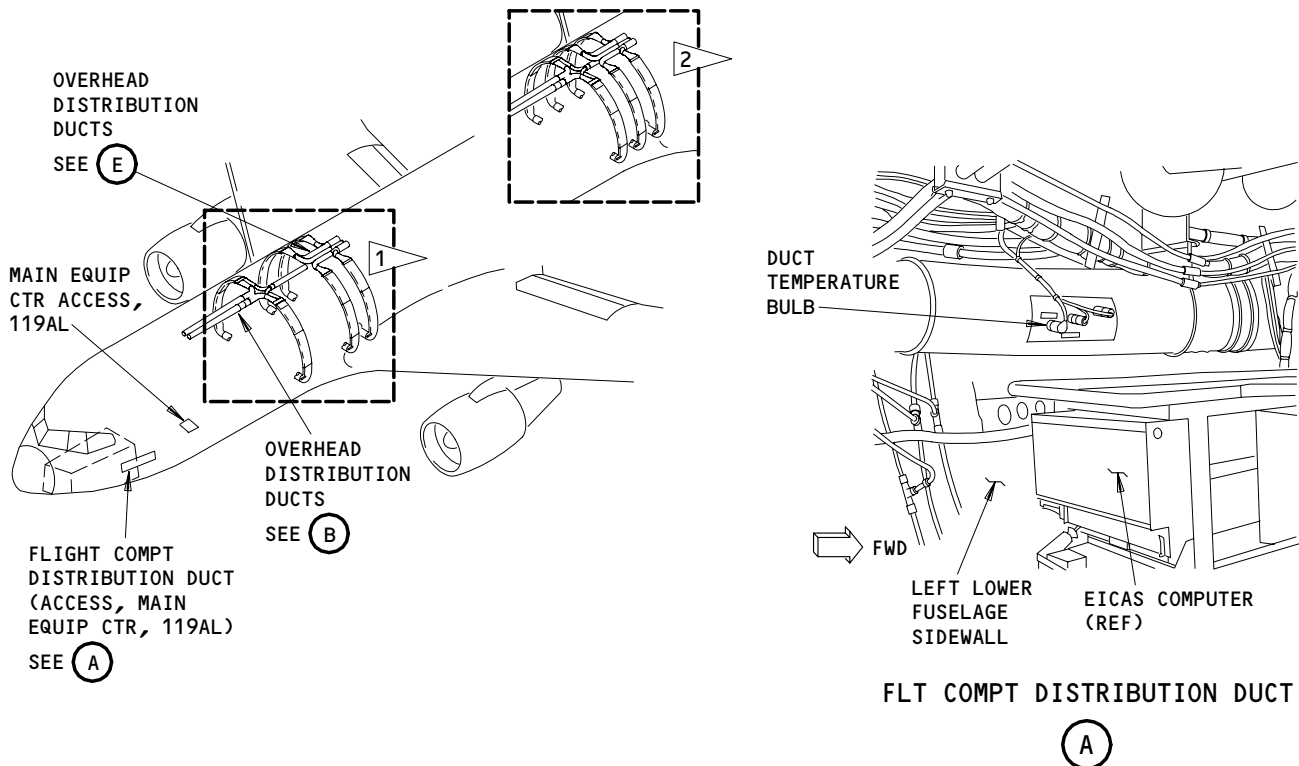
**EICAS SCREEN
(STATUS FORMAT)**

E

**Zone Temperature Indication
Figure 1 (Sheet 2)**



21-65-00



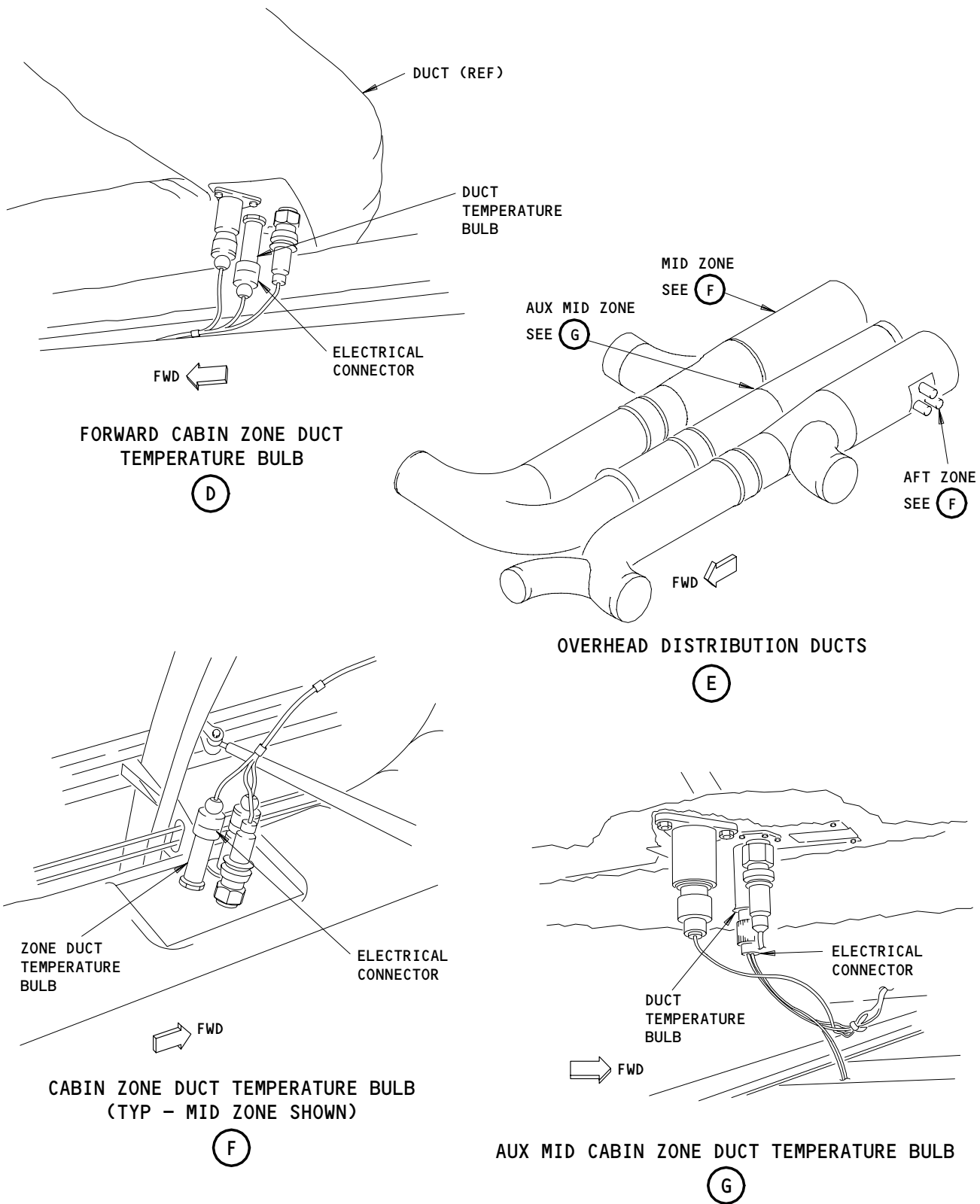
- 1 767-300 AIRPLANES
- 2 767-200 AIRPLANES

Zone Temperature Indication Sensors
Figure 2 (Sheet 1)

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21-65-00

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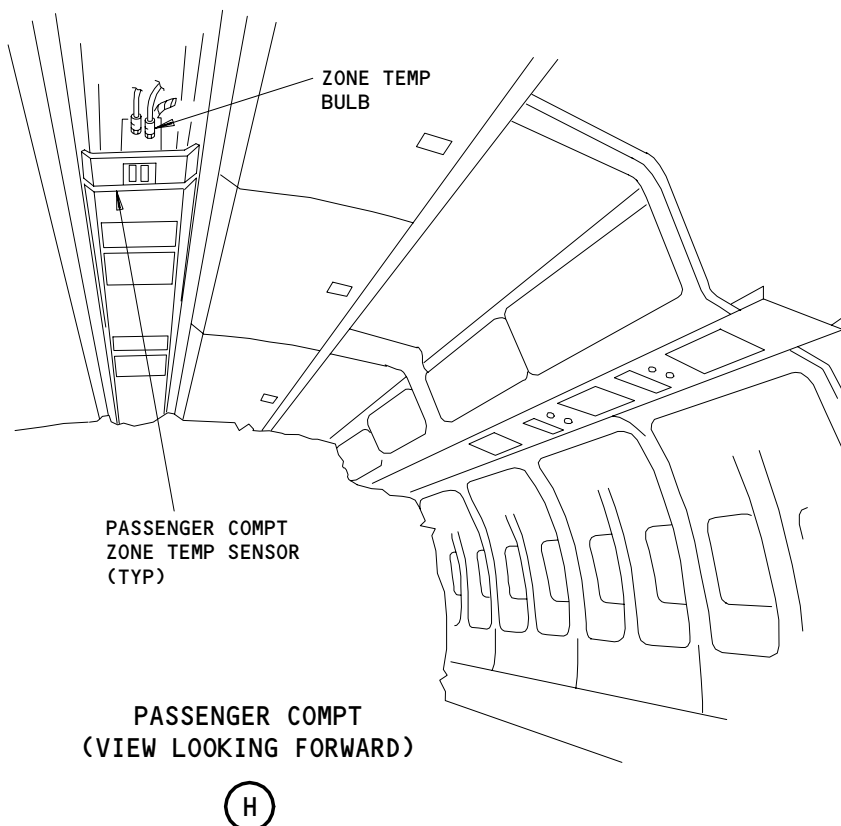
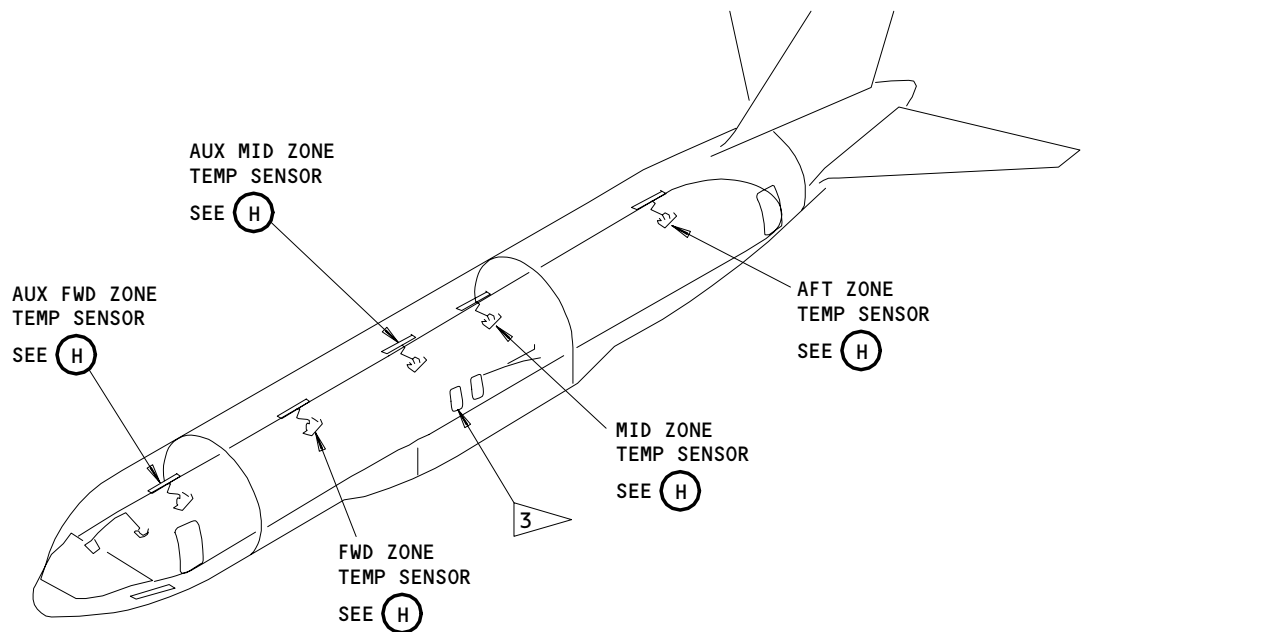


Zone Temperature Indication Sensors
Figure 2 (Sheet 2)

EFFECTIVITY	ALL
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21-65-00

BOEING
767
MAINTENANCE MANUAL

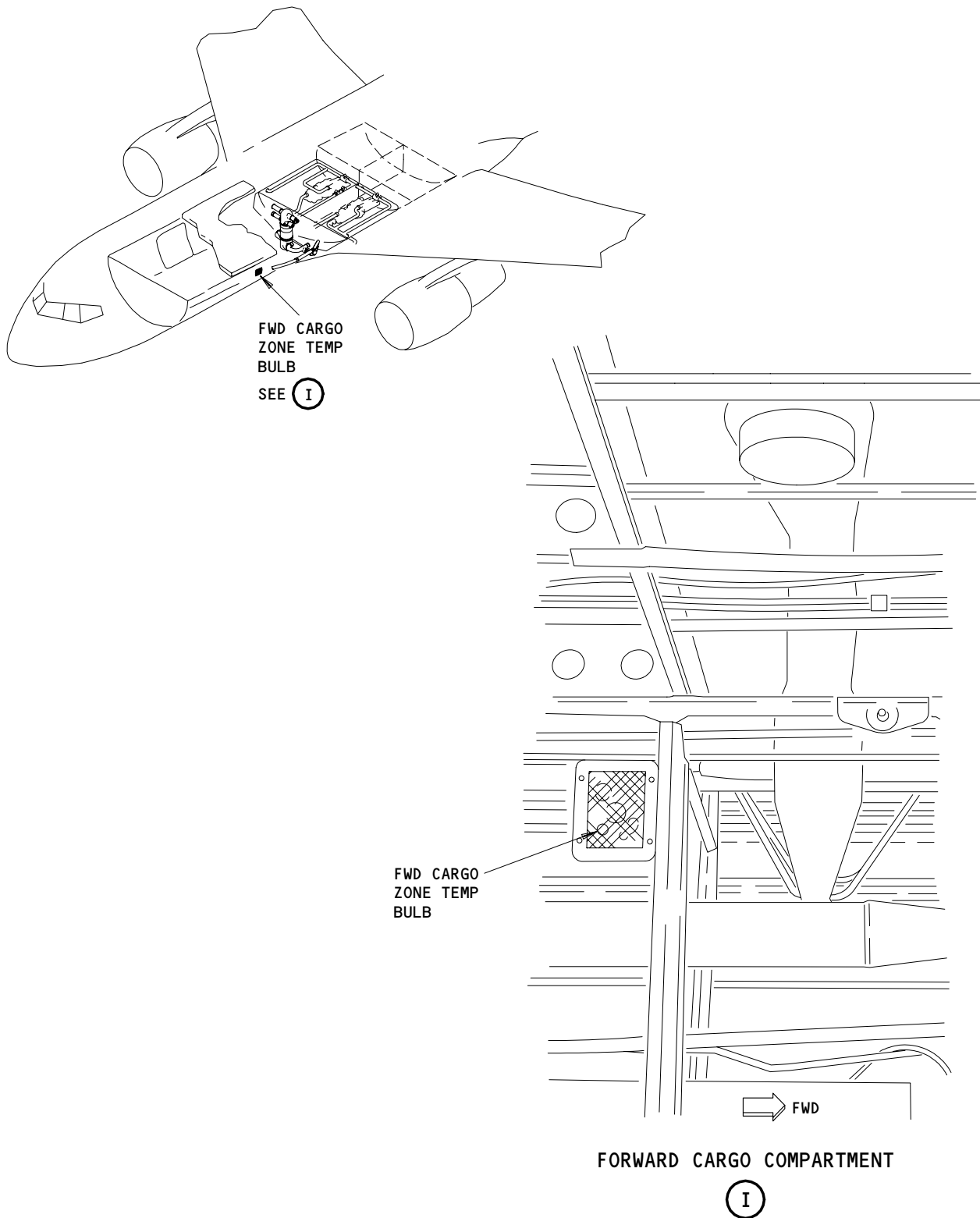


3 DUAL OVERWING ESCAPE HATCHES ON SAS 150-999 AND ALL MTH AIRPLANES

Zone Temperature Indication Sensors
Figure 2 (Sheet 3)

EFFECTIVITY	ALL
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21-65-00



Zone Temperature Indication Sensors
Figure 2 (Sheet 4)

EFFECTIVITY	ALL
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21-65-00

- (8) Forward Cargo Zone Temperature Indication
 - (a) The indicator system of the forward cargo zone has these components:
 - 1) Compartment temperature bulb
 - 2) Engine Indication and Crew Alerting System (Ref 31-41-00) status display page.
 - (b) These components monitor the operation of the temperature control system for the forward cargo zone.
 - (c) Compartment temperature may be read from the lower EICAS display panel. The current compartment temperature for the forward cargo zone is shown on the EICAS status page.
 - (d) The cargo compartment temperature bulb sends an electrical signal to the EICAS computer. The electrical resistance type temperature bulb varies the strength of the signal sent to the EICAS computer based on the sensed temperature.

2. Operation (Fig. 3, 4)

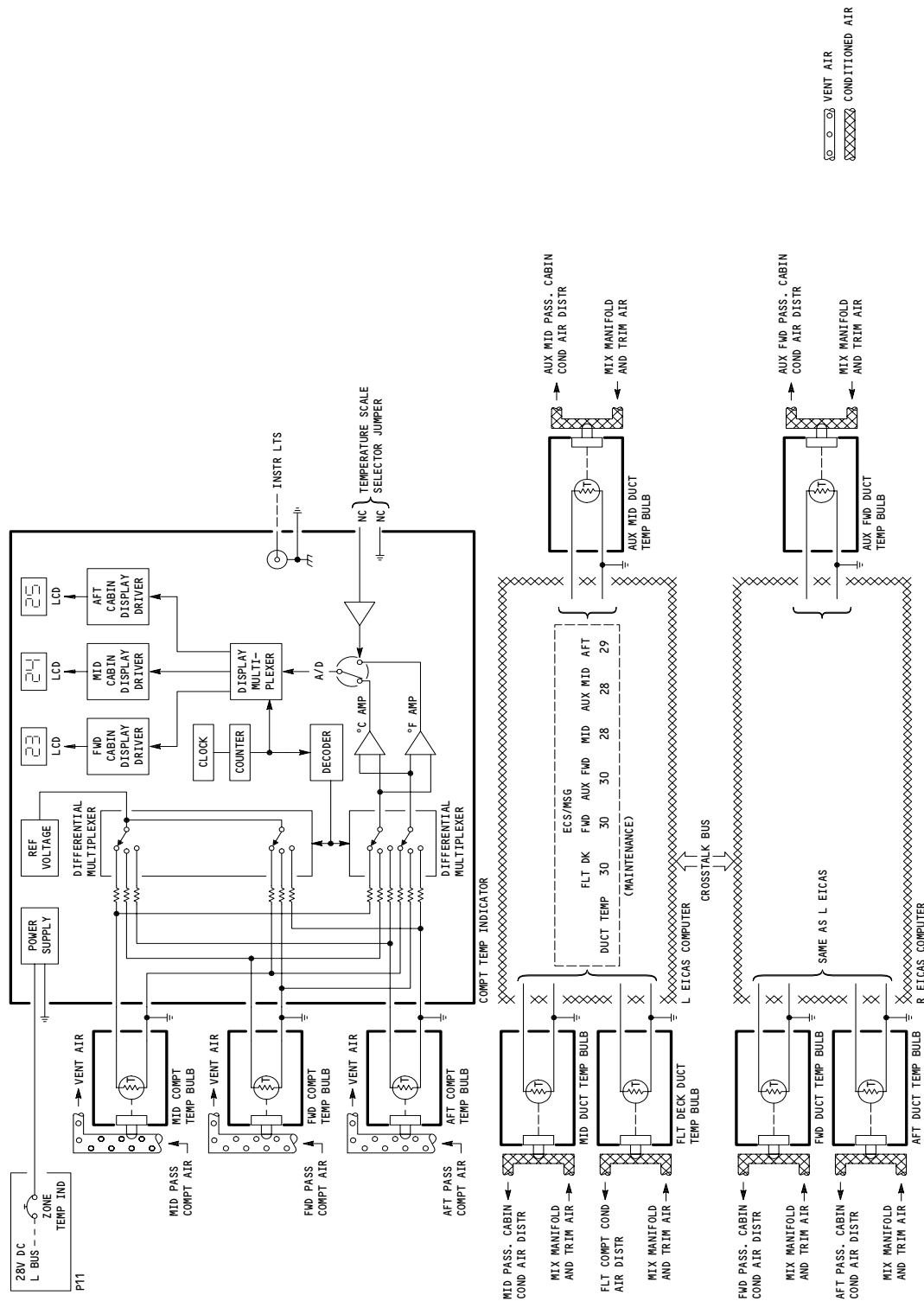
A. Temperature Indication

- (1) Twenty-eight volt dc power operates the compartment temperature indicator. The indicator sends a reference voltage through each compartment temperature bulb. The resistance through each temperature bulb varies with temperature and the signal then returns to the indicator. Thus the voltage level returning to the indicator produces the temperature readout corresponding to the actual compartment temperature.
- (2) The EICAS computers send a reference voltage through each duct temperature bulb and the forward cargo zone temperature bulb. The resistance through each temperature bulb varies with temperature and the signal then returns to the computer. Push the ECS/MSG pushbutton to call up the environmental control system (ECS) maintenance page. The duct temperature for each cabin zone appears on that page. Push the STATUS pushbutton to call up the status page. The forward cargo zone temperature appears on that page.

EFFECTIVITY

ALL

21-65-00

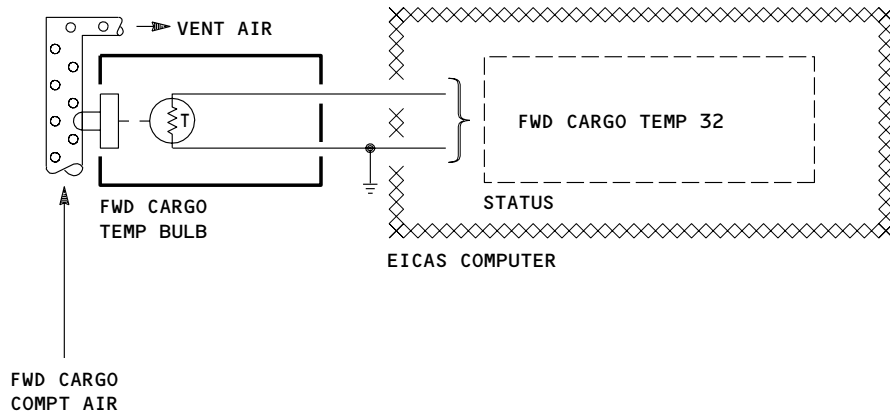


Cabin Zone Temperature Indication Schematic
Figure 3

EFFECTIVITY

ALL

21-65-00



Forward Cargo Zone Temperature Indication Schematic
Figure 4

EFFECTIVITY ————
ALL

21-65-00

COMPARTMENT TEMPERATURE INDICATOR - REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) A removal of the compartment temperature indicator.
 - (2) An installation of the compartment temperature indicator.
- B. The compartment temperature indicator is installed on this panel:
 - (1) The Pilot's Overhead Panel, P5.

TASK 21-65-01-004-013

2. Remove the Compartment Temperature Indicator (Fig. 401)

- A. Access
 - (1) Location Zone
212 Control Cabin (Right)
- B. Prepare for the Removal
 - S 864-001
 - (1) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
 - (a) 11R16, ZONE TEMP IND
- C. Remove the Temperature Indicator
 - S 034-002
 - (1) Loosen the 1/4 turn fasteners on the compartment temperature indicator.
 - S 034-003
 - (2) Pull the indicator out of the panel to get access to the electrical connector on the rear of the indicator.
 - S 034-004
 - (3) Disconnect the electrical connector from the temperature indicator.
 - S 024-005
 - (4) Remove the indicator.

TASK 21-65-01-404-014

3. Install the Compartment Temperature Indicator (Fig. 401)

- A. References
 - (1) 24-22-00/201, Electric Power Control
- B. Access
 - (1) Location Zone
212 Control Cabin (Right)

EFFECTIVITY

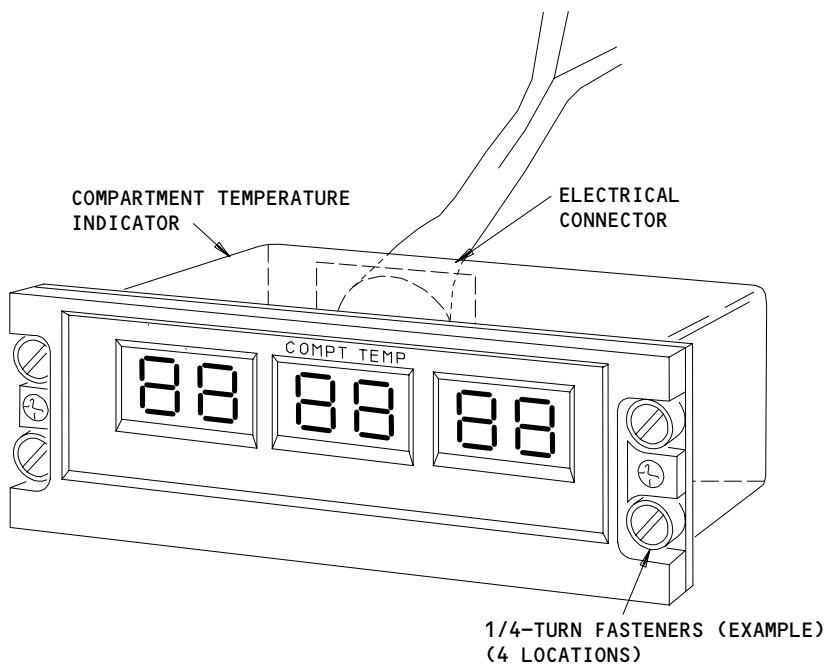
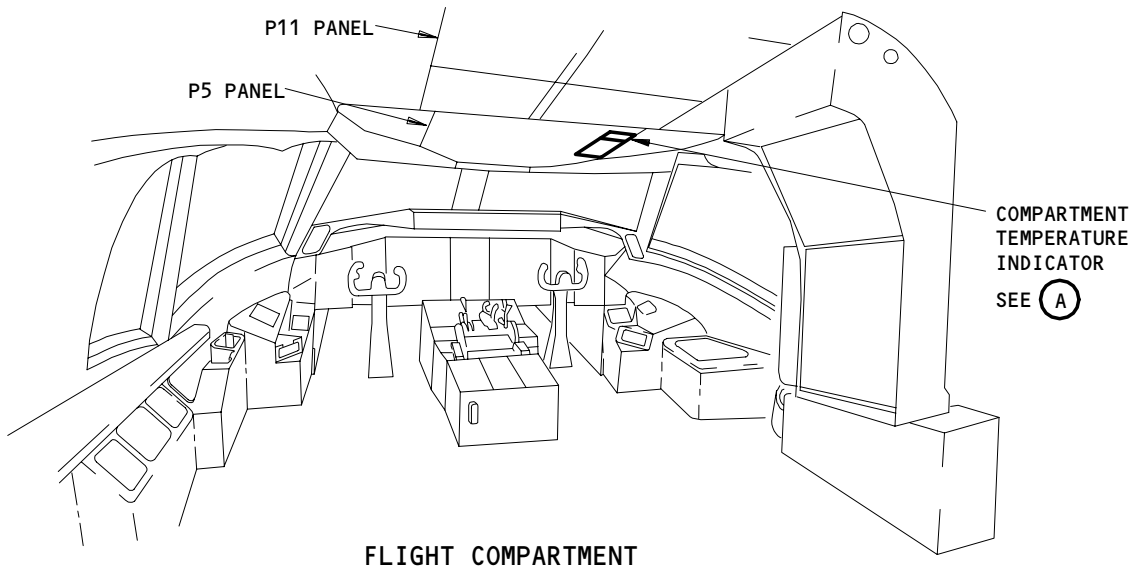
ALL

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BOEING
767
MAINTENANCE MANUAL



COMPARTMENT TEMPERATURE INDICATOR

(A)

Compartment Temperature Indicator
Figure 401

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C. Procedure

S 434-006

- (1) Attach the electrical connector to the indicator.

S 424-007

- (2) Carefully install the indicator into the panel.

S 434-008

- (3) Tighten the 1/4-turn fasteners.

S 864-009

- (4) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
(a) 11R16, ZONE TEMP IND

S 864-010

- (5) Supply electrical power (Ref 24-22-00).

S 214-011

- (6) Make sure none of the compartment temperature indications show "0" or "99".

D. Put the Airplane Back to Its Usual Condition

S 864-012

- (1) Remove electrical power if it is not necessary (Ref 24-22-00).

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COMPARTMENT TEMPERATURE BULB – REMOVAL/INSTALLATION

1. General

- A. This procedure has these tasks:
 - (1) A removal of the compartment temperature bulbs.
 - (2) An installation of the compartment temperature bulbs.
 - (3) The removal of the bulk cargo compartment temperature bulb
 - (4) The installation of the bulk cargo compartment temperature bulb
 - (5) A removal of the forward cargo compartment temperature bulb.
 - (6) An installation of the forward cargo compartment temperature bulb.
- B. The compartment temperature bulbs supply temperature signals to the compartment temperature indicator. There is a compartment temperature bulb installed in each applicable compartment temperature sensor assembly. You can identify the applicable compartment temperature sensor assemblies by a small grill in the ceiling.

NOTE: See Fig. 401 for the approximate locations of the applicable compartment temperature sensor assemblies.

- C. The temperature bulb for the forward cargo compartment supplies a signal to the EICAS computer to show the forward cargo compartment temperature. The temperature bulb is installed in the temperature sensor assembly for the forward cargo compartment. The temperature sensor assembly is installed on the left side of the forward cargo compartment, directly opposite the forward cargo door.

TASK 21-65-03-004-001

2. Remove the Passenger Compartment Temperature Bulb (Fig. 401)

- A. Access
 - (1) Location Zones

211	Control Cabin (Left)
233/234	Area Above Passenger Cabin Ceiling – Section 43
243/244	Area Above Passenger Cabin Ceiling – Section 45
253/254	Area Above Passenger Cabin Ceiling – Section 46

B. Prepare for Removal

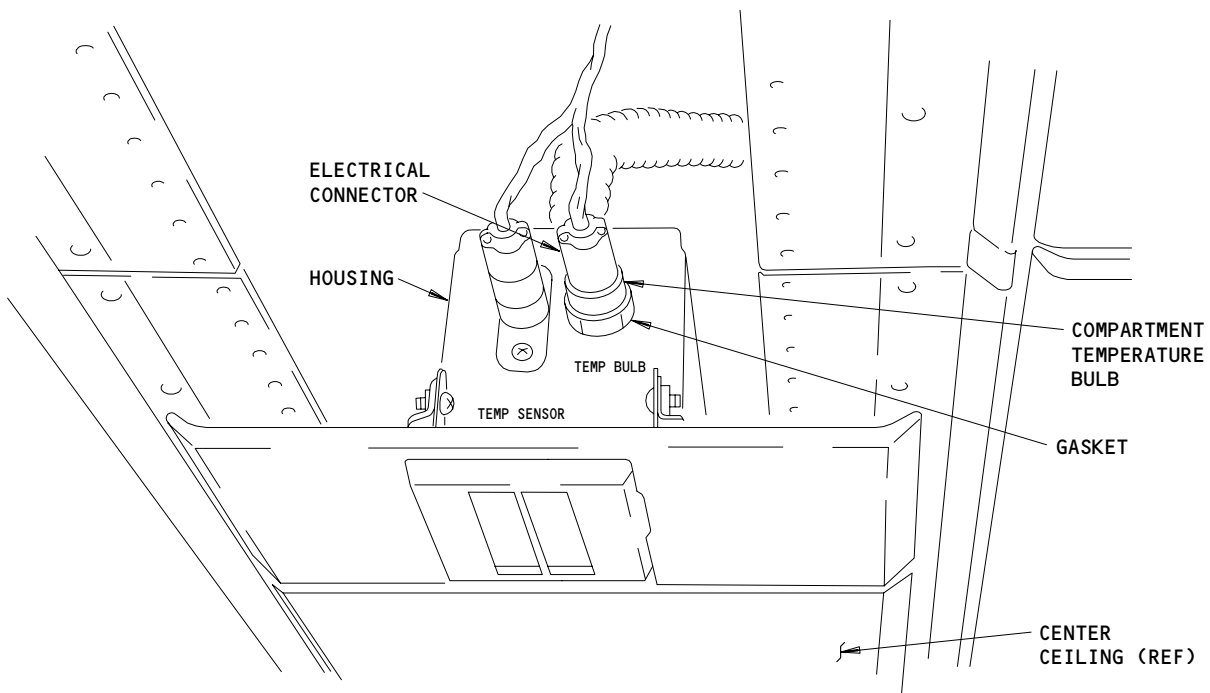
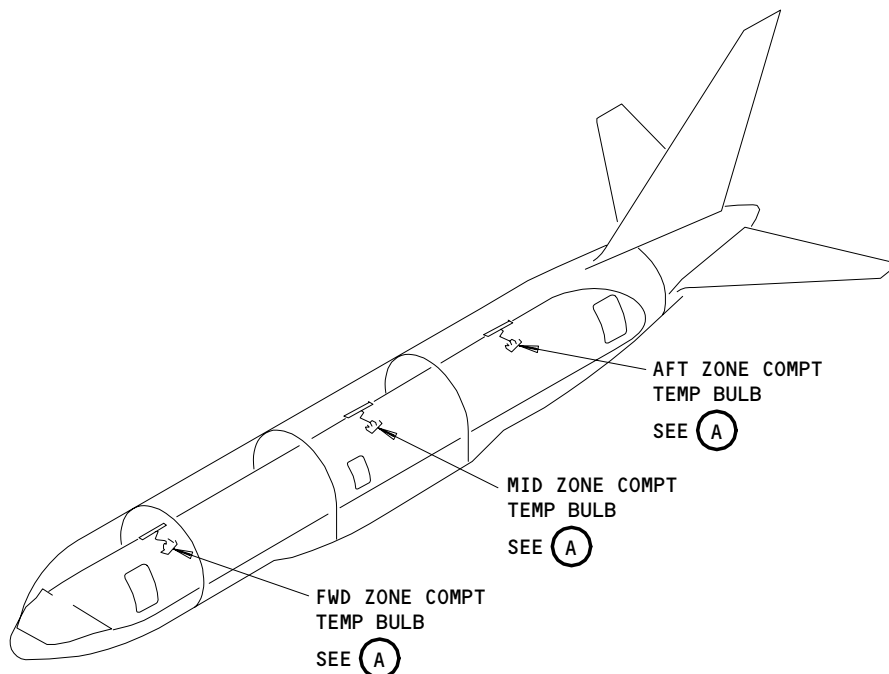
S 864-087

CAUTION: DO NOT LEAVE THE EQUIP COOL AFT FAN 1 AND THE EQUIP COOL AFT FAN 2 CIRCUIT BREAKERS OPEN FOR MORE THAN TEN MINUTES IF ELECTRICAL POWER IS SUPPLIED TO THE AIRPLANE. CORRECT COOLING FOR EQUIPMENT WILL NOT BE SUPPLIED AND EQUIPMENT DAMAGE COULD OCCUR.

- (1) Open this circuit breaker on the forward miscellaneous electrical equipment panel, P33, and attach a DO-NOT-CLOSE tag:
 - (a) 33B1, EQUIP COOL AFT FAN 1

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PASSENGER COMPARTMENT ZONE TEMPERATURE SENSOR
(VIEW IN THE FORWARD DIRECTION)

(A)

Compartment Temperature Bulb Installation
Figure 401

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S 864-004

- (2) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach DO-NOT-CLOSE tag:
(a) 36G4, EQUIP COOL AFT FAN 2

S 864-007

- (3) Put the APU control selector on the pilots' overhead panel, P5, in the OFF position.
(a) Attach a DO-NOT-OPERATE tag on the selector.

S 864-008

- (4) Push the two RECIRC FAN switch-lights on the P5 panel to the off position.
(a) Attach DO-NOT-OPERATE tags to the switch-lights.

S 864-009

- (5) Put the two control selectors for the air conditioning pack in the OFF position.
(a) Attach DO-NOT-OPERATE tags to the two selectors.

S 864-010

- (6) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tag:
(a) 11R16, ZONE TEMP IND

S 214-011

- (7) Remove the applicable ceiling panel and find the temperature bulb.

NOTE: Remove the ceiling panel to remove the compartment temperature bulb. This panel is found centerline of the airplane immediately aft of the assembly for the zone temperature sensor.

C. Remove the Passenger Compartment Bulb

S 034-012

- (1) Remove the electrical connector from the bulb.

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S 034-044
(2) Remove the lockwire from the bulb.

S 024-013
(3) Loosen and remove the temperature bulb from the housing.

S 494-014
(4) Put a cover on the hole in the housing to prevent the entry of unwanted objects.

NOTE: If more than 10 minutes occurs before the temperature bulb is installed and electrical power is supplied to the airplane, close the equipment cooling circuit breakers. This will supply sufficient equipment cooling while the temperature bulb is removed.

TASK 21-65-03-404-029

3. Install the Passenger Compartment Temperature Bulb (Fig. 401)

A. References

- (1) AMM 20-10-23/401, Standard Practices, Lockwire
- (2) AMM 24-22-00/201, Electric Power Control
- (3) AMM 36-00-00/201, Pneumatic-General

B. Access

(1) Location Zones

211	Control Cabin (Left)
233/234	Area Above Passenger Cabin Ceiling - Section 43
243/244	Area Above Passenger Cabin Ceiling - Section 45
253/254	Area Above Passenger Cabin Ceiling - Section 46

C. Procedure

- S 094-030
(1) Remove the cover from the hole in the housing.

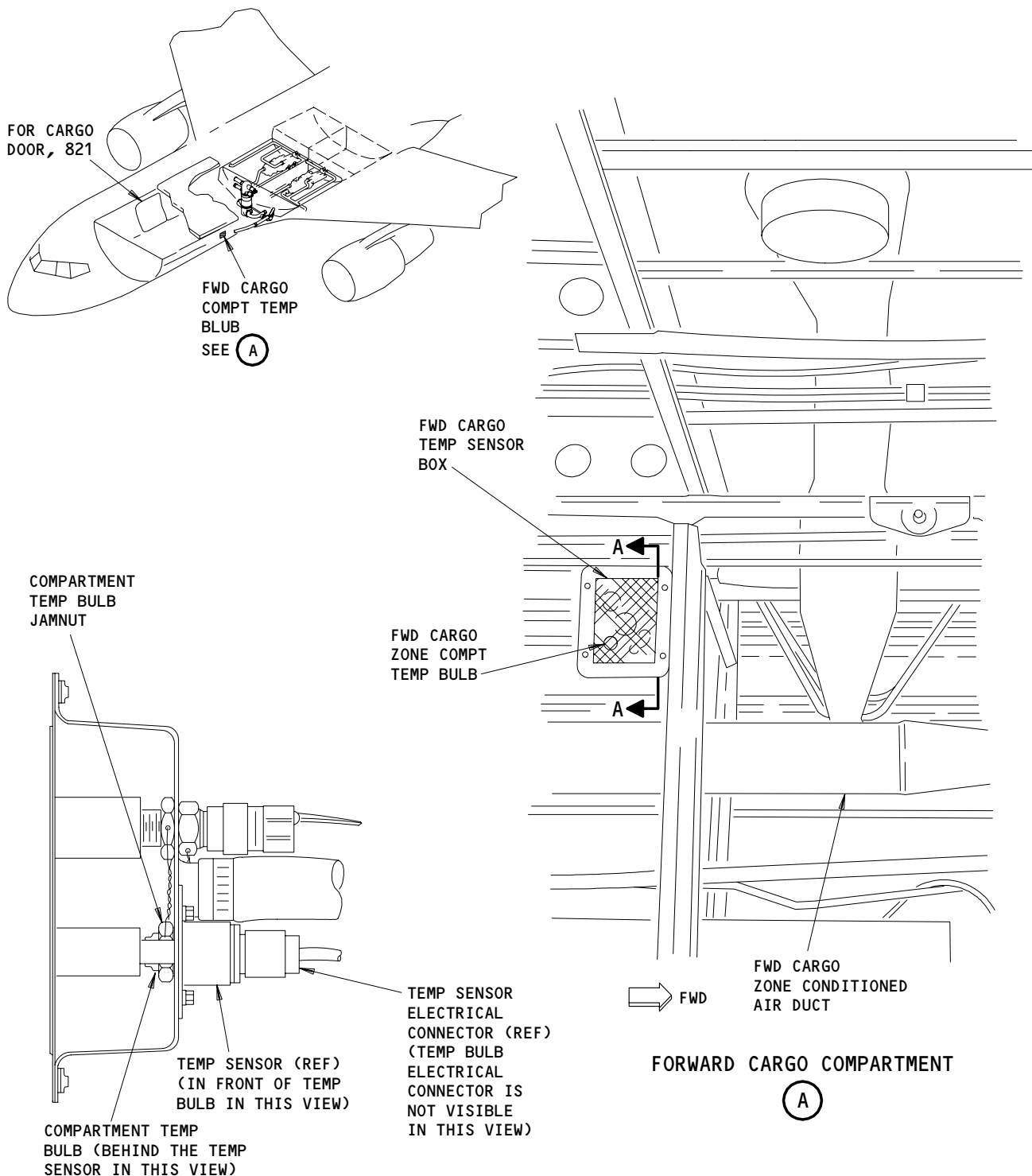
EFFECTIVITY

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A-A

Forward Cargo Compartment Temperature Bulb Installation
Figure 402

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- S 434-031
 - (2) Put a gasket on the temperature bulb.

 - S 424-022
 - (3) Install the temperature bulb into the housing.

 - S 434-032
 - (4) Tighten the bulb.

 - S 434-037
 - (5) Install the lockwire (AMM 20-10-23/401).

 - S 434-052
 - (6) Connect the electrical connector to the temperature bulb.

 - S 864-034
 - (7) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
 - (a) 11R16, ZONE TEMP IND

 - S 864-054
 - (8) Remove the DO-NOT-OPERATE tag from the RECIRC FAN switch-lights.

 - S 864-036
 - (9) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P33 panel:
 - (a) 33B1, EQUIP COOL AFT FAN 1

 - S 864-038
 - (10) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
 - (a) 36G4, EQUIP COOL AFT FAN 2

 - S 864-039
 - (11) Remove the DO-NOT-OPERATE tag from the APU control selector.

 - S 864-040
 - (12) Remove the DO-NOT-OPERATE tags from the control selectors on the air conditioning pack.
- D. Do a test of the compartment temperature bulb.
- S 864-041
 - (1) Supply electrical power (AMM 24-22-00/201).

 - S 714-041
 - (2) Make sure the ambient temperature is shown on the COMPT TEMP indicator.

 - S 864-042
 - (3) Supply pneumatic power (AMM 36-00-00/201).

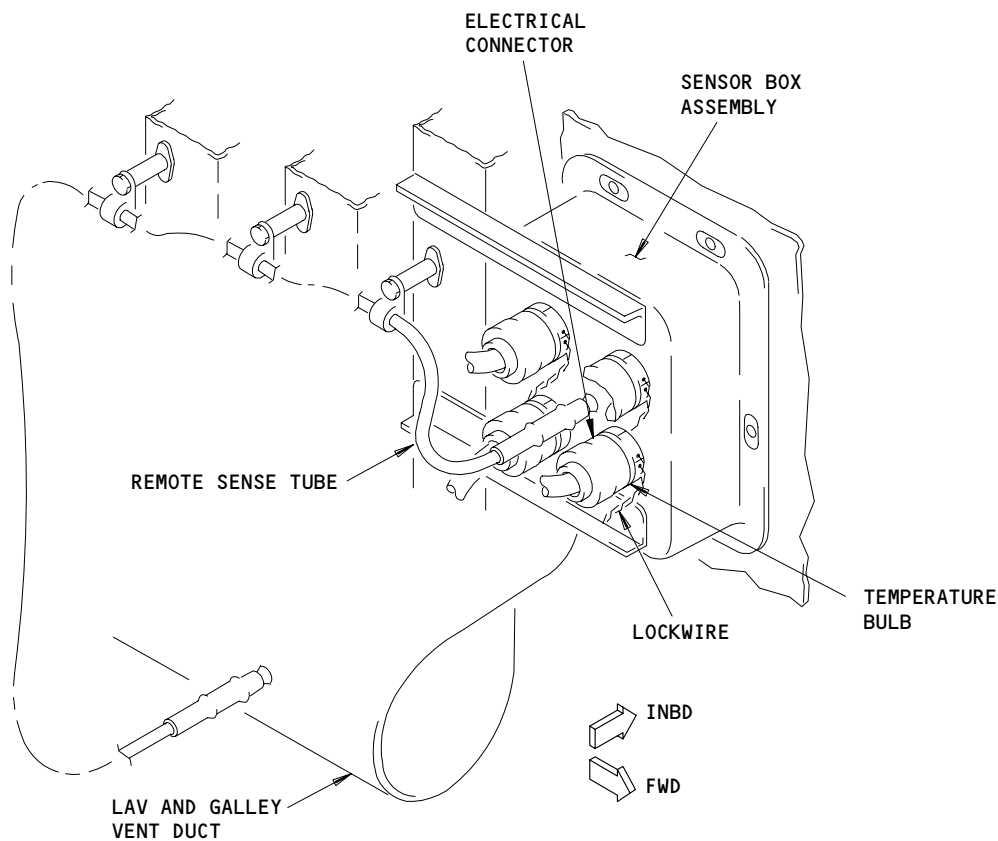
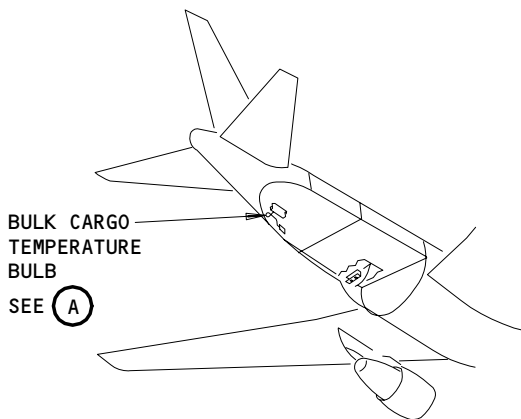
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NOTE: THE INSULATION BLANKET IS NOT SHOWN INSTALLED AROUND THE SENSOR BOX ASSEMBLY IN ORDER TO SHOW THE INSTALLATION OF THE BULK CARGO TEMPERATURE SWITCHES.

BULK CARGO TEMPERATURE BULB

(A)

**Bulk Cargo Temperature Bulb Installation
Figure 403**

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- S 864-043
- (4) Put all the zone temperature selectors on the P5 panel, to the AUTO-W position.
- S 714-044
- (5) Make sure the COMPT TEMP indicator for the installed temperature bulb shows an increase in temperature from ambient.
- E. Put the Airplane Back to Its Usual Condition
 - S 414-045
 - (1) Install the applicable ceiling panels.
 - S 864-046
 - (2) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).
 - S 864-053
 - (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

TASK 21-65-03-004-060

4. Bulk Cargo Compartment Temperature Bulb Removal (Fig. 403)

- A. References
 - (1) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings
- B. Access
 - (1) Location Zones
 - 161/162 Bulk Cargo Compartment

C. Procedure

- S 014-061
- (1) Open the bulk cargo door, 811.
- S 214-062
- (2) Find the bulk cargo temperature sensor box assembly on the right sidewall aft of the bulk cargo door.
- S 014-063
- (3) Remove the sidewall lining which is around the temperature sensor box assembly (AMM 25-52-01/401).
- S 024-064
- (4) Remove the insulation blanket from the backside of the temperature sensor box assembly.
- S 024-065
- (5) Disconnect the electrical connector from the temperature bulb.
- S 024-066
- (6) Remove the lockwire from the temperature bulb at the backside of the temperature sensor box assembly.

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- S 024-067
- (7) Remove the air inlet grille from the frontside of the temperature sensor box assembly.
- S 024-068
- (8) Remove the lockwire from the temperature bulb inside the temperature sensor box assembly.
- S 024-069
- (9) Remove the jamnut from the temperature bulb inside the temperature sensor box assembly.
- S 024-070
- (10) Remove the temperature bulb from the temperature sensor box assembly.

TASK 21-65-03-404-072

5. Bulk Cargo Compartment Temperature Bulb Installation (Fig. 403)

A. Reference

- (1) AMM 25-52-01/401, Containerized Cargo Compartment Sidewall Linings

B. Access

- (1) Location Zones
161/162 Bulk Cargo Compartment

C. Procedure

- S 424-073
- (1) Install the temperature bulb in the temperature sensor box assembly.
- S 424-074
- (2) Install the jamnut on the temperature bulb inside the temperature sensor box assembly.
- S 424-075
- (3) Install a new lockwire to the temperature bulb inside the temperature sensor box assembly.
- S 424-076
- (4) Install the air inlet grille on the frontside of the temperature sensor box assembly.
- S 424-077
- (5) Install a new lockwire to the temperature bulb on the backside of the temperature sensor box assembly.
- S 424-078
- (6) Connect the electrical connector to the temperature bulb.

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S 424-079

- (7) Install the insulation blanket around the backside of the temperature sensor box assembly.
 - (a) Make sure the velcro tape holds the insulation blanket securely around the backside of the temperature sensor box assembly.
 - (b) Make sure you wrap the insulation blanket around the air supply tube and wire bundles and secure it with a plastic strap.

S 414-080

- (8) Install the sidewall lining around the temperature sensor box assembly (AMM 25-52-01/401).

D. Temperature Bulb Post-Installation Test

S 864-082

- (1) Supply electrical power.
 - (a) Make sure that the lavatory/galley ventilation fan begins to operate and that you can feel air flow through the temperature sensor box.

S 714-084

- (2) Measure the temperature near the temperature bulb in the bulk cargo compartment.

S 714-085

- (3) Make sure the BULK CARGO TEMP indication shown on the ECS/MSG EICAS Maintenance page is within 5 degrees Fahrenheit (3 degrees Celcius) of the temperature you measured in the bulk cargo compartment.

E. Put the Airplane Back To Its Usual Condition

S 414-081

- (1) Close the bulk cargo door, 811.

S 864-083

- (2) Remove electrical power (AMM 24-22-00/201).

TASK 21-65-03-004-015

6. Remove the Forward Cargo Compartment Temperature Bulb (Fig. 402)

A. Reference

- (1) AMM 06-46-00/201, Entry, Service and Cargo Doors Access Doors and Panels

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B. Access

- (1) Location Zone
121 Forward Cargo Comartment (Left)

C. Prepare for Removal

S 864-045

CAUTION: DO NOT LEAVE THE EQUIP COOL AFT FAN 1 AND THE EQUIP COOL AFT FAN 2 CIRCUIT BREAKERS OPEN FOR MORE THAN 10 MINUTES IF ELECTRICAL POWER IS SUPPLIED TO THE AIRPLANE. CORRECT COOLING FOR EQUIPMENT WILL NOT BE SUPPLIED AND EQUIPMENT DAMAGE COULD OCCUR.

- (1) Open this circuit breaker on the forward miscellaneous electrical equipment panel, P33, and attach a DO-NOT-CLOSE tag:
(a) 33B1, EQUIP COOL AFT FAN 1

S 864-017

- (2) Open this circuit breaker on the left miscellaneous electrical equipment panel, P36, and attach a DO-NOT-CLOSE tag:
(a) 36G4, EQUIP COOL AFT FAN 2

S 864-018

- (3) Put the APU control selector on the pilots' overhead panel, P5, in the OFF position.
(a) Attach a DO-NOT-OPERATE tag on the selector.

S 864-019

- (4) Push the two RECIRC FAN switch-lights on the P5 panel to the off position.
(a) Attach DO-NOT-OPERATE tags to the switch-lights.

S 864-020

- (5) Put the two control selectors for the air conditioning pack in the OFF position.
(a) Attach DO-NOT-OPERATE tags to the two selectors.

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- S 214-021
- (6) Push the FWD CARGO A/C switch-light on the P5 panel to the off position.
- (a) Make sure the amber INOP light comes on.
- (b) Attach a DO-NOT-OPERATE tag on the switch-light.

- S 014-022
- (7) Open the forward cargo door (AMM 06-46-00/201) and find the temperature bulb in the temperature sensor box for the forward cargo compartment.

D. Remove the Forward Cargo Compartment Bulb

- S 014-023
- (1) Remove the sensor box cover.

- S 014-024
- (2) Remove the cargo liner from around the temperature sensor box.

- S 034-025
- (3) Disconnect the electrical connector from the bulb.

- S 034-026
- (4) Remove the jamnut that holds the temperature bulb to the sensor box assembly.

- S 024-027
- (5) Remove the bulb.

TASK 21-65-03-404-048

7. Install the Forward Cargo Compartment Temperature Bulb (Fig. 402)

A. References

- (1) AMM 20-10-23/401, Standard Practices, Lockwire
- (2) AMM 24-22-00/201, Electric Power Control
- (3) AMM 36-00-00/201, Pneumatic-General

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B. Access

- (1) Location Zone
121 Forward Cargo Comartment (Left)

C. Procedure

S 424-049

- (1) Put the temperature bulb in the sensor box assembly.

S 434-033

- (2) Install the jamnut.

S 434-050

- (3) Hand tighten the jamnut.

S 434-051

- (4) Connect the electrical connector to the bulb.

S 414-052

- (5) Put the sensor cover on the box.

S 424-053

- (6) Move the temperature bulb so that it is in the center of the tube on the cover.

S 434-054

- (7) Tighten the jamnut.

S 434-034

- (8) Install the lockwire (AMM 20-10-23/401).

S 864-055

- (9) Remove the DO-NOT-OPERATE tags from the RECIRC FAN switch-lights.

S 864-092

- (10) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P33 panel:
(a) 33B1, EQUIP COOL AFT FAN 1

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S 864-091

- (11) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P36 panel:
(a) 36G4, EQUIP COOL AFT FAN 2

S 864-090

- (12) Remove the DO-NOT-OPERATE tag from the APU control selector.

S 864-059

- (13) Remove the DO-NOT-OPERATE tags from the control selectors on the air conditioning pack.

S 864-060

- (14) Remove the DO-NOT-OPERATE tag from the FWD CARGO A/C switch-light.
D. Do a test of the compartment temperature bulb.

S 864-061

- (1) Supply electrical power (AMM 24-22-00/201).

S 714-062

- (2) Push the STATUS switch on the select panel of the EICAS display to show the status page.
(a) Make sure the ambient temperature is shown for the forward cargo compartment.

S 864-063

- (3) Supply pneumatic power (AMM 36-00-00/201).

S 864-064

- (4) Push the FWD CARGO A/C switch-light on the P5 panel to the ON position.

S 864-065

- (5) Put the temperature selector for the forward cargo zone, on the P5 panel, to the AUTO-W position.

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- S 714-066
- (6) Make sure the forward cargo compartment temperature shows an increase in temperature from ambient.
- S 864-088
- (7) Turn the temperature selector to the AUTO position on the FWD CARGO A/C panel.
- E. Put the Airplane Back to Its Usual Condition
- S 864-048
- (1) Push the FWD CARGO A/C switch-light to the off position.
- S 864-067
- (2) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).
- S 864-068
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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DUCT TEMPERATURE BULB – REMOVAL/INSTALLATION

1. General

- A. Each air supply duct that goes to a cabin zone has a duct temperature bulb.
 - (1) The flight compartment bulb is below the floor. The bulb is along the left sidewall near the aft corner of the nose wheel well.
 - (2) The passenger zone bulbs are above the passenger compartment ceiling. The bulbs are in the air supply duct that goes to each cabin zone.
 - (a) The air supply ducts go from the floor to the ceiling along the side of the airplane.
 - (b) These ducts are near the leading edge of the wing (see Fig. 401 to find the approximate locations of the riser ducts).
- B. The removal/installation procedure is the same for all the temperature bulbs. The access to the bulbs can be different.

TASK 21-65-04-004-001

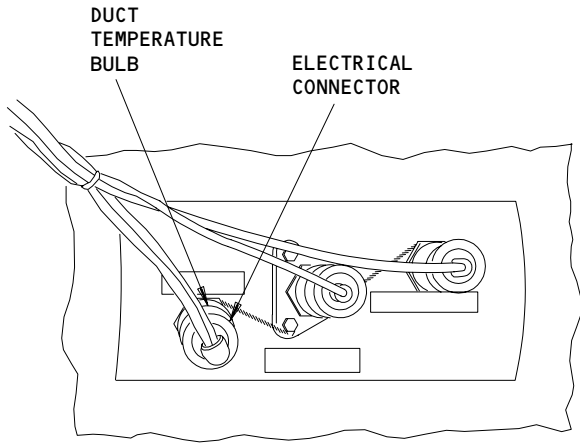
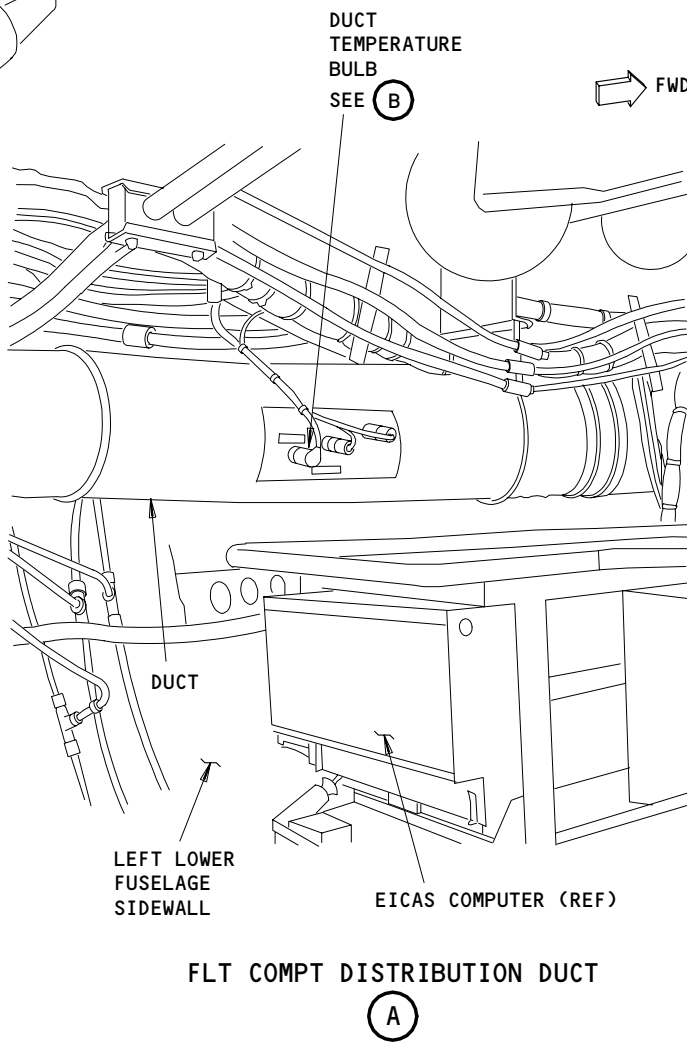
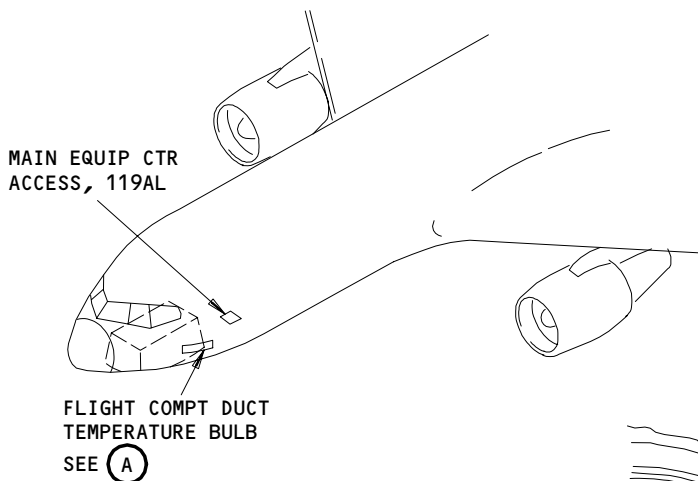
2. Remove the Duct Temperature Bulb (Fig. 401)

- A. References
 - (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
- B. Access
 - (1) Location Zones
 - 117 Area Outboard and Above NLG Wheel Well (Left)
 - 223/224 Area Above Passenger Cabin Ceiling – Section 43
 - (2) Access Panel
 - 119AL Main Equipment Center Access Door
- C. Prepare for the Removal
 - S 864-003
 - (1) Push the two RECIRC FAN switch-lights, on the pilot's overhead panel P5, to the off position.
 - (a) Attach the DO-NOT-OPERATE tags to the two switch-lights.

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FLT COMPT DUCT TEMPERATURE BULB SWITCH

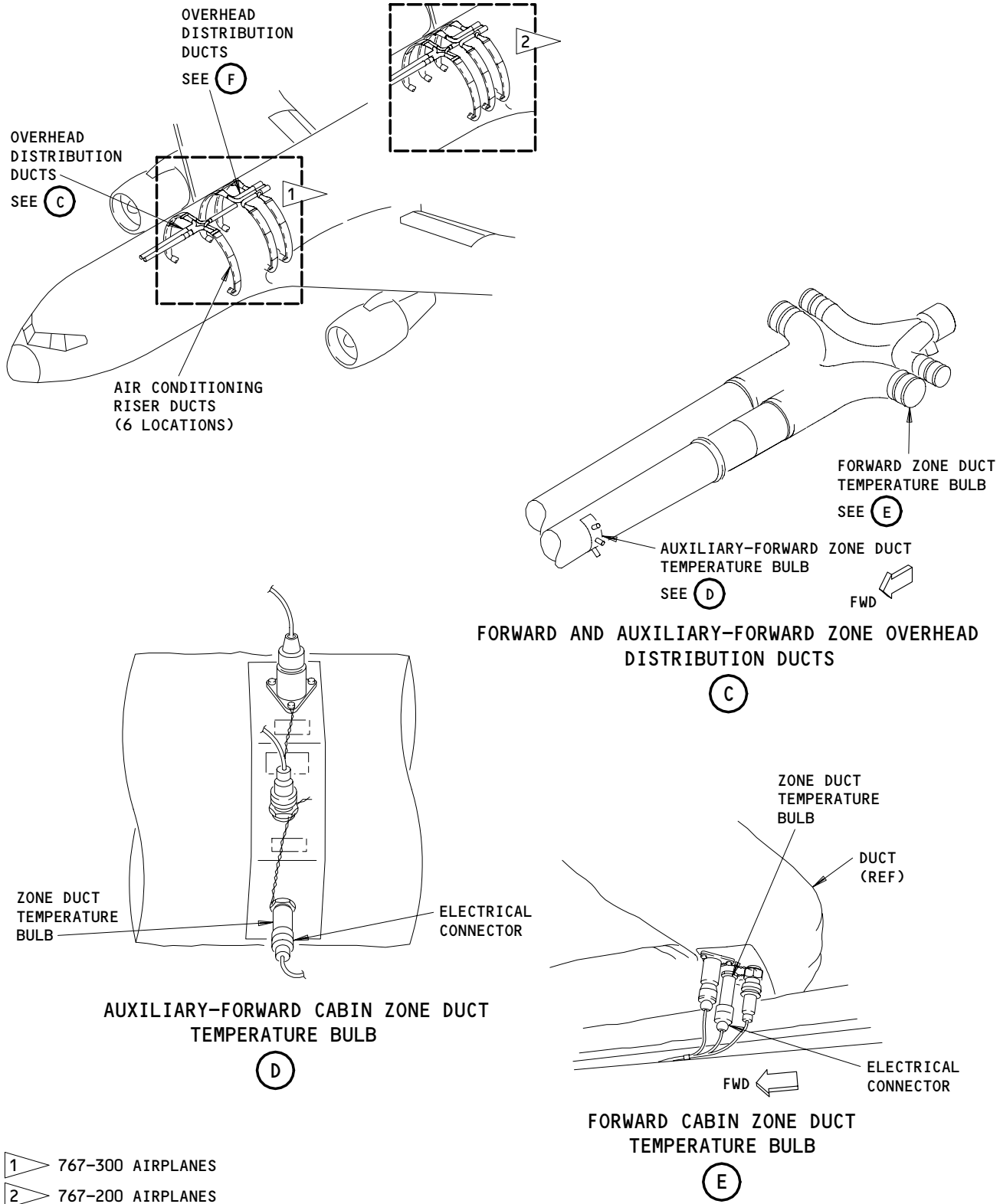
(B)

Zone Duct Temperature Bulb Installation
Figure 401 (Sheet 1)

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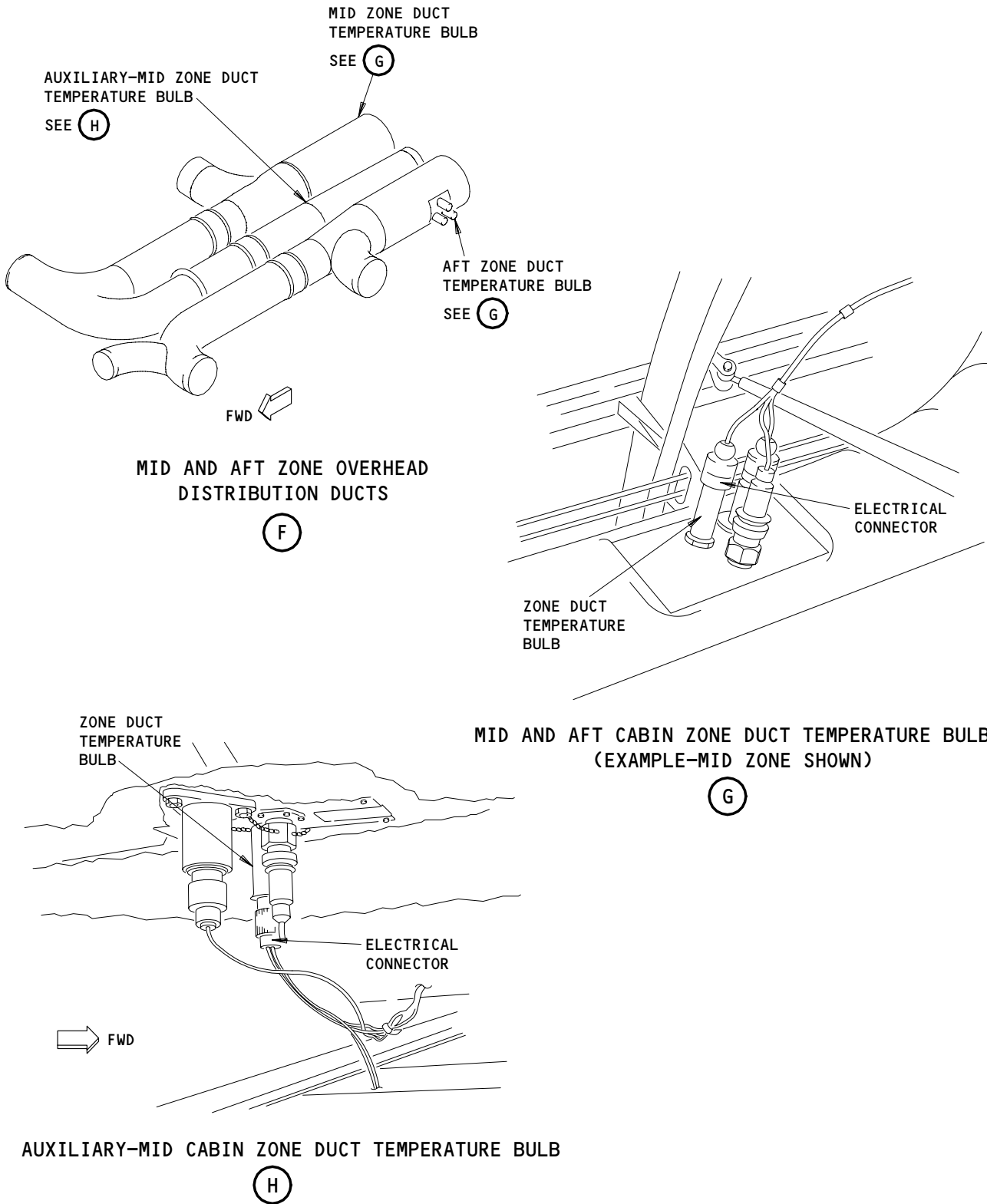


Zone Duct Temperature Bulb Installation
Figure 401 (Sheet 2)

- 1 767-300 AIRPLANES
- 2 767-200 AIRPLANES

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Zone Duct Temperature Bulb Installation
Figure 401 (Sheet 3)

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S 864-004

- (2) Turn the two control selector switches for the air conditioning packs, on the P5 panel, to the OFF position.
- (a) Attach the DO-NOT-OPERATE tags to the two control selector switches.

S 864-007

- (3) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach the DO-NOT-CLOSE tags:
- (a) The flight compartment bulb:
1) 11R24, ZONE DUCT OVHT FLT DK
- (b) The forward zone bulb:
1) 11R25, ZONE DUCT OVHT FWD
2) 11H5, ZONE DUCT OVHT AUX FWD
- (c) The aux-forward zone bulb:
1) 11R25, ZONE DUCT OVHT FWD
2) 11H5, ZONE DUCT OVHT AUX FWD
- (d) The mid zone bulb:
1) 11R26, ZONE DUCT OVHT MID
2) 11H6, ZONE DUCT OVHT AUX MID
- (e) The aux-mid zone bulb:
1) 11H6, ZONE DUCT OVHT AUX MID
2) 11R26, ZONE DUCT OVHT MID
- (f) The aft zone bulb:
1) 11R27, ZONE DUCT OVHT AFT

S 014-020

- (4) Open the access door for the main equipment center 119AL (AMM 06-41-00/201) to get access to the flight compartment bulb.

S 014-022

- (5) Open the sculptured ceiling panels on the left side, to get access to the forward or aux-forward zone bulb.

S 014-024

- (6) Open the sculptured ceiling panels on the right side, to get access to the mid or aux-mid zone bulb.

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D. Remove the Duct Temperature Bulb

S 034-032

- (1) Disconnect the electrical connector from the temperature bulb.

S 024-033

- (2) Remove the temperature bulb from the duct.

S 494-034

- (3) Put a cover on the duct hole to keep out unwanted objects.

TASK 21-65-04-404-035

3. Install the Duct Temperature Bulb (Fig. 401)

A. References

- (1) AMM 20-10-23/401 Standard Practices - Lockwire
(2) AMM 24-22-00/201, Electric Power Control
(3) AMM 36-00-00/201, Pneumatic - General

B. Access

(1) Location Zones

- 117 Area Outboard and Above NLG Wheel Well (Left)
223/224 Area Above Passenger Cabin Ceiling - Section 43

(2) Access Panel

- 119AL Main Equipment Center Access Door

C. Procedure

S 094-036

- (1) Remove the duct cover.

S 424-037

- (2) Install the temperature bulb into the duct.

S 424-082

- (3) Tighten the temperature bulb (AMM 20-10-23/401).

S 434-064

- (4) Put a lockwire on the temperature bulb (AMM 20-10-23/401).

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- S 434-038
- (5) Connect the electrical connector to the temperature bulb.
- S 864-039
- (6) Remove the DO-NOT-CLOSE tags, and close these circuit breakers on the P11 panel:
- (a) The flight compartment bulb:
 - 1) 11R24, ZONE DUCT OVHT FLT DK
 - (b) The forward zone bulb:
 - 1) 11R25, ZONE DUCT OVHT FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
 - (c) The aux-forward zone bulb:
 - 1) 11R25, ZONE DUCT OVHT FWD
 - 2) 11H5, ZONE DUCT OVHT AUX FWD
 - (d) The mid zone bulb:
 - 1) 11R26, ZONE DUCT OVHT MID
 - 2) 11H6, ZONE DUCT OVHT AUX MID
 - (e) The aux-mid zone bulb:
 - 1) 11H6, ZONE DUCT OVHT AUX MID
 - 2) 11R26, ZONE DUCT OVHT MID
 - (f) The aft zone bulb:
 - 1) 11R27, ZONE DUCT OVHT AFT
- D. Do a test of the duct temperature bulb.

- S 864-052
- (1) Supply electrical power (AMM 24-22-00/201).

- S 214-053
- (2) Push the ECS MSG switch on the EICAS MAINT panel on the right side panel, P61.
- (a) Make sure the DUCT TEMP on the ECS/MSG display on the pilot's center instrument panel, P2, is about ambient temperature.

- S 864-054
- (3) Supply pneumatic power (AMM 36-00-00/201).

- S 864-055
- (4) Turn the temperature selector switch for the applicable temperature bulb to the AUTO/W position.

- S 864-056
- (5) Remove the DO-NOT-OPERATE tags from the control selector switches for the air conditioning packs, on the P5 panel.
- (a) Turn the two control selector switches to the AUTO position.
 - (b) Make sure the DUCT TEMP for the applicable temperature bulb shows a temperature increase.

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- S 864-057
- (6) Remove the DO-NOT-OPERATE tags from the RECIRC FAN switch-lights on the P5 panel.
- S 214-059
- (7) Turn the two control selector switches for the air conditioning packs, on the P5 panel, to the OFF position.
(a) Make sure the PACK OFF light comes on.
- E. Put the Airplane Back to Its Usual Condition
- S 414-061
- (1) Close the applicable sculptured ceiling panel or the access door for the main equipment center 119AL.
- S 864-062
- (2) Remove pneumatic power if it is not necessary (AMM 36-00-00/201).
- S 864-063
- (3) Remove electrical power if it is not necessary (AMM 24-22-00/201).

EFFECTIVITY

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CREW REST AREA TEMPERATURE CONTROL SYSTEM – DESCRIPTION AND OPERATION

1. General (Fig. 1)

- A. The crew rest area (CRA) temperature control systems keep the temperature of the air in each CRA to any temperature selected between 64°F (18°C) and 76°F (24°C). Each CRA temperature control system operates separately from the other systems. Each of the CRA temperature control systems has these components:
 - (1) A temperature controller.
 - (2) A temperature selector.
 - (3) A duct temperature sensor.
 - (4) A zone temperature sensor.
 - (5) A heater.
- B. The flight deck CRA temperature control system also has a skin temperature sensor.
- C. The amount of air that is supplied to the CRAs is controlled by the CRA air conditioning distribution system (Ref 21-29-00).

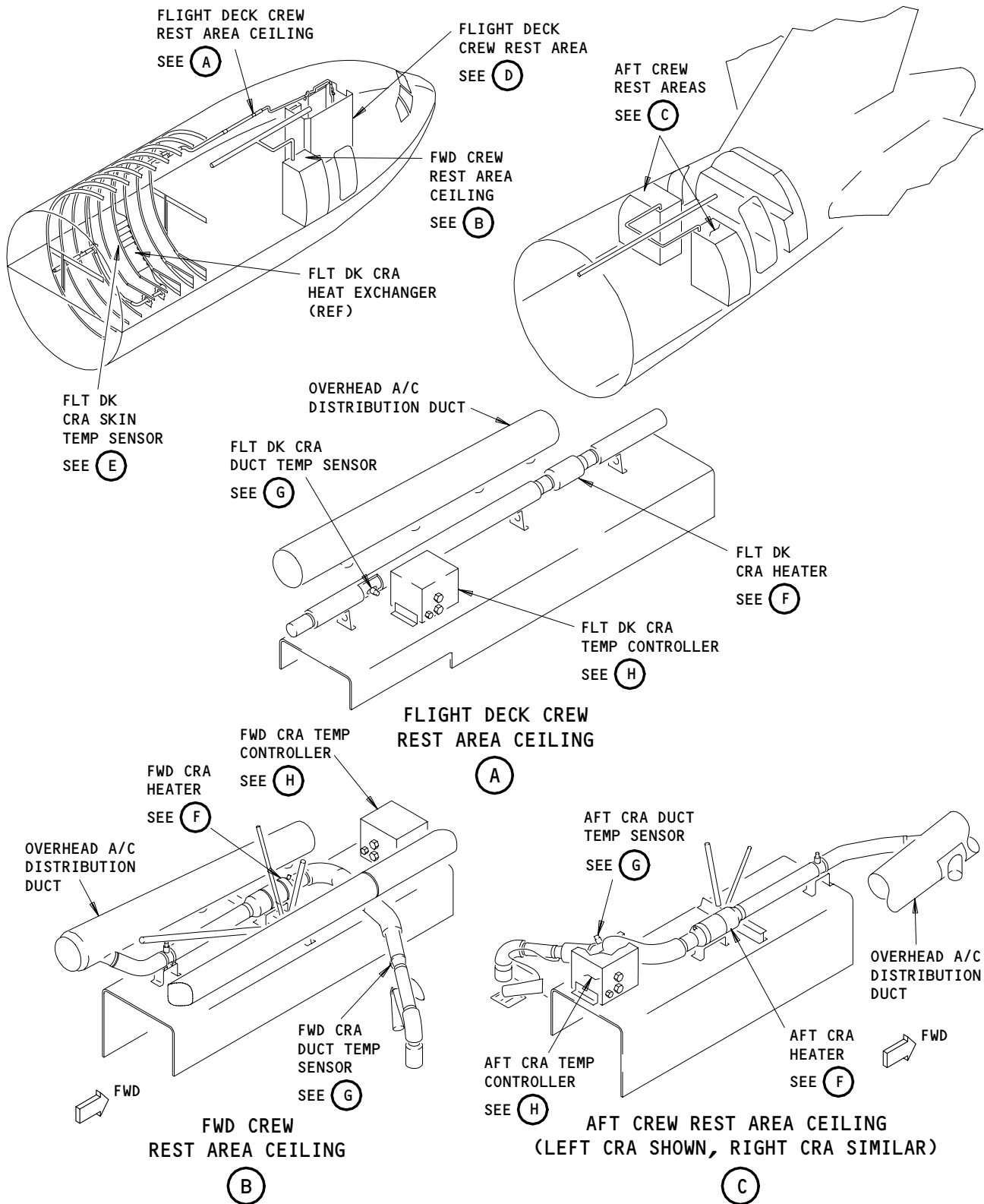
2. Component Details

A. CRA Temperature Controller (Fig. 1)

- (1) Description
 - (a) Each CRA temperature controller is a black box that controls and monitors the CRAs. It receives analog inputs from the temperature selector and the temperature sensors. It receives analog discrete inputs from the CRA fans, packs, air/ground relays, and the smoke detection system. It gives a pulse width modulated power drive for the heater. It has an ARINC transmitter to send signals of a failure in the system.
 - (b) The flight deck CRA temperature controller also receives analog discrete inputs and gives discrete analog outputs to the CRA valves.
- (2) Function
 - (a) Each CRA temperature controller controls all of the CRA components except for the fan. It analyzes the input signals to determine how much power to supply to the heater. The flight deck CRA temperature controller also commands the valves to open or close.
 - (b) Each CRA temperature also monitors each CRA component for a failure. If a failure occurs, the controller sends a signal to the EICAS computer. The specific failure is recorded in the ARINC 429 signal.

B. CRA Temperature Selector (Fig. 1)

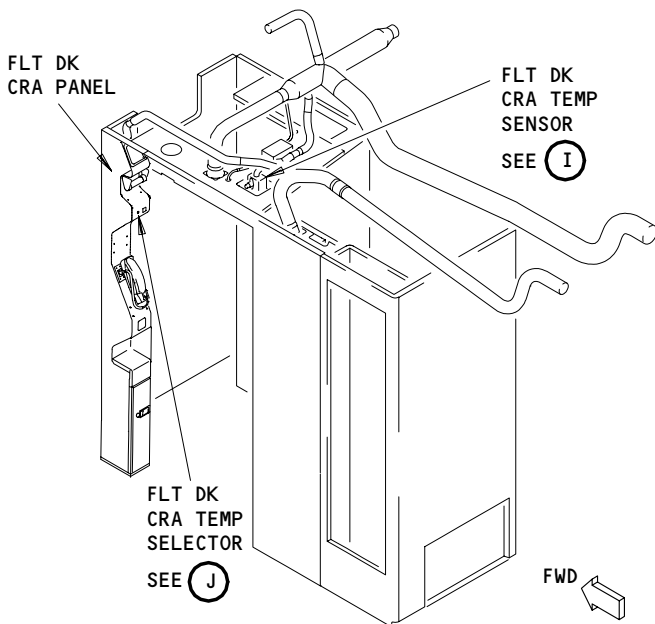
- (1) The temperature selector is a linear, single-turn, wirewound variable resistor mounted in an aluminum-alloy housing. The resistor is wired to a six-pin electrical connector to connect to a temperature controller. The selector has a 270 degree arc of rotation. It weighs approximately 0.5 pounds (0.2 kg).



Crew Rest Area Temperature Control System
Figure 1 (Sheet 1)

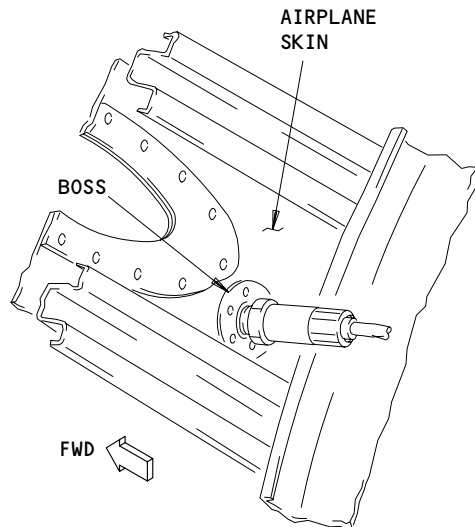
EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

21-66-00



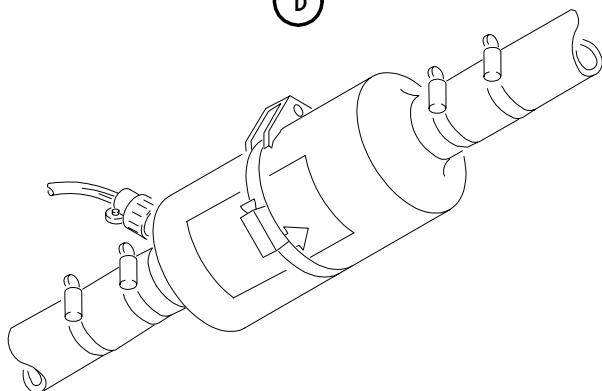
FLIGHT DECK CREW REST AREA

(D)



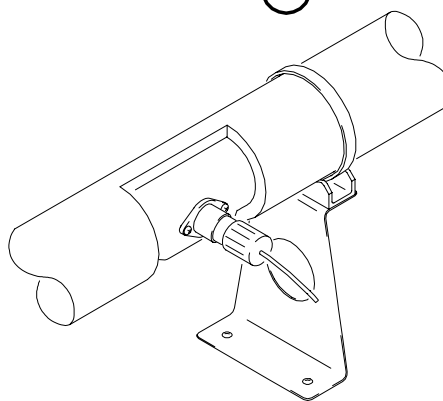
FLT DK CRA SKIN TEMPERATURE SENSOR

(E)



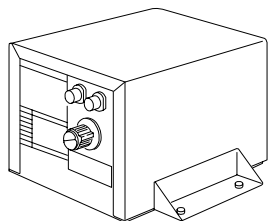
CRA HEATER

(F)



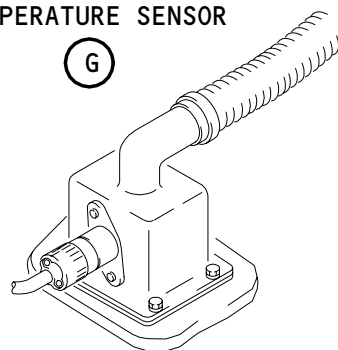
CRA DUCT TEMPERATURE SENSOR

(G)



CRA TEMPERATURE CONTROLLER

(H)



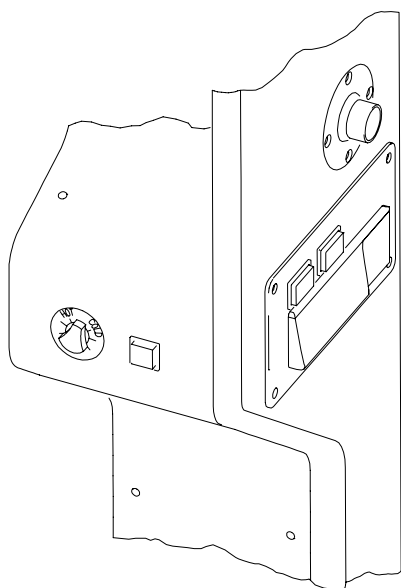
FLT DK CRA TEMPERATURE SENSOR

(I)

Crew Rest Area Temperature Control System
Figure 1 (Sheet 2)

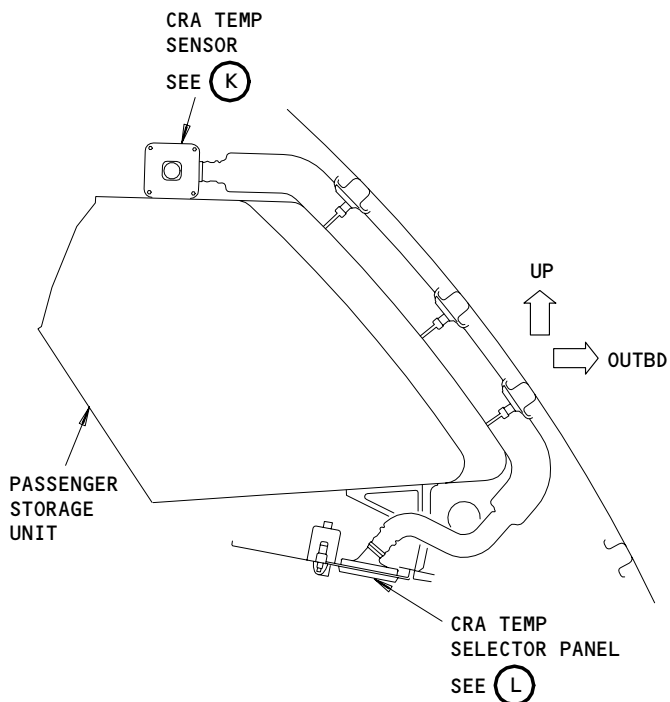
EFFECTIVITY
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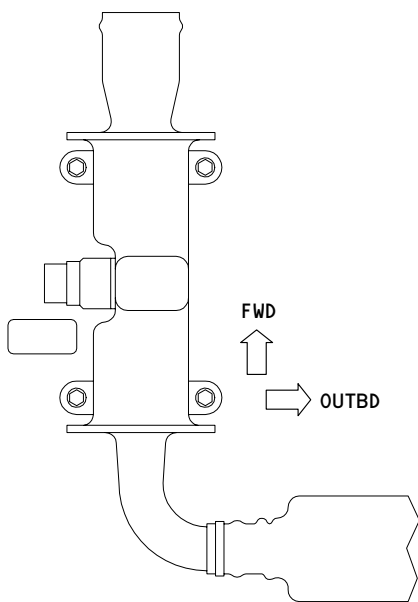


FLIGHT DECK CRA
TEMPERATURE SELECTOR

(J)

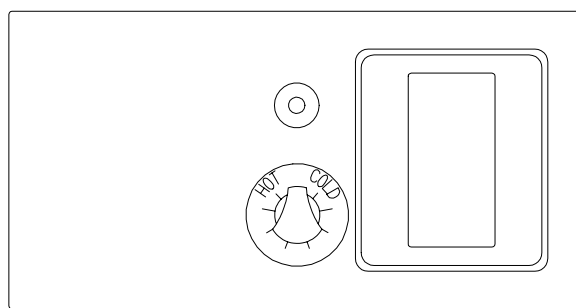


FORWARD/AFT CREW
REST AREA CEILING



FORWARD/AFT CRA
TEMPERATURE SENSOR

(K)



FORWARD/AFT CRA
TEMPERATURE SELECTOR PANEL

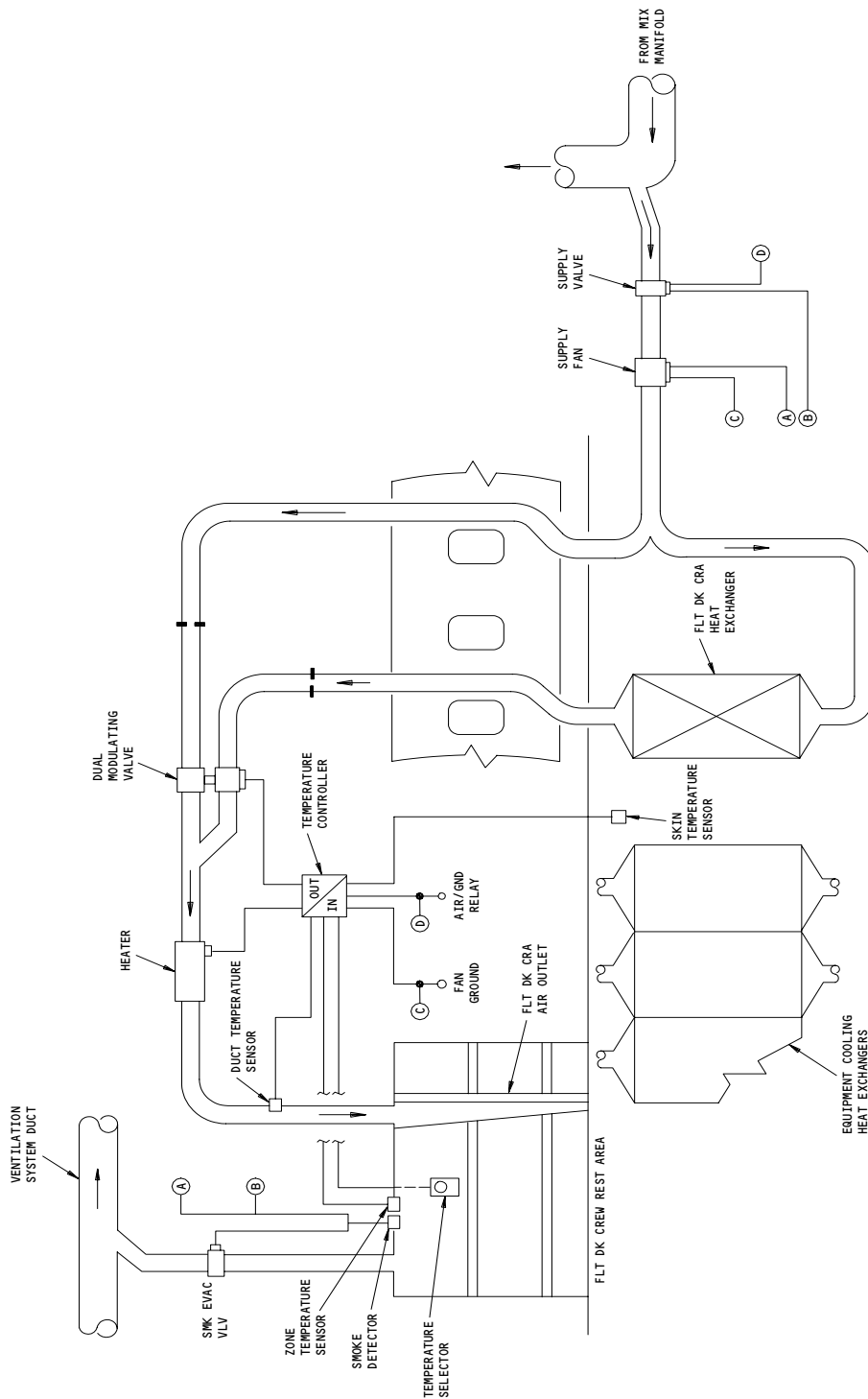
(L)

Crew Rest Area Temperature Control System
Figure 1 (Sheet 3)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

21-66-00

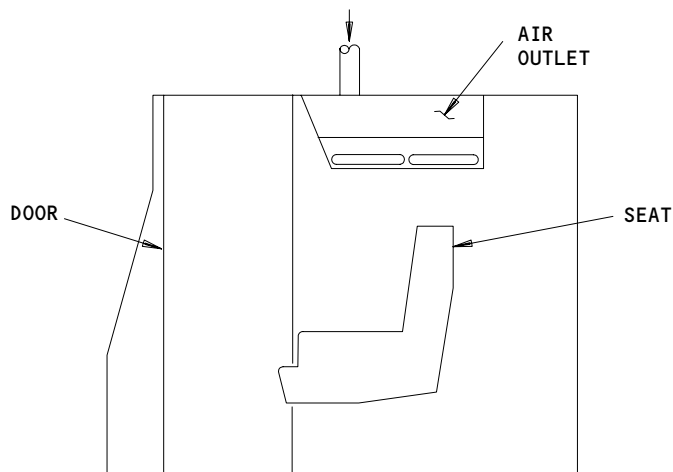
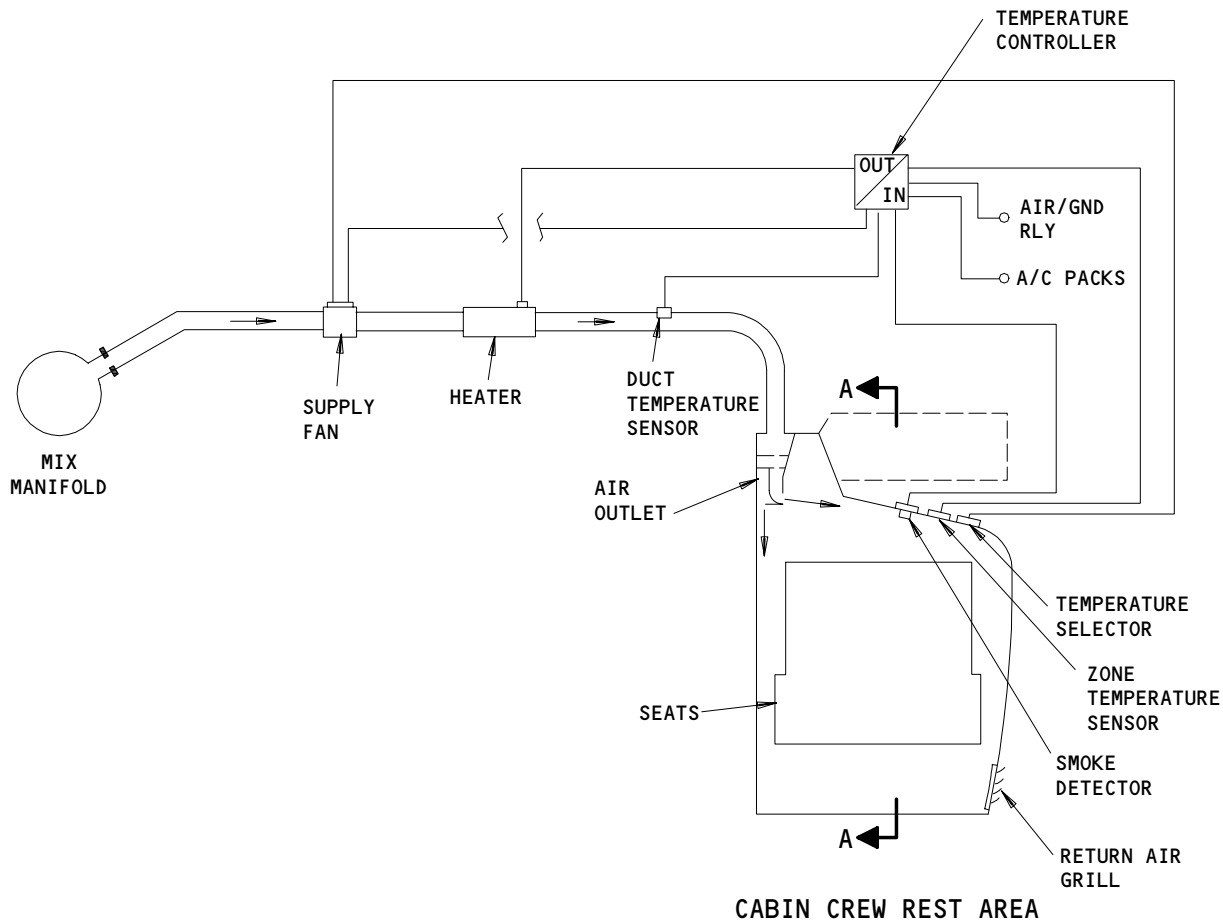
- (2) The temperature selector sends a signal to the CRA temperature controller to tell it the desired temperature for the CRA.
 - C. CRA Duct Temperature Sensor (Fig. 1)
 - (1) Each CRA duct temperature sensor sends a signal to the applicable CRA temperature controller to tell it the temperature of the air in the duct.
 - D. CRA Zone Temperature Sensor (Fig. 1)
 - (1) Each CRA zone temperature sensor sends a signal to the applicable CRA temperature controller to tell it the temperature of the air in the CRA.
 - E. CRA Heater (Fig. 1)
 - (1) The flight deck CRA heater is a two phase heater rated at 333 watts at 200/115 vac, 400Hz. The forward and aft CRA heaters are three phase heaters rated at 700 watts at 200/115 vac, 400Hz. The heaters receive a percentage of a zero crossover, pulse width modulated, 115 vac, 400 Hz signal from the applicable temperature controller. The signal from the controller determines the output of the heater.
 - F. Flight Deck CRA Skin Temperature Sensor (Fig. 1)
 - (1) The skin temperature sensor adheres to the inside of the airplane skin. It sends a signal to the flight deck CRA temperature controller of the temperature of the airplane skin.
3. Operation
- A. Functional Description – Flight Deck CRA System (Fig. 2)
 - (1) The flight deck CRA supply fan is the only component in the flight deck CRA system that is not controlled by the flight deck CRA temperature controller. It is controlled by an air/ground relay and the smoke detection system. The fan will come on when all of these conditions occur:
 - (a) The airplane is in the air.
 - (b) The FWD and AFT CARGO FIRE switch-lights, on the P8 panel, are not ARMED.
 - (c) Smoke is not detected in the flight deck CRA.
 - (d) The flight deck CRA shutoff valve is open.
 - (2) The condition of the supply fan is monitored by the flight deck CRA temperature controller. The controller receives signals from the air/ground relays and the smoke detection system. It also receives signals from the fan current sensor and the FAN CONT circuit breaker. The controller compares all of these signals to determine if the fan has failed. If the fan is on when it should be off, or if it is off when it should be on, then the controller sends a signal through ARINC 429 that a failure has occurred. Also, the message FLT REST SYS will show on the EICAS display.



FLT DK Crew Rest Area System
Figure 2

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

21-66-00

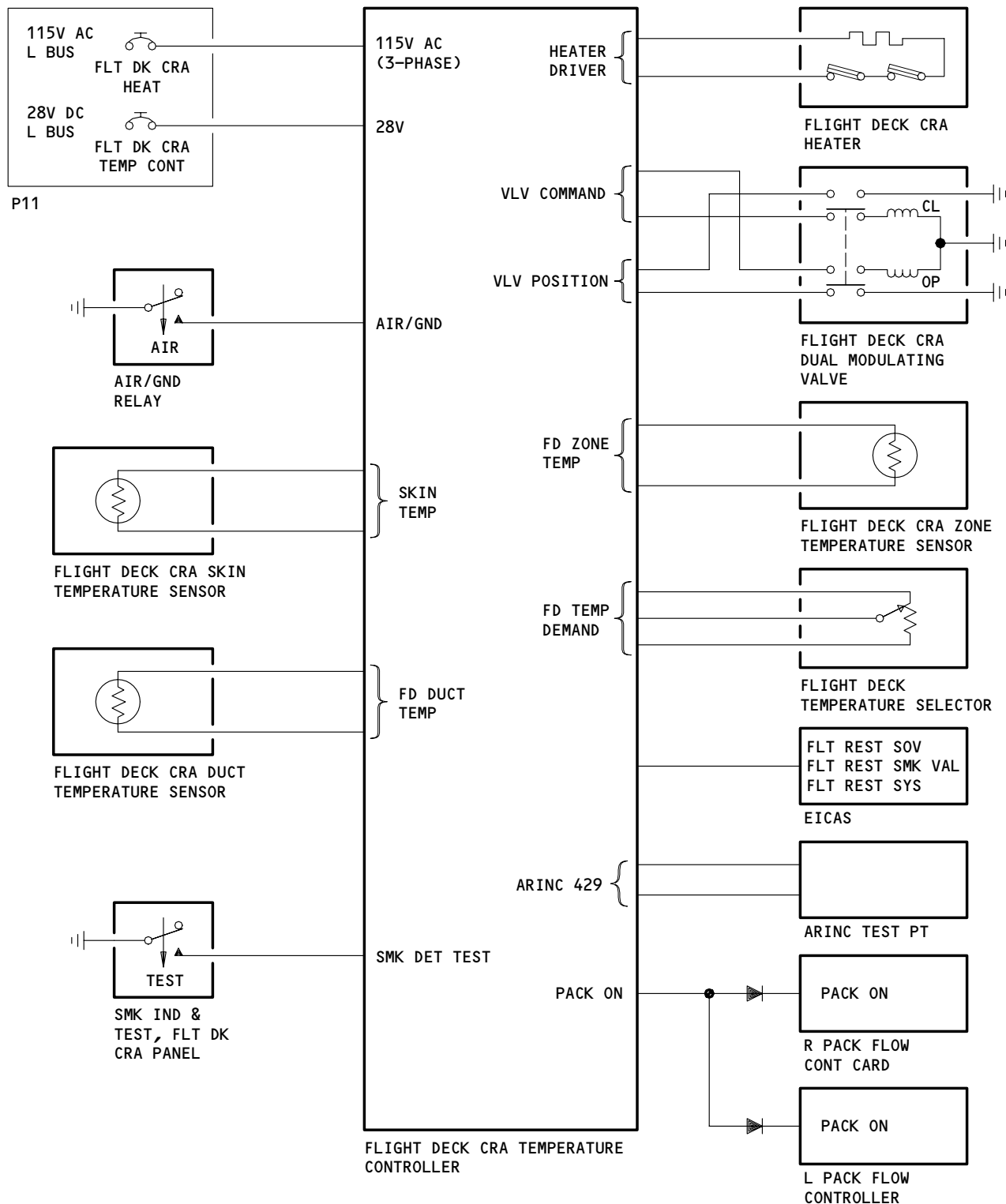


A-A
CABIN CREW REST AREA (EXAMPLE)

Cabin Crew Rest Area Temperature Control System
Figure 3

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

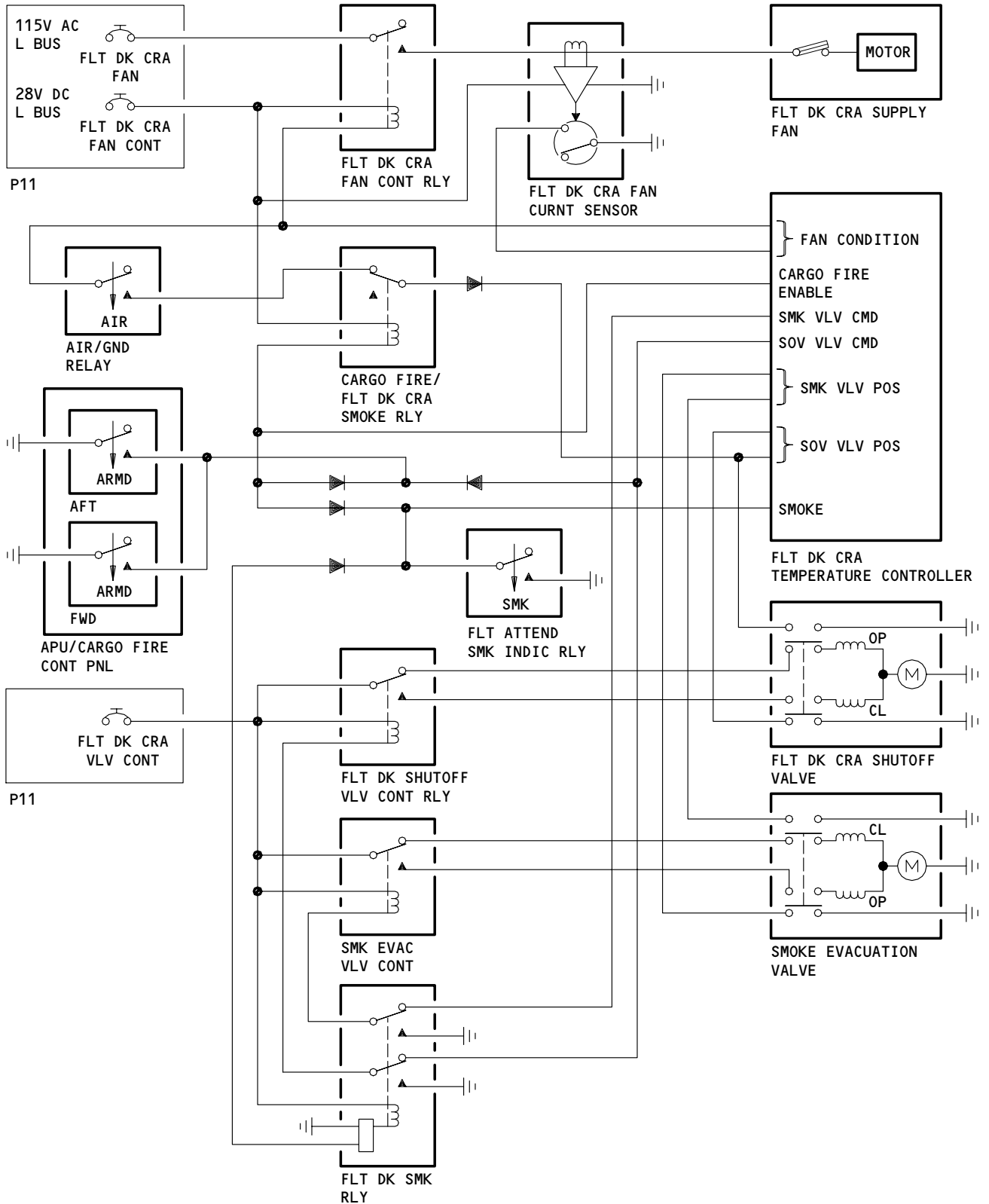
21-66-00



Flight Deck Crew Rest Area System
Figure 4 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

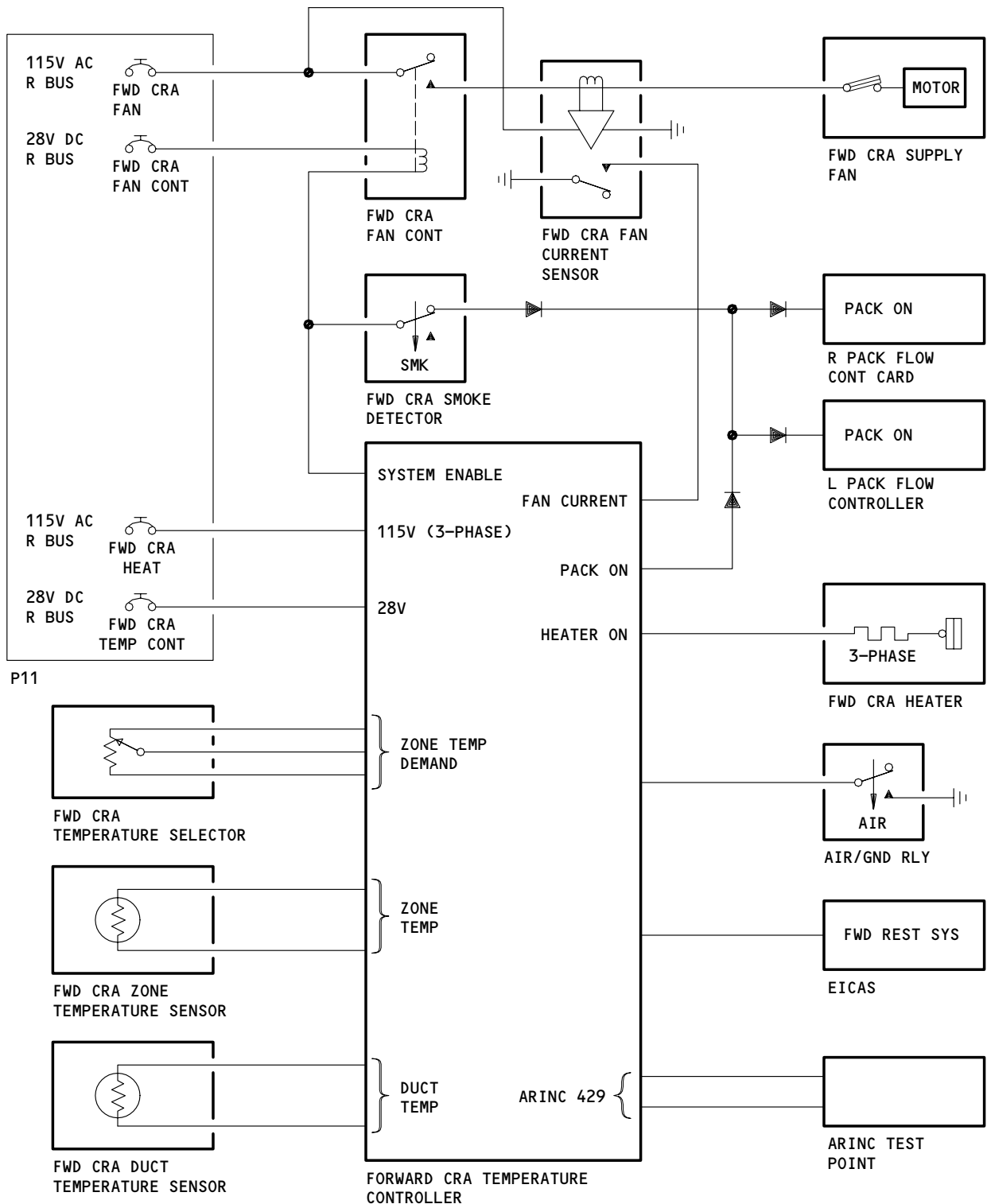
21-66-00



Flight Deck Crew Rest Area System
Figure 4 (Sheet 2)

EFFECTIVITY
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Forward Crew Rest Area System
(Aft Crew Rest Area Systems Similar)
Figure 5

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- (3) The flight deck CRA temperature controller controls the flight deck CRA shutoff valve, dual modulation valve, heater, and the smoke evacuation valve. It receives signals from the air/ground relays, the air cooling packs, the smoke detection system, the flight deck CRA temperature selector, duct temperature sensor, and zone temperature sensor to determine what command to send to the valves and heater.
- (4) The flight deck CRA shutoff valve is controlled and monitored by the flight deck CRA temperature controller. The shutoff valve opens when all of these conditions occur:
 - (a) The airplane is in the air.
 - (b) The FWD and AFT CARGO FIRE switch-lights, on the P8 panel, are not ARMED.
 - (c) No smoke is detected in the flight deck CRA.
- (5) A signal of the position of the shutoff valve is sent to the temperature controller. If the shutoff valve is not in the commanded position, then the controller sends a signal through the ARINC 429 that a failure has occurred. Also, the messages FLT REST SOV and FLT REST SYS will show on the EICAS display.
- (6) The flight deck CRA dual modulating valve is controlled and monitored by the flight deck CRA temperature controller. The dual modulating valve controls the airflow through two ducts. The valve is never fully closed because the two butterfly disks (one for each duct) are at 90 degrees to each other. When one disk is fully closed, the other disk will be fully open. Thus, when the heat exchanger duct is open, the bypass duct will be closed. When the heat exchanger duct is closed, then the bypass duct will be open. The valve modulates between the two positions to control the temperature of the air downstream of the valve. The position of the dual modulating valve is determined as follows:
 - (a) The bypass duct will be fully open when the airplane is on the ground. It will also be fully open when the airplane is in the air and the flight deck CRA skin temperature is greater than the flight deck CRA duct temperature.
 - (b) The bypass duct will start to close when the airplane is in the air and the skin temperature is greater than the duct temperature. How much the bypass duct closes (and the heat exchanger duct opens) is determined by the temperature demand. The valve will change positions so that the flight deck CRA zone temperature is the same as the demand by the temperature selector.
- (7) A signal of the position of the dual modulating valve is sent to the temperature controller. If the valve is not in the commanded position, then the controller sends a signal through the ARINC 429 that a failure has occurred. Also, the message FLT REST SYS will show on the EICAS display.

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AIRPLANES WITH CREW REST AREAS

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- (8) The flight deck CRA heater is controlled and monitored by the flight deck CRA temperature controller. The temperature controller sends a pulse-width modulated signal to the heater to control the output of the heater. The heater is given only the power that is necessary to make the flight deck CRA zone temperature the same as the temperature demanded by the temperature selector. The heater will come on when all of these conditions occur:
 - (a) The airplane is in the air.
 - (b) The bypass duct of the flight deck CRA dual modulating valve is fully open.
 - (c) The flight deck CRA supply fan is on.
 - (d) The zone temperature is less than the temperature demanded by the temperature selector.
- (9) The temperature controller can detect an open circuit in the heater logic. If an open circuit occurs, the controller sends a signal through the ARING 429 that a failure has occurred. Also, the message FLT REST SYS will show on the EICAS display.
- (10) The smoke evacuation valve is controlled and monitored by the flight deck CRA temperature controller. The smoke evacuation valve only opens when smoke is detected in the flight deck CRA. If the airplane is in the air when the valve opens, the valve will stay open (to clear the area of odors) until the airplane lands.
- (11) If smoke is detected in the flight deck CRA, relays external to the temperature controller will cause these conditions will occur:
 - (a) The flight deck CRA shutoff valve will close.
 - (b) The flight deck CRA supply fan will stop.
 - (c) The flight deck CRA smoke evacuation valve will open.
- (12) One minute after the smoke detection relay relaxes (no smoke is detected), the temperature controller will reset the CRA system. When the system is reset, all the components, except the smoke evacuation valve, will return to their usual operation. The smoke evacuation valve will stay open until the airplane is on the ground.
- (13) If a failure occurs in the flight deck CRA system, the heater will be switched off and the dual modulating valve will stay in its last commanded position. The supply fan will stay on and the shutoff valve will stay open.
- (14) A failure of the air cooling packs or the recirculation fans will not affect the CRA system. However, one pack must be on for the supply fan to stay on.
- (15) When the electrical power is first supplied to the flight deck CRA temperature controller, the controller BITE will cycle the shutoff valve and the smoke evacuation valve, to make sure they operate correctly.

B. Functional Description – Cabin Deck CRA System (Fig. 3)

- (1) There are three separate cabin CRAs: the forward CRA, the left aft CRA, and the right aft CRA. Each cabin CRA has its own temperature control system and operates independent of the other cabin CRAs. Each cabin CRA operates the same as the flight deck CRA system except without the shutoff valve, the dual modulating valve, and the smoke evacuation valve.
- (2) One of these messages will show on the EICAS display if a failure occurs in the cabin CRA systems:
 - (a) FWD REST SYS means that one component in the forward CRA system has failed.
 - (b) AFT REST SYS means that one component in the left aft or right aft CRAs has failed.

C. Built In Test Equipment (BITE)

- (1) Each CRA temperature controller has BITE to detect a failure in its CRA system. When a failure is detected, the EICAS display will show the applicable message: FLT (or FWD, or AFT) REST SYS. Also, a signal of the failure is sent through the ARINC 429 output bus on the label 350. To find the specific failure in the CRA system, you must connect an ARINC reader to the ARINC outlet in the main equipment center. The ARINC reader will display which bits of the bus are energized (an energized bit = 1, a relaxed bit = 0). The bits indicate which components have failed. Here is a list of the bits that indicate failures:
 - (a) Bit 30=1 and Bit 31=1. This means that the controller operation is normal.
 - (b) If bit 11=1, the temperature selector failed.
 - (c) If bit 12=1, the heater failed.
 - (d) If bit 13=1, the temperature controller failed.
 - (e) If bit 14=1, the ARINC input bus failed.
 - (f) If bit 15=1, the zone temperature sensor failed.
 - (g) If bit 16=1, the duct temperature sensor failed.
 - (h) If bit 17=1, the skin temperature sensor failed. **
 - (i) If bit 18=1, the shutoff valve failed. **
 - (j) If bit 19=1, the dual modulation valve failed. **
 - (k) If bit 20=1, the smoke evacuation valve failed. **
 - (l) If bit 21=1, the supply fan failed.** These components are only on the flight deck CRA system.

D. Control

- (1) Supply electrical power (Ref 24-22-00).
- (2) Make sure the applicable circuit breakers, on the P36 panel, are closed:
 - (a) FLT DK CREW REST HEAT
 - (b) FLT DK CREW REST FAN
 - (c) FLT DK CREW REST VLV CONT
 - (d) FLT DK CREW REST HEAT CONT

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- (e) FLT DK CREW REST FAN CONT
 - (f) AFT LH CREW REST HEAT
 - (g) AFT LH CREW REST FAN
 - (h) AFT LH CREW REST TEMP CONT
 - (i) AFT LH CREW REST FAN CONT
- (3) Make sure the applicable circuit breakers, on the P37 panel, are closed:
- (a) FWD CREW REST HEAT
 - (b) FWD CREW REST FAN
 - (c) FWD CREW REST TEMP CONT
 - (d) FWD CREW REST FAN CONT
 - (e) AFT RH CREW REST HEAT
 - (f) AFT RH CREW REST FAN
 - (g) AFT RH CREW REST TEMP CONT
 - (h) AFT RH CREW REST FAN CONT

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CREW REST AIR CONDITIONING SYSTEM – ADJUSTMENT/TEST

1. General

- A. This procedure has instructions to do an Operational Test and a System Test for the air conditioning systems in each crew rest area.

TASK 21-66-00-715-050

2. Operational Test – Crew Rest Air Conditioning

A. References

- (1) AMM 24-22-00/201, Electrical Power – Control
- (2) AMM 27-61-00/201, Spoiler/Speedbrake Control System
- (3) AMM 32-09-02/201, Air/Ground Relay
- (4) AMM 36-00-00/201, Pneumatic – General

B. Access

- (1) Location Zones
 - 135 Environmental control system (ECS) bay (Left)
 - 200 Upper half of the fuselage
- (2) Access Door
 - 193NL Environmental control system bay

C. Prepare for the Test

S 865-051

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-052

- (2) Supply pneumatic power (AMM 36-00-00/201) or do the steps that follow:
 - (a) Open this circuit breaker, on the overhead circuit breaker panel, P11:
 - 1) 11A13, LEFT PACK FLOW CONT
 - (b) Open the left ECS access door, 193NL (Ref 06-41-00).
 - (c) Disconnect the electrical connector, D2770, from the flow control valve for the left cooling pack.

S 865-053

- (3) Close these circuit breakers, on the P11 panel:
 - (a) 11A13, LEFT PACK FLOW CONT
 - (b) 11N10, LEFT PACK AUTO PWR
 - (c) 11N11, LEFT PACK AUTO CONT
 - (d) 11N24, L PACK PWR STBY
 - (e) 11N25, L PACK CONT STBY

S 865-054

- (4) Turn the L PACK selector, on the P5 panel, to the AUTO position.

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S 865-055

- (5) Push the ECS MSG switch on the EICAS MAINT panel, on the right side panel, P61.

D. Do the Test

S 865-056

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel, P36:
 - (a) 36B1 or 36C4, AFT LH CBN CREW REST AREA FAN
 - (b) 36B4 or 36C7, AFT LH CBN CREW REST AREA HEAT
 - (c) 36C4 or 36B4, FLT DK CREW REST AREA HEAT
 - (d) 36C7 or 36B1, FLT DK CREW REST AREA FAN
 - (e) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (f) 36D4 or 36L3, FLT DK CREW REST AREA FAN CONT
 - (g) 36D5 or 36L4, AFT LH CBN CREW REST AREA FAN CONT
 - (h) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 865-057

- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel, P37:
 - (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B7, AFT RH CBN CREW REST AREA HEAT
 - (c) 37C4 or 37D2, FWD CBN CREW REST AREA FAN
 - (d) 37C7, AFT RH CBN CREW REST AREA FAN
 - (e) 37D6 or 37K3, FWD CBN CREW REST AREA FAN CONT
 - (f) 37D7 or 37K2, AFT RH CBN CREW REST AREA FAN CONT
 - (g) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (h) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 215-058

- (3) Make sure these EICAS messages show on the bottom display:
 - (a) The EICAS message, FLT REST SYS
 - (b) The EICAS message, FWD CAB REST SYS
 - (c) The EICAS message, AFT CAB REST SYS

S 865-059

- (4) Close these circuit breakers, on the left miscellaneous electrical equipment panel, P36:
 - (a) 36B1 or 36C4, AFT LH CBN CREW REST AREA FAN
 - (b) 36B4 or 37C7, AFT LH CBN CREW REST AREA HEAT
 - (c) 36C4 or 36B4, FLT DK CREW REST AREA HEAT
 - (d) 36C7 or 36B1, FLT DK CREW REST AREA FAN
 - (e) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (f) 36D4 or 36L3, FLT DK CREW REST AREA FAN CONT
 - (g) 36D5 or 36L4, AFT LH CBN CREW REST AREA FAN CONT

(h) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 865-060

- (5) Close these circuit breakers, on the right miscellaneous electrical equipment panel, P37:
- (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B7, AFT RH CBN CREW REST AREA HEAT
 - (c) 37C4 or 37D2, FWD CBN CREW REST AREA FAN
 - (d) 37C7, AFT RH CBN CREW REST AREA FAN
 - (e) 37D6 or 37K3, FWD CBN CREW REST AREA FAN CONT
 - (f) 37D7 or 37K2, AFT RH CBN CREW REST AREA FAN CONT
 - (g) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (h) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 865-061

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL THE PERSONS AND THE EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT.

- (6) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all the persons and the equipment away from the spoilers.

S 865-062

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (7) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).

S 215-063

- (8) Make sure these EICAS messages do not show on the bottom display:
- (a) The EICAS message, FLT REST SYS
 - (b) The EICAS message, FWD CAB REST SYS
 - (c) The EICAS message, AFT CAB REST SYS

S 715-064

- (9) Make sure the supply fan for each crew rest area (CRA) comes on.

S 715-065

- (10) Feel the A/C outlet in each CRA to make sure air flows into the CRA.

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S 715-066

- (11) Do the CARGO FIRE Switch-light Test
- (a) Push the AFT CARGO FIRE switch-light, on the pilot's control stand panel, P8, to the ARMED position.
 - 1) Make sure the ARMED light comes on.
 - (b) Make sure the supply fan for the flight crew rest area (CRA) stops.
 - (c) Feel the A/C outlet in the flight CRA to make sure no air flows into this area.
 - (d) Push the AFT CARGO FIRE switch-light, on the P8 panel, to the off position.
 - 1) Make sure the ARMED light is not on.
 - (e) After 20 seconds, make sure the supply fan for each CRA comes on.
 - (f) Feel the A/C outlet in each CRA to make sure air flows into the CRA.
 - (g) Push the FWD CARGO FIRE switch-light, on the P8 panel, to the ARMED position.
 - 1) Make sure the ARMED light comes on.
 - (h) Make sure the supply fan for each crew rest area (CRA) stops.
 - (i) Feel the A/C outlet in each CRA to make sure no air flows into this area.
 - (j) Push the FWD CARGO FIRE switch-light, on the P8 panel, to the off position.
 - 1) Make sure the ARMED light goes off.
 - (k) After 20 seconds, make sure the fan for each CRA comes on.
 - (l) Feel the A/C outlet in each CRA to make sure the air flows into the CRA.

E. Put the airplane back to its usual condition

S 865-067

- (1) Put the airplane back to the ground mode (AMM 32-09-02/201).

S 865-068

- (2) If you did the deactivation procedure for the spoilers, do the activation procedure (AMM 27-61-00/201).

S 865-069

- (3) Remove the pneumatic power, if it is not necessary (AMM 36-00-00/201) or do the steps that follow:
- (a) Open this circuit breaker, on the P11 panel:
 - 1) 11A13, LEFT PACK FLOW CONT
 - (b) Connect the electrical connector, D2770, to the left flow control valve.
 - (c) Close the left ECS access door, 193NL (AMM 06-41-00/201).

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- (d) Close this circuit breaker, on the P11 panel:
1) 11A13, LEFT PACK FLOW CONT

S 865-070

- (4) Turn the L PACK selector, on the P5 panel, to the OFF position.

S 865-071

- (5) Remove the electrical power, if it is not necessary
(AMM 24-22-00/201).

TASK 21-66-00-735-072

3. System Test - Crew Rest Air Conditioning

A. Equipment

- (1) ARINC 429 Data Bus Analyzer - JcAIR Instrumentation (preferred)
400 Industrial Parkway,
Industrial Airport, KS 66031
- Interface Technology (optional)
150 E. Arrow Highway,
San Dimas, CA 91773
- (2) Decade Box, Range 0 to 10,000 Ohms - commercially available
(3) Dry Ice - commercially available
(4) AC Voltmeter, Range 0 to 200 VAC - commercially available

B. References

- (1) AMM 06-41-00/201, Fuselage Access Doors and Panels
(2) AMM 06-46-00/201, Entry, Service, and Cargo Doors Access Doors and Panels
(3) AMM 24-22-00/201, Electrical Power - Control
(4) AMM 27-61-00/201, Spoiler/Speedbrake Control System
(5) AMM 32-09-02/201, Air/Ground Relay
(6) AMM 36-00-00/201, Pneumatic - General

C. Access

- (1) Location Zones
121 Forward Cargo Compartment (Left)
135 Environmental control system (ECS) bay (Left)
200 Upper Half of Fuselage
- (2) Access Door
193NL Environmental control system bay

D. Prepare for the test

S 865-073

- (1) Supply electrical power (AMM 24-22-00/201).

S 865-074

- (2) Close these circuit breakers, on the pilot's overhead circuit breaker panel, P11:
(a) 11A13, LEFT PACK FLOW CONT
(b) 11N10, LEFT PACK AUTO PWR

- (c) 11N11, LEFT PACK AUTO CONT
- (d) 11N24, L PACK STANDBY PWR
- (e) 11N25, L PACK CONT STBY

S 865-075

- (3) Close these circuit breakers, on the left miscellaneous electrical equipment panel, P36:
 - (a) 36B1 or 36C4, AFT LH CBN CREW REST AREA FAN
 - (b) 36B4 or 36C7, AFT LH CBN CREW REST AREA HEAT
 - (c) 36C4 or 36B4, FLT DK CREW REST AREA HEAT
 - (d) 36C7 or 36B1, FLT DK CREW REST AREA FAN
 - (e) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (f) 36D4 or 36L3, FLT DK CREW REST AREA FAN CONT
 - (g) 36D5 or 36L4, AFT LH CBN CREW REST AREA FAN CONT
 - (h) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 865-076

- (4) Close these circuit breakers, on the right miscellaneous electrical equipment panel, P37:
 - (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B7, AFT RH CBN CREW REST AREA HEAT
 - (c) 37C4 or 37D2, FWD CBN CREW REST AREA FAN
 - (d) 37C7, AFT RH CBN CREW REST AREA FAN
 - (e) 37D6 or 37K3, FWD CBN CREW REST AREA FAN CONT
 - (f) 37D7 or 37K2, AFT RH CBN CREW REST AREA FAN CONT
 - (g) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (h) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 865-077

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL THE PERSONS AND THE EQUIPMENT AWAY FROM THE SPOILERS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT.

- (5) Do the deactivation procedure for the spoilers (AMM 27-61-00/201) or move all the persons and the equipment away from the spoilers.

S 865-078

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (6) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).

- S 865-079
- (7) Turn the L PACK selector, on the P5 panel, to the AUTO position.
- S 865-080
- (8) Open this circuit breaker, on the P11 panel:
- (a) 11A13, LEFT PACK FLOW CONT
- S 015-081
- (9) Open the left ECS access door, 193NL (Ref 06-41-00).
- S 035-082
- (10) Disconnect the electrical connector, D2770, from the flow control valve for the left cooling pack.
- S 865-083
- (11) Close this circuit breaker, on the P11 panel:
- (a) 11A13, LEFT PACK FLOW CONT
- S 015-084
- (12) Get access to the shutoff valve, supply fan, and the skin temperature sensor for the flight compartment CRA.
- (a) Open the forward cargo door, 821 (AMM 06-46-00/201).
- (b) Remove the left cargo sidewall lining, 10 feet (3 meters) forward of the aft end of the forward cargo compartment (AMM 25-52-01/401).
- S 015-085
- (13) Get access to the dual modulating valve.
- (a) Remove the sculptured ceiling panel on the left side of the passenger cabin, approximately 17 feet (5 meters) aft of the flight compartment CRA.
- S 015-086
- (14) Get access to the smoke evacuation valve.
- (a) Lower the ceiling access panel in the flight compartment CRA.
- S 015-087
- (15) Get access to the zone temperature sensors.
- (a) For the zone temperature sensor in the flight compartment CRA, lower the access panel in the ceiling of the flight compartment CRA.
- (b) For the zone temperature sensor in the forward CRA, remove the sculptured ceiling panel, immediately to the left of the forward CRA.

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- (c) For the zone temperature sensor in the left aft CRA, remove the sculptured ceiling panel, immediately to the right of the left aft CRA.
- (d) For the zone temperature sensor in the right aft CRA, remove the sculptured ceiling panel, immediately to the left of the right aft CRA.

S 015-088

- (16) Get access to the heaters.
 - (a) For the flight compartment CRA heater, remove the sculptured ceiling panel, immediately to the left and aft of the flight compartment CRA.
 - (b) For the forward CRA heater, remove the sculptured ceiling panel, immediately to the left and aft of the forward CRA.
 - (c) For the left aft CRA heater, remove the sculptured ceiling panel, immediately to the right and forward of the left aft CRA.
 - (d) For the right aft CRA heater, remove the sculptured ceiling panel, immediately to the left and forward of the right aft CRA.

E. Do the Test for the Flight Compartment Crew Rest Area

S 735-089

- (1) Do the temperature control test
 - (a) Open this circuit breaker, on the P36 panel:
 - 1) 36C4 or 36B4, FLT DK CREW REST HEAT
 - (b) Remove the electrical connector, D13870, from the heater for the flight compartment CRA.
 - (c) Install a jumper between pin 1 of the electrical connector and pin 1 of the heater.
 - (d) Install a jumper between pin 2 of the electrical connector and pin 2 of the heater.
 - (e) Install a jumper between pin 4 of the electrical connector and pin 4 of the heater.
 - (f) Connect the voltmeter between pin 2 and pin 4 of the electrical connector.
 - (g) Disconnect the electrical connector, D2603, from the compartment temperature sensor for the flight compartment CRA.
 - (h) Connect the decade box to the pins 1 and 2 of the electrical connector, D2603.
 - (i) Apply the dry ice to the skin temperature sensor for the flight compartment CRA.
 - (j) Wait 5 minutes for the temperature of the sensor to decrease.
 - (k) Turn the temperature selector in the flight compartment CRA to the fully warm position.

- (l) Set the decade box resistance to 5300 Ohms (which simulates 65 F).
- (m) Close this circuit breaker, on the P36 panel:
 - 1) 36C4 or 36B4, FLT DK CREW REST HEAT
- (n) Make sure the position indicator on the dual modulating valve is in the HOT position.
- (o) Make sure the voltmeter shows 200 +/- 15 VAC.
- (p) Make sure the EICAS message, FLT REST SYS, does not show on the bottom display.
- (q) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (r) Make sure the voltmeter shows 0 +/- 15 VAC.
- (s) Listen for the supply fan for the flight compartment CRA to stop.
- (t) After 20 seconds, make sure the shutoff valve for the flight compartment CRA closes.

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (u) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).
- (v) Make sure the voltmeter shows 200 +/- 15 VAC.
- (w) Set the decade box to 3300 Ohms (which simulates 86 F).
- (x) Turn the temperature selector in the flight compartment CRA to the full cold position.
- (y) Make sure the position indicator on the dual modulating valve moves to the COLD position.
- (z) Make sure the voltmeter shows 0 +/- 15 VAC.
- (aa) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (ab) Make sure the position indicator on the dual modulating valve moves to the HOT position.
- (ac) Make sure the voltmeter shows 0 +/- 15 VAC.
- (ad) Remove the voltmeter from the pins 2 and 4 of the electrical connector, D13870.
- (ae) Remove the jumpers from the pins 1, 2, and 4 of the electrical connector and the heater.
- (af) Connect the electrical connector, D13870, to the heater.
- (ag) Remove the dry ice from the airplane skin.

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- (2) Do the Failure Indication Test.

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WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (a) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).
- (b) After 20 seconds, make sure the shutoff valve for the flight compartment CRA is open.
- (c) Make sure the supply fan for the flight compartment CRA is on.
- (d) Open this circuit breaker, on the P36 panel:
1) 36D2 or 36L1, FLT DK CREW REST VLV CONT
- (e) Disconnect the electrical connector, D2605, from the smoke evacuation valve.
- (f) After 90 seconds, make sure the EICAS message, FLT REST SYS, shows on the bottom display.
- (g) Push the STATUS DISPLAY switch, on the P9 panel.
- (h) Make sure the EICAS message, FLT REST SMK VAL, shows on the bottom display.
- (i) Connect the electrical connector, D2605, to the smoke evacuation valve.
- (j) Close this circuit breaker, on the P36 panel:
1) 36D2 or 36L1, FLT DK CREW REST VLV CONT
- (k) Open, then close this circuit breaker, on the P36 panel:
1) 36C4 or 36B4, FLT DK CREW REST HEAT
- (l) Make sure the EICAS message, FLT REST SMK VAL, does not show on the bottom display.
- (m) Push the ECS MSG switch, on the P61 panel.
- (n) Make sure the EICAS message, FLT REST SYS, does not show on the EICAS display.
- (o) Connect the ARINC reader to the burndy block TB318, in the P36 panel.
1) Connect the red wire (high) of the ARINC reader to the pin XA9 of the burndy block TB318.
2) Connect the black wire (low) of the ARINC reader to the pin XA10 of the burndy block TB318.
- (p) Apply power to the ARINC reader.
- (q) Use the thumb switches on the front of the ARINC reader to set the label to 350.
- (r) After 2 minutes, make sure the bits on the ARINC reader screen show like this:

BIT NO.	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	
	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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- (s) If the bits 28, 30, or 31 are set to 0, then the system has a failure. If one of the other bits are set to 1, then an LRU failure has occurred. The table below shows the bit for each LRU.

BIT NO	LRU
11	Temperature Selector
12	Heater
13	Temperature Controller
14	Input Bus
15	Compartment Temperature Sensor
16	Duct Temperature Sensor
17	Skin Temperature Sensor
18	Shutoff Valve
19	Dual Modulating Valve
20	Smoke Evacuation Valve
21	Supply Fan

- (t) Remove the power from the ARINC reader.
 (u) Disconnect the ARINC reader from the burndy block TB318.
 (v) Remove the decade box from the electrical connector, D2603, for the compartment temperature sensor for the flight compartment CRA.
 (w) Connect the electrical connector, D2603, to the compartment temperature sensor for the flight compartment CRA.

F. Do the Test for the Forward Crew Rest Area

S 735-091

- (1) Do the temperature control test
- Open this circuit breaker, on the P37 panel:
 - 37B4, FWD CREW REST HEAT
 - Remove the electrical connector, D13884, from the heater for the forward CRA.
 - Install a jumper between pin 1 of the electrical connector and pin 1 of the heater.
 - Install a jumper between pin 2 of the electrical connector and pin 2 of the heater.
 - Install a jumper between pin 4 of the electrical connector and pin 4 of the heater.

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- (f) Connect the voltmeter between pin 2 and pin 4 of the electrical connector.
- (g) Disconnect the electrical connector, D13882, from the duct temperature sensor for the forward CRA.
- (h) Connect a decade box to the pins 1 and 2 of the electrical connector, D13882.
- (i) Set the decade box resistance to 2350 Ohms (this simulates 70 F).
- (j) Disconnect the electrical connector, D13888, from the compartment temperature sensor for the forward CRA.
- (k) Connect a decade box to the pins 1 and 2 of the electrical connector.
- (l) Turn the temperature selector in the forward CRA to the fully warm position.
- (m) Set the decade box resistance for the compartment temperature sensor to 5300 Ohms (which simulates 65 F).
- (n) Close this circuit breaker, on the P37 panel:
 - 1) 37B4, FWD CREW REST HEAT
- (o) Make sure the voltmeter shows 200 +/- 15 VAC.
- (p) Make sure the EICAS message, FWD CAB REST SYS, does not show on the bottom display.
- (q) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (r) Make sure the voltmeter shows 0 +/- 15 VAC.
- (s) Listen to make sure the supply fan for the forward CRA is on.

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (t) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).
- (u) Make sure the voltmeter shows 200 +/- 15 VAC.
- (v) Set the decade box for the compartment temperature sensor to 3300 Ohms (which simulates 86 F).
- (w) Turn the temperature selector in the forward CRA to the full cold position.
- (x) Make sure the voltmeter shows 0 +/- 15 VAC.
- (y) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (z) Make sure the voltmeter shows 0 +/- 15 VAC.
- (aa) Remove the voltmeter from the pins 2 and 4 of the electrical connector, D13884.
- (ab) Remove the jumpers from the pins 1, 2, and 4 of the electrical connector and the heater.
- (ac) Connect the electrical connector, D13884, to the heater.

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- (2) Do the Failure Indication Test.

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (a) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (Ref 32-09-02).
- (b) Make sure the supply fan for the forward CRA is on.
- (c) Make sure the EICAS message, FWD CAB REST SYS, does not show on the bottom display.
- (d) Open this circuit breaker, on the P37 panel:
 - 1) 37B4, FWD CREW REST HEAT
- (e) Make sure the EICAS message, FWD CAB REST SYS, shows on the bottom display.
- (f) Close this circuit breaker, on the P37 panel:
 - 1) 37B4, FWD CREW REST HEAT
- (g) Make sure the EICAS message, FWD CAB REST SYS, does not show on the bottom display.
- (h) Open this circuit breaker, on the P37 panel:
 - 1) 37D6 or 37K3, FWD CREW REST FAN CONT
- (i) After 30 seconds, make sure the EICAS message, FWD CAB REST SYS, shows on the bottom display.
- (j) Close this circuit breaker, on the P37 panel:
 - 1) 37D6, or 37K3 FWD CREW REST FAN CONT
- (k) Open, then close this circuit breaker, on the P37 panel:
 - 1) 37B4, FWD CREW REST HEAT
- (l) Make sure the EICAS message, FWD CREW REST SYS, does not show on the bottom display.
- (m) Connect the ARINC reader to the burndy block TB318, in the P36 panel.
 - 1) Connect the red wire (high) of the ARINC reader to the pin XB9 of the burndy block TB318.
 - 2) Connect the black wire (low) of the ARINC reader to the pin XB10 of the burndy block TB318.
- (n) Apply power to the ARINC reader.
- (o) Use the thumb switches on the front of the ARINC reader to set the label to 350.
- (p) After 2 minutes, make sure the bits on the ARINC reader screen show like this:

BIT NO.	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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- (q) If the bits 28, 30, or 31 are set to 0, then the system has a failure. If one of the other bits are set to 1, then an LRU failure has occurred. The table below shows the bit for each LRU.

BIT NO	LRU
11	Temperature Selector
12	Heater
13	Temperature Controller
14	Input Bus
15	Compartment Temperature Sensor
16	Duct Temperature Sensor
17	Not Used
18	Not Used
19	Not Used
20	Not Used
21	Supply Fan

- (r) Open this circuit breaker, on the P37 panel:
1) 37D6 or 37K3, FWD CREW REST FAN CONT

- (s) Make sure bit 21 is set to 1.

NOTE: Bit 28 can be set to 1 or 0.

- (t) Close this circuit breaker, on the P37 panel:

1) 37D6 or 37K3, FWD CREW REST FAN CONT

- (u) Put the airplane back to the ground mode (AMM 32-09-02/201).

- (v) Make sure the EICAS message, FWD CAB REST SYS, shows on the bottom display.

- (w) Make sure the bit 21 is set to 1.

- (x) Open, then close this circuit breaker, on the P37 panel:

1) 37B4, FWD CREW REST HEAT

- (y) Make sure the EICAS message, FWD CAB REST SYS, does not show on the bottom display.

- (z) After 2 minutes, make sure the bit 21 is set to 0.

- (aa) Remove the power from the ARINC reader.

- (ab) Disconnect the ARINC reader from the burndy block TB318.

- (ac) Remove the decade box from the electrical connector, D13880, for the compartment temperature sensor for the forward CRA.

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- (ad) Connect the electrical connector, D13880, to the compartment temperature sensor for the forward CRA.
 - (ae) Remove the decade box from the electrical connector, D13882, for the duct temperature sensor for the forward CRA.
 - (af) Connect the electrical connector, D13882, to the duct temperature sensor for the forward CRA.
- G. Do the Test for the Left Aft Crew Rest Area

S 735-093

- (1) Do the temperature control test
 - (a) Open this circuit breaker, on the P36 panel:
 - 1) 36B4 or 36C7, AFT LH CREW REST HEAT
 - (b) Remove the electrical connector, D13894, from the heater for the left aft CRA.
 - (c) Install a jumper between pin 1 of the electrical connector and pin 1 of the heater.
 - (d) Install a jumper between pin 2 of the electrical connector and pin 2 of the heater.
 - (e) Install a jumper between pin 4 of the electrical connector and pin 4 of the heater.
 - (f) Connect the voltmeter between pin 2 and pin 4 of the electrical connector.
 - (g) Disconnect the electrical connector, D13890, from the duct temperature sensor for the left aft CRA.
 - (h) Connect a decade box to the pins 1 and 3 of the electrical connector.
 - (i) Set the decade box resistance to 2350 Ohms (this simulates 70 F).
 - (j) Disconnect the electrical connector, D13892, from the compartment temperature sensor for the left aft CRA.
 - (k) Connect the decade box to the pins 1 and 2 of the electrical connector.
 - (l) Turn the temperature selector in the left aft CRA to the fully warm position.
 - (m) Set the decade box resistance for the compartment temperature sensor to 5300 Ohms (which simulates 65 F).
 - (n) Close this circuit breaker, on the P36 panel:
 - 1) 36B4 or 36C7, AFT LH CREW REST HEAT
 - (o) Make sure the voltmeter shows 200 +/- 15 VAC.
 - (p) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
 - (q) Put the airplane back to the ground mode (AMM 32-09-02/201).
 - (r) Make sure the voltmeter shows 0 +/- 15 VAC.
 - (s) Listen to make sure the supply fan for the left aft CRA is on.

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (t) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).

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- (u) Make sure the voltmeter shows 200 +/- 15 VAC.
- (v) Set the decade box for the compartment temperature sensor to 3300 Ohms (which simulates 86 F).
- (w) Turn the temperature selector in the left aft CRA to the full cold position.
- (x) Make sure the voltmeter shows 0 +/- 15 VAC.
- (y) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (z) Make sure the voltmeter shows 0 +/- 15 VAC.
- (aa) Remove the voltmeter from the pins 2 and 4 of the electrical connector, D13894.
- (ab) Remove the jumpers from the pins 1, 2, and 4 of the electrical connector and the heater.
- (ac) Connect the electrical connector, D13894, to the heater.

S 735-094

- (2) Do the Failure Indication Test.

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (a) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).
- (b) Make sure the supply fan for the left aft CRA is on.
- (c) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
- (d) Open this circuit breaker, on the P36 panel:
 - 1) 36B4 or 36C7, AFT LH CREW REST HEAT
- (e) Make sure the EICAS message, AFT LH CAB REST SYS, shows on the bottom display.
- (f) Close this circuit breaker, on the P36 panel:
 - 1) 36B4 or 36C7, AFT LH CREW REST HEAT
- (g) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
- (h) Open this circuit breaker, on the P36 panel:
 - 1) 36D5 or 36L4, AFT LH CREW REST FAN CONT
- (i) After 30 seconds, make sure the EICAS message, AFT CAB REST SYS, shows on the bottom display.
- (j) Close this circuit breaker, on the P36 panel:
 - 1) 36D5 or 36L4, AFT LH CREW REST FAN CONT
- (k) Open, then close this circuit breaker, on the P36 panel:
 - 1) 36B4 or 36C7, AFT LH CREW REST HEAT
- (l) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.

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- (m) Connect the ARINC reader to the burndy block TB318, in the P36 panel.
 - 1) Connect the red wire (high) of the ARINC reader to the pin XC9 of the burndy block TB318.
 - 2) Connect the black wire (low) of the ARINC reader to the pin XC10 of the burndy block TB318.
- (n) Apply power to the ARINC reader.
- (o) Use the thumb switches on the front of the ARINC reader to set the label to 350.
- (p) After 2 minutes, make sure the bits on the ARINC reader screen show like this:

BIT NO.	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

- (q) If the bits 28, 30, or 31 are set to 0, then the system has a failure. If one of the other bits are set to 1, then an LRU failure has occurred. The table below shows the bit for each LRU.

BIT NO	LRU
11	Temperature Selector
12	Heater
13	Temperature Controller
14	Input Bus
15	Compartment Temperature Sensor
16	Duct Temperature Sensor
17	Not Used
18	Not Used
19	Not Used
20	Not Used
21	Supply Fan

- (r) Open this circuit breaker, on the P36 panel:
 - 1) 36D5 or 36L4, AFT LH CREW REST FAN CONT
- (s) Make sure the EICAS message, AFT CAB REST SYS, shows on the bottom display.

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(t) Make sure the bit 21 is set to 1.

NOTE: Bit 28 can be set to 0 or 1.

- (u) Close this circuit breaker, on the P36 panel:
 - 1) 36D5 or 36L4, AFT LH CREW REST FAN CONT
- (v) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (w) Make sure the EICAS message, AFT CAB REST SYS, shows on the bottom display.
- (x) Make sure the bit 21 is set to 1.
- (y) Open, then close this circuit breaker, on the P36 panel:
 - 1) 36B4 or 36C7, AFT LH CREW REST HEAT
- (z) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
- (aa) After 2 minutes, make sure the bit 21 is set to 0.
- (ab) Remove the power from the ARINC reader.
- (ac) Disconnect the ARINC reader from the burndy block TB318.
- (ad) Remove the decade box from the electrical connector, D13890, for the duct temperature sensor for the left aft CRA.
- (ae) Connect the electrical connector, D13890, to the duct temperature sensor for the left aft CRA.
- (af) Remove the decade box from the electrical connector, D13892, for the compartment temperature sensor for the left aft CRA.
- (ag) Connect the electrical connector, D13892, to the compartment temperature sensor for the left aft CRA.

H. Do the Test for the Right Aft Crew Rest Area

S 735-095

- (1) Do the temperature control test
 - (a) Open this circuit breaker, on the P37 panel:
 - 1) 37B7, AFT RH CREW REST HEAT
 - (b) Remove the electrical connector, D13904, from the heater for the right aft CRA.
 - (c) Install a jumper between pin 1 of the electrical connector and pin 1 of the heater.
 - (d) Install a jumper between pin 2 of the electrical connector and pin 2 of the heater.
 - (e) Install a jumper between pin 4 of the electrical connector and pin 4 of the heater.
 - (f) Connect the voltmeter between pin 2 and pin 4 of the electrical connector.
 - (g) Disconnect the electrical connector, D13900, from the duct temperature sensor for the right aft CRA.
 - (h) Connect a decade box to the pins 1 and 3 of the electrical connector.
 - (i) Set the decade box resistance to 2350 Ohms (which simulates 70 F).
 - (j) Disconnect the electrical connector, D13902, from the compartment temperature sensor for the right aft CRA.
 - (k) Connect a decade box to the pins 1 and 2 of the electrical connector.

- (l) Turn the temperature selector in the right aft CRA to the fully warm position.
- (m) Set the decade box resistance for the compartment temperature sensor to 5300 Ohms (which simulates 65 F).
- (n) Close this circuit breaker, on the P37 panel:
 - 1) 37B7, AFT RH CREW REST HEAT
- (o) Make sure the voltmeter shows 200 +/- 15 VAC.
- (p) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
- (q) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (r) Make sure the voltmeter shows 0 +/- 15 VAC.
- (s) Listen to make sure the supply fan for the right aft CRA is on.

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (t) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (AMM 32-09-02/201).
- (u) Make sure the voltmeter shows 200 +/- 15 VAC.
- (v) Set the decade box resistance for the compartment temperature sensor to 3300 Ohms (which simulates 86 F).
- (w) Turn the temperature selector in the right aft CRA to the full cold position.
- (x) Make sure the voltmeter shows 0 +/- 15 VAC.
- (y) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (z) Make sure the voltmeter shows 0 +/- 15 VAC.
- (aa) Remove the voltmeter from the pins 2 and 4 of the electrical connector, D13904.
- (ab) Remove the jumpers from the pins 1, 2, and 4 of the electrical connector and the heater.
- (ac) Connect the electrical connector, D13904, to the heater.

S 735-096

- (2) Do the Failure Indication Test.

WARNING: MAKE SURE YOU DO THE FLIGHT SIMULATION PROCEDURE CORRECTLY. IF THE PROCEDURE IS NOT DONE CORRECTLY, INJURY TO THE PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

- (a) Do the Flight Mode Simulation procedure for the No. 1 and the No. 2 air/ground systems (Ref 32-09-02).
- (b) Make sure the supply fan for the right aft CRA is on.
- (c) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
- (d) Open this circuit breaker, on the P37 panel:
 - 1) 37B7, AFT RH CREW REST HEAT
- (e) Make sure the EICAS message, AFT CAB REST SYS, shows on the bottom display.

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- (f) Close this circuit breaker, on the P37 panel:
 - 1) 37B7, AFT RH CREW REST HEAT
- (g) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
- (h) Open this circuit breaker, on the P37 panel:
 - 1) 37D7 or 37K2, AFT RH CREW REST FAN CONT
- (i) After 30 seconds, make sure the EICAS message, AFT CAB REST SYS, shows on the bottom display.
- (j) Close this circuit breaker, on the P37 panel:
 - 1) 37D7 or 37K2, AFT RH CREW REST FAN CONT
- (k) Open, then close this circuit breaker, on the P37 panel:
 - 1) 37B7, AFT RH CREW REST HEAT
- (l) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
- (m) Connect the ARINC reader to the burndy block TB318, in the P36 panel.
 - 1) Connect the red wire (high) of the ARINC reader to the pin XD9 of the burndy block TB318.
 - 2) Connect the black wire (low) of the ARINC reader to the pin XD10 of the burndy block TB318.
- (n) Apply power to the ARINC reader.
- (o) Use the thumb switches on the front of the ARINC reader to set the label to 350.
- (p) After 2 minutes, make sure the bits on the ARINC reader screen show like this:

BIT NO.	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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- (q) If the bits 28, 30, or 31 are set to 0, then the system has a failure. If one of the other bits are set to 1, then an LRU failure has occurred. The table below shows the bit for each LRU.

BIT NO	LRU
11	Temperature Selector
12	Heater
13	Temperature Controller
14	Input Bus
15	Compartment Temperature Sensor
16	Duct Temperature Sensor
17	Not Used
18	Not Used
19	Not Used
20	Not Used
21	Supply Fan

- (r) Open this circuit breaker, on the P37 panel:
1) 37D7 or 37K2, AFT RH CREW REST FAN CONT
- (s) Make sure the EICAS message, AFT CAB REST SYS, shows on the bottom display.
- (t) Make sure the bit 21 is set to 1.

NOTE: Bit 28 can be set to 0 or 1.

- (u) Close this circuit breaker, on the P37 panel:
1) 37D7, AFT RH CREW REST FAN CONT
- (v) Put the airplane back to the ground mode (AMM 32-09-02/201).
- (w) Make sure the EICAS message, AFT CAB REST SYS, shows on the bottom display.
- (x) Make sure the bit 21 is set to 1.
- (y) Open, then close this circuit breaker, on the P37 panel:
1) 37B7 or 37K2, AFT RH CREW REST HEAT
- (z) Make sure the EICAS message, AFT CAB REST SYS, does not show on the bottom display.
- (aa) After 2 minutes, make sure the bit 21 is set to 0.
- (ab) Remove the power from the ARINC reader.
- (ac) Disconnect the ARINC reader from the burndy block TB318.

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- (ad) Remove the decade box from the electrical connector, D13900, for the duct temperature sensor for the right aft CRA.
- (ae) Connect the electrical connector, D13900, to the duct temperature sensor for the right aft CRA.
- (af) Remove the decade box from the electrical connector, D13902, for the compartment temperature sensor for the right aft CRA.
- (ag) Connect the electrical connector, D13902, to the compartment temperature sensor for the right aft CRA.

I. Put the airplane back to its usual condition.

S 865-097

- (1) Turn the L PACK selector, on the P5 panel, to the OFF position.

S 435-098

- (2) Connect the electrical connector, D2770, to the left flow control valve.

S 415-099

- (3) Close the left ECS access door, 193NL (AMM 06-41-00/201).

S 865-100

- (4) If you did the deactivation procedure for the spoilers, do the activation procedure (AMM 27-61-00/201).

S 865-101

- (5) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

CREW REST AREA (CRA) TEMPERATURE CONTROLLERS – REMOVAL/INSTALLATION

1. General

- A. Each crew rest area has its own temperature controller. The temperature controllers control the amount and temperature of the air that is supplied to each crew rest area. Each temperature controller is installed near its specified crew rest area, on top of a passenger stowage bin, near the overhead distribution duct. This procedure has instructions to remove and install all of the temperature controllers.

TASK 21-66-01-004-001

2. Remove the Temperature Controllers (Fig. 401)

A. Access

(1) Location Zones

- | | |
|-----|---|
| 223 | Area above passenger cabin ceiling – section 41 (Left) |
| 234 | Area above passenger cabin ceiling – section 45 (Right) |
| 253 | Area above passenger cabin ceiling – section 46 (Left) |
| 254 | Area above passenger cabin ceiling – section 46 (Right) |

B. Prepare for the Removal

S 864-002

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
- (a) 36B4 or 36C7, AFT LH CBN CREW REST AREA HEAT
 - (b) 36C4 or 36B4, FLT DK CREW REST AREA HEAT
 - (c) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (d) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 864-003

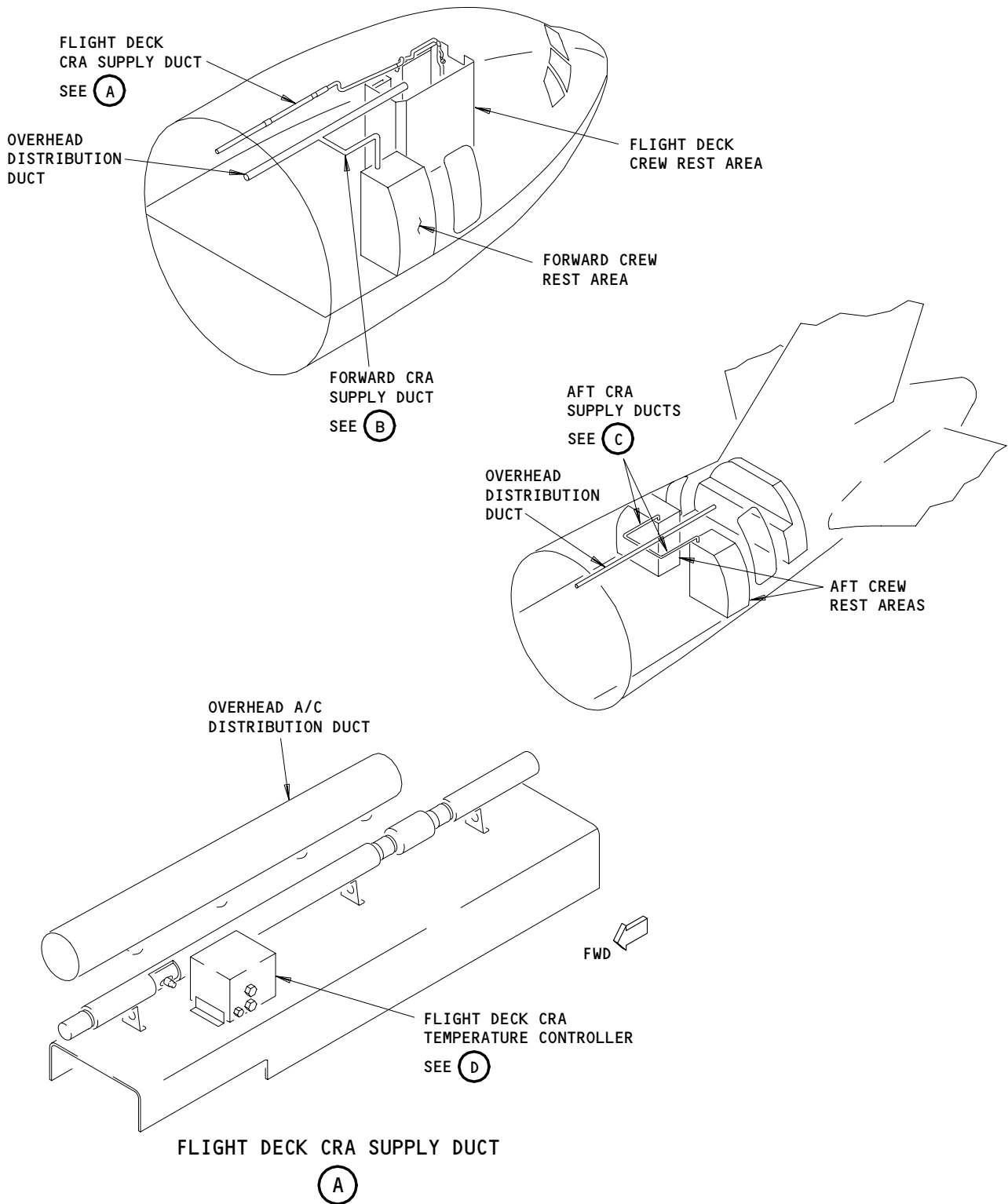
- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel P37, and attach the DO-NOT-CLOSE tags:
- (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B7, AFT RH CBN CREW REST AREA HEAT
 - (c) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (d) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 014-004

- (3) Get access to the temperature controller for the flight deck crew rest area.
- (a) Remove the sculptured ceiling panel immediately left and aft of the flight deck crew rest area.

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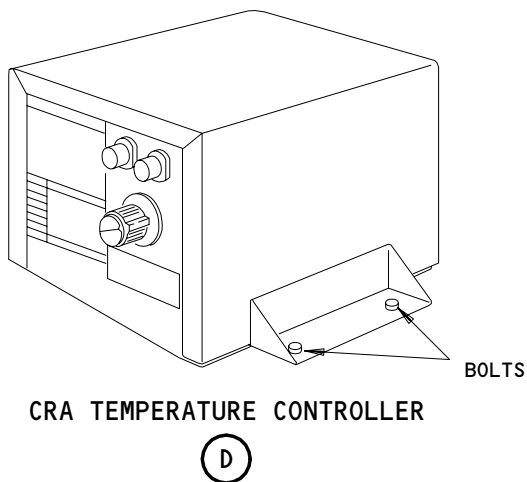
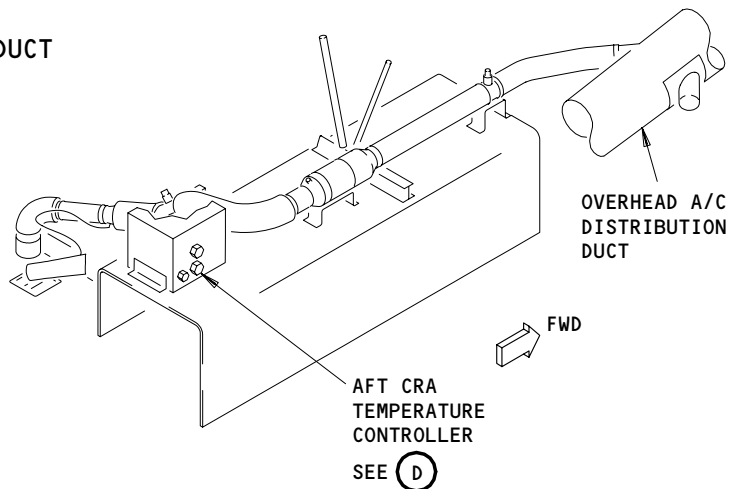
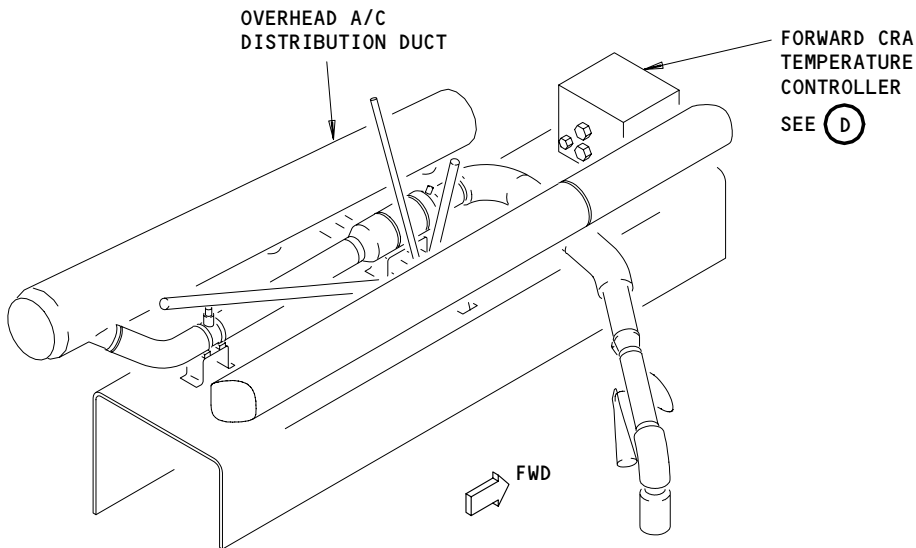
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Crew Rest Area Temperature Controller Installation
Figure 401 (Sheet 1)

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Crew Rest Area Temperature Controller Installation
Figure 401 (Sheet 2)

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S 014-005

- (4) Get access to the temperature controller for the forward crew rest area.
 - (a) Remove the sculptured ceiling panel immediately left and aft of the forward crew rest area.

S 014-006

- (5) Get access to the temperature controller for the left aft crew rest area.
 - (a) Remove the sculptured ceiling panel immediately forward and right of the left aft crew rest area.

S 014-007

- (6) Get access to the temperature controller for the right aft crew rest area.
 - (a) Remove the sculptured ceiling panel immediately forward and left of the right aft crew rest area.

C. Remove the temperature controller

S 034-008

- (1) Disconnect the electrical connectors from the controller.

S 034-009

- (2) Remove the bolts that hold the controller to the top of the passenger stowage bin.

S 024-010

- (3) Remove the controller.

TASK 21-66-01-404-011

3. Install the Temperature Controller (Fig. 401)

A. References

- (1) 24-22-00/201, Electrical Power Control

B. Access

(1) Location Zones

- | | |
|-----|---|
| 223 | Area above passenger cabin ceiling - section 41 (Left) |
| 234 | Area above passenger cabin ceiling - section 45 (Right) |
| 253 | Area above passenger cabin ceiling - section 46 (Left) |
| 254 | Area above passenger cabin ceiling - section 46 (Right) |

C. Install the temperature controller

S 424-012

- (1) Put the controller into position on top of the passenger stowage bin.

- S 434-013
- (2) Install the bolts and washers to hold the controller in its position.
- S 424-024
- (3) Connect the electrical connectors to the controller.
- D. Do the temperature controller installation test
- S 864-014
- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
 - (a) 36B4 or 36C7, AFT LH CBN CREW REST AREA HEAT
 - (b) 36C4 or 36B4, FLT DK CREW REST AREA HEAT
 - (c) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (d) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT
- S 864-015
- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P37 panel:
 - (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B7, AFT RH CBN CREW REST AREA HEAT
 - (c) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (d) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT
- S 864-016
- (3) Supply electrical power (Ref 24-22-00).
- S 864-017
- (4) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.
- S 214-018
- (5) Make sure the applicable EICAS message (FLT, FWD, or AFT) REST SYS does not show on the lower display.
- E. Put the Airplane Back to its Usual Condition
- S 414-019
- (1) If the temperature controller for the flight deck crew rest area was installed, install the sculptured ceiling panel immediately aft and left of the flight deck crew rest area.
- S 414-020
- (2) If the temperature controller for the forward crew rest area was installed, install the sculptured ceiling panel immediately aft and left of the forward crew rest area.

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- S 414-021
- (3) If the temperature controller for the left aft crew rest area was installed, install the sculptured ceiling panel immediately forward and right of the left aft crew rest area.
- S 414-022
- (4) If the temperature controller for the right aft crew rest area was installed, install the sculptured ceiling panel immediately forward and left of the right aft crew rest area.
- S 864-023
- (5) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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CREW REST AREA (CRA) TEMPERATURE SELECTOR – REMOVAL/INSTALLATION

1. General

- A. Each crew rest area has its own temperature selector. The temperature selector lets the crew person select the temperature of the area. Then it sends a signal to the temperature controller of the temperature demand for that area. This procedure has instructions to remove and install all of the temperature selectors
- B. The temperature selector for the flight deck crew rest area is installed in the flight deck crew rest area, on the left wall.
- C. The temperature selectors for the forward and aft crew rest areas are installed in each crew rest area, in the ceiling.

TASK 21-66-02-004-001

2. Remove the Temperature Selectors (Fig. 401)

A. Access

(1) Location Zones

- 223 Passenger cabin – section 41 (Left)
- 234 Passenger cabin – section 45 (Right)
- 253 Passenger cabin – section 46 (Left)
- 254 Passenger cabin – section 46 (Right)

B. Prepare for the Removal

S 864-002

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
 - (a) 36D3, FLT DK CREW REST AREA TEMP CONT
 - (b) 36D6, AFT LH CBN CREW REST AREA TEMP CONT

S 864-003

- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel P37, and attach the DO-NOT-CLOSE tags:
 - (a) 37H4, FWD CBN CREW REST AREA TEMP CONT
 - (b) 37H5, AFT RH CBN CREW REST AREA TEMP CONT

S 014-004

- (3) Get access to the temperature selector for the applicable crew rest area (CRA):
 - (a) For the temperature selector in the flight deck CRA, remove the left side wall from the anomalies panel in the flight deck CRA.
 - (b) For the temperature selector in the forward CRA, lower the temperature selector panel, in the ceiling of the forward CRA.
 - (c) For the temperature selector in the left aft CRA, lower the temperature selector panel, in the ceiling of the left aft CRA.

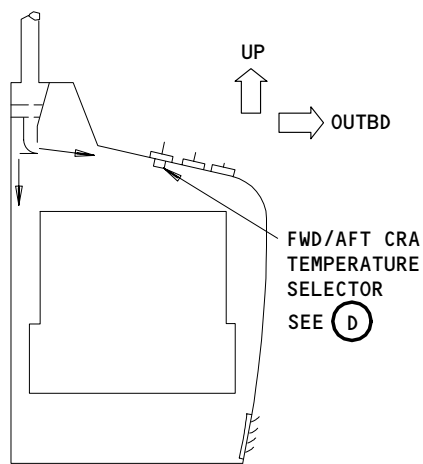
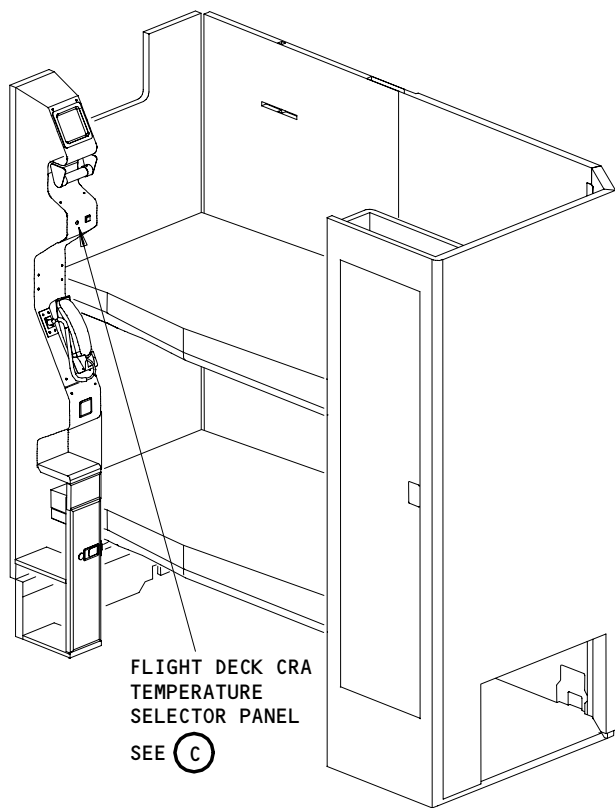
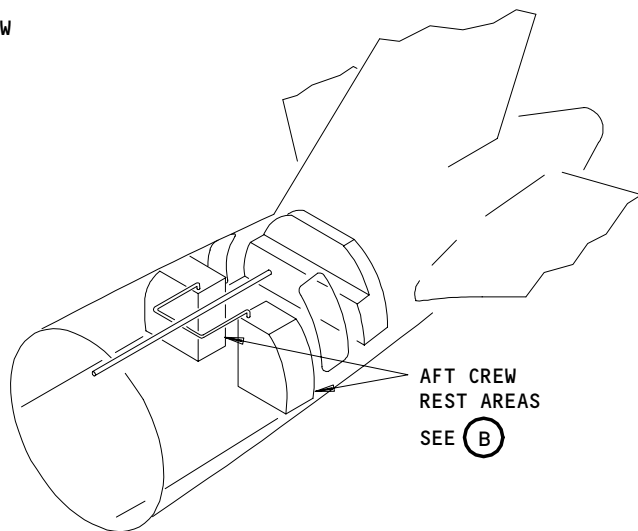
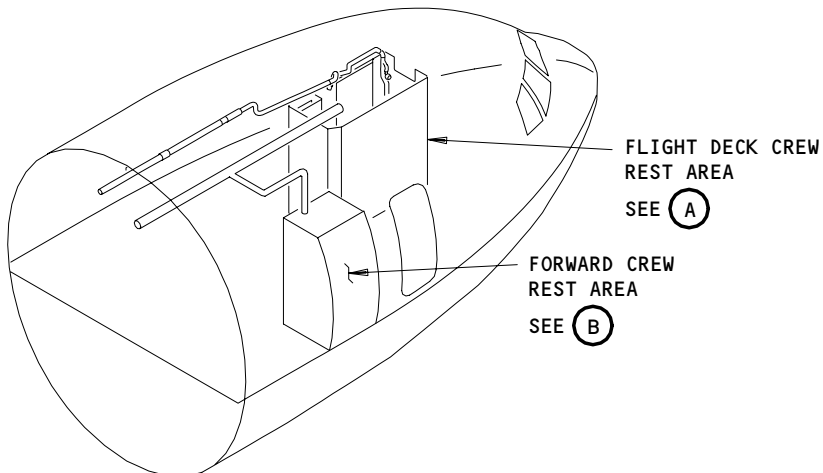
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FLIGHT DECK CREW REST AREA

(A)

FWD/AFT CREW REST AREA (EXAMPLE)

(B)

Crew Rest Area Temperature Selector Installation
Figure 401 (Sheet 1)

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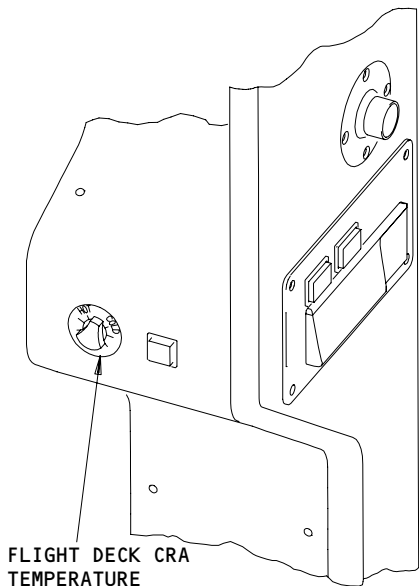
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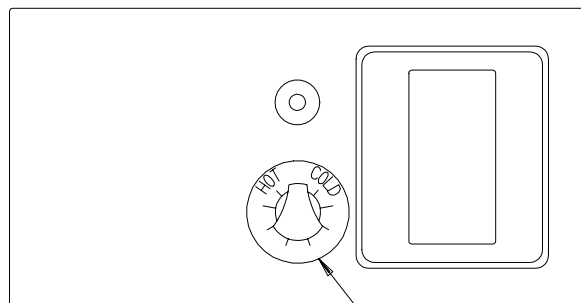


FLIGHT DECK CRA
TEMPERATURE
SELECTOR

SEE (E)

FLIGHT DECK CRA TEMPERATURE
SELECTOR PANEL

(C)

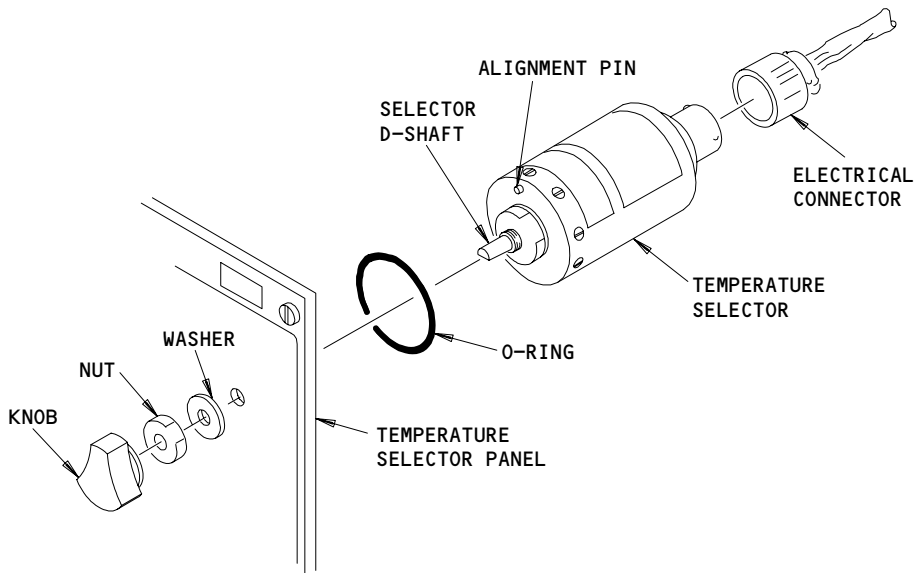


CRA TEMPERATURE
SELECTOR

SEE (E)

FORWARD/AFT CRA TEMPERATURE SELECTOR PANEL

(D)



CRA TEMPERATURE SELECTOR

(E)

Crew Rest Area Temperature Selector
Figure 401 (Sheet 2)

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(d) For the temperature selector in the right aft CRA, lower the temperature selector panel, in the ceiling of the right aft CRA.

C. Remove the temperature selector.

S 034-005

(1) Disconnect the electrical connector from the selector.

S 024-023

(2) Remove the selector knob from the front of the panel.

S 034-006

(3) For the temperature selector in the flight deck CRA, remove the nut on the front of the panel.

S 024-007

(4) Remove the temperature selector.

TASK 21-66-02-404-008

3. Install the Temperature Selectors (Fig. 401)

A. References

(1) 24-22-00/201, Electrical Power Control

B. Access

(1) Location Zones

223	Passenger cabin - section 41 (Left)
234	Passenger cabin - section 45 (Right)
253	Passenger cabin - section 46 (Left)
254	Passenger cabin - section 46 (Right)

C. Install the temperature selector

S 424-009

(1) Put the temperature selector into position in the panel.

S 434-010

(2) Install the selector knob on the front of the panel.

S 434-011

(3) For the temperature selector in the flight deck CRA, install the nut on the front of the panel.

S 434-012

(4) Connect the electrical connector to the selector.

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D. Do the temperature selector installation test

S 864-013

- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
 - (a) 36D3, FLT DK CREW REST AREA TEMP CONT
 - (b) 36D6, AFT LH CBN CREW REST AREA TEMP CONT

S 864-014

- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P37 panel:
 - (a) 37H4, FWD CBN CREW REST AREA TEMP CONT
 - (b) 37H5, AFT RH CBN CREW REST AREA TEMP CONT

S 864-015

- (3) Supply electrical power (Ref 24-22-00).

S 864-016

- (4) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.

S 214-017

- (5) Make sure the applicable EICAS message (FLT, FWD, or AFT) REST SYS does not show on the lower display.

E. Put the Airplane Back to its Usual Condition

S 414-018

- (1) If the temperature selector for the flight deck CRA was installed, install the left side wall of the anomalies panel in the flight deck CRA.

S 414-019

- (2) If the temperature selector in the forward CRA was installed, raise the temperature selector panel, in the forward CRA ceiling, until it clicks into position.

S 414-020

- (3) If the temperature selector in the left aft CRA was installed, raise the temperature selector panel, in the left aft CRA ceiling, until it clicks into position.

S 414-021

- (4) If the temperature selector in the right aft CRA was installed, raise the temperature selector panel, in the right aft CRA ceiling, until it clicks into position.

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- S 864-022
(5) Remove the electrical power, if it is not necessary (Ref 24-22-00).

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CREW REST AREA (CRA) DUCT TEMPERATURE SENSORS – REMOVAL/INSTALLATION

1. General

- A. Each crew rest area (CRA) has its own duct temperature sensor. Each sensor sends a signal of the duct temperature to its applicable CRA temperature controller. Each duct temperature sensors is installed near its specified CRA, in the passenger ceiling, near the overhead distribution duct. This procedure has instructions to remove and install all of the CRA duct temperature controllers.

TASK 21-66-03-004-001

2. Remove the Duct Temperature Sensor (Fig. 401)

A. Access

(1) Location Zones

- | | |
|-----|---|
| 223 | Area above passenger cabin ceiling – section 41 (Left) |
| 234 | Area above passenger cabin ceiling – section 45 (Right) |
| 253 | Area above passenger cabin ceiling – section 46 (Left) |
| 254 | Area above passenger cabin ceiling – section 46 (Right) |

B. Prepare for the Removal

S 864-002

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
- (a) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (b) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 864-003

- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel P37, and attach the DO-NOT-CLOSE tags:
- (a) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (b) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 864-004

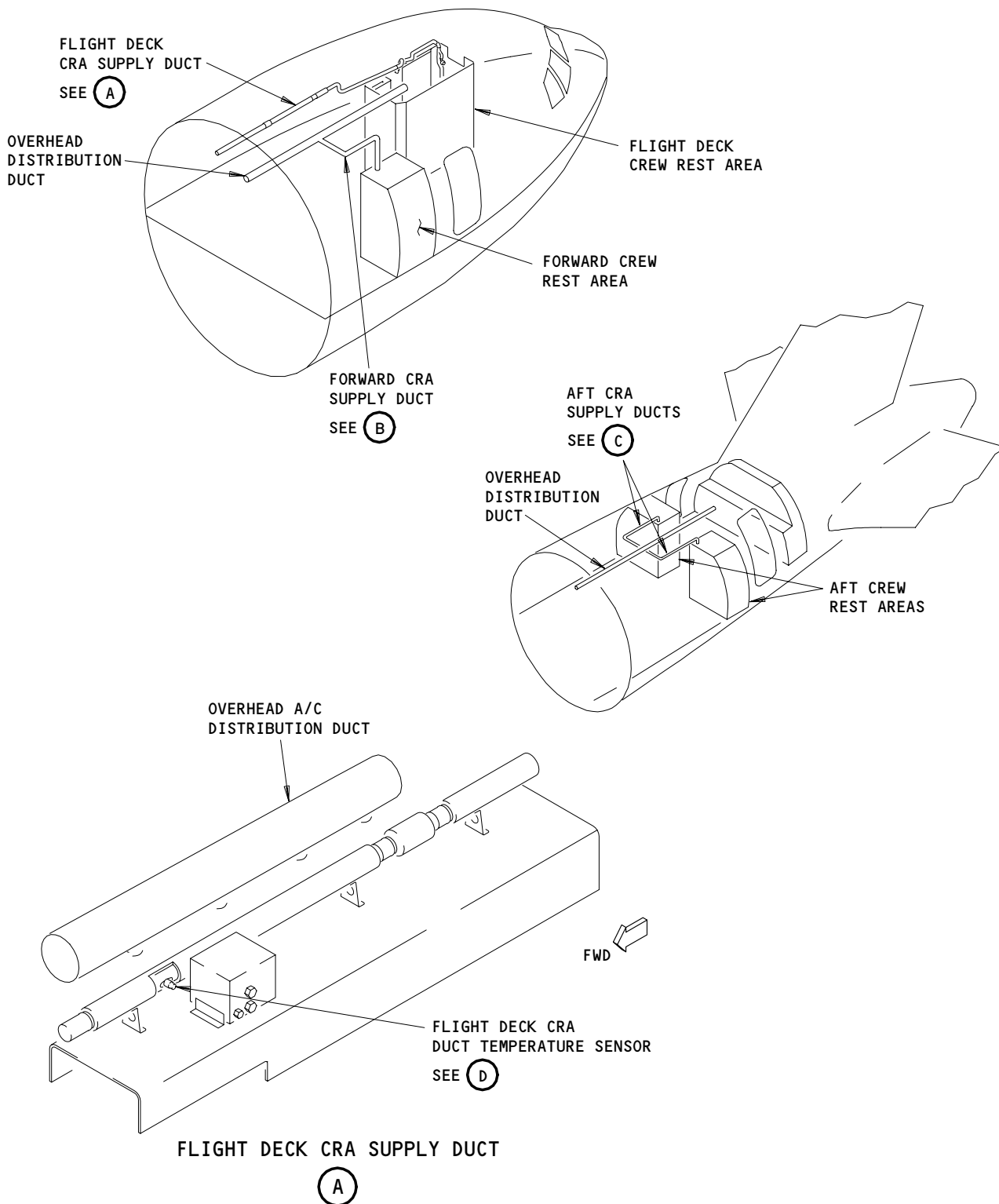
- (3) Turn the L and R PACK selectors, on the pilots' overhead control panel P5, to the OFF position.
- (a) Make sure the PACK OFF lights come on.
 - (b) Attach the DO-NOT-OPERATE tags to the selectors.

S 864-005

- (4) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to the off position.
- (a) Make sure the ON lights go off.
 - (b) Attach the DO-NOT-OPERATE tags to the switch-lights.

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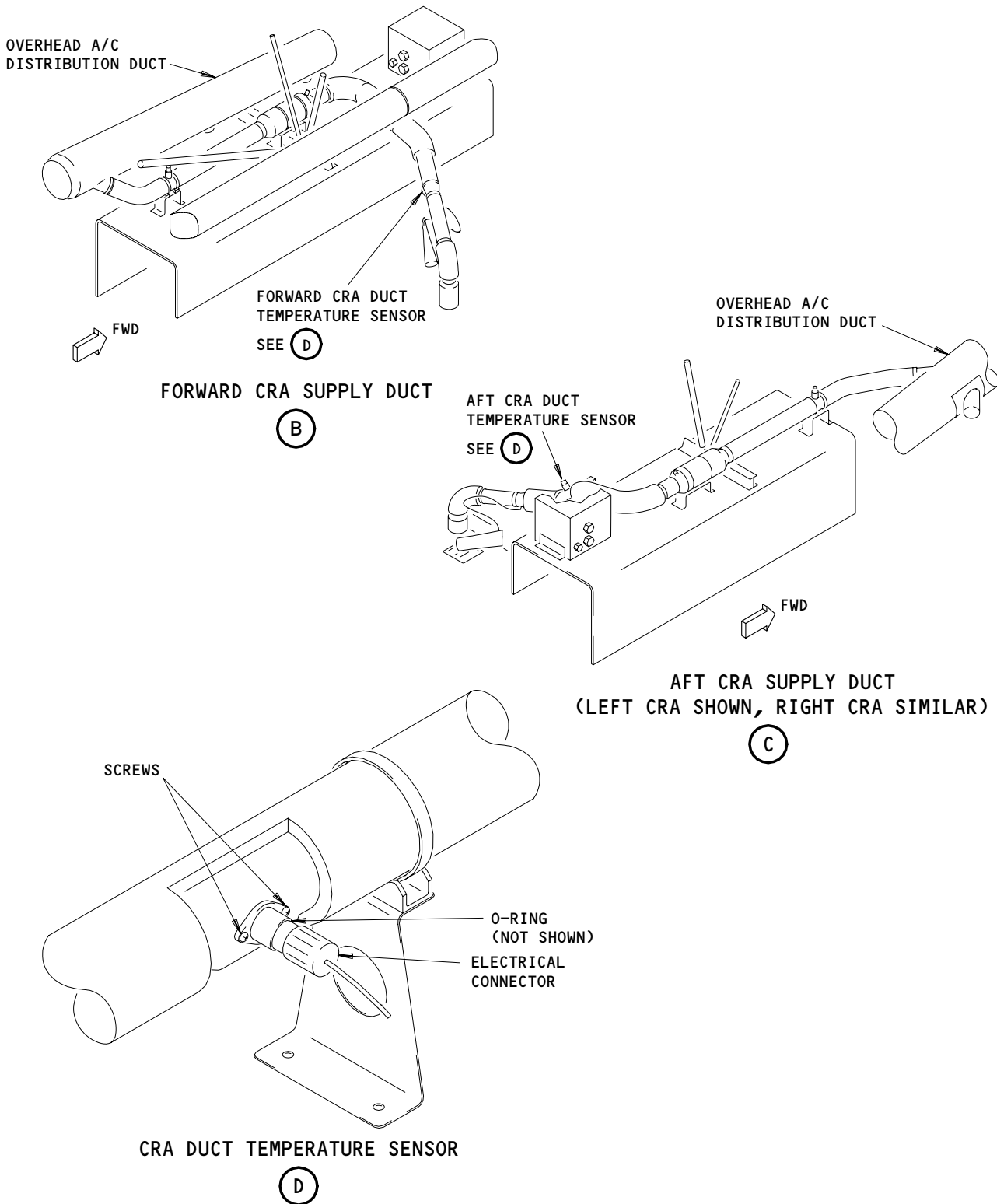
21-66-03



Crew Rest Area Duct Temperature Sensor Installation
Figure 401 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

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Crew Rest Area Duct Temperature Sensor Installation
Figure 401 (Sheet 2)

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AIRPLANES WITH CREW REST AREAS

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S 014-006

- (5) Get access to the duct temperature sensor for the flight deck crew rest area.
 - (a) Remove the sculptured passenger ceiling immediately left and aft of the flight deck crew rest area.

S 014-007

- (6) Get access to the duct temperature sensor for the forward crew rest area.
 - (a) Remove the sculptured ceiling panel immediately left and aft of the forward crew rest area.

S 014-008

- (7) Get access to the duct temperature sensor for the left aft crew rest area.
 - (a) Remove the sculptured ceiling panel immediately forward and right of the left aft crew rest area.

S 014-009

- (8) Get access to the duct temperature sensor for the right aft crew rest area.
 - (a) Remove the sculptured ceiling panel immediately forward and left of the right aft crew rest area.

C. Remove the duct temperature sensor

S 034-010

- (1) Disconnect the electrical connector from the temperature sensor.

S 034-011

- (2) Remove the screws from the sensor flange.

S 024-012

- (3) Remove the temperature sensor.

S 434-013

- (4) Install a cover over the sensor flange.

TASK 21-66-03-404-014

3. Install the Duct Temperature Sensor (Fig. 401)

A. References

- (1) 24-22-00/201, Electrical Power Control

B. Access

(1) Location Zones

- 223 Area above passenger cabin ceiling - section 41 (Left)
- 234 Area above passenger cabin ceiling - section 45 (Right)
- 253 Area above passenger cabin ceiling - section 46 (Left)
- 254 Area above passenger cabin ceiling - section 46 (Right)

C. Install the duct temperature sensor

S 034-015

- (1) Remove the cover from the sensor flange.

S 424-016

- (2) Put the temperature sensor into position in the flange.

S 434-017

- (3) Install the washers and screws to hold the sensor into the flange.

S 434-018

- (4) Connect the electrical connector to the temperature sensor.

D. Do the duct temperature sensor installation test

S 864-019

- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:

- (a) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
- (b) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 864-020

- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P37 panel:

- (a) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
- (b) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 864-021

- (3) Supply electrical power (Ref 24-22-00).

S 864-022

- (4) Remove the DO-NOT-OPERATE tag from the L and R RECIRC FAN switch-lights, on the P5 panel.

S 864-023

- (5) Remove the DO-NOT-OPERATE tag from the L and R PACK selectors, on the P5 panel.

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AIRPLANES WITH CREW REST AREAS

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S 864-024

- (6) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.

S 214-025

- (7) Make sure the applicable EICAS message (FLT, FWD, or AFT) REST SYS does not show on the lower display.

E. Put the Airplane Back to its Usual Condition

S 414-026

- (1) If the duct temperature sensor for the flight deck crew rest area was installed, install the sculptured ceiling panel just left and aft of the flight deck crew rest area.

S 414-027

- (2) If the duct temperature sensor for the forward crew rest area was installed, install the sculptured ceiling panel immediately aft and left of the forward crew rest area.

S 414-028

- (3) If the duct temperature sensor for the left aft crew rest area was installed, install the sculptured ceiling panel immediately forward and right of the left aft crew rest area.

S 414-029

- (4) If the duct temperature sensor for the right aft crew rest area was installed, install the sculptured ceiling panel immediately forward and left of the right aft crew rest area.

S 864-030

- (5) Remove the electrical power, if it is not necessary (Ref 24-22-00).

CREW REST AREA (CRA) ZONE TEMPERATURE SENSORS – REMOVAL/INSTALLATION

1. General

- A. Each crew rest area (CRA) has its own zone temperature sensor. Each zone temperature sensor sends a signal of the temperature in the CRA to the applicable CRA temperature controller. This procedure has instructions to remove and install all of the zone temperature sensors.
- B. The zone temperature sensor for the flight deck CRA is installed in the ceiling of the flight deck CRA.
- C. The zone temperature sensors for the forward and aft crew rest areas are installed above the passenger stowage bin, above the applicable CRA.

TASK 21-66-04-004-001

2. Remove the Zone Temperature Sensors (Fig. 401)

A. Access

(1) Location Zones

- 223 Area above passenger cabin ceiling – section 41 (Left)
- 234 Area above passenger cabin ceiling – section 45 (Right)
- 253 Area above passenger cabin ceiling – section 46 (Left)
- 254 Area above passenger cabin ceiling – section 46 (Right)

B. Prepare for the Removal

S 864-002

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
 - (a) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (b) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 864-003

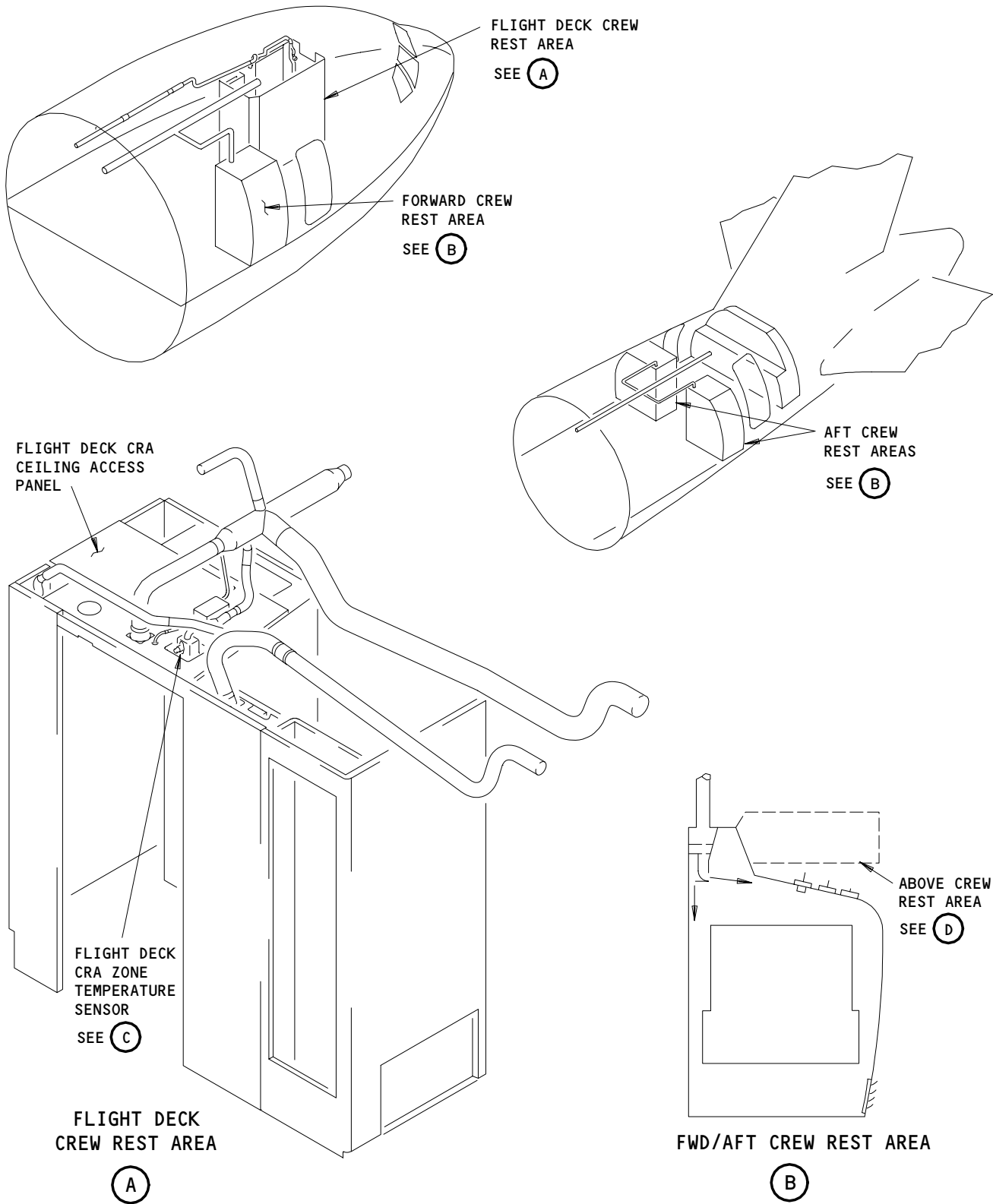
- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel P37, and attach the DO-NOT-CLOSE tags:
 - (a) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (b) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 014-004

- (3) Get access to the applicable zone temperature sensor.
 - (a) For the zone temperature sensor for the flight deck CRA, lower the access panel in the ceiling of the flight deck CRA.
 - (b) For the zone temperature sensor for the forward CRA, remove the sculptured ceiling panel immediately left of the forward CRA.
 - (c) For the zone temperature sensor for the left aft CRA, remove the sculptured ceiling panel immediately right of the left aft CRA.
 - (d) For the zone temperature sensor for the right aft CRA, remove the sculptured ceiling panel immediately left of the right aft CRA.

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

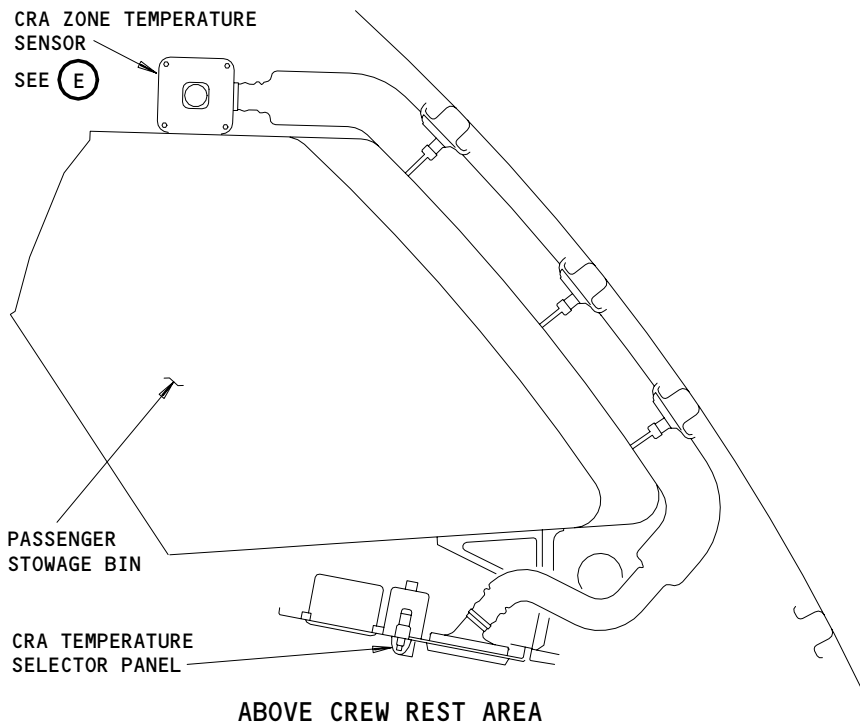
21-66-04



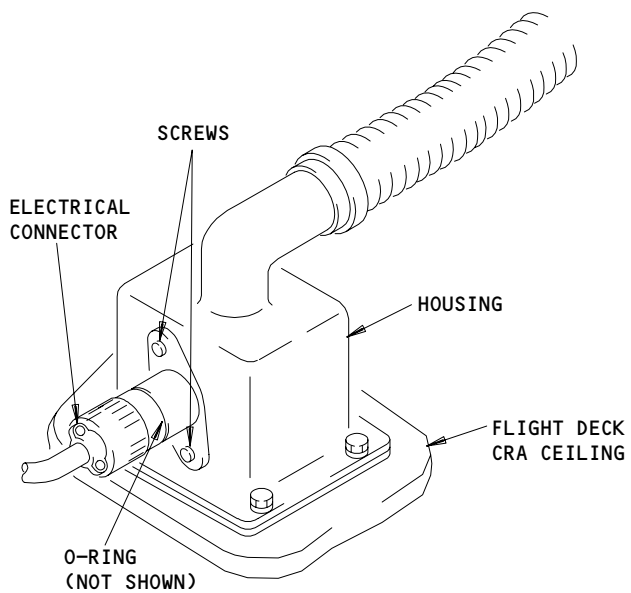
Crew Rest Area Zone Temperature Sensor Installation
Figure 401 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

21-66-04

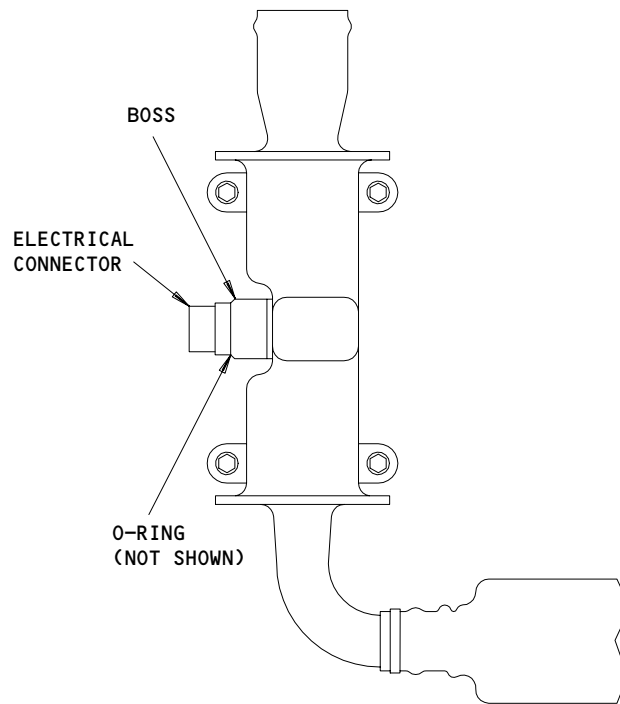


(C)



FLIGHT DECK CRA ZONE
TEMPERATURE SENSOR

(D)



CRA ZONE TEMPERATURE SENSOR
(VIEW FROM BELOW)

(E)

Crew Rest Area Duct Temperature Sensor Installation
Figure 401 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

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C. Remove the zone temperature sensor.

S 034-005

- (1) Disconnect the electrical connector from the temperature sensor.

S 024-006

- (2) Use two wrenches to remove the temperature sensor. Use one wrench to hold the boss and the other wrench to unscrew the sensor.

S 434-007

- (3) Install a cover over the boss.

TASK 21-66-04-404-008

3. Install the Zone Temperature Sensors (Fig. 401)

A. References

- (1) 24-22-00/201, Electrical Power Control

B. Access

(1) Location Zones

- | | |
|-----|---|
| 223 | Area above passenger cabin ceiling - section 41 (Left) |
| 234 | Area above passenger cabin ceiling - section 45 (Right) |
| 253 | Area above passenger cabin ceiling - section 46 (Left) |
| 254 | Area above passenger cabin ceiling - section 46 (Right) |

C. Install the zone temperature sensors

S 034-009

- (1) Remove the cover from the boss.

S 424-010

- (2) Install the zone temperature sensor into the boss.

S 434-011

- (3) Use two wrenches to tighten the sensor. One wrench is to hold the boss and the other wrench is to tighten the sensor.

S 434-012

- (4) Connect the electrical connector to the temperature sensor.

D. Do the zone temperature sensor installation test

S 864-013

- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
- (a) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (b) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

- S 864-014
- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P37 panel:
- (a) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (b) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT
- S 864-015
- (3) Supply electrical power (Ref 24-22-00).
- S 864-016
- (4) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.
- S 214-017
- (5) Make sure the applicable EICAS message (FLT, FWD, or AFT) REST SYS does not show on the lower display.
- E. Put the Airplane Back to its Usual Condition
- S 414-018
- (1) If the zone temperature sensor for the flight deck CRA was installed, raise the access panel in the flight deck CRA ceiling until it clicks into position.
- S 414-019
- (2) If the zone temperature sensor for the forward CRA was installed, install the sculptured ceiling panel immediately left of the forward CRA.
- S 414-020
- (3) If the zone temperature sensor for the left aft CRA was installed, install the sculptured ceiling panel immediately right of the left aft CRA.
- S 414-021
- (4) If the zone temperature sensor for the right aft CRA was installed, install the sculptured ceiling panel immediately left of the right aft CRA.
- S 864-022
- (5) Remove the electrical power, if it is not necessary (Ref 24-22-00).

EFFECTIVITY _____
AIRPLANES WITH CREW REST AREAS

21-66-04

FLIGHT DECK CREW REST AREA (CRA) SKIN TEMPERATURE SENSOR -
REMOVAL/INSTALLATION

1. General

- A. The skin temperature sensor for the flight deck crew rest area (CRA) is installed on the left side of the forward cargo compartment, immediately aft of the flight deck CRA heat exchanger. It sends a signal of the temperature of the airplane skin to the flight deck CRA temperature controller. This procedure has instructions to remove and install the supply valve.

TASK 21-66-05-004-001

2. Remove the Skin Temperature Sensor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zones
121 Forward Cargo Compartment (Left)

C. Prepare for the Removal

S 864-002

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
 - (a) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (b) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 864-003

- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel P37, and attach the DO-NOT-CLOSE tags:
 - (a) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (b) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 014-004

- (3) Open the forward cargo door, 821 (Ref 06-41-00).

S 014-005

- (4) Remove the left cargo sidewall lining, 10 feet (3 meters) forward of the aft end of the forward cargo compartment (Ref 25-52-01).

D. Remove the skin temperature sensor

S 034-006

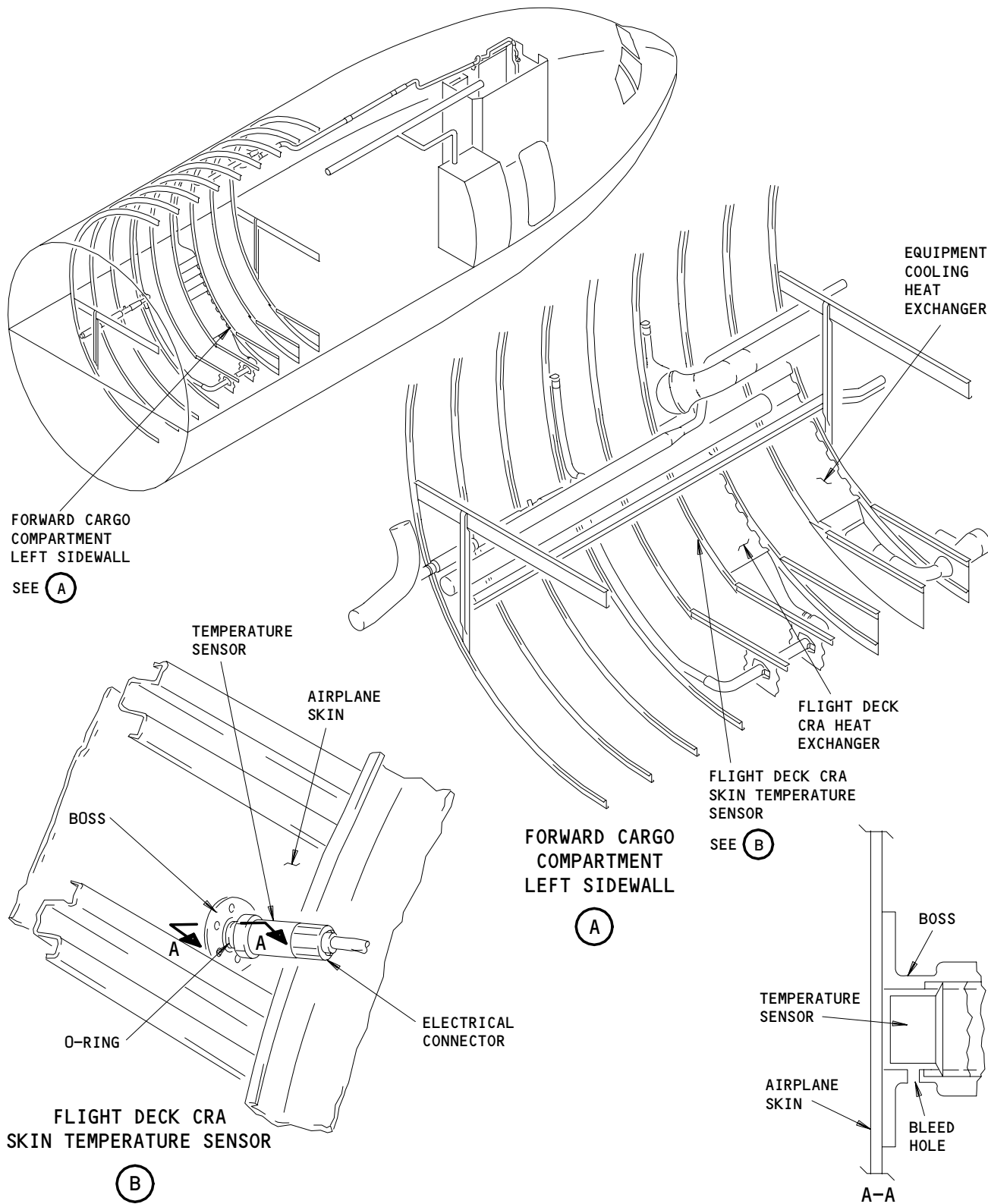
- (1) Disconnect the electrical connector from the temperature sensor.

S 024-007

- (2) Pry the temperature sensor off of the airplane skin.

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

21-66-05



Flight Deck Crew Rest Area Skin Temperature Sensor Installation
Figure 401

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

21-66-05

TASK 21-66-05-404-008

3. Install the Skin Temperature Sensor (Fig. 401)

A. References

- (1) 06-41-00/201, Fuselage Access Doors and Panels
- (2) 24-22-00/201, Electrical Power Control
- (3) 25-52-01/401, Containerized Cargo Compartment Sidewall Lining

B. Access

- (1) Location Zones
121 Forward Cargo Compartment (Left)

C. Install the skin temperature sensor

S 164-009

- (1) Make sure the area of the airplane skin that the sensor will be applied to is clean and dry and greater than 50 F.

S 034-010

- (2) Remove the adhesive protective liner from the temperature sensor.

S 424-011

- (3) Put the temperature sensor against the airplane skin.

S 434-012

- (4) Push on the temperature sensor with an even pressure to make sure the contact is complete.

S 434-013

- (5) Connect the electrical connector to the temperature sensor.

D. Do the skin temperature sensor installation test

S 864-014

- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
 - (a) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (b) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 864-015

- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P37 panel:
 - (a) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (b) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 864-016

- (3) Supply electrical power (Ref 24-22-00).

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AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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- S 864-017
- (4) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.
- S 214-018
- (5) Make sure the EICAS message FLT REST SYS does not show on the lower display.
- E. Put the Airplane Back to its Usual Condition
- S 414-019
- (1) Install the left cargo sidewall lining, 10 feet (3 meters) forward of the aft end of the forward cargo compartment (Ref 25-52-01).
- S 414-020
- (2) Close the forward cargo door, 821 (Ref 06-41-00).
- S 864-021
- (3) Remove the electrical power, if it is not necessary (Ref 24-22-00).

EFFECTIVITY
AIRPLANES WITH A FLIGHT DECK
CREW REST AREA

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CREW REST AREA (CRA) HEATERS – REMOVAL/INSTALLATION

1. General

- A. Each crew rest area has its own heater. The heaters heat the air that is supplied to the crew rest areas. Each heater is installed near its specified crew rest area, in the passenger ceiling, near the overhead distribution duct. This procedure has instructions to remove and install all of the CRA heaters.

TASK 21-66-06-004-001

2. Remove the CRA Heaters (Fig. 401)

A. Access

(1) Location Zones

- 234 Area above ceiling, passenger cabin – section 45 (Right)
253 Area above ceiling, passenger cabin – section 46 (Left)
254 Area above ceiling, passenger cabin – section 46 (Right)

B. Prepare for the Removal

S 864-002

- (1) Open these circuit breakers, on the left miscellaneous electrical equipment panel P36, and attach the DO-NOT-CLOSE tags:
(a) 36B4 or 36C7, AFT LH CBN CREW REST AREA HEAT
(b) 36C4 or 36B4, FLT DK CREW REST AREA HEAT
(c) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
(d) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 864-003

- (2) Open these circuit breakers, on the right miscellaneous electrical equipment panel P37, and attach the DO-NOT-CLOSE tags:
(a) 37B4, FWD CBN CREW REST AREA HEAT
(b) 37B7, AFT RH CBN CREW REST AREA HEAT
(c) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
(d) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 864-004

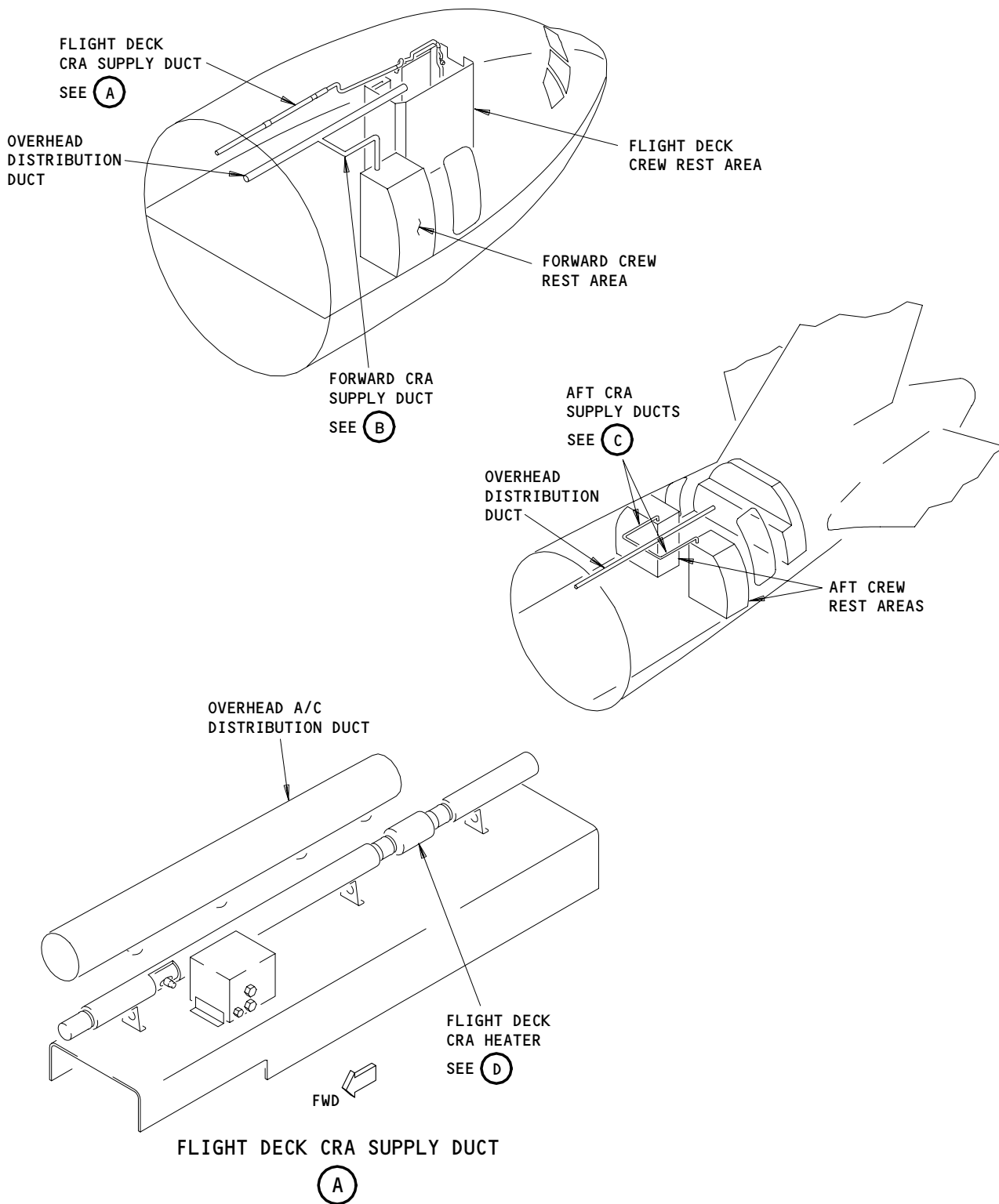
- (3) Turn the L and R PACK selectors, on the pilots' overhead control panel P5, to the OFF position.
(a) Make sure the PACK OFF lights come on.
(b) Attach the DO-NOT-OPERATE tags to the selectors.

S 864-005

- (4) Push the L and R RECIRC FAN switch-lights, on the P5 panel, to OFF.
(a) Make sure the ON lights go off.
(b) Attach the DO-NOT-OPERATE tags to the switch-lights.

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

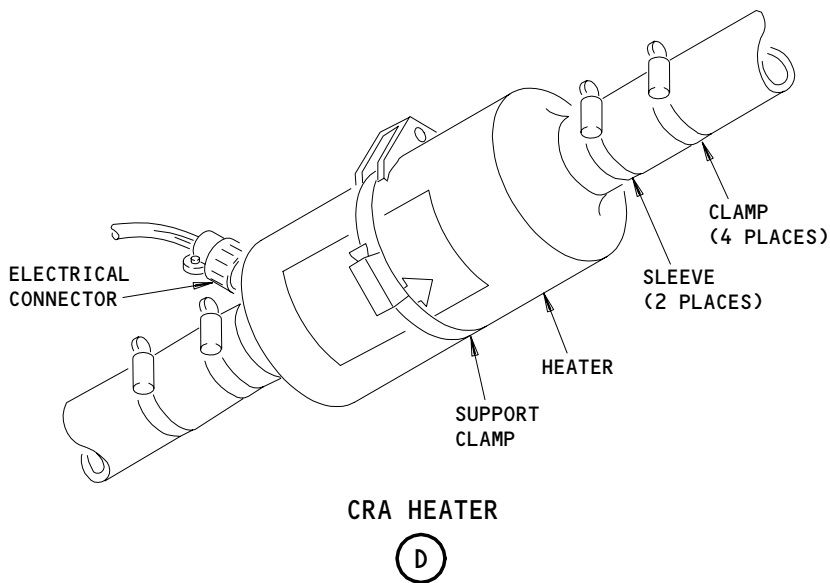
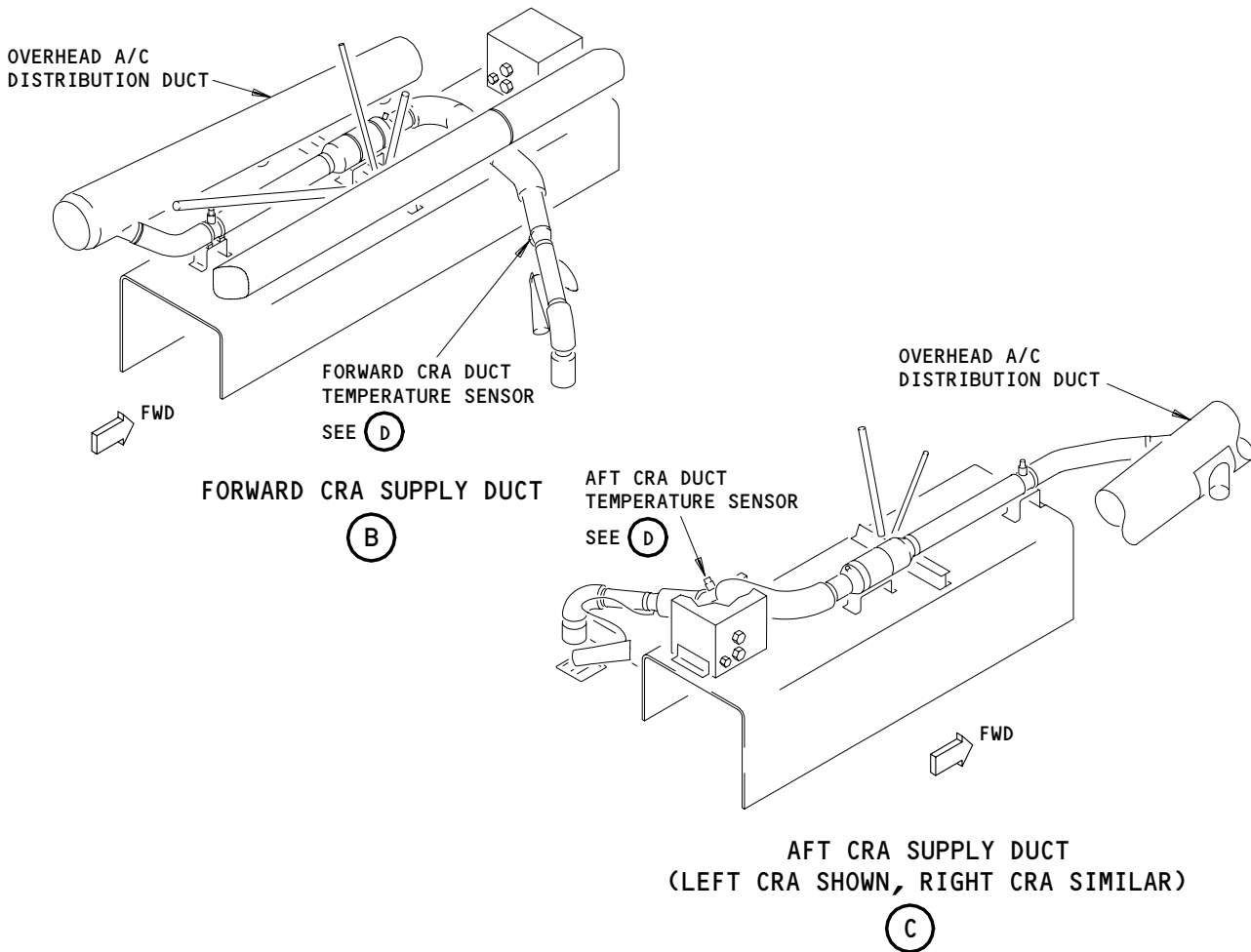
21-66-06



Crew Rest Area Heater Installation
Figure 401 (Sheet 1)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

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Crew Rest Area Heater Installation
Figure 401 (Sheet 2)

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

21-66-06

S 014-006

- (5) Get access to the heater for the flight deck crew rest area.
 - (a) Remove the sculptured ceiling panel immediately left and aft of the flight deck crew rest area.

S 014-007

- (6) Get access to the heater for the forward crew rest area.
 - (a) Remove the sculptured ceiling panel immediately left and aft of the forward crew rest area.

S 014-008

- (7) Get access to the heater for the left aft crew rest area.
 - (a) Remove the sculptured ceiling panel immediately forward and right of the left aft crew rest area.

S 014-009

- (8) Get access to the heater for the right aft crew rest area.
 - (a) Remove the sculptured ceiling panel immediately forward and left of the right aft crew rest area.

C. Remove the heater

S 034-010

- (1) Disconnect the electrical connector from the heater.

S 034-011

- (2) Remove the bonding jumper from the heater.

S 034-012

- (3) Remove the plastic straps from both sides of the heater.

S 034-013

- (4) Move the flex ducts away from each end of the heater.

S 034-014

- (5) Remove the clamps that hold the heater to the support bracket.

NOTE: This step is not necessary for the heater for the flight deck crew rest area.

S 024-015

- (6) Remove the heater.

S 434-016

- (7) Install a cover over each duct opening.

TASK 21-66-06-404-017

3. Install the CRA Heater (Fig. 401)

A. Equipment

- (1) Strap installation tool, Panduit Corp., P/N GS4H 17301 Ridgeland Ave., Tinley Park, IL 60477

B. Consumable Material

- (1) Strap - Plastic, adjustable, self-locking, BACS38K6

C. References

- (1) 24-22-00/201, Electrical Power Control
- (2) 36-00-00/201, Pneumatic - General

D. Access

- (1) Location Zones
 - 234 Area above ceiling, passenger cabin - section 45 (Right)
 - 253 Area above ceiling, passenger cabin - section 46 (Left)
 - 254 Area above ceiling, passenger cabin - section 46 (Right)

E. Install the heater

S 034-018

- (1) Remove the duct covers.

S 034-019

- (2) Make sure the ducts do not have any debris or equipment in them.

S 424-020

- (3) Put the heater in position against the support bracket.
 - (a) Make sure the flow arrow points toward the crew rest area.
 - (b) Make sure that there is enough clearance to install the electrical connector.

S 434-021

- (4) Install the clamps that hold the heater to the support bracket.

NOTE: This step is not necessary for the heater for the flight deck crew rest area.

S 434-022

- (5) Tighten the clamps to 18 pound-inches.

S 434-023

- (6) Move the flex ducts on to each end of the heater.

S 434-024

- (7) Install the plastic straps on both sides of the heater.

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

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S 434-025

- (8) Use a panduit tool to tighten the straps.
 - (a) Set the selector to the heavy position.
 - (b) Set the tension indicator to 8.

S 434-026

- (9) Connect the bonding jumper to the heater with a bolt, 2 washers, and a nut.

S 434-027

- (10) Connect the electrical connector to the heater.
- F. Do the heater installation test

S 864-028

- (1) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P36 panel:
 - (a) 36B4 or 36C7, AFT LH CBN CREW REST AREA HEAT
 - (b) 36C4 or 36B4, FLT DK CREW REST AREA HEAT
 - (c) 36D3 or 36L2, FLT DK CREW REST AREA TEMP CONT
 - (d) 36D6 or 36L5, AFT LH CBN CREW REST AREA TEMP CONT

S 864-029

- (2) Remove the DO-NOT-CLOSE tag and close these circuit breakers, on the P37 panel:
 - (a) 37B4, FWD CBN CREW REST AREA HEAT
 - (b) 37B7, AFT RH CBN CREW REST AREA HEAT
 - (c) 37H4 or 37K5, FWD CBN CREW REST AREA TEMP CONT
 - (d) 37H5 or 37K4, AFT RH CBN CREW REST AREA TEMP CONT

S 864-030

- (3) Supply electrical power (Ref 24-22-00).

S 864-031

- (4) Supply pneumatic power (Ref 36-00-00).

S 864-032

- (5) Remove the DO-NOT-OPERATE tag from the L and R RECIRC FAN switch-lights, on the P5 panel.

S 864-033

- (6) Remove the DO-NOT-OPERATE tag from the L and R PACK selectors, on the P5 panel.
 - (a) Turn the L and R PACK selectors to AUTO.
 - (b) Make sure the PACK OFF lights go off.

S 864-034

WARNING: DO THE DEACTIVATION PROCEDURE FOR THE SPOILERS OR MOVE ALL PERSONS AND EQUIPMENT AWAY FROM THE SPOILER PANELS. THE SPOILERS CAN RETRACT QUICKLY AND CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (7) Do the deactivation procedure for the spoilers (Ref 27-61-00) or move all persons and equipment away from the spoiler panels.

S 864-035

WARNING: MAKE SURE THAT THE FLIGHT MODE SIMULATION PROCEDURE IS DONE CORRECTLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROCEDURE IS NOT DONE CORRECTLY.

- (8) Do the Flight Mode Simulation procedure for the No. 1 and No. 2 air/ground systems (Ref 32-09-02).

S 214-036

- (9) Feel for airflow around the heater.
(a) A small leak is permitted.
(b) You must repair a large leak.

S 864-037

- (10) Push the ECS MSG switch on the EICAS MAINT module, on the pilot's right side control panel P61.

S 214-038

- (11) Make sure the applicable EICAS message (FLT, FWD, or AFT) REST SYS does not show on the lower display.

G. Put the Airplane Back to its Usual Condition

S 864-039

- (1) Put the airplane back to the ground mode (Ref 32-09-02).

S 864-040

- (2) Do the activation procedure for the spoilers if you did the deactivation procedure (Ref 27-61-00).

S 414-041

- (3) If the heater for the flight deck crew rest area was installed, install the sculptured ceiling panel immediately left and aft of the flight deck crew rest area.

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

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- S 414-042
- (4) If the heater for the forward crew rest area was installed, install the sculptured ceiling panel immediately aft and left of the forward crew rest area.
- S 414-043
- (5) If the heater for the left aft crew rest area was installed, install the sculptured ceiling panel immediately forward and right of the left aft crew rest area.
- S 414-044
- (6) If the heater for the right aft crew rest area was installed, install the sculptured ceiling panel immediately forward and left of the right aft crew rest area.
- S 864-045
- (7) Remove the electrical power, if it is not necessary (Ref 24-22-00).
- S 864-046
- (8) Remove the pneumatic power, if it is not necessary (Ref 36-00-00).

EFFECTIVITY
AIRPLANES WITH CREW REST AREAS

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- MTH (2) The fan at the inlet side of the unit causes an airflow which is
 MTH separated by divider vanes into two separate channels.
 MTH (a) The channel of production air, approximately 80% of the total
 MTH airflow, passes through the rotor and the humidity in it is
 MTH absorbed by the silica-gel. This airflow then comes out at the
 MTH other side of the rotor and passes through a separate outlet as
 MTH dry air.
 MTH (b) The channel of regeneration air, approximately 20% of the total
 MTH airflow, is heated by the electrical heater element before it
 MTH passes through the rotor. The rotor drive, connected to the
 MTH rotor with a belt drive, makes the rotor slowly rotate and when
 MTH the heated air passes into the rotor it will reabsorb from the
 MTH silica-gel the humidity left by the production air. By this
 MTH principle the dryer and in particular the rotor is continuously
 MTH regenerated so that it can continuously produce dry air.
- MTH B. Control Box and Control Panel (Fig. 1)
- MTH (1) The control box is a 270x80x60 mm black box mounted on a bracket on
 MTH the underside of the zonal dryer. It contains three relays (control
 MTH relay, latch relay, and power relay), a 1 ampere circuit breaker, a
 MTH terminal block and three connectors. The control box weighs 0.9 kg.
- MTH (2) The control panel is a 125x65x50 mm zinc-chromate-primed box mounted
 MTH on top of the mid stowage bin close to each zonal dryer. It
 MTH contains an ON/OFF switch, a fault indication lamp, a RESET button
 MTH and a 1000 mm long wire harness with a connector.
- MTH (3) The zonal dryer, control box, and control panel are integrated
 MTH electrically. The control box controls all of the dryer components
 MTH except the heater elements. If a failure should occur, the 28V DC
 MTH deactivates the relays, and the 115/200V AC will be cut off and the
 MTH dryer will shut down.
- MTH (a) The ON/OFF switch on the control panel is used to start and
 MTH stop the dryer.
- MTH (b) The fault indication light will indicate if a failure occurs.
- MTH (c) The RESET button is used to restart the zonal dryer when the
 MTH fault indication light has come on.
- MTH C. Main Circuit Breaker Panel (Fig. 1)
- MTH (1) The main circuit breaker panel is a 207x70x65 mm zinc-chromate
 MTH primed box mounted on top of the mid stowage bin in the fwd area
 MTH close to the FWD dryer. The main circuit breaker panel contains
 MTH three 10 amp circuit breakers, three 1 amp circuit breakers and
 MTH weighs 0.45 kg.
- MTH (2) The three 10 Ampere circuit breakers, one for each zonal dryer,
 MTH controls that if a short circuiting on the 115/200V AC heater
 MTH element should occur on one particular zonal dryer the dryer will
 MTH shut down and the other two dryers will not be affected.

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MTH (3) The three 1 Ampere circuit breakers, one for each zonal dryer,
MTH controls that if a short circuiting on the 28V DC circuit should
MTH occur on one particular zonal dryer the dryer will shut down and the
MTH other two dryers will not be affected.

MTH D. Filter Box (Fig. 1)

MTH (1) A high efficiency filter is fitted in a box on a bracket and
MTH installed on top of the mid stowage bin on the inlet side of each
MTH zonal dryer. The filter stops nicotine and bacteria from the air
MTH that goes through and out through the zonal dryer.
MTH (2) The high efficiency filter is bonded into a 250x250 mm aluminum
MTH frame. The filter stops dust, fibre, nicotine particles, and
MTH bacteria. Filter with frame are locked in the filter box with the
MTH clips on the filter clip.

MTH E. Ducting System (Fig. 1)

MTH (1) Each dryer has its own ducting system, which supply the dryer with
MTH air from the cabin. There are two air inlets installed for each
MTH dryer in the mid overhead ceiling panels close to the FWD, MID and
MTH AFT galleys.
MTH (a) To ensure that the system does not draw in any air from the
MTH crown area, in MID and AFT air inlet areas closure panels are
MTH installed in the mid stowage bin to create a box around the air
MTH inlet. In FWD inlet area existing box is used. All boxes are
MTH sealed, and on top of the stowage bin above each box a hole is
MTH located with a hose connector attached.
MTH (b) The FWD inlet ducting is routed from two hose connectors
MTH towards the FWD zonal dryer inlet by two flexible hoses, an
MTH angled Y-connector, a duct, a silencer, the filter box and a
MTH reducer.
MTH (c) The MID inlet ducting is routed from two hose connectors
MTH towards the MID zonal dryer inlet by a flexible hose, a
MTH T-connector, a flexible hose, a silencer, the filter box and a
MTH reducer.
MTH (d) The AFT inlet ducting is routed from two hose connectors
MTH towards to AFT zonal dryer inlet by two flexible hoses, a
MTH angled Y-connector, a duct, the filter box, a duct, a silencer
MTH and a reducer.
MTH (e) General for all hoses, ducts, silencers and inlet reducers is
MTH that they are connected together with silicon sleeves and
MTH secured with tie wraps. All ducting systems are secured with
MTH tie wrap to a radius support mounted on brackets installed on
MTH top of the mid stowage bin.

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- MTH (2) Each dryer contains a regeneration ducting system which lead the
MTH regeneration air down to the recirculation bay (cheek area).
MTH (a) From regeneration air outlet on the zonal dryer in FWD
MTH installation, two ducts are routed backwards in the aircraft on
MTH top of stowage bin. The ducts are secured with tie wraps to
MTH radius support mounted on brackets installed on the stowage
MTH bin.
MTH (b) A flexible hose is attached from the duct up to a Y-connector
MTH attached to a stringer over left hand aisle with support
MTH attachment, radius support and secured with tie wrap.
MTH (c) From the Y-connector two lines of total six flexible hoses are
MTH routed down behind left hand stowage bin and sidewall panel.
MTH The hoses are attached to three stringers with support
MTH attachment, radius support and tie wrap.
MTH (d) Two 90-degree bends are attached to the end of each hose to
MTH distribute the regeneration air out in the right direction.
MTH The two 90-degree bends are secured with tie wraps to radius
MTH supports mounted on brackets that are installed at floor level.
MTH (e) In MID and AFT installation the regeneration ducting system is
MTH routed as in FWD installation except with the following
MTH differences:
MTH 1) MID Installation:
MTH Regeneration ducting system are routed on right hand side.
MTH One duct installed, instead of two, from regeneration air
MTH outlet on top of right hand mid stowage bin.
MTH 2) AFT Installation:
MTH Between regeneration air outlet on dryer and Y-connector a
MTH flexible hose is routed instead of ducts. General for all
MTH ducts and hoses is that they are connected with silicon
MTH cuffs and secured with tie wraps.

MTH 3. Operation

MTH A. Functional Description (Fig. 2)

- MTH (1) When the system is operative the cabin air is drawn into the system
MTH by the fan through two inlet grills in the overhead ceiling panel.
MTH The two inlets installed will maintain as slow airflow speed as
MTH possible.
MTH (a) Dependent on the installation the air passes through a length
MTH of ducting to the filter box with a high efficiency filter.
MTH The high efficiency filter stops dust, fibre, nicotine and
MTH bacteria from entering the system.
MTH (b) The air then passes through ducting towards the zonal dryer
MTH inlet, but before entering the zonal dryer the air passes
MTH throug a muffler silencer which stops the sonic frequencies of
MTH the fan that otherwise would be transmitted back to the inlet
MTH grills that are open to the cabin.

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- MTH (4) The control box and control panel, one for each zonal dryer, control
 MTH the logic circuits to operate the zonal dryer. The control panel
 MTH provide 28V DC to power relay in the control box which provide
 MTH 115/200V AC, 3-phase power to the fan, heater elements and rotor
 MTH drive motor in the zonal dryer.
- MTH (5) Basic Zonal Dryer Circuit
- MTH (a) When the ON/OFF switch on the control panel is pushed to ON,
 MTH the power relay is activated, which provide 115/200V AC power
 MTH to the fan, heater elements and rotor drive. The zonal dryer
 MTH is now operative. If the fan or rotor drive motor short
 MTH circuit caused by an electrical overload the circuit breaker in
 MTH the control box opens and removes the power to the fan and
 MTH rotor drive motor. It will also activate the latch relay which
 MTH in its turn opens the power relay and removes the power to the
 MTH heater elements. The fault indication circuit is energized by
 MTH 28V DC and fault indication lights illuminates.
- MTH (b) If the heater elements short circuit caused by damage on
 MTH elements or wiring the AC circuit breaker in the main circuit
 MTH breaker panel will open and break the 115/200V AC power. The
 MTH control relay in the control box will open and break the 28V DC
 MTH circuit. The fault indication light will not illuminate.
- MTH (c) A thermal switch in the rotor drive motor case provides
 MTH overheat protection. Mechanical overloading or electrical
 MTH fault causes the thermal switch to close at 140-degree C. Two
 MTH thermal switches inside the inlet cone adjacent to heater
 MTH elements provides overheat air protection. Foreign objects on
 MTH inlet screen or clogged prefilter, result in reduced airflow
 MTH and overheating of elements, which causes the two thermal
 MTH switches to close at 90-degree C. When one or more of these
 MTH thermal switches close, the 28V DC deactivates the latch relay
 MTH which in its turn opens the power relay and remove the power
 MTH from fan, heater element, rotor drive motor and fault
 MTH indication lights illuminates.
- MTH B. Control - Zonal Drying System
- MTH (1) References
- MTH (a) System Test of the Zonal Drying System (AMM 21-74-00/501)

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- MTH D. Perform the operational test for the zonal drying system
MTH
MTH S 715-005
MTH (1) Perform the test procedure:
MTH (a) Push the FWD control panel ON/OFF switch to the ON position.
MTH 1) Listen for the fan in the zonal dryer to come on.
MTH 2) Feel for the airflow from the zonal dryer air distributor
MTH three outlets.
MTH 3) Put a finger into one of the inspection holes in the zonal
MTH dryer and feel that the rotor drive belt is moving.
MTH (b) Push the FWD control ON/OFF switch to the OFF position.
MTH 1) Listen for the fan in the zonal dryer to stop.
MTH (c) Push the MID control panel ON/OFF switch to the ON position.
MTH 1) Listen for the fan in the zonal dryer to come on.
MTH 2) Feel for the airflow from the zonal dryer air distributor
MTH three outlets.
MTH 3) Put a finger into one of the inspection holes in the zonal
MTH dryer and feel that the rotor drive belt is moving.
MTH (d) Push the MID control ON/OFF switch to the OFF position.
MTH 1) Listen for the fan in the zonal dryer to stop.
MTH (e) Push the AFT control panel ON/OFF switch to the ON position.
MTH 1) Listen for the fan in the zonal dryer to come on.
MTH 2) Feel for the airflow from the zonal dryer air distributor
MTH three outlets.
MTH 3) Put a finger into one of the inspection holes in the zonal
MTH dryer and feel that the rotor drive belt is moving.
MTH (f) Push the AFT control ON/OFF switch to the OFF position.
MTH 1) Listen for the fan in the zonal dryer to stop.

MTH E. Put the Airplane Back to Its Usual Condition

- MTH S 865-006
MTH (1) Remove electrical power if it is not necessary (AMM 24-22-00/201).

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MTH 3. System Test - Zonal Drying System (Fig. 501)

- MTH A. References
MTH (1) AMM 24-22-00/201, Electrical Power Control
MTH B. Access
MTH (1) Location Zones
MTH 230/240/250 Passenger Cabin
MTH (2) Access Panels
MTH 119AL Main equipment center access door
MTH

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- MTH (e) Disconnect the zonal dryer ground wire from the ground wire GND
MTH STA 455.4, LBL 20.29 AC. Make sure this condition occurs:
MTH 1) The FWD zonal dryer stops.
- MTH (f) Connect the zonal dryer ground wire to the ground GND
MTH STA 455.4, LBL 20.29 AC. Make sure this condition occurs:
MTH 1) The FWD zonal dryer starts.
- MTH (g) Open this circuit breaker on the main circuit breaker panel:
MTH 1) C9102, FWD Zonal Dryer 10A
- MTH (h) Make sure this condition occurs:
MTH 1) The FWD zonal dryer stops.
- MTH (i) Close this circuit breaker on the main circuit breaker panel:
MTH 1) C9102, FWD Zonal Dryer 10A
- MTH (j) Make sure this condition occurs:
MTH 1) The FWD zonal dryer starts.
- MTH (k) Open this circuit breaker on the main circuit breaker panel:
MTH 1) C9105, FWD Zonal Dryer 1A
- MTH (l) Make sure this condition occurs:
MTH 1) The FWD zonal dryer stops.
- MTH (m) Close this circuit breaker on the main circuit breaker panel:
MTH 1) C9105, FWD Zonal Dryer 1A
- MTH (n) Make sure this condition occurs:
MTH 1) The FWD zonal dryer starts.
- MTH (o) Open this circuit breaker on the control box:
MTH 1) CB1, Zonal Dryer Fan and Rotor Drive
- MTH (p) Make sure these conditions occur:
MTH 1) The FWD zonal dryer stops.
MTH 2) The FWD control panel fault indication light comes on.
- MTH (q) Close this circuit breaker on the control box:
MTH 1) CB1, Zonal Dryer Fan and Rotor Drive
- MTH (r) Press the RESET button on FWD control panel. Make sure these
MTH conditions occur:
MTH 1) The FWD zonal dryer starts.
MTH 2) The fault indication lights on the FWD control panel
MTH extinguish.
- MTH (s) Leave the FWD zonal dryer in operation.

S 735-012

- MTH (2) Perform the MID zonal dryer system test.
- MTH (a) Push the MID control panel ON/OFF switch to the ON position.
MTH 1) Listen for the fan in the zonal dryer to come on.
MTH 2) Feel for the airflow from the zonal dryer air distributor
MTH three outlets.
MTH 3) Put a finger into one of the inspection holes in the zonal
MTH dryer and feel that the rotor drive belt is moving.

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- MTH (b) Make sure that there are no air leaks on the zonal dryer inlet and regeneration outlet duct joints.
 - MTH 1) Use your hand to make sure that you do feel NO airflow around the duct joints.
- MTH (c) disconnect the zonal dryer ground wire from the GND STA 932.4, RBL 21.29 DC. Make sure this condition occurs:
 - MTH 1) The MID zonal dryer stops.
- MTH (d) Connect the zonal dryer ground wire to the GND STA 932.4, RBL 21.29 DC. Make sure this condition occurs:
 - MTH 1) The MID zonal dryer starts.
- MTH (e) Disconnect the zonal dryer ground wire from the GND STA 932.4, RBL 20.29 AC. Make sure this condition occurs:
 - MTH 1) The MID zonal dryer stops.
- MTH (f) Connect the zonal dryer ground wire to the GND STA 932.4, RBL 20.29 AC. Make sure this condition occurs:
 - MTH 1) The MID zonal dryer starts.
- MTH (g) Open this circuit breaker on the main circuit breaker panel:
 - MTH 1) C9103, MID Zonal Dryer 10A
- MTH (h) Make sure this condition occurs:
 - MTH 1) The MID zonal dryer stops.
- MTH (i) Close this circuit breaker on the main circuit breaker panel:
 - MTH 1) C9103, MID Zonal Dryer 10A
- MTH (j) Make sure this condition occurs:
 - MTH 1) The MID zonal dryer starts.
- MTH (k) Open this circuit breaker on the main circuit breaker panel:
 - MTH 1) C9106, MID Zonal Dryer 1A
- MTH (l) Make sure this condition occurs:
 - MTH 1) The MID zonal dryer stops.
- MTH (m) Close this circuit breaker on the main circuit breaker panel:
 - MTH 1) C9106, MID Zonal Dryer 1A
- MTH (n) Make sure this condition occurs:
 - MTH 1) The MID zonal dryer starts.
- MTH (o) Open this circuit breaker on the control box:
 - MTH 1) CB1, Zonal Dryer Fan and Rotor Drive
- MTH (p) Make sure these conditions occur:
 - MTH 1) The MID zonal dryer stops.
 - MTH 2) The MID control panel fault indication lights come on.
- MTH (q) Close this circuit breaker on the control box:
 - MTH 1) CB1, Zonal Dryer Fan and Rotor Drive
- MTH (r) Press the RESET button on the MID control panel. Make sure these conditions occur:
 - MTH 1) The MID zonal dryer starts.
 - MTH 2) The fault indication lights on the MID control panel extinguish.
- MTH (s) Leave the MID zonal dryer in operation.

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- MTH (q) Close this circuit breaker on the control box:
MTH 1) CB1, Zonal Dryer Fan and Rotor Drive
MTH (r) Press the RESET button on the AFT control panel. Make sure
MTH these conditions occur:
MTH 1) The AFT zonal dryer starts.
MTH 2) The fault indication lights on the AFT control panel
MTH extinguish.
MTH (s) Leave the AFT zonal dryer in operation.
MTH
MTH S 735-014
MTH (4) Performed the FWD, MID, and AFT zonal dryer system test.
MTH (a) Open this circuit breaker on the P36 panel:
MTH 1) C9100 G6 or C9101 D5, ZONAL DRYERS
MTH (b) Make sure these conditions occur:
MTH 1) The FWD zonal dryer stops.
MTH 2) The MID zonal dryer stops.
MTH 3) The AFT zonal dryer stops.
MTH (c) Close this circuit breaker on the P36 panel:
MTH 1) C9100 G6 or C9101 D5, ZONAL DRYERS
MTH (d) Make sure these conditions occur:
MTH 1) The FWD zonal dryer starts.
MTH 2) The MID zonal dryer starts.
MTH 3) The AFT zonal dryer starts.
MTH E. Put the Airplane Back to its Usual Condition
MTH
MTH S 865-015
MTH (1) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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MTH (i) Carefully lower the FWD Zonal dryer (1) down between the right
MTH and left beam (17). Pull the FWD Zonal dryer (1) out to the
MTH left.

MTH D. MID Zonal Dryer Removal (Fig. 403)

MTH S 024-007

- MTH (1) To remove the MID zonal dryer, do the steps that follow:
- MTH (a) Disconnect the electrical connector (4) from the P3 receptacle
 - MTH on the MID zonal dryer (1).
 - MTH (b) Disconnect the chassis GND (5) from the MID zonal dryer (1).
 - MTH (c) To remove the control box (14) and the chassis GND (8) from the
 - MTH bracket (23), remove the four bolts (9) and four washers (10).
 - MTH Keep the control box on top of the stowage bin beside the MID
 - MTH zonal dryer (1)
 - MTH (d) To remove the bracket (23) from the MID zonal dryer (1), remove
 - MTH the two bolts (6) and two washers (7).
 - MTH (e) Cut the tie wrap (18) and remove the air distributor (19).
 - MTH (f) Disconnect the inlet reducer (3) from the MID zonal dryer (1).
 - MTH Cut the tie wrap (18)
 - MTH (g) Disconnect the regeneration duct (21) from the MID zonal dryer
 - MTH (1). Cut the tie wrap (18) and carefully move the regeneration
 - MTH duct away from the MID zonal dryer (1) until it is loose from
 - MTH the regeneration outlet hose connector.
 - MTH (h) Remove the two bolts (16), two washers (7), and two
 - MTH spacers (15) on the left beam (17). Support the MID zonal
 - MTH dryer (1) while you remove the two bolts (16), two washers (7),
 - MTH and two spacers (15) on the right beam.
 - MTH (i) Carefully lower the MID zonal dryer (1) down between the right
 - MTH and left beam (17). Pull the MID zonal dryer (1) out to the
 - MTH right.

MTH E. AFT Zonal Dryer Removal (Fig. 404)

MTH S 024-008

- MTH (1) To remove the AFT zonal dryer, do the steps that follow:
- MTH (a) Disconnect the electrical connector (4) from the P3 receptacle
 - MTH on the AFT zonal dryer (1).
 - MTH (b) Disconnect the chassis GND (5) from the AFT zonal dryer (1).
 - MTH (c) To remove the control box (14) and the chassis GND (8) from the
 - MTH bracket (23), remove the four bolts (9) and four washers (10).
 - MTH Keep the control box on top of the stowage bin beside the AFT
 - MTH zonal dryer (1).
 - MTH (d) To remove the bracket (23) from the AFT zonal dryer (1), remove
 - MTH the two bolts (6) and two washers (7).
 - MTH (e) Cut the tie wrap (18) and remove the air distributor (19).
 - MTH (f) Disconnect the inlet reducer (3) from the AFT zonal dryer (1).
 - MTH Cut the tie wrap (18).

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- MTH (g) Disconnect the regeneration hose (22) from the AFT zonal dryer (1). Cut the tie wrap (18) and carefully move the regeneration hose away from the AFT zonal dryer (1) until it is loose from the regeneration outlet hose connector.
- MTH (h) Remove the two bolts (16), two washers (7), and two spacers (15) on the right beam (17). Support the AFT zonal dryer (1) while you remove the two bolts (16), two washers (7), and two spacers (15) on the left beam (17).
- MTH (i) Carefully lower the AFT zonal dryer (1) down between the right and left beam (17). Pull the AFT zonal dryer (1) out to the left.

MTH TASK 21-74-01-404-009

MTH 3. Zonal Dryer Installation (Fig. 401-404)

MTH A. Parts

AMM		NOMENCLATURE	P/N
FIG	ITEM		
402	1	Zonal Dryer	3000-000
	2	Sleeve	4166-000
	6	Bolt	AN4-6A
	7	Washer	AN960-416L
	9	Bolt	NAS1801-08-6
	10	Washer	AN960-8L
	15	Spacer	4090-000
	16	Bolt	AN3-4A
	18	Tie wrap	PLT4S-C1E
403	1	Zonal Dryer	3000-000
	2	Sleeve	4166-000
	6	Bolt	AN4-6A
	7	Washer	AN960-416L
	9	Bolt	NAS1801-08-6
	10	Washer	AN960-8L
	15	Spacer	4090-000
	16	Bolt	AN3-4A
	18	Tie wrap	PLT4S-C1E
404	1	Zonal Dryer	3000-000
	2	Sleeve	4166-000
	6	Bolt	AN4-6A
	7	Washer	AN960-416L
	9	Bolt	NAS1801-08-6
	10	Washer	AN960-8L
	15	Spacer	4090-000
	16	Bolt	AN3-4A
	18	Tie wrap	PLT4S-C1E

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- MTH B. References
MTH (1) SWPM 20-20-00, Standard Wiring Practices Manual
MTH (2) AMM 24-22-00/201, Electric Power Control
- MTH C. Access
MTH (1) Location Zones
MTH FWD crown area STA 434-456 Access from LH aisle
MTH MID crown area STA 915.5-933 Access from RH aisle
MTH AFT crown area STA 1351-1373 Access from LH aisle
- MTH D. FWD Zonal Dryer Installation (Fig. 402)
MTH S 424-011
MTH (1) To install the FWD zonal dryer, do the steps that follow:
MTH (a) Make sure there is no unwanted material in the inlet reducer
MTH (3) or in the regeneration duct (20).
MTH (b) Lift the FWD zonal dryer (1) into position between the right
MTH and left beam (17).
MTH (c) Insert and tighten the four bolts (16), four washers (7), and
MTH four spacers (15) to the beam (17) and the FWD zonal dryer (1)
MTH in this order; bolt, washer, beam, spacer, and zonal dryer.
MTH (d) Connect the regeneration duct (20) by carefully moving the duct
MTH with the cuff onto the regeneration outlet hose connector.
MTH Secure with a tie wrap (18).
MTH (e) Connect the inlet reducer (3) to the FWD zonal dryer inlet.
MTH Move part of the sleeve (2) from the inlet reducer over to the
MTH inlet on the FWD zonal dryer (1). Secure with a tie wrap (18)
MTH on each end of the sleeve.
MTH (f) Install the air distributor (19) on the underside of the FWD
MTH zonal dryer dry air outlet. Secure with two lines of tie wrap
MTH (18).
MTH (g) Install the bracket (23) on the underside of zonal dryer (1).
MTH Use two bolts (6) and two washers (7).
MTH (h) Install the control box (14) on the bracket (23). Use three
MTH bolts (9) and three washers (10). Leave the bolt hole for the
MTH chassis GND (8) open.

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- MTH (i) Connect the chassis GND (8) to the control box (14). Use the
MTH bolt (9) and the washer (10). After you join the ground
MTH connection, restore the surface in accordance with Standard
MTH Wiring Practices Manual (SWPM 20-20-00 page 11).
MTH (j) Connect the chassis GND (5) to the zonal dryer (1). Use the
MTH bolt (6) and the washer (7). After you join the ground
MTH connection, restore the surface in accordance with Standard
MTH Wiring Practices Manual (SWPM 20-20-00 page 11).
MTH (k) Connect the electrical connector (4) to the P3 receptacle on
MTH the FWD zonal dryer (1).
MTH

S 714-022

- (2) Do an operational test of the FWD zonal dryer which is found at the end of this procedure.

E. MID Zonal Dryer Installation (Fig. 403)

S 424-012

- (1) To install the MID zonal dryer, do the steps that follow:
(a) Make sure there is no unwanted material in the inlet reducer (3) or in the regeneration duct (21).
(b) Lift the MID zonal dryer (1) into position between the left and right beam (17).
(c) Insert and tighten the four bolts (16), four washers (7), and four spacers (15) to the beams (17) and the MID zonal dryer (1) in this order; bolt, washer, beam, spacer, and zonal dryer.
(d) Connect the regeneration duct (21) by carefully moving the duct with the cuff onto the regeneration outlet hose connector. Secure with a tie wrap (18).
(e) Connect the inlet reducer (3) to the zonal dryer inlet. Move part of the sleeve (2) from the inlet reducer over to the inlet on the zonal dryer. Secure with a tie wrap (18) on each end of the sleeve.
(f) Install the air distributor (19) on the zonal dryer dry air outlet. Secure with two lines of tie wrap (18).
(g) Install the bracket (23) on the underside of the zonal dryer (1). Use two bolts (6) and two washers (7).

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- (h) Install the control box (14) on the bracket (23). Use three bolts (9) and three washers (10). Leave the bolt hole for the chassis GND (8) open.
 - (i) Connect the chassis GND (8) to the control box (14). Use the bolt (9) and the washer (10). After you join the ground connection, restore the surface in accordance with Standard Wiring Practices Manual (SWPM 20-20-00 page 11).
 - (j) Connect the chassis GND (5) to the zonal dryer (1). Use the bolt (6) and the washer (7). After you join the ground connection, restore the surface in accordance with Standard Wiring Practices Manual (SWPM 20-20-00 page 11).
 - (k) Connect the electrical connector (4) to the P3 receptacle on the MID zonal dryer (1).

S 714-023

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- (2) Do an operational test of the MID zonal dryer which is found at the end of this procedure.

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F. AFT Zonal Dryer Installation (Fig. 404)

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S 424-013

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- (1) To install the AFT zonal dryer, do the steps that follow:
 - (a) Make sure there is no unwanted material in the inlet reducer (3) or in the regeneration hose (22).
 - (b) Lift the AFT zonal dryer (1) into position between the right and left beam (17).
 - (c) Insert and tighten the four bolts (16), four washers (7), and four spacers (15) to the beams (17) and the zonal dryer (1) in this order; bolt, washer, beam, spacer and zonal dryer.
 - (d) Connect the regeneration hose (22) by carefully moving the hose with the cuff onto the regeneration outlet hose connector. Secure with a tie wrap (18).
 - (e) Connect the inlet reducer (3) to the zonal dryer inlet. Move part of the sleeve (2) from the inlet reducer over to the inlet on the AFT zonal dryer (1). Secure with a tie wrap (18) on each end of the sleeve.

- MTH (f) Install the air distributor (19) on the AFT zonal dryer dry air outlet. Secure with two lines of tie wrap (18).
- MTH (g) Install the bracket (23) on the underside of the AFT zonal dryer (1). Use two bolts (6) and two washers (7).
- MTH (h) Install the control box (14) on the bracket (23). Use three bolts (9) and three washers (10). Leave the bolt hole for the chassis GND (8) open.
- MTH (i) Connect the chassis GND (8) to the control box (14). Use the bolt (9) and the washer (10). After you join the ground connection, restore the surface in accordance with Standard Wiring Practices Manual (SWPM 20-20-00 page 11).
- MTH (j) Connect the chassis GND (5) to the zonal dryer (1). Use the bolt (6) and the washer (7). After you join the ground connection, restore the surface in accordance with Standard Wiring Practices Manual (SWPM 20-20-00 page 11).
- MTH (k) Connect the electrical connector (4) to the P3 receptacle on the AFT zonal dryer (1).

S 714-024

- (2) Do an operational test of the AFT zonal dryer which is found at the end of this procedure.

G. Zonal Dryer Post-Installation Operational Test

S 864-014

- (1) Supply electrical power (AMM 24-22-00/201).

S 864-015

- (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers for the applicable zonal dryer:
 - (a) For the FWD zonal dryer:
 - 1) On the Main Circuit Breaker panel, on top of the left MID overhead storage bin at STA 433:
 - a) C9102 10A FWD
 - b) C9105 1A FWD
 - 2) On the left Miscellaneous Electrical Equipment Panel P36:
 - a) C9100 G6 ZONAL DRYERS

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- S 864-020
(2) Remove the electrical power, if it is not necessary
(AMM 24-22-00/201).

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MTH E. AFT Control Box Removal

MTH S 024-007

- MTH (1) To remove the AFT control box, do the steps that follow:
- MTH (a) Disconnect these electrical connectors from the control
MTH box (14):
- MTH 1) Connector (11) D9103
 - MTH 2) Connector (12) P2
 - MTH 3) Connector (13) D9106
- MTH (b) To remove the control box (14) and chassis GND (8) from the
MTH bracket (23), remove the four bolts (9) and four washers (10).
- MTH (c) Put covers on the three electrical connectors on the control
MTH box (14).

MTH TASK 21-74-02-404-008

MTH 3. Control Box Installation (Fig. 401)

MTH A. Parts

AMM		NOMENCLATURE	P/N
FIG	ITEM		
401	8	Chassis GND	4119-001
	9	Bolt	NAS1801-08-6
	10	Washer	AN960-416L
	14	Control Box	3800-000

MTH B. References

- MTH (1) SWPM 20-20-00, Standard Wiring Practices Manual
- MTH (2) AMM 24-22-00/201, Electric Power Control

MTH C. Access

- MTH (1) Location Zones
- MTH FWD crown area STA 434-456 Access from LH aisle
 - MTH MID crown area STA 915.5-933 Access from RH aisle
 - MTH AFT crown area STA 1351-1373 Access from LH aisle

MTH D. FWD Control Box Installation

MTH S 424-010

- MTH (1) To install the FWD control box, do the steps that follow:
- MTH (a) Install the control box (14) on the bracket (23). Use three
MTH bolts (9) and three washers (10). Leave the bolt hole for the
MTH chassis GND (8) open.

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- MTH (b) Connect the chassis GND (8) to the control box (14). Use the
- MTH bolt (9) and the washer (10). After you join the ground
- MTH connection, restore the surface in accordance with Standard
- MTH Wiring Practices Manual (SWPM 20-20-00, page 11).
- MTH (c) Connect these electrical connectors to the control box (14):
- MTH 1) Connector (11) to receptacle D9101 on control box
- MTH 2) Connector (12) to receptacle P2 on control box
- MTH 3) Connector (13) to receptacle D9104 on control box

S 714-019

- (2) Do the operational test of the control box which is found at the end of this procedure.

E. MID Control Box Installation

S 424-011

- (1) To install the MID control box, do the steps that follow:
 - (a) Install the control box (14) on the bracket (23). Use three bolts (9) and three washers (10). Leave the bolt hole for the chassis GND (8) open.
 - (b) Connect the chassis GND (8) to the control box (14). Use the bolt (9) and the washer (10). After you join the ground connection, restore the surface in accordance with Standard Wiring Practices Manual (SWPM 20-20-00, page 11).
 - (c) Connect these electrical connectors to the control box (14):
 - 1) Connector (11) to receptacle D9102 on control box
 - 2) Connector (12) to receptacle P2 on control box
 - 3) Connector (13) to receptacle D9105 on control box

S 714-021

- (2) Do the operational test of the control box which is found at the end of this procedure.

F. AFT Control Box Installation

S 424-012

- (1) To install the AFT control box, do the steps that follow:
 - (a) Install the control box (14) on the bracket (23). Use three bolts (9) and three washers (10). Leave the bolt hole for the chassis GND (8) open.
 - (b) Connect the chassis GND (8) to the control box (14). Use the bolt (9) and the washer (10). After you join the ground connection, restore the surface in accordance with Standard Wiring Practices Manual (SWPM 20-20-00, page 11).
 - (c) Connect these electrical connectors to the control box (14):
 - 1) Connector (11) to receptacle D9103 on control box

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- S 864-024
- (5) Push the ON/OFF switch on the applicable control panel to the ON position.
 - (a) Listen for the fan in the applicable zonal dryer to come on.
 - (b) Feel for the airflow from the zonal dryer air distributor three outlets.
 - (c) Put a finger into one of the inspection holes in the applicable zonal dryer and feel that the rotor drive belt is moving.
 - (d) Leave the zonal dryer in operation.
- H. Put the Airplane Back to It's Usual Condition

- S 414-015
- (1) Install the sculptured ceiling panels.
 - (a) FWD crown area STA 390-522 LH aisle
 - (b) MID crown area STA 889-995.1 RH aisle
 - (c) AFT crown area STA 1329-1395 LH aisle

- S 864-016
- (2) Remove the electrical power, if it is not necessary (AMM 24-22-00/201).

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MTH E. AFT Control Panel Removal

MTH S 024-009

- MTH (1) To remove the AFT control panel, do the steps that follow:
- MTH (a) Disconnect the electrical connector (13) from the receptacle D9106 on the control box (14).
 - MTH (b) Remove the tie wraps to loosen the wiring harness from the control panel (24).
 - MTH (c) To remove the control panel (24) with it's wiring harness, remove the four bolts (25) and the four washers (10).
 - MTH (d) Put a cover on the receptacle D9106 on the control box (14) and on the connector (13) of the control panel wiring harness.

MTH TASK 21-74-03-404-010

MTH 3. Control Panel Installation (Fig. 401)

MTH A. Parts

AMM		NOMENCLATURE	P/N
FIG	ITEM		
401	9	Bolt	NAS1801-08-6
	10	Washer	AN960-416L
	24	FWD Control Panel	4146-000
	25	Bolt	NAS1801-08-5
	27	Clamp	MS21919D64
	29	Tie wrap	PLT4S-CIE

MTH B. References

- MTH (1) SWPM 20-20-00, Standard Wiring Practices Manual
- MTH (2) AMM 24-22-00/201, Electric Power Control

MTH C. Access

- MTH (1) Location Zones
- MTH FWD crown area STA 434-456 Access from LH aisle
 - MTH MID crown area STA 915.5-933 Access from RH aisle
 - MTH AFT crown area STA 1351-1373 Access from LH aisle

MTH D. FWD Control Panel Installation

MTH S 424-012

- MTH (1) To install the FWD control panel, do the steps that follow:
- MTH (a) Install the control panel (24) to the four inserts (28) on top of the stowage bin close to the zonal dryer (1). Use four bolts (25) and four washers (10).

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- MTH (b) Connect the electrical connector (13) to the receptacle D9104
- MTH on the control box (14).
- MTH (c) Install the wiring clamp (27) on the control box (14). Use the
- MTH bolt (9) and the washer (10).

S 714-021

- (2) Do the operational test of the control panel which is found at the end of this procedure.

E. MID Control Panel Installation

S 424-013

- (1) To install the MID control panel, do the steps that follow:
 - (a) Install the control panel (24) to the four inserts (28) on top of the stowage bin close to the zonal dryer (1). Use four bolts (25) and four washers (10).
 - (b) Connect the electrical connector (13) to the receptacle D9105 on the control box (14).
 - (c) Tie the control panel wiring harness to the existing wire bundle to the control box (14). Use the required amount of tie wraps (29).

S 714-022

- (2) Do the operational test of the control panel which is found at the end of this procedure.

F. AFT Control Panel Installation

S 424-014

- (1) To install the AFT control panel, do the steps that follow:
 - (a) Install the control panel (24) to the four inserts (28) on top of the stowage bin close to the zonal dryer (1). Use four bolts (25) and four washers (10).
 - (b) Connect the electrical connector (13) to the receptacle D9106 on the control box (14).
 - (c) Tie the control panel wiring harness to the existing wire bundle to the control box. Use the required amount of tie wraps (29).

S 714-023

- (2) Do the operational test of the control panel which is found at the end of this procedure.

G. Control Panel Post-Installation Operational Test

S 864-015

- (1) Supply electrical power (AMM 24-20-00/201).

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- S 864-028
(7) Close the circuit breaker CB1 on the FWD, MID, or AFT control box.
- S 864-029
(8) Remove the DO-NOT-OPERATE tag from the applicable control panel.
- S 864-030
(9) Push the ON/OFF switch on the applicable control panel to the ON position.
(a) Listen for the fan in the applicable zonal dryer to come on.
(b) Leave the zonal dryer in operation.
- H. Put the Airplane Back to It's Usual Condition.
- S 414-017
(1) Install the sculpture ceiling panels.
(a) FWD crown area STA 390-522 LH aisle
(b) MID crown area STA 889-995.1 RH aisle
(c) AFT crown area STA 1329-1395 LH aisle
- S 864-018
(2) Remove the electrical power, if it is not necessary
(AMM 24-22-00/201).

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- MTH B. Access
- MTH (1) Location Zones
- | | | | |
|-----|------------------|---------------|----------------------|
| MTH | FWD crown area | STA 320-544 | Access from LH aisle |
| MTH | MID crown area | STA 871.5-977 | Access from RH aisle |
| MTH | AFT crown area | STA 1329-1480 | Access from LH aisle |
| MTH | FWD LH wall area | STA 500-544 | Access from RH aisle |
| MTH | MID RH wall area | STA 955.1-999 | Access from LH aisle |
| MTH | AFT LH wall area | STA 1329-1373 | Access from LH aisle |

MTH C. Duct Installation

- MTH S 424-011
- MTH (1) To install the duct, do the steps that follow:
- MTH (a) Remove the covers from the duct openings.
- MTH (b) Make sure there is no unwanted material in the duct openings.
- MTH (c) Roll the cuff at one end backwards onto the duct (Fig. 401).
- MTH (d) Attach the end of duct with cuff (not rolled) or beaded insert to the applicable connection end.
- MTH (e) Attach the end of the duct with the rolled cuff to the connection. Roll the cuff over the connection.
- MTH (f) Install a tie wrap on each end of the duct, then install a tie wrap to the support bracket if necessary

MTH D. Ducting System Post-Installation Test

- MTH S 864-014
- MTH (1) Supply electrical power (AMM 24-22-00/201).
- MTH S 864-015
- MTH (2) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
- MTH (a) If ducts were installed in the FWD zonal dryer system:
- MTH 1) On the Main Circuit Breaker panel, on top of the left MID overhead stowage bin at STA 433:
- MTH a) C9102 10A FWD ZONAL DRYER
- MTH b) C9105 1A FWD ZONAL DRYER
- MTH (b) If ducts were installed in the MID zonal dryer system:
- MTH 1) On the Main Circuit Breaker panel, on top of the left MID overhead storage bin at STA 433:
- MTH a) C9103 10A MID ZONAL DRYER

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- MTH (c) To replace the filter in the AFT filter box, open the
MTH sculptured ceiling panel above the LH aisle at STA 1307-1439 to
MTH get access to the crown area.
MTH
MTH S 864-004
MTH (2) Push the ON/OFF switch on the applicable FWD, MID, or AFT control
MTH panel, to the OFF position.
MTH (a) Put a DO-NOT-OPERATE tag on the applicable ON/OFF switch.
MTH
- D. High Efficiency Filter Removal
- MTH S 024-015
MTH (1) To remove the clip assy (30), lift the two clips on the clip assy
MTH (30) and then carefully pull it out from it's seat in the filter
MTH box.
MTH
MTH S 024-016
MTH (2) To remove the marked high efficiency filter (29), pull it out from
MTH it's seat in the filter box, then discard the filter.
MTH
- E. High Efficiency Filter Installation
- MTH S 424-017
MTH (1) Install a new high efficiency filter (29) in it's seat in the filter
MTH box.
MTH
MTH S 424-018
MTH (2) Install the clip assy (30) on the filter box.
MTH (a) Make sure that the two clips on the clip assy (30) locks in the
MTH filter box.
MTH
- F. High Efficiency Filter Post-Installation Test
- MTH S 864-019
MTH (1) Push the ON/OFF switch on the applicable control panel to the ON
MTH position.
MTH (a) Listen for the fan in the applicable zonal dryer to come on.
MTH (b) Feel for the airflow at the zonal dryer air distributor three
MTH outlets.
MTH (c) Leave the zonal dryer in operation.
MTH
- G. Put the Airplane Back to It's Usual Condition
- MTH S 414-012
MTH (1) Close the sculptured ceiling panels.
MTH (a) FWD crown area STA 368-456 LH aisle
MTH (b) MID crown area STA 889-933 RH aisle
MTH (c) AFT crown area STA 1307-1439 LH aisle

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MTH F. Post-Installation Test

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S 867-021

- (1) Remove the DO-NOT-OPERATE tag from the ON/OFF switch on the applicable control panel.

S 867-020

- (2) Push the ON/OFF switch on the applicable control panel to the ON position.
 - (a) Listen for the fan in the applicable zonal dryer to come on.
 - (b) Leave the zonal dryer in operation.

MTH G. Put the Airplane Back to It's Usual Condition

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S 867-018

- (1) Close the sculptured ceiling panels:

FWD crown area	STA 368-456
MID crown area	STA 889-933
AFT crown area	STA 1307-1373

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